Energy Efficiency for the Nunamiut People

Yukon River Inter Tribal Watershed Council
Nunamiut Corporation

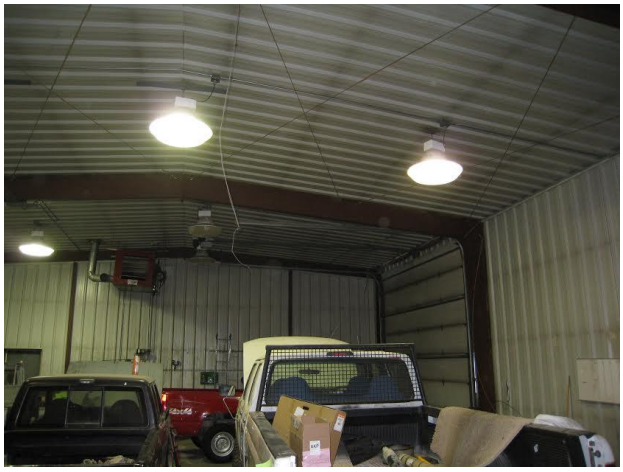
Nunamiut Corporation owned buildings where efficiency upgrades were implemented

Nunamiut Corporate Office/Hotel

Nunamiut Restaurant

Nunamiut Corporation Managers' House

Nunamiut Corporate Store



Nunamiut Corporation Shop

Project Overview

Under this project, the Yukon River Inter-tribal Watershed Council (YRITWC) will:

1) Educate local community members, elders and youth on the environmental and economic benefits of Energy Efficiency.
2) Replace inefficient heating systems in 3 buildings with higher efficiency furnaces and toyo stoves.
3) Replace or seal exterior doors and single-paned exterior windows with high efficiency, high R-value doors and windows and add insulation to existing attic spaces.
4) Caulk and seal points of air leakage in all buildings.
5) Replace inefficient hot water supply systems with on-demand units.
6) Replace electromagnetic T-12 Fluorescent lighting with T-8 electronic ballasts.

Objectives

The goal of this project is to upgrade existing building facilities owned by Nunamiut Corporation in Anaktuvuk Pass, AK. The upgrades mentioned will include lighting, heating system, insulation and smart control units designed to increase the energy efficiency of Village Corporation owned buildings.

The village of Anaktuvuk Pass

The only way in and out of Anaktuvuk Pass is by plane. The village is nestled in the heart of the Brooks Range, an expansive mountain range covering a footprint larger than that of the European Alps. Anaktuvuk Pass is a small village with fewer than 300 residents. The town is home to Alaska's only inland Inupiat population, the Nunamiut. Unlike their coastal Inupiat counterparts who depended on whale and seal to survive, the Nunamiut historically hunted caribou, following the herds through the mountains. They were the last documented hunter-gather population in North America, and finally settled in Anaktuvuk Pass in the 1950's. The town itself is small, but has a surprising amount of infrastructure the airstrip, a clinic, k-12 school, two stores, a health clinic, a gas pump and a museum. The Nunamiut Corporation owns 5 buildings where energy efficiency upgrades were implemented, the corporate store, corporate restaurant, corporate hotel and the manager's living quarters. Because of the harsh environment and the fact that building materials for repairs aren't readily available each of these building provided its own unique challenges.

Description of Activities Performed

Q4 2011

During Q4 of 2011 a contractor was approved for HVAC installation. Triple pane windows were ordered and picked up, though not sent out due to cold temperatures. 1 case of caulk was purchased and sent to AKP, where it was stored until local labor was able to use it to seal windows during Q1 of 2012. Furnaces were ordered and delivered to the store. A 50 gallon water heater in the store was replaced with a 6 gallon water heater that sufficiently met the demand. 132 LED bulbs were replaced in the store as well as 2 occupancy sensors.
Because of the hazardous material associated with fluorescent bulbs 140 T-40 bulbs were set aside and backhauled to Fairbanks for safe disposal.

LED lights installed in the Corporate Store

6 gallon Water heater installed in the Store.

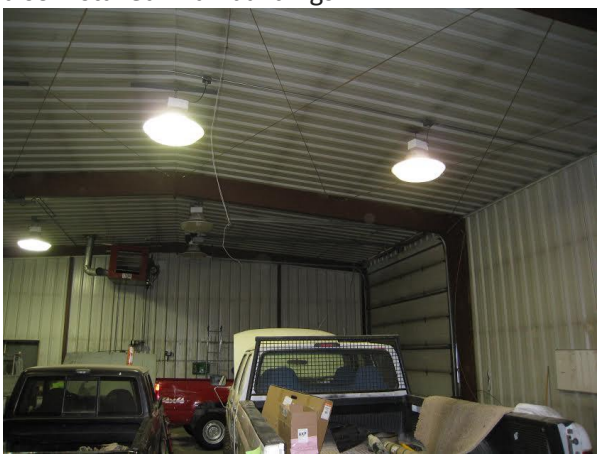
Q1 2012

During Q1 of 2012 Nunamiut Corporation hired in-kind Heating contractors. Blow in cellulose and triple pane windows were sent up to Anaktuvuk Pass. Cold-Temp shut off was installed on the Economizers as HVAC upgrades. Shop lights were ordered for the Nunamiut Corporation Shop. On March 30th a presentation was made to the Nunamiut Corporation board regarding the progress of the energy efficiency project. They were very pleased. Worked with AK Energy Efficiency Group to add the Anaktuvuk Pass project to the state Energy Efficiency map. Publicized results of the project to Alaska Building Science Network (ABSN) and the Tlingit-Haida housing Authority.

Blowing in cellulose in the village store

Q2 2012

Q2 of 2012 we are working with the construction company that was selected to complete the school retrofit this summer to recycle doors from their retrofit to use in some of the corporations spaces. Installed vent covers at the store. Blew in cellulose insulation into half of the store. Windows were installed on the restaurant and an insulating membrane was installed on the restaurant roof. The heating system in the Nunamiut Corporation Shop has been repaired by DOE project staff. New LED lights were installed in the shop as well as hotel and restaurant. Timers and occupancy sensors were also installed in all buildings.



LED bulbs in the shop's high bay fixture

Q3 2012

Sensors in the shop area were completed. Replaced some bad bulbs in the shop area and the cafeteria. Finished blowing in cellulose insulation (70 bags) into the store. Windows in the managers dwelling were sized and ordered.

Q4 2012

Received and sent up windows to Nunamiut corporate to install in the manager's dwelling. Began talks with the onsite contractor regarding insulating the restaurant and install tankless hot water heaters. Weather problems impeded some trips that I had had planned.

Q1 2013

Consulted with the onsite contractor in AKP and he advised me that doing any more work on the restaurant area wouldn't necessarily be the best use of our resources due to the construction of the building that houses the restaurant. Weather was a factor in more not being completed this quarter.

Q2 2013

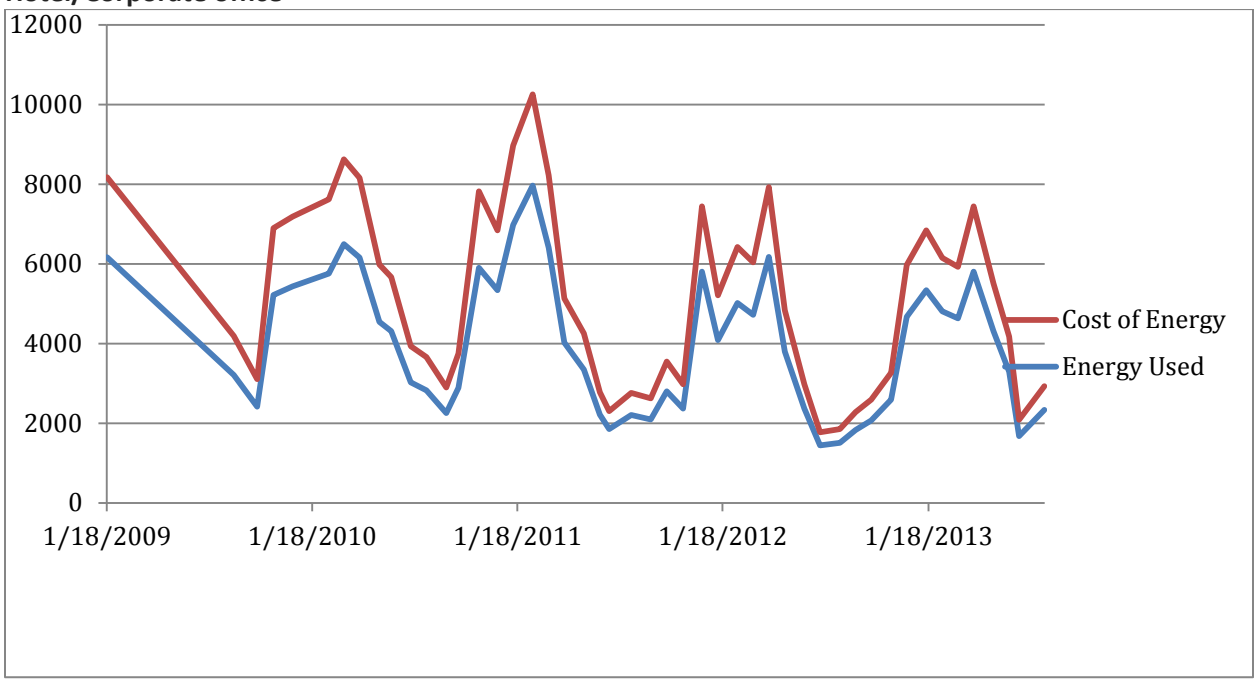
Purchased and sent up replacement doors and plywood to patch holds in the roof. Sealant was also purchased and sent up to Anaktuvuk Pass. Made arrangements with a plumber and electrician to install tank less hot water heaters in the hotel and restaurant.

Q3 2013

During Q3 of 2013 I made 2 trips to Anaktuvuk Pass. On the first trip I managed a team of Nunamiut Corporation workers to seal the roof of the Hotel. The door on the north of the building was broken and I was able to cover the door frame and seal it with plywood and foam insulation. 2 of the windows in the restaurant area were also broken and I coved and sealed them with plywood and foam insulation. Replaced 3 doors and built an arctic entryway in the manager's office/hotel. Installed a 2 Toyo stoves in the manager office so that they can stop using their outdated and highly inefficient system. A TED energy monitoring system and IPad were also purchased and installed so that the General Manager of the Nunamiut corporation is able to accurately monitor the energy that is being used on their heating systems.

Graphics depicting use and cost of fuel during the project period

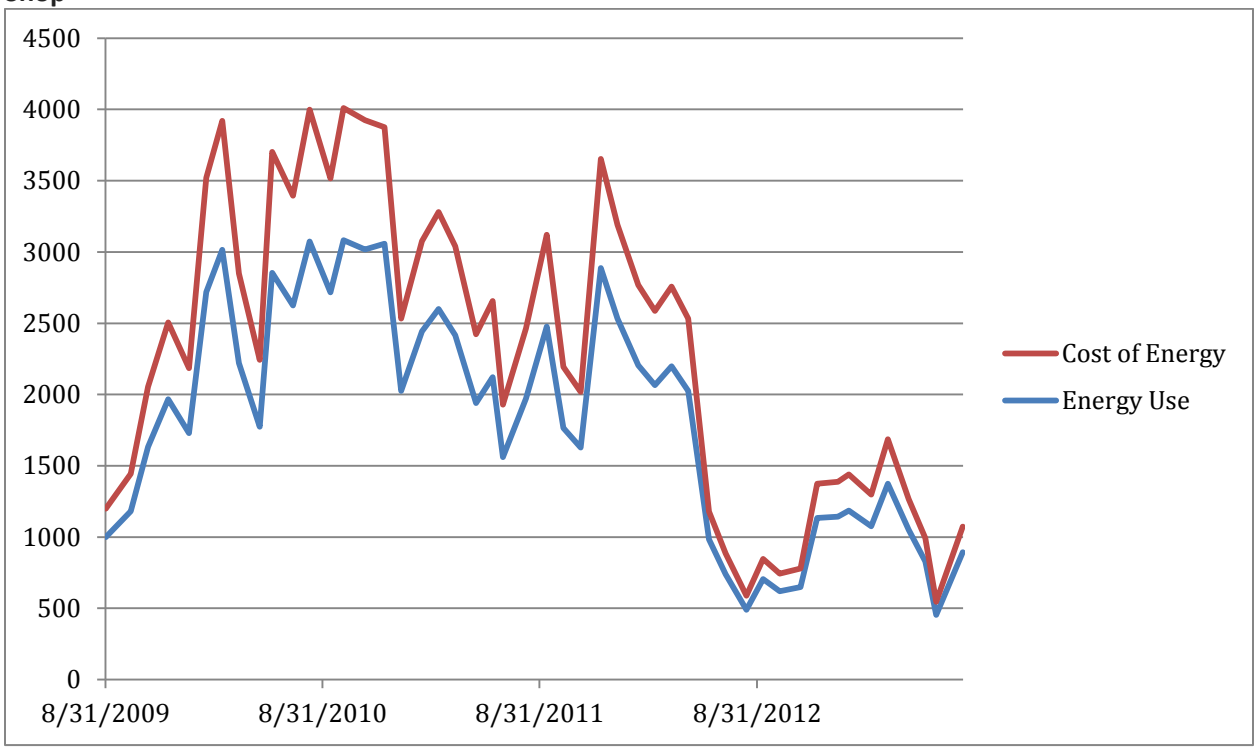
Hotel/Corporate office



As you can see from the graph above there is a steady decline in power use due to the energy efficiency upgrades that were completed in the Hotel. The LED lights and occupancy sensors alone have helped with the decreased use of power. Couple that with sealing the entire building from the harsh winter and you can see that we have significantly dropped the amount of power used in this building. Sealing the roof and removing 2 non-working stove pipes have also contributed to the amount of energy being saved in this particular building. In the front of the building there was also a doorway that was essentially open. I covered this with plywood and insulation, effectively sealing the entryway. Near the main entrance we were able to build an arctic entryway to keep the amount of heat loss in the winter to a minimum.

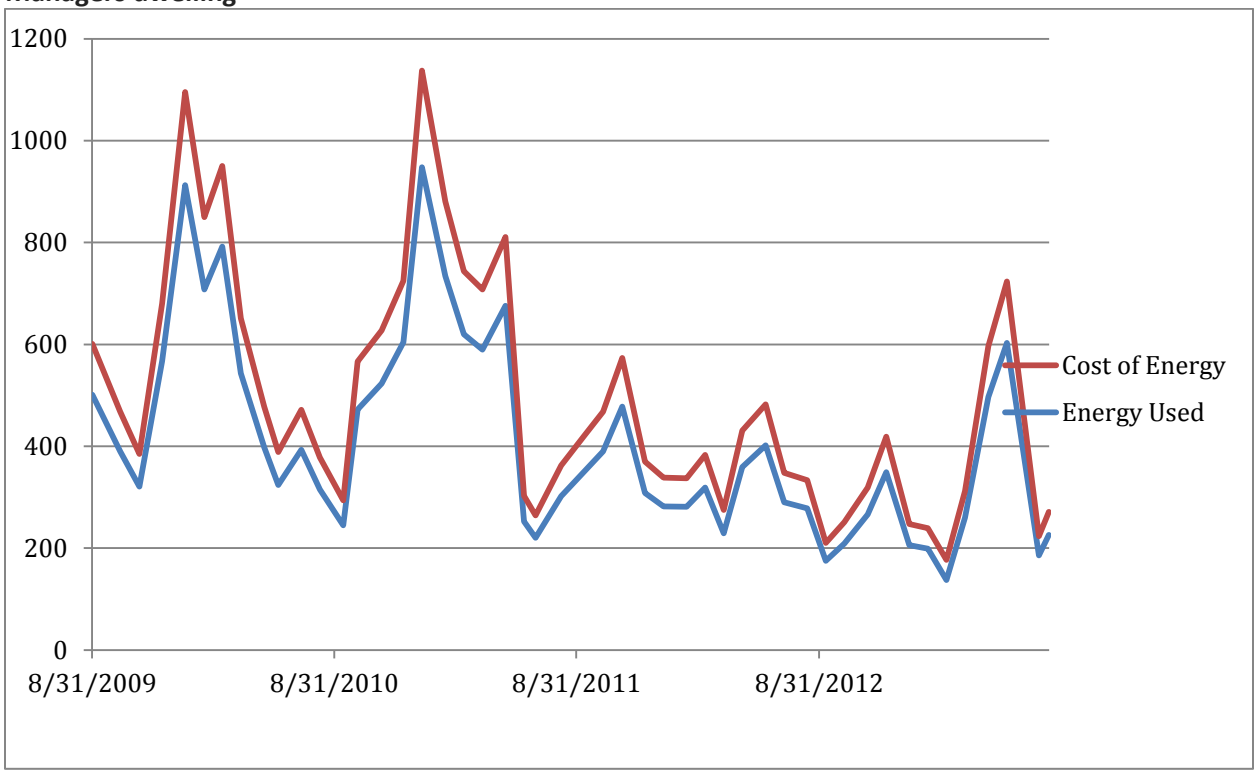
Arctic entryway

Shop



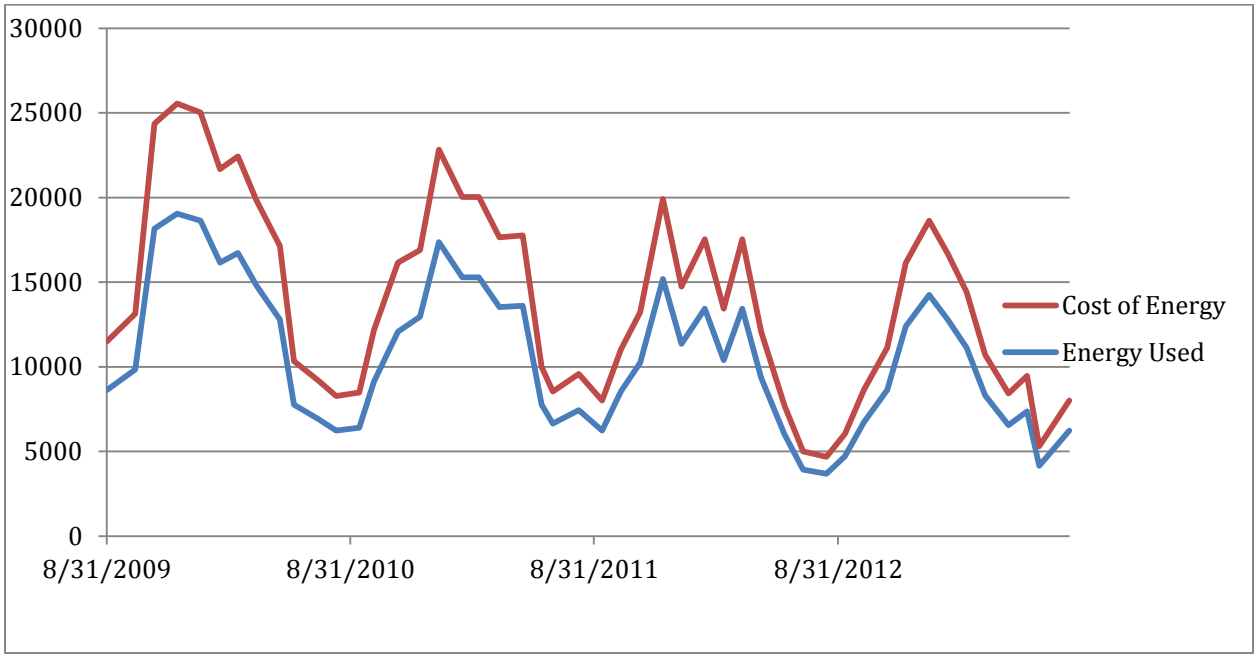
Changing the high bay lights in the shop with the T-40 LED lights has made a dramatic improvement on the amount of energy being consumed. We also insulated the shop doors to help battle the outside elements pulling the heat out of the building.

Managers dwelling



The Manager's dwelling has had a considerable drop in power usage after the double paned windows and the occupancy sensors were installed. The biggest factor though was that the managers dwelling wasn't sealed properly when it was built. There were large gaps in the siding that needed to be caulked. Once that was completed we saw a significant drop in energy usage. There is a spike near the beginning of 2013 where an electric heater was being used. Once this problem was isolated we again saw the drop in energy usage.

Restaurant



The restaurant in Anaktuvuk Pass is what seems to be 2 or 3 large mobile homes that have been pushed and welded together. This created a very unique energy efficiency problem, with very little insulation we were forced to be creative. First and foremost the roof membrane(layer between the roofing and the tar paper) had holes in it so it needed to be replaced. After that was replaced the furnace that was being used was replaced with an ultra efficient toyo stove to heat the main portion of the building. Lastly there were 3 50 gallon water heaters that were consolidated down to 2 on demand water heaters.

Conclusions and Recommendations

This project has been a huge success. From upgrading lighting systems throughout the corporations buildings to updating heating systems in somewhat dilapidated buildings. We have been successful in updating those buildings by sealing them completely, replacing windows, doors and heating systems. During the course of this project there has been multiple turnover at the General Manager position for the Nunamiut corporation. There was rarely a shared vision and a lot of the time there was a lot of resistance to the efficiency changes that were to be put in place. Over countless meetings understandings were met and the project moved forward, this could have been alleviated however with more cooperation and a long term vision of the project that was shared by the corporation and YRITWC.

My recommendation for the future of energy efficiency projects in Alaska is to continue working with tribal governments and tribal corporations to develop and maintain clean energy in their buildings and villages. With the amount of turnover that happens in the tribal corporations I feel like it is very important to create a network of stability so that if there is turnover in the middle of a project the transition will be seamless. It is widely accepted that the clean energy is a priority, especially with the price of heating fuel in the remote regions of Alaska. Creating some fail safes in the grant and with the grant manager would greatly help with keeping projects running smoothly even after turnover. The only problems that we had with the energy efficiency grant was the problem with different visions of each general manager of the Nunamiut Corporation.

As the grant manager for this project there were many factors that contributed to the success of this project despite the recurring hiccups due to turnover. We have saved the corporation nearly 55,000 dollars per year and helped to educate local workers from Nunamiut Corporation in basic energy efficiency and installation of energy efficiency equipment (LED lights, motion sensors, sealing windows etc.) . It has been the overall success of this project that makes us hopeful for other villages in the watershed to adopt the ideas and implementation of this project and continue saving money and using less power.

Thank you.