

Village Energy Efficiency Program
AEA VEEP Grant # 7520001 Administered by Alaska Building Science Network
Togiak Final Report
Grant Amount: \$150,000



Center Photo: ©State of AK Division of Community and Regional Affairs

Community Summary

14 community buildings and teacher housing units received energy efficient lighting, weatherization, and heating upgrades as follows: Family Resource Center (FRC), Boys and Girls Club, City Duplex, Police and Fire Building, Southwest Region School District: New Teacher Housing 4-Plex Units B, C, & D, Old Teacher Housing Duplex East & West Units, Principal Duplex East & West Units, New School Gym, New School Foyer, New School Foyer Center

Retrofits Completed: February 2012

Village-Wide Energy Efficient Lighting, Weatherization and Heating Retrofit Summary:

• Projected Annual Electrical Savings (kWh):	38,493
• Projected Annual Electrical Cost Savings:	\$21,163 ^{1,2}
• Projected Annual Heating Fuel Savings (gallons):	3,217
• Projected Annual Fuel Cost Savings:	\$19,205 ³
• Total Projected Annual Energy Cost Savings:	\$40,369
• Total village wide In-kind contribution:	\$59,426
• Total project cost including In-kind contribution:	\$209,426
• Simple Payback (including In-kind contributions):	5.28 years

¹ kWh Rate [used to calculate electrical cost savings] for Lighting Measures (State of AK - AEA PCE Program Report FY 2011 avg): \$0.55

² kWh Rate [used to calculate electrical cost savings] for Weatherization & Heating Measures (AkWarm Library): \$0.55

³ #2 Heating Fuel Rate [used to calculate heating fuel savings] (AkWarm Library): \$5.97/gal

CITY OF TOGIAC OWNED BUILDINGS

Family Resource Center

Weatherization/Heating Retrofit Summary:



- Cleaned and tuned both boilers; insulated boiler pipes and added a blanket to the water heater.
- Installed seven programmable thermostats, including village staff training.

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- Annual energy savings projection: 428 gallons
 - Estimated Annual Heating Fuel Cost Savings: **\$2,555**

Boys and Girls Club

Weatherization/Heating Retrofit Summary:



- Cleaned and tuned boiler; added zone valve to hot water tank; installed four programmable thermostats.
- Added R-38 batt insulation to crawlspace perimeter.

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- Annual energy savings projection: 377 gallons / 29 kWh
 - Estimated Annual Energy Cost Savings: **\$2,251 (fuel) / \$16 (electricity)**

City Duplex

Weatherization/Heating Retrofit Summary:



- Installed three programmable thermostats, including village staff training.
- Cleaned and tuned boiler and installed a zone controller.
- Air sealed building to reduce air leakage.
- Sealed rim joist with 2" XPS foam and permanently flexible caulk/sealant.
- Installed 17" of loose-fill fiberglass insulation in attic.

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| • Annual energy savings projection: | 359 gallons |
| • Estimated Annual Heating Fuel Cost Savings: | \$2,143 |

Police and Fire Building

Weatherization/Heating Retrofit Summary:



- Installed two programmable thermostats, and extra zone valve on the 1.5 copper line for the garage unit heater.
- Cleaned and tuned boiler to 84% combustion efficiency and installed an outdoor reset boiler control.
- Added R-25 batt insulation to crawlspace perimeter and installed a vapor barrier on floor.

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| • Annual energy savings projection: | 108 gallons |
| • Estimated Annual Heating Fuel Cost Savings: | \$64 |

SOUTHWEST REGION SCHOOL DISTRICT OWNED BUILDINGS

New Teacher Housing 4-Plex, Units B, C & D

Lighting Retrofit Summary:



Materials Installed

CFL-19W

Quantity

176

- Pre-retrofit energy use: 10.560 Kilowatts
- Post-retrofit energy use: 3.344 Kilowatts
- Energy savings projection: 7.216 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 68%
- Estimated Annual Savings: kWh Saved: 12,628

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	\$3,967.36	521.39	\$1,746.65
7 Hours/day	\$6,942.87	912.43	\$3,056.63
10 Hours/day	\$9,918.39	1303.47	\$4,366.62
1375 Hours/year (Est.)	\$5,455.12	716.91	\$2,401.64

Old Teacher Housing Duplex East & West Units

Total Building Savings All Measures:

• Projected Annual Electrical Savings (kWh):	2,289
• Projected Annual Electrical Cost Savings:	\$1,258
• Projected Annual Heating Fuel Savings (gallons):	837
• Projected Annual Fuel Cost Savings:	\$4,997
• Total Projected Annual Energy Cost Savings:	\$6,255

Lighting Retrofit Summary:



<u>Materials Installed</u>	<u>Quantity</u>
Fluorescent 2-lamp electronic ballast, (2) 25 watt T8 lamps	4
CFL-19W	25
CFL-23 W	2

• Pre-retrofit energy use:	2.013 Kilowatts
• Post-retrofit energy use:	0.705 Kilowatts
• Energy savings projection:	1.308 Kilowatts
• Pre-retrofit to post retrofit energy reduction:	65%
• Estimated Annual Savings:	kWh Saved: 2,289

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	\$719.14	94.51	\$316.60
7 Hours/day	\$1,258.49	165.39	\$554.06
10 Hours/day	\$1,797.85	236.27	\$791.51
1375 Hours/year (Est.)	\$988.82	129.95	\$435.33

Old Teacher Housing Duplex East & West Units

Weatherization Retrofit Summary:



- Installed six programmable thermostats.
- Added R-30 batt insulation to crawlspace perimeter, and installed new vapor retarder.
- Sealed rim joist with 2" XPS foam and permanently flexible caulk/sealant.
- Air sealed building to reduce air leakage.

• Annual energy savings projection:	837 gallons
• Estimated Annual Heating Fuel Cost Savings:	\$4,997

Principal Duplex East & West Units

Lighting Retrofit Summary:

<u>Materials Installed</u>	<u>Quantity</u>
Outdoor LED 8 watt A19 lamps	2
CFL-19W	48
CFL-23 W	5
CFL-9 W	16

- Pre-retrofit energy use: 4.060 Kilowatts
- Post-retrofit energy use: 1.187 Kilowatts
- Energy savings projection: 2.873 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 71%
- Estimated Annual Savings: kWh Saved: 5,028

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	\$1,579.58	207.59	\$695.42
7 Hours/day	\$2,764.26	363.28	\$1,216.98
10 Hours/day	\$3,948.94	518.97	\$1,738.54
1375 Hours/year (Est.)	\$2,171.92	285.43	\$956.20

New School Gym

Lighting Retrofit Summary:



Materials Installed

Quantity

Fluorescent T5 fixture, electronic ballast, (5) 54 watt T5 HO	18
Fluorescent T5 fixture, electronic ballast, (6) 54 watt T5 HO	4

- Pre-retrofit energy use: 10.010 Kilowatts
- Post-retrofit energy use: 6.462 Kilowatts
- Energy savings projection: 3.548 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 35%
- Estimated Annual Savings: kWh Saved: 6,209

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	\$1,950.69	256.36	\$858.80
7 Hours/day	\$3,413.71	448.63	\$1,502.90
10 Hours/day	\$4,876.73	640.90	\$2,147.00
1750 Hours/year (Est.)	\$3,413.71	448.63	\$1,502.90

New School Foyer

Lighting Retrofit Summary:



Materials Installed

Quantity

Fluorescent T5 fixture, electronic ballast, (4) 54 watt T5 HO	4
Fluorescent T5 fixture, electronic ballast, (6) 54 watt T5 HO	1

- Pre-retrofit energy use: 2.275 Kilowatts
- Post-retrofit energy use: 1.254 Kilowatts
- Energy savings projection: 1.021 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 45%
- Estimated Annual Savings: kWh Saved: 1,787

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	\$561.35	73.77	\$247.14
7 Hours/day	\$982.36	129.10	\$432.49
10 Hours/day	\$1,403.36	184.43	\$617.84
1750 Hours/year (Est.)	\$982.36	129.10	\$432.49

New School Foyer Center

Lighting Retrofit Summary:



Materials Installed

Quantity

Fluorescent 4-lamp electronic ballast, (4) 32 watt T8 lamps 18

- Pre-retrofit energy use: 8.190 Kilowatts
- Post-retrofit energy use: 2.160 Kilowatts
- Energy savings projection: 6.030 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 74%
- Estimated Annual Savings: kWh Saved: 10,553

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	\$3,315.29	435.69	\$1,459.57
7 Hours/day	\$5,801.76	762.46	\$2,554.25
10 Hours/day	\$8,288.24	1089.23	\$3,648.93
1750 Hours/year (Est.)	\$5,801.76	762.46	\$2,554.25

Togiak, In-Kind Contribution Tracking Record - ABSN Energy Efficiency Projects:					
In-Kind Item	Dates	Hours Contributed	Hourly Wage	\$Value / Amount	Notes
Staff time for project contact, introduction & review of intro materials		4	\$ 20.00	\$80.00	Number of entities x 1 hour each
Staff time for Attending teleconference	08/25/10	2	\$ 20.00	\$40.00	City time
Staff time for Attending teleconference	08/25/10	2	\$ 20.00	\$40.00	TC/IRA time
Staff time for Attending teleconference	08/25/10	2	\$ 20.00	\$40.00	School time
Maint. Staff time to accompany Field Manager on building assessment	5/19/11 - 5/20/11	11	18	\$198.00	City, Shirley Upton, 1st site visit
Maint. Staff time to accompany Field Manager on building assessment	5/19/11 - 5/20/11	6	20	\$108.00	City, Larry (Tribal Housing Manager), helped with blower door and audit
Maint. Staff time to accompany Field Manager on building assessment	5/21/11 - 5/23/11	4	18	\$72.00	School, John Parker, 1st site visit
Conservative village office administrative percentage of total project cost less ABSN Admin %. Total project cost = \$273,831/village - (our admin percentage, (around 14%) Approx: \$38,336) = \$235,501 x 4% = \$9420 (this 4% 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 for cumulative, otherwise unaccounted time expense for village-based project support.	Aug '10 through Completion			\$9,420.00	Each time we call, email, or fax a village entity, someone receives the communication, reviews and/or forwards the information, follows-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 for recycling, request a labor reimbursement agreement, or invoice etc. Village expenses for phone charges, copying and fax costs, office supplies, etc. are part of this amount.
Lodging for ABSN Field Managers	5/18/11 -			\$300.00	City apartment - 1st assessment site visit
Transportation and fuel costs	5/18/11 -	9	18	\$153.00	City - 1st assessment site visit
Copper River Seafoods	July '11			\$9,000.00	Wx materials freight
Lodging for ABSN Field Managers	2/6/12 -			\$300.00	City apartment (FRC) - Lighting Upgrades
Transportation and fuel costs	2/6/12 -			200.00	City suburban w/gas - Lighting Upgrades
Reuben Topkok payroll taxes & workers comp	7/26/11			\$61.20	Togiak School - Wx Upgrades
Carlson Tingook payroll taxes & workers comp	7/26/11			\$ 51.64	Togiak School - Wx Upgrades
Jerry Okbaok payroll taxes & workers comp	7/26/11			\$ 22.95	Togiak School - Wx Upgrades
John Okleasik payroll taxes & workers comp	7/26/11			\$ 22.95	Togiak School - Wx Upgrades
Rany Olanna payroll taxes & workers comp	7/26/11			\$ 60.25	Togiak School - Wx Upgrades
Lenny Wassillie regular pay + taxes	August '11	33	\$23.15	\$769.74	Togiak School - Wx Upgrades
B&B Rental, 30 @ \$300.00	12/1/11	30	\$300.00	\$9,000.00	City of Togiak - Wx Upgrades
Equipment Rental, 30 @ \$200.00	12/1/11	30	\$200.00	\$6,000.00	City of Togiak - Wx Upgrades
City Heating - New boiler materials	2/9/12			\$7,941.00	City of Togiak - Heating Upgrades
City Heating - New hot water tank materials	2/9/12			\$1,351.62	City of Togiak - Heating Upgrades (Materials to replace hot water tank - per invoice to City of Togiak from Central Plumbing & Heating: Order # 0063140, 12/3/10)
City Heating - Boiler and hot water tank shipping	2/9/12			\$500.00	City of Togiak - Heating Upgrades (Shipping: Anch-Dillingham-Togiak)
Labor - regular pay + taxes	February '12	26	\$18.00	\$468.00	Togiak School - Lighting Upgrades
Labor - regular pay + taxes	August '12	4	\$33.45	\$133.80	SWRSD - Lighting Upgrades (Expediting materials in Dillingham)
Labor - regular pay + taxes	August '12	74	\$33.45	\$2,475.53	SWRSD - Lighting Upgrades (Maintenance Mechanic in Togiak)
Labor - regular pay + taxes	August '12			\$7,400.00	SWRSD - Lighting Upgrades (Contracted Electrical Services: Walter Creasey)
Shipping via Everts Air (high bay lighting materials)	4/9/12			\$1,286.73	SWRSD - High bay lighting materials (Shipping: Anchorage-Dillingham)
Shipping (high bay lighting materials)	4/9/12			\$1,930.00	SWRSD - High bay lighting materials (Shipping: Dillingham-Togiak)
	TOTAL			\$59,426.41	