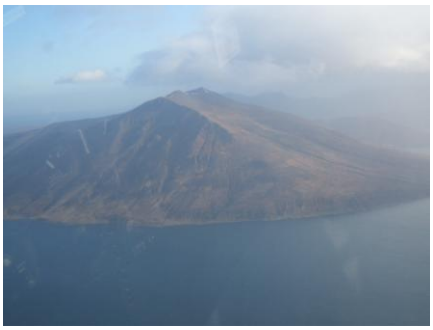
Village End Use Energy Efficiency Measures Program

AEA Grant # 2195225 Administered by Alaska Building Science Network

False Pass Final Report


Community Summary

11 community buildings received energy efficiency upgrades as follows:

City Office/Community Center, City Shop, Clinic, Library/Post Office, Old Generator building, Water Treatment Plant , Tribal Office/Warehouse, Isanotski Corp Office & Triplex B&B, Grocery Store, Liquor Store, K-12 School and Gymnasium.

Retrofits Completed: July 2007 - December 2008

Village-Wide Lighting Retrofit Summary:

- Retrofitted 275 light fixtures with electronic ballasts & T8 lamps
- Installed 71 compact fluorescent light bulbs
- Installed 8, T5 linear fluorescent fixtures in the School Gym
- Pre-retrofit energy use for all lighting: 36.964 Kilowatts
- Post-retrofit energy use for all lighting: 20.067 Kilowatts
- Energy savings projection: 16.897 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 46%

- Estimated Annual Savings:

kWh Rate (as of Fall 2008): $0.65 Fuel Cost (FY 2007 Ave): $2.48

Hours Per Day/ 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$19,154.19	2524.32	$6,260.31
4 Hours/day	$11,033.70	1454.13	$3,606.24
7 Hours/day	**$19,309.00**	2544.73	$6,310.93
10 Hours/day	$27,584.30	3635.33	$9,015.61

- Total project cost for all measures: $37,775
- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): **1.96 years**
- Total village wide in-kind contribution: $ 10,369 (extended grant capacity by 27.4 %)

City of False Pass Owned Buildings

John Shelikof and Siri Goullete work on a fixture.

Crab pots in storage.

John and Siri take a break after completing lighting retrofits in the community library.

6 buildings owned by the City of False Pass received energy efficient lighting upgrades as follows:

City Office/Community Center, City Shop, Clinic, Library/Post Office, Old Generator building, Water Treatment Plant

- Lighting upgrades completed in November 2007
- Retrofitted 77 light fixtures with electronic ballasts & T8 lamps
- Installed 24 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 11.838 Kilowatts
- Post-retrofit energy use for all lighting: 6.389 Kilowatts
- Energy savings projection: 5.449 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	$6,678.07	880.10	$2,182.65
4 Hours/day	$3,558.20	468.93	$1,162.95
7 Hours/day	$6,226.84	820.63	$2,035.17
10 Hours/day	$8,895.49	1172.33	$2,907.38

City Office/Community Center



Materials Installed — **Quantity**

2-lamp electronic ballast, (2) 25 watt T8 lamps	1
4-lamp electronic ballast, (4) 25 watt T8 lamps	17
CFL-14 W	7

- Pre-retrofit energy use: 2940 watts
- Post-retrofit energy use: 1675 watts
- Energy savings projection: 1265 watts
- Pre-retrofit to post retrofit energy reduction: 43%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
2000 Hours/year (Est.)	$1,652.09	217.73	$539.97
4 Hours/day	$826.05	108.86	$269.98
7 Hours/day	$1,445.58	190.51	$472.47
10 Hours/day	$2,065.11	272.16	$674.96

City Shop


Materials Installed — **Quantity**

4-lamp electronic ballast, (4) 32 watt T8 lamps	3
CFL-23 W	7

- Pre-retrofit energy use: 1204 watts
- Post-retrofit energy use: 521 watts
- Energy savings projection: 683 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
2150 Hours/year (Est.)	$958.90	126.37	$313.40
4 Hours/day	$446.00	58.78	$145.77
7 Hours/day	$780.50	102.86	$255.10
10 Hours/day	$1,115.00	146.94	$364.42

Clinic

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	2
4-lamp electronic ballast, (4) 25 watt T8 lamps	18
CFL-14 W	2
CFL-20 W	3

- Pre-retrofit energy use: 3517 watts
- Post-retrofit energy use: 1802 watts
- Energy savings projection: 1715 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
2000 Hours/year (Est.)	$2,239.79	295.18	$732.05
4 Hours/day	$1,119.90	147.59	$366.02
7 Hours/day	$1,959.82	258.28	$640.54
10 Hours/day	$2,799.74	368.98	$915.06

Library/Post Office

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	7
4-lamp electronic ballast, (3) 25 watt T8 lamps	15
CFL-20 W	1
CFL-23 W	1

- Pre-retrofit energy use: 2824 watts
- Post-retrofit energy use: 1497 watts
- Energy savings projection: 1327 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
2000 Hours/year (Est.)	$1,733.06	228.40	$566.43
4 Hours/day	$866.53	114.20	$283.22
7 Hours/day	$1,516.43	199.85	$495.63
10 Hours/day	$2,166.33	285.50	$708.04

Notes: Fifteen 4-lamp fixtures were de-lamped to three, 25-watt T-8 lamps each for additional savings.

Old Generator Building

Materials Installed — **Quantity**

2-lamp electronic ballast, (2) 32 watt T8 lamps	10
CFL-20 W	1

- Pre-retrofit energy use: 915 watts
- Post-retrofit energy use: 620 watts
- Energy savings projection: 295 watts
- Pre-retrofit to post retrofit energy reduction: 32%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
100 Hours/year (Est.)	$19.26	2.54	$6.30
4 Hours/day	$192.64	25.39	$62.96
7 Hours/day	$337.11	44.43	$110.18
10 Hours/day	$481.59	63.47	$157.40

Notes: these lights were changed to maintain consistency with updating lighting in other City buildings. Small measurable savings is anticipated since lights are rarely on.

Water Treatment Plant

Materials Installed — **Quantity**

2-lamp electronic ballast, (2) 32 watt T8 lamps	4
CFL-14 W	1
CFL-20 W	1

- Pre-retrofit energy use: 438 watts
- Post-retrofit energy use: 274 watts
- Energy savings projection: 164 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
700 Hours/year (Est.)	$74.96	9.88	$24.50
4 Hours/day	$107.09	14.11	$35.00
7 Hours/day	$187.41	24.70	$61.25
10 Hours/day	$267.73	35.28	$87.50

False Pass Tribal Council Owned Buildings

Lighting supplies delivered to False Pass.

1 building owned by the False Pass Tribal Council received energy efficient lighting upgrades as follows:
Retrofits Completed: December 2008

Tribal Office/Warehouse

Energy efficient T-8 lighting retro-kits used to update inefficient high output fixtures.

Materials Installed	**Quantity**	
2 ft fixture, 2-lamp electronic ballast, (2) 17 watt T8	3	
2-lamp electronic ballast, (2) 25 watt T8 lamps	8	
2-lamp electronic ballast, (2) 32 watt T8 lamps	15	(four of these are 4ft, 2-lamp retro-kits)
4-lamp electronic ballast, (4) 32 watt T8 lamps	18	(all of these are 8ft, 4-lamp retro-kits)
CFL-20 W	1	

- Lighting upgrades completed in November 2007
- Retrofitted 44 light fixtures with electronic ballasts & T8 lamps
- Installed 1 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 6.751 Kilowatts
- Post-retrofit energy use for all lighting: 3.552 Kilowatts
- Energy savings projection: 3.199 Kilowatts
- 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
Locally Estimated	$3,133.42	412.95	$1,024.12
4 Hours/day	$2,088.95	275.30	$682.75
7 Hours/day	$3,655.66	481.78	$1,194.81
10 Hours/day	$5,222.37	688.25	$1,706.87

Isanotski Corporation Owned Buildings



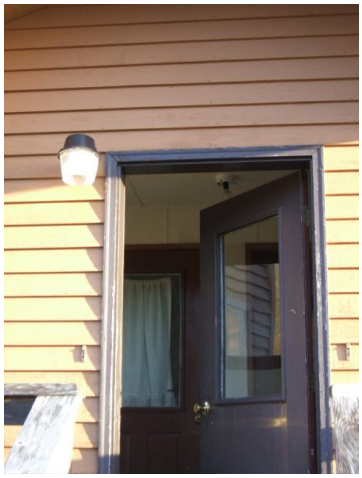
3 buildings owned by the Isanotski Corporation received energy efficient lighting upgrades as follows:

Isanotski Corp Office & Triplex B&B, Grocery Store, Liquor Store

- Lighting upgrades completed in November 2007
- Retrofitted 25 light fixtures with electronic ballasts & T8 lamps
- Installed 46 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 5.767 Kilowatts
- Post-retrofit energy use for all lighting: 2.187 Kilowatts
- Energy savings projection: 3.58 Kilowatts
- 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
Locally Estimated	$3,903.60	514.45	$1,275.84
4 Hours/day	$2,337.74	308.09	$764.06
7 Hours/day	$4,091.05	539.16	$1,337.11
10 Hours/day	$5,844.35	770.22	$1,910.15

Triplex-Isanotski Office



Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	2
CFL-14 W	3
CFL-20 W	4
CFL-23 W	1
CFL-27 W	4

- Pre-retrofit energy use: 1148 watts
- Post-retrofit energy use: 347 watts
- Energy savings projection: 801 watts
- Pre-retrofit to post retrofit energy reduction: 70%
- 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.)	$915.34	120.63	$299.17
4 Hours/day	$523.05	68.93	$170.95
7 Hours/day	$915.34	120.63	$299.17
10 Hours/day	$1,307.63	172.33	$427.38

Triplex-Leased Upstairs Apartment

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	3
CFL-14 W	13
CFL-20 W	6
CFL-23 W	4

- Pre-retrofit energy use: 1882 watts
- Post-retrofit energy use: 535 watts
- Energy savings projection: 1347 watts
- Pre-retrofit to post retrofit energy reduction: 72%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
1500 Hours/year (Est.)	$1,319.39	173.88	$431.23
4 Hours/day	$879.59	115.92	$287.48
7 Hours/day	$1,539.28	202.86	$503.10
10 Hours/day	$2,198.98	289.80	$718.71

Tri-Plex-B&B

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	3
CFL-14 W	1
CFL-20 W	2
CFL-23 W	5

- Pre-retrofit energy use: 950 watts
- Post-retrofit energy use: 310 watts
- Energy savings projection: 640 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
1500 Hours/year (Est.)	$626.88	82.62	$204.89
4 Hours/day	$417.92	55.08	$136.59
7 Hours/day	$731.36	96.39	$239.04
10 Hours/day	$1,044.80	137.69	$341.48

Grocery Store

Siri Goulette performs a systems watts test during the lighting assessment.

Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	2
2-lamp electronic ballast, (2) 32 watt T8 lamps	10
CFL-20 W	1

- Pre-retrofit energy use: 1167 watts
- Post-retrofit energy use: 714 watts
- Energy savings projection: 453 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
2400 Hours/year (Est.)	$709.94	93.56	$232.04
4 Hours/day	$295.81	38.98	$96.68
7 Hours/day	$517.67	68.22	$169.19
10 Hours/day	$739.52	97.46	$241.70

Liquor Store

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	5
CFL-23 W	2

- Pre-retrofit energy use: 620 watts
- Post-retrofit energy use: 281 watts
- Energy savings projection: 339 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
1500 Hours/year (Est.)	$332.05	43.76	$108.53
4 Hours/day	$221.37	29.17	$72.35
7 Hours/day	$387.39	51.05	$126.61
10 Hours/day	$553.42	72.93	$180.88

Aleutians East Borough School District Owned Buildings



False Pass School

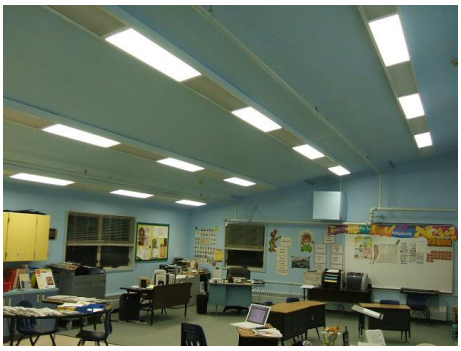
1 building owned by the School District received energy efficient lighting upgrades as follows:
False Pass K-12 School and Gymnasium

- School Lighting upgrades completed July 2007 - December 2007
- Retrofitted 129 light fixtures with electronic ballasts & T8 lamps
- Installed 8 T5 linear fluorescent fixtures in the School Gym
- Pre-retrofit energy use for all lighting: 12.608 Kilowatts
- Post-retrofit energy use for all lighting: 7.939 Kilowatts
- Energy savings projection: 4.669 Kilowatts
- 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
Locally Estimated	$5,439.10	716.82	$1,777.70
4 Hours/day	$3,048.86	401.81	$996.48
7 Hours/day	$5,335.50	703.16	$1,743.84
10 Hours/day	$7,622.14	1004.52	$2,491.20

K-12 School



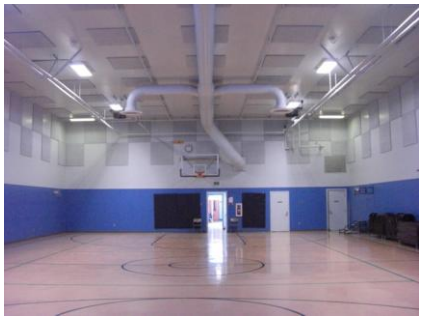
All classroom and hallway fixtures updated with energy efficient electronic ballast and 25 watt T-8 lamps save energy while improving light levels for a better learning environment.

Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	125
2-lamp electronic ballast, (2) 32 watt T8 lamps	4
• Pre-retrofit energy use:	9288 watts
• Post-retrofit energy use:	6115 watts
• Energy savings projection:	3173 watts
• Pre-retrofit to post retrofit energy reduction:	34%
• Estimated annual savings:	

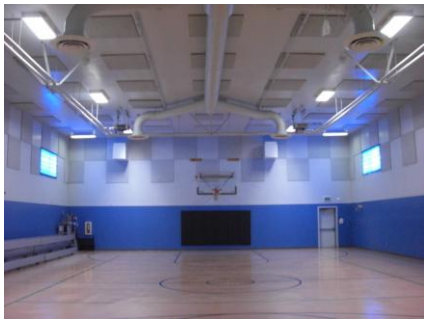
Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
1800 Hours/year (Est.)	$3,729.54	491.51	$1,218.96
4 Hours/day	$2,071.97	273.06	$677.20
7 Hours/day	$3,625.95	477.86	$1,185.10
10 Hours/day	$5,179.92	682.66	$1,692.99

Gymnasium

Existing 400 watt metal halide fixtures- pre retrofit



T-5 fluorescent fixtures installed in high school gymnasium.



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

Materials Installed	**Quantity**
T5 fixture, electronic ballast, (4) 54 watt T5 HO	8
• Pre-retrofit energy use:	3320 watts
• Post-retrofit energy use:	1824 watts
• Energy savings projection:	1496 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
1750 Hours/Year (Est)	$1,709.55	225.30	$558.75
4 Hours/day	$976.89	128.74	$319.28
7 Hours/day	$1,709.55	225.30	$558.75
10 Hours/day	$2,442.22	321.86	$798.21

False Pass - Alaska Building Science Network - T5 Lighting Upgrade Details

These retrofits were completed in July 2007

False Pass 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**
	81ft/10in	50 ft/3in.	19ft/10in.	HPS 150 watt		160	**0**	14	34		T-5 2 lamps	114	**0**
				HPS 250 watt		260	**0**				T-5 3 lamps	171	**0**
				Multi-Vapor 400 watt	8	415	**3,320**			8	T-5 4 lamps	228	**1824**
				Other School Gym			**0**				T-5 6 lamps	342	**0**
				Other School Gym			**0**				Other fixtures		**0**
					Total Existing Watts		3,320				Total New Watts		1824

Percent Savings Pre to Post Retrofit:	**45.06%**

Savings & Payback Calculation for Gym:

1750 New watts / old watts

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

neg 1 (New watts / Old watts x 100 - 100) / 100

Full cost of electricity: $0.6530 /kWh

Watts of existing lighting: 3,320

New wattage for T5 fixtures: 1,824

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

Existing Cost: $3,794

Retrofitted Cost: $ 2,084

Annual Savings: $ $ 1,710

Est material & shipping cost of Gym retrofit: $1,698 PO 199 is ~ $,1500

Simple Payback: Materials cost / annual savings = **0.99** years (for retrofit to pay for itself in materials)

False Pass, 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 & review of intro materials (Number of entities x 1 hour each)		4.00	$15.00	$60.00	list number of entities
Staff time for Attending teleconference (TC/IRA)		1.00	$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		1.00	$15.00	$15.00	City
Staff time for Attending teleconference		3.00	$15.00	$45.00	Village Corp
Staff time for Attending teleconference		2.00	$15.00	$30.00	School
Maint labor hours for lighting upgrades - in-kind from Isanoski Corp.	11/27/07	15.00	$4.00	$60.00	4 hours x $15/hr
Maint labor hours for lighting upgrades - in-kind from False pass Tribal Council.	11-27 to 11-30-07	66.50	$20.00	$1,330.00	16.5 hours x $20/hr - estimated wage including fringe
Maint labor hours for lighting upgrades - in-kind from False Pass School - Siri G	11-29 to 1-24-08	85.00	$22.00	$1,870.00	85 hours x $22/hr - estimated wage including fringe
Conservative village office administrative percentage of total project cost less ABSN Admin %. Total project cost = $37,775/village - (our admin percentage , (around 9%) Approx: $3,400) = $34,375 x 5% = $1,718 (this 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 project support.	Feb, '07 through			$1,718.00	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. Wether 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 ammount.
Lodging for ABSN Field Managers - 1st assessment site visit	Oct 22-25, 2007			$255	$85/nightx3 nights
Lodging for ABSN Field Managers - 2nd site visit	Nov 26-Dec 1, 2007			$340	$85/nightx4 nights
School gymnasium lights, labor				$4,271.00	see ext tab to the right: itemized statement-paid for by AEBSD
Isanotski Corporation labor		24.00	$15.00	$360.00	All corp buildings labor hours in-kind. **Estmate hrs from tallysheet**
	TOTAL			$10,369.00	