



# Comprehensive Energy Audit For Venetie Village Council Office



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Prepared For  
**The Venetie Village Council**

**May 30, 2018**

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## **PREFACE**

The purpose of this report is to provide guidance in reducing facility operating costs and enhance the sustainability of this community. The report assesses the current energy usage of the facility, provide options for reducing the amount of energy used, and evaluate the cost versus benefit of each option.

Discussions of site specific concerns, financing options, general facility information, and an energy efficiency action plan are also included in this report.

## **ACKNOWLEDGMENTS**

The Alaska Native Tribal Health Consortium (ANTHC) Rural Energy Initiative gratefully acknowledges the assistance of Patrick (PJ) Hanson, First Chief, the members of the Venetie Village Council, and Donna Erick, the former Council administrator.

## **LIMITATIONS OF THIS STUDY**

The building modeling software AkWarm© was used to create a virtual representation of the Venetie Village Council Office. The model is then used to test the cost effectiveness of different energy efficiency measures (EEMs) like LED lighting and pump improvements. The AkWarm© software calculates the annual cost savings and payback period for the investment, and then ranks all EEMs based on their payback period.

There are limitations using this software, which may affect the accuracy of the EEMs cost savings. This report should serve as a guide when deciding which EEMS to pursue further. All EEMs and installation costs should be verified with a certified professional in that field before construction begins.

# OVERVIEW

This report was prepared for the Venetie Village Council. The scope of the audit focused on the Venetie Village Council Office and includes an analysis of building occupancy schedules, building shell, heating systems, lighting, and other electrical loads. The Venetie Village Council Office was constructed in the 1970s and was recently outfitted with LED overhead lighting. The office building is approximately 800 square feet, and has a central meeting area and office spaces. Data was gathered on a site survey and interviews with members of the Venetie Village Council.

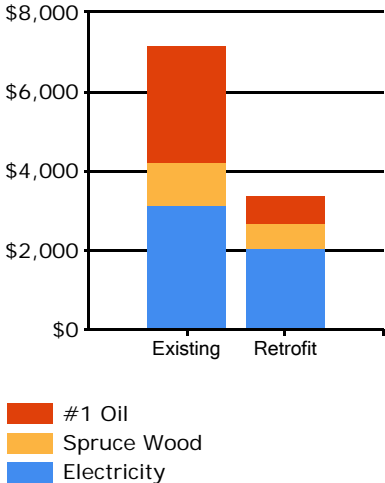
# ENERGY BASELINE

Based on unsubsidized electricity and fuel oil prices in effect at the time of the audit, the total predicted energy costs are about \$7,192 per year. This includes \$3,109 for unsubsidized electricity, a calculated cost of \$3,004 for #1 fuel oil, and an estimated cost of \$1,079 for cord wood.

The State of Alaska Power Cost Equalization (PCE) program provides a subsidy to rural communities across the state to lower electricity costs and make energy affordable in rural Alaska. The Venetie Village Council Office receives a PCE subsidy, reducing the cost of electricity from \$0.90 per kWh to about \$0.52 per kWh.

Table 1 lists the predicted annual energy usage before and after the proposed retrofits for the Venetie Village Council Office.

**Annual Energy Costs by Fuel Type**



**Table 1: Predicted Annual Energy Use for the Venetie Village Council Office**

Predicted Annual Energy Use			
Fuel Use	Existing Building	With Proposed Retrofits	Total Energy Savings
Electricity	3,454 kWh	2,243 kWh	1,211 kWh
Spruce Wood	7.19 cords	4.36 cords	2.83 cords
#1 Oil	334 gallons	67 gallons	267 gallons

# PROPOSED ENERGY EFFICIENCY MEASURES (EEM)

Table 2 below summarizes the energy efficiency measures analyzed for the Venetie Village Council Office. Listed are the estimates of the annual savings, installed costs, and two different financial measures of investment return: the Savings Investment Ratio (SIR) and the retrofits' Simple Payback. Green highlighted cells are high priority measures, yellow are medium priority, and orange highlighted cells are the lowest priority recommendations.

**Table 2: Priority List – Energy Efficiency Measures**

Rank	Feature	Recommendation	Annual Energy Savings	Installed Cost	Savings to Investment Ratio, SIR <sup>1</sup>	Simple Payback (Years) <sup>2</sup>
1	Toyotomi Stove	Program the Toyotomi Laser stove to reduce the set temperature to 60°F when the office is unoccupied.	\$738	\$25	381.48	0
2	Wood Stove	Consider replacing the current woodstove with a more efficient model. The total includes estimated costs for the stove, freight, miscellaneous materials, and installation.	\$2,282	\$2,500	15.04	1.1
3	Coffee Maker	Turn off and unplug the coffee maker after each brew. Keep brewed coffee in an insulated carafe.	\$12	\$30	2.49	2.5
4	Council Office Floor	Remove the existing floorboards and insulation. Replace insulation with R-30 fiberglass batts. Cost estimate includes construction materials, shipping, and installation costs, but does not include new interior flooring.	\$244	\$5,165	1.02	21.1
5	Council Office Walls	Furr out the building interior wall. Fill the framing cavity with R-13 fiberglass batts. Cost estimate includes construction materials, shipping, and installation costs.	\$340	\$11,138	0.66	32.8
6	Air Sealing	Replace the entrance door handle. Fill any gaps in the wood wall chinking, and around windows and doors. Install weather-stripping around door and window frames as needed. Energy savings reflect a 5% reduction in draft.	\$21	\$600	0.31	29

Rank	Feature	Recommendation	Annual Energy Savings	Installed Cost	Savings to Investment Ratio, SIR <sup>1</sup>	Simple Payback (Years) <sup>2</sup>
7	Council Office Roof	Remove existing roofing and insulation. Respray the wooden beams with spray foam insulation. Install a metal roof with R-30 fiberglass batts. Cost estimate includes construction materials, shipping, and installation costs.	\$225	\$16,966	0.29	75.4
8	Window: Council Office Meeting Space	Replace the existing window with a triple pane, low-E, argon-filled window.	\$15	\$2,822	0.09	183.2
9	Window: Workforce Office (building front)	Replace the existing window with a triple pane, low-E, argon-filled window.	\$17	\$3,303	0.08	190.6
10	Window: Workforce Office (building side)	Replace the existing window with a triple pane, low-E, argon-filled window.	\$15	\$3,303	0.07	215.2
11	Council Office Front Door	Construct an unheated arctic entry to the Council Office. Installation cost is an estimated.	\$4	\$1,492	0.04	357.6
<b>TOTAL for all measures</b>			<b>\$3,915</b>	<b>\$47,344</b>	<b>1.39</b>	<b>12.1</b>
<b>TOTAL for high and medium priority measures</b>			<b>\$3,277</b>	<b>\$7,720</b>	<b>6.80</b>	<b>2.4</b>

**Table Notes:**

<sup>1</sup>Savings to Investment Ratio (SIR) is the total savings over the life of a project (for example: changing a light bulb) divided by its investment costs (materials, labor, shipping, etc.). The SIR shows how profitable a project will be; the higher the SIR, the more profitable the project. An SIR greater than 1.0 indicates a cost-effective project (i.e. more savings than cost). Note: the project's SIR is related to the rest of the Energy Efficiency Measures (EEM) above and the calculation assumes that projects are completed in the same order as in the table.

<sup>2</sup> Simple Payback (SP) is the estimated length of time needed to recoup the initial investment cost of the project. Note: this does not account for accrued interest from loans or any future changes in energy prices.

The wood stove upgrade recommended above is one solution to balance residents' needs, fuel efficiency, and improved air quality. There are numerous models available that will serve this purpose, and still meet or exceed the building's current heating requirements.

*Note: Wood stoves may contribute to poor indoor air quality. Long-term exposure to poor indoor air quality may increase the risk of developing respiratory conditions, particularly in young children and elders. Steps should be taken to properly monitor and ventilate buildings with woodstoves, regardless of any potential improvements to the building shell. Burning dry, cured wood whenever possible will reduce particulate emissions at its source.*

### **Additional Recommendations (not included in Table 2)**

Window film: Applying shrink wrap film may reduce air/heat loss through the windows.

Thermal curtains: Installing thermally insulating or heavy curtains may reduce air/heat loss through the windows.

## **FACILITY DESCRIPTION**

### **Building Occupancy Schedules**

The building is used meetings and office space Monday through Friday 10:00 AM to 5:00 PM. There are about five to ten people in the building during operating hours.

### **Building Shell**

The exterior walls are log construction. Each log is approximately eight inches in diameter.

The roof of the building is log construction on the interior. The cathedral ceiling has about two inches of spray foam insulation and 5.5 inches of R-21 fiberglass batt on top of the logs. An exterior roof covers the insulation materials. The cathedral roof cavity is not sealed, so the fiberglass insulation is likely to be damaged from exposure to moisture.

The floor of the building is constructed on short pilings. There is approximately 5.5 inches of R-21 fiberglass batt between the exterior and interior subfloors. The subfloor cavity is not well sealed, so the fiberglass insulation is also likely to be damaged.

Typical windows throughout the building are double paned with wood framing. The windows are most likely filled with air.

The Venetie Village Council Office building has one entrance door. The door is fiberglass with a polyurethane core. It does not have a window. The door handle is missing.



**Typical roofing structure in Venetie.**

## Heating Systems

The heating systems used in the building are:

### **Wood Stove**

Nameplate Information:	Barrel stove (55-gallon drum)
Fuel Type:	Cord wood (spruce)
Input Rating:	32,292 BTU/hr. (approximate)
Steady State Efficiency:	40 - 60 % (depending on the cord wood moisture)
Idle Loss:	10 %
Heat Distribution Type:	Air

### **Toyotomi Laser 73**

Nameplate Information:	Toyostove Vented Kerosene Heater - Laser 73
Fuel Type:	#1 Oil
Input Rating:	63,000 BTU/hr.
Steady State Efficiency:	82 %
Idle Loss:	0 %
Heat Distribution Type:	Air
Notes:	Direct vent

### **Electric Space Heater**

Nameplate Information:	Comfort Zone electric space heater
Fuel Type:	Electricity
Input Rating:	1500 W
Steady State Efficiency:	100 %
Idle Loss:	0 %
Heat Distribution Type:	Air

## Lighting

There are a total of 10 light fixtures in the building. The lights use an estimated 956 kWh annually.

**Table 3: Lighting in the Venetie Village Council Office**

Lighting	Number of Bulbs	Fixture Type	Location(s)
4' 4-bulb LED Fixtures	12	Overhead lighting	Main entrance and meeting area
4' 2-bulb LED Fixtures	14	Overhead lighting	Offices



## **Major Equipment**

Below is a list of the major equipment in the Venetie Village Council Office building. The appliances and equipment use an estimated 1,002 kWh annually.

**Table 4: Major Appliances and Equipment in the Venetie Village Office**

<b>Equipment</b>	<b>Rating (Watts)</b>	<b>Annual Usage (kWh)</b>
Bunn Coffee Maker	900 (maximum)	296
Electric Hot Water Pot	1200 (maximum)	78.3
Sharp Microwave	1,680	33
Desktop Computers	32 (each)	175.3
Desktop Monitors	21 (each)	153.4
Desktop Fax Machine	220 (each)	1.1
HP OfficeJet Printer	10 (each)	9.1
HP All-in-One Desktop Computer	70 (each)	255.7

## **PROJECT FINANCING**

The total estimated cost of the recommended EEM's is \$47,344. The payback for the implemented EEM's is approximately 12.1 years. ANTHC is willing to assist the community with acquiring funds to complete the scope of work recommended in this energy audit.

There are several options for financing energy efficiency projects within the State of Alaska. These include the use of grants, loans, and other funding opportunities. Below is some information on potential funding opportunities.

**Energy Efficiency Revolving Loan Program** – This is a loan administered by the Alaska Housing Finance Corporation (AHFC) for use by any applicant who is also the owner of the building where the work will take place. It provides a loan for permanent energy-efficiency projects with a completion window of one year.

**Sustainable Energy Transmission and Supply Program** – This is a loan administered by the Alaska Energy Authority (AEA) for a government, business, or other organized body of people. It provides a loan for energy-efficiency or power transmission or distribution projects.

**USDA-RD Communities Facilities Direct Loan & Grant Program** - This is a loan or grant provided by the US Department of Agriculture – Rural Development (USDA-RD) for any essential community facility in a rural area. It provides a loan or grant to develop essential community facilities with upgrades or equipment for improvement.

## **MEASUREMENT AND VERIFICATION**

The actual results of these recommendations can be measured by collecting and monitoring energy use. This information is available on the monthly bills provided by the local electric utility and the local fuel oil supplier. Collecting data and performing a historical comparison is the simplest method of validating the energy and cost savings seen by the measures. Additionally, active remote monitoring systems are available that can collect and store data regarding energy and fuel usage. These systems allow the user to track the usage in real time and can be shared more easily with partners across the state.

# APPENDICES

## Appendix A – Energy Billing Data

### 1. Electricity Billing Data

Electric Utility: Venetie Village Electric

Date	Reading	Usage (kWh)	Charge
January 2017	4794	297	\$267.30
February 2017	5246	452	\$406.80
March 2017	5642	396	\$356.40
April 2017	5926	284	\$255.60
May 2017	6116	190	\$171.00
June 2017	6393	277	\$249.30
July 2017	6612	219	\$197.10
August 2017	6865	253	\$227.70
September 2017	7224	359	\$323.10
October 2017	7496	272	\$244.80
November 2017	7933	437	\$393.30
December 2017	No reading	-	-

*Note: The charge above is the cost of electricity before the PCE subsidy is applied.*

### 2. #1 Fuel Oil (Diesel) Billing Data

Fuel Company: Venetie Village Council

Year	Gallons	Price per Gallon	Total
2017	371	\$9.00	\$3,339

### 3. Spruce Cord Wood Usage (estimated)

Date	Usage (cord)	Charge
January 2017	1	\$150.00
February 2017	1	\$150.00
March 2017	1	\$150.00
April 2017	1	\$150.00
May 2017	0	-
June 2017	0	-
July 2017	0	-
August 2017	0.25	\$37.50
September 2017	0.75	\$112.5
October 2017	1	\$150.00
November 2017	1	\$150.00
December 2017	1	\$150.00

## Appendix B- Energy Audit Report – Project Summary

ENERGY AUDIT REPORT – PROJECT SUMMARY	
General Project Information	
PROJECT INFORMATION	AUDITOR INFORMATION
<b>Building:</b> Venetie Village Council Office	<b>Auditor Company:</b> Alaska Native Tribal Health Consortium
<b>Address:</b> Venetie	<b>Auditor Name:</b> Kevin Ulrich
<b>City:</b> P.O. Box 8119, Venetie	<b>Auditor Address:</b> 4500 Diplomacy Drive
<b>Client Name:</b> Patrick (PJ) Hanson	Anchorage, AK 99508
<b>Client Address:</b> P.O. Box 8119 Venetie, AK	<b>Auditor Phone:</b> (907) 729-3237
<b>Client Phone:</b> (907) 849-8212	<b>Auditor FAX:</b> (907) 729-3509
<b>Client FAX:</b> (907) 849-8097	<b>Auditor Comment:</b> Assistant Auditor: Kelli Whelan, MS Environmental Engineering (907) 729-3723, kmwhelan@anthc.org
Design Data	
<b>Building Area:</b> 800 square feet	<b>Design Space Heating Load:</b> Design Loss at Space: 25,435 BTU/hour with Distribution Losses: 25,435 BTU/hour Plant Input Rating assuming 82.0% Plant Efficiency and 25% Safety Margin: 38,772 BTU/hour
<b>Typical Occupancy:</b> 5 people	<b>Design Indoor Temperature:</b> 70° F (building average)
<b>Actual City:</b> P.O. Box 8119, Venetie	<b>Design Outdoor Temperature:</b> -49.4° F
<b>Weather/Fuel City:</b> Venetie	<b>Heating Degree Days:</b> 15,409° F-days
Utility Information	
<b>Electric Utility:</b> Venetie Village Electric	<b>#1 Fuel Oil (Diesel) Provider:</b> Venetie Village Council
<b>Average Annual Cost/kWh:</b> \$0.900/kWh	<b>Average Annual Cost/gal.:</b> \$9.00/gallon

Annual Energy Cost Estimate				
Description	Space Heating	Lighting	Other Electrical	Total Cost
Existing Building	\$5,430	\$860	\$902	<b>\$7,192</b>
With Proposed Retrofits	\$1,528	\$860	\$888	<b>\$3,277</b>
Savings	\$3,902	\$0	\$13	<b>\$3,915</b>

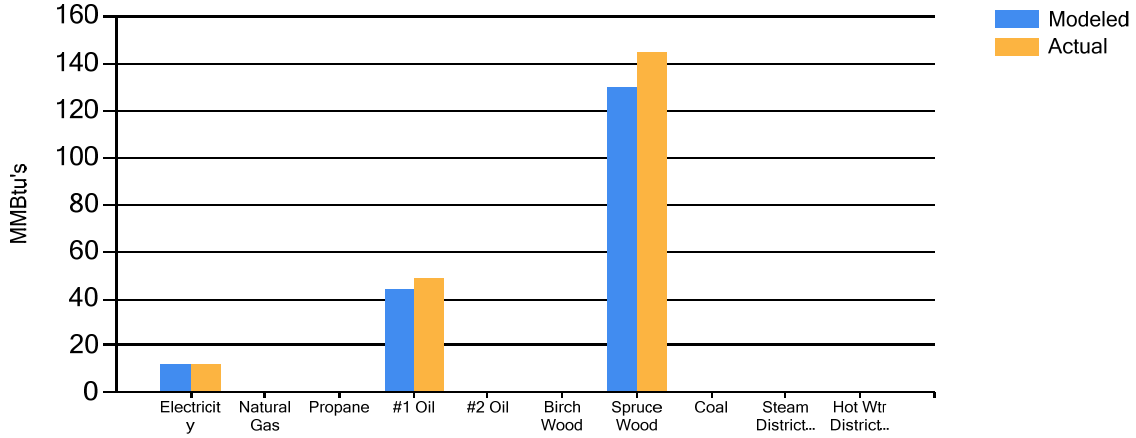
Building Benchmarks			
Description	EUI (kBtu/sq. ft.)	EUI/HDD (BTU/sq. ft./HDD)	ECI (\$/sq. ft.)
Existing Building	232.7	15.10	\$8.99
With Proposed Retrofits	119.4	7.75	\$4.10

EUI: Energy Use Intensity - The annual site energy consumption divided by the structure's conditioned area.  
 EUI/HDD: Energy Use Intensity per Heating Degree Day.  
 ECI: Energy Cost Index - The total annual cost of energy divided by the square footage of the conditioned space in the building.

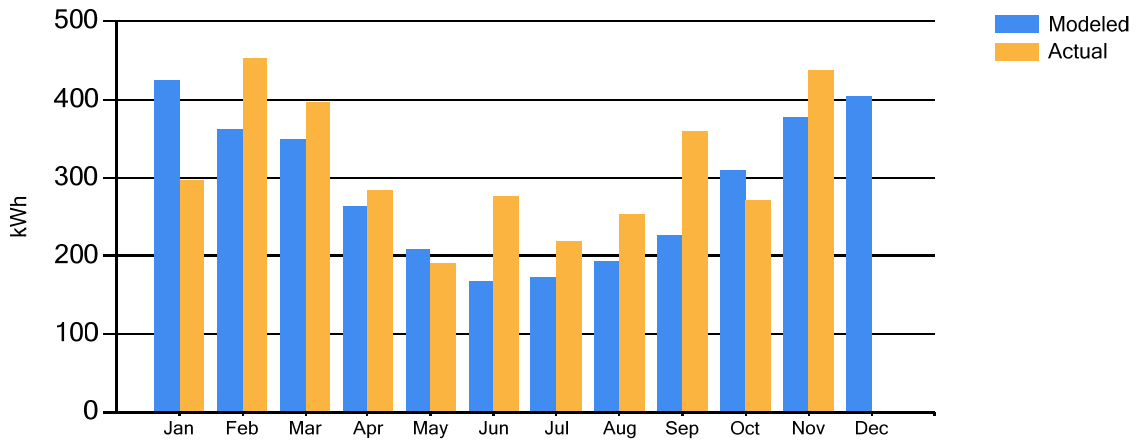
## Appendix C – Actual Fuel Use versus Modeled Fuel Use

The graphs below show the modeled energy usage results of the energy audit process compared to the actual energy usage report data. The model was completed using AkWarm modeling software. The orange bars show actual fuel use, and the blue bars are AkWarm’s prediction of fuel use.

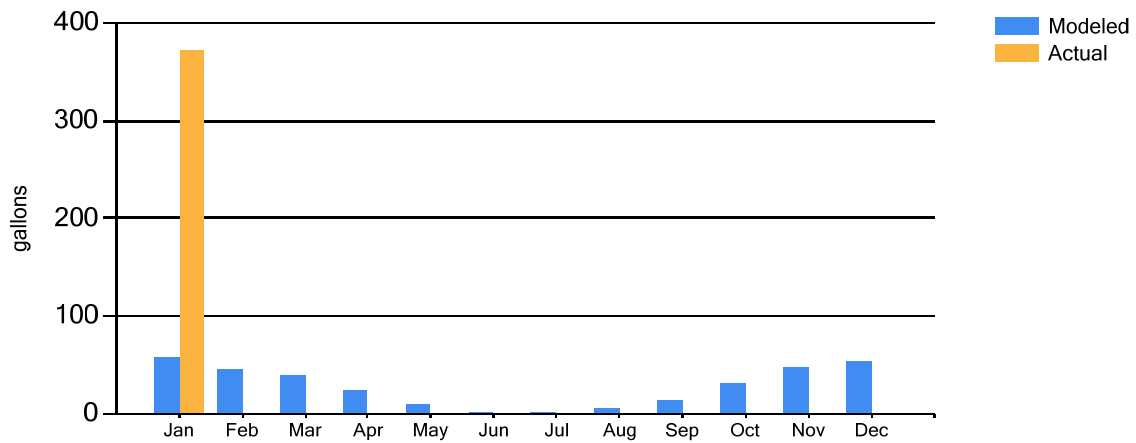
### Annual Fuel Use



### Electricity Fuel Use

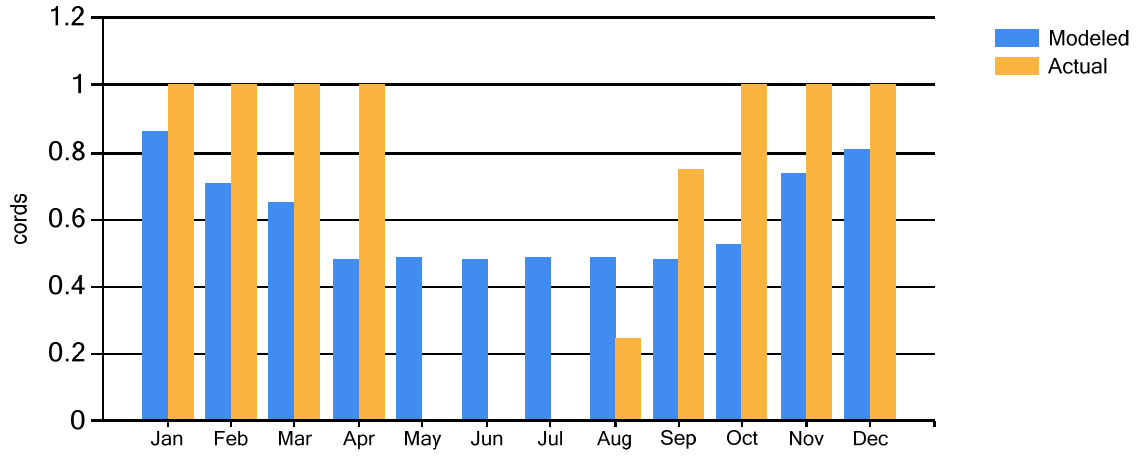


### #1 Fuel Oil Fuel Use



Note: The yellow bar represents the total amount of fuel purchased in 2017.

### Spruce Wood Fuel Use



*Note: The cord wood usage was estimated based on community member input.*

## Appendix D - EUI Calculation Details

Venetie Village Electric currently provides electricity to the residents of Venetie as well as to all commercial and public facilities. The Venetie Village Council is the local fuel distributor.

The average cost for each type of fuel used in this building is shown in Table D-1 below. This figure includes all surcharges, subsidies, and utility customer charges:

**Table D-1: Energy Cost Rates for each Fuel Type**

Average Energy Cost (as of March 2018)	
Description	Average Energy Cost
Electricity	\$ 0.90/kWh
#1 Oil	\$ 9.00/gallons
Cord Wood (Spruce)	\$150/cord

Table D-2 shows the calculated results for the building Energy Use Index (EUI), which determines the total energy usage for a type of building for comparison with other buildings of the same type. This allows the user to determine the relative energy use of a building in relation to others of the same type or use.

**Table D-2: EUI Building Calculations for the Venetie Village Council Office**

Energy Type	Building Fuel Use per Year	Site Energy Use per Year, kBTU	Source/Site Ratio	Source Energy Use per Year, kBTU
Electricity	3,454 kWh	11,789	3.340	39,374
Cord Wood (Spruce)	7.19 cords	130,229	1.000	130,229
#1 Oil	334 gallons	44,064	1.010	44,504
<b>Total</b>		<b>186,081</b>		<b>214,107</b>
BUILDING AREA		800	Square Feet	
BUILDING SITE EUI		233	kBTU/Ft <sup>2</sup> /Yr.	
<b>BUILDING SOURCE EUI</b>		<b>268</b>	<b>kBTU/Ft<sup>2</sup>/Yr.</b>	
* Site - Source Ratio data is provided by the Energy Star Performance Rating Methodology for Incorporating Source Energy Use document issued March 2011.				

Table D-3 shows information on common energy use benchmarks used to characterize the efficiency of a building.

**Table D-3: Building Benchmarks for the Venetie Village Council Office**

Building Benchmarks			
Description	EUI (kBTU/sq. ft.)	EUI/HDD (BTU/sq. ft./HDD)	ECI (\$/sq. ft.)
Existing Building	232.7	15.10	\$8.99
With Proposed Retrofits	119.4	7.75	\$4.10
EUI: Energy Use Intensity - The annual site energy consumption divided by the structure's conditioned area. EUI/HDD: Energy Use Intensity per Heating Degree Day. ECI: Energy Cost Index - The total annual cost of energy divided by the square footage of the conditioned space in the building.			

## Appendix E- Materials List and Labor Estimation

Tables E-1 and E-2: ANTHC Materials List and Cost Estimation for the Venetie Village Council Office EEM's

Energy Retrofit	Required Materials	Quantity <sup>a</sup>	Cost per Item	Total Materials Cost	Total Project Cost <sup>b</sup>
Shell Improvement: Walls	R-13 faced fiberglass insulation (pallet)	9	\$658.56	\$5,927.00	\$11,130
	Vapor barrier	5	\$63.72	\$318.60	
	2x4 Lumber	44	\$14.77	\$747.40	
	¼" Plywood	116	\$12.75	\$1,479.00	
	Additional construction materials (sheathing tape, screws, interior paint)	-	-	\$433.50	
Shell Improvement: Floors	R-30 faced fiberglass insulation (pallet)	2	\$564.83	\$1,129.70	\$5,165
	Vapor barrier	3	\$63.72	\$191.20	
	23/32" Subflooring	28	\$43.78	\$1,225.80	
	Additional construction materials (sheathing tape, screws)	-	-	\$203.50	
Shell Improvement: Roof	Icynene spray foam	2	\$734.00	\$1,468.00	\$16,970
	R-30 faced fiberglass insulation (pallet)	2	\$564.83	\$1,129.70	
	Vapor barrier	4	\$63.72	\$254.90	
	15/32" Plywood sheathing	29	\$49.98	\$1,449.40	
	Metal roofing and components	30	\$37.75	\$1,132.50	
	Tar paper	1	\$79.98	\$80.00	
	Screws	1	\$241.00	\$241.00	
Air sealing	Weather stripping, caulking	-	-	\$200.00	\$430
	Insulating foam sealant	10	\$4.48	\$44.80	\$151.10
Heating	New wood stove	1	\$1,249.00	\$1,249.00	\$2,800
	Additional flue pipe, flooring materials for stove replacement	-	-	\$750.00	
Other	Insulating carafe	1	\$35.00	\$35.00	\$40.30

<sup>a</sup> 10% surplus included.

<sup>b</sup> Project costs include materials, freight (15% of materials cost, and labor).



	<b>Contactor (roof replacement)</b>	<b>Local Labor</b>
<b>Category</b>	<b>Cost (\$)</b>	<b>Cost (\$)</b>
Labor	9,600	4,500
Materials	5,760	13,840
Freight	865	2,080
Travel <sup>c</sup>	3,840	-
Indirect <sup>d</sup>	6,020	-
<b>Subtotal</b>	<b>\$26,085</b>	<b>\$20,470</b>
<b>Grand Total</b>		<b>\$46,560</b>

<sup>c</sup> Travel costs for three construction crew members: airfare from Fairbanks, three nights lodging, and per diem (\$80 per day).

<sup>d</sup> Indirect rate is 30% (of the total estimated labor, travel, materials, and freight costs). This represents an estimate of contractor profit, insurance, and bonding costs.

## ***Appendix F – Example Materials***

### **Insulation**

#### **1. [Owens Corning R-13 Kraft Faced Fiberglass Insulation Batts 15" x 93" \(10 bags\)](#)**

Owens Corning EcoTouch Insulation is soft to the touch, easy to cut and install. It delivers comfort – helping homes stay cooler in the summer and warmer in the winter to reduce energy costs. The R13 Kraft Faced Batt Insulation has pre-cut widths to fit between the studs and joists in your home. It offers exceptional thermal and sound control performance.

- Dimensions: 3-1/2 in. x 15 in. x 93 in. 11 pieces (106.56 sq. ft. / bag)
- 10 bags/pallet is equal to 110-pieces/1065.60 sq. ft.
- Application: 2x4 walls (exterior/interior/basement), floors
- Thermal insulation performance helps lower monthly heating/cooling costs
- EcoTouch insulation helps control sound; add to bedrooms, home office, family room, utility room, kitchen and bathroom
- Can be combined with FOAMULAR insulating sheathing to achieve greater R-value in exterior wall applications

#### **2. [Owens Corning R-30 Kraft Faced Fiberglass Insulation Batt 24" x 48" \(8 bags\)](#)**

Owens Corning EcoTouch Insulation is soft to the touch, easy to cut and install. It delivers comfort – helping homes stay cooler in the summer and warmer in the winter to reduce energy costs. The R30 Kraft Faced Batt Insulation has pre-cut widths to fit between the studs and joists in your home. It offers exceptional thermal and sound control performance.

- Dimensions: 9-1/2 in. x 24 in. x 48 in., 11 pieces (88 sq. ft./bag)
- 8 Bags/pallet = 88 pieces/704 sq. ft.
- Application: attics
- Provides thermal performance and helps lower monthly heating/cooling costs
- Check with your local building department or building official on the need for a vapor retarder facing on ceiling insulation
- If your joist cavities are completely filled, lay un-faced insulation in long runs perpendicular to the joists
- Department of Energy recommends an R-30 to R-60 for attics
- You need 20 in. of insulation to reach an R-60 in your attic

### **Vapor Barrier**

#### **3. [Vapor Barrier: CertainTeed MemBrain 100" x 50' Air Barrier with Smart Vapor Retarder](#)**

### **Lumber**

4. [2 x 4 Lumber](#)
5. [1/4" Plywood](#)
6. [15/23" Plywood](#)
7. [23/32" Subflooring](#)

## Heating

### 8. [Wood Stove: Osburn Freestanding 1600 Wood Stove](#)

Maximum log length:	17"
Log positioning:	Over width
Chimney diameter:	6"
Flue outlet diameter:	6"
Minimum chimney height (feet):	12'
Baffle type:	C-Cast
Approved for a mobile home installation:	Yes
Shipping Weight:	360 lb (163 kg)
Door type:	Single, glass with cast iron frame
Glass type:	Ceramic glass
Glass surface – dimensions (Width X Height):	15" X 8 3/8"
Glass air-wash system:	Yes
Overall dimension (Height):	32 3/8"
Overall dimension (Width):	25"
Overall dimension (Depth):	26 1/2"
Door opening – dimension (Height):	8 3/8"
Door opening - dimension (Width):	15 5/8"
Firebox – dimension (Height):	12 7/8"
Firebox – dimension (Width):	18 1/8"
Firebox – dimension (Depth):	14 3/4"
Firebox lined with refractory bricks for better heat distribution:	Yes
Stainless-steel secondary-air system improving gas combustion:	Yes
Model:	Pedestal
Steel thickness – body:	3/16"
Steel thickness – top:	5/16"
Centre line of flue outlet to the side:	12 1/2"
Centre line of flue outlet to the back:	7 7/8"

Easy-to-access ash drawer:	Yes
USA standard (emissions):	EPA
Canadian Standard (emissions):	CSA B415.1-10
USA standard (safety):	UL 1482
Canadian standard (safety)	ULC S627
Tested and listed as per applicable standards:	By an accredited laboratory (CAN/USA)
Warranty:	Limited lifetime

***Appendix G – Additional Photos of the Venetie Village Council Office***



**Venetie Village Council Office interior.**



**Council Office interior ceiling construction.**



**Council Office barrel-style wood stove.**



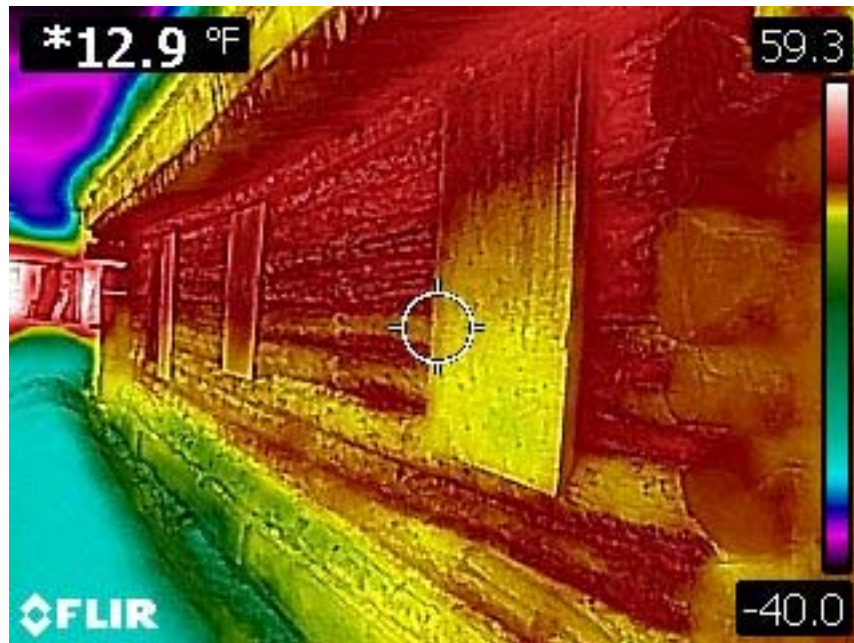
**Building's current roof. Gaps at the eaves and corners of the roof expose the fiberglass batt to moisture. Moisture damages the batt, reducing its ability to insulate the building.**



**Council Office's flooring exterior.**

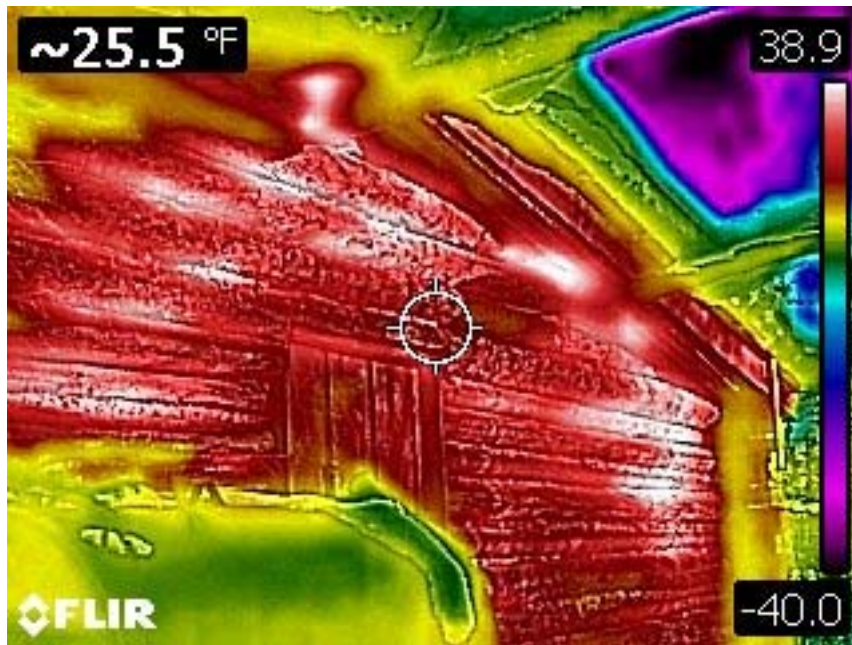


FLIR thermal imaging of the Council Office main entrance. The color gradient on the right depicts the temperature range of the photo (-40° F to 29.8° F). Colors in the higher end of the gradient indicate where heat is being lost.

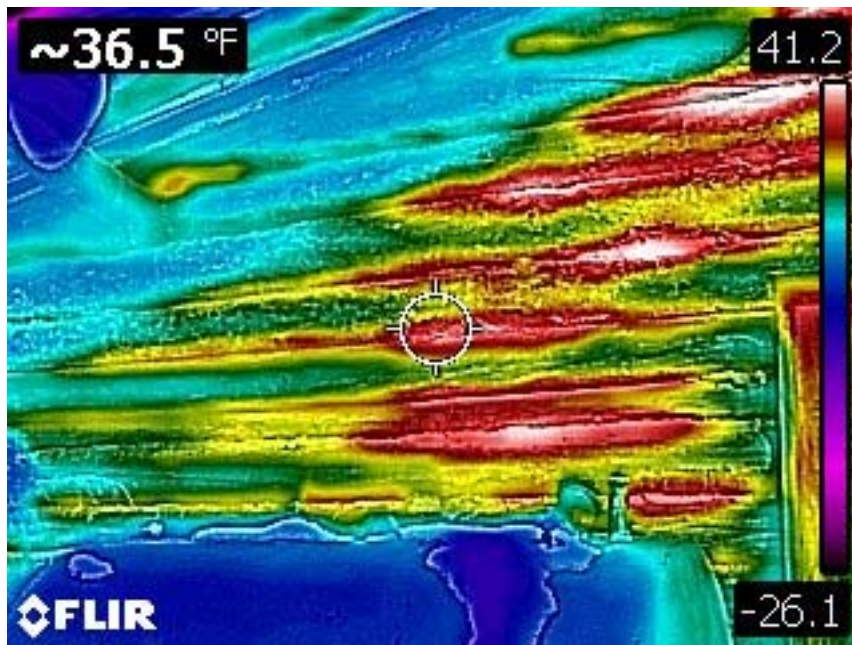


FLIR thermal imaging of the side of the building. The color gradient on the right depicts the temperature range of the photo (-40° F to 59.3° F).

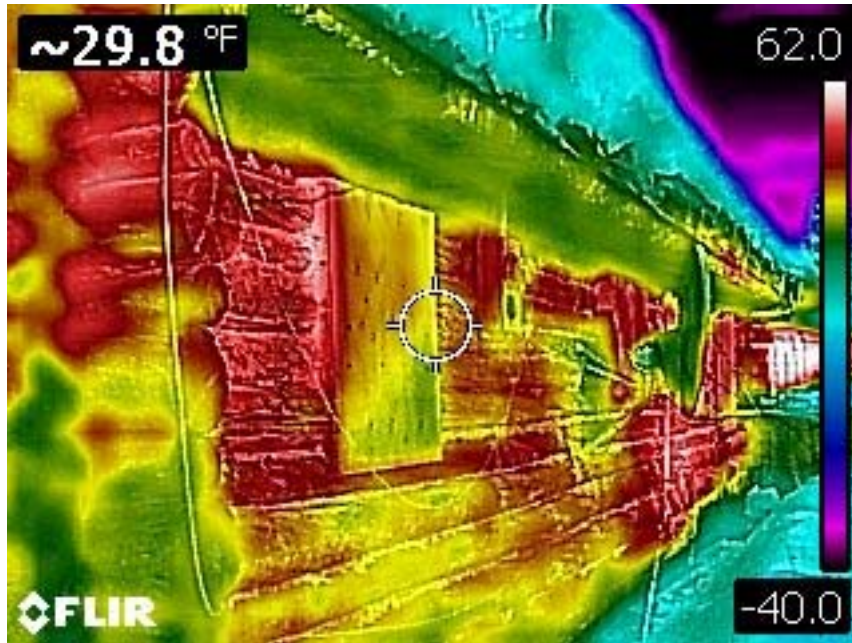




FLIR thermal imaging of the rear of the Council Office. The color gradient on the right depicts the temperature range of the photo (-40° F to 38.9° F). Chinking around the eaves and between the logs should be checked and resealed to prevent heat loss.



FLIR thermal imaging of the rear wall behind the fuel oil tank (temperature range: -26.1° F to 41.2° F). A significant amount of the heat produced by the Toyostove is being lost to the atmosphere. The chinking behind the stove wall should be checked and resealed if needed.



FLIR thermal imaging of the side of the building. The color gradient on the right depicts the temperature range of the photo (-40° F to -62° F).