
Ayukîi

First Steps
Toward Developing Renewable Energy and Energy Efficiency on Tribal Lands

Karuk Tribe

Partnerships

U.S. Department of Energy

Karuk Tribe Department of Natural Resources

Winzler and Kelly

WINZLER & KELLY

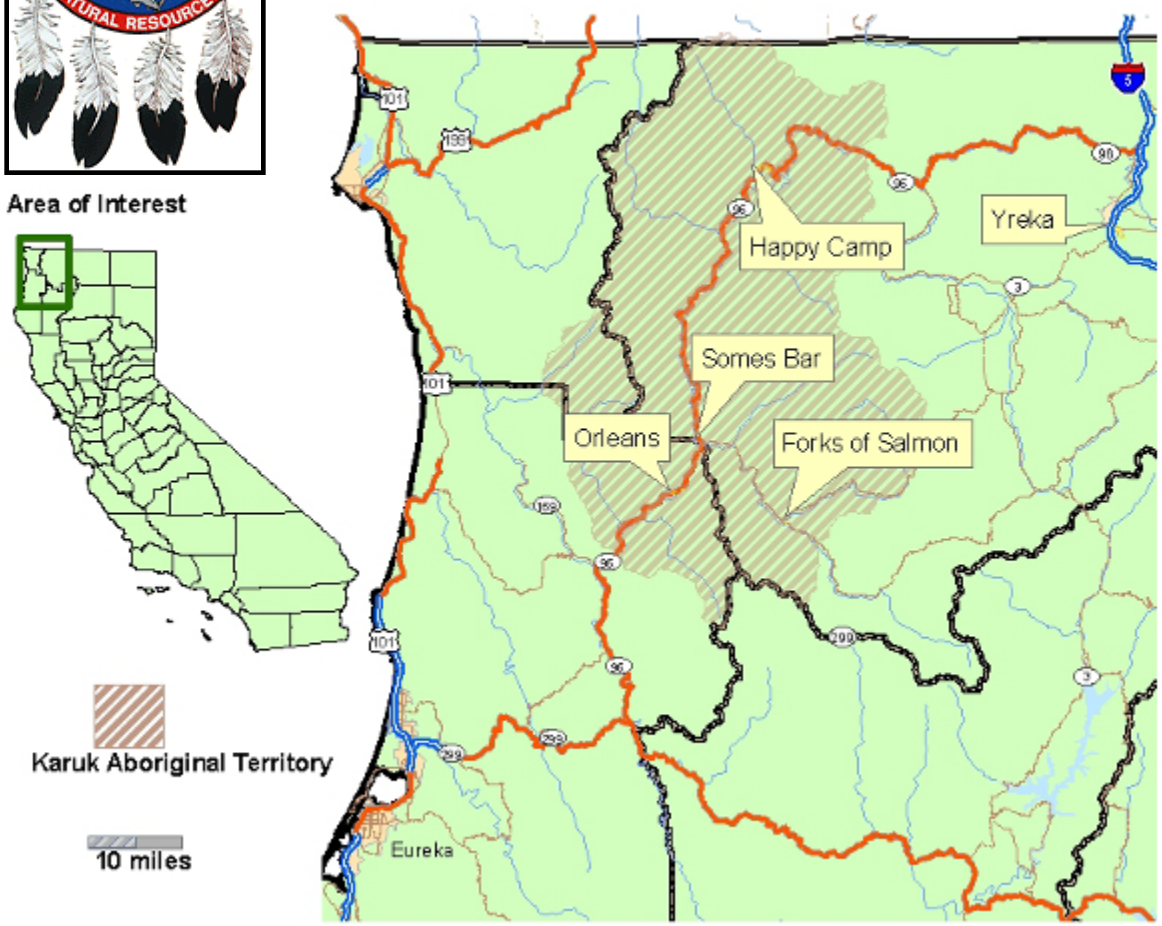
Location Map

Occupies Aboriginal land along the middle course of the Klamath and Salmon Rivers in Northern California.

Aboriginal Territory includes an estimated 1.38 million acres of rugged, heavily forested land within the Klamath River Basin.

The Karuk people have continuously resided in this area since the beginning of time.

Location Map



The Karuk Tribe was federally recognized in 1976.

Second largest Tribal government in California with 3,520 enrolled Tribal members.

The Karuk Tribe is a non-gaming Tribe

No resource extraction on Tribally owned lands

Economically depressed area with few development options

The Tribe has a wide range of governmental departments and programs including health and human services, education, natural resources, self-governance, community development and language.

The mission of Karuk Tribe is to promote the general welfare of all Karuk People, to establish equality and justice for our Tribe, to restore and preserve Tribal traditions, customs, language and ancestral rights, and to secure to ourselves and our descendants the power to exercise inherent rights of self-governance.

KARUK ENERGY PROGRAM

The Program began in August of 2007, after receiving a DOE First Steps grant.

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

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What Will This Project Lead To?

1. Greater independence and sovereignty for the Karuk Tribe.
2. Tangible strategies for lowering Tribal utility costs, particularly for selected structures.
3. Useful baseline data regarding energy:
   a) An approximate understanding of the Tribe's energy demands
   b) Energy conservation opportunities (ways to save $)
   c) Energy efficiency opportunities (ways to save $)
   d) A preliminary understanding of the Tribe's renewable energy options
4. Installation of Tribally-owned renewable energy projects!!!

Tasks

1. Tribal Council Participation
2. Energy Demand Analysis
3. Energy Conservation & Efficiency
4. Assessment of Renewable Energy Availability
5. Energy Export Assessment
6. Human Capacity Building

Karuk 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.

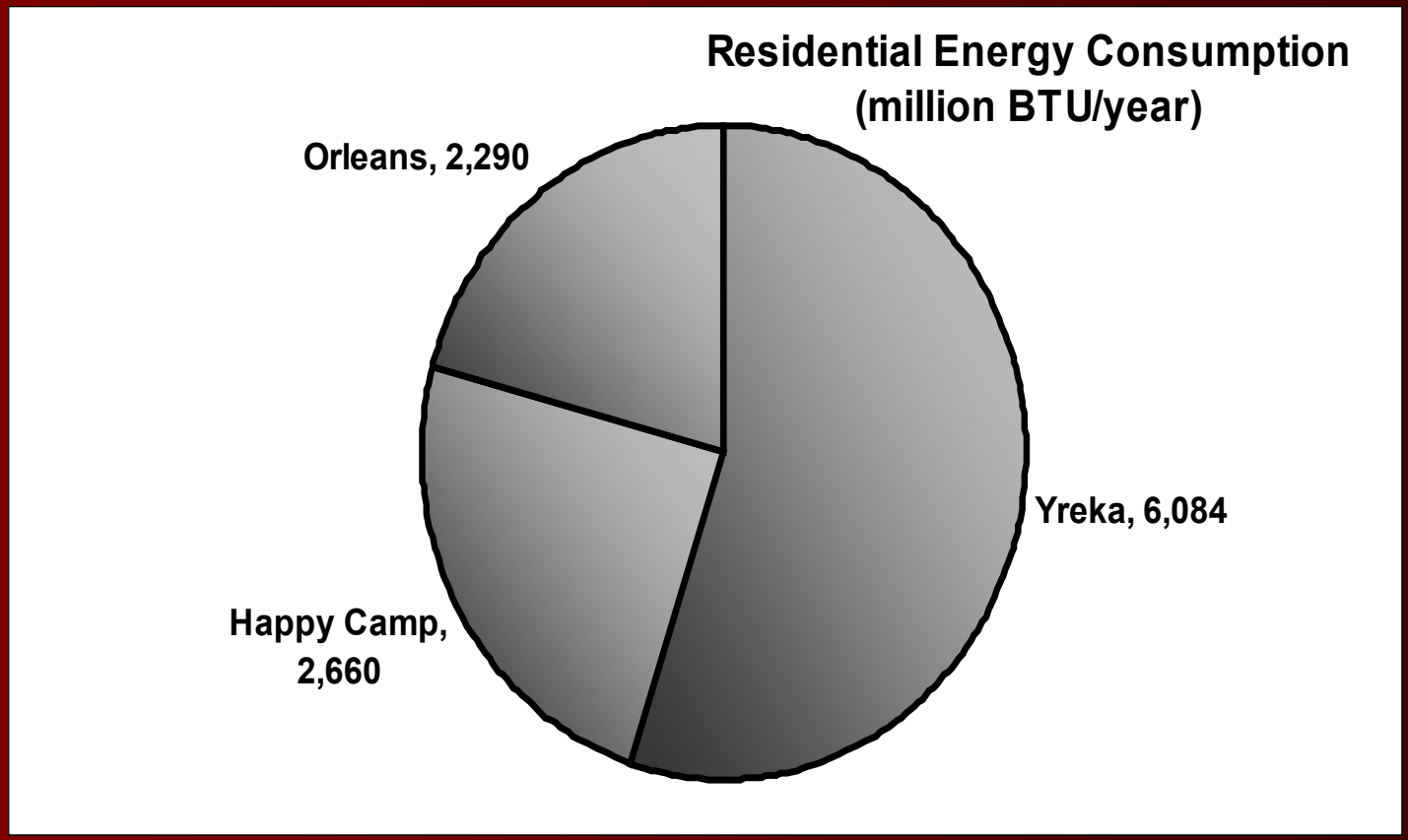
Screening Criteria Matrix

This matrix established by the 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.

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 O&M 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

Energy Demands

(Assessed using Tribal Housing, Survey, Energy Audit, Utility, and DOE Energy Book Data)



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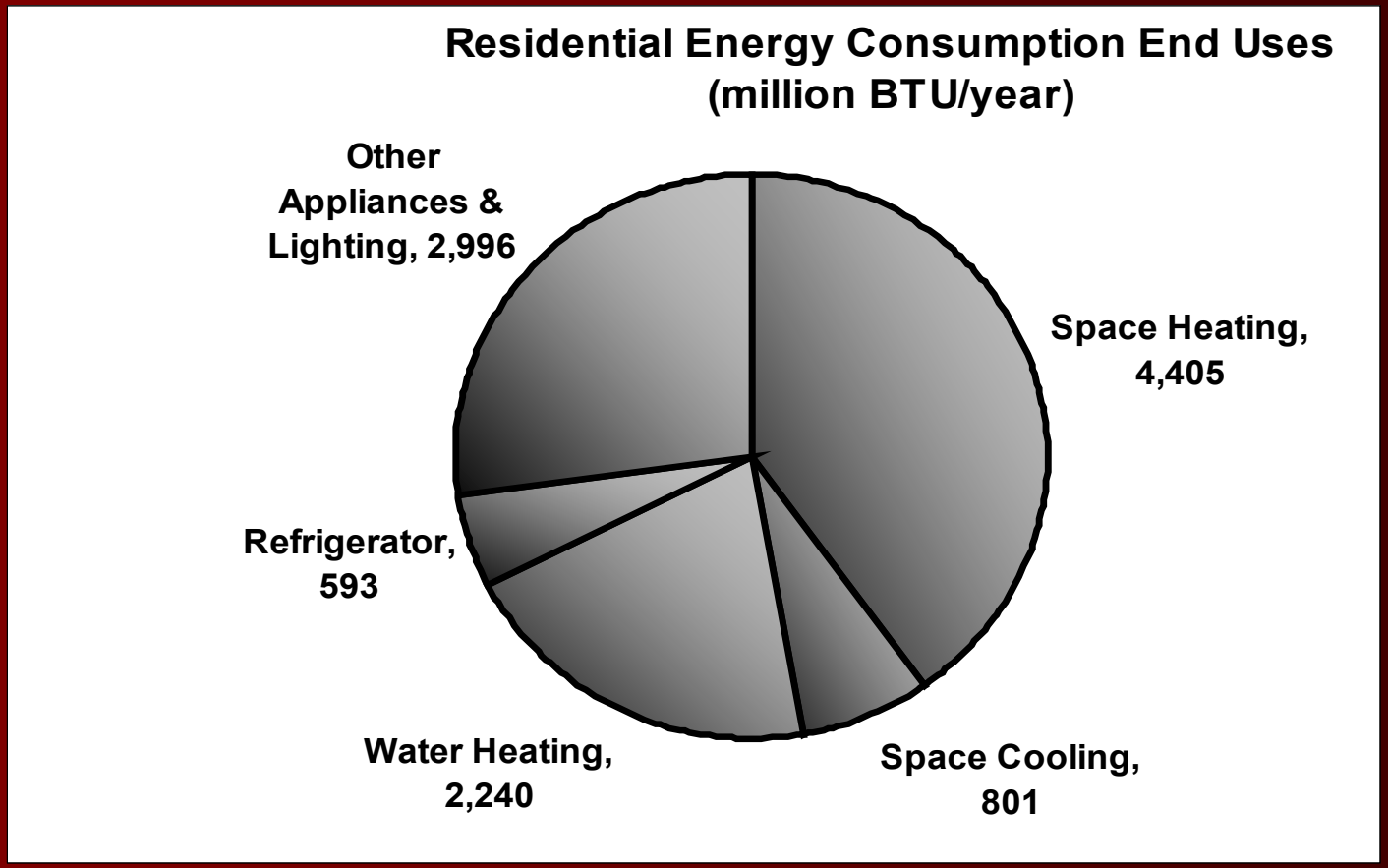

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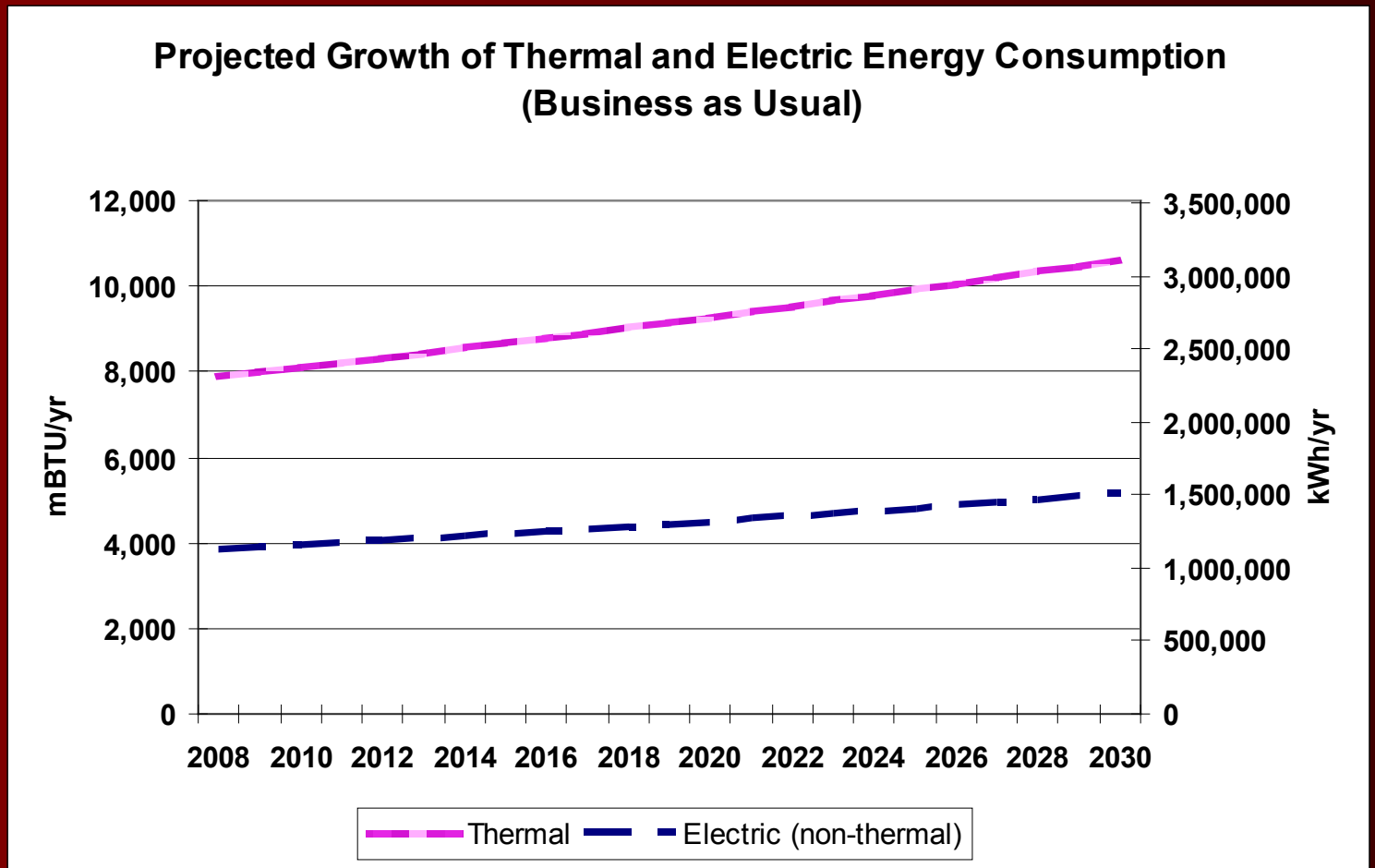
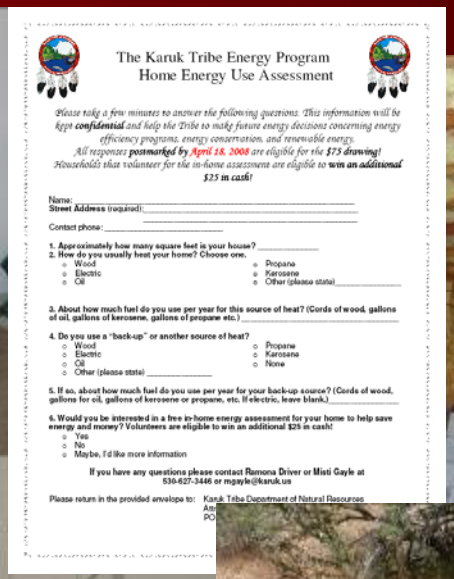


Energy Conservation and Efficiency Measures

Energy Audits



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.)_____

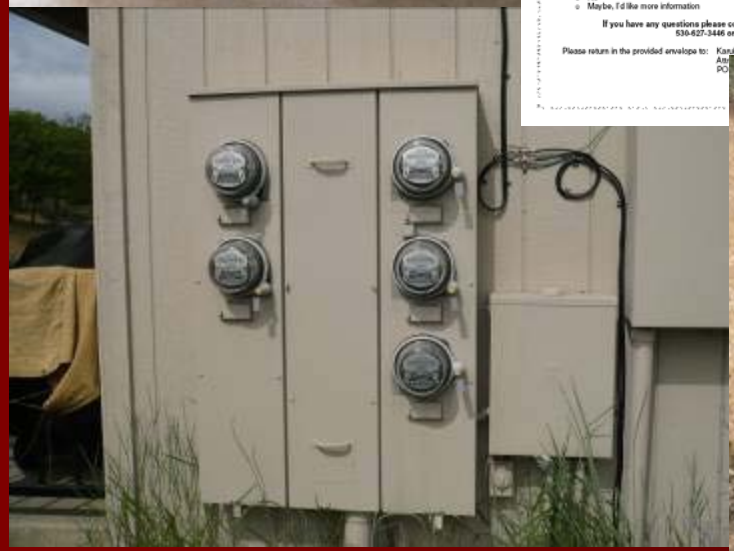
4. Do you use a "back-up" or another source of heat?
   - o Wood
   - o Electric
   - o Oil
   - o Other (please state) _____
   - o Propane
   - o Kerosene
   - o None

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



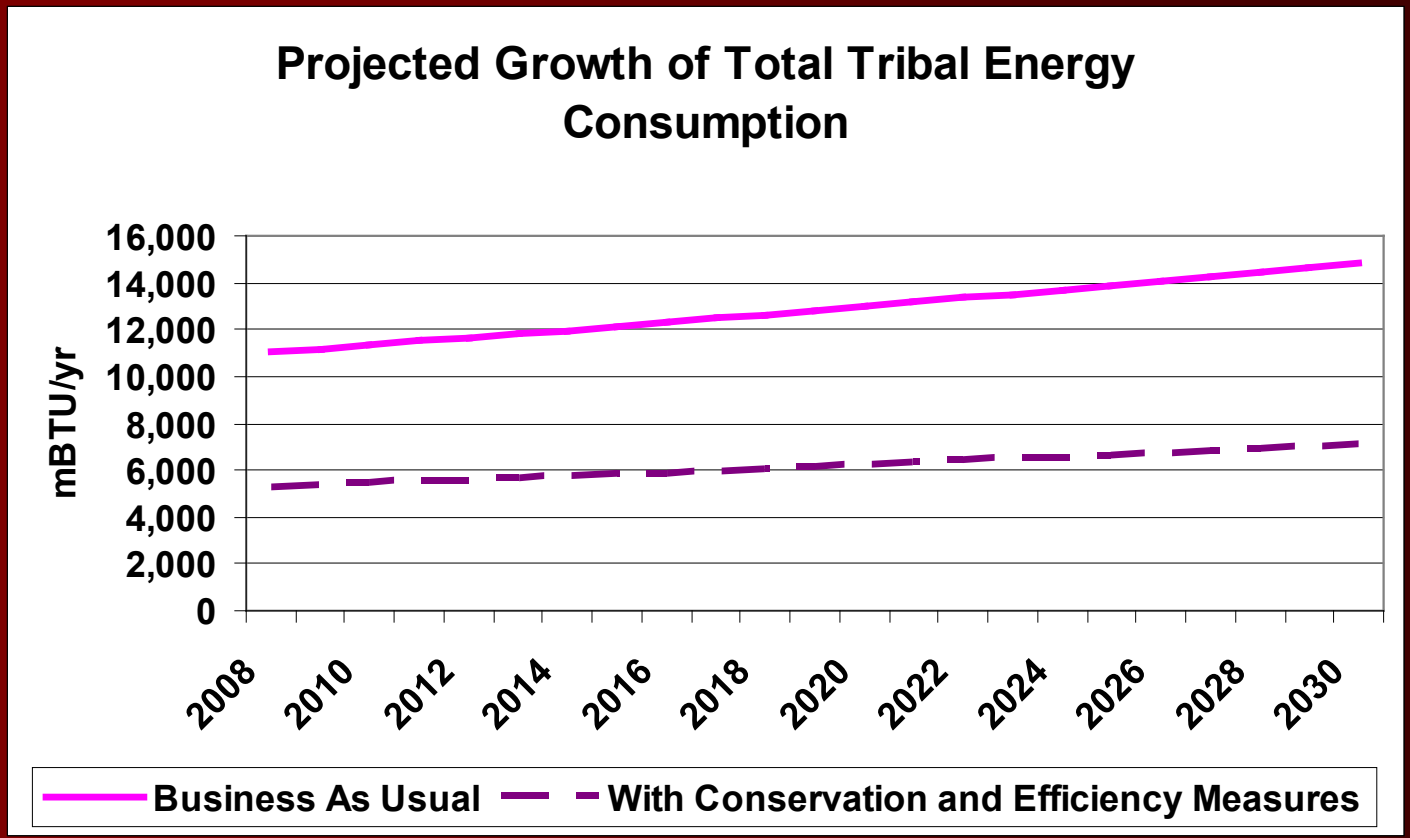
Energy Conservation and Efficiency Measures

Energy Modeling

- Sub-consultant Abbay Technical Services ran 15 energy assessment models using EnergyPro modeling software.
  - Simulations explored potential energy savings for conservation and efficiency alternatives
- Results for residential structures indicate potential savings ranging from 27% to 85% with an average energy savings potential of 52% per structure

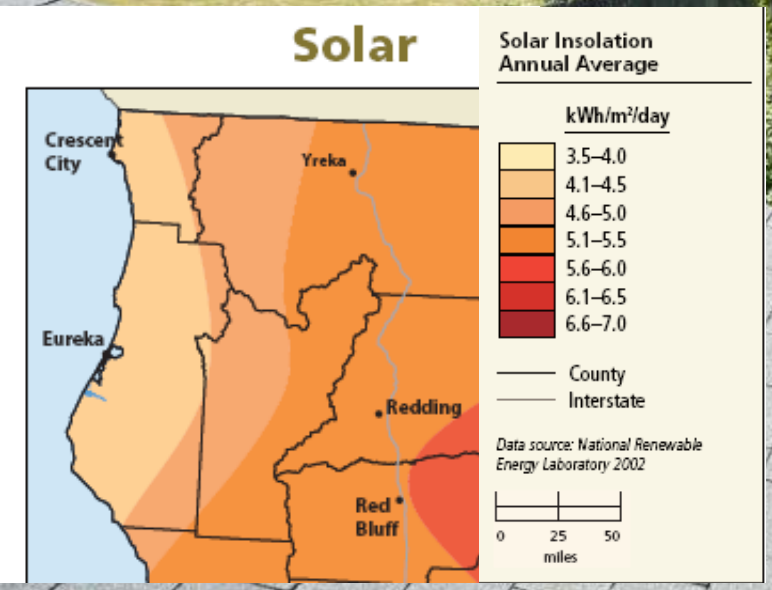
Energy Demands

projected growth of business as usual and with all recommended efficiency and conservation measures enacted



Assess Renewable Energy Potential

Solar



EnergyAtlas.org

Preliminary Renewable Energy Assessment- Solar

- Orleans
  - Tribal Housing Community
    - Good solar electric and solar thermal potential
    - Backup power is desired due to grid reliability issues
  - Tribal Department of Natural Resources and Health Clinic Building
    - Good solar electric and solar thermal potential
    - Upgrade existing backup generator at facility

Preliminary Renewable Energy Assessment- Solar

- Somes Bar
  - Good solar potential at Junction Elementary School
  - Backup system desired
- Happy Camp
  - Good solar potential at Tribal Administration Complex

Preliminary Renewable Energy Assessment- Solar

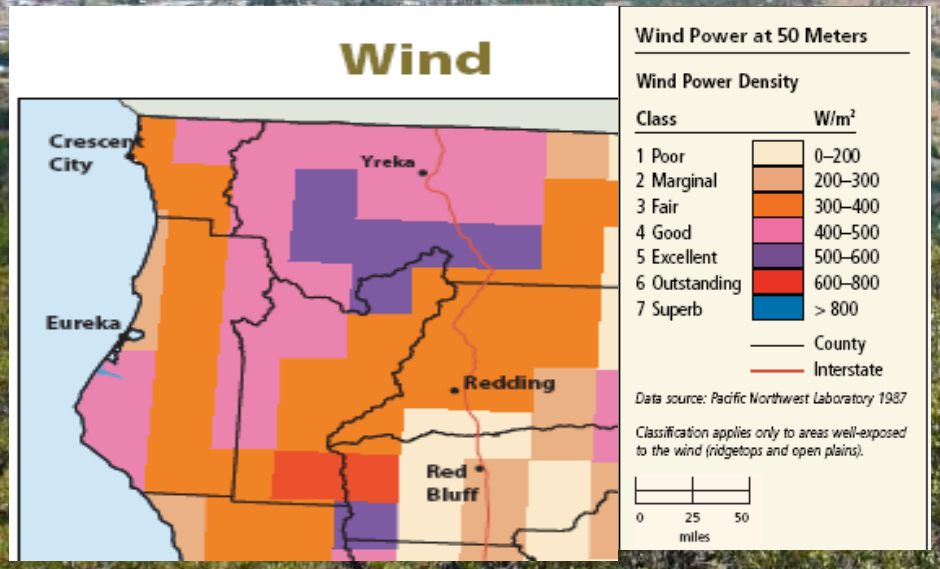
- Forks of Salmon
  - Nearest electricity grid: 19 miles
  - Good solar potential at Forks of Salmon Elementary School
  - New diesel/battery backup power system just installed at school
  - Potential for partnership between the Tribe and School to provide renewable power with diesel/battery backup to community members

Preliminary Renewable Energy Assessment- Solar

- Yreka
  - Good solar potential
  - Backup power not a huge concern in Yreka

Assess Renewable Energy Potential

Wind



EnergyAtlas.org

Preliminary Renewable Energy Assessment - Wind

- Yreka
  - Class 3 wind in Yreka area
  - Tribe is considering installing a MET tower to assess wind energy potential on Trust Land
  - Most interested in community scale wind energy to provide electricity to Tribal developments

Assess Renewable Energy Potential

Small-Hydroelectric

Preliminary Renewable Energy Assessment - Hydroelectric

- Protection of fisheries resources is the primary concern for hydro development
- Tribal small or micro hydroelectric projects would be designed to:
  - Avoid impacts to fish migration, spawning, and habitat
  - Avoid adverse water quality impacts

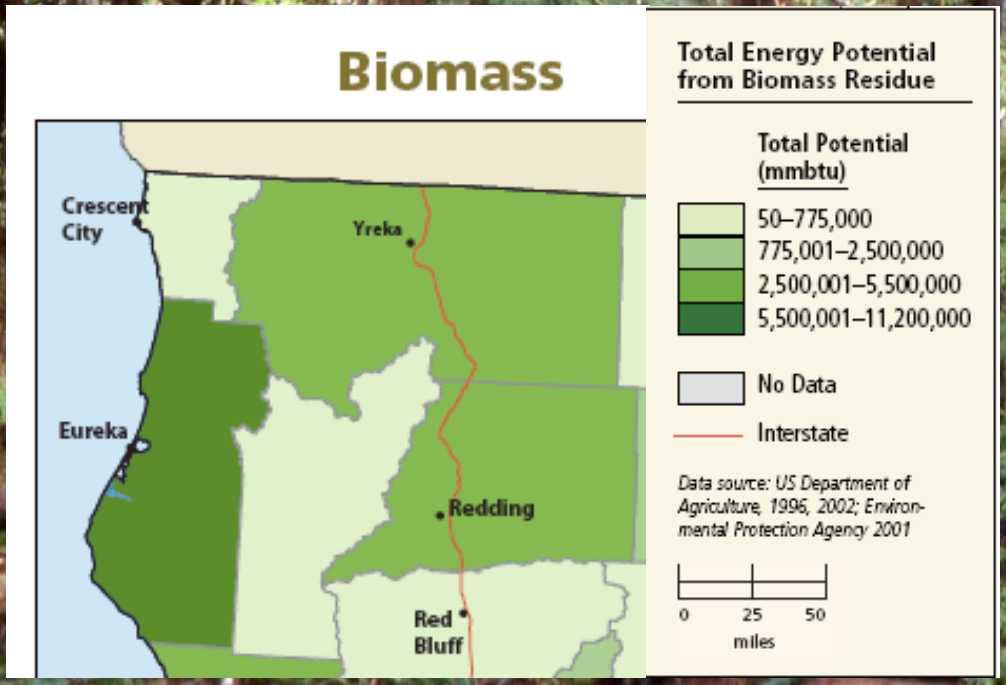
Preliminary Renewable Energy Assessment - Hydroelectric

- Area North of Somes Bar and South of Happy Camp
  - No Electricity Grid: Gap between PPL and PG&E Grids
  - Potential for small hydroelectric (<500kW) on Aubrey Creek to supply power to local residents
  - New power distribution infrastructure would be needed
  - Screening level analysis may be pursued

Preliminary Renewable Energy Assessment - Hydroelectric

- Forks of Salmon
  - No electricity grid
  - Potential for upgrade of existing micro hydroelectric on Butler Creek
    - Existing system currently powers a small community
    - Neighbors across the creek are Tribal members without electricity
    - Upgrade project would fortify and slightly increase the size of the existing system and add distribution lines to Tribal members across creek

Assess Renewable Energy Potential
Biomass



EnergyAtlas.org

Preliminary Renewable Energy Assessment- Biomass

- No significant forest holdings on Tribal lands
- Potential to partner with US Forest Service fuels reduction projects to obtain biomass
- Terrain is very rugged and remote
  - Access roads and landings are typically too small for a full size chip van
  - Transportation costs are high

Assess Renewable Energy Export Potential

- Orleans, Somes Bar, Happy Camp
  - Electricity grid is unreliable
  - Renewable energy resources are community scale, not commercial scale
- Yreka
  - Transmission infrastructure is close by
  - Results of anemometer study needed to determine if energy export is worth exploring
  - Wind resource is most likely community scale

Human Capacity Building

- Tribal Energy Program Launched
- Hired Tribal member as Energy Intern to work on the project
- Developed energy training manual with references on energy efficiency, conservation, and renewable energy
- Community meetings held in each of three main communities with an energy presentation, games, demonstrations, and door prizes
- Emphasize listening to needs and experience of community members

Lessons Learned

- Greater coordination within Tribal government before beginning projects
- Appropriate scope and size of project for available staff and resources
- Provide for dedicated Tribal staff to work on project
- Work with best available data
- Do not plan community meetings on same evening as high school football rivalry games

Activities Yet to Be Completed

- Complete analysis of non-residential building energy consumption
- Compare energy demands to renewable resources availability
- Write final report

Future Plans for Karuk Energy Program

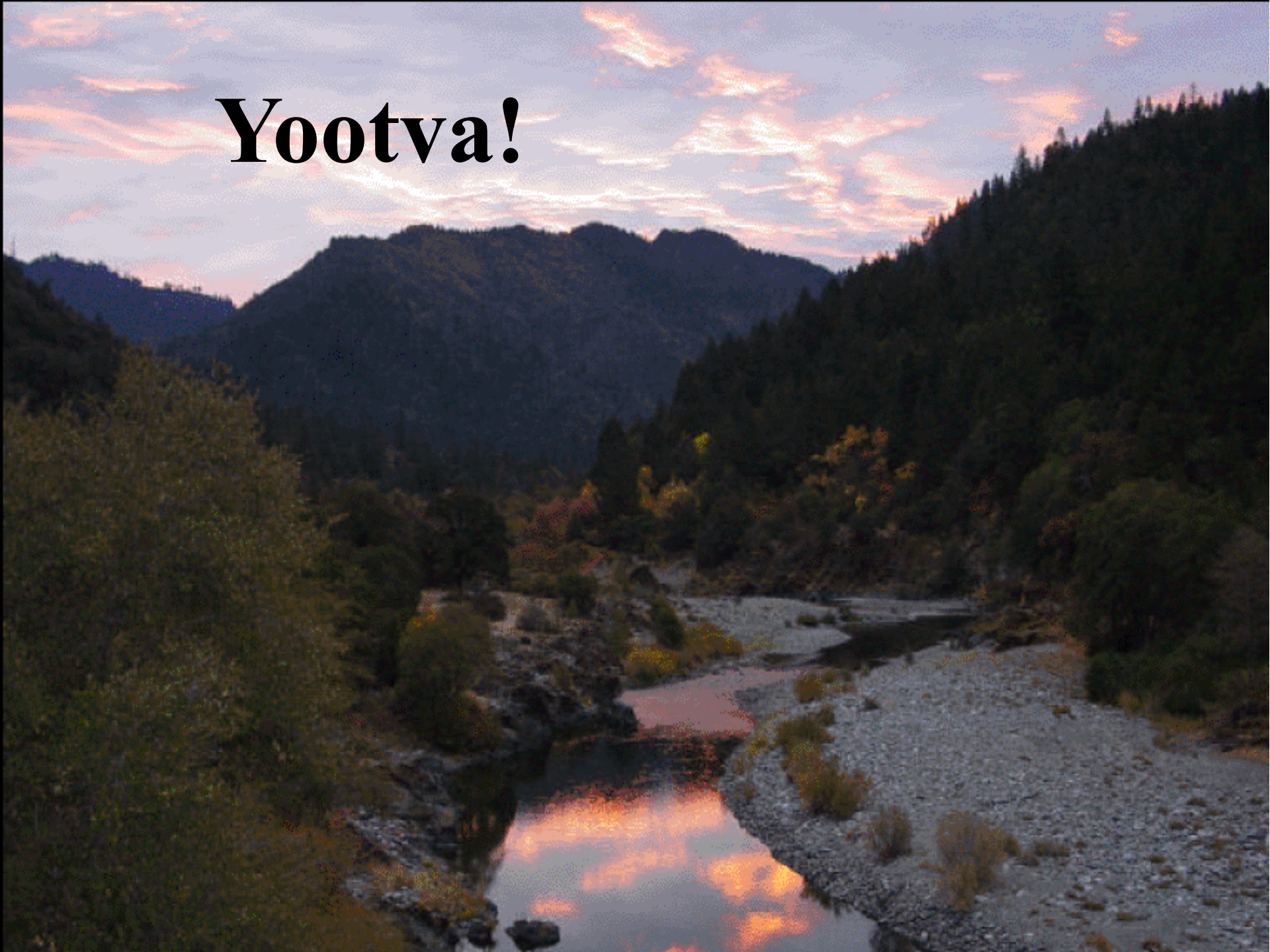
1. Funding Funding Funding

2. Implement recommendations for conservation and efficiency measures first

3. Develop a strategic implementation plan for renewable energy

4. Participate in existing Tribal structures to forward energy agenda

5. Human capacity building through training, outreach, and education


Yootva!