Village End Use Energy Efficiency Measures Program

AEA Grant # 2195294 Administered by Alaska Building Science Network

Allakaket Final Report



Community Summary

11 community buildings and 6 teacher housing units received energy efficiency upgrades.

City Office, Clinic, Community Hall, Mental Health, Post Offices, Tribal Office, Washeteria School, School Gym, Utility Building, Water plant, Bus Barn, and Teacher Housing

Upgrades Completed In May 2010

Village-Wide Lighting Retrofit Summary:

- Installed 73 compact fluorescent light bulbs
- Retrofitted 379 light fixtures with electronic ballasts & T8 lamps
- Pre-retrofit energy use for all lighting: 49.647 Kilowatts
- Post-retrofit energy use for all lighting: 24.637 Kilowatts
- Energy savings projection: 25.010 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 50%
- Estimated Annual Savings:

kWh Rate (FY 2009 AVE): $0.67 Fuel Cost (FY 2009 Ave): $4.98

Hours Per Day/ 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated Use	$34,962.64	3922.90	$19,536.0
4 Hours/day	$16,684.17	1872.01	$9,322.59
7 Hours/day	$29,197.30	3276.01	$16,314.5
10 Hours/day	$41,710.43	4680.01	$23,306.4

- Total project cost for all measures: $52,000
- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): 1.78 years
- Total village wide in-kind contribution: $8,029

Additional Energy Efficiency Measures:

- Installed 2 Programmable Thermostats in Teacher Housing

City Owned Buildings

5 buildings owned by the City received energy efficient lighting upgrades as follows:

City Office, Clinic, Community Hall, Mental Health, Post Offices

- Lighting upgrades completed in May 2010
- Installed 15 compact fluorescent light bulbs
- Retrofitted 90 light fixtures with electronic ballasts & T8 lamps
- Pre-retrofit energy use for all lighting: 12.397 Kilowatts
- Post-retrofit energy use for all lighting: 6.332 Kilowatts
- Energy savings projection: 6.065 Kilowatts
- 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
Locally Estimated	$7,490.53	840.46	$4,185.47
4 Hours/day	$4,045.96	453.97	$2,260.76
7 Hours/day	$7,080.43	794.44	$3,956.32
10 Hours/day	$10,114.9	1134.92	$5,651.89

City Office

Materials Installed — **Quantity**

CFL-27 W: 6

- Pre-retrofit energy use: 450 watts
- Post-retrofit energy use: 162 watts
- Energy savings projection: 288 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	$192.12	21.56	$107.35
7 Hours/day	$336.22	37.72	$187.87
10 Hours/day	$480.31	53.89	$268.38
1750 Hours/year (Est.)	$336.22	37.72	$187.87

Clinic

Materials Installed	Quantity
CFL-27 W	1
2-lamp electronic ballast, (2) 25 watt T8 lamps	2
3-lamp electronic ballast, (3) 25 watt T8 lamps	9
4-lamp electronic ballast, (3) 25 watt T8 lamps	5

- Pre-retrofit energy use: 2379 watts
- Post-retrofit energy use: 1160 watts
- Energy savings projection: 1219 watts
- Pre-retrofit to post retrofit energy reduction: 51%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$813.19	91.24	$454.39
7 Hours/day	$1,423.09	159.67	$795.18
10 Hours/day	$2,032.99	228.11	$1,135.97
1500 Hours/year (Est.)	$1,219.79	136.86	$681.58

Community Hall

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	40
4-lamp electronic ballast, (4) 25 watt T8 lamps	28

- Pre-retrofit energy use: 8064 watts
- Post-retrofit energy use: 4360 watts
- Energy savings projection: 3704 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
4 Hours/day	$2,470.94	277.25	$1,380.68
7 Hours/day	$4,324.14	485.18	$2,416.19
10 Hours/day	$6,177.35	693.11	$3,451.71
2000 Hours/year (Est.)	$4,941.88	554.49	$2,761.37

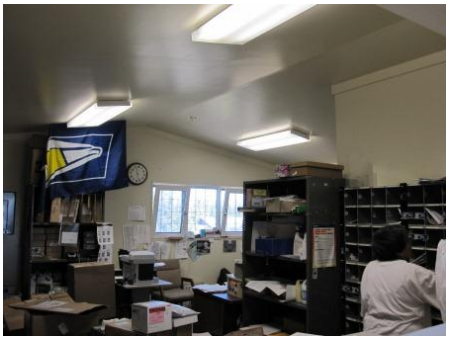
Mental Health Building

Materials Installed	Quantity
CFL-23 W	4
CFL-27 W	4

- Pre-retrofit energy use: 640 watts
- Post-retrofit energy use: 200 watts
- Energy savings projection: 440 watts
- Pre-retrofit to post retrofit energy reduction: 69%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$293.52	32.93	$164.01
7 Hours/day	$513.67	57.63	$287.02
10 Hours/day	$733.81	82.34	$410.03
1500 Hours/year (Est.)	$440.29	49.40	$246.02

Post Offices



Materials Installed **Quantity**

4-lamp electronic ballast, (3) 25 watt T8 lamps 6

- Pre-retrofit energy use: 864 watts
- Post-retrofit energy use: 450 watts
- Energy savings projection: 414 watts
- Pre-retrofit to post retrofit energy reduction: 48%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$276.18	30.99	$154.32
7 Hours/day	$483.31	54.23	$270.06
10 Hours/day	$690.45	77.47	$385.80
2000 Hours/year (Est.)	$552.36	61.98	$308.64

IRA/TC Owned Buildings

2 buildings owned by the IRA/TC received energy efficient lighting upgrades as follows:

Tribal Office, Washeteria

- Lighting upgrades completed in May 2010
- Retrofitted 89 light fixtures with electronic ballasts & T8 lamps
- Pre-retrofit energy use for all lighting: 10.244 Kilowatts
- Post-retrofit energy use for all lighting: 5.566 Kilowatts
- Energy savings projection: 4.678 Kilowatts
- 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
Locally Estimated	$4,690.91	526.33	$2,621.14
4 Hours/day	$3,120.69	350.15	$1,743.75
7 Hours/day	$5,461.21	612.76	$3,051.55
10 Hours/day	$7,801.73	875.37	$4,359.36

Tribal Office

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	24

- Pre-retrofit energy use: 2160 watts
- Post-retrofit energy use: 1104 watts
- Energy savings projection: 1056 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	$704.46	79.04	$393.63
7 Hours/day	$1,232.80	138.32	$688.85
10 Hours/day	$1,761.14	197.60	$984.07
2200 Hours/year (Est.)	$1,549.81	173.89	$865.98

Washeteria



Materials Installed	Quantity
2 ft fixture, 2-lamp electronic ballast, (2) 17 watt T8	2
2-lamp electronic ballast, (2) 25 watt T8 lamps	23
4-lamp electronic ballast, (3) 25 watt T8 lamps	20
4-lamp fixture (2) 2-lamp ballasts (4) 25 watt T8	20

- Pre-retrofit energy use: 8084 watts
- Post-retrofit energy use: 4462 watts
- Energy savings projection: 3622 watts
- 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
4 Hours/day	$2,416.24	271.11	$1,350.12
7 Hours/day	$4,228.41	474.44	$2,362.70
10 Hours/day	$6,040.59	677.77	$3,375.29
1300 Hours/year (Est.)	$3,141.11	352.44	$1,755.15

School Owned Buildings

4 buildings and 6 Teacher Housing Units owned by the School received energy efficient lighting upgrades as follows:

School, School Gym, Utility Building, Waterplant, Bus Barn, Duplex (2) Units, Log Cabin, Single House #1, Single House #2, Single House #4

- Lighting upgrades completed in May 2010
- Installed 58 compact fluorescent light bulbs
- Retrofitted 200 light fixtures with electronic ballasts & T8 lamps
- Pre-retrofit energy use for all lighting: 27.006 Kilowatts
- Post-retrofit energy use for all lighting: 12.739 Kilowatts
- Energy savings projection: 14.267 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 53%
- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$22,781.2	2556.11	$12,729.4
4 Hours/day	$9,517.52	1067.89	$5,318.09
7 Hours/day	$16,655.6	1868.81	$9,306.65
10 Hours/day	$23,793.7	2669.72	$13,295.2

School

Materials Installed	Quantity
CFL-23 W	4
2 ft fixture, 2-lamp electronic ballast, (2) 17 watt T8	1
2-lamp electronic ballast, (1) 25 watt T8 lamp	14
2-lamp electronic ballast, (2) 25 watt T8 lamps	71
3-lamp electronic ballast, (2) 25 watt T8 lamps	47
4-lamp electronic ballast, (3) 25 watt T8 lamps	2

- Pre-retrofit energy use: 11694 watts
- Post-retrofit energy use: 6348 watts
- Energy savings projection: 5346 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
4 Hours/day	$3,566.32	400.15	$1,992.75
7 Hours/day	$6,241.05	700.26	$3,487.30
10 Hours/day	$8,915.79	1000.37	$4,981.86
3600 Hours/year (Est.)	$12,838.7	1440.54	$7,173.88

School Gym

Materials Installed	Quantity
8 ft fixture, 2 lamp electronic ballast, (2) 59 watt T8	31

- Pre-retrofit energy use: 7282 watts
- Post-retrofit energy use: 3658 watts
- Energy savings projection: 3624 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	$2,417.57	271.26	$1,350.86
7 Hours/day	$4,230.75	474.70	$2,364.01
10 Hours/day	$6,043.93	678.14	$3,377.16
2000 Hours/year (Est.)	$4,835.14	542.51	$2,701.72

Utility Building

Materials Installed — **Quantity**

2-lamp electronic ballast, (2) 25 watt T8 lamps — 5

- Pre-retrofit energy use: 360 watts
- Post-retrofit energy use: 230 watts
- Energy savings projection: 130 watts
- Pre-retrofit to post retrofit energy reduction: 36%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$86.72	9.73	$48.46
7 Hours/day	$151.77	17.03	$84.80
10 Hours/day	$216.81	24.33	$121.15
500 Hours/year (Est.)	$43.36	4.87	$24.23

Waterplant

Materials Installed — **Quantity**

2-lamp electronic ballast, (2) 25 watt T8 lamps — 6

4-lamp electronic ballast, (3) 25 watt T8 lamps — 6

- Pre-retrofit energy use: 1320 watts
- Post-retrofit energy use: 726 watts
- Energy savings projection: 594 watts
- Pre-retrofit to post retrofit energy reduction: 45%
- Estimated annual savings:

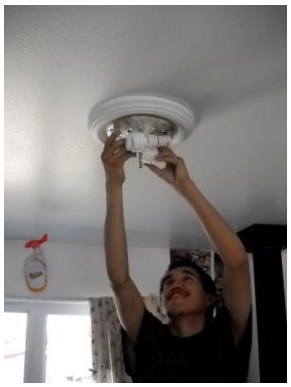
Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$396.26	44.46	$221.42
7 Hours/day	$693.45	77.81	$387.48
10 Hours/day	$990.64	111.15	$553.54
1750 Hours/year (Est.)	$693.45	77.81	$387.48

Bus Barn

Materials Installed	Quantity
CFL-23 W	4
• Pre-retrofit energy use:	400 watts
• Post-retrofit energy use:	92 watts
• Energy savings projection:	308 watts
• Pre-retrofit to post retrofit energy reduction:	77%
• Estimated annual savings:	

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$205.47	23.05	$114.81
7 Hours/day	$359.57	40.34	$200.91
10 Hours/day	$513.67	57.63	$287.02
500 Hours/year (Est.)	$102.73	11.53	$57.40

Duplex (2) Units



Materials Installed	Quantity
CFL-14 W	3
CFL-20 W	5
CFL-23 W	7
CFL-9 W	9
• Pre-retrofit energy use:	1710 watts
• Post-retrofit energy use:	384 watts
• Energy savings projection:	1326 watts
• Pre-retrofit to post retrofit energy reduction:	78%
• Estimated annual savings:	

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$884.57	99.25	$494.27
7 Hours/day	$1,548.01	173.69	$864.98
10 Hours/day	$2,211.44	248.13	$1,235.68
1500 Hours/year (Est.)	$1,326.86	148.88	$741.41

Log Cabin

Materials Installed **Quantity**

CFL-20 W	3
CFL-23 W	4
CFL-9 W	4
• Pre-retrofit energy use:	800 watts
• Post-retrofit energy use:	188 watts
• Energy savings projection:	612 watts
• Pre-retrofit to post retrofit energy reduction:	77%
• Estimated annual savings:	

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$408.27	45.81	$228.13
7 Hours/day	$714.46	80.16	$399.22
10 Hours/day	$1,020.66	114.52	$570.31
1500 Hours/year (Est.)	$612.40	68.71	$342.19

Single House #1

Materials Installed **Quantity**

3-lamp electronic ballast, (2) 25 watt T8 lamps	8
4-lamp electronic ballast, (3) 25 watt T8 lamps	1
• Pre-retrofit energy use:	1260 watts
• Post-retrofit energy use:	491 watts
• Energy savings projection:	769 watts
• Pre-retrofit to post retrofit energy reduction:	61%
• Estimated annual savings:	

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$513.00	57.56	$286.65
7 Hours/day	$897.75	100.73	$501.63
10 Hours/day	$1,282.50	143.90	$716.62
1500 Hours/year (Est.)	$769.50	86.34	$429.97

Single House #2

Materials Installed	Quantity	
3-lamp electronic ballast, (2) 25 watt T8 lamps	8	
• Pre-retrofit energy use:	1260	watts
• Post-retrofit energy use:	416	watts
• Energy savings projection:	844	watts
• Pre-retrofit to post retrofit energy reduction:	67%	

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$563.03	63.17	$314.60
7 Hours/day	$985.31	110.55	$550.56
10 Hours/day	$1,407.58	157.93	$786.51
1500 Hours/year (Est.)	$844.55	94.76	$471.91

Single House #4

Materials Installed	Quantity	
CFL-14 W	3	
CFL-23 W	4	
CFL-9 W	8	
• Pre-retrofit energy use:	920	watts
• Post-retrofit energy use:	206	watts
• Energy savings projection:	714	watts
• Pre-retrofit to post retrofit energy reduction:	78%	

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$476.31	53.44	$266.15
7 Hours/day	$833.54	93.53	$465.76
10 Hours/day	$1,190.77	133.61	$665.37
1500 Hours/year (Est.)	$714.46	80.16	$399.22

Allakaket, 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, intro & 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)		2	$ 15.00	$ 30.00	
Staff time for Attending teleconference (City)		2	$ 15.00	$ 30.00	
Staff time for Attending teleconference (School)		2	$ 15.00	$ 30.00	
Maint. Staff time to accompany Field Manager on building assessments - 1st site visit		6	12	$ 72.00	list entity and maint staff, add rows as necessary
Maint. Staff time to attend ABSN training		12	12	$ 144.00	list entity and maint staff, add rows as necessary
Conservative village office administrative percentage of total project cost less ABSN Admin %. Total project cost = $52,000 / Allakaket - (our admin percentage , (around 12%) Approx: $6,240) = $45,760 x 5.5% = $2,288 (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			$2,288.00	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. 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		2	50	$ 100.00	
Lodging for ABSN Field Managers - 2nd visit		5	50	$ 250.00	
Office Manager / Staff time for specific upgrades beyond lighting,		180	18	$3,240.00	conservative est for sd labor for school lighting retrofits
School T5s, etc . .		100	$ 18.00	$1,800.00	conservative est for sd labor for gym retrofits
	TOTAL			$8,029.00	

The capacity of ABSN's scope of work was greatly 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 Allakaket to deliver 15% more energy savings measures beyond the original grant funding.