Village End Use Energy Efficiency Measures Program

AEA Grant # 2195225 Administered by Alaska Building Science Network

Nikolski Final Report



Community & Aleutian Region School District Building Summary

Two community buildings and one teacher-housing building received energy efficiency upgrades as follows:

Nikolski School Building, Teacher Housing building, Native Village of Nikolski Community Center,

Lighting Retrofits Completed: March 2008

Village-Wide Lighting Retrofit Summary:

- Retrofitted 27 light fixtures with electronic ballasts & T-8 lamps
- Installed 29 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 4.902 Kilowatts
- Post-retrofit energy use for all lighting: 2.321 Kilowatts
- Energy savings projection: 2.581 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 53%

- Estimated Annual Savings:

kWh Rate (as of): $0.65 Fuel Cost (FY 2006 Ave): $3.33

Hours Per Day/ 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$8,337.91	1430.54	$4,763.71
4 Hours/day	$1,677.65	287.84	$958.49
7 Hours/day	**$2,935.89**	503.71	$1,677.37
10 Hours/day	$4,194.13	719.59	$2,396.24

- Total project cost for all measures: $ 37,775
- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): 12.87 years
- Total village wide in-kind contribution: $12,564 (extended grant capacity by 33%)

Additional Energy Efficiency Measures:

- Heat Recovery Project: Native Village of Nikolski Community Center

Notes: With lighting retrofits as a primary emphasis of these grants, we had to look at other measures right away where Nikolski was concerned. In our original community planning teleconference for these grants, we learned that all the lighting retrofits for village community buildings had already been coordinated and completed by the local tribal environmental office and community at large. The only lighting retrofits that had not been completed through the local tribe were 27 linear fluorescent light fixtures in the school and a few cfls to be installed in the teacher housing building. The lighting summary above reflects savings projections from completing those retrofits. The simple payback at 12.87 years reflects only the savings from these few lighting retrofits and is why it is so much longer a time-frame than any other village covered under these grants. The fuel savings from the community center heat recovery project once it is completed will significantly decrease the long payback time currently listed for this village.

Nikolski School



Lighting retrofits save energy while improving light levels in classrooms for a better learning environment.

The main school building and teacher housing building owned by the Aleutian Region School District received the following:

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	14
4-lamp electronic ballast, (4) 25 watt T8 lamps	13
• Pre-retrofit energy use:	2822 watts
• Post-retrofit energy use:	1828 watts
• Energy savings projection:	994 watts
• Pre-retrofit to post retrofit energy reduction:	35%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
2160 Hours/year (Est.)	$1,395.58	239.44	$797.34
4 Hours/day	$646.10	110.85	$369.14
7 Hours/day	$1,130.68	193.99	$645.99
10 Hours/day	$1,615.25	277.13	$922.84

Teacher Housing



Compact fluorescent light bulbs are a great strategy for reducing wattage use in teacher housing units.

Materials Installed	**Quantity**
CFL-14 W	18
CFL-20 W	4
CFL-23 W	7
• Pre-retrofit energy use:	2080 watts
• Post-retrofit energy use:	493 watts
• Energy savings projection:	1587 watts
• Pre-retrofit to post retrofit energy reduction:	76%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
6730 Hours/year (Est.)	$6,942.33	1191.10	$3,966.37
4 Hours/day	$1,031.55	176.98	$589.36
7 Hours/day	$1,805.21	309.72	$1,031.38
10 Hours/day	$2,578.88	442.46	$1,473.39

Notes cont'd: The immediate priority for the village beyond lighting was the potential for heat recovery fuel savings by connecting the community center to the adjacent power plant. In 2007 and 2008 we coordinated with Nikolski IRA Council, Aleutian Pribiloff Island Association and TDX Power Co. to reserve VEUEEM funds to help complete this measure. The three entities above collaborated on writing a state renewable energy grant to complete a wind-diesel power generation system to supply power to the village. Included in their grant scope is a heat recovery system for the community building from the power plant. They were awarded the full grant in March, 2009, and the Alaska State Legislature approve that full funding. Grant funds however were not appropriated by the Legislature as of late March, and therefore ABSN could not complete VEUEEM grant spending for Nikolski. With the grant awarded however ABSN continued coordinating with Nikolski IRA Council APIAI and TDX Power to identify critical material components of the heat recovery system and go as far as we could toward spending VEUEEM funds for community building energy efficiency in Nikolski. TDX Power compiled a materials list and selected Mantech Mechanical as their materials supplier for the primary heat recovery parts. See Mantech Mechanical's invoice to TDX Power attached below.

Nikolski, Community Center in foreground, power plant center w/green roof

Wind Generator awaiting hookup to Power Plant and wind-diesel power system with heat recovery.

Umnak Power Plant

MAR-16-2009 15:53 MANTECH MECH 907 3492621 P.01/01

Mantech Mechanical, Inc
7401 Arctic Blvd
Anchorage AK 99518
907 349 2567

License: 10836

Contract Invoice

Invoice#: 11577
Date: 03/16/2009

Billed To: TDX Power
4300 B Street, Suite 402
Attn: John Lyons
Anchorage AK 99503

Project: TDX Nikolski Heat Reclaim

2782316

Due Date: 04/15/2009 **Terms:** 30DY **Order#**

Description	Amount
100LF 4 HDPE core with 2" 3LB urethane foam 8" HDPE shell	3,878.00
200LF 1-1/2 oxy barrier pex pipe Carrier Piping	4,486.00
(4) 1-1/2 pex 90 Ells & Sleeves	218.00
(1) 12x24x40 plate heat exchanger with adapter and flange kits	1,949.00

A service charge of 10.50 % per annum will be charged on all amounts overdue on regular statement dates.

Thank you for your business.

Non-Taxable Amount:	10,531.00
Taxable Amount:	0.00
Sales Tax:	0.00
Amount Due	**10,531.00**

TOTAL P.01

Nikolski IRA Council Community Center Heat Recovery Project

The building is well insulated and built with energy efficiency in mind

Recently completed Native Village of Nikolski Community Center

Currently a Monitor heater is the heating source for the building

Karen Pletnikoff, Community Environ. & Safety Manager, Aleutian Pribilof Islands Association Inc. commented on the heat recovery project in March, 2009: ***"It's an essential community building and a real no-brainer as far as maximizing the energy efficiency for the community out there."***

The slated heat recovery system is directly connected and related to their overall wind-diesel power system design, and therefore must be finalized as a process of logistics, site preparation, final work plans and final adjustments to system design, for all components covered in their $400,000 renewable energy grant. Since these funds were so recently appropriated, this process is currently ongoing. All entities involved are moving forward with the Nikolski power system components this construction season.

Community Center built in close proximity with the Umnak Power Plant for heat recovery potential

Soon the waste heat exhaust fans will not operate as often

As soon as final preparations are completed and the heat recovery portion is scheduled, Nikolski IRA Council will invoice ABSN for the heat recovery materials and the VEUEEM grant expenditures for the village will be completed. Nikolski IRA Council's cost proposal for the heat recovery system listed in their renewable energy grant is $43,580. ABSN has reserved approximately $10,000 to contribute to the project, or roughly 25%.

Pre-retrofit fuel use data was not available at the time of writing this report. With the substantial in kind contribution for this measure, payback on the VEUEEM grant portion is expected to be reasonable. We will continue to stay in touch with local and regional entities working in Nikolski on this project. As new information becomes available we will report any findings to AEA in future progress reports.

Nikolski, In-Kind Contribution Tracking Record - ABSN Energy Efficiency Projects:

In-Kind Item	Dates	Hours Contri -buted	Hourly Wage	Value / Amount	Notes
Staff time for project contact, introduction, and review of intro materials (Number of entities x 1 hour each)		4	$15	$60.00	list number of entities
Staff time for Attending teleconference (TC/IRA)		3	$15	$45.00	list # of staff and wages if possible ($15/hr is an average wage designated for village entity staff).
Staff time for Attending teleconference (Village Corp)		1	$15	$5.00	"
Conservative village office administrative percentage of total project cost less ABSN Admin %. Total project cost = $37,775/village - (our admin percentage , (around 12%) Approx: $4,533) = $33,242 x 5.5% = $1,828 (this 5.5% village admin cost estimate is spread across all entities we work with for the course of the grant for completing all energy efficiency measures. These are primarily for cumulative, otherwise unaccounted time expense for village- based project support.	Feb, '07 through			$ 1,828.00	Each time we call, email, or fax a village entity, someone has to receive the communication, review and/or forward the information, follow-up on requests, etc. Whether it is to set-up a teleconference, verify maintenance staff participation in lighting or boiler trainings, set-up in-kind lodging and transportation, lighting trainings, track a shipment, verify completion of lighting in a given building, ship lamps and ballasts out of the village, request a labor reimbursement agreement, or invoice etc, etc. Village expenses for phone charges, copying and fax costs, office supplies, etc are part of this amount.
School lighting upgrades - local labor costs for John Stam	March, '08	22	$ 28	$616.00	Wage and fringe
Nikolski IRA Council, heat recovery for community center				$10,500.00	consulting, design, transportation, materials / transport, installation of heat recovery system for community center. VEUEEM grants will fund ~$10,500 for critical parts and materials. Nikolski IRA Council and TDX Power estimate total project costs at $43,580. We will list a full match of $10.5k although the Nikolski IRA will spend an additional $33k from their recent State Renewable Energy Fund grant to complete the project.
	TOTAL			$12,564.00	