Village End Use Energy Efficiency Measures Program

AEA Grant # 2195234 Administered by Alaska Building Science Network

Stony River Final Report

Community Summary

6 community buildings received energy efficiency upgrades as follows:

Village Office, Stony River Inn – Summer Rental, Church, Main School Bldg, Generator Room, School Gym

Retrofits Completed: October 2007 – December 2008

Village-Wide Lighting Retrofit Summary:

- Retrofitted 105 light fixtures with electronic ballasts & T8 lamps
- Installed 49 compact fluorescent light bulbs
- Installed 21 T5 linear fluorescent fixtures in the School Gym
- Pre-retrofit energy use for all lighting: 19.142 Kilowatts
- Post-retrofit energy use for all lighting: 10.119 Kilowatts
- Energy savings projection: 9.023 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 47%

- Estimated Annual Savings:

kWh Rate (as of 11/19/08): $0.85 Fuel Cost (FY 2007 Ave): $3.15

Hours Per Day/ 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$12,487.94	1829.91	$5,764.23
4 Hours/day	$7,660.53	1122.53	$3,535.97
7 Hours/day	**$13,405.90**	1964.43	$6,187.95
10 Hours/day	$19,151.30	2806.33	$8,839.93

- Total project cost for all measures: $ 37,775
- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): 2.82 years
- Total village wide in-kind contribution: $7,873.00 (extended grant capacity by 20.8%)

Stony River Traditional Council Owned Buildings

2 buildings owned by the Stony River Traditional Council received energy efficient lighting upgrades as follows:

Village Office, Stony River Inn – Summer Rental

- Lighting upgrades completed in Oct 2007
- Retrofitted 11 light fixtures with electronic ballasts & T8 lamps
- Installed 44 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 3.994 Kilowatts
- Post-retrofit energy use for all lighting: 1.349 Kilowatts
- Energy savings projection: 2.645 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 66%

- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$3,069.81	449.83	$1,416.98
4 Hours/day	$2,245.61	329.06	$1,036.53
7 Hours/day	$3,929.81	575.85	$1,813.93
10 Hours/day	$5,614.01	822.65	$2,591.33

Village Office

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	1
CFL-14 W	19
CFL-20 W	6
CFL-23 W	8

- Pre-retrofit energy use: 2154 watts
- Post-retrofit energy use: 617 watts
- Energy savings projection: 1537 watts
- Pre-retrofit to post retrofit energy reduction: 71%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
1800 Hours/year (Est.)	$2,348.84	344.19	$1,084.19
4 Hours/day	$1,304.91	191.21	$602.33
7 Hours/day	$2,283.60	334.63	$1,054.07
10 Hours/day	$3,262.28	478.04	$1,505.82

Stony River Inn - Summer Rental

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	10
CFL-20 W	4
CFL-27 W	2

- Pre-retrofit energy use: 1340 watts
- Post-retrofit energy use: 604 watts
- Energy savings projection: 736 watts
- 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
800 Hours/year (Est.)	$499.89	73.25	$230.74
4 Hours/day	$624.86	91.56	$288.43
7 Hours/day	$1,093.51	160.24	$504.75
10 Hours/day	$1,562.16	228.91	$721.07

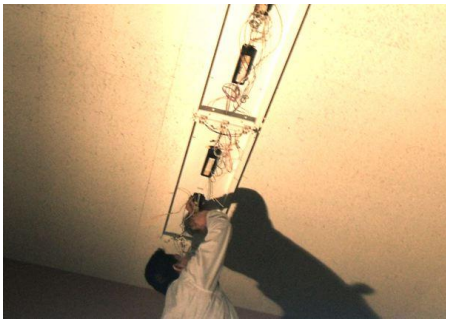
Church

Materials Installed	**Quantity**
CFL-20 W	1
CFL-27 W	4

- Pre-retrofit energy use: 500 watts
- Post-retrofit energy use: 128 watts
- Energy savings projection: 372 watts
- Pre-retrofit to post retrofit energy reduction: 74%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
700 Hours/year (Est.)	$221.08	32.40	$102.05
4 Hours/day	$315.83	46.28	$145.78
7 Hours/day	$552.70	80.99	$255.12
10 Hours/day	$789.57	115.70	$364.45

Kuspuk School District Owned Buildings



3 buildings owned by the Kuspuk School District received energy efficient lighting upgrades as follows:

Main School Bldg, Generator Room, School Gym

- Lighting upgrades completed in October 2007 & December 2008
- Retrofitted 94 light fixtures with electronic ballasts & T8 lamps
- Installed 5 compact fluorescent light bulbs
- Installed 21 T5 linear fluorescent fixtures
- Pre-retrofit energy use for all lighting: 15.148 Kilowatts
- Post-retrofit energy use for all lighting: 8.77 Kilowatts
- Energy savings projection: 6.378 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 42%
- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$9,418.13	1,380.08	$4,347.25
4 Hours/day	$5,414.92	793.47	$2,499.44
7 Hours/day	$9,476.11	1,388.58	$4,374.02
10 Hours/day	$13,537.3	1,983.68	$6,248.59

Main School Bldg

School maintenance worker retrofits a fixture.

Electronic ballast and T-8, 25 watt lighting retrofits save energy while improving light levels in school classrooms and hallways for a better learning environment.

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	29
2-lamp electronic ballast, (2) 32 watt T8 lamps	10
3-lamp fixture, (2) 2-lamp electronic ballasts (3) 25	53
CFL-27 W	1
• Pre-retrofit energy use:	9540 watts
• Post-retrofit energy use:	5806 watts
• Energy savings projection:	3734 watts
• Pre-retrofit to post retrofit energy reduction:	39%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
1800 Hours/year (Est.)	$5,706.30	836.17	$2,633.93
4 Hours/day	$3,170.17	464.54	$1,463.30
7 Hours/day	$5,547.79	812.94	$2,560.77
10 Hours/day	$7,925.42	1161.35	$3,658.24

Generator Room

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 32 watt T8 lamps	2
CFL-27 W	4
• Pre-retrofit energy use:	568 watts
• Post-retrofit energy use:	228 watts
• Energy savings projection:	340 watts
• Pre-retrofit to post retrofit energy reduction:	60%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
1000 Hours/year (Est.)	$288.66	42.30	$133.24
4 Hours/day	$288.66	42.30	$133.24
7 Hours/day	$505.16	74.02	$233.17
10 Hours/day	$721.65	105.75	$333.10

School Gym



T-5 fixtures save energy while improving light levels in large spaces.

Materials Installed	**Quantity**
T5 fixture, electronic ballast, (2) 54 watt T5 HO	15
T5 fixture, electronic ballast, (3) 54 watt T5 HO	6

- Pre-retrofit energy use: 5040 watts
- Post-retrofit energy use: 2736 watts
- Energy savings projection: 2304 watts
- Pre-retrofit to post retrofit energy reduction: 46%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
1750 Hours/year (Est.)	$3,423.17	501.61	$1,580.08
4 Hours/day	$1,956.10	286.64	$902.90
7 Hours/day	$3,423.17	501.61	$1,580.08
10 Hours/day	$4,890.24	716.59	$2,257.25

Stony River - Alaska Building Science Network - T5 Lighting Upgrade Details

These retrofits were completed in Dec, 2008.

School Gym	Length (feet)	Width (feet)	Ceiling Height (feet)	Type of Existing Fixture	# of Existing Fixtures	Existing Fixture Wattage	**Total Existing Wattage**	Existing Foot-candles	New Foot-Candles	# of New Fixtures	New fixtures	New Fixture Wattage	**Total New Wattage**
	56	39	low 16' high 24'	HPS 150 watt		160	**0**			15	T-5 2 lamps	114	**1710**
				HPS 250 watt		260	**0**			6	T-5 3 lamps	171	**1026**
				Other School Gym (A)	40	126	**5,040**				T-5 6 lamps	342	**0**
				Other School Gym (B)			**0**				Other fixtures (A)		**0**
					Total Existing Watts		5,040				Total New Watts		2,736

Percent Savings Pre to Post Retrofit:	**45.71%**

1750

New watts / old watts

Savings & Payback Calculation for Gym:

Assume 1750 hrs / year for 250 days/year of use

Full cost of electricity: $0.85 /kWh

Watts of existing lighting: 5,040

New wattage for T5 fixtures: 2,736

Calculation: (Watts) x (hrs/year) / (1000w/kw) x (cost of electricity) = (cost / year)

Existing Cost: $7,488

Retrofitted Cost: $4,065

Annual Savings: $3,423

T5 Materials costs	$ 3,585
T5 shipping costs	$ 540

Material & shipping cost of Gym retrofit: $4,125

Simple Payback: Materials cost / annual savings **1.21** years (for retrofit to pay for itself in materials)

Stony River, 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)		3	$15.00	$45.00	list number of entities
Staff time for Attending teleconference (TC/IRA)		1	$15.00	$15.00	list # of staff and wages if possible ($15/hr is an average wage designated for village entity staff).
Staff time for Attending teleconference (School)		1	$15.00	$15.00	"
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.
Lodging for ABSN Field Managers - 1st assessment site visit	3-29 through 3-30-07			$120.00	
Transportation and fuel costs - 1st assessment site-visit	3-29 through 3-30-08				
Lodging for ABSN Field Managers - 2nd site visit	10-8 through 10-10-07			$180.00	
Transportation and fuel costs during 2nd Site-visit	10-8 through 10-10-07			$135.00	
KSD cert. electrician maint labor for T5 retrofits				$4,500.00	Comparable estimate - In-kind labor, provided by school district - includes airfare & per diem and lodging.
Kuspuk SD maint labor for T8 and cfl retrofits in school facilities	Oct '07	69	$15.00	$1,035.00	Our tally sheet labor estimate for retrofitting 94 linear fluorescent and 5 cfl light fixtures is 69 hours @ $15/hr
	TOTAL			$7,873.00	