Karuk Tribe

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STRATEGIC ENERGY PLAN AND ENERGY OPTIONS ANALYSIS

FINAL REPORT

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TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

APPENDICES

1. Introduction

In 2007 the Karuk Tribe (Tribe) was awarded a First Steps Grant from the US Department of Energy (DOE) to develop a Strategic Energy Plan and Energy Options Analysis (Project). The purposes of the Project are to:

- Quantify existing and project energy demands for Tribal Structures
- Assess renewable energy generation potential on Tribal lands
- Build the human capacity in order to maintain a Tribal Energy Program
- Assess the potential for export of renewable energy resources from Tribal lands

The Tribe contracted with Winzler & Kelly to implement the Project and this report presents the work completed by Winzler & Kelly and our sub-consultant Abbay Technical Services.

The report is organized according to the following Chapters:

- Introduction
- Tribal Council Participation
- Existing and Projected Energy Demands and Energy Conservation and Efficiency Measures
- Renewable Energy Resource Availability
- Evaluation of Most Promising Renewable Energy Resources
- Assessment of Renewable Energy Export From Tribal Lands
- Human Capacity Building

The remainder of this introductory chapter provides background information about the Tribe and the Project, provides further detail regarding the scope of work, and provides basic information about energy terms and concepts.

1.1. Background

Karuk Ancestral Territory includes approximately 1.38 million acres located within the Klamath River Basin in Northern California and Southern Oregon. Historically, the Klamath River bioregion was extraordinarily rich in cultural and natural resources. During the California Gold Rush, the Karuk Ancestral Territory had a significant influx of non-native peoples.

Prior to European contact, the Tribe flourished by managing the plentiful resources for sustainable harvests of plants and animals for food, medicine and cultural items. Two primary food sources were salmon caught in the Klamath and Salmon rivers and acorns harvested from groves of oaks. Salmon fisheries have since been reduced to a shadow of what they once were due to hydroelectric dams being built on the Klamath River, which cut off thousands of miles of spawning grounds, and commercial fishing activities in the Pacific Ocean.

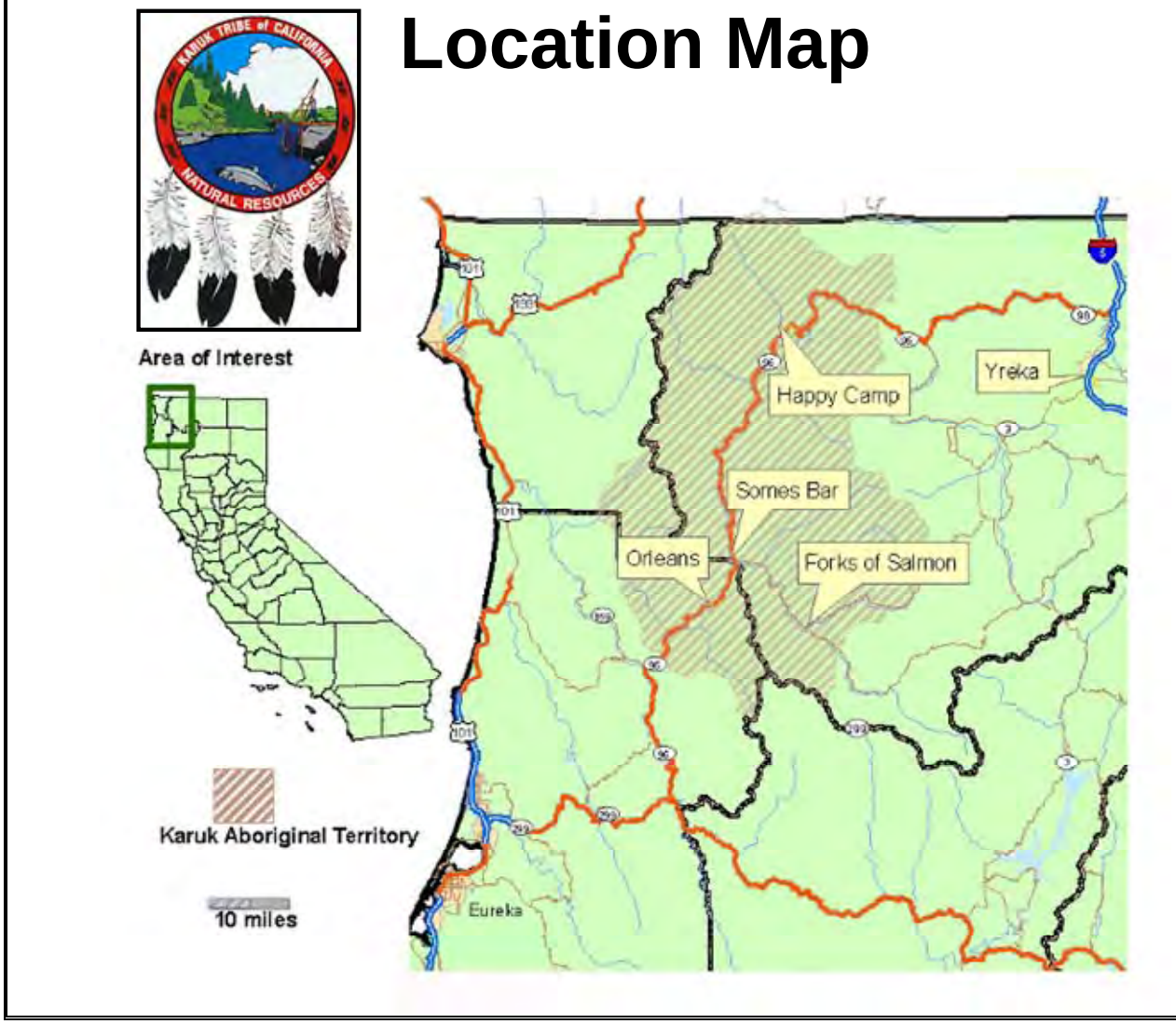
The US Forest Service's practices of fire suppression and softwood timber production have reduced the production and availability of acorns to levels below Tribal subsistence needs. Despite the challenges of history, the Tribe maintains a strong sense of cultural values and has developed a Tribal government with a variety of departments serving the diverse needs of Tribal members.

The Tribe, which has 3,507 enrolled members, does not have a designated reservation. The 2000 US

Census reported Karuk Tribal land in trust and fee holdings of approximately 720 acres in Humboldt and Siskiyou Counties in Northern California, with a resident population of 333 persons and 124 houses.

The Karuk trust and fee lands are centered around the towns of Orleans, in Northern Humboldt County, and Happy Camp and Yreka, in Siskiyou County, with additional holdings in Somes Bar and Forks of Salmon. The Karuk Tribal Lands are separated from each other by significant distances, as shown in Figure 1.1.

Figure 1.1: Location Map of Karuk Ancestral Territory



The Pacific Gas & Electric electricity grid serves Orleans and extends to the North, terminating in Somes Bar. The Pacific Power and Light electricity grid serves Yreka and extends South terminating in Happy Camp. The area between Somes Bar and Happy Camp and the Forks of Salmon areas do not have electric service. None of the communities have natural gas service, but propane delivery is available. Propane, kerosene, electricity, and chord wood is used as fuel for space heating and domestic hot water.

The Tribe has taken an active role in protecting natural resources within its Aboriginal Territory. The Karuk Department of Natural Resources (DNR) has developed an Eco-Cultural Resource Management Plan (ECRMP), which is intended to integrate Traditional Ecological Knowledge and the best western science into a format that outlines programmatic resource concerns, goals, and objectives. The ECRMP also outlines historical, current, and future desired conditions of ecological, social and/or physical interactions of humans and the environment in the interest of developing standardized Cultural Environmental Management Practices for the Karuk Ancestral Territory.

The Tribe has also been actively involved in the coalition that has formed to advocate for the removal of four hydroelectric dams on the upper Klamath River. As mentioned previously, these dams have adversely affected native salmon populations, which are central to Karuk Tribal culture. The development of a Karuk Tribal Strategic Energy Plan is consistent with these other efforts towards responsible stewardship of resources on Tribal Lands.

1.2. Scope

The scope of the project consisted of the following eight tasks, which are described in the project contract (Appendix A):

Task 1: Tribal Council Participation in Analysis and Development of Tribal Strategic Energy Plan
Task 2: Analyze Existing Energy Demand and Project Future Energy Demand
Task 3: Identify and Evaluate Opportunities for Energy Conservation and Efficiency Measures
Task 4: Assess Renewable Energy Resource Availability
Task 5: Evaluate the Most Promising Energy Source
Task 6: Assessment of Renewable Energy Export Off Tribal Trust Lands
Task 7: Human Capacity Building
Task 8: Strategic Energy Plan and Energy Options Analysis

1.3. Energy Basics

This section describes the terminology used in this report and provides an overview of energy concepts. While not comprehensive, this section is intended to be used as an educational tool.

Energy and Power

Power is a measurement of the ability to do work or provide some useful service such as illumination or heat. Power is a rate, which means there is a unit of time in the expression. Common units of power are horsepower (hp), Watts (W), kilowatts (1 kW = 1000 Watts), and British Thermal Units per hour (BTUH). While a Watt doesn't appear to have a unit of time, it is defined as one Joule per second. Appliances and lights are generally given a rating in Watts.

Energy is an amount of work done for an amount of time, determined by multiplying a unit of power by a unit of time. Utility companies bill their customers in units of energy such as kilowatt-hours (kWh) and therms (100,000 BTUs). For example, a light bulb rated at 100 Watts of power does not use any energy until it is turned on. If left on for one hour, it has used 100 Watt-hours, or 0.1 kWh, of energy.

By definition, a BTU is the amount of energy it takes to raise the temperature of a pound of water one degree Fahrenheit. One Joule (1 Watt x 1 second) is the amount of energy required to lift a one Newton weight one meter. One BTU is the equivalent of approximately 1055 Joules, and one kWh equals

approximately 3412 BTUs.

Energy Consumption
Energy consumption is the overall amount of energy used. One primary goal of this project is to reduce the Tribe's overall energy consumption without sacrificing comfort or functionality.

Energy Efficiency
One method of reducing energy use is through energy efficiency. Energy efficiency refers to getting the same amount of work or service while using less energy. An efficient 20 W compact fluorescent light bulb (CFL) can provide the same amount light while using less energy than a 75 W incandescent bulb. Energy Star appliances are generally more energy efficient than other models, meaning that they will provide the same amount of heat or keep your food just as cold while using less energy. Implementing energy efficiency measures does not necessarily guarantee a reduction of overall energy consumption. If the more efficient 20W bulb is left on for more hours than the 75 W bulb, it may still use more energy overall. Similarly, if a refrigerator is replaced with a new Energy Star model, but the old one is moved to the garage and plugged in, the overall energy consumption goes up.

Energy Conservation
While energy efficiency means more work output for less energy input, energy conservation reduces energy use by doing less work while getting the same benefit. Energy conservation measures can be both behavioral, such as turning off lights when they are not being used or adjusting the power options on a computer, or material, such as better insulating a house so that less heat or cooling needs to be added to keep it comfortable. To effectively reduce overall energy consumption, both energy efficiency and energy conservation measures need to be investigated.

Cogeneration
Cogeneration is a method of saving energy by producing more than one benefit from a single energy source. Most commonly, cogeneration refers to using the "waste" heat from an electricity generator to provide space or water heating. Because two products, electricity and heat, are being produced from a single fuel, less overall energy is used than if both products were produced separately.

Types of Energy and the Laws of Thermodynamics
There are many different types of energy, including kinetic, potential, and atomic. In analyzing household energy use we are looking primarily at electric and thermal energy use. Electric energy is what powers our appliances and lights. Thermal energy is the energy required for water heating and heating and cooling the living space. Electricity is often used to create the thermal energy used for heating and cooling. Because of convention, electric energy is generally measured in kWh and thermal energy in BTUs or therms, but these are simply units that can be converted back and forth.

The laws of thermodynamics state that converting from one type of energy, such as electric, to another, such as thermal, always involves some efficiency losses. Therefore, heating a house by converting electricity into heat is less efficient than creating the heat directly through the combustion of a fuel. There are always other considerations, of course, such as the relative costs and availability of fuels and appliances.

Renewable Energy
Renewable Energy can be defined as energy created from a source that will not run out or can be recreated. There is a limited amount of fossil fuels such as gas and oil on this planet, but it is unlikely

we will run out of sunlight or wind. Renewable energy has the added benefit of producing much fewer harmful side effects, although nothing is without an impact. Hydropower is more problematic. While water is an abundant resource, using it to create electricity can take it away from other needs. Therefore, large scale hydropower is generally not considered renewable. Small and micro hydroelectric, which diverts only a fraction of a stream's flow and returns it after the energy is generated, is considered renewable. Nuclear energy cannot be considered renewable because of the limited supply of fuel (uranium) and our inability to safely handle the radioactive waste products. Other types of energy that are considered renewable include geothermal, tidal, biomass, and waste-to-energy. The last two are only truly renewable if the fuel is not used faster than it can be generated.

Utilities throughout the state and country are being required by law to acquire a certain percentage of their electricity from renewable sources. This is opening up opportunities for independent producers to sell renewable energy to the utility.

While renewable energy has great promise, economic considerations generally makes it much more cost effective to first reduce energy consumption through efficiency and conservation before spending money to generate energy through renewable means.

Potential Effects of Global Climate Change

Global climate change, also known as global warming, has been a topic of much discussion lately. Atmospheric concentrations of carbon dioxide (CO_2), methane, and other "greenhouse gases" act to block reflected heat from the earth while allowing the sun's rays to pass through. Therefore, some of the heat that would normally be reflected away from the earth into space remains within our atmosphere, causing global temperatures to rise. Even small rises in average global temperatures are expected to have significant effects, including changes in precipitation patterns.

While scientific consensus has been reached that the global climate is warming, the many interactions that occur are extremely complex and difficult to predict. Much of the atmospheric CO_2 is absorbed by the oceans and forests; however, human activity and temperature can alter this ability. As ice caps and glaciers melt, the reflectivity of the earth's surface decreases, compounding global warming as the earth absorbs heat that was previously reflected. As areas of frozen tundra heat up and melt, additional methane and CO_2 that had been sequestered for ages is released into the atmosphere. Smog and other types of atmospheric pollution can act to block solar heat from reaching the earth, creating a cooling effect. And although it is certain that increased global temperatures will change global weather patterns, it is difficult to determine how local areas will be affected. All of these factors and many others act to add uncertainty to projections of future climate patterns.

This concludes Chapter One. The next Chapter discusses Tribal Council Participation in the Project.

2. Tribal Council Participation

Tribal Council participation is a necessary precondition for the success of any Tribal project. This Chapter summarizes the Tribal Council Participation in the project.

For the Karuk Strategic Energy Plan project, the Tribal Council participated by authorizing the DNR to pursue the US Department of Energy Grant for the project. Once the grant was awarded, the Tribal Council was involved in the contracting process and was informed about initial project setup activities. Once the project was initiated, Winzler & Kelly delivered a presentation to Tribal Council describing the project team, the scope and purpose of the project, and presenting basic information about energy conservation and efficiency and renewable energy. After this introductory presentation, DNR staff and Winzler & Kelly conducted a visioning workshop with Tribal Council during which a Tribal Energy Vision was drafted and a screening criteria matrix was developed to rate energy alternatives to be considered during the course of the project.

After these introductory activities, the Tribal Council authorized the hiring of an Energy Intern. DNR staff and the Energy Intern worked closely with Winzler & Kelly staff throughout the project and, when additional support was needed, the Tribal Council directed other Tribal Departments to participate in the project.

Throughout the study DNR staff met with Tribal Council to discuss progress on the project and gathered input. As a result of this consultation, Tribal Chairman Arch Super and the Department of Natural Resources staff member Ramona Taylor attended the November 2008 DOE Tribal Energy Program Conference in Denver Co. Nearing the end of the project, DNR and Winzler &Kelly met with Council to discuss the preliminary findings and determine the future of the Karuk Energy Program. The Tribal Council and key tribal staff reviewed and commented on the draft deliverable for the project in December 2008.

The remainder of this chapter presents the Tribal Energy Vision and the screening criteria matrix.

2.1. Tribal Energy Vision

The Karuk Tribal Energy Vision statement is as follows:

The Vision of the Karuk Tribe Energy Program is to strengthen sovereignty through energy self-reliance, while maintaining cultural and ecological values.

2.2. Screening Criteria Matrix

The Screening criteria matrix, which is shown in Table 2.1 below, was established by the Tribal Council on November 14, 2007. The matrix is intended to be used as a guide in evaluating energy alternatives investigated by the Tribe and was used to evaluate the energy alternatives considered in this project.

Table 2.1: Screening Criteria Matrix for Energy Alternatives				
Criteria Weight (1-6)	**Orleans/Somes Bar**	**Happy Camp**	**Yreka**	**Off-Grid Communities**
Non-controversial to neighbors	6	3	2	3
Minimum environmental impact	6	6	6	6
Low startup cost	2	2	2	2
Low Operations & Maintenance cost	5	5	5	5
Availability of financing (grants or low interest loans)	3	3	3	3
Maximum export potential and revenue generation	1	1	2	1
Culturally appropriate (specify)	6	6	5	6
Creates new jobs for Tribal members	1	1	1	1
Provides educational opportunities	1	1	1	1
Can be maintained by Tribe without outside contractors	5	5	4	6
Dependability	6	6	6	6
Note: Tribal Council rates different criteria on a scale of 1 (not important) to 6 (very important) for each of the communities in selecting among different renewable energy options				

As can be seen in Table 2.1, dependability and minimizing environmental impact were ranked at the highest importance; weighted at 6 in each of the four communities. Cultural appropriateness also received very high weights: 6 everywhere except Yreka where it was weighted 5. Low operations and maintenance costs is also an important criteria for Tribal energy projects.

This concludes Chapter Two. The next Chapter presents the analysis of existing and projected energy demands and energy conservation and efficiency opportunities.

3. Existing and Projected Energy Demands and Energy Conservation and Efficiency Measures

The first step in strategic energy planning is to analyze existing energy demands. This establishes a baseline that can be used to assess the potential efficiency and conservation opportunities and to assess the potential for Tribal energy demands to be met by renewable energy. This chapter presents existing and projected Tribal energy demands as well as the potential for strategic demand reductions from efficiency and conservation measures. This Chapter also includes an estimate of initial costs and economic performance for a Tribal energy efficiency and conservation project.

The energy conservation and efficiency measure analysis for this project was contracted to Abbay Technical Services (ATS) of Arcata California. Winzler & Kelly and Tribal Energy Program Staff collected data in the field and supplied it to ATS, who used it to create building simulation models using the EnergyPro Software. The existing conditions of the structures were modeled and then various energy conservation and efficiency measures were simulated and potential energy savings were estimated. The comprehensive report developed by ATS for the project and the two accompanying appendices are included as Appendix B.

The remainder of this Chapter is organized into the following sections:

- Existing and Projected Energy Demands
- Energy Costs
- Energy Efficiency and Conservation Project Costs

The Chapter ends with a summary of the main conclusions.

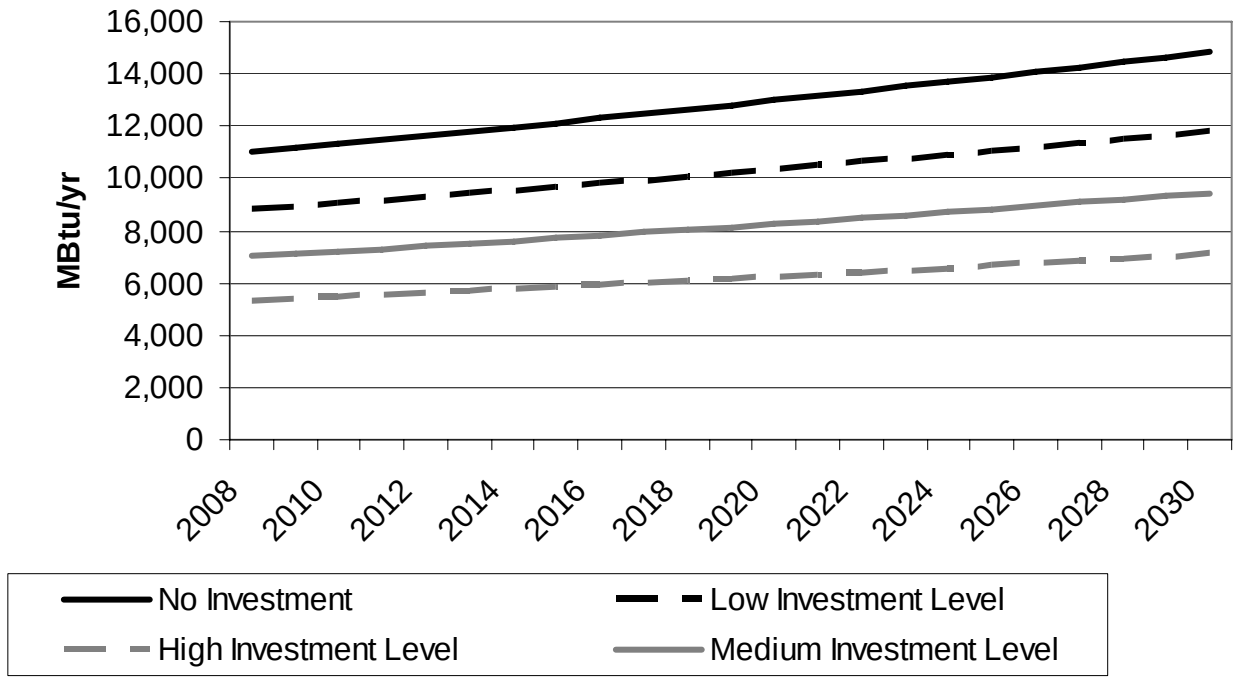
3.1. Existing and Projected Energy Demands

Both thermal and electrical baselines were established as part of the TEA. Using the baselines, electric and thermal demands were projected to 2030 to estimate future energy costs under the following scenarios:

- No conservation and efficiency investment
- Low conservation and efficiency investment
- Medium conservation and efficiency investment
- High conservation and efficiency investment

Figure 3.1 below shows the projected total energy demands (electric, kerosene, and propane) under these scenarios.

Figure 3.1: Projected Annual Energy Demands for Three Conservation and Efficiency Investment Scenarios and the No Investment Scenario



For ease of presentation by avoiding very large numbers, the energy units shown in Figure 3.1 are in Million of British Thermal Units (MBtu) per year. For comparison, one MBtu is equal to approximately 293 kilowatt hours (kWh), which is enough energy to supply approximately 10 to 20 typical single family homes for one day.

As can be seen in Figure 3.1, there is significant potential for energy savings by investing in conservation and efficiency measures. Further details about the low, medium, and high investment levels in conservation and efficiency measures are discussed below and details are provided in Appendix C.

3.2. Energy Costs

Table 3.1 below shows the current average prices paid by the Tribe for each MBtu of electricity, kerosene, and propane.

Table 3.1: Average Energy Costs, 2008

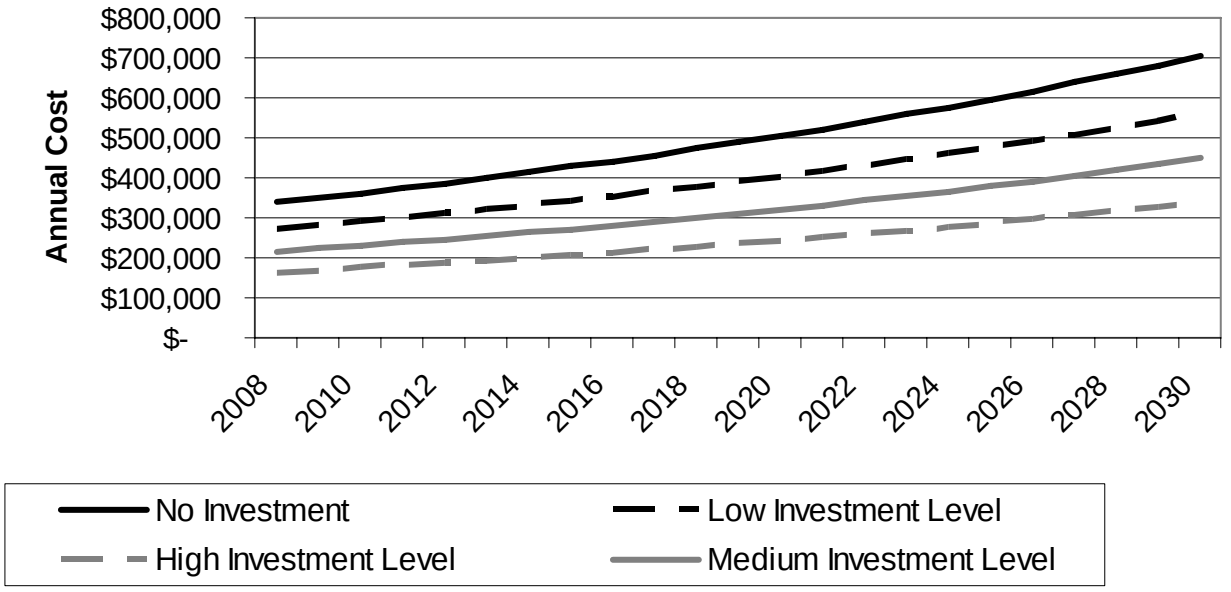
Type of Energy	Average Cost
Electric ($/MBtu)	$ 30.24
Kerosene ($/MBtu)	$ 27.01
Propane ($/MBtu)	$ 33.01
Aggregate Average ($/MBtu)	$ 30.09

Notes:
1) Assumed energy content of kerosene: 135,000 Btu/gallon
2) Assumed energy content of kerosene: 91,300 Btu/gallon

As can be seen in Table 3.1, propane is the most expensive type of energy consumed by the Tribe and kerosene is the least expensive type.

Figure 3.2 shows energy cost projections based fuel escalation rate of 2% per year.

Figure 3.2 Projected Annual Energy Costs for Three Conservation and Efficiency Investment Scenarios



Note: Projections are based on a fuel escalation rate of 2% per year

Figure 3.2 indicates that significant cost savings could be realized with investments in energy conservation and efficiency measures.

3.3. Energy Conservation and Efficiency Project Costs

Table 3.2 shows the approximate initial cost for the high, medium, and low investment levels in conservation and efficiency measures. Table 3.2 also shows the estimated simple payback and estimated cumulative savings after 20 years for the three investment scenarios. Further information regarding the results shown in Table 3.2 is contained in Appendix C.

Table 3.2: Economics for High, Medium, and Low Investment Levels in Conservation and Efficiency Measures			
Investment Level	**Initial Cost**	**Simple Payback**	**Cumulative Savings After 20 years**
High	$ 780,000	4-5 years	$ 6.0 Million
Medium	$ 520,000	4-5 years	$ 4.2 Million
Low	$ 260,000	3-5 years	$ 2.3 Million

Notes:

1) Initial costs for high investment level based on upgrade cost of $3 per square foot, which represents the average upgrade cost from the efficiency and conservation measure modeling completed by Abbay Technical Services.
2) Initial costs for medium investment level assumed to be $2 per square foot
3) Initial costs for low investment level assumed to be $1 per square foot.

As can be seen in Table 3.2, the initial investments are somewhat large. However, the simple payback periods are short and the potential for long term savings significant.

The simple payback period is presented in Table 3.2 as a relative indicator of economic performance for a Tribal wide conservation and efficiency project. Since the Tribe does not pay all of the utility bills for the structures inventoried for this study, the payback would not be directly realized by the Tribal budget. Instead, it would be realized in a more subtle way by creating room in the budgets of Tribal members who pay their own utility bills as well as the Tribal budget at large. Because of this subtlety, an actual payback period for the Tribal government would be very difficult to estimate.

Potential funding sources that could be used to cover the initial investment needed for a Tribal efficiency and conservation project include:

- Grants
- Low interest loans
- Carbon Offsets
- White Tags
    - Tradable conservation certificates
    - This funding mechanism is expected to become commercially mature within the next 5 to 10 years.

3.4. Conclusion

There is significant potential to reduce Tribal energy demands in a very cost effective manner without sacrificing occupant comfort or functionality by implementing a Tribal-wide energy efficiency and conservation project. A comprehensive report was developed for this project by Abbay Technical Services of Arcata. For details about the type of measures that are recommended please see the ATS report and appendices, which are included in Appendix B.

This concludes Chapter Three. Chapter Four presents the analysis of renewable energy resource availability.

4. Renewable Energy Resource Availability

This chapter presents an overview of renewable energy generation potential on Tribal Lands. General information is presented here and more specific information follows in Chapter 5, which discusses the most promising renewable energy resource for each community. The following types of renewable energy resources are the most applicable to the Karuk Ancestral Territory[1]:

- Solar Electric (photovoltaic)
- Solar Thermal
- Wind
- Biomass
- Small and Micro Scale Hydroelectric

This chapter is organized into sections corresponding to the resources listed above.

4.1. Solar-electric

Solar electric systems convert the energy in sunlight into electricity. The most common technology used for this purpose is photovoltaic (PV) modules, which are commonly referred to as solar panels.

Advantages

Advantages are that energy from the sun is free and abundant, the equipment used to convert solar energy to electricity is long lasting with few moving parts and the technology is commercially proven. Solar electric systems also have the advantage of providing stable electricity pricing over the lifetime of the system, thus protecting the system owner from volatile energy prices.

Disadvantages

Disadvantages include relatively high initial costs, the requirement of a large amount of open, unshaded space for the solar panels, and the intermittent nature of the resource. Electricity isn't generated at night or when the sun isn't shining, so a connection to the electricity grid, generator, or energy storage system such as batteries is necessary.

Additional Considerations

Locations for photovoltaic installations are evaluated using historical weather data and a site analysis. The site analysis identifies the best location to mount the solar panels to avoid shading (usually on an existing roof), the structural integrity and general condition of the roof structure, and the capacity of the existing electrical system to safely incorporate solar electricity. A tool called the Solar Pathfinder is typically used for the shading analysis.

To estimate the return on investment for a solar electric system, data from the site visit and solar insolation data describing the solar energy availability in watt-hours per day for the specific geographic

[1] Note that for the purposes of this study, geothermal heat pumps are considered an efficiency measure rather than a renewable energy resource and as such, are not covered in this chapter. However, geothermal heat pumps are being utilized with a high degree of satisfaction by the Tribe and future deployment of geothermal heat pump systems is recommended due to the high efficiency of these systems. Electricity production using a high temperature geothermal heat source was not investigated under this study.

region, and the technical specifications of the equipment are used to predict the amount of energy that could be produced by the system. The estimated installed cost of the system and its expected lifetime are used to calculate the levelized cost of electricity produced by the system. The levelized cost represents the fixed cost of electrical energy that the system owner will pay for electricity over the life of the system. Comparing the levelized cost to the utilities electricity rates gives a sense of the economic competiveness for the solar electric project.

Two electric utilities serve the Karuk communities. Pacific Gas and Electric (PG&E) serves Orleans and Somes Bar and Pacific Power and Light (PPL) serves Happy Camp and Yreka. PG&E electricity rates are higher than PPL's rates but both are low enough that justifying a photovoltaic project on a strictly economic basis may be difficult. However, taking full advantage of incentives, grant funds, renewable energy credits (RECs) and carbon offsets (Offsets) can make a solar electric project more competitive. Finally, one of the greatest benefits of installing a solar electric system is energy sovereignty, which is difficult to quantify in an economic analysis.

Solar Electric Potential
According to the National Solar Radiation Database (NSRDB) at the National Renewable Energy Laboratory (NREL), the solar resource for the Orleans, Somes Bar, and Forks of Salmon areas is in the 4.5 to 5.0 kWh/m^2/day range. For the Happy Camp and Yreka areas, the NSRDB quantifies the solar resource in the 5.5 to 6.0 kWh/m^2/day range. These data indicate that there are adequate solar resources for both residential and community scale solar electric development on Karuk Tribal lands.

Conclusions
Solar electricity meets the important screening criteria shown in Table 2.1. Therefore, solar electricity will be further analyzed in Chapter 5.

4.2. Solar-thermal

Solar-thermal refers to the process of capturing the suns heat and using it for space heating, water heating, and to a limited extent, space cooling. The most common types are rooftop solar water heating systems.

Advantages
Like solar-electric, the chief advantage is the free and abundant resource of sunlight. Furthermore, solar-thermal collectors are less expensive than PV panels and are less affected by shading issues. As with solar electric, solar thermal systems can provide some protection for the system owner from volatile energy prices.

Disadvantages
There are few disadvantages for using a solar thermal system. The systems do need to be maintained on an annual basis to prevent leaks and check for corrosion. But annual maintenance should be planned for with any mechanical system. If maintenance is not performed than scaling and other residuals can become concentrated in the working fluid and the passages in the solar thermal collectors can become clogged.

Additional Considerations
As with solar electric, potential solar thermal project locations are evaluated based on weather data, site specific factors, and equipment performance specifications. The economic analysis of a solar thermal project is also similar to what was described above for the solar electric system. However, in

this case the system competes against the cost of propane or kerosene. Energy bill data collected for this project indicate that propane and kerosene costs are relatively high, which means that using solar thermal for domestic hot water heating will likely be an economical choice. Further details are provided in Chapter 5.

Solar Thermal Potential

As mentioned previously, the NSRDB data indicates that the solar resource for the Orleans, Somes Bar, and Forks of Salmon areas is in the 4.5 to 5.0 kWh/m^2/day range and for the Happy Camp and Yreka areas the solar resource in the 5.5 to 6.0 kWh/m^2/day range. These data indicate that there are adequate solar resources for residential scale solar thermal development on Karuk Tribal lands.

The conversion efficiency of solar thermal systems is higher than for solar electric systems so more of the suns energy can be converted to useful energy using a solar thermal system as compared to a solar electric system. The next chapter provides an analysis of a household scale solar thermal system for the Orleans area as an example.

Conclusions

Solar thermal systems meet the screening criteria shown in Table 2.1. Therefore, solar thermal will be further analyzed in Chapter 5.

4.3. Woody Biomass

Woody Biomass can be used as fuel for the generation of electricity, heat, or both. Energy can be generated by combustion or gasification. Gasification is more commonly seen for new projects because of reduced emissions compared to combustion based systems. Forest thinning and fuels reduction residuals and scrap from lumber mill operations are common sources of biomass material.

Advantages

Significant environmental benefits can be realized by converting biomass to energy. While energy generation from biomass creates greenhouse gases and other pollutants, it can be considered carbon neutral because the same amount of carbon released to produce biomass energy would normally be released over time as the material decomposes on the forest floor. Also, using the biomass to produce energy means that an equivalent amount of energy from fossil fuel will not be used, which keeps the carbon sequestered in that fossil fuel out of the atmospheric carbon cycle. Keeping carbon that has been sequestered into fossil fuels out of the atmospheric carbon cycle combats global warming.

Over the last several years, hundreds of thousands of acres within the Karuk Ancestral Territory have burned in catastrophic wildfires initiated by lightning. One advantage of biomass energy is the potential to use the residual “waste” (or biomass) created by ongoing forest health/hazardous fuels reduction projects. Forest health/fuels reduction projects have several positive impacts including reducing the frequency of catastrophic wildfires and improving general forest health.

Prior to European contact, lightning induced fires and additional controlled burns within Karuk Ancestral Territory were allowed to burn cleaning underbrush and improving forest health. There are many benefits to regular burning including plentiful acorn production, reduction of insect and diseases and enhanced grazing for foraging species. Some studies also indicate that the suppression of fire

increases vegetation which reduces the amount of water available and can impact overall water levels. Traditionally, many resources, including acorns, were harvested from the forest to provide food, medicine and ceremonial items. These traditions continue today, but forest health has dramatically decreased, negatively impacting cultural traditions and the health of the Karuk People. .

Around a hundred years ago, the US Government began to manage the Klamath forest for timber production. Conifers were promoted and fires were suppressed. As a result, ladder fuels have accumulated and large catastrophic wild fires, most caused by lighting, have become commonplace. Collecting and utilizing biomass from the forests in Karuk Ancestral Territory can help reduce damage to large timber stands from wildfires fed by large quantities of ladder fuels and improve forest health and diversity.

Other benefits are economic gains from heating fuel consumption and energy security from reducing dependence on fossil fuels.

Disadvantages
Biomass is best suited for situations where the feedstock supply is readily accessible and the located in close proximity to the utilization site. The biggest challenge with biomass energy projects is getting the fuel from the forest to the utilization site. This process can be very energy intensive and can nullify the environmental and economic benefits of using biomass energy. This is especially true for the rugged mountainous terrain that comprises Karuk Ancestral Territory. Additionally, biomass utilization is operationally intensive and the equipment is specialized, which may warrant a partnership with an outside contractor for aspects of operations and/or maintenance services.

Additional Considerations
The Tribe conducts fuels reduction projects in cooperation with the US Forest Service and residuals from these fuels reduction projects could be processed and used to generate heat or electricity.

Potential Biomass Availability
Using data from NREL on biomass availability in Humboldt and Siskiyou Counties and assuming an energy content of 12.6 MMBtu per dry ton of woody biomass, the estimated amount of primary biomass energy available from the Six Rivers and Klamath National Forests is on the order of 400,000 to 500,000 MMBtu per year. The amount of site specific energy available will be some fraction of the primary energy depending on a number of factors including the conversion efficiency of the equipment used to turn the biomass into heat and/or electricity. This preliminary result indicates that there likely sufficient biomass available within the Six Rivers and Klamath National Forests to meet all of the energy demands of the entire Karuk Tribe. The practicality of accessing that biomass and converting it to useful energy is a topic for further study. Further details on this calculation are included in Appendix D.

Potential uses for the woody biomass resource identified above include:

- Medium scale biomass power plant (~10 MW)
    - Cogeneration, whereby the heat generated during electricity production is used for space heating, is likely not an option because there are no existing or planned Tribal facilities large enough to absorb the process heat that would be produced from a power plant of this size.
    - This option requires a large initial investment and a secure supply of biomass is

necessary to realize a reasonable return on investment.

- A pellet mill producing fuel pellets for sale and/or use in heating Tribal facilities.
  - This option also requires a significant initial investment.
  - There is potential for the Tribe to offset a significant amount of propane and natural gas use by substituting wood pellets as heating fuel.

Conclusions

Due to uncertainties regarding the economical availability of large quantities of biomass, large scale utilization of this resource does not appear to be practical at this time. A large scale biomass to energy project could become more attractive in the future as energy prices rise and if agreements securing adequate quantities can be obtained.

The use of residual woody biomass in a small to medium sized pellet mill does appear to be an appropriate technology that could be used by the Tribe to offset propane and kerosene use for home heating. This concept is not investigated further in Chapter 5 due to the current lack of a steady supply of biomass. However, further investigation of the concept through a feasibility study focused on biomass supply considerations and a technology assessment does seem warranted.

4.4. Wind

Wind energy uses the power of the wind to turn turbines that produce electricity. Wind energy potential is classified based on typical wind speeds. The wind speed classes range from Class 1 (lowest) to Class 7 (highest). In general, for a turbine 50 meters high, wind power Class 4 or higher can be useful for generating wind power with large turbines. Typically, Class 4 sites and above are considered good wind resources. Given the advances in technology, some locations in the Class 3 sites may also be suitable for utility-scale wind development.

Advantages

As with solar, the chief advantage of wind energy is that the fuel is free and can be abundant. Wind energy can also provide a large amount of power in a relatively small area when compared to solar electric technology. Energy security and protection from volatile energy prices are other benefits enjoyed by owners of wind power systems.

Disadvantages

The greatest disadvantage of wind energy is that the resource can be intermittent and unpredictable, which can cause instability in the electricity grid. For this reason, significant study is required before a given wind project receives approval to connect to the grid. Projects also need to be carefully planned to mitigate adverse impacts to bird and bat populations.

Other considerations

Wind power is a rapidly developing industry and many large scale wind farms are being developed in the Midwest producing hundreds of megawatts of renewable energy. These commercial scale wind energy projects require large tracts of land and high velocity, consistent winds (class four, five, six, and seven). Such projects typically take approximately 5 years or more to implement from the planning stage through construction.

Considerations also need to be taken to minimize impact on birds and bats as well and visual impacts

can sometimes be a contentious issue. A typical wind power site assessment uses available wind data from both satellite and ground level monitoring stations to determine if there is enough of a wind resource for the investment in turbines to pay off.

Wind Energy Potential
The Yreka area does appear to have some sites with class four winds. However, these sites are mostly small ridge top sites that are not owned by the Tribe. Winds in the Orleans and Happy Camp areas are class three at best. Therefore, commercial scale wind power is not likely to be a viable option for the Tribe unless additional land is purchased outside of Karuk Ancestral Territory.

Community scale wind power may be feasible in Yreka on Tribal land near the Tribal Housing Community. However, a careful analysis of the available wind resource is necessary before deciding to install wind turbines. Although an area may seem windy, a steady high average wind speed is needed. Wind power, or the available energy in the wind, is a function of the cube of the wind speed. Doubling the wind speed increases the wind power eight times, therefore, small differences in average wind speed cause a great deal of difference in available energy.

Conclusions
Community scale wind energy meets some of the screening criteria shown in Table 2.1 and will therefore be further analyzed in Chapter 5.

4.5. Small and Micro Scale Hydroelectric

Small-hydroelectric systems divert a fraction of a stream's flow and pass it through a turbine before returning it to the stream. Systems typically range from tens of kilowatts up to one or two megawatts. Smaller systems (typically less than 10 kilowatts) are known as "micro-hydro" systems. These systems are typically very low impact and household scale micro-hydro installations are quite common in Karuk Ancestral Territory.

Advantages
One advantage of small and micro hydroelectric systems is that renewable energy generation can be relatively constant when compared to wind and solar. This means that energy storage is not necessarily required for hydroelectric systems. Also, with careful design, environmental impacts can typically be reduced to acceptable levels.

Disadvantages
Disadvantages include difficulty of construction and high capital costs due to rugged mountainous terrain. Permitting can also be difficult, and the systems may only be able to operate for part of the year when there is enough water for both fish passage and hydropower. Pipeline easements and water rights issues can also be complex. Typically, the smaller the system the fewer permitting and legal issues will arise during implementation.

Additional Considerations
Another important consideration is the proximity of the system to a concentrated electrical load or an existing utility grid. Isolated systems can be cost prohibitive if transmission lines need to be constructed to transport the electricity to the loads.

Small and Micro Hydroelectric Generation Potential
There are a number of small to medium sized creeks that are tributaries to the Klamath and Salmon River that have the hydrologic and hydraulic characteristics to support a small hydroelectric system. However, none of these sites are close enough to a population center or a utility grid to allow a project to be implemented without substantial investment in new electricity transmission infrastructure. In the event that the utility grid is extended between Somes Bar and Happy Camp, small hydroelectric could be revisited for Aubrey Creek.

As mentioned previously, micro hydroelectric systems are quite common on tributaries to the Klamath and Salmon Rivers. The potential to upgrade existing systems in the Forks of Salmon area is high. These upgrades could add 2 to 5 kW of capacity and increase the reliability of the electricity supply for Tribal members and community members at large in this area.

Conclusions
Small hydroelectric installations on the tributaries to the Klamath and Salmon Rivers in Karuk Ancestral Territory do not appear to be worthy of further analysis at this time. This is either due to the lack of a concentrated load and/or electricity grid in close proximity to the potential site, or the environmental impacts were perceived to be unacceptable. It should be noted that the analysis of small hydro development conducted during this study was cursory and a more detailed investigation may well yield different results.

Micro hydro development in the Forks of Salmon area does appear to have a reasonable chance of benefiting the local community. Therefore, micro hydro will be discussed further in the Chapter 5 and small hydroelectric will not.

4.6. Conclusion

Based on the assessment of renewable energy resources presented in this chapter, the following renewable energy project concepts will be further explored in the next chapter:

- Facility scale solar electric and solar hot water systems in Orleans, Somes Bar, Forks of Salmon, Happy Camp, and Yreka.
- Micro Hydroelectricity for Forks of Salmon
- Community scale wind power in Yreka

5. Evaluation of Most Promising Renewable Energy Resources

This chapter presents additional analysis of the renewable energy resources identified in the previous chapter as the most promising for Karuk communities at this time. The chapter is organized into the following sections:

- Community Specific Findings
- Photovoltaic System Analysis
- Solar Hot Water System Analysis
- Micro-Hydroelectric Systems
- Community Scale Wind Power

5.1. Community Specific Findings

This section presents the apparent best renewable energy alternatives that were studied for each of the Karuk Communities. The findings of this report should not be considered exhaustive and other renewable energy alternatives may be identified by others as conditions and technologies change over time.

Orleans

There is good potential for both solar electric and solar thermal systems to be placed on the Tribal housing units in the town of Orleans. There is also solar potential on the DNR office and health clinic facility, however shading is more of a concern in this area. The solar potential for the DNR Building is better in the parking lot than on the roof.

Solar thermal systems could reduce propane costs for domestic hot water and space heating in the Tribal Housing units and the DNR facility.

Solar electric could be either strictly grid-intertied (buying from the grid at night and selling to the grid during the day) or grid-intertied with battery backup. Without battery backup, a grid-intertied solar electric system will not provide power when the electricity grid goes down. Battery backup systems could be configured for individual houses, for the entire housing development, or a portion of it. If individual battery backup systems are used and no generator is included in the design, only critical loads would be backed up. If a central battery backup system is used, or if each house's backup system includes a generator, the entire electrical system in the house can be backed up.

Somes Bar

There is good potential for solar electric and solar hot water systems at Junction Elementary School. Solar hot water would likely be used to supplement domestic hot water supply only. Again the solar electric could either be strictly grid-intertied or grid intertied with battery backup. In this case, because of the size of the electrical loads, the battery backup system would need to incorporate a diesel generator.

Area Between Happy Camp and Somes Bar

There is no electrical utility grid between Somes Bar and Happy Camp. Both Solar Electric and Solar Thermal Systems are applicable in this area. Small and Micro hydroelectric may also be practical depending on site specific conditions.

One potential project that could be explored to provide electricity to people living in this area would be to develop a small hydroelectric system on Aubrey Creek. The creek has a steep gradient and relatively high flows and there are a number of people living in the vicinity that could benefit from the electricity produced by the system.

A project of this type, even with subsidies to help with construction, would require significant investment from the Tribe to maintain the system and for the power distribution lines that would be required to bring electricity to local residents. Also, the system may not be able to operate year round because, in the summer, there may not be enough water to meet both environmental permitting requirements and power production demands. The Tribe may consider pursuing grant funds to conduct a feasibility study of the concept.

Forks of Salmon
Water from Butler Creek is being used for a micro hydro system for residents that live near the creek. There is potential for upgrading the existing micro-hydro system to make it more reliable and efficient and to provide electricity for Tribal members living across Butler Creek.

In Forks of Salmon, there is a new diesel battery hybrid electrical system powering the school. The Tribe could partner with the school to implement an energy efficiency and renewable energy project at the school to augment the new diesel battery hybrid system. The renewable energy system could utilize winter time hydroelectric power from McNeil Creek and a 3 to 5 kW photovoltaic array. This would result in excess capacity at the school's new system. This excess capacity could be used to provide power to other Forks of Salmon community members.

In general, solar electric and solar thermal systems are good alternatives for this area since there is no electricity service and propane costs are relatively high.

Happy Camp
There is potential for a rooftop solar electric system and or solar thermal on the Happy Camp Admin complex. Most of the Tribal housing studied in Happy Camp did not show good potential for rooftop solar due to significant shading. If shading can be reduced to acceptable levels rooftop solar could become feasible on the houses analyzed in Happy Camp. Pole mounted solar arrays in locations with clear solar windows could also be an option, however these systems are typically more expensive due to increased costs for mounting hardware and wiring.

Yreka
Preliminary analysis using satellite wind data indicates there may be useful resource on or near Yreka Tribal Lands. Further study would be needed to determine if wind power development is feasible. The first step would be to set up an anemometer to measure and record wind speed for a minimum of one year. The National Renewable Energy Laboratory loans out anemometers to Tribes studying wind power potential. The Tribe could investigate the possibility of installing an anemometer on the ridge above Karuk Housing to analyze potential for wind power.

There is also considerable rooftop solar electric and solar thermal potential on Yreka housing and Administration building.

This concludes the community specific findings. The following sections provide further details on the apparent best renewable energy opportunities.

5.2. Photovoltaic System Analysis

Photovoltaic systems are applicable to most Tribal structures analyzed under this study. A typical solar electric system consists of photovoltaic modules, and inverter that converts DC electricity to AC electricity, a charge controller and various other components. Systems can also have a battery component to provide off the grid operation or grid connected operation with Battery backup. Grid connected systems export electricity through a bi-directional meter during the day if the sun is shining and then at night, electricity is purchased from the grid. In a carefully designed system, the amount of energy sold to the grid over the course of the year is roughly equal to the amount of energy purchased from the grid so the annual bill is very close to the minimum charge that the utility charges to be connected. The utility will allow a facilities photovoltaic system to cancel out the annual electricity bill but any solar electricity produced and exported to the grid beyond that is lost. Strictly grid connected systems offer no backup if the grid goes down. To provide backup, either batteries, or a generator, or both are required. To provide a sense of performance and cost for grid connected solar electric systems, the following analyses were conducted:

- A Photovoltaic analysis for DNR Complex
- A Photovoltaic analysis for typical single family home in Orleans, Happy Camp, or Yreka.

The remainder of this section discusses these two analyses.

Photovoltaic analysis for DNR Complex

The photovoltaic analysis for the Karuk DNR facility consisted of the following activities:

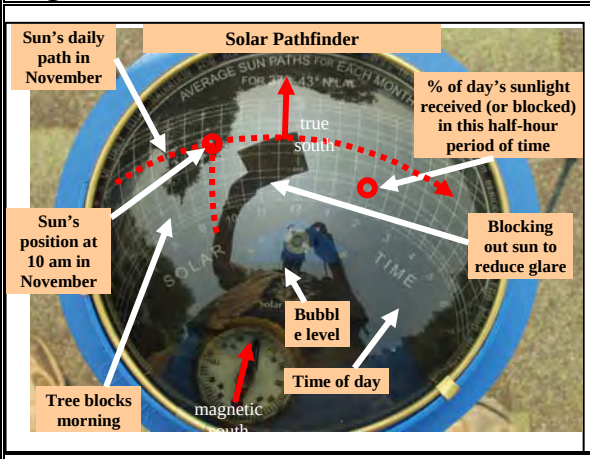
- Solar site analysis with the Solar Pathfinder
- Use of a computer model to size a photovoltaic system that could net the facilities annual bill to the minimum customer charge
- A lifecycle cost analysis

This section presents the results of this analysis.

Solar Pathfinder Analysis

A solar pathfinder is used to assess whether or not trees or structures will result in significant shading that would impact solar energy production over the course of the year. The device consists of a convex lens over a grid that shows the month and time of day for a year (see Figure 5.1). By placing the Solar Pathfinder at the proposed location for a solar panel, the outline of any objects that would shade the panels are projected onto the grid. A digital photograph is taken and imported into the Solar Pathfinder software. Using historical weather files for the given location and the image of shading objects, annual output of solar potential is calculated.

Figure 5.1: Solar Pathfinder Tool



Note: The image can be imported into the Solar Pathfinder software, which will calculate the amount of solar resource available at this location.

Photovoltaic System Sizing for the Karuk DNR Facility

Electrical consumption data at the Karuk DNR facility was provided by PG&E for this analysis. These data were input into a spreadsheet model that contained the monthly solar energy availability for the Orleans area from the NSRDB. The electricity costs for the A1 rate schedule were also obtained from PG&E. Using this information, a solution was generated to show how big a system would be needed to meet the electricity demands. A printout of the spreadsheet model is included in Appendix E.

The results indicate that a 13 kW_DC photovoltaic array would net the facilities annual bill close to PG&E's minimum charge. This array would occupy approximately 1,100 square feet of roof space. The estimated economics for the system are presented in Table 5.1 below.

Table 5.1: Preliminary Economics for Photovoltaic System for Karuk DNR Building

Cost of PV modules	$52,586
Cost of Inverter	$15,000
Balance of systems	$10,138
Capital cost	$77,724
Installation costs	$10,000
Capital cost + installation costs	$87,724
PG&E rebate ($/Watt)	$3.20
Total rebate	$30,515
Net cost	**$57,208**
Lifecycle cost	$77,841.43
Levelized cost ($/kWh)	$0.15
$/watt_DC	$4.35

As can be seen in Table 5.1, the estimated levelized cost of electricity for the system is $0.15 per kWh. This is slightly higher than the PG&E prices, however the Renewable Energy Credits and/or Carbon Offsets have not been accounted for in the economics. In the interest of attracting a buyer for the RECs and/or Offsets that is willing to pay a premium for energy produced from this Tribal Energy Project, the Tribe may want to aggregate several photovoltaic projects together into one larger project with a

capacity of 40 kW or greater. Also, the increased energy sovereignty provided by the photovoltaic projects provides value beyond the project's economics.

Photovoltaic System for a Karuk Residential Structure

Despite repeated attempts to obtain electricity bills for Tribal residential structures, no Tribal members agreed to let this information be released. Therefore, a system was analyzed for a theoretical residential structure with an area of 1,500 square feet. Electrical energy consumption was estimated at 420 kWh per month using data from the US Department of Energy's Energy Information Agency. Available solar energy for the Orleans area was used. As stated previously, the available solar energy in Happy Camp and Yreka are roughly equal and slightly higher than the available solar energy in Orleans.

The analysis indicated that a 3.5 kW_DC photovoltaic system would net this theoretical structures annual bill to the utilities minimum charge. The photovoltaic array would occupy approximately 290 square feet of roof space. Table 5.2 below shows the estimated economic performance for the system.

Table 5.2: Preliminary Economics for Photovoltaic System for Typical Karuk Residence

Cost of PV modules	$13,889
Cost of Inverter	$3,000
Balance of systems	$2,533
Capital cost	$19,422
Installation costs	$3,000
Capital cost + installation costs (PV)	$22,422
CEC rebate ($/Watt)	$3.20
Total rebate	$8,060
Net cost	**$14,363**
Lifecycle cost	$18,399.34
Levelized cost ($/kWh)	$0.14
$/watt_DC	$4.14

Further details on the residential solar electric analysis as well as solar pathfinder reports for multiple Tribal structures are included in Appendix E.

5.3. Solar Hot Water System Analysis

Solar hot water systems are also applicable to all Karuk communities. A typical solar hot water system consists of collectors which sit atop a roof or other mounting structure, a thermal storage tank, a circulation pump, and an expansion tank. Systems need to have some sort of freeze protection so that the collectors are not damaged during the winter. This is either accomplished by using a glycol solution instead of water as the heat transfer fluid, or by using a drainback tank and differential controller which together ensure that no water is present in the collectors when temperatures are below freezing.

The analysis presented here focused on a residential scale drainback system with two 32 square foot collectors, a 120 gallon storage tank, a drainback tank, a differential temperature controller, a circulation pump, and an on-demand water heater. The differential temperature controller senses when the temperature at the collectors is hot and turns the circulation pump on. The circulation pump cycles

water through the collectors and then through a coil in the storage tank thereby warming the water. The water is warmed to the degree possible by the sun and then, when a demand for hot water arises, the water from the storage tank is passed through the on-demand water heater for final heating. The energy savings are realized by reducing the amount of gas needed to make hot water because the water has been preheated by the sun. When the temperature on the roof drops below the temperature in the storage tank, the differential temperature controller shuts off the pump and the water in the collectors drains into the drainback tank. This prevents heat loss through the collectors and prevents damage from freezing.

The system described above is estimated to have a capital cost of approximately $7,500. The approximate system life is 30 years. Accounting for a fuel inflation rate of 2% per year, regular replacement intervals of major components and operations and maintenance costs, the net present value of the system over its lifetime is estimated to be approximately $18,200. This can be compared to a net present value of $28,600 for a basic hot water heating system for the same structure without solar. The net present value of the savings of $10,400 over the life of the system, when multiplied over a number of Tribal structures, could result in substantial savings for the Tribe.

Reduced dependence on fossil fuels and increased energy sovereignty are added benefits that are more difficult to quantify. As an example, if, due to increased fossil energy scarcity, the fuel inflation were to be increased to 4% per year, the net present value of the savings would increase to $15,900 per residential system. A printout of the analysis spreadsheet used to generate the results for the solar thermal analysis is contained in Appendix F.

5.4. Micro Hydroelectric Systems

Micro Hydroelectric systems are household scale with some potential to provide enough power for a cluster of residences. The two potential opportunities that were identified during the course of this study were on McNeil Creek and Butler Creek. Flow data was not obtained for either of these creeks. Therefore, the discussion presented in this section is qualitative only. Due to the nature of the terrain and hydrology within Karuk Ancestral territory, there are likely other opportunities for micro-hydro development that were not identified during the course of this study.

Butler Creek System

There is an existing micro hydro system on Butler Creek that is functional but could benefit from an upgrade project. The system provides power to a cluster of houses located at the confluence of Butler Creek and the Salmon River. There is another residence across Butler Creek that currently has only generator power and is occupied by Tribal members. This area is approximately 15 miles from the nearest utility grid.

A potential project that the Tribe may consider would be to upgrade the existing micro hydro system to improve reliability for existing users and install power lines across Butler Creek to provide power for the Tribal members living there. This project would involve upgrading the intake structure, which is located upstream of a natural fish barrier. The penstock would also need to be upgraded and its alignment along the creek could be improved. A turbine house and a bank of two or three new 1 kW Pelton wheels could be installed with a proper spillway to route the water back to the creek. New batteries and an inverter would round out the system. Approximately 1,000 feet of transmission would need to be run across the creek to provide power to the neighbors. This project could become a part of a larger feasibility study for developing renewable energy projects in Karuk Ancestral Territory.

McNeil Creek System

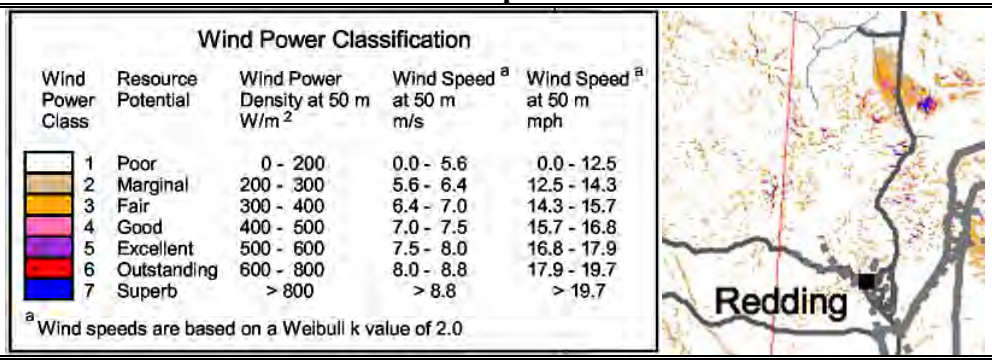
As mentioned previously, the Forks of Salmon Elementary School recently installed a new 32 kW diesel battery hybrid power system. Phase 2 of that project, which is now seeking funding, is to implement conservation and efficiency measures and to install renewable energy capacity to further reduce diesel consumption, which is a very large expense for the school since it is remotely located (19 miles from the nearest utility grid in very mountainous terrain). The renewable energy options being considered by the school are winter micro hydroelectric from McNeil Creek coupled with a 2 to 5 kW solar electric array mounted on the roof of the Generator shed. When Phase 2 of the project is implemented, significant capacity will become available for surrounding residents if the infrastructure can be added and if the school can be compensated to provide revenue for maintenance and repairs. A significant percentage of the children attending the school come from Karuk families and many of the school staff are Karuk as well.

The micro hydro component of the project would consist of upgrading an existing reservoir on McNeil creek, which provides water for multiple families. Years ago, the school installed a pipe from the reservoir to the school and water from the reservoir is used in the summer for irrigation. During the summer there is sometimes not enough water to go around and cooperation among users becomes necessary. The school is considering the idea of using the existing pipe between the reservoir and the school to convey water to a 1 kW Pelton wheel during the winter when there is plenty of water to go around. The Tribe could consider partnering with the school to help implement phase 2 of the project, thereby creating excess electrical generation capacity in the Forks of Salmon area, which could benefit both Tribal and non-Tribal community members. This project could also become a part of a larger feasibility study for developing renewable energy projects in Karuk Ancestral Territory.

5.5. Community Scale Wind Power

According to NRELs wind resource maps, there are class two, three and potentially some class four wind sites in the vicinity of Yreka. Figure 5.2 shows some of the Data in the NREL wind resource maps. A full size copy of this map is included as Appendix G.

Figure 5.2 Data from NRELs Wind Resource Map



NREL has an anemometer loan program for Tribes that could be accessed to obtain a tower to place on Tribal lands to assess the wind resource. Figure 5.3 below shows one potential location for an anemometer that appears to be within a wind regime of Class 2 or higher.

Figure 5.3 Potential Anemometer Location

The site identified in Figure 5.3 is one potential anemometer location. Additional research should be conducted before making a final decision about where to locate an anemometer tower. Collecting wind data from a promising site under Tribal control in Yreka could be a part of a feasibility study for renewable energy development on Karuk lands. The proximity of the ridges in Figure 5.3 to Tribal housing and facilities combined with the indication of a potential resource from the NREL maps make a feasibility study for community scale wind power in Yreka a reasonable course of action should further grant funds become available.

5.6. Conclusion

There are several renewable energy development opportunities for the Tribe consider as the energy program moves forward. Facility scale solar electric and solar thermal installations are appropriate for Orleans, Forks of Salmon, Happy Camp, and Yreka because the solar resource is adequate, the cost of heating fuel is high, the end use devices being used are generally outdated, and electricity grid is unreliable. The results of this study indicated that in most case, these types of systems can be deployed without further planning level studies once the appropriate construction documents have been prepared.

There does appear to be the potential for micro-hydroelectric deployment in the Forks of Salmon area, and potentially other areas within Karuk Ancestral Territory, however, there are political and environmental considerations that should be accounted for before a project is implemented. A feasibility study specific to the deployment of micro-hydro in the Forks of Salmon area may be warranted depending on the level of interest expressed by Tribal Council.

As mentioned in Chapter 4, the use of residual woody biomass in a small to medium sized pellet mill does appear to be an appropriate technology that could be used by the Tribe to offset propane and kerosene use for home heating. Further investigation of this concept through a feasibility study does seem warranted.

Lastly, there does appear to be a reasonable probability that community scale wind development could occur in Yreka. Therefore, a feasibility study of the concept does seem warranted.

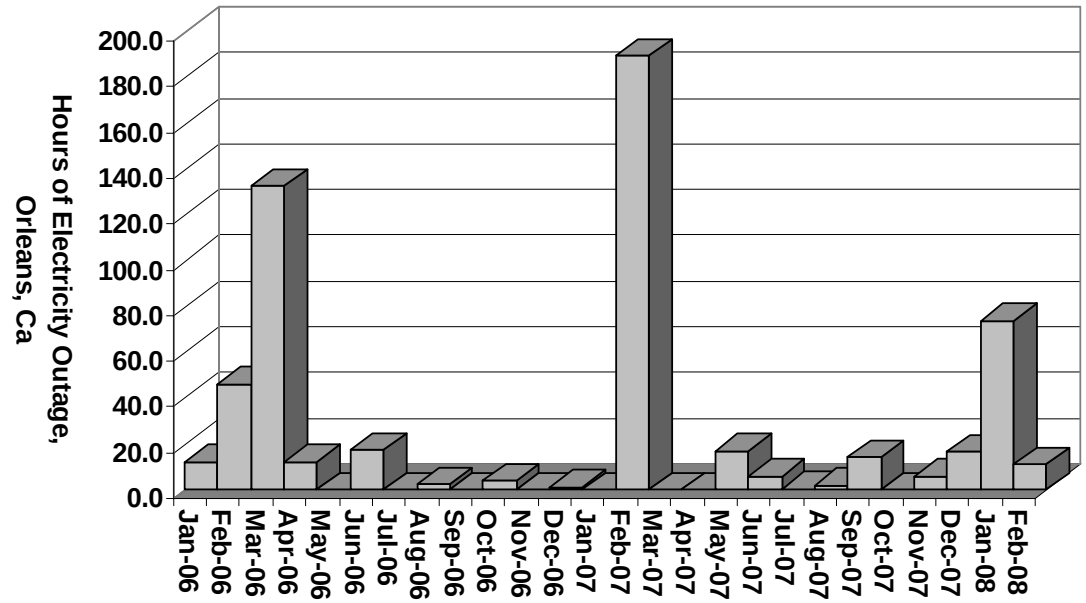
On a final note, it should be noted that there may be opportunities for renewable energy development within Karuk Ancestral territories that were not identified during the course of this study.

6. Assessment of Renewable Energy Export From Tribal Lands

Karuk Tribal lands are serviced by two investor-owned electricity providers, Pacific Gas and Electric (PG&E) in Humboldt County and Pacific Power and Light (PPL) in Siskiyou County. Natural gas service is not available in either territory, and residences between Somes Bar and Happy Camp and in the Forks of Salmon areas are without any utility services. However, propane delivery is available in all communities.

With the exception of Yreka, the areas of Karuk Tribal Lands are subject to frequent and long power outages. According to PG&E records from a single transformer, the Orleans area experienced about 9.5 days without electricity in 2006 and 10.5 days in 2007. Figure 6.1 shows a graph of hours of electricity outage per month for the reported transformer in Orleans. Outages in more remote locations may have been even more frequent and of longer duration.

Figure 6.1 History of Electricity Outages in Orleans, CA, 01/06 – 02/08



The lack of a reliable electricity grid essentially rules out any renewable energy export potential for the communities of Orleans, Somes Bar and Happy Camp. Even if the utility grid was more reliable, the renewable resources identified in these communities were more on a community scale. The only potential commercial scale renewable energy alternatives identified was a distant possibility for a medium scale biomass power plant in the future when energy pricing is such that the feedstock can "pay its way out of the woods."

There is a possibility that a large community or marginal commercial scale wind resource may exist in Yreka. This will likely become the subject of a feasibility study in the near future. Part of the feasibility study will be to determine if there is transmission capacity, available in the I-5 corridor that could be used to wheel the electricity from a Tribal wind project in Yreka. The climate for obtaining power purchase agreements would also be investigated at that time.

7. Human Capacity Building

The Human Capacity Building aspect of this project was met through staff training, community outreach, and summary of additional training opportunities available to the Tribe. The Karuk Tribal Energy Program was also established during this project.

7.7. Staff Training

The Karuk Tribe hired Misti Gayle for the position of Energy Intern. She worked closely with DNR staff and Winzler & Kelly consultants. To introduce the intern to basic energy concepts and renewable energy, energy efficiency, and energy conservation, a binder of readings titled *Energy Basics and Renewable Energy Curriculum* was prepared. Thirteen documents from various sources were included. The binder will become a resource that can be added to for other Tribal employees to learn energy concepts.

Misti also participated in residential and non-residential energy audits, collecting data necessary for energy use assessments and interacting with the community. She also helped organize and run the three community meetings, giving a presentation on ways to save energy in the home. Furthermore, she trained in energy analysis with Abbay Technical Services and provided valuable office support throughout the project and prepared energy presentations at local elementary schools. In addition, she prepared her first resume and attended her first professional conference.

7.8. Community Outreach

Three community meetings were held to discuss energy efficiency, energy conservation, and renewable energy with area residents. The meetings were held at Tribal Community Buildings in Orleans, Happy Camp, and Yreka in May. A $50 door prize and free compact fluorescent light bulbs and power strips were offered to help encourage attendance. The meetings were conducted in an informal manner, using games, demonstrations, PowerPoint slides, and community interaction to discuss energy efficiency, energy conservation, and renewable energy concepts. The games included Watt's Up, in which community members try to guess the power consumption of common household appliances. The appliances, such as a hair dryer, radio, compact fluorescent and incandescent lightbulbs, and more, were then plugged into a watt meter to show their actual consumption. The PowerPoint slideshow is included in Appendix H.

At the community meeting in Orleans, attendees were trained to administer a free light bulb exchange program for the Tribe funded by PG&E through the Redwood Coast Energy Authority, which is based in Eureka Ca.

7.9. Additional Training Opportunities and Resources

There are many energy-related training opportunities that are available to the Tribe. Opportunities are available from local universities, non-profit agencies, and government agencies. The following is a sample list of some recent and upcoming opportunities:

Dates: Periodic

In this intensive workshop, you will learn how to perform energy efficiency audits of smart classrooms and office environments. These skills can be applied to saving energy and money (as well as reducing carbon emissions) on campus, at home, and on the job. Topics will include:

- Energy auditing techniques
- Basic energy efficiency (EE) theory
- Hands-on training with EE tools

Understanding Grid-Connected Solar Electric Systems
Instructor: Jim Zoellick
Dates: Periodic
Are you considering installing a solar electric system on your home or business and wondering whether or not it makes sense? Then this course is for you. It will provide you with the information you need to make informed decisions. The course will cover system components, system operation, site selection, array orientation, net metering, interconnection agreements, rate options, system design and sizing, component selection, and code and permit issues. We will talk frankly about system economics, rebates and tax credits, and financing. We will examine a real life system in operation. And we'll talk about energy conservation and efficiency, because that's the smart place to begin.

Understanding Solar Water Heating Systems
Instructor: Jim Zoellick
Dates: Periodic
Solar water heating systems are efficient and economical. They can save you money and lessen your carbon footprint. This introductory course will examine how systems work. It will discuss various system types and components, end use applications, system design and sizing, performance ratings, site analysis, economic incentives, and financial payback. The course will culminate with a tour of a working solar hot water system. If you're thinking of installing a system or just want to learn about the topic, then this course can get you started.

Whole Earth Engineering
Instructor: Lonnie Grafman
Dates: Periodic
Apply engineering and science concepts and methods to self-sufficient habitat systems: housing, energy, water and food supply

Redwood Coast Energy Authority
http://www.redwoodenergy.org/
The Redwood Coast Energy Authority's (RCEA) purpose is to develop and implement sustainable energy initiatives that reduce energy demand, increase energy efficiency, and advance the use of clean, efficient and renewable resources available in the region. RCEA offers energy education, events, and resources to residents and public agencies in Humboldt and Del Norte Counties.

Shasta Energy Group
http://www.shastaenergygroup.org/index.asp
Through education and demonstration, SEG inspires communities and individuals to make sound sustainable choices. Efficient and innovative technologies provide Siskiyou County's energy needs from renewable sources.

Solar Energy International Training
Solar Energy International (SEI) is a USA non-profit organization whose mission is to help others use renewable energy and environmental building technologies through education. SEI teaches individuals from all walks of life how to design, install and maintain renewable energy systems, and how to design and build efficient, sustainable homes. SEI offers trainings online and in 22 locations around the world. For more on SEIA, see http://www.solarenergy.org/index.html.

U.S. Department Of Housing And Urban Development Grant Writing Training
HUD is offering 60 free Grant Writing Training workshops in 2008 from March - September. The sessions are FREE and open to the public. Registration is on a first come, first served basis. Participants receive personal instruction from key HUD staff on how to become more competitive for Federal grants, secure 501(c)(3) status, and the organizational structure necessary to secure government funds. Workshop topics include: organizational capacity building, grant proposal writing techniques, accessing government funds, HUD common factors for award, and tips on working with local government agencies. For more information, visit
http://www.hud.gov/offices/fbci/grantwriting08.cfm.

Annual DOE Tribal Energy Program Review
This annual program review is intended as a forum for Tribes to meet and learn from other Tribes pursuing energy sufficiency through conservation or renewable energy. The forum consists of presentations by Tribes across the nation that are exploring renewable energy and energy efficiency. Participants hear about projects, the progress that ahs been made, successes and the lessons learned as Tribes explore their energy options. The conference is open to Indian Country as a whole. This is a unique forum where you can get an excellent overview of the wide range of renewable energy and energy efficiency projects under way in Indian Country. Further information is located on the TEP website: http://apps1.eere.energy.gov/tribalenergy/

Regional Training: Renewable Energy And Energy Efficiency For Tribal Community And Project Development
Several regional workshops on Tribal renewable energy development are planned. The workshops will address: renewable energy technologies and energy efficiency concepts; renewable energy project development; organizational structures and legal frameworks for development; and financing options.

These unique courses will help tribal leaders and staff understand the range of energy efficiency and renewable energy opportunities that exist within their communities. The course material will focus on: 1) Determining community energy values and objectives; 2) Developing the outline of a tribal strategic energy plan; 3) Exploring how energy efficiency and renewable energy technologies can be used to help meet tribal objectives; 4) Organizing for tribal community success.
Dates and locations are can be found on the Department of Energy's Tribal Energy Program Website.

Appendix A: Project Contract and Scope of Work

012507 007 002

Karuk Tribe of California

Administrative Office
64236 Second Ave. • P.O. Box 1016
Happy Camp, CA 96039
(530) 493-1600 Fax (530) 493-5322

Happy Camp Health Services
38 Park Way • P.O. Box 1016
Happy Camp, CA 96039
(530) 493-5257 Fax (530) 493-5270

AGREEMENT FOR INDEPENDENT CONTRACTOR SERVICES
Contract Number: 07-C-027

This Agreement, dated as of October 3, 2007, is between the Karuk Tribe of California (hereinafter "KTOC") and Winzler & Kelly, Engineering Consultants (hereinafter "INDEPENDENT CONTRACTOR"), who agree as follows:

1. **Description of Services**: KTOC hereby retains Independent Contractor to provide the services described in the attached *Description of Independent Contractor Services and Activities.* The retention of Independent Contractor's services by KTOC is contingent upon an award of funding from Funding Opportunity Number: DE-PS36-06GO96038, *First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands* grant, administered by the U.S. Department of Energy, Golden Field Office, CFDA Number 81.087.

2. **Duration**: The term of this Agreement shall be from the date of the last signature below to the end of the grant period for Funding Opportunity Number: DE-PS36-06GO96038. The grant period is one year from the date of award; the Department of Energy anticipates notifying applicants selected for negotiation of award by June 30, 2007 and making awards by September 30, 2007.

3. **Compensation**: Independent Contractor will be compensated as provided in the attached *Description of Independent Contractor Services and Activities*, $85,243. All invoices must be submitted no later than thirty (30) days past the end date of this Agreement as stated in Clause 2 above. The Tribal staff person responsible for overseeing this Agreement and approving invoices for payment shall be the Director of the Department of Natural Resources, Sandi Tripp.

4. **Claims for Compensation**: Independent Contractor agrees that he/she shall not be entitled to and shall not claim compensation for services performed under this Agreement from another federally funded source of compensation for the same work performed, same working hour(s) or same working day(s). It is further agreed by the Independent Contractor that any claim for compensation submitted in violation of this clause shall, if paid, be recoverable by KTOC.

5. **Indemnity and Hold Harmless**: Independent Contractor represents that it has every legal right to enter into the Agreement and to perform in accordance with its terms and that it is not and will not become a party to any Agreement with anyone else which would be in violation of the rights granted to KTOC hereunder. Independent Contractor will indemnify and hold KTOC harmless from and against any losses, damages and liabilities arising out of its performance of this

agreement to the extent caused by the negligent acts, errors, or omissions of Independent Contractor. KTOC makes no express warranty, indemnity or hold harmless agreement.

6. **Independent Contractor Status**: It is understood and agreed between the parties that KTOC shall not be obligated to withhold any federal, state or local taxes from fees paid to the Independent Contractor, nor shall KTOC have any liability for such withholding. Further, any required public liability, public damage and/or Worker's Compensation Insurances shall be the sole responsibility of the Independent Contractor.

7. **Confidential Information**: Independent Contractor will not disclose directly or indirectly to or use for the benefit of any third party any secret or confidential information, knowledge or data acquired by virtue of its relationship with KTOC without the prior written approval of KTOC. It is understood and agreed by the parties that the obligations of this paragraph shall survive the expiration or termination of the Agreement.

8. **Non-Assignability**: This Agreement may not be assigned or transferred by either party without the prior written approval of the other party.

9. **Authority**: Independent Contractor's authority to act under this Agreement can be suspended upon written or verbal notice by the Tribal Chairman of the KTOC or his/her designee. If verbal notice is given, it shall be confirmed in writing within five (5) working days.

10. **Termination**: This Agreement may be terminated at any time, with or without cause, by either party, upon notice in writing. Any such termination shall be effective immediately. Independent Contractor shall invoice KTOC within thirty (30) days of agreement termination for satisfactory work performed up to termination date.

11. **Complete Agreement**: This Agreement constitutes the entire agreement between the parties, and no amendment or modification hereof shall be effective unless reduced to writing and signed by both parties.

12. **Severability**: Should any provision of this Agreement be held invalid or unenforceable, such a holding shall not affect the validity or enforceability of any other provision thereof.

13. **Copyrights**: All original materials, written, photographed, recorded or otherwise collected or produced by the Independent Contractor pursuant to this Agreement are instruments of professional services and shall be the sole property of KTOC, upon completion of services and payment in full of all monies due Independent Contractor.

14. **Ability Certification**: The Independent Contractor assures KTOC that they and all their approved sub-contractors possess the ability and resources necessary for satisfactory completion of the activities described in the *Activities to be Performed.*

15. **Certification Regarding Debarment, Suspension and Related Matters**: The Independent Contractor hereby certifies to the best of their knowledge that it or any of its officers or contractors or sub-contractors:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transaction by any Federal department or agency;

2. Have not within a three (3) year period preceding this Agreement been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain or performing a public (Federal, State or local) transaction or agreement under a public transaction; violation of federal or state antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements or receiving stolen property;

3. Are not presently indicted for or otherwise criminally or civilly charged by a government entity (Federal, State or local) with commission of any of the offenses enumerated in Paragraph 2 of this certification; and

4. Have not within a three (3) year period preceding this Agreement had one or more public (Federal, State or local) transactions terminated for cause or default.

16. **Applicable Law**: This Agreement shall be governed by the laws of the United States of America and by Karuk Tribal law. In the absence of Federal or Tribal law, the laws of the State of California shall be applicable. Independent Contractor is required to comply with Office of Management and Budget Circular A-102 Subpart C § .36 (i)(3,4,5,6,11,12,13). This provision is not intended to waive KTOC's sovereign immunity status or submit KTOC to any jurisdiction inconsistent with such status.

17. **Indian Preference:** This Contract shall be executed in accordance with the Indian Preference Act of 1934, 25 CFR Part 5 Preference in Employment and the Karuk Tribe TITLE 5 TERO Ordinance.

18. **Tribal Employment Rights Ordinance (TERO):** Independent Contractor acknowledges that a (1%) TERO fee will be imposed on the gross value of any contract initiated within the interior/exterior boundaries of the Karuk Ancestral Territory, provided that the total contract or annual gross revenues meet or exceed $2500.00.

19. **Sovereign Immunity:** Nothing in this Agreement shall be construed or interpreted to relinquish the sovereign immunity of the Tribe.

In consideration of the mutual promises of the parties this Agreement is executed on the date first above written, in duplicate, intending each duplicate to be an original.

INDEPENDENT CONTRACTOR
Winzler & Kelly, Engineering Consultants
633 Third Street
Eureka, California 95501

10/4/07
Signature/Date

KARUK TRIBE OF CALIFORNIA
Arch Super, Chairman
64236 Second Avenue
Happy Camp, California 96039

10/3/07
Signature/Date

TIN/SSN: _____

Activities to be Performed:

Scope of Work:
First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands Grant

Task 1: Tribal Council participation in analysis and development of Tribal Strategic Energy Plan
Conduct a preliminary Tribal Council participation meeting in which the Karuk Tribe's energy vision is discussed. This discussion may include the Tribe's overall strategic plan as it relates to energy and renewable energy, management of Tribal resources elucidated in the Department of Natural Resources' Integrated Resources Management Plan (IRMP) as it relates to energy, and improving Tribal capacity to develop renewable energy sources. This meeting will provide a forum for Tribal Council to inform the development of Tribal screening criteria that will be used to evaluate renewable energy options available to the Tribe on trust lands.

> **Deliverable:** *Report summarizing Tribal screening criteria to be developed using Tribal Council feedback regarding Tribal energy vision with information provided by the Karuk Tribe's Department of Natural Resources regarding renewable energy goals. Deliverable shall be electronic.*

Task 2: Analyze existing energy demand and project future energy demand
Analyze current energy consumption patterns associated with tribal facilities and operations. This would include existing residential and non-residential buildings, ceremonial grounds and related facilities on trust lands. Analyze existing energy use patterns and project future energy demand for the Karuk Tribe.

The energy use patterns of up to 50 representative residential structures and up to 10 representative non-residential structures located on trust lands will be analyzed. Based on the analysis of these representative structures the Tribe's energy demands will be estimated using extrapolation based on the population of the tribe as a whole. Future energy demands will be estimated using the best available population growth data.

> **Deliverable:** *Report on current and projected energy demands at Karuk facilities and operations including residential and non-residential, and other areas identified by the Karuk Tribe of California on trust land. Deliverable shall be in electronic form.*

Task 3: Identify and evaluate opportunities for energy conservation and efficiency measures
Identify specific energy conservation opportunities. The energy conservation opportunities analysis will consider and recommend measures to reduce energy use when appropriate and increase electrical, mechanical and thermal efficiencies relevant to Tribal facilities and operations. Up to a total of 20 existing residential units in the four Karuk communities will be evaluated for energy efficiency and conservation measures. Recommendations for increased residential efficiency will be developed where appropriate. Up to a total of 5 existing nonresidential units in the four Karuk communities will be evaluated for energy efficiency. Recommendations for increased nonresidential efficiency will be developed where appropriate. Technologies to improve efficiency will be identified. This could include measures for off peak usage, and potential for cogeneration to balance usage. More effective insulation, efficiency retrofits, and lighting controls are good examples of what could be considered for increased thermal and electrical efficiency.

Deliverable: *A report describing the potential energy conservation and efficiency improvement opportunities that could be employed by the Karuk Tribe. Include cost estimates regarding long-term maintenance of such equipment and overall durability. Deliverable shall be in electronic form.*

Task 4: Assess renewable energy resource availability

Assess renewable energy resource availability. Conduct preliminary assessment with respect to the selected renewable energy sources. For example, using the best available data, the preliminary assessment could include analysis of hydro flows, solar accessibility potential, wind accessibility potential, and/or woody biomass availability on Karuk Tribal trust lands.

Deliverable: *Assessment of generation potential for specific energy resources such as micro-hydro, solar electric and solar thermal, wind, biomass energy and/or co-generation. This study will include, at a minimum, an analysis of the availability of solar electric and small scale hydroelectric energy generation relevant to Karuk Tribe facilities and operations. Deliverable shall be in electronic form.*

Task 5: Evaluate the most promising energy source

Develop criteria specifically based on the Karuk Tribe's needs as identified in the preliminary participation meeting with Tribal Council (See Task 1). Identify and evaluate the most promising energy source specific to typical structures (residential/non-residential), area, or community using those criteria. Analyze both fixed costs (i.e., cost of capital equipment, grid/distribution network intertie, maintenance) and variable costs (i.e., feedstock fuel for biomass). Analyze likely energy sales revenues (through power purchase agreements with the utility) or avoided energy purchase costs, adjusted for intermittency and other generation factors.

Deliverable: *A "cost of energy" analysis for the different forms of renewable energy. Description of technical upgrades necessary to implement the potential renewable energy facilities. Cost estimate for materials and installation so that each structure could be powered by a renewable energy source. Include cost estimates regarding long-term maintenance of such equipment and overall durability. Deliverable shall be electronic.*

Task 6: Assessment of renewable energy export off Tribal trust lands

The potential excess in energy generation, from sources identified in prior tasks, will be projected. Assess industry rates that could be charged to commercial energy purchasers, to estimate revenue. Consider conceptual feasibility and potential marketability for the Karuk Tribe to sell power back to the grid. (i.e. locations and days of sun, water flows, possible storage capacity). Conduct a conceptual analysis of the economic viability for the form of renewable energy identified in Task 5. Drawing from information developed in Task 5, prepare a conceptual economic analysis for each of the identified options. A net present value economic assessment that accounts for conceptual costs and benefits over the life of the project will be prepared for each option.

Consider potential future economic conditions based on a sensitivity analysis that examines a range of economic parameters (financing costs, fuel costs, electricity sales prices, sales of renewable energy credits, and so forth.). Conduct a preliminary analysis of the capacity of the transmission and distribution grid to accept generated power from the scale of generation facilities under consideration. Estimate capacity for energy exports from trust lands. Obtain general information about power purchase, transmission, and interconnection

agreements. Evaluate the extent to which there are underserved areas on trust lands, and estimate the dollar/mile costs of extending the grid to these areas.

Deliverable: *Feasibility and potential marketability report for the Karuk Tribe to sell power back to the grid. Deliverable shall be in electronic form.*

Task 7: Human capacity building.
Facilitate one community meeting in Yreka, one in Happy Camp, and one in Orleans, which the Department of Natural Resources will organize, where energy conservation and renewable energy concepts are presented and discussed. Incorporate the Tribal Council, Eco-Cultural Restoration Specialist, Renewable Energy Intern, and other members of the Karuk Tribe into activities carried out under Tasks 1-4. Research additional training programs that could provide opportunities for members of the Karuk Tribe to build on skills already obtained through participation in Tasks 1-4. Examples of additional training programs include renewable energy system design classes offered through Humboldt State University Extended Education Department.

Deliverable: *Energy demand and renewable resource assessment training program. Summary of renewable energy system design, installation and maintenance training opportunities available to the Karuk Tribe. Deliverables shall be in electronic form.*

Task 8: Strategic Energy Plan and Energy Options Analysis
All reports and descriptions prepared under the previous tasks will be compiled into draft and final versions of the Strategic Energy Plan and Energy Options Analysis. The draft will be submitted to the Karuk Tribe for review and a presentation made to Tribal Council. The Tribes comments from the draft review will be incorporated into a final Plan. Tribal staff shall compile all comments from the Tribe on one copy of the draft report and shall rectify any conflicts in comments prior to providing them for incorporation into the final report.

Deliverable: *Electronic copies of both the draft and final Strategic Energy Plan and Energy Options Analysis.*

Appendix B: Conservation and Efficiency Measures Analysis by Abbay Technical Services

Abbay Technical Services

Building Energy Consultants
& Title 24 Reports

Building Energy Assessment for The Karuk Tribe November 2008

1125 16th St., Rm. 216, Arcata CA 95521 Phone: (707) 826-1433

Abbay Technical Services

Primary Energy Consultant / Owner:

Anne M. McQueeney
Building Energy Consultant
Certified Energy Analyst
Certified Energy Plans Examiner
Member of the California Association of
Building Energy Consultants
E-mail: *anny@abbaytechnicalservices.com*

Karuk Tribe Energy Assessment Project Manager,
Data compiled, processed and analyzed by:

Diane Knight
Building Energy Consultant
E-mail: *diane@abbaytechnicalservices.com*

Additional consultation provided by:

Neva S. Holladay
Building Energy Consultant
E-mail: *neva@abbaytechnicalservices.com*

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1125 16th St., Rm. 216
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www.abbaytechnicalservices.com

Table of Contents

Table of Contents – Con't.

An Introduction to Abbay Technical Services

Abbay Technical Services has been providing energy consultation and Title 24 energy compliance documentation for over 20 years. Originally established in 1985 by William N. Abbay, Anne M. McQueeney mentored with Bill Abbay for 11 years before buying the business in 2001 upon Bill's retirement.

Abbay Technical Services has developed a well-known reputation for providing straight-forward energy consultation with the most current information to its clients regarding legislation, conservation and the development of energy efficiency measures in California. Anne is a Certified Energy Analyst with vast experience in building energy consulting and an abundance of professional training. She is also a Certified Plans Examiner for both residential and non-residential applications and a member of the California Association of Building Energy Consultants (CABEC).

Experience is a key element to doing energy compliance calculations and building energy consulting. Achieving compliance in the most cost effective way can best be done by performing many energy calculations in different climate zones. Abbay Technical Services has done thousands of energy calculations throughout the sixteen climate zones in California.

Title 24, Part 6 of the California Building Code establishes building energy efficiency standards for new construction, additions, alterations, and repairs to residential, commercial and industrial buildings. Since it was first enacted in 1978, the building energy efficiency standards, along with energy efficient appliances, have helped Californians save more than $56 billion in electricity and natural gas costs.[1] The standards are updated periodically to incorporate new energy efficiency technologies and methods.

Abbay Technical Services works with engineers, architects, contractors, builders, developers, and homeowners to educate them on current topics and regulations regarding energy use, as well as provide the Title 24 energy documentation required for building permit submittal.

1 - California Energy Commission estimate. http://www.energy.ca.gov/title24/ 8/25/2008

Scope of Services Provided by Abbay Technical Services

Abbay Technical Services, in cooperation with Winzler & Kelly Consulting Engineers, has been contracted to provide energy consulting services to assist the Karuk Tribe and US Department of Energy in implementing its Energy First Steps Grant Project. Abbay Technical Services' participation in this project will include the following elements:

Task : *Energy Conservation and Efficiency Measures Analysis*

Abbay Technical Services will analyze (14) residential structures and (2) non-residential structures for opportunities to implement energy conservation and efficiency measures. The structures will be located in the Tribal communities of Orleans, Happy Camp and Yreka.

Information will be provided by Winzler & Kelly to Abbay Technical Services. This information may include, but is not limited to: blueprints and/or dimensions for the residential and non-residential structures; electrical and thermal energy use and rates for each of the structures within the three given areas; information regarding equipment used in the homes such as heating and cooling units, water heaters, window types, lighting wattages, etc. Default assumptions may be made dependent on when the structure was built. Default assumptions, as defined by the California Energy Commission (CEC), are installed elements of the building which would be considered reasonable, common and standard construction practices at the time the building was constructed.

Task : *Deliverable*

For each structure analyzed, Abbay Technical Services will provide a report summarizing the energy conservation and efficiency measures that could be implemented for the structure. The report will include an estimate of the annual energy savings that could be realized through their implementation, for all (16) structures. Three residential structures will be analyzed for the material costs of the improvements.

Methodology

Abbay Technical Services currently uses EnergyPro, a California Energy Commission-approved compliance software program designed specifically to analyze and provide compliance scenarios for clients seeking Title 24 Energy documentation in both residential and non-residential building projects. One feature of this program is the ability to analyze a structure's predicted energy use without the Title 24 filters. It is this feature that enables us to provide a detailed energy use estimate without the various credits and debits that the Title 24 software program would normally use.

(NOTE: EnergyPro provides reporting options for either a Natural Gas or Propane energy source. Kerosene and other alternative energy sources are not an option. However, it will make no difference in the calculation results as this is primarily a reporting tool within the program.)

The California Energy Commission (CEC) has defined sixteen climate zones in California and collects weather data for each of these zones. Each climate zone's weather data has been taken, predominantly, from a single weather station within each zone. The result reflects the weather conditions of the climate zone as a whole and not the particular climatic conditions of any individual city or building site.[2] The CEC's statistical energy use data for each of these sixteen zones is used as the basis of the computer software program to analyze various structures within these zones. An average energy use scenario can then be created based on this data.

The computer method is capable of calculating space conditioning and water heating energy use. The method also simulates the thermal behavior of buildings by calculating heat flows into and out of the various thermal zones of the building. The program generates a "performance standard" which predicts and compares the energy use of buildings. This performance standard establishes an energy budget for the building in terms of energy consumption per square foot of floor area. The CEC has approved several privately developed computer software programs called Alternative Calculation Methods (ACMs) for the purpose of creating and analyzing these performance standards. EnergyPro is one of the CEC-approved ACMs. Computer methods are the basis of performance standards because of their relative accuracy in analyzing annual space conditioning and water heating energy use for different conservation features.[3]

2 – CEC Joint Appendix for 2005 Building Energy Efficiency Standards
3 – CEC 2005 Non-Residential Compliance Manual

The following steps are a general outline of the process:

- Detailed data for the building components must be collected including glazing, wall, door, roof/ceiling, and floor areas, construction assemblies, window performance, mass characteristics, equipment specifications, etc.
- Prepare an input file that describes the other thermal aspects of the proposed design. Input values and assumptions must correctly correspond to the proposed design.
- The program user chooses construction assemblies from the Joint Appendix IV.[4] Certain modifications to the standard construction assemblies can be made to accommodate project specific conditions. Where it is not possible to choose the correct corresponding construction assembly, every effort will be made to model the assembly in the most appropriate and accurate way.
- The following elements, to be included in the computer simulation, must be consistent with plans and specifications of the building:
    - *Opaque Exterior Walls:* Each opaque exterior wall construction assembly, as well as wall area, orientation and tilt. Heat capacities or characteristics necessary to determine the heat capacity (conductivity, mass, volume) of opaque exterior walls, must be included.
    - *Doors:* All exterior doors must be included.
    - *Opaque Roofs/Ceilings:* Each opaque exterior roof/ceiling construction assembly, as well as roof/ceiling area, orientation and tilt. Heat capacity or characteristics necessary to determine the heat capacity (conductivity, mass, volume) of opaque exterior roof/ceilings, must be included.
    - *Raised Floors and Slab Floors:* Each floor construction assembly, including floor area to outside or unconditioned space.
    - *Glass in Walls and Shading:* Each exterior vertical glass area, orientation, tilt, U-factor, and solar heat gain coefficient (SHGC).
    - *Horizontal (Skylight) Glass and Shading:* Each horizontal or skylight glass area, orientation, tilt, U-factor, and SHGC.
    - *Thermal Mass:* Liquid or solid materials used to store heat for later heating use or for reducing cooling requirements.
    - *Cooling and Heating Efficiency:* Includes the type of heating and cooling system, air distribution and the actual efficiencies of the equipment included in the proposed design.
    - *Cooling System Capacity:* Sensible output capacity of the cooling system at ARI (Air-Conditioning, Heating and Refrigeration Institute) conditions.
    - *Heating System Capacity:* The output capacity of the heating system.
    - *Other System Values:* All other space conditioning system components and their associated values.
    - *Calculate Potential Alterations:* Values for each element may be altered to predict the performance of the building after a desired improvement is made.

4 – CEC Joint Appendices for the 2005 Building Energy Efficiency Standards for Residential and Non-Residential Buildings as referenced in the 2005 Non-Residential Compliance Manual.

The software calculates energy use for three main components: the space conditioning energy, the lighting energy (generally for non-residential buildings), and the service water heating energy. It does not include energy for plug loads from computers, appliances, garage ventilation, outdoor lighting, or other miscellaneous energy uses.

The predicted energy use of the existing building without energy improvements is calculated first. The predicted energy use of the building is then calculated with various energy improvements. The difference and the percentage of the building's energy use with and without various energy improvements can then be determined and a dollar savings associated with each energy improvement. The energy used by space heating, cooling, fans, and domestic hot water, is expressed as kilowatt hours for electrical use and therms for propane or kerosene use. When possible, the energy improvements will appear in the Appendix B support documentation as "altered". In other cases, changes to the building will appear as "existing" or "new". This is done to account for the constraints of the software program and to ensure that the most accurate results are derived.

The CEC and energy analysts from California have made every effort to be as accurate in data collection, program design, and analysis procedures as possible. It should be noted that the energy analysis bases the predicted energy use on a reasonably conservative average household. However, there are many variables which are beyond the ability of the CEC or energy analysts to collect or control. The largest contributing factors to variations in energy use is the behavior of the occupants. While the CEC has attempted to examine the energy use behaviors of California residents, it cannot be predicted with 100% accuracy how energy users will behave from day-to-day. The ACM programs and guidelines can only give a representation of average energy use in California residences.

Modeling Assumptions

For this analysis, all information was first taken directly from architectural design drawings of the structures themselves which were provided by Winzler & Kelly Consulting Engineers. In May of 2008, representatives of Winzler & Kelly collected information about the specific buildings through site visits and inspections where they observed first hand the actual installed equipment and building components. If there was a discrepancy between what was called out on the architectural plans and what Winzler & Kelly representatives observed, the first hand observations were used for the analysis. Any other required information which was not found and/or confirmed in the architectural drawings or through the site visit observations was input in the form of default assumptions. Default assumptions have been tagged in the building descriptions with an asterisk (*). Please see Appendix A for support information regarding default building assumptions.

It is assumed that all buildings were wrapped with an air retarding wrap, such as Tyvek or a similar product.

For fenestration products (including double dome acrylic skylights), in the absence of performance data rated by the National Fenestration Rating Council (NFRC), the fenestration has been calculated with default values defined by the CEC and consistent with the type of windows which were installed. Please see Appendix A for support documentation regarding default fenestration ratings.

For HVAC systems only the U.S. Department of Energy rated annual fuel utilization efficiency (AFUE) is used. In cases where it is unclear what the true AFUE rating is, default values as defined by the CEC, have been used. Please see Appendix A for support information regarding default AFUE ratings.

For the residential analysis the installed duct insulation wrap was assumed to be R-4.2, the minimum required value for residential duct insulation at the time of construction. For the non-residential analysis the installed duct insulation was assumed to be R-8, the minimum required value for Yreka and Happy Camp at the time of construction. Please see Appendix A for support information regarding default duct insulation.

Residential hydronic HVAC systems have been modeled as a combined system for which the water heater provides heat for both space and water heating.

In the absence of actual installed lighting and lighting use estimates and utility bills, electrical lighting use has been analyzed conservatively as follows: lighting density was estimated at 1.3 watts per square foot of habitable spaces within each residential structure as directed by representatives of Winzler & Kelly Consulting Engineers. For each structure it has been assumed that a base number of 100 watt incandescent light

bulbs at an average of five hours a day were used. Then a simple yearly rate calculation was made from that average based upon rates supplied by Winzler & Kelly.

Rate calculation for lighting electrical service is as follows:

(Number of lamps per structure) *x* (equivalent kilowatt rating per hour) *x* (five hours per day of use) *x* (365 days) = Total kilowatt hours per year
(Total kilowatt hours per year) *x* (electrical rate) = estimated cost of electricity per year
100 Watt Incandescent = 0.1 kWh
26 Watt Compact Fluorescent = 0.026 kWh

The following rates were provided by Winzler & Kelly. The electrical rates include the bundled rate per kilowatt hour only and do not include any additional service charges or other taxes and fees associated with the electrical use. The gas rate is based upon dollars per therm.

Electrical Rates:	Happy Camp	$0.09699/kWh
	Yreka	$0.09699/kWh
	Orleans	$0.11559/kWh
Kerosene Rate:	$3.65/gallon @ 135,000 Btu/gallon = $0.000027/Btu ≈$2.70/therm	
Propane Rate:	$3.00/gallon @ 91,300 Btu/gallon = $0.000033/Btu ≈$3.30/therm	

A lighting analysis has not been performed on the non-residential buildings due to the absence of the installed lighting equipment and their associated wattages. However, a chart has been included explaining the maximum allowed wattages under California's 2005 Title 24 for each space to assist the Tribe in determining the most efficacious lighting while still maintaining or improving the quality of the task lighting in each space.

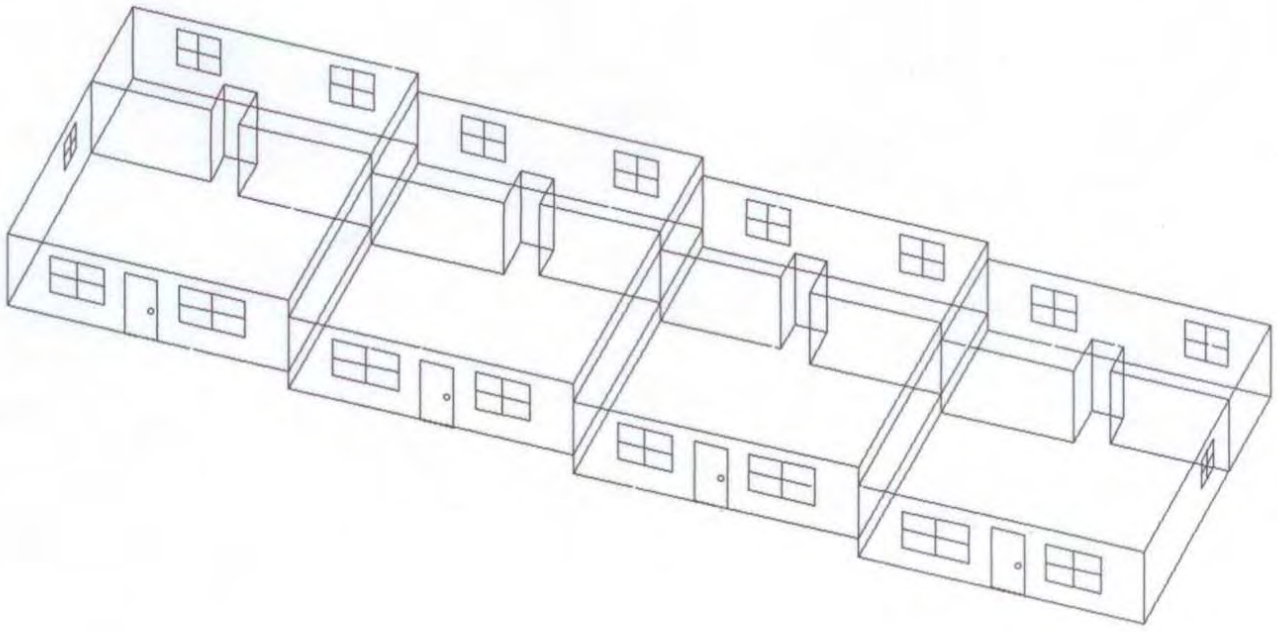
When possible, specification sheets consistent with the installed equipment have been included for reference. Only the pages which apply have been included as some specification booklets can be quite lengthy. Most specification sheets can be found online. Please see Appendix A for those equipment specification cut sheets which have been included. In some cases, certain equipment and their performance data is no longer available. In these cases default values, as defined by the CEC, have been used. Please refer to the manuals and support literature which was provided with the installed equipment for more detailed information regarding the performance of this equipment.

Abbay Technical Services has made every effort to model all buildings accurately and appropriately according to the building materials as well as equipment installed and observed in line with the guidelines set forth by the CEC. Please note that all energy use and the cost savings reported in this document are for estimation purposes only and is not meant to reflect the exact energy usage or cost savings of any of the buildings. Abbay Technical Services cannot be held responsible for errors as a result of incorrect information, conflicts between equipment specified in the architectural plans and that which is installed, or assumptions made on a good-faith basis.

Summaries of Structures
And Potential Energy Improvements

Structure 1

1242 Thook St.
Yreka, CA



Structure 1

1242 Thook St.
Yreka, CA

Description:

- Total Conditioned Area: 3328 ft^2
- Multi-Family, one story apartment building with four 2 bedroom units
- Built approximately 1992
- Front Orientation: Southwest, 225˚
- Climate Zone: 16
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane metal framed with clear glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83% AFUE†, electric baseboard heaters at 1500 watts* in each bedroom
- Existing DHW: Electric A.O. Smith EES, 40 gallon storage tank with Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting Density: 1.3 Watts/ ft^2 @ 3328 ft^2 ≈(43) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

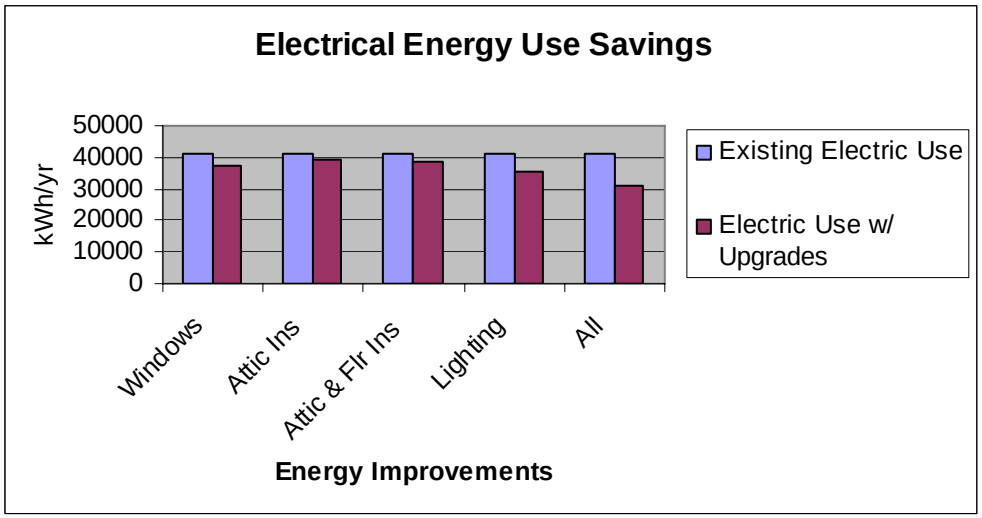
Structure 1

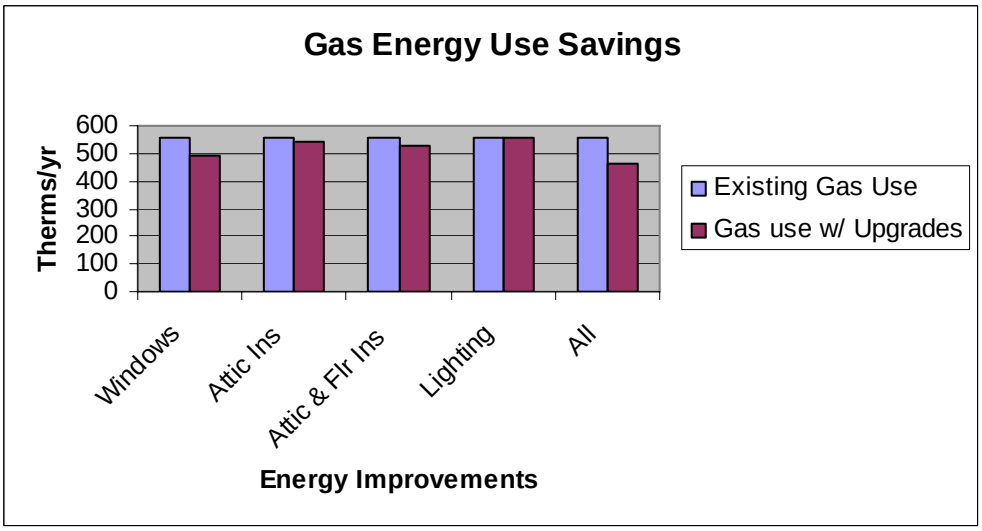
1242 Thook St.
Yreka, CA

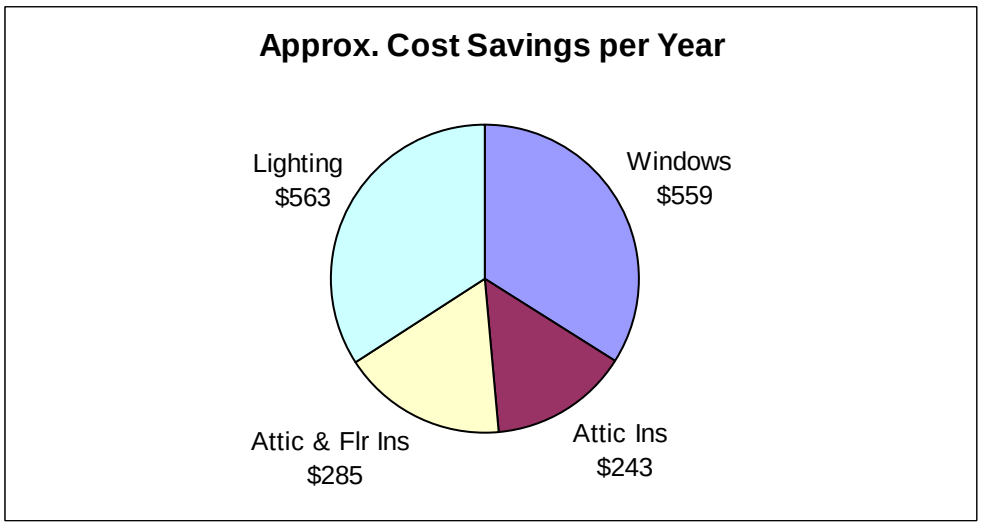
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	Whole Building As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	40,954	560	Double Pane Vinyl Frame w/ Low E	37,058	493	9.5%	12%	$558.77
Attic Insulation	R-38			R-49	38,979	541	4.8%	3.4%	$242.86
Attic & Floor Insulation	R-38, R-19			R-49, R-22	38,852	530	5.1%	5.4%	$284.87
HVAC	Kerosene 83%			---	---	---	---	---	---
Domestic Hot Water	Electric EF 0.89			---	---	---	---	---	---
Lighting	(43) 100 Watt Incandescent			(43) 26 Watt Compact Fluorescent	35,146	560	14.2%	0%	$563.32
All Upgrades	All			All	30,821	462	24.7%	17.5%	$1,247.40

Structure 1


Electrical Energy Use Savings
50000
40000
30000
20000
10000
0
kWh/yr
Existing Electric Use
Electric Use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
Lighting
All
Energy Improvements

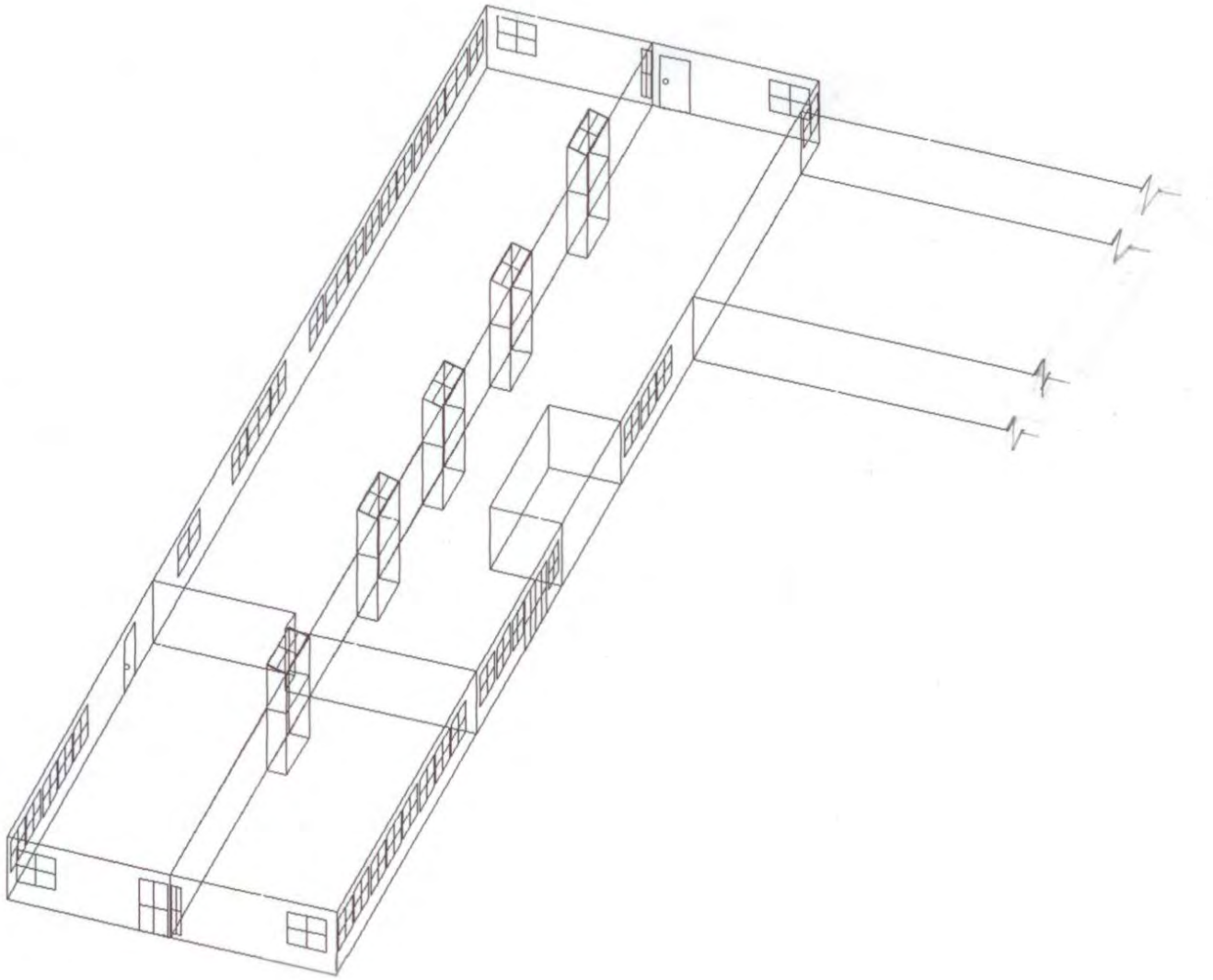

Gas Energy Use Savings
600
500
400
300
200
100
0
Therms/yr
Existing Gas Use
Gas use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
Lighting
All
Energy Improvements


Approx. Cost Savings per Year
Lighting
$563
Windows
$559
Attic & Flr Ins
$285
Attic Ins
$243

Structure 2

Karuk Administration, Health & Dental Complex
Happy Camp, CA

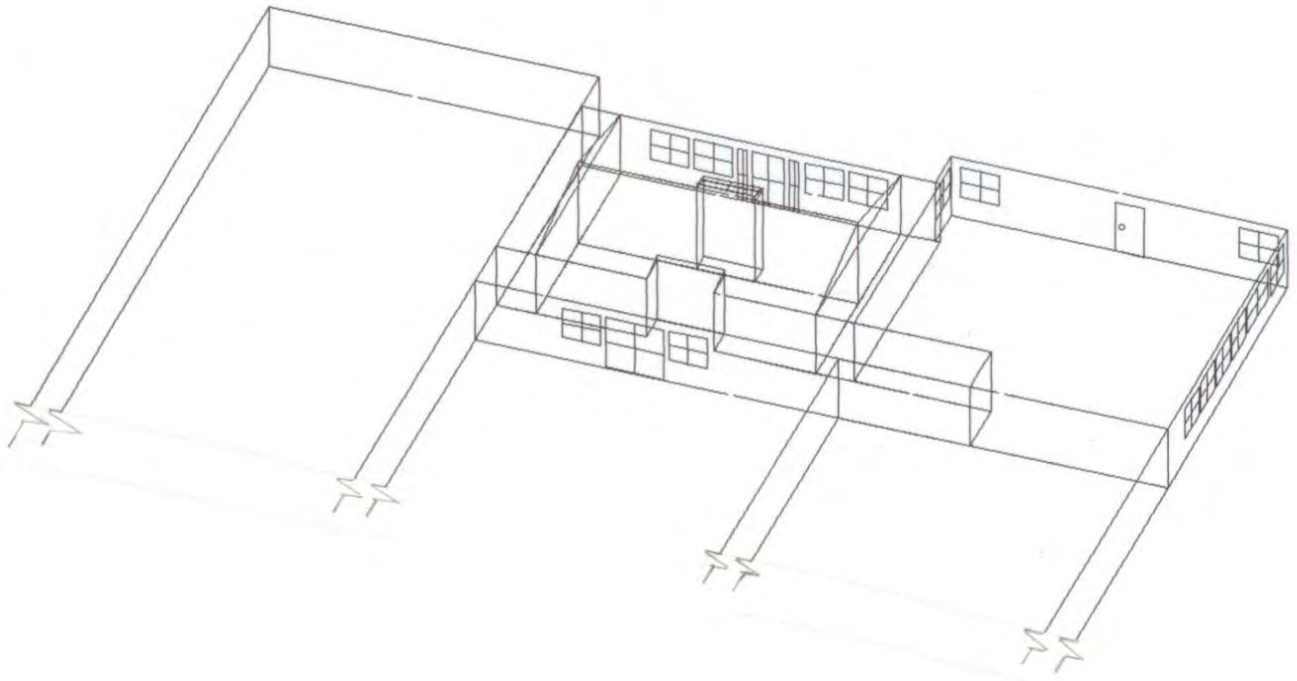
Administration, Planning Wing



Structure 2

Karuk Administration, Health & Dental Complex
Happy Camp, CA

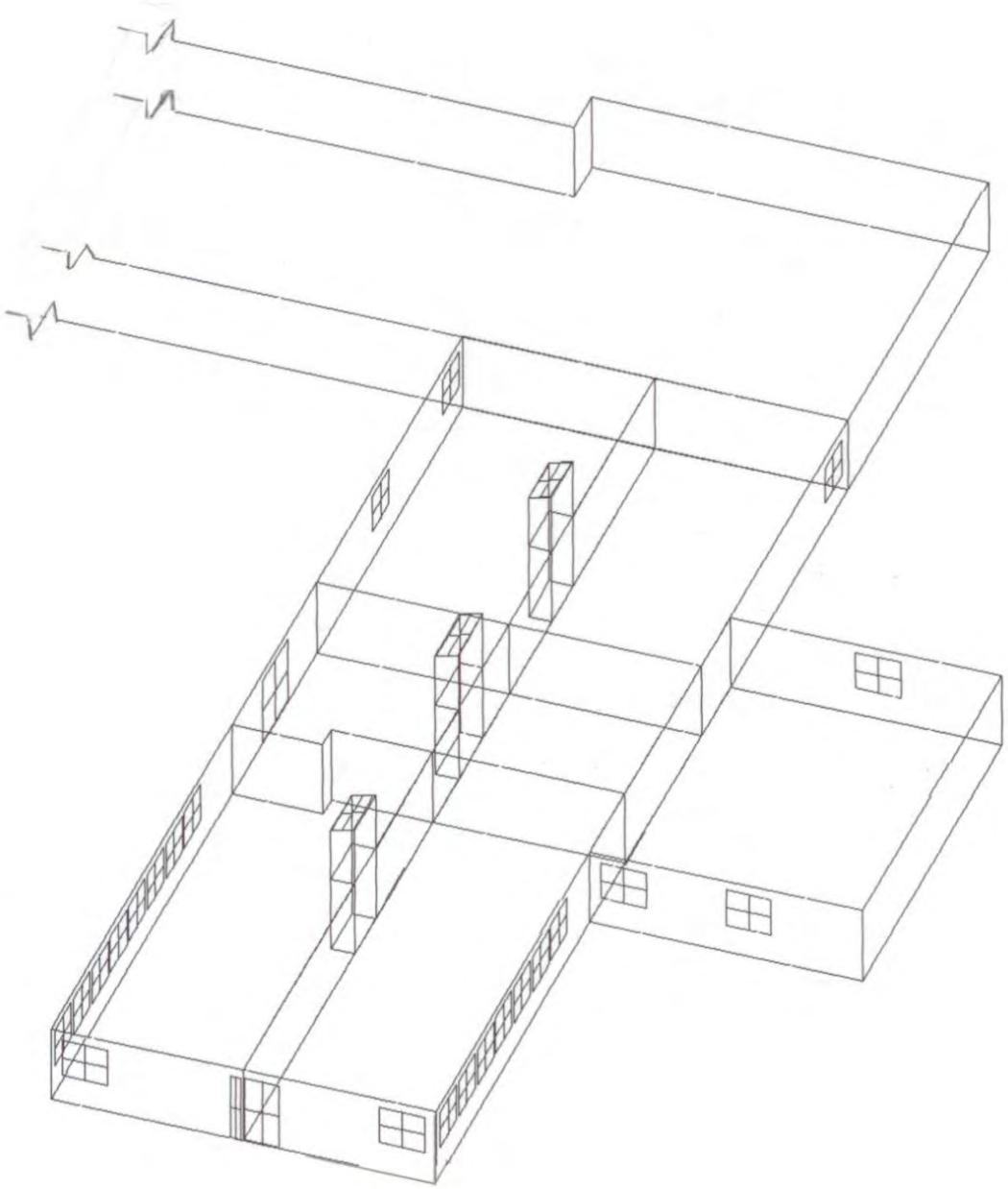
Health Wing



Structure 2

Karuk Administration, Health & Dental Complex
Happy Camp, CA

Dental Wing



Structure 2

Karuk Administration, Health and Dental Complex
Happy Camp, CA

Description:

- Total conditioned area: 11,092 ft^2
- One story, administration building including offices, health and dental exam and operation rooms, large multi-purpose meeting room, conference rooms, restrooms and storage rooms
- Built approximately 1995 to 2002 in separate stages
- Front Orientation: Southwest, 225°
- Climate Zone: 16
- Ceilings: Flat and vaulted
- Existing Insulation: Concrete masonry units with varied furring and rigid insulation, R-21 insulation in skylight wells, partial exterior underground walls, slab-on-grade floors, R-38 ceiling insulation
- Existing windows: Double pane, metal framed windows and doors with clear glass*
- Existing skylights: Single pane, metal framed with clear glass*
- Existing HVAC: Heat pumps and gas forced air units*
- Existing DHW: Electric 40 gallon storage water heaters, Energy Factor 0.98, electric tankless water heaters, Energy Factor 0.92
- Utility Service: Electricity $0.09699/Kilowatt Hour
  Propane $3.30/Therm
- Lighting Density: Lighting density has not been calculated for this building. Please see chart which explains maximum allowed wattages under California 2005 Title 24.

*- Indicates a default assumption

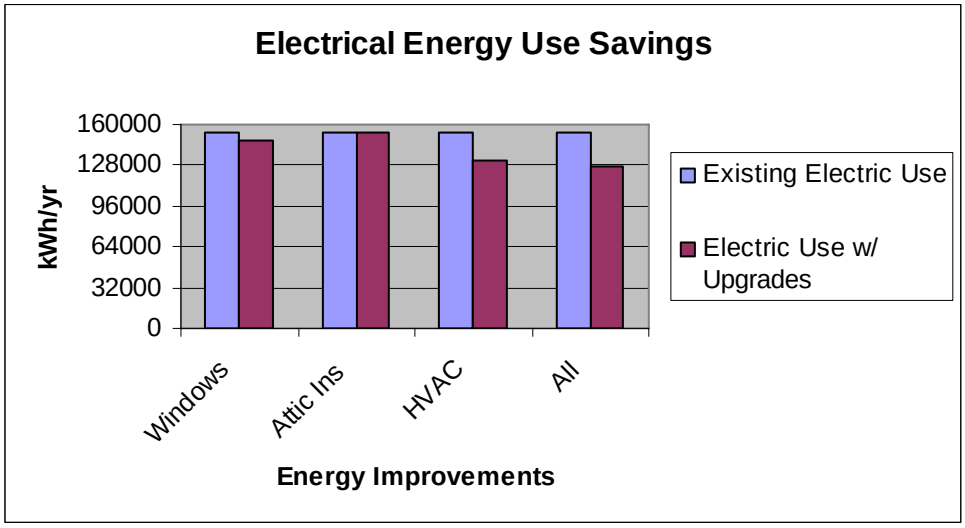
Structure 2

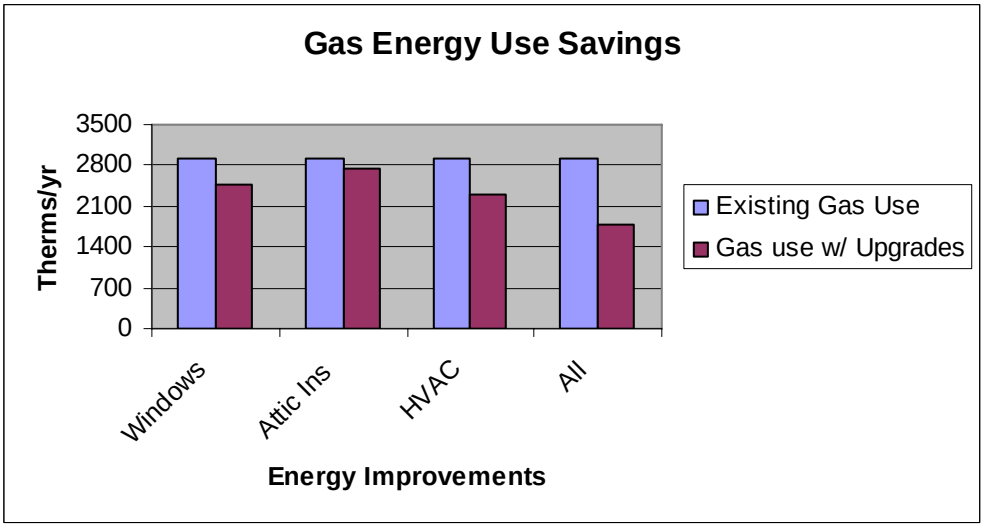
Karuk Administration, Health & Dental Complex
Happy Camp, CA

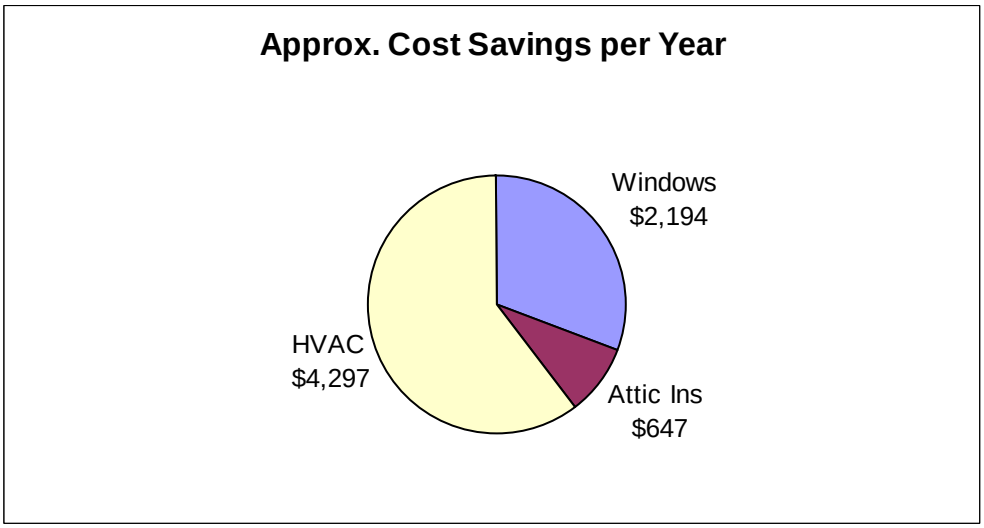
Energy Cost Savings Analysis for Envelope, HVAC, and DHW

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms	Possible Improvement	kWh/yr	therms	Electric	Gas	
Windows	Double Pane Metal Frame Clear, Skylights Single Metal Frame	154,391	2,916	Double Pane Vinyl Frame w/ Low E, Skylights NFRC rated	147,079	2,466	4.7%	15.4%	$2,194.19
Attic Insulation	R-38			R-49	153,945	2,733	0.3%	6.3%	$647.16
Attic & Floor Insulation	R-38, Slab			- - -	- - -	- - -	- - -	- - -	- - -
HVAC Zones: 1,2, 3, 4, 5, 6, 7 Dental Zones: 1, 2, 3, 4 Server Room	Assorted heat pumps 10 SEER, w/ Assorted Forced Air Units 92% Heating & Cooling units 10 SEER 8 HSPF R-8 duct wrap			All systems increased to 10 HSPF 16 SEER Perform duct testing and sealing	131,628	2,283	14.7%	21.7%	$4,296.68
Domestic Hot Water	Electric Storage EF 0.86 Electric Tankless EF 0.98			- - -	- - -	- - -	- - -	- - -	- - -
All Upgrades	All			All	127,841	1,780	17.2%	39.0%	$6,323.88

Structure 2


Electrical Energy Use Savings
160000
128000
96000
64000
32000
0
kWh/yr
Windows
Attic Ins
HVAC
All
Energy Improvements
Existing Electric Use
Electric Use w/ Upgrades


Gas Energy Use Savings
3500
2800
2100
1400
700
0
Therms/yr
Windows
Attic Ins
HVAC
All
Energy Improvements
Existing Gas Use
Gas use w/ Upgrades


Approx. Cost Savings per Year
Windows
$2,194
Attic Ins
$647
HVAC
$4,297

Karuk Administration, Health & Dental Complex
Administration Wing
Maximum Allowed Wattages under California's 2005 Title 24

Room/Number	Occupancy	Area	Allowed Watts/ft	Total Allowed Watts
Entry/Waiting 101	Lobby/Main Entry	438ft^2	1.5	657
Custodial 102	Commercial, Industrial Storage	55ft^2	0.6	33
Secretary 103	Office	206ft^2	1.2	247.2
Elect Data 104	Electrical/Mechanical Room	124ft^2	0.7	86.8
Office 105	Office	171ft^2	1.2	205.2
Coffee 106	Office	47ft^2	1.2	56.4
Toilet 107	Corridor/Restroom/Support	53ft^2	0.6	31.8
Workroom 108	Office	258ft^2	1.2	309.6
Fiscal 109	Office	578ft^2	1.2	693.6
Office 110	Office	145ft^2	1.2	174
Office 111	Office	138ft^2	1.2	165.6
Office 112	Office	253ft^2	1.2	303.6
Hall 113	Corridor/Restroom/Support	223ft^2	0.6	133.8
Conference 114	Convention/Conference/Meeting	241ft^2	1.4	337.4
Restrooms 115/116	Corridor/Restroom/Support	109ft^2	0.6	65.4
Mechanical 117	Electrical/Mechanical Room	123ft^2	0.7	86.1
Files/Coffee 118	Office	123ft^2	1.2	147.6
Census/Enrollment 119	Office	273ft^2	1.2	327.6
Office 120	Office	145ft^2	1.2	174
Office 121	Office	145ft^2	1.2	174
Office 122	Office	138ft^2	1.2	165.6
Office 123	Office	138ft^2	1.2	165.6
Office 124	Office	138ft^2	1.2	165.6
Office 123	Office	138ft^2	1.2	165.6
		Total		5072.1 watts

Karuk Administration,
Health & Dental Complex
Health Wing

Maximum Allowed Wattages under California's 2005 Title 24

Room/Number	Occupancy	Area	Allowed Watts/ft	Total Allowed Watts
Meeting Room 201	Convention/Conference/Meeting	740ft^2	1.4	1036
Office 202	Office	238ft^2	1.2	285.6
Office 203	Office	174ft^2	1.2	208.8
Office 204	Office	135ft^2	1.2	226.8
Office 205	Office	189ft^2	1.2	226.8
Men RR 206	Corridor/Restroom/Support	49ft^2	0.6	29.4
Women RR 207	Corridor/Restroom/Support	49ft^2	0.6	29.4
Corridor 208	Corridor/Restroom/Support	166ft^2	0.6	99.6
Corridor 209	Corridor/Restroom/Support	328ft^2	0.6	196.8
Storage 210	Commercial, Industrial Storage	60ft^2	0.6	36
Storage 211	Commercial, Industrial Storage	48ft^2	0.6	28.8
Mechanical 212	Electrical/Mechanical Room	18ft^2	0.7	12.6
		Total		2416.6 Watts

Karuk Administration, Health & Dental Complex
Dental Wing
Maximum Allowed Wattages under California's 2005 Title 24

Room/Number	Occupancy	Area	Allowed Watts/ft	Total Allowed Watts
Medical Exam 101	Medical/Clinical Care	152ft^2	1.2	182.4
Medical Exam 102	Medical/Clinical Care	152ft^2	1.2	182.4
Records 103	Medical Records	100ft^2	1.8	180
Medical Office 104	Office	152ft^2	1.2	182.4
Storage 105	Corridor/Restroom/Support	36ft^2	0.6	21.6
Utility 106	Commercial/Industrial/Storage	29ft^2	0.6	17.4
Pharmacy 107	Pharmacy/Medicine Room	35ft^2	1.2	42
Unisex 108	Corridor/Restroom/Support	49ft^2	0.6	29.4
Corridor 109	Corridor/Restroom/Support	294ft^2	0.6	176.4
Medical Lab 110	Laboratory	79ft^2	1.8	142.2
Reception 111	Office	84ft^2	1.2	100.8
Men 112	Corridor/Restroom/Support	52ft^2	0.6	31.2
Tele/Data 113	Electrical/Mechanical Room	28ft^2	0.7	19.6
Lobby 114	Lobby/Main Entry	471ft^2	1.5	706.5
Women 115	Corridor/Restroom/Support	52ft^2	0.6	31.2
Corridor 116	Corridor/Restroom/Support	33ft^2	0.6	19.8
Dental Lab 117	Laboratory	116ft^2	1.8	208.8
Operatory 118	Operating Room	196ft^2	2.2	431.2
Operatory 119/120	Operating Room	334ft^2	2.2	734.8
Dental Office 121	Office	123ft^2	1.2	147.6
Conference 122	Convention/Conference/Meeting	157ft^2	1.4	219.8
Office 123	Office	138ft^2	1.2	165.6
Open Office 124	Office	283ft^2	1.2	339.6
Corridor 125	Corridor/Restroom/Support	330ft^2	0.6	198

- Continued next page -

Karuk Administration, Health & Dental Complex Dental Wing – Cont'd

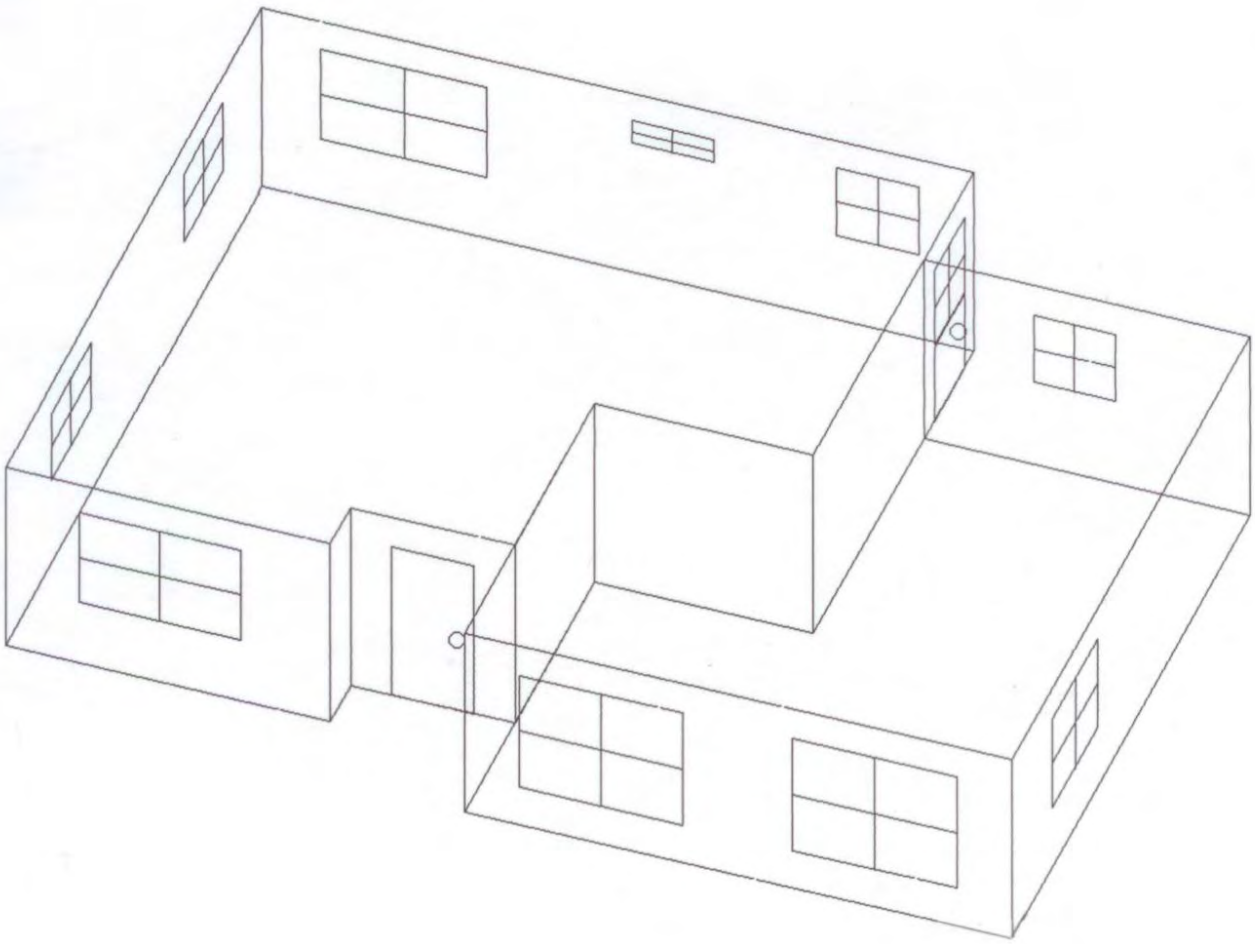
Maximum Allowed Wattages under California's 2005 Title 24

Room/Number	Occupancy	Area	Allowed Watts/ft	Total Allowed Watts
Office 126	Office	145ft^2	1.2	174
Office 127	Office	132ft^2	1.2	158.4
Office 128	Office	125ft^2	1.2	150
Office 129	Office	138ft^2	1.2	165.6
Copier 130	Office	100ft^2	1.2	120
Mechanical 131	Electrical/Mechanical Room	42ft^2	0.7	29.4
Mechanical 132	Electrical/Mechanical Room	45ft^2	0.7	31.5
Mechanical 133	Electrical/Mechanical Room	14ft^2	0.7	9.8
		Total		5349.4 Watts

Spaces have been named according to their referenced labels from the architectural drawings provided for this analysis.
Please see "Modeling Assumptions" for guidelines on calculating total wattages for non-residential buildings.

Structure 3

230 Axak
Orleans, CA



Structure 3

230 Axak
Orleans, CA

Description:

- Total conditioned area: 976 ft^2
- One story, single family, 2 bedroom house
- Built approximately 1994
- Front Orientation: East, 90˚
- Climate Zone: 2
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, slab on-grade floor, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Combined hydronic forced air system incorporating domestic water heater and air handler, evaporative cooling,* R-4.2 duct wrap*, wood stove as a secondary heating source (not modeled)
- Existing DHW: Propane 50 gallon storage tank with Energy Factor of 0.525*
- Utility Service: Electricity $0.11559/Kilowatt hour
  Propane $3.30 / Therm
- Lighting density: 1.3 Watts/ ft^2 @ 976 ft^2 ≈(13) 100 watt incandescent bulbs

* - Indicates a default assumption

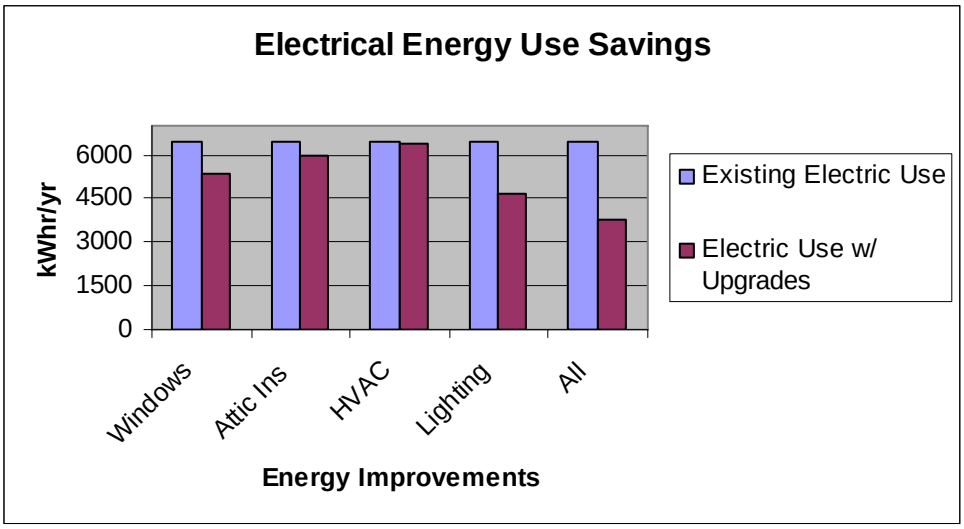
Structure 3

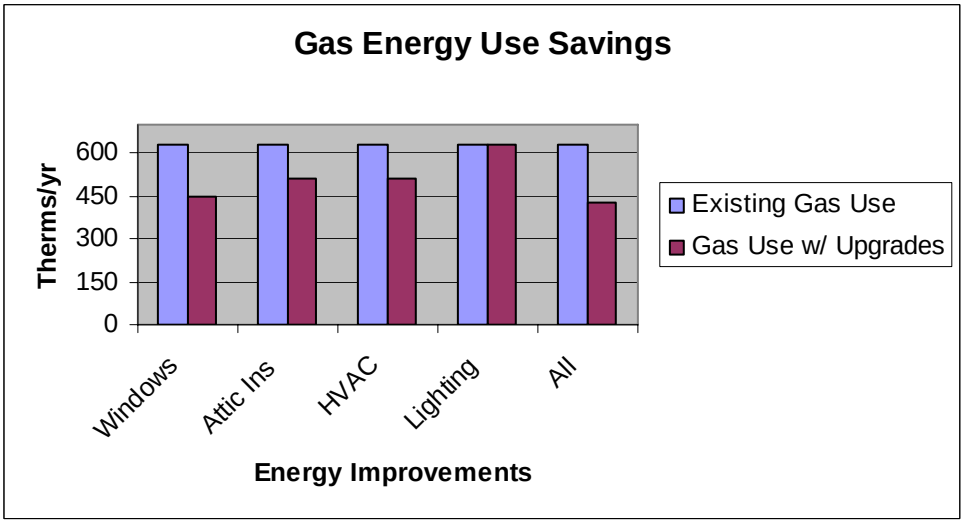
230 Axak
Orleans, CA

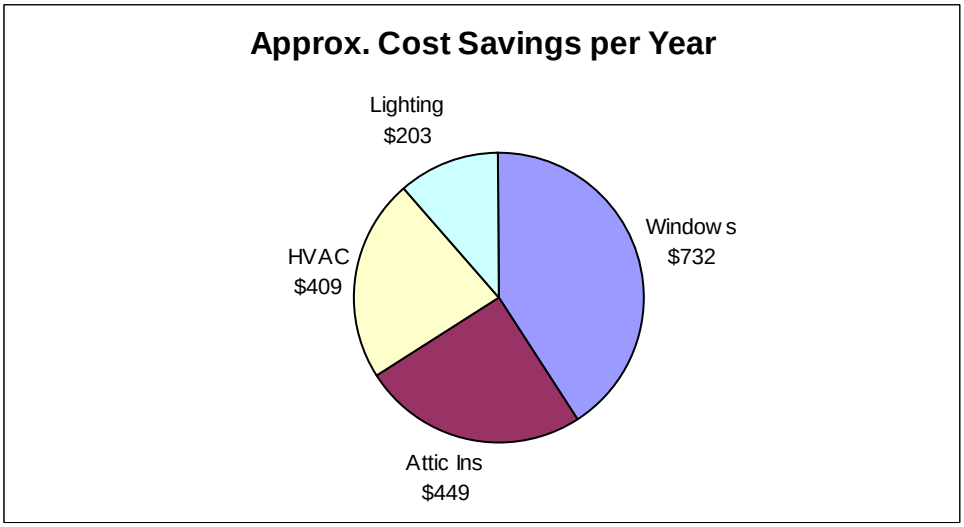
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	6,452	633	Double Pane Vinyl Frame w/ Low E	5,376	449	16.7%	29.1%	$731.57
Attic Insulation	R-38			R-49	5,995	513	7.1%	19%	$448.82
Attic & Floor Insulation	R-38, R-19, Slab			- - -	- - -	- - -	- - -	- - -	- - -
Combined Hydronic HVAC & DHW	Combined Hydronic w/ air handler R-4.2 duct wrap Propane DHW EF 0.525			R-6 duct wrap perform duct sealing and testing Propane DHW EF 0.62	6,396	511	0.9%	19.3%	$409.07
Lighting	(13) 100 Watt Incandescent			(13) 26 Watt Compact Fluorescent	4,696	633	27.2%	0%	$202.98
All Upgrades	All			All	3,806	427	41.0%	32.5%	$985.65

Structure 3

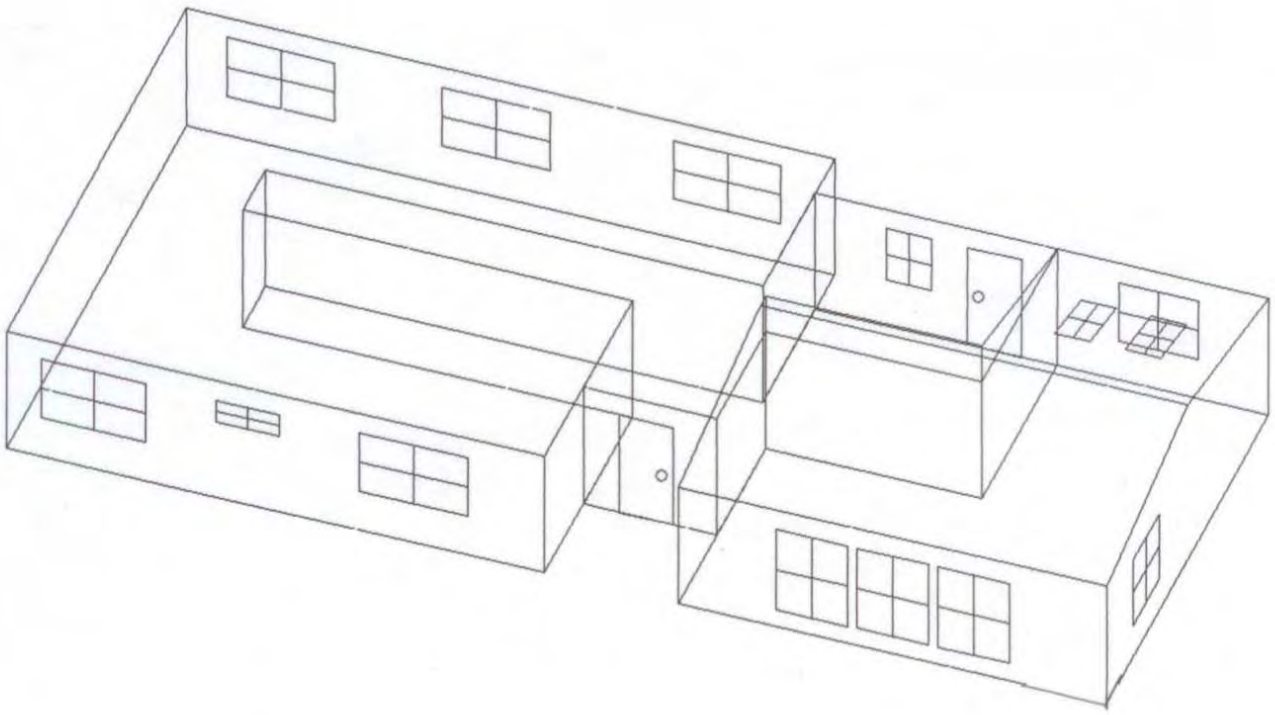

Electrical Energy Use Savings
kWhr/yr
6000
4500
3000
1500
0
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements
Existing Electric Use
Electric Use w/ Upgrades


Gas Energy Use Savings
Therms/yr
600
450
300
150
0
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements
Existing Gas Use
Gas Use w/ Upgrades


Approx. Cost Savings per Year
Lighting
$203
Windows
$732
HVAC
$409
Attic Ins
$449

Structure 4

610 Jacobs Way
Happy Camp, CA



Structure 4

610 Jacobs Way
Happy Camp, CA

Description:

- Total conditioned area: 1610 ft^2
- One story, single family, 5 bedroom home
- Built approximately 1992
- Front Orientation: West, 270˚
- Climate Zone: 16
- Ceilings: Flat and vaulted
- Existing insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing Skylights: Double dome acrylic curb mount*
- Existing HVAC: 1500 watt* electric baseboard heaters in bedrooms and bathrooms, wood stove as a secondary heat source (not modeled)
- Existing DHW: Electric 50 gallon storage tank, Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
- Lighting density: 1.3 Watts/ ft^2 @ 1610 $ft^2 \approx$ (21) 100 watt incandescent bulbs

* - Indicates a default assumption

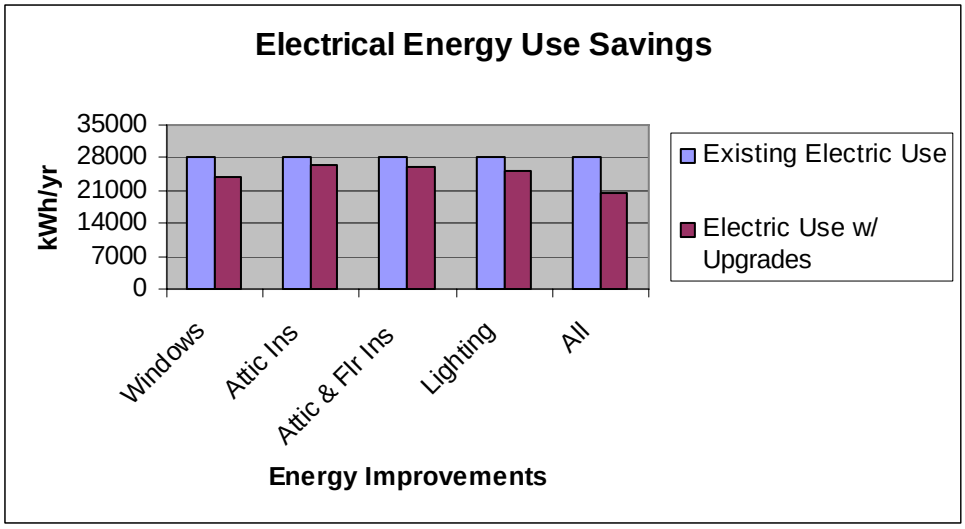
Structure 4

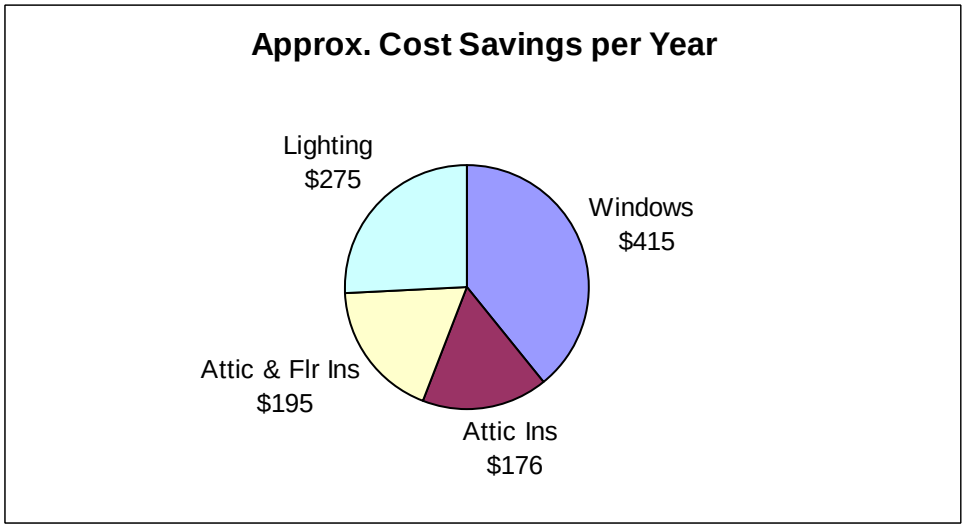
610 Jacobs Way
Happy Camp, CA

Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear Skylights Double Dome Acrylic curb mount			Double Pane Vinyl Frame w/ Low E, Skylights NFRC rated	23,909	- - -	15.2%	- - -	$415.41
Attic Insulation	R-38			R-49	26,373	- - -	6.5%	- - -	$176.42
Attic & Floor Insulation	R-38, R-19			R-49, R-22	26,186	- - -	7.1%	- - -	$194.56
HVAC	Electric Baseboards	28,192	- - -	- - -	- - -	- - -	- - -	- - -	- - -
Domestic Hot Water	Electric EF 0.89			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(21) 100 Watt Incandescent			(21) 26 Watt Compact Fluorescent	25,355	- - -	10.1%	- - -	$275.16
All Upgrades	All			All	20,502	- - -	27.3%	- - -	$745.85

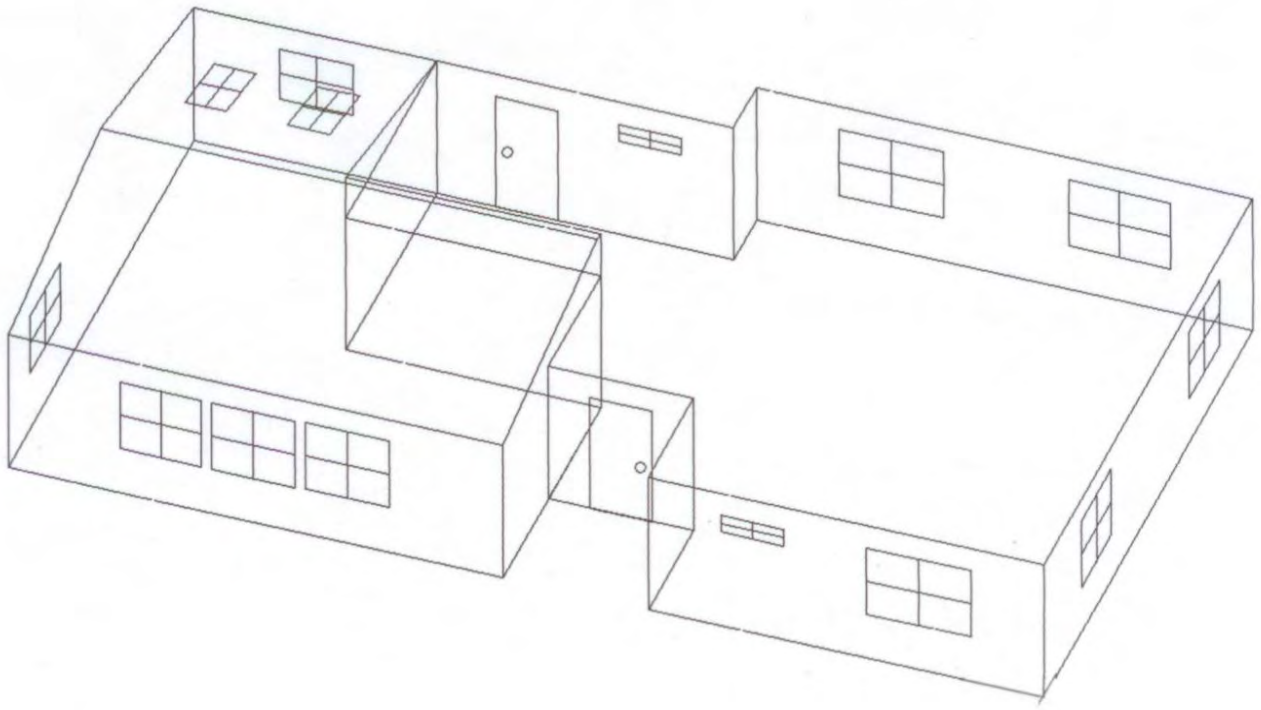
Structure 4


Electrical Energy Use Savings
35000
28000
21000
14000
7000
0
kWh/yr
Existing Electric Use
Electric Use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
Lighting
All
Energy Improvements


Approx. Cost Savings per Year
Lighting $275
Windows $415
Attic & Flr Ins $195
Attic Ins $176

Structure 5

63538 Itroop
Happy Camp, CA



Structure 5

63538 Itroop
Happy Camp, CA

Description:

- Total conditioned area: 1280 ft^2
- One story, single family, 3 bedroom home
- Built approximately 1997
- Front Orientation: East-southeast, 113˚
- Climate Zone: 16
- Ceilings: Flat and vaulted
- Existing insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing skylights: Double dome acrylic curb mount*
- Existing HVAC: Propane Payne PY1PNB03606, 83% efficient roof mounted forced air unit with cooling*, R-4.2 duct wrap*, home also has a fuel oil stove as a secondary heating source (not modeled)
- Existing DHW: Propane Rheem 41V50P, 50 gallon storage tank, Energy Factor of 0.54
- Utility Service: Electricity $0.09699/Kilowatt hour
  Propane $3.30/Therm
- Lighting density: 1.3 Watts/ft^2@ 1280 ft^2 ≈(17) 100 watt incandescent bulbs

* - Indicates a default assumption

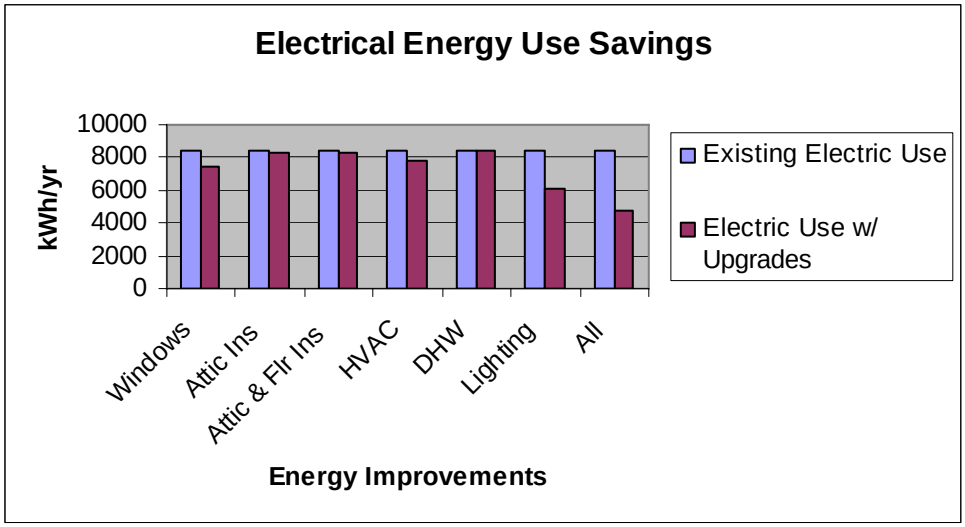
Structure 5

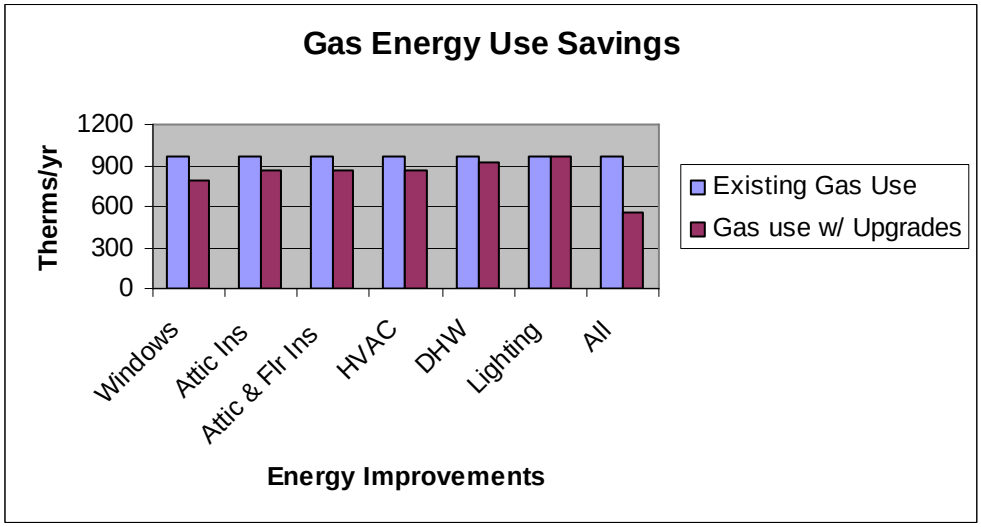
63538 Itroop
Happy Camp, CA

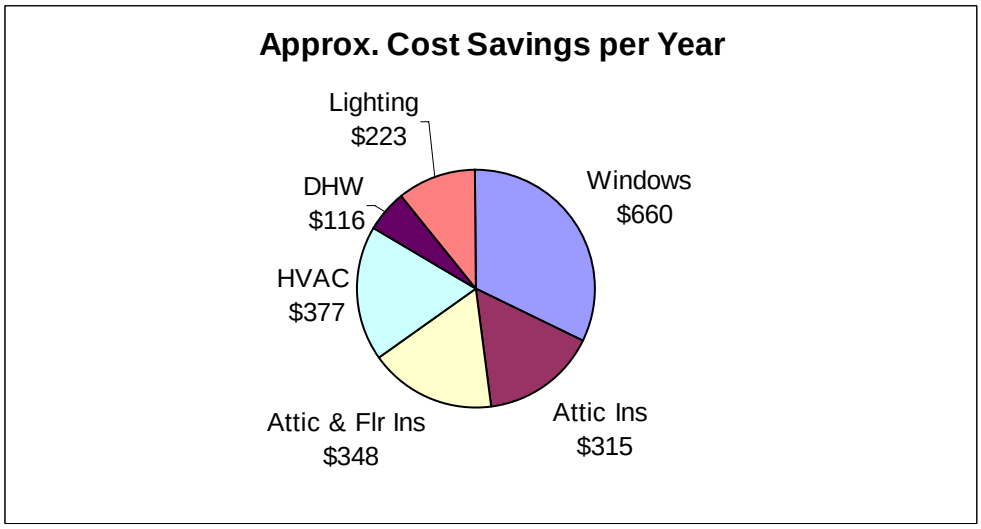
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear, Skylights Double Dome Acrylic	8,376	961	Double Pane Vinyl Frame w/ Low E, Skylights NFRC rated	7,493	787	10.5%	18.1%	$659.84
Attic Insulation	R-38			R-49	8,323	867	0.6%	9.8%	$315.34
Attic & Floor Insulation	R-38, R-19			R-49 R-22	8,322	857	0.6%	10.8%	$348.44
HVAC	Propane FAU 83%, 9.7 SEER, R-4.2 duct wrap			Propane FAU 92%, 16 SEER R-6 duct wrap, Perform duct testing and sealing	7,752	865	7.4%	10%	$377.32
Domestic Hot Water	Propane EF 0.54			Propane EF 0.62	8,376	926	0%	3.6%	$115.50
Lighting	(17) 100 Watt Incandescent			(17) 26 Watt Compact Fluorescent	6,080	961	27.4%	0%	$222.69
All Upgrades	All			All	4,740	563	43.4%	41.4%	$1,666.06

Structure 5

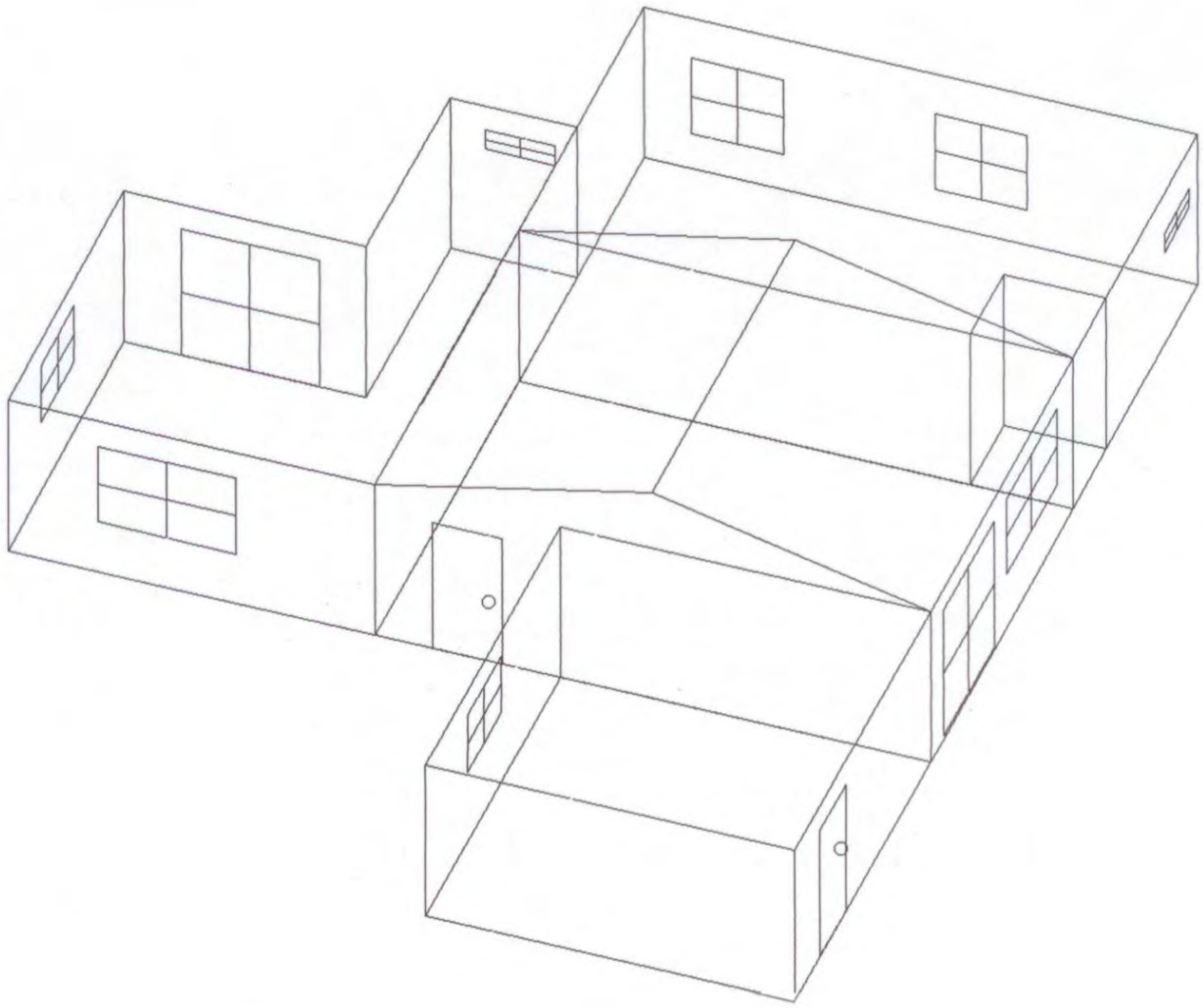

Electrical Energy Use Savings
10000
8000
6000
4000
2000
0
kWh/yr
Existing Electric Use
Electric Use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
HVAC
DHW
Lighting
All
Energy Improvements


Gas Energy Use Savings
1200
900
600
300
0
Therms/yr
Existing Gas Use
Gas use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
HVAC
DHW
Lighting
All
Energy Improvements


Approx. Cost Savings per Year
Lighting
$223
Windows
$660
DHW
$116
HVAC
$377
Attic & Flr Ins
$348
Attic Ins
$315

Structure 6

1529 Apsuun Way
Yreka, CA



Structure 6

1529 Apsuun Way
Yreka, CA

Description:

- Total conditioned area: 1303 ft^2
- One story, single family, 2 bedroom home
- Built approximately 2001
- Front Orientation: Northeast, 45˚
- Climate Zone: 16
- Ceilings: Flat and vaulted
- Existing insulation: 2 x 6 wood framing with R-19 wall insulation, slab on grade floors, R-38 ceiling insulation
- Existing windows: Double pane, vinyl framed with clear glass*
- Existing HVAC: Weatherking WRKA-A036JKD6E 76%†, 10 SEER*, R-4.2 duct wrap*
- Existing DHW: Propane State Select PR6 40 POCT, 40 gallon storage tank, Energy Factor of 0.62
- Utility Service: Electricity $0.09699/Kilowatt hour
  Propane $3.30/Therm
- Lighting density: 1.3 Watts/ft^2 @ 1303 ft^2 ≈(17) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

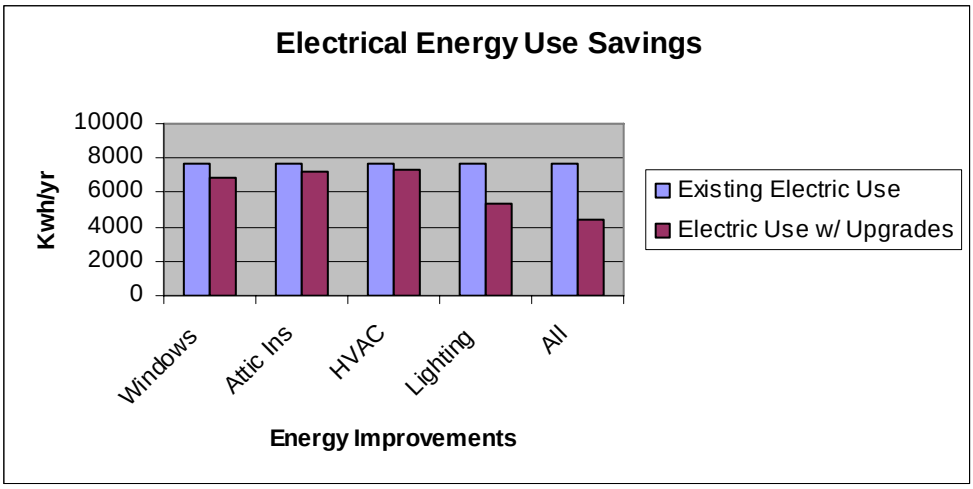
Structure 6

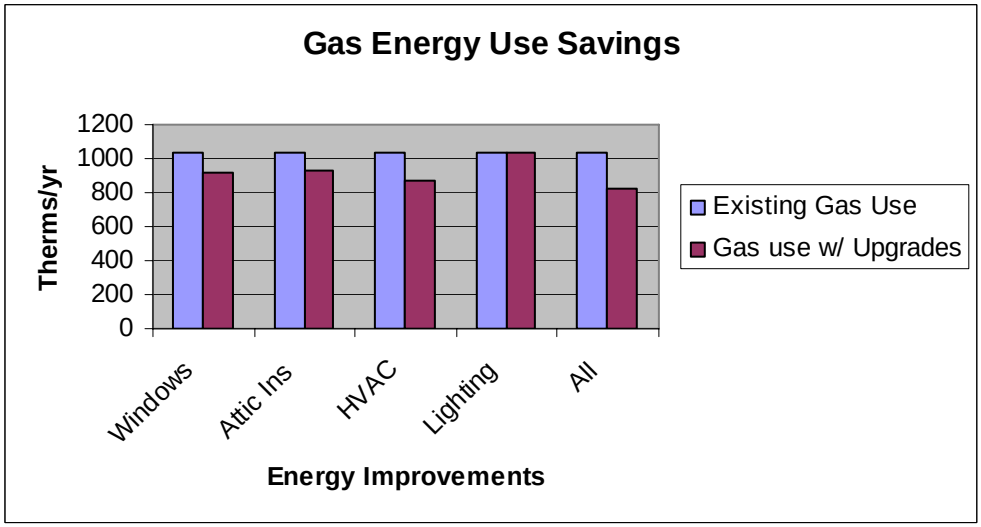
1529 Apsuun Way
Yreka, CA

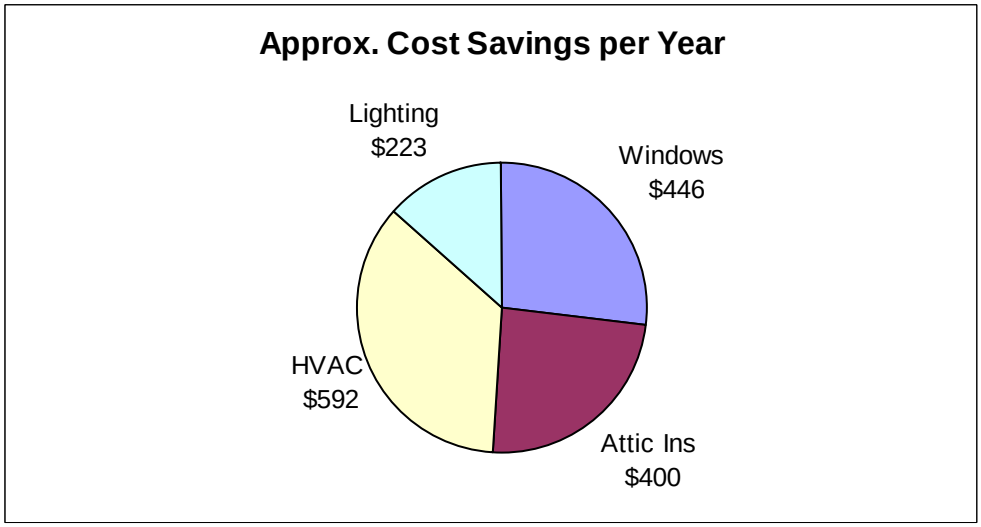
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Vinyl Frame Clear	7,637	1,036	Double Pane Vinyl Frame w/ Low E	6,879	923	9.9%	10.9%	$446.42
Attic Insulation	R-38			R-49	7,259	926	4.9%	10.6%	$399.66
Attic & Floors Insulation	R-38, Slab			- - -	- - -	- - -	- - -	- - -	- - -
HVAC	Heating & Cooling unit 76%, 10 SEER, R-4.2 duct wrap			Heating & Cooling unit 92%, 16 SEER, R-6 duct wrap, perform duct testing and sealing	7,314	866	4.2%	16.4%	$592.33
Domestic Hot Water	Propane EF 0.62			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(17) 100 Watt Incandescent			(17) 26 Watt Compact Fluorescent	5,341	1036	30.1%	0%	$222.69
All Upgrades	All			All	4,619	827	39.5%	20.2%	$982.40

Structure 6

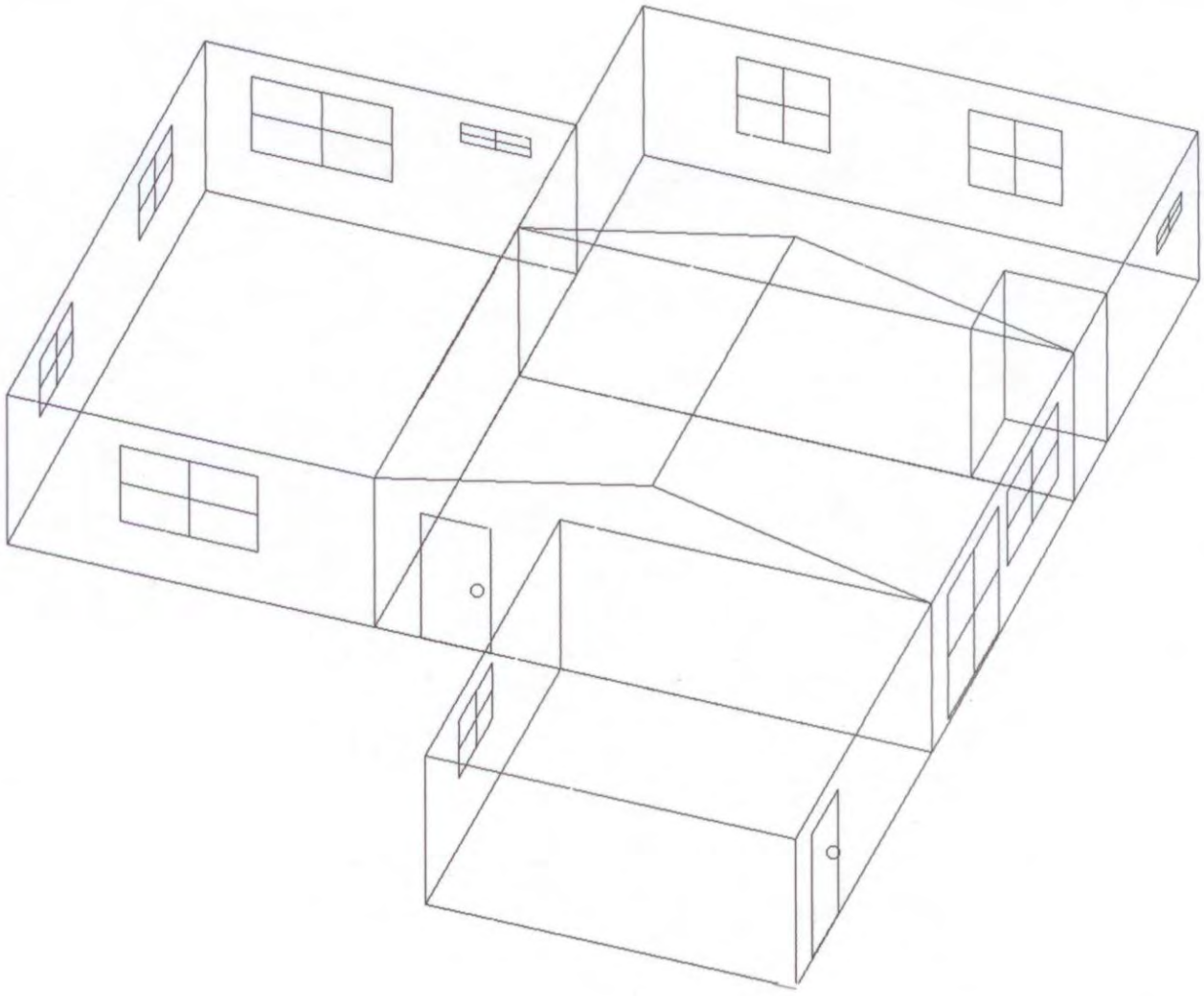

Electrical Energy Use Savings
10000
8000
6000
4000
2000
0
Kwh/yr
Existing Electric Use
Electric Use w/ Upgrades
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements


Gas Energy Use Savings
1200
1000
800
600
400
200
0
Therms/yr
Existing Gas Use
Gas use w/ Upgrades
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements


Approx. Cost Savings per Year
Lighting
$223
Windows
$446
HVAC
$592
Attic Ins
$400

Structure 7

1449 Apsuun Way
Yreka, CA



Structure 7

1449 Apsuun Way
Yreka, CA

Description:

- Total conditioned area: 1408 ft^2
- One story, single family, 3 bedroom home
- Built approximately 2001
- Front Orientation: Northeast, 45˚
- Climate Zone: 16
- Ceilings: Flat and vaulted
- Existing insulation: 2 x 6 wood framing with R-19 wall insulation, slab on grade floors, R-38 ceiling insulation
- Existing windows: Double pane, vinyl framed with clear glass*
- Existing HVAC: Weatherking WRKA-A036JKD6E 76%†, 10 SEER*, R-4.2 duct wrap*
- Existing DHW: Propane State Select PR6 40 POCT 52, 40 gallon storage tank, Energy Factor of 0.62
- Utility Service: Electricity $0.09699/Kilowatt hour
  Propane $3.30/Therm
- Lighting density: 1.3 Watts/ ft^2 @ 1408 ft^2 ≈(18) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

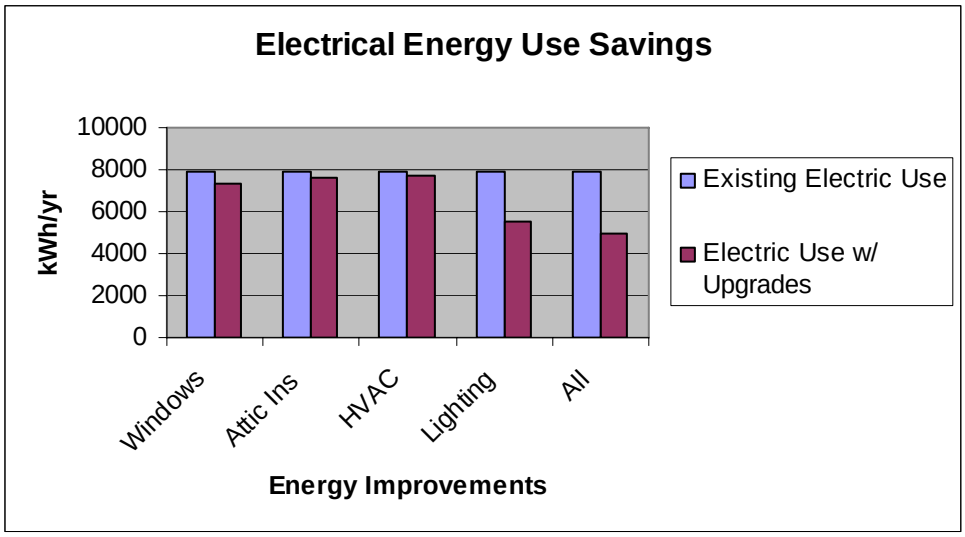
Structure 7

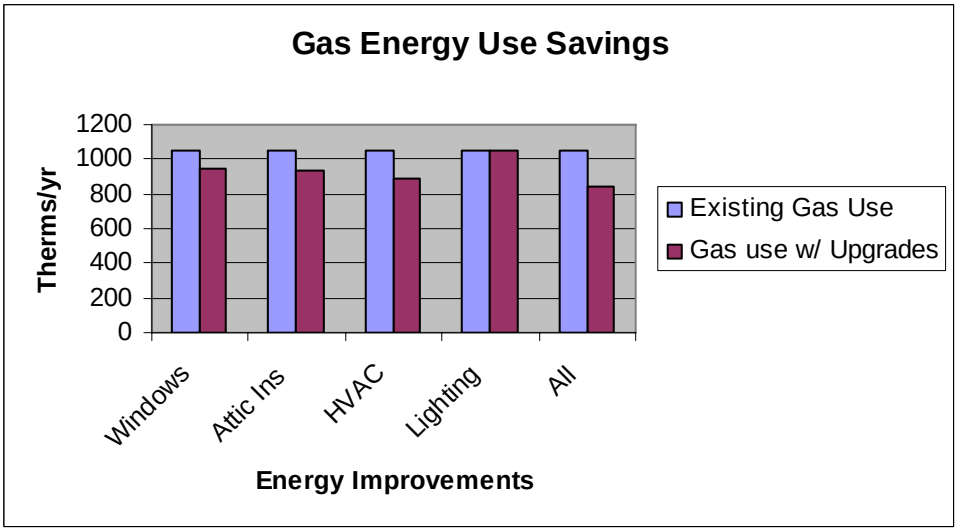
1449 Apsuun Way
Yreka, CA

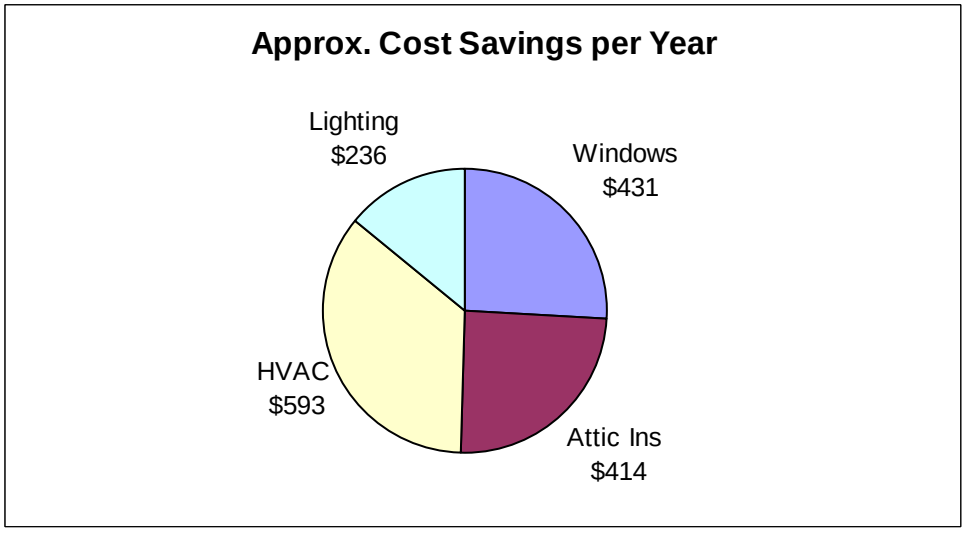
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh	therms	Electric	Gas	
Windows	Double Pane Vinyl Frame Clear	7,938	1,055	Double Pane Vinyl Frame w/ Low E	7,308	943	7.9%	10.6%	$430.70
Attic Insulation	R-38			R-49	7,586	940	4.4%	10.9%	$413.64
Attic & Floors Insulation	R-38, Slab			- - -	- - -	- - -	- - -	- - -	- - -
HVAC	Propane FAU 76%, 10 SEER, R-4.2 duct wrap			Propane FAU 92%, 16 SEER, R-6 duct wrap perform duct testing and sealing	7,671	883	3.4%	16.3%	$593.50
Domestic Hot Water	Propane EF 0.62			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(18) 100 Watt Incandescent			(18) 26 Watt Compact Fluorescent	5,507	1,055	30.6%	0%	$235.78
All Upgrades	All			All	4,905	847	38.2%	19.7%	$980.56

Structure 7

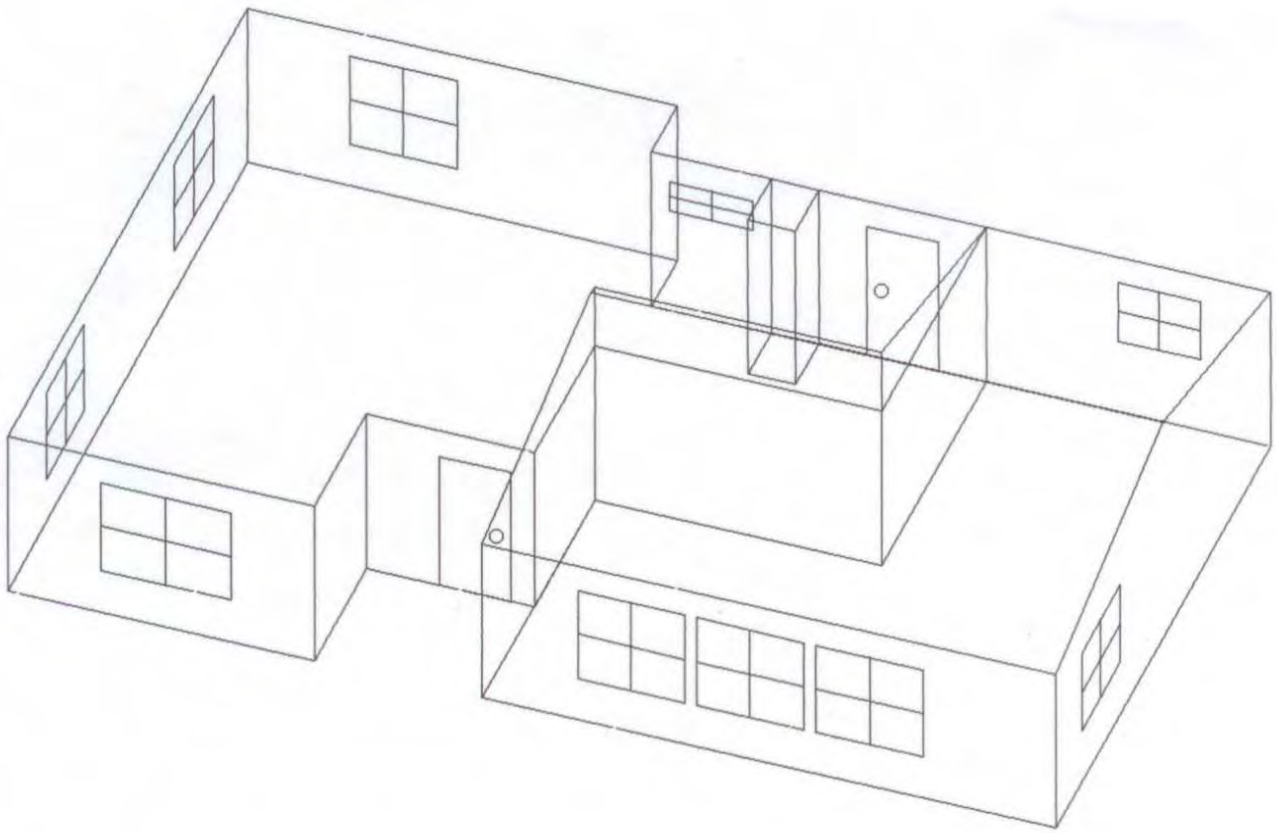

Electrical Energy Use Savings
10000
8000
6000
4000
2000
0
kWh/yr
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements
Existing Electric Use
Electric Use w/ Upgrades


Gas Energy Use Savings
1200
1000
800
600
400
200
0
Therms/yr
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements
Existing Gas Use
Gas use w/ Upgrades


Approx. Cost Savings per Year
Lighting
$236
Windows
$431
HVAC
$593
Attic Ins
$414

Structure 8

440 Vursur Impah
Happy Camp, CA



Structure 8

440 Virsur Impah
Happy Camp, CA

Description:

- Total conditioned area: 1112 ft^2
- One story, single family, 2 bedroom home
- Built approximately 1997
- Front Orientation: North, 0˚
- Climate Zone: 16
- Ceilings: Flat and vaulted
- Existing insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Propane roof mounted HVAC 78%*, Unitary Products Air Conditioner H2RA030506D, 9.7 SEER*, R-4.2 duct wrap*
- Existing DHW: Propane Rheem 41V50P, 50 gallon storage tank, Energy Factor of 0.54
- Utility Service: Electricity $0.09699 / Kilowatt hour
  Propane $3.30 / Therm
- Lighting density: 1.3 Watts/ft^2 @ 1112 ft^2 ≈(14) 100 watt incandescent bulbs

* - Indicates a default assumption

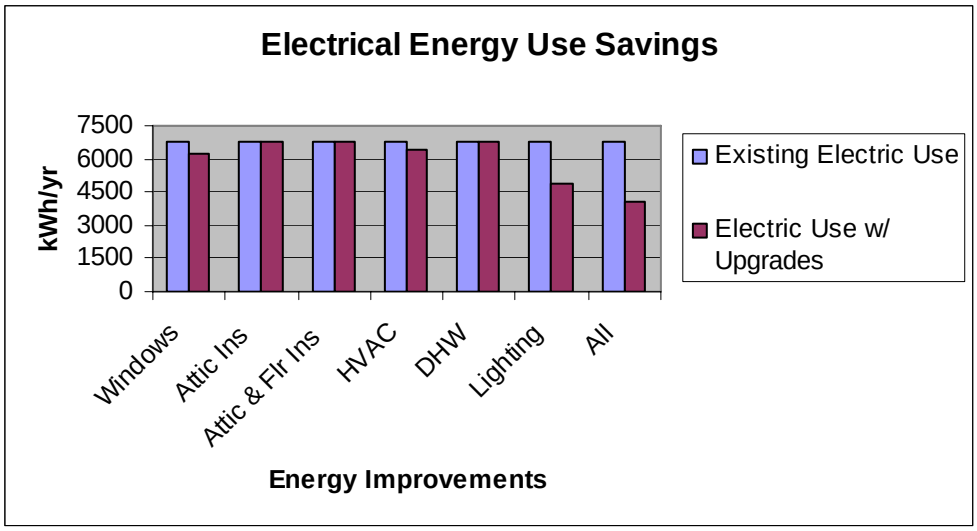
Structure 8

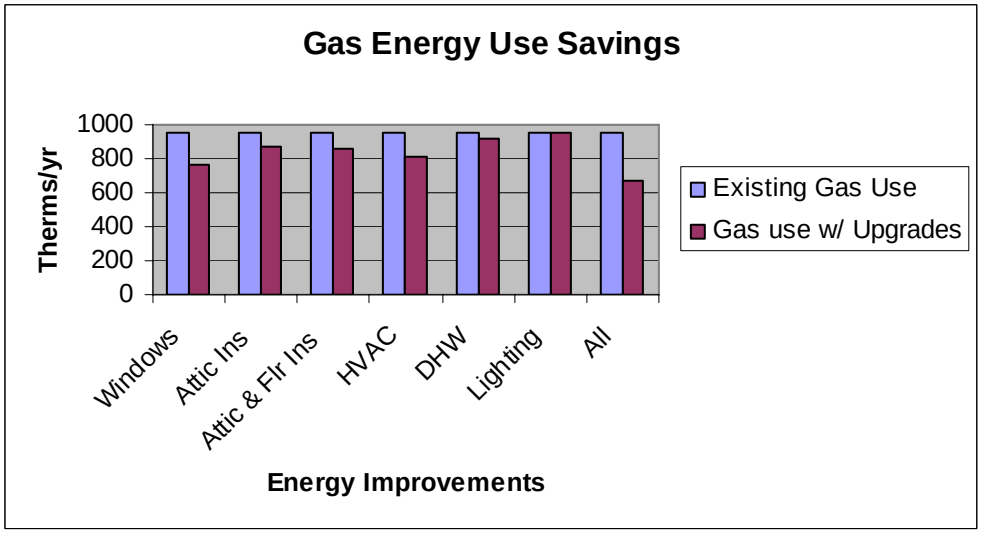
440 Virsur Impah
Happy Camp, CA

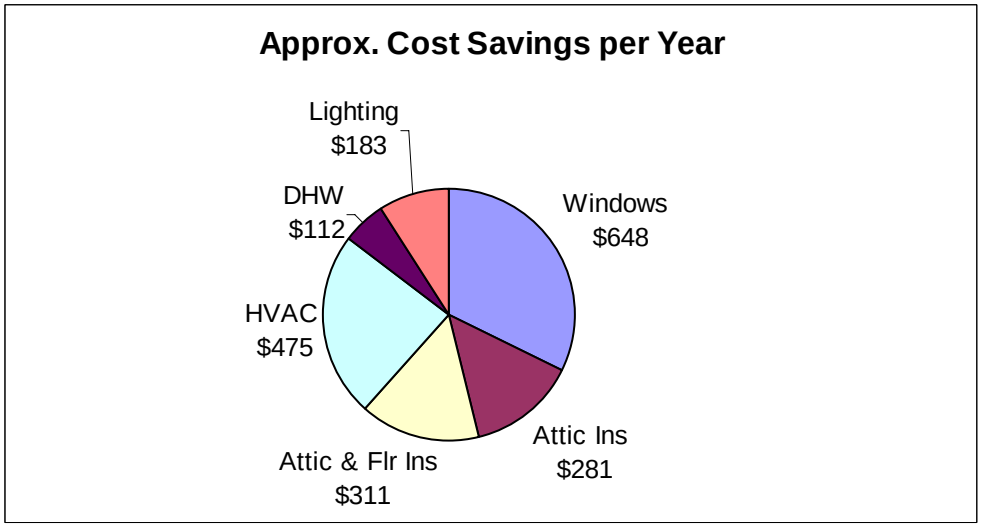
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	6,797	949	Double Pane Vinyl Frame w/ Low E	6,241	769	8.2%	19%	$647.93
Attic Insulation	R-38			R-49	6,754	865	0.6%	8.9%	$281.37
Attic & Floor Insulation	R-38, R-19			R-49, R-22	6,754	856	0.6%	9.8%	$311.07
HVAC	Propane FAU 78%, A/C 9.7 SEER, R-4.2 duct wrap			Propane FAU 92%, A/C 16 SEER, R-6 duct wrap, perform duct testing and sealing	6,387	817	6%	13.9%	$475.37
Domestic Hot Water	Propane EF 0.54			Propane EF 0.62	6,797	915	0%	3.6%	$112.20
Lighting	(14) 100 Watt Incandescent			(14) 26 Watt Compact Fluorescent	4,906	949	27.8%	0%	$183.41
All Upgrades	All			All	4,090	670	39.8%	29.4%	$1,183.22

Structure 8


Electrical Energy Use Savings
7500
6000
4500
3000
1500
0
kWh/yr
Existing Electric Use
Electric Use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
HVAC
DHW
Lighting
All
Energy Improvements


Gas Energy Use Savings
1000
800
600
400
200
0
Therms/yr
Existing Gas Use
Gas use w/ Upgrades
Windows
Attic Ins
Attic & Flr Ins
HVAC
DHW
Lighting
All
Energy Improvements


Approx. Cost Savings per Year
Lighting
$183
DHW
$112
Windows
$648
HVAC
$475
Attic Ins
$281
Attic & Flr Ins
$311

Structure 8

Materials Cost Analysis

Estimated cost of materials for upgrades are based on commonly used building materials and home appliances which are widely available at many retail outlets. Cost estimates given are for the specific material named and do not include installation, delivery fees, taxes or other associated costs. All costs are estimates only and may vary by brand, store, quality and/or region.

New attic insulation may be added over existing insulation to increase its effectiveness so long as the integrity of the existing insulation has not been compromised. Inspect insulation carefully to determine if the existing insulation should be replaced with a higher quality material.

Adding insulation to floors is not practical or cost effective. Older existing floor insulation is easily damaged due to sagging, animal activity under houses, moisture and a variety of other causes which lower its effective R-value. The best way to improve insulation in floors is to remove old insulation and replace it with new high quality materials.

Material/ Equipment	Estimated Price	Materials Required	Estimated Cost of Material/Equipment
R-11 Batt Attic Insulation	$0.23 / sf	1,121 sf	$257.83
R-22 Batt Floor Insulation	$0.85 / sf	1,112 sf	$945.20
Vinyl Framed Double Pane Windows w/ Low E	$14.58 / sf	180 sf	$2,624.40
Propane Water Heater Energy Factor 0.62	$459.00	1 unit	$459.00
		Total Estimated Cost of Materials	**$4,286.43**
Simple Payback Compared to "All Upgrades" Savings			**≈ 3.6 years**

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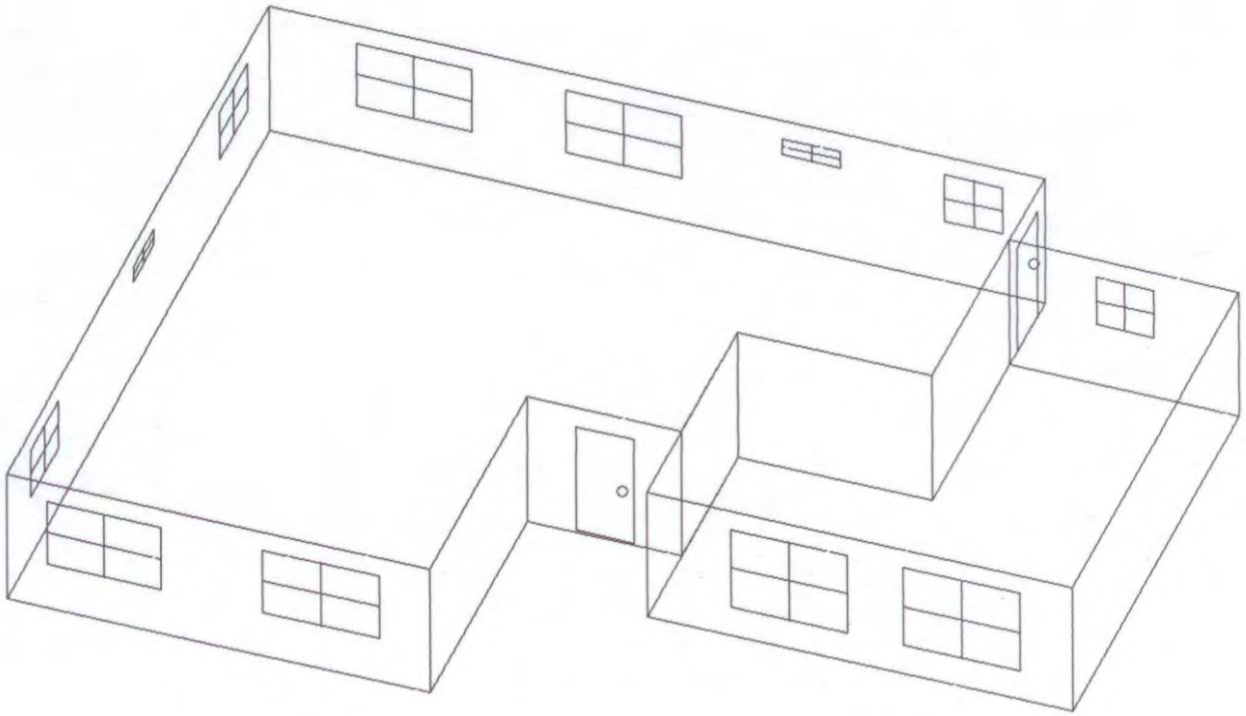
Structure 9

250 Axak
Orleans, CA



Structure 9

250 Axak
Orleans, CA

Description:

- Total conditioned area: 1606 ft^2
- One story, single family, 4 bedroom home
- Built approximately 1994
- Front Orientation: South, 180˚
- Climate Zone: 2
- Ceilings: Flat
- Existing insulation: 2 x 6 wood framing with R-19 wall insulation, slab on grade floors, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Combined hydronic forced air system incorporating domestic water heater and air handler, evaporative cooling*, R-4.2 duct wrap*
- Existing DHW: Propane Apollo 5010, 50 gallon storage tank *, Energy Factor of 0.525*
- Utility Service: Electricity $0.11559/Kilowatt hour
  Propane $3.30/Therm
- Lighting density: 1.3 Watts/ft^2 @ 1606 ft^2 ≈(21) 100 watt incandescent bulbs

* - Indicates a default assumption

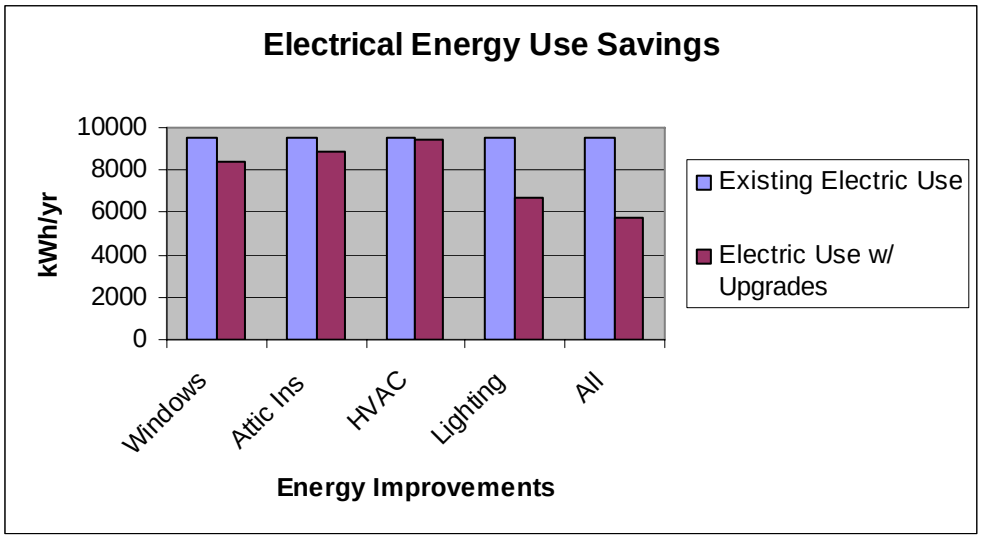
Structure 9

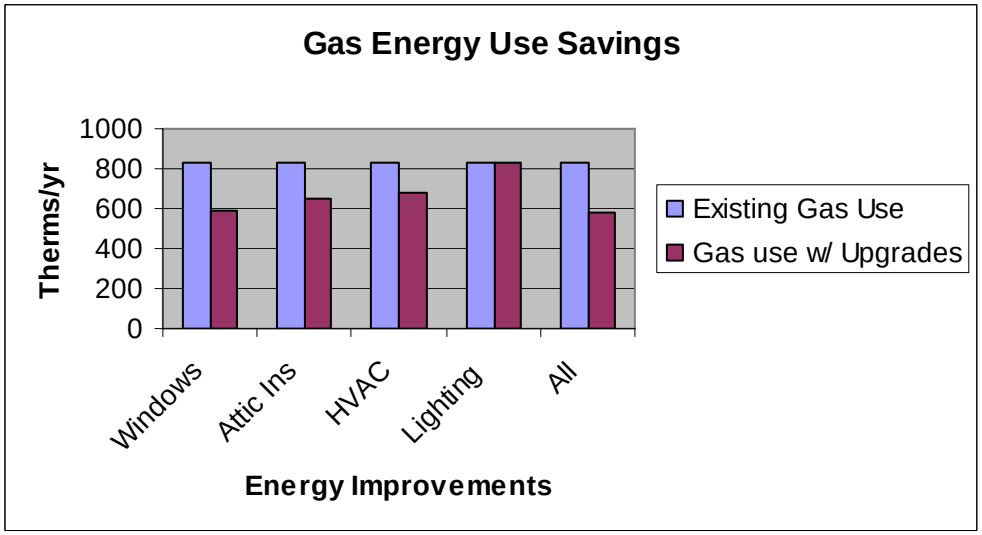
250 Axak
Orleans, CA

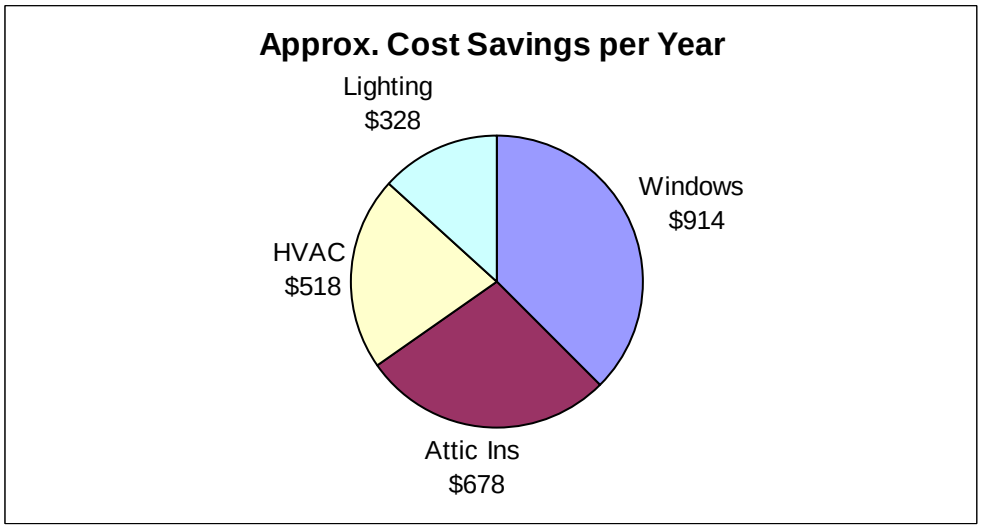
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	9,489	831	Double Pane Vinyl Frame w/ Low E	8,378	593	11.7%	28.6%	$913.82
Attic Insulation	R-38			R-49	8,878	647	6.4%	22.1%	$677.83
Attic & Floor Insulation	R-38, R-19, Slab			- - -	- - -	- - -	- - -	- - -	- - -
Combined Hydronic HVAC & DHW	Combined Hydronic w/ Air handler, R-4.2 duct wrap, Propane DHW EF 0.525			R-6 duct wrap, perform duct testing and sealing, Propane DHW EF 0.62	9,435	676	0.6%	18.7%	$517.74
Lighting	(21) 100 Watt Incandescent			(21) 26 Watt Compact Fluorescent	6,652	831	29.9%	0%	$327.93
All Upgrades	All			All	5,746	582	39.4%	30.0%	$1,254.24

Structure 9


Electrical Energy Use Savings
10000
8000
6000
4000
2000
0
kWh/yr
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements
Existing Electric Use
Electric Use w/ Upgrades


Gas Energy Use Savings
1000
800
600
400
200
0
Therms/yr
Windows
Attic Ins
HVAC
Lighting
All
Energy Improvements
Existing Gas Use
Gas use w/ Upgrades


Approx. Cost Savings per Year
Lighting
$328
Windows
$914
HVAC
$518
Attic Ins
$678

Structure 9

Materials Cost Analysis

Estimated cost of materials for upgrades are based on commonly used building materials and home appliances which are widely available at many retail outlets. Cost estimates given are for the specific material named and do not include installation, delivery fees, taxes or other associated costs. All costs are estimates only and may vary by brand, store, quality and/or region.

New attic insulation may be added over existing insulation to increase its effectiveness so long as the integrity of the existing insulation has not been compromised. Inspect insulation carefully to determine if the existing insulation should be replaced with a higher quality material.

Adding insulation to floors is not practical or cost effective. Older existing floor insulation is easily damaged due to sagging, animal activity under houses, moisture and a variety of other causes which lower its effective R-value. The best way to improve insulation in floors is to remove old insulation and replace it with new high quality materials.

Material/ Equipment	Estimated Price	Materials Required	Estimated Cost of Material/Equipment
R-11 Batt Attic Insulation	$0.23 / sf	1,606 sf	$369.38
R-22 Batt Floor Insulation	$0.85 / sf	1,606 sf	$1,365.10
Vinyl Framed Double Paned Windows w/ Low E	$14.58 / sf	204 sf	$2,974.32
Propane Water Heater Energy Factor 0.62	$459.00	1 unit	$459.00
		Total Estimated Cost of Materials	**$5,167.80**
Simple Payback Compared to "All Upgrades" Savings			**≈ 4.1 years**

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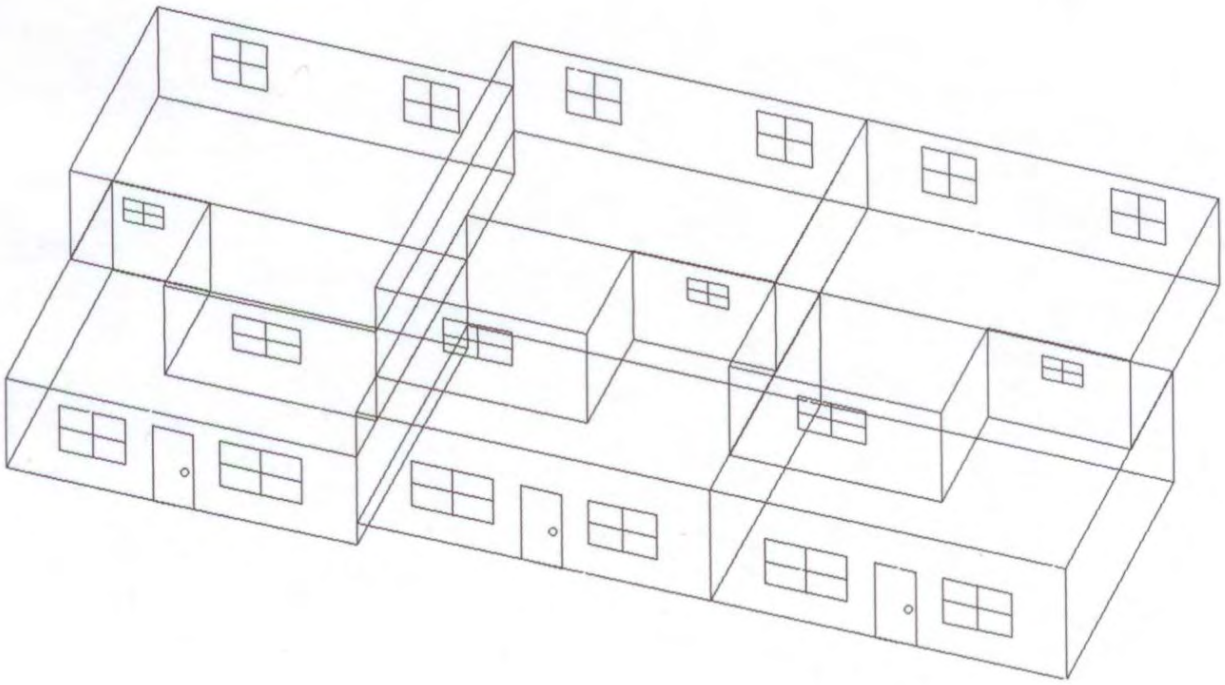
Structure 10

1336 Tucka Tucka Tee
Yreka, CA



Structure 10

1336 Tucka Tucka Tee
Yreka, CA

Description:

- Total conditioned area: 3627 ft^2
- Multi-Family, two story apartment building with three 3-bedroom units
- Built approximately 1992
- Front Orientation: Northwest, 315˚
- Climate Zone: 16
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83%†, electric baseboard heaters at 1500 watts* in each bedroom
- Existing DHW: Electric A.O. Smith EES, 40 gallon storage tank, Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting Density: 1.3 Watts/ft^2 @ 3627 ft^2 ≈(47) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

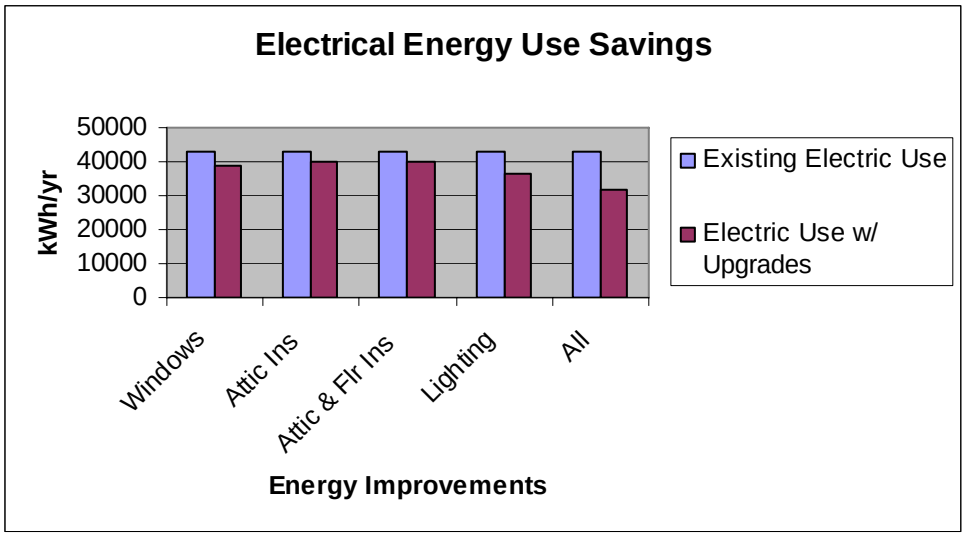
Structure 10

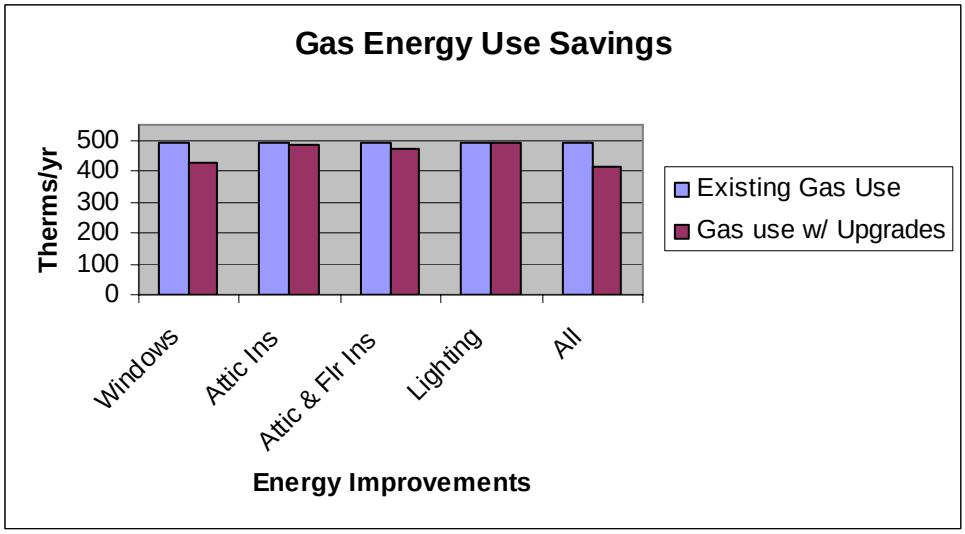
1336 Tucka Tucka Tee
Yreka, CA

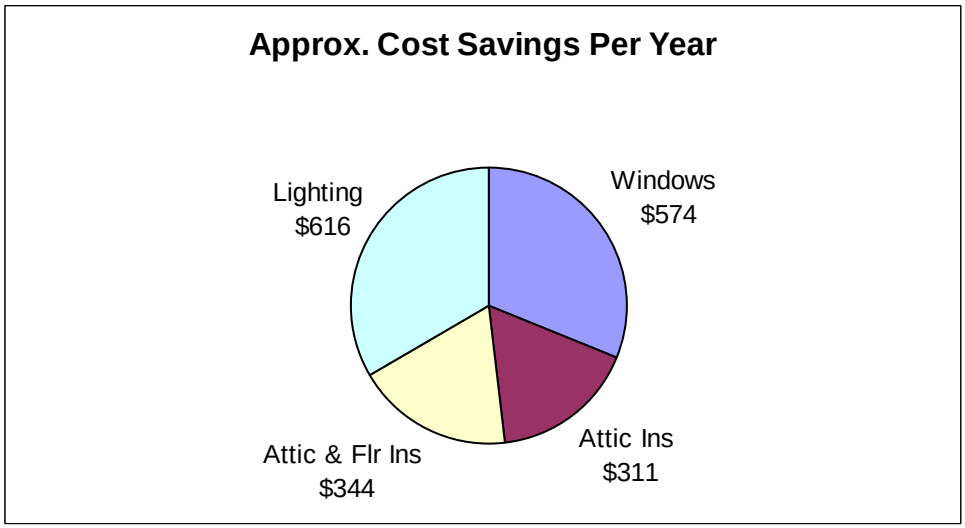
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	Whole Building As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	42,891	490	Double Pane Vinyl Frame w/ Low E	38,695	428	9.8%	12.7%	$574.37
Attic Insulation	R-38			R-49	39,853	484	7.1%	1.2%	$310.86
Attic & Floor Insulation	R-38, R-19			R-49, R-22	39,761	475	7.3%	3.1%	$344.08
HVAC	Kerosene 83%			- - -	- - -	- - -	- - -	- - -	- - -
Domestic Hot Water	Electric EF 0.89			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(47) 100 Watt Incandescent			(47) 26 Watt Compact Fluorescent	36,543	490	14.8%	0%	$615.69
All Upgrades	All			All	31,814	415	25.8%	15.3%	$1,276.80

Structure 10

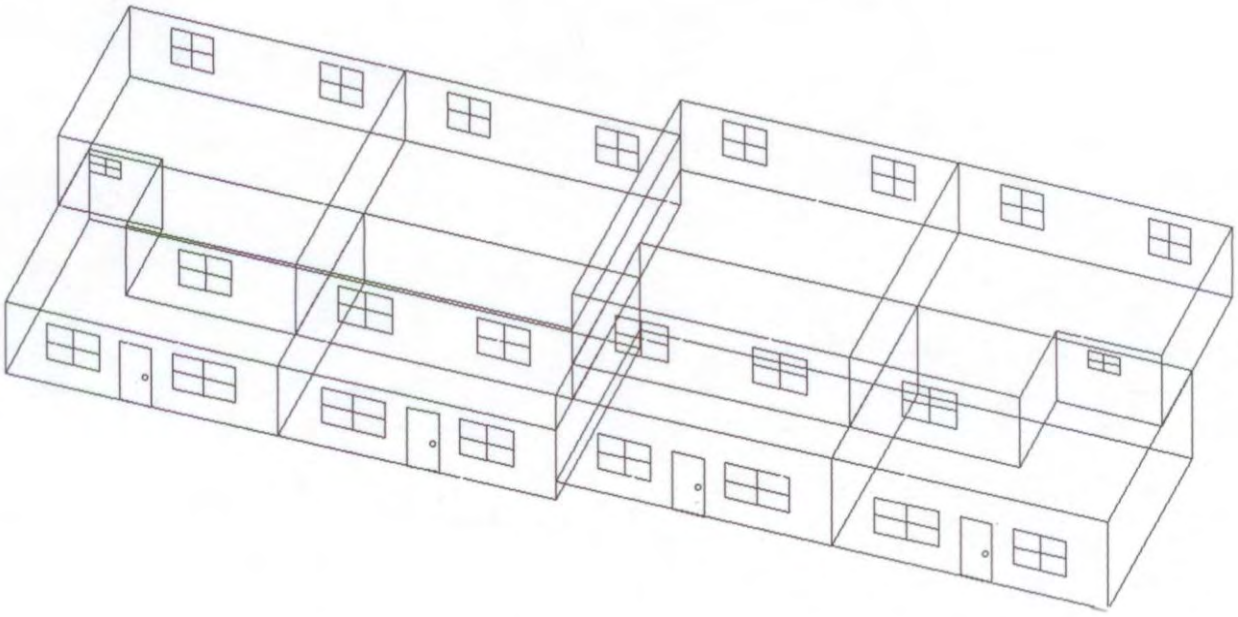






Structure 11

1256 Puh Nay Fitch
Yreka, CA



Structure 11

1256 Puh Nay Fitch
Yreka, CA

Description:

- Total conditioned area: 5010 ft^2
- Multi-Family, two story apartment building with 4 units with two 3-bedroom units and two 4-bedroom units
- Built approximately 1992
- Front Orientation: Northwest, 315°
- Climate Zone: 16
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83%†, electric baseboard heaters at 1500 watts* in each bedroom
- Existing DHW: Electric A.O. Smith EES, 40 gallon storage tank, Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting Density: 1.3 Watts/ft^2 @ 5010 ft^2 ≈(65) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

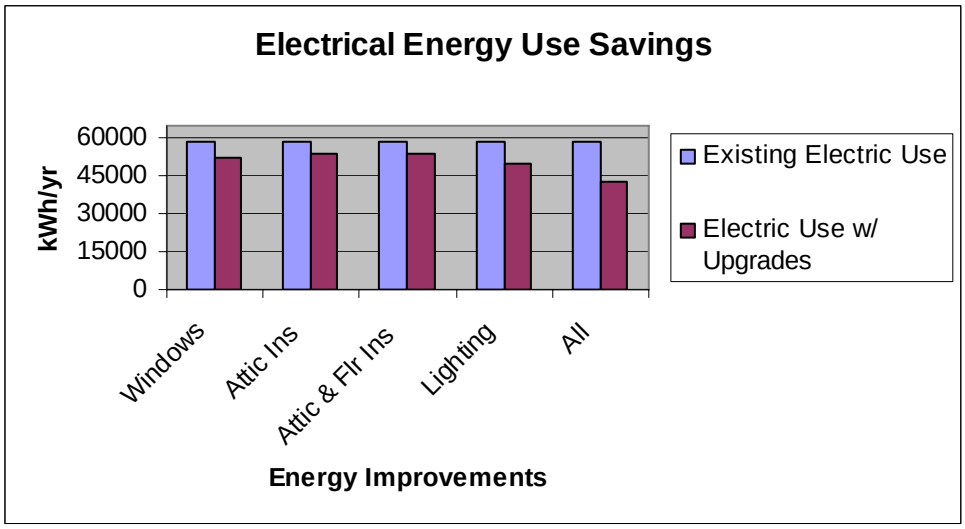
Structure 11

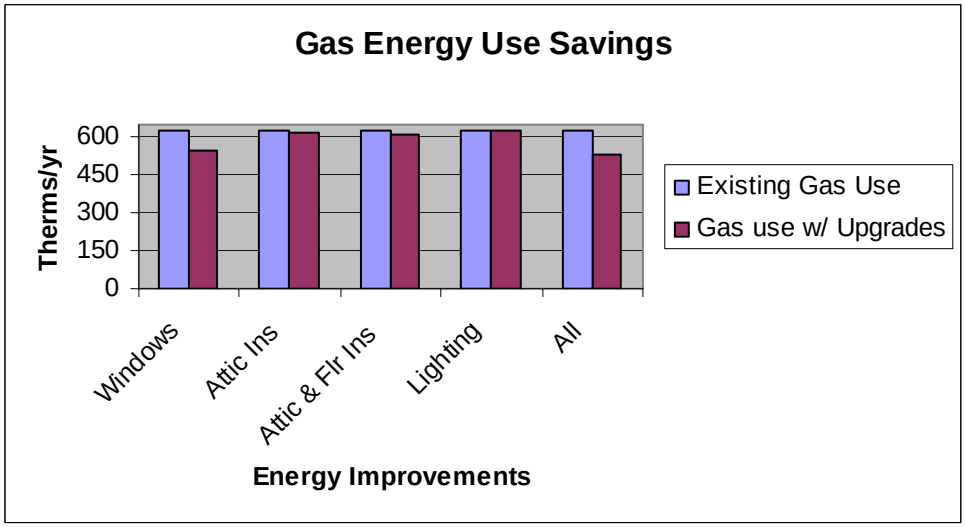
1256 Puh Nay Fitch
Yreka, CA

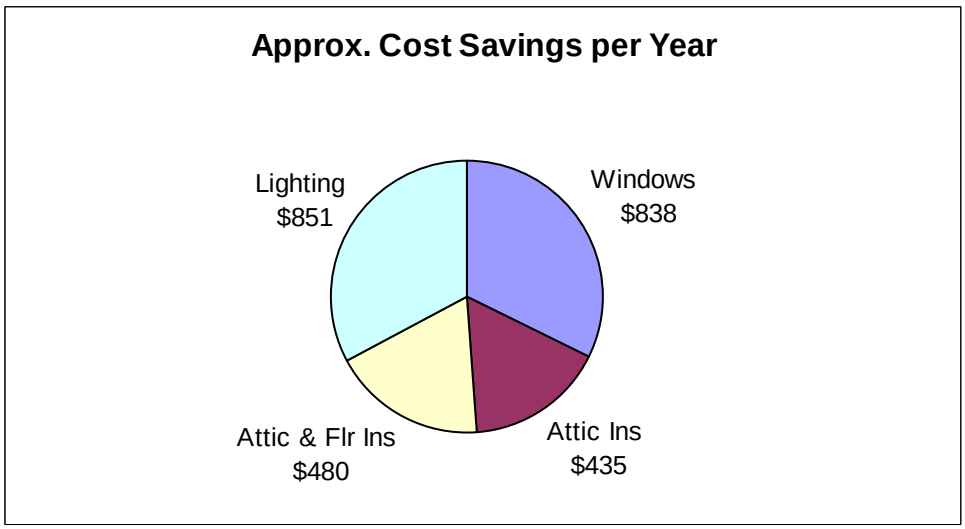
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	Whole Building As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	58,432	626	Double Pane Vinyl Frame w/ Low E	52,043	545	10.9%	12.9%	$838.37
Attic Insulation	R-38			R-49	54,119	620	7.4%	1.0%	$434.52
Attic & Floor Insulation	R-38, R-19			R-49, R-22	53,987	608	7.6%	2.9%	$479.72
HVAC	Kerosene 83%			- - -	- - -	- - -	- - -	- - -	- - -
Domestic Hot Water	Electric EF 0.89			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(65) 100 Watt Incandescent			(65) 26 Watt Compact Fluorescent	49,653	626	15.0%	0%	$851.48
All Upgrades	All			All	42,498	528	27.3%	15.7%	$1,810.04

Structure 11

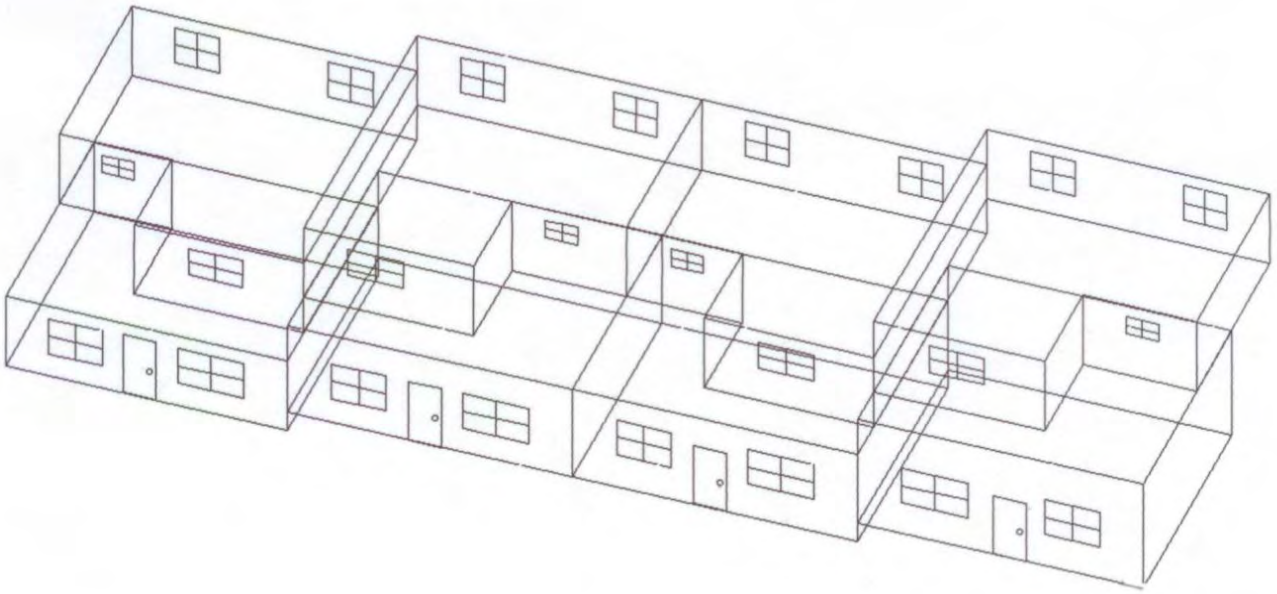






Structure 12

1231 Thook
Yreka, CA



Structure 12

1231 Thook
Yreka, CA

Description:

- Total conditioned area: 4836 ft^2
- Multi-Family, two story apartment building with four 3-bedroom units
- Built approximately 1992
- Front Orientation: North, 0˚
- Climate Zone: 16
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83%†, electric baseboard heaters at 1500 watts* in each bedroom
- Existing DHW: Electric A.O. Smith storage EES, 40 gallon storage tank, Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting Density: 1.3 Watts/ft^2 @ 4836 ft^2 ≈ (63) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

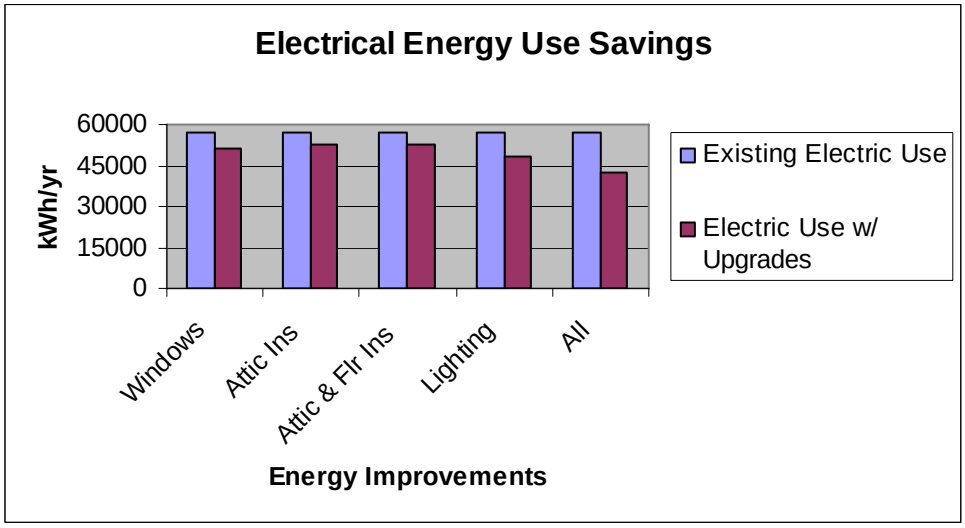
Structure 12

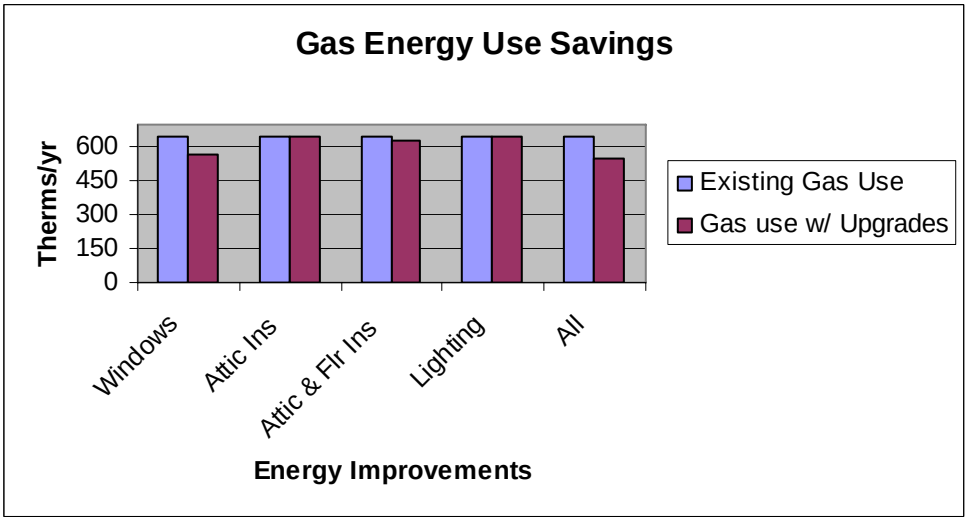
1231 Thook
Yreka, CA

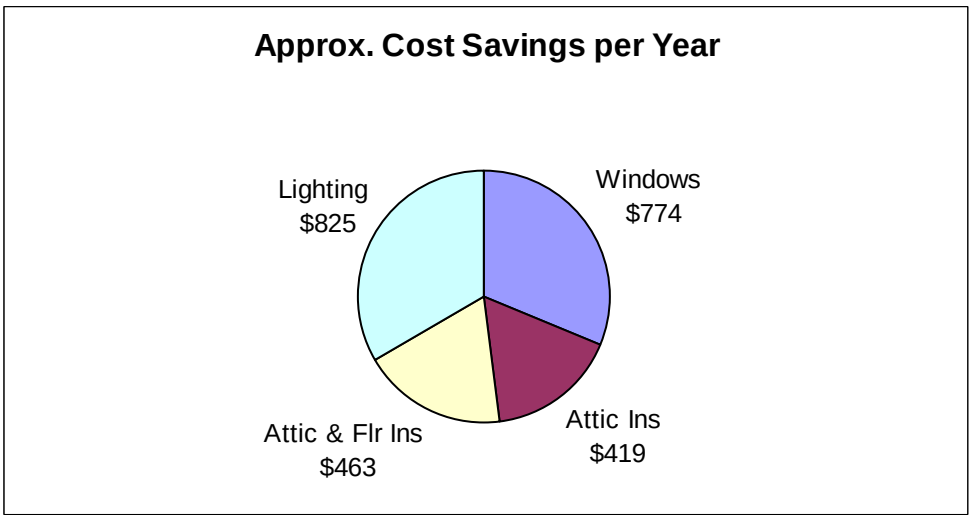
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	Whole Building As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	57,011	651	Double Pane Vinyl Frame w/ Low E	51,368	567	9.9%	12.9%	$774.11
Attic Insulation	R-38			R-49	52,919	643	7.2%	1.2%	$418.68
Attic & Floor Insulation	R-38, R-19			R-49, R-22	52,793	631	7.4%	3.1%	$463.10
HVAC	Kerosene 83%			- - -	- - -	- - -	- - -	- - -	- - -
Domestic Hot Water	Electric EF 0.89			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(63) 100 Watt Incandescent			(63) 26 Watt Compact Fluorescent	48,502	651	14.9%	0%	$825.29
All Upgrades	All			All	42,155	548	26.1%	15.8%	$1,718.98

Structure 12

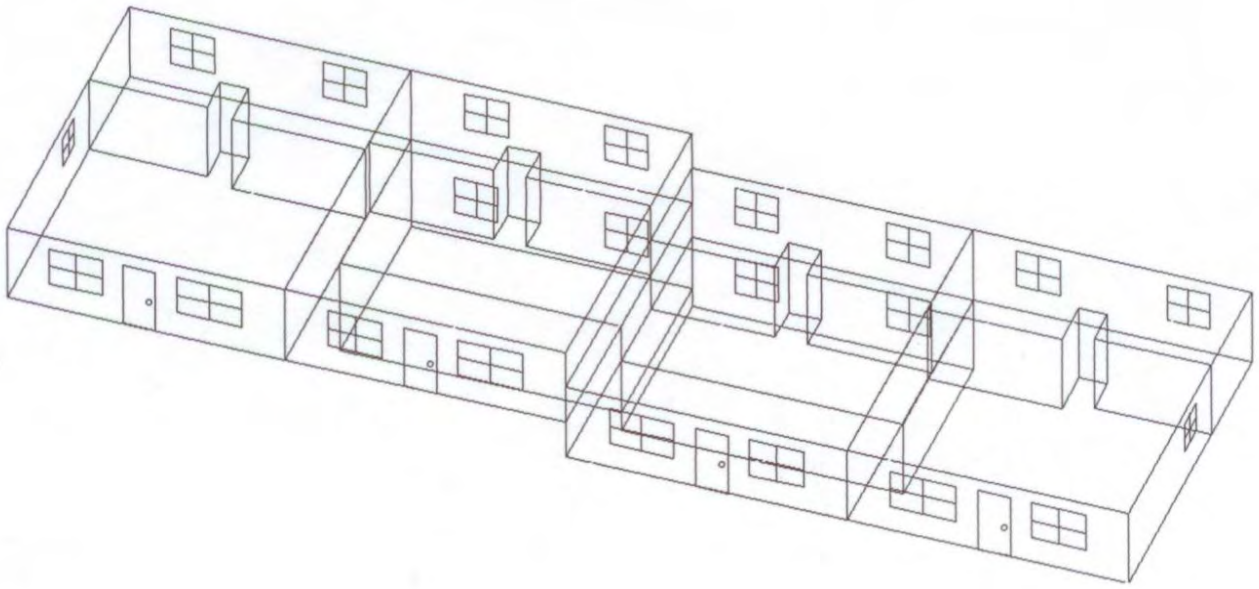






Structure 13

1230 Thook
Yreka, CA



Structure 13

1230 Thook
Yreka, CA

Description:

- Total conditioned area: 3187 ft^2
- Multi-Family, one and two story 4 unit apartments with two 2-bedroom units and two 4-bedroom units
- Built approximately 1992
- Front Orientation: South, 180˚
- Climate Zone: 16
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83%†, electric baseboard heaters at 1500 watts* in bedrooms
- Existing DHW: Electric A.O. Smith EES, 40 gallon storage tank, Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting Density: 1.3 Watts/ft^2 @ 3187 ft^2 ≈(41) 100 watt incandescent bulbs

*- Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

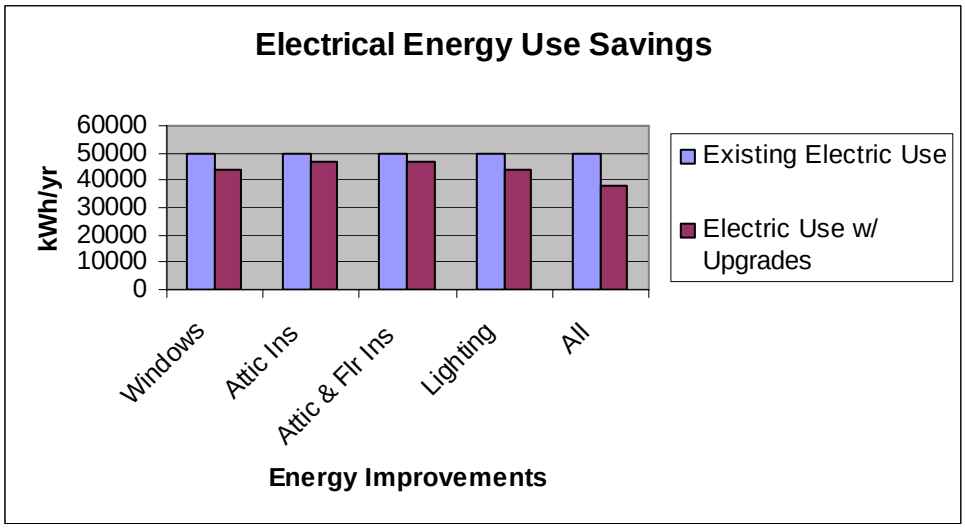
Structure 13

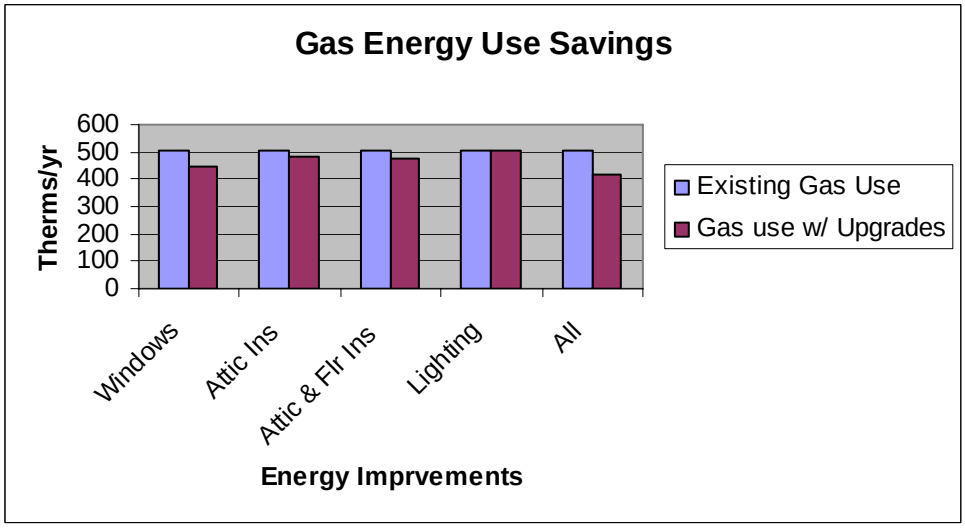
1230 Thook
Yreka, CA

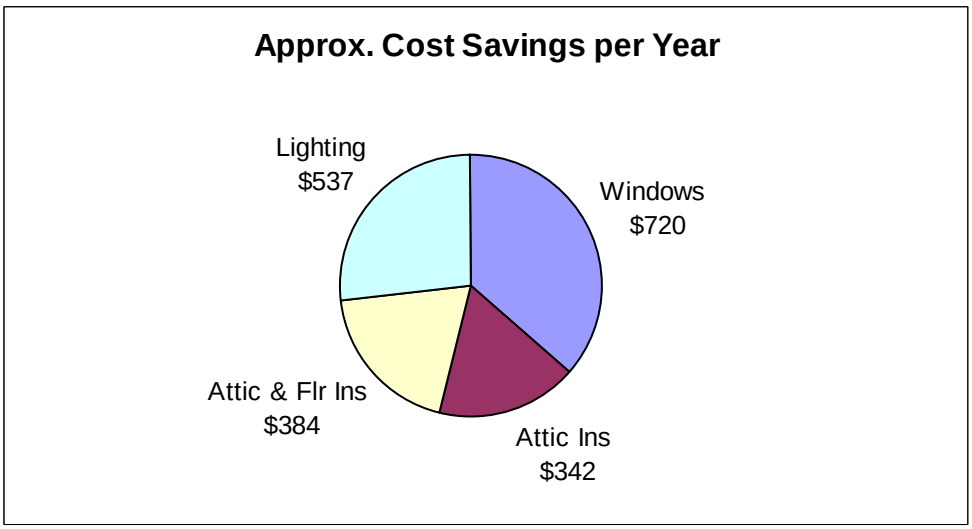
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	Whole Building As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	49,666	504	Double Pane Vinyl Frame w/ Low E	43,937	443	11.5%	12.1%	$720.36
Attic Insulation	R-38			R-49	46,694	484	6.0%	4.0%	$342.25
Attic & Floor Insulation	R-38, R-19			R-49, R-22	46,514	475	6.3%	5.8%	$384.01
HVAC	Kerosene 83%			- - -	- - -	- - -	- - -	- - -	- - -
Domestic Hot Water	Electric EF 0.89			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(41) 100 Watt Incandescent			(41) 26 Watt Compact Fluorescent	44,128	504	11.2%	0%	$537.13
All Upgrades	All			All	37,952	417	23.6%	17.3%	$1,371.04

Structure 13







Structure 13

Materials Cost Analysis

Estimated cost of materials for upgrades are based on commonly used building materials and home appliances which are widely available at many retail outlets. Cost estimates given are for the specific material named and do not include installation, delivery fees, taxes or other associated costs. All costs are estimates only and may vary by brand, store, quality and/or region.

New attic insulation may be added over existing insulation to increase its effectiveness so long as the integrity of the existing insulation has not been compromised. Inspect insulation carefully to determine if the existing insulation should be replaced with a higher quality material.

Adding insulation to floors is not practical or cost effective. Older existing floor insulation is easily damaged due to sagging, animal activity under houses, moisture and a variety of other causes which lower its effective R-value. The best way to improve insulation in floors is to remove old insulation and replace it with new high quality materials.

Material/ Equipment	Estimated Price	Materials Required	Estimated Cost of Material/Equipment
R-11 Batt Attic Insulation	$0.23 / sf	3,328 sf	$765.44
R-22 Batt Floor Insulation	$0.85 / sf	3,328 sf	$2,828.80
Vinyl Framed Double Paned Windows w/ Low E	$14.58 / sf	386 sf	$5,627.88
	Total Estimated Cost of Materials		**$9,222.12**
Simple Payback Compared to "All Upgrades" Savings			**≈ 6.7 years**

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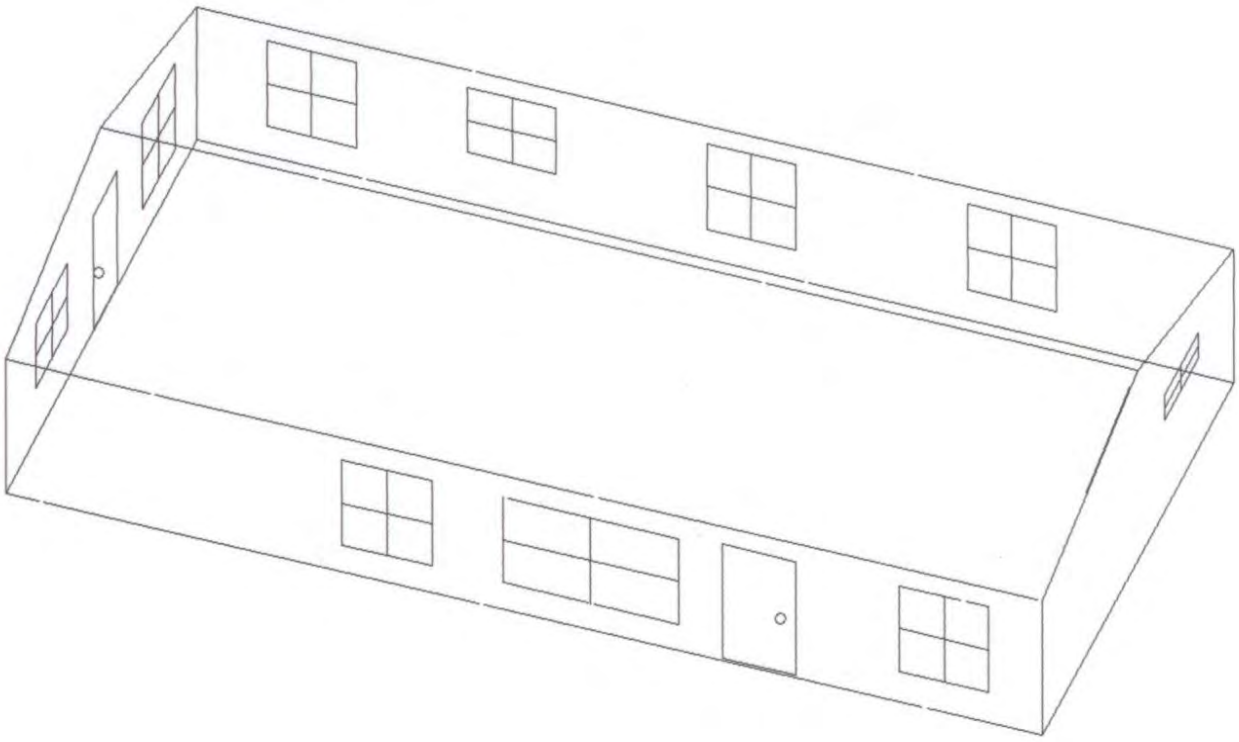
Structure 14

2501 China Grade Rd.
Happy Camp, CA



Structure 14

2501 China Grade Rd.
Happy Camp, CA

Description:

- Total conditioned area: 1387 ft^2
- Manufactured, one story, single family, 3 bedroom home
- Built approximately 2003
- Front Orientation: Northeast, 45˚
- Climate Zone: 16
- Ceilings: Vaulted
- Existing insulation: 2 x 6 framing with R-19 wall insulation*, R-19 floor insulation*, R-30 ceiling insulation*
- Existing windows: Double pane, metal framed with Low E glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83%†, heat pump cooling unit*
- Existing DHW: Electric Rheem 82VR52-2, 50 gallon storage tank, Energy Factor of 0.93
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting density: 1.3 Watts/ft^2 @ 1387 ft^2 ≈ (18) 100 watt incandescent bulbs

* - Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

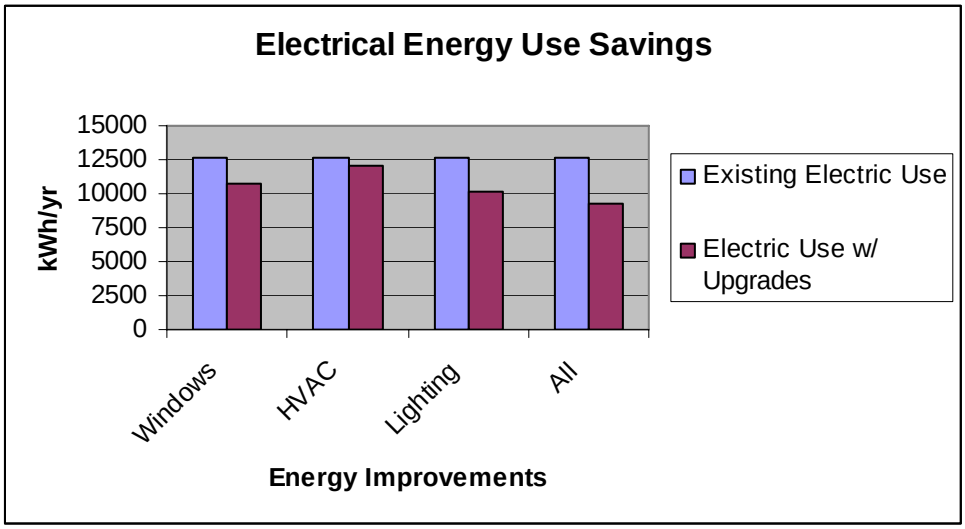
Structure 14

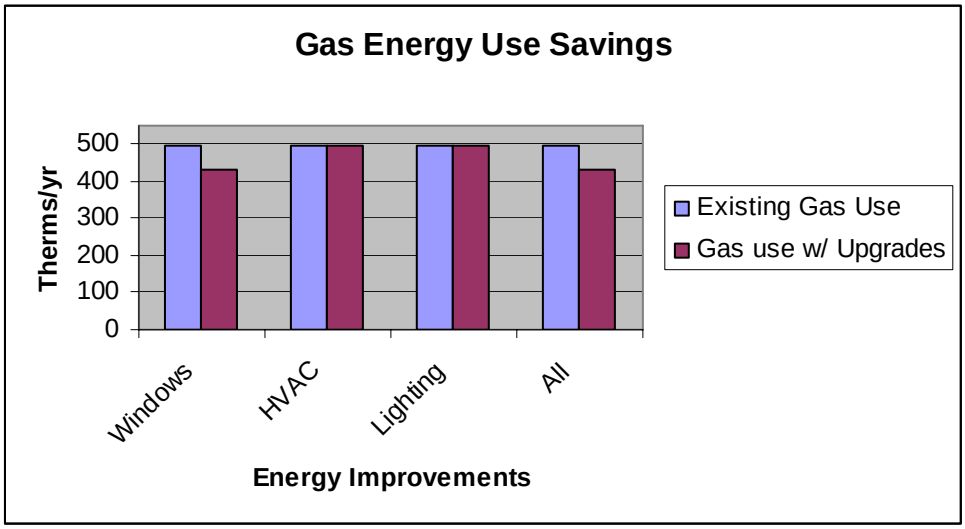
2501 China Grade Rd.
Happy Camp, CA

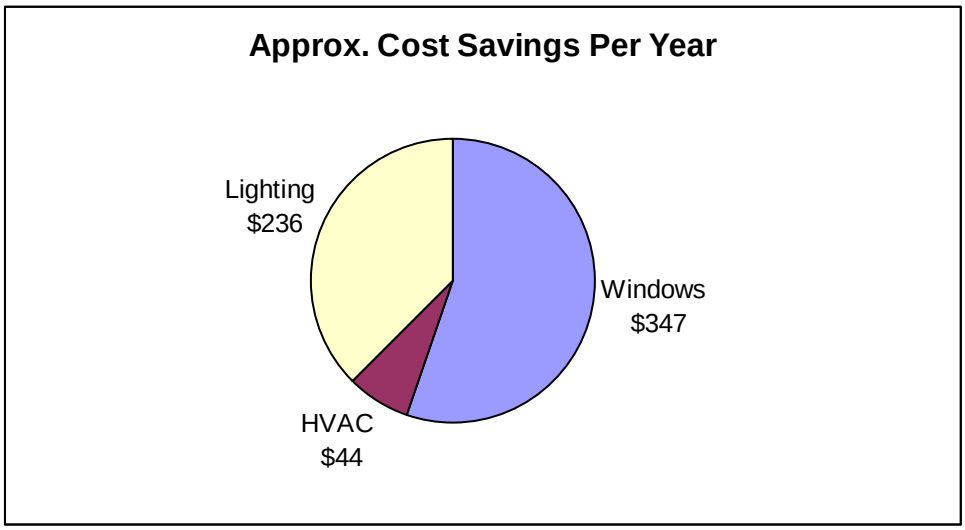
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Low E	12,574	494	Double Pane Vinyl Frame w/ Low E	10,807	429	14.1%	13.2%	$346.88
Attic Insulation	R-30			- - -	- - -	- - -	- - -	- - -	- - -
Attic & Floor Insulation	R-30, R-19			- - -	- - -	- - -	- - -	- - -	- - -
HVAC	Kerosene 83% Heat Pump/AC 10 SEER			Kerosene 83% Heat Pump/AC 16 SEER	12,121	494	3.6%	0%	$43.94
Domestic Hot Water	Electric EF 0.93			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(18) 100 Watt Incandescent			(18) 26 Watt Compact Fluorescent	10,143	494	19.3%	0%	$235.78
All Upgrades	All			All	9,197	429	26.9%	13.2%	$503.04

Structure 14

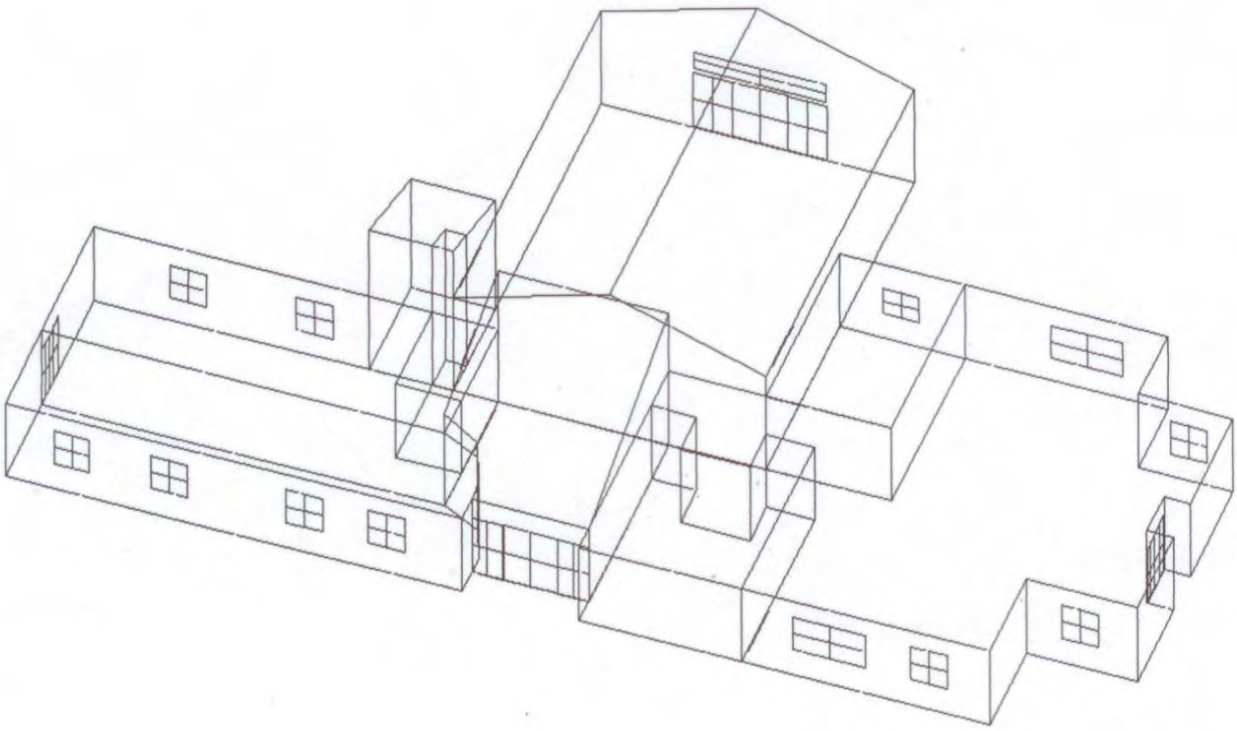






Structure 15

Karuk Tribal Administration Building
Apsuun St.
Yreka, CA



Structure 15

Karuk Tribal Administration Building
Apsuun St.
Yreka, CA

Description:

- Total conditioned floor area: 5736 ft^2
- One story, administration building including offices, large multi-purpose meeting room, kitchen, restrooms and storage rooms
- Built approximately 2006
- Front Orientation: East, 90˚
- Climate Zone: 16
- Ceilings: Vaulted and flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, slab-on-grade floors, R-38 ceiling insulation
- Existing windows: Double pane, vinyl framed with clear glass*, single pane, metal framed storefront doors*
- Existing HVAC: Armstrong Air Heat pumps with air handlers, Greenheck exhaust fans, Fujitsu air conditioning units
- Existing DHW: Electric A.O. Smith, 80 gallon storage tank, Energy Factor of 0.86
- Utility Service: Electricity $0.09699/Kilowatt hour
  Propane $3.30/Therm
- Lighting Density: Lighting density has not been calculated for this building. Please see chart which explains maximum allowed wattages under California's 2005 Title 24.

*- Indicates a default assumption

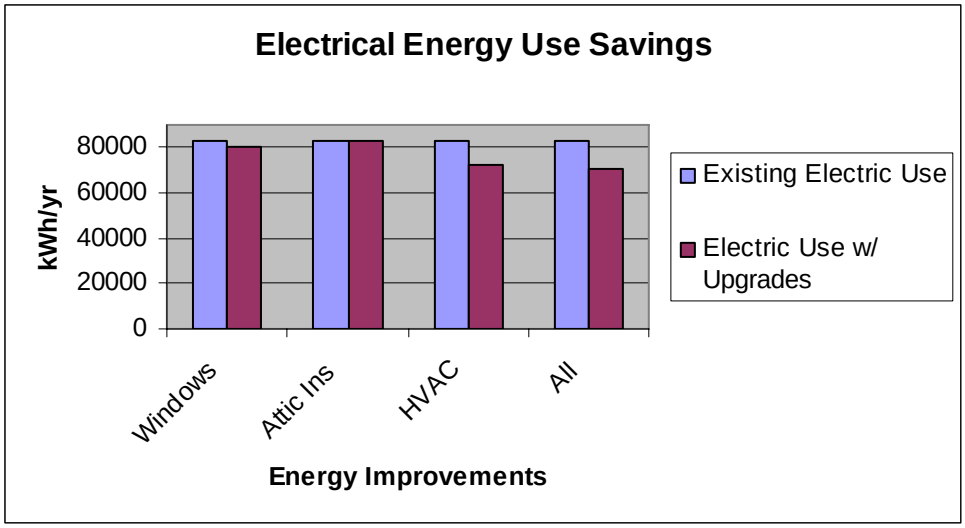
Structure 15

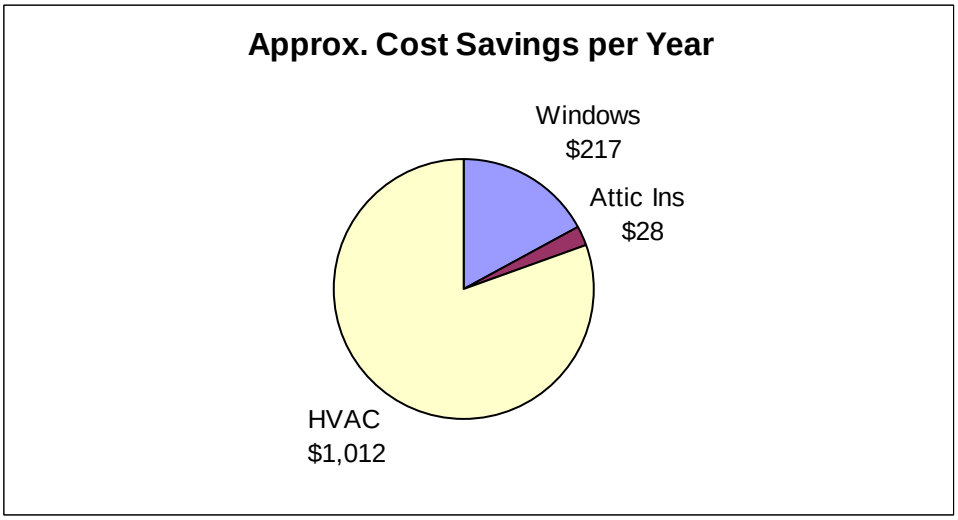
Karuk Tribal Administration Building
Apsuun St.
Yreka, CA

Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear			Double Pane Vinyl Frame w/ Low E	80,669	- - -	2.7%	- - -	$217.26
Attic Insulation	R-38			R-49	82,619	- - -	0.3%	- - -	$28.13
Attic & Floor Insulation	R-38, Slab			- - -	- - -	- - -	- - -	- - -	- - -
HVAC									
FC/HP1	7.7 HSPF 10 SEER R-8 duct wrap								
FC/HP3	8 HSPF 13.5 SEER R-8 duct wrap								
FC/HP4	7.7 HSPF 13 SEER R-8 duct wrap	82,909	- - -	All systems increased to 10 HSPF 16 SEER	72,480	- - -	12.6%	- - -	$1,011.51
FC/HP5	8 HSPF 13.5 SEER R-8 duct wrap			Perform duct testing and sealing					
FC/HP6	7.7 HSPF 13 SEER R-8 duct wrap								
CU7	14.3 SEER R-8 duct wrap								
Domestic Hot Water	Electric EF 0.86			- - -	- - -	- - -	- - -	- - -	- - -
All Upgrades	All			All	70,899	- - -	14.5%	- - -	$1,164.85

Structure 15





Karuk Tribal Administration Building

Maximum Allowed Wattages under California's 2005 Title 24

Room/Number	Occupancy	Area	Allowed Watts/ft	Total Allowed Watts
Lobby 100	Lobby/Main Entry	425ft^2	1.5	637.5
Reception 101	Office	136ft^2	1.2	163.2
Office 102	Office	140ft^2	1.2	168
Office 103	Office	140ft^2	1.2	168
Office 104	Office	141ft^2	1.2	169.2
Hall 105	Corridor/Restroom/Support	224ft^2	0.6	134.4
Computer 106	Office	211ft^2	1.2	253.2
Office 108	Office	140ft^2	1.2	168
Restroom 109	Corridor/Restroom/Support	70ft^2	0.6	42
Workroom 110	Office	80ft^2	1.2	96
Storage 111	Electrical/Mechanical	109ft^2	0.7	76.3
Server 112	Electrical/Mechanical	10ft^2	0.7	7
Multi-Purpose 113	Convention/Conference/Meeting	1548ft^2	1.4	2,167.8
Kitchen 114	Kitchen/Food Preparation	305ft^2	1.6	488
Pantry 115	Commercial/Industrial Storage	81ft^2	0.6	48.6
Janitor 116	Commercial/Industrial Storage	81ft^2	0.6	48.6
Elders 117	Office	329ft^2	1.2	394.8
Office 118	Office	140ft^2	1.2	168
Hall 119/126	Corridor/Restroom/Support	288ft^2	0.6	172.8
Office 120	Office	138ft^2	1.2	165.6
Exercise 121	Office	259ft^2	1.2	310.8
Cultural 122	Office	344ft^2	1.2	412.8
Women's RR 123	Corridor/Restroom/Support	176ft^2	0.6	105.6
Men's RR 124	Corridor/Restroom/Support	160ft^2	0.6	96
Closet 125	Corridor/Restroom/Support	23ft^2	0.6	13.8
		Total		6,676 watts

Spaces have been named according to their referenced labels from the architectural drawings provided for this analysis.
Please see "Modeling Assumptions" for guidelines on calculating total wattages for non-residential buildings.

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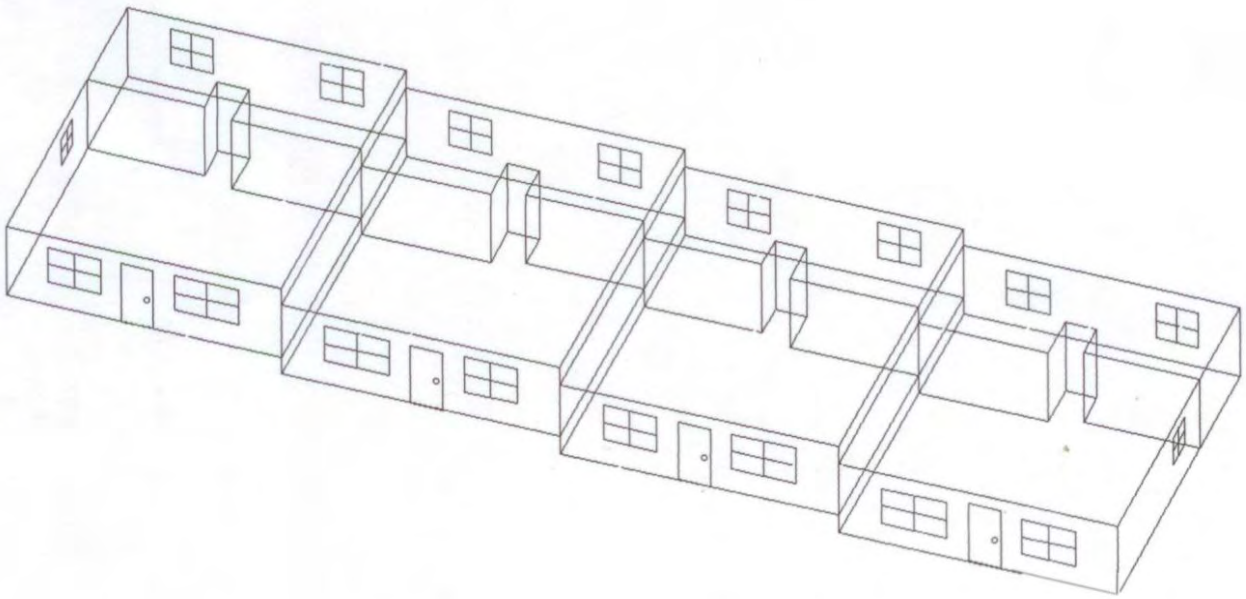
Structure 16

1331 Tucka Tucka Tee
Yreka, CA



Structure 16

1331 Tucka Tucka Tee
Yreka, CA

Description:

- Total conditioned floor area: 3328 ft^2
- Multi-Family, one story, apartment building with four 2 bedroom units
- Built approximately 1992
- Front Orientation: Southeast, 135˚
- Climate Zone: 16
- Ceilings: Flat
- Existing Insulation: 2 x 6 wood framing with R-19 wall insulation, R-19 floor insulation, R-38 ceiling insulation
- Existing windows: Double pane, metal framed with clear glass*
- Existing HVAC: Kerosene Monitor 441 wall heater at 83%†, electric baseboard heaters at 1500 watts* in each bedroom
- Existing DHW: Electric A.O. Smith EES, 40 gallon storage tank, Energy Factor of 0.89
- Utility Service: Electricity $0.09699/Kilowatt hour
  Kerosene $2.70/Therm
- Lighting Density: 1.3 Watts/ft^2 @ 3328 ft^2 ≈(43) 100 watt incandescent bulbs

*- Indicates a default assumption
† - Indicates a default value based on EnergyPro Version 3.144 equipment database

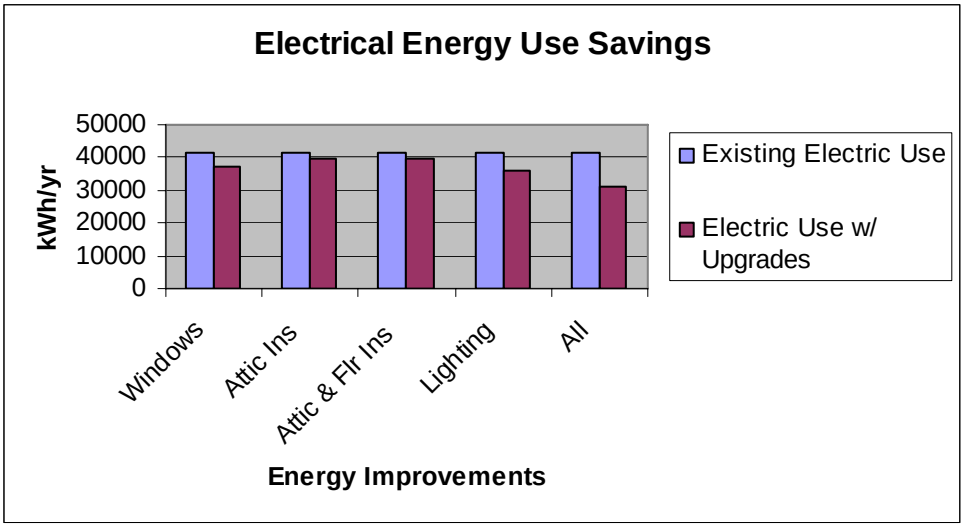
Structure 16

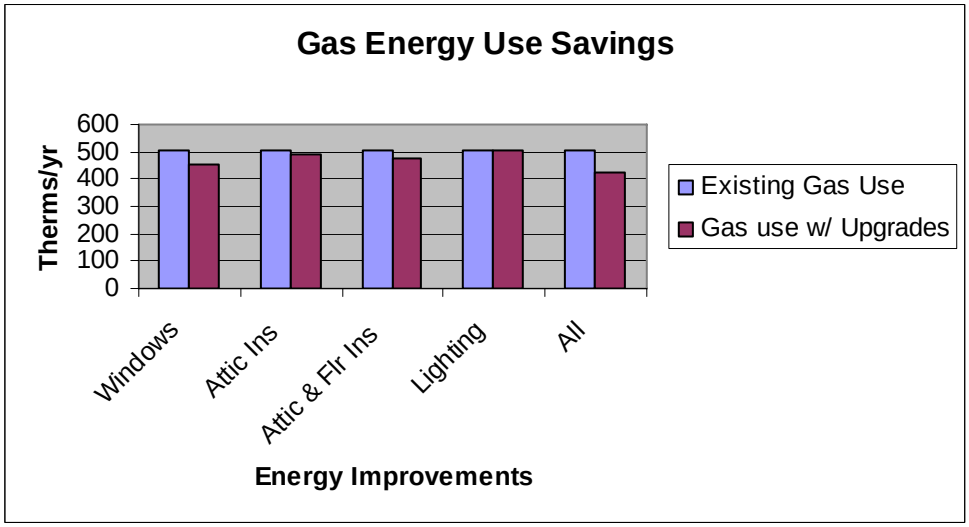
1331 Tucka Tucka Tee
Yreka, CA

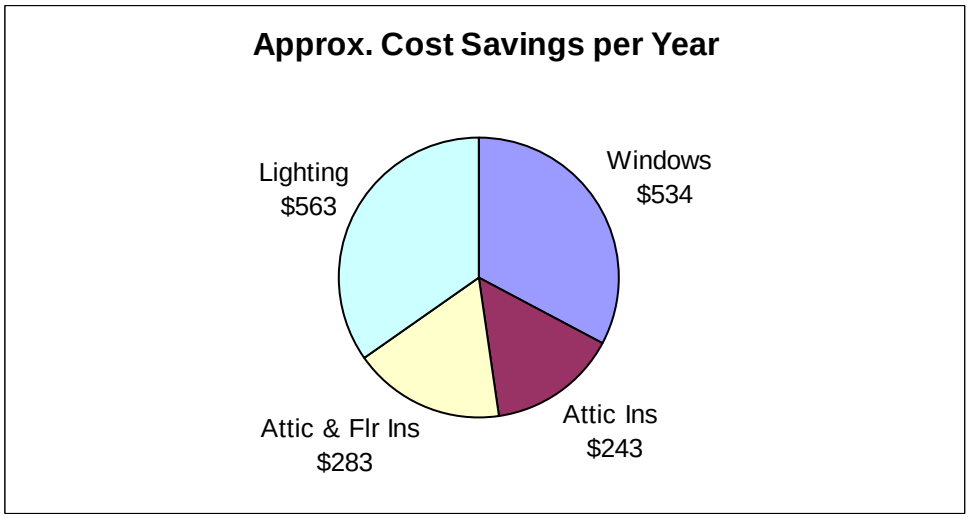
Energy Cost Savings Analysis for Envelope, HVAC, DHW, and Lighting

Item	Whole Building As-Built			w/ Energy Improvements			%Energy Savings		Approx. Cost Savings/yr
	Existing Condition	kWh/yr	therms/yr	Possible Improvement	kWh/yr	therms/yr	Electric	Gas	
Windows	Double Pane Metal Frame Clear	41,534	506	Double Pane Vinyl Frame w/ Low E	37,476	454	9.8%	10.3%	$533.99
Attic Insulation	R-38			R-49	39,562	487	4.7%	3.8%	$242.56
Attic & Floor Insulation	R-38, R-19			R-49, R-22	39,428	477	5.1%	5.7%	$282.56
HVAC	Kerosene 83%			- - -	- - -	- - -	- - -	- - -	- - -
Domestic Hot Water	Electric EF 0.89			- - -	- - -	- - -	- - -	- - -	- - -
Lighting	(43) 100 Watt Incandescent			(43) 26 Watt Compact Fluorescent	35,726	506	14.0%	0%	$563.32
All Upgrades	All			All	31,231	424	24.8%	16.2%	$1220.69

Structure 16







Suggestions and Recommendations for Energy Efficiency

Envelope:

- To reduce infiltration of air leakage from outside, seal cracks and leaks in buildings. Weatherstrip around doors and windows. Caulk around window and door framing. Repair any holes or leaks in the building envelope. For safety reasons it is not recommended to caulk around water heater and furnace exhaust pipes.

- Inspect insulation for proper installation. Batt insulation should fit snugly and fill the cavities without being folded, crushed or compressed. In areas where insulation is accessible (attics and crawlspaces) make sure there are no holes, tears, or gaps in the insulation material. If possible, add insulation to create a higher R-value, or replace older insulation with a higher quality material.

- Keep exterior windows and doors closed when operating mechanical heating and cooling equipment.

- Install a radiant barrier inside ventilated attics. Radiant barriers are materials which can be installed in buildings to reduce solar heat gain into the attic and in turn reduce heating and cooling energy usage. Radiant barrier materials must have a high reflectivity and low emissivity and must face an open air space to perform properly.

  Radiant barriers can be used in residential, commercial and industrial buildings. Radiant barriers may be installed in ventilated attics in several configurations. One variation is to attach the radiant barrier to the bottom surfaces of the attic truss chords or rafter framing. Another option is to attach the radiant barrier directly to the underside of the roof deck. Please refer to the product literature or consult with a building contractor for the most appropriate way to incorporate an attic radiant barrier into an existing structure.

- Install/add a cool roof. A cool roof works under the same principal as a radiant barrier but is applied to the exterior surface of the roof. Cool roofs may be, but are not limited to, metal roofing products, roof coatings, shingles, slate, or tile. It is recommended that all cool roof products be rated by the Cool Roof Rating Council (CRRC). A cool roof reflects and emits the sun's heat back to the sky instead of transferring it into the building. "Coolness" is determined by solar reflectance and thermal emittance, both measured from 0 to 1. The higher the value, the "cooler" the roof. Solar reflectance is the fraction of solar energy that

is reflected by the roof, and thermal emittance is the relative ability of the roof surface to radiate absorbed heat.

Fenestration:

- Upgrade windows to non-metal framed, double paned glass with a Low E treatment. Metal frame windows increase conductivity of heat exchange to the outside. Low E treatments reduce the amount of solar heat gain into a space, keeping indoor temperatures cooler on hot days and reducing the need for mechanical cooling. Low E windows which incorporate argon gas between the glazing panes may decrease energy use even further. The latest and highest performing Low E products are Low-E3 or Low-E4 which can substantially reduce cooling loads.

- Replace faulty or failed windows.

Lighting:

- In residential applications change out incandescent bulbs for compact fluorescent Energy Star® rated screw-in bulbs or pin base fixtures and lamps. Replacing a single 100 watt incandescent bulb with a 26 watt compact fluorescent will save approximately 74% of the electricity used to power the incandescent. While compact fluorescent bulbs are more costly than incandescent they have a considerably longer life than incandescent bulbs, reducing the need to buy replacement bulbs as often.

  It should be noted that fluorescent bulbs and fixtures have evolved significantly over the years. Manufacturers have developed fixtures that are attractive and blend in with most residential and non-residential applications. As a result, newer fluorescent fixtures are not the generic, industrial looking fixtures they used to be. Manufacturers have been able to eliminate the annoying buzzing sounds and flickering properties that many people dislike about fluorescent fixtures.

- According the California Energy Commission, indoor lighting accounts for one third of all commercial building electrical use. For each older inefficient, 4 foot 32 watt two-tube fixture, with an input wattage rating of 78 watts, that is replaced with an efficient 32 watt T8 two-tube fixture, with an input wattage rating of 48 watts, there will be an approximate saving of $6.00 per year for each fixture. Additionally, for each 100 watt incandescent that is replaced with a 26 watt screw-in fluorescent, there will be an approximate savings of $15.00 per year for each fixture. For example, if fifty two-tube fixtures were to be replaced and twenty 100 watt incandescent bulbs replaced, there would be a savings of approximately $610.00 per year.

Lighting controls such as automatic time switches, occupancy sensors and timers are another way to reduce lighting electrical use. Automatic time switches, some times called time clocks, are programmable switches that are used to automatically shut off lights according to pre-established schedules, depending on the hours of operation of the building. Occupancy sensors automatically turn off all the lights in an area no more than 30 minutes after the area has been vacated.

HVAC:

- Keep HVAC systems, associated fans and ducts free of debris and dust. Clean or replace air filters regularly.

- Upgrade gas powered heating and cooling units to higher efficiency units. Over time older mechanical units may lose their ability to perform to their intended efficiency rates.

- Inspect the duct insulation wrap. All air distribution ducts should be properly insulated to minimize heat loss through cracks or duct connections and to maximize the efficiency of the furnace. When duct work in unconditioned attics is not properly insulated heat can easily escape to the outdoors instead of into the home. Improperly insulated ducts may lead to increased use of mechanical heating and cooling equipment as well as higher energy bills.

- Perform duct leakage testing and duct sealing. California's Title 24 requires ducts to be sealed to leak less than 15% of the supply air flow for existing buildings and 6% for new construction. When duct leakage is kept to a minimum, forced air systems perform closer to their rated efficiencies; they cycle on and off less often, minimizing wear on the system and its components. Correctly sealed ducts reduce the amount of energy used to heat and cool spaces, thereby reducing energy use and utility bills.

- When possible use natural ventilation in place of the cooling system.

- Try to minimize the use of electrically powered cooling units, such as window air conditioners and portable plug-in fans. These units are inefficient and, in some cases, may pose a hazard to the residents. Upgrade air conditioning units to those that are Energy Star® Rated.

- Close dampers in stoves and fireplaces when not in use. Try not to use central heating systems simultaneously with wood stoves or fireplaces.

Domestic Water Heaters:

- Upgrade water heaters to more efficient gas powered units (if possible). The Energy Factor is the efficiency rating of water heaters and should be a minimum

of 0.58, many have higher energy factors. Instantaneous water heaters (also known as 'on-demand', 'tankless', or 'flash' hot water) are highly efficient and eliminate the need to constantly heat water stored in a storage tank water heater. An instantaneous water heater only heats water when there is a demand for hot water rather than heating it all the time.

- Installing solar hot water collectors is another way to reduce water heating costs. Solar water heaters incorporate a small solar collector panel to pre-heat water which reduces energy use from gas or electricity.

- Repair leaking faucets. Leaking hot water taps increase the use of gas or electricity to heat water and may increase energy and utility bills.

- Insulate plumbing from the domestic water heater to the various taps in the house. Much like insulation on HVAC ducts, insulated pipes prevent heat from escaping through the conductive metal pipes.

Household Appliances:

- Use appliances wisely. Wait until dishwashers are full before running a cycle. Turn off the drying cycle before running, then open the door at end of cycle and allow to air dry. Wash full loads of laundry but avoid overloading. If possible, use a clothesline to take advantage of the power of wind and sun for drying.

- Many appliances draw a small amount of electricity when they are plugged in but not actually in use. This is known as "vampire power" or "phantom" loads. Some common household items which fall into this category are hand-held chargeable vacuum cleaners, power drills, media equipment (such as VCRs or TVs) and rarely used refrigerators or freezers in garages. Unplug such appliances to eliminate this unnecessary energy use. Plugging appliances into power strips which can be shut down with one switch is another easy and effective way to reduce energy use. Follow the manufacturer's guidelines for proper use of power switches and to prevent overloading.

- Install energy saver shower heads to reduce water heating and use.

- Recycle and replace old appliances with Energy Star® rated equipment. A ten year old refrigerator may use up to twice as much energy as a newer Energy Star® rated unit.

- Pacific Gas & Electric Company offers many on-line tools to help California residents understand their energy usage and billing.

  To perform an energy audit of an existing residence please go to http://www.pge.com/myhome/saveenergymoney/analyzer/en/

  Many of the energy saving ideas here can be found on the PG&E site as well as other suggestions to help utility customers reduce their bills. Please go to http://www.pge.com/myhome/saveenergymoney/savingstips/

  To view a list of energy efficient appliances please go to

http://www.pge.com/myhome/saveenergymoney/rebates/energyefficientproducts/

Standards and Documents Referenced in The Building Energy Assessment for The Karuk Tribe

EnergyPro Software, Versions 3.144 & 4.410

Energy Soft – "World Class Building Energy Analysis Software"
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Software Sales and Support (415) 897-6400, Ext. 315
www.energysoft.com

2005 Building Energy Efficiency Standards for Residential and Non-Residential Buildings – Standards and Regulations
CEC-400-2006-015 replaces P400-03-001F

Effective Date October 1, 2005, Revised September 2006
This document can be downloaded from the California Energy Commission Website http://www.energy.ca.gov/title24/2005standards/index.html
To obtain a hard copy, contact the Energy Commission's publications unit at (916) 654-5200

Joint Appendices for the 2005 Building Energy Efficiency Standards for Residential and Non-Residential Buildings
P400-03-001JAF

Effective Date October 1, 2005
This document can be downloaded from the California Energy Commission Website http://www.energy.ca.gov/title24/2005standards/index.html
To obtain a hard copy, contact the Energy Commission's publications unit at (916) 654-5200

2005 Building Energy Efficiency Standards Residential Compliance Manual
CEC-400-2005-005-CMF Revision 3
2005 Building Energy Efficiency Standards Non-Residential Compliance Manual
CEC-400-2005-006-CMF Revision 3

Prepared by Architectural Energy Consultants, San Francisco –
California Energy Commission Approved Manual
This document can be downloaded from the California Energy Commission Website http://www.energy.ca.gov/title24/2005standards/index.html
To obtain a hard copy, contact the Energy Commission's publications unit at (916) 654-5200

These resources should be used in conjunction with a current copy of the 2005 Building Energy Efficiency Standards for Residential and Non-Residential Buildings

California Energy Commission (CEC)

The CEC is California's primary energy policy and planning agency. Please visit their website for the most current information available regarding building energy efficiency. www.energy.ca.gov

U.S. Department of Energy (U.S. DOE)
1000 Independence Ave., SW
Washington, DC, 20585
1-800-dial-DOE

The U.S. D.O.E. is a department of the U.S. government responsible for energy policy and nuclear safety. Please visit their website for detailed information regarding energy conservation, energy related research, and domestic energy production. www.energy.gov

Pacific Gas & Electric Company

PG&E wants to help California utility users save energy, save money, and save the environment. Please visit their website for information regarding energy use in California. http://www.pge.com/myhome/

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Abbay Technical Services

Building Energy Consultants
& Title 24 Reports

Building Energy Assessment for The Karuk Tribe

•Appendix A•

November 2008

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•Appendix A•
Table of Contents

Glossary
From Joint Appendix I of the California Energy Commission's Joint Appendices for the 2005 Building Energy Efficiency Standards for Residential and Nonresidential Buildings

ALTERATIONS	are changes to a building's envelope, space conditioning system, water heating system, or lighting system that are not additions.
ALTERNATIVE CALCULATION METHODS (ACMS)	are the California Energy Commission's Public Domain Computer Programs, one of the Commission's Simplified Calculation Methods or any other calculation method approved by the Commission.
ANNUAL FUEL UTILIZATION EFFICIENCY (AFUE)	is a measure of the percentage of heat from the combustion of gas or oil which is transferred to the space being heated during a year.
ANSI	is the American National Standards Institute.
ARI	is the Air-Conditioning and Refrigeration Institute.
ASSEMBLY	See *Construction Layers*
ASHRAE	is the American Society of Heating, Refrigerating and Air-Conditioning Engineers.
ATTIC	is an enclosed unconditioned space directly below the roof and above the ceiling.
BRITISH THERMAL UNIT (BTU)	is the amount of heat needed to raise the temperature of one pound of water one degree Fahrenheit.
BTU/H	is the amount of heat in Btu that is removed or added during one hour. Used for measuring heating and cooling equipment output.
BTU/H INPUT	is the amount of source energy required by a heating, ventilation, or air conditioning system to create heating, cooling and ventilation.
BTU/H OUTPUT	is the actual amount of source energy that is transformed into heating, cooling or ventilation for a space. The amount of Btu/hr output is dependent on the efficiency (AFUE) of the system that is using it.

BUILDING ENERGY EFFICIENCY STANDARDS	are the California Building Energy Efficiency Standards as set forth in the California Code of Regulations, Title 24, Part 6. Also known as the California Energy Code.
BUILDING ENVELOPE	is the ensemble of exterior and demising partitions of a building that enclose conditioned space.
BUILDING LOCATION DATA	is the physical information about the location of the building. Building location data may include the street address, city, zip code and parcel number of record.
CALIFORNIA ENERGY CODE	See *Building Energy Efficiency Standards.*
CEILING	is the interior upper surface of a space separating it from an attic, plenum, indirectly or directly conditioned space or the roof assembly, which has a slope less than 60 degrees from horizontal.
CLIMATE ZONES	are the 16 geographic areas of California for which the Commission has established typical weather data, prescriptive packages and energy budgets.
CONDITIONED FLOOR AREA (CFA)	is the floor area (in square feet) of enclosed conditioned space on all floors of a building, as measured at the floor level of the exterior surfaces of exterior walls enclosing the conditioned space.
CONDITIONED FOOTPRINT	is a projection of all conditioned space on all floors to a vertical plane. The conditioned footprint area may be equal to the first floor area, or it may be greater, if upper floors project over lower floors. One way to think of the conditioned footprint area is as the area of the largest conditioned floor in the building plus the conditioned floor area of any projections from other stories that extend beyond the outline of that largest floor.
CONDITIONED SPACE	is space in a building that is either directly conditioned or indirectly conditioned.

CONSTRUCTION LAYERS	are roof, wall and floor constructions which represent an assembly of layers. Some layers are homogenous, such as gypsum board and plywood sheathing, while other layers are non-homogenous such as the combination of wood framing and cavity insulation typical in many buildings.
COOLING EQUIPMENT	is equipment used to provide mechanical cooling for a room or rooms in a building.
COOLING LOAD	is the rate at which heat must be extracted from a space to maintain a desired room condition.
CRAWL SPACE	is a space immediately under the first floor of a building adjacent to grade.
DEPLETABLE SOURCES	is energy obtained by electricity purchased from a public utility, or energy obtained from burning coal, oil, natural gas, or liquefied petroleum gas.
DUCT LOSSES	is heat transfer into or out of a space conditioning system duct through conduction or leakage.
DUCT SEALING	is a procedure for installing a space conditioning distribution system. Minimum specifications for installation procedures, materials, diagnostic testing and field verification are contained in the Residential and Non-Residential ACM Approval Manuals.
EER	See *Energy Efficiency Ratio.*
EFFICACY, LAMP	is the quotient of rated initial lamp lumens divided by the rated lamp power (watts), without including auxiliaries such as ballasts.
ELECTRIC HEATING	is an electrically powered heating source, such as electric resistance, heat pumps with no auxiliary heat or with electric auxiliary heat, solar with electric back-up, etc.

ELECTRIC RESISTANCE HEATING	is a heating system that converts electric energy directly into heat energy by passing a current through an electric resistance. Electric resistance heat is inherently less efficient than gas as a heating energy source because it must account for losses associated with generation from depletable fossil fuels and transmission to the building site.
ENERGY EFFICIENCY RATIO (EER)	is the ratio of net cooling capacity (in Btu/hr.) to total rate of electrical energy (in watts) of a cooling system under the applicable test method in the Appliance Efficiency Regulations.
ENERGY FACTOR (EF)	is the ratio of energy output to energy consumption of a water heater, expressed in equivalent units, under designated operating conditions over a 24-hour use cycle, as determined using the applicable test method in the Appliance Efficiency Regulations.
ENVELOPE	See *Building Envelope.*
EXPOSED THERMAL MASS	is mass that is directly exposed (uncovered) to the conditioned space of the building. Concrete floors that are covered by carpet are not considered exposed thermal mass.
EXTERIOR ROOF/CEILING	is an exterior partition, or a demising partition, that has a slope less than 60 degrees from horizontal, that has conditioned space below, and that is not an exterior door or skylight.
EXTERIOR ROOF/CELING AREA	is the area of the exterior surface of exterior roof/ceilings.
EXTERIOR WALL	is any wall or element of a wall, or any member or group of members which defines the exterior boundaries or courts of a building and which has a slope of 60 degrees or greater with the horizontal plane. An exterior wall or partition is not and exterior floor/soffit, exterior door, exterior roof/ceiling, window, skylight, or demising wall.
EXTERIOR WALL AREA	is the area of the opaque exterior surface of exterior walls.

FENESTRATION AREA	is the area of fenestration products (i.e., windows, skylights, and glass doors) in exterior openings, including the sash or frame area. The nominal area (from nominal dimensions such as $4^0 4^0$) or rough opening is also acceptable. Where the term "glazing area" is used in the standards it is the entire fenestration area, not just the area of glazing, unless stated otherwise.
FENESTRATION PRODUCT	is any transparent or translucent material plus any sash, frame, mullions and dividers, in the envelope of a building, including, but not limited to, windows, sliding glass doors, French doors, skylights, curtain walls, garden windows, and other doors with a glazed area of more than one half of the door area.
GLAZING	See *Fenestration Product.*
GLAZING AREA	See *Fenestration Area.*
HEAT PUMP	is a device that is capable of heating by refrigeration, and that may include a capability for cooling.
HEATING EQUIPMENT	is equipment used to provide mechanical heating for a room or rooms in a building.
HEATING SEASONAL PERFORMANCE FACTOR (HSPF)	is the total heating output of a central air-conditioning heat pump during its normal usage period for heating, divided by the total electrical energy input in watt-hours during the same period, as determined using the applicable test method in the Applicable Efficiency Regulations.
HEATING, VENTILATING AND AIR CONDITIONING (HVAC) SYSTEM	is the mechanical heating, ventilating and air conditioning system of the building, also known as the HVAC system. The standards use various measures of equipment efficiency defined according to the equipment installed. Gas (fossil fuel) heating equipment is rated by the Annual Fuel Utilization Efficiency (AFUE). The heating efficiency of electric heat pumps with less than 65,000 Btu/h cooling capacity is rated by the Heating Seasonal Performance Factor (HSPF). The heating efficiency of heat pumps with cooling capacity of 65,000 Btu/h or

	more is rated by the Coefficient of Performance (COP). Electric resistance heating is rated by HSPF or COP. All electric cooling equipment (including heat pump cooling equipment) with less than 65,000 Btu/h output capacity is rated by the Seasonal Energy Efficiency Ratio (SEER) (equipment of this size may also be rated by the EER). Electric cooling equipment (including heat pump cooling equipment) with an output capacity of 65,000 Btu/h or more is rated by the Energy Efficiency Ratio (EER).
HORIZONTAL FENESTRATION	See *Skylight.*
HSPF	See *Heating Seasonal Performance Factor.*
HVAC	See *Heating, Ventilating and Air Conditioning.*
INSULATION	Insulation is a material that limits heat transfer. Insulation is placed within or contiguous with a wall, ceiling or floor, or over the surface of any appliance or its intake or outtake mechanism for the purpose of reducing heat transfer or reducing adverse temperature fluctuations of the building, room or appliance. Insulation may be installed in wall, ceiling/roof and raised floor assemblies and at the edge of a slab-on-grade.
KILOWATT (kW)	is a unit of power equal to 1000 watts.
KILOWATT HOUR	is a unit of energy equal to the work done by a power of 1000 watts operating for one hour.
LOW-E COATING	is a low emissive metallic coating applied to glazing in fenestration products.
MODELING ASSUMPTIONS	are the conditions (such as weather condition, thermostat settings and schedules, internal gain schedules, etc.) that are used for calculating a building's annual energy consumption as specified in the ACM Manuals. Modeling assumptions are based on common, reasonable, or standard building practices at the time the building was constructed.

MULTI-FAMILY DWELLING UNIT	is a dwelling unit of occupancy type R, as defined by the CBC, sharing a common wall and/or ceiling/floor with a6t least one other dwelling unit.
NFRC	is the National Fenestration Rating Council. This is a national organization of fenestration product manufacturers, glazing manufacturers, manufacturers of related materials, utilities, state energy offices, laboratories, home builders, specifiers (architects), and public interest groups. This organization is designated by the Commission as the Supervisory Entity, which is responsible for rating the U-factors and solar heat gain coefficients of manufactured fenestration product (i.e., windows, skylights, glazed doors) that must be used in analysis and compliance calculations.
NONRESIDENTIAL BUILDING	is any building which is a Group A, B, E, F, H, M, or S Occupancy.
NONRESIDENTIAL MANUAL	is the manual developed by the Commission, under Section 25402.1(e) of the Public Resources Code, to aid designers, builders and contractors in meeting the energy efficiency requirements for nonresidential, high-rise residential, and hotel/motel buildings.
OPAQUE SURFACES	are the structural element of a building such as walls, floors and ceilings.
OVERALL HEAT GAIN	is the total heat gain through all portions of the building envelope calculated as specified in Section 143 (b) 2 for determining compliance with the Overall Envelope Approach.
OVERALL HEAT LOSS	is the total heat loss through all portions of the building envelope calculated as specified in Section 143 (b) 1 for determining compliance with the Overall Envelope Approach.
PACKAGED AIR CONDITIONER OR HEAT PUMP	is an air conditioner or heat pump that combines both the condenser and air handling capabilities in a single enclosure or package.

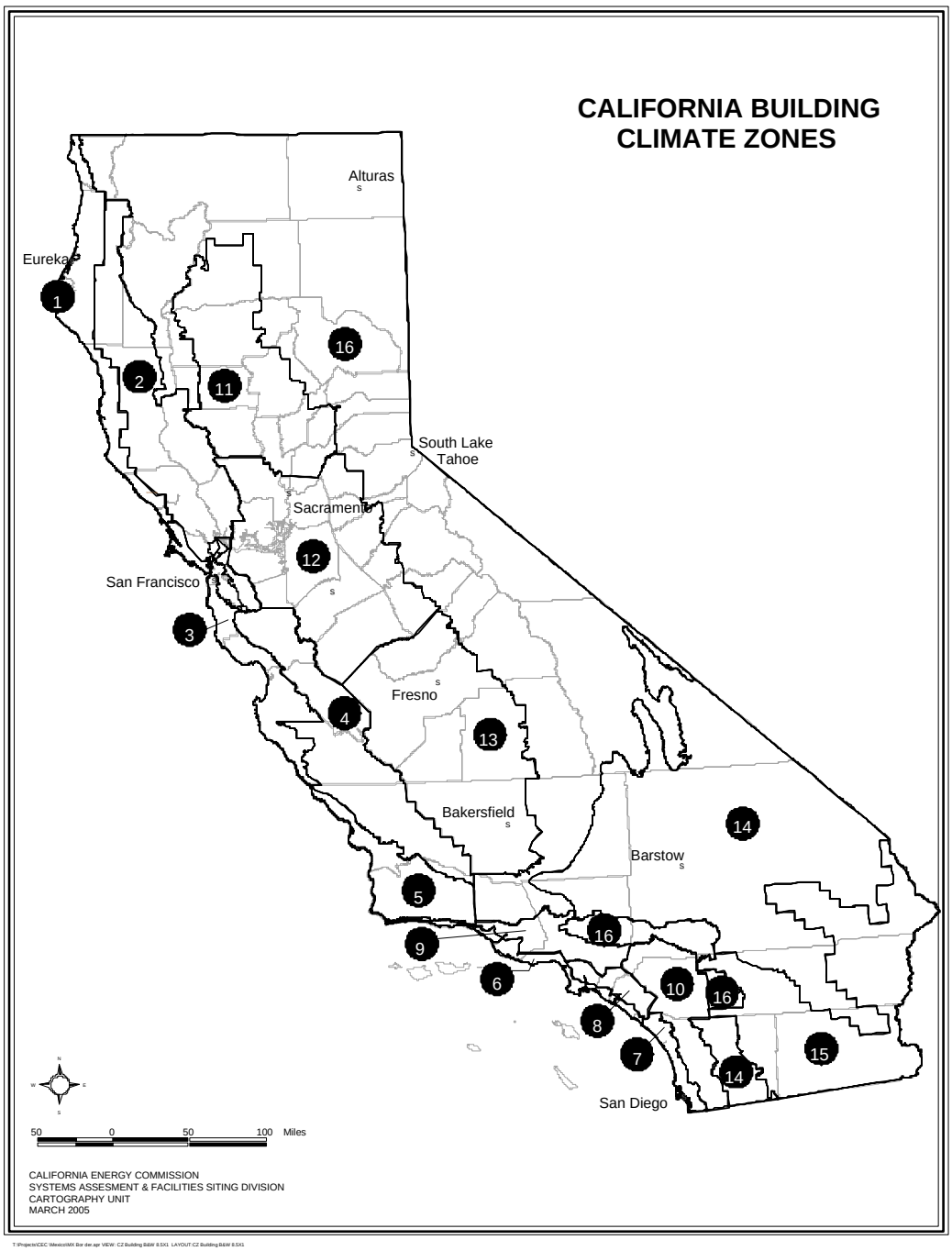
PROPOSED DESIGN	is the proposed building design which shows the predicted energy use of a building.
RAISED FLOOR	is a floor (partition) over a crawl space, or an unconditioned space, or ambient air.
RECOVERY EFFICIENCY (RE)	is one measure of the efficiency of water heaters. It is required for water heating analysis and energy calculations for some types of water heaters. It is a measure of the percentage of heat from combustion of gas or oil which is transferred to the water. For non-storage type water heaters, the recovery efficiency is really a thermal efficiency.
RESIDENTIAL MANUAL	is the manual developed by the Commission, under Section 25402.1 of the Public Resources Code, to aid designers, builders and contractors in meeting energy efficiency standards for low-rise residential buildings.
ROOF/CEILING TYPE	is a type of roof/ceiling assembly that has a specific framing type and U-factor.
R-VALUE	is the measure of the thermal resistance of insulation or any material or building component expressed in ft^2-hr°F/Btu. See *Thermal Resistance*
SEASONAL ENERGY EFFICIENCY RATIO (SEER)	is the total cooling output of a central air conditioner in Btu during its normal usage period for cooling divided by the total electrical energy input in watt-hours during the same period, as determined using the applicable test method in the Appliance Efficiency Regulations.
SERVICE WATER HEATING	is heating of water for sanitary purposes for human occupancy, other than for comfort heating.
SKYLIGHT AREA	is the area of the rough opening for a skylight.
SKYLIGHT TYPE	is a type of skylight assembly having a specific solar heat gain coefficient and U-factor, whether glass mounted on a curb, glass not mounted on a curb or plastic (assumed to be mounted on a curb).

SLAB-ON-GRADE	is an exterior concrete floor in direct contact with the earth below the building.
SOLAR HEAT GAIN COEFFICIENT (SHGC)	is the ratio of the solar heat gain entering the space through the fenestration area to the incident solar radiation. Solar heat gain includes directly transmitted solar heat and absorbed solar radiation, which is then reradiated, conducted, or convected into the space.
SPLIT SYSTEM AIR CONDITIONER OR HEAT PUMP	is an air conditioner or heat pump that has physically separate condenser and air handling unit(s) that work together as a single cooling system.
STANDARD DESIGN	is a hypothetical or existing building that is used to calculate a custom energy budget for nonresidential and residential building. In an existing building, the Standard Design shows the calculated energy use of a building as it exists with its current energy elements.
SYSTEM	is a combination of equipment, controls, accessories, interconnecting means, or terminal elements by which energy is transformed to perform a specific function, such as space conditioning, service water heating, or lighting.
THERMAL RESISTANCE (R)	is the resistance of a material or building component to the passage of heat in (hr.xft.^{2}x$^\circ$F)/Btu.
U-FACTOR	is the overall coefficient of thermal transmittance of a construction assembly, in Btu/(hr.xft.^{2}x$^\circ$F), including air film resistance as both surfaces.
UNCONDITIONED SPACE	is enclosed space within a building that is not directly conditioned or indirectly conditioned.
VINYL WINDOW FRAME	is a fenestration frame constructed with a polyvinyl chloride (PVC) which has a lower conductivity than metal and a similar conductivity to wood.
WALL TYPE	is a type of wall assembly that has a specific heat capacity, framing type, and U-factor.

WINDOW	is fenestration that is not a skylight.
WINDOW AREA	is the area of the surface of a window, plus the area of the frame, sash, and mullions.
WINDOW TYPE	is a window assembly having a specific solar heat gain coefficient, relative solar heat gain, and U-factor.
WINDOW WALL RATIO	is the ratio of the window area to gross exterior wall area.

California Climate Zones
From Joint Appendix II of the California Energy Commission's Joint Appendices for the 2005 Building Energy Efficiency Standards for Residential and Nonresidential Buildings

Reference Weather/Climate Data



Climate Zone Map

Standards Table 151-C
Alternative Component Package D
From the List of Tables in the
California Energy Commission's
2005 Building Energy Efficiency Standards

STANDARDS TABLE 151-C ALTERNATIVE COMPONENT PACKAGE D

Climate Zone	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
BUILDING ENVELOPE																
Insulation minimums [1]																
Ceiling	R38	R30	R30	R30	R30	R30	R30	R30	R30	R30	R38	R38	R38	R38	R38	R38
Wood-frame walls	R21	R13	R13	R13	R13	R13	R13	R13	R13	R13	R19	R19	R19	R21	R21	R21
"Heavy mass" walls	(R4.76)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R2.44)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	(R4.76)	
"Light mass" walls	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Below-grade walls	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R0	R13
Slab floor perimeter	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	R7
Raised floors	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19	R19
Concrete raised floors	R8	R8	R0	R0	R0	R0	R0	R0	R0	R0	R8	R4	R8	R8	R4	R8
Radiant Barrier	NR	REQ	NR	REQ	NR	NR	NR	REQ	REQ	REQ	REQ	REQ	REQ	REQ	REQ	NR
FENESTRATION																
Maximum U-factor [2]	0.57	0.57	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.57	0.57	0.57	0.57	0.57	0.57	0.55
Maximum Solar Heat Gain Coefficient (SHGC) [3]	NR	0.40	NR	0.40	NR	NR	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	NR
Maximum total area	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%	20%
Maximum West facing area	NR	5%	NR	5%	NR	NR	5%	5%	5%	5%	5%	5%	5%	5%	5%	NR
THERMAL MASS [4]	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
SPACE-HEATING [5]																
Electric-resistant allowed	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No	No
If gas, AFUE =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
If heat pump, HSPF [6] =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
SPACE-COOLING																
SEER =	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN	MIN
If split system,	NR	REQ [9]	NR	NR	NR	NR	NR	REQ [9]	REQ [9]	REQ [12]	REQ [12]	REQ [12]	REQ [13]	REQ [14]	REQ	NR
Refrigerant charge measurement or Thermostatic Expansion valve																
DUCTS																
Duct sealing	REQ [8]	REQ [9]	REQ [10]	REQ [11]	REQ [10]	REQ [10]	REQ [10]	REQ [9]	REQ [9]	REQ [12]	REQ [12]	REQ [12]	REQ [13]	REQ [14]	REQ	REQ [8]
Duct Insulation	R-6	R-6	R-6	R-6	R-6	R-4.2	R-4.2	R-4.2	R-6	R-6	R-6	R-6	R-6	R-8	R-8	R-8
WATER-HEATING	System shall meet Section 151 (f) 8 or Section 151 b															

Table R3-11
Default Assumptions for Existing Buildings
Vintage Table Values
From Appendix B of the
California Energy Commission's
2005 Building Energy Efficiency Standards
Residential Compliance Manual

TABLE R3-11 – DEFAULT ASSUMPTIONS FOR EXISTING BUILDINGS – VINTAGE TABLE VALUES

	Default Assumptions for Year Built (Vintage)							
Conservation Measure	Before 1978	1978 to 1983	1984 to 1991	1992 to 1998	1999 - 2000	2001-2003	2004-2005	2006 and Later
INSULATION U-FACTOR								
Roof	0.079	0.049	0.049	0.049	0.049	0.049	0.049	0.049
Wall	0.356	0.110	0.110	0.102	0.102	0.102	0.102	0.102
Raised Floor – CrawlSp	0.099	0.099	0.099	0.046	0.046	0.046	0.046	0.046
Raised Floor-No CrawlSp	0.238	0.238	0.238	0.064	0.064	0.064	0.064	0.064
Slab Edge F-factor =	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73
Ducts	R-2.1	R-2.1	R-2.1	R-4.2	R-4.2	R-4.2	R-4.2	R-4.2
LEAKAGE								
Building (SLA)	4.9	4.9	4.9	4.9	4.9	4.9	4.9	4.9
Duct Leakage Factor (See Table 4-13)	0.86	0.86	0.86	0.86	0.86	0.89	0.89	0.89
FENESTRATION								
U-factor	Use Table 116-A - Title 24, Part 6, Section 116 for all Vintages							
SHGC	Use Table 116-B - Title 24, Part 6, Section 116 for all Vintages							
Shading Dev.	Use Table R3-7 for all Vintages							
SPACE HEATING EFFICIENCY								
Gas Furnace (Central) AFUE	0.75	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Gas Heater (Room) AFUE	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Heat Pump HSPF	5.6	5.6	6.6	6.6	6.8	6.8	6.8	7.4
Electric Resistance HSPF	3.413	3.413	3.413	3.413	3.413	3.413	3.413	3.413
SPACE COOLING EFFICIENCY								
All Types, SEER	8.0	8.0	8.9	9.7	9.7	9.7	9.7	12.0
WATER HEATING								
Energy Factor	0.525	0.525	0.525	0.525	0.58	0.58	0.575	0.575
Rated Input, MBH	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0

Table 116-A
Default Fenestration Product U-Factors
From Section 116 of the
California Energy Commission's
2005 Building Energy Efficiency Standards

TABLE 116-A DEFAULT FENESTRATION PRODUCT U-FACTORS

FRAME TYPE[1]	PRODUCT TYPE	SINGLE-PANE U-FACTOR	DOUBLE-PANE U-FACTOR[2]
Metal	Operable	1.28	0.79
Metal	Fixed	1.19	0.71
Metal	Greenhouse/garden window	2.26	1.40
Metal	Doors	1.25	0.77
Metal	Skylight	1.98	1.3
Metal, Thermal Break	Operable	NA	0.66
Metal, Thermal Break	Fixed	NA	0.55
Metal, Thermal Break	Greenhouse/garden window	NA	1.12
Metal, Thermal Break	Doors	NA	0.59
Metal, Thermal Break	Skylight	NA	1.11
Nonmetal	Operable	0.99	0.58
Nonmetal	Fixed	1.04	0.55
Nonmetal	Doors	0.99	0.53
Nonmetal	Greenhouse/garden windows	1.94	1.06
Nonmetal	Skylight	1.47	0.84

[1] Metal includes any field-fabricated product with metal cladding. Nonmetal-framed manufactured fenestration products with metal cladding must add 0.04 to the listed U-factor. Nonmetal-frame types can include metal fasteners, hardware, and door thresholds. Thermal break product design characteristics are:

a. The material used as the thermal break must have a thermal conductivity of not more than 3.6 Btu-inch/hr/ft^2/°F,

b. The thermal break must produce a gap of not less than 0.210 inch, and

c. All metal members of the fenestration product exposed to interior and exterior air must incorporate a thermal break meeting the criteria in Items a. and b. above.

In addition, the fenestration product must be clearly labeled by the manufacturer that it qualifies as a thermally broken product in accordance with this standard. Thermal break values shall not apply to field-fabricated fenestration products.

[2] For all dual-glazed fenestration products, adjust the listed U-factors as follows:

a. Subtract 0.05 for spacers of 7/16 inch or wider.

b. Subtract 0.05 for products certified by the manufacturer as low-E glazing.

c. Add 0.05 for products with dividers between panes if spacer is less than 7/16 inch wide.

d. Add 0.05 to any product with true divided lite (dividers through the panes).

Table 116-B
Default Solar Heat Gain Coefficient
From Section 116 of the
California Energy Commission's
2005 Building Energy Efficiency Standards

TABLE 116-B DEFAULT SOLAR HEAT GAIN COEFFICIENT

FRAME TYPE	PRODUCT	GLAZING	TOTAL WINDOW SHGC[2]	
			Single-Pane	Double-Pane
Metal	Operable	Clear	0.80	0.70
Metal	Fixed	Clear	0.83	0.73
Metal	Operable	Tinted	0.67	0.59
Metal	Fixed	Tinted	0.68	0.60
Metal, Thermal Break	Operable	Clear	NA	0.63
Metal, Thermal Break	Fixed	Clear	NA	0.69
Metal, Thermal Break	Operable	Tinted	NA	0.53
Metal, Thermal Break	Fixed	Tinted	NA	0.57
Nonmetal	Operable	Clear	0.74	0.65
Nonmetal	Fixed	Clear	0.76	0.67
Nonmetal	Operable	Tinted	0.60	0.53
Nonmetal	Fixed	Tinted	0.63	0.55
[2] SHGC = Solar Heat Gain Coefficient.				

Table F-5
Standards for Small Federally-Regulated Water Heaters
From Appendix B of the California Energy Commission's 2005 Building Energy Efficiency Standards Nonresidential Compliance Manual

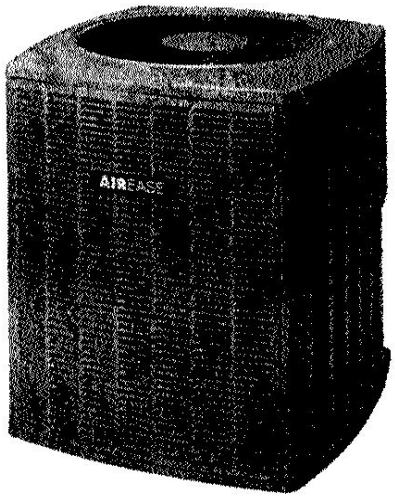
Table F-5
Standards for Small Federally-Regulated Water Heaters

Appliance	*Minimum Energy Factor*	
	Effective April 15, 1991	***Effective January 20, 2004***
Gas-fired storage-type water heaters	0.62 – (.0019 x V)	0.67 – (.0019 x V)
Oil-fired water heaters (storage and instantaneous)	0.59 – (.0019 x V)	0.59 – (.0019 x V)
Electric storage water heaters (excluding tabletop water heaters)	0.93 - (.00132 x V)	0.97 - (.00132 x V)
Electric tabletop water heaters	0.93 - (.00132 x V)	0.93 - (.00132 x V)
Gas-fired instantaneous water heaters	0.62 – (.0019 x V)	0.62 – (.0019 x V)
Electric instantaneous water heaters (excluding tabletop water heaters)	0.93 - (.00132 x V)	0.93 - (.00132 x V)
Heat pump water heaters	0.93 - (.00132 x V)	0.97 - (.00132 x V)
V = rated volume in gallons.		

Equipment Specification Sheets and Performance Data

Split System Heat Pump

2SHP13LB



5 year limited warranty on compressor
5 year limited warranty on all parts
Extended warranty available

ARI PERFORMANCE CERTIFIED
ARI Standard 210/240 UHP

c UL us

COMPRESSOR
- High efficiency scroll compressor
- Grommet mounted compressor for quiet operation
- Internally protected against high temperature motor overload conditions
- R22 refrigerant

CABINET
- Full metal louvered jacket coil guard protection
- Controls located in corner post for easy installation and service
- Rounded corners for safety and attractive, clean appearance
- Baked polyester paint finish over galvanized steel for maximum durability
- External gauge ports for easy service
- Raised base pan with drain ports allows for excellent water and debris drainage

COIL
- Enhanced aluminum fins and copper tubing for high efficiency and capacity
- Raised coil prevents debris from collecting in bottom of coil and causing loss of airflow

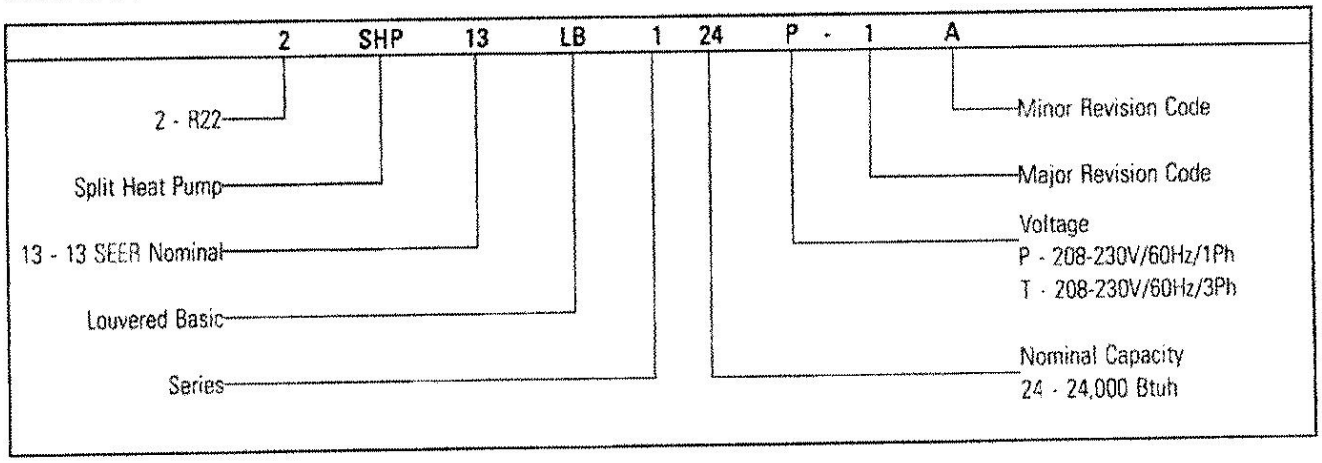
COMPONENTS
- Full metal jacket panels remove with just two screws per panel for easy coil cleaning and service
- Bi-directional filter drier for long-lasting durability and system protection
- Discharge muffler for quiet operation
- Reliable, solid-state, time-initiated, temperature terminated defrost system
- Defrost control is Quiet Shift™ capable
- Service valves positioned for quick installation and easy service
- Low pressure switch for loss of charge system protection
- Integrated control with LED diagnostics
- Trade available components
- Defrost control features built in diagnostics for easier service
- Defrost control has short cycle protection to protect the compressor
- Defrost cycle is field selectable 30/60/90 minutes

DESIGN
- Designed for ambients up to 125°F

ACCESSORIES
- High pressure cutout kit
- Fossil fuel kit
- Outdoor thermostat/low-ambient compressor cutout kit
- Thermal expansion valve kits

AIREASE
Built for life. Yours.™

Model Number Guide



Physical and Electrical

Model	Voltage/ Hz/Phase	Voltage Range	Min. Circuit Amp.	Max. Over current Device (amps)	Compressor		Fan Motor			Refrigerant Connections		R22 Refrig. Charge (oz.)	Weight (lbs.)
					Rated Load (amps)	Locked Rotor (amps)	Rated Load (amps)	Rated HP	Nom. RPM	Liquid O.D. (in.)	Vapor O.D. (in.)		
2SHP13LB118P	208-230/60/1	197-253	12.3	20	8.9	41	1.0	1/6	1075	3/8	3/4	102	185
2SHP13LB124P	208-230/60/1	197-253	14.0	20	10.3	56	1.0	1/6	1075	3/8	3/4	99	190
2SHP13LB130P	208-230/60/1	197-253	18.0	30	13.5	72	1.0	1/6	1075	3/8	3/4	132	205
2SHP13LB136P	208-230/60/1	197-253	19.4	30	14.7	83	1.0	1/6	1075	3/8	7/8	138	210
2SHP13LB142P	208-230/60/1	197-253	23.1	40	17.0	95	1.9	1/3	1075	3/8	7/8	200	250
2SHP13LB148P	208-230/60/1	197-253	29.2	50	22.0	137	1.7	1/4	825	3/8	7/8	232	295
2SHP13LB160P	208-230/60/1	197-253	31.3	55	24.0	137	1.7	1/4	825	3/8	1-1/8	285	305
2SHP13LB136T	208-230/60/3	197-253	10.2	15	9.6	77	1.0	1/6	1075	3/8	7/8	138	210
2SHP13LB148T	208-230/60/3	197-253	14.8	25	14.7	91	1.7	1/4	825	3/8	7/8	232	295
2SHP13LB160T	208-230/60/3	197-253	20.8	35	14.7	91	1.7	1/4	825	3/8	1-1/8	285	305

Sound Ratings

Model No.	Sound Rating (dBA)
2SHP13LB118	76
2SHP13LB124	76
2SHP13LB130	76
2SHP13LB136*	76
2SHP13LB142	78
2SHP13LB148*	78
2SHP13LB160*	79

* Single or three phase

Performance

Outdoor Model	Indoor Model	Cooling				Heating					CFM	Required Indoor TXV Kit[2]
		Btuh	SEER[1]	EER	S/T	HSPF	47° Btuh	47° COP	17° Btuh	17° COP		
2SHP13LB118	BCS2M18C00NA-1P	18,000	13.00	11.50	.75	7.70	17,000	3.4	10,600	2.4	600	.057
	BCS2M18C00NA-2X	18,000	13.00	11.50	.75	7.70	17,000	3.4	10,600	2.4	600	Factory TXV
	EFV08/CAM36	18,000	13.50	12.00	.75	8.00	17,000	3.4	10,600	2.6	600	H2TXV01
2SHP13LB124	BCS2M24C00NA-1P	24,000	13.00	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	.061
	BCS2M24C00NA-2X	24,000	13.00	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	Factory TXV
	EFV08/CAM36	24,000	13.50	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	H2TXV01
	G2D95*****V12B / E*1P30B	24,000	13.00	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	H2TXV01
	G2D95*****V14B / E*1P30B	24,000	13.00	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	H2TXV01
	G2D80*****V12B / E*1P30B	24,000	13.00	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	H2TXV01
	G2D80*****V14B / E*1P30B	24,000	13.00	11.50	.75	7.70	22,000	3.5	14,000	2.4	800	H2TXV01
2SHP13LB130	BCS2M30C00NA1-1P	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	.072
	BCS2M30C00NA-2X	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	Factory TXV
	EFV14/CAM48N	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	H2TXV01
	G2D95*****V12B / E*1P36B	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	H2TXV01
	G2D95*****V14B / E*1P36B	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	H2TXV01
	G2D95*****V16C / E*1P36C	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	H2TXV01
	G2D80*****V12B / E*1P36B	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	H2TXV01
	G2D80*****V14B / E*1P36B	31,000	13.00	11.00	.76	7.70	28,600	3.5	17,900	2.4	1000	H2TXV01
2SHP13LB136*	BCS2M36C00NA-1P	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	.074
	BCS2M36C00NA-2X	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	Factory TXV
	EFV14/CAM48N	35,200	13.00	11.00	.75	7.70	33,800	3.5	21,000	2.5	1200	H2TXV02
	G2D95*****V12B / E*1P36B	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	H2TXV02
	G2D95*****V14B / E*1P36B	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	H2TXV02
	G2D95*****V16C / E*1P36C	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	H2TXV02
	G2D80*****V12B / E*1P36B	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	H2TXV02
	G2D80*****V14B / E*1P36B	35,200	13.00	11.00	.74	7.70	33,800	3.5	21,000	2.4	1200	H2TXV02
2SHP13LB142	BCS2M42C00NA-1P	41,500	13.00	11.00	.75	7.70	41,000	3.2	26,400	2.4	1400	.082
	BCS2M42C00NA-2X	41,500	13.00	11.00	.75	7.70	41,000	3.2	26,400	2.4	1400	Factory TXV
	EFV14/CAM60N	41,500	13.00	11.50	.75	7.70	41,000	3.2	26,400	2.4	1400	H2TXV02
	EC1P62C	41,500	13.00	11.00	.75	7.70	39,000	3.3	24,000	2.4	1400	H2TXV02
	G2D95*****V16C / E*1P49C	41,500	13.00	11.00	.75	7.70	41,000	3.2	26,400	2.4	1400	H2TXV02
	G2D95*****V20C / E*1P49C	41,500	13.00	11.00	.75	7.70	41,000	3.2	26,400	2.4	1400	H2TXV02
	G2D80*****V20C / E*1P49C	41,500	13.00	11.00	.75	7.70	41,000	3.2	26,400	2.4	1400	H2TXV02
2SHP13LB148*	BCS2M48C00NA-1P	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	.088
	BCS2M48C00NA-2X	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	Factory TXV
	EFV16/CAM60N	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	H2TXV02
	EC1P62C	48,000	13.00	11.00	.75	7.70	47,500	3.5	30,600	2.4	1600	.088
	G2D95*****V16C / E*1P62C	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	H2TXV02
	G2D95*****V20C / E*1P62C	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	H2TXV02
	G2D95*****V20D/ E*1P62D	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	H2TXV02
	G2D80*****V20C / E*1P62C	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	H2TXV02
	G2D80*****V20D / E*1P62D	48,000	13.00	11.00	.75	7.70	47,500	3.4	30,600	2.4	1600	H2TXV02
2SHP13LB160*	BCS2M60C00NA-1P	55,000	13.00	11.00	.76	7.70	55,000	3.6	35,000	2.5	1800	.090
	BCS2M60C00NA-2X	55,000	13.00	11.00	.76	7.70	55,000	3.6	35,000	2.5	1800	Factory TXV
	EFV20/CAM61	55,000	13.00	11.00	.76	8.00	55,000	3.7	35,000	2.6	1800	H2TXV03
	EC1P62C	53,000	13.00	11.00	.76	7.70	50,000	3.6	33,000	2.5	1800	H2TXV03

* Single or three phase

[1]Certified in accordance with Unitary Air Conditioner Certification Program, which is based on ARI Standard 210/240.

[2]Required to achieve ARI rating.

Cooling Performance Extended Ratings

Outdoor Model	Indoor Model	Indoor Temp DB/WB °F	Outdoor Temp - DB°F														
			65			82			95			105			115		
			Btuh	S/T	kW	Btuh	S/T	kW	Btuh	S/T	kW	Btuh	S/T	kW	Btuh	S/T	kW
2SHP13LE118	BCS2M18C00NA-1P	85/72	20,200	.65	1.21	20,000	.69	1.39	19,000	.72	1.56	18,000	.74	1.70	17,000	.77	1.83
	BCS2M18C00NA-2X	80/67	19,200	.68	1.18	19,000	.72	1.36	18,000	.75	1.53	17,000	.77	1.67	16,000	.80	1.80
	EFV08/CAM36	75/63	18,200	.71	1.15	18,000	.75	1.33	17,000	.78	1.50	16,000	.80	1.64	15,000	.83	1.77
2SHP13LE124	BCS2M24C00NA-1P	85/72	27,000	.67	1.60	26,200	.68	1.83	25,000	.72	2.08	23,000	.73	2.30	21,800	.76	2.53
	BCS2M24C00NA-2X	80/67	26,000	.70	1.57	25,200	.71	1.80	24,000	.75	2.05	22,000	.76	2.27	20,800	.79	2.50
	EFV08/CAM36	75/63	25,000	.73	1.54	24,200	.74	1.77	23,000	.78	2.02	21,000	.79	2.24	19,800	.82	2.47
2SHP13LE130	BCS2M30C00NA1-1P	85/72	34,000	.68	1.85	33,200	.71	2.19	32,000	.72	2.48	31,000	.74	2.74	28,000	.85	2.97
	BCS2M30C00NA-2X	80/67	33,000	.71	1.82	32,200	.74	2.16	31,000	.75	2.45	30,000	.77	2.71	27,000	.82	3.00
	EFV14/CAM48N	75/63	32,000	.74	1.79	31,200	.77	2.13	30,000	.78	2.42	29,000	.80	2.68	26,000	.79	3.03
2SHP13LE136*	BCS2M36C00NA-1P	85/72	40,200	.66	2.36	38,000	.68	2.76	36,200	.69	3.16	35,000	.71	3.51	33,000	.74	3.99
	BCS2M36C00NA-2X	80/67	39,200	.69	2.33	37,000	.71	2.73	35,200	.72	3.13	34,000	.74	3.48	32,000	.77	3.96
	EFV14/CAM48N	75/63	38,200	.72	2.30	36,000	.74	2.70	34,200	.75	3.10	33,000	.77	3.45	31,000	.80	3.93
2SHP13LE142	BCS2M42C00NA-1P	85/72	47,000	.68	2.94	45,000	.69	3.30	42,500	.70	3.69	39,700	.72	4.03	38,600	.73	4.45
	BCS2M42C00NA-2X	80/67	46,000	.71	2.91	44,000	.72	3.27	41,500	.73	3.66	38,700	.75	4.00	37,600	.76	4.42
	EFV14/CAM60N	75/63	45,000	.74	2.88	43,000	.75	3.24	40,500	.76	3.63	37,700	.78	3.97	36,600	.79	4.39
2SHP13LE148*	BCS2M48C00NA-1P	85/72	55,400	.68	3.05	52,000	.71	3.54	50,000	.72	3.99	48,000	.73	4.36	45,800	.75	4.85
	BCS2M48C00NA-2X	80/67	53,400	.71	3.02	50,000	.74	3.51	48,000	.75	3.96	46,000	.76	4.33	43,800	.78	4.82
	EFV16/CAM60N	75/63	51,400	.74	2.99	48,000	.77	3.48	46,000	.78	3.93	44,000	.79	4.30	41,800	.81	4.79
2SHP13LE160*	BCS2M60C00NA-1P	85/72	59,000	.64	3.82	58,000	.65	4.49	57,000	.68	5.11	55,000	.69	5.66	53,000	.72	6.30
	BCS2M60C00NA-2X	80/67	57,000	.67	3.79	56,000	.68	4.46	55,000	.71	5.08	53,000	.72	5.63	51,000	.75	6.27
	EFV20/CAM61	75/63	55,000	.70	3.76	54,000	.71	4.43	53,000	.74	5.05	51,000	.75	5.60	49,000	.78	6.24

* Single or three phase

Heating Performance Extended Ratings

Outdoor Model	Indoor Model	Outdoor Temp. DB/WB°F														
		0/0			17/15			35/33			47/43			62/56		
		Btuh	COP	kW	Btuh	COP	kW	Btuh	COP	kW	Btuh	COP	kW	Btuh	COP	kW
2SHP13LB118	BCS2M18C00NA-1P	6,400	1.80	1.15	10,600	2.40	1.29	15,000	3.00	1.47	18,000	3.40	1.55	21,700	3.90	1.63
	BCS2M18C00NA-2X															
	EFV08/CAM36															
2SHP13LB124	BCS2M24C00NA-1P	9,500	1.80	1.63	14,000	2.40	1.71	18,800	3.10	1.78	22,000	3.50	1.84	26,000	4.10	1.86
	BCS2M24C00NA-2X															
	EFV08/CAM36															
2SHP13LB130	BCS2M30C00NA1-1P	11,800	1.80	2.07	17,900	2.40	2.19	24,300	3.10	2.30	28,600	3.50	2.39	34,000	4.10	2.43
	BCS2M30C00NA-2X															
	EFV14/CAM48N															
2SHP13LB136*	BCS2M36C00NA-1P	13,700	1.80	2.41	21,000	2.40	2.56	28,700	3.10	2.71	33,800	3.50	2.83	40,200	4.10	2.87
	BCS2M36C00NA-2X															
	EFV14/CAM48N															
2SHP13LB142	BCS2M42C00NA-1P	18,100	1.90	2.92	26,400	2.40	3.22	35,200	2.90	3.56	41,000	3.20	3.75	48,300	3.60	3.93
	BCS2M42C00NA-2X															
	EFV14/CAM60N															
2SHP13LB148*	BCS2M48C00NA-1P	21,000	1.80	3.53	30,600	2.40	3.74	40,700	3.00	3.98	47,500	3.40	4.09	56,000	3.90	4.21
	BCS2M48C00NA-2X															
	EFV16/CAM60N															
2SHP13LB160*	BCS2M60C00NA-1P	23,700	1.90	3.89	35,000	2.50	4.10	47,000	3.20	4.30	55,000	3.60	4.48	65,000	4.20	4.54
	BCS2M60C00NA-2X															
	EFV20/CAM61															

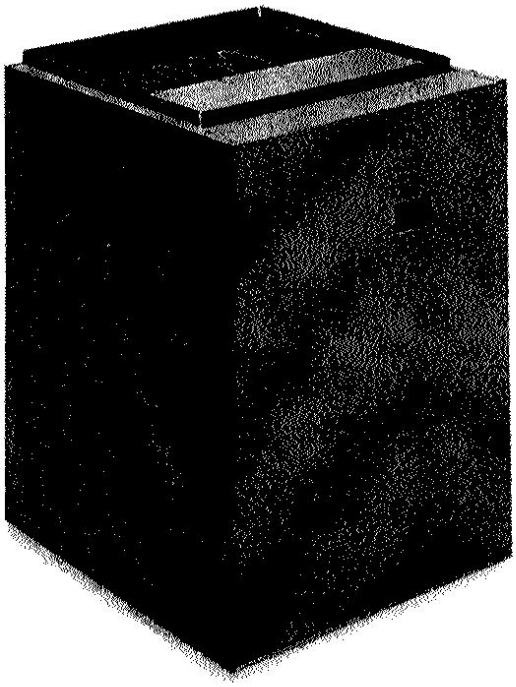
* Single or three phase

Accessories

Kit Number	Description	Used with
40K58	Blower Off Delay Kit	All 2SHP13's
45F08	Compressor Low Ambient Cut-off	All 2SHP13's
94J46	High Pressure Switch Kit	All 2SHP13's
47J27	Time Off Control	All 2SHP13's
67K90	Crank Case Heater	All 2SHP13's
10J42	Hard Start Kit 1.5 – 3.5 ton	2SHP13LB118,24,30,36,42
81J69	Hard Start Kit 4 – 5 ton	2SHP13LB148,60
33M07	Mild Ambient Kit	All 2SHP13's
27J00	Low Ambient Kit	All 2SHP13's
H2TXV01	TXV Kit	2SHP13LB118, 24, 30
H2TXV02	TXV Kit	2SHP13LB136, 42, 48
H2TXV03	TXV Kit	2SHP13LB160

ARMSTRONG AIR

Electric Furnace
Modular Air System
EFC/EFV



Application

- 1 1/2 - 5 ton sizes
- Upflow, counterflow and horizontal positions

Cabinet

- Cabinet dimensions match standard furnace widths
- Painted galvanized cabinet

Components

- EFC models feature efficient PSC motors
- EFV models feature ECM variable speed motors
- Field-installed 5-20 kW heat strips
- Factory installed fan relays for non-heat strip installations

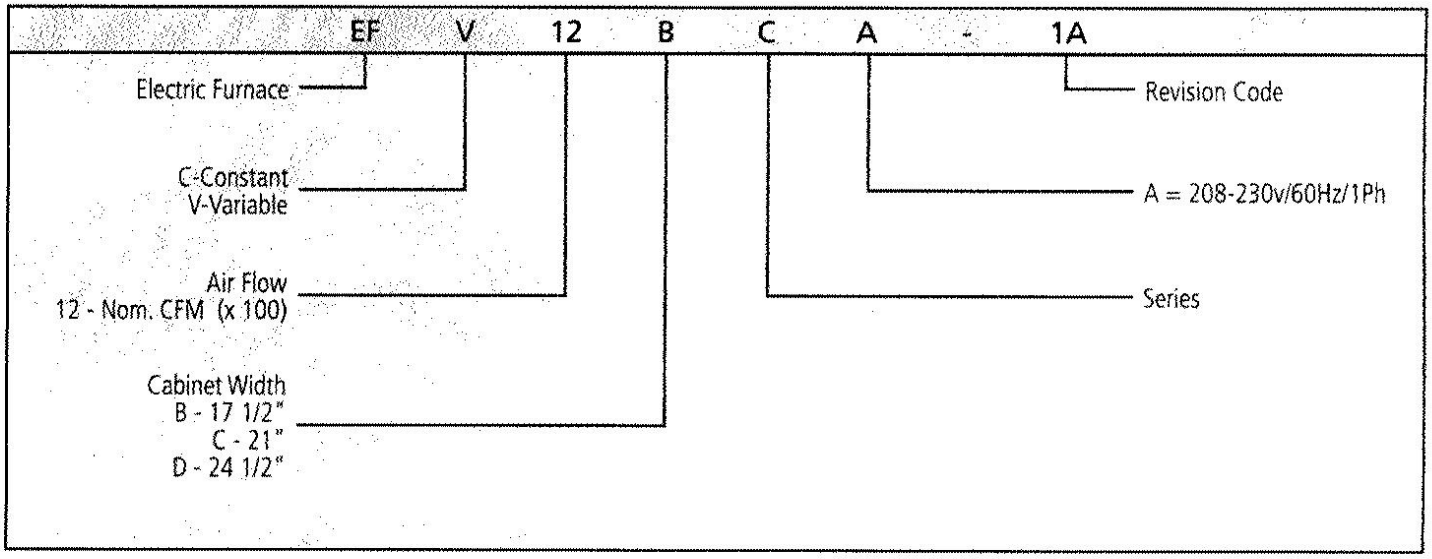
ARI Standard 210/240 UHP

ARI Standard 210/240 UAC

5 year limited warranty on all parts.

Extended warranty available.

Model Number Guide



Physical

Model	Volts/Hz/Phase	Blower Motor (hp)	Blower Motor Speeds	Max. Duct Static	Rated Load Amps	Nominal Tonnage	Weight (lbs.)
EFC08BC	208-230/60/1	1/4	3	.20	1.9	1 1/2 - 2	78
EFC12BC	208-230/60/1	1/3	3	.35	2.6	2 1/2 - 3	85
EFC16CC	208-230/60/1	3/4	3	.15	4.0	4	96
EFC20DC	208-230/60/1	3/4	3	.15	4.3	5	104
EFV08BC	208-230/60/1	1/3	*	.40	2.4	1 1/2 - 2	79
EFV12BC	208-230/60/1	1/3	*	.40	3.1	1 1/2 - 3	86
EFV16CC	208-230/60/1	3/4	*	.40	5.7	2 - 4	97
EFV20DC	208-230/60/1	3/4	*	.40	5.7	3 - 5	105

Electrical (EFC Models)

Blower Size	Elec. Heating Cap.		Blower Amps		(2) (3) Total Amps per Circuit						Total Unit Amps		Circuit Breaker Amps per Stage	
	kW	Btuh			208v			240v						
	(1) 240v	(1)) 240v	208v	240v	1	2	3	1	2	3	208	240	1	2
08 (no heat)	0	0	2.0	1.9	-	-	-	-	-	-	2.0	1.9	15	-
08	5	17,100	2.0	1.9	20.1	-	-	22.7	-	-	20.1	22.7	30	-
08	7.5	25,600	2.0	1.9	29.1	-	-	33.2	-	-	29.1	33.2	45	-
08	10	34,100	2.0	1.9	38.1	-	-	43.6	-	-	38.1	43.6	60	-
12 (no heat)	0	0	2.8	2.6	-	-	-	-	-	-	2.8	2.6	15	-
12	5	17,100	2.8	2.6	20.9	-	-	23.4	-	-	20.9	23.4	30	-
12	7.5	25,600	2.8	2.6	29.9	-	-	33.9	-	-	29.9	33.9	45	-
12	10	34,100	2.8	2.6	38.9	-	-	44.3	-	-	38.9	44.3	60	-
12	15	51,200	2.8	2.6	38.9	18.1	-	44.3	20.8	-	57.0	65.1	60	30
16 (no heat)	0	0	4.3	4.0	-	-	-	-	-	-	4.3	4.0	15	-
16	5	17,100	4.3	4.0	22.4	-	-	24.8	-	-	22.4	24.8	30	-
16	7.5	25,600	4.3	4.0	31.4	-	-	35.3	-	-	31.4	35.3	45	-
16	10	34,100	4.3	4.0	40.4	-	-	45.7	-	-	40.4	45.7	60	-
16	15	51,200	4.3	4.0	40.4	18.1	-	45.7	20.8	-	58.8	66.5	60	30
16	20	68,300	4.3	4.0	40.4	27.1	-	45.7	41.7		76.5	87.3	60	60
20 (no heat)	0	0	4.6	4.3	-	-	-	-	-	-	4.6	4.3	15	-
20	5	17,100	4.6	4.3	22.6	-	-	25.1	-	-	22.6	25.1	30	-
20	7.5	25,600	4.6	4.3	31.7	-	-	35.5	-	-	31.7	35.5	45	-
20	10	34,100	4.6	4.3	40.7	-	-	46.0	-	-	40.7	46.0	60	-
20	15	51,200	4.6	4.3	40.7	18.1	-	46.0	20.8	-	58.8	66.8	60	30
20	20	68,300	4.6	4.3	40.7	36.1	-	46.0	41.7		76.8	87.6	60	60

NOTE: IF NOMINAL CFM IS 1000 (2.5 TONS) WITH 15 KW ELECTRIC HEAT, THE MOTOR SPEED MUST BE SET AT MEDIUM OR HIGHER.

NOTE: MAXIMUM KW FOR UNITS WITH NOMINAL CFM SET AT 1400 (3.5 TONS) IS 15 KW.

(1) For 208 volt use .751 correction factor for kW and Btuh.

(2) 15 and 20 kW (2 stage models) require 2 supply circuits.

(3) Circuit #1 includes blower motor amps.

kW packages in bold indicate that these heat packages require and include circuit breakers. Optional for others.

Blower Performance (EFC Models)

Size	Blower Speed	External Static Pressure in W.C. - No Filter (Dry Coil)				
		.10	.20	.30	.40	.50
EFC08B	Low	590	600	590	560	510
	*Med	910	880	830	770	700
	High	1080	1020	950	870	770
EFC12B	Low	1090	1080	1060	1040	1010
	*Med	1260	1260	1250	1210	1170
	High	1340	1330	1330	1290	1250
EFC16C	Low	1510	1490	1440	1400	1320
	*Med	1640	1610	1590	1500	1420
	High	1730	1700	1640	1560	1470
EFC20D	Low	1600	1580	1550	1490	1420
	*Med	2060	1990	1910	1820	1710
	High	2220	2130	2040	1940	1830

*Speeds marked in italics with an asterisk * are the factory settings for both heating and cooling.*

Cooling speeds should not be reduced below factory settings.

Different speeds can be set for heating mode.

See installation instructions for changing speeds and minimum settings on electric heat.

Electrical (EFV Models)

Blower Size	Elec. Heating Cap.		Blower Amps		(2) (3) Total Amps per Circuit						Total Unit Amps		MCA		Circuit Breaker Amps per Stage	
	kW	Btuh			208v			240v								
	(1) 240v	(1) 240v	208v	240v	1	2	3	1	2	3	208	240	208v	240v	1	2
08 (no heat)	0	0	2.6	2.4	-	-	-	-	-	-	2.3	2.4	2.9	3.0	15	-
08	5	17,100	2.6	2.4	20.7			23.2			20.7	23.2	25.8	29.0	30	-
08	7.5	25,600	2.6	2.4	29.7			33.7			29.7	33.7	37.1	42.1	45	-
08	10	34,100	2.6	2.4	38.7			44.1			38.7	44.1	48.4	55.1	60	-
12 (no heat)	0	0	2.9	2.7	-	-	-	-	-	-	2.9	2.7	3.6	3.4	15	-
12	5	17,100	2.9	2.7	20.9			23.5			20.9	23.5	26.1	29.4	30	-
12	7.5	25,600	2.9	2.7	30.0			34.0			30.0	34.0	37.5	42.5	45	-
12	10	34,100	2.9	2.7	39.0			44.4			39.0	44.4	48.8	55.5	60	-
12	15	51,200	2.9	2.7	39.0	18.1		44.4	20.8		57.1	65.2	71.4	81.5	60	30
16 (no heat)	0	0	3.8	3.5	-	-	-	-	-	-	3.8	3.5	4.8	4.4	15	-
16	5	17,100	3.8	3.5	21.8			24.3			21.8	24.3	27.3	30.4	35	-
16	7.5	25,600	3.8	3.5	31.9			35.8			31.9	35.8	39.9	44.8	45	-
16	10	34,100	3.8	3.5	39.9			45.1			39.9	45.1	49.9	56.4	60	-
16	15	51,200	3.8	3.5	39.9	18.1		45.1	20.8		58.0	65.9	72.5	82.4	60	30
16	20	68,300	3.8	3.5	39.9	36.1		45.1	41.7		76.0	86.8	95.0	108.5	60	60
20 (no heat)	0	0	4.7	4.3	-	-	-	-	-	-	0.0	0.0	0.0	0.0	15	-
20	5	17,100	4.7	4.3	22.7			25.1			22.7	25.1	28.4	31.4	35	-
20	7.5	25,600	4.7	4.3	31.8			35.5			31.8	35.5	39.8	44.4	45	-
20	10	34,100	4.7	4.3	40.9			45.9			40.9	45.9	51.1	57.4	60	-
20	15	51,200	4.7	4.3	40.9	18.1		45.9	20.8		59.0	66.7	73.8	83.4	60	30
20	20	68,300	4.7	4.3	40.9	36.1		45.9	41.7		77.0	87.6	96.3	109.5	60	60

NOTE: IF NOMINAL CFM IS 1000 (2.5 TONS) WITH 15 KW ELECTRIC HEAT, THE MOTOR SPEED MUST BE SET AT MEDIUM OR HIGHER.

NOTE: MAXIMUM KW FOR UNITS WITH NOMINAL CFM SET AT 1400 (3.5 TONS) IS 15 KW.

(1) For 208 volt use .751 correction factor for kW and Btuh.

(2) 15 and 20 kW (2 stage models) require 2 supply circuits.

(3) Circuit #1 includes blower motor amps.

kW packages in bold indicate that these packages require and include circuit breakers. Optional for others.

Electrical (EFV Models)

Blower Size	Elec. Heating Cap.		Blower Amps		(2) (3) Total Amps per Circuit						Total Unit Amps		MCA		Circuit Breaker Amps per Stage	
	kW	Btuh			208v			240v								
	(1) 240v	(1) 240v	208v	240v	1	2	3	1	2	3	208	240	208v	240v	1	2
08 (no heat)	0	0	2.6	2.4	-	-	-	-	-	-	2.3	2.4	2.9	3.0	15	-
08	5	17,100	2.6	2.4	20.7			23.2			20.7	23.2	25.8	29.0	30	-
08	7.5	25,600	2.6	2.4	29.7			33.7			29.7	33.7	37.1	42.1	45	-
08	10	34,100	2.6	2.4	38.7			44.1			38.7	44.1	48.4	55.1	60	-
12 (no heat)	0	0	2.9	2.7	-	-	-	-	-	-	2.9	2.7	3.6	3.4	15	-
12	5	17,100	2.9	2.7	20.9			23.5			20.9	23.5	26.1	29.4	30	-
12	7.5	25,600	2.9	2.7	30.0			34.0			30.0	34.0	37.5	42.5	45	-
12	10	34,100	2.9	2.7	39.0			44.4			39.0	44.4	48.8	55.5	60	-
12	15	51,200	2.9	2.7	39.0	18.1		44.4	20.8		57.1	65.2	71.4	81.5	60	30
16 (no heat)	0	0	3.8	3.5	-	-	-	-	-	-	3.8	3.5	4.8	4.4	15	-
16	5	17,100	3.8	3.5	21.8			24.3			21.8	24.3	27.3	30.4	35	-
16	7.5	25,600	3.8	3.5	31.9			35.8			31.9	35.8	39.9	44.8	45	-
16	10	34,100	3.8	3.5	39.9			45.1			39.9	45.1	49.9	56.4	60	-
16	15	51,200	3.8	3.5	39.9	18.1		45.1	20.8		58.0	65.9	72.5	82.4	60	30
16	20	68,300	3.8	3.5	39.9	36.1		45.1	41.7		76.0	86.8	95.0	108.5	60	60
20 (no heat)	0	0	4.7	4.3	-	-	-	-	-	-	0.0	0.0	0.0	0.0	15	-
20	5	17,100	4.7	4.3	22.7			25.1			22.7	25.1	28.4	31.4	35	-
20	7.5	25,600	4.7	4.3	31.8			35.5			31.8	35.5	39.8	44.4	45	-
20	10	34,100	4.7	4.3	40.9			45.9			40.9	45.9	51.1	57.4	60	-
20	15	51,200	4.7	4.3	40.9	18.1		45.9	20.8		59.0	66.7	73.8	83.4	60	30
20	20	68,300	4.7	4.3	40.9	36.1		45.9	41.7		77.0	87.6	96.3	109.5	60	60

NOTE: IF NOMINAL CFM IS 1000 (2.5 TONS) WITH 15 KW ELECTRIC HEAT, THE MOTOR SPEED MUST BE SET AT MEDIUM OR HIGHER.

NOTE: MAXIMUM KW FOR UNITS WITH NOMINAL CFM SET AT 1400 (3.5 TONS) IS 15 KW.

(1) For 208 volt use .751 correction factor for kW and Btuh.

(2) 15 and 20 kW (2 stage models) require 2 supply circuits.

(3) Circuit #1 includes blower motor amps.

kW packages in bold indicate that these packages require and include circuit breakers. Optional for others.

Blower Performance (EFV Models)

Air Handler Model	Energized Thermostat Terminal	Control Board Tap	CFM @ ESP. in W.C.							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
EFV08BC	Y1	A	710	690	680	690	690	690	690	680
		B	560	560	560	570	560	560	570	570
		C	490	490	500	500	500	500	490	490
		D	430	430	430	430	440	440	440	440
	Y1/Y2	A	1010	980	970	980	980	980	980	970
		B	800	800	800	810	800	800	810	810
		C	700	700	710	710	710	710	700	700
		D	610	610	620	620	630	630	630	630
	G	A	510	490	480	490	490	490	490	490
		B	400	400	400	410	400	400	410	410
		C	350	350	360	360	360	360	350	350
		D	310	310	310	310	320	320	320	320
EFV12BC	Y1	A	850	860	860	870	880	880	880	880
		B	710	720	730	740	740	750	730	730
		C	620	600	600	600	610	600	610	610
		D	500	480	470	470	460	450	440	420
	Y1/Y2	A	1,220	1,220	1,210	1,210	1,210	1,210	1,200	1,200
		B	1,000	1,010	1,040	1,040	1,040	1,040	1,040	1,020
		C	820	820	830	830	840	840	840	840
		D	650	640	640	650	650	660	660	640
	G	A	640	620	640	640	640	640	630	630
		B	570	560	560	550	560	550	520	520
		C	510	500	490	480	470	460	440	430
		D	470	450	440	410	400	400	390	380
EFV16CC	Y1	A	1,130	1,120	1,120	1,110	1,100	1,090	1,080	1,070
		B	990	970	960	950	940	920	910	910
		C	850	830	810	790	780	750	740	710
		D	690	660	650	620	610	580	560	530
	Y1/Y2	A	1,680	1,660	1,640	1,620	1,610	1,610	1,610	1,600
		B	1,440	1,400	1,400	1,400	1,390	1,380	1,380	1,360
		C	1,230	1,220	1,210	1,210	1,200	1,180	1,170	1,160
		D	1,000	990	980	980	960	950	950	940
	G	A	800	790	760	750	720	710	680	660
		B	680	670	650	630	610	580	550	520
		C	580	540	510	480	460	430	390	370
		D	480	430	390	410	400	400	400	400

Blower Performance (EFV Models) Continued

Air Handler Model	Energized Thermostat Terminal	Control Board Tap	CFM @ ESP. in W.C.							
			0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
EFV20DC	Y1	A	1,250	1,230	1,210	1,180	1,140	1,100	1,070	1,050
		B	1,120	1,100	1,080	1,040	990	970	940	930
		C	980	950	900	860	840	820	810	800
		D	860	810	760	740	720	710	700	680
	Y1/Y2	A	1,840	1,830	1,810	1,790	1,780	1,760	1,730	1,690
		B	1,640	1,640	1,620	1,610	1,600	1,570	1,540	1,490
		C	1,390	1,380	1,370	1,360	1,322	1,296	1,255	1,220
		D	1,210	1,190	1,180	1,140	1,100	1,040	1,030	1,000
	G	A	910	870	830	790	770	760	740	730
		B	840	790	740	710	710	690	680	660
		C	740	690	640	640	620	610	600	590
		D	680	610	580	570	560	550	530	500

NOTES:

Humidistat will reduce cooling airflow by 10% in high humidity.

Adjust tap (+) will increase airflow by 10%, while tap (-) will decrease airflow by 12%.

Adjust tap test will cause the motor to run at 70% of full airflow. Use this for troubleshooting only.

At the start of a call for cooling, there is a short run at 82% of airflow for 7.5 minutes.

At the end of a call for cooling, there is a blower delay of 1 minute.

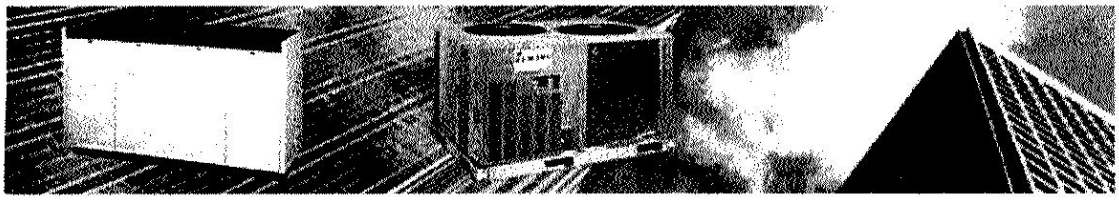
Accessories

Kit Number	Description	Used with
AEHBCC05NSA-1	5 KW WITH Terminal Block	ALL
AEHBCC05CSA-1	5 KW WITH Circuit Breaker	ALL
AEHBCC07NSA-1	7.5 KW WITH Terminal Block	ALL
AEHBCC07CSA-1	7.5 KW WITH Circuit Breaker	ALL
AEHBCC10NSA-1	10 KW WITH Terminal Block	ALL
AEHBCC10CSA-1	10 KW WITH Circuit Breaker	ALL
AEHBCC15CSA-1	15 KW WITH Circuit Breaker	12, 16, 20
AEHBCC20CSA-1	20 KW WITH Circuit Breaker	16, 20

*C - Constant or V - Variable

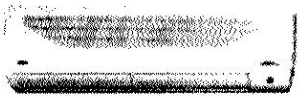
1 N = No Circuit Breaker

2 C = Circuit Breaker



40QN

Duct-Free Split-System
High-Wall Fan Coil Indoor Sections
9,000 to 12,000 Btuh



40QNB - Cooling
40QNE - Heat pump
40QNH - Heat pump with electric heat

40QNB Cooling Only Fan Coils with 38AN condensers

NOMINAL CAPACITY TONS	INDOOR UNIT	OUTDOOR UNIT	ARI CAPACITY Btuh	ARI CFM	SEER	EER	SOUND RATING (dBa)			
							INDOOR POWER	INDOOR PRESSURE	OUTDOOR POWER	OUTDOOR PRESSURE
0.75	40QNB009-1	38AN-009-1	8,500	215	10.5	9.7	50.4	39.4	62.3	51.3
1.0	40QNB012-1	38AN-012-1	11,000	300	10.5	9.3	54.0	43.0	63.1	52.1
	40QNB012-3	38AN-012-3	11,600	302	11.0	10.1	54.0	43.0	63.1	52.1

CFM - Cubic Feet Per Minute
SEER - Seasonal Energy Efficiency Rating
¿ Each Indoor Section

40QNE and 40QNH Heat Pump Fan Coils with 38BK condensers

NOMINAL CAPACITY TONS	INDOOR UNIT	OUTDOOR UNIT	ARI CAPACITIES		ARI CFM	SEER	EER	HSPF	SOUND RATING (dBa)			
			C/O Btuh	H/P Btuh					INDOOR POWER	INDOOR PRESSURE	OUTDOOR POWER	OUTDOOR PRESSURE
0.8	40QNE009-1	38BK-009-1	8,700	9,000	252	10.0	9.2	6.8	50.6	39.6	63.4	52.4
1.0	40QNH012-3	38BK-012-3	11,100	11,700	300	10.0	9.5	6.8	54.0	43.0	62.8	51.8

CFM - Cubic Feet Per Minute
SEER - Seasonal Energy Efficiency Rating
¿ Each Indoor Section

Submittal Data: System 9CQ
ASU9CQ & AOU9CQ

FUJITSU

Job Name: Location:

Purchaser:

Engineer:

Submitted To: For: ❑ Reference ❑ Approval ❑ Construction

Submitted By:

Unit Designation: Schedule No. Model No.:

Capacities:

Cooling		9,700 BTU/h
Outdoor Design Temperature	F° DB/WB	95/ 75
SEER		14.3

Indoor Unit:

Power Supply	115 V
Noise Level db (A) - H/ M/ L/ Q	40/ 36/ 31/ 26
Weight	21 lbs.

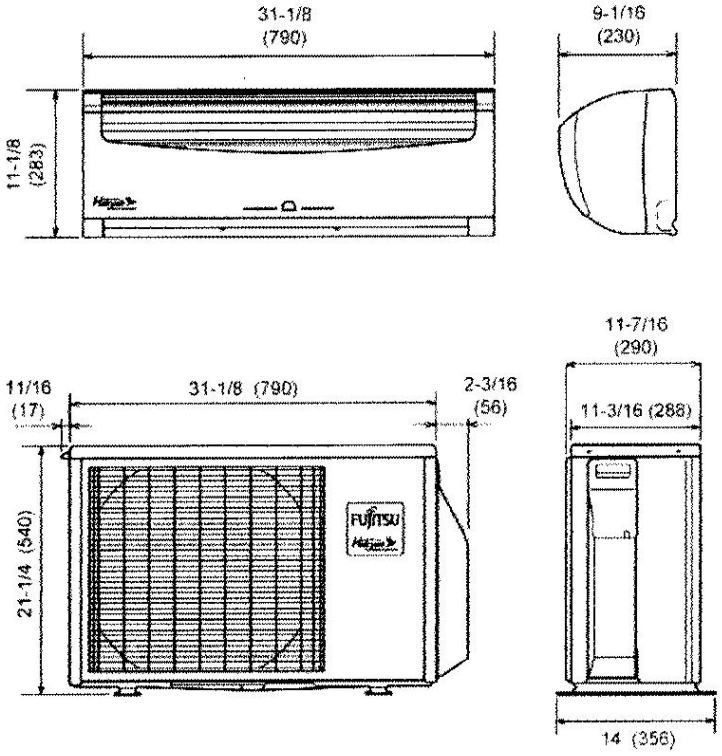
Outdoor Unit:

Power Supply	115 V
Max Fuse Size	15A
Min. Ampacity	12A
Running Current	7.6A
Weight	68 lbs.

Refrigerant Piping:

Max Ht. Difference	26 ft.
Max Total or Combined Length	49 ft.
Discharge Vapor Line (O.D.)	1/4 in.
Suction (O.D.)	3/8 in.

OUTLINE AND DIMENSIONS



Standard Features:

- Six year compressor warranty
- Two year parts warranty
- Digital wireless remote control
- Automatic fan speed control
- 4 Way Auto Louver function
- Built in Low Ambient to 32° F
- Auto Restart/ Reset
- Programmable Timer
- Optional Wired Remote Control
- Plasma Filter
- Refrigerant R-410A

Notes:

Monitor 441/422

MPI Products

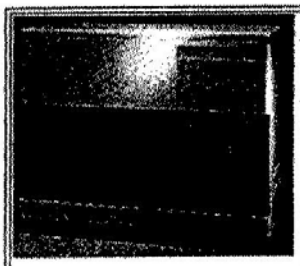
MPI News

Please read important consumer news here.

Book Mark

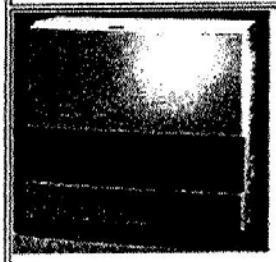
More Info

E-Mail



Monitor 441	High	High/ Med	Med/ Low	Low
BTU Rating/Hour	43,000	33,900	21,000	16,200
BTU Output/ Hour	40,400	31,500	19,500	15,000
Fuel Consumption Gal/ Hour	.319	.25	.16	.12

Fuel Source	Separate Tanks
Fuel	Kerosene(High quality, low sulphur, No. 1 Stove Oil)
Power	Electric, 120 Volts 60 cycles
Dimensions	26.6" H x 28.7" W x 13.8" D
Weight	69 lbs.



Monitor 422	High	High/ Med	Med/ Low	Low
BTU Rating/Hour	22,000	17,400	11,700	9,600
BTU Output/Hour	20,400	16,200	10,900	8,900
Fuel Consumption Gal/Hour	.164	.13	.09	.07

Fuel Source	1.32 gallon internal tank* or separate tank
Fuel	Kerosene(High quality, low sulphur, No. 1 Stove Oil)
Power	Electric, 120 Volts 60 cycles
Dimensions	25.5" H x 21" W x 12.5" D
Weight	69 lbs.

* internal tank not available in Connecticut or Massachusetts

Recommended Usage by Region

Monitor 422

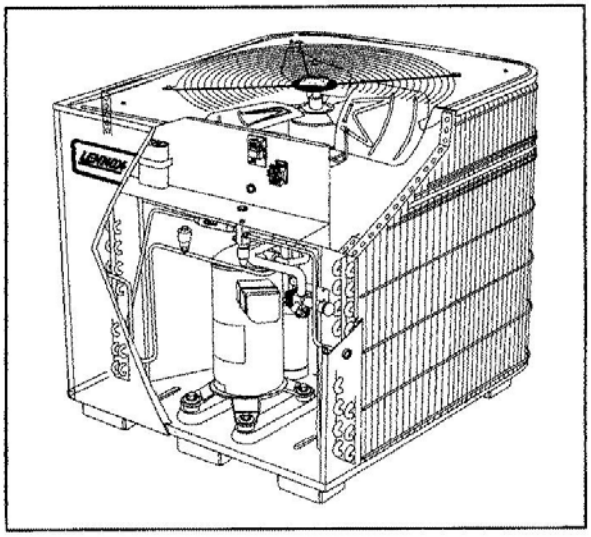
1820-2600 sq ft | 1430-1820 sq ft | 1170-1430 sq ft | 910-1170 sq ft | 730-910 sq ft

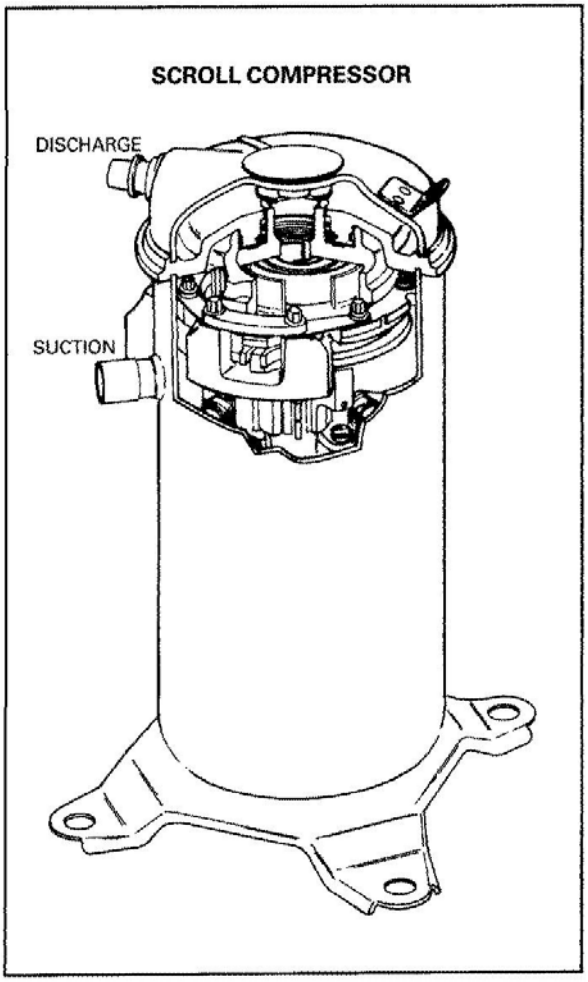
HS25 SERIES UNITS

The HS25 is a high efficiency residential split–system condensing unit which features a scroll compressor. It operates much like a standard condensing unit, but the HS25's scroll compressor is unique in the way that it compresses refrigerant. Several models are available in sizes ranging from 1–1/2 through 5 tons. The series is designed for use with an expansion valve in the indoor unit.

This manual is divided into sections which discuss the major components, refrigerant system, charging procedure, maintenance and operation sequence.

All specifications in this manual are subject to change.





I–APPLICATION

All major components (indoor blower/coil) must be matched according to Lennox recommendations for the compressor to be covered under warranty. Refer to the Engineering Handbook for approved system matchups. A misapplied system will cause erratic operation and can result in early compressor failure.

II–SCROLL COMPRESSOR

The scroll compressor design is simple, efficient and requires few moving parts. A cutaway diagram of the scroll compressor is shown on the cover. The scrolls are located in the top of the compressor can and the motor is located just below. The oil level is immediately below the motor.

The scroll is a simple compression concept centered around the unique spiral shape of the scroll and its inherent properties. Figure 1 shows the basic scroll form. Two identical scrolls are mated together forming concentric spiral shapes (figure 2). One scroll remains stationary, while the other is allowed to orbit (figure 3). Note that the orbiting scroll does not rotate or turn but merely orbits the stationary scroll.

SPECIFICATIONS

Model No.		HS25-211	HS25-261	HS25-311	HS25-411
Outdoor Coil	Face area (sq.ft.) inner / outer	- - -/11.8	5.4/11.8	5.5/15.9	5.5/15.9
	Tube diameter (in.)	3/8	3/8	3/8	3/8
	No. of Rows	1.0	1.48	1.36	1.36
	Fins per inch	20	20	20	20
Condenser Fan	Diameter (in.)	20	20	24	24
	No. of Blades	4	4	3	3
	Motor hp	1/6	1/6	1/6	1/6
	Cfm	2600	2450	3150	3150
	RPM	820	820	820	820
	Watts	200	210	215	210
HCFC-22 (charge furnished)		6lbs. 2oz.	6lbs. 8oz.	8lbs. 1oz.	8lbs. 1oz.
Liquid line connection		3/8	3/8	3/8	3/8
Suction line connection		5/8	3/4	3/4	3/4

ELECTRICAL DATA

Model No.		HS25-211	HS25-261	HS25-311	HS25-411
Line voltage data – 60hz./1 phase		208/230V	208/230V	208/230V	208/230V
Compressor	Rated load amps	9.7	11.6	13.5	18.0
	Power factor	.96	.96	.96	.96
	Locked rotor amps	50.0	62.5	76.0	90.5
Condenser Fan Motor	Full load amps	1.1	1.1	1.1	1.1
	Locked rotor amps	2.0	2.0	2.0	2.0
Max fuse or c.b. size (amps)		20	25	30	40
*Minimum circuit ampacity		13.3	15.6	18.0	23.6

*Refer to National Electrical Code Manual to determine wire, fuse and disconnect size requirements.
NOTE – Extremes of operating range are plus 10% and minus 5% of line voltage

SPECIFICATIONS

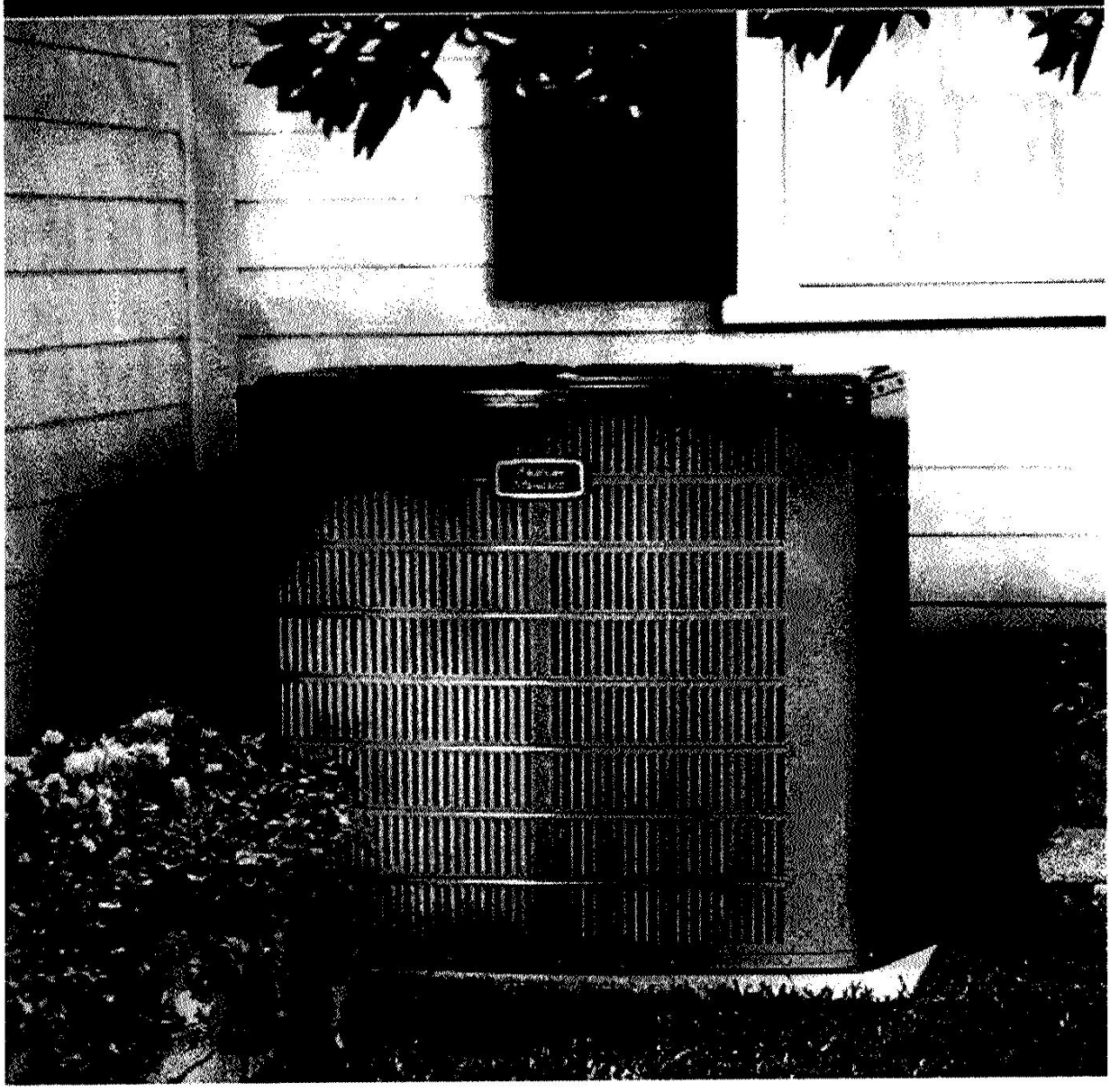
Model No.		HS25-461	HS25-511	HS25-651
Outdoor Coil	Face area (sq.ft.) inner / outer	8.8/15.9	20.8/21.6	20.8/21.6
	Tube diameter (in.)	3/8	3/8	3/8
	No. of Rows	1.57	2.0	2.0
	Fins per inch	20	20	20
Condenser Fan	Diameter (in.)	24	24	24
	No. of Blades	3	4	4
	Motor hp	1/6	1/4	1/4
	Cfm	3100	3870	4250
	RPM	820	840	820
	Watts	205	330	350
HCFC-22 (charge furnished)		8lbs. 5oz.	13lbs. 8oz.	15lbs. 8oz.
Liquid line connection		3/8	3/8	3/8
Suction line connection		7/8	7/8	1-1/8

ELECTRICAL DATA

Model No.		HS25-461	HS25-511	HS25-651
Line voltage data – 60hz./1 phase		208/230V	208/230V	208/230V
Compressor	Rated load amps	20	23.7	28.8
	Power factor	.97	.89	0.97
	Locked rotor amps	107	129	169
Condenser Fan Motor	Full load amps	1.1	1.7	1.6
	Locked rotor amps	2.0	3.1	3.8
Max fuse or c.b. size (amps)		45	50	60
*Minimum circuit ampacity		26.1	31.3	37.7

*Refer to National Electrical Code Manual to determine wire, fuse and disconnect size requirements.
NOTE – Extremes of operating range are plus 10% and minus 5% of line voltage

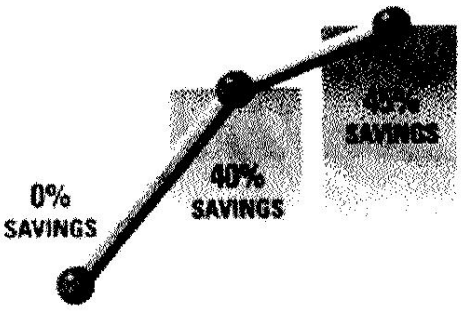
Allegiance 10 & 11
Air Conditioners



A HIGHER EFFICIENCY CAN SAVE YOU MONEY.

* Seasonal Energy Efficiency Ratio (SEER) is established according to Air Conditioning & Refrigeration Institute procedures. Efficiency ratings and savings estimates will vary depending on the system size and matching of the outdoor unit and indoor blower/coil.

3-ton model shown. Other models may vary.



Estimated Annual Cooling Cost Comparisons.

If your current air conditioner is more than 10 years old, it could be as low as a 6.00 SEER. Compare the estimated annual cooling bill of a 6.00 SEER system to that of a new system with a higher SEER such as American Standard's 10.00 or 11.00. For instance, if the annual cooling bill of a 6.00 SEER system was $1000, it could cost only $550 for an 11.00 SEER system, or a potential annual savings of 45%.

Annual Cooling Bill	6 SEER	10 SEER*	11 SEER
	$600	$360	$330
	$800	$480	$440
	$1,000	$600	$550
	$1,200	$720	$660
	$1,400	$840	$770

*Minimum efficiency established by the Department of Energy.

Potential energy savings may vary depending on your personal lifestyle, system settings, equipment maintenance, local climate, actual construction and installation of equipment and duct system.

With an extended warranty from American Standard, we've got you covered.

You can rest easy with American Standard's excellent limited warranties on your new home comfort system. However, for added peace of mind, you may want to consider an extended warranty. With an extended warranty, unplanned repair bills become a thing of the past. For the term of your agreement, we pay the bills for any part replacement. All service work and preventative maintenance will be conducted by American Standard-trained professionals.

System Features	Homeowner Benefits
Duration™ compressor	Dependable, durable comfort
10 or 11 SEER	More economical operation
Baked on powder paint, ceramic coated screws and full-side louvered panels	Weather resistant, safe and durable for years to come
Sculpted contoured top and sides. Soft gray, neutral color	Attractive, modern design, backyard safe

We'd like to make purchasing a home comfort system as easy as possible.

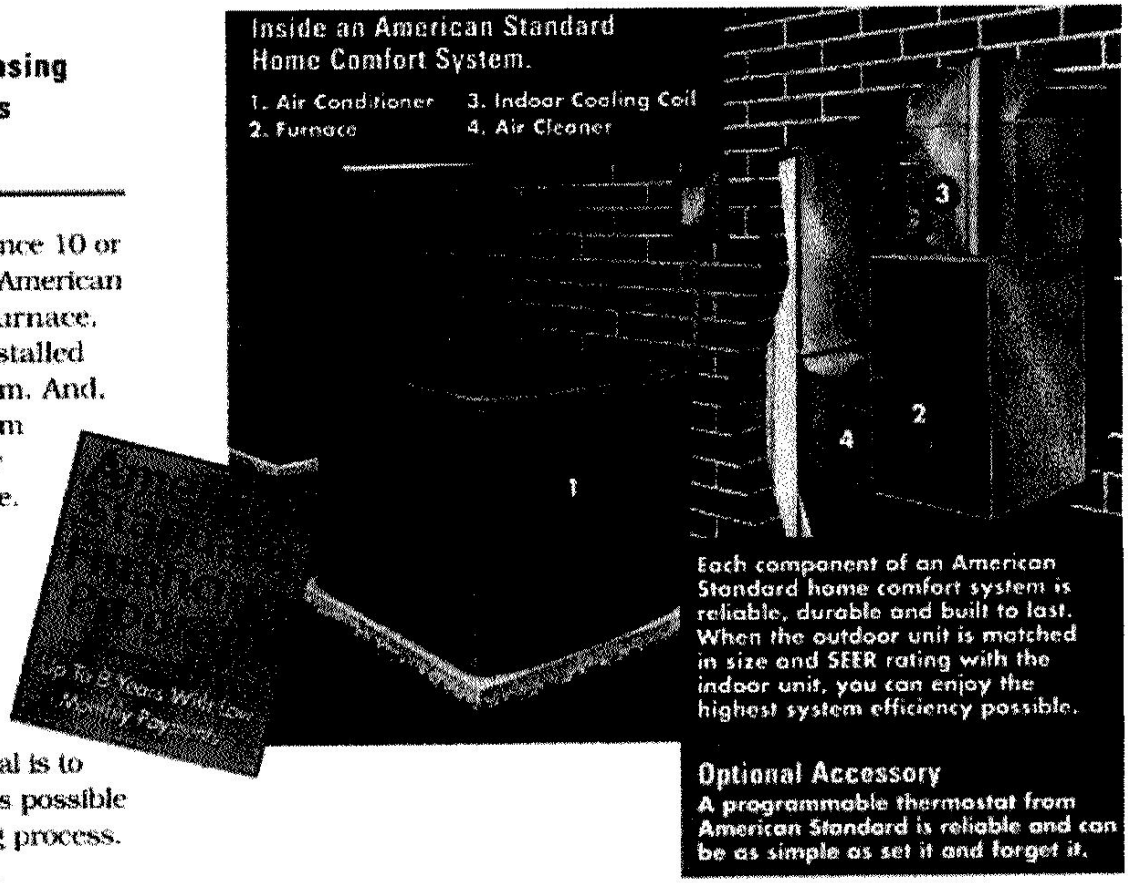
When you match an Allegiance 10 or 11 air conditioner with an American Standard variable speed furnace, you can be sure you've installed a perfectly balanced system. And, a perfectly balanced system offers maximum efficiency and comfort for your home.

Our financing program makes buying easy.

With our flexible payment and financing options, price needn't be a concern. Our goal is to make you as comfortable as possible throughout the purchasing process. Ask your dealer for details.

A fixture in American homes for more than 100 years.

For more than a century, American Standard has been dedicated to building heating and air conditioning products known for quality, reliability and durability. We remain committed to finding better ways to make your life more comfortable.



Each component of an American Standard home comfort system is reliable, durable and built to last. When the outdoor unit is matched in size and SEER rating with the indoor unit, you can enjoy the highest system efficiency possible.

Optional Accessory
A programmable thermostat from American Standard is reliable and can be as simple as set it and forget it.

Allegiance 10

Model Number	Nominal Tonnage	Height (In.)	Width (In.)	Depth (In.)
7A0018A100A	1.5	24	29	26
7A0024A100A	2.0	24	29	26
7A0030A100A	2.5	24	29	26
7A0036A100A	3.0	29	29	26
7A0042A100A	3.5	24	29	26
7A0048B100A	4.0	33	29	26
7A0060B100A	5.0	33	35	30

Allegiance 11

Model Number	Nominal Tonnage	Height (In.)	Width (In.)	Depth (In.)
7A1018A100A	1.5	24	29	26
7A1024A100A	2.0	24	29	26
7A1030A100A	2.5	29	29	26
7A1036A100A	3.0	29	35	30
7A1042A100A	3.5	37	35	30
7A1048B100A	4.0	37	35	30
7A1060A100A	5.0	37	41	35

Listed by Underwriters Laboratory.

Certified by the Air Conditioning and Refrigeration Institute Standard 210. Rated in accordance with A.R.I. Standard 270.

Since American Standard has a policy of continuous product improvement, it reserves the right to change specifications and design without notice. Read important energy cost and efficiency information available from your dealer.

BARKER MECHANICAL SERVICES INC.
925-560-0280
http://barkermech.com
6800 Sierra Ct. Suite L
Dublin, CA 94568

American Standard
HEATING & AIR CONDITIONING

LENNOX

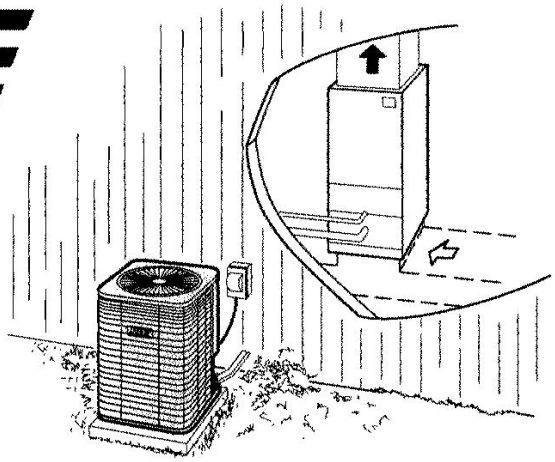
HEAT PUMP OUTDOOR UNITS - 50HZ

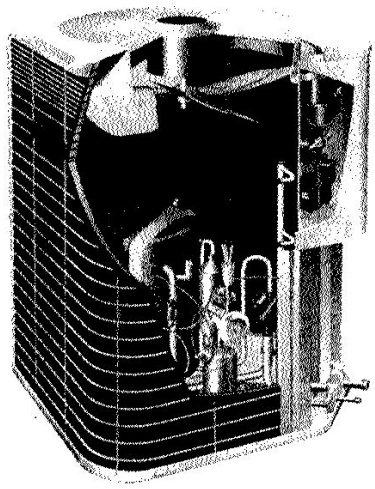
HP29

Net Cooling Capacity - 5.9 to 14.4 kW (20 100 to 49 300 Btuh)
Net Heating Capacity - 5.8 to 14.4 kW (19 700 to 49 100 Btuh)

Bulletin No. 490072
April 1999
Supersedes June 1998

Typical Application





FEATURES

Applications
- Vertical air discharge allows concealment behind shrubs at grade level or out of sight on a roof.
- Matching up-flow, down-flow and horizontal blower coil units with supplemental electric heat provide a wide range of cooling and heating capacities and applications. See ratings table for match-ups.
- For indoor blower coil unit data, see Coils - Blower Coil Units, this section.
- Units shipped completely factory assembled, piped and wired. Each unit is test operated at the factory insuring proper operation.
- Installer must set outdoor unit, connect refrigerant lines and make electrical connections to complete job.

Completely Tested
- Tested in the Lennox Research Laboratory environmental test rooms which meet American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Standard 37 requirements.
- Rating test conditions are those included in Air-Conditioning and Refrigeration Institute (ARI) Standard 210/240-94 while operating at rated voltages and air volumes.
- Sound rated in Lennox reverberant sound test room in accordance with test conditions for Air-Conditioning and Refrigeration Institute (ARI) Standard 270-95.
- Condensing units and components within bonded for grounding to meet safety standards for servicing required by Underwriters Laboratories (U.L.) and the International Electrotechnical Commission (IEC).
- Developed in accordance with International Standards Organization (ISO) 9000 quality standards.

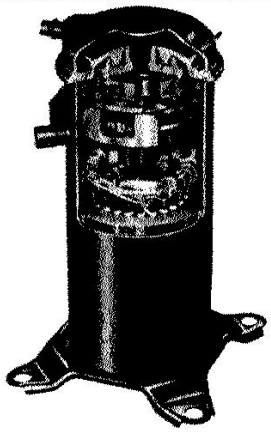
Unit Cabinet
- Heavy gauge steel cabinet with five station metal wash process.
- Powder paint finish provides rust and corrosion protection.
- Painted base section.
- Control box is conveniently located with all controls factory wired.
- Corner patch plate allows access to compressor.
- Drainage holes are provided in base section for moisture removal.

Reciprocating Compressor (HP29-024-036)
- Designed for dependable efficiency with minimum operating cost.
- Suction cooled and overload protected with internal pressure relief.
- Hermetically sealed with built-in protection from excessive current and temperatures.
- Crankcase heater assures proper compressor lubrication.
- Running gear assembly resiliently suspended internally inside case. Compressor installed in unit on resilient rubber mounts assuring low sound and vibration free operation.

NOTE - Due to Lennox' ongoing commitment to quality, Specifications, Ratings and Dimensions subject to change without notice and without incurring liability.

FEATURES

Copeland® Compliant Scroll Compressor (HP29-036S-048-060)



- Compressor features high efficiency with uniform suction flow, constant discharge flow and high volumetric efficiency and quiet operation.
- Compressor consists of two involute spiral scrolls matched together to generate a series of crescent shaped gas pockets between them.
- During compression, one scroll remains stationary while the other scroll orbits around it.
- Gas is drawn into the outer pocket, the pocket is sealed as the scroll rotates.
- As the spiral movement continues, gas pockets are pushed to the center of the scrolls. Volume between the pockets is simultaneously reduced.
- When pocket reaches the center, gas is now at high pressure and is forced out of a port located in the center of the fixed scrolls.
- During compression, several pockets are compressed simultaneously resulting in a smooth continuous compression cycle.
- Continuous flank contact, maintained by centrifugal force, minimizes gas leakage and maximizes efficiency.
- Scroll compressor is tolerant to the effects of slugging and contaminants. If this occurs, scrolls separate, allowing liquid or contaminants to to be worked toward the center and discharged.
- Low gas pulses during compression reduces operational sound levels.
- Compressor motor is internally protected from excessive current and temperature.
- Compressor is installed in the unit on resilient rubber mounts for vibration free operation.

Defrost Control

- Solid-state time/temperature defrost control is furnished as standard equipment.
- Control initiates a defrost cycle every 30, 60 or 90 minutes of compressor "on" time at outdoor temperatures below 2°C (35° F) (factory setting 60 minutes).
- Maximum defrost cycle 14 minutes.
- Defrost thermostat mounted on liquid line determines when defrost cycle is required and when to terminate cycle.

Reversing Valve

- Factory installed 4-way reversing valve provides rapid change in refrigerant flow direction resulting in quick changeover from cooling to heating and vice-versa.
- Valve operates on pressure differential between outdoor unit and indoor unit.

Copper Tube/Enhanced Fin Coil

- Lennox designed and fabricated coil.
- Ripple-edged aluminum fins.
- Copper tube construction.
- Lanced fins provide maximum exposure of fin surface to air stream resulting in excellent heat transfer.
- Fin collars grip tubing for maximum contact area.
- Flared shoulder tubing connections/silver soldering construction.
- Coil is factory tested under high pressure to insure leakproof construction.
- Entire coil is accessible for cleaning.
- Polyvinyl Chloride (PVC) coated steel wire coil guard furnished as standard.

Outdoor Coil Fan

- Direct drive fan moves large air volumes uniformly through entire outdoor coil for high refrigerant cooling capacity.
- Vertical air discharge minimizes operating sounds and eliminates damage to lawn and shrubs.
- Fan motor has sleeve bearings and is inherently protected.
- Motor totally enclosed for maximum protection from weather, dust and corrosion.
- Rain shield on motor provides additional protection from moisture.
- Louvered steel top fan guard furnished as standard.
- Fan service access accomplished by removal of fan guard.

Expansion Valve

- Factory installed and piped expansion valve is designed and sized specifically for use in heat pump system.
- Sensing bulb is located on suction line between reversing valve and compressor to sense suction temperature in any cycle.

Hi-Capacity Drier

- Factory installed.
- Drier traps any moisture or dirt that could contaminate the refrigerant system.

High Pressure Switch

- Automatic reset switch shuts off unit if abnormal operating conditions cause discharge pressure to rise above setting.

Start Controls

- Furnished on HP29-024-036 units.
- Provides assistance for compressor start under loaded conditions or in case of low voltage.

Refrigerant Line Connections, Electrical Inlets, Service Valves

- Sweat connection suction and liquid lines are located on corner of unit cabinet.
- Fully serviceable brass service valves prevent corrosion and provide access to refrigerant system. Suction valve can be fully shut off, while liquid valve may be front seated to manage refrigerant charge while servicing system.
- 45° elbow furnished for ease of suction line connection.
- HP29-024 models are stubbed with 9.5 mm (3/8 in.) liquid line connection. 9.5 mm x 7.9 mm (3/8 in. x 5/16 in.) reducer bushing furnished with for liquid line connection.
- Field installed thermometer well furnished for installation in the liquid line to check refrigerant charge.
- Refrigerant line connections and field wiring inlets are located in one central area of cabinet for easy access. See dimension drawing.

OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA

Thermostat (Optional)
- Thermostat not furnished with unit. See Lennox Price Book.

Refrigerant Line Kits (Optional)
- Refrigerant lines (suction & liquid) are shipped refrigeration clean. Lines are cleaned, dried, pressurized and sealed at factory.
- Suction line fully insulated.
- L15 lines are stubbed at both ends.
- See Refrigerant Line Kit table for selection.

Low Ambient Kit (Optional)
- Outdoor units operate satisfactorily in the cooling mode down to 7°C (45°F) outdoor air temperature without any additional controls.
- Low Ambient Control Kit LB-57113BM **(27J00)** can be field installed, allowing proper unit operation in the cooling mode down to -1°C (30°F).

Unit Stand-Off Kit (Optional)
- Black high density polyethylene feet **(94J45)** are available to raise unit off of mounting surface away from damaging moisture.
- Four feet are furnished per order number.

SPECIFICATIONS

Model Number			HP29-024	HP29-036	HP29-036S	HP29-048	HP29-060
Outdoor Coil	Net face area — m^2 ($ft.^2$)	Outer coil	1.06 (11.41)	1.41 (15.21)			1.96 (21.11)
		Inner coil	- - - -	0.51 (5.44)	1.35 (14.5)		1.89 (20.31)
	Tube outside diameter — mm (in.)		7.9 (5/16)				
	Number of rows		1	1.37	2		
	Fins per m (inch)		866 (22)		709 (18)		866 (22)
Outdoor Coil Fan	Diameter — mm (in.)		457 (18)				559 (22)
	Number of blades		3	4			
	Motor output — W (hp)		125 (1/6)			250 (1/3)	
	Air volume — L/s (cfm)		945 (2000)	985 (2085)	985 (2085)	1190 (2520)	1705 (3610)
	Rev/Min		920			940	900
	Motor input — W		140	155	155	255	320
†Refrigerant charge furnished — kg (oz.) HCFC-22			1.93 (68)	2.81 (99)	3.32 (117)	4.05 (143)	5.44 (192)
Liquid line connection - outside diameter - mm (in.) sweat			*9.5 (3/8)	9.5 (3/8)			
Vapor line connection - outside diameter - mm (in.) sweat			15.9 (5/8)	19.1 (3/4)		22.2 (7/8)	28.6 (1-1/8)
Shipping weight — kg (lbs.) 1 package			69 (152)	88 (193)	86 (190)		115 (254)
OPTIONAL ACCESSORIES - MUST BE ORDERED EXTRA							
Low Ambient Kit			LB-57113BM (**27J00**)				
Unit Stand-Off Kit			**94J45**				

†Refrigerant charge sufficient for 6.1 m (20 feet) of connecting refrigerant lines.
*9.5 mm x 8 mm (3/8 inch x 5/16 inch) adaptor furnished for liquid line connection.

ELECTRICAL DATA

Model Number		HP29-024	HP29-036		HP29-036S		HP29-048	HP29-060
Line voltage and phase (50hz)		220/240V 1 phase	220/240V 1 phase	380/420V 3 phase	220/240V 1 phase	380/420V 3 phase	†380/420V 3 phase	†380/420V 3 phase
Voltage range (minimum — maximum)		198 — 264V	198 — 264V	342 — 462V	198 — 264V	342 — 462V	342 — 462V	342 — 462V
Compressor	Rated load amps	7.8	13.7	4.4	14.7	5.1	8.2	10
	Locked rotor amps	58	81	38	82	40	50	62
Outdoor Coil Fan Motor (1 phase)	Full load amps	1.0		0.5	1.0	0.5	0.7	
	Locked rotor amps	1.9		0.9	1.9	0.9	1.8	

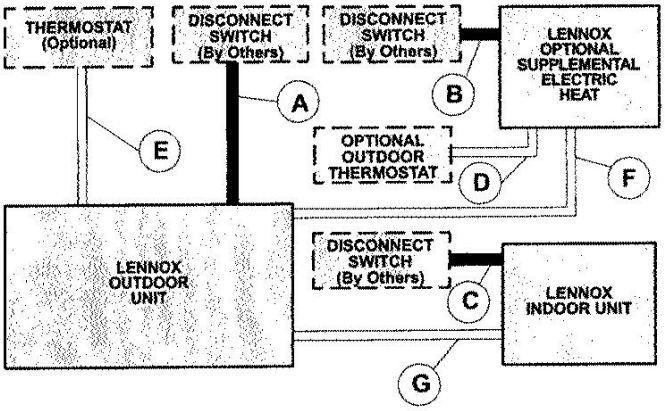
NOTE — Refer to local electrical codes to determine wire, fuse and disconnect size requirements.
†Neutral required with optional Transformer Kit **(16F34)**.

RATINGS

Outdoor Unit Model Number ([2]Sound Rating Number db)	[1]Net Cooling and Heating Ratings													Blower Coil Unit	Check and Expansion Kit Required
	Cooling Capacity		High Temperature Heating Capacity		Low Temperature Heating Capacity		Cooling			High Temperature Heating		Low Temperature Heating			
	kW	Btuh	kW	Btuh	kW	Btuh	Total Power Input kW	(Out/Input) Performance Coefficient	(Btuh/Watt) Ratio Efficiency Energy	Total Power Input kW	(Out/Input) Performance Coefficient	Total Power Input kW	(Out/Input) Performance Coefficient		
HP29-024 (76)	5.9	20 100	5.8	19 700	3.4	11 700	2.20	2.68	9.15	1.8	3.12	1.5	2.23	CB29M-21/26	[3]Factory Installed
HP29-036 HP29-036S (76)	9.0	30 700	9.0	30 800	5.1	17 400	3.25	2.77	9.44	2.7	3.35	2.2	2.35	CB29M-31/41	[3]Factory Installed
HP29-048 (84)	12.2	41 700	11.0	37 700	6.4	22 000	4.39	2.78	9.50	3.5	3.19	2.7	2.34	CB29M-51	[3]Factory Installed
HP29-060 (84)	14.4	49 300	14.4	49 100	9.0	30 700	5.80	2.49	8.51	4.5	3.16	4.1	2.17	CB29M-65	[3]Factory Installed

[1]The rating test conditions are those included in Air-Conditioning and Refrigeration Institute (ARI) Standard 210/240-89 while operating at rated voltage and air volumes;
Cooling Ratings — 35°C (95°F) outdoor air temperature, 26.7°C (80°F) dry bulb and 19.4°C (67°F) wet bulb entering indoor coil air.
High Temperature Heating Ratings — 8.3°C (47°F) dry bulb, 6.1°C (43°F) wet bulb outdoor air temperature and 21.1°C (70°F) entering indoor coil air.
Low Temperature Heating Ratings — minus 8.3°C (17°F) dry bulb, minus 9.4°C (15°F) wet bulb outdoor air temperature and 21.1°C (70°F) entering indoor coil air.
[2]Sound rating number rated at test conditions for Air-Conditioning and Refrigeration Institute (ARI) Standard 270.
[3]Furnished as standard with coil.

FIELD WIRING



A — Single Or Three Phase With Neutral (see Electrical Data)
B — Single Phase (size to heater capacity)
C — Single Phase (size to indoor coil blower motor)
D — Two Wire 24 Volt — 18 ga. minimum
E — Eight Wire 24 Volt — 18 ga. minimum — with Electric Heat
— Ten Wire 24 Volt with Optional Outdoor Thermostat
F — Four Wire 24 Volt — 18 ga. minimum
G — Three Wire 24 Volt — 18 ga. minimum

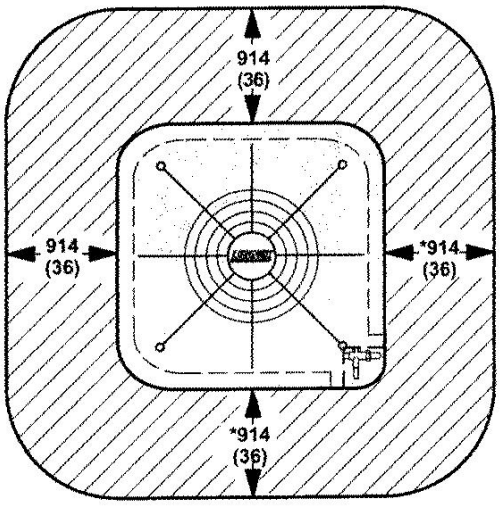
— Field Wiring Not Furnished —

All wiring must conform to local electrical codes.

REFRIGERANT LINE KITS

Outdoor Unit Model Number	Line Set Model Number	Length of Lines		Liquid Line Outside Diameter		Vapor Line Outside Diameter	
		ft.	m	in.	mm	in.	mm
HP29-024	L15-21-20	20	6	5/16	7.9	5/8	15.9
	L15-21-25	25	8				
	L15-21-35	35	11				
	L15-21-50	50	15				
HP29-036 HP29-036S	L15-41-20	20	6	3/8	9.5	3/4	19
	L15-41-30	30	9				
	L15-41-40	40	12				
	L15-41-50	50	15				
HP29-048	L15-65-30	30	9	3/8	9.5	7/8	22.2
	L15-65-40	40	12				
	L15-65-50	50	15				
HP29-060	Field Fabricate			3/8	9.5	1-1/8	28.5

INSTALLATION CLEARANCES - MM (IN.)



NOTE—1219 mm (48 in.) clearance required on top of unit.
***NOTE—One side must be 914 mm (36 in.) for service.**
Two of the remaining three sides may be 305 mm (12 in.).

COOLING AND HEATING RATINGS — 50HZ

NOTE — For Temperatures and Capacities not shown in tables, see bulletin — Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data Section.

HP29-024 — COOLING CAPACITY — CB29M-21/26

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																					
			29°C (85°F)						35°C (95°F)						41° C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb		
	L/s	cfm	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F
17.2°C (63°F)	305	650	6.0	20 400	1.60	.75	.89	.99	5.7	19 300	1.71	.77	.91	1.00	5.3	18 100	1.81	.79	.94	1.00	5.0	16 900	1.91	.82	.97	1.00
	380	800	6.2	21 200	1.62	.80	.95	1.00	5.9	20 000	1.74	.82	.97	1.00	5.5	18 900	1.85	.85	.99	1.00	5.2	17 700	1.95	.88	1.00	1.00
	450	950	6.4	21 800	1.64	.85	.99	1.00	6.1	20 700	1.76	.87	1.00	1.00	5.7	19 600	1.88	.90	1.00	1.00	5.4	18 400	1.99	.93	1.00	1.00
19.4°C (67°F)	305	650	6.4	21 800	1.64	.58	.72	.86	6.0	20 500	1.76	.59	.74	.88	5.7	19 300	1.86	.60	.76	.91	5.3	18 000	1.96	.62	.79	.94
	380	800	6.6	22 400	1.66	.61	.77	.92	6.2	21 100	1.78	.62	.80	.94	5.8	19 800	1.89	.64	.82	.97	5.4	18 500	1.99	.66	.85	.99
	450	950	6.7	22 900	1.67	.64	.82	.97	6.3	21 600	1.79	.66	.85	.99	5.9	20 200	1.90	.68	.88	1.00	5.5	18 800	2.01	.70	.91	1.00
21.7°C (71°F)	305	650	6.9	23 400	1.68	.43	.56	.69	6.5	22 100	1.81	.43	.57	.71	6.1	20 700	1.92	.44	.59	.74	5.7	19 300	2.03	.44	.60	.76
	380	800	7.0	24 000	1.70	.44	.59	.75	6.6	22 600	1.82	.45	.61	.77	6.2	21 200	1.94	.45	.63	.80	5.8	19 700	2.05	.46	.65	.83
	450	950	7.2	24 400	1.71	.45	.63	.80	6.7	23 000	1.84	.46	.64	.83	6.3	21 600	1.96	.47	.67	.85	5.9	20 100	2.07	.48	.69	.89

HP29-024 — HEATING CAPACITY — CB29M-21/26

Indoor Coil Air Volume 70°F db (21°C db)		Air Temperature Entering Outdoor Coil													
		65°F (18°C)			45°F (7°C)			25°F (-4°C)			5°F (-15°C)			-15°F (-28°C)		
		Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input
L/s	cfm	kW	Btuh		kW	Btuh		kW	Btuh		kW	Btuh		kW	Btuh	
305	650	7.0	23 900	1675	5.4	18 300	1430	3.6	12 400	1180	2.5	8 500	965	1.2	4 000	730
380	800	7.2	24 500	1640	5.5	18 900	1395	3.8	13 000	1145	2.7	9 100	930	1.3	4 600	695
450	950	7.3	25 000	1615	5.7	19 400	1370	4.0	13 500	1120	2.8	9 600	905	1.5	5 100	670

NOTE — Heating capacities include the effect of defrost cycles in the temperature range where they occur.

HP29-036/HP29-036S — COOLING CAPACITY — CB29M-31/41

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Temperature																					
			29°C (85°F)						35°C (95°F)						41° C (105°F)						46°C (115°F)					
			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Compressor Motor	Sensible To Total Ratio (S/T) Dry Bulb		
	L/s	cfm	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F	kW	Btuh	kW	24°C 75°F	27°C 80°F	29°C 85°F
17.2°C (63°F)	470	1000	9.1	31 200	2.38	.74	.88	.98	8.7	29 600	2.55	.75	.90	1.00	8.2	27 900	2.72	.77	.92	1.00	7.6	26 100	2.87	.80	.95	1.00
	565	1200	9.4	32 100	2.41	.78	.93	1.00	8.9	30 500	2.59	.80	.95	1.00	8.4	28 800	2.76	.82	.97	1.00	7.9	27 100	2.93	.85	.99	1.00
	660	1400	9.7	33 000	2.44	.82	.97	1.00	9.2	31 300	2.62	.84	.99	1.00	8.7	29 700	2.81	.87	1.00	1.00	8.2	28 000	2.99	.90	1.00	1.00
19.4°C (67°F)	470	1000	9.7	33 200	2.44	.57	.71	.84	9.2	31 500	2.63	.58	.73	.86	8.7	29 700	2.81	.59	.75	.89	8.1	27 700	2.97	.61	.77	.92
	565	1200	10.0	34 000	2.47	.60	.75	.90	9.4	32 200	2.66	.61	.77	.92	8.9	30 300	2.84	.62	.80	.95	8.3	28 400	3.01	.64	.83	.97
	660	1400	10.1	34 600	2.49	.62	.80	.94	9.6	32 800	2.68	.64	.82	.97	9.1	30 900	2.87	.65	.84	.99	8.5	28 900	3.04	.67	.88	1.00
21.7°C (71°F)	470	1000	10.4	35 400	2.51	.43	.56	.68	9.8	33 600	2.71	.43	.57	.70	9.3	31 700	2.91	.43	.58	.72	8.7	29 700	3.09	.44	.59	.75
	565	1200	10.6	36 300	2.53	.44	.58	.73	10.1	34 400	2.74	.44	.60	.75	9.5	32 400	2.94	.45	.61	.77	8.9	30 300	3.13	.45	.63	.80
	660	1400	10.8	36 800	2.54	.45	.61	.77	10.2	34 900	2.76	.45	.63	.80	9.6	32 900	2.96	.46	.64	.82	9.0	30 700	3.15	.47	.66	.85

HP29-036/HP29-036S — HEATING CAPACITY — CB29M-31/41

Indoor Coil Air Volume 70°F db (21°C db)		Air Temperature Entering Outdoor Coil													
		65°F (18°C)			45°F (7°C)			25°F (-4°C)			5°F (-15°C)			-15°F (-28°C)		
		Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input	Total Heating Capacity		Comp. Motor Watts Input
L/s	cfm	kW	Btuh		kW	Btuh		kW	Btuh		kW	Btuh		kW	Btuh	
470	1000	11.1	38 000	2455	8.3	28 200	2110	5.2	17 800	1765	3.7	12 600	1410	1.8	6 100	1070
565	1200	11.4	38 800	2415	8.5	29 000	2070	5.5	18 600	1725	3.9	13 400	1370	2.0	6 900	1030
660	1400	11.5	39 400	2380	8.7	29 600	2035	5.6	19 200	1690	4.1	14 000	1335	2.2	7 500	995

NOTE — Heating capacities include the effect of defrost cycles in the temperature range where they occur.

COOLING AND HEATING RATINGS – 50HZ

NOTE — For Temperatures and Capacities not shown in tables, see bulletin — Cooling Unit Rating Table Correction Factor Data in Miscellaneous Engineering Data Section.

HP29-048 — CB29-51M - COOLING CAPACITY

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Air Temperature Entering Outdoor Coil																					
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)			
			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb		
	m^3/s	cfm	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F
17°C (63°F)	.66	1400	12.3	41.8	3.16	.78	.94	1.00	11.8	40.2	3.57	.80	.95	1.00	11.3	38.6	4.03	.82	.97	1.00	10.8	37.0	4.56	.83	.99	1.00
	.75	1600	12.5	42.8	3.18	.82	.97	1.00	12.1	41.2	3.58	.84	.99	1.00	11.6	39.6	4.04	.86	1.00	1.00	11.2	38.1	4.58	.87	1.00	1.00
	.85	1800	12.8	43.7	3.19	.86	1.00	1.00	12.4	42.2	3.60	.87	1.00	1.00	11.9	40.7	4.07	.89	1.00	1.00	11.5	39.1	4.60	.91	1.00	1.00
19°C (67°F)	.66	1400	13.0	44.3	3.20	.60	.76	.91	12.5	42.5	3.61	.61	.77	.92	11.9	40.7	4.07	.62	.79	.94	11.4	38.9	4.60	.63	.81	.96
	.75	1600	13.2	45.0	3.21	.62	.80	.95	12.7	43.2	3.62	.64	.81	.96	12.1	41.4	4.09	.65	.83	.98	11.6	39.6	4.61	.66	.85	.99
	.85	1800	13.4	45.6	3.22	.65	.83	.98	12.8	43.8	3.63	.66	.85	.99	12.3	41.9	4.09	.67	.87	1.00	11.8	40.1	4.62	.69	.89	1.00
22_C (71°F)	.66	1400	13.9	47.3	3.25	.44	.59	.73	13.3	45.4	3.66	.44	.60	.75	12.7	43.5	4.13	.44	.61	.77	12.2	41.6	4.65	.45	.62	.79
	.75	1600	14.1	48.0	3.26	.45	.61	.78	13.5	46.1	3.67	.45	.62	.79	12.9	44.1	4.14	.46	.63	.81	12.3	42.1	4.66	.46	.65	.83
	.85	1800	14.2	48.5	3.27	.46	.64	.81	13.7	46.6	3.69	.46	.65	.83	13.1	44.6	4.15	.47	.66	.85	12.5	42.6	4.68	.47	.68	.87

HP29-048 — CB29M-51 - HEATING CAPACITY

Indoor Coil Air Volume 21°C db (70°F db)		Air Temperature Entering Outdoor Coil											
		18°C (65°F)			7°C (45°F)			minus 4°C (25°F)			minus 15°C (5°F)			minus 28°C (minus 15°F)		
		Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input
m^3/s	cfm	kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh	
.66	1400	14.2	48.3	3.07	11.2	38.2	2.82	8.2	27.9	2.56	5.6	19.1	2.24	2.8	9.5	1.66
.75	1600	14.3	48.8	2.98	11.3	38.7	2.73	8.3	28.4	2.47	5.7	19.6	2.15	2.9	10.0	1.57
.85	1800	14.4	49.3	2.91	11.5	39.2	2.66	8.5	28.9	2.40	5.9	20.1	2.08	3.1	10.5	1.50

HP29-060 — CB29M-65 - COOLING CAPACITY

Entering Wet Bulb Temperature	Total Air Volume		Outdoor Air Temperature Entering Outdoor Coil																					
			29°C (85°F)						35°C (95°F)						41°C (105°F)						46°C (115°F)			
			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb			Total Cooling Capacity		Comp Motor kW Input	Sensible To Total Ratio (S/T) Dry Bulb		
	m^3/s	cfm	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F	kW	kBtuh		24°C 75°F	27°C 80°F	29°C 85°F
17°C (63°F)	.75	1600	15.4	52.4	4.05	.74	.87	.98	14.8	50.6	4.57	.75	.89	.99	14.3	48.7	5.18	.76	.91	1.00	13.7	46.8	5.87	.77	.92	1.00
	.85	1800	15.6	53.4	4.04	.76	.91	1.00	15.1	51.6	4.57	.77	.92	1.00	14.6	49.7	5.18	.79	.94	1.00	14.0	47.8	5.87	.80	.96	1.00
	.94	2000	15.9	54.4	4.04	.79	.94	1.00	15.4	52.5	4.57	.80	.95	1.00	14.8	50.6	5.17	.82	.97	1.00	14.3	48.7	5.86	.83	.98	1.00
19°C (67°F)	.75	1600	16.4	55.8	4.04	.57	.71	.84	15.8	53.9	4.56	.58	.72	.86	15.2	51.9	5.17	.59	.73	.87	14.6	49.7	5.86	.60	.75	.89
	.85	1800	16.6	56.7	4.04	.59	.74	.88	16.0	54.7	4.56	.59	.75	.89	15.4	52.7	5.17	.60	.76	.91	14.8	50.5	5.86	.61	.78	.93
	.94	2000	16.9	57.5	4.04	.60	.76	.91	16.3	55.5	4.56	.61	.78	.92	15.6	53.4	5.16	.62	.79	.94	15.0	51.2	5.86	.63	.81	.96
22_C (71°F)	.75	1600	17.5	59.6	4.03	.43	.56	.68	16.9	57.6	4.56	.43	.56	.69	16.3	55.5	5.16	.43	.57	.71	15.6	53.3	5.87	.44	.58	.72
	.85	1800	17.8	60.6	4.02	.43	.57	.71	17.1	58.5	4.55	.44	.58	.72	16.5	56.3	5.16	.44	.59	.74	15.8	54.0	5.86	.44	.60	.75
	.94	2000	18.0	61.3	4.03	.44	.59	.74	17.3	59.2	4.55	.44	.60	.75	16.7	57.0	5.16	.45	.61	.77	16.0	54.7	5.86	.45	.62	.79

HP29-060 — CB29M-65 - HEATING CAPACITY

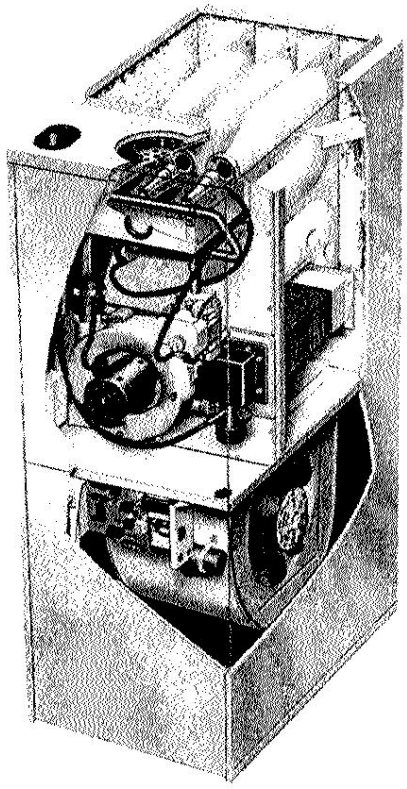
Indoor Coil Air Volume 21°C db (70°F db)		Air Temperature Entering Outdoor Coil											
		18°C (65°F)			7°C (45°F)			minus 4°C (25°F)			minus 15°C (5°F)			minus 28°C (minus 15°F)		
		Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input	Total Heating Capacity		Comp. Motor kW Input
m^3/s	cfm	kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh		kW	kBtuh	
.75	1600	18.1	61.6	4.46	14.4	49.1	3.97	10.6	36.2	3.47	7.4	25.2	2.95	3.6	12.4	2.22
.85	1800	18.3	62.4	4.32	14.6	49.9	3.82	10.8	37.0	3.32	7.6	26.0	2.80	3.9	13.2	2.07
.94	2000	18.4	62.8	4.21	14.7	50.3	3.71	11.0	37.4	3.21	7.7	26.4	2.69	4.0	13.6	1.96

G26 SERIES UNITS

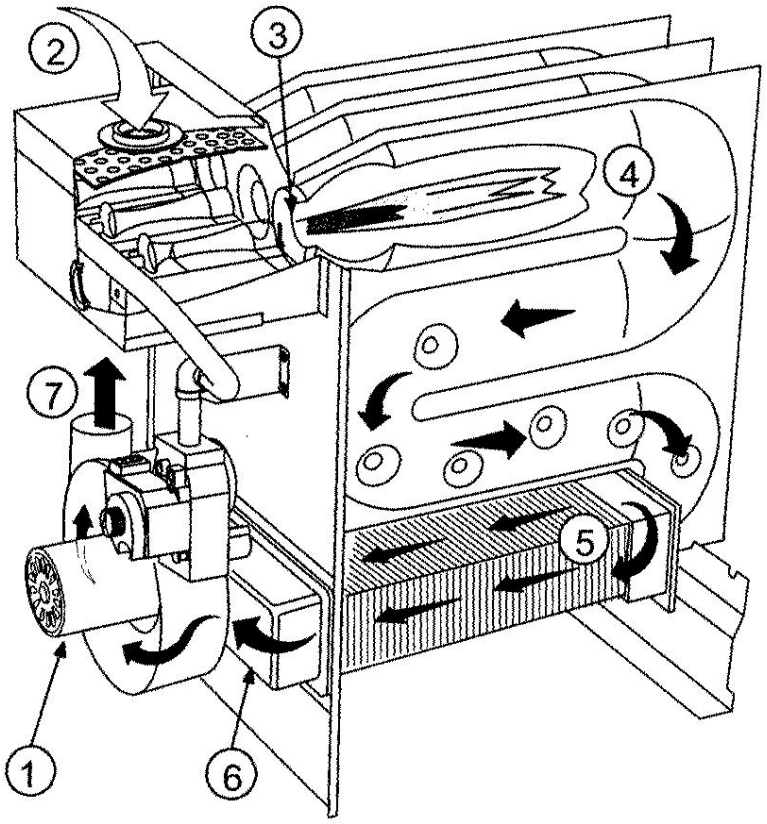
G26 series units are high-efficiency upflow gas furnaces manufactured with DuralokPlus™ aluminized steel clamshell-type heat exchangers. G26 units are available in heating capacities of 50,000 to 125,000 Btuh and cooling applications up to 5 tons. Refer to Engineering Handbook for proper sizing.

Units are factory equipped for use with natural gas. A kit is available for conversion to LPG operation. G26-1 and -2 model units use electronic (intermittent pilot) ignition. G26-3, -4, -5 and -6 model units feature the Lennox SureLight® silicon nitride ignition system. Each unit meets the California Nitrogen Oxides (NO_x) Standards and California Seasonal Efficiency requirements without modification. All units use a redundant gas valve to assure safety shut-off as required by A.G.A. or C.G.A.

Information contained in this manual is intended for use by qualified service technicians only. All specifications are subject to change. Procedures outlined in this manual are presented as a recommendation only and do not supersede or replace local or state codes. In the absence of local or state codes, the guidelines and procedures outlined in this manual (except where noted) are recommended only.



G26 FURNACE▲



◀G26 HEAT EXCHANGE ASSEMBLY

Combustion Process:

1. A call for heat starts the combustion air blower.
2. Outdoor air is drawn through pipe into the burner compartment where it mixes with gas in a conventional style inshot burner.
3. The SureLight ignition system lights the burners.
4. Combustion products are drawn downward through the heat exchanger. Heat is extracted as indoor air passes across the outside surface of the metal.
5. Latent heat is removed from the combustion products as air passes through the coil. Condensate (water) is formed as the combustion products cool.
6. As the combustion products exit the coil, condensate is collected and drained away.
7. Combustion products are pulled from the heat exchanger and forced into the flue.

SPECIFICATIONS

Model No.		G26Q2-50	G26Q3-50	G26Q3-75	G26Q4/5-75
Input Btuh (kW)		50,000 (14.7)		75,000 (22.0)	
Output Btuh (kW)		46,000 (13.5)	47,000 (13.8)	70,000 (20.5)	69,000 (20.2)
☆A.F.U.E.		92%	92.4%	92.0%	92.0%
California Seasonal Efficiency		85.9%	86.5%	86.3%	83.8%
[1]Exhaust pipe connection (PVC) diameter— in. (mm)		2 (51)			
[1]Intake pipe connection (PVC) diameter— in. (mm)		2 (51)			
Condensate drain connection (PVC)— in. (mm)		1/2 (12.7)			
Temperature rise range — °F (°C)		40-70 (22-39)	30-60 (17-33)	40-70 (22-39)	20-50 (11-28)
High static certified by (A.G.A./C.G.A.) — in. wg. (Pa)		.50 (125)			
Gas Piping Size I.P.S. Natural or LPG/propane	in.	1/2			
	mm	12.7			
Blower wheel nominal diameter x width	in.	10 x 7	10 x 8		11-1/2 x 9
	mm	254 x 178	254 x 203		292 x 229
Blower motor output — hp (W)		1/5 (149)	1/3 (249)		3/4 (560)
Nominal cooling that can be added	Tons	1 to 2	2 to 3		3-1/2 to 5
	kW	3.5 to 7.0	3.5 to 10.6		12.3 to 17.6
Shipping weight — lbs. (kg) 1 package		150 (68)	157 (71)	157 (71)	182 (83)
Electrical characteristics		120 volts — 60 hertz — 1 phase (all models) (less than 12 amps)			
Optional Accessories (Must Be Ordered Extra)					
LPG/Propane kit (optional)		**65K27** (all models)			
Filter and Filter Rack Kits ‡No. & size of filters - in. (mm)		Single **(44J20)** Ten Pack **(66K61)** (1) 14 x 25 x 1 (356 x 635 x 25)			Single **(44J21)** Ten Pack **(66K62)** (1) 20 x 25 x 1 (508 x 635 x 25)
Concentric Vent/Intake Air/Roof Termination Kit (optional)		**60G77** — 1 1/2 inch (38 mm)			
[1]Vent/Intake Air Roof Termination Kit (optional) — vent size	2 inch (51 mm)	**15F75**			
	3 inch (76 mm)	**44J41**			
[1]Vent/Intake Air Wall Termination Kit (optional) — vent size	2 inch (51 mm)	**15F74** (ring kit) — **22G44** (close couple) — **30G28** (WTK close couple) **30G79** (WTKX close couple with extension riser)			
	3 inch (76 mm)	**44J40** (close couple) or **81J20** (WTK close couple)			
Twinning Kits (optional)	Non-continuous low speed	**64H88** (all models)			
	Continuous low speed	**35J93** (all models)			
Continuous Low Speed Blower Switch (optional)		**44J06** (-1 and -2 models) Not used with Twinning Kits			

☆Annual Fuel Utilization Efficiency based on U.S. DOE test procedures and FTC labeling regulations. Isolated combustion system rating for non-weatherized furnaces.
‡Polyurethane frame type filter.
[1]Determine from venting tables proper intake and exhaust pipe size and termination kit required.

BLOWER PERFORMANCE DATA

G26Q2-50 BLOWER PERFORMANCE

External Static Pressure		Air Volume and Motor Watts at Specific Blower Taps								
		High			Medium			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0	0	1115	525	495	885	415	360	720	340	280
.10	25	1095	515	475	880	415	350	700	330	265
.20	50	1065	505	465	855	405	340	680	320	260
.30	75	1035	490	445	830	390	325	660	310	250
.40	100	995	470	425	755	355	315	645	305	235
.50	125	950	450	405	755	355	300	625	295	225
.60	150	900	425	390	740	350	280	540	255	215
.70	175	815	385	365	660	310	255	530	250	205
.80	200	610	290	340	585	275	240	360	170	180
.90	225	590	280	315	390	185	215	- - - -	- - - -	- - - -

NOTE — All air data is measured external to unit with 1 in. (25 mm) cleanable foam filter (not furnished) in place. Also see Filter Air Resistance table.

G26Q3-50 BLOWER PERFORMANCE

External Static Pressure		Air Volume and Motor Watts at Specific Blower Taps											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0	0	1485	700	590	1275	600	485	1045	495	390	840	395	310
.10	25	1445	680	565	1250	590	460	1030	485	375	830	390	300
.20	50	1390	655	545	1225	580	445	1010	475	365	815	385	290
.30	75	1345	635	520	1190	560	425	985	465	345	790	375	285
.40	100	1290	610	500	1150	545	405	955	450	335	780	370	275
.50	125	1225	580	480	1095	515	385	920	435	315	735	345	255
.60	150	1160	545	460	1030	485	365	875	415	300	700	330	240
.70	175	1075	505	440	950	450	345	855	405	280	600	285	220
.80	200	975	460	415	865	410	315	645	305	250	510	240	195
.90	225	845	400	385	615	290	265	545	255	225	375	175	180

NOTE — All air data is measured external to unit with 1 in. (25 mm) cleanable foam filter (not furnished) in place. Also see Filter Air Resistance table.

G26Q3-75 BLOWER PERFORMANCE

External Static Pressure		Air Volume and Motor Watts at Specific Blower Taps											
		High			Medium-High			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0	0	1490	705	650	1340	630	540	1060	500	440	870	410	360
.10	25	1435	675	625	1305	615	515	1050	495	425	865	410	350
.20	50	1385	655	605	1260	595	490	1025	485	405	850	400	335
.30	75	1330	630	580	1215	575	470	1000	470	385	835	395	325
.40	100	1260	595	560	1160	545	445	965	455	365	810	380	310
.50	125	1200	565	540	1100	520	420	920	435	345	770	365	290
.60	150	1125	530	515	1035	490	400	870	410	325	735	345	280
.70	175	1035	490	495	960	455	375	780	370	305	685	325	265
.80	200	935	440	475	865	410	345	725	340	285	- - - -	- - - -	- - - -
.90	225	805	380	445	630	295	295	540	255	240	- - - -	- - - -	- - - -

NOTE — All air data is measured external to unit with 1 in. (25 mm) cleanable foam filter (not furnished) in place. Also see Filter Air Resistance table.

G26Q4/5-75 BLOWER PERFORMANCE

External Static Pressure		Air Volume and Motor Watts at Specific Blower Taps														
		High			Medium-High			Medium			Medium-Low			Low		
in. w.g.	Pa	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts	cfm	L/s	Watts
0	0	2415	1140	1240	2120	1000	1015	1875	885	855	1635	770	705	1430	675	585
.10	25	2330	1100	1200	2090	985	1005	1835	865	835	1615	760	700	1420	670	585
.20	50	2265	1070	1165	2045	965	990	1795	845	815	1580	745	690	1390	655	580
.30	75	2210	1045	1145	2000	945	970	1765	835	810	1545	730	675	1365	645	575
.40	100	2145	1010	1110	1950	920	955	1720	810	795	1510	715	670	1340	630	570
.50	125	2075	980	1085	1885	890	930	1680	795	785	1475	695	665	1310	620	565
.60	150	2000	945	1060	1825	860	910	1630	770	770	1435	675	655	1270	600	555
.70	175	1935	915	1040	1775	840	895	1565	740	755	1395	660	645	1220	575	545
.80	200	1840	870	1005	1705	805	870	1515	715	745	1345	635	630	1165	550	535
.90	225	1760	830	980	1610	760	845	1455	685	725	1275	600	615	1110	525	530

NOTE — All air data is measured external to unit with 1 in. (25 mm) cleanable foam filter (not furnished) in place. Also see Filter Air Resistance table.

A.O.Smith *Residential Electric Water Heaters*

ProMax®

PROMAX® FEATURES

TALL, SHORT AND LOWBOY (TOP CONNECT) MODELS AVAILABLE.

A. O. SMITH DYNACLEAN™ DIFFUSER DIP TUBE
Helps reduce lime and sediment buildup, maximizes hot water output. Made from long-lasting PEX cross-link polymer.

COREGARD™ ANODE ROD
Aluminum anode with stainless steel core protects tank against corrosion longer than ordinary mild steel anodes.

DURABLE TAMPER-RESISTANT BRASS DRAIN VALVE

A. O. SMITH PERMAGLAS® GLASS COATING
Protects steel tank from rust.

FACTORY-INSTALLED SIDE-MOUNTED TEMPERATURE AND PRESSURE (T&P) RELIEF VALVE
Top-mounted T&P Valve available as option on some models.

6-YEAR LIMITED TANK AND PARTS WARRANTY
For complete information consult written warranty or A. O. Smith Water Products Company.

UPGRADE TANK WARRANTY TO 10 YEARS
See details on page 2.

CODE COMPLIANCE: CEC, CABO, HUD, BOCA NATIONAL CODES, ASHRAE/IES 90.1-1999 AND 2004 NAECA

CERTIFIED TO UL 174 FOR HOUSEHOLD ELECTRIC WATER HEATERS

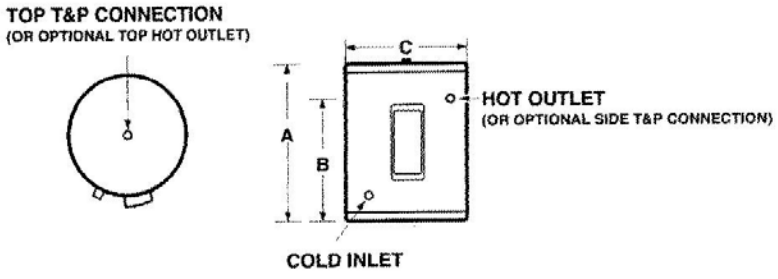
A.O.Smith
Water Heaters
www.hotwater.com

RESIDENTIAL *Electric Water Heaters*

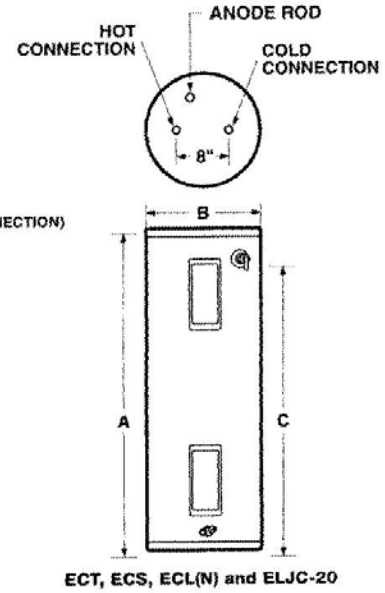
ProMax®

MODEL NUMBER	FIRST HOUR RATING GALLONS	ENERGY FACTOR	GAL. CAP.	ELEMENT WATTAGE 240 VAC		RECOVERY 90°F RISE GALLON PER HOUR	R VALUE	DIMENSIONS IN INCHES			APPROX. SHIPPING WEIGHT (LBS)
				STANDARD	MAXIMUM			A	B	C	
TALL MODELS											
ECT-30**	43	.93	30	4500	6000	21	16	46-1/2	18	39-1/2	95
ECT-40	52	.92	40	4500	6000	21	16	59-1/2	18	53-1/2	115
ECT-52	62	.91	50	4500	6000	21	16	54	20-1/2	47-1/2	125
ECT-55	67	.90	55	4500	6000	21	16	60-1/4	20-1/2	52-3/4	135
ECT-66	72	.88	66	4500	6000	21	16	60-1/4	22	53	170
ECT-80	81	.86	80	4500	6000	21	16	60-1/2	24	52	200
ECT-120*	116	.81	119	4500	6000	21	16	64-1/4	28	54-1/4	320
SHORT MODELS											
ECS-30**	43	.93	30	4500	6000	21	16	36-1/2	20-1/2	28	100
ECS-40**	52	.92	40	4500	6000	21	16	44	20-1/2	37-3/4	115
ECS-50**	60	.90	50	4500	6000	21	16	48	22	40-1/2	150
LOWBOY MODELS											
ELJC-6	N/A	N/A	6	1500 @ 120V	2500 @ 120V	7	8	15-1/2	14-1/4	10-1/2	35
ELJC-15	N/A	N/A	15	1500 @ 120V	2500 @ 120V	7	16	32-1/4	14-1/4	20-3/4	58
ELJC-20	N/A	N/A	19	2500 @ 120V	6000 @ 240V	11	16	32-1/4	18	15-3/4	73
ECL-30**	42	.93	29	4500	6000	21	16	30	22	22-1/2	105
ECLN-40**	48	.92	38	4500	6000	21	12	31-1/4	23	24-5/8	125
ECL-50**	58	.91	50	4500	6000	21	16	34	26-1/2	25	170

Recovery capacity is based on actual performance tests.
For 10-year tank warranty, change "E" to "P" in model number (PCT-40).
* This model is not available with top T&P Valve.
** Models supplied with Heat Trap Nipples.
10-year tank warranty and top T&P Valve option combo not available on ECLN-40 and ECL-50.



ELJC-6 and ELJC-15



ECT, ECS, ECL(N) and ELJC-20

A.O.Smith
Water Heaters
www.hotwater.com

500 Tennessee Waltz Parkway, Ashland City, TN 37015

For Technical Information and Automated Fax Service, call 800-527-1953.
A. O. Smith Corporation reserves the right to make product changes or improvements without prior notice.

Form
RWHR

Request for Approval for
Residential Water Heater Rating

version 3/2003
Gas Appliance Manufacturers Association

Name and Address of Company to Appear in Directory:	Model Series Name:	Energy Source:	Type of Water Heater	Earliest Publish Date:
RHEEM MFG. CO., WATER HEATER DIVISION 2600 Gunter Park Dr. E. Montgomery , AL 36109-1413	Rheem - gas	☑ Gas ☐ Oil ☐ Electric Resistance ☐ Heat Pump - with tank ☐ Heat Pump - without tank	storage	8/12/03
Trade Names: Rheem				

Row #	Model #	Standard Footnotes	Custom Footnotes	Type of Gas	1st HR Supply Rating, Gals.	Energy Factor	Storage Volume, Gals.	Input MBTUH or kWh	Recovery Effcy, %	Basic Model
Dis-cont-inued	41*50P		The "*" denotes the warranty period and may be replaced by the letters: V, I, X, or a dash.	Propane	83.0	0.54	50	40.0 MBTUH	76	false

Model: Rheem 41V50P
Serial Number: unknown

STATE SELECT®

GAS UTILITY MODELS

6-YEAR TANK WARRANTY
6-YEAR PARTS WARRANTY

- Everlast PEXAN™ polymer dip tube.
- Single anode rod.
- Minimum 2" foam insulation (R-Value 16.67).
- Factory-installed Safety Valve (T&P Valve).
- Energy-Saving Pilot.
- Nylon Drain Valve.
- Maximum Hydrostatic Working Pressure: 150 PSI.

	Model Number	Gallon Capacity	BTU Input Per Hour Natural/ Propane	Energy Factor	First Hour Rating	Recovery—GPH Degree Rise 90°	60°	Dimensions in Inches A	B	C	D	E	F	Draft Hood Outlet (Inches)	Approximate Shipping Weight (lbs.)
TALL	PR6 40 NOCT 42W	40	40,000/40,000	.61	72	41	62	62½	58	20	15	8	52	3*	159
	PR6 50 NOCT 42W	50	36,000/36,000	.61	77	38	57	63	58½	22	15	8	52	3*	193
	PR6 40 NOCT 52	40	35,000/35,000	.62	68	36	54	65	60½	20	15	8	54¼	3*	180
	PR6 40 NOCT 52W	40	35,000/35,000	.63	68	36	54	65	60½	20	15	8	54¼	3*	180
	PR6 50 NOCT 32W	50	36,000/36,000	.60	76	38	57	60	56½	22	15	8	50¾	3	165

First-Hour Ratings and Recoveries are based on natural Btu and are rounded to nearest gallon.

When ordering propane, change **"N"** to **"P"** in model number (PR6 40 POCT 42W).

All models have ¾" female inlet and outlet connections. Except PR6 40 NOCT 52 & 52W which have ¾" male connections.

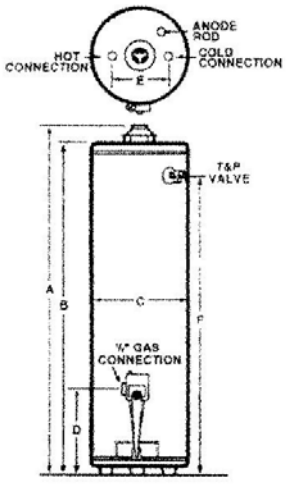
All models available with 10-year tank, 6-year parts warranty. When ordering, substitute **"PRX"** for **"PR6"** in model number. Example: **PRX** 40 NOCT 42W.

*Provision for 3" or 4" Vent Pipe.

Manufactured under one or more of these U.S. Patent Numbers: 4,447,377; 4,527,543 or 4,505,231. Canadian Patent Numbers: 1,151,480; 1,229,270; 1,264,622 and other Canadian Patents pending.

All models meet or exceed federal minimum energy standards effective January 1, 1990, according to the National Appliance Energy Conservation Act (NAECA) of 1987. They also comply with the latest editions of the B.O.C.A. National Codes, U.B.C., S.B.C.C., C.A.B.O. and the H.U.D. Standards. All models design-certified by CSA International, according to ANSI Z21.10.1 Standards governing storage-type water heaters.

Note on warranties: Installation of State residential water heaters in a commercial application reduces length of warranty. Tank warranty is reduced from 6 years to 1 year on State Select models. Parts warranty on all models is reduced from 6 years to 1 year.



All models design-certified by CSA International according to ANSI Z21.10.1 Standards governing storage-type water heaters.

These State Water Heaters are manufactured in the United States of America, in Ashland City, Tennessee.

State Industries' manufacturing facility in Ashland City, Tennessee is certified as complying with ISO-9001 standards for quality management.

Warranty details available at nearest State sales office.

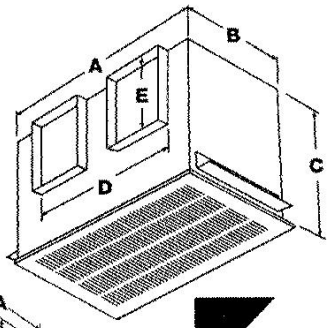
Specifications and Energy Factors are subject to change without prior notice.

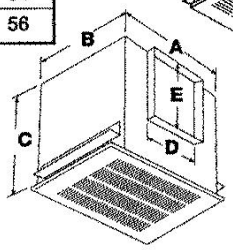
state INDUSTRIES, INC. 500 Lindahl Parkway, Ashland City, TN 37015

Dimensional Data

Model	A	B	C	D	E	Standard Grille	Decorative Grille	Unit Wt.
50, 70, 90	13 1/4	10 5/8	11 5/8	6	DIA.	14 7/8 x 13 1/4	15 1/4 sq.	12
110, 125, 190	13 1/4	10 5/8	10 1/2	8	6	14 7/8 x 13 1/4	15 1/4 sq.	17
200, 250, 290, 390	14	11 7/8	11 1/4	8	8	14 7/8 x 13 1/4	15 1/4 sq.	24
410, 510	18	14 3/8	14 1/2	8	8	19 3/8 x 16 3/8	-	31
700	23 5/8	11 5/8	11 5/8	19 1/2	8	25 1/8 x 13 1/2	-	34
710, 780	18	14 3/8	14 1/2	10	8	19 3/8 x 16 3/8	-	34
900, 1050, 1410, 1550	23 3/4	14 3/8	14 1/2	18 3/4	8	25 x 16 3/8	-	56

Outlet connection width is 1 inch - Mounting bracket width is 1½ inch.
For complete dimensional information, see CAPS submittal drawings.
All dimensions are in inches.





c UL us LISTED

Performance Data

Model	RPM	Amps	Watts	HVI [1] Sones		CFM/Static Pressure in Inches of WG								
						0.000	0.100	0.125	0.250	0.375	0.500	0.625	0.750	1.000
[2,3,5] SP-A50	700	0.31	18	0.7	CFM	76	51	47	30					
					Sones	0.7	1.0	1.1	1.8					
[2,3,5] SP-A70	850	0.27	20	0.8	CFM	83	70	66	42					
					Sones	1.1	1.1	1.4	2.2					
[2,3,5] SP-A90	900	0.34	29	1.0	CFM	99	88	84	61	25				
					Sones	1.1	1.4	1.4	1.7	1.9				
[2,3,4,5,6] SP-A110	950	0.58	49	0.8	CFM	119	110	106	88					
					Sones	1.3	1.2	1.2	1.6					
[2,3,5,6] SP-A125	1100	0.62	53	1.2	CFM	135	123	121	104					
					Sones	1.4	1.7	1.8	1.9					
[3,4,5,6] SP-A190	1400	1.30	113	2.0	CFM	216	197	192	167	133				
					Sones	3.2	2.8	2.9	3.1	3.4				
[3,5] SP-A200	900	0.43	48	2.0	CFM	247	225	220	196	172	142	105	67	
					Sones	2.0	2.3	2.4	3.0	3.5	4.1	4.6	4.5	
[3,5] SP-A250	1000	0.77	83	2.0	CFM	272	251	246	227	210	185	157	119	
					Sones	2.9	3.0	3.0	3.4	4.4	4.6	4.9	5.2	
[3,4,5] SP-A290	1050	0.72	81	2.5	CFM	315	293	287	257	231	207	175	124	
					Sones	3.2	3.3	3.3	3.6	3.9	4.1	4.5	5.5	
[3,4,5] SP-A390	1350	1.34	135	4.5	CFM	410	395	391	368	345	325	307	279	
					Sones	5.4	5.4	5.4	5.7	6.0	6.3	6.4	6.7	
[3] SP-A410	1000	1.74	121	3.0	CFM	443	413	405	351	305				
					Sones	4.1	3.8	3.7	3.7	4.3				
[3,4] SP-A510	1070	3.30	224	4.5	CFM	557	512	501	439	392	325			
					Sones	6.0	5.7	5.6	5.5	5.4	4.7			
[3] SP-A700	1100	3.20	350	5.5	CFM	757	729	723	700	679	649	613	560	396
					Sones	6.1	6.1	6.1	6.3	6.7	7.1	7.3	7.5	7.7
[3] SP-A710	1080	4.40	285	6.0	CFM	752	714	701	653	588	485	320		
					Sones	7.4	7.2	7.2	7.0	6.8	6.7	6.7		
[3,4] SP-A780	1600	3.30	348	8.5	CFM	812	782	775	741	704	665	625	581	
					Sones	10.2	10.2	10.2	9.9	9.5	9.5	9.4	9.4	
[3] SP-A900	950	4.00	285	4.5	CFM	955	907	896	841	773	701			
					Sones	5.2	5.7	5.8	6.1	6.2	6.2			
[3,4] SP-A1050	1095	6.30	420	6.0	CFM	1125	1059	1043	964	885	796	662		
					Sones	7.2	7.0	6.9	6.8	6.6	6.5	6.5		
[3] SP-A1410	1450	7.40	786	9.5	CFM	1455	1414	1404	1353	1307	1262	1218	1174	
					Sones	11.6	11.6	11.7	11.6	11.5	11.6	11.6	11.6	
[3,4] SP-A1550	1610	8.60	818	10.0	CFM	1607	1568	1558	1506	1449	1407	1369	1323	
					Sones	12.4	12.1	12.1	12.0	11.9	12.8	14.1	15.9	

1 HVI sones at 0.1 wg
2 Available with light
3 Available with CRD - Ceiling Radiation Damper
4 Available with 50 Hz motors (See CAPS for performance)
5 UL Listed for use above tubs.
6 Available with 277 volt motor.

Performance certified is for Model SP exhaust for installation type B: Free Inlet, Ducted outlet. Performance ratings include the effects of an inlet grille and backdraft damper. Speed (RPM) shown is nominal. Performance is based on actual speed of test. The sound ratings shown are loudness values in fan sones at 5 ft. (1.5m) in a hemispherical free field calculated per AMCA Standard 301. Values are for installation type B: free inlet fan sone levels.

Abbay Technical Services

Building Energy Consultants
& Title 24 Reports

Building Energy Assessment for The Karuk Tribe

•Appendix B•

November 2008

1125 16th St., Rm. 216, Arcata CA 95521 Phone: (707) 826-1433

Abbay Technical Services

Primary Energy Consultant / Owner:

Anne M. McQueeney
Certified Energy Analyst
Certified Energy Plans Examiner
Member of the California Association of
Building Energy Consultants
E-mail: *anny@abbaytechnicalservices.com*

Karuk Tribe Energy Assessment Project Manager,
Data compiled, processed and analyzed by:

Diane Knight
Building Energy Consultant
E-mail: *diane@abbaytechnicalservices.com*

Additional consultation provided by:

Neva S. Holladay
Building Energy Consultant
E-mail: *neva@abbaytechnicalservices.com*

Located in the Stewart School Building
1125 16th St., Rm. 216
Arcata, CA 95521

Phone: (707) 826-1433
Fax: (707) 826-1430
E-mail: *anny@abbaytechnicalservices.com*

Please visit our Website:

www.abbaytechnicalservices.com

•Appendix B•
Table of Contents

EnergyPro Support Documentation

TITLE 24 REPORT

Title 24 Report for:

Structure 1 Built~1992
1242 Thook St.
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers
,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-1

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 1 Built~1992 EXISTING
Project Title

9/26/2008
Date

1242 Thook St Yreka
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition ☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SW) 225 deg

Fuel Type: Propane

Fenestration:
Area: 322 ft² Avg. U: 0.79
Ratio: 9.7% Avg. SHGC: 0.70

Total Conditioned Floor Area:	3,328 ft²
Existing Floor Area:	3,328 ft²
Raised Floor Area:	3,328 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	4.00
Number of Stories:	1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.026	R-38	R-0.0	225	0	X		Existing	01-A6	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	225	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	1,098	0.026	R-38	R-0.0	225	0	X		Existing	01-A6	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Run Initiation Time: 09/26/08 13:27:10 Run Code: 1222460830

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 1 Built~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(SW)	176.0	0.790	116-A	0.70	116-B	225	90	Existing	Double Metal Clear Default	1st Flr Living Areas
2	Window	Left	(NW)	9.0	0.790	116-A	0.70	116-B	315	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window	Right	(SE)	9.0	0.790	116-A	0.70	116-B	135	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window	Rear	(NE)	128.0	0.790	116-A	0.70	116-B	45	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 1 Built~1992 EXISTING — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 09/26/08 13:27:10 Run Code: 1222460830

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 1 Built~1992 WINDOW UPGRADE
Project Title

9/26/2008
Date

1242 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SW) 225 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.34
Ratio: 9.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area:	3,328 ft²
Existing Floor Area:	3,328 ft²
Raised Floor Area:	3,328 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	4.00
Number of Stories:	1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.026	R-38	R-0.0	225	0	X		Existing	01-A8	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	225	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	1,098	0.026	R-38	R-0.0	225	0	X		Existing	01-A8	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 1 Built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SW)	176.0	0.340 NFRC	0.35 NFRC	225	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (NW)	9.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Right (SE)	9.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Rear (NE)	128.0	0.340 NFRC	0.35 NFRC	45	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 1 Built~1992 WINDOW UPGRADE — Project Title
9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	63% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,358	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

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This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 1 Built~1992ATTIC INSUL UPGRADE
Project Title

9/26/2008
Date

1242 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

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Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SW) 225 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.79
Ratio: 9.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.020	R-49	R-0.0	225	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	225	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	1,098	0.020	R-49	R-0.0	225	0	X		Altered	01-A9 (F=01-A8)	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 1 Built~1992ATTIC INSUL. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SW)	176.0	0.790 116-A	0.70 116-B	225	90	Existing	Double Metal Clear Default	1st Flr Living Areas
2	Window Left (NW)	9.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window Right (SE)	9.0	0.790 116-A	0.70 116-B	135	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window Rear (NE)	126.0	0.790 116-A	0.70 116-B	45	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Run Initiation Time: 09/26/08 13:22:56 Run Code: 1222460576

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 1 Built~1992ATTIC INSUL. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 1 Built~1992ATTIC&FLOOR INS. UPGRADE
Project Title

9/26/2008
Date

1242 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SW) 225 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.79
Ratio: 9.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.020	R-49	R-0.0	225	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	225	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Living Areas
Roof	Wood	1,098	0.020	R-49	R-0.0	225	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Bedrooms

Run Initiation Time: 09/26/08 13:18:02 Run Code: 1222460282

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 1 Built~1992ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(SW)	176.0	0.790	116-A	0.70	116-B	225	90	Existing	Double Metal Clear Default	1st Flr Living Areas
2	Window	Left	(NW)	9.0	0.790	116-A	0.70	116-B	315	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window	Right	(SE)	9.0	0.790	116-A	0.70	116-B	135	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window	Rear	(NE)	128.0	0.790	116-A	0.70	116-B	45	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 1 Built~1992ATTIC&FLOOR INS. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 09/26/08 13:18:02 Run Code: 1222460282

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 1 Built~1992 ALL UPGRADES — Project Title
10/22/2008 — Date
1242 Thook St Yreka — Project Address
Building Permit #
ABRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition — ☒ Multi Family ☒ Existing + Add/Alt
Building Front Orientation: (SW) 225 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.34
Ratio: 9.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.020	R-49	R-0.0	225	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	225	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Living Areas
Roof	Wood	1,098	0.020	R-49	R-0.0	225	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Bedrooms

Run Initiation Time: 10/22/08 11:33:38 Run Code: 1224700418

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 1 Built~1992 ALL UPGRADES — Project Title

10/22/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SW)	176.0	0.340 NFRC	0.35 NFRC	225	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (NW)	9.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Right (SE)	9.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Rear (NE)	128.0	0.340 NFRC	0.35 NFRC	45	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 1 Built~1992 ALL UPGRADES — Project Title

10/22/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Hot Water Pump Control	#	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 2 Blt~1997

Happy Camp, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-2

Date:

10/9/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 2 Blt~1997 EXISTING		DATE: 10/8/2008
PROJECT ADDRESS: Happy Camp		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 11,092 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
☐	☐	☐	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
☐	☐	☐	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
☐	☐	☐	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: ENV-1			
PRINCIPAL ENVELOPE DESIGNER - NAME: Karuk Tribe Building Energy Assessment	SIGNATURE	LIC. NO.	DATE

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: LTG-1, LTG-2			
PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: MECH-1, MECH-2, MECH-3, MECH-5			
PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 EXISTING	10/8/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

ENERGY COMPONENT	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

Percent better than Standard: (excluding process)

This Portion of the Report
Is Not Applicable to this Analysis

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(SW) 225 deg	Conditioned Floor Area	11,092 sqft.
Number of Stories	1	Unconditioned Floor Area	0 sqft.
Number of Systems	11	Conditioned Footprint Area	11,092 sqft.
Number of Zones	11	Fuel Type	Propane

	Orientation	Gross Area	Glazing Area	Glazing Ratio
Front Elevation	(SW)	869 sqft.	226 sqft.	26.0%
Left Elevation	(NW)	1,695 sqft.	554 sqft.	32.7%
Rear Elevation	(NE)	875 sqft.	183 sqft.	20.9%
Right Elevation	(SE)	1,689 sqft.	520 sqft.	30.8%
Total		5,128 sqft.	1,483 sqft.	28.9%
Roof		11,179 sqft.	104 sqft.	0.9%

	Standard	Proposed
Lighting Power Density	1.289 W/sqft.	1.289 W/sqft.
Prescriptive Env. Heat Loss	2,481 Btu/h	2,245 Btu/h
Prescriptive Env. Heat Gain	211,614 Btu/h-F	286,133 Btu/h-F

Remarks:

Run Initiation Time: 10/08/08 15:52:39 Run Code: 1223506359

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 EXISTING	10/8/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Exstg Heatg&Coolg ZONE 1	Offices	Office	1,590	*1.200				
Exstg Heatg&Coolg ZONE 2	Offices	Office	1,503	*1.200				
Exstg Heatg&Coolg ZONE 3	Offices	Office	1,362	*1.200				
Exstg Heatg&Coolg Server Rm	Elec. Data Rm	Office	124	*1.200				
Exstg Heatg&Coolg ZONE 5	Meeting Room	Convention/Conference/Meeting	867	*1.400				
Exstg Heatg&Coolg ZONE 6	Corridor	Corridor/Restroom/Support	327	*0.600				
Exstg Heatg&Coolg ZONE 7	Offices	Office	1,103	*1.200				
Exstg Heatg&Coolg Dental Z1	Medical Offices	Office	1,207	*1.200				
Exstg Heatg&Coolg Dental Z2	Lobby	Lobby, Main Entry	645	*1.500				
Exstg Heatg&Coolg Dental Z3	Offices	Office	1,548	*1.200				
Exstg Heatg&Coolg Dental Z4	Dental Operatories	Operating Room	816	*2.200				

Notes: 1. See LTG-2-C (items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/08/08 15:52:39 Run Code: 1223506359

CERTIFICATE OF COMPLIANCE — ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 EXISTING — DATE: 10/8/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,590	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
2	WallBG	186	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
3	Wall	303	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
4	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
5	Wall	80	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
6	Roof	1,503	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
7	Roof	5	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
8	Wall	44	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
9	Wall	136	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
10	Wall	44	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
11	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
12	Wall	66	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
13	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
14	Wall	122	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
15	WallBG	98	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
16	Wall	135	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
17	Roof	1,362	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
18	Roof	1	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
19	Wall	11	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
20	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep

*N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Left	(NW)	256	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
2	Window	Rear	(NE)	22	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
3	Skylight	Right	(SE)	48	1.980	116-A	0.83	116-B	135	Existing	Single Mtl Clr Skylight Default	Offices
4	Window	Rear	(NE)	16	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
5	Window	Right	(SE)	40	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default-Door	Offices
6	Window	Right	(SE)	120	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
7	Skylight	Right	(SE)	12	1.980	116-A	0.83	116-B	135	Existing	Single Mtl Clr Skylight Default	Offices
8	Window	Front	(SW)	20	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Offices
9	Window	Front	(SW)	38	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Offices
10	Window	Left	(NW)	80	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
11	Window	Right	(SE)	128	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
12	Skylight	Rear	(NE)	12	1.980	116-A	0.83	116-B	45	Existing	Single Mtl Clr Skylight Default	Meeting Room
13	Window	Rear	(NE)	23	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default-Door	Meeting Room

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76											
2	None	0.76											
3	None	1.00											
4	None	0.76											
5	None	0.76											
6	None	0.76											
7	None	1.00											
8	None	0.76											
9	None	0.76											
10	None	0.76											
11	None	0.76											
12	None	1.00											
13	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/08/08 15:52:39 Run Code: 1223506359

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 EXISTING

DATE: 10/8/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Wall	146	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
22	Wall	35	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
23	WallBG	83	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
24	Wall	149	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
25	Door	20	0.500	Insul	R-0.0	315	90	Existing	28-A3	Offices
26	Wall	1	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
27	Wall	30	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
28	WallBG	78	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
29	Wall	106	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
30	Roof	124	0.032	R-30	R-0.0	225	0	Existing	01-A17	Elec. Data Rm
31	WallBG	33	0.129	None	R-9.8	0	90	Existing	13-F5	Elec. Data Rm - 24" deep
32	Wall	99	0.129	None	R-9.8	135	90	Existing	13-F5	Elec. Data Rm
33	Roof	192	0.032	R-30	R-0.0	225	0	Existing	01-A17	Meeting Room
34	Roof	337	0.032	R-30	R-0.0	225	14	Existing	01-A17	Meeting Room
35	Roof	347	0.297	None	R-0.0	45	14	Existing	02-A1	Meeting Room
36	Wall	3	0.069	R-21	R-0.0	225	90	Existing	09-A6	Meeting Room
37	Wall	1	0.069	R-21	R-0.0	315	90	Existing	09-A6	Meeting Room
38	Wall	3	0.069	R-21	R-0.0	45	90	Existing	09-A6	Meeting Room
39	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Meeting Room - 24" deep
40	Wall	125	0.129	None	R-9.8	45	90	Existing	13-F5	Meeting Room

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction.

#	Type			Area	U-Fac.(1)		SHGC(2)		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
14	Window	Rear	(NE)	74	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Meeting Room
15	Window	Front	(SW)	40	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Corridor
16	Window	Front	(SW)	32	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Corridor
17	Window	Left	(NW)	16	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
18	Window	Rear	(NE)	32	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
19	Window	Right	(SE)	104	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
20	Skylight	Left	(NW)	10	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Medical Offices
21	Window	Left	(NW)	32	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Medical Offices
22	Window	Right	(SE)	16	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Medical Offices
23	Skylight	Left	(NW)	12	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Lobby
24	Window	Left	(NW)	42	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default-Door	Lobby
25	Skylight	Left	(NW)	10	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Offices
26	Window	Front	(SW)	21	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Offices

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
14	None	0.76				
15	None	0.76				
16	None	0.76				
17	None	0.76				
18	None	0.76				
19	None	0.76				
20	None	1.00				
21	None	0.76				
22	None	0.76				
23	None	1.00				
24	None	0.76				
25	None	1.00				
26	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/08/08 15:52:39 Run Code: 1223506359

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 EXISTING

DATE: 10/8/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
41	Wall	1	0.069	R-21	R-0.0	135	90	Existing	09-A6	Meeting Room
42	Roof	327	0.032	R-30	R-0.0	225	0	Existing	01-A17	Corridor
43	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Corridor - 24" deep
44	Wall	150	0.129	None	R-9.8	225	90	Existing	13-F5	Corridor
45	Roof	1,103	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
46	WallBG	9	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
47	Wall	10	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
48	WallBG	70	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
49	Wall	158	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
50	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
51	WallBG	69	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
52	Wall	102	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
53	Roof	1,196	0.032	R-30	R-0.0	225	0	Existing	01-A17	Medical Offices
54	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Medical Offices
55	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Medical Offices
56	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Medical Offices
57	WallBG	7	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
58	Wall	181	0.129	None	R-9.8	315	90	Existing	13-F5	Medical Offices
59	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Medical Offices
60	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Medical Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction.

#	Type			Area	U-Fac.(1)		SHGC(2)		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
27	Window	Front	(SW)	43	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Offices
28	Window	Left	(NW)	128	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
29	Window	Right	(SE)	112	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
30	Window	Front	(SW)	32	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Dental Operatories
31	Window	Rear	(NE)	16	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Dental Operatories

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
27	None	0.76				
28	None	0.76				
29	None	0.76				
30	None	0.76				
31	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/08/08 15:52:39 Run Code: 1223506359

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 EXISTING

DATE: 10/8/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
61	WallBG	57	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
62	Wall	155	0.129	None	R-9.8	135	90	Existing	13-F5	Medical Offices
63	Roof	632	0.032	R-30	R-0.0	225	0	Existing	01-A17	Lobby
64	Roof	1	0.032	R-30	R-0.0	315	18	Existing	01-A17	Lobby
65	Wall	13	0.069	R-21	R-0.0	225	90	Existing	09-A6	Lobby
66	Wall	33	0.069	R-21	R-0.0	315	90	Existing	09-A6	Lobby
67	WallBG	4	0.129	None	R-9.8	0	90	Existing	13-F5	Lobby - 24" deep
68	Wall	81	0.129	None	R-9.8	315	90	Existing	13-F5	Lobby
69	Wall	13	0.069	R-21	R-0.0	45	90	Existing	09-A6	Lobby
70	Wall	38	0.069	R-21	R-0.0	135	90	Existing	09-A6	Lobby
71	Roof	1,537	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
72	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Offices
73	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
74	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
75	Wall	140	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
76	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
77	WallBG	88	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
78	Wall	136	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
79	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
80	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/08/08 15:52:39 Run Code: 1223506359

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 EXISTING

DATE: 10/8/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
81	WallBG	75	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
82	Wall	113	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
83	Roof	816	0.032	R-30	R-0.0	225	0	Existing	01-A17	Dental Operatories
84	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
85	Wall	112	0.129	None	R-9.8	225	90	Existing	13-F5	Dental Operatories
86	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
87	Wall	128	0.129	None	R-9.8	45	90	Existing	13-F5	Dental Operatories
88	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
89	Wall	204	0.129	None	R-9.8	135	90	Existing	13-F5	Dental Operatories

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 EXISTING

DATE: 10/8/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	1	40,000	40	Existing	0.92	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	2	31,400	0	Existing	0.98	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	1	31,400	0	Existing	0.98	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Exstg Heat & Cool Units Zone 1	Split DX	1	69,000	0.0	92% AFUE	60,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heat & Cool Units Zone 2	Split DX	1	69,000	0.0	92% AFUE	54,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heat & Cool Units Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Unit-Server	Split DX	1	11,500	0.0	8.00 HSPF	18,000	10.3 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 5	Split DX	1	62,800	0.0	92% AFUE	49,300	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 6	Split DX	1	25,000	0.0	92% AFUE	20,100	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 7	Split DX	1	62,800	0.0	92% AFUE	49,300	10.0 SEER / 8.6 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Exstg Heat & Cool Units Zone 1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heat & Cool Units Zone 2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heat & Cool Units Zone 3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heatg & Coolg Unit-Server	Constant Volume	Blow-Through	540	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 5	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 6	Constant Volume	Blow-Through	950	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 7	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES		DATE: 10/9/2008
PROJECT ADDRESS: Happy Camp		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 11,092 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
☐	☐	☐	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
☐	☐	☐	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
☐	☐	☐	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 WINDOW UPGRADES	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

Percent better than Standard: (excluding process)

This Portion of the Report
Is Not Applicable to this Analysis

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(SW) 225 deg	Conditioned Floor Area	11,092 sqft.
Number of Stories	1	Unconditioned Floor Area	0 sqft.
Number of Systems	11	Conditioned Footprint Area	11,092 sqft.
Number of Zones	11	Fuel Type	Propane

	Orientation	Gross Area	Glazing Area	Glazing Ratio
Front Elevation	(SW)	869 sqft.	226 sqft.	26.0%
Left Elevation	(NW)	1,695 sqft.	554 sqft.	32.7%
Rear Elevation	(NE)	875 sqft.	183 sqft.	20.9%
Right Elevation	(SE)	1,689 sqft.	520 sqft.	30.8%
Total		5,128 sqft.	1,483 sqft.	28.9%
Roof		11,179 sqft.	104 sqft.	0.9%

	Standard	Proposed
Lighting Power Density	1.289 W/sqft.	1.289 W/sqft.
Prescriptive Env. Heat Loss	2,481 Btu/h	1,421 Btu/h
Prescriptive Env. Heat Gain	211,614 Btu/h-F	173,245 Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 WINDOW UPGRADES	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Exstg Heatg&Coolg ZONE 1	Offices	Office	1,590	*1.200				
Exstg Heatg&Coolg ZONE 2	Offices	Office	1,503	*1.200				
Exstg Heatg&Coolg ZONE 3	Offices	Office	1,362	*1.200				
Exstg Heatg&Coolg Server Rm	Elec. Data Rm	Office	124	*1.200				
Exstg Heatg&Coolg ZONE 5	Meeting Room	Convention/Conference/Meeting	867	*1.400				
Exstg Heatg&Coolg ZONE 6	Corridor	Corridor/Restroom/Support	327	*0.600				
Exstg Heatg&Coolg ZONE 7	Offices	Office	1,103	*1.200				
Exstg Heatg&Coolg Dental Z1	Medical Offices	Office	1,207	*1.200				
Exstg Heatg&Coolg Dental Z2	Lobby	Lobby, Main Entry	645	*1.500				
Exstg Heatg&Coolg Dental Z3	Offices	Office	1,548	*1.200				
Exstg Heatg&Coolg Dental Z4	Dental Operatories	Operating Room	816	*2.200				

Notes: 1. See LTG-2-C (items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-6-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,590	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
2	WallBG	186	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
3	Wall	303	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
4	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
5	Wall	80	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
6	Roof	1,503	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
7	Roof	5	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
8	Wall	44	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
9	Wall	136	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
10	Wall	44	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
11	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
12	Wall	66	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
13	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
14	Wall	122	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
15	WallBG	98	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
16	Wall	135	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
17	Roof	1,362	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
18	Roof	1	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
19	Wall	11	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
20	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Left (NW)	256	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
2	Window Rear (NE)	22	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
3	Skylight Right (SE)	48	0.470	NFRC	0.34	NFRC	135	New	NFRC rated Skylight	Offices
4	Window Rear (NE)	16	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
5	Window Right (SE)	40	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vnl LowE-Door	Offices
6	Window Right (SE)	120	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
7	Skylight Right (SE)	12	0.470	NFRC	0.34	NFRC	135	New	NFRC rated Skylight	Offices
8	Window Front (SW)	20	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vnl LowE-Door	Offices
9	Window Front (SW)	38	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
10	Window Left (NW)	80	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
11	Window Right (SE)	128	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vlnyl w/LowE	Offices
12	Skylight Rear (NE)	12	0.470	NFRC	0.34	NFRC	45	New	NFRC rated Skylight	Meeting Room
13	Window Rear (NE)	23	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vnl LowE-Door	Meeting Room

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
1	None	0.76				
2	None	0.76				
3	None	1.00				
4	None	0.76				
5	None	0.76				
6	None	0.76				
7	None	1.00				
8	None	0.76				
9	None	0.76				
10	None	0.76				
11	None	0.76				
12	None	1.00				
13	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

CERTIFICATE OF COMPLIANCE — ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES — DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Wall	146	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
22	Wall	35	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
23	WallBG	83	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
24	Wall	149	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
25	Door	20	0.500	Insul	R-0.0	315	90	Existing	28-A3	Offices
26	Wall	11	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
27	Wall	30	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
28	WallBG	78	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
29	Wall	106	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
30	Roof	124	0.032	R-30	R-0.0	225	0	Existing	01-A17	Elec. Data Rm
31	WallBG	33	0.129	None	R-9.8	0	90	Existing	13-F5	Elec. Data Rm - 24" deep
32	Wall	99	0.129	None	R-9.8	135	90	Existing	13-F5	Elec. Data Rm
33	Roof	192	0.032	R-30	R-0.0	225	0	Existing	01-A17	Meeting Room
34	Roof	337	0.032	R-30	R-0.0	225	14	Existing	01-A17	Meeting Room
35	Roof	347	0.297	None	R-0.0	45	14	Existing	02-A1	Meeting Room
36	Wall	3	0.069	R-21	R-0.0	225	90	Existing	09-A6	Meeting Room
37	Wall	1	0.069	R-21	R-0.0	315	90	Existing	09-A6	Meeting Room
38	Wall	3	0.069	R-21	R-0.0	45	90	Existing	09-A6	Meeting Room
39	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Meeting Room - 24" deep
40	Wall	125	0.129	None	R-9.8	45	90	Existing	13-F5	Meeting Room

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

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#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
14	Window	Rear	(NE)	74	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Meeting Room
15	Window	Front	(SW)	40	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vnl LowE-Door	Corridor
16	Window	Front	(SW)	32	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Corridor
17	Window	Left	(NW)	16	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Offices
18	Window	Rear	(NE)	32	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Offices
19	Window	Right	(SE)	104	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Offices
20	Skylight	Left	(NW)	10	0.470	NFRC	0.34	NFRC	315	New	NFRC rated Skylight	Medical Offices
21	Window	Left	(NW)	32	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Medical Offices
22	Window	Right	(SE)	16	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Medical Offices
23	Skylight	Left	(NW)	12	0.470	NFRC	0.34	NFRC	315	New	NFRC rated Skylight	Lobby
24	Window	Left	(NW)	42	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vnl LowE-Door	Lobby
25	Skylight	Left	(NW)	10	0.470	NFRC	0.34	NFRC	315	New	NFRC rated Skylight	Offices
26	Window	Front	(SW)	21	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vnl LowE-Door	Offices

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
14	None	0.76											
15	None	0.76											
16	None	0.76											
17	None	0.76											
18	None	0.76											
19	None	0.76											
20	None	1.00											
21	None	0.76											
22	None	0.76											
23	None	1.00											
24	None	0.76											
25	None	1.00											
26	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
41	Wall	1	0.069	R-21	R-0.0	135	90	Existing	09-A6	Meeting Room
42	Roof	327	0.032	R-30	R-0.0	225	0	Existing	01-A17	Corridor
43	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Corridor - 24" deep
44	Wall	150	0.129	None	R-9.8	225	90	Existing	13-F5	Corridor
45	Roof	1,103	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
46	WallBG	9	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
47	Wall	10	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
48	WallBG	70	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
49	Wall	158	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
50	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
51	WallBG	69	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
52	Wall	102	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
53	Roof	1,196	0.032	R-30	R-0.0	225	0	Existing	01-A17	Medical Offices
54	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Medical Offices
55	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Medical Offices
56	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Medical Offices
57	WallBG	71	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
58	Wall	181	0.129	None	R-9.8	315	90	Existing	13-F5	Medical Offices
59	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Medical Offices
60	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Medical Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type		Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
27	Window	Front (SW)	43	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Offices
28	Window	Left (NW)	128	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Offices
29	Window	Right (SE)	112	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Offices
30	Window	Front (SW)	32	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Dental Operatories
31	Window	Rear (NE)	16	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Dental Operatories

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
27	None	0.76				
28	None	0.76				
29	None	0.76				
30	None	0.76				
31	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
61	WallBG	57	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
62	Wall	155	0.129	None	R-9.8	135	90	Existing	13-F5	Medical Offices
63	Roof	632	0.032	R-30	R-0.0	225	0	Existing	01-A17	Lobby
64	Roof	1	0.032	R-30	R-0.0	315	18	Existing	01-A17	Lobby
65	Wall	13	0.069	R-21	R-0.0	225	90	Existing	09-A6	Lobby
66	Wall	33	0.069	R-21	R-0.0	315	90	Existing	09-A6	Lobby
67	WallBG	4	0.129	None	R-9.8	0	90	Existing	13-F5	Lobby - 24" deep
68	Wall	81	0.129	None	R-9.8	315	90	Existing	13-F5	Lobby
69	Wall	13	0.069	R-21	R-0.0	45	90	Existing	09-A6	Lobby
70	Wall	38	0.069	R-21	R-0.0	135	90	Existing	09-A6	Lobby
71	Roof	1,537	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
72	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Offices
73	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
74	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
75	Wall	140	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
76	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
77	WallBG	88	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
78	Wall	136	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
79	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
80	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
81	WallBG	75	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
82	Wall	113	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
83	Roof	816	0.032	R-30	R-0.0	225	0	Existing	01-A17	Dental Operatories
84	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
85	Wall	112	0.129	None	R-9.8	225	90	Existing	13-F5	Dental Operatories
86	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
87	Wall	128	0.129	None	R-9.8	45	90	Existing	13-F5	Dental Operatories
88	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
89	Wall	204	0.129	None	R-9.8	135	90	Existing	13-F5	Dental Operatories

*N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction.

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt. RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	1	40,000	40	Existing	0.92	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	2	31,400	0	Existing	0.98	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	1	31,400	0	Existing	0.98	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Exstg Heat & Cool Units Zone 1	Split DX	1	69,000	0.0	92% AFUE	60,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heat & Cool Units Zone 2	Split DX	1	69,000	0.0	92% AFUE	54,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heat & Cool Units Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Unit-Server	Split DX	1	11,500	0.0	8.00 HSPF	18,000	10.3 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 5	Split DX	1	62,800	0.0	92% AFUE	49,300	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 6	Split DX	1	25,000	0.0	92% AFUE	20,100	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 7	Split DX	1	62,800	0.0	92% AFUE	49,300	10.0 SEER / 8.6 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN				RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Exstg Heat & Cool Units Zone 1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heat & Cool Units Zone 2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heat & Cool Units Zone 3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heatg & Coolg Unit-Server	Constant Volume	Blow-Through	540	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 5	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 6	Constant Volume	Blow-Through	950	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 7	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 WINDOW UPGRADES

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	2	40,000	40	Existing	0.92	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING Output	HEATING Aux. kW	HEATING Eff.	COOLING Output	COOLING Efficiency	Condition Status	Economizer Type
Exstg Heatg&Coolg - Dental Zone 1	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg&Coolg - Dental Zone 2	Split DX	1	69,000	0.0	92% AFUE	36,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg&Coolg - Dental Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg&Coolg - Dental Zone 4	Split DX	1	69,000	0.0	92% AFUE	36,000	10.0 SEER / 8.6 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN Motor Location	SUPPLY FAN CFM	SUPPLY FAN BHP	SUPPLY FAN Motor Eff.	SUPPLY FAN Drive Eff.	RETURN FAN CFM	RETURN FAN BHP	RETURN FAN Motor Eff.	RETURN FAN Drive Eff.
Exstg Heatg&Coolg - Dental Zone 1	Constant Volume	Blow-Through	1,865	0.75	77.0%	100.0%	none			
Exstg Heatg&Coolg - Dental Zone 2	Constant Volume	Blow-Through	1,865	0.75	77.0%	100.0%	none			
Exstg Heatg&Coolg - Dental Zone 3	Constant Volume	Blow-Through	1,865	0.75	77.0%	100.0%	none			
Exstg Heatg&Coolg - Dental Zone 4	Constant Volume	Blow-Through	1,865	0.75	77.0%	100.0%	none			

Run Initiation Time: 10/09/08 08:01:02 Run Code: 1223564462

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE		DATE: 10/9/2008
PROJECT ADDRESS: Happy Camp		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 11,092 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
[ ]	[ ]	[ ]	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
[ ]	[ ]	[ ]	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
[ ]	[ ]	[ ]	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: ENV-1			
PRINCIPAL ENVELOPE DESIGNER - NAME: Karuk Tribe Building Energy Assessment	SIGNATURE	LIC. NO.	DATE

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: LTG-1, LTG-2			
PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: MECH-1, MECH-2, MECH-3, MECH-5			
PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 ATTIC INSULATION UPGRADE	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

ENERGY COMPONENT	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

This Portion of the Report
Is Not Applicable to this Analysis

Percent better than Standard: (excluding process)

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(SW) 225 deg	Conditioned Floor Area	11,092 sqft.
Number of Stories	1	Unconditioned Floor Area	0 sqft.
Number of Systems	11	Conditioned Footprint Area	11,092 sqft.
Number of Zones	11	Fuel Type	Propane

	Orientation	Gross Area	Glazing Area	Glazing Ratio
Front Elevation	(SW)	869 sqft.	226 sqft.	26.0%
Left Elevation	(NW)	1,695 sqft.	554 sqft.	32.7%
Rear Elevation	(NE)	875 sqft.	183 sqft.	20.9%
Right Elevation	(SE)	1,689 sqft.	520 sqft.	30.8%
Total		5,128 sqft.	1,483 sqft.	28.9%
Roof		11,179 sqft.	104 sqft.	0.9%

	Standard	Proposed
Lighting Power Density	1.289 W/sqft.	1.289 W/sqft.
Prescriptive Env. Heat Loss	2,481 Btu/h	2,116 Btu/h
Prescriptive Env. Heat Gain	211,614 Btu/h-F	267,081 Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 ATTIC INSULATION UPGRADE	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Exstg Heatg&Coolg ZONE 1	Offices	Office	1,590	*1.200				
Exstg Heatg&Coolg ZONE 2	Offices	Office	1,503	*1.200				
Exstg Heatg&Coolg ZONE 3	Offices	Office	1,362	*1.200				
Exstg Heatg&Coolg Server Rm	Elec. Data Rm	Office	124	*1.200				
Exstg Heatg&Coolg ZONE 5	Meeting Room	Convention/Conference/Meeting	867	*1.400				
Exstg Heatg&Coolg ZONE 6	Corridor	Corridor/Restroom/Support	327	*0.600				
Exstg Heatg&Coolg ZONE 7	Offices	Office	1,103	*1.200				
Exstg Heatg&Coolg Dental Z1	Medical Offices	Office	1,207	*1.200				
Exstg Heatg&Coolg Dental Z2	Lobby	Lobby, Main Entry	645	*1.500				
Exstg Heatg&Coolg Dental Z3	Offices	Office	1,548	*1.200				
Exstg Heatg&Coolg Dental Z4	Dental Operatories	Operating Room	816	*2.200				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-6-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,590	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
2	WallBG	186	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
3	Wall	303	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
4	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
5	Wall	80	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
6	Roof	1,503	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
7	Roof	5	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
8	Wall	44	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
9	Wall	136	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
10	Wall	44	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
11	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
12	Wall	66	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
13	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
14	Wall	122	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
15	WallBG	98	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
16	Wall	135	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
17	Roof	1,362	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
18	Roof	1	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
19	Wall	11	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
20	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Left	(NW)	256	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
2	Window	Rear	(NE)	22	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
3	Skylight	Right	(SE)	48	1.980	116-A	0.83	116-B	135	Existing	Single Mtl Clr Skylight Default	Offices
4	Window	Rear	(NE)	16	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
5	Window	Right	(SE)	40	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default-Door	Offices
6	Window	Right	(SE)	120	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
7	Skylight	Right	(SE)	12	1.980	116-A	0.83	116-B	135	Existing	Single Mtl Clr Skylight Default	Offices
8	Window	Front	(SW)	20	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Offices
9	Window	Front	(SW)	38	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Offices
10	Window	Left	(NW)	80	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
11	Window	Right	(SE)	128	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
12	Skylight	Rear	(NE)	12	1.980	116-A	0.83	116-B	45	Existing	Single Mtl Clr Skylight Default	Meeting Room
13	Window	Rear	(NE)	23	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default-Door	Meeting Room

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76												
2	None	0.76												
3	None	1.00												
4	None	0.76												
5	None	0.76												
6	None	0.76												
7	None	1.00												
8	None	0.76												
9	None	0.76												
10	None	0.76												
11	None	0.76												
12	None	1.00												
13	None	0.76												

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Wall	146	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
22	Wall	35	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
23	WallBG	83	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
24	Wall	149	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
25	Door	20	0.500	Insul	R-0.0	315	90	Existing	28-A3	Offices
26	Wall	11	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
27	Wall	30	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
28	WallBG	78	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
29	Wall	106	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
30	Roof	124	0.020	R-49	R-0.0	225	0	New	01-A19	Elec. Data Rm
31	WallBG	33	0.129	None	R-9.8	0	90	Existing	13-F5	Elec. Data Rm - 24" deep
32	Wall	99	0.129	None	R-9.8	135	90	Existing	13-F5	Elec. Data Rm
33	Roof	192	0.020	R-49	R-0.0	225	0	New	01-A19	Meeting Room
34	Roof	337	0.020	R-49	R-0.0	225	14	New	01-A19	Meeting Room
35	Roof	347	0.297	None	R-0.0	45	14	Existing	02-A1	Meeting Room
36	Wall	3	0.069	R-21	R-0.0	225	90	Existing	09-A6	Meeting Room
37	Wall	1	0.069	R-21	R-0.0	315	90	Existing	09-A6	Meeting Room
38	Wall	3	0.069	R-21	R-0.0	45	90	Existing	09-A6	Meeting Room
39	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Meeting Room - 24" deep
40	Wall	125	0.129	None	R-9.8	45	90	Existing	13-F5	Meeting Room

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
14	Window	Rear	(NE)	74	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Meeting Room
15	Window	Front	(SW)	40	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Corridor
16	Window	Front	(SW)	32	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Corridor
17	Window	Left	(NW)	16	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
18	Window	Rear	(NE)	32	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
19	Window	Right	(SE)	104	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
20	Skylight	Left	(NW)	10	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Medical Offices
21	Window	Left	(NW)	32	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Medical Offices
22	Window	Right	(SE)	16	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Medical Offices
23	Skylight	Left	(NW)	12	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Lobby
24	Window	Left	(NW)	42	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default-Door	Lobby
25	Skylight	Left	(NW)	10	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Offices
26	Window	Front	(SW)	21	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Offices

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
14	None	0.76											
15	None	0.76											
16	None	0.76											
17	None	0.76											
18	None	0.76											
19	None	0.76											
20	None	1.00											
21	None	0.76											
22	None	0.76											
23	None	1.00											
24	None	0.76											
25	None	1.00											
26	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
41	Wall	1	0.069	R-21	R-0.0	135	90	Existing	09-A6	Meeting Room
42	Roof	327	0.020	R-49	R-0.0	225	0	New	01-A19	Corridor
43	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Corridor - 24" deep
44	Wall	150	0.129	None	R-9.8	225	90	Existing	13-F5	Corridor
45	Roof	1,103	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
46	WallBG	9	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
47	Wall	10	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
48	WallBG	70	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
49	Wall	158	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
50	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
51	WallBG	69	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
52	Wall	102	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
53	Roof	1,196	0.020	R-49	R-0.0	225	0	New	01-A19	Medical Offices
54	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Medical Offices
55	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Medical Offices
56	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Medical Offices
57	WallBG	7	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
58	Wall	181	0.129	None	R-9.8	315	90	Existing	13-F5	Medical Offices
59	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Medical Offices
60	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Medical Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction.

#	Type			Area	U-Fac.(1)		SHGC(2)		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
27	Window	Front	(SW)	43	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Offices
28	Window	Left	(NW)	128	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
29	Window	Right	(SE)	112	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
30	Window	Front	(SW)	32	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Dental Operatories
31	Window	Rear	(NE)	16	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Dental Operatories

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
27	None	0.76												
28	None	0.76												
29	None	0.76												
30	None	0.76												
31	None	0.76												

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
61	WallBG	57	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
62	Wall	155	0.129	None	R-9.8	135	90	Existing	13-F5	Medical Offices
63	Roof	632	0.020	R-49	R-0.0	225	0	New	01-A19	Lobby
64	Roof	1	0.032	R-30	R-0.0	315	18	Existing	01-A17	Lobby
65	Wall	13	0.069	R-21	R-0.0	225	90	Existing	09-A6	Lobby
66	Wall	33	0.069	R-21	R-0.0	315	90	Existing	09-A6	Lobby
67	WallBG	4	0.129	None	R-9.8	0	90	Existing	13-F5	Lobby - 24" deep
68	Wall	8	0.129	None	R-9.8	315	90	Existing	13-F5	Lobby
69	Wall	13	0.069	R-21	R-0.0	45	90	Existing	09-A6	Lobby
70	Wall	38	0.069	R-21	R-0.0	135	90	Existing	09-A6	Lobby
71	Roof	1,537	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
72	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Offices
73	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
74	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
75	Wall	140	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
76	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
77	WallBG	88	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
78	Wall	136	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
79	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
80	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt. RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
81	WallBG	75	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
82	Wall	113	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
83	Roof	816	0.020	R-49	R-0.0	225	0	New	01-A19	Dental Operatories
84	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
85	Wall	112	0.129	None	R-9.8	225	90	Existing	13-F5	Dental Operatories
86	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
87	Wall	128	0.129	None	R-9.8	45	90	Existing	13-F5	Dental Operatories
88	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
89	Wall	204	0.129	None	R-9.8	135	90	Existing	13-F5	Dental Operatories

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	1	40,000	40	Existing	0.92	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	2	31,400	0	Existing	0.98	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	1	31,400	0	Existing	0.98	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Exstg Heat & Cool Units Zone 1	Split DX	1	69,000	0.0	92% AFUE	60,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heat & Cool Units Zone 2	Split DX	1	69,000	0.0	92% AFUE	54,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heat & Cool Units Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Unit-Server	Split DX	1	11,500	0.0	8.00 HSPF	18,000	10.3 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 5	Split DX	1	62,800	0.0	92% AFUE	49,300	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 6	Split DX	1	25,000	0.0	92% AFUE	20,100	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg & Coolg Zone 7	Split DX	1	62,800	0.0	92% AFUE	49,300	10.0 SEER / 8.6 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Exstg Heat & Cool Units Zone 1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heat & Cool Units Zone 2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heat & Cool Units Zone 3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heatg & Coolg Unit-Server	Constant Volume	Blow-Through	540	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 5	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 6	Constant Volume	Blow-Through	950	0.68	76.0%	100.0%	none			
Exstg Heatg & Coolg Zone 7	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 ATTIC INSULATION UPGRADE

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	2	40,000	40	Existing	0.92	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Exstg Heatg&Coolg - Dental Zone 1	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg&Coolg - Dental Zone 2	Split DX	1	69,000	0.0	92% AFUE	36,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg&Coolg - Dental Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	10.0 SEER / 8.6 EER	Existing	No Economizer
Exstg Heatg&Coolg - Dental Zone 4	Split DX	1	69,000	0.0	92% AFUE	36,000	10.0 SEER / 8.6 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Exstg Heatg&Coolg - Dental Zone 1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heatg&Coolg - Dental Zone 2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heatg&Coolg - Dental Zone 3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Exstg Heatg&Coolg - Dental Zone 4	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			

Run Initiation Time: 10/09/08 07:56:30 Run Code: 1223564190

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE		DATE: 10/9/2008
PROJECT ADDRESS: Happy Camp		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 11,092 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
[ ]	[ ]	[ ]	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
[ ]	[ ]	[ ]	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
[ ]	[ ]	[ ]	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 HVAC UPGRADE	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

Percent better than Standard: (excluding process)

This Portion of the Report
Is Not Applicable to this Analysis

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(SW) 225 deg	Conditioned Floor Area	11,092	sqft.
Number of Stories	1	Unconditioned Floor Area	0	sqft.
Number of Systems	11	Conditioned Footprint Area	11,092	sqft.
Number of Zones	11	Fuel Type	Propane	

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	(SW)	869	sqft.	226	sqft.	26.0%
Left Elevation	(NW)	1,695	sqft.	554	sqft.	32.7%
Rear Elevation	(NE)	875	sqft.	183	sqft.	20.9%
Right Elevation	(SE)	1,689	sqft.	520	sqft.	30.8%
Total		5,128	sqft.	1,483	sqft.	28.9%
Roof		11,179	sqft.	104	sqft.	0.9%

	Standard		Proposed	
Lighting Power Density	1.289	W/sqft.	1.289	W/sqft.
Prescriptive Env. Heat Loss	2,481	Btu/h	2,245	Btu/h
Prescriptive Env. Heat Gain	211,614	Btu/h-F	286,133	Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 HVAC UPGRADE	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Upgrd Heatg&Coolg ZONE1	Offices	Office	1,590	*1.200				
Upgrd Heatg&Coolg ZONE2	Offices	Office	1,503	*1.200				
Upgrd Heatg&Coolg ZONE3	Offices	Office	1,362	*1.200				
Upgrd Heatg&Coolg Serv. Rm	Elec. Data Rm	Office	124	*1.200				
Upgrd Heatg&Coolg ZONE5	Meeting Room	Convention/Conference/Meeting	867	*1.400				
Upgrd Heatg&Coolg ZONE6	Corridor	Corridor/Restroom/Support	327	*0.600				
Upgrd Heatg&Coolg ZONE7	Offices	Office	1,103	*1.200				
Upgrd Heatg&Coolg Dental Z1	Medical Offices	Office	1,207	*1.200				
Upgrd Heatg&Coolg Dental Z2	Lobby	Lobby, Main Entry	645	*1.500				
Upgrd Heatg&Coolg Dental Z3	Offices	Office	1,548	*1.200				
Upgrd Heatg&Coolg Dental Z4	Dental Operatories	Operating Room	816	*2.200				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The HVAC System "Upgrd Heatg&Coolg ZONE1" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg ZONE2" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg ZONE3" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg Serv. Rm" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg ZONE5" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg ZONE6" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg ZONE7" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg Dental Z1" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg Dental Z2" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg Dental Z3" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The HVAC System "Upgrd Heatg&Coolg Dental Z4" incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,590	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
2	WallBG	186	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
3	Wall	303	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
4	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
5	Wall	80	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
6	Roof	1,503	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
7	Roof	5	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
8	Wall	44	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
9	Wall	136	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
10	Wall	44	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
11	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
12	Wall	66	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
13	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
14	Wall	122	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
15	WallBG	98	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
16	Wall	135	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
17	Roof	1,362	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
18	Roof	1	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
19	Wall	11	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
20	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep

*N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Left	(NW)	256	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
2	Window	Rear	(NE)	22	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
3	Skylight	Right	(SE)	48	1.980	116-A	0.83	116-B	135	Existing	Single Mtl Clr Skylight Default	Offices
4	Window	Rear	(NE)	16	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
5	Window	Right	(SE)	40	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default-Door	Offices
6	Window	Right	(SE)	120	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
7	Skylight	Right	(SE)	12	1.980	116-A	0.83	116-B	135	Existing	Single Mtl Clr Skylight Default	Offices
8	Window	Front	(SW)	20	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Offices
9	Window	Front	(SW)	38	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Offices
10	Window	Left	(NW)	80	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
11	Window	Right	(SE)	128	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
12	Skylight	Rear	(NE)	12	1.980	116-A	0.83	116-B	45	Existing	Single Mtl Clr Skylight Default	Meeting Room
13	Window	Rear	(NE)	23	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default-Door	Meeting Room

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76												
2	None	0.76												
3	None	1.00												
4	None	0.76												
5	None	0.76												
6	None	0.76												
7	None	1.00												
8	None	0.76												
9	None	0.76												
10	None	0.76												
11	None	0.76												
12	None	1.00												
13	None	0.76												

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Wall	146	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
22	Wall	35	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
23	WallBG	83	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
24	Wall	149	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
25	Door	20	0.500	Insul	R-0.0	315	90	Existing	28-A3	Offices
26	Wall	11	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
27	Wall	30	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
28	WallBG	78	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
29	Wall	106	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
30	Roof	124	0.032	R-30	R-0.0	225	0	Existing	01-A17	Elec. Data Rm
31	WallBG	33	0.129	None	R-9.8	0	90	Existing	13-F5	Elec. Data Rm - 24" deep
32	Wall	99	0.129	None	R-9.8	135	90	Existing	13-F5	Elec. Data Rm
33	Roof	192	0.032	R-30	R-0.0	225	0	Existing	01-A17	Meeting Room
34	Roof	337	0.032	R-30	R-0.0	225	14	Existing	01-A17	Meeting Room
35	Roof	347	0.297	None	R-0.0	45	14	Existing	02-A1	Meeting Room
36	Wall	3	0.069	R-21	R-0.0	225	90	Existing	09-A6	Meeting Room
37	Wall	1	0.069	R-21	R-0.0	315	90	Existing	09-A6	Meeting Room
38	Wall	3	0.069	R-21	R-0.0	45	90	Existing	09-A6	Meeting Room
39	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Meeting Room - 24" deep
40	Wall	125	0.129	None	R-9.8	45	90	Existing	13-F5	Meeting Room

*N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
14	Window	Rear	(NE)	74	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Meeting Room
15	Window	Front	(SW)	40	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Corridor
16	Window	Front	(SW)	32	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Corridor
17	Window	Left	(NW)	16	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
18	Window	Rear	(NE)	32	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Offices
19	Window	Right	(SE)	104	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
20	Skylight	Left	(NW)	10	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Medical Offices
21	Window	Left	(NW)	32	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Medical Offices
22	Window	Right	(SE)	16	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Medical Offices
23	Skylight	Left	(NW)	12	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Lobby
24	Window	Left	(NW)	42	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default-Door	Lobby
25	Skylight	Left	(NW)	10	1.980	116-A	0.83	116-B	315	Existing	Single Mtl Clr Skylight Default	Offices
26	Window	Front	(SW)	21	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default-Door	Offices

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
14	None	0.76												
15	None	0.76												
16	None	0.76												
17	None	0.76												
18	None	0.76												
19	None	0.76												
20	None	1.00												
21	None	0.76												
22	None	0.76												
23	None	1.00												
24	None	0.76												
25	None	1.00												
26	None	0.76												

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
41	Wall	1	0.069	R-21	R-0.0	135	90	Existing	09-A6	Meeting Room
42	Roof	327	0.032	R-30	R-0.0	225	0	Existing	01-A17	Corridor
43	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Corridor - 24" deep
44	Wall	150	0.129	None	R-9.8	225	90	Existing	13-F5	Corridor
45	Roof	1,103	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
46	WallBG	9	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
47	Wall	10	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
48	WallBG	70	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
49	Wall	158	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
50	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
51	WallBG	69	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
52	Wall	102	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
53	Roof	1,196	0.032	R-30	R-0.0	225	0	Existing	01-A17	Medical Offices
54	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Medical Offices
55	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Medical Offices
56	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Medical Offices
57	WallBG	71	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
58	Wall	181	0.129	None	R-9.8	315	90	Existing	13-F5	Medical Offices
59	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Medical Offices
60	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Medical Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
27	Window Front (SW)	43	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Offices
28	Window Left (NW)	128	0.790	116-A	0.70	116-B	315	Existing	Double Metal Clear Default	Offices
29	Window Right (SE)	112	0.790	116-A	0.70	116-B	135	Existing	Double Metal Clear Default	Offices
30	Window Front (SW)	32	0.790	116-A	0.70	116-B	225	Existing	Double Metal Clear Default	Dental Operatories
31	Window Rear (NE)	16	0.790	116-A	0.70	116-B	45	Existing	Double Metal Clear Default	Dental Operatories

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
27	None	0.76				
28	None	0.76				
29	None	0.76				
30	None	0.76				
31	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
61	WallBG	57	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
62	Wall	155	0.129	None	R-9.8	135	90	Existing	13-F5	Medical Offices
63	Roof	632	0.032	R-30	R-0.0	225	0	Existing	01-A17	Lobby
64	Roof	1	0.032	R-30	R-0.0	315	18	Existing	01-A17	Lobby
65	Wall	13	0.069	R-21	R-0.0	225	90	Existing	09-A6	Lobby
66	Wall	33	0.069	R-21	R-0.0	315	90	Existing	09-A6	Lobby
67	WallBG	4	0.129	None	R-9.8	0	90	Existing	13-F5	Lobby - 24" deep
68	Wall	81	0.129	None	R-9.8	315	90	Existing	13-F5	Lobby
69	Wall	13	0.069	R-21	R-0.0	45	90	Existing	09-A6	Lobby
70	Wall	38	0.069	R-21	R-0.0	135	90	Existing	09-A6	Lobby
71	Roof	1,537	0.032	R-30	R-0.0	225	0	Existing	01-A17	Offices
72	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Offices
73	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
74	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
75	Wall	140	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
76	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
77	WallBG	88	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
78	Wall	136	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
79	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
80	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
81	WallBG	75	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
82	Wall	113	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
83	Roof	816	0.032	R-30	R-0.0	225	0	Existing	01-A17	Dental Operatories
84	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
85	Wall	112	0.129	None	R-9.8	225	90	Existing	13-F5	Dental Operatories
86	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
87	Wall	128	0.129	None	R-9.8	45	90	Existing	13-F5	Dental Operatories
88	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
89	Wall	204	0.129	None	R-9.8	135	90	Existing	13-F5	Dental Operatories

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:19:12 Run Code: 1223565552

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 HVAC UPGRADE

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	1	40,000	40	Existing	0.92	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	2	31,400	0	Existing	0.98	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	1	31,400	0	Existing	0.98	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Upgraded Heat & Cool Units Zone 1	Split DX	1	69,000	0.0	92% AFUE	60,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heat & Cool Units Zone 2	Split DX	1	69,000	0.0	92% AFUE	54,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heat & Cool Units Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Unit-Server	Split DX	1	11,500	0.0	8.00 HSPF	18,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Zone 5	Split DX	1	62,800	0.0	92% AFUE	49,300	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Zone 6	Split DX	1	25,000	0.0	92% AFUE	20,100	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Zone 7	Split DX	1	62,800	0.0	92% AFUE	49,300	16.0 SEER / 8.6 EER	New	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Upgraded Heat & Cool Units Zone 1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heat & Cool Units Zone 2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heat & Cool Units Zone 3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heatg & Coolg Unit-Server	Constant Volume	Blow-Through	540	0.68	76.0%	100.0%	none			
Upgraded Heatg & Coolg Zone 5	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			
Upgraded Heatg & Coolg Zone 6	Constant Volume	Blow-Through	950	0.68	76.0%	100.0%	none			
Upgraded Heatg & Coolg Zone 7	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES		DATE: 10/9/2008
PROJECT ADDRESS: Happy Camp		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 11,092 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
☐	☐	☐	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
☐	☐	☐	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
☐	☐	☐	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: ENV-1			
PRINCIPAL ENVELOPE DESIGNER - NAME: Karuk Tribe Building Energy Assessment	SIGNATURE	LIC. NO.	DATE

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: LTG-1, LTG-2			
PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures			
Required Forms: MECH-1, MECH-2, MECH-3, MECH-5			
PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 ALL UPGRADES	10/9/2008

ANNUAL FOR ENERGY USE SUMMARY (kBtu/sq.ft.-yr)

Energy Consumption	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

Percent better than Standard: (excluding process)

This Portion of the Report
Is Not Applicable to this Analysis

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(SW) 225 deg	Conditioned Floor Area	11,092 sqft.
Number of Stories	1	Unconditioned Floor Area	0 sqft.
Number of Systems	11	Conditioned Footprint Area	11,092 sqft.
Number of Zones	11	Fuel Type	Propane

	Orientation	Gross Area	Glazing Area	Glazing Ratio
Front Elevation	(SW)	869 sqft.	226 sqft.	26.0%
Left Elevation	(NW)	1,695 sqft.	554 sqft.	32.7%
Rear Elevation	(NE)	875 sqft.	183 sqft.	20.9%
Right Elevation	(SE)	1,689 sqft.	520 sqft.	30.8%
Total		5,128 sqft.	1,483 sqft.	28.9%
Roof		11,179 sqft.	104 sqft.	0.9%

	Standard	Proposed
Lighting Power Density	1.289 W/sqft.	1.289 W/sqft.
Prescriptive Env. Heat Loss	2,481 Btu/h	1,292 Btu/h
Prescriptive Env. Heat Gain	211,614 Btu/h-F	154,193 Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 2 Blt~1997 ALL UPGRADES	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Upgrd Heatg&Coolg ZONE 1	Offices	Office	1,590	*1.200				
Upgrd Heatg&Coolg ZONE 2	Offices	Office	1,503	*1.200				
Upgrd Heatg&Coolg ZONE 3	Offices	Office	1,362	*1.200				
Upgrd Heatg&Coolg Serv. Rm	Elec. Data Rm	Office	124	*1.200				
Upgrd Heatg&Coolg ZONE 5	Meeting Room	Convention/Conference/Meeting	867	*1.400				
Upgrd Heatg&Coolg ZONE 6	Corridor	Corridor/Restroom/Support	327	*0.600				
Upgrd Heatg&Coolg ZONE 7	Offices	Office	1,103	*1.200				
Upgrd Heatg&Coolg Dental Z1	Medical Offices	Office	1,207	*1.200				
Upgrd Heatg&Coolg Dental Z2	Lobby	Lobby, Main Entry	645	*1.500				
Upgrd Heatg&Coolg Dental Z3	Offices	Office	1,548	*1.200				
Upgrd Heatg&Coolg Dental Z4	Dental Operatories	Operating Room	816	*2.200				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The HVAC System "Upgrd Heatg&Coolg ZONE 1" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg ZONE 2" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg ZONE 3" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg Serv. Rm" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg ZONE 5" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg ZONE 6" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg ZONE 7" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg Dental Z1" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg Dental Z2" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg Dental Z3" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgrd Heatg&Coolg Dental Z4" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES
DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,590	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
2	WallBG	186	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
3	Wall	303	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
4	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
5	Wall	60	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
6	Roof	1,503	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
7	Roof	5	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
8	Wall	44	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
9	Wall	136	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
10	Wall	44	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
11	WallBG	34	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
12	Wall	66	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
13	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
14	Wall	122	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
15	WallBG	98	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
16	Wall	135	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
17	Roof	1,362	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
18	Roof	1	0.297	None	R-0.0	135	16	Existing	02-A1	Offices
19	Wall	11	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
20	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction.

#	Type			Area	U-Fac.(1)		SHGC(2)		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Left	(NW)	256	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Offices
2	Window	Rear	(NE)	22	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Offices
3	Skylight	Right	(SE)	48	0.470	NFRC	0.34	NFRC	135	New	NFRC rated Skylight	Offices
4	Window	Rear	(NE)	16	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Offices
5	Window	Right	(SE)	40	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vnl LowE-Door	Offices
6	Window	Right	(SE)	120	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Offices
7	Skylight	Right	(SE)	12	0.470	NFRC	0.34	NFRC	135	New	NFRC rated Skylight	Offices
8	Window	Front	(SW)	20	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vnl LowE-Door	Offices
9	Window	Front	(SW)	38	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Offices
10	Window	Left	(NW)	80	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Offices
11	Window	Right	(SE)	128	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Offices
12	Skylight	Rear	(NE)	12	0.470	NFRC	0.34	NFRC	45	New	NFRC rated Skylight	Meeting Room
13	Window	Rear	(NE)	23	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vnl LowE-Door	Meeting Room

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
1	None	0.76				
2	None	0.76				
3	None	1.00				
4	None	0.76				
5	None	0.76				
6	None	0.76				
7	None	1.00				
8	None	0.76				
9	None	0.76				
10	None	0.76				
11	None	0.76				
12	None	1.00				
13	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

CERTIFICATE OF COMPLIANCE — ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES — DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Wall	146	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
22	Wall	35	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
23	WallBG	63	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
24	Wall	149	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
25	Door	20	0.500	Insul	R-0.0	315	90	Existing	28-A3	Offices
26	Wall	1	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
27	Wall	30	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices
28	WallBG	78	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
29	Wall	106	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
30	Roof	124	0.020	R-49	R-0.0	225	0	New	01-A19	Elec. Data Rm
31	WallBG	33	0.129	None	R-9.8	0	90	Existing	13-F5	Elec. Data Rm - 24" deep
32	Wall	99	0.129	None	R-9.8	135	90	Existing	13-F5	Elec. Data Rm
33	Roof	192	0.020	R-49	R-0.0	225	0	New	01-A19	Meeting Room
34	Roof	337	0.020	R-49	R-0.0	225	14	New	01-A19	Meeting Room
35	Roof	347	0.297	None	R-0.0	45	14	Existing	02-A1	Meeting Room
36	Wall	3	0.069	R-21	R-0.0	225	90	Existing	09-A6	Meeting Room
37	Wall	1	0.069	R-21	R-0.0	315	90	Existing	09-A6	Meeting Room
38	Wall	3	0.069	R-21	R-0.0	45	90	Existing	09-A6	Meeting Room
39	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Meeting Room - 24" deep
40	Wall	125	0.129	None	R-9.8	45	90	Existing	13-F5	Meeting Room

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
14	Window	Rear	(NE)	74	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Meeting Room
15	Window	Front	(SW)	40	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vnl LowE-Door	Corridor
16	Window	Front	(SW)	32	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Corridor
17	Window	Left	(NW)	16	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Offices
18	Window	Rear	(NE)	32	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Offices
19	Window	Right	(SE)	104	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Offices
20	Skylight	Left	(NW)	10	0.470	NFRC	0.34	NFRC	315	New	NFRC rated Skylight	Medical Offices
21	Window	Left	(NW)	32	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Medical Offices
22	Window	Right	(SE)	16	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Medical Offices
23	Skylight	Left	(NW)	12	0.470	NFRC	0.34	NFRC	315	New	NFRC rated Skylight	Lobby
24	Window	Left	(NW)	42	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vnl LowE-Door	Lobby
25	Skylight	Left	(NW)	10	0.470	NFRC	0.34	NFRC	315	New	NFRC rated Skylight	Offices
26	Window	Front	(SW)	21	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vnl LowE-Door	Offices

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
14	None	0.76												
15	None	0.76												
16	None	0.76												
17	None	0.76												
18	None	0.76												
19	None	0.76												
20	None	1.00												
21	None	0.76												
22	None	0.76												
23	None	1.00												
24	None	0.76												
25	None	1.00												
26	None	0.76												

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
41	Wall	1	0.069	R-21	R-0.0	135	90	Existing	09-A6	Meeting Room
42	Roof	327	0.020	R-49	R-0.0	225	0	New	01-A19	Corridor
43	WallBG	74	0.129	None	R-9.8	0	90	Existing	13-F5	Corridor - 24" deep
44	Wall	150	0.129	None	R-9.8	225	90	Existing	13-F5	Corridor
45	Roof	1,103	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
46	WallBG	9	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
47	Wall	10	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
48	WallBG	70	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
49	Wall	158	0.129	None	R-9.8	45	90	Existing	13-F5	Offices
50	Door	20	0.500	Insul	R-0.0	45	90	Existing	28-A3	Offices
51	WallBG	69	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
52	Wall	102	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
53	Roof	1,196	0.020	R-49	R-0.0	225	0	New	01-A19	Medical Offices
54	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Medical Offices
55	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Medical Offices
56	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Medical Offices
57	WallBG	7	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
58	Wall	181	0.129	None	R-9.8	315	90	Existing	13-F5	Medical Offices
59	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Medical Offices
60	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Medical Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction.

#	Type	Area	U-Fac.(1)		SHGC(2)		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
27	Window Front (SW)	43	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Offices
28	Window Left (NW)	128	0.340	NFRC	0.35	NFRC	315	New	NFRC rated Dbl/Vinyl w/LowE	Offices
29	Window Right (SE)	112	0.340	NFRC	0.35	NFRC	135	New	NFRC rated Dbl/Vinyl w/LowE	Offices
30	Window Front (SW)	32	0.340	NFRC	0.35	NFRC	225	New	NFRC rated Dbl/Vinyl w/LowE	Dental Operatories
31	Window Rear (NE)	16	0.340	NFRC	0.35	NFRC	45	New	NFRC rated Dbl/Vinyl w/LowE	Dental Operatories

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.
27	None	0.76				
28	None	0.76				
29	None	0.76				
30	None	0.76				
31	None	0.76				

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
61	WallBG	57	0.129	None	R-9.8	0	90	Existing	13-F5	Medical Offices - 24" deep
62	Wall	155	0.129	None	R-9.8	135	90	Existing	13-F5	Medical Offices
63	Roof	632	0.020	R-49	R-0.0	225	0	New	01-A19	Lobby
64	Roof	1	0.032	R-30	R-0.0	315	18	Existing	01-A17	Lobby
65	Wall	13	0.069	R-21	R-0.0	225	90	Existing	09-A6	Lobby
66	Wall	33	0.069	R-21	R-0.0	315	90	Existing	09-A6	Lobby
67	WallBG	4	0.129	None	R-9.8	0	90	Existing	13-F5	Lobby - 24" deep
68	Wall	81	0.129	None	R-9.8	315	90	Existing	13-F5	Lobby
69	Wall	13	0.069	R-21	R-0.0	45	90	Existing	09-A6	Lobby
70	Wall	38	0.069	R-21	R-0.0	135	90	Existing	09-A6	Lobby
71	Roof	1,537	0.020	R-49	R-0.0	225	0	New	01-A19	Offices
72	Roof	1	0.297	None	R-0.0	315	18	Existing	02-A1	Offices
73	Wall	12	0.069	R-21	R-0.0	225	90	Existing	09-A6	Offices
74	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
75	Wall	140	0.129	None	R-9.8	225	90	Existing	13-F5	Offices
76	Wall	28	0.069	R-21	R-0.0	315	90	Existing	09-A6	Offices
77	WallBG	88	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
78	Wall	136	0.129	None	R-9.8	315	90	Existing	13-F5	Offices
79	Wall	12	0.069	R-21	R-0.0	45	90	Existing	09-A6	Offices
80	Wall	32	0.069	R-21	R-0.0	135	90	Existing	09-A6	Offices

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

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#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

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CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
81	WallBG	75	0.129	None	R-9.8	0	90	Existing	13-F5	Offices - 24" deep
82	Wall	113	0.129	None	R-9.8	135	90	Existing	13-F5	Offices
83	Roof	816	0.020	R-49	R-0.0	225	0	New	01-A19	Dental Operatories
84	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
85	Wall	112	0.129	None	R-9.8	225	90	Existing	13-F5	Dental Operatories
86	WallBG	48	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
87	Wall	128	0.129	None	R-9.8	45	90	Existing	13-F5	Dental Operatories
88	WallBG	68	0.129	None	R-9.8	0	90	Existing	13-F5	Dental Operatories - 24" deep
89	Wall	204	0.129	None	R-9.8	135	90	Existing	13-F5	Dental Operatories

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

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#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table NI-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	1	40,000	40	Existing	0.92	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	2	31,400	0	Existing	0.98	n/a	n/a
Existing Elec Tankless DHW	Instant Elec	No Pipe Insulation	1	31,400	0	Existing	0.98	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Upgraded Heat & Cool Units Zone 1	Split DX	1	69,000	0.0	92% AFUE	60,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heat & Cool Units Zone 2	Split DX	1	69,000	0.0	92% AFUE	54,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heat & Cool Units Zone 3	Split DX	1	69,000	0.0	92% AFUE	48,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Unit-Server	Split DX	1	11,500	0.0	8.00 HSPF	18,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Zone 5	Split DX	1	62,800	0.0	92% AFUE	49,300	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Zone 6	Split DX	1	25,000	0.0	92% AFUE	20,100	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg & Coolg Zone 7	Split DX	1	62,800	0.0	92% AFUE	49,300	16.0 SEER / 8.6 EER	New	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Upgraded Heat & Cool Units Zone 1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heat & Cool Units Zone 2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heat & Cool Units Zone 3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heatg & Coolg Unit-Server	Constant Volume	Blow-Through	540	0.68	76.0%	100.0%	none			
Upgraded Heatg & Coolg Zone 5	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			
Upgraded Heatg & Coolg Zone 6	Constant Volume	Blow-Through	950	0.68	76.0%	100.0%	none			
Upgraded Heatg & Coolg Zone 7	Constant Volume	Blow-Through	2,000	0.68	76.0%	100.0%	none			

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 2 Blt~1997 ALL UPGRADES

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
Existing Elec Storage DHW	Small Elec.	No Pipe Insulation	2	40,000	40	Existing	0.92	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Upgraded Heatg&Coolg-Dental Zone1	Split DX	1	69,000	0.0	92% AFUE	48,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg&Coolg-Dental Zone2	Split DX	1	69,000	0.0	92% AFUE	36,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg&Coolg-Dental Zone3	Split DX	1	69,000	0.0	92% AFUE	48,000	16.0 SEER / 8.6 EER	New	No Economizer
Upgraded Heatg&Coolg-Dental Zone4	Split DX	1	69,000	0.0	92% AFUE	36,000	16.0 SEER / 8.6 EER	New	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Upgraded Heatg&Coolg-Dental Zone1	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heatg&Coolg-Dental Zone2	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heatg&Coolg-Dental Zone3	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			
Upgraded Heatg&Coolg-Dental Zone4	Constant Volume	Blow-Through	1,885	0.75	77.0%	100.0%	none			

Run Initiation Time: 10/09/08 08:56:35 Run Code: 1223567795

TITLE 24 REPORT

Title 24 Report for:

Structure 3 Built~1994
230 Axak Rd.
Orleans, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-3

Date:

10/1/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 3 Built~1994 EXISTING
Project Title

10/1/2008
Date

230 Axak Rd Orleans
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (E) 90 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.79
Ratio: 18.5% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 976 ft²
Existing Floor Area: 976 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 976 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Combined Hydronic/FAU	976	7,808	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	976	0.026	R-38	R-0.0	90	0	X		Existing	01-A8	1st Flr
Wall	Wood	200	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	224	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	259	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Wall	Wood	210	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	10	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr

Run Initiation Time: 10/01/08 14:34:51 Run Code: 1222896891

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 3 Built~1994 EXISTING — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(E)	84.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr
2	Window	Left	(S)	24.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Rear	(W)	45.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Right	(N)	28.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	141	None	No Insulation	26-A1	Existing	1st Flr

Run Initiation Time: 10/01/08 14:34:51 Run Code: 1222896891

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 3 Built~1994 EXISTING — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Combined Hydronic/FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Combined Hydronic/FAU	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping

System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Existing Propane 50 Gallon DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane 50 Gallon DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.52	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 3 Built~1994 WINDOW UPGRADE
Project Title

10/1/2008
Date

230 Axak Rd Orleans
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (E) 90 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.34
Ratio: 18.5% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 976 ft²
Existing Floor Area: 976 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 976 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Combined Hydronic/FAU	976	7,808	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	976	0.026	R-38	R-0.0	90	0	X		Existing	01-A8	1st Flr
Wall	Wood	200	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	224	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	259	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Wall	Wood	210	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	10	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr

Run Initiation Time: 10/01/08 14:38:03 Run Code: 1222897083

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 3 Built~1994 WINDOW UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (F)	84.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (S)	24.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (W)	45.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Right (N)	28.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	141	None	No Insulation	26-A1	Existing	1st Flr

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 3 Built~1994 WINDOW UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Combined Hydronic/FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Combined Hydronic/FAU	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Existing Propane 50 Gallon DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane 50 Gallon DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.52	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 3 Built~1994 ATTIC INSUL UPGRADE
Project Title

10/1/2008
Date

230 Axak Rd Orleans
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (E) 90 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.79
Ratio: 18.5% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 976 ft²
Existing Floor Area: 976 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 976 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Combined Hydronic/FAU	976	7,808	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	976	0.020	R-49	R-0.0	90	0	X		Altered	01-A9 (E=01-A8)	1st Flr
Wall	Wood	200	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	224	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	259	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Wall	Wood	210	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	10	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr

Run Initiation Time: 10/01/08 14:36:19 Run Code: 1222896979

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 3 Built~1994 ATTIC INSUL. UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(E)	84.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr
2	Window	Left	(S)	24.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Rear	(W)	45.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Right	(N)	28.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	141	None	No Insulation	26-A1	Existing	1st Flr

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 3 Built~1994 ATTIC INSUL. UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Combined Hydronic/FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Combined Hydronic/FAU	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Existing Propane 50 Gallon DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane 50 Gallon DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.52	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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Name:
Title/Firm: Karuk Tribe Building Energy Assessment
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Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 3 Built~1994 HVAC UPGRADE — Project Title
10/1/2008 — Date
230 Axak Rd Orleans — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author — (707) 826-1433 Telephone
Plan Check/Date
EnergyPro — Compliance Method — CA Climate Zone 02 Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (E) 90 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.79
Ratio: 18.5% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 976 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 976 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Combined Hydr. FAU Upgrade	976	7,808	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	976	0.026	R-38	R-0.0	90	0	X		Existing	01-A8	1st Flr
Wall	Wood	200	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	224	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	259	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Wall	Wood	210	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	10	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr

Run Initiation Time: 10/01/08 14:33:10 Run Code: 1222896790

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 3 Built~1994 HVAC UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(E)	84.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr
2	Window	Left	(S)	24.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Rear	(W)	45.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Right	(N)	28.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	141	None	No Insulation	26-A1	Existing	1st Flr

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 3 Built~1994 HVAC UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Combined Hydr. FAU Upgrade	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Combined Hydr. FAU Upgrade	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
New Propane 50 Gallon DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane 50 Gallon DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Run Initiation Time: 10/01/08 14:33:10 Run Code: 1222896790

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 3 Built~1994 ALL UPGRADES — Project Title
10/22/2008 — Date
230 Axak Rd Orleans — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 02 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Multi Family [ ] Addition [ ] Existing + Add/Alt

Building Front Orientation: (E) 90 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft²
Ratio: 18.5%
Avg. U: 0.34
Avg. SHGC: 0.35

Total Conditioned Floor Area: 976 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 976 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Electric Hydronic FAU	976	7,808	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	976	0.020	R-49	R-0.0	90	0	X		Existing	01-A9	1st Flr
Wall	Wood	200	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	224	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	259	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Wall	Wood	210	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	10	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr

Run Initiation Time: 10/22/08 11:52:53 Run Code: 1224701573

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 3 Built~1994 ALL UPGRADES — Project Title

10/22/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(E)	84.0	0.340 NFRC	0.35 NFRC	90	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
2	Window	Left	(S)	24.0	0.340 NFRC	0.35 NFRC	180	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
3	Window	Rear	(W)	45.0	0.340 NFRC	0.35 NFRC	270	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
4	Window	Right	(N)	28.0	0.340 NFRC	0.35 NFRC	0	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	141	None	No Insulation	26-A1	Existing	1st Flr

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 3 Built~1994 ALL UPGRADES — Project Title

10/22/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Electric Hydronic FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Electric Hydronic FAU	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping

System Name	Pipe Length	Pipe Diameter	Insul. Thick.
New Propane 50 Gallon DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane 50 Gallon DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 4 Built~1992
610 Jacobs Way
Happy Camp, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-4

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 4 Built~1992 EXISTING
Project Title

9/26/2008
Date

610 Jacobs Way Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (W) 270 deg
Fuel Type: Propane
Fenestration:
Area: 252 ft² **Avg. U:** 0.79
Ratio: 15.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,610 ft²
Existing Floor Area: 1,610 ft²
Raised Floor Area: 1,610 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Elect Bsbrd Default	1,610	13,497	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	309	0.026	R-38	R-0.0	270	0	X		Existing	01-A8	1st Flr Living Areas
Roof	Wood	306	0.026	R-38	R-0.0	270	12	X		Existing	01-A8	1st Flr Living Areas
Roof	Wood	149	0.026	R-38	R-0.0	90	12	X		Existing	01-A8	1st Flr Living Areas
Wall	Wood	166	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	270	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	81	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	186	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	215	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	771	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	839	0.026	R-38	R-0.0	270	0	X		Existing	01-A8	1st Flr Bedrooms
Wall	Wood	190	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	224	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	219	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	72	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	839	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Run Initiation Time: 09/26/08 15:00:58 Run Code: 1222466458

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 4 Built~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(E)	16.0	0.840	116-A	0.67	116-B	90	12	Existing	Dbl Acrylic Non-Mtl Clr Default SI	1st Flr Living Areas
2	Window	Front	(W)	66.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window	Rear	(E)	27.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window	Right	(S)	18.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Flr Living Areas
5	Window	Front	(W)	53.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr Bedrooms
6	Window	Rear	(E)	72.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												
6	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 4 Built~1992 EXISTING — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Elect Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Elect Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric 50 Gallon DHW	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

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Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
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Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 4 Built~1992 - WINDOW UPGRADE — Project Title
9/26/2008 — Date
610 Jacobs Way Happy Camp — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [X] Single Family [ ] Addition [ ] Multi Family [X] Existing + Add/Alt

Building Front Orientation: (W) 270 deg
Fuel Type: Propane
Fenestration:
Area: 252 ft² **Avg. U:** 0.35
Ratio: 15.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,610 ft²
Existing Floor Area: 1,610 ft²
Raised Floor Area: 1,610 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Elect Bsbrd Default	1,610	13,497	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	309	0.026	R-38	R-0.0	270	0	X		Existing	01-A8	1st Flr Living Areas
Roof	Wood	306	0.026	R-38	R-0.0	270	12	X		Existing	01-A8	1st Flr Living Areas
Roof	Wood	149	0.026	R-38	R-0.0	90	12	X		Existing	01-A8	1st Flr Living Areas
Wall	Wood	166	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	270	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	81	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	186	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	215	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	771	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	839	0.026	R-38	R-0.0	270	0	X		Existing	01-A8	1st Flr Bedrooms
Wall	Wood	190	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	224	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	219	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	72	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	839	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 4 Built~1992 - WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight Rear (E)	16.0	0.470 NFRC	0.34 NFRC	90	12	Altered	NFRC rated Skylights	1st Flr Living Areas
2	Existing		0.840 116-A	0.67 116-B				Dbl Acrylic Non-Mtl Clr Default SL	pre-altered for above
3	Window Front (W)	66.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
4	Existing		0.790 116-A	0.70 116-B				Dbl Metal Clear Default	pre-altered for above
5	Window Rear (E)	27.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
6	Existing		0.790 116-A	0.70 116-B				Dbl Metal Clear Default	pre-altered for above
7	Window Right (S)	18.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
8	Existing		0.790 116-A	0.70 116-B				Dbl Metal Clear Default	pre-altered for above
9	Window Front (W)	53.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
10	Existing		0.790 116-A	0.70 116-B				Dbl Metal Clear Default	pre-altered for above
11	Window Rear (E)	72.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
12	Existing		0.790 116-A	0.70 116-B				Dbl Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												
9	Bug Screen	0.76												
11	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 4 Built~1992 - WINDOW UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Elect.Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Elect.Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric 50 Gallon DHW	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 4 Built~1992 - ATTIC INSUL, UPGRADE
Project Title

9/26/2008
Date

610 Jacobs Way Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (W) 270 deg
Fuel Type: Propane
Fenestration:
Area: 252 ft² **Avg. U:** 0.79
Ratio: 15.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,610 ft²
Existing Floor Area: 1,610 ft²
Raised Floor Area: 1,610 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Elect Bsbrd Default	1,610	13,497	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	309	0.020	R-49	R-0.0	270	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Roof	Wood	306	0.020	R-49	R-0.0	270	12	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Roof	Wood	149	0.020	R-49	R-0.0	90	12	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	166	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	270	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	81	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	186	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	215	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	771	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	839	0.020	R-49	R-0.0	270	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	190	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	224	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	219	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	72	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	839	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Run Initiation Time: 09/26/08 15:03:04 Run Code: 1222466584

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 4 Built~1992 - ATTIC INSUL, UPGRADE — 9/26/2008
Project Title — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(E)	16.0	0.840	116-A	0.67	116-B	90	12	Existing	Dbl Acrylic Non-Mtl Clr Default SL	1st Flr Living Areas
2	Window	Front	(W)	66.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window	Rear	(E)	27.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window	Right	(S)	18.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Flr Living Areas
5	Window	Front	(W)	53.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr Bedrooms
6	Window	Rear	(E)	72.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												
6	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 4 Built~1992 - ATTIC INSUL. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Elect.Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Elect.Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric 50 Gallon DHW	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 4 Built~ '92 ATTIC&FLOOR INS UPGRADE — Project Title
9/26/2008 — Date
610 Jacobs Way Happy Camp — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Multi Family [ ] Addition [x] Existing + Add/Alt

Building Front Orientation: (W) 270 deg
Fuel Type: Propane
Fenestration:
Area: 252 ft²
Ratio: 15.7%
Avg. U: 0.79
Avg. SHGC: 0.70

Total Conditioned Floor Area: 1,610 ft²
Existing Floor Area: 1,610 ft²
Raised Floor Area: 1,610 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Elect Bsbrd Default	1,610	13,497	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	309	0.020	R-49	R-0.0	270	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Roof	Wood	306	0.020	R-49	R-0.0	270	12	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Roof	Wood	149	0.020	R-49	R-0.0	90	12	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	166	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	270	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	81	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	186	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	215	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	771	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Living Areas
Roof	Wood	839	0.020	R-49	R-0.0	270	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	190	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	224	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	219	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	72	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	839	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Bedrooms

Run Initiation Time: 09/26/08 15:03:56 Run Code: 1222466636

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 4 Built~ '92 ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(E)	16.0	0.840	116-A	0.67	116-B	90	12	Existing	Dbl Acrylic Non-Mtl Clr Default SI	1st Flr Living Areas
2	Window	Front	(W)	66.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window	Rear	(E)	27.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window	Right	(S)	18.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Flr Living Areas
5	Window	Front	(W)	53.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Flr Bedrooms
6	Window	Rear	(E)	72.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												
6	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 4 Built~ '92 ATTIC&FLOOR INS. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Elect.Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Elect.Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric 50 Gallon DHW	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

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(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 4 Built~ 1992 All UPGRADE
Project Title

10/9/2008
Date

610 Jacobs Way Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (W) 270 deg
Fuel Type: Propane
Fenestration:
Area: 252 ft² **Avg. U:** 0.35
Ratio: 15.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,610 ft²
Existing Floor Area: 1,610 ft²
Raised Floor Area: 1,610 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Elect Bsbrd Default	1,610	13,497	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	309	0.020	R-49	R-0.0	270	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Roof	Wood	306	0.020	R-49	R-0.0	270	12	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Roof	Wood	149	0.020	R-49	R-0.0	90	12	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	166	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	270	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	81	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	186	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	215	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	771	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Living Areas
Roof	Wood	839	0.020	R-49	R-0.0	270	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	190	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	224	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	219	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	72	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	839	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Bedrooms

Run Initiation Time: 10/09/08 15:36:20 Run Code: 1223591780

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 4 Built~ 1992 All UPGRADE — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight Rear (E)	16.0	0.470 NFRC	0.34 NFRC	90	12	Altered	NFRC rated Skylights	1st Flr Living Areas
2	Existing		0.840 116-A	0.67 116-B				Dbl Acrylic Non-Mtl Clr Default SL	pre-altered for above
3	Window Front (W)	66.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (E)	27.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Right (S)	18.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
9	Window Front (W)	53.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
10	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
11	Window Rear (E)	72.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
12	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												
9	Bug Screen	0.76												
11	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 4 Built~ 1992 All UPGRADE — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Elect.Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Elect.Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric 50 Gallon DHW	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 5 Built~1997
63538 Itroop
Happy Camp, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-5

Date:

10/1/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 EXISTING
Project Title

10/1/2008
Date

63538 Itroop Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft²
Ratio: 14.6%
Avg. U: 0.79
Avg. SHGC: 0.70

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: 1,280 ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing FAU w/Default Cool	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.026	R-38	R-0.0	113	0	X		Existing	01-A8	1st Flr
Roof	Wood	306	0.026	R-38	R-0.0	113	12	X		Existing	01-A8	1st Flr
Roof	Wood	139	0.026	R-38	R-0.0	293	12	X		Existing	01-A8	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/01/08 15:00:53 Run Code: 1222898453

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 EXISTING — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(NW)	16.0	0.840	116-A	0.67	116-B	293	12	Existing	Dbl Acrylic Non-Mtl Clear Default	1st Flr
2	Window	Front	(SE)	71.0	0.790	116-A	0.70	116-B	113	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Left	(SW)	14.0	0.790	116-A	0.70	116-B	203	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Rear	(NW)	54.0	0.790	116-A	0.70	116-B	293	90	Existing	Double Metal Clear Default	1st Flr
5	Window	Right	(NE)	32.0	0.790	116-A	0.70	116-B	23	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 EXISTING — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing FAU w/Default Cool	Central Furnace	83% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing FAU w/Default Cool	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 WINDOW UPGRADE
Project Title

10/1/2008
Date

63538 Itroop Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft² **Avg. U:** 0.35
Ratio: 14.6% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: 1,280 ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing FAU w/Default Cool	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.026	R-38	R-0.0	113	0	X		Existing	01-A8	1st Flr
Roof	Wood	306	0.026	R-38	R-0.0	113	12	X		Existing	01-A8	1st Flr
Roof	Wood	139	0.026	R-38	R-0.0	293	12	X		Existing	01-A8	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/01/08 15:06:41 Run Code: 1222898801

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 WINDOW UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight Rear (NW)	16.0	0.470 NFRC	0.34 NFRC	293	12	Altered	NFRC rated Skylight	1st Flr
2	Existing		0.840 116-A	0.67 116-B				Dbl Acrylic Non-Mtl Clear Default	pre-altered for above
3	Window Front (SE)	71.0	0.340 NFRC	0.35 NFRC	113	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Left (SW)	14.0	0.340 NFRC	0.35 NFRC	203	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Rear (NW)	54.0	0.340 NFRC	0.35 NFRC	293	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
9	Window Right (NE)	32.0	0.340 NFRC	0.35 NFRC	23	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
10	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												
9	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 WINDOW UPGRADE — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing FAU w/Default Cool	Central Furnace	83% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing FAU w/Default Cool	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 10/01/08 15:06:41 Run Code: 1222898801

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 ATTIC INSUL UPGRADE
Project Title

10/1/2008
Date

63538 Itroop Happy Camp
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft² **Avg. U:** 0.79
Ratio: 14.6% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: 1,280 ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing FAU w/Default Cool	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.020	R-49	R-0.0	113	0	X		Altered	01-A9 (E=01-A8)	1st Flr
Roof	Wood	306	0.020	R-49	R-0.0	113	12	X		Altered	01-A9 (E=01-A8)	1st Flr
Roof	Wood	139	0.020	R-49	R-0.0	293	12	X		Altered	01-A9 (E=01-A8)	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/01/08 15:12:53 Run Code: 1222899173

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 ATTIC INSUL. UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(NW)	16.0	0.840	116-A	0.67	116-B	293	12	Existing	Dbl Acrylic Non-Mtl Clear Default	1st Flr
2	Window	Front	(SE)	71.0	0.790	116-A	0.70	116-B	113	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Left	(SW)	14.0	0.790	116-A	0.70	116-B	203	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Rear	(NW)	54.0	0.790	116-A	0.70	116-B	293	90	Existing	Double Metal Clear Default	1st Flr
5	Window	Right	(NE)	32.0	0.790	116-A	0.70	116-B	23	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 ATTIC INSUL. UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing FAU w/Default Cool	Central Furnace	83% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing FAU w/Default Cool	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Run Initiation Time: 10/01/08 15:12:53 Run Code: 1222899173

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 ATTIC&FLOOR INS UPGRADE — Project Title
10/1/2008 — Date
63538 Itroop Happy Camp — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author — (707) 826-1433 Telephone
Plan Check/Date
EnergyPro — Compliance Method — CA Climate Zone 16 Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft²
Ratio: 14.6%
Avg. U: 0.79
Avg. SHGC: 0.70

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: 1,280 ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing FAU w/ Default Cool	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.020	R-49	R-0.0	113	0	X		Altered	01-A9 (F=01-A8)	1st Flr
Roof	Wood	306	0.020	R-49	R-0.0	113	12	X		Altered	01-A9 (F=01-A8)	1st Flr
Roof	Wood	139	0.020	R-49	R-0.0	293	12	X		Altered	01-A9 (F=01-A8)	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (F=20-A4)	1st Flr

Run Initiation Time: 10/01/08 15:14:49 Run Code: 1222899289

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 ATTIC&FLOOR INS UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(NW)	16.0	0.840	116-A	0.67	116-B	293	12	Existing	Dbl Acrylic Non-Mtl Clear Default	1st Flr
2	Window	Front	(SE)	71.0	0.790	116-A	0.70	116-B	113	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Left	(SW)	14.0	0.790	116-A	0.70	116-B	203	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Rear	(NW)	54.0	0.790	116-A	0.70	116-B	293	90	Existing	Double Metal Clear Default	1st Flr
5	Window	Right	(NE)	32.0	0.790	116-A	0.70	116-B	23	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 ATTIC&FLOOR INS UPGRADE — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing FAU w/ Default Cool	Central Furnace	83% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing FAU w/ Default Cool	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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Telephone: Lic. #:

(signature) (date)

Documentation Author

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Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 HVAC UPGRADE
Project Title

10/1/2008
Date

63538 Itroop Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft² **Avg. U:** 0.79
Ratio: 14.6% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New FAU & AC	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.026	R-38	R-0.0	113	0	X		Existing	01-A8	1st Flr
Roof	Wood	306	0.026	R-38	R-0.0	113	12	X		Existing	01-A8	1st Flr
Roof	Wood	139	0.026	R-38	R-0.0	293	12	X		Existing	01-A8	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/01/08 15:20:14 Run Code: 1222899614

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 HVAC UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(NW)	16.0	0.840	116-A	0.67	116-B	293	12	Existing	Dbl Acrylic Non-Mtl Clear Default	1st Flr
2	Window	Front	(SE)	71.0	0.790	116-A	0.70	116-B	113	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Left	(SW)	14.0	0.790	116-A	0.70	116-B	203	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Rear	(NW)	54.0	0.790	116-A	0.70	116-B	293	90	Existing	Double Metal Clear Default	1st Flr
5	Window	Right	(NE)	32.0	0.790	116-A	0.70	116-B	23	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 HVAC UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New FAU & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New FAU & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 DHW UPGRADES
Project Title

10/1/2008
Date

63538 Itroop Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft² **Avg. U:** 0.79
Ratio: 14.6% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing FAU w/Default Cool	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.026	R-38	R-0.0	113	0	X		Existing	01-A8	1st Flr
Roof	Wood	306	0.026	R-38	R-0.0	113	12	X		Existing	01-A8	1st Flr
Roof	Wood	139	0.026	R-38	R-0.0	293	12	X		Existing	01-A8	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/01/08 15:22:18 Run Code: 1222899738

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 DHW UPGRADES — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(NW)	16.0	0.840	116-A	0.67	116-B	293	12	Existing	Dbl Acrylic Non-Mtl Clear Default	1st Flr
2	Window	Front	(SE)	71.0	0.790	116-A	0.70	116-B	113	90	Existing	Double Metal Clear Default	1st Flr
3	Window	Left	(SW)	14.0	0.790	116-A	0.70	116-B	203	90	Existing	Double Metal Clear Default	1st Flr
4	Window	Rear	(NW)	54.0	0.790	116-A	0.70	116-B	293	90	Existing	Double Metal Clear Default	1st Flr
5	Window	Right	(NE)	32.0	0.790	116-A	0.70	116-B	23	90	Existing	Double Metal Clear Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 DHW UPGRADES — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing FAU w/Default Cool	Central Furnace	83% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing FAU w/Default Cool	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane Water Heater	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 5 Built~1997 ALL UPGRADES
Project Title

10/9/2008
Date

63538 Itroop Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (SE) 113 deg
Fuel Type: Propane
Fenestration:
Area: 187 ft² **Avg. U:** 0.35
Ratio: 14.6% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,280 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,280 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New FAU & AC	1,280	10,880	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	828	0.020	R-49	R-0.0	113	0	X		Existing	01-A9	1st Flr
Roof	Wood	306	0.020	R-49	R-0.0	113	12	X		Existing	01-A9	1st Flr
Roof	Wood	139	0.020	R-49	R-0.0	293	12	X		Existing	01-A9	1st Flr
Wall	Wood	309	0.074	R-19	R-0.0	113	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	113	90	X		Existing	28-A4	1st Flr
Wall	Wood	291	0.074	R-19	R-0.0	203	90	X		Existing	09-A5	1st Flr
Wall	Wood	357	0.074	R-19	R-0.0	293	90	X		Existing	09-A5	1st Flr
Door	None	20	0.500	None	R-0.0	293	90	X		Existing	28-A4	1st Flr
Wall	Wood	273	0.074	R-19	R-0.0	23	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,280	0.034	R-22	R-0.0	0	180		X	Existing	20-A5	1st Flr

Run Initiation Time: 10/09/08 15:40:54 Run Code: 1223592054

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 5 Built~1997 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Skylight	Rear	(NW)	16.0	0.470	NFRC	0.34	NFRC	293	12	Existing	NFRC rated Skylight	1st Flr
2	Window	Front	(SE)	71.0	0.340	NFRC	0.35	NFRC	113	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
3	Window	Left	(SW)	14.0	0.340	NFRC	0.35	NFRC	203	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
4	Window	Rear	(NW)	54.0	0.340	NFRC	0.35	NFRC	293	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
5	Window	Right	(NE)	32.0	0.340	NFRC	0.35	NFRC	23	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	1.00												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 5 Built~1997 ALL UPGRADES — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New FAU & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New FAU & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane Water Heater	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Hot Water Pump Control	#	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 6 built~2001
1529 Apsuun Way
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-6

Date:

10/1/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 6 built~2001 EXISTING
Project Title

10/1/2008
Date

1529 Apsuun Way Yreka
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00

Percent better than Standard: 0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: ☒ Single Family ☐ Addition
☐ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 202 ft² **Avg. U:** 0.58
Ratio: 15.5% **Avg. SHGC:** 0.65

Total Conditioned Floor Area: 1,303 ft²
Existing Floor Area: 1,303 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,303 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,303	11,076	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	695	0.026	R-38	R-0.0	45	0	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	135	14	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	315	14	X		Existing	01-A8	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	280	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 15:29:26 Run Code: 1222900166

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 6 built~2001 EXISTING — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(NE)	24.0	0.580	116-A	0.65	116-B	45	90	Existing	Double Non-Metal Clear Default	1st Floor
2	Window	Left	(SE)	36.0	0.580	116-A	0.65	116-B	135	90	Existing	Double Non-Metal Clear Default	1st Floor
3	Window	Rear	(SW)	75.0	0.580	116-A	0.65	116-B	225	90	Existing	Double Non-Metal Clear Default	1st Floor
4	Window	Right	(NW)	67.0	0.580	116-A	0.65	116-B	315	90	Existing	Double Non-Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 6 built~2001 EXISTING — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
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Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 6 built~2001 WINDOW UPGRADE
Project Title

10/1/2008
Date

1529 Apsuun Way Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 202 ft² **Avg. U:** 0.34
Ratio: 15.5% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,303 ft²
Existing Floor Area: 1,303 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,303 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,303	11,076	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	895	0.026	R-38	R-0.0	45	0	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	135	14	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	315	14	X		Existing	01-A8	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	280	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 15:32:04 Run Code: 1222900324

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 6 built~2001 WINDOW UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.340 NFRC	0.35 NFRC	45	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.560 116-A	0.65 116-B				Double Non-Metal Clear Default	pre-altered for above
3	Window Left (SE)	36.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Existing		0.560 116-A	0.65 116-B				Double Non-Metal Clear Default	pre-altered for above
5	Window Rear (SW)	75.0	0.340 NFRC	0.35 NFRC	225	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
6	Existing		0.560 116-A	0.65 116-B				Double Non-Metal Clear Default	pre-altered for above
7	Window Right (NW)	67.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
8	Existing		0.560 116-A	0.65 116-B				Double Non-Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 6 built~2001 WINDOW UPGRADE — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 6 built~2001 ATTIC INSUL UPGRADE
Project Title

10/1/2008
Date

1529 Apsuun Way Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 202 ft² **Avg. U:** 0.58
Ratio: 15.5% **Avg. SHGC:** 0.65

Total Conditioned Floor Area: 1,303 ft²
Existing Floor Area: 1,303 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,303 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,303	11,076	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	895	0.020	R-49	R-0.0	45	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	135	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	315	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	280	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 15:35:13 Run Code: 1222900513

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 6 built~2001 ATTIC INSUL. UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.580 116-A	0.65 116-B	45	90	Existing	Double Non-Metal Clear Default	1st Floor
2	Window Left (SE)	36.0	0.580 116-A	0.65 116-B	135	90	Existing	Double Non-Metal Clear Default	1st Floor
3	Window Rear (SW)	75.0	0.580 116-A	0.65 116-B	225	90	Existing	Double Non-Metal Clear Default	1st Floor
4	Window Right (NW)	67.0	0.580 116-A	0.65 116-B	315	90	Existing	Double Non-Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 6 built~2001 ATTIC INSUL. UPGRADE — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 6 built~2001 HVAC UPGRADE — Project Title
10/1/2008 — Date
1529 Apsuun Way Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author — (707) 826-1433 Telephone
Plan Check/Date
EnergyPro — Compliance Method — CA Climate Zone 16 Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 202 ft²
Ratio: 15.5%
Avg. U: 0.58
Avg. SHGC: 0.65

Total Conditioned Floor Area: 1,303 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,303 ft²
Average Ceiling Height: 8.5 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New HVAC & AC	1,303	11,076	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	895	0.026	R-38	R-0.0	45	0	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	135	14	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	315	14	X		Existing	01-A8	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	280	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 15:40:06 Run Code: 1222900806

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 6 built~2001 HVAC UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.580 116-A	0.65 116-B	45	90	Existing	Double Non-Metal Clear Default	1st Floor
2	Window Left (SE)	36.0	0.580 116-A	0.65 116-B	135	90	Existing	Double Non-Metal Clear Default	1st Floor
3	Window Rear (SW)	75.0	0.580 116-A	0.65 116-B	225	90	Existing	Double Non-Metal Clear Default	1st Floor
4	Window Right (NW)	67.0	0.580 116-A	0.65 116-B	315	90	Existing	Double Non-Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 6 built~2001 HVAC UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New HVAC & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New HVAC & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
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Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 6 Built~2001 ALL UPGRADES Project Title	10/9/2008 Date
1529 Apsuun Way Yreka Project Address	Building Permit #
ARRAY TECHNICAL SERVICES (707) 826-1433 Documentation Author Telephone	Plan Check/Date
EnergyPro CA Climate Zone 16 Compliance Method Climate Zone	Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 202 ft² **Avg. U:** 0.34
Ratio: 15.5% **Avg. SHGC:** 0.35

Total Conditioned Floor Area:	1,303 ft²
Existing Floor Area:	n/a ft²
Raised Floor Area:	0 ft²
Slab on Grade Area:	1,303 ft²
Average Ceiling Height:	8.5 ft
Number of Dwelling Units:	1.00
Number of Stories:	1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New HVAC & AC	1,303	11,076	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	895	0.020	R-49	R-0.0	45	0	X		Existing	01-A9	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	135	14	X		Existing	01-A9	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	315	14	X		Existing	01-A9	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	280	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/09/08 15:53:57 Run Code: 1223592837

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 6 Built~2001 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.340 NFRC	0.35 NFRC	45	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Window Left (SE)	36.0	0.340 NFRC	0.35 NFRC	135	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
3	Window Rear (SW)	75.0	0.340 NFRC	0.35 NFRC	225	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Window Right (NW)	67.0	0.340 NFRC	0.35 NFRC	315	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 6 Built~2001 ALL UPGRADES — Project Title
10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New HVAC & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New HVAC & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 7 Built~2001
1449 Apsuun Way
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-7

Date:

10/1/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 7 Built~2001 EXISTING
Project Title

10/1/2008
Date

1449 Apsuun Way Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 186 ft² **Avg. U:** 0.58
Ratio: 13.2% **Avg. SHGC:** 0.65

Total Conditioned Floor Area: 1,408 ft²
Existing Floor Area: 1,408 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,408 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,408	11,827	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,000	0.026	R-38	R-0.0	45	0	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	135	14	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	315	14	X		Existing	01-A8	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	296	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 16:10:10 Run Code: 1222902610

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 7 Built~2001 EXISTING — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.580 116-A	0.65 116-B	45	90	Existing	Double Non-Metal Clear Default	1st Floor
2	Window Left (SE)	36.0	0.580 116-A	0.65 116-B	135	90	Existing	Double Non-Metal Clear Default	1st Floor
3	Window Rear (SW)	59.0	0.580 116-A	0.65 116-B	225	90	Existing	Double Non-Metal Clear Default	1st Floor
4	Window Right (NW)	67.0	0.580 116-A	0.65 116-B	315	90	Existing	Double Non-Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 7 Built~2001 EXISTING — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

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Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 7 Built~2001 WINDOW UPGRADE
Project Title

10/1/2008
Date

1449 Apsuun Way Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 186 ft² **Avg. U:** 0.34
Ratio: 13.2% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,408 ft²
Existing Floor Area: 1,408 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,408 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,408	11,827	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,000	0.026	R-38	R-0.0	45	0	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	135	14	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	315	14	X		Existing	01-A8	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	296	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 16:12:28 Run Code: 1222902748

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 7 Built~2001 WINDOW UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.340 NFRC 0.35	NFRC	45	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.560 116-A 0.65	116-B				Double Non-Metal Clear Default	pre-altered for above
3	Window Left (SE)	36.0	0.340 NFRC 0.35	NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Existing		0.560 116-A 0.65	116-B				Double Non-Metal Clear Default	pre-altered for above
5	Window Rear (SW)	59.0	0.340 NFRC 0.35	NFRC	225	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
6	Existing		0.560 116-A 0.65	116-B				Double Non-Metal Clear Default	pre-altered for above
7	Window Right (NW)	67.0	0.340 NFRC 0.35	NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
8	Existing		0.560 116-A 0.65	116-B				Double Non-Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 7 Built~2001 WINDOW UPGRADE — Project Title

10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 7 Built~2001 ATTIC INSUL UPGRADE — Project Title
10/1/2008 — Date
1449 Apsuun Way Yreka — Project Address
Building Permit #
ABRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: [X] Single Family [ ] Addition
[ ] Multi Family [X] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 186 ft²
Avg. U: 0.58
Ratio: 13.2%
Avg. SHGC: 0.65

Total Conditioned Floor Area: 1,408 ft²
Existing Floor Area: 1,408 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,408 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,408	11,827	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,000	0.020	R-49	R-0.0	45	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	135	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	315	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	296	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 16:14:07 Run Code: 1222902847

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 7 Built~2001 ATTIC INSUL. UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.580 116-A	0.65 116-B	45	90	Existing	Double Non-Metal Clear Default	1st Floor
2	Window Left (SE)	36.0	0.580 116-A	0.65 116-B	135	90	Existing	Double Non-Metal Clear Default	1st Floor
3	Window Rear (SW)	59.0	0.580 116-A	0.65 116-B	225	90	Existing	Double Non-Metal Clear Default	1st Floor
4	Window Right (NW)	67.0	0.580 116-A	0.65 116-B	315	90	Existing	Double Non-Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 7 Built~2001 ATTIC INSUL. UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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Title/Firm: Karuk Tribe Building Energy Assessment
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Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 7 Built~2001 HVAC UPGRADE
Project Title

10/1/2008
Date

1449 Apsuun Way Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 186 ft² **Avg. U:** 0.58
Ratio: 13.2% **Avg. SHGC:** 0.65

Total Conditioned Floor Area:	1,408 ft²
Existing Floor Area:	n/a ft²
Raised Floor Area:	0 ft²
Slab on Grade Area:	1,408 ft²
Average Ceiling Height:	8.4 ft
Number of Dwelling Units:	1.00
Number of Stories:	1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New HVAC & AC	1,408	11,827	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,000	0.026	R-38	R-0.0	45	0	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	135	14	X		Existing	01-A8	1st Floor
Roof	Wood	210	0.026	R-38	R-0.0	315	14	X		Existing	01-A8	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	296	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/01/08 16:18:19 Run Code: 1222903099

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 7 Built~2001 HVAC UPGRADE — Project Title

10/1/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.580 116-A	0.65 116-B	45	90	Existing	Double Non-Metal Clear Default	1st Floor
2	Window Left (SE)	36.0	0.580 116-A	0.65 116-B	135	90	Existing	Double Non-Metal Clear Default	1st Floor
3	Window Rear (SW)	59.0	0.580 116-A	0.65 116-B	225	90	Existing	Double Non-Metal Clear Default	1st Floor
4	Window Right (NW)	67.0	0.580 116-A	0.65 116-B	315	90	Existing	Double Non-Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 7 Built~2001 HVAC UPGRADE — Project Title
10/1/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New HVAC & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New HVAC & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

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Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 7 Built~2001 ALL UPGRADES — Project Title
10/22/2008 — Date
1449 Apsuun Way Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author — (707) 826-1433 Telephone
Plan Check/Date
EnergyPro — Compliance Method — CA Climate Zone 16 Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (NE) 45 deg
Fuel Type: Propane
Fenestration:
Area: 186 ft² **Avg. U:** 0.34
Ratio: 13.2% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,408 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,408 ft²
Average Ceiling Height: 8.4 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New HVAC & AC	1,408	11,827	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,000	0.020	R-49	R-0.0	45	0	X		Existing	01-A9	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	135	14	X		Existing	01-A9	1st Floor
Roof	Wood	210	0.020	R-49	R-0.0	315	14	X		Existing	01-A9	1st Floor
Wall	Wood	311	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	45	90	X		Existing	28-A4	1st Floor
Wall	Wood	348	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	296	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Wall	Wood	297	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/22/08 12:13:19 Run Code: 1224702799

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 7 Built~2001 ALL UPGRADES — Project Title

10/22/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NE)	24.0	0.340 NFRC	0.35 NFRC	45	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Window Left (SE)	36.0	0.340 NFRC	0.35 NFRC	135	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
3	Window Rear (SW)	59.0	0.340 NFRC	0.35 NFRC	225	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Window Right (NW)	67.0	0.340 NFRC	0.35 NFRC	315	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	176	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 7 Built~2001 ALL UPGRADES — Project Title

10/22/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New HVAC & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New HVAC & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane State PR6 40	Small Gas	No Pipe Insulation	1	35,000	40	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

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Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 10/22/08 12:13:19 Run Code: 1224702799

TITLE 24 REPORT

Title 24 Report for:

Structure 8 Built~1997
440 Virsur Impah
Happy Camp, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-8

Date:

10/2/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 8 Built~1997 EXISTING
Project Title

10/2/2008
Date

440 Virsur Impah Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.79
Ratio: 16.3% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,112 ft²
Existing Floor Area: 1,112 ft²
Raised Floor Area: 1,112 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.6 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	1st Floor
Roof	Wood	309	0.026	R-38	R-0.0	0	14	X		Existing	01-A8	1st Floor
Roof	Wood	161	0.026	R-38	R-0.0	180	14	X		Existing	01-A8	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor

Run Initiation Time: 10/02/08 08:57:20 Run Code: 1222963040

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 8 Built~1997 EXISTING — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	86.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(E)	41.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(S)	36.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Floor
4	Window	Right	(W)	18.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 8 Built~1997 EXISTING — Project Title

10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	76% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 8 Built~1997 WINDOW UPGRADE
Project Title

10/2/2008
Date

440 Virsur Impah Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.34
Ratio: 16.3% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,112 ft²
Existing Floor Area: 1,112 ft²
Raised Floor Area: 1,112 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.6 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	1st Floor
Roof	Wood	309	0.026	R-38	R-0.0	0	14	X		Existing	01-A8	1st Floor
Roof	Wood	161	0.026	R-38	R-0.0	180	14	X		Existing	01-A8	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor

Run Initiation Time: 10/02/08 09:12:42 Run Code: 1222963962

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 8 Built~1997 WINDOW UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (N)	86.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (E)	41.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (S)	36.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Right (W)	18.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 8 Built~1997 WINDOW UPGRADE — Project Title
10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	78% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Run Initiation Time: 10/02/08 09:12:42 Run Code: 1222963962

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 8 Built ~1997 ATTIC INSUL UPGRADE
Project Title

10/2/2008
Date

440 Virsur Impah Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.79
Ratio: 16.3% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,112 ft²
Existing Floor Area: 1,112 ft²
Raised Floor Area: 1,112 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.6 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	309	0.020	R-49	R-0.0	0	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	161	0.020	R-49	R-0.0	180	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor

Run Initiation Time: 10/02/08 09:15:12 Run Code: 1222964112

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 8 Built ~1997 ATTIC INSUL. UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	86.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(E)	41.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(S)	36.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Floor
4	Window	Right	(W)	18.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 8 Built ~1997 ATTIC INSUL. UPGRADE — Project Title

10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	78% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Hot Water Pump Control	#	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

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Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structr 8 Built ~1997 ATTIC & FLOOR INS. UPGRADE — Project Title
10/2/2008 — Date
440 Virsur Impah Happy Camp — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author — (707) 826-1433 Telephone
Plan Check/Date
EnergyPro — Compliance Method — CA Climate Zone 16 Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft² **Avg. U:** 0.79
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Total Conditioned Floor Area: 1,112 ft²
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Raised Floor Area: 1,112 ft²
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Number of Dwelling Units: 1.00
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Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	309	0.020	R-49	R-0.0	0	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Roof	Wood	161	0.020	R-49	R-0.0	180	14	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (F=20-A4)	1st Floor

Run Initiation Time: 10/02/08 09:20:09 Run Code: 1222964409

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structr 8 Built ~1997 ATTIC & FLOOR INS. UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	86.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(E)	41.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(S)	36.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Floor
4	Window	Right	(W)	18.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structr 8 Built ~1997 ATTIC & FLOOR INS. UPGRADE — Project Title
10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	78% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
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Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 8 Built ~1997 HVAC UPGRADE
Project Title

10/2/2008
Date

440 Virsur Impah Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft²
Ratio: 16.3%
Avg. U: 0.79
Avg. SHGC: 0.70

Total Conditioned Floor Area: 1,112 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,112 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.6 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New HVAC & AC	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	1st Floor
Roof	Wood	309	0.026	R-38	R-0.0	0	14	X		Existing	01-A8	1st Floor
Roof	Wood	161	0.026	R-38	R-0.0	180	14	X		Existing	01-A8	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor

Run Initiation Time: 10/02/08 09:24:18 Run Code: 1222964658

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 8 Built ~1997 HVAC UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	86.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(E)	41.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(S)	36.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Floor
4	Window	Right	(W)	18.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 8 Built ~1997 HVAC UPGRADE — Project Title
10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New HVAC & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New HVAC & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane Rheem 41V50P	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.54	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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(signature) (date)

Documentation Author
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Title/Firm: ABBAY TECHNICAL SERVICES
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Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 8 Built ~1997 DHW UPGRADE
Project Title

10/2/2008
Date

440 Virsur Impah Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft²
Avg. U: 0.79
Ratio: 16.3%
Avg. SHGC: 0.70

Total Conditioned Floor Area: 1,112 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,112 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.6 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Heat & Cool Default	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	1st Floor
Roof	Wood	309	0.026	R-38	R-0.0	0	14	X		Existing	01-A8	1st Floor
Roof	Wood	161	0.026	R-38	R-0.0	180	14	X		Existing	01-A8	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor

Run Initiation Time: 10/02/08 09:27:41 Run Code: 1222964861

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 8 Built ~1997 DHW UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	86.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(E)	41.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(S)	36.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	1st Floor
4	Window	Right	(W)	18.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 8 Built ~1997 DHW UPGRADE — Project Title
10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Heat & Cool Default	Central Furnace	78% AFUE	Split Air Conditioner	9.7 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Heat & Cool Default	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

	Hot Water Pump			Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Run Initiation Time: 10/02/08 09:27:41 Run Code: 1222964861

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 8 Built ~1997 ALL UPGRADES
Project Title

10/9/2008
Date

440 Virsur Impah Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 181 ft²
Avg. U: 0.34
Ratio: 16.3%
Avg. SHGC: 0.35

Total Conditioned Floor Area: 1,112 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,112 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.6 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
New HVAC & AC	1,112	9,563	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	656	0.020	R-49	R-0.0	0	0	X		Existing	01-A9	1st Floor
Roof	Wood	309	0.020	R-49	R-0.0	0	14	X		Existing	01-A9	1st Floor
Roof	Wood	161	0.020	R-49	R-0.0	180	14	X		Existing	01-A9	1st Floor
Wall	Wood	246	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	270	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	332	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	293	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,112	0.034	R-22	R-0.0	0	180		X	Existing	20-A5	1st Floor

Run Initiation Time: 10/09/08 15:58:07 Run Code: 1223593087

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 8 Built ~1997 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	86.0	0.340	NFRC	0.35	NFRC	0	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Window	Left	(E)	41.0	0.340	NFRC	0.35	NFRC	90	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
3	Window	Rear	(S)	36.0	0.340	NFRC	0.35	NFRC	180	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Window	Right	(W)	18.0	0.340	NFRC	0.35	NFRC	270	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 8 Built ~1997 ALL UPGRADES — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
New HVAC & AC	Central Furnace	92% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
New HVAC & AC	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

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Telephone: Lic. #:

(signature) (date)

Documentation Author

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Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 9 built~1994
250 Axak Rd.
Orleans, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-9

Date:

10/2/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 9 built~1994 EXISTING
Project Title

10/2/2008
Date

250 Axak Rd Orleans
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 204 ft² **Avg. U:** 0.79
Ratio: 12.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,606 ft²
Existing Floor Area: 1,606 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,606 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Combined Hydronic/FAU	1,606	12,848	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,606	0.026	R-38	R-0.0	180	0	X		Existing	01-A8	1st Floor
Wall	Wood	288	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	317	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Wall	Wood	347	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Wall	Wood	324	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/02/08 10:05:10 Run Code: 1222967110

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 9 built~1994 EXISTING — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (S)	108.0	0.790 116-A	0.70 116-B	180	90	Existing	Double Metal Clear Default	1st Floor
2	Window Left (W)	27.0	0.790 116-A	0.70 116-B	270	90	Existing	Double Metal Clear Default	1st Floor
3	Window Rear (N)	69.0	0.790 116-A	0.70 116-B	0	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	190	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 9 built~1994 EXISTING — Project Title

10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Combined Hydronic/FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Combined Hydronic/FAU	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Existing Propane 50 Gallon	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane 50 Gallon	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.52	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 9 built~1994 WINDOW UPGRADE
Project Title

10/2/2008
Date

250 Axak Rd Orleans
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 204 ft² **Avg. U:** 0.34
Ratio: 12.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,606 ft²
Existing Floor Area: 1,606 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,606 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Combined Hydronic/FAU	1,606	12,848	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,606	0.026	R-38	R-0.0	180	0	X		Existing	01-A8	1st Floor
Wall	Wood	288	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	317	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Wall	Wood	347	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Wall	Wood	324	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/02/08 10:12:17 Run Code: 1222967537

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 9 built~1994 WINDOW UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (S)	108.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (W)	27.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (N)	69.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	190	None	No Insulation	26-A1	Existing	1st Floor

Run Initiation Time: 10/02/08 10:12:17 Run Code: 1222967537

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 9 built~1994 WINDOW UPGRADE — Project Title
10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Combined Hydronic/FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Combined Hydronic/FAU	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Existing Propane 50 Gallon	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane 50 Gallon	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.52	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

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Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Run Initiation Time: 10/02/08 10:12:17 Run Code: 1222967537

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 9 built~1994 ATTIC INSUL UPGRADE — Project Title
10/2/2008 — Date
250 Axak Rd Orleans — Project Address
Building Permit #
ABRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 02 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES , NO HERS VERIFICATION REQUIRED

Building Type: [X] Single Family [ ] Multi Family [ ] Addition [X] Existing + Add/Alt
Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 204 ft²
Avg. U: 0.79
Ratio: 12.7%
Avg. SHGC: 0.70

Total Conditioned Floor Area: 1,606 ft²
Existing Floor Area: 1,606 ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,606 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Combined HydronicFAU	1,606	12,848	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,606	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	288	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	317	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Wall	Wood	347	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Wall	Wood	324	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/02/08 10:15:41 Run Code: 1222967741

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 9 built~1994 ATTIC INSUL. UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(S)	108.0	0.790 116-A	0.70 116-B	180	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(W)	27.0	0.790 116-A	0.70 116-B	270	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(N)	69.0	0.790 116-A	0.70 116-B	0	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	190	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 9 built~1994 ATTIC INSUL. UPGRADE — Project Title
10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Combined Hydronic/FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Combined Hydronic/FAU	Ducted	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
Existing Propane 50 Gallon	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Propane 50 Gallon	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.52	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

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Address:
Telephone:
(signature) (date)

Run Initiation Time: 10/02/08 10:15:41 Run Code: 1222967741

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 9 built~1994 HVAC UPGRADE
Project Title

10/2/2008
Date

250 Axak Rd Orleans
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES , HERS VERIFICATION REQUIRED

Building Type: [X] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 204 ft² **Avg. U:** 0.79
Ratio: 12.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,606 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,606 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Combined Hydr. FAU Upgrade	1,606	12,848	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,606	0.026	R-38	R-0.0	180	0	X		Existing	01-A6	1st Floor
Wall	Wood	288	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	317	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Wall	Wood	347	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Wall	Wood	324	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/02/08 10:34:47 Run Code: 1222968887

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 9 built~1994 HVAC UPGRADE — Project Title

10/2/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(S)	108.0	0.790 116-A	0.70 116-B	180	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Left	(W)	27.0	0.790 116-A	0.70 116-B	270	90	Existing	Double Metal Clear Default	1st Floor
3	Window	Rear	(N)	69.0	0.790 116-A	0.70 116-B	0	90	Existing	Double Metal Clear Default	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

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#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	190	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 9 built~1994 HVAC UPGRADE — Project Title

10/2/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Combined Hydr. FAU Upgrade	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Combined Hydr. FAU Upgrade	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping

System Name	Pipe Length	Pipe Diameter	Insul. Thick.
New Propane DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

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(signature) (date)

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Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 9 built~1994 ALL UPGRADES
Project Title

10/27/2008
Date

250 Axak Rd Orleans
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 02
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 204 ft² **Avg. U:** 0.34
Ratio: 12.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,606 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 0 ft²
Slab on Grade Area: 1,606 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Electric Hydronic FAU	1,606	12,848	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	1,606	0.020	R-49	R-0.0	180	0	X		Existing	01-A9	1st Floor
Wall	Wood	288	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	180	90	X		Existing	28-A4	1st Floor
Wall	Wood	317	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Wall	Wood	347	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Wall	Wood	324	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Door	None	20	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Floor

Run Initiation Time: 10/27/08 15:14:09 Run Code: 1225143249

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 9 built~1994 ALL UPGRADES — Project Title

10/27/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(S)	108.0	0.340 NFRC	0.35 NFRC	180	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Window	Left	(W)	27.0	0.340 NFRC	0.35 NFRC	270	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor
3	Window	Rear	(N)	69.0	0.340 NFRC	0.35 NFRC	0	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments
Slab Perimeter	190	None	No Insulation	26-A1	Existing	1st Floor

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 9 built~1994 ALL UPGRADES — Project Title

10/27/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Electric Hydronic FAU	Combined Hydronic	see below	Split Air Conditioner	n/a	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Electric Hydronic FAU	Ducted	Ducted	Attic	6.0	Existing	Yes

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.
New Propane DHW	0	0.50	0.50

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
New Propane DHW	Small Gas	No Pipe Insulation	1	40,000	50	Existing	0.62	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 10 built~1992
1336 Tucka Tucka Tee St.
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-10

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 10 built~1992 EXISTING
Project Title

9/26/2008
Date

1336 Tucka Tucka Tee St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 291 ft² **Avg. U:** 0.79
Ratio: 8.0% **Avg. SHGC:** 0.70

Total Conditioned Floor Area:	3,627 ft²
Existing Floor Area:	3,627 ft²
Raised Floor Area:	2,496 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	3.00
Number of Stories:	2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	1,742	13,936	1.44	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	1,885	15,080	1.56	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	611	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	1st Floor
Wall	Wood	432	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	60	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Wall	Wood	624	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	223	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,742	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor
Roof	Wood	1,885	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	2nd Floor
Wall	Wood	528	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	561	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	412	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	339	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	754	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:38:54 Run Code: 1222461534

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 10 built~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	132.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	1st Floor
2	Window Rear (SE)	96.0	0.790	116-A 0.70	116-B 135	90	Existing	Double Metal Clear Default	2nd Floor
3	Window Front (NW)	63.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 10 built~1992 EXISTING — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	3	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 10 built~1992 WINDOW UPGRADE
Project Title

9/26/2008
Date

1336 Tucka Tucka Tee St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00

Percent better than Standard: 0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 291 ft² **Avg. U:** 0.34
Ratio: 8.0% **Avg. SHGC:** 0.35

Total Conditioned Floor Area:	3,627 ft²
Existing Floor Area:	3,627 ft²
Raised Floor Area:	2,496 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	3.00
Number of Stories:	2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	1,742	13,936	1.44	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	1,885	15,080	1.56	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	611	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	1st Floor
Wall	Wood	432	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	60	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Wall	Wood	624	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	223	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,742	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor
Roof	Wood	1,885	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	2nd Floor
Wall	Wood	528	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	561	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	412	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	339	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	754	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:36:58 Run Code: 1222461418

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 10 built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	132.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Rear (SE)	96.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Front (NW)	63.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 10 built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	3	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

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Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 10 built~1992 ATTIC INSUL UPGRADE
Project Title

9/26/2008
Date

1336 Tucka Tucka Tee St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 291 ft² **Avg. U:** 0.79
Ratio: 8.0% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 3,627 ft²
Existing Floor Area: 3,627 ft²
Raised Floor Area: 2,496 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 3.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
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OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	611	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	432	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	60	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor
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Wall	Wood	624	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	223	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,742	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor
Roof	Wood	1,885	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	528	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	561	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	412	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	339	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	754	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:39:50 Run Code: 1222461590

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 10 built~1992 ATTIC INSUL. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(NW)	132.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Rear	(SE)	96.0	0.790 116-A	0.70 116-B	135	90	Existing	Double Metal Clear Default	2nd Floor
3	Window	Front	(NW)	63.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 10 built~1992 ATTIC INSUL. UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	3	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structr 10 built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title
9/26/2008 — Date
1336 Tucka Tucka Tee St Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition — ☒ Multi Family ☒ Existing + Add/Alt
Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 291 ft²
Ratio: 8.0%
Avg. U: 0.79
Avg. SHGC: 0.70

Total Conditioned Floor Area:	3,627 ft²
Existing Floor Area:	3,627 ft²
Raised Floor Area:	2,496 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	3.00
Number of Stories:	2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	1,742	13,936	1.44	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	1,885	15,080	1.56	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	611	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	432	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	60	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Wall	Wood	624	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	223	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,742	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor
Roof	Wood	1,885	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	528	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	561	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	412	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	339	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	754	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor

Run Initiation Time: 09/26/08 13:40:48 Run Code: 1222461648

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structr 10 built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	132.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	1st Floor
2	Window Rear (SE)	96.0	0.790	116-A 0.70	116-B 135	90	Existing	Double Metal Clear Default	2nd Floor
3	Window Front (NW)	63.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structr 10 built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title
9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	3	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 10 built~1992 ALL UPGRADES — Project Title
10/9/2008 — Date
1336 Tucka Tucka Tee St Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author — (707) 826-1433 Telephone
Plan Check/Date
EnergyPro — Compliance Method — CA Climate Zone 16 Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition — ☒ Multi Family ☒ Existing + Add/Alt
Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 291 ft² Avg. U: 0.34
Ratio: 8.0% Avg. SHGC: 0.35

Total Conditioned Floor Area:	3,627 ft²
Existing Floor Area:	3,627 ft²
Raised Floor Area:	2,496 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	3.00
Number of Stories:	2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	1,742	13,936	1.44	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	1,885	15,080	1.56	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	611	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	432	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor
Door	None	60	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor
Wall	Wood	624	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor
Wall	Wood	223	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor
Floor	Wood	1,742	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor
Roof	Wood	1,885	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	528	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	561	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	412	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	339	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	754	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor

Run Initiation Time: 10/09/08 16:05:51 Run Code: 1223593551

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 10 built~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	132.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Rear (SE)	96.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Front (NW)	63.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 10 built~1992 ALL UPGRADES — 10/9/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	3	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 11 built~1992
1256 Puh Nay Fitch
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-11

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 11 built~1992 EXISTING
Project Title

9/26/2008
Date

1256 Puh Nay Fitch Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 436 ft² **Avg. U:** 0.79
Ratio: 8.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 5,010 ft²
Existing Floor Area: 5,010 ft²
Raised Floor Area: 3,380 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,288	18,304	1.83	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,722	21,776	2.17	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	658	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	1st Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor Living Area
Door	None	80	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor Living Area
Wall	Wood	185	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	832	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	220	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor Living Area
Floor	Wood	2,288	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor Living Area
Roof	Wood	2,722	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	2nd Floor
Wall	Wood	700	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	336	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	266	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,092	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:49:40 Run Code: 1222462180

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 11 built~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	176.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	1st Floor Living Area
2	Window Front (NW)	132.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	2nd Floor
3	Window Rear (SE)	128.0	0.790 116-A	0.70 116-B	135	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 11 built~1992 EXISTING — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 11 built~1992 WINDOW UPGRADE
Project Title

9/26/2008
Date

1256 Puh Nay Fitch Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00

Percent better than Standard: 0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 436 ft² **Avg. U:** 0.34
Ratio: 8.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 5,010 ft²
Existing Floor Area: 5,010 ft²
Raised Floor Area: 3,380 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,288	18,304	1.83	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,722	21,776	2.17	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	658	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	1st Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor Living Area
Door	None	80	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor Living Area
Wall	Wood	185	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	832	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	220	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor Living Area
Floor	Wood	2,288	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor Living Area
Roof	Wood	2,722	0.026	R-38	R-0.0	315	0	X		Existing	01-A8	2nd Floor
Wall	Wood	700	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	336	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	266	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,092	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:50:39 Run Code: 1222462239

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 11 built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	176.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl Pane Vinyl w/LowE	1st Floor Living Area
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Front (NW)	132.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl Pane Vinyl w/LowE	2nd Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (SE)	128.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl Pane Vinyl w/LowE	2nd Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 11 built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 11 built~1992 ATTIC INSUL UPGRADE — Project Title
9/26/2008 — Date
1256 Puh Nay Fitch Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition — ☒ Multi Family ☒ Existing + Add/Alt
Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 436 ft²
Ratio: 8.7%
Avg. U: 0.79
Avg. SHGC: 0.70

Total Conditioned Floor Area: 5,010 ft²
Existing Floor Area: 5,010 ft²
Raised Floor Area: 3,380 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,288	18,304	1.83	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,722	21,776	2.17	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	658	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	1st Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor Living Area
Door	None	80	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor Living Area
Wall	Wood	185	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	832	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	220	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor Living Area
Floor	Wood	2,288	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor Living Area
Roof	Wood	2,722	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	700	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	336	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	266	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,092	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:48:35 Run Code: 1222462115

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 11 built~1992 ATTIC INSUL. UPGRADE — 9/26/2008
Project Title — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(NW)	176.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	1st Floor Living Area
2	Window	Front	(NW)	132.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	2nd Floor
3	Window	Rear	(SE)	128.0	0.790 116-A	0.70 116-B	135	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 11 built~1992 ATTIC INSUL. UPGRADE — Project Title
9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

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Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Run Initiation Time: 09/26/08 13:48:35 Run Code: 1222462115

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 11 built~1992ATTIC&FLOOR INS. UPGRADE — Project Title
9/26/2008 — Date
1256 Puh Nay Fitch Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition — ☒ Multi Family ☒ Existing + Add/Alt
Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 436 ft² Avg. U: 0.79
Ratio: 8.7% Avg. SHGC: 0.70

Total Conditioned Floor Area: 5,010 ft²
Existing Floor Area: 5,010 ft²
Raised Floor Area: 3,380 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,288	18,304	1.83	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,722	21,776	2.17	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	658	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	1st Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor Living Area
Door	None	80	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor Living Area
Wall	Wood	185	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	832	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	220	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor Living Area
Floor	Wood	2,288	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor Living Area
Roof	Wood	2,722	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	700	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	336	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	266	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,092	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor

Run Initiation Time: 09/26/08 13:52:27 Run Code: 1222462347

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 11 built~1992ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	176.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	1st Floor Living Area
2	Window Front (NW)	132.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	2nd Floor
3	Window Rear (SE)	128.0	0.790	116-A 0.70	116-B 135	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 11 built~1992ATTIC&FLOOR INS. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 09/26/08 13:52:27 Run Code: 1222462347

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 11 built~1992 ALL UPGRADES
Project Title

10/9/2008
Date

1256 Puh Nay Fitch Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (NW) 315 deg
Fuel Type: Propane
Fenestration:
Area: 436 ft² **Avg. U:** 0.34
Ratio: 8.7% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 5,010 ft²
Existing Floor Area: 5,010 ft²
Raised Floor Area: 3,380 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,288	18,304	1.83	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,722	21,776	2.17	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	658	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	1st Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Floor Living Area
Door	None	80	0.500	None	R-0.0	315	90	X		Existing	28-A4	1st Floor Living Area
Wall	Wood	185	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	832	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Floor Living Area
Wall	Wood	220	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Floor Living Area
Floor	Wood	2,288	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor Living Area
Roof	Wood	2,722	0.020	R-49	R-0.0	315	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	700	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	2nd Floor
Wall	Wood	336	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	2nd Floor
Wall	Wood	266	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,092	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor

Run Initiation Time: 10/09/08 16:08:16 Run Code: 1223593696

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 11 built~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (NW)	176.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl Pane Vinyl w/LowE	1st Floor Living Area
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Front (NW)	132.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl Pane Vinyl w/LowE	2nd Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (SE)	128.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl Pane Vinyl w/LowE	2nd Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 11 built~1992 ALL UPGRADES — 10/9/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 10/09/08 16:08:16 Run Code: 1223593696

TITLE 24 REPORT

Title 24 Report for:

Structure 12 Blt~1992
1231 Thook St.
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-12

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 12 Blt~1992 EXISTING
Project Title

9/26/2008
Date

1231 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 388 ft² **Avg. U:** 0.79
Ratio: 8.0% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 4,836 ft²
Existing Floor Area: 4,836 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,323	18,584	1.92	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,513	20,104	2.08	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	815	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	1st Floor
Wall	Wood	576	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	80	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	832	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Wall	Wood	268	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	2,323	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor
Roof	Wood	2,513	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	2nd Floor
Wall	Wood	748	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor
Wall	Wood	524	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor
Wall	Wood	377	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,005	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 14:00:47 Run Code: 1222462847

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 12 Blt~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	176.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Front	(N)	84.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	2nd Floor
3	Window	Rear	(S)	128.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 12 Blt~1992 EXISTING — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
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Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 12 built~1992 WINDOW UPGRADE
Project Title

9/26/2008
Date

1231 Thook St Yreka
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 388 ft² **Avg. U:** 0.34
Ratio: 8.0% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 4,836 ft²
Existing Floor Area: 4,836 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,323	18,584	1.92	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,513	20,104	2.08	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	815	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	1st Floor
Wall	Wood	576	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	80	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	832	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Wall	Wood	268	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	2,323	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor
Roof	Wood	2,513	0.026	R-38	R-0.0	0	0	X		Existing	01-A8	2nd Floor
Wall	Wood	748	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor
Wall	Wood	524	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor
Wall	Wood	377	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,005	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 13:59:50 Run Code: 1222462790

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 12 built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (N)	176.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Front (N)	84.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (S)	128.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 12 built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 12 built~1992 ATTIC INSUL UPGRADE
Project Title

9/26/2008
Date

1231 Thook St Yreka
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 388 ft² **Avg. U:** 0.79
Ratio: 8.0% **Avg. SHGC:** 0.70

Total Conditioned Floor Area:	4,836 ft²
Existing Floor Area:	4,836 ft²
Raised Floor Area:	3,328 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	4.00
Number of Stories:	2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,323	18,584	1.92	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,513	20,104	2.08	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	815	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	576	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	80	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	832	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Wall	Wood	268	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	2,323	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor
Roof	Wood	2,513	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	748	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor
Wall	Wood	524	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor
Wall	Wood	377	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,005	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor

Run Initiation Time: 09/26/08 14:02:40 Run Code: 1222462960

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 12 built~1992 ATTIC INSUL. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	176.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Front	(N)	84.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	2nd Floor
3	Window	Rear	(S)	128.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 12 built~1992 ATTIC INSUL. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 12 built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title
9/26/2008 — Date
1231 Thook St Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition ☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 388 ft² Avg. U: 0.79
Ratio: 8.0% Avg. SHGC: 0.70

Total Conditioned Floor Area: 4,836 ft²
Existing Floor Area: 4,836 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,323	18,584	1.92	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,513	20,104	2.08	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	815	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	576	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	80	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	832	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Wall	Wood	268	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	2,323	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor
Roof	Wood	2,513	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	748	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor
Wall	Wood	524	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor
Wall	Wood	377	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,005	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor

Run Initiation Time: 09/26/08 14:03:41 Run Code: 1222463021

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 12 built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	176.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor
2	Window	Front	(N)	84.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	2nd Floor
3	Window	Rear	(S)	128.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	2nd Floor

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 12 built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title
9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 12 built~1992 ALL UPGRADES
Project Title

10/9/2008
Date

1231 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition ☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 388 ft² **Avg. U:** 0.34
Ratio: 8.0% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 4,836 ft²
Existing Floor Area: 4,836 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,323	18,584	1.92	Conditioned	Setback	8	n/a
Existing Default Elect. Bsbrds.	2,513	20,104	2.08	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	815	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	1st Floor
Wall	Wood	576	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor
Door	None	80	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Floor
Wall	Wood	187	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor
Wall	Wood	832	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor
Wall	Wood	268	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor
Floor	Wood	2,323	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor
Roof	Wood	2,513	0.020	R-49	R-0.0	0	0	X		Altered	01-A9 (E=01-A8)	2nd Floor
Wall	Wood	748	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor
Wall	Wood	524	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor
Wall	Wood	704	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor
Wall	Wood	377	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor
Floor	Wood	1,005	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor

Run Initiation Time: 10/09/08 16:10:25 Run Code: 1223593825

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 12 built~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (N)	176.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Front (N)	84.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Rear (S)	128.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 12 built~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 13 Blt~1992
1230 Thook St.
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-13

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 13 Blt~1992 EXISTING
Project Title

9/26/2008
Date

1230 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 386 ft² **Avg. U:** 0.79
Ratio: 9.1% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 4,264 ft²
Existing Floor Area: 4,264 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Default Elect. Bsbrds	2,013	16,104	1.89	Conditioned	Setback	8	n/a
Existing Kerosene Wall Heater	2,251	18,008	2.11	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Wall	Wood	416	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	180	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	352	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	144	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor Bedrooms
Floor	Wood	936	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor Bedrooms
Roof	Wood	1,077	0.026	R-38	R-0.0	180	0	X		Existing	01-A8	2nd Floor Bedrooms
Wall	Wood	84	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	126	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Bedrooms
Floor	Wood	552	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor Bedrooms
Roof	Wood	2,251	0.026	R-38	R-0.0	180	0	X		Existing	01-A8	2nd Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor Living Area
Door	None	80	0.500	None	R-0.0	180	90	X		Existing	28-A4	2nd Floor Living Area
Wall	Wood	219	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Living Area
Wall	Wood	249	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Living Area
Floor	Wood	1,840	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor Living Area

Run Initiation Time: 09/26/08 14:11:04 Run Code: 1222463464

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 13 Blt~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Rear	(N)	64.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor Bedrooms
2	Window	Rear	(N)	128.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	2nd Floor Bedrooms
3	Window	Front	(S)	176.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	2nd Floor Living Area
4	Window	Left	(W)	9.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	2nd Floor Living Area
5	Window	Right	(E)	9.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	2nd Floor Living Area

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 13 Blt~1992 EXISTING — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 13 blt~1992 WINDOW UPGRADE
Project Title

9/26/2008
Date

1230 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 386 ft² **Avg. U:** 0.34
Ratio: 9.1% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 4,264 ft²
Existing Floor Area: 4,264 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Default Elect. Bsbrds	2,013	16,104	1.89	Conditioned	Setback	8	n/a
Existing Kerosene Wall Heater	2,251	18,008	2.11	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Wall	Wood	416	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	180	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	352	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	144	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor Bedrooms
Floor	Wood	936	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor Bedrooms
Roof	Wood	1,077	0.026	R-38	R-0.0	180	0	X		Existing	01-A8	2nd Floor Bedrooms
Wall	Wood	84	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	126	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Bedrooms
Floor	Wood	552	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor Bedrooms
Roof	Wood	2,251	0.026	R-38	R-0.0	180	0	X		Existing	01-A8	2nd Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor Living Area
Door	None	80	0.500	None	R-0.0	180	90	X		Existing	28-A4	2nd Floor Living Area
Wall	Wood	219	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Living Area
Wall	Wood	249	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Living Area
Floor	Wood	1,840	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor Living Area

Run Initiation Time: 09/26/08 14:09:59 Run Code: 1222463399

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 13 blt~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Rear (N)	64.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor Bedrooms
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Rear (N)	128.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Bedrooms
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Front (S)	176.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Living Area
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Left (W)	9.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Living Area
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
9	Window Right (E)	9.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Living Area
10	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												
9	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 13 blt~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 13 blt~1992 ATTIC INSULATION UPGRADE — Project Title
9/26/2008 — Date
1230 Thook St Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES (707) 826-1433 — Documentation Author / Telephone
Plan Check/Date
EnergyPro — Compliance Software
CA Climate Zone 16 — Climate Zone
Field Checklist

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00

Percent better than Standard: 0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition ☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 386 ft² **Avg. U:** 0.79
Ratio: 9.1% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 4,264 ft²
Existing Floor Area: 4,264 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Default Elect. Bsbrds	2,013	16,104	1.89	Conditioned	Setback	8	n/a
Existing Kerosene Wall Heater	2,251	18,008	2.11	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Wall	Wood	416	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	180	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	352	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	144	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor Bedrooms
Floor	Wood	936	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Floor Bedrooms
Roof	Wood	1,077	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	2nd Floor Bedrooms
Wall	Wood	84	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	126	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Bedrooms
Floor	Wood	552	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor Bedrooms
Roof	Wood	2,251	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	2nd Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor Living Area
Door	None	80	0.500	None	R-0.0	180	90	X		Existing	28-A4	2nd Floor Living Area
Wall	Wood	219	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Living Area
Wall	Wood	249	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Living Area
Floor	Wood	1,840	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	2nd Floor Living Area

Run Initiation Time: 09/26/08 14:13:52 Run Code: 1222463632

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 13 blt~1992 ATTIC INSULATION UPGRADE — 9/26/2008
Project Title — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Rear	(N)	64.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor Bedrooms
2	Window	Rear	(N)	128.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	2nd Floor Bedrooms
3	Window	Front	(S)	176.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	2nd Floor Living Area
4	Window	Left	(W)	9.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	2nd Floor Living Area
5	Window	Right	(E)	9.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	2nd Floor Living Area

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 13 blt~1992 ATTIC INSULATION UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

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Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 09/26/08 14:13:52 Run Code: 1222463632

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 13 blt~1992 ATTIC&FLOOR INS UPGRADE
Project Title

9/26/2008
Date

1230 Thook St Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
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Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
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Existing Floor Area: 4,264 ft²
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OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
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Wall	Wood	180	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	352	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	144	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor Bedrooms
Floor	Wood	936	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (F=20-A4)	1st Floor Bedrooms
Roof	Wood	1,077	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	2nd Floor Bedrooms
Wall	Wood	84	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	126	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Bedrooms
Floor	Wood	552	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (F=20-A4)	2nd Floor Bedrooms
Roof	Wood	2,251	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	2nd Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor Living Area
Door	None	80	0.500	None	R-0.0	180	90	X		Existing	28-A4	2nd Floor Living Area
Wall	Wood	219	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Living Area
Wall	Wood	249	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Living Area
Floor	Wood	1,840	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (F=20-A4)	2nd Floor Living Area

Run Initiation Time: 09/26/08 14:14:49 Run Code: 1222463689

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 13 blt~1992 ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Rear	(N)	64.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	1st Floor Bedrooms
2	Window	Rear	(N)	128.0	0.790	116-A	0.70	116-B	0	90	Existing	Double Metal Clear Default	2nd Floor Bedrooms
3	Window	Front	(S)	176.0	0.790	116-A	0.70	116-B	180	90	Existing	Double Metal Clear Default	2nd Floor Living Area
4	Window	Left	(W)	9.0	0.790	116-A	0.70	116-B	270	90	Existing	Double Metal Clear Default	2nd Floor Living Area
5	Window	Right	(E)	9.0	0.790	116-A	0.70	116-B	90	90	Existing	Double Metal Clear Default	2nd Floor Living Area

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												
5	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 13 blt~1992 ATTIC&FLOOR INS. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping

System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 13 blt~1992 ALL UPGRADES
Project Title

10/9/2008
Date

1230 Thook St Yreka
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (S) 180 deg
Fuel Type: Propane
Fenestration:
Area: 386 ft² **Avg. U:** 0.35
Ratio: 9.1% **Avg. SHGC:** 0.36

Total Conditioned Floor Area: 4,264 ft²
Existing Floor Area: 4,264 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 2

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Default Elect. Bdrms	2,013	16,104	1.89	Conditioned	Setback	8	n/a
Existing Kerosene Wall Heater	2,251	18,008	2.11	Conditioned	Setback	8	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Wall	Wood	416	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	180	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	352	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Floor Bedrooms
Wall	Wood	144	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Floor Bedrooms
Floor	Wood	936	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Floor Bedrooms
Roof	Wood	1,077	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	2nd Floor Bedrooms
Wall	Wood	84	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	2nd Floor Bedrooms
Wall	Wood	126	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Bedrooms
Floor	Wood	552	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor Bedrooms
Roof	Wood	2,251	0.020	R-49	R-0.0	180	0	X		Altered	01-A9 (E=01-A8)	2nd Floor Living Area
Wall	Wood	576	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	2nd Floor Living Area
Door	None	80	0.500	None	R-0.0	180	90	X		Existing	28-A4	2nd Floor Living Area
Wall	Wood	219	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	2nd Floor Living Area
Wall	Wood	249	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	2nd Floor Living Area
Floor	Wood	1,840	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	2nd Floor Living Area

Run Initiation Time: 10/09/08 16:12:19 Run Code: 1223593939

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 13 blt~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Rear (N)	64.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Floor Bedrooms
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Rear (N)	128.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Bedrooms
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Front (S)	176.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Living Area
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Left (W)	9.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	2nd Floor Living Area
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
9	Window Right (E)	9.0	0.790 116-A	0.70 116-B	90	90	Existing	Double Metal Clear Default	2nd Floor Living Area

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												
9	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 13 blt~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Default Elect. Bsbrds.	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Default Elect. Bsbrds.	Ductless / No Fan	Ductless	n/a	n/a	Existing	No
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping

System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 14 Blt~2003
2501 China Grade Rd.
Happy Camp, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-14

Date:

10/9/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 14 Blt~2003 EXISTING
Project Title

10/9/2008
Date

2501 China Grade Rd Happy Camp
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00

Percent better than Standard: 0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: ☒ Single Family ☐ Addition Total Conditioned Floor Area: 1,387 ft²

☐ Multi Family ☒ Existing + Add/Alt

Building Front Orientation:	(N) 0 deg	**Existing Floor Area:**	1,387 ft²
Fuel Type:	Propane	**Raised Floor Area:**	1,387 ft²
Fenestration:		**Slab on Grade Area:**	0 ft²
Area:	224 ft² **Avg. U:** 0.74	**Average Ceiling Height:**	9.7 ft
Ratio:	16.1% **Avg. SHGC:** 0.70	**Number of Dwelling Units:**	1.00
		Number of Stories:	1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Kerosene Htr w/Cooling	1,387	13,454	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	715	0.036	R-30	R-0.0	0	14	X		Existing	02-A9	1st Flr
Roof	Wood	715	0.036	R-30	R-0.0	180	14	X		Existing	02-A9	1st Flr
Wall	Wood	300	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	25	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr
Wall	Wood	195	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	23	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	330	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	251	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,387	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/09/08 10:52:55 Run Code: 1223574775

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 14 Blt~2003 EXISTING — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	91.0	0.740	116-A	0.70	116-B	0	90	Existing	Double Metal w/ Low E Default	1st Flr
2	Window	Left	(E)	40.0	0.740	116-A	0.70	116-B	90	90	Existing	Double Metal w/ Low E Default	1st Flr
3	Window	Rear	(S)	86.0	0.740	116-A	0.70	116-B	180	90	Existing	Double Metal w/ Low E Default	1st Flr
4	Window	Right	(W)	7.0	0.740	116-A	0.70	116-B	270	90	Existing	Double Metal w/ Low E Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 14 Blt~2003 EXISTING — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Kerosene Htr w/Cooling	Room Furnace	83% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Kerosene Htr w/Cooling	Ductless / with Fan	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric Rheem 82VR52-2	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.92	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

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Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 14 Blt~2003 WINDOW UPGRADE
Project Title

10/9/2008
Date

2501 China Grade Rd Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [x] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 224 ft² **Avg. U:** 0.34
Ratio: 16.1% **Avg. SHGC:** 0.35

Total Conditioned Floor Area: 1,387 ft²
Existing Floor Area: 1,387 ft²
Raised Floor Area: 1,387 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 9.7 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Exstg Kerosene Htr w/Cooling	1,387	13,454	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	715	0.036	R-30	R-0.0	0	14	X		Existing	02-A9	1st Flr
Roof	Wood	715	0.036	R-30	R-0.0	180	14	X		Existing	02-A9	1st Flr
Wall	Wood	300	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	25	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr
Wall	Wood	195	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	23	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	330	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	251	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,387	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/09/08 10:58:06 Run Code: 1223575086

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 14 Blt~2003 WINDOW UPGRADE — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (N)	91.0	0.340 NFRC	0.35 NFRC	0	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
2	Existing		0.740 116-A	0.70 116-B				Double Metal w/ Low E Default	pre-altered for above
3	Window Left (E)	40.0	0.340 NFRC	0.35 NFRC	90	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
4	Existing		0.740 116-A	0.70 116-B				Double Metal w/ Low E Default	pre-altered for above
5	Window Rear (S)	86.0	0.340 NFRC	0.35 NFRC	180	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
6	Existing		0.740 116-A	0.70 116-B				Double Metal w/ Low E Default	pre-altered for above
7	Window Right (W)	7.0	0.340 NFRC	0.35 NFRC	270	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr
8	Existing		0.740 116-A	0.70 116-B				Double Metal w/ Low E Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 14 Blt~2003 WINDOW UPGRADE — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Exstg Kerosene Htr w/Cooling	Room Furnace	83% AFUE	Split Air Conditioner	10.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Exstg Kerosene Htr w/Cooling	Ductless / with Fan	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric Rheem 82VR52-2	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.92	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 14 Blt~2003 HVAC UPGRADE
Project Title

10/9/2008
Date

2501 China Grade Rd Happy Camp
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00

Percent better than Standard: 0.0%

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

This Portion of the Report
Is Not Applicable to this Analysis

Building Type: ☒ Single Family ☐ Addition
☐ Multi Family ☐ Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 224 ft² **Avg. U:** 0.74
Ratio: 16.1% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 1,387 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,387 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 9.7 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Kerosene Htr /Upgrade Coolg	1,387	13,454	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	715	0.036	R-30	R-0.0	0	14	X		Existing	02-A9	1st Flr
Roof	Wood	715	0.036	R-30	R-0.0	180	14	X		Existing	02-A9	1st Flr
Wall	Wood	300	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	25	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr
Wall	Wood	195	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	23	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	330	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	251	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,387	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/09/08 11:17:15 Run Code: 1223576235

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 14 Blt~2003 HVAC UPGRADE — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]		SHGC[2]		True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	91.0	0.740	116-A	0.70	116-B	0	90	Existing	Double Metal w/ Low E Default	1st Flr
2	Window	Left	(E)	40.0	0.740	116-A	0.70	116-B	90	90	Existing	Double Metal w/ Low E Default	1st Flr
3	Window	Rear	(S)	86.0	0.740	116-A	0.70	116-B	180	90	Existing	Double Metal w/ Low E Default	1st Flr
4	Window	Right	(W)	7.0	0.740	116-A	0.70	116-B	270	90	Existing	Double Metal w/ Low E Default	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 14 Blt~2003 HVAC UPGRADE — Project Title
10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Kerosene Htr /Upgrade Coolg	Room Furnace	83% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Kerosene Htr /Upgrade Coolg	Ductless / with Fan	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric Rheem 82VR52-2	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.92	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:
(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433
(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:
(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 14 Blt~2003 All Upgrades
Project Title

10/9/2008
Date

2501 China Grade Rd Happy Camp
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: [x] Single Family [ ] Addition
[ ] Multi Family [ ] Existing + Add/Alt

Building Front Orientation: (N) 0 deg
Fuel Type: Propane
Fenestration:
Area: 224 ft²
Avg. U: 0.34
Ratio: 16.1%
Avg. SHGC: 0.35

Total Conditioned Floor Area: 1,387 ft²
Existing Floor Area: n/a ft²
Raised Floor Area: 1,387 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 9.7 ft
Number of Dwelling Units: 1.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Kerosene Htr /Upgrade Coolg	1,387	13,454	1.00	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	715	0.036	R-30	R-0.0	0	14	X		Existing	02-A9	1st Flr
Roof	Wood	715	0.036	R-30	R-0.0	180	14	X		Existing	02-A9	1st Flr
Wall	Wood	300	0.074	R-19	R-0.0	0	90	X		Existing	09-A5	1st Flr
Door	None	25	0.500	None	R-0.0	0	90	X		Existing	28-A4	1st Flr
Wall	Wood	195	0.074	R-19	R-0.0	90	90	X		Existing	09-A5	1st Flr
Door	None	23	0.500	None	R-0.0	90	90	X		Existing	28-A4	1st Flr
Wall	Wood	330	0.074	R-19	R-0.0	180	90	X		Existing	09-A5	1st Flr
Wall	Wood	251	0.074	R-19	R-0.0	270	90	X		Existing	09-A5	1st Flr
Floor	Wood	1,387	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr

Run Initiation Time: 10/09/08 11:24:33 Run Code: 1223576673

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 14 Blt~2003 All Upgrades — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type			Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Front	(N)	91.0	0.340 NFRC	0.35 NFRC	0	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
2	Window	Left	(E)	40.0	0.340 NFRC	0.35 NFRC	90	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
3	Window	Rear	(S)	86.0	0.340 NFRC	0.35 NFRC	180	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr
4	Window	Right	(W)	7.0	0.340 NFRC	0.35 NFRC	270	90	Existing	NFRC rated Dbl/Vinyl w/LowE	1st Flr

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 14 Blt~2003 All Upgrades — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Kerosene Htr /Upgrade Coolg	Room Furnace	83% AFUE	Split Air Conditioner	16.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Kerosene Htr /Upgrade Coolg	Ductless / with Fan	Ducted	Attic	4.2	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric Rheem 82VR52-2	Small Elec.	No Pipe Insulation	1	40,000	50	Existing	0.92	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

TITLE 24 REPORT

Title 24 Report for:

Structure 15 Blt~2006
Apsuun St.
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-15

Date:

10/9/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 15 Blt~2006 EXISTING		DATE: 10/9/2008
PROJECT ADDRESS: Apsuun St. Yreka		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 5,736 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
[ ]	[ ]	[ ]	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
[ ]	[ ]	[ ]	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
[ ]	[ ]	[ ]	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 EXISTING	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

This Portion of the Report
Is Not Applicable to this Analysis

Percent better than Standard: (exceeding process)

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(E) 90 deg	Conditioned Floor Area	5,736	sqft.
Number of Stories	1	Unconditioned Floor Area	0	sqft.
Number of Systems	6	Conditioned Footprint Area	5,736	sqft.
Number of Zones	7	Fuel Type	Propane	

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	(E)	918	sqft.	33	sqft.	3.6%
Left Elevation	(S)	1,359	sqft.	219	sqft.	16.1%
Rear Elevation	(W)	902	sqft.	33	sqft.	3.7%
Right Elevation	(N)	1,250	sqft.	214	sqft.	17.1%
Total		4,429	sqft.	499	sqft.	11.3%
Roof		5,822	sqft.	0	sqft.	0.0%

	Standard		Proposed	
Lighting Power Density	1.240	W/sqft.	1.240	W/sqft.
Prescriptive Env. Heat Loss	932	Btu/h	858	Btu/h
Prescriptive Env. Heat Gain	79,301	Btu/h-F	87,881	Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 10:10:03 Run Code: 1223572203

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 EXISTING	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Existing FC/HP1	Offices & Hall (N)	Office	1,709	*1.200				
	Restrooms	Corridor/Restroom/Support	359	*0.600				
Existing FC/HP3	Kitchen	Kitchen, Food Preparation	305	*1.600				
Existing FC/HP4	Storage & Multi-Purpose	Convention/Conference/Meeting	1,647	*1.400				
Existing FC/HP5	Office & Hall (S)	Office	645	*1.200				
Existing FC/HP6	Lobby, Offices, RR	Office	1,061	*1.200				
Existing CU7	Server	Electrical, Mechanical Room	10	*0.700				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 10:10:03 Run Code: 1223572203

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 EXISTING

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,709	0.025	R-38	R-0.0	0	0	Existing	01-A18	Offices & Hall (N)
2	Wall	322	0.066	R-21	R-0.0	0	90	Existing	09-A24	Offices & Hall (N)
3	Wall	278	0.066	R-21	R-0.0	180	90	Existing	09-A24	Offices & Hall (N)
4	Wall	413	0.066	R-21	R-0.0	270	90	Existing	09-A24	Offices & Hall (N)
5	Roof	359	0.025	R-38	R-0.0	0	0	Existing	01-A18	Restrooms
6	Wall	162	0.066	R-21	R-0.0	0	90	Existing	09-A24	Restrooms
7	Wall	27	0.066	R-21	R-0.0	90	90	Existing	09-A24	Restrooms
8	Roof	305	0.025	R-38	R-0.0	0	0	Existing	01-A18	Kitchen
9	Wall	112	0.066	R-21	R-0.0	180	90	Existing	09-A24	Kitchen
10	Roof	806	0.028	R-38	R-0.0	90	16	Existing	02-A28	Storage & Multi-Purpose
11	Roof	103	0.028	R-38	R-0.0	180	16	Existing	02-A28	Storage & Multi-Purpose
12	Roof	806	0.028	R-38	R-0.0	270	16	Existing	02-A28	Storage & Multi-Purpose
13	Wall	117	0.066	R-21	R-0.0	0	90	Existing	09-A24	Storage & Multi-Purpose
14	Wall	562	0.066	R-21	R-0.0	90	90	Existing	09-A24	Storage & Multi-Purpose
15	Wall	485	0.066	R-21	R-0.0	180	90	Existing	09-A24	Storage & Multi-Purpose
16	Wall	343	0.066	R-21	R-0.0	270	90	Existing	09-A24	Storage & Multi-Purpose
17	Roof	645	0.025	R-38	R-0.0	0	0	Existing	01-A18	Office & Hall (S)
18	Wall	113	0.066	R-21	R-0.0	90	90	Existing	09-A24	Office & Hall (S)
19	Wall	244	0.066	R-21	R-0.0	180	90	Existing	09-A24	Office & Hall (S)
20	Roof	637	0.025	R-38	R-0.0	0	0	Existing	01-A18	Lobby, Offices, RR

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type			Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window	Right	(N)	64	0.580	116-A	0.65	116-B	0	Existing	Double Non Metal Clear	Offices & Hall (N)
2	Window	Left	(S)	48	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Offices & Hall (N)
3	Window	Rear	(W)	20	1.280	116-A	0.80	116-B	270	Existing	Single Metal Clear-Door	Offices & Hall (N)
4	Window	Rear	(W)	13	0.580	116-A	0.65	116-B	270	Existing	Double Non Metal Clear	Offices & Hall (N)
5	Window	Left	(S)	12	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Kitchen
6	Window	Left	(S)	98	1.280	116-A	0.80	116-B	180	Existing	Single Metal Clear-Door	Storage & Multi-Purpose
7	Window	Left	(S)	29	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Storage & Multi-Purpose
8	Window	Front	(E)	20	1.280	116-A	0.80	116-B	90	Existing	Single Metal Clear-Door	Office & Hall (S)
9	Window	Front	(E)	13	0.580	116-A	0.65	116-B	90	Existing	Double Non Metal Clear	Office & Hall (S)
10	Window	Left	(S)	32	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Office & Hall (S)
11	Window	Right	(N)	86	1.280	116-A	0.80	116-B	0	Existing	Single Metal Clear-Door	Lobby, Offices, RR
12	Window	Right	(N)	64	0.580	116-A	0.65	116-B	0	Existing	Double Non Metal Clear	Lobby, Offices, RR

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, COG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76												
2	None	0.76												
3	None	0.76												
4	None	0.76												
5	None	0.76												
6	None	0.76												
7	None	0.76												
8	None	0.76												
9	None	0.76												
10	None	0.76												
11	None	0.76												
12	None	0.76												

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:10:03 Run Code: 1223572203

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 EXISTING

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Roof	442	0.028	R-38	R-0.0	0	16	Existing	02-A28	Lobby, Offices, RR
22	Wall	425	0.066	R-21	R-0.0	0	90	Existing	09-A24	Lobby, Offices, RR
23	Wall	10	0.066	R-21	R-0.0	26	90	Existing	09-A24	Lobby, Offices, RR
24	Wall	5	0.066	R-21	R-0.0	70	90	Existing	09-A24	Lobby, Offices, RR
25	Wall	178	0.066	R-21	R-0.0	90	90	Existing	09-A24	Lobby, Offices, RR
26	Wall	21	0.066	R-21	R-0.0	180	90	Existing	09-A24	Lobby, Offices, RR
27	Wall	113	0.066	R-21	R-0.0	270	90	Existing	09-A24	Lobby, Offices, RR
28	Roof	10	0.028	R-38	R-0.0	180	16	Existing	02-A28	Server

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:10:03 Run Code: 1223572203

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 EXISTING

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
AO Smith ProMax ECT80	Small Elec.	No Pipe Insulation	1	20,478	80	Existing	0.86	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Armstrong Air 2 SHP 13/EFV 148	Split DX	1	47,500	5.0	7.70 HSPF	48,000	13.0 SEER / 11.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 118	Split DX	2	17,000	5.0	8.00 HSPF	18,000	13.5 SEER / 12.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 160	Split DX	1	55,000	5.0	7.70 HSPF	55,000	13.0 SEER / 11.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 136	Split DX	1	33,800	5.0	7.70 HSPF	35,200	13.0 SEER / 11.0 EER	Existing	No Economizer
Fujitsu Air Conditioning	Split DX	1	0	5.0	n/a	9,700	14.3 SEER / 12.0 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Armstrong Air 2 SHP 13/EFV 148	Constant Volume	Blow-Through	2,700	1.00	82.5%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 118	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 160	Constant Volume	Blow-Through	2,940	1.00	82.5%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 136	Constant Volume	Blow-Through	2,080	0.50	76.0%	100.0%	none			
Fujitsu Air Conditioning	Constant Volume	Blow-Through	500	0.30	64.0%	100.0%	none			

Run Initiation Time: 10/09/08 10:10:03 Run Code: 1223572203

MECHANICAL EQUIPMENT DETAILS

Part 2 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 EXISTING

DATE: 10/9/2008

ZONE TERMINAL SUMMARY

		TERMINAL UNIT			VAV			TERMINAL FAN			
Zone Name	System Name	System Type	Heating	Cooling	Qty.	Min CFM Ratio	Reheat Coil	CFM	BHP	Motor Eff.	Drive Eff.

EXHAUST FAN SUMMARY

EXHAUST FAN						EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.	Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Offices & Hall (North)	1.0	104	0.05	40.0%	97.0%	Lobby & Offices	1.0	61	0.03	40.0%	97.0%
Restrooms	1.0	207	0.10	49.0%	97.0%						
Kitchen	1.0	125	0.05	40.0%	97.0%						

Run Initiation Time: 10/09/08 10:10:03 Run Code: 1223572203

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 15 Blt~2006 WINDOW UPGRADES		DATE: 10/9/2008
PROJECT ADDRESS: Apsuun St. Yreka		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 5,736 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
[ ]	[ ]	[ ]	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
[ ]	[ ]	[ ]	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
[ ]	[ ]	[ ]	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 WINDOW UPGRADES	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

This Portion of the Report
Is Not Applicable to this Analysis

Percent better than Standard: (excluding process)

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(E) 90 deg	Conditioned Floor Area	5,736	sqft.
Number of Stories	1	Unconditioned Floor Area	0	sqft.
Number of Systems	6	Conditioned Footprint Area	5,736	sqft.
Number of Zones	7	Fuel Type	Propane	

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	(E)	918	sqft.	33	sqft.	3.6%
Left Elevation	(S)	1,359	sqft.	219	sqft.	16.1%
Rear Elevation	(W)	902	sqft.	33	sqft.	3.7%
Right Elevation	(N)	1,250	sqft.	214	sqft.	17.1%
Total		4,429	sqft.	499	sqft.	11.3%
Roof		5,822	sqft.	0	sqft.	0.0%

	Standard		Proposed	
Lighting Power Density	1.240	W/sqft.	1.240	W/sqft.
Prescriptive Env. Heat Loss	932	Btu/h	581	Btu/h
Prescriptive Env. Heat Gain	79,301	Btu/h-F	56,709	Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 10:12:36 Run Code: 1223572356

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 WINDOW UPGRADES	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Existing FC/HP1	Offices & Hall (N)	Office	1,709	*1.200				
	Restrooms	Corridor/Restroom/Support	359	*0.600				
Existing FC/HP3	Kitchen	Kitchen, Food Preparation	305	*1.600				
Existing FC/HP4	Storage & Multi-Purpose	Convention/Conference/Meeting	1,647	*1.400				
Existing FC/HP5	Office & Hall (S)	Office	645	*1.200				
Existing FC/HP6	Lobby, Offices, RR	Office	1,061	*1.200				
Existing CU7	Server	Electrical, Mechanical Room	10	*0.700				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 10:12:36 Run Code: 1223572356

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 WINDOW UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
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8	Roof	305	0.025	R-38	R-0.0	0	0	Existing	01-A18	Kitchen
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10	Roof	806	0.028	R-38	R-0.0	90	16	Existing	02-A28	Storage & Multi-Purpose
11	Roof	103	0.028	R-38	R-0.0	180	16	Existing	02-A28	Storage & Multi-Purpose
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15	Wall	485	0.066	R-21	R-0.0	180	90	Existing	09-A24	Storage & Multi-Purpose
16	Wall	343	0.066	R-21	R-0.0	270	90	Existing	09-A24	Storage & Multi-Purpose
17	Roof	645	0.025	R-38	R-0.0	0	0	Existing	01-A18	Office & Hall (S)
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19	Wall	244	0.066	R-21	R-0.0	180	90	Existing	09-A24	Office & Hall (S)
20	Roof	637	0.025	R-38	R-0.0	0	0	Existing	01-A18	Lobby, Offices, RR

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#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Right (N)	64	0.340	NFRC	0.35	NFRC	0	New	NFRC rated Dbl/Vinyl w/LowE	Offices & Hall (N)
2	Window Left (S)	48	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Offices & Hall (N)
3	Window Rear (W)	20	0.340	NFRC	0.35	NFRC	270	New	NFRC rated Dbl/Vnl LowE-Door	Offices & Hall (N)
4	Window Rear (W)	13	0.340	NFRC	0.35	NFRC	270	New	NFRC rated Dbl/Vinyl w/LowE	Offices & Hall (N)
5	Window Left (S)	12	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Kitchen
6	Window Left (S)	98	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vnl LowE-Door	Storage & Multi-Purpose
7	Window Left (S)	29	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Storage & Multi-Purpose
8	Window Front (E)	20	0.340	NFRC	0.35	NFRC	90	New	NFRC rated Dbl/Vnl LowE-Door	Office & Hall (S)
9	Window Front (E)	13	0.340	NFRC	0.35	NFRC	90	New	NFRC rated Dbl/Vinyl w/LowE	Office & Hall (S)
10	Window Left (S)	32	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Office & Hall (S)
11	Window Right (N)	86	0.340	NFRC	0.35	NFRC	0	New	NFRC rated Dbl/Vnl LowE-Door	Lobby, Offices, RR
12	Window Right (N)	64	0.340	NFRC	0.35	NFRC	0	New	NFRC rated Dbl/Vinyl w/LowE	Lobby, Offices, RR

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76											
2	None	0.76											
3	None	0.76											
4	None	0.76											
5	None	0.76											
6	None	0.76											
7	None	0.76											
8	None	0.76											
9	None	0.76											
10	None	0.76											
11	None	0.76											
12	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:12:36 Run Code: 1223572356

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 WINDOW UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Roof	442	0.028	R-38	R-0.0	0	16	Existing	02-A28	Lobby, Offices, RR
22	Wall	425	0.066	R-21	R-0.0	0	90	Existing	09-A24	Lobby, Offices, RR
23	Wall	10	0.066	R-21	R-0.0	26	90	Existing	09-A24	Lobby, Offices, RR
24	Wall	5	0.066	R-21	R-0.0	70	90	Existing	09-A24	Lobby, Offices, RR
25	Wall	178	0.066	R-21	R-0.0	90	90	Existing	09-A24	Lobby, Offices, RR
26	Wall	21	0.066	R-21	R-0.0	180	90	Existing	09-A24	Lobby, Offices, RR
27	Wall	113	0.066	R-21	R-0.0	270	90	Existing	09-A24	Lobby, Offices, RR
28	Roof	10	0.028	R-38	R-0.0	180	16	Existing	02-A28	Server

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:12:36 Run Code: 1223572356

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 WINDOW UPGRADES

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
AO Smith ProMax ECT80	Small Elec.	No Pipe Insulation	1	20,478	80	Existing	0.86	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Armstrong Air 2 SHP 13/EFV 148	Split DX	1	47,500	5.0	7.70 HSPF	48,000	13.0 SEER / 11.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 118	Split DX	2	17,000	5.0	8.00 HSPF	18,000	13.5 SEER / 12.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 160	Split DX	1	55,000	5.0	7.70 HSPF	55,000	13.0 SEER / 11.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 136	Split DX	1	33,800	5.0	7.70 HSPF	35,200	13.0 SEER / 11.0 EER	Existing	No Economizer
Fujitsu Air Conditioning	Split DX	1	0	5.0	n/a	9,700	14.3 SEER / 12.0 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Armstrong Air 2 SHP 13/EFV 148	Constant Volume	Blow-Through	2,700	1.00	82.5%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 118	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 160	Constant Volume	Blow-Through	2,940	1.00	82.5%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 136	Constant Volume	Blow-Through	2,080	0.50	76.0%	100.0%	none			
Fujitsu Air Conditioning	Constant Volume	Blow-Through	500	0.30	64.0%	100.0%	none			

Run Initiation Time: 10/09/08 10:12:36 Run Code: 1223572356

MECHANICAL EQUIPMENT DETAILS

Part 2 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 WINDOW UPGRADES

DATE: 10/9/2008

ZONE TERMINAL SUMMARY

		TERMINAL UNIT			VAV			TERMINAL FAN			
Zone Name	System Name	System Type	Heating	Cooling	Qty.	Min CFM Ratio	Reheat Coil	CFM	BHP	Motor Eff.	Drive Eff.

EXHAUST FAN SUMMARY

EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Offices & Hall (North)	1.0	104	0.05	40.0%	97.0%
Restrooms	1.0	207	0.10	49.0%	97.0%
Kitchen	1.0	125	0.05	40.0%	97.0%

EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Lobby & Offices	1.0	61	0.03	40.0%	97.0%

Run Initiation Time: 10/09/08 10:12:36 Run Code: 1223572356

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 15 Blt~2006 ATTIC INSUL. UPGRADE		DATE: 10/9/2008
PROJECT ADDRESS: Apsuun St. Yreka		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 5,736 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
☐	☐	☐	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
☐	☐	☐	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
☐	☐	☐	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 ATTIC INSUL. UPGRADE	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

Percent better than Standard: (exceeding process)

This Portion of the Report
Is Not Applicable to this Analysis

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(E) 90 deg	Conditioned Floor Area	5,736	sqft.
Number of Stories	1	Unconditioned Floor Area	0	sqft.
Number of Systems	6	Conditioned Footprint Area	5,736	sqft.
Number of Zones	7	Fuel Type	Propane	

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	(E)	918	sqft.	33	sqft.	3.6%
Left Elevation	(S)	1,359	sqft.	219	sqft.	16.1%
Rear Elevation	(W)	902	sqft.	33	sqft.	3.7%
Right Elevation	(N)	1,250	sqft.	214	sqft.	17.1%
Total		4,429	sqft.	499	sqft.	11.3%
Roof		5,822	sqft.	0	sqft.	0.0%

	Standard		Proposed	
Lighting Power Density	1.240	W/sqft.	1.240	W/sqft.
Prescriptive Env. Heat Loss	932	Btu/h	839	Btu/h
Prescriptive Env. Heat Gain	79,301	Btu/h-F	85,163	Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 10:15:06 Run Code: 1223572506

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 ATTIC INSUL. UPGRADE	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Existing FC/HP1	Offices & Hall (N)	Office	1,709	*1.200				
	Restrooms	Corridor/Restroom/Support	359	*0.600				
Existing FC/HP3	Kitchen	Kitchen, Food Preparation	305	*1.600				
Existing FC/HP4	Storage & Multi-Purpose	Convention/Conference/Meeting	1,647	*1.400				
Existing FC/HP5	Office & Hall (S)	Office	645	*1.200				
Existing FC/HP6	Lobby, Offices, RR	Office	1,061	*1.200				
Existing CU7	Server	Electrical, Mechanical Room	10	*0.700				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-6-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 10:15:06 Run Code: 1223572506

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 ATTIC INSUL. UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,709	0.020	R-49	R-0.0	0	0	New	01-A19	Offices & Hall (N)
2	Wall	322	0.066	R-21	R-0.0	0	90	Existing	09-A24	Offices & Hall (N)
3	Wall	278	0.066	R-21	R-0.0	180	90	Existing	09-A24	Offices & Hall (N)
4	Wall	413	0.066	R-21	R-0.0	270	90	Existing	09-A24	Offices & Hall (N)
5	Roof	359	0.020	R-49	R-0.0	0	0	New	01-A19	Restrooms
6	Wall	162	0.066	R-21	R-0.0	0	90	Existing	09-A24	Restrooms
7	Wall	27	0.066	R-21	R-0.0	90	90	Existing	09-A24	Restrooms
8	Roof	305	0.020	R-49	R-0.0	0	0	New	01-A19	Kitchen
9	Wall	112	0.066	R-21	R-0.0	180	90	Existing	09-A24	Kitchen
10	Roof	806	0.028	R-38	R-0.0	90	16	Existing	02-A28	Storage & Multi-Purpose
11	Roof	103	0.028	R-38	R-0.0	180	16	Existing	02-A28	Storage & Multi-Purpose
12	Roof	806	0.028	R-38	R-0.0	270	16	Existing	02-A28	Storage & Multi-Purpose
13	Wall	117	0.066	R-21	R-0.0	0	90	Existing	09-A24	Storage & Multi-Purpose
14	Wall	562	0.066	R-21	R-0.0	90	90	Existing	09-A24	Storage & Multi-Purpose
15	Wall	485	0.066	R-21	R-0.0	180	90	Existing	09-A24	Storage & Multi-Purpose
16	Wall	343	0.066	R-21	R-0.0	270	90	Existing	09-A24	Storage & Multi-Purpose
17	Roof	645	0.020	R-49	R-0.0	0	0	New	01-A19	Office & Hall (S)
18	Wall	113	0.066	R-21	R-0.0	90	90	Existing	09-A24	Office & Hall (S)
19	Wall	244	0.066	R-21	R-0.0	180	90	Existing	09-A24	Office & Hall (S)
20	Roof	637	0.020	R-49	R-0.0	0	0	New	01-A19	Lobby, Offices, RR

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Right (N)	64	0.580	116-A	0.65	116-B	0	Existing	Double Non Metal Clear	Offices & Hall (N)
2	Window Left (S)	48	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Offices & Hall (N)
3	Window Rear (W)	20	1.280	116-A	0.80	116-B	270	Existing	Single Metal Clear-Door	Offices & Hall (N)
4	Window Rear (W)	13	0.580	116-A	0.65	116-B	270	Existing	Double Non Metal Clear	Offices & Hall (N)
5	Window Left (S)	12	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Kitchen
6	Window Left (S)	98	1.280	116-A	0.80	116-B	180	Existing	Single Metal Clear-Door	Storage & Multi-Purpose
7	Window Left (S)	29	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Storage & Multi-Purpose
8	Window Front (E)	20	1.280	116-A	0.80	116-B	90	Existing	Single Metal Clear-Door	Office & Hall (S)
9	Window Front (E)	13	0.580	116-A	0.65	116-B	90	Existing	Double Non Metal Clear	Office & Hall (S)
10	Window Left (S)	32	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Office & Hall (S)
11	Window Right (N)	86	1.280	116-A	0.80	116-B	0	Existing	Single Metal Clear-Door	Lobby, Offices, RR
12	Window Right (N)	64	0.580	116-A	0.65	116-B	0	Existing	Double Non Metal Clear	Lobby, Offices, RR

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76											
2	None	0.76											
3	None	0.76											
4	None	0.76											
5	None	0.76											
6	None	0.76											
7	None	0.76											
8	None	0.76											
9	None	0.76											
10	None	0.76											
11	None	0.76											
12	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:15:06 Run Code: 1223572506

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 ATTIC INSUL. UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Roof	442	0.028	R-38	R-0.0	0	16	Existing	02-A28	Lobby, Offices, RR
22	Wall	425	0.066	R-21	R-0.0	0	90	Existing	09-A24	Lobby, Offices, RR
23	Wall	10	0.066	R-21	R-0.0	26	90	Existing	09-A24	Lobby, Offices, RR
24	Wall	5	0.066	R-21	R-0.0	70	90	Existing	09-A24	Lobby, Offices, RR
25	Wall	178	0.066	R-21	R-0.0	90	90	Existing	09-A24	Lobby, Offices, RR
26	Wall	21	0.066	R-21	R-0.0	180	90	Existing	09-A24	Lobby, Offices, RR
27	Wall	113	0.066	R-21	R-0.0	270	90	Existing	09-A24	Lobby, Offices, RR
28	Roof	10	0.028	R-38	R-0.0	180	16	Existing	02-A28	Server

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:15:06 Run Code: 1223572506

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 ATTIC INSUL. UPGRADE

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
AO Smith ProMax ECT80	Small Elec.	No Pipe Insulation	1	20,478	80	Existing	0.86	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
Armstrong Air 2 SHP 13/EFV 148	Split DX	1	47,500	5.0	7.70 HSPF	48,000	13.0 SEER / 11.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 118	Split DX	2	17,000	5.0	8.00 HSPF	18,000	13.5 SEER / 12.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 160	Split DX	1	55,000	5.0	7.70 HSPF	55,000	13.0 SEER / 11.0 EER	Existing	No Economizer
Armstrong Air 2 SHP 13/EFV 136	Split DX	1	33,800	5.0	7.70 HSPF	35,200	13.0 SEER / 11.0 EER	Existing	No Economizer
Fujitsu Air Conditioning	Split DX	1	0	5.0	n/a	9,700	14.3 SEER / 12.0 EER	Existing	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
Armstrong Air 2 SHP 13/EFV 148	Constant Volume	Blow-Through	2,700	1.00	82.5%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 118	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 160	Constant Volume	Blow-Through	2,940	1.00	82.5%	100.0%	none			
Armstrong Air 2 SHP 13/EFV 136	Constant Volume	Blow-Through	2,080	0.50	76.0%	100.0%	none			
Fujitsu Air Conditioning	Constant Volume	Blow-Through	500	0.30	64.0%	100.0%	none			

Run Initiation Time: 10/09/08 10:15:06 Run Code: 1223572506

MECHANICAL EQUIPMENT DETAILS

Part 2 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 ATTIC INSUL. UPGRADE

DATE: 10/9/2008

ZONE TERMINAL SUMMARY

		TERMINAL UNIT			VAV			TERMINAL FAN			
Zone Name	System Name	System Type	Heating	Cooling	Qty.	Min CFM Ratio	Reheat Coil	CFM	BHP	Motor Eff.	Drive Eff.

EXHAUST FAN SUMMARY

EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Offices & Hall (North)	1.0	104	0.05	40.0%	97.0%
Restrooms	1.0	207	0.10	49.0%	97.0%
Kitchen	1.0	125	0.05	40.0%	97.0%

EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Lobby & Offices	1.0	61	0.03	40.0%	97.0%

Run Initiation Time: 10/09/08 10:15:06 Run Code: 1223572506

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 15 Blt~2006 HVAC UPGRADE		DATE: 10/9/2008
PROJECT ADDRESS: Apsuun St. Yreka		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 5,736 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
[ ]	[ ]	[ ]	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
[ ]	[ ]	[ ]	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
[ ]	[ ]	[ ]	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 HVAC UPGRADE	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

Percent better than Standard: (excluding process)

This Portion of the Report
Is Not Applicable to this Analysis

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(E) 90 deg	Conditioned Floor Area	5,736	sqft.
Number of Stories	1	Unconditioned Floor Area	0	sqft.
Number of Systems	6	Conditioned Footprint Area	5,736	sqft.
Number of Zones	7	Fuel Type	Propane	

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	(E)	918	sqft.	33	sqft.	3.6%
Left Elevation	(S)	1,359	sqft.	219	sqft.	16.1%
Rear Elevation	(W)	902	sqft.	33	sqft.	3.7%
Right Elevation	(N)	1,250	sqft.	214	sqft.	17.1%
Total		4,429	sqft.	499	sqft.	11.3%
Roof		5,822	sqft.	0	sqft.	0.0%

	Standard		Proposed	
Lighting Power Density	1.240	W/sqft.	1.240	W/sqft.
Prescriptive Env. Heat Loss	932	Btu/h	858	Btu/h
Prescriptive Env. Heat Gain	79,301	Btu/h-F	87,881	Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 10:06:46 Run Code: 1223572006

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 HVAC UPGRADE	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Upgraded FC/HP1	Offices & Hall (N)	Office	1,709	*1.200				
	Restrooms	Corridor/Restroom/Support	359	*0.600				
Upgraded FC/HP3	Kitchen	Kitchen, Food Preparation	305	*1.600				
Upgraded FC/HP4	Storage & Multi-Purpose	Convention/Conference/Meeting	1,647	*1.400				
Upgraded FC/HP5	Office & Hall (S)	Office	645	*1.200				
Upgraded FC/HP6	Lobby, Offices, RR	Office	1,061	*1.200				
Upgraded CU7 - Server	Server	Electrical, Mechanical Room	10	*0.700				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The HVAC System "Upgraded FC/HP1" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP3 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP4 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP5 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP6 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 10:06:46 Run Code: 1223572006

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,709	0.025	R-38	R-0.0	0	0	Existing	01-A18	Offices & Hall (N)
2	Wall	322	0.066	R-21	R-0.0	0	90	Existing	09-A24	Offices & Hall (N)
3	Wall	278	0.066	R-21	R-0.0	180	90	Existing	09-A24	Offices & Hall (N)
4	Wall	413	0.066	R-21	R-0.0	270	90	Existing	09-A24	Offices & Hall (N)
5	Roof	359	0.025	R-38	R-0.0	0	0	Existing	01-A18	Restrooms
6	Wall	162	0.066	R-21	R-0.0	0	90	Existing	09-A24	Restrooms
7	Wall	27	0.066	R-21	R-0.0	90	90	Existing	09-A24	Restrooms
8	Roof	305	0.025	R-38	R-0.0	0	0	Existing	01-A18	Kitchen
9	Wall	112	0.066	R-21	R-0.0	180	90	Existing	09-A24	Kitchen
10	Roof	806	0.028	R-38	R-0.0	90	16	Existing	02-A28	Storage & Multi-Purpose
11	Roof	103	0.028	R-38	R-0.0	180	16	Existing	02-A28	Storage & Multi-Purpose
12	Roof	806	0.028	R-38	R-0.0	270	16	Existing	02-A28	Storage & Multi-Purpose
13	Wall	117	0.066	R-21	R-0.0	0	90	Existing	09-A24	Storage & Multi-Purpose
14	Wall	562	0.066	R-21	R-0.0	90	90	Existing	09-A24	Storage & Multi-Purpose
15	Wall	485	0.066	R-21	R-0.0	180	90	Existing	09-A24	Storage & Multi-Purpose
16	Wall	343	0.066	R-21	R-0.0	270	90	Existing	09-A24	Storage & Multi-Purpose
17	Roof	645	0.025	R-38	R-0.0	0	0	Existing	01-A18	Office & Hall (S)
18	Wall	113	0.066	R-21	R-0.0	90	90	Existing	09-A24	Office & Hall (S)
19	Wall	244	0.066	R-21	R-0.0	180	90	Existing	09-A24	Office & Hall (S)
20	Roof	637	0.025	R-38	R-0.0	0	0	Existing	01-A18	Lobby, Offices, RR

*N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Right (N)	64	0.580	116-A	0.65	116-B	0	Existing	Double Non Metal Clear	Offices & Hall (N)
2	Window Left (S)	48	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Offices & Hall (N)
3	Window Rear (W)	20	1.280	116-A	0.80	116-B	270	Existing	Single Metal Clear-Door	Offices & Hall (N)
4	Window Rear (W)	13	0.580	116-A	0.65	116-B	270	Existing	Double Non Metal Clear	Offices & Hall (N)
5	Window Left (S)	12	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Kitchen
6	Window Left (S)	98	1.280	116-A	0.80	116-B	180	Existing	Single Metal Clear-Door	Storage & Multi-Purpose
7	Window Left (S)	29	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Storage & Multi-Purpose
8	Window Front (E)	20	1.280	116-A	0.80	116-B	90	Existing	Single Metal Clear-Door	Office & Hall (S)
9	Window Front (E)	13	0.580	116-A	0.65	116-B	90	Existing	Double Non Metal Clear	Office & Hall (S)
10	Window Left (S)	32	0.580	116-A	0.65	116-B	180	Existing	Double Non Metal Clear	Office & Hall (S)
11	Window Right (N)	86	1.280	116-A	0.80	116-B	0	Existing	Single Metal Clear-Door	Lobby, Offices, RR
12	Window Right (N)	64	0.580	116-A	0.65	116-B	0	Existing	Double Non Metal Clear	Lobby, Offices, RR

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76											
2	None	0.76											
3	None	0.76											
4	None	0.76											
5	None	0.76											
6	None	0.76											
7	None	0.76											
8	None	0.76											
9	None	0.76											
10	None	0.76											
11	None	0.76											
12	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:06:46 Run Code: 1223572006

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 HVAC UPGRADE

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Roof	442	0.028	R-38	R-0.0	0	16	Existing	02-A28	Lobby, Offices, RR
22	Wall	425	0.066	R-21	R-0.0	0	90	Existing	09-A24	Lobby, Offices, RR
23	Wall	10	0.066	R-21	R-0.0	26	90	Existing	09-A24	Lobby, Offices, RR
24	Wall	5	0.066	R-21	R-0.0	70	90	Existing	09-A24	Lobby, Offices, RR
25	Wall	178	0.066	R-21	R-0.0	90	90	Existing	09-A24	Lobby, Offices, RR
26	Wall	21	0.066	R-21	R-0.0	180	90	Existing	09-A24	Lobby, Offices, RR
27	Wall	113	0.066	R-21	R-0.0	270	90	Existing	09-A24	Lobby, Offices, RR
28	Roof	10	0.028	R-38	R-0.0	180	16	Existing	02-A28	Server

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:06:46 Run Code: 1223572006

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 HVAC UPGRADE

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
AO Smith ProMax ECT80	Small Elec.	No Pipe Insulation	1	20,478	80	Existing	0.86	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING		Condition Status	Economizer Type
			Output	Aux. kW	Eff.	Output	Efficiency		
New Heatg&Coolg FC/HP1	Split DX	1	47,500	5.0	10.00 HSPF	48,000	16.0 SEER / 11.0 EER	New	No Economizer
New Heatg&Cooling FC/HP3	Split DX	1	17,000	5.0	10.00 HSPF	18,000	16.0 SEER / 12.0 EER	New	No Economizer
New Heatg&Coolg FC/HP4	Split DX	1	55,000	5.0	10.00 HSPF	55,000	16.0 SEER / 11.0 EER	New	No Economizer
New Heatg&Coolg FC/HP5	Split DX	1	17,000	5.0	10.00 HSPF	18,000	16.0 SEER / 12.0 EER	New	No Economizer
New Heatg & Coolg FC/HP6	Split DX	1	33,800	5.0	10.00 HSPF	35,200	16.0 SEER / 11.0 EER	New	No Economizer
New Coolg CU7	Split DX	1	0	5.0	n/a HSPF	9,700	16.0 SEER / 12.0 EER	New	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
New Heatg&Coolg FC/HP1	Constant Volume	Blow-Through	2,700	1.00	82.5%	100.0%	none			
New Heatg&Cooling FC/HP3	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
New Heatg&Coolg FC/HP4	Constant Volume	Blow-Through	2,940	1.00	82.5%	100.0%	none			
New Heatg&Coolg FC/HP5	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
New Heatg & Coolg FC/HP6	Constant Volume	Blow-Through	2,080	0.50	76.0%	100.0%	none			
New Coolg CU7	Constant Volume	Blow-Through	500	0.30	64.0%	100.0%	none			

MECHANICAL EQUIPMENT DETAILS

Part 2 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 HVAC UPGRADE

DATE: 10/9/2008

ZONE TERMINAL SUMMARY

		TERMINAL UNIT			VAV			TERMINAL FAN			
Zone Name	System Name	System Type	Heating	Cooling	Qty.	Min CFM Ratio	Reheat Coil	CFM	BHP	Motor Eff.	Drive Eff.

EXHAUST FAN SUMMARY

EXHAUST FAN						EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.	Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Offices & Hall (North)	1.0	104	0.05	40.0%	97.0%	Lobby & Offices	1.0	61	0.03	40.0%	97.0%
Restrooms	1.0	207	0.10	49.0%	97.0%						
Kitchen	1.0	125	0.05	40.0%	97.0%						

Run Initiation Time: 10/09/08 10:06:46 Run Code: 1223572006

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 1 of 3 PERF-1

PROJECT NAME: Structure 15 Blt~2006 ALL UPGRADES		DATE: 10/9/2008
PROJECT ADDRESS: Apsuun St. Yreka		Building Permit #
PRINCIPAL DESIGNER - ENVELOPE: Karuk Tribe Building Energy Assessment	TELEPHONE	
DOCUMENTATION AUTHOR: ABBAY TECHNICAL SERVICES	TELEPHONE: (707) 826-1433	Checked by/Date Enforcement Agency Use

GENERAL INFORMATION

DATE OF PLANS	BUILDING CONDITIONED FLOOR AREA: 5,736 Sq.Ft.			CLIMATE ZONE: 16
BUILDING TYPE	[X] NONRESIDENTIAL	[ ] HIGH RISE RESIDENTIAL	[ ] HOTEL/MOTEL GUEST ROOM	
PHASE OF CONSTRUCTION	[X] NEW CONSTRUCTION	[ ] ADDITION	[ ] EXISTING + ADDITION/ALTERATION	

STATEMENT OF COMPLIANCE

This Certificate of Compliance lists the building features and performance specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations. This certificate applies only to a Building using the performance compliance approach.

The documentation preparer hereby certifies that the documentation is accurate and complete.

DOCUMENTATION AUTHOR	SIGNATURE	DATE
Anne M. McQueeney, CEA, CEPE		

The Principal Designer hereby certifys that the proposed building design represented in this set of construction documents is consistent with the other compliance forms and worksheets, with the specifications, and with any other calculations submitted with this permit application. The proposed building as designed meets the energy efficiency requirements contained in sections 110, 116, through 118, and 140, 142, 143 or 149 of Title 24, Part 6.

ENV.	LTG.	MECH.	
[ ]	[ ]	[ ]	1. I hereby affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code to sign this document as the person responsible for its preparation; and that I am licensed in the State of California as a civil engineer, mechanical engineer, electrical engineer, or I am a licensed architect.
[ ]	[ ]	[ ]	2. I affirm that I am eligible under the provisions of Division 3 of the Business and Professions Code Section 5537.2 or 6737.3 to sign this document as the person responsible for its preparation; and that I am a licensed contractor performing this work.
[ ]	[ ]	[ ]	3. I affirm that I am eligible under Division 3 of the Business and Professions Code to sign this document because it pertains to a structure or type of work described as exempt pursuant to Business and Professions Code Sections 5537, 5538, and 6737.1. (These sections of the Business and Professions Code are printed in full in the Nonresidential Manual.)

ENVELOPE COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	ENV-1

PRINCIPAL ENVELOPE DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE
Karuk Tribe Building Energy Assessment			

LIGHTING COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	LTG-1, LTG-2

PRINCIPAL LIGHTING DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

MECHANICAL COMPLIANCE

Indicate location on plans of Note Block for Mandatory Measures	
Required Forms	MECH-1, MECH-2, MECH-3, MECH-5

PRINCIPAL MECHANICAL DESIGNER - NAME	SIGNATURE	LIC. NO.	DATE

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 2 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 ALL UPGRADES	10/9/2008

ANNUAL TDV ENERGY USE SUMMARY (kBtu/sqft-yr)

Energy Component	Standard Design	Proposed Design	Compliance Margin
Space Heating			
Space Cooling			
Indoor Fans			
Heat Rejection			
Pumps & Misc.			
Domestic Hot Water			
Lighting			
Receptacle			
Process			
TOTALS:			

This Portion of the Report
Is Not Applicable to this Analysis

Percent better than Standard: (excluding process)

CALCULATED RESULTS ARE NOT CURRENT

GENERAL INFORMATION

Building Orientation	(E) 90 deg	Conditioned Floor Area	5,736	sqft.
Number of Stories	1	Unconditioned Floor Area	0	sqft.
Number of Systems	6	Conditioned Footprint Area	5,736	sqft.
Number of Zones	7	Fuel Type	Propane	

	Orientation	Gross Area		Glazing Area		Glazing Ratio
Front Elevation	(E)	918	sqft.	33	sqft.	3.6%
Left Elevation	(S)	1,359	sqft.	219	sqft.	16.1%
Rear Elevation	(W)	902	sqft.	33	sqft.	3.7%
Right Elevation	(N)	1,250	sqft.	214	sqft.	17.1%
Total		4,429	sqft.	499	sqft.	11.3%
Roof		5,822	sqft.	0	sqft.	0.0%

	Standard		Proposed	
Lighting Power Density	1.240	W/sqft.	1.240	W/sqft.
Prescriptive Env. Heat Loss	932	Btu/h	563	Btu/h
Prescriptive Env. Heat Gain	79,301	Btu/h-F	53,981	Btu/h-F

Remarks:

Run Initiation Time: 10/09/08 10:34:38 Run Code: 1223573678

PERFORMANCE CERTIFICATE OF COMPLIANCE Part 3 of 3 PERF-1

PROJECT NAME	DATE
Structure 15 Blt~2006 ALL UPGRADES	10/9/2008

ZONE INFORMATION

System Name	Zone Name	Occupancy Type	Floor Area (sqft.)	Inst. LPD (W/sf) [1]	Ctrl. Credits (W/sf) [2]	Allowed LPD Area (W/sf) [3]	Allowed LPD Tailored (W/sf) [4]	Proc. Loads (W/sf)
Upgraded FC/HP1	Offices & Hall (N)	Office	1,709	*1.200				
	Restrooms	Corridor/Restroom/Support	359	*0.600				
Upgraded FC/HP3	Kitchen	Kitchen, Food Preparation	305	*1.600				
Upgraded FC/HP4	Storage & Multi-Purpose	Convention/Conference/Meeting	1,647	*1.400				
Upgraded FC/HP5	Office & Hall (S)	Office	645	*1.200				
Upgraded FC/HP6	Lobby, Offices, RR	Office	1,061	*1.200				
Upgraded CU7 - Server	Server	Electrical, Mechanical Room	10	*0.700				

Notes: 1. See LTG-2-C (Items marked with asterisk, see LTG-2 -C by others) 2. See LTG-4-C 3. See LTG-5-C (by others) 4. See LTG-5-C

Items above require special documentation

EXCEPTIONAL CONDITIONS COMPLIANCE CHECKLIST

The local enforcement agency should pay special attention to the items specified in this checklist. These items require special written justification and documentation, and special verification to be used with the performance approach. The local enforcement agency determines the adequacy of the justification, and may reject a building or design that otherwise complies based on the adequacy of the special justification and documentation submitted.

The HVAC System "Upgraded FC/HP1" Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP3 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP4 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP5 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.
The HVAC System "Upgraded FC/HP6 " Incorporates HERS verified Duct Leakage. Target leakage is calculated and documented on the MECH-5-A.

The exceptional features listed in this performance approach application have specifically been reviewed. Adequate written justification and documentation for their use have been provided by the applicant.

Authorized Signature or Stamp _____

Run Initiation Time: 10/09/08 10:34:38 Run Code: 1223573678

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 ALL UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
1	Roof	1,709	0.020	R-49	R-0.0	0	0	New	01-A19	Offices & Hall (N)
2	Wall	322	0.066	R-21	R-0.0	0	90	Existing	09-A24	Offices & Hall (N)
3	Wall	278	0.066	R-21	R-0.0	180	90	Existing	09-A24	Offices & Hall (N)
4	Wall	413	0.066	R-21	R-0.0	270	90	Existing	09-A24	Offices & Hall (N)
5	Roof	359	0.020	R-49	R-0.0	0	0	New	01-A19	Restrooms
6	Wall	162	0.066	R-21	R-0.0	0	90	Existing	09-A24	Restrooms
7	Wall	27	0.066	R-21	R-0.0	90	90	Existing	09-A24	Restrooms
8	Roof	305	0.020	R-49	R-0.0	0	0	New	01-A19	Kitchen
9	Wall	112	0.066	R-21	R-0.0	180	90	Existing	09-A24	Kitchen
10	Roof	806	0.028	R-38	R-0.0	90	16	Existing	02-A28	Storage & Multi-Purpose
11	Roof	103	0.028	R-38	R-0.0	180	16	Existing	02-A28	Storage & Multi-Purpose
12	Roof	806	0.028	R-38	R-0.0	270	16	Existing	02-A28	Storage & Multi-Purpose
13	Wall	117	0.066	R-21	R-0.0	0	90	Existing	09-A24	Storage & Multi-Purpose
14	Wall	562	0.066	R-21	R-0.0	90	90	Existing	09-A24	Storage & Multi-Purpose
15	Wall	485	0.066	R-21	R-0.0	180	90	Existing	09-A24	Storage & Multi-Purpose
16	Wall	343	0.066	R-21	R-0.0	270	90	Existing	09-A24	Storage & Multi-Purpose
17	Roof	645	0.020	R-49	R-0.0	0	0	New	01-A19	Office & Hall (S)
18	Wall	113	0.066	R-21	R-0.0	90	90	Existing	09-A24	Office & Hall (S)
19	Wall	244	0.066	R-21	R-0.0	180	90	Existing	09-A24	Office & Hall (S)
20	Roof	637	0.020	R-49	R-0.0	0	0	New	01-A19	Lobby, Offices, RR

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]		SHGC[2]		Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Right (N)	64	0.340	NFRC	0.35	NFRC	0	New	NFRC rated Dbl/Vinyl w/LowE	Offices & Hall (N)
2	Window Left (S)	48	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Offices & Hall (N)
3	Window Rear (W)	20	0.340	NFRC	0.35	NFRC	270	New	NFRC rated Dbl/Vnl LowE-Door	Offices & Hall (N)
4	Window Rear (W)	13	0.340	NFRC	0.35	NFRC	270	New	NFRC rated Dbl/Vinyl w/LowE	Offices & Hall (N)
5	Window Left (S)	12	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Kitchen
6	Window Left (S)	98	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vnl LowE-Door	Storage & Multi-Purpose
7	Window Left (S)	29	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Storage & Multi-Purpose
8	Window Front (E)	20	0.340	NFRC	0.35	NFRC	90	New	NFRC rated Dbl/Vnl LowE-Door	Office & Hall (S)
9	Window Front (E)	13	0.340	NFRC	0.35	NFRC	90	New	NFRC rated Dbl/Vinyl w/LowE	Office & Hall (S)
10	Window Left (S)	32	0.340	NFRC	0.35	NFRC	180	New	NFRC rated Dbl/Vinyl w/LowE	Office & Hall (S)
11	Window Right (N)	86	0.340	NFRC	0.35	NFRC	0	New	NFRC rated Dbl/Vnl LowE-Door	Lobby, Offices, RR
12	Window Right (N)	64	0.340	NFRC	0.35	NFRC	0	New	NFRC rated Dbl/Vinyl w/LowE	Lobby, Offices, RR

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	None	0.76											
2	None	0.76											
3	None	0.76											
4	None	0.76											
5	None	0.76											
6	None	0.76											
7	None	0.76											
8	None	0.76											
9	None	0.76											
10	None	0.76											
11	None	0.76											
12	None	0.76											

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 W/ft2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:34:38 Run Code: 1223573678

CERTIFICATE OF COMPLIANCE ENV-1-C

PROJECT NAME: Structure 15 Blt~2006 ALL UPGRADES

DATE: 10/9/2008

OPAQUE SURFACES

#	Surface Type	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Cond.* Status	Joint Appendix IV Reference	Location / Comments
21	Roof	442	0.028	R-38	R-0.0	0	16	Existing	02-A28	Lobby, Offices, RR
22	Wall	425	0.066	R-21	R-0.0	0	90	Existing	09-A24	Lobby, Offices, RR
23	Wall	10	0.066	R-21	R-0.0	26	90	Existing	09-A24	Lobby, Offices, RR
24	Wall	5	0.066	R-21	R-0.0	70	90	Existing	09-A24	Lobby, Offices, RR
25	Wall	178	0.066	R-21	R-0.0	90	90	Existing	09-A24	Lobby, Offices, RR
26	Wall	21	0.066	R-21	R-0.0	180	90	Existing	09-A24	Lobby, Offices, RR
27	Wall	113	0.066	R-21	R-0.0	270	90	Existing	09-A24	Lobby, Offices, RR
28	Roof	10	0.020	R-49	R-0.0	180	16	New	01-A19	Server

* N, E, A, R (New, Existing, Altered, Removed)

FENESTRATION SURFACES

☐ More than or equal to 10,000 sq.ft. of site-built fenestration area must include a label certificate either issued by NFRC or provide a CEC Default Label Certificate using the default U-factors from Standards Table 116-A and B. Certificate shall be filed in the contractor's project office during construction and in the building manager's office after construction

#	Type	Area	U-Fac.[1]	SHGC[2]	Act. Azm.	Cond. Stat.	Glazing Type	Location/ Comments

(1) U-factor Type: 116-A Default Table from Standards, Table N-1 Default Table from the ACM Manual Appendix, NFRC Labeled value.
(2) SHGC Type: 116-B Default Table from Standards, CCG Center of Glass, NFRC Labeled Value

EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt. Wd.	Overhang Len. Hgt. LExt.RExt.	Left Fin Dist. Len. Hgt.	Right Fin Dist. Len. Hgt.

MINIMUM SKYLIGHT AREA FOR LARGE ENCLOSED SPACES

☐ The proposed building is in climate zones 2 through 15 and contains an enclosed space with floor area greater than 25,000 ft2, a ceiling height greater than 15 feet, and an LPD for general lighting of at least 0.5 Watt2. See Section 143(c). If this box is checked, ENV-4-C must be filled out. when submitting under the Prescriptive Compliance Approach.

Run Initiation Time: 10/09/08 10:34:38 Run Code: 1223573678

MECHANICAL EQUIPMENT DETAILS

Part 1 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 ALL UPGRADES

DATE: 10/9/2008

CHILLER AND TOWER SUMMARY

Equipment Name	Equipment Type	Qty.	Efficiency	Tons	PUMPS					
					Tot. Qty	GPM	BHP	Motor Eff.	Drive Eff.	Pump Control

DHW / BOILER SUMMARY

System Name	System Type	Distribution Type	Qty	Rated Input	Vol. (Gals.)	Condition Status	Energy Factor or RE	Standby Loss or Pilot	TANK INSUL. Ext. R-Val.
AO Smith ProMax ECT80	Small Elec.	No Pipe Insulation	1	20,478	80	Existing	0.86	n/a	n/a

MULTI-FAMILY CENTRAL WATER HEATING DETAILS

Hot Water Pump				Hot Water Piping Length (ft)			
Control	#	HP	Type	In Plenum	Outside	Buried	Add 1/2" Insulation

CENTRAL SYSTEM RATINGS

System Name	System Type	Qty	HEATING			COOLING			
			Output	Aux. kW	Eff.	Output	Efficiency	Condition Status	Economizer Type
New Heatg&Coolg FC/HP1	Split DX	1	47,500	5.0	10.00 HSPF	48,000	16.0 SEER / 11.0 EER	New	No Economizer
New Heatg&Cooling FC/HP3	Split DX	1	17,000	5.0	10.00 HSPF	18,000	16.0 SEER / 12.0 EER	New	No Economizer
New Heatg&Coolg FC/HP4	Split DX	1	55,000	5.0	10.00 HSPF	55,000	16.0 SEER / 11.0 EER	New	No Economizer
New Heatg&Coolg FC/HP5	Split DX	1	17,000	5.0	10.00 HSPF	18,000	16.0 SEER / 12.0 EER	New	No Economizer
New Heatg & Coolg FC/HP6	Split DX	1	33,800	5.0	10.00 HSPF	35,200	16.0 SEER / 11.0 EER	New	No Economizer
New Coolg CU7	Split DX	1	0	5.0	n/a HSPF	9,700	16.0 SEER / 12.0 EER	New	No Economizer

CENTRAL SYSTEM FAN SUMMARY

System Name	Fan Type	SUPPLY FAN					RETURN FAN			
		Motor Location	CFM	BHP	Motor Eff.	Drive Eff.	CFM	BHP	Motor Eff.	Drive Eff.
New Heatg&Coolg FC/HP1	Constant Volume	Blow-Through	2,700	1.00	82.5%	100.0%	none			
New Heatg&Cooling FC/HP3	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
New Heatg&Coolg FC/HP4	Constant Volume	Blow-Through	2,940	1.00	82.5%	100.0%	none			
New Heatg&Coolg FC/HP5	Constant Volume	Blow-Through	1,480	0.50	76.0%	100.0%	none			
New Heatg & Coolg FC/HP6	Constant Volume	Blow-Through	2,080	0.50	76.0%	100.0%	none			
New Coolg CU7	Constant Volume	Blow-Through	500	0.30	64.0%	100.0%	none			

MECHANICAL EQUIPMENT DETAILS

Part 2 of 2 **MECH-5-C**

PROJECT NAME: Structure 15 Blt~2006 ALL UPGRADES

DATE: 10/9/2008

ZONE TERMINAL SUMMARY

		TERMINAL UNIT			VAV			TERMINAL FAN			
Zone Name	System Name	System Type	Heating	Cooling	Qty.	Min CFM Ratio	Reheat Coil	CFM	BHP	Motor Eff.	Drive Eff.

EXHAUST FAN SUMMARY

EXHAUST FAN						EXHAUST FAN					
Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.	Room Name	Qty.	CFM	BHP	Motor Eff.	Drive Eff.
Offices & Hall (North)	1.0	104	0.05	40.0%	97.0%	Lobby & Offices	1.0	61	0.03	40.0%	97.0%
Restrooms	1.0	207	0.10	49.0%	97.0%						
Kitchen	1.0	125	0.05	40.0%	97.0%						

Run Initiation Time: 10/09/08 10:34:38 Run Code: 1223573678

TITLE 24 REPORT

Title 24 Report for:

Structure 16 Built~1992
1331 Tucka Tucka Tee
Yreka, CA

Project Designer:

Karuk Tribe Building Energy Assessment
Winzler & Kelly Consulting Engineers

,

Report Prepared By:

Anne M. McQueeney, CEA, CEPE
ABBAY TECHNICAL SERVICES
1125 16th Street, Rm. 216
Arcata, CA 95521
(707) 826-1433

Job Number:

8075-16

Date:

9/26/2008

The EnergyPro computer program has been used to perform the calculations summarized in this compliance report. This program has approval and is authorized by the California Energy Commission for use with both the Residential and Nonresidential 2005 Building Energy Efficiency Standards.

This program developed by EnergySoft, LLC - www.energysoft.com.

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 16 Built~1992 EXISTING
Project Title

9/26/2008
Date

1331 Tucka Tucka Tee Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SE) 135 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.79
Ratio: 9.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.026	R-38	R-0.0	135	0	X		Existing	01-A8	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	135	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	1,098	0.026	R-38	R-0.0	135	0	X		Existing	01-A8	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Run Initiation Time: 09/26/08 14:26:50 Run Code: 1222464410

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 16 Built~1992 EXISTING — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SE)	176.0	0.790	116-A 0.70	116-B 135	90	Existing	Double Metal Clear Default	1st Flr Living Areas
2	Window Left (SW)	9.0	0.790	116-A 0.70	116-B 225	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window Right (NE)	9.0	0.790	116-A 0.70	116-B 45	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window Rear (NW)	128.0	0.790	116-A 0.70	116-B 315	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 16 Built~1992 EXISTING — Project Title
9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	63% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,358	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	Hot Water Pump HP	Hot Water Pump Type	Hot Water Piping Length (ft) In Plenum	Hot Water Piping Length (ft) Outside	Hot Water Piping Length (ft) Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 16 Built~1992 WINDOW UPGRADE
Project Title

9/26/2008
Date

1331 Tucka Tucka Tee Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SE) 135 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft²
Ratio: 9.7%
Avg. U: 0.34
Avg. SHGC: 0.35

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.026	R-38	R-0.0	135	0	X		Existing	01-A8	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	135	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	1,098	0.026	R-38	R-0.0	135	0	X		Existing	01-A8	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Run Initiation Time: 09/26/08 14:24:58 Run Code: 1222464298

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 16 Built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SE)	176.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (SW)	9.0	0.340 NFRC	0.35 NFRC	225	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Right (NE)	9.0	0.340 NFRC	0.35 NFRC	45	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Rear (NW)	128.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 16 Built~1992 WINDOW UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers

Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 16 Built~1992 ATTIC INSUL UPGRADE
Project Title

9/26/2008
Date

1331 Tucka Tucka Tee Yreka
Project Address

Building Permit #

ARRAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SE) 135 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.79
Ratio: 9.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.020	R-49	R-0.0	135	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	135	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Living Areas
Roof	Wood	1,098	0.020	R-49	R-0.0	135	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.037	R-19	R-0.0	0	180		X	Existing	20-A4	1st Flr Bedrooms

Run Initiation Time: 09/26/08 14:29:38 Run Code: 1222464578

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 16 Built~1992 ATTIC INSUL. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SE)	176.0	0.790 116-A	0.70 116-B	135	90	Existing	Double Metal Clear Default	1st Flr Living Areas
2	Window Left (SW)	9.0	0.790 116-A	0.70 116-B	225	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window Right (NE)	9.0	0.790 116-A	0.70 116-B	45	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window Rear (NW)	128.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 16 Built~1992 ATTIC INSUL. UPGRADE — Project Title

9/26/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Strctr 16 Built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title
9/26/2008 — Date
1331 Tucka Tucka Tee Yreka — Project Address
Building Permit #
ARRAY TECHNICAL SERVICES — Documentation Author
(707) 826-1433 — Telephone
Plan Check/Date
EnergyPro — Compliance Method
CA Climate Zone 16 — Climate Zone
Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps			
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition — ☒ Multi Family ☒ Existing + Add/Alt
Building Front Orientation: (SE) 135 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft² **Avg. U:** 0.79
Ratio: 9.7% **Avg. SHGC:** 0.70

Total Conditioned Floor Area: 3,328 ft²
Existing Floor Area: 3,328 ft²
Raised Floor Area: 3,328 ft²
Slab on Grade Area: 0 ft²
Average Ceiling Height: 8.0 ft
Number of Dwelling Units: 4.00
Number of Stories: 1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Act. Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.020	R-49	R-0.0	135	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	135	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Living Areas
Roof	Wood	1,098	0.020	R-49	R-0.0	135	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Bedrooms

Run Initiation Time: 09/26/08 14:27:49 Run Code: 1222464469

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Strctr 16 Built~1992 ATTIC&FLOOR INS. UPGRADE — Project Title

9/26/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SE)	176.0	0.790 116-A	0.70 116-B	135	90	Existing	Double Metal Clear Default	1st Flr Living Areas
2	Window Left (SW)	9.0	0.790 116-A	0.70 116-B	225	90	Existing	Double Metal Clear Default	1st Flr Living Areas
3	Window Right (NE)	9.0	0.790 116-A	0.70 116-B	45	90	Existing	Double Metal Clear Default	1st Flr Living Areas
4	Window Rear (NW)	128.0	0.790 116-A	0.70 116-B	315	90	Existing	Double Metal Clear Default	1st Flr Bedrooms

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
2	Bug Screen	0.76												
3	Bug Screen	0.76												
4	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Inside Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Strctr 16 Built~1992 ATTIC&FLOOR INS. UPGRADE — 9/26/2008
Project Title — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Def	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)
Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author
Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency
Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 09/26/08 14:27:49 Run Code: 1222464469

Certificate Of Compliance : Residential (Part 1 of 4) CF-1R

Structure 16 Built~1992 ALL UPGRADES
Project Title

10/9/2008
Date

1331 Tucka Tucka Tee Yreka
Project Address

Building Permit #

ABBAY TECHNICAL SERVICES (707) 826-1433
Documentation Author Telephone

Plan Check/Date

EnergyPro CA Climate Zone 16
Compliance Method Climate Zone

Field Check/Date

TDV (kBtu/sf-yr)	Standard Design	Proposed Design	Compliance Margin
Space Heating	0.00	0.00	0.00
Space Cooling	0.00	0.00	0.00
Fans	0.00	0.00	0.00
Domestic Hot Water	0.00	0.00	0.00
Pumps	0.00	0.00	0.00
Totals	0.00	0.00	0.00
Percent better than Standard:			0.0%

This Portion of the Report
Is Not Applicable to this Analysis

BUILDING COMPLIES - NO HERS VERIFICATION REQUIRED

Building Type: ☐ Single Family ☐ Addition
☒ Multi Family ☒ Existing + Add/Alt

Building Front Orientation: (SE) 135 deg
Fuel Type: Propane
Fenestration:
Area: 322 ft²
Ratio: 9.7%
Avg. U: 0.34
Avg. SHGC: 0.35

Total Conditioned Floor Area:	3,328 ft²
Existing Floor Area:	3,328 ft²
Raised Floor Area:	3,328 ft²
Slab on Grade Area:	0 ft²
Average Ceiling Height:	8.0 ft
Number of Dwelling Units:	4.00
Number of Stories:	1

BUILDING ZONE INFORMATION

Zone Name	Floor Area	Volume	# of Units	Zone Type	Thermostat Type	Vent Hgt.	Vent Area
Existing Kerosene Wall Heater	2,230	17,840	2.68	Conditioned	Setback	2	n/a
Existing Elect. Bsbrd. Default	1,098	8,784	1.32	Conditioned	Setback	2	n/a

OPAQUE SURFACES

Type	Frame	Area	U-Fac.	Insulation Cav.	Insulation Cont.	Act. Azm.	Tilt	Gains Y	Gains N	Condition Status	JA IV Reference	Location / Comments
Roof	Wood	2,230	0.020	R-49	R-0.0	135	0	X		Altered	01-A9 (E=01-A8)	1st Flr Living Areas
Wall	Wood	576	0.074	R-19	R-0.0	135	90	X		Existing	09-A5	1st Flr Living Areas
Door	None	80	0.500	None	R-0.0	135	90	X		Existing	28-A4	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Living Areas
Wall	Wood	288	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Living Areas
Floor	Wood	2,230	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Living Areas
Roof	Wood	1,098	0.020	R-49	R-0.0	135	0	X		Altered	01-A9 (E=01-A8)	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	225	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	704	0.074	R-19	R-0.0	315	90	X		Existing	09-A5	1st Flr Bedrooms
Wall	Wood	151	0.074	R-19	R-0.0	45	90	X		Existing	09-A5	1st Flr Bedrooms
Floor	Wood	1,098	0.034	R-22	R-0.0	0	180		X	Altered	20-A5 (E=20-A4)	1st Flr Bedrooms

Run Initiation Time: 10/09/08 16:14:17 Run Code: 1223594057

Certificate Of Compliance : Residential (Part 2 of 4) CF-1R

Structure 16 Built~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

FENESTRATION SURFACES

#	Type	Area	U-Factor[1]	SHGC[2]	True Azm.	Tilt	Cond. Stat.	Glazing Type	Location/ Comments
1	Window Front (SE)	176.0	0.340 NFRC	0.35 NFRC	135	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
2	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
3	Window Left (SW)	9.0	0.340 NFRC	0.35 NFRC	225	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
4	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
5	Window Right (NE)	9.0	0.340 NFRC	0.35 NFRC	45	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Living Areas
6	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above
7	Window Rear (NW)	128.0	0.340 NFRC	0.35 NFRC	315	90	Altered	NFRC rated Dbl/Vinyl w/LowE	1st Flr Bedrooms
8	Existing		0.790 116-A	0.70 116-B				Double Metal Clear Default	pre-altered for above

1. Indicate source either from NFRC or Table 116A. 2. Indicate source either from NFRC or Table 116B.

INTERIOR AND EXTERIOR SHADING

#	Exterior Shade Type	SHGC	Window Hgt.	Window Wd.	Overhang Len.	Overhang Hgt.	Overhang LExt.	Overhang RExt.	Left Fin Dist.	Left Fin Len.	Left Fin Hgt.	Right Fin Dist.	Right Fin Len.	Right Fin Hgt.
1	Bug Screen	0.76												
3	Bug Screen	0.76												
5	Bug Screen	0.76												
7	Bug Screen	0.76												

THERMAL MASS FOR HIGH MASS DESIGN

Type	Area (sf)	Thick. (in.)	Heat Cap.	Cond.	Inside R-Val.	JA IV Reference	Condition Status	Location/ Comments

PERIMETER LOSSES

Type	Length	R-Val.	Insulation Location	JA IV Reference	Condition Status	Location/ Comments

Certificate Of Compliance : Residential (Part 3 of 4) CF-1R

Structure 16 Built~1992 ALL UPGRADES — Project Title

10/9/2008 — Date

HVAC SYSTEMS

Location	Heating Type	Minimum Eff	Cooling Type	Minimum Eff	Condition Status	Thermostat Type
Existing Kerosene Wall Heater	Room Furnace	83% AFUE	No Cooling	13.0 SEER	Existing	Setback
Existing Elect. Bsbrd. Default	Electric	3.41 HSPF	No Cooling	13.0 SEER	Existing	Setback

HVAC DISTRIBUTION

Location	Heating	Cooling	Duct Location	Duct R-Value	Condition Status	Ducts Tested?
Existing Kerosene Wall Heater	Ductless / with Fan	Ductless	n/a	n/a	Existing	No
Existing Elect. Bsbrd. Default	Ductless / No Fan	Ductless	n/a	n/a	Existing	No

Hydronic Piping System Name	Pipe Length	Pipe Diameter	Insul. Thick.

WATER HEATING SYSTEMS

System Name	Water Heater Type	Distribution	# in Syst.	Rated Input (Btu/hr)	Tank Cap. (gal)	Condition Status	Energy Factor or RE	Standby Loss (%)	Tank Insul. R-Value Ext.
Existing Electric AO Smith	Small Elec.	No Pipe Insulation	4	15,356	40	Existing	0.89	n/a	n/a

Multi-Family Central Water Heating Details

Control	Hot Water Pump #	HP	Type	Hot Water Piping Length (ft) In Plenum	Outside	Buried	Add 1/2" Insulation

REMARKS

COMPLIANCE STATEMENT

This certificate of compliance lists the building features and specifications needed to comply with Title 24, Parts 1 and 6 of the California Code of Regulations, and the administrative regulations to implement them. This certificate has been signed by the individual with overall design responsibility. The undersigned recognizes that compliance using duct design, duct sealing, verification of refrigerant charge and TXVs, insulation installation quality, and building envelope sealing require installer testing and certification and field verification by an approved HERS rater.

Designer or Owner (per Business & Professions Code)

Name:
Title/Firm: Karuk Tribe Building Energy Assessment
Address: Winzler & Kelly Consulting Engineers
Telephone: Lic. #:

(signature) (date)

Documentation Author

Name: Anne M. McQueeney, CEA, CEPE
Title/Firm: ABBAY TECHNICAL SERVICES
Address: 1125 16th Street, Rm. 216
Arcata, CA 95521
Telephone: (707) 826-1433

(signature) (date)

Enforcement Agency

Name:
Title/Firm:
Address:
Telephone:

(signature) (date)

Run Initiation Time: 10/09/08 16:14:17 Run Code: 1223594057

Appendix C: Economic Analysis of Efficiency and Conservation Measures & Structure Inventory

Est. Initial Cost for Investment Scenario

Investment Level	($/square foot)	Total
High	$ 3.00	**$ 779,700**
Medium	$ 2.00	**$ 519,800**
Low	$ 1.00	**$ 259,900**

Parameters

Conditioned Space	259,900	Square feet
Estimated Energy Costs	$ 30.09	$/MBtu
Fuel Escalation Rate	2.0%	Percent

	Estimated MBtu/yr by Investment Level			Estimated Cost by Investment Level				Cumulative Savings by Investment Level		
Year	High	Low	Medium	High	Low	Medium	None	High	Low	Medium
1	5,265	8,777	7,019	$ 161,577	$ 269,350	$ 215,383	$ 338,635	$ 177,058	$ 69,286	$ 123,253
2	5,337	8,897	7,114	$ 167,051	$ 278,475	$ 222,680	$ 350,108	$ 360,114	$ 140,919	$ 250,681
3	5,410	9,018	7,211	$ 172,711	$ 287,909	$ 230,224	$ 361,969	$ 549,372	**$ 214,979**	$ 382,426
4	5,483	9,140	7,309	$ 178,562	$ 297,663	$ 238,023	$ 374,232	**$ 745,042**	**$ 291,548**	**$ 518,635**
5	5,558	9,265	7,409	$ 184,611	$ 307,747	$ 246,087	$ 386,910	**$ 947,341**	$ 370,711	**$ 659,458**
6	5,633	9,391	7,509	$ 190,866	$ 318,173	$ 254,424	$ 400,018	$ 1,156,493	$ 452,555	$ 805,052
7	5,710	9,519	7,611	$ 197,332	$ 328,952	$ 263,044	$ 413,570	$ 1,372,731	$ 537,173	$ 955,578
8	5,788	9,648	7,715	$ 204,017	$ 340,097	$ 271,955	$ 427,581	$ 1,596,295	$ 624,657	$ 1,111,205
9	5,866	9,779	7,820	$ 210,929	$ 351,619	$ 281,168	$ 442,067	$ 1,827,433	$ 715,105	$ 1,272,103
10	5,946	9,913	7,926	$ 218,075	$ 363,531	$ 290,694	$ 457,043	$ 2,066,401	$ 808,618	$ 1,438,452
11	6,027	10,047	8,034	$ 225,463	$ 375,847	$ 300,542	$ 472,527	$ 2,313,466	$ 905,298	$ 1,610,437
12	6,109	10,184	8,144	$ 233,101	$ 388,580	$ 310,724	$ 488,536	$ 2,568,900	$ 1,005,254	$ 1,788,249
13	6,192	10,323	8,254	$ 240,998	$ 401,744	$ 321,251	$ 505,087	$ 2,832,988	$ 1,108,596	$ 1,972,085
14	6,277	10,463	8,367	$ 249,163	$ 415,355	$ 332,134	$ 522,198	$ 3,106,023	$ 1,215,439	$ 2,162,148
15	6,362	10,605	8,481	$ 257,604	$ 429,426	$ 343,387	$ 539,889	$ 3,388,308	$ 1,325,902	$ 2,358,651
16	6,449	10,750	8,596	$ 266,332	$ 443,975	$ 355,020	$ 558,180	$ 3,680,156	$ 1,440,107	$ 2,561,811
17	6,536	10,896	8,713	$ 275,354	$ 459,016	$ 367,047	$ 577,090	$ 3,981,892	$ 1,558,182	$ 2,771,854
18	6,625	11,044	8,831	$ 284,683	$ 474,566	$ 379,482	$ 596,641	$ 4,293,850	$ 1,680,256	$ 2,989,012
19	6,715	11,195	8,952	$ 294,328	$ 490,644	$ 392,339	$ 616,854	$ 4,616,376	$ 1,806,466	$ 3,213,528
20	6,807	11,347	9,073	$ 304,299	$ 507,266	$ 405,630	$ 637,752	$ 4,949,830	$ 1,936,952	$ 3,445,649
21	6,899	11,501	9,197	$ 314,608	$ 524,452	$ 419,373	$ 659,358	$ 5,294,580	$ 2,071,859	$ 3,685,635
22	6,993	11,658	9,322	$ 325,266	$ 542,219	$ 433,580	$ 681,696	$ 5,651,009	$ 2,211,336	$ 3,933,751
23	7,088	11,816	9,449	$ 336,286	$ 560,589	$ 448,269	$ 704,791	$ 6,019,514	$ 2,355,538	$ 4,190,273

Assumptions

High level of investment achieves average energy savings from buildings modeled by Abbay
Medium level of investment achieves 2/3 of average energy savings identified by Abbay
Low level of investment achieves 1/3 of average energy savings identified by Abbay
High level of investment costs $3/sqft per Abbay's cost estimates
Medium level of investment costs $2/sq ft
Low level of investment costs $1/sqft
Energy costs in year 1 is $30/Mbtu per Abbay results

Karuk Tribal Energy Program ID #	Structure Name	Location (address and descriptive location if the building is isolated)	Square footage	Year Built	Blueprints available ? (**Y** or **N**)	Electric Co.	Account Number	2007 Annual Electric Use (kWh)	2007 Annual Electric Use (MBtu)	Propane Company	Account Propane Number	2007 Annual Usage (gal)	2007 Annual Propane Usage (MBtu)	Kerosene or Other Secocndary Fuel Company	Account #	2007 Annual Usage (gal)	2007 Annual Kerosene Usage (MBtu)
NR-1	Orleans-Natural Resources	39051 Highway 96 PO Box 282 Orleans, California 95556			Y	PG&E	2192741157-5	62560	213.46	Campora	Tank # 748310	2822	257.65				0.00
NR-2	Orleans Fisheries formerly Head Start	39051 Highway 96 PO Box 282 Orleans, California 95556		95/96		PG&E	2151074493-7	8524	29.09	Campora	97259	370	33.78				0.00
NR-3	Pananamik Senior Center	459 Asip road				PG&E		101	0.34	Campora	138254 & 134549	282	25.75				0.00
NR-4	Somes Bar Dance Grounds			early 70's		PG&E	9015495583-6	4524	15.44				0.00				0.00
NR-5	Somes Bar Heli-Port					PG&E	8697803540-9	6198	21.15				0.00				0.00
NR-6	Somes Bar Workcenter	99300 Highway 96 PO Box 282 Somes Bar, CA. 95568		57/58		PG&E	9921747611-0	46560	158.87				0.00				0.00
NR-7	HC Admin Building/Peoples Center/Street lights	64236 Second Avenue PO Box 1016 Happy Camp, California 96039	11092	93/97	Y	PPL	62567961-0042		0.00	Suburban Propane	5175		0.00	Amerigas (more propane)	31560	1520.4	138.81
NR-8	HC Medical Billing	64236 Second Avenue PO Box 1016 Happy Camp, California 96039		2004/2005		PPL	62567961-0174		0.00	Suburban Propane	5175		0.00	Franks Fuel	46090	356.8	48.17
NR-9	HC Maintenance Building	64236 Second Avenue PO Box 1016 Happy Camp, California 96039		1941	Partial	PPL	62612271-028-0 ?		0.00	Suburban Propane	5175	6099.7	556.90				0.00
NR-10	HC Headstart Admin./Old Admin.	632 Jacobs Way PO Box 1016 Happy Camp, California 96039		mid 80's	Y	PPL	62567961-008	62715	213.99				0.00				0.00
NR-11	HC Autoshop	2501 China Grade Road Happy Camp, California 96039		1930		PPL	62567961-0109		0.00				0.00				0.00
NR-12	HC Old Hardware Store	Hwy. 96 Happy Camp, California 96039		68/69	N	PPL	62567961-001	21124	72.08	Amerigas	4778	1207.6	110.25				0.00
NR-13	HC Big White House (Housing Maintenance)	635 Jacobs Way PO Box 1159 Happy Camp, California 96039		40/50	N	PPL			0.00				0.00	Franks Fuel	46091	501.6	67.72
NR-14	Yreka Housing Maintenance	1320 Yellowhammer PO Box 282 Yreka, California 96097				PPL	62657981-001	10440	35.62	Amerigas	4238	1700.5	155.26				0.00
NR-15	Yreka Medical, Dental Clinic and Social Services	1519 S. Oregon St.				PPL			0.00	Suburban Propane	9200	3958.2	361.38				0.00
NR-16	Yreka Housing	1836 Apsuun				PPL			0.00	Suburban Propane	7585	2883.6	263.27				0.00
NR-17	Yreka Head Start	1316 Yellowhammer				PPL	62657981-001		0.00	Suburban Propane	5406	449.8	41.07				0.00
		Totals							**760**				**1944**				**116**

Cells shaded red indicate obvious missing data

Community	Location (address and descriptive location if the house is isolated	Type **M**- modular **S**- site built **A**- apartment **O**- other	Apartment Unit	Year Built	Elder Unit ? (**Y** or **N**)	appx area (sq ft)	Estimated annual energy consumption (MBTU)	number of bedrooms	Primary Heating Type **W**- wood **G**- metered gas **P**- propane **E**- electric **O**- heating oil **K**- kerosene	Secondary Heating Type **W**- wood **G**- metered gas **P**- propane **E**- electric **O**- heating oil **K**- kerosene **N**- none	Municiple Service Connections? **G**- gas, **W**- water, **S**- sewer, **E**- electricity **N**- none
Yreka	1432 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	kerosene	W,S,E
Yreka	1473 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	kerosene	W,S,E
Yreka	1509 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	kerosene	W,S,E
Yreka	1526 Apsuun	Site Built		2001	No	2,100	89.16	5	Propane	kerosene	W,S,E
Yreka	1545 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	kerosene	W,S,E
Yreka	1621 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	kerosene	W,S,E
Yreka	1633 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	kerosene	W,S,E
Yreka	1655 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	kerosene	W,S,E
Yreka	1230 Thook	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1230 Thook	Apartment	B	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1230 Thook	Apartment	C	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1230 Thook	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1231 Thook	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1231 Thook	Apartment	B	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1231 Thook	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1231 Thook	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1234 Thook	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1234 Thook	Apartment	B	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1234 Thook	Apartment	C	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1234 Thook	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1235 Thook	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1235 Thook	Apartment	B	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1235 Thook	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1235 Thook	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1238 Thook	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1238 Thook	Apartment	B	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1238 Thook	Apartment	C	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1238 Thook	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1239 Thook	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1239 Thook	Apartment	B	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1239 Thook	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1239 Thook	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1242 Thook	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1242 Thook	Apartment	B	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1242 Thook	Apartment	C	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1242 Thook	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1251 Puh-Nay-Fitch Street	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1251 Puh Nay Fitch	Apartment	B	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1251 Puh Nay Fitch	Apartment	C	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1251 Puh Nay Fitch	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1256 Puh Nay Fitch	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1256 Puh-Nay-Fitch Street	Apartment	B	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1256 Puh-Nay-Fitch Street	Apartment	C	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1256 Puh Nay Fitch	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1331 EE Tucka Tucka Tee	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1331 EE Tucka Tucka Tee	Apartment	B	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1331 EE Tucka Tucka Tee	Apartment	C	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1331 EE Tucka Tucka Tee	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1336 EE Tucka Tucka Tee	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1336 EE Tucka Tucka Tee	Apartment	B	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1336 EE Tucka Tucka Tee	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1241 Muh-Chee-Shee	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1241 Muh-Chee-Shee	Apartment	B	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1241 Muh-Chee-Shee	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1241 Muh-Chee-Shee	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1245 Muh-Chee-Shee	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1245 Muh-Chee-Shee	Apartment	B	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1245 Muh-Chee-Shee	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1245 Muh-Chee-Shee	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1248 Muh-Chee-Shee	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1248 Muh-Chee-Shee	Apartment	B	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1248 Muh-Chee-Shee	Apartment	C	1992	No	1,200	50.95	4	kerosene	electric	W,S,E
Yreka	1248 Muh-Chee-Shee	Apartment	D	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1313 Kutchy Kawtch	Apartment	A	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1313 Kutchy Kawtch	Apartment	B	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1313 Kutchy Kawtch	Apartment	C	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1313 Kutchy Kawtch	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1320 Kutchy Kawtch	Apartment	A	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1320 Kutchy Kawtch	Apartment	B	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1320 Kutchy Kawtch	Apartment	C	1992	No	800	33.97	2	kerosene	electric	W,S,E
Yreka	1320 Kutchy Kawtch	Apartment	D	1992	No	1,000	42.46	3	kerosene	electric	W,S,E
Yreka	1420 Kutchy Kawtch	Site Built	A	2001	No	1,500	63.69	2	kerosene	electric	W,S,E
Yreka	1595 Chuufish	Site Built			No	1,800	76.43	3			
Yreka	1583 Chuufish	Site Built			No	1,800	76.43	3			
Yreka	1862 Oak Tree Court	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1865 Oak Tree Court	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1866 Oak Tree Court	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1869 Oak Tree Court	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1895 Apsuun	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1855 Apsuun	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1932 Apsuun	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1935 Apsuun	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E
Yreka	1936 Apsuun	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe-no wood	W,S,E

Community	Location (address and descriptive location if the house is isolated	Type **M**- modular **S**- site built **A**- apartment **O**- other	Apartment Unit	Year Built	Elder Unit ? (**Y** or **N**)	appx area (sq ft)	Estimated annual energy consumption (MBTU)	number of bedrooms	Primary Heating Type **W**- wood **G**- metered gas **P**- propane **E**- electric **O**- heating oil **K**- kerosene	Secondary Heating Type **W**- wood **G**- metered gas **P**- propane **E**- electric **O**- heating oil **K**- kerosene **N**- none	Municiple Service Connections? **G**- gas, **W**- water, **S**- sewer, **E**- electricity **N**- none
Yreka	1939 Apsuun	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1529 Pyrite Drive	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1528 Pyrite Drive	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1533 Pyrite Drive	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1534 Pyrite Drive	Site Built		2006	Elder Rentals	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1449 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1455 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1473 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1491 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1509 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1510 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1515 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1529 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1540 Apsuun	Site Built		2001	No	2,100	89.16	5	Propane	monitor maybe- no wood	W,S,E
Yreka	1560 Virusur	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1575 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	monitor maybe- no wood	W,S,E
Yreka	1613 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1626 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1639 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1641 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	monitor maybe- no wood	W,S,E
Yreka	1644 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1647 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	monitor maybe- no wood	W,S,E
Yreka	1651 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	monitor maybe- no wood	W,S,E
Yreka	1655 Apsuun	Site Built		2001	No	1,500	63.69	2	Propane	monitor maybe- no wood	W,S,E
Yreka	1671 Apsuun	Site Built		2001	No	2,000	84.92	4	Propane	monitor maybe- no wood	W,S,E
Yreka	1672 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
Yreka	1675 Apsuun	Site Built		2001	No	1,800	76.43	3	Propane	monitor maybe- no wood	W,S,E
						143,300	**6084.37**				
Happy Camp	610 Jacobs Way	Site Built		1992	No	2,300	97.66	5	Wood	Electric	W, S, E
Happy Camp	611 Jacobs Way	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	636 Jacobs Way	Site Built		1992	No	2,000	84.92	4	Wood	Electric	W, S, E
Happy Camp	638 Jacobs Way	Site Built		1992	No	2,300	97.66	5	Wood	Electric	W, S, E
Happy Camp	700 Jacobs Way	Site Built		1992	No	2,000	84.92	4	Wood	Electric	W, S, E
Happy Camp	710 Jacobs Way	Site Built		1992	No	2,300	97.66	5	Wood	Electric	W, S, E
Happy Camp	722 Jacobs Way	Site Built		1992	No	2,000	84.92	4	Wood	Electric	W, S, E
Happy Camp	622 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	623 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	638 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	706 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	715 Shan D	Site Built		1992	No	2,000	84.92	4	Wood	Electric	W, S, E
Happy Camp	718 Shan D	Site Built		1992	No	2,000	84.92	4	Wood	Electric	W, S, E
Happy Camp	721 Shan D	Site Built		1992	No	2,000	84.92	4	Wood	Electric	W, S, E
Happy Camp	724 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	734 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	738 Shan D	Site Built		1992	No	1,600	67.93	3	Wood	Electric	W, S, E
Happy Camp	439 Virusur Impah	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	440 Virusur Impah	Site Built		96/97	Elder Rentals	1,350	57.32	2	Kerosene	Propane	W, S, E
Happy Camp	500 Virusur Impah	Site Built		96/97	Elder Rentals	1,350	57.32	2	Kerosene	Propane	W, S, E
Happy Camp	503 Virusur Impah	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63503 Itroop	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63513 Itroop	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63517 Itroop	Site Built		96/97	Elder Rentals	1,350	57.32	2	Kerosene	Propane	W, S, E
Happy Camp	63538 Itroop	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63520 Itroop	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63521 Itroop	Site Built		96/97	Elder Rentals	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63524 Itroop	Site Built		96/97	Elder Rentals	1,350	57.32	2	Kerosene	Propane	W, S, E
Happy Camp	63538 Itroop	Site Built		96/97	No	1,600	67.93	3	Kerosene	Propane	W, S, E
Happy Camp	63629 Piith	Site Built			No	2,300	97.66	5	Kerosene	Propane	W, S, E
Happy Camp	63695 Piith	Site Built			Elder Rentals	1,350	57.32	2	Kerosene	Propane	W, S, E
Happy Camp	63616 Piith	Site Built			Elder Rentals	1,350	57.32	2	Kerosene	Propane	W, S, E
Happy Camp	2501 China Grade Road	Modular			Elder Rentals	1,600	67.93	3			W, S, E
Happy Camp	2517 China Grade Road	Modular			No	1,350	57.32	2			W, S, E
Happy Camp	62739 Upper Itroop Drive	Modular			No	1,600	67.93	3			W, S, E
Happy Camp	62731 Upper Itroop Drive	Modular			No	1,600	67.93	3			W, S, E
Happy Camp	62614 Upper Itroop Drive	Modular			No	1,600	67.93	3			W, S, E
						62,650	**2660.05**				

Community	Location (address and descriptive location if the house is isolated	Type **M**- modular **S**- site built **A**- apartment **O**- other	Apartment Unit	Year Built	Elder Unit ? (**Y** or **N**)	appx area (sq ft)	Estimated annual energy consumption (MBTU)	number of bedrooms	Primary Heating Type **W**- wood **G**- metered gas **P**- propane **E**- electric **O**- heating oil **K**- kerosene	Secondary Heating Type **W**- wood **G**- metered gas **P**- propane **E**- electric **O**- heating oil **K**- kerosene **N**- none	Municiple Service Connections? **G**- gas, **W**- water, **S**- sewer, **E**- electricity **N**- none
Orleans	100 Yitha	Site Built			No	2,000	84.92	4	Propane	Wood	W,E
Orleans	110 Yitha	Site Built			No	1,600	67.93	3	Propane	Wood	W,E
Orleans	120 Yitha	Site Built			No	1,600	67.93	3	Propane	Wood	W,E
Orleans	130 Yitha	Site Built			No	1,600	67.93	3	Propane	Wood	W,E
Orleans	200 Axak Ct.	Site Built		1994	No	1,600	67.93	3	Propane	Wood	W,E
Orleans	210 Axak Ct.	Site Built		1994	No	2,000	84.92	4	Propane	Wood	W,E
Orleans	220 Axak Ct.	Site Built		1994	No	1,350	57.32	2	Propane	Wood	W,E
Orleans	230 Axak Ct.	Site Built		1994	No	1,350	57.32	2	Propane	Wood	W,E
Orleans	240 Axak Ct.	Site Built		1994	No	1,600	67.93	3	Propane	Wood	W,E
Orleans	250 Axak Ct.	Site Built		1994	No	2,000	84.92	4	Propane	Wood	W,E
Orleans	300 Kuyraak	Site Built		1994	No	2,000	84.92	4	Propane	Wood	W,E
Orleans	310 Kuyraak	Site Built		1994	No	1,600	67.93	3	Propane	Wood	W,E
Orleans	320 Kuyraak	Site Built		1994	No	1,350	57.32	2	Propane	Wood	W,E
Orleans	330 Kuyraak	Site Built		1994	No	1,350	57.32	2	Propane	Wood	W,E
Orleans	340 Kuyraak	Site Built		1994	No	2,000	84.92	4	Propane	Wood	W,E
Orleans	400 Asip	Site Built		2000	No	2,000	84.92	4	Propane	Wood	W,E
Orleans	1251 Redcap Rd	Modular		2006	No	1,600	67.93	3			W,E
Orleans	1241 Redcap Rd.	Modular		2006	No	1,350	57.32	2			W,E
Orleans	100 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	110 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	120 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	130 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	140 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	150 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	160 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	170 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	180 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	190 Panamnik Unahyaach	Modular		2004	Elder Rentals	1,600	67.93	3	Electric	Kerosene	W,E
Orleans	500 Panamnik	Site Built		98-99	No	2,000	84.92	4			W,E
Orleans	440 Asip	Site Built		98-99	No	2,000	84.92	4			W,E
Orleans	460 Asip	Site Built		98-99	No	2,000	84.92	4			W,E
Orleans	420 Asip	Site Built		98-99	No	2,000	84.92	4			W,E
Totals-->						**53,950**	**2290.66**				
Grand Total -->						**259,900**					

Appendix D: Biomass Availability Calculation

Preliminary Estimate of Biomass Availability for Karuk Tribe			
Metric	**Quantity**	**Unit**	**Reference/Comment**
Biomass availability in Humboldt County	100,000	dry tons/yr	NREL
Total area of Humboldt County	9,658	sqmi	Wikipedia
Total area of Humboldt County	6,181,120	acres	
Biomass availability in Humboldt County	0.01618	dry tons/ac/yr	
Area of Six Rivers National Forest	1,091,000	acres	USFS
Estimated Biomass Availability for Karuk Tribe in Humboldt County	17,651	dry tons/yr	Assumes Tribe can access biomass from Six Rivers NF
Biomass availability in Siskiyou County	50,000	dry tons/yr	NREL. High end of range because of local knowledge of forest density
Total area of Siskiyou County	6347	sqmi	Wikipedia
Total area of Siskiyou County	4,062,080	acres	
Biomass availability in Siskiyou County	0.01231	dry tons/ac/yr	
Area of Klamath National Forest	1,700,000	acres	USFS
Estimated Biomass Availability for Karuk Tribe in Siskiyou County	20,925	dry tons/yr	Assumes Tribe can access biomass from Klamath NF
Total estimated biomass availability for Karuk Tribe	38,576	dry tons/yr	
Energy content of biomass	13.3	GJ/ton	LHV, EUBIA, Forest softwood chips, 30% Moist, http://www.eubia.org/115.0.html
1GJ =	947,817	BTU	
1GJ =	1	MBTU	
Energy content of biomass	12.6	MBTU/ton	
Primary energy available from biomass for the Karuk Tribe	486,285	MBtu/yr	
Conversion efficiency	70%		Estimated
Estimated Site energy available from Biomass for Karuk Tribe	**340,399**	**MBtu/yr**	Estimated

Appendix E: Photovoltaic Sizing Analysis for Karuk DNR Facility

Electric load (kWh/yr)	17521
Overall system efficiency	0.087044208

Conservation (kWh/mo)	0

Current rate (A1)	
Win Elec. Cost ($/kWh)	0.19225
Sum Elec. Cost ($/kWh)	0.19408

Derate factors	
Production tolerance	0.95
High temp losses	0.89
Dirt and dust	0.95
Mismatch losses	0.98
Wiring losses	0.97
Inverter losses	0.95
Total derate factor	0.73
Panel efficiency	0.12
Array size (kw_AC)	9.53603214
Array size (kw_DC)	13.14646755

percent of bill covered	97%
Minimum charge	$ 107.92
Actual annual bill	$107.9
Difference	0

Array size	0.0823	ft^2/watt
Array size	1,082	ft^2
Roof Area	3,775	sqft

Mo	H_T (Wh/m^2/day)	H_T (Wh/m^2/month)	Load (kWh/mo)	Reduced Load (kWh/mo)	PV production	Difference	Diff w/o cons	Current PG&E bill	Before PV PG&E bill	After PV PG&E bill	without conservation
1	2400.00	74400.00	1124	1124	709	415	415	$216	$216	$80	$80
2	3340.00	93520.00	1323	1323	892	431	431	$254	$254	$83	$83
3	4070.00	126170.00	1372	1372	1203	169	169	$264	$264	$32	$32
4	5100.00	153000.00	1448	1448	1459	-11	-11	$278	$278	-$2	-$2
5	6170.00	191270.00	1620	1620	1824	-204	-204	$314	$314	-$40	-$40
6	6660.00	199800.00	1743	1743	1905	-162	-162	$338	$338	-$31	-$31
7	7690.00	238390.00	1550	1550	2273	-723	-723	$301	$301	-$140	-$140
8	7270.00	225370.00	1646	1646	2149	-503	-503	$319	$319	-$98	-$98
9	5890.00	176700.00	1365	1365	1685	-320	-320	$265	$265	-$62	-$62
10	4490.00	139190.00	1306	1306	1327	-21	-21	$253	$253	-$4	-$4
11	2770.00	83100.00	1454	1454	792	662	662	$280	$280	$127	$127
12	2440.00	75640.00	1570	1570	721	849	849	$302	$302	$163	$163
	sum	1776550.00	17521	17521	16941	580	580	$3,385	$3,385	$108	$108
	Peak sun hours		1377								
	4.8575										

Cost of PV modules	$52,586
Cost of Inverter	$15,000
Balance of systems	$10,138
Capital cost	$77,724
Installation costs	$10,000
Capital cost + installatio	$87,724
CEC rebate ($/Watt)	$3.20
Total rebate	$30,515
Net cost	**$57,208**
Lifecycle cost	$77,841.43
Levelized cost ($/kWh)	$0.15
$/watt_DC	$4.35

Notes:

Karuk DNR Office Roof
Azimuth 45 degrees- Google earth
Array tilt- 30 degrees, flush mount
Wh/m^2/day from NREL PVWatts

Rpw 10 factor	0.82
Rpw 20 factor	0.673
Spw factor	0.308

Electric load (kWh/yr)	5040
Overall system efficiency	0.087044208
Savings (kWh/mo)	0

Current rate (A1)	
Win Elec. Cost ($/kWh)	0.19225
Sum Elec. Cost ($/kWh)	0.19408

Derate factors	
Production tolerance	0.95
High temp losses	0.89
Dirt and dust	0.95
Mismatch losses	0.98
Wiring losses	0.97
Inverter losses	0.95
Total derate factor	0.73
Panel efficiency	0.12
Array size (kw_AC)	2.518683469
Array size (kw_DC)	3.472281762

percent of bill covered	89%
Minimum charge	$ 107.92
Actual annual bill	$107.9
Difference	0

Array size	0.0823	ft^2/watt
Array size	286	ft^2
Roof Area	3,775	sqft

Mo	H_T (Wh/m^2/day)	H_T (Wh/m^2/month)	Load (kWh/mo)	Reduced Load (kWh/mo)	PV production	Difference	Diff w/o cons	Current PG&E bill	Before PV PG&E bill	After PV PG&E bill	without conservation
1	2400.00	74400.00	420	420	187	233	233	$81	$81	$45	$45
2	3340.00	93520.00	420	420	236	184	184	$81	$81	$35	$35
3	4070.00	126170.00	420	420	318	102	102	$81	$81	$20	$20
4	5100.00	153000.00	420	420	385	35	35	$81	$81	$7	$7
5	6170.00	191270.00	420	420	482	-62	-62	$82	$82	-$12	-$12
6	6660.00	199800.00	420	420	503	-83	-83	$82	$82	-$16	-$16
7	7690.00	238390.00	420	420	600	-180	-180	$82	$82	-$35	-$35
8	7270.00	225370.00	420	420	568	-148	-148	$82	$82	-$29	-$29
9	5890.00	176700.00	420	420	445	-25	-25	$82	$82	-$5	-$5
10	4490.00	139190.00	420	420	351	69	69	$82	$82	$13	$13
11	2770.00	83100.00	420	420	209	211	211	$81	$81	$41	$41
12	2440.00	75640.00	420	420	191	229	229	$81	$81	$44	$44
	sum	1776550.00	5040	5040	4475	565	565	$974	$974	$108	$108
	Peak sun hours		420								
	4.8575										

Cost of PV modules	$13,889
Cost of Inverter	$3,000
Balance of systems	$2,533
Capital cost	$19,422
Installation costs	$3,000
Capital cost + installatio	$22,422
CEC rebate ($/Watt)	$3.20
Total rebate	$8,060
Net cost	**$14,363**
Lifecycle cost	$18,399.34
Levelized cost ($/kWh)	$0.14
$/watt_DC	$4.14

Notes:

Theoretical Residential Structure
Azimuth 45 degrees- Assumed
Array tilt- 30 degrees, flush mount
Wh/m^2/day from NREL PVWatts

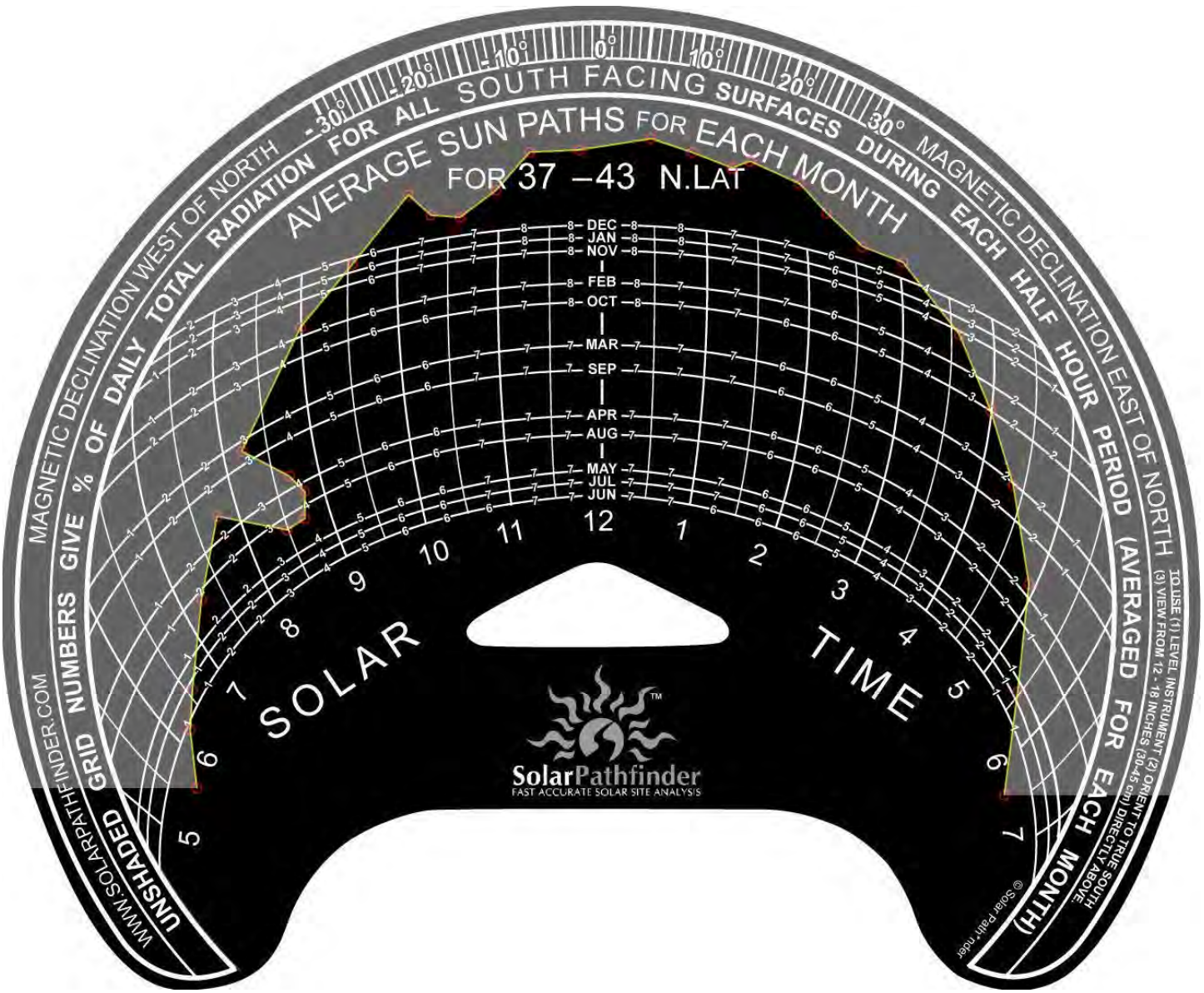
Structure area -	1,500	sqaure feet
Electrical energy intensity-	3.36	kWh/sqft-yr
Annual elec consumption	5,040	kWh/yr

Rpw 10 factor	0.82
Rpw 20 factor	0.673
Spw factor	0.308

Solar Site Analysis Report

Report Title	Happy Camp Admin Bldg - Admin Roof
Image File	HappyCampAdmin_43_PF_Admin.JPG
Report Date	Thursday, June 19, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	230.00 degrees

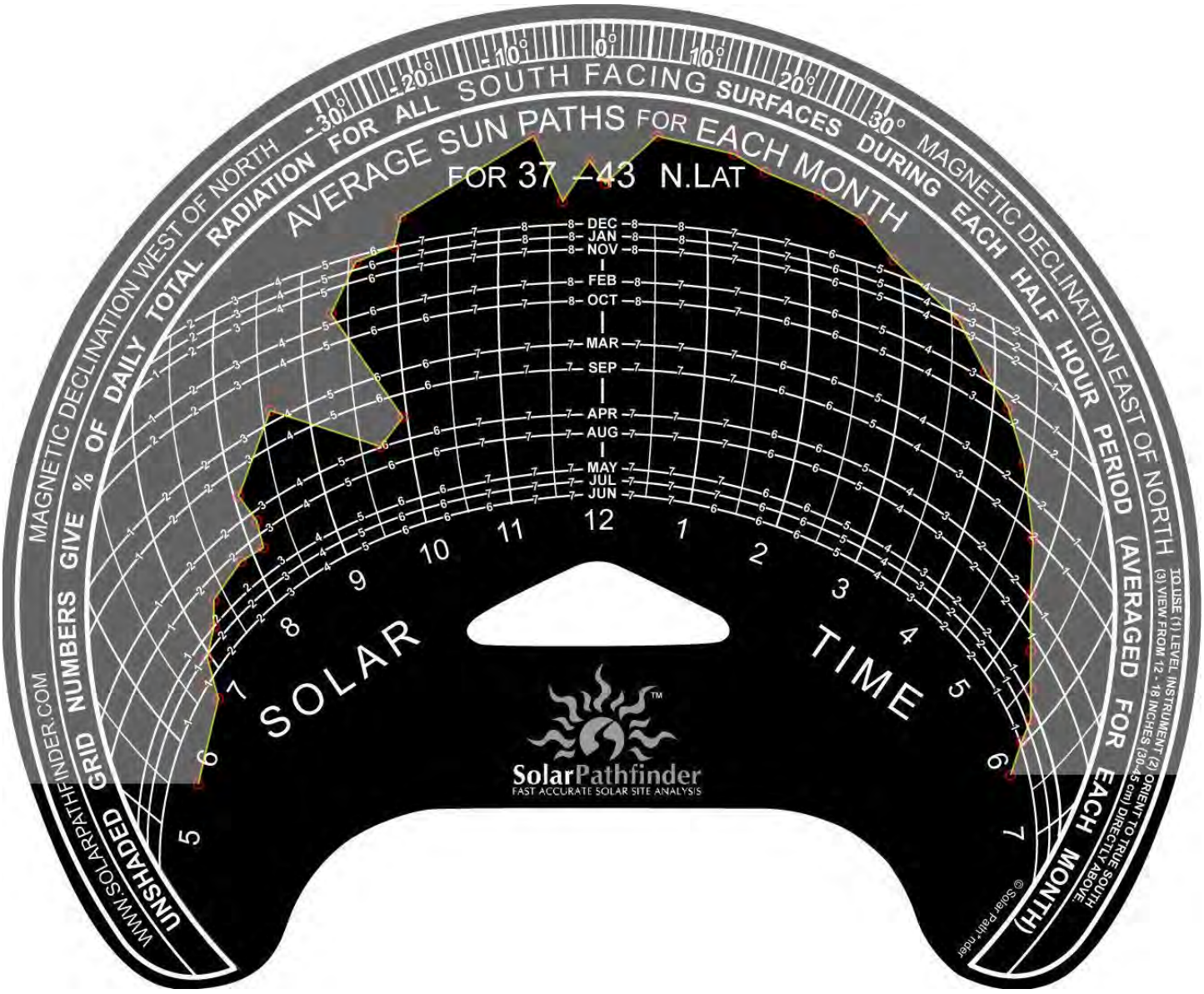
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=230.0 Tilt=41.7 KWH/m ^{2} /day
January	80.20%	1.40
February	86.50%	2.30
March	89.50%	3.74
April	90.90%	4.75
May	99.10%	6.06
June	98.80%	6.35
July	99.50%	7.26
August	93.60%	6.14
September	90.30%	4.78
October	86.80%	3.33
November	81.10%	1.69
December	77.20%	1.20
Totals	89.46%	48.98 [87.65%]



Solar Site Analysis Report

Report Title	Happy Camp Admin Bldg Breezeway Roof
Image File	HappyCampAdmin_37_PF_Entrance.JPG
Report Date	Thursday, June 19, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	230.00 degrees

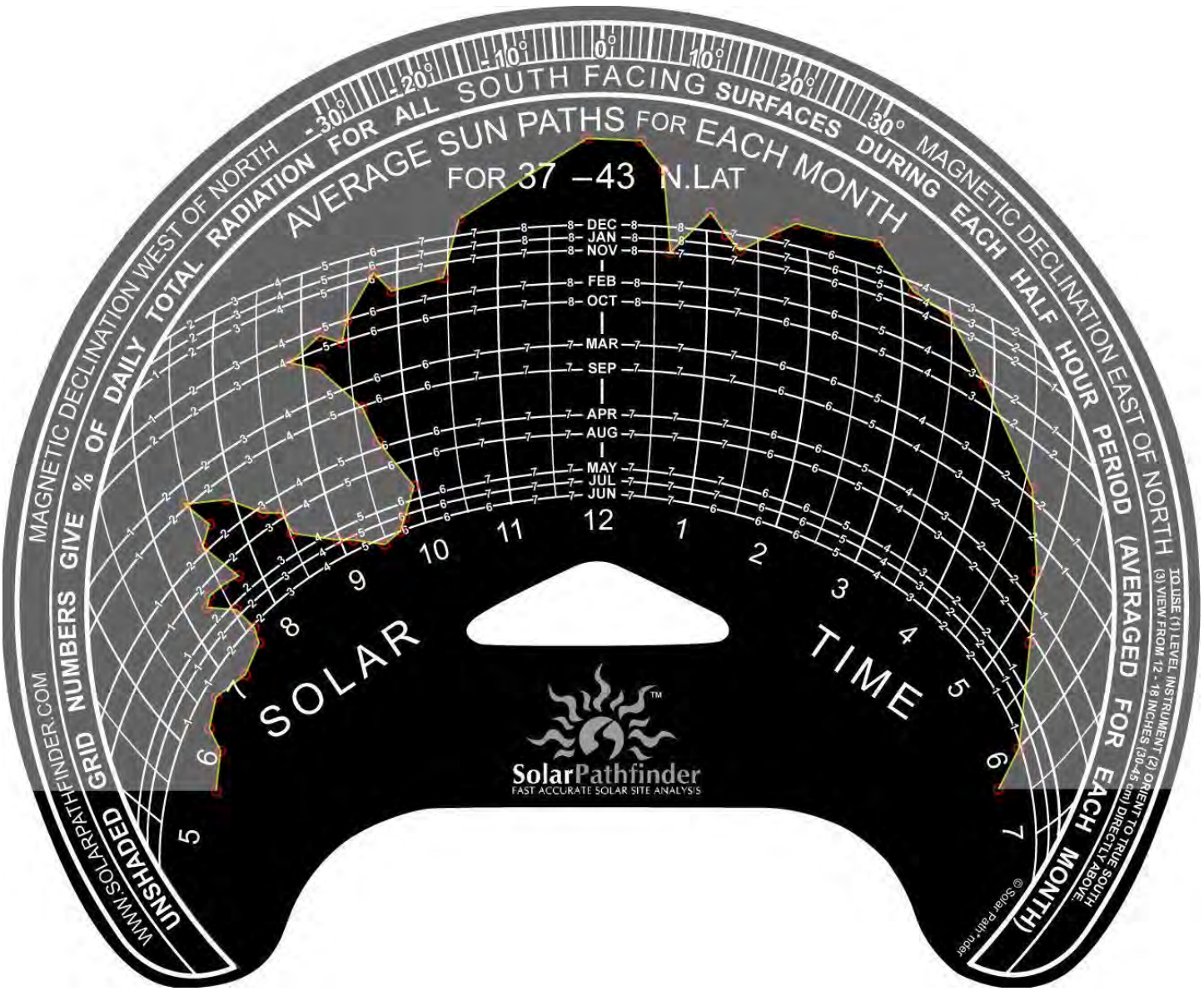
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=230.0 Tilt=41.7 KWH/m ^{2} /day
January	80.40%	1.41
February	83.00%	2.20
March	79.00%	3.31
April	93.20%	4.87
May	98.00%	5.99
June	98.20%	6.31
July	99.00%	7.22
August	93.30%	6.12
September	81.80%	4.33
October	81.20%	3.11
November	80.20%	1.67
December	73.20%	1.14
Totals	86.71%	47.67 [85.29%]



Solar Site Analysis Report

Report Title	Happy Camp Dental Roof
Image File	HappyCampAdmin_33_PF_dental.JPG
Report Date	Thursday, June 19, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	230.00 degrees

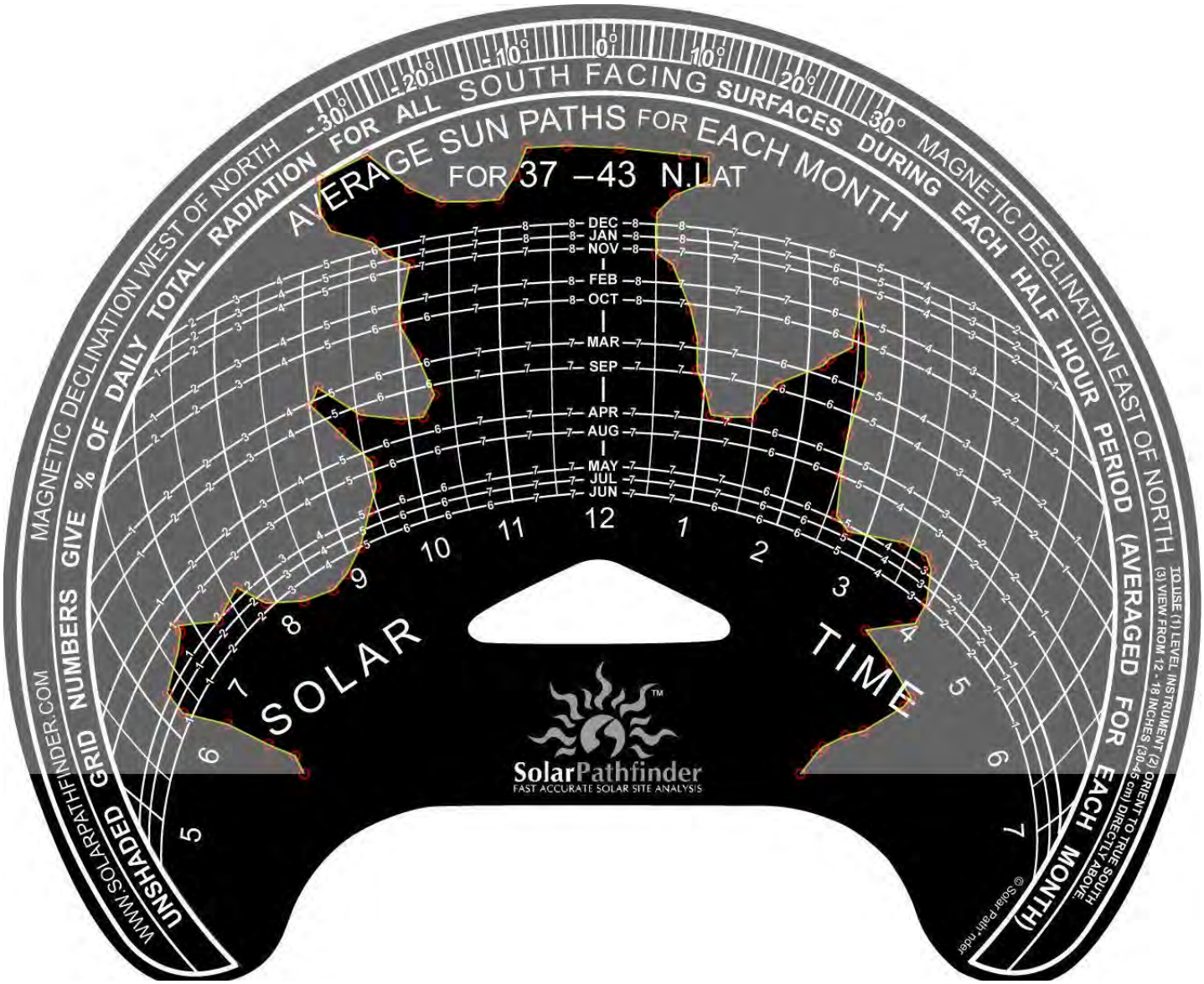
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=230.0 Tilt=41.7 KWH/m ^{2} /day
January	64.10%	1.12
February	81.40%	2.16
March	81.60%	3.41
April	82.50%	4.31
May	86.00%	5.26
June	91.50%	5.88
July	88.40%	6.45
August	82.70%	5.42
September	80.40%	4.25
October	86.40%	3.31
November	67.80%	1.41
December	53.40%	0.83
Totals	78.85%	43.82 [78.40%]



Solar Site Analysis Report

Report Title	Happy Camp Head Start
Image File	HappyCamp HeadStart_5.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	180.00 degrees

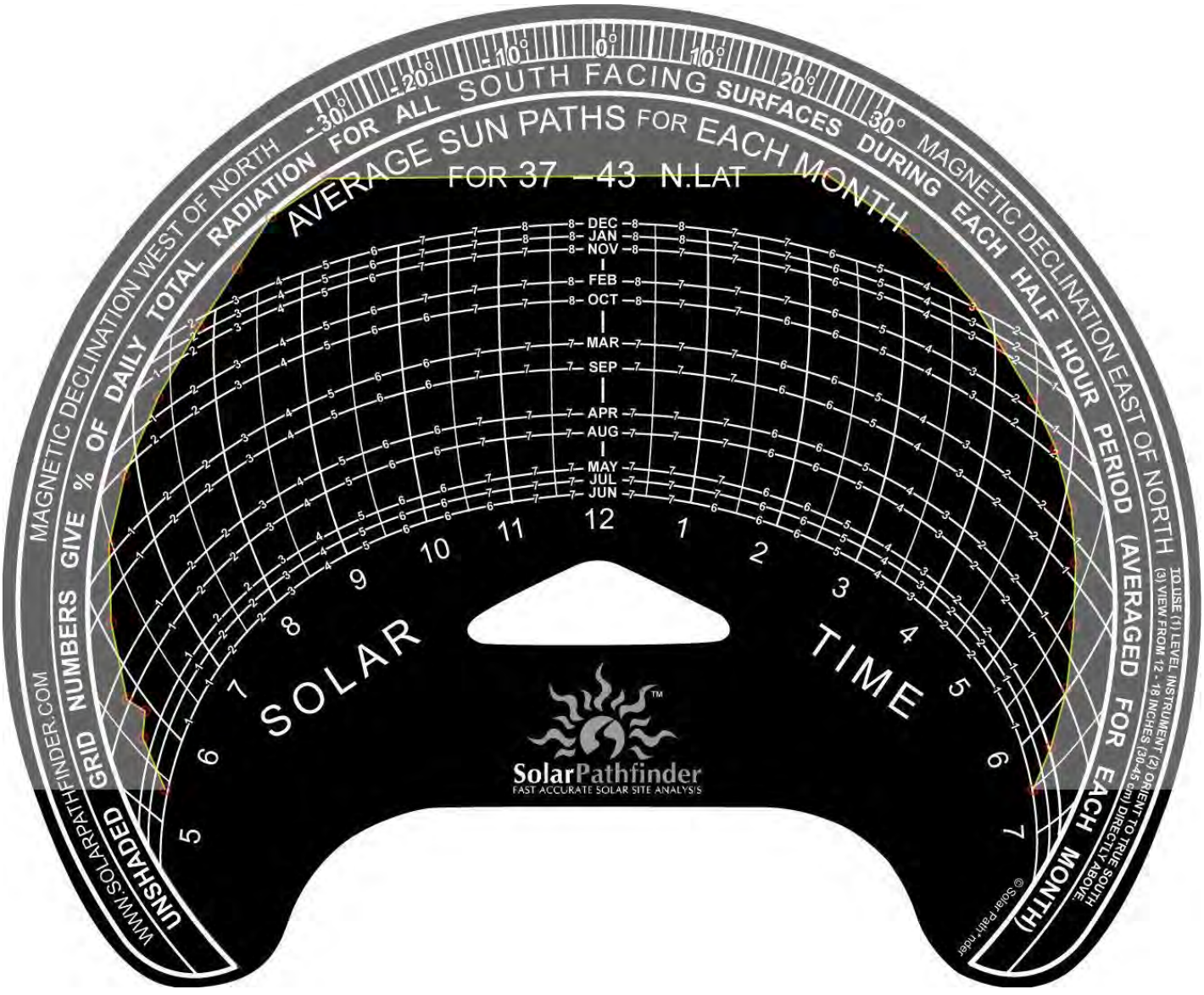
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=180.0 Tilt=41.7 KWH/m ^{2} /day
January	38.80%	0.90
February	40.30%	1.38
March	46.30%	2.31
April	66.50%	3.68
May	79.00%	5.03
June	84.30%	5.43
July	84.10%	6.12
August	65.30%	4.67
September	49.30%	3.13
October	41.90%	2.05
November	35.60%	0.87
December	40.60%	0.78
Totals	56.00%	36.35 [61.50%]



Solar Site Analysis Report

Report Title	Yreka Admin Bldg
Image File	YrekaAdmin_21.JPG
Report Date	Friday, June 20, 2008
Declination	15d 31m
Latitude/Longitude	41.624 / -122.44
Analysis Site	YREKA, CA, Zipcode: 96097
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	55.86 miles
Array Type	Fixed
Tilt Angle	41.62 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	250.00 degrees

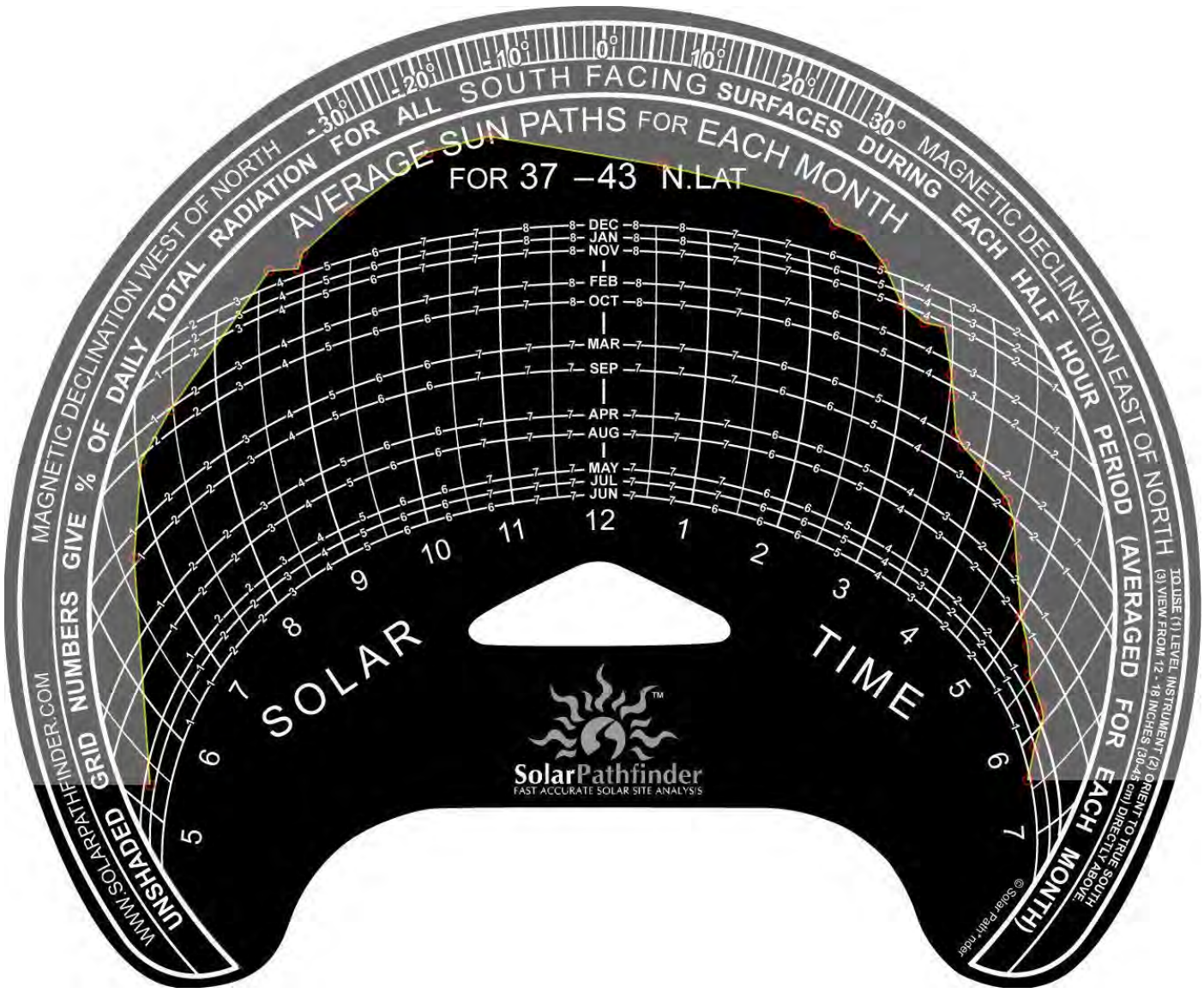
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.6	Actual Solar Rad w/ Shading Azimuth=250.0 Tilt=41.6 KWH/m ^{2} /day
January	96.80%	1.26
February	98.80%	2.00
March	99.50%	3.45
April	100.00%	4.72
May	100.00%	5.71
June	100.00%	6.26
July	100.00%	7.00
August	100.00%	5.90
September	99.90%	4.42
October	99.40%	2.95
November	96.00%	1.57
December	95.50%	1.14
Totals	98.83%	46.38 [88.71%]



Solar Site Analysis Report

Report Title	170_Placer_Orleans
Image File	170_Placer_PF.JPG
Report Date	Friday, June 20, 2008
Declination	15d 37m
Latitude/Longitude	41.305 / -123.558
Analysis Site	ORLEANS, CA, Zipcode: 95556
Weather Station	ARCATA, CA, Elevation: 69 m
Station/Site Distance	35.96 miles
Array Type	Fixed
Tilt Angle	41.30 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	160.00 degrees

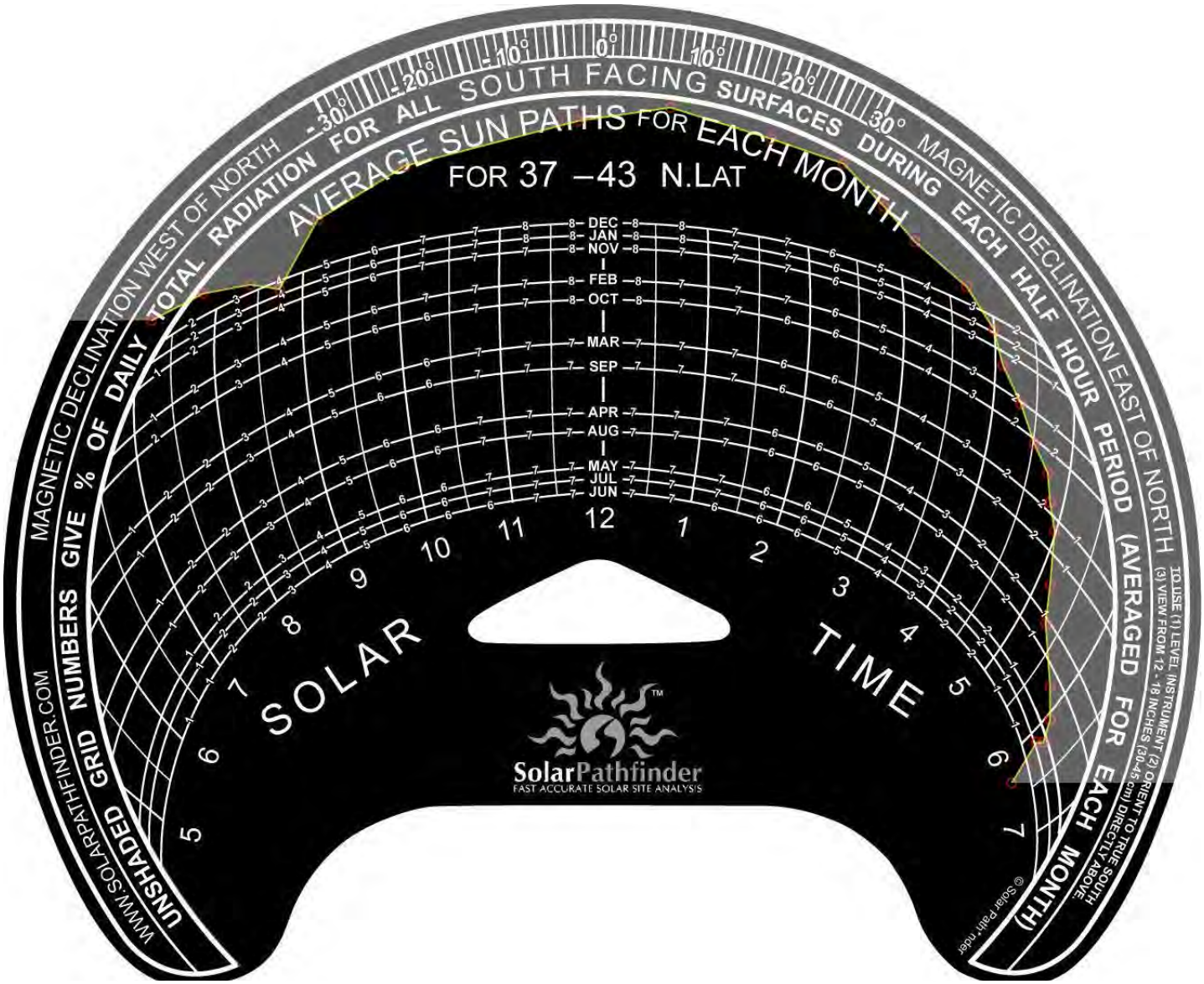
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.3	Actual Solar Rad w/ Shading Azimuth=160.0 Tilt=41.3 KWH/m^2 /day
January	87.00%	2.58
February	92.80%	3.20
March	92.80%	3.93
April	98.40%	5.20
May	100.00%	5.21
June	100.00%	4.90
July	100.00%	4.98
August	99.20%	4.54
September	96.60%	4.69
October	92.70%	3.55
November	86.40%	2.85
December	84.80%	2.59
Totals	94.23%	48.23 [92.54%]



Solar Site Analysis Report

Report Title	230 Axak west
Image File	230Axak_PF_west.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	270.00 degrees

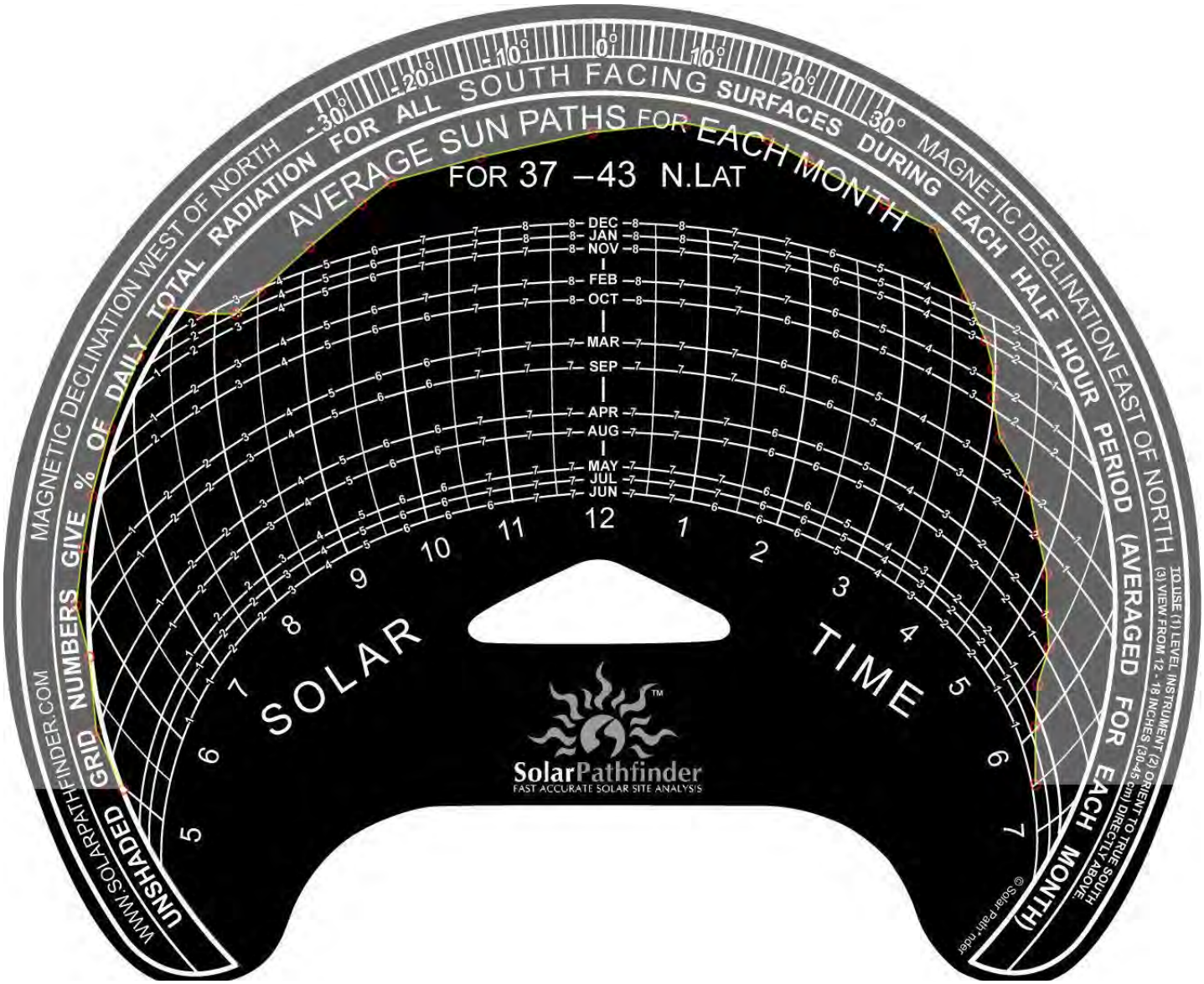
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=270.0 Tilt=41.7 KWH/m ^{2} /day
January	98.20%	0.87
February	98.40%	1.40
March	98.80%	2.65
April	99.60%	4.04
May	100.00%	5.18
June	100.00%	5.91
July	100.00%	6.50
August	100.00%	5.07
September	99.20%	3.42
October	98.00%	2.03
November	97.20%	1.13
December	95.80%	0.80
Totals	98.77%	39.00 [81.83%]



Solar Site Analysis Report

Report Title	230 Axak, Orleans
Image File	230Axak_PF_East.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	90.00 degrees

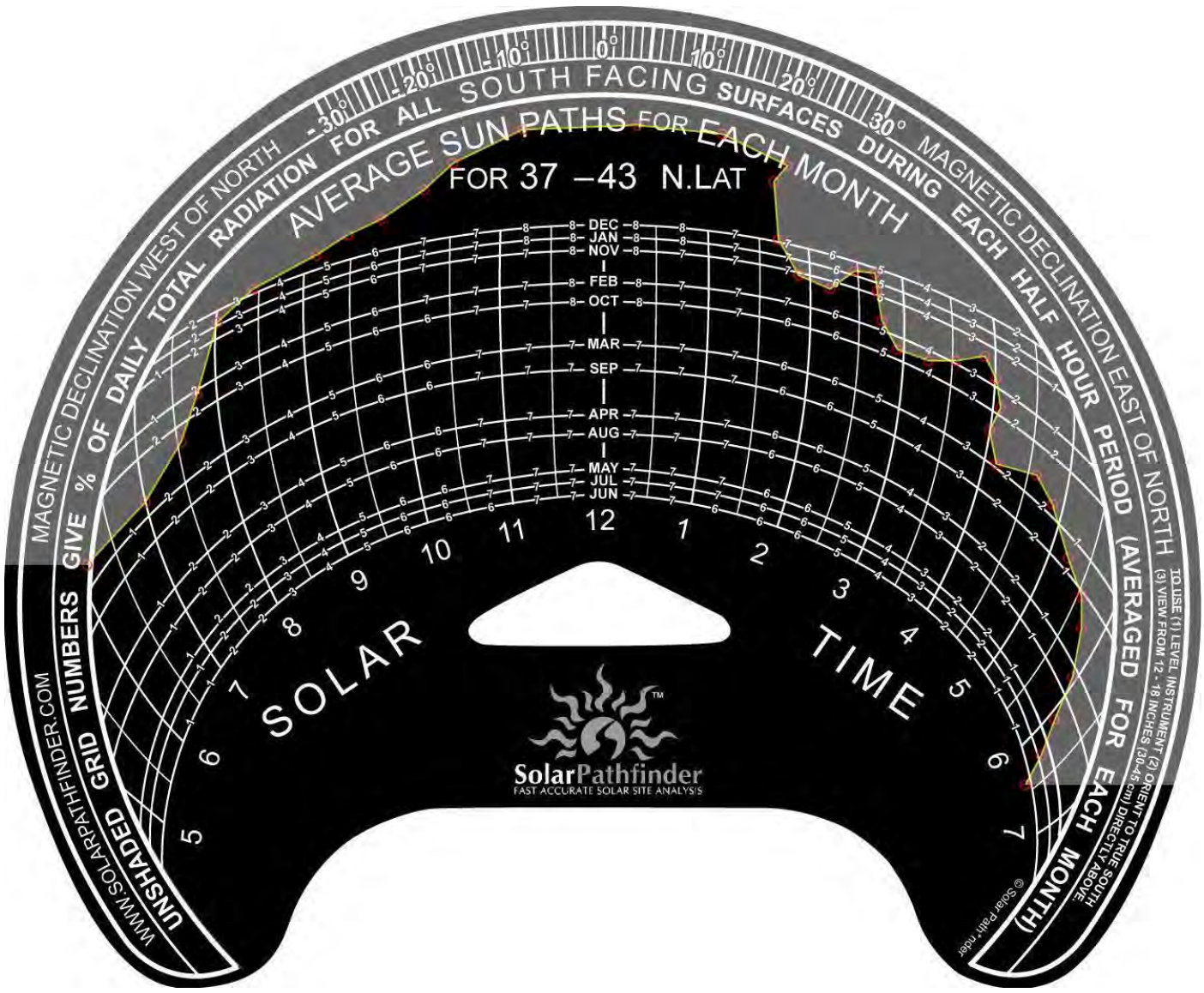
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=90.0 Tilt=41.7 KWH/m 2 /day
January	97.10%	0.74
February	97.00%	1.18
March	97.40%	2.29
April	99.70%	3.51
May	100.00%	5.13
June	100.00%	6.57
July	100.00%	6.69
August	100.00%	5.09
September	98.60%	3.32
October	96.20%	1.65
November	96.40%	0.69
December	92.50%	0.55
Totals	97.91%	37.41 [80.71%]



Solar Site Analysis Report

Report Title	250 Axak, Orleans
Image File	250_Axak_PF2.JPG
Report Date	Friday, June 20, 2008
Declination	15d 37m
Latitude/Longitude	41.305 / -123.558
Analysis Site	ORLEANS, CA, Zipcode: 95556
Weather Station	ARCATA, CA, Elevation: 69 m
Station/Site Distance	35.96 miles
Array Type	Fixed
Tilt Angle	41.30 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	180.00 degrees

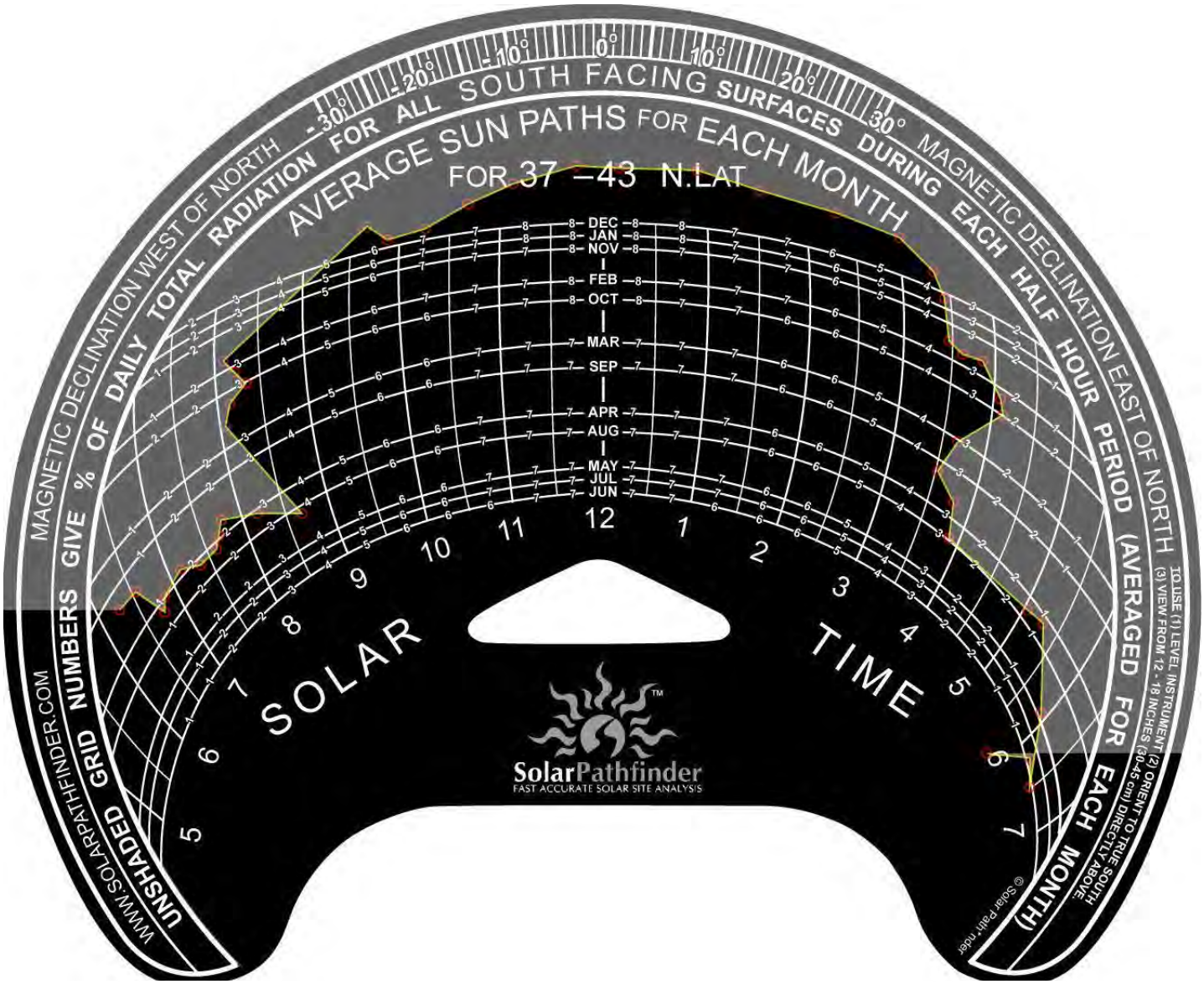
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.3	Actual Solar Rad w/ Shading Azimuth=180.0 Tilt=41.3 KWH/m^2 /day
January	78.70%	2.47
February	89.30%	3.17
March	99.00%	4.35
April	100.00%	5.43
May	100.00%	5.43
June	100.00%	5.20
July	100.00%	5.49
August	100.00%	4.98
September	99.90%	5.06
October	93.60%	3.89
November	79.50%	2.84
December	72.70%	2.35
Totals	92.73%	50.65 [94.45%]



Solar Site Analysis Report

Report Title	440 VirusurImpah, Happy Camp
Image File	440VirusurImpah_4.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	200.00 degrees

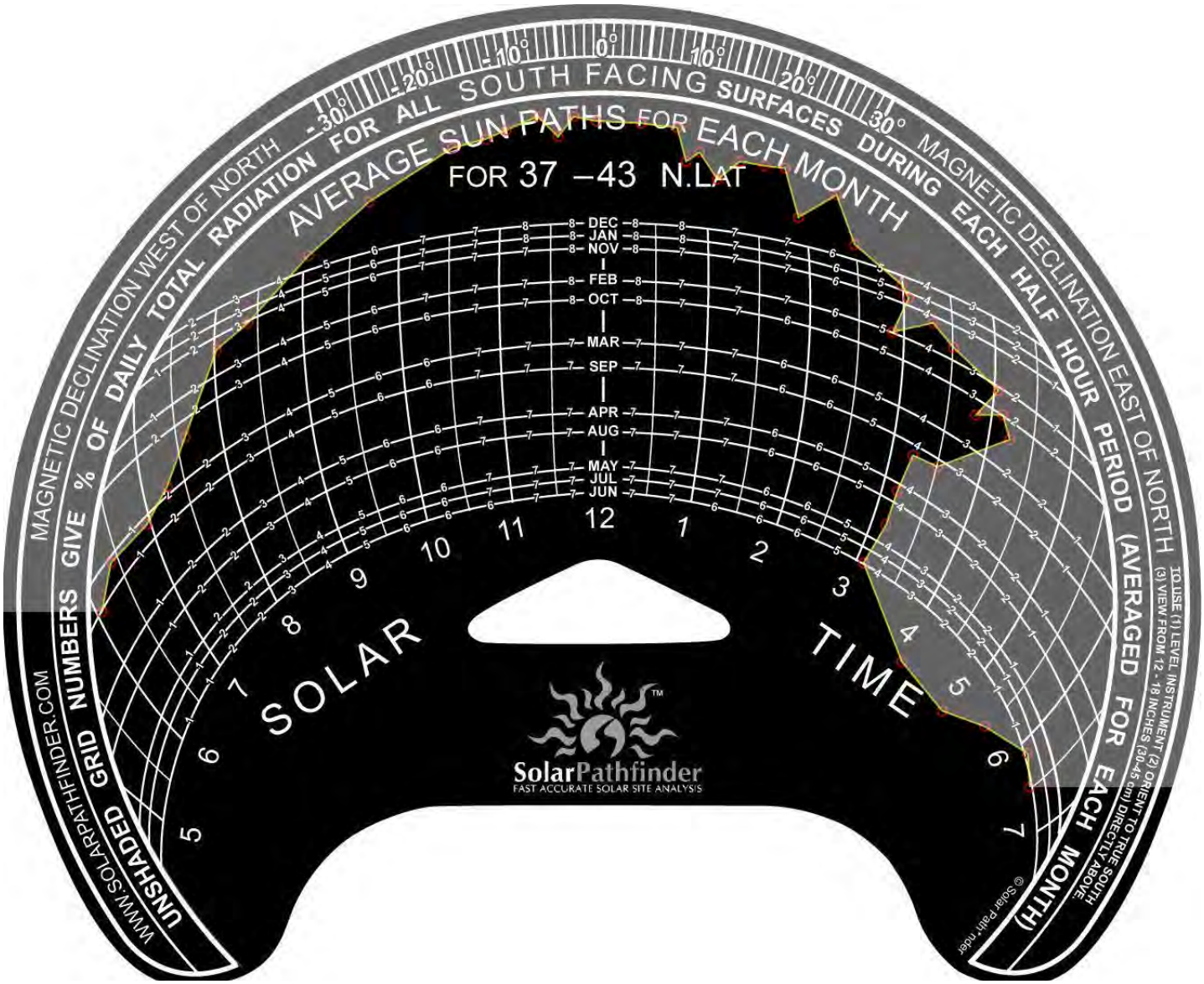
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=200.0 Tilt=41.7 KWH/m 2 /day
January	85.10%	1.92
February	92.80%	3.10
March	87.00%	4.28
April	89.50%	5.00
May	100.00%	6.35
June	100.00%	6.42
July	100.00%	7.31
August	99.10%	7.02
September	85.80%	5.30
October	90.50%	4.32
November	85.60%	2.12
December	83.10%	1.58
Totals	91.54%	54.71 [92.97%]



Solar Site Analysis Report

Report Title	610 JacobsWay, Happy Camp
Image File	610JacobsWay_6.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	140.00 degrees

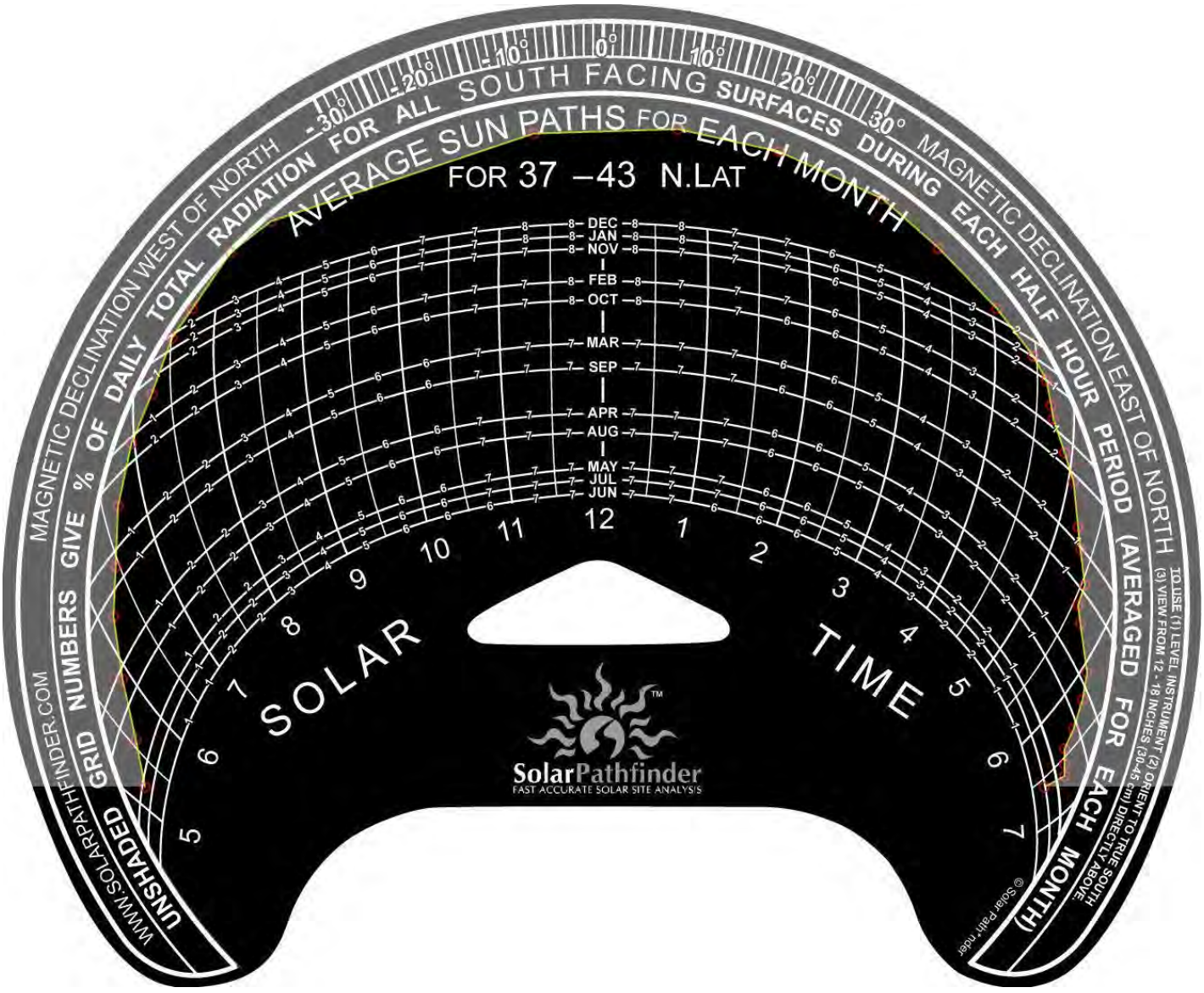
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=140.0 Tilt=41.7 KWH/m 2 /day
January	85.20%	1.51
February	94.10%	2.51
March	92.80%	3.82
April	89.60%	4.42
May	89.20%	5.51
June	88.20%	6.05
July	89.20%	6.65
August	89.60%	6.10
September	92.90%	5.15
October	92.90%	3.53
November	85.00%	1.46
December	81.70%	1.14
Totals	89.20%	47.83 [85.43%]



Solar Site Analysis Report

Report Title	1449 Apsuun, Yreka
Image File	1449 Apsuun_3.JPG
Report Date	Friday, June 20, 2008
Declination	15d 31m
Latitude/Longitude	41.624 / -122.44
Analysis Site	YREKA, CA, Zipcode: 96097
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	55.86 miles
Array Type	Fixed
Tilt Angle	41.62 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	240.00 degrees

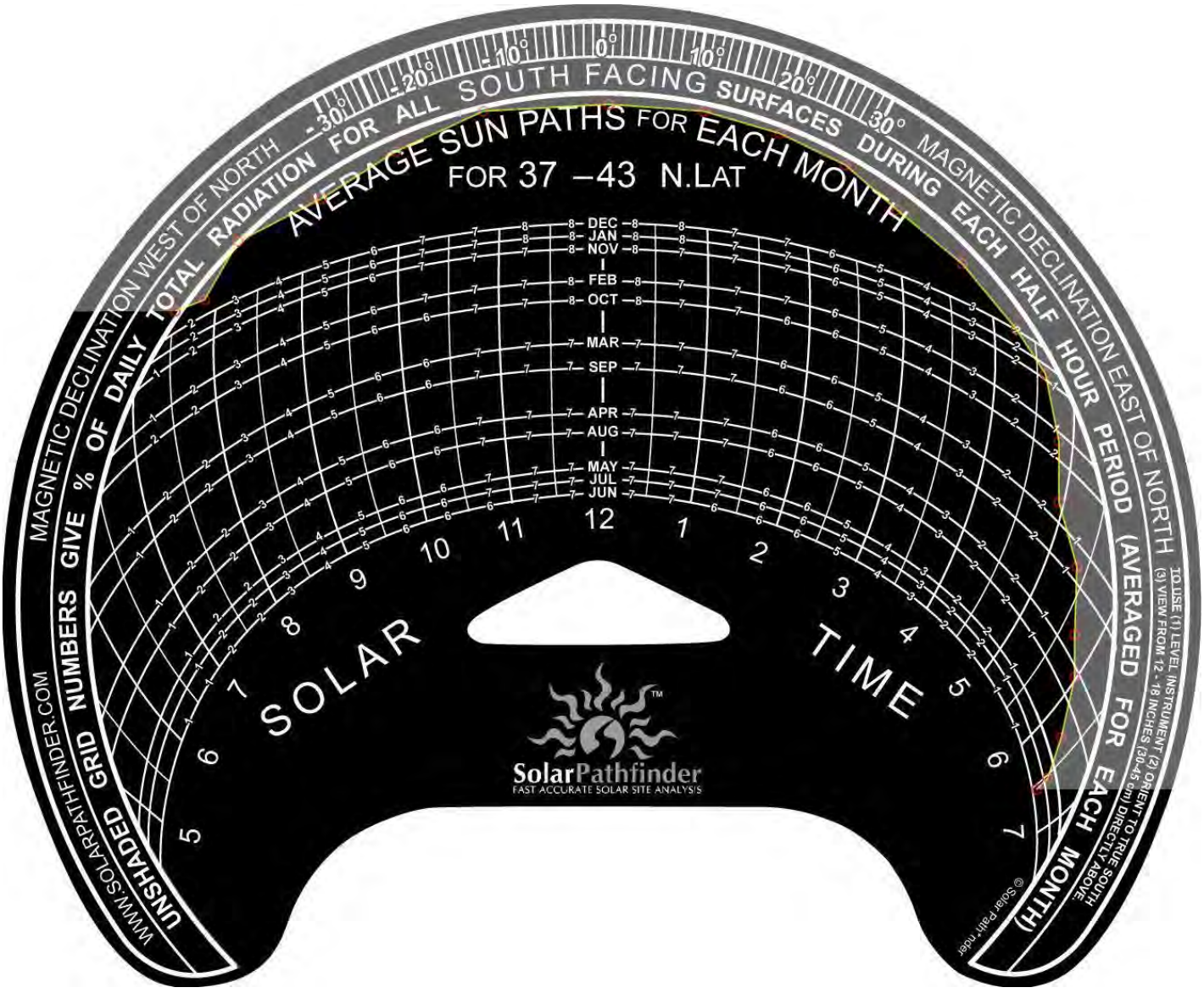
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.6	Actual Solar Rad w/ Shading Azimuth=240.0 Tilt=41.6 KWH/m ^{2} /day
January	99.80%	1.53
February	99.50%	2.34
March	99.60%	3.83
April	100.00%	4.98
May	100.00%	5.94
June	100.00%	6.37
July	100.00%	7.18
August	100.00%	6.23
September	100.00%	4.85
October	100.00%	3.39
November	98.50%	1.84
December	98.60%	1.36
Totals	99.67%	49.84 [91.96%]



Solar Site Analysis Report

Report Title	1529 Apsuun, Yreka
Image File	1529Apsuun_6.JPG
Report Date	Friday, June 20, 2008
Declination	15d 31m
Latitude/Longitude	41.624 / -122.44
Analysis Site	YREKA, CA, Zipcode: 96097
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	55.86 miles
Array Type	Fixed
Tilt Angle	41.62 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	160.00 degrees

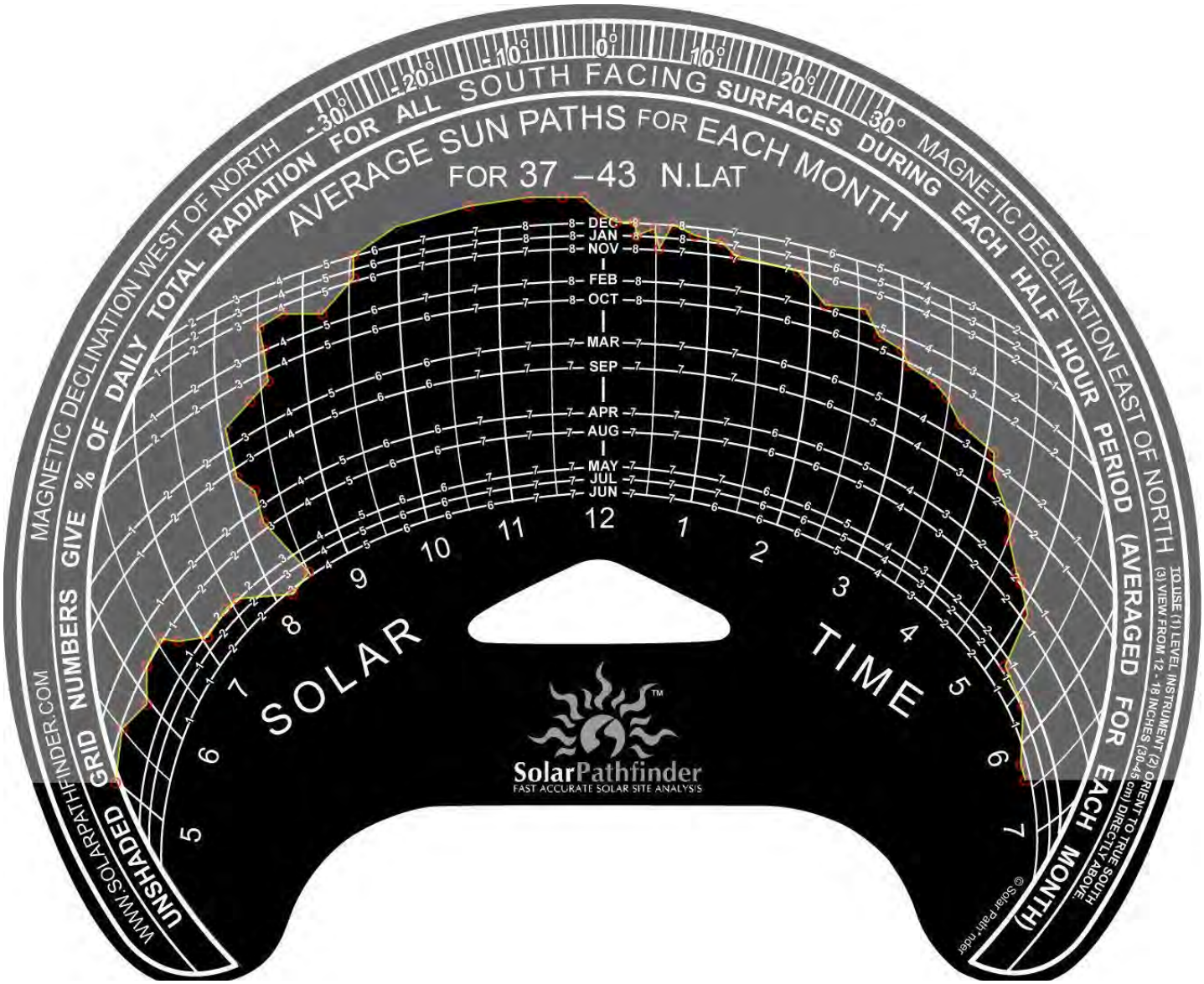
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.6	Actual Solar Rad w/ Shading Azimuth=160.0 Tilt=41.6 KWH/m ^{2} /day
January	100.00%	2.15
February	99.60%	3.16
March	99.30%	4.64
April	100.00%	5.31
May	100.00%	6.32
June	100.00%	6.61
July	100.00%	7.34
August	100.00%	7.07
September	99.90%	6.11
October	99.40%	4.50
November	99.30%	2.14
December	99.40%	1.71
Totals	99.74%	57.07 [98.18%]



Solar Site Analysis Report

Report Title	2501 China Grade Road
Image File	2501ChinaGradeRoad_5.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	180.00 degrees

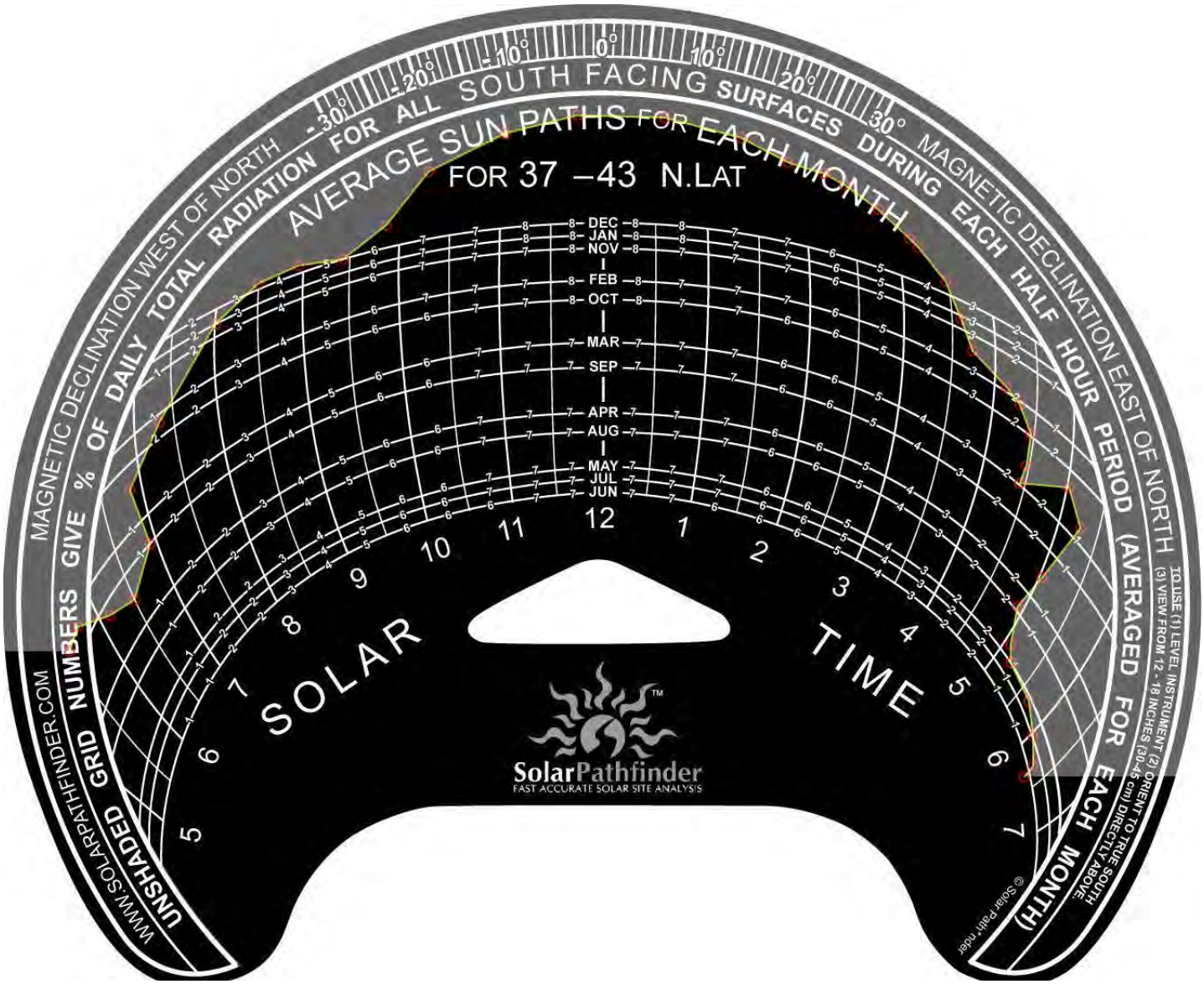
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=180.0 Tilt=41.7 KWH/m 2 /day
January	53.40%	1.24
February	80.20%	2.75
March	90.00%	4.49
April	92.10%	5.10
May	94.30%	6.00
June	98.50%	6.35
July	96.40%	7.01
August	92.60%	6.62
September	91.00%	5.77
October	81.60%	4.00
November	60.50%	1.48
December	41.00%	0.78
Totals	80.97%	51.60 [87.29%]



Solar Site Analysis Report

Report Title	63538 Itroop Happy Camp
Image File	63538Itroop_15.JPG
Report Date	Friday, June 20, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	280.00 degrees

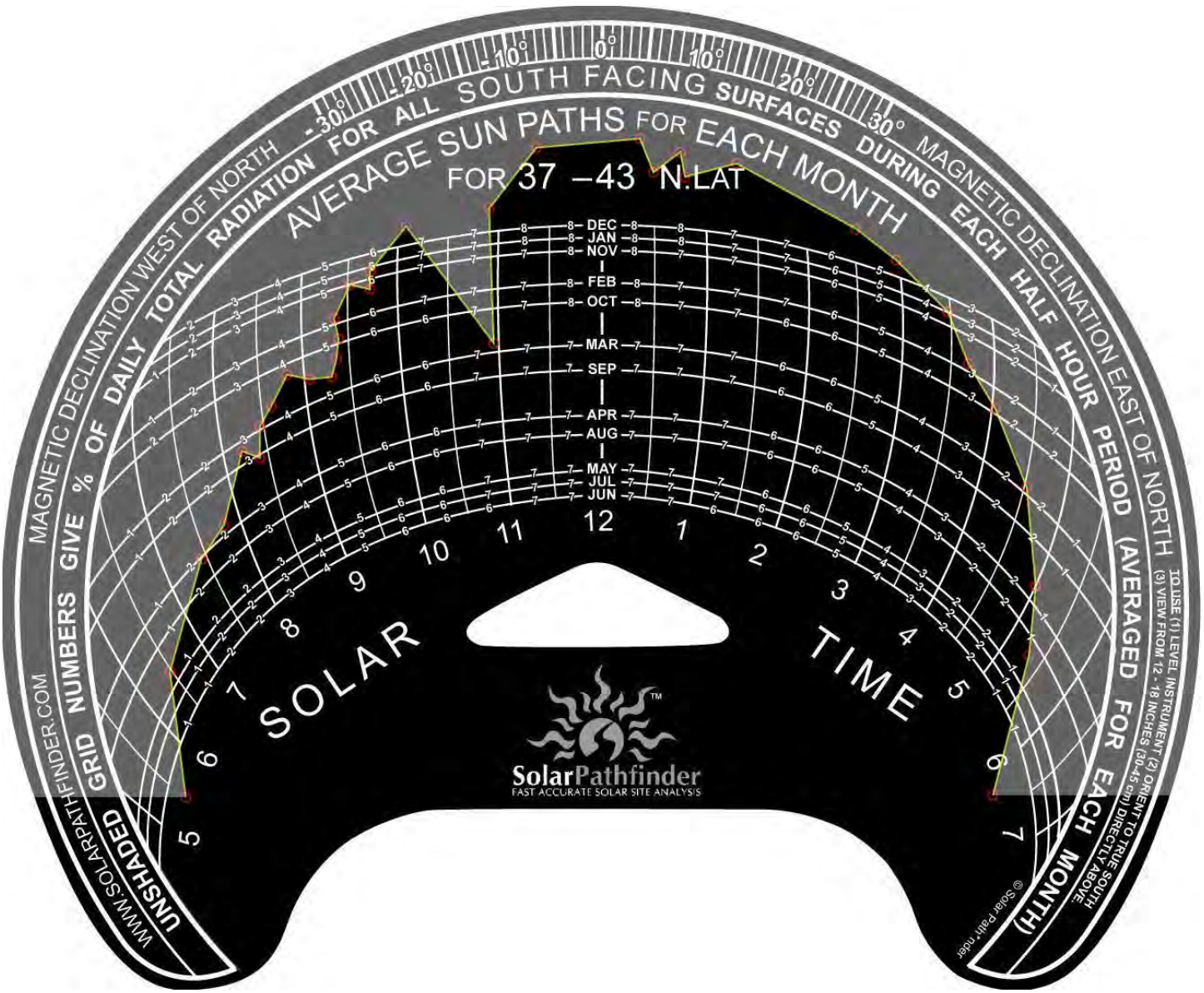
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=280.0 Tilt=41.7 KWH/m ^{2} /day
January	93.30%	0.67
February	97.00%	1.12
March	98.60%	2.28
April	99.00%	3.65
May	99.70%	4.84
June	100.00%	5.66
July	100.00%	6.15
August	98.80%	4.53
September	98.40%	2.91
October	97.20%	1.63
November	92.60%	0.88
December	91.20%	0.62
Totals	97.15%	34.95 [77.53%]



Solar Site Analysis Report

Report Title	Happy Camp Admin - Health Clinic Roof
Image File	HappyCampAdmin_40_PF_Health.JPG
Report Date	Thursday, June 19, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	230.00 degrees

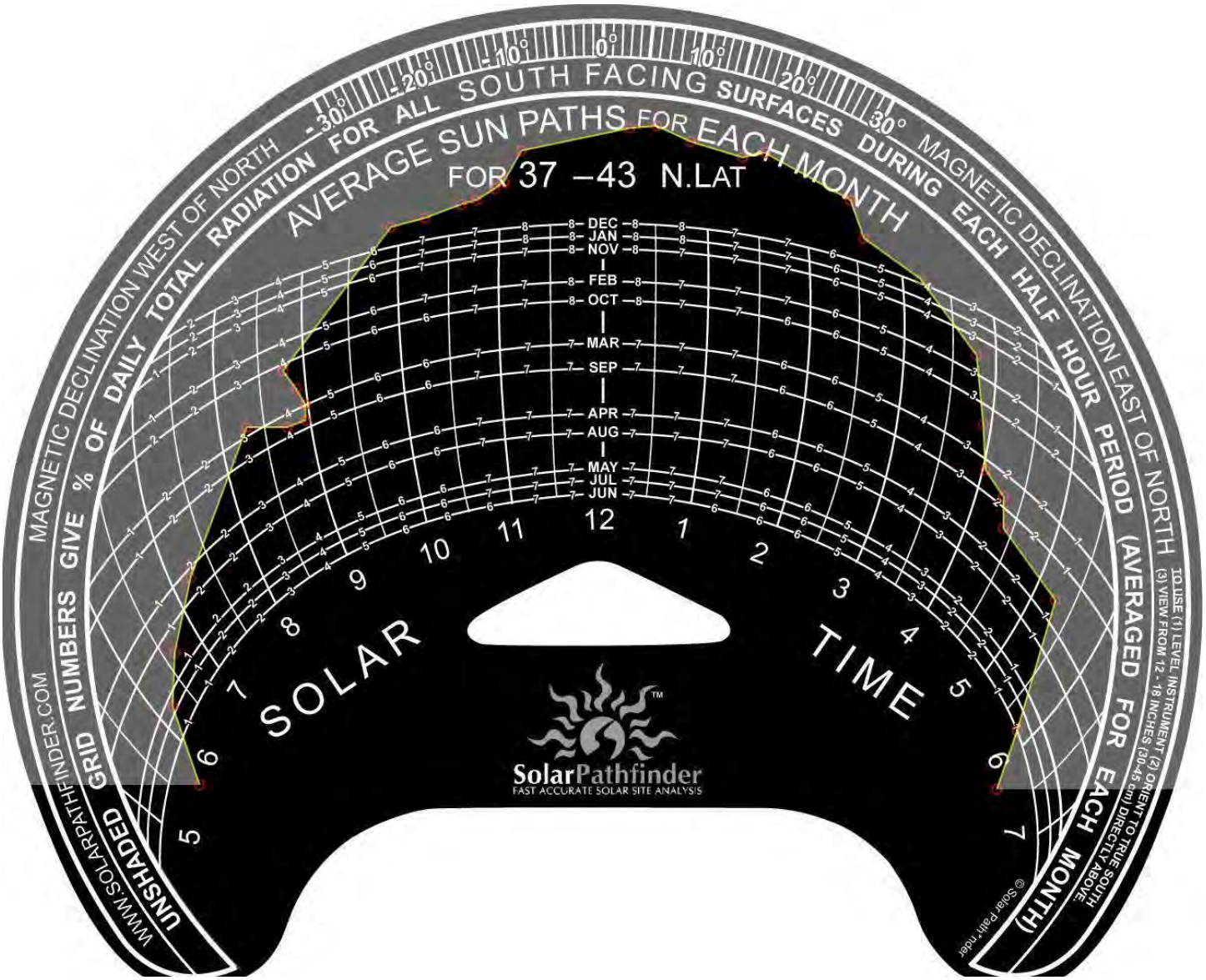
Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=230.0 Tilt=41.7 KWH/m ^{2} /day
January	68.30%	1.19
February	77.90%	2.07
March	89.40%	3.74
April	96.00%	5.02
May	100.00%	6.11
June	99.40%	6.39
July	100.00%	7.30
August	98.10%	6.43
September	92.00%	4.87
October	77.90%	2.99
November	68.60%	1.43
December	63.80%	0.99
Totals	85.95%	48.52 [86.81%]



Solar Site Analysis Report

Report Title	Happy Camp Admin - lawn
Image File	HappyCampAdmin_28_PF_lawn.JPG
Report Date	Thursday, June 19, 2008
Declination	15d 41m
Latitude/Longitude	41.667 / -123.422
Analysis Site	HAPPY CAMP, CA, Zipcode: 96039
Weather Station	MEDFORD, OR, Elevation: 396 m
Station/Site Distance	56.20 miles
Array Type	Fixed
Tilt Angle	41.67 degrees
Cost of Electricity	6 cents/kWhr
DC Rate	4.00 kW
Derate Factor	0.77
Azimuth (180 = south)	180.00 degrees

Month	Unshaded % of Ideal Site Azimuth=180.0 Tilt=41.7	Actual Solar Rad w/ Shading Azimuth=180.0 Tilt=41.7 KWH/m ^{2} /day
January	78.40%	1.82
February	84.60%	2.90
March	84.70%	4.22
April	97.10%	5.38
May	100.00%	6.37
June	99.50%	6.41
July	100.00%	7.28
August	98.60%	7.05
September	91.10%	5.78
October	85.20%	4.18
November	78.70%	1.92
December	76.00%	1.45
Totals	89.49%	54.76 [92.63%]



Appendix F: Solar Hot Water Analysis

Changes are made in these cells with this color when trying another collector choice

Change the red cell below to reduce or increase overall water tank storage size.

If you change any economic parameters, don't forget to reset the NPV costs without solar by setting collector area to zero and entering the value from P13 into P12.

System design parameters		
$(\tau\alpha)_{avg}/(\tau\alpha)_n$	0.96	
$\eta_{specific}$		
$\eta_{hardness}$	0.85	
F_R/F_R	0.95	
$F_R(\tau\alpha)_n$	0.68	
Storage tank size reference	75	Liters/m² c.a.
Storage tank size target	75	Liters/m² c.a.
Xc/X	1.06	
cold water temp	13	degrees C
Hot water set point	50	degrees C
$F_R U_L$	4.54	W/m²-deg C
DHW flow	302.8	L/day
density H_2O	0.99	kg/L
C_p water	4184	J/kg-deg K
T_{ref}	100	deg C

Economic Parameters		Units
net discount rate	0.05	
O&M factor	0.02	
replacement cost factor	1	
Salvage value factor	0.2	
Propane gas cost ($/therm)	$ 3.30	$/therm
inflation rate multiplier	1.04	
B.O.S. / installation factor	0.2	
Storage ($/gal)	$ 17.50	
Initial capital costs	$ 7,570.33	
	$ 14.91	
Rheem qoute	2.27	$/gal

System parameters				average F
Lat (deg)	41	Beta (deg)	42.4121914	0.78
Average ground reflectance			0.352	
Gross collector area (m²)			7.60	
$		-	2.00	
Storage tank size (L)			456.00	
Storage tank size (gal)			120.38	
Category			Gas water heater	
NPV costs without solar system *			$ 35,888.69	
NPV costs of system			$ 19,809.99	
NPV savings with solar system			$ 15,878.70	

* From setting collector area to zero

% of annual load met by solar
77%

Array area		
Gross area (ft² / m²)	81.76	7.60

Choose a collector from the list below and Insert the number here

5

Number	Manufacturer	Model	type
1	Focus Tech.	AP-30	evacuted tube
2	BTF solar	SP-20	evacuted tube
3	Thermomax	AST30	evacuted tube
4	Thermo Tech.	TMA-600-30	evacuted tube
5	Sun Earth	EC-40	Flat plate

Summary of the panel your modelling		
Manufacturer	Sun Earth	Units
Model	EC-40	
Collector $	$ 407.63	$/m² w/shipping
Optical eff.	0.68	
loss coeff.	-4.54	W/m²-K
Gross collector area	3.80	m²

EIA DATA	
Annual NG use	67297 1000BTU
Space heating	44342 1000BTU
Water heating	14971 1000BTU
Appliances	7984 1000BTU
Annual HW Load	59.3 MBTU
Annual profile (Helmut)	0.00 MBTU

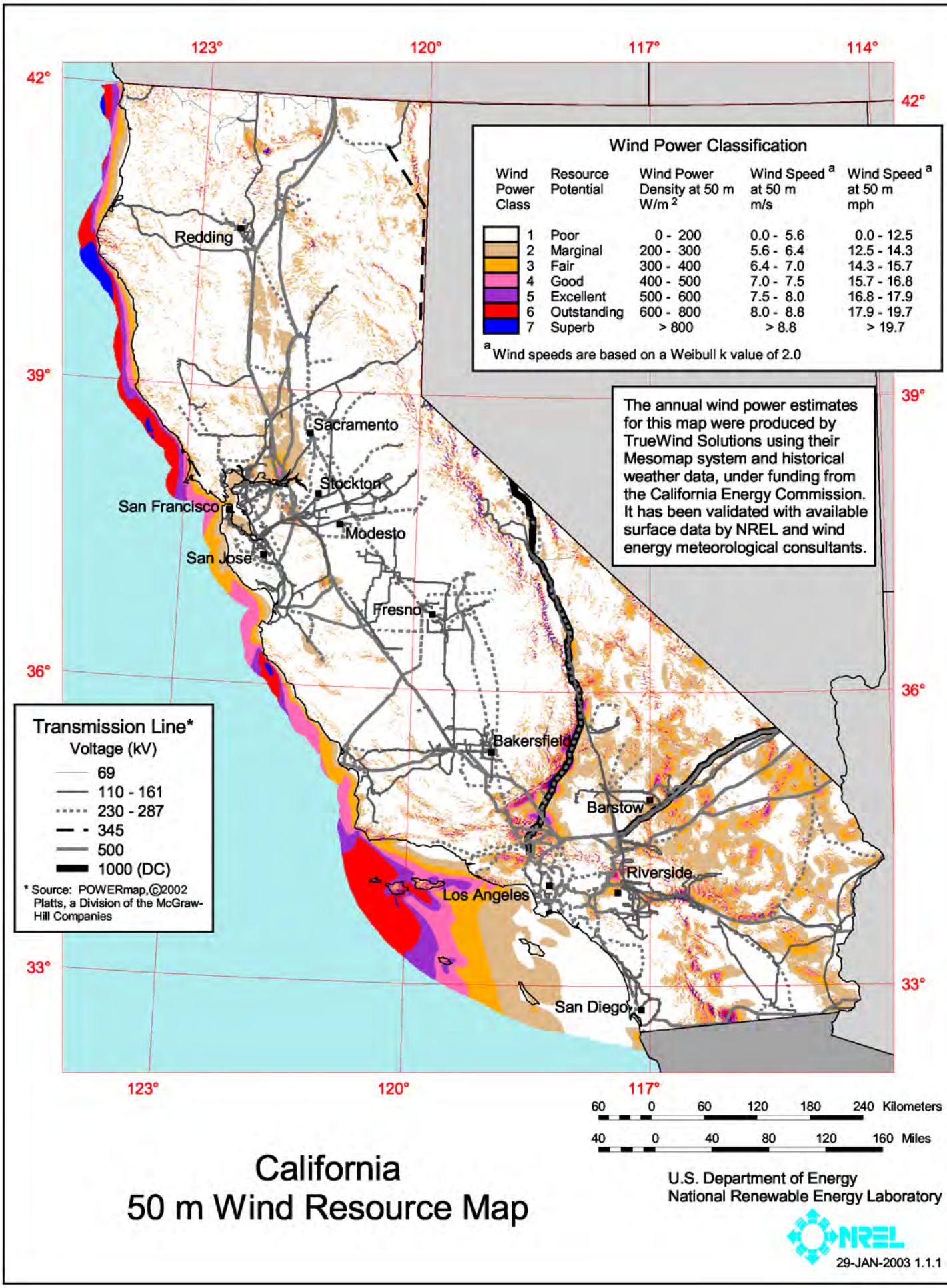
MO	# days	Ave Temp (deg C)	NSRD data Hbar (W/m^2/day)	$Hbar_o$ (MJ/m^2/day)	$Hbar_o$ (W/m^2/day)	K_T	Average day of the month	Angle of declination	Sunset hour angle	H_d/H	Omega s	Omega s prime	R_b	rho_{ha}	H_T (W/m^2/day)	H_T (J/m^2/day)	H_T (W/m^2/month	H_T (J/m^2/month)	L (J)	L (kWh)	X	Xc	Y	F	F	kWh met by solar	kWh met utility	Therms met by utility	DHW Estimate from EIA (MBTU)	Space heating loads (MBTU)	Monthly Average HDD 2001 to 2005	Percent of monthly average HDDs
																		1 BTU =	1055.1	Joule										
1	31	7.8	3050	14.60	4054.69	0.75	17	-20.92	70.60	0.17	90.54	70.60	2.37	0.35	6571.26	23656519.47	203708.92	733352103.70	1.25	1316325175.00	27549497.07	765.3	2.94	3.11	1.26	0.77	0.77	585.5	179.7	6.1	1.25	0.00	17	11%
2	28	9.4	4150	19.97	5546.38	0.75	47	-12.95	78.47	0.18	90.32	78.47	1.85	0.35	7157.12	25765619.27	200399.26	721437339.64	1.25	1316325175.00	26157279784.94	726.6	2.75	2.90	1.30	0.80	0.80	580.7	145.9	5.0	1.25	0.00	18	11%
3	31	11.1	4730	26.98	7494.13	0.63	75	-2.42	87.90	0.31	90.06	87.90	1.41	0.35	6078.41	21882285.78	188430.79	678350859.20	1.25	1316325175.00	27549497.07	765.3	2.83	3.00	1.16	0.72	0.72	551.9	213.4	7.3	1.25	0.00	17	10%
4	30	11.4	5300	34.35	9543.14	0.56	105	9.41	98.29	0.38	89.77	89.77	1.06	0.35	5493.58	19776883.98	164807.37	593306519.26	1.25	1316325175.00	27085424464.93	752.4	2.78	2.94	1.04	0.65	0.65	490.0	262.4	8.9	1.25	0.00	16	10%
5	31	13.7	5910	39.61	11003.90	0.54	135	18.79	107.21	0.39	89.52	89.52	0.87	0.35	5399.20	19437121.92	167375.22	602550779.47	1.25	1316325175.00	27549497.07	765.3	2.75	2.91	1.03	0.65	0.65	498.9	266.4	9.1	1.25	0.00	13	8%
6	30	14.4	6150	41.77	11604.08	0.53	162	23.09	111.75	0.40	89.40	89.40	0.79	0.35	5332.77	19197974.46	159983.12	575939233.86	1.25	1316325175.00	27085424464.93	752.4	2.69	2.84	1.01	0.64	0.64	480.4	271.9	9.3	1.25	0.00	10	6%
7	30	15.8	6840	40.64	11288.82	0.61	198	21.18	109.69	0.33	89.45	89.45	0.82	0.35	6046.94	21768996.44	187455.25	674838889.60	1.25	1316325175.00	27085424464.93	752.4	2.64	2.79	1.14	0.72	0.72	540.9	211.5	7.2	1.25	0.00	9	5%
8	31	16.3	6930	36.34	10094.85	0.69	228	13.45	102.00	0.26	89.66	89.66	0.97	0.35	6874.72	24748985.91	213116.27	767218563.06	1.25	1316325175.00	27549497.07	765.3	2.67	2.82	1.32	0.81	0.81	619.9	145.3	5.0	1.25	0.00	8	5%
9	30	14.5	6500	29.60	8223.77	0.79	258	2.22	91.93	0.16	89.95	89.95	1.26	0.35	8048.07	28973037.93	241441.98	869191137.90	1.25	1316325175.00	27085424464.93	752.4	2.68	2.84	1.52	0.90	0.90	678.9	73.5	2.5	1.25	0.00	10	6%
10	31	12.7	5460	21.99	6109.76	0.89	288	-9.60	81.55	0.05	90.24	81.55	1.69	0.35	9265.87	33357148.00	287242.11	1034071587.91	1.25	1316325175.00	27549497.07	765.3	2.78	2.94	1.77	1.00	0.95	727.0	38.3	1.3	1.25	0.00	12	8%
11	30	9.5	3330	15.84	4399.49	0.76	318	-18.91	72.67	0.17	90.48	72.67	2.22	0.35	6773.52	24384689.64	203205.75	731540889.17	1.25	1316325175.00	27085424464.93	752.4	2.84	3.00	1.28	0.78	0.78	587.0	165.3	5.6	1.25	0.00	15	10%
12	31	9.1	3140	13.14	3650.31	0.86	344	-23.05	68.29	0.07	90.60	68.29	2.55	0.35	7805.77	28100762.91	241978.79	871123650.22	1.25	1316325175.00	27549497.07	765.3	2.90	3.06	1.49	0.88	0.88	673.6	91.6	3.1	1.25	0.00	17	10%
															sum	2910550025.70	2459144.82	8852921352.98									9080.04			sums		7014.8	2065.3	70.4	14.97		162	100%

Index	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Year	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Initial capital	$ 7,570.33									$ 1,801.95										$ 5,958.61										
O&M	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17	$ 119.17
Gas Rate	$ 3.30	$ 3.43	$ 3.57	$ 3.71	$ 3.86	$ 4.01	$ 4.18	$ 4.34	$ 4.52	$ 4.70	$ 4.88	$ 5.08	$ 5.28	$ 5.49	$ 5.71	$ 5.94	$ 6.18	$ 6.43	$ 6.69	$ 6.95	$ 7.23	$ 7.52	$ 7.82	$ 8.13	$ 8.46	$ 8.80	$ 9.15	$ 9.52	$ 9.90	$ 10.29
Gas cost	$ 273.42	$ 284.36	$ 295.73	$ 307.56	$ 319.86	$ 332.66	$ 345.96	$ 359.80	$ 374.19	$ 389.16	$ 404.73	$ 420.92	$ 437.75	$ 455.26	$ 473.47	$ 492.41	$ 512.11	$ 532.59	$ 553.90	$ 576.05	$ 599.09	$ 623.06	$ 647.98	$ 673.90	$ 700.86	$ 728.89	$ 758.05	$ 788.37	$ 819.90	$ 852.70
Salvage Value	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,514.07
Continual costs	$ 392.59	$ 403.53	$ 414.90	$ 426.73	$ 439.03	$ 451.83	$ 465.13	$ 478.97	$ 493.36	$ 508.33	$ 523.90	$ 540.09	$ 556.92	$ 574.43	$ 592.65	$ 611.58	$ 631.28	$ 651.76	$ 673.07	$ 695.22	$ 718.27	$ 742.23	$ 767.15	$ 793.07	$ 820.03	$ 848.06	$ 877.22	$ 907.54	$ 939.07	$ 971.87
Present Value	$ 7,962.92	$ 384.31	$ 376.33	$ 368.63	$ 361.19	$ 354.02	$ 347.09	$ 340.40	$ 333.93	$ 1,489.23	$ 321.63	$ 315.78	$ 310.12	$ 304.63	$ 299.33	$ 294.18	$ 289.20	$ 284.36	$ 279.67	$ 2,633.15	$ 270.71	$ 266.42	$ 262.25	$ 258.20	$ 254.26	$ 250.44	$ 246.71	$ 243.08	$ 239.55	$ (131.72)

Summary	
Category	SUMS
Capital	$ 15,330.69
O&M	$ 3,575.17
Gas cost	$ 15,334.68
Salvage Value	$ 1,514.07
continual costs (gas)	$ 18,909.84
Total PV (gas option)	$ 19,809.99

Item	cost	quantity	Total capital	replacement interval (yrs)	O&M/year	10 year cost	20 year cost
collector (cost-per m^2)	$ 232.63	7.60	$ 1,768.00	20	$ 35.36	$ -	$ 1,768.00
Collector shipping	$ 175.00	2	$ 350.00				
glycol circulation pump Taco_009	$ 288.85	0	$ -	10	$ -	$ -	$ -
expansion tank	$ 138.74	1	$ 138.74	20	$ 2.77	$ -	$ 138.74
pressure relief valve	$ 10.00	3	$ 30.00	10	$ 0.60	$ 30.00	$ 30.00
shut off valve	$ 3.00	19	$ 57.00	10	$ 1.14	$ 57.00	$ 57.00
controller	$ 143.20	1	$ 143.20	20	$ 2.86	$ -	$ 143.20
Air bleed valve	$ 15.00	4	$ 60.00	10	$ 1.20	$ 60.00	$ 60.00
storage tank	$ 2,106.72	1	$ 2,106.72	20	$ 42.13	$ -	$ 2,106.72
heat exchanger	$ -	2	$ -	20	$ -	$ -	$ -
Boiler	$ -	1	$ -	10	$ -	$ -	$ -
tankless heater	$ 1,500.00	1	$ 1,500.00	10	$ 30.00	$ 1,500.00	$ 1,500.00
tempering valve	$ 30.00	1	$ 30.00	10	$ 0.60	$ 30.00	$ 30.00
Circulation pump Tac_006	$ 124.95	1	$ 124.95	10	$ 2.50	$ 124.95	$ 124.95
zone control valve	$ -	0	$ -	10	$ -	$ -	$ -
thermostat	$ -	0	$ -	20	$ -	$ -	$ -
booster pump Taco_009	$ -	1	$ -	10	$ -	$ -	$ -
subtotals			$ 6,308.61			$ 1,801.95	$ 5,958.61
			$ 1,261.72				
Totals			$ 7,570.33		$ 119.17	$ 1,801.95	$ 5,958.61

Appendix G: NREL Wind Resource Map



California
50 m Wind Resource Map

U.S. Department of Energy
National Renewable Energy Laboratory

NREL

29-JAN-2003 1.1.1

Appendix H: Powerpoint Presentation used for Community Meetings

First Steps Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands

Partnership:
U.S. Department of Energy
Karuk Tribe of California, Department of Natural Resources
Winzler and Kelly Consulting Engineers

Karuk Tribe of California

WINZLER&KELLY
CONSULTING ENGINEERS

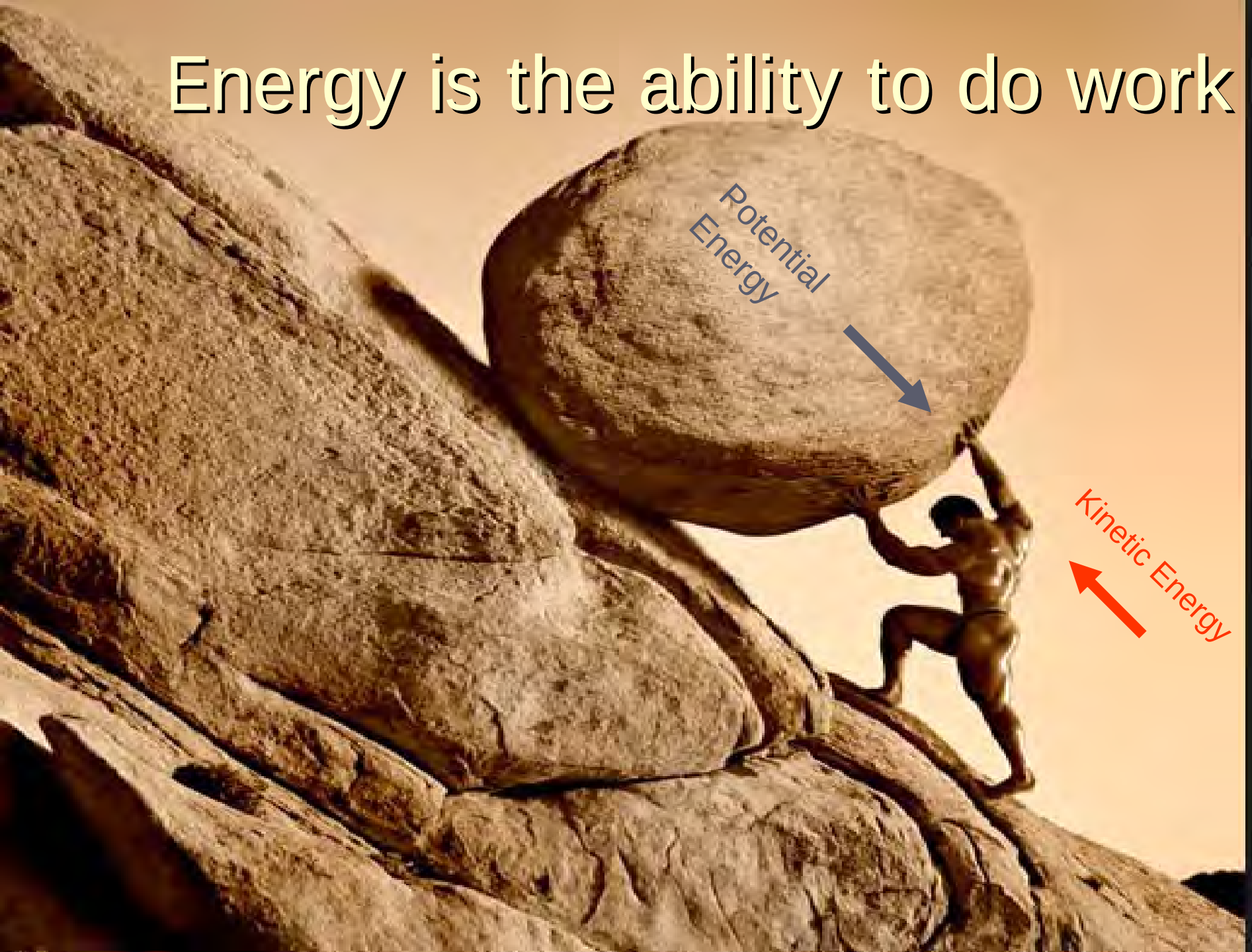
Project Team

- Ramona Driver
- Misti Gayle
- Robert Holmlund
- David Carter
- Stephen Kullmann
- and many others...

Energy Efficiency, Energy Conservation, and Renewable Energy

What is Energy and Where Does It Come From?

Energy is the ability to do work



Other Types of Energy

- Electrical

•Internal

•Mechanical

•Chemical

Thermal

Where Does Our Household Energy Come from?

Renewable energy < 5% of total US energy consumption

Why Should We Care about Saving Energy?

- Self Sufficiency
- Saving Money
- Income Potential
- Environment
  - Global Warming
  - Local pollution issues
  - Running out of fossil fuels

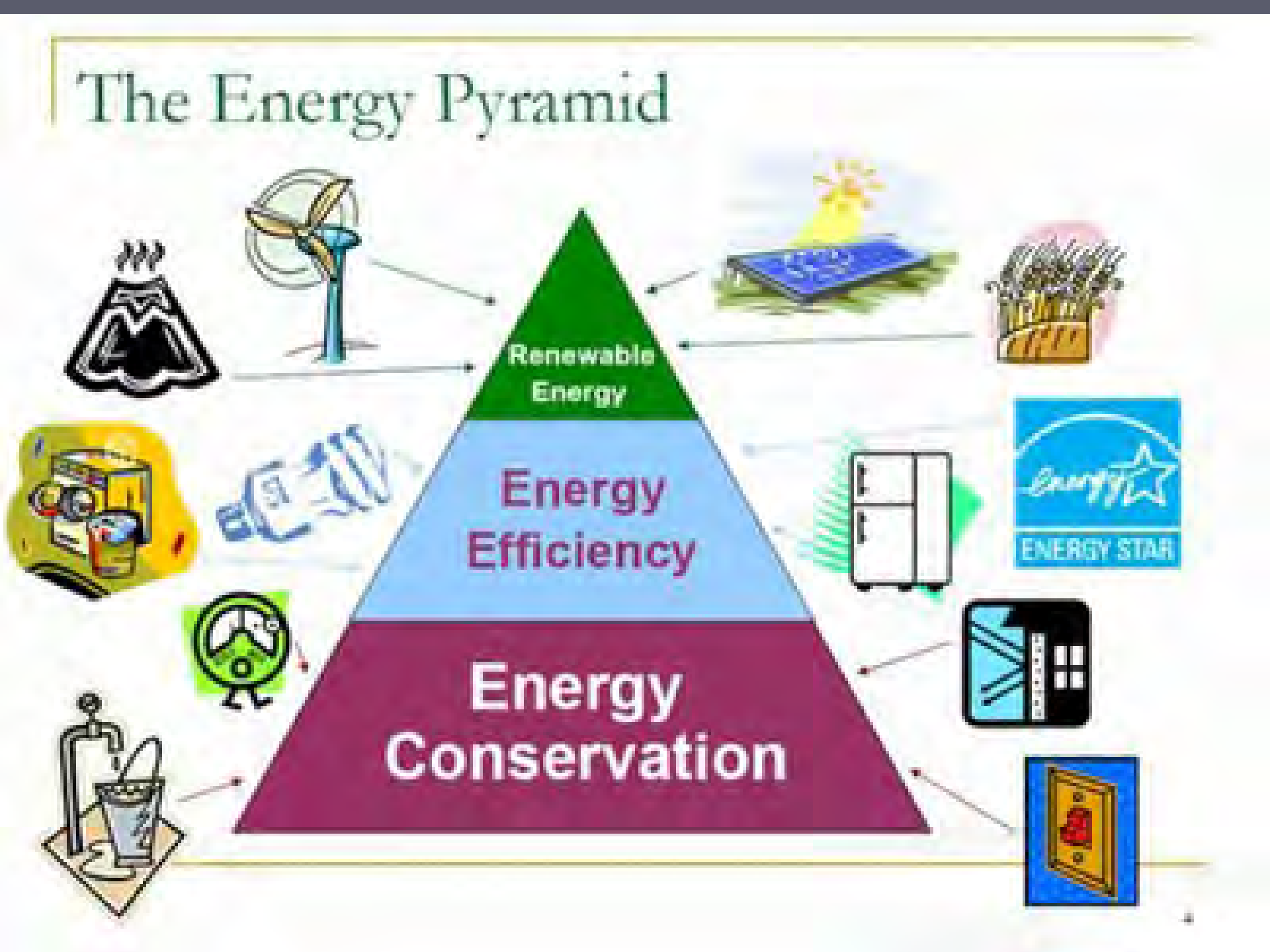
Let’s Play a Game!

WATT'S UP!

Tribal Energy Vision

The Vision of the Karuk Tribe Energy Program is to strengthen sovereignty through energy self-reliance, while maintaining cultural and ecological values.

The Energy Pyramid



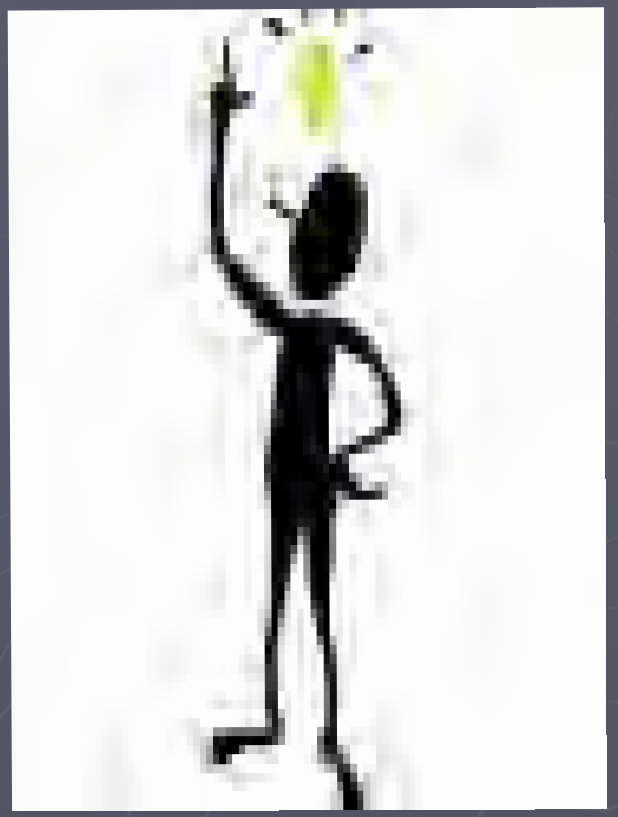
Energy Efficiency vs. Energy Conservation

- Energy Efficiency: doing the same amount of work with less energy
  - Example: newer furnace

- Energy Conservation: doing less work and getting the same benefit
  - Example: better insulation

Energy Efficiency

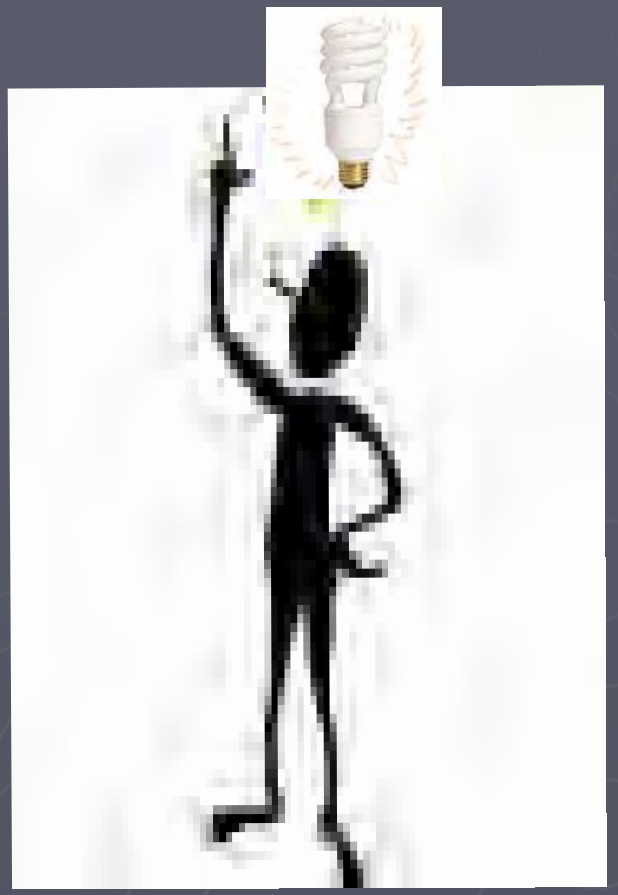
- Useful Energy Out/Energy Input



Energy Efficiency

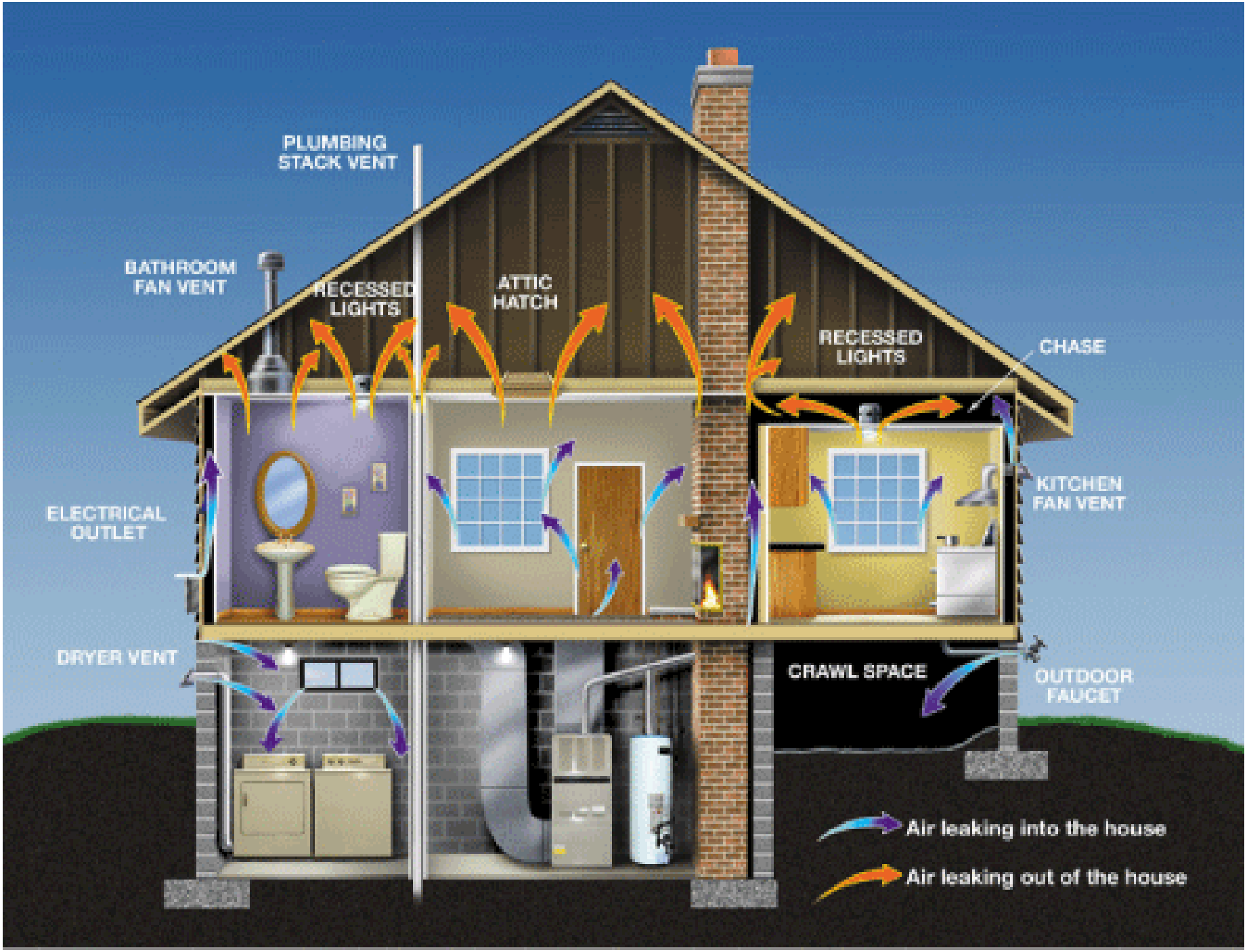
- Useful Energy Out/Energy Input

- A more efficient light bulb uses less electricity to produce the same amount of light!



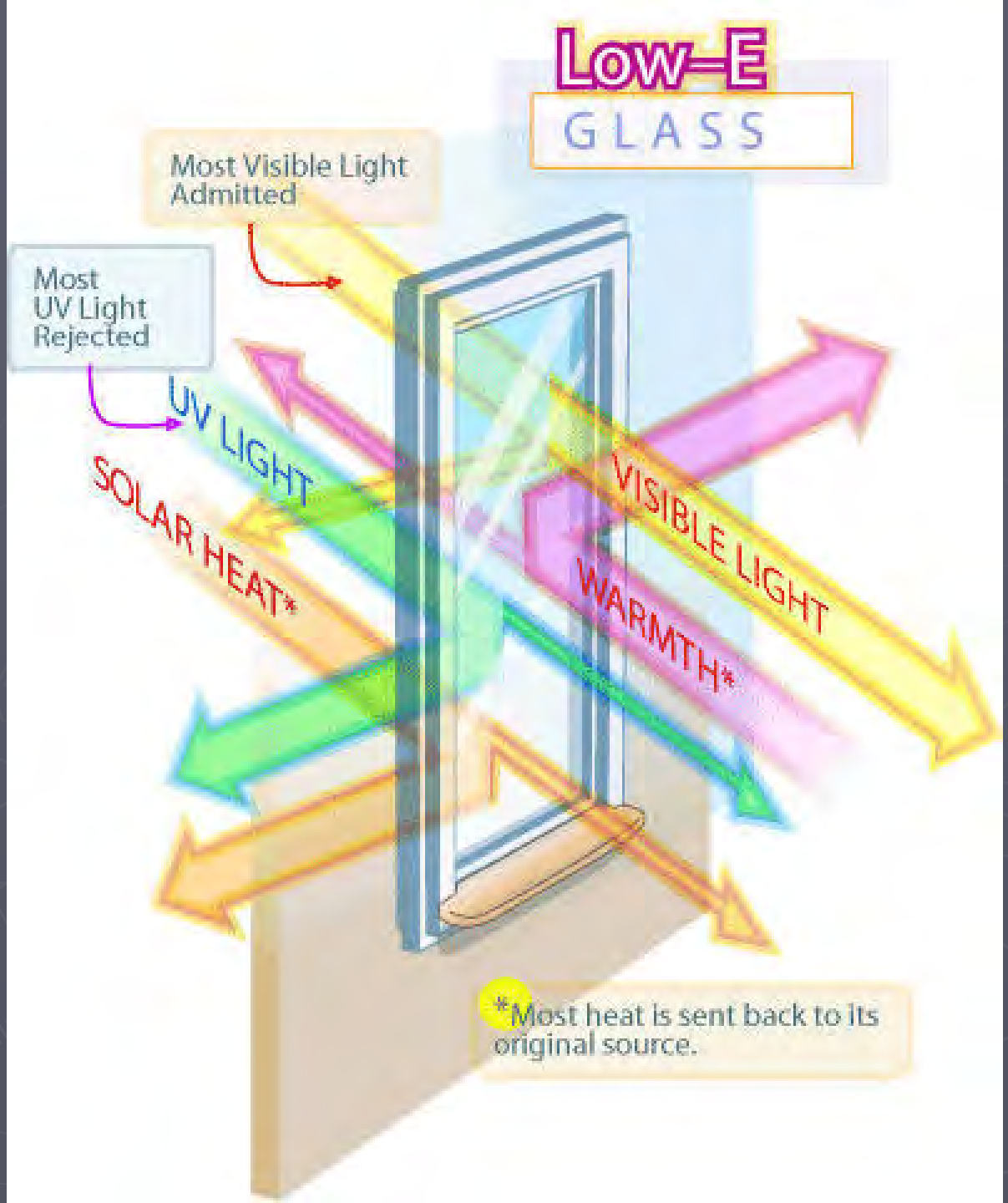
Energy Conservation

Energy Conservation


PLUMBING STACK VENT
BATHROOM FAN VENT
RECESSED LIGHTS
ATTIC HATCH
RECESSED LIGHTS
CHASE
KITCHEN FAN VENT
ELECTRICAL OUTLET
DRYER VENT
CRAWL SPACE
OUTDOOR FAUCET
Air leaking into the house
Air leaking out of the house


65


fluorescent lamp
luminaire
passive-infrared
motion-sensor
manual switch
with on/off
and dimming
functions

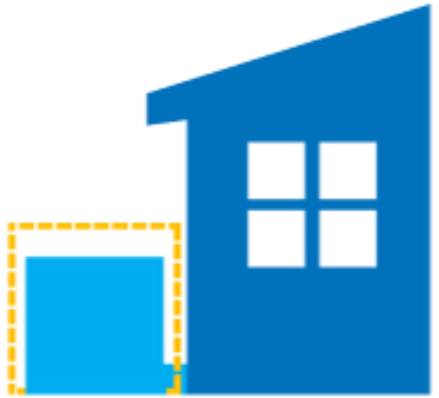

Low-E
GLASS
Most Visible Light Admitted
Most UV Light Rejected
UV LIGHT
SOLAR HEAT*
VISIBLE LIGHT
WARMTH*
*Most heat is sent back to its original source.

Phantom Loads

Phantom Loads (*aka standby power*)

- Electricity that is used when appliance is turned off
- About 6% of national residential energy consumption!
- Televisions, battery chargers, phone chargers
- Anything with a blinking light or cube plug
- Power strips are one way to manage Phantom Loads

Energy Efficiency



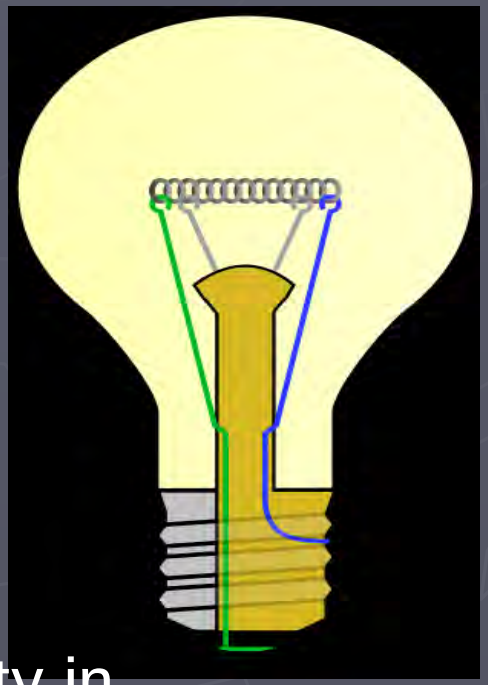
ENERGY STAR-labelled heat pumps and air conditioners use

20% less energy

than new standard models.

Light Bulb Efficiency

5 Watts of light energy



95 Watts of Heat

100 Watts electricity in

5% efficiency


1 eco-bulb = 12 incandescents

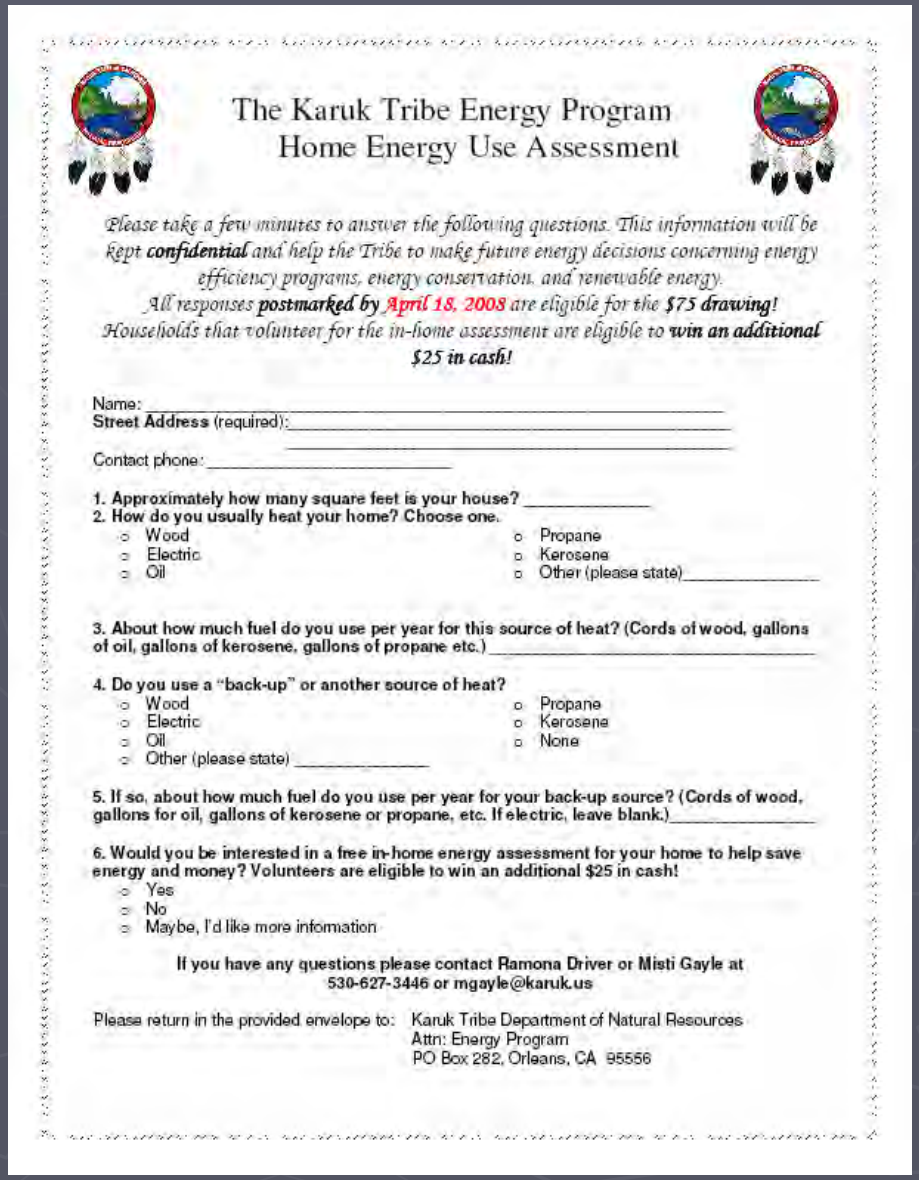
10-year Cost Comparison

	CFL	LED	Incandescent
life span (hours)	10000	60000	1500
number of bulbs	3	1	20
cost per bulb ($)	$5.00	$50.00	$2.00
total bulb cost ($)	$15.00	$50.00	$40.00
Watts	14	6	60
10 - year kWh	408.8	175.2	1752
total Electricity cost	49.056	21.024	210.24
total 10 year costs	**$64.06**	**$71.02**	**$250.24**

Energy Audits

- Determine actual energy use of a home or business
- Look for ways to save energy and money

Self Audit Form



The Karuk Tribe Energy Program
Home Energy Use Assessment

Please take a few minutes to answer the following questions. This information will be kept ***confidential*** *and help the Tribe to make future energy decisions concerning energy efficiency programs, energy conservation, and renewable energy.*
All responses ***postmarked by April 18, 2008*** *are eligible for the* ***$75 drawing!***
Households that volunteer for the in-home assessment are eligible to ***win an additional $25 in cash!***

Name: _____
Street Address (required): _____
_____
Contact phone: _____

1. Approximately how many square feet is your house? _____
2. How do you usually heat your home? Choose one.
- o Wood
- o Electric
- o Oil
- o Propane
- o Kerosene
- o Other (please state) _____

3. About how much fuel do you use per year for this source of heat? (Cords of wood, gallons of oil, gallons of kerosene, gallons of propane etc.) _____

4. Do you use a "back-up" or another source of heat?
- o Wood
- o Electric
- o Oil
- o Other (please state) _____
- o Propane
- o Kerosene
- o None

5. If so, about how much fuel do you use per year for your back-up source? (Cords of wood, gallons for oil, gallons of kerosene or propane, etc. If electric, leave blank.) _____

6. Would you be interested in a free in-home energy assessment for your home to help save energy and money? Volunteers are eligible to win an additional $25 in cash!
- o Yes
- o No
- o Maybe, I'd like more information

If you have any questions please contact Ramona Driver or Misti Gayle at 530-627-3446 or mgayle@karuk.us

Please return in the provided envelope to: Karuk Tribe Department of Natural Resources
Attn: Energy Program
PO Box 282, Orleans, CA 95556

10 Ways to Save Energy

without changing your lifestyle

One:
Setting your Thermostat

- In the summer months, the air conditioner's thermostat should not be set any lower than 78 degrees Fahrenheit.
Likewise, the settings should not be any higher than 68 degrees Fahrenheit in the winter.

- Install a programmable thermostat - you can lower your heating bill by up to 10% just by programming the thermostat back ten degrees every night.

Two:
Lower your Water Heater Temperature

- You can reduce your water heating costs by simply lowering the thermostat setting on your water heater. For each 10 degree Fahrenheit reduction in water temperature, you can save between 3%–5% in energy costs. It also slows mineral buildup in your water heater and pipes.
This helps your water heater last longer and operate at its maximum efficiency.

- Although some manufacturers set water heater thermostats at 140 degrees Fahrenheit, most households usually only require them set at 120 or even 115 degrees Fahrenheit. Water heated at 140 degrees Fahrenheit also poses a safety hazard—scalding.

Three:
Washing Clothes or Dishes

- Follow the load guideline.

Never use the dishwasher or washing machine unless it's a full load.

Four :
Use Power Strips

- Almost all computers, printers, modems, scanners, etc. and home entertainment products: stereo, DVD player, televisions, etc. draw an idle electrical current even after they have been turned off.

- Some devices still draw the same amount of power even when turned off. To alleviate this, the device needs to be physically unplugged from the wall.

- Using a power strip allows multiple devices to be plugged into one unit. Rather than having to unplug multiple devices, you only need to unplug the power strip in this case making it a much easier process that you are more likely to remember.

Five:
Power down Computers and Monitors

- Turn off your computer and monitor when they are not being used.
  Turning them on and off will not cause damage.
- If you are away from your computer at different intervals, make sure you have set the

  Power Save Mode

Six:
Drying Dishes

- Air dry your dishes rather than using the heated drying cycle on your dish washer.

Seven:
Washing in Cold Water

- The best way to save money when you are doing the laundry is to wash clothes in cold water. Heating the water to wash clothes amounts to 90% of washing machines power consumption.

- When washing clothes with cold-water detergent, washing in cold water is actually better for your clothes. Oily stains that require hot water for removal can be switched from hot to warm still saving energy and doing a good job of cleaning your laundry. This not only reduces hot water usage, but it is better for your clothing as well.

Eight:
Use Compact Fluorescent Lighting or CFL's

- Use compact fluorescent bulbs to light your home. Not only do these bulbs use less energy, but they last longer than traditional bulbs.

Nine:
Taking Showers

- Take short showers instead of baths. The amount of water used, and heated is significantly less for a shower.

Ten:
Look for the Energy Star Label

- Buy products that have the Energy Star label on them.
- All Energy Star products meet strict guidelines set by the US Department of Energy.
- Energy Star labels are found on over 40 product categories and in the year 2005 alone is responsible for saving consumers over 12 billion dollars.

Contacts & Websites

Energy Planet

Renewable Energy Directory

A visual and interactive web directory of information resources about renewable energy technology.

www.energyplanet.info/

Energy Star

For a complete list of Energy Star Products, Home Improvement, Building & Plants, and New Homes

www.energystar.gov/

Redwood Coast Energy Authority (RCEA)
Director: *David Boyd*
(707)269-1700

Pacific Gas & Electric (PG&E)
Robert Cherry
(707)445-5627

Pacific Power & Light (PPL)
Regional Community Manager: *Toby Freeman*
888-775-8656

Window Demonstration

Renewable Energy

- Woody Biomass
- Micro-Hydro
- Solar
- Wind

Woody Biomass

Resource Map

Biomass

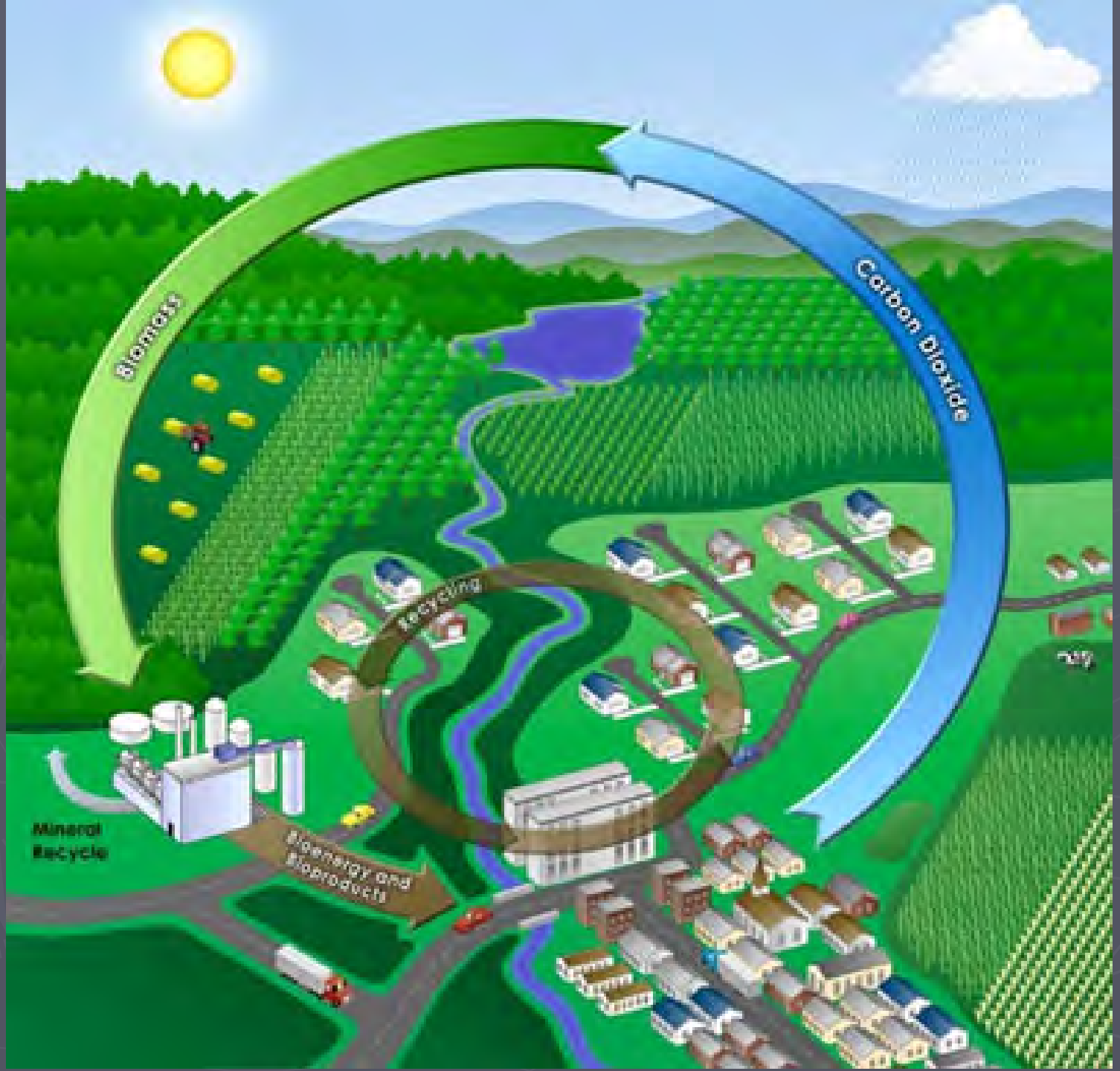
Total Energy Potential from Biomass Residue

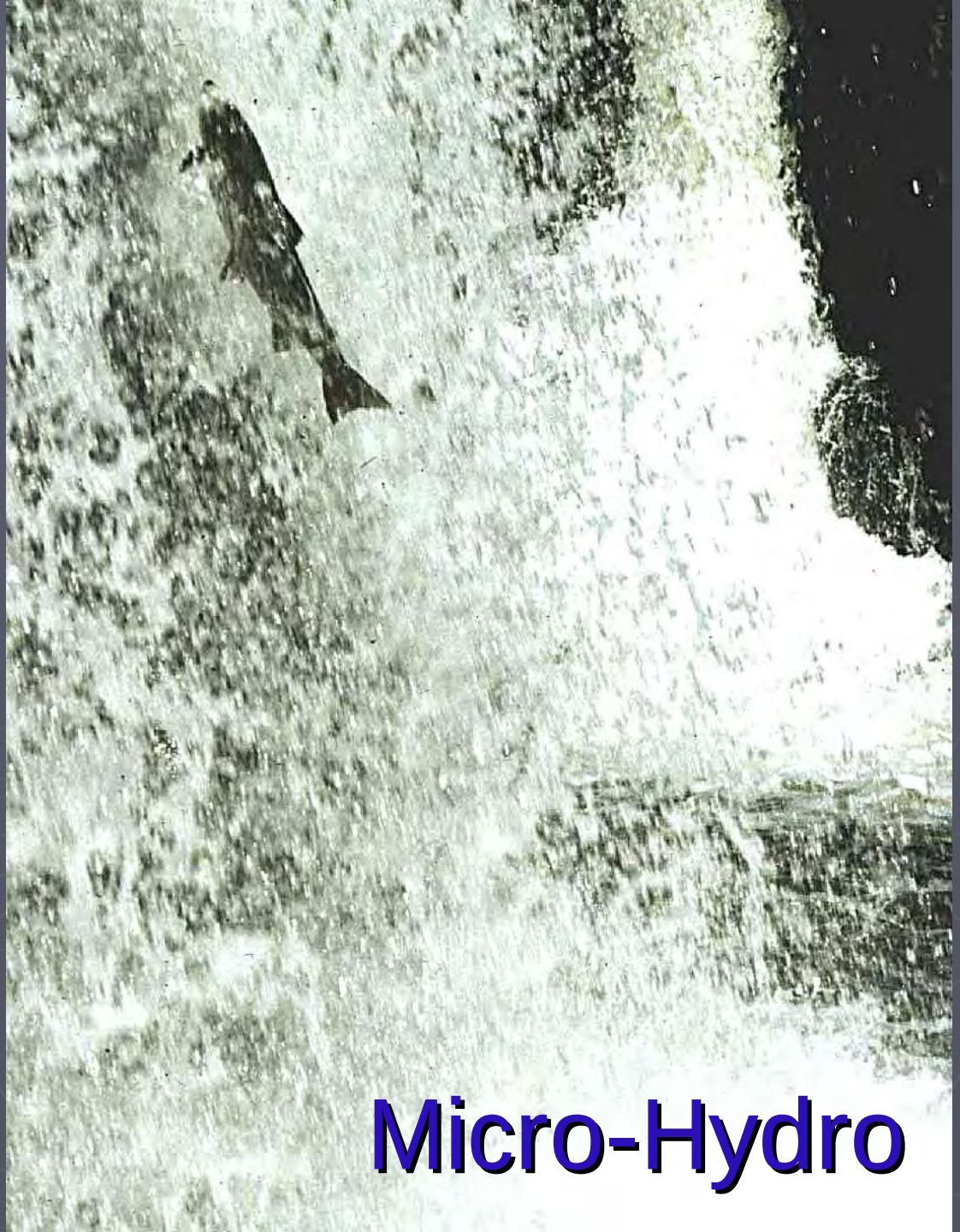
Total Potential (mmbtu)

- 50–775,000
- 775,001–2,500,000
- 2,500,001–5,500,000
- 5,500,001–11,200,000
- No Data
- Interstate

Data source: US Department of Agriculture, 1996, 2002; Environmental Protection Agency 2001

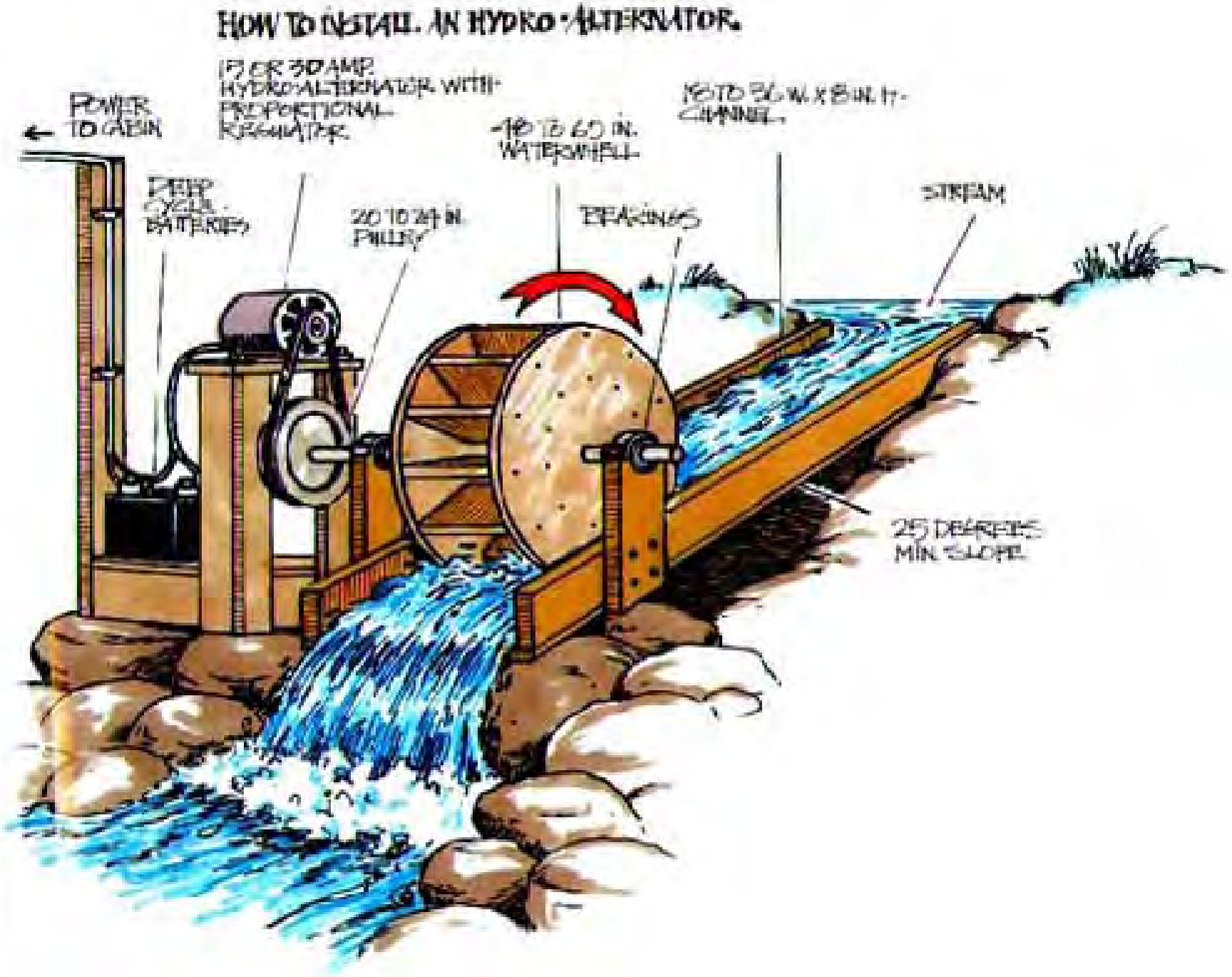
0 25 50
miles


Biomass
Carbon Dioxide
Recycling
Mineral
Recycle
Bioenergy and
Bioproducts



Micro-Hydro

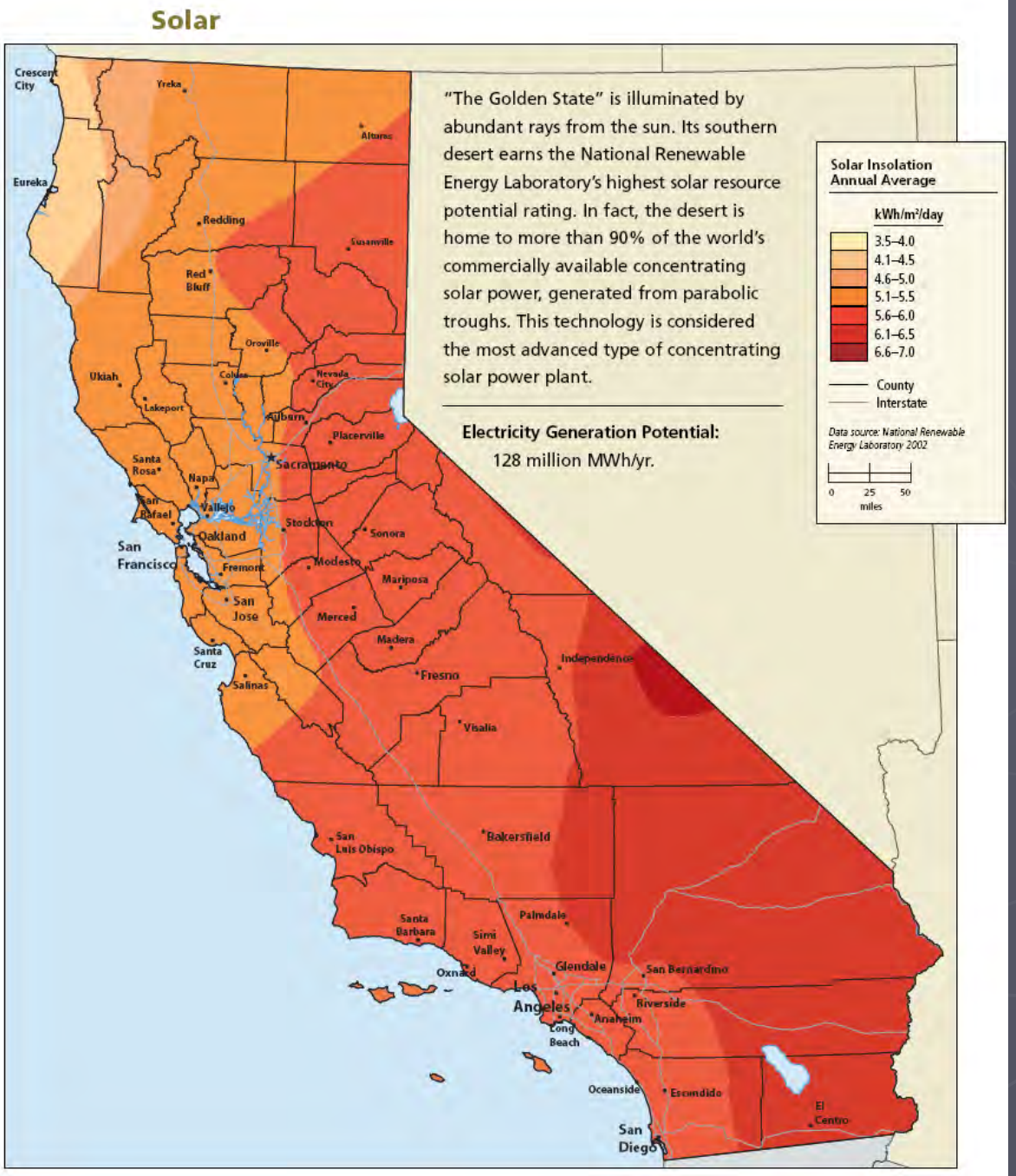
Micro-Hydro


HOW TO INSTALL AN HYDRO-ALTERNATOR.
POWER TO CABIN
FOR 30 AMP HYDRO-ALTERNATOR WITH PROPORTIONAL REGULATOR.
40 TO 60 IN. WATERWHEEL
DEEP CYCLE BATTERIES
20 TO 24 IN PULLEY
BEARINGS
STREAM
25 DEGREES MIN SLOPE

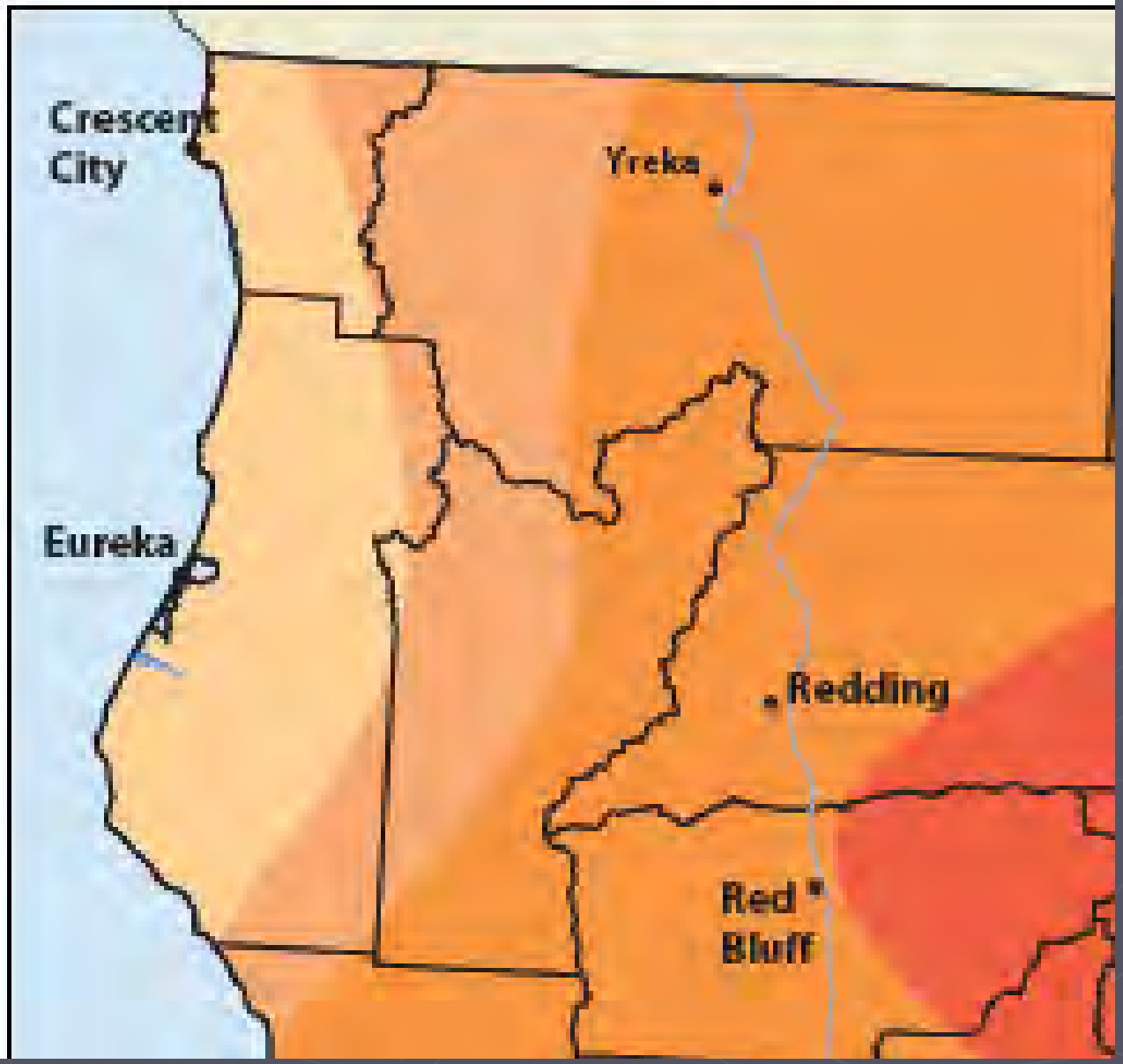

Two nozzle input
Shutoff valve & pressure gauge
Turbine and generator
Tailrace
Power output


Solar

Resource Map



Solar



Solar Insolation Annual Average

kWh/m²/day

- 3.5–4.0
- 4.1–4.5
- 4.6–5.0
- 5.1–5.5
- 5.6–6.0
- 6.1–6.5
- 6.6–7.0

County

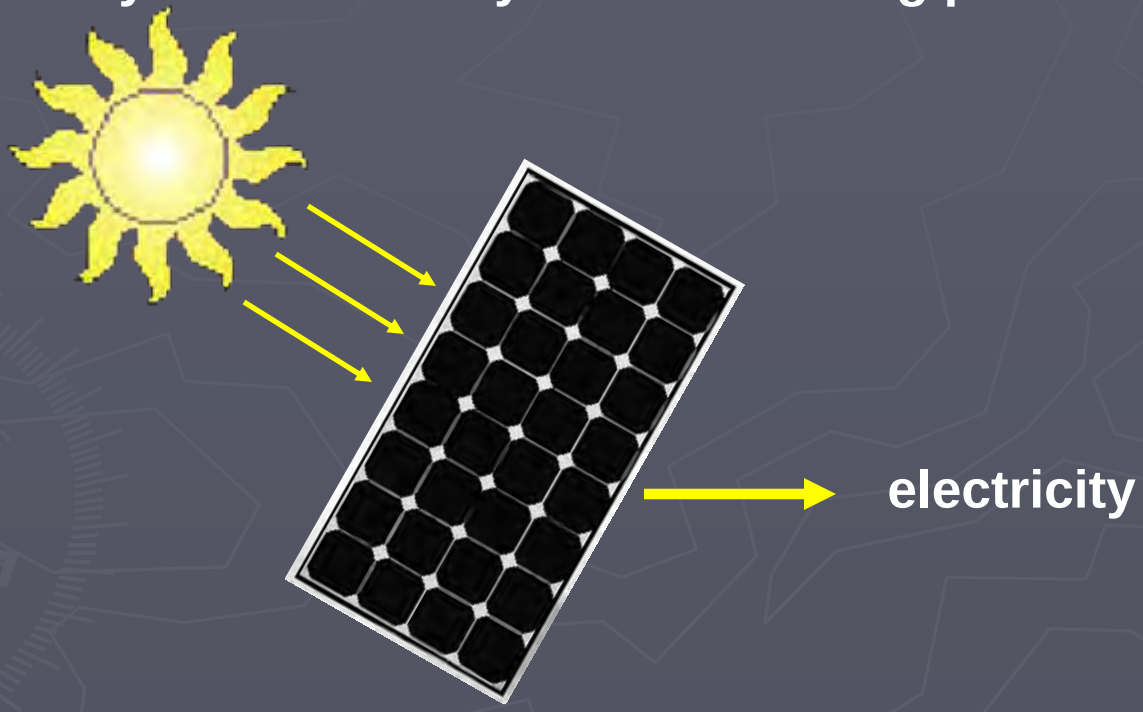
Interstate

Data source: National Renewable Energy Laboratory 2002

0 25 50
miles

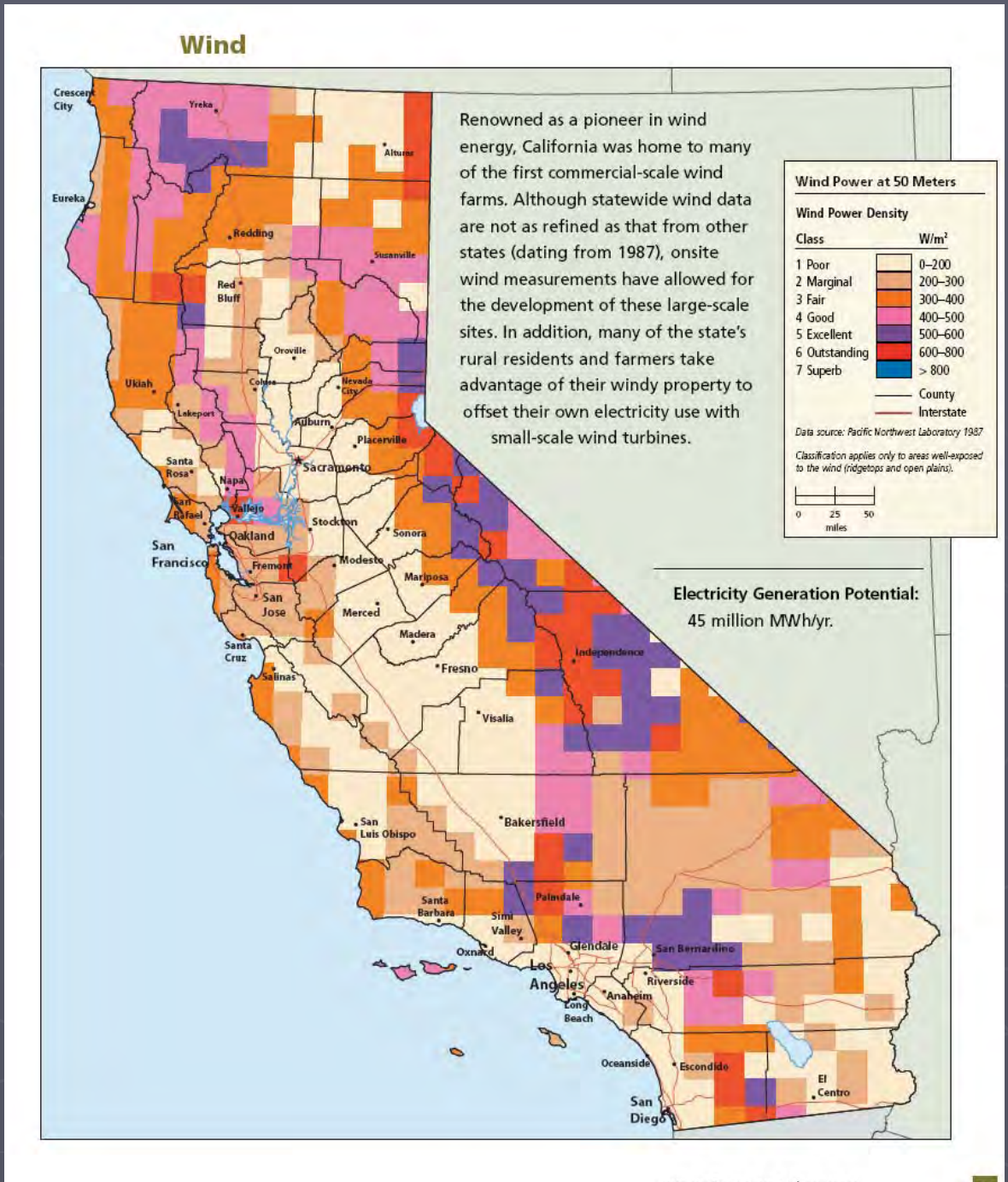
Solar PV Electric Systems

- Solar electric, or photovoltaic modules, convert sunlight directly into electricity with no moving parts

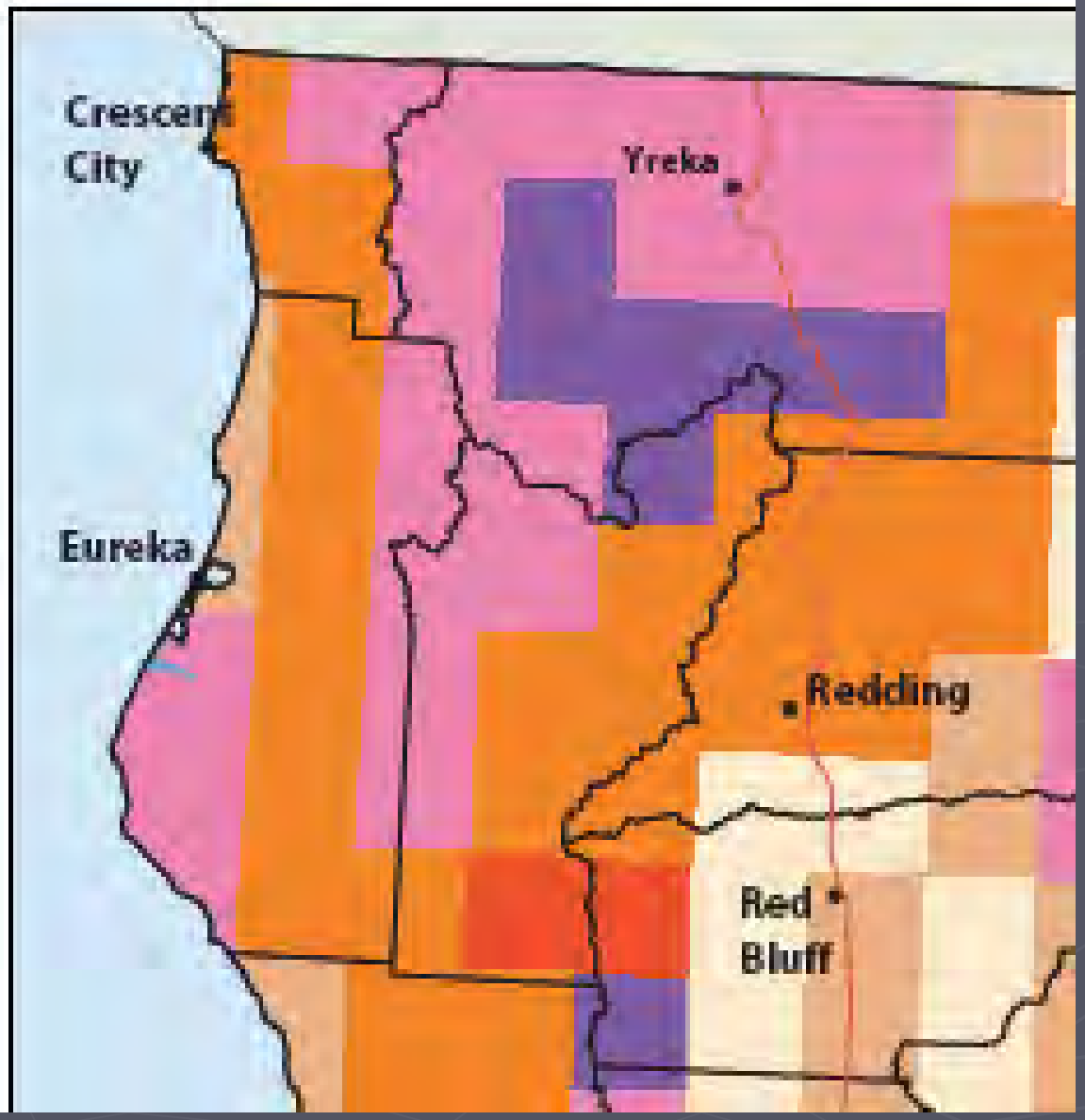


Wind Power

Resource Map



Wind



Wind Power at 50 Meters

Wind Power Density

Class	W/m²
1 Poor	0–200
2 Marginal	200–300
3 Fair	300–400
4 Good	400–500
5 Excellent	500–600
6 Outstanding	600–800
7 Superb	> 800

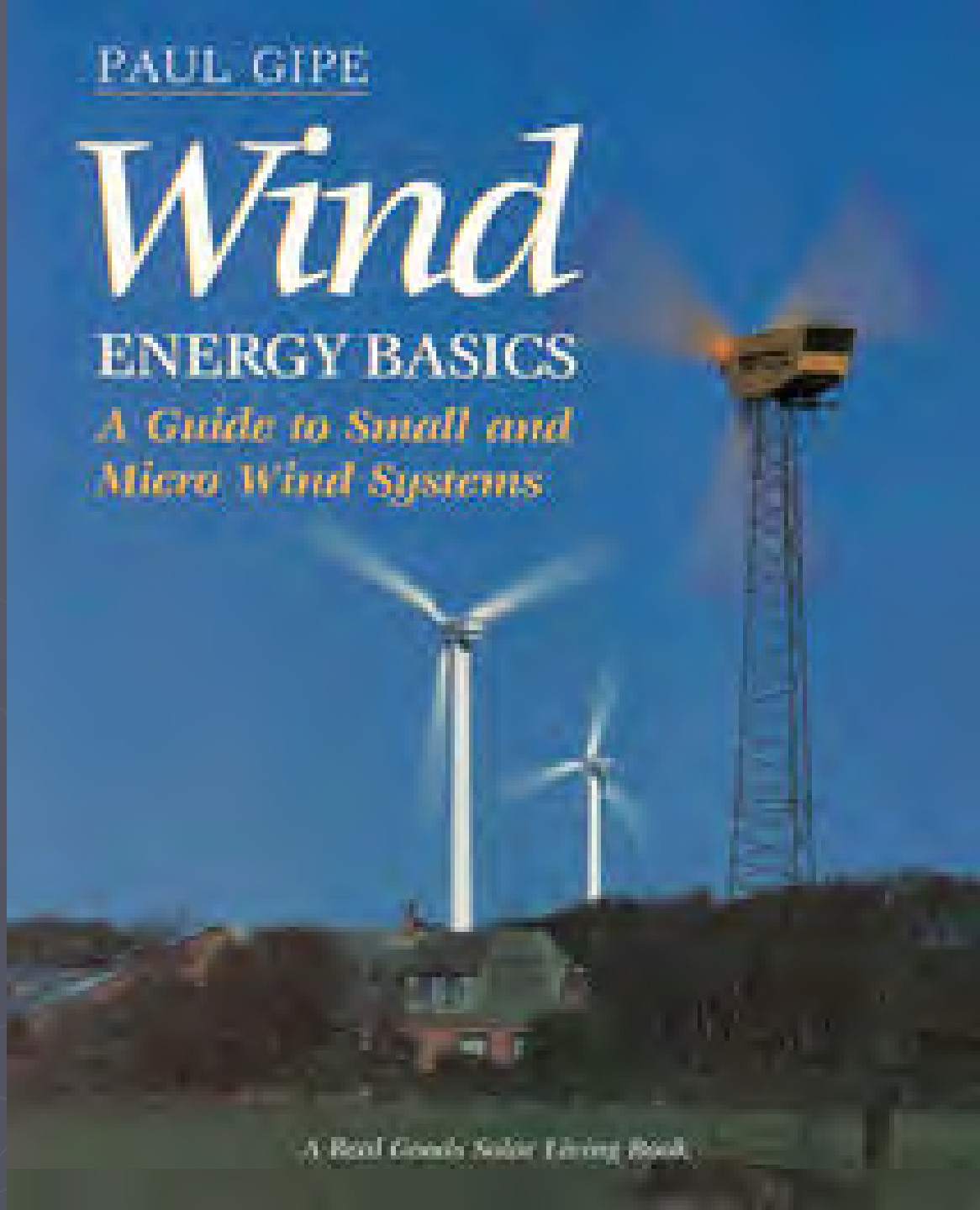
County

Interstate

Data source: Pacific Northwest Laboratory 1987

Classification applies only to areas well-exposed to the wind (ridgetops and open plains).

0 25 50
miles

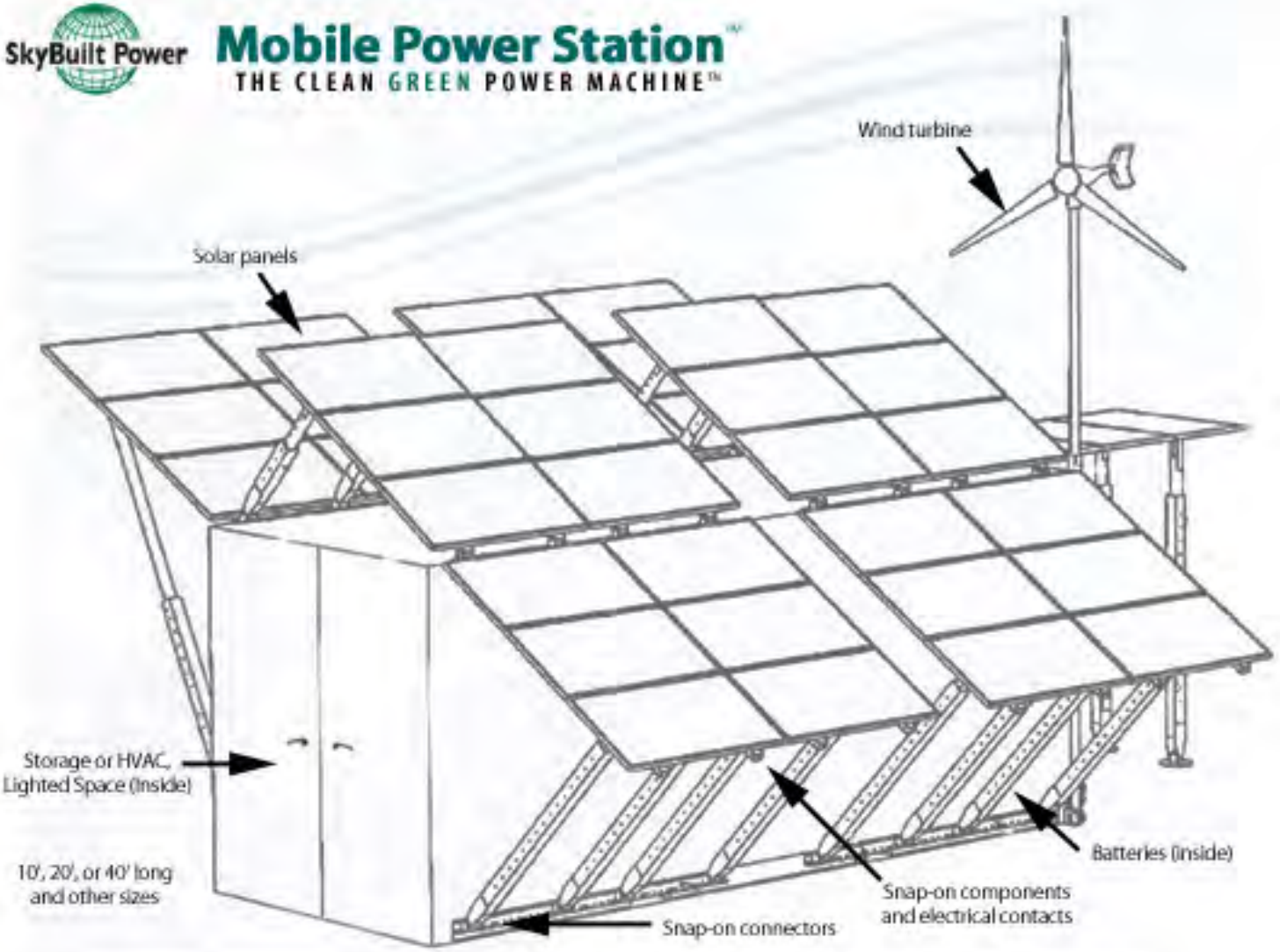

PAUL GIPE
Wind
ENERGY BASICS
A Guide to Small and Micro Wind Systems
A Real Goods Solar Living Book


D400

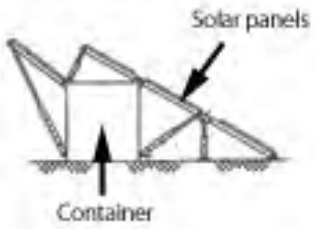
SkyBuilt Power

Mobile Power Station™

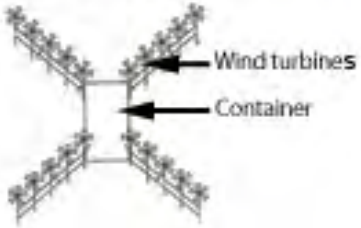
THE CLEAN GREEN POWER MACHINE™



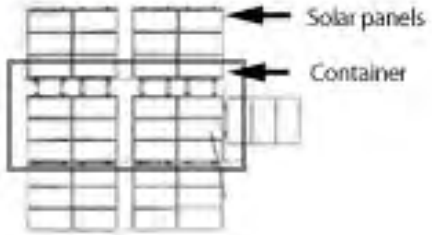
SIDE VIEW



WIND FARM



SOLAR FARM



Conclusions

Conclusions

Working Together the Karuk Tribe and Surrounding Communities Can Take Action for Their Energy Future

Conclusions

Need a multi-faceted approach to energy management

Conclusions

Energy Efficiency, Conservation, and Renewable Energy

Many People Helped with this Project

Karuk Tribe
- Natural Resources Department
- Housing Department
- Enrollment Department

Pacific Gas & Energy

Pacific Power

Tribal Members

Community Members

And many many more!

Thank You!