Village End Use Energy Efficiency Measures Program

AEA Grant # 2195294 Administered by Alaska Building Science Network

Arctic Village Final Report

Community Summary

9 community buildings received energy efficiency upgrades as follows:

Traditional Council Office, Clinic, Community Hall, Native Store/ Youth Center, Washeteria, Water Treatment Plant, Old High School, Old School Maintenance Garage, New Church

Retrofits Completed: October 2009

Village-Wide Lighting Retrofit Summary:

- Retrofitted 88 light fixtures with electronic ballasts & T8 lamps
- Installed 34 compact fluorescent light bulbs
- Installed 1 LED outdoor floodlight
- Pre-retrofit energy use for all lighting: 11.686 Kilowatts
- Post-retrofit energy use for all lighting: 5.353 Kilowatts
- Energy savings projection: 6.333 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 54%
- Estimated Annual Savings:

kWh Rate (FY 2009 AVE): $0.75 Fuel Cost (FY 2009 Ave): $10.00

Hours Per Day/ 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated Use	$7,846.70	819.93	$8,199.27
4 Hours/day	$4,749.75	496.32	$4,963.17
7 Hours/day	**$8,312.06**	868.55	$8,685.54
10 Hours/day	$11,874.38	1240.79	$12,407.9

- Total project cost for all measures: $20,000
- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): 2.41
- Total village wide in-kind contribution: $1,485.50

Arctic Village Traditional Council Owned Buildings

6 buildings owned by the Arctic Village Traditional Council received energy efficient lighting upgrades as follows:

Traditional Council Office, Clinic, Community Hall, Native Store/ Youth Center, Washeteria , Plant, Water Treatment Plant

- Lighting upgrades completed in: October 2009
- Retrofitted 68 light fixtures with electronic ballasts & t8 lamps
- Installed 17 compact fluorescent light bulbs
- Installed 1 led
- Pre-retrofit energy use for all lighting: 8.475 Kilowatts
- Post-retrofit energy use for all lighting: 3.773 Kilowatts
- Energy savings projection: 4.702 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 55%
- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$6,614.98	691.22	$6,912.20
4 Hours/day	$3,526.50	368.50	$3,684.95
7 Hours/day	$6,171.38	644.87	$6,448.67
10 Hours/day	$8,816.25	921.24	$9,212.38

Traditional Council Office

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	9
CFL-14 W	2
CFL-27 W	2
• Pre-retrofit energy use:	996 watts
• Post-retrofit energy use:	496 watts
• Energy savings projection:	500 watts
• Pre-retrofit to post retrofit energy reduction:	50%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$375.00	39.18	$391.85
7 Hours/day	$656.25	68.57	$685.74
10 Hours/day	$937.50	97.96	$979.62
1800 Hours/year (Est.)	$675.00	70.53	$705.33

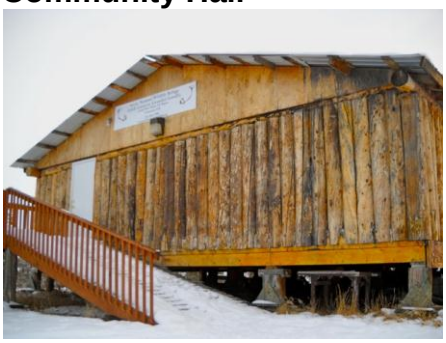
Clinic

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	9
CFL-14 W	3
CFL-23 W	2
LED - 3w Flood Lamp	1
• Pre-retrofit energy use:	1183 watts
• Post-retrofit energy use:	505 watts
• Energy savings projection:	678 watts
• Pre-retrofit to post retrofit energy reduction:	57%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$508.50	53.13	$531.35
7 Hours/day	$889.88	92.99	$929.86
10 Hours/day	$1,271.25	132.84	$1,328.37
1040 Hours/year (Est.)	$528.84	55.26	$552.60

Community Hall

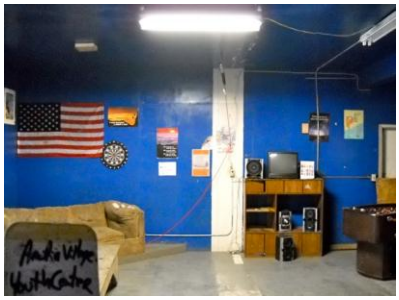



Materials Installed	**Quantity**	
2-lamp electronic ballast, (2) 25 watt T8 lamps	12	
CFL-27 W	3	
• Pre-retrofit energy use:	1233	watts
• Post-retrofit energy use:	633	watts
• Energy savings projection:	600	watts
• Pre-retrofit to post retrofit energy reduction:	49%	

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$450.00	47.02	$470.22
7 Hours/day	$787.50	82.29	$822.88
10 Hours/day	$1,125.00	117.55	$1,175.55
1800 Hours/year (Est.)	$810.00	84.64	$846.39

Native Store / Youth Center



Materials Installed	**Quantity**	
2-lamp electronic ballast, (2) 25 watt T8 lamps	13	
CFL-14 W	1	
CFL-27 W	1	
• Pre-retrofit energy use:	1212	watts
• Post-retrofit energy use:	639	watts
• Energy savings projection:	573	watts
• Pre-retrofit to post retrofit energy reduction:	47%	

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$429.75	44.91	$449.06
7 Hours/day	$752.06	78.59	$785.85
10 Hours/day	$1,074.38	112.26	$1,122.65
1250 Hours/year (Est.)	$537.19	56.13	$561.32

Washeteria



Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	18
4-lamp electronic ballast, (4) 25 watt T8 lamps	3
CFL-14 W	2
• Pre-retrofit energy use:	3104 watts
• Post-retrofit energy use:	1126 watts
• Energy savings projection:	1978 watts
• Pre-retrofit to post retrofit energy reduction:	64%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$1,483.50	155.02	$1,550.16
7 Hours/day	$2,596.13	271.28	$2,712.77
10 Hours/day	$3,708.75	387.54	$3,875.39
2400 Hours/year (Est.)	$3,560.40	372.04	$3,720.38

Note: Sixteen 4-lamp fixtures reduced to 2-lamp fixtures for additional savings.

Water Treatment Plant


Materials Installed	Quantity
4-lamp electronic ballast, (4) 25 watt T8 lamps	4
CFL-14 W	1
• Pre-retrofit energy use:	747 watts
• Post-retrofit energy use:	374 watts
• Energy savings projection:	373 watts
• Pre-retrofit to post retrofit energy reduction:	50%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$279.75	29.23	$292.32
7 Hours/day	$489.56	51.16	$511.56
10 Hours/day	$699.38	73.08	$730.80
1800 Hours/year (Est.)	$503.55	52.62	$526.18

Yukon Flats School District Owned Buildings

2 buildings owned by the Yukon Flats School District received energy efficient lighting upgrades as follows: Arctic Village School

Old High School, Old School Maintenance Garage

- Lighting upgrades completed in: October 2009
- Retrofitted 20 light fixtures with electronic ballasts & t8 lamps
- Installed 8 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 2.536 Kilowatts
- Post-retrofit energy use for all lighting: 1.4 Kilowatts
- Energy savings projection: 1.136 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 45%
- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$1,046.10	109.31	$1,093.10
4 Hours/day	$852.00	89.03	$890.28
7 Hours/day	$1,491.00	155.80	$1,557.99
10 Hours/day	$2,130.00	222.57	$2,225.71

With invitation from local teachers, Arctic Village Jr. High and High School students test various appliances for phantom power and learn about electrical energy savings from ABSN Field Manager Dan Lung.

Old High School

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	12
4-lamp electronic ballast, (4) 25 watt T8 lamps	6
• Pre-retrofit energy use:	1728 watts
• Post-retrofit energy use:	1092 watts
• Energy savings projection:	636 watts
• Pre-retrofit to post retrofit energy reduction:	37%
• Estimated annual savings:	

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$477.00	49.84	$498.43
7 Hours/day	$834.75	87.23	$872.26
10 Hours/day	$1,192.50	124.61	$1,246.08
1800 Hours/year (Est.)	$858.60	89.72	$897.18

Old School Maintenance Garage

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	2
CFL-27 W	8
• Pre-retrofit energy use:	808 watts
• Post-retrofit energy use:	308 watts
• Energy savings projection:	500 watts
• Pre-retrofit to post retrofit energy reduction:	62%
• Estimated annual savings:	

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$375.00	39.18	$391.85
7 Hours/day	$656.25	68.57	$685.74
10 Hours/day	$937.50	97.96	$979.62
500 Hours/year (Est.)	$187.50	19.59	$195.92

Church Owned Buildings

1 building owned by the Church received energy efficient lighting upgrades as follows:

New Church

Materials Installed	**Quantity**
CFL-20 W	9

- Lighting upgrades completed in: October 2009
- Installed 9 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 0.675 Kilowatts
- Post-retrofit energy use for all lighting: 0.18 Kilowatts
- Energy savings projection: 0.495 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 73%
- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$371.25	38.79	$387.93
7 Hours/day	$649.69	67.89	$678.88
10 Hours/day	$928.13	96.98	$969.83
500 Hours/year (Est.)	$185.63	19.40	$193.97

Arctic Village, 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 materials		2	$20.00	$30.00	(Number of entities x 1 hour each) not including church
Staff time for Attending teleconference		3	$20.00	$45.00	(TC/IRA)
Staff time for Attending teleconference		1	$20.00	$20.00	(School)
Maint. Staff time to accompany Field Manager on building assessments - 1st site visit		7	$15.00	$97.50	Leonard John's Time
Conservative village office administrative percentage of total project cost less ABSN Admin %. Total project cost = $20,000/village - (our admin percentage , (around 12%) Approx: $2,400 = $17,600 x 5.5% = $968 (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			$968.00	Each time we call, email, or fax a village entity, someone has to receive the communication, review and/or foward 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. Village expenses for phone charges, copying and fax costs, office supplies, etc. are part of this amount.
Lodging for ABSN Field Managers - 1st assessment site visit				$75.00	3 nights at school-$25/night
Lodging for ABSN Field Managers - 2nd site visit				$100.00	4 nights at school-$25/night
Transportation and fuel costs during 2nd Site-visit				$150.00	Brian Lee-YFSD maintenance provided general transportation of Field Manager & moving supplies on & off over the course of 3 of days during the lighting retrofit trip (Mon, Tues, Wed) - -value $50/day
	TOTAL			$1,485.50	

The capacity of ABSN's scope of work was increased by the response of local communities to work in partnership with ABSN and provide in-kind services of project coordination, paid labor for lighting retrofits, transportation and lodging for ABSN field staff, and other valuable contributions. This allowed ABSN and the community of Arctic Village to deliver 7% more energy savings measures beyond the original grant funding.