

# Atmautluak

## Energy Action Plan

6/18/2019



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# LIST OF ACRONYMS

AK	Alaska
ANTHC	Alaska Native Tribal Health Consortium
ATC	Atmautluak Traditional Council
ATM	Automated Teller Machine
BTU	British Thermal Unit
CCHRC	Cold Climate Housing Research Center
CFL	Compact Fluorescent Light
CO	Carbon Monoxide
DOE	Department of Energy
ECM	Energy Conservation Measure
EEM	Energy Efficiency Measure
EOL	End Of Life
ERV	Energy Recovery Ventilator
Ft	Foot
HPS	High Pressure Sodium
HUD	(United States Department of) Housing and Urban Development
HVAC	Heating, Ventilation, and Air-Conditioning
ISER	Institute of Social and Economic Research
LED	Light-Emitting Diode
MBTU	One Million British Thermal Units
O&M	Operations & Maintenance
ONAP	Office of Native American Programs
PC	Personal Computer
TBA	To Be Announced
UAA	University of Alaska Anchorage
W	Watt



# ABSTRACT

In 2017, the Native Village of Atmautluak received a grant for the Atmautluak Energy Efficiency Project from the United States Department of Energy Office of Indian Energy. The objective of the project was to reduce and stabilize energy costs in tribal buildings by setting energy efficiency improvement goals to provide direction for a future retrofit project. This final report begins with information about the community of Atmautluak and the project procedure. Chapters follow on each component of the project. The project team began by recording information about the six project buildings as well as the Traditional Council's goal for each building. Tribal staff also gathered baseline data on each building, including their energy use and general condition. An energy professional surveyed each building, prepared an energy model using AkWarm-C energy modeling software to determine energy-saving retrofits, and completed energy audits, summarized within this report. Each energy audit lists energy efficiency measures and energy conservation measures to pursue to improve the building and decrease its energy use. This report also contains three resources to help with the next steps in an energy retrofit project: a data monitoring plan to track the building condition and energy use through a retrofit project, a maintenance plan to facilitate energy conservation, and a list of funding and training opportunities that could provide resources for a retrofit or training for maintenance staff. Finally, readers can find materials from the outreach component of the project which demonstrated sustainable practices to the community. This Energy Action Plan marks the conclusion of the Atmautluak Energy Efficiency Project, but is meant to lead to the next step towards safe, comfortable, and energy efficient tribal buildings that will continue to benefit the community of Atmautluak for many years to come.



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# INTRODUCTION

The Native Village of Atmautluak received a grant from the United States Department of Energy Office of Indian Energy in 2017 to promote energy efficiency in their tribal buildings. This Energy Action Plan is the product of the resulting project, and is intended to lead into the next step of a comprehensive energy project. It contains the energy efficiency improvement goals for each building that participated in the project as well as supplementary resources to help develop and implement energy saving solutions and reduce energy costs for the Native Village of Atmautluak.

## Community information

The Native Village of Atmautluak is located in the Yukon Kuskokwim Delta in southwest Alaska. The community sits on the west bank of the Pitmevak River, and the rolling tundra provides fish and game animals to support the subsistence lifestyle of the residents. Yup'ik people have lived in the village site for thousands of years, and today 277 people live in Atmautluak, 98% of whom are Alaska Native (United States Census Bureau, 2010). Many people continue to practice traditional arts, crafts, and dances.

Atmautluak is not accessible by road so residents travel to and from the village by boat during the summer, snow machine in the winter, and small planes year round. Supplies and fuel come in by barge in the summer, or by plane, and thus are expensive. Energy costs are high, with a gallon of fuel costing \$4.86 and residential electricity at \$0.80 per kilowatt-hour for residents exceeding the limits set out by Alaska's power cost equalization program (ISER / UAA, 2018). Due to the tundra, it is difficult to install centralized plumbing, so residents haul water from the river, well, or cut ice blocks from tundra lakes. Homes depend on the use of honey buckets for sewage handling. The community has one school, one clinic, and two stores.

The Traditional Council governs Atmautluak. The Council has a long-term goal of making Atmautluak sustainable,



Atmautluak lies next to the Pitmevak River in southwest Alaska



healthy, and safe. In working toward this goal, they worked with the Cold Climate Housing Research Center (CCHRC) previously on a project to design and construct two super energy efficient prototype homes in 2013. Community members provided input on the design and made up the building crew for both of the homes, which were funded by the United States Department of Housing and Urban Development (HUD) Rural Innovation Program. Now, the Tribal Council is hoping to address the high energy usage of the tribal buildings and will use this project to form a plan to lower energy costs.

## Project objective

The objective of the Atmautluak Energy Efficiency Project is to reduce and stabilize energy costs in tribal buildings by setting energy efficiency improvement goals to provide direction for future retrofit projects. Energy efficient and safe buildings will empower the Native Village of Atmautluak by providing warm, comfortable spaces for community needs and events and decreasing dependence on outside shipments of fuel oil. The project will also showcase sustainable practices and behaviors to the entire community.

## Project activities

The Atmautluak Energy Efficiency Project followed a comprehensive procedure so that the Atmautluak Traditional Council and project staff could work together to create goals for the participating buildings, collect information on their current status and energy use, and develop the Energy Action Plan. The procedure, described below, began with a decision on which buildings would participate in the project and concludes with the finalization of the Energy Action Plan, a document meant to serve as a starting point for future building retrofit projects.

**Decide on buildings:** The Atmautluak Traditional Council met to decide which buildings would participate. They chose six tribal buildings to receive energy audits as a part of the project and set goals for each building.

**Project kickoff meeting:** In February 2018, the Atmautluak Traditional Council met with project staff. They discussed the overall goal of the project, the procedure, and reviewed the list of buildings participating in the project and their goals for each. The Council members provided information on the specific purpose of each building as well as broader knowledge on past retrofit projects in Atmautluak and the Council's overall energy goals. Finally, the Council members and project staff participated in a discussion about how to act on the recommendations from the Energy Action Plan when this project concludes, such as how retrofits might be financed, local staff and contractors that can perform retrofits or maintenance tasks, and how to utilize other local resources. The flyer from this meeting is in Appendix A.

**Develop data monitoring plan:** During the kickoff meeting, the Council decided on metrics, such as energy use and occupant comfort, for tracking each building in the project. The data monitoring plan, found on page 16, also includes details such as how the chosen metrics will be collected, stored, accessed, and analyzed. Monitoring building metrics is important because it shows how the buildings are changing over time and if an investment into energy efficiency retrofits results in improvements such as increased safety, reduced energy use, better occupant comfort, and less maintenance.

**Collect baseline data:** Project staff worked with the tribal office staff and building occupants to benchmark the current condition and energy use of each building in the project. The baseline data included both the most recent data, and where available and applicable, data from previous years. It includes energy use broken out by fuel type, occupant comfort, and maintenance tasks where available. This data is useful because it provides a snapshot of the building at the beginning of the project and provides a comparison of the building's energy use and condition to similarly-sized buildings. The energy auditor used baseline data to calibrate energy models of each building. Finally, the Traditional Council can use this data to determine if future retrofit projects improve the building's condition or decrease energy use.



**Survey buildings:** Project staff surveyed each building in the project, collecting basic information such as the layout, envelope insulation values, and occupancy schedule. They also checked the condition of the building systems such as the envelope, heating and ventilation, and electric appliances. During the surveys, staff looked to identify unsafe building features, maintenance needs, and sources of occupant discomfort as well as determining where, when, and how energy is used in the facility.

**Building energy audits:** Using information collected in the building surveys, the energy auditor drafted diagrams of the building layouts and created energy models of each building using AkWarm-C, an energy modeling software used in Alaska. After identifying potential retrofits, the energy auditor used AkWarm-C to determine the energy savings from each retrofit option to determine whether the retrofit was cost-effective. The final energy audit report for each building, summarized on page 23, contains information on the building features and energy use, benchmark information comparing the building's energy consumption to other buildings with similar size, use, and occupancy, and most importantly, a list of energy efficiency measures ranked by priority. The audits also suggest energy conservation measures that can be implemented by maintenance staff with little or no cost.

**Develop draft Energy Action Plan:** This document, the Energy Action Plan, builds on the energy audits of the tribal buildings. The objective of the Energy Action Plan is both to summarize the recommendations of the energy audits and to add actionable steps to help lead to and guide future retrofit projects. To create the Energy Action Plan, staff communicated with representatives of the Tribe and interviewed experts throughout Alaska to identify training and financing opportunities, regional resources, and best practices for retrofit projects.

**Final project team meeting:** In February 2019, the Atmautluak Traditional Council reviewed a draft of the Energy Action Plan with project staff. They revisited project goals to ensure that the Energy Action Plans addressed them adequately and suggested revisions where appropriate. The Council then considered next steps following the conclusion of the project.

**Final Energy Action Plan:** Project staff incorporated the suggestions of the Traditional Council and other reviewers to create a final Energy Action Plan for the Atmautluak Energy Efficiency Project.

**Outreach:** Throughout the project, Council members, tribal administrative staff, and project team members performed outreach activities to publicize the goals, steps, and outcomes of the project. The outreach included a presentation at the United States Department of Energy Office of Indian Energy Program Reviews in 2017 and 2018 as well as flyers and a video advertising the project to the community.

## Document overview

This report contains the objective, procedure, and a summary of the building energy audits of the Atmautluak Energy Efficiency Project. In addition, the later sections supplement the audit recommendations in order to help facilitate future energy reduction projects.

The introductory section explains the project objective and procedure. Readers can find basic information on the buildings participating in the project in *Tribal buildings*, and information on their baseline condition and data monitoring in the *Data monitoring plan* and *Baseline data* sections. The energy audits are summarized on page 23. The *Maintenance plan* section suggests a monthly checklist that maintenance personnel can follow each month to help reduce energy costs and improve building safety and comfort. Information on where to look for financing options for future retrofit projects and details on how to fund and schedule training for maintenance personnel appears in the *Funding and training opportunities* section. The *Outreach* section explains the project activities that served to showcase the objective and results of the project to community members, Alaskans, and others. Finally, the appendices contain documents produced throughout the project, such as flyers, and resources to help with future energy projects such as a scope of work for contractors and a summary of energy audits of other local buildings that might participate in a community energy project.



# TRIBAL BUILDINGS

The Atmautluak Traditional Council (ATC) chose a total of six buildings to participate in this project. The buildings are all single story, wood-framed buildings and are located centrally in the community. ATC wants to reduce electrical and fuel use in all six buildings in a future energy retrofit project.

## ATC office & community center

Building goal: Reduce electrical and fuel oil use.

The ATC office and community center serves as a community gathering place as well as an administrative center. There is a large staff of around fifteen people and the facility is utilized by approximately 15-20 community members on a daily basis. The building is open during typical business hours throughout the year.

The 3,500 square-foot building sits on a steel piling foundation with wood siding. The building shell is in poor condition with some of the windows experiencing disrepair. A hydronic unit heater that utilizes the waste heat system provides heat. Secondary heating is supplied by an oil-fired, direct vent Toyotomi heater. There is no domestic hot water or plumbing in the building. The exterior lighting is comprised of incandescent lamps. The interior lighting consists of fluorescent and compact fluorescent lamp (CFL) fixtures. Plug loads for the facility are moderately high due to the high volume of daily visitors and use of the space as an office. The ATC is hoping to reduce the energy use of this building in a future energy retrofit project.



The ATC office is, along with the school, one of the most used buildings in the community. It is both a hub for decision making and a gathering place for the community.

## ATC rental house

Building goal: Reduce electrical and fuel oil use.

The ATC rental house is a residential structure that has traditionally housed the janitor/maintenance employee of the ATC. The rental house has been occupied by the same family for the last six years.

The 576 square-foot building was constructed in the 1970s. The structure does not have a foundation and is in direct contact with the ground. The building shell is in poor condition. There is no potable water or domestic hot water plumbing in the home. An oil-fired, direct vent Toyotomi heater provides primary heating, with a wood stove as a secondary heat source. There is no exterior lighting and the interior lighting is a mix of fluorescent, CFL, and incandescent lamps. The ATC is hoping to reduce the energy use of this building in a future energy retrofit project.



The ATC rental house is traditionally reserved for the janitor position at the community hall and tribal office.



## ATC shop

Building goal: Reduce electrical and fuel oil use.

The ATC shop is a workspace for tribal maintenance personnel and a local storage facility. The building is occupied on an as-needed basis depending on the needs of the Council.

The 480 square foot building sits on grade with wooden planks covering the dirt floor. The building shell is in poor condition. There is no plumbing in the building. Exterior lighting is comprised of a single screw-in fixture. The interior lighting consists of high pressure sodium (HPS) fixtures and several incandescent lamps. Plug loads for the facility are negligible. The ATC is hoping to reduce the energy use of this building in a future energy retrofit project.



The ATC Shop is used periodically and seasonally but is not occupied by permanent staff.

## Gaming office & post office

Building goal: Reduce electrical and fuel oil energy use.

The gaming office and post office building serves many needs for the community of Atmautluak. The gaming hall's staff of two hosts bingo for about fifteen community members on every weeknight, except Wednesday. There is a semi-monthly bingo giveaway that is attended by an average of fifty people. A Post Office occupies the other end of the building and is staffed by one community member.

The 1,680 square-foot building was constructed in the mid-1970s on an elevated pier foundation. The building shell is in poor condition with about half of the windows experiencing disrepair. The waste heat system distributes heat from the power plant to the building via unit heaters. There are manual thermostats for controlling the unit heaters. There is no plumbing in the building. The exterior lighting is mostly incandescent lamps, and the interior lighting is a mixture of fluorescent, CFL, and incandescent lamps. Plug loads are low in this building. There is a PC/cash register, an ATM machine, a small refrigerator, and a bingo display board. The ATC is hoping to reduce the energy use of this building in a future energy retrofit project.



The gaming office's bingo hall takes up half of a repurposed building that sees great changes in occupant load based over the course of a typical week. The other half of the building is taken up by the post office.



## Police station

Building goal: Reduce electrical and fuel oil use.

The police station is an important aspect of the village of Atmautluak's civic structure. The facility is utilized every day with an evening and night shift and on an intermittent basis when the holding cell is occupied.

The 768 square-foot building is situated on a wooden pad foundation. The building shell is in poor condition with the roof showing signs of disrepair. An oil-fired, direct vent Toyotomi heater provides heat. There is no potable or domestic hot water plumbing in the building. There is no exterior lighting. The interior lighting consists of a mix of CFL and incandescent lamps. Plug loads are negligible for the facility. The ATC is hoping to reduce the energy use of this building in a future energy retrofit project.



The police station in Atmautluak contains both an office and a jail cell.

## Washeteria

Building goal: Reduce electrical and fuel oil use.

The washeteria is a facility that the community members of Atmautluak can utilize for water and laundry services. The building also contains the water treatment plant.

The 2,048 square-foot building sits on a triodetic foundation. The building receives waste heat from the power plant. Oil-fired boilers supplement the waste heat. The facility has two top loading washers and two front loading washers. There are four stackable dryers and three commercial dryers. The ATC is hoping to reduce the energy use of this building in a future energy retrofit project.



Waste heat from the power plant is utilized by numerous public buildings in the community, including the washeteria.



# DATA MONITORING PLAN

At the kickoff meeting for this project, the Atmautluak Traditional Council worked with CCHRC staff to create a Data Monitoring Plan for the buildings in the project. It is important to document building conditions before, during, and after energy retrofit projects in order to track the building condition and energy use. Before a retrofit project, the building data helps to identify measures that can improve building energy performance and lower operating costs. After the retrofit, tracking building metrics shows if the investment resulted in improvements such as increased safety, reduced energy use, better occupant comfort, and less maintenance.

The purpose of the Data Monitoring Plan is to provide a framework to guide the collection, analysis, and storage of data. It helps the project team know who will be responsible for each task, and it helps those outside the project quickly review what data the team is tracking. Thus, the plan contains building-specific information as to which metrics will be collected and why. It also documents how the data on the buildings will be collected, stored, accessed, and analyzed.

## Data management overview

In Atmautluak, all data monitoring activities, including the collection and storage of data, will be overseen by the tribal administrator.

## Data collection

There are four basic types of data for the tribal buildings in Atmautluak:

1. Annual fuel oil use: In buildings that are heated using fuel oil combustion appliances, monitoring the annual fuel oil use shows the amount of energy used for heating in the building. There is also a waste heat line from the power plant that provides heat to some buildings in Atmautluak; in these buildings there is no charge for heat and there is no meter monitoring the amount of heat going to each building.
2. Monthly electrical energy use: Monitoring electric usage shows the amount of energy used to operate the building.
3. Occupant comfort levels and building condition reports: Occupant comfort and building conditions are established through regular interviews with the people who spend the most time in each building. These interviews serve to identify safety issues as well as to document the general condition of the buildings.
4. Maintenance records: Currently, the data monitoring plan does not include maintenance tasks or building condition reports for each building; however, tribal staff may choose to add this metric in the future.

## Data storage

The Tribe stores hard copies of all fuel and electrical energy data for each building in a file cabinet in the tribal office. The tribal administrator will decide where to store building condition and occupant comfort data if they conduct additional surveys during an energy retrofit project.

Project staff also collected baseline data for this project, which consists of energy use and occupant comfort data for the period just prior to the energy audit. This data, shown in the *Baseline data* section of this report is stored in a project folder on a server at the Cold Climate Housing Research Center and is also available on CCHRC's website: <http://www.cchrc.org/doe-energy-efficiency-and-renewable-energy-projects>



## Building data

Data requirements for each building, shown in the table below, differ slightly for each building depending on the current and anticipated future use.

	Building	Data	Notes
1	ATC office and community center	<input type="checkbox"/> Monthly electrical energy use <input type="checkbox"/> Occupant comfort levels and building condition report	This building is currently heated by waste heat, with supplemental heat provided by a Toyotomi stove.
2	ATC rental house	<input type="checkbox"/> Annual fuel oil use <input type="checkbox"/> Monthly electrical energy use <input type="checkbox"/> Occupant comfort levels and building condition report	This building is currently heated by a Toyotomi monitor stove. The building is considered marginally habitable for occupants.
3	ATC shop	<input type="checkbox"/> Monthly electrical energy use <input type="checkbox"/> Annual fuel oil use <input type="checkbox"/> Occupant comfort levels and building condition report	This building does not currently have a consistent heating source. At present, electric resistance heaters and a Toyotomi stove are used.
4	Gaming office & post office	<input type="checkbox"/> Monthly electrical energy use <input type="checkbox"/> Occupant comfort levels and building condition report	The building is currently heated by waste heat, but there are concerns regarding the performance of the heat distribution system. A single Toyotomi unit heater is used to supplement the waste heat.
5	Police station	<input type="checkbox"/> Annual fuel oil use <input type="checkbox"/> Monthly electrical energy use <input type="checkbox"/> Occupant comfort levels and building condition report	This building is currently heated by a Toyotomi monitor stove.
6	Washeteria	<input type="checkbox"/> Monthly electrical energy use <input type="checkbox"/> Occupant comfort levels and building condition report	This building is currently heated by waste heat, with supplemental heat provided by boilers.



## Accessibility

Electric utility data is available from the Utility Works office in the ATC office building, and is easily accessible by the tribal administrator. Data on past heating fuel use is not available, as Atmautluak Limited Corporation does not keep local records and the Tribal office staff stopped keeping records after the majority of their buildings went onto a waste heat line.

The baseline data for this project, consisting of energy use and occupant comfort data is available on the project webpage (<http://www.cchrc.org/doe-energy-efficiency-and-renewable-energy-projects>) and is also documented in the *Baseline data* section of this report.

## Analysis

The tribal administrator is responsible for monitoring energy use and other data on an ongoing basis. For the baseline period for energy audits for this project, CCHRC staff worked with the tribal administrator to consolidate energy use, building condition, and occupant comfort data for each building.



# BASELINE DATA

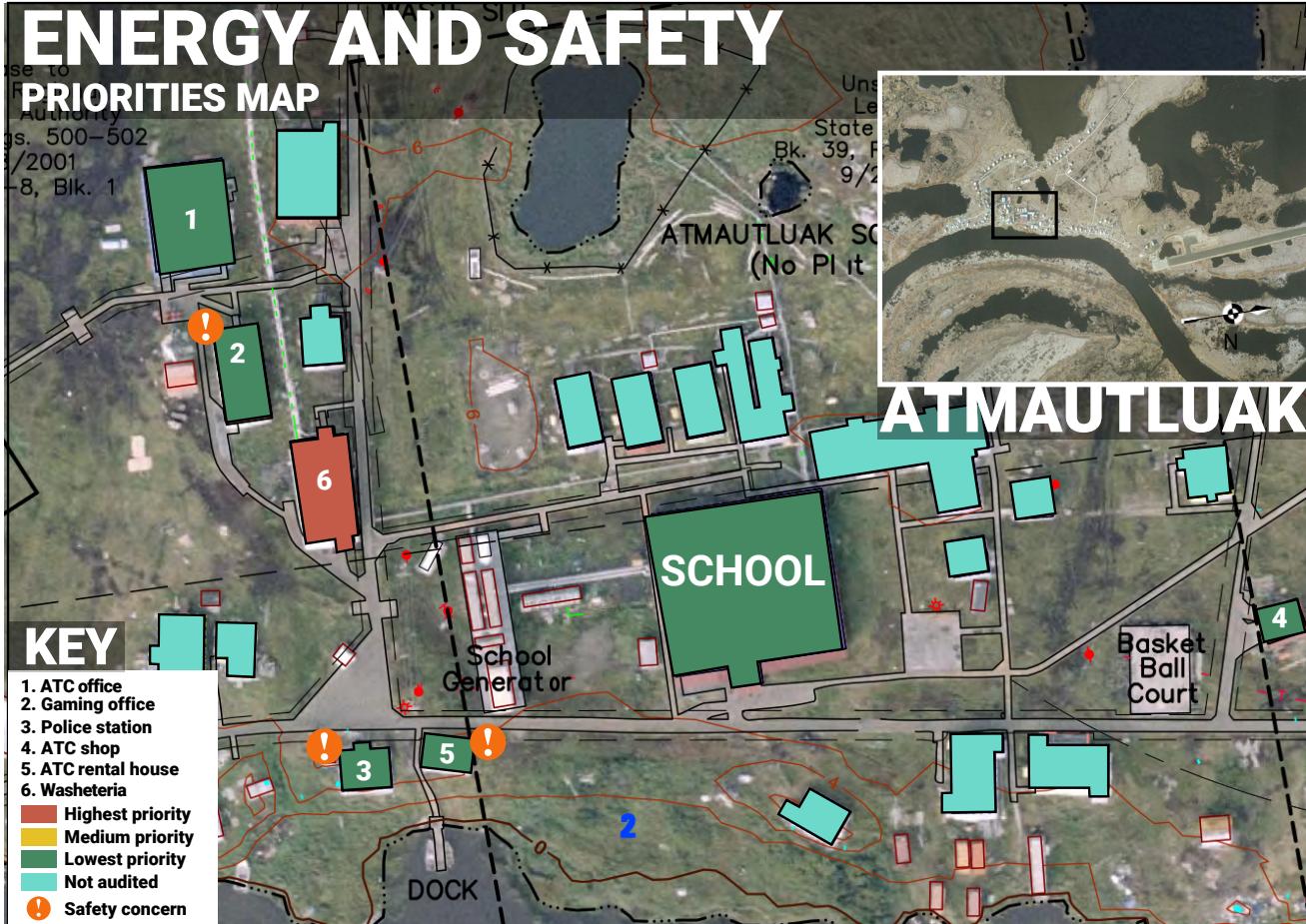
In 2018, project staff worked with the tribal office staff and building occupants to benchmark the current condition and energy use of each building in the project. This baseline, or pre-audit, picture of the buildings is useful for several reasons. First and foremost, it serves to give the building owners and occupants a description of the current state of the buildings. Baseline conditions, in conjunction with the goals and future use of each building, also help to establish a priority for maintenance needs and future energy retrofits. During the energy audit process, the baseline conditions also help the energy auditor calibrate the energy model for the building, meaning that the energy savings estimates for each recommendation are more accurate. Finally, this snapshot of the condition, energy use, and costs for each building can be useful when searching for and filling out applications for grant or loan funding for retrofit construction.

The map in this section shows the six buildings that participated in this energy audit project. Three of them are at a high priority for a retrofit, because of safety issues. The washeteria is also a high retrofit priority because it has the largest energy consumption of all the tribal buildings, and thus has a good potential to realize energy savings from a building retrofit. The tribal rental house is also a good candidate to realize energy savings, because it is not connected to the waste heat loop that provides free heat to many of the other buildings. The charts following the map show energy use from the collected utility bills for each building. This use is slightly different from the modeled energy use in the audits because these graphs reflect purchased fuel in the stated years, which depends on weather and occupancy as well as building characteristics.

The building conditions chart in this section provides more details on the buildings, highlighting the safety, maintenance, and occupant comfort concerns of the buildings. Three of the buildings have high priority safety issues: the ATC rental house, the gaming office, and the police station. These issues, including mold, lack of ventilation, and inadequate building envelopes, should be addressed as soon as possible.



Atmautluak is a boardwalk community on the Alaska tundra. The residents depend on their environment for subsistence.



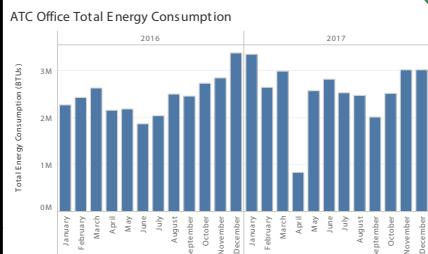
## KEY

- Fuel Consumption
- Electrical Consumption
- 1K One Thousand BTUs
- 1M One Million BTUs

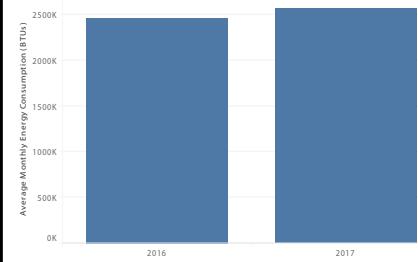
## NOTES

Because fuel is purchased when holding tanks are low or empty, fuel records reflect sporadic fuel consumption. Several buildings had periods when they were not occupied, thus reducing demand for fuel. Additionally, consistent fuel records were not available for all buildings, as evidenced by the lack of data within certain years.

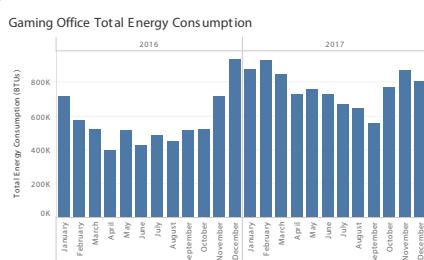
## ATC OFFICE



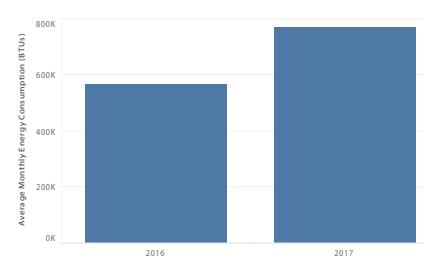
## ATC Office Monthly Energy Consumption



## GAMING OFFICE



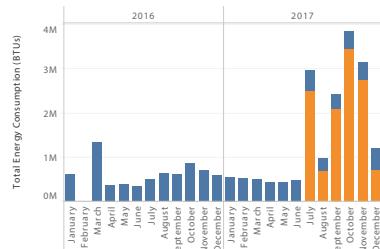
## Gaming Office Monthly Energy Consumption



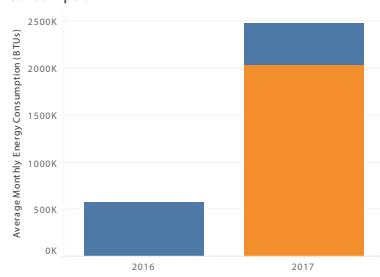


## POLICE STATION

Police Station Total Energy Consumption

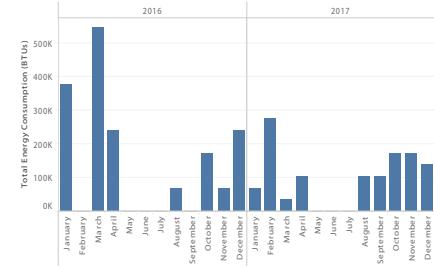


Police Station Monthly Energy Consumption

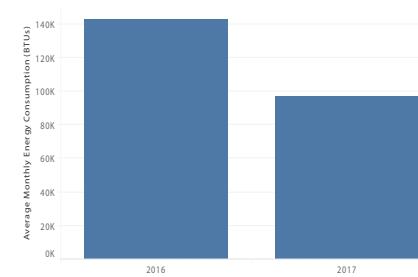


## ATC SHOP

ATC Shop Total Energy Consumption

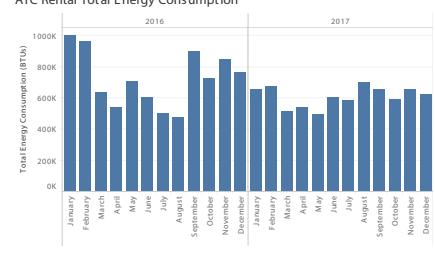


ATC Shop Monthly Energy Consumption

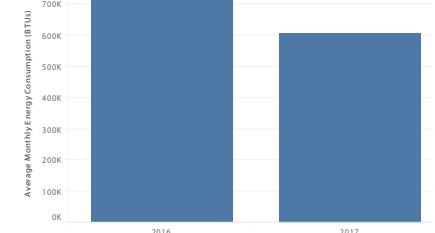


## ATC RENTAL HOUSE

ATC Rental Total Energy Consumption

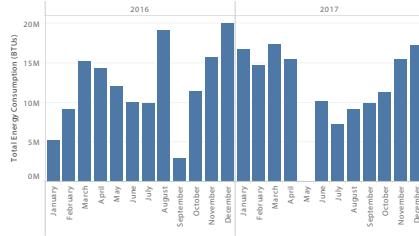


ATC Rental Monthly Energy Consumption

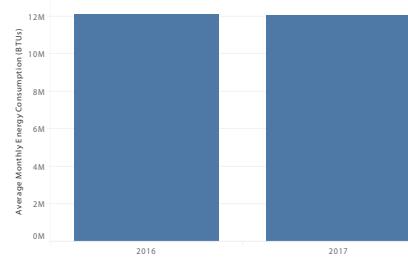


## WASHETERIA

Washeteria Total Energy Consumption



Washeteria Monthly Energy Consumption Average per Year



6



## Safety, comfort, and maintenance concerns

In addition to energy use, it is paramount to monitor the general condition and safety of buildings. Safe, well-maintained buildings are comfortable for occupants and allow workers and guests to focus on their tasks without being cold or worried about the building condition.

<b>Building Name:</b>	<b>Building safety, occupant comfort, and maintenance concerns</b>
ATC office & community center	This heavily-used building is in poor condition. The building has several boarded windows, creating an egress issue. The building does not have plumbing, and the bathroom with the honey bucket smells because it does not have ventilation.
ATC rental house	This building is in extremely poor condition and is marginally habitable for humans. The envelope has multiple gaps, including separations between the walls and roof where the wind can blow through. It has no insulation or plumbing, poor lighting, and boarded over windows.
ATC shop	This building is in poor condition. It lacks heating, plumbing, or a dedicated floor. The building envelope has gaps which allow the wind to blow through.
Gaming office & post office	This building is in extremely poor condition. It does not have plumbing or ventilation. There is mold on the base of the walls. The building envelope contains cracks that allow wind to blow through. The building's heat distribution system is inadequate, which causes the office portion to frequently experience cold temperatures.
Police station	This building is in extremely poor condition. The roof leaks, and there is water damage in the attic. The building is cold due to drafts from cracks in the envelope; in the winter the jail cell is too cold to house inmates. The building has mold, and lacks ventilation.
Washeteria	This building is in poor condition. It lacks plumbing, so staff need to haul water. The building is also not always warm.



# ENERGY AUDIT SUMMARIES

Six tribal buildings participated in this energy planning project. The project team surveyed each building and gathered baseline energy use. An energy auditor used the building details and past energy use to build an energy model of the building using AkWarm-C software. This allowed the energy auditor to explore different retrofits for each building, and ultimately build a list of recommendations to decrease its energy use. In this section, each energy audit is summarized below; the full audits are available on the project web page: <http://www.cchrc.org/doe-energy-efficiency-and-renewable-energy-projects>.

Energy audits prioritize energy retrofits, or energy efficiency measures (EEMs) that improve the safety of the building. They then rank remaining EEMs according to their simple payback, or the amount of time it takes to earn back the installation price through energy savings. Low simple payback periods, indicating retrofits that are quickly cost-effective, have the highest priority. Audits also include suggestions for energy conservation measures (ECMs). ECMs are recommendations for occupants to reduce energy consumption and costs which have little or no cost and can often be implemented by maintenance staff or directly by the occupants.

The auditor identified several recommendations that applied almost universally to the tribal buildings, including installing and using setback thermostats to decrease the temperature set point when the buildings are unoccupied, and upgrading lighting to LED bulbs. Additionally, many of the buildings could benefit from envelope upgrades, including replacing broken windows and treating and painting T1-11 siding to extend its lifetime. Further, several buildings would have lower energy use if they had more attic insulation and if a technician could replace or repair zone valves in the space heating distribution system.

Similarly, many ECMs apply to all tribal buildings in the project. Ongoing energy monitoring can identify opportunities to decrease energy use, reducing air infiltration through air-sealing saves heating oil, and annual servicing of HVAC equipment keeps equipment operating at peak efficiency. Other recommendations include turning off plug loads when buildings are not occupied, and replacing electric appliances with Energy Star versions at their end of life.

## ATC office & community center

The ATC office and community center is a 3,500 square foot building constructed in 1990. It is occupied by 14 staff members and 15-20 visitors per day from 8am to 5pm Monday through Friday. In 2018, the predicted annual energy costs were \$2,296, which is mostly due to the cost of electricity.

The energy audit recommends two important actions which should be addressed as soon as possible:

1. Replace the line voltage, manual thermostat controlling the unit heater fan with a programmable setback model configured to set room temperatures back when unoccupied.
2. Treat and paint the building exterior to preserve the remaining life left in the T1-11 siding.



The energy auditor for the project reviews the recommendations for the ATC office building with Atmautluak's tribal administrator, Andrew Steven.



Other recommendations include implementing a heating temperature unoccupied setback to 64 degrees Fahrenheit throughout, replace existing lighting with LEDs, install a smarter control for the destratification fans, perform air sealing to reduce air leakage by 20%, replace existing south side windows with U-0.22 vinyl units, and replace north and west side windows with U-0.30 vinyl units.

If the Tribe is able to implement all recommendations, the annual energy use would decrease by 51.2 MBTU, resulting in an energy and maintenance savings of **\$873**. At an approximate installation cost of \$13,021, the simple payback of a retrofit project would be **14.9 years**.

The audit also includes suggestions for several ECMS, including ongoing energy monitoring, efficient building management, reducing air infiltration, turning off plug loads, and servicing HVAC equipment annually. Additionally, specific to the ATC office and community center, the Tribe should be sure to maintain the air sealing on the envelope, use electronic timers for large electronic equipment, replace refrigeration equipment and commercial cooking equipment at the end of useful life (EOL) with Energy Star versions and keep heating coils in air handlers, unit heaters, and fan coil units clean,

## ATC rental house

The ATC rental house is a 567 square foot building constructed in the 1970s. In 2018, the predicted annual energy costs were roughly \$5,500, which is mostly due to fuel oil used for space heating. The remainder is for electricity and spruce wood for the wood stove.

The energy audit recommends six important actions, one of which is a safety concern, which should be addressed as soon as possible:

1. Lift and stabilize the building and install a proper foundation to remove it from ground contact and insulate the floor.
2. Install an ERV to improve indoor air quality.
3. Repair or replace the roof to prevent further water damage.
4. Install rain shield and weather proof siding on the building.
5. Install vapor barriers.
6. If the wood stove is being used, it appears to have a single wall flue exiting the attic. **This is a safety issue** and the current flue should be replaced with a multi-wall flue to prevent fire danger.



The Tribe's rental house has safety concerns that should be addressed immediately, including the need for a proper foundation, ventilation, roof repair, and a multi-wall flue for the wood stove.

Other recommendations include implementing a heating temperature unoccupied setback to 64 degrees Fahrenheit throughout, replace existing lighting with LEDs, perform air sealing to reduce air leakage by 70%, add R-42 blown cellulose insulation to the attic with standard truss, remove the entry door and replace with a standard pre-hung U-0.16 insulated door, replace existing west window with U-0.22 vinyl unit, and replace the existing refrigerator with a new Energy Star model.

If the Tribe is able to implement all recommendations, the annual energy use would decrease by 69.2 MBTU, resulting in an energy and maintenance savings of **\$2,240**. At an approximate installation cost of \$10,318, the simple payback of a retrofit project would be **4.6 years**.



The audit also includes suggestions for several ECMs, including ongoing energy monitoring, efficient building management, reducing air infiltration, turning off plug loads, and servicing HVAC equipment annually. Additionally, specific to the ATC Rental House, the Tribe should make sure to maintain the air sealing on the envelope, replace refrigeration equipment and cooking equipment at the end of useful life (EOL) with Energy Star versions with Energy Star versions, keep refrigeration coils clean, and keep heating coils in air handlers, unit heaters, and fan coil units clean.

## ATC shop

The ATC shop is a 480 square foot building constructed in the 1990s. It is intermittently occupied by 1-2 people 1 hour a day 5 days per week. In 2018, the predicted annual energy costs were roughly \$1,200, which is mostly due to fuel oil for space heating. The remainder is for electricity.

The energy audit recommends three important actions which should be addressed as soon as possible:

1. If the building is heated, all garage doors should be replaced with an insulated roll up version with new weather stripping and the entry door should be replaced with a better insulated, pre-hung version with new weather stripping and sweep.
2. Repair the broken window.
3. Treat and paint the building exterior to preserve the remaining life left in the T1-11 siding.

Other recommendations include air tightening the garage door to reduce leakage by 40% and replace existing lights with LEDs.

If the Tribe is able to implement all recommendations, the annual energy use would decrease by 5.5 MBTU, resulting in an energy and maintenance savings of **\$264**. At an approximate installation cost of \$4,630, the simple payback of a retrofit project would be **17.5 years**.

The audit also includes suggestions for several ECMs, including ongoing energy monitoring, efficient building management, reducing air infiltration, turning off plug loads, and servicing HVAC equipment annually. Additionally, specific to the shop, the Tribe should be sure to maintain air sealing in all wall and ceiling penetrations including switch, electrical outlets, windows, and light fixture junction boxes, and keep heating coils, air handlers, unit heaters and fan coil units clean.

## Gaming office & post office

The gaming office is a 1,680 square foot building constructed in the 1970s and is used as a post office and gaming hall. The post office is occupied by 1 staff member from Monday through Saturday while the gaming hall has a staff of 1-2 and operates from 10 am to 9 pm weekdays. In 2018, the predicted annual energy costs were roughly \$870, which is mostly due to electricity. The remainder is used to purchase fuel oil to supplement the waste heat from the power plant.

The energy audit recommends three important actions, one may be a safety issue, which should be addressed as soon as possible:

1. Investigate the 35% increase in electric



The energy auditor and Atmautluak's tribal administrator use a thermal camera to examine the building envelope of the gaming office.



consumption from 2016 to 2017 and rectify the cause of this increase.

2. The building envelope is in need of immediate repair – **the foundation is potentially unsafe**, the roof decking is missing in some places, the furnace flue allows rain to enter the building, and 6 of the 9 windows are either broken or boarded up.
3. Insulate and seal the attic access hatch.

Other recommendations include replacing existing lights with LEDs, implement a heating temperature unoccupied setback to 65 degrees Fahrenheit throughout, perform air sealing to reduce air leakage by 50%, add R-42 blown cellulose insulation in the attic standard truss, and replace existing windows (southeast and north side) with U-0.22 vinyl models.

If the Tribe is able to implement all recommendations, the annual energy use would decrease by 77.8 MBTU, resulting in an energy and maintenance savings of **\$299**. At an approximate installation cost of \$17,987, the simple payback of a retrofit project would be **60.2 years**. However, many retrofits need to occur to address the safety issues of the building, regardless of the payback period.

The audit also includes suggestions for several ECMs, including ongoing energy monitoring, efficient building management, reducing air infiltration, turning off plug loads, and servicing HVAC equipment annually. Additionally, specific to this building, the Tribe should be sure to maintain air sealing in all wall and ceiling penetrations including switch, electrical outlets, windows, light fixture junction boxes, use electronic timers for large electronic equipment, replace refrigeration equipment at the end of useful life (EOL) with Energy Star versions, and keep heating coils, air handlers, unit heaters and fan coil units clean.

## Police station

The police station is a 768 square foot building constructed in the early 1970s. It is intermittently occupied by 1-2 staff between for a few hours each day plus an inmate 2-3 times per month. In 2018, the predicted annual energy costs were roughly \$2,900. This is mostly for fuel oil used for space heating, with the remainder for electricity costs.

The energy audit recommends three important actions which should be addressed as soon as possible:

1. Repair the foundation of the building.
2. Repair or replace the roof to prevent further water damage.
3. Treat and paint the building exterior to preserve the remaining life left in the T1-11 siding.



A retrofit of the police station could decrease its energy use by **\$883 per year**.

Other recommendations include implementing a heating temperature unoccupied setback to 60 degrees Fahrenheit throughout, replace existing lighting with LEDs, perform air sealing to reduce air leakage by 50%, and add R-33 blown cellulose insulation to the attic with standard truss.

If the Tribe is able to implement all recommendations, the annual energy use would decrease by 19.7 MBTU, resulting in an energy and maintenance savings of **\$883**. At an approximate installation cost of \$1,878, the simple payback of a retrofit project would be **2.1 years**.



The audit also includes suggestions for several ECMs, including ongoing energy monitoring, efficient building management, reducing air infiltration, turning off plug loads, and servicing HVAC equipment annually. Additionally, specific to the police station, the Tribe should be sure to maintain air sealing in all wall and ceiling penetrations including switch, electrical outlets, windows, and light fixture junction boxes, use electronic timers for large electronic equipment, and keep heating coils and air handlers, unit heaters and fan coil units clean.

## Washeteria

The Alaska Native Tribal Health Consortium (ANTHC) previously audited the washeteria in 2016. That audit recommended several EEMs, including a lighting upgrade to LED bulbs, using temperature setbacks in both the washeteria and the water treatment portions of the building, replacing lift pumps with more efficient models, replacing windows with triple pane versions, air-tightening the building, replacing electric dryers with hydronic versions, and only using the heat trace on the water lines for emergency purposes. Since 2016, the lighting has been upgraded to LEDs. For this current project, the energy auditor surveyed the building and determined that the remaining recommendations from the 2016 audit are still valid and could be included in any future retrofit project.



An audit update for the washeteria's 2016 report revealed that while lighting has been upgraded, many of the other recommendations are still valid.



# MAINTENANCE PLAN

Writing and following a maintenance plan has many benefits. Regular maintenance check-ups keep buildings safe, comfortable, and functioning properly. They also can alert staff to issues before they grow into large problems – preventing frozen pipes, combustion safety issues, and structural changes. A typical maintenance plan, such as the one suggested in this section, mainly consists of a monthly walk-through of the interior and exterior of the building. It's important to keep records of each maintenance check-up, writing notes as you go through the checklist and including photos of anything that is amiss. These records can show how quickly a problem might be growing, can be included in grant applications to help solicit funding for building improvements, and provide contractors with valuable information to order parts and fix a problem. If changes to the building occur, ask the contractor if any maintenance tasks should be added or removed from the maintenance checklist.

A three-ring binder makes an ideal maintenance notebook. Sections can include:

1. Printed copies of monthly maintenance checklists, signed and dated by the person who completed the inspection;
2. Notes on any system or occupant issues;
3. Instruction manuals and warranties for the building's appliances; and
4. Contact numbers for service providers, the local utility, and emergency services.

## Energy bill analysis

On a monthly basis, check the fuel and electrical use of each building for irregularly high usage and costs. Fuel use can be checked with a dipstick or some other object that can consistently be used to measure the amount of fuel left in a tank. The amount of fuel should be written down in the maintenance notebook. Electrical use can be checked by getting the bills from the administration office or local utility. These should also be documented in the maintenance notebook. If excessively high bills are noticed then ask the building occupants if their habits have changed or if the use of the building has changed.

## Monthly maintenance checklist

The following maintenance items can be administered on a monthly basis for each tribal building to improve building safety, efficiency, and comfort.

### ATC office & community center

- Heating: Check that the internal programmable thermostat for the Toyotomi stove is configured. If it is not, it will need to be reprogrammed to run at lower temperatures when there is no one in the building. Create a parts list that can be used for reference when ordering replacement heating components.
- Lighting: Ensure all lighting fixtures are operating and document any failed fixtures. Ensure replacements are LED.
- Appliances: Check to ensure office equipment is not running during off hours and that staff is utilizing plug load management devices.
- Envelope/Structure: Walk around the exterior of the building and document any damage, such as cracked windows, shifting foundation, or damage to the siding.
- Health and safety: Check the smoke alarm and CO detector to make sure they have power and the



batteries are full.

- Occupants: Talk to the building occupants. Have they noticed anything that is making the building unsafe or uncomfortable? Document their comments in the maintenance notebook, and follow up with any concerns.



Ensure all lighting fixtures are working and replace any fixtures that are not.



Check on the Toyotomi stoves periodically to ensure that the programmable thermostat is set to reduce the temperature at night.

## ATC rental house

- Heating: Check that the internal programmable thermostat of the Toyotomi stove is configured. If it is not, it will need to be reprogrammed to run at lower temperatures when there is no one in the building. Create a parts list that can be used for reference when ordering replacement heating components. Check that the wood stove chimney is free of creosote buildup or blockage. Schedule or perform a cleaning on the chimney if there is lots of creosote buildup.
- Lighting: Ensure all lighting fixtures are operating and document failed fixtures. Ensure replacements are LED.
- Appliances: Check that the refrigerator is operating properly. Replace with an Energy Star certified appliance when the current one fails.
- Envelope/Structure: Walk around the exterior of the building and document any damage, such as cracked windows, shifting foundation, or damage to the siding. Fix as soon as possible.
- Health and safety: Check the smoke alarm and CO detector to make sure they have power and the batteries are full.
- Occupants: Talk to the building occupants. Have they noticed anything that is making the building unsafe or uncomfortable? Document their comments in the maintenance notebook, and follow up with any concerns.



Visually inspect the house exterior and document any changes to the structure, such as current damage getting worse.



## ATC shop

- Lighting: Ensure all lighting fixtures are operating and document any failed fixtures. Ensure replacements are LED.
- Envelope/Structure: Walk around the exterior of the building and document any damage, such as cracked windows, shifting foundation, or damage to the siding.
- Health and safety: Check the smoke alarm and CO detector to make sure they have power and the batteries are full.
- Occupants: Talk to the building occupants. Have they noticed anything that is making the building unsafe or uncomfortable? Document their comments in the maintenance notebook, and follow up with any concerns.



Each month, walk around the ATC shop to visually inspect the exterior. Document any damage to the structure, such as damaged roofing or siding.

## Gaming office & post office

- Heating: Ensure that the unit heater in the post office and gaming side of the building are not running during summer months.
- Lighting: Ensure all lighting fixtures are operating and document any failed fixtures. Ensure replacements are LED.
- Appliances: Check to ensure appliances not running during off hours and that staff are utilizing plug load management devices. Replace the small refrigerator with an Energy Star certified refrigerator at the end of its life.
- Envelope/Structure: Walk around the exterior of the building and document any damage, such as cracked windows, shifting foundation, or damage to the siding.
- Health and safety: Check the smoke alarm and CO detector to make sure they have power and the batteries are full.
- Occupants: Talk to the building occupants. Have they noticed anything that is making the building unsafe or uncomfortable? Document their comments in the maintenance notebook, and follow up with any concerns.



Each month, visually inspect the building exterior and document any damage to the structure, such as damaged roofing or siding.

## Police station

- Heating: Check that the internal programmable thermostat of the Toyotomi stove is configured. If it is not, it will need to be reprogrammed to run at lower temperatures when there is no one in the building. Create a parts list that can be used for reference when ordering replacement heating components.
- Lighting: Ensure all lighting fixtures are operating and document any failed fixtures. Ensure replacements



are LED.

- Envelope/Structure: Walk around the exterior of the building and document any damage, such as cracked windows, shifting foundation, or damage to the siding.
- Health and safety: Check the smoke alarm and CO detector to make sure they have power and the batteries are full.
- Occupants: Talk to the building occupants. Have they noticed anything that is making the building unsafe or uncomfortable? Document their comments in the maintenance notebook, and follow up with any concerns.



The Toyotomi stove in the police station should be checked on periodically to ensure that the programmable thermostat is set.

## Washeteria

- Heating: Check that the programmable thermostat for the boiler is configured. If it is not, it will need to be reprogrammed to run at lower temperatures when there is no one in the building.
- Lighting: Ensure all lighting fixtures are operating and document any failed fixtures. Ensure replacements are LED.
- Health and safety: Check the smoke alarm and CO detector to make sure they have power and the batteries are full.
- Envelope/Structure: Walk around the exterior of the building and document any damage, such as cracked windows, shifting foundation, or damage to the siding.
- Occupants: Talk to the building occupants. Have they noticed anything that is making the building unsafe or uncomfortable? Document their comments in the maintenance notebook, and follow up with any concerns.



Ensure that the thermostat for the boiler is programmed to run at lower temperatures when there is no one in the building.



Visually inspect the building exterior and document any damage to the structure, such as damaged roofing or siding.



# FUNDING AND TRAINING OPPORTUNITES

Obtaining an energy audit for a building is an important first step toward realizing lower energy costs. However, the energy audit represents only the beginning of a comprehensive retrofit project and an ongoing operations and maintenance practice. Acting on the energy audit recommendations can be straightforward, but building owners might face multiple hurdles along the way, including a lack of funding, knowledge, equipment, or time.

This section is meant to serve as a starting point for addressing some of the larger, more costly recommendations. It contains a table of funding and training opportunities that may apply to a retrofit project for the tribal buildings. However, it is unlikely that funding for a comprehensive retrofit will all come from one source. In reality, it will be up to the Tribe to create a patchwork of funding resources, training opportunities, matching labor, and materials to complete all the audit recommendations. Be creative and ready to adapt new ideas to create a project that will best serve the community. It will be worth it to realize safer, more comfortable buildings along with energy savings!

It is best to consider financing at the beginning of the energy audit process. While a funding search is ongoing, consider the following tips that can help strengthen a future application while improving the buildings immediately:

1. Maintain momentum gained from the energy audits and this Energy Action Plan. No funding is necessary for many energy conservation measures, or for following the monthly checklist in the *Maintenance plan* section. It's also possible to continue building monitoring with only a little time invested. Energy and comfort data, maintenance logs, and small completed retrofits will realize immediate energy savings as well as providing valuable input for a future application for funding.
2. When applying for funding for a building energy retrofit project, combine the retrofits for as many buildings as possible, including those that are not owned by the Tribe. Appendix B contains summaries of energy audits that have been completed on other local buildings. Consider contacting these building owners to see if they would participate in an application for funding and a subsequent retrofit project. Combining all of the retrofits within the village into one project has several advantages: the project can leverage contractor travel and shipping of retrofit materials; owners can combine resources for match funding and proposal development; and the increased scale of the project will help bolster its potential impact.
3. In forming a project, list project objectives and how those goals will lead to sustainable results. Funders might be hesitant to fund a capital project for building retrofits if it doesn't include a viable maintenance plan. If energy savings are the goal of the project, address how the future savings will be used in your application. For instance, will a reduction of energy costs and maintenance needs allow the Tribe to repay loans, train personnel, or implement additional projects?
4. Community support for a project indicates to funders that there is a high level of interest and a strong likelihood that the project will be completed. Consider how to show this in an application through community surveys, letters of support, and matching labor. Think about recruiting other project partners to demonstrate cooperation and interest. Community support and other partners indicate the capability of the applicant to gather resources, communicate with stakeholders, and share information.
5. Refer to and use this Energy Action Plan in a future retrofit project. It demonstrates the ability of the Tribe to successfully complete a federal energy planning project, showing that the applicant has a strong skill set to manage a project, gather resources, and complete project requirements.
6. Use the information from the energy audits to develop a thorough and complete project plan. Strong applications have a defined project scope, clear estimate of financial needs, realistic timeline, and demonstrated personnel management. Think about potential risks, and strategies for countering those risks, and list these in your application to show advanced preparation.
7. Reach out to other communities who have completed similar projects to improve their buildings, either through deep retrofit projects or little by little. Ask them for their stories, lessons learned, and advice!



This section contains a table of funding and training opportunities that exist at the time of publication. The list contains a lot of variety, including grant and loan programs, training scholarships, and technical assistance. Not all of these apply directly to every building retrofit project, and they are color-coded to indicate their applicability to the audit recommendations in this report. The list is meant to be comprehensive, so that applicants can consider both the building retrofits as a stand-alone comprehensive project, and how they might divide into several smaller projects.

## ABBREVIATIONS

AHFC	Alaska Native Health Consortium
AVEC	Alaska Village Electric Cooperative
BIA	Bureau of Indian Affairs
DOE	Department of Energy
DOL	Department of Labor
HUD	US Department of Housing and Urban Development
IEPP	Office of Indian Energy Policies and Programs
OIE	Office of Indian Energy
USDARD	United States Department of Agriculture Rural Development

## NOTES

 indicates that the funding source prioritizes projects that **directly relate** to energy efficiency improvements

 indicates that the funding source prioritizes projects that may **somewhat relate** to energy efficiency improvements

 indicates that the funding source prioritizes projects that may **loosely relate** to energy efficiency improvements



# GRANTS

	AK - DOL	DOE - OIE	HUD	RASMUSON FOUNDATION
<b>Disbursement Amount</b> 	Workforce Innovation and Opportunity Act (WIOA) Incumbent Worker Training Program  Project Dependent	Energy Infrastructure Deployment on Tribal Lands  TBD	Indian Community Development Block Grant Program  Project Dependent	Tier I Grant Program  Up to \$25,000
<b>Eligible Uses of Funding</b> 	<input type="checkbox"/> Workforce Training	<input type="checkbox"/> Energy Efficiency Measures  <input type="checkbox"/> Energy System Installation	<input type="checkbox"/> Community Facility/ Housing Improvements  <input type="checkbox"/> Economic Development	<input type="checkbox"/> Light Community Facility Improvements
<b>Special Terms of Eligibility</b> 	Funding is intended to assist existing employees only.	None Listed	None Listed	Tribal Governments are eligible to request support for short-term capital projects.
<b>Application Deadline</b> 	Rolling	None listed; generally in spring	2020 Deadline TBA	Rolling
<b>Tips for Applying</b> 	Have a training opportunity in mind prior to applying	Join the DOE Office of Indian Energy email list to receive an official Notice of Funding Availability	Contact area ONEP representative to discuss project competitiveness prior to applying	<b>Evaluation based on:</b> <input type="checkbox"/> Complete budget, scope of work, and expected outcomes <input type="checkbox"/> Project benefits <input type="checkbox"/> Organizational capacity
<b>Contact</b> 	Department of Labor & Workforce Development 907-465-2712; dol.iwt@alaska.gov	Department of Energy; TribalGrants@hq.doe.gov	Office of Native American Programs - Alaska (907) 677-9800	Rasmuson Foundation (907) 297-2700



# GRANTS

## RASMUSON FOUNDATION

### USDA - RD

### USDA - RD

### USDA - RD

Disbursement Amount	RASMUSON FOUNDATION	USDA - RD	USDA - RD	USDA - RD
Eligible Uses of Funding	<ul style="list-style-type: none"> <li><input type="checkbox"/> Large-scale Community Facility Improvements</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Essential Community Facility Improvements</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Identification of Community Facility needs</li> <li><input type="checkbox"/> Preparation of assistive resources</li> </ul>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Training for Community Facility/ Housing Improvements</li> <li><input type="checkbox"/> Training in Economic Development</li> </ul>
Special Terms of Eligibility	Tribal Governments are eligible to request support for projects that provide broad community benefits.	Project must serve an eligible rural area, with median household income (MHI) below 90% of state non-metropolitan MHI	An organization must form a partnership with the Tribe to apply and then provide the technical assistance	Matching funds required (may not include in-kind donations)
Application Deadline	Rolling	Rolling	TBA	TBA
Tips for Applying	<b>Evaluations based on:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Strong cash match</li> <li><input type="checkbox"/> Committed project staff</li> <li><input type="checkbox"/> Complete project plan and budget</li> </ul>	<b>Evaluations based on:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Population</li> <li><input type="checkbox"/> Median Household Income</li> <li><input type="checkbox"/> Total project costs</li> <li><input type="checkbox"/> Financial need</li> </ul>	Preference is given to applicants with cash matching funds. In-kind contributions cannot be used as a match. Partnerships are required.	Grant is nationally competitive. Contact grant representative to discuss and determine project compatibility.
Contact	Rasmuson Foundation (907) 297-2700	Jessie Huff (907) 761-7768 <a href="mailto:jessie.huff@ak.usda.gov">jessie.huff@ak.usda.gov</a>	Jessie Huff (907) 761-7768 <a href="mailto:jessie.huff@ak.usda.gov">jessie.huff@ak.usda.gov</a>	Jessie Huff (907) 761-7768 <a href="mailto:jessie.huff@ak.usda.gov">jessie.huff@ak.usda.gov</a>



# GRANTS

	BIA	HUD	USDA - RD
Disbursement Amount	Tribal Energy Development Capacity  Up to \$300,000	Indian Housing Block Grant  Project Dependent	Housing Preservation Grant  Project Dependent
Eligible Uses of Funding	<input type="checkbox"/> Resource Development <input type="checkbox"/> Business Management	<input type="checkbox"/> Housing Development <input type="checkbox"/> Housing Services	<input type="checkbox"/> Low Income household repair/ improvements
Special Terms of Eligibility	None Listed	None Listed	None Listed
Application Deadline	TBA	Rolling (with discrete submission dates)	Rolling
Tips for Applying	Grant is nationally competitive. Contact grant representative to discuss and determine project compatibility.	None Listed	Need to have a contractor identified before applying
Contact Information	Amy Wilson W: (720) 692-7508 C: (720) 407-0623 <a href="mailto:amy.wilson@bia.gov">amy.wilson@bia.gov</a>	Office of Native American Programs - Alaska (907) 677-9800	Jessie Huff (907) 761-7768 <a href="mailto:jessie.huff@ak.usda.gov">jessie.huff@ak.usda.gov</a>



# LOANS

	USDA - RD	USDA-RD	AHFC
Disbursement Amount	Community Facilities Loans and Grants	Rural Energy for America Program Renewable Energy & Energy Efficiency	Energy Efficiency Revolving Loan Fund for Public Facilities
Eligible Uses of Funding	Project Dependent	<b>GRANTS</b> \$1,500 - \$500,000 <b>LOANS</b> \$5,000 - \$25million	Project Dependent
Special Terms of Eligibility	For communities of under 5,000 people, and Median Household Income (MHI) under 60% of the state non-metropolitan MHI, grants are limited to 75% of project costs.	Applicants must be a small business or agricultural producer in an eligible rural area. Energy Efficiency projects require an energy audit.	Applicants must obtain an Investment Grade Audit prior to applying.
Application Deadline	TBA	<b>Grants:</b> <input type="checkbox"/> Jan 31, 2019 <input type="checkbox"/> Apr. 1, 2019 <b>Loans:</b> Rolling	Rolling
Tips for Applying	<b>Priority given to:</b> <input type="checkbox"/> Population <input type="checkbox"/> Median Household Income <input type="checkbox"/> Total project costs <input type="checkbox"/> Financial need	Keep in mind that this grant may only constitute 25% of project costs. Loan guarantees up to 75% of project costs.	None Listed
Contact Information	Jessie Huff (907) 761-7768 <a href="mailto:jessie.huff@ak.usda.gov">jessie.huff@ak.usda.gov</a>	Jessie Huff (907) 761-7768 <a href="mailto:jessie.huff@ak.usda.gov">jessie.huff@ak.usda.gov</a>	Michael Spencer Energy Program Manager (907) 330-8197



# LOANS

	USDA	DOE	USDA - RD
<b>Disbursement</b> 	<b>Business Industry Loan Guarantee</b>  <b>Project Dependent</b>	<b>Tribal Energy Loan Guarantee Program</b>  <b>Project Dependent</b>	<b>Intermediary Relending Program</b>  <b>Up to \$2,000,000</b>
<b>Eligible Uses</b> 	<input type="checkbox"/> Community Facility Improvements <input type="checkbox"/> Economic Development	<input type="checkbox"/> Energy - Related Development Projects	<input type="checkbox"/> Community Facility Improvements <input type="checkbox"/> Community Services <input type="checkbox"/> Economic Development
<b>Special Terms of Eligibility</b> 	Applicants must have legal authority, sufficient experience, and financial strength required for operating loans.	Applicants must have legal authority to operate loan guarantees, and must demonstrate experience in originating and servicing loans of a similar size.	Applicants must have the legal authority to operate a Revolving Loan Fund.
<b>Application Deadline</b> 	<b>Rolling</b>	<b>Discrete Rolling Deadlines</b> Jan. 16, 2019 Mar. 13, 2019 July 7, 2019 Sept. 18, 2019 Nov. 1, 2019	<b>Rolling</b>
<b>Tips for Applying</b> 	Applicants are encouraged to discuss project options with local representative prior to applying.	<input type="checkbox"/> Preference is given to projects which catalyze the use of commercially available technologies. <input type="checkbox"/> Applicants should submit a letter of intent to TELGP@hq.doe.gov as soon as possible.	None Listed
<b>Contact Information</b> 	Jerry Ward State Director (907) 761-7705	Loan Origination Division US Department of Energy (202) 586-1262 TELGP@hq.doe.gov	Jerry Ward State Director (907) 761-7705



# ADDITIONAL RESOURCES

	AVEC	DOE - IEPP
<b>Disbursement Amount</b> 	Vocational, Technical, Academic Scholarship  <b>\$100 - \$5,000</b>	Technical Assistance  <b>N/A (FREE SERVICE)</b>
<b>Eligible Uses of Funding</b> 	<input type="checkbox"/> Workforce Training	<input type="checkbox"/> Energy Planning <input type="checkbox"/> Energy Efficiency <input type="checkbox"/> Project Development <input type="checkbox"/> Resilience <input type="checkbox"/> Village Power <input type="checkbox"/> Policy and Regulatory
<b>Special Terms of Eligibility</b> 	<b>Applicants must:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Live in a household of an active AVEC member</li> <li><input type="checkbox"/> Hold a high school diploma or GED</li> <li><input type="checkbox"/> Have a min. 2.0 GPA</li> <li><input type="checkbox"/> Be enrolled in post-secondary school</li> </ul>	Projects currently funded by DOE receive priority.
<b>Application Deadline</b> 	<b>Fall Semester Deadline:</b> Apr. 15  <b>Spring Semester Deadline:</b> Aug. 15	<b>Rolling</b>
<b>Tips for Applying</b> 	Have a vocational, technical, or academic program in mind prior to applying.	<b>Reviewers ask that applicants:</b> <ul style="list-style-type: none"> <li><input type="checkbox"/> Designate an easily-accessible Tribal contact</li> <li><input type="checkbox"/> Respond to requests for additional information in a timely manner</li> </ul>
<b>Contact Information</b> 	AVEC Member Services: (800) 478-1818	Office of Indian Energy US Department of Energy (240) 562-1352 <a href="mailto:indianenergy@hq.doe.gov">indianenergy@hq.doe.gov</a>



# OUTREACH

The tribal buildings of Atmautluak are a key part of the region. Collectively, they provide benefits to the community every day, including mail service, facilitation of public safety, housing, and serving as the host of community events. This project, with its objective of planning to improve the safety, comfort, and energy efficiency of these buildings, directly benefits both the Tribe and the occupants and visitors of the buildings. The outreach component of the project is meant to extend these benefits further into the community, by promoting the project to educate local citizens about energy efficiency planning. The hope is that not only will Atmautluak residents see improvements to their community buildings, but that they also learn about energy efficiency and conservation, and gain the knowledge on how to implement similar sustainable practices in their own homes.

In Atmautluak, tribal office staff frequently updated and worked with the Tribal Council on project activities throughout the course of the energy audit and planning process. After the energy auditor prepared a compilation of initial results for each building, project staff made a formal flyer for both the Tribal Council and interested tribal members. This flyer, along with other outreach materials mentioned in this section, can be found in Appendix C. Project staff also made flyers of energy conservation strategies, such as how to use setback thermostats, for the tribal building occupants.

Representatives from the Atmautluak Tribal Office attended two D.O.E. Office of Indian Energy Program Reviews during the project. In 2017, Conor Sosebee of CCHRC presented on behalf of previous Tribal Administrator David Nicholai on the objectives and future plans for the project. His presentation can be found at the link listed below. In 2018, Vanessa Stevens of CCHRC presented on behalf of Andrew Steven on the project procedure, conclusions, and lessons learned.

Finally, project staff created a final project flyer and video. The flyer can serve either as a poster or handout, and is meant to provide an overview of the project to Atmautluak residents. Similarly, the video reviews the project procedure, and shows viewers the community of Atmautluak.

## Links to online outreach materials

2017 Program Review presentation:

<https://www.energy.gov/indianenergy/2017-office-indian-energy-program-review-meeting-presentations>

2018 Program Review presentation:

<https://www.energy.gov/indianenergy/2018-office-indian-energy-program-review-meeting-presentations>

Project video:

<http://www.cchrc.org/doe-energy-efficiency-and-renewable-energy-projects>



Atmautluak is a boardwalk community, and residents often walk between the many community buildings and their homes.



# CONCLUSION

The objective of the Atmautluak Energy Efficiency Project was to reduce and stabilize energy costs in tribal buildings by setting energy efficiency improvement goals to provide direction for future retrofit projects. Goals that lead to a retrofit project that improves the safety, comfort, and energy efficiency of a future retrofit project have many advantages for the community. Better buildings have multiple benefits for the Tribe and the community at large, including warmer, more comfortable spaces for community needs and events. Increased efficiency will also decrease dependence on outside shipments of fuel oil while lowering energy costs so that the Tribe will be able to use extra money on other programs. Finally, showcasing sustainable practices, projects, and behaviors in community buildings will demonstrate them to citizens who wish to implement similar strategies in their own homes.

Through this project, the Atmautluak Traditional Council wrote goals for each of their buildings. Project staff, with the help of the Tribal office staff, established each building's baseline condition, including both its energy use and comfort level, along with making a data monitoring plan to continue tracking the buildings in the future. An energy auditor used the baseline data, information from building surveys, and AkWarm-C energy modeling software to produce a comprehensive energy audit for each building. These reports document information about the building, including the floor plan, mechanical systems, energy use, and electrical appliances. They then list recommendations for energy efficiency improvements, energy conservation measures, and safety concerns – all with the goal of addressing safety issues, reducing energy use, and improving occupant comfort. Project staff also created a maintenance plan for each building and listed potential funding and training opportunities for a retrofit project that would act on the energy audit recommendations. As the project came to a conclusion, project staff traveled to Atmautluak to review the energy audit recommendations, maintenance plans, and potential for future projects with the Tribe. The energy auditor and a report author met and reviewed project progress and results with the Tribal Council. They walked through each building, speaking with the Tribal Administrator and building occupants about each recommendation. In some buildings, the occupants were able to immediately implement some of the audit recommendations, such as programming setback thermostats and making a plan to replace light bulbs with more efficient LEDs. Project staff worked with members of the Tribal office and Traditional Council to promote the project to the community of Atmautluak. The outreach component of the project included flyers, updates to the community, and a video about the project activities.

This project identified the strengths and weaknesses of the six tribal buildings in the project and their management. Three of the buildings have safety issues that should be addressed immediately, including damaged building envelopes, and a lack of plumbing and ventilation. While several buildings are on a waste heat loop, the rental house is not and would benefit greatly from retrofits that would reduce the energy cost of providing space heating. And other buildings, such as the public safety building and ATC office, could realize savings of nearly \$1,000 per year in electric costs. The tribal office already has a dedicated and motivated tribal office staff. They have started to track energy and baseline conditions of the buildings. The staff frequently collaborates with the Council members to discuss the best next step for each building. Overall, they could save over \$4,000 per year in energy costs by implementing all the recommendations in the audits.

The tribal office staff identified a few lessons learned for Tribes that might embark on a similar project. First, tribes should know that energy planning projects are about awareness and options. This type of project made the Tribal Council and office staff aware of where their energy costs came from, and how they could be reduced. Also, there are many options for reducing energy costs, including retrofit projects, better maintenance practices, and energy conservation. Finally, any Tribe working on a federal project should remain flexible and enthusiastic. Such characteristics help see a project through to completion, in spite of hurdles including changes in staff or canceled travel plans.

As this project concludes in 2019, the Native Village of Atmautluak is looking toward next steps. The tribal office staff have already implemented some of the audit recommendations, including building monitoring, maintenance walk-throughs, and building occupant energy education. The Traditional Council and office staff are pursuing funding for a comprehensive retrofit project with the objective of taking the next steps toward fulfilling their goal for safe, comfortable, energy efficient tribal buildings.



# WORKS CITED

ISER/UAA. (2018). *Community data summary: Atmautluak*. (This database is supported under the US Department of Energy Office of Science EPSCoR Award # DE-SC000 4903.) Retrieved March 22, 2018 from Alaska Energy Data Gateway: <https://akenergygateway.alaska.edu>

United States Census Bureau. (2010) *American Fact Finder: Atmautluak CDP, Alaska*. Retrieved May 25, 2018 from United States Census Bureau: <https://www.census.gov>



## APPENDIX A: KICK OFF MEETING FLYER

The Atmautluak Tribal Council and project staff held a kick-off meeting for the project in February 2018. This flyer guided the meeting's agenda. Council members and project staff discussed the goals of the project, and outlined the rough procedure of project activities. They also addressed specific questions, found on the flyer's second page, to provide context for the project in general, and give specific direction to project activities.



The ATC members met in February 2018 to discuss energy projects for the community.



# Atmautluak Energy Efficiency Project

## Project goal

The goal of this project is to create an **Energy Action Plan** for Tribal buildings. The Energy Action Plan will give details on making buildings safer, more comfortable, and more energy efficient.

## Energy action plan

The energy action plan will contain many parts to help start off an energy retrofit project.

1. Information on each building, including a description of the building and its current use, and the Tribe's goals for the future of the building.
2. Baseline energy, occupancy, comfort, and maintenance data for each building.
3. A data monitoring plan for each building to track the progress of the retrofit.
4. Energy audit for each building, which includes information about the building from an on-site building assessment and recommendations for improvements.
5. Timeline for the implementation of the energy retrofit for the buildings.
6. Funding opportunities for the building retrofits.
- \*7. A maintenance plan for each building.
- \*8. Training opportunities for building owners and/or staff.
- \*9. Potential training for building occupants on energy efficient habits.
- \*10. Scope of work and contractor bids.

\*if applicable

## Project steps

The project will follow these steps to complete the Energy Action Plan.

1. CCHRC, Energy Audits of Alaska, and the Tribe meet to talk about the project, the Tribe's goals, and the buildings to be audited.
2. CCHRC and Energy Audits of Alaska will collect information and interview building staff to find the baseline data for each building.
3. CCHRC will work with building staff and the Tribe to write a data monitoring plan for each building to track building improvements.
4. Energy Audits of Alaska will complete an on-site assessment of each building.
5. CCHRC and Energy Audits of Alaska will prepare a draft Energy Action Plan.
6. CCHRC and Energy Audits of Alaska will present the draft Energy Action Plan to the Tribe and listen to feedback.
7. CCHRC and Energy Audits of Alaska will revise and finalize the plan.
8. CCHRC and Energy Audits of Alaska will provide the final plan to the Tribe.

Throughout the project, CCHRC can help with meeting the grant requirements, such as writing quarterly progress reports, preparing the final report, and creating outreach materials.



## Questions for the Native Village of Atmautluak

CCHRC and Energy Audits of Alaska are grateful for this opportunity to work together and want to listen to the Tribe's past experiences and goals for this project.

1. How did past energy efficiency projects in Atmautluak go, such as the Village Energy Efficiency Project audits? What did the community like (or dislike) about the projects?

2. Which buildings would the Native Village of Atmautluak like us to audit? The project can audit 4-8 buildings. The buildings listed in the grant proposal were:

Community hall  
Gaming department  
Public safety building  
Traditional Council shop

*Jim Fowler, the building auditor, will also audit the school while in Atmautluak. The Alaska Native Tribal Health Consortium is paying for that audit.*

3. What is the purpose of each building? Will this remain the same in the future?

4. Have any of the buildings been retrofitted in the past? Any planned retrofits for the future?

5. Do you have an idea of how much you think building retrofits should cost? What is a reasonable payback time for you?

6. Who staffs each building? Who maintains the buildings? When are the buildings used?

7. Who would you like to perform the retrofits? Are there local contractors or maintenance staff that can perform retrofits?

8. This project does not include financing for the retrofits. How would you prefer to finance them? How have projects been financed in the past? Do you want us to search for grant or loan programs? Do you have savings or maintenance funds that could be used?

9. How can we obtain the building energy use for 2016 and 2017? This includes the fuel oil use and electricity consumption for each building.

10. How would you like to monitor the building during and after this project? This is important to see results of the retrofits and report them. We can track energy bills, do occupant surveys, or install simple monitoring devices.

### Project contacts

CCHRC - Aaron Cooke (907-267-9197, aaron@cchrc.org)

Vanessa Stevens, Project manager (907-450-1762, vanessa@cchrc.org)

Michele Doyle-Brewer, Chief Operations Officer (907-450-1764, michele@cchrc.org)

Energy Audits of Alaska - Jim Fowler (907-269-4350, jim@jim-fowler.com)



# APPENDIX B: ADDITIONAL ENERGY AUDIT SUMMARIES

In addition to the tribal buildings that received energy audits through this project, there is another building in Atmautluak with an existing energy audit, shown in the table below.

Table 1: There is an existing energy audit for another building in Atmautluak that could potentially be addressed in a retrofit project.

Building	Audit date
Atmautluak School	February 2018

Should the Tribe and community wish to begin a retrofit project, it would be useful to consider this building as well. A comprehensive retrofit project that addresses the audit recommendations for all buildings with audits in Atmautluak would have several potential advantages – higher energy savings for the community, the possibility to leverage the cost of contractor travel, and the potential to collaborate on the match funding and proposal development for a grant opportunity.

The audits for this building are similar to other the audits other Atmautluak buildings. Similarities include benefiting from a lighting retrofit to replace the current bulbs with LEDs, and by installing programmable thermostats and implementing unoccupied temperature setbacks.

## Atmautluak School

12,760 square feet facility

Annual energy use per square foot: 101.2 kBtUs/SF

Predicted annual energy use per square foot if recommendations are implemented: 69.6 kBtUs/SF

### Building description

The 12,760 square foot Joann A. Alexie Memorial School was originally constructed in 1989 with the north addition constructed in 2006. The building is typically occupied by 107 students and 27 staff, from 7:30am till 4:30pm Monday through Friday. The gymnasium is used till 10:00pm for open gym several nights each week.

The walls are a combination of 2x8 studs with R-22 batt insulation and 2x12 studs with R-38 batt insulation. Exterior walls are finished with either T1-11 plywood or horizontal wood siding and interior walls are finished with gypsum. All windows utilize double glazing in vinyl frames and are in good condition. The school is heated by waste heat from the power plant, two Burnham Boiler V-36's, and two Weil McLain WGO-4's.

### Energy use

The total predicted energy cost for washeteria is \$4.31 per square foot based on fuel and electricity costs at the time of the site visit. Electricity and fuel oil consumption levels are about the same in terms of annual cost. Fuel oil covers space heating demands and domestic hot water while the largest components of electricity are lighting, plug loads and heat traces, and fans and motors for heat distribution.

### Recommendations

The energy audit includes a list of priorities that are cost-effective and have a fast payback period. The number 1 priority is lighting. Replacing the lighting in the specified locations with LEDs is an energy efficiency measure



with relatively low up-front costs. Completing this measure would cost \$8,571 and save \$1,680 annually.

The next priority is ventilation. Adding a 10 hour timer to the bathroom exhaust fan, installing occupancy sensors to the kindergarten and laundry exhaust fans, and retro-commission AHU-1 to assure input parameters are correct (unit sometimes runs at 100% when it is not needed). Completing these actions should cost \$2,625 and take just 1 year to recover the cost.

Another measure is to implement an unoccupied temperature setback of 60 deg F for the server/mechanical space, 64 deg F for the corridor, classrooms, kitchen, bathrooms, laundry, and offices, and 65 deg F for the gymnasium. It would cost roughly \$10,000 to complete this action and would save \$3,844 annually.

### **Energy efficiency measures that are NOT recommended**

A number of measures were identified in the audit that were not determined to be cost-effective by the energy model. While they may improve the building, these measures are not recommended because they may save only a small amount of energy or be too expensive to install. For example, installing LED lights in the entire building would make the school more energy efficient but would not yield enough energy savings to justify the upfront cost.

### **Post-retrofit expectations**

The existing school spends approximately \$55,000 on energy each year. With the proposed retrofits energy costs would drop to roughly \$40,500. The proposed retrofit would cost an estimated \$122,896 for a payback period of 7.8 years. With all of these energy efficiency measures in place, the annual utility cost can be reduced by \$14,500 per year, or 26.5% of the buildings' current energy costs.



The school is a central building in Atmautluak. Not only does it host classes for all levels of students, it also serves as lodging for out-of-town visitors, and a gathering place for basketball games and sports tournaments.



Table 2: If the school implements all the cost-effective recommendations, the energy costs would decrease by \$14,500 per year.

Improvement description	Predicted annual energy savings	Estimated installation cost	Simple payback (years)
Replace Classroom 6,7,8 T8-3 with 6 LED 8W Module StdElectronic	\$605	\$30	0
Replace Bathroom 1 T8-2 with LED 15W Module StdElectronic	\$8	\$5	0.7
1.) Add timer to EF-1 (bathroom exhaust) to only run 10 hrs/day, estimated parts cost \$250 + 3 hrs labor @ \$125/hr = \$625. 2.) Install switch mounted occupancy sensors for kindergarten and laundry exhaust fans (TEF-1 & 2) @ installed cost of \$250 ea., reduce run time by 50%. 3.) Retro-commission AHU-1 to assure that VFD input parameters are correct (unit was running at 100% during survey and should not have been) to allow variable speed as designed. Est. cost 8 hrs labor @ \$125/hr + \$500 parts. Should result in minimum 50% reduction in wattage and cfm.	\$2,698	\$2,625	1.0
Implement a Heating Temperature Unoccupied Setback to 60.0 deg F for the Server/Mechanical space.	\$356	\$500	1.4
Replace Corr 4 CFL 32w with 2 LED 8W Module StdElectronic	\$19	\$16	0.8
Implement a Heating Temperature Unoccupied Setback to 64.0 deg F for the Corridor space.	\$287	\$500	1.7
Implement a Heating Temperature Unoccupied Setback to 64.0 deg F for the Classrooms /Kitchen space.	\$2,121	\$4,000	1.9
Implement a Heating Temperature Unoccupied Setback to 64.0 deg F for the School Bathrooms/Laundry space.	\$193	\$500	2.6
Replace Kitchen CFL 22w with 2LED 8W Module StdElectronic	\$4	\$10	2.2
Replace Vestibule T8-2 with LED (2) 15W Module StdElectronic	\$59 + \$5 maintenance savings	\$134	2.1



Implement a Heating Temperature Unoccupied Setback to 64.0 deg F for the School Offices space.	\$128	\$500	3.9
Implement a Heating Temperature Unoccupied Setback to 65.0 deg F for the Gym space.	\$759	\$4,000	5.3
Replace Outdoor T8-2 with 2 LED (2) 15W Module StdElectronic	\$29 + \$10 maintenance savings	\$134	3.5
Replace Kitchen Storage T8-2 with 2 LED (2) 15W Module StdElectronic	\$21 + \$10 maintenance savings	\$268	8.7
Replace Corr 1,2 T8-6 with 2 LED (6) 15W Module (2) StdElectronic	\$105 + \$10 maintenance savings	\$615	5.4
Replace Corr 1,2 T8-2 with 7 LED (2) 15W Module StdElectronic	\$126 + \$35 maintenance savings	\$936	5.8
1.) replace two original equipment boilers in boiler room with new 87% efficient units @ estimated cost of \$100,000 installed; estimated maintenance savings \$1500/yr. 2.) replace DHW recirculation pump with unit with integral timer, program to run only 8 hrs/day; estimate cost \$500 installed 3.) Add insulation blanket (R-9) to HWH @ installed cost of \$200.	\$5,733 + \$1,500 maintenance savings	\$100,500	13.9
Replace Classroom 4,3,1 T8-4 with 27 LED (4) 15W Module (2) StdElectronic	\$567 + \$135 maintenance savings	\$4,691	6.7
Replace Office 2 T8-2 with 2 LED (2) 15W Module StdElectronic	\$26 + \$10 maintenance savings	\$268	7.5
Replace Special Ed. T8-3 with 3 LED (3) 15W Module StdElectronic	\$45 + \$15 maintenance savings	\$461	7.6
Replace Kitchen T8-4 with 5 LED (4) 15W Module (2) StdElectronic	\$55 + \$25 maintenance savings	\$869	10.8



Replace Frigidare upright freezer with New Energy Star chest freezer at end of life of existing freezer (18 yrs old); incremental cost \$100, total cost \$1200	\$112	\$1,200	10.7
Replace Bathroom 2 T8-2 with LED (2) 15W Module StdElectronic	\$11 + \$5 maintenance savings	\$134	8.2
<b>TOTAL, cost-effective measures</b>	\$14,069 + \$1,760 maintenance savings	\$122,896	7.8

## APPENDIX C: OUTREACH MATERIALS

While the main goal of the Atmautluak Energy Efficiency Project was to create an Energy Action Plan to improve the safety, comfort, and energy efficiency of tribal buildings in the community, the project also included an outreach component. The purpose of general outreach about the project to the community was twofold: first to publicize the project and Tribe's goals and second to showcase sustainable practices so that Atmautluak residents could replicate them in their own homes.

Outreach materials created through this project appear in this appendix in the following order:

- 1) Tribal Council update flyer
- 2) Setback thermostat instruction poster
- 3) Final project flyer



May 2018



Cold Climate Housing Research Center  
CCHRC

## Atmautluak Energy Efficiency Project

### PROJECT GOAL

The goal of this project is to create an Energy Action Plan for tribal buildings, which will give details on making buildings safer, more comfortable, and more energy efficient.

### PROJECT STEPS

The project is following these steps to complete the Energy Action Plan. Below, the finished steps appear in italics.

1. CCHRC, Energy Audits of Alaska, and the Tribe met to talk about the project, the Tribe's goals, and the buildings to be audited.
2. CCHRC and Energy Audits of Alaska collected information and interviewed building staff to find the baseline data for each building.
3. CCHRC, building staff, and the Tribe created a data monitoring plan for each building to track building improvements.
4. Energy Audits of Alaska completed an on-site assessment of each building.
5. CCHRC and Energy Audits of Alaska will prepare a draft Energy Action Plan.
6. CCHRC and Energy Audits of Alaska will present the draft Energy Action Plan to the Tribe and listen to feedback.
7. CCHRC and Energy Audits of Alaska will revise and finalize the plan.
8. CCHRC and Energy Audits of Alaska will provide the final plan to the Tribe.

### MAY 2018 UPDATE

This project is approximately halfway complete. After the visit to Atmautluak in February 2018, CCHRC and Energy Audits of Alaska have been working on a draft of the Energy Action Plan. We anticipate completing a draft of this Plan near the end of summer and are hoping to visit to present it to the Council in late summer or early fall.

- Conor Sosebee of CCHRC on behalf of David Nicholai gave a presentation about the project to the Department of Energy at a conference in Denver, Colorado in November 2017.
- Aaron Cooke of CCHRC, Andrew Stevens, and Christopher Nicholai collected baseline energy data on the buildings in the project and wrote plans to continue to track the data.
- We submitted two quarterly reports to the Department of Energy on the project progress, one for October - December 2017 and one for January - March 2018. Both of these reports are in this packet.
- Energy Audits of Alaska completed an initial assessment of the tribal buildings in the project. This is summarized on the back page of this flyer and there is a copy of the full version in this packet.
- We are communicating with the Energy Program Coordinator at Nuvista Electric Light & Power / CEMAI, Bertha Prince, so that we can coordinate with other energy projects in the region.



## Preliminary Findings from Tribal Building Surveys

Jim Fowler (energy auditor from Energy Audits of Alaska) completed a short report on preliminary findings after conducting building surveys in January 2018. These findings focus on ways to reduce energy costs in tribal buildings. The report is included in this packet, and a summary of the findings is below.

There are 6 tribal buildings that are participating in the project:

Community hall (ATC building)	Gaming department
Public safety building	Traditional Council shop
Washeteria	Tribal rental

There are several primary community needs:

1. There is a need for an individual to perform energy efficiency checks each month, completing tasks such as checking programmable thermostats, monitoring fuel consumption, and addressing occupant comfort complaints.
2. Air seal the walls, ceiling and floor of the ATC building, gaming department, and shop. Also, repair the siding and re-paint each of these buildings.
3. Renovate the walls of the public safety building and rental house by re-siding, re-insulating, and air-sealing them.
4. Replace the roof and foundation underneath the rental house.
5. Install programmable thermostats to set back temperatures when the buildings are not occupied.
6. Repair and maintain the hydronic clothes dryers in the Washeteria and stop using the electric dryers.
7. Replace all lighting with LEDs.
8. Provide additional training for washeteria personnel such as preventative maintenance and washer and dryer maintenance.

Mr. Fowler will also enter individual energy efficiency retrofits for each building into an energy modeling software, AkWarm, to determine if the retrofits will be cost effective. Examples of potential retrofits including the following:

1. Replacing windows and doors.
2. Adding insulation to attics and walls.
3. Air-sealing the floors, walls, and ceilings.
4. Turning off or replacing electrical appliances.

## PROJECT CONTACTS

CCHRC - Aaron Cooke (907-457-3454, aaron@cchrc.org)

Vanessa Stevens, Project manager (907-450-1762, vanessa@cchrc.org)

Michele Doyle-Brewer, Chief Operations Officer (907-450-1764, michele@cchrc.org)

Energy Audits of Alaska - Jim Fowler (907-269-4350, jim@jim-fowler.com)



# TOYO SET BACK INSTRUCTIONS



IF CLOCK IS FLASHING,  
TOYO NEEDS TO BE  
RESET

**Auto Mode 5**

Push AUTO button to activate  
Set Back mode

**4 Set Back**

Adjust temperature to 63  
(this is the temp when no  
one is in the building)

**1 Reset Clock**

Turn switch to Clock Set.  
Use Hour & Minute  
buttons to adjust time

**Start Set 2**

Use Hour & Minute buttons  
to set the time you **leave** building

**Stop Set 3**

Use Hour & Minute buttons  
to set the time you **arrive** at building

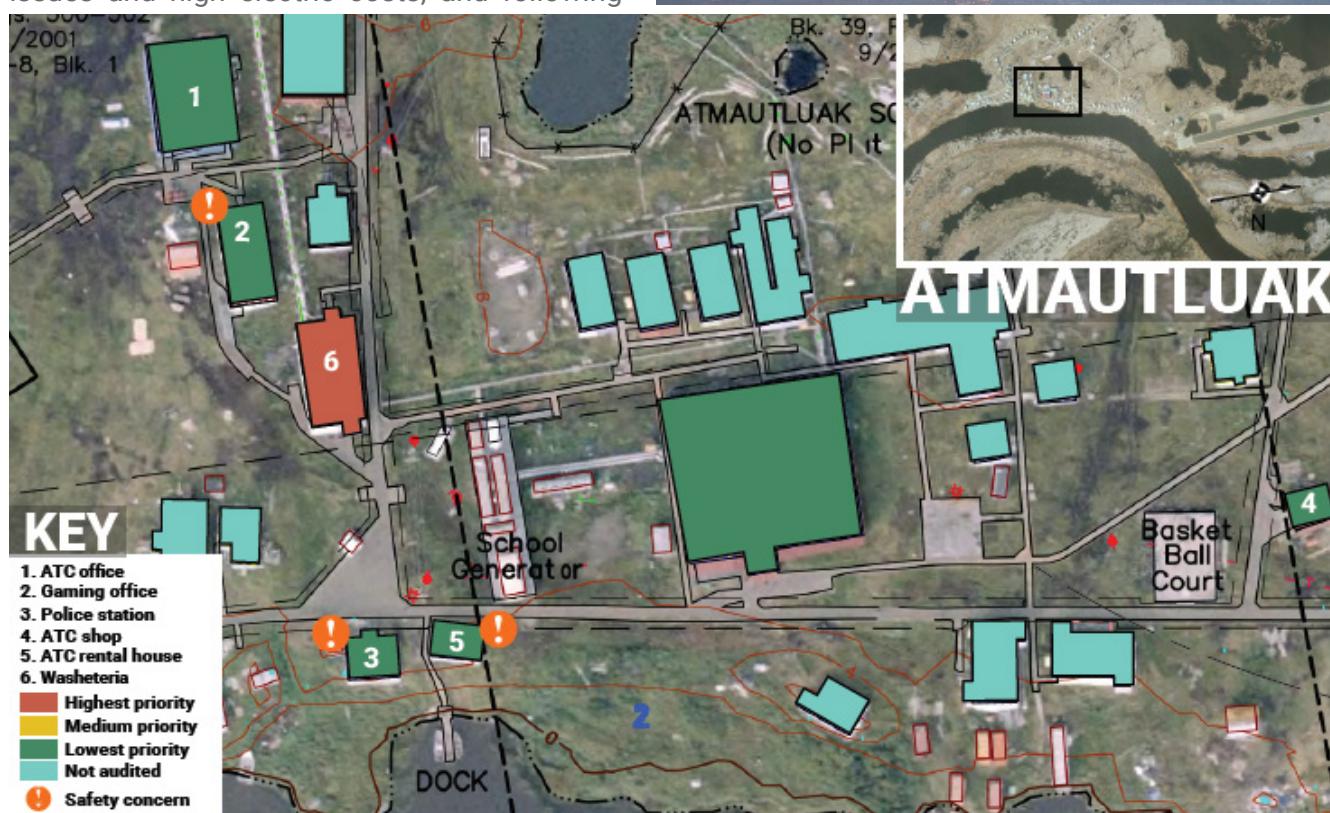


# Atmautluak Energy Efficiency Project

In 2017, the Atmautluak Native Community partnered with the Cold Climate Housing Research Center and Energy Audits of Alaska to make a plan to improve tribal buildings in the village. Funded by the U.S. Department of Energy Office of Indian Energy, the 2-year project resulted in an Energy Action Plan for tribal buildings. The plan contains baseline data on the condition and energy use of six tribal buildings. From this information, a set of recommendations were formulated to improve each building's energy efficiency and safety. A maintenance plan and funding opportunities were also included in the final Energy Action Plan.

Many of the buildings in the project have safety issues and high electric costs, and following

all the recommendations in the Energy Action Plan can result in over \$4,000 in savings annually. The tribal administrator and building occupants have already begun to act on these recommendations, and the dedicated tribal staff and Tribal Council are now looking towards the next steps to realizing safe, comfortable, and energy efficient tribal buildings.



COLD CLIMATE HOUSING RESEARCH CENTER

**CCHRC**
**U.S. DEPARTMENT OF  
ENERGY**
**Office of  
Indian Energy**



## SCOPES OF WORK

For energy efficiency upgrades recommended for  
The Native Village of Atmautluak

Prepared For  
**Atmautluak Tribal Council**  
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**Energy Audits of Alaska**



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## ENERGY AUDITS OF ALASKA

## ATMAUTLUAK

The table below summarizes the Energy Efficiency Measures (EEMs) recommended for the buildings in Aniak. The scope of work for each EEM is described in paragraphs 1 through 3 below the summary table. Contractor is required to field verify all quantities.

An energy audit report is available for each building. The audit report contains each individual EEM with additional detail as well as lighting and HVAC schematics.

Table – Summary of all EEMs

Building	HVAC & DHW			Lighting			Envelope			
	Other	Controls	Hot water heating	Interior	Exterior	Controls	Air Sealing	Doors	Insulation & other	Windows
ATC Office & Community Center		Program 1 Toyo Stove setback thermostats		replace 2 Incandescent or CFL A-type bulbs with LED	replace 4 Incandescent or CFL A-type bulbs with LED		Seal all floor, wall and ceiling penetrations			Replace 6 existing windows with U-0.22 units
		Install timer on de-stratification fan		retrofit 22 T8 fixtures & 82 lamps with LED						
		Install (1) 7-day programmable thermostats								
ATC Rental House	Add ERV	Program Toyo Stove setback thermostat		replace 4 Incandescent or CFL A-type bulbs with LED			Seal all floor, wall and ceiling penetrations	Replace with new pre-hung unit	Add R-42 attic insulation	Replace 1 existing window with U-0.22 units
	Replace existing refrigerator with new Energy Star			retrofit 1 T8 fixtures & 2 lamps with LED						
ATC Shop				replace 6 Incandescent or CFL A-type bulbs with LED	replace 1 Incandescent or CFL A-type bulbs with LED		Install new insulated overhead door			
				replace 2 HID wall packs with LED			Install new pre-hung insulated man-door			
Gaming Building & Post Office		Install (2) 7-day programmable thermostats		replace 19 Incandescent or CFL A-type bulbs with LED	replace 3 Incandescent or CFL A-type bulbs with LED		Seal all floor, wall and ceiling penetrations	Add R-42 attic insulation	Replace 7 existing windows with U-0.22 units	
				retrofit 1 T8 fixtures & 8 lamps with LED						
Police Station		Program 1 Toyo Stove setback thermostat		replace 6 Incandescent or CFL A-type bulbs with LED	replace 1 Incandescent or CFL A-type bulbs with LED		Seal all floor, wall and ceiling penetrations		Blow in R-33 attic insulation	

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## 1. HVAC & DHW

### a. CONTROLS

#### i. Programmable Setback thermostat

- Contractor shall identify the zone valve, wall convector, electric baseboard or heating coil valve controlled by existing thermostat.
- Field verify control voltage.
- Field verify proper operation of controlled component (zone valve, control valve, damper actuator, baseboard convector, etc.)
- If new thermostat requires 3 or more signal wires, field verify that sufficient conductors exist and there are no shorts or breaks in conductors.
- If insufficient conductors exist, run new signal wire, verify no shorts or break or install transformer of correct voltage and amperage nearby new thermostat.
- New thermostat to have the following minimum requirements:
  1. 7-day programmable.
  2. Simple up and down arrow temperature over-ride.
  3. Revert back to program at next event (wake, leave, return or sleep).
  4. Does not allow (or installer can disable) permanent hold over-ride of program.
  5. Non-volatile memory to preserve program in event of power outage.
- Install thermostat and program to match occupant daily use.
- Install thermostat per manufacturer's recommendation.
- Confirm that thermostat properly operates controlled component.
- If thermostat is Wi-Fi compatible, and occupants select this option:
  1. Program thermostat to communicate with local Wi-Fi.
  2. Help at least 2 occupants download and create log in credentials to appropriate App on their communication devices.
  3. Sync thermostats to App.
  4. Confirm control from communication device is operable.
  5. Confirm monitoring is active.
- Provide minimum of 15 minutes of training to at least 2 occupants on premises.

#### ii. Program Toyo Stoves

- Contractor to program Toyo stove clock and set back feature and adhere to stove or on nearby wall, programming instructions provided by CCHRC.
- Provide minimum of 15 minutes of training to at least 2 occupants on premises.

**b. OTHER****i. Install ERV in ATC Rental House**

Contractor shall install new Energy Recovery Ventilator (ERV) similar to Panasonic FV series, or equivalent, with the following minimum capacities and features:

- Minimum 10 cfm air flow and 17w power consumption.
- Maximum 40 cfm air flow and 23w power consumption.
- Programmable for intermittent or continual operation.

Install per manufacturer's recommendations.

Contractor shall re-finish wall and ceiling surfaces to original condition.

Provide and connect electric supply.

Provide and connect ductwork.

Program delay timers and sensor levels per owner instructions.

Confirm proper operation of unit.

**ii. Install de-stratification timer in ATC Office & Community Center**

Safely disconnect electric power to de-stratification fan and turn off at breaker.

Demo existing switch.

Install programmable timer in existing switch junction box.

Program for 10 hr per day operation, weekdays, per owner preference.

Reconnect electric power.

Confirm proper operation.

**2. LIGHTING****a. INTERIOR****i. Linear Florescent Fixtures**

Contractor to field verify quantities.

Contractor to replace 24" and 48" linear fluorescent T8 and T12 tubes with direct wire, line voltage LED tubes. The 48" tubes shall consume a maximum of 15w and output a minimum of 1800 lumens. Building owner to select color temperature; in absence of owner's selection, a color temperature of 4000K will be used. 48" LED tubes must manufactured by one of the following brand name manufacturers and have a minimum rated life of 50,000 hours and 5 year warrantee:

Philips  
Lithonia  
GE Lighting  
Topaz



LED tubes shall be retrofitted as follows:

- Turn electric power off at breaker.
- Open fixture, remove ballast cover.
- Sever wires exiting ballast, abandon ballast in place.
- Remove old end caps and discard.
- Re-wire line voltage to new end caps per LED tube wiring instructions (may require shunted end cap).
- Install new end caps.
- Install ballast cover, adhere warning label to ballast cover indicating wiring pattern and that new lamp is an LED.
- Install new LED.
- Measure amperage, confirm it is correct for the LED lamp.
- Clean inside of fixture and lens, reinstall lens.
- Test fixture for proper operation.

**ii. A-type bulb replacements**

- Remove existing fixture cover and existing screw-in bulb.
- If existing fixture has dimming capability, new bulb shall be dimmable.
- LED shall have a color temperature between 2700K and 3500K based on owner preference and a minimum of 800 lumens (60w incandescent equivalent).
- LED shall have a rated life of 20,000 hours minimum.
- Replace with new LED, clean fixture cover, and replace cover.

**iii. BR reflector bulb replacements**

- Remove existing fixture cover and existing screw-in bulb.
- If existing fixture has dimming capability, new bulb shall be dimmable.
- LED shall have a color temperature between 2700K and 3500K based on owner preference and a minimum of 700 lumens (65 w incandescent BR30 equivalent).
- LED shall have a rated life of 20,000 hours minimum.
- Replace with new LED, clean fixture cover, replace cover.

**b. EXTERIOR**

**i. 50w to 100w Wall Packs**

Contractor to replace small HID wall packs up to 100w with new LED wall packs with the following requirements:

- Maximum 20w LED wall pack with minimum 1500 lumen output to replace 50w HID wall packs.
- Maximum 30w LED wall pack with minimum 2200 lumen output to replace up to 70w-100w HID wall packs.
- LED wall packs to have integral photocell sensor.
- LED wall packs to have a minimum rated life of 50,000 hours and a 5 year warranty.



- Color temperature shall be between 4000K-5000K.

Contractor to install as follows:

- Turn off electric power at breaker.
- Remove fixture from building, disconnect and temporarily cap off electric wires.
- Reconnect electric supply to new fixture; mount in same location as old fixture.
- Test for proper operation, including photocell sensor.

#### **ii. Wall Packs larger than 100w**

Contractor to retrofit large HID wall packs, greater than 100w by re-wiring the fixture and using a "corn cob" bulb with the following requirements:

- Maximum 50w LED bulb with minimum 5000 lumen output to replace 175w to 200w HID wall packs.
- Maximum 60w LED wall pack with minimum 8000 lumen output to replace 250w to 400w HID wall packs.
- LED wall packs to have a minimum rated life of 50,000 hours and a 5 year warranty.
- Color temperature shall be between 4000K-5000K.

Contractor to install as follows:

- Turn off electric power at breaker.
- Open fixture, disconnect and temporarily cap off electric wires.
- Bypass existing ballast per lamp manufacturer's recommendations, abandon ballast in place if possible, and otherwise dispose of properly.
- Replace socket as necessary.
- Connect electric supply to new socket.
- Clean fixture and lens.
- Close fixture, turn electric service on, test for proper operation.

### **3. ENVELOPE UPGRADES**

#### **a. AIR SEALING**

Contractor shall seal all wall, floor and ceiling penetrations in the following buildings:

**ATC Office & Community Center**

**ATC Rental House**

**Gaming Building/Post Office**

**Police Station**

A blower door test shall be conducted on the building before starting any work and the results recorded.



Contractor shall perform air sealing on the buildings listed above as follows:

- Seal all floor, wall and ceiling penetrations.
- Assure that bathroom, laundry, kitchen and all other exhaust fan and dryer outlets have a damper that closes when no air is being exhausted.
- Caulk around all doors and windows.
- Repair any windows, door seals and sweeps.
- Replace weather stripping as needed.

A second blower door test shall be performed after the air sealing is complete; a minimum 50% reduction is acceptable.

#### **b. INSULATION AND OTHER ENVELOPE RETROFITS**

##### **Attic Insulation to be added**

**ATC Rental House:** add R-42 minimum

**Gaming Building/Post Office:** add R-42 minimum

**Police Station:** add R-33 minimum

All storage items to be removed from attic.

If existing insulation is water damaged or otherwise compromised it is to be removed.

Seal all ceiling penetrations.

Confirm attic is vented properly, add or repair venting as needed.

Install baffles as required.

If there is water encroachment due to roof leakage, leaks are to be repaired by others, prior to implementing this retrofit.

If there is a vapor barrier, confirm there are no penetrations and repair as needed to maintain barrier integrity.

Install minimum insulation as listed above per manufacturer's recommendation.

Insulate attic access hatch with minimum R-42.

#### **c. WINDOW REPLACEMENTS**

The following windows shall be replaced:

##### **ATC Office & Community Center**

- 6 windows, size 2'10" x 3'10", casement

##### **ATC Rental House**

- 1 window, size 1'9" x 2'9", casement

##### **Gaming Office/Post Office**

- 7 windows, size 2'0" x 3'0", casement

Contractor shall replace existing window with double glazed, vinyl frame unit with a maximum U=0.28, with the same operating type and opening size as existing.

- Demo existing windows and properly dispose.
- Remove any remaining sheathing, shimming, etc.



- Install new windows, assure square, plumb and freely operates.
- Re-install fascia, trim, exterior siding and repaint to match existing.
- Repair any damaged interior walls and finish and paint to match existing.
- Final caulk and seal.

**d. DOOR REPLACEMENTS**

This scope covers replacement of entry and garage doors.

**ATC Rental House**

- Existing main entry door, estimated size 2'6" x 6'7", metal exit

Contractor shall replace existing entry door with new pre-hung, insulated, metal unit with a maximum U=0.30, with the same operating type and opening size as existing.

Demo existing door and properly dispose.

Install new door, assure square, plumb and freely operates.

Install fascia, trim, exterior sising and repaint to match existing.

Repair any damaged interior walls and finish and paint to match existing.

Final caulk and seal.

**ATC Shop**

- Existing main entry door, estimated size 3'0" x 6'7", metal exit
- Existing garage door, estimated existing size 9'6" x 8'9"
- New garage door size, 8'0" x 8'0"

Entry door:

Contractor shall replace existing entry door with new pre-hung, insulated, metal unit with a maximum U=0.30, with the same operating type and opening size as existing.

Garage door:

Contractor to provided new door, door shall be overhead sectional, insulated, with maximum U=0.28 and nominal size 8'0" x 8'0".

Demo existing doors and properly dispose.

Re-frame opening to fit new door size.

Install new door, assure square, plumb and freely operates.

Install fascia, trim, exterior sising and repaint to match existing.

Repair any damaged interior walls and finish and paint to match existing.

Final caulk and seal.