

Village End Use Energy Efficiency Measures Program '05 – '06
AEA Grant # 2195225 Administered by Alaska Building Science Network

Gambell Final Report



Community Summary

12 Community buildings received energy efficiency upgrades August '05 – June '07

City Hall, Washeteria, Clinic, Qernughvik Building, Community Building, Library, Small Trailer, Sivuqaq Lodge, Village Corporation Annex, Village Corporation Rental Trailer, Birder's Building 1, Birder's Building 2

Village-Wide Lighting Retrofit Summary:

- Retrofitted 291 light fixtures village-wide with electronic ballasts and T8 lamps
- Installed: 160 compact fluorescent light bulbs village-wide
- T5 Light fixtures were installed in the school Gym
- Pre-retrofit energy use for all lighting: 49,601 watts
- Post-retrofit energy use for all lighting: 27,488 watts
- Energy savings projection: 22,113 watts (22.11 kW)
- **Pre-retrofit to post retrofit energy reduction: 45 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$4,423	1,620 Gallons	\$2,948
7 Hours	\$7,740	2,835 Gallons	\$5,160
10 Hours	\$11,057	4,050 Gallons	\$7,371

- Total project cost for all measures: \$ 38,235
- Simple mean payback 4.94 Years
- *(All grant funds, but accounting for lighting savings only)
- Total village wide in-kind contribution: \$ 9,528

Additional Energy Efficiency Measures: (Budget Expense: \$ 2,350)

- Installation of a Monitor heater in the Gambell IRA Bingo hall and community building. In-kind labor provided by Native Village of Gambell IRA.

Gambell City Owned Buildings

Energy efficient lighting upgrades were completed in four buildings owned by the City of Gambell.

City owned Buildings - Lighting Retrofit Summary:

- Substantial lighting upgrades completed in December, 2006. The washeteria is scheduled to be completed by June 2007. We found out in May, 2007 that parts of this building did not receive lighting retrofits. We were asked if this building could be completed. Since we still had some remaining '05-'06 grant funds we agreed to provide materials for the retrofits. The City of Gambell will provide in-kind labor for these upgrades.)
- Retrofitted 164 linear fluorescent fixtures with T8 lamps and electronic ballasts
- Installed: 17 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 16,109 watts
- Post-retrofit energy use for all lighting: 10,975 watts
- Energy savings projection: 5,134 watts (5.13 kW)
- **Pre-retrofit to post retrofit energy reduction: 32 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$1,027	376 Gallons	\$685
7 Hours	\$1,797	658 Gallons	\$1,198
10 Hours	\$2,567	940 Gallons	\$1,711

City Hall



Outside of City Hall Building



City Hall Upstairs Hallway



City Hall Main Room Downstairs

Materials Installed	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
City Hall	40	6	0	0	0	0	0	0

- Pre-retrofit energy use: 3,832 watts
- Post-Retrofit Energy Use: 3,120 watts
- Energy savings projection: 712 watts (.71 Kw)
- **Pre-retrofit to post retrofit energy reduction: 19 %**

• **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$142	52 Gallons	\$95
7 Hours	\$249	91 Gallons	\$166
10 Hours	\$356	130 Gallons	\$237

Washeteria & Garage



Washeteria & Garage Outside



Laundry Room



Garage

Materials Installed	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
Washeteria	46	2	0	0	0	10	0	0

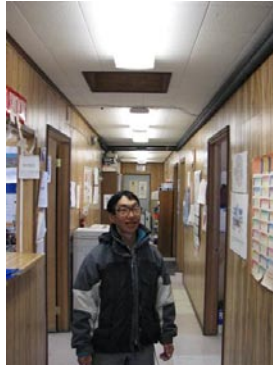
- Pre-retrofit energy use: 4,700 watts
- Post-Retrofit Energy Use: 3,130 watts
- Energy savings projection: 1,570 watts (1.57 Kw)
- **Pre-retrofit to post retrofit energy reduction: 33 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$314	115 Gallons	\$209
7 Hours	\$550	201 Gallons	\$366
10 Hours	\$785	288 Gallons	\$523

Clinic



Clinic From the Outside



Miller Campbell and his lighting upgrades in the Clinic Hall



Small Office Inside Clinic

Materials Installed	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
Clinic (Old Portion)	21	6	0	0	0	0	2	1

- Pre-retrofit energy use: 3,751 watts
- Post-Retrofit Energy Use: 2,045 watts
- Energy savings projection: 1,706 watts (1.71 Kw)
- **Pre-retrofit to post retrofit energy reduction: 45 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$341	125 Gallons	\$227
7 Hours	\$597	219 Gallons	\$398
10 Hours	\$853	312 Gallons	\$569

Qernughvik Building



One of the Two Local Bingo Halls



Inside the Q Building with Miller Campbell

Materials Installed	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
Qernughvik (Q Building)	43	0	0	0	0	0	0	4

- Pre-retrofit energy use: 3,826 watts
- Post-Retrofit Energy Use: 2,680 watts
- Energy savings projection: 1,146 watts (1.15 Kw)
- **Pre-retrofit to post retrofit energy reduction: 30 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$229	84 Gallons	\$153
7 Hours	\$401	147 Gallons	\$267
10 Hours	\$573	210 Gallons	\$382

Gambell IRA Owned Buildings

Energy efficient lighting upgrades were completed in 3 buildings owned by the Gambell IRA

IRA owned Buildings - Lighting Retrofit Summary:

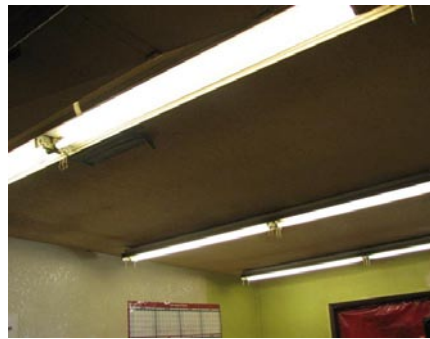
- Substantial lighting upgrades completed in December, 2006.
The library is scheduled to be completed in June 2007. (This building was originally operated by the City of Gambell and was not in use. It was subsequently transferred to the IRA. In May, '07 we were asked if this building could be done. Since we still had some remaining '05-'06 grant funds we agreed to provide materials for the retrofits. The Gambell IRA will provide in-kind labor for these upgrades.)
- Retrofitted 48 linear fluorescent fixtures with T8 lamps and electronic ballasts
- Installed: 1 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 3,689 watts
- Post-retrofit energy use for all lighting: 2,321 watts
- Energy savings projection: 1,368 watts (1.37 kW)
- **Pre-retrofit to post retrofit energy reduction: 37 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$274	100 Gallons	\$182
7 Hours	\$479	175 Gallons	\$319
10 Hours	\$684	251 Gallons	\$456

Community Building



The Second Gambell Bingo Hall



Bingo Hall Offices



Bingo Hall Main Room

Materials Installed	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
Community Building	0	0	18	9	0	0	1	0

- Pre-retrofit energy use: 2,039 watts
- Post-Retrofit Energy Use: 1,334 watts
- Energy savings projection: 705 watts (.71 Kw)
- **Pre-retrofit to post retrofit energy reduction: 35 %**

- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$141	52 Gallons	\$94
7 Hours	\$247	90 Gallons	\$165
10 Hours	\$353	129 Gallons	\$235

Library

Materials Installed	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
Library	0	0	15	0	0	0	0	0

- Pre-retrofit energy use: 1,230 watts
- Post-Retrofit Energy Use: 705 watts
- Energy savings projection: 525 watts (.53 Kw)
- **Pre-retrofit to post retrofit energy reduction: 43 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$105	38 Gallons	\$70
7 Hours	\$184	67 Gallons	\$123
10 Hours	\$263	96 Gallons	\$175

Small Office Trailer

TC/IRA Buildings	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL
Small Office Trailer	0	0	6	0	0	0	0	0

- Pre-retrofit energy use: 420 watts
- Post-Retrofit Energy Use: 282 watts
- Energy savings projection: 138 watts (.14 Kw)
- **Pre-retrofit to post retrofit energy reduction: 33 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$28	10 Gallons	\$18
7 Hours	\$48	18 Gallons	\$32
10 Hours	\$69	25 Gallons	\$46

Gambell Village Corporation Owned Buildings

Energy efficient lighting upgrades were completed in 5 buildings owned by Sivuqaq Inc.

Village Corporation owned Buildings - Lighting Retrofit Summary:

- Substantial lighting upgrades completed in December, 2006. The Annex, Rental Office, Birder’s Building #1, Birder’s Building #2 is scheduled to be completed in June 2007. (These buildings were not originally part of USKH energy audits. We were asked by Sivuqaq Inc. in April if these buildings could be done. Since we still had remaining '05-'06 grant funds we agreed to provide materials for the retrofits. Sivuqaq will provide in-kind labor for these upgrades.)
- Retrofitted 36 linear fluorescent fixtures with T8 lamps and electronic ballasts
- Installed: 142 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 13,615 watts
- Post-retrofit energy use for all lighting: 4,202 watts
- Energy savings projection: 9,413 watts (9.41 kW)
- **Pre-retrofit to post retrofit energy reduction: 69 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$1,883	690 Gallons	\$1,255
7 Hours	\$3,295	1,207 Gallons	\$2,196
10 Hours	\$4,707	1,724 Gallons	\$3,138

Sivuqaq Lodge



Outside of Sivuqaq Lodge



Lodge Bathroom



Lodge Sitting Room & Hansen Irrigoo

Village Corp Buildings	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL	3-way CFLs
Sivuqaq Lodge	30	0	0	60	0	0	0

- Pre-retrofit energy use: 6,460 watts
- Post-Retrofit Energy Use: 2,340 watts
- Energy savings projection: 4,120 watts (4.12 Kw)
- **Pre-retrofit to post retrofit energy reduction: 64 %**

- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$824	302 Gallons	\$549
7 Hours	\$1,442	528 Gallons	\$961
10 Hours	\$2,060	755 Gallons	\$1,373

Annex

Village Corp Buildings	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL	3-way CFLs
Annex	0	0	0	0	8	10	10	0

- Pre-retrofit energy use: 2,480 watts
- Post-Retrofit Energy Use: 554 watts
- Energy savings projection: 1,926 watts (1.93 Kw)
- **Pre-retrofit to post retrofit energy reduction: 78 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$385	141 Gallons	\$257
7 Hours	\$674	247 Gallons	\$449
10 Hours	\$963	353 Gallons	\$642

Rental Office

Village Corp Buildings	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL	3-way CFLs
Rental "Office"	6	0	0	0	0	0	0	0

- Pre-retrofit energy use: 420 watts
- Post-Retrofit Energy Use: 282 watts
- Energy savings projection: 138 watts (.14 Kw)
- **Pre-retrofit to post retrofit energy reduction: 33 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$28	10 Gallons	\$18
7 Hours	\$48	18 Gallons	\$32
10 Hours	\$69	25 Gallons	\$46

Birder's Building 1



Village Corp Buildings	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL	3-way CFLs
Birder's Building 1	0	0	0	0	9	8	12	7

- Pre-retrofit energy use: 3,175 watts
- Post-Retrofit Energy Use: 717 watts
- Energy savings projection: 2,458 watts (2.46 Kw)
- **Pre-retrofit to post retrofit energy reduction: 77 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$492	180 Gallons	\$328
7 Hours	\$860	315 Gallons	\$574
10 Hours	\$1,229	450 Gallons	\$819

Birder's Building 2



Village Corp Buildings	2-Lamp Ballasts 25w lamps	2-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Fixtures 3-lamp ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL	3-way CFLs
Birder's Building 2	0	0	0	0	8	7	1	2

- Pre-retrofit energy use: 1,080 watts
- Post-Retrofit Energy Use: 309 watts
- Energy savings projection: 771 watts (.77 Kw)
- **Pre-retrofit to post retrofit energy reduction: 71 %**

- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$154	56 Gallons	\$103
7 Hours	\$270	99 Gallons	\$180
10 Hours	\$386	141 Gallons	\$257

Notes: The majority of lighting in Sivuqaq Inc buildings was incandescent bulbs. Throughout their buildings Sivuqaq maintenance staff replaced 142 incandescents with CFLs which will result in sizeable savings and substantially reduced energy use.

Gambell School Owned Buildings

Energy efficient lighting upgrades were completed in six room spaces in the school owned by the Bering Straits School District.

School owned Buildings - Lighting Retrofit Summary:

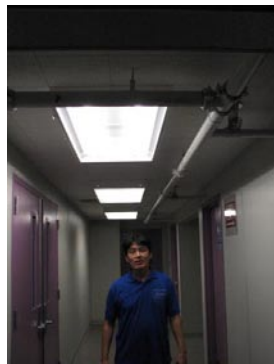
- Lighting upgrades completed in August, 2005
- Retrofitted 43 linear fluorescent fixtures with T8 lamps and electronic ballasts
- Pre-retrofit energy use for all lighting: 16,188 watts
- Post-retrofit energy use for all lighting: 9,990 watts
- Energy savings projection: 6,198 watts (6.20 kW)
- **Pre-retrofit to post retrofit energy reduction: 38 %**
- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$1,240	454 Gallons	\$826
7 Hours	\$2,169	795 Gallons	\$1,446
10 Hours	\$3,099	1,135 Gallons	\$2,066

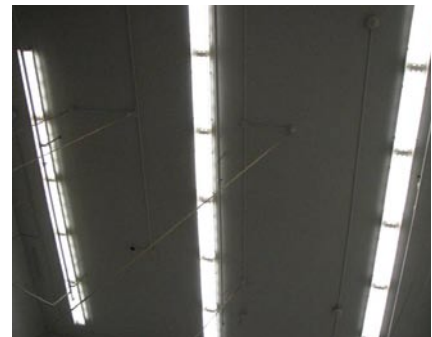
School Building



Gambell School



School Hallway



School Shop

School Buildings	2-Lamp Ballasts 32w lamps	4-Lamp Ballasts 32w lamps	2-Lamp Ballasts 25w lamps	4-Lamp Ballasts 25w lamps	13w CFL	20w CFL	25w CFL	3-Lamp Fixtures 3-lamp ballasts (3) 32w lamps
Fixture TOTALS	24	0	0	0	0	0	0	19

- Pre-retrofit energy use: 4,153 watts
- Post-Retrofit Energy Use: 3,150 watts
- Energy savings projection: 1,003 watts (1 Kw)
- **Pre-retrofit to post retrofit energy reduction: 24 %**

- **Estimated Annual Savings:**

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$201	73 Gallons	\$134
7 Hours	\$351	129 Gallons	\$234
10 Hours	\$502	184 Gallons	\$334

High Output T5 Lighting Upgrades for the School Gym



School Gym

Hours Per Day / 250 Days Per Year	Electrical Savings	Avoided Diesel Use	Avoided Diesel Costs
4 Hours	\$1,039	381 Gallons	\$693
7 Hours	\$1,818	666 Gallons	\$1,212
10 Hours	\$2,598	951 Gallons	\$1,732

Notes: With the darker walls of the Gambell gym, we chose to use all 4-lamp fixtures to provide ample lighting. Four choices of wall switching also give flexibility in selecting light levels. The lighting plan with all 4-lamp fixtures will result in a 43% reduction in energy use while providing exceptional light level.

Gambell School, T5 Lighting Upgrade Details, ABSN Energy Efficiency Projects '05-'06

These retrofits were completed in August, 2005.

Gambell Gym	Length (feet)	Width (feet)	Ceiling Height (feet)	# of Existing Fixtures	Existing Fixture Wattage	Total Existing Wattage	Existing Foot-candles	New Foot-Candles	# of New Fixtures	lamps / fixture	New Fixture Wattage	Total New Wattage
	86	58	27	29	415	12,035		92	30	4	228	6840

New T5 wattage = 57 watts / lamp, which includes ballast wattage

New foot candles per Industrial Lighting Products

Total New wattage for gym = ~43 % savings !

Savings & Payback Calculation for Gym:

Assume 1800 hrs / year for 250 days/year of use

Full cost of electricity: \$ /kWh
0.20

Watts of existing lighting: 12,035

New wattage for T5 fixtures: 6,840

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

Existing Cost: \$ /yr
4,333

Retrofitted Cost: \$ /yr
2,462

Annual Savings: \$ \$ /yr
1,870

Est material & shipping cost of Gym retrofit: \$
6,417.42

Simple Payback: Materials cost / annual savings = **3.431408** years (for retrofit to pay for itself in materials)

Measures Beyond Lighting:

Notes: With the expense of T5 lighting upgrades for the Gambell school gym, little materials and labor budget was left for energy saving measures beyond lighting.

New Monitor heater for the Gambell IRA Bingo Hall

Prior to the VEUEEM program The Gambell IRA Bingo Hall had an old, worn out forced air furnace barely heating that building. Duct leakage into the attic space was also occurring. The Gambell IRA staff mentioned what they thought was excessive fuel use for that building. During the course of the grant, the old forced air furnace broke down for the last time and we used grant funds to purchase a replacement Monitor heater. Fuel savings and payback on the measure is expected to be substantial. Gambell IRA maintenance staff installed the new Monitor through in-kind labor.

Gambell, In-Kind Contribution Tracking Record - ABSN Energy Efficiency Projects:

Village entities worked with: Tribe, City, Village Corp, School District.

In-Kind Item	Dates	Hours Contributed	Hourly Wage	Value / Amount	Notes
Staff time for project contact, introduction, and review of intro materials (Number of entities x 1 hour each)		4	\$15.00	\$60.00	# of entities we worked with in the village is indicated in the Hrs contributed column. \$15 / hr is our generic estimated average wage for local village staff: Tribal Administrators, City Clerks, etc.
Staff time for Attending teleconference village-wide		10.5	\$15.00	\$157.50	Hrs contributed column indicates length of telecon multiplied by # of village telecon participants
Tribal Maint. Staff time to assist Field Manager on building assessments - 1st site visit		3	\$15.00	\$45.00	list hrs of in-kind staff assisting FM on building assessments.
City Maint. Staff time to assist Field Manager on building assessments - 1st site visit		3	\$15.00	\$45.00	
School Maint. Staff time to assist Field Manager site visits		16	\$15.00	\$240.00	in-kind portion
Lighting training 3-05	March '05	3	\$15.00	\$45.00	City of Gambell paid for training - lighting upgrades
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.	Jan '05 - Jan '07			\$1,718.00	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 Final site visit				\$125.00	reg rate of \$105/night, less discounted rate of \$85/for 2 nights
Transportation and fuel costs during 2nd Site-visit				\$100.00	2 days @ \$50/day
Employer share of payroll contributions				\$158.33	Native village of Gambell Payroll & w/c employer share from 12-28-06 invoice
School & teacher housing lighting upgrades				\$360.00	estimate T8s: 1 staff, 20 hours X \$18/hr, =
Installation of Monitor heater in IRA Bingo hall / community bldg		15	15	\$225.00	15 hours In-kind labor by Gambell IRA, research materials, shipping, purchase, set-up, install
School T5 Gym lighting upgrades				\$6,250.00	estimate based on half of Savoonga's itemized BSSD expense for the T5 installations. As Gambell was the 2nd village, many of the install bugs had been worked out.
	TOTAL			\$9,528.83	

