

**Village End Use Energy Efficiency Measures Program**  
**AEA Grant # 2195225 Administered by Alaska Building Science Network**

## Unalakleet Final Report



### Community Summary

22 community buildings and 32 school district housing units received energy efficiency upgrades as follows:

City Office/Radio Station, Water Plant/City Mechanic Shop/Fire Station/ Small Apartment, Office Rental Space, Court House/ Coffee, Library, Midtown Sewer Lift, 6 Mile Water Pump, Sewer Lift Station, Garbage Bailer Building, Tribal Office Building, UNC Office/General Store, Old Store & Office, Igloo Rec Center, UNC 8-Plex, Covenant Church, Covenant Parsonage, Covenant Youth Facility, Assembly of God, Catholic Church, Elementary School, School District Office, Maintenance Trailer,

**Retrofits Completed: School facilities: May '09 – April 2010. Village Entity Bldgs: Dec '09-April 2010**

ABSN Field Management by: Geoff Butler, Dan Lung and Anna Hilbruner

Trained 16 local maintenance staff who were employed by village entities to complete lighting retrofits

### Village-Wide Lighting Retrofit Summary:

- Retrofitted 1,180 light fixtures with electronic ballasts & T8 lamps
- Installed 817 compact fluorescent light bulb
- Installed 23 T5 linear fluorescent fixtures in the School Gym /Lunch Room and Garbage Bailer Building
- Pre-retrofit energy use for all lighting: 196.94 Kilowatts
- Post-retrofit energy use for all lighting: 97.41 Kilowatts
- Energy savings projection: 99.53 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 50.5%

- Estimated Annual Savings:

kWh Rate (FY 2009 AVE): \$0.49

Bulk Fuel Cost (FY 2009 Ave): \$4.13

| Hours Per Day/<br>Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|---------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| Locally Estimated Use           | \$81,003              | 12154                                      | \$50,198                               |
| 4 Hours/day                     | \$48,988              | 7350                                       | \$30,358                               |
| 7 Hours/day                     | <b>\$85,730</b>       | 12863                                      | \$53,128                               |
| 10 Hours/day                    | \$122,471             | 18377                                      | \$75,897                               |

- Total project cost for all measures: \$89,300
- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): 1.04 Years
- Total village wide in-kind contribution: \$38,905 (Increased grant capacity by 44%.)

## City of Unalakleet Owned Buildings



9 buildings owned by the City of Unalakleet received energy efficient lighting upgrades as follows:

City Office/Radio Station, Water Plant/City Mechanic Shop/Fire Station/ Small Apartment, Office Rental Space, Court House/ Coffee, Library, Midtown Sewer Lift, 6 Mile Water Pump, Sewer Lift Station, Garbage Bailer Building

While wattages were calculated separately in the following pages, the Water Plant, City Mechanic Shop, Fire Station and Small Apartment are all in the same building.

- Lighting upgrades completed in: December 2009, except City Bailer Bldg – completed in March, 2010
- Retrofitted 189 light fixtures with electronic ballasts & T8 lamps
- Installed 21 compact fluorescent light bulbs
- Installed 9 T5 linear fluorescent fixtures in the Garbage Bailer Building
- Pre-retrofit energy use for all lighting: 30.937 Kilowatts
- Post-retrofit energy use for all lighting: 14.822 Kilowatts
- Energy savings projection: 16.115 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 52%

- Estimated Annual Savings:

| Hours Per Day /<br>250 Days Per Year<br>Locally Estimated | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided<br>Diesel Costs |
|-----------------------------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                                               | \$7,931.80            | 1190.18                                    | \$4,915.43                             |
| 7 Hours/day                                               | \$13,880.60           | 2082.81                                    | \$8,602.01                             |
| 10 Hours/day                                              | \$19,829.50           | 2975.44                                    | \$12,288.50                            |

The City of Unalakleet lighting scope was just slightly larger than the village-wide lighting scope average of this grant's 1<sup>st</sup> four years: 2005 through 2008.

**City Office/Radio Station**



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 10         |
| 4-lamp electronic ballast, (3) 25 watt T8 lamps   | 11         |
| CFL-14 W                                          | 1          |
| CFL-20 W                                          | 4          |
| • Pre-retrofit energy use:                        | 3943 watts |
| • Post-retrofit energy use:                       | 1379 watts |
| • Energy savings projection:                      | 2564 watts |
| • Pre-retrofit to post retrofit energy reduction: | 65%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$1,262.00            | 189.36                                     | \$782.08                               |
| 7 Hours/day                          | \$2,208.50            | 331.39                                     | \$1,368.63                             |
| 10 Hours/day                         | \$3,155.00            | 473.41                                     | \$1,955.19                             |
| 2000 Hours/year (Est.)               | \$2,524.00            | 378.73                                     | \$1,564.15                             |

Note: We reduced 11 fixtures from 4-lamp to 3-lamp fixtures and 10 fixtures from 4-lamp to 2-lamp fixtures.

**Water Plant/City Shop/Boiler Building**



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 2          |
| 3 ft, 2-lamp electronic ballast, (2) 25w T8 Lamps | 2          |
| 4-lamp electronic ballast, (3) 25 watt T8 lamps   | 20         |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps   | 21         |
| • Pre-retrofit energy use:                        | 7260 watts |
| • Post-retrofit energy use:                       | 3594 watts |
| • Energy savings projection:                      | 3666 watts |
| • Pre-retrofit to post retrofit energy reduction: | 50%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$1,804.41            | 270.75                                     | \$1,118.21                             |
| 7 Hours/day                          | \$3,157.71            | 473.82                                     | \$1,956.87                             |
| 10 Hours/day                         | \$4,511.01            | 676.88                                     | \$2,795.53                             |
| 1900 Hours/year (Est.)               | \$3,428.37            | 514.43                                     | \$2,124.60                             |

Note: Village maintenance staff reduced 1 fixture from a 4-lamp to a 2-lamp fixture and 20 fixtures from 4-lamp to 3-lamp fixtures in this building.

## City Mechanic Shop



### Materials Installed

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

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

- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

### Quantity

1

30

5124 watts

2296 watts

2828 watts

55%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$1,391.94            | 208.86                                     | \$862.60                               |
| 7 Hours/day                          | \$2,435.90            | 365.51                                     | \$1,509.55                             |
| 10 Hours/day                         | \$3,479.85            | 522.16                                     | \$2,156.51                             |
| 1200 Hours/year (Est.)               | \$1,670.33            | 250.64                                     | \$1,035.12                             |

Note: We reduced 30 fixtures from 4-lamp to 3-lamp fixtures in the City Mechanic Shop.

## Fire Station



### Materials Installed

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

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

- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

### Quantity

4

10

2016 watts

934 watts

1082 watts

54%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$532.56              | 79.91                                      | \$330.03                               |
| 7 Hours/day                          | \$931.98              | 139.84                                     | \$577.56                               |
| 10 Hours/day                         | \$1,331.40            | 199.78                                     | \$825.08                               |
| 1500 Hours/year (Est.)               | \$798.84              | 119.87                                     | \$495.05                               |

Note: We reduced 10 fixtures from 4-lamp to 3-lamp fixtures in the Fire Hall.

### Small Apartment @ City Shop



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 4          |
| CFL-14 W                                          | 3          |
| CFL-20 W                                          | 1          |
| CFL-23 W                                          | 2          |
| CFL-27 W                                          | 1          |
| CFL-9 W                                           | 3          |
| • Pre-retrofit energy use:                        | 1084 watts |
| • Post-retrofit energy use:                       | 346 watts  |
| • Energy savings projection:                      | 738 watts  |
| • Pre-retrofit to post retrofit energy reduction: | 68%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$363.24              | 54.51                                      | \$225.11                               |
| 7 Hours/day                          | \$635.68              | 95.38                                      | \$393.94                               |
| 10 Hours/day                         | \$908.11              | 136.26                                     | \$562.77                               |
| 1500 Hours/year (Est.)               | \$544.87              | 81.76                                      | \$337.66                               |

Note: We reduced 2 kitchen fixtures from 4-lamp to 2-lamp fixtures in this apartment.

### Office Rental Space



**Materials Installed**

**Quantity**

|                                                         |            |
|---------------------------------------------------------|------------|
| 2 ft fixture, 2-lamp electronic ballast, (2) 17 watt T8 | 2          |
| 2-lamp electronic ballast, (2) 25 watt T8 lamps         | 19         |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps         | 8          |
| CFL-14 W                                                | 1          |
| • Pre-retrofit energy use:                              | 2660 watts |
| • Post-retrofit energy use:                             | 1672 watts |
| • Energy savings projection:                            | 988 watts  |
| • Pre-retrofit to post retrofit energy reduction:       | 37%        |
| • Estimated annual savings:                             |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$486.29              | 72.97                                      | \$301.36                               |
| 7 Hours/day                          | \$851.01              | 127.70                                     | \$527.38                               |
| 10 Hours/day                         | \$1,215.73            | 182.42                                     | \$753.40                               |
| 1800 Hours/year (Est.)               | \$875.33              | 131.34                                     | \$542.45                               |

## Court House/ Coffee Shop



### Materials Installed

2-lamp electronic ballast, (2) 25 watt T8 lamps  
 4-lamp electronic ballast, (4) 25 watt T8 lamps  
 CFL-14 W  
 CFL-27 W

- Pre-retrofit energy use: 2169 watts
- Post-retrofit energy use: 1047 watts
- Energy savings projection: 1122 watts
- Pre-retrofit to post retrofit energy reduction: 52%
- Estimated annual savings:

### Quantity

19  
 1  
 4  
 1

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$552.25              | 82.87                                      | \$342.23                               |
| 7 Hours/day                          | \$966.43              | 145.01                                     | \$598.91                               |
| 10 Hours/day                         | \$1,380.62            | 207.16                                     | \$855.59                               |
| 1600 Hours/year (Est.)               | \$883.60              | 132.58                                     | \$547.58                               |

## Library



### Materials Installed

2-lamp electronic ballast, (2) 25 watt T8 lamps  
 3-lamp electronic ballast, (3) 25 watt T8 lamps

- Pre-retrofit energy use: 1932 watts
- Post-retrofit energy use: 896 watts
- Energy savings projection: 1036 watts
- Pre-retrofit to post retrofit energy reduction: 54%
- Estimated annual savings:

### Quantity

5  
 9

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$509.92              | 76.51                                      | \$316.00                               |
| 7 Hours/day                          | \$892.36              | 133.90                                     | \$553.01                               |
| 10 Hours/day                         | \$1,274.80            | 191.29                                     | \$790.01                               |
| 1600 Hours/year (Est.)               | \$815.87              | 122.42                                     | \$505.60                               |

Note: We reduced 9 fixtures from 4-lamp to 3-lamp fixtures in the Court House / Coffee Shop building.

## Midtown Sewer Lift Station



### Materials Installed

- 4-lamp electronic ballast, (4) 25 watt T8 lamps
- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:

### Quantity

1  
168 watts  
90 watts  
78 watts  
46%

- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$38.39               | 5.76                                       | \$23.79                                |
| 7 Hours/day                          | \$67.19               | 10.08                                      | \$41.64                                |
| 10 Hours/day                         | \$95.98               | 14.40                                      | \$59.48                                |
| 200 Hours/year (Est.)                | \$7.68                | 1.15                                       | \$4.76                                 |

## 6 Mile Water Pump House



### Materials Installed

- 2-lamp electronic ballast, (2) 32 watt T8 lamps
- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:

### Quantity

2  
144 watts  
120 watts  
24 watts  
17%

- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$11.81               | 1.77                                       | \$7.32                                 |
| 7 Hours/day                          | \$20.67               | 3.10                                       | \$12.81                                |
| 10 Hours/day                         | \$29.53               | 4.43                                       | \$18.30                                |
| 200 Hours/year (Est.)                | \$2.36                | 0.35                                       | \$1.46                                 |

## Sewer Lift Station Near Covenant Church



### Materials Installed

### Quantity

- |                                                   |           |
|---------------------------------------------------|-----------|
| 3-lamp electronic ballast, (3) 25 watt T8 lamps   | 1         |
| • Pre-retrofit energy use:                        | 114 watts |
| • Post-retrofit energy use:                       | 74 watts  |
| • Energy savings projection:                      | 40 watts  |
| • Pre-retrofit to post retrofit energy reduction: | 35%       |

### • Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$19.69               | 2.95                                       | \$12.20                                |
| 7 Hours/day                          | \$34.45               | 5.17                                       | \$21.35                                |
| 10 Hours/day                         | \$49.22               | 7.39                                       | \$30.50                                |
| 200 Hours/year (Est.)                | \$3.94                | 0.59                                       | \$2.44                                 |

### Garbage Bailer Building T8 Retrofits



**Materials Installed**

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

- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

**Quantity**

7  
588 watts  
322 watts  
266 watts  
45%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$130.93              | 19.65                                      | \$81.14                                |
| 7 Hours/day                          | \$229.12              | 34.38                                      | \$141.99                               |
| 10 Hours/day                         | \$327.31              | 49.11                                      | \$202.84                               |
| 1700 Hours/year (Est.)               | \$222.57              | 33.40                                      | \$137.93                               |

### Garbage Bailer Building T5 Installations



Former existing HID lighting with very poor color rendering index and long start-up time

New T5 fluorescents with 85 CRI and instant start-up.

**Materials Installed**

T5 fixture, electronic ballast, (4) 54 watt T5 HO

- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

**Quantity**

9  
3735 watts  
2052 watts  
1683 watts  
45%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$828.37              | 124.30                                     | \$513.35                               |
| 7 Hours/day                          | \$1,449.65            | 217.52                                     | \$898.37                               |
| 10 Hours/day                         | \$2,070.93            | 310.75                                     | \$1,283.38                             |
| 1700 Hours/year (Est.)               | \$1,408.23            | 211.31                                     | \$872.70                               |

**Unalakleet - Alaska Building Science Network - T5 Lighting Upgrade Details**

These retrofits were completed in March, 2010 - there are still 6 fixtures in addition to the 9 shown below, that are in Unalakleet at the Bailer Bldg to be installed in the outside sorting area that were not in the City budget to cover installation. City Maintenance Manager, Gus (Henry Johnson) knows about this and said in March, 2010 he would look into getting them installed on a separate switch and circuit at a future date.

| City Bailer Bldg                                                                                                                | 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 |      |
|---------------------------------------------------------------------------------------------------------------------------------|----------------------|--------------|-----------------------|--------------------------|------------------------|--------------------------|------------------------|-----------------------|------------------|-------------------|--------------|---------------------|-------------------|------|
| "warm side"                                                                                                                     | 44                   | 51           | see notes             | HPS 150 watt             |                        | 160                      | 0                      | very dark, 10-15 FC   | ~48              |                   | T-5 2 lamps  | 114                 | 0                 |      |
| Color shade of floor                                                                                                            | Other School Gym (A) |              |                       | Multi-Vapor 400 watt     | 9                      | 415                      | 3,735                  |                       |                  | 9                 | T-5 4 lamps  | 228                 | 2052              |      |
| Cold side: 15, 400w Multi-vapor fixtures. First 6 are on one switch, next nine (not receiving retrofits) are on another switch. |                      |              |                       |                          |                        |                          | 0                      |                       |                  |                   |              | T-5 6 lamps         | 342               | 0    |
|                                                                                                                                 |                      |              |                       |                          |                        |                          | Total Existing Watts   | 3,735                 |                  |                   |              |                     | Total New Watts   | 2052 |

New watts / old watts

|                                              |               |                                                 |
|----------------------------------------------|---------------|-------------------------------------------------|
| <b>Percent Savings Pre to Post Retrofit:</b> | <b>45.06%</b> | neg 1 (New watts / Old watts x 100 - 100) / 100 |
|----------------------------------------------|---------------|-------------------------------------------------|

**Savings & Payback Calculation for Bailer Building - based on 9 ours of use / day, 250 days / year.:**

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

Full cost of electricity: **\$ 0.49** kWh

Watts of existing lighting: **3,735** watts

New wattage for T5 fixtures: **2,052** watts

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

Existing Cost: **\$ 3,217**

Retrofitted Cost: **\$ 1,767**

T5 Materials costs **\$ 2,987.10**

**Annual Savings: \$ 1,450**

T5 shipping costs **\$ 154.10**

Material & shipping cost of Gym retrofit: **\$ 3,141**

**Simple Payback:** Materials cost / annual savings = **2.17** years (for retrofit to pay for itself in materials)

## Native Village of Unalakleet Owned Buildings



Maintenance Staff Charlie Doty retrofitting a 2-lamp fixture

*“Now that (ABSN) has provided a gateway into the field, Charlie is willing to get trained (as a certified electrician). We sure need certified electricians out here in bush Alaska.”*

- Sheldon Katchatag, Housing Director for Native Village of Unalakleet: Speaking about intentions to work with Charlie Dotie to help him train to become a certified electrician for the NVU Housing Authority.

1 building owned by the Native Village of Unalakleet received energy efficient lighting upgrades as follows:

### Native Village of Unalakleet Office Building

**Materials Installed**

**Quantity**

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- 4-lamp electronic ballast, (4) 25 watt T8 lamps

55  
4

- Pre-retrofit energy use: 4536 watts
- Post-retrofit energy use: 2890 watts
- Energy savings projection: 1646 watts
- Pre-retrofit to post retrofit energy reduction: 36%

• Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$810.16              | 121.57                                     | \$502.07                               |
| 7 Hours/day                          | \$1,417.78            | 212.74                                     | \$878.62                               |
| 10 Hours/day                         | \$2,025.40            | 303.91                                     | \$1,255.17                             |
| 2000 Hours/year (Est.)               | \$1,620.32            | 243.13                                     | \$1,004.13                             |

## Unalakleet Native Corporation Owned Buildings



4 buildings owned by the Unalakleet Native Corporation received energy efficient lighting upgrades as follows:

UNC Office/General Store, Old Store & Office, Igloo Rec Center, 8-Plex

- Lighting upgrades completed in: January 2010
- Retrofitted 132 light fixtures with electronic ballasts & T8 lamps
- Installed 42 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 24.742 Kilowatts
- Post-retrofit energy use for all lighting: 13.255 Kilowatts
- Energy savings projection: 11.487 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 46%
- Estimated Annual Savings:

| Hours Per Day /<br>250 Days Per Year<br>Locally Estimated | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided<br>Diesel Costs |
|-----------------------------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                                               | \$5,653.90            | 848.38                                     | \$3,503.79                             |
| 7 Hours/day                                               | \$9,894.33            | 1484.66                                    | \$6,131.63                             |
| 10 Hours/day                                              | \$14,134.7            | 2120.94                                    | \$8,759.47                             |



Existing older HO fixture lamp holders



Existing older HO fixture wattage test



Retrofitted std 8' fixture lamp holders

Note: The Unalakleet Native Corporation had two buildings primarily lit with 2-lamp 8-foot linear fluorescent fixtures. Of 83 total 8-foot fixtures, 59 had high output lamps and ballasts running at up to 268 watts per fixture. ABSN field manager Dan Lung achieved a substantial wattage reduction in the 8-foot lighting by working with village corp. maintenance staff to retrofit the old HO fixtures with new std T8 lamp holders, T8 lamps and electronic ballasts reducing overall fixture wattage to 118 watts / fixture, and removing 7,788 watts total from all 8-foot lighting.

**UNC Office/General Store**



**Materials Installed**

|                                                                  |            |
|------------------------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps                  | 1          |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps                  | 1          |
| 8 ft fixture, 2 lamp electronic ballast, (2) 59 watt T8 CFL-14 W | 32         |
| CFL-14 W                                                         | 3          |
| CFL-20 W                                                         | 1          |
| CFL-27 W                                                         | 1          |
| • Pre-retrofit energy use:                                       | 5676 watts |
| • Post-retrofit energy use:                                      | 4001 watts |
| • Energy savings projection:                                     | 1675 watts |
| • Pre-retrofit to post retrofit energy reduction:                | 30%        |
| • Estimated annual savings:                                      |            |

**Quantity**

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$824.44              | 123.71                                     | \$510.91                               |
| 7 Hours/day                          | \$1,442.76            | 216.49                                     | \$894.10                               |
| 10 Hours/day                         | \$2,061.09            | 309.27                                     | \$1,277.28                             |
| 2600 Hours/year (Est.)               | \$2,143.53            | 321.64                                     | \$1,328.37                             |

**Old Store & Office Rental Space**



**Materials Installed**

|                                                                  |             |
|------------------------------------------------------------------|-------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps                  | 9           |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps                  | 1           |
| 8 ft fixture, 2 lamp electronic ballast, (2) 59 watt T8 CFL-14 W | 51          |
| CFL-14 W                                                         | 3           |
| CFL-20 W                                                         | 7           |
| CFL-9 W                                                          | 3           |
| • Pre-retrofit energy use:                                       | 14467 watts |
| • Post-retrofit energy use:                                      | 6731 watts  |
| • Energy savings projection:                                     | 7736 watts  |
| • Pre-retrofit to post retrofit energy reduction:                | 53%         |
| • Estimated annual savings:                                      |             |

**Quantity**

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$3,807.66            | 571.34                                     | \$2,359.65                             |
| 7 Hours/day                          | \$6,663.40            | 999.85                                     | \$4,129.39                             |
| 10 Hours/day                         | \$9,519.15            | 1428.36                                    | \$5,899.13                             |
| 2000 Hours/year (Est.)               | \$7,615.32            | 1142.69                                    | \$4,719.30                             |

### Igloo Rec Center



**Materials Installed**

- 2-lamp electronic ballast, (1) 25 watt T8 lamp
- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- 3-lamp electronic ballast, (2) 25 watt T8 lamps
- 4-lamp electronic ballast, (4) 25 watt T8 lamps
- 4-lamp electronic ballast, (4) 32 watt T8 lamps
- CFL-20 W
- CFL-23 W

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
|                                                   | 4          |
|                                                   | 4          |
|                                                   | 1          |
|                                                   | 2          |
|                                                   | 6          |
|                                                   | 3          |
|                                                   | 1          |
| • Pre-retrofit energy use:                        | 1959 watts |
| • Post-retrofit energy use:                       | 1323 watts |
| • Energy savings projection:                      | 636 watts  |
| • Pre-retrofit to post retrofit energy reduction: | 32%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$313.04              | 46.97                                      | \$193.99                               |
| 7 Hours/day                          | \$547.82              | 82.20                                      | \$339.49                               |
| 10 Hours/day                         | \$782.60              | 117.43                                     | \$484.99                               |
| 1600 Hours/year (Est.)               | \$500.86              | 75.16                                      | \$310.39                               |

Note: We reduced 1 fixture from a 4-lamp fixture to a 2-lamp fixture with a 3-lamp ballast in this building.

### 8-Plex



**Materials Installed**

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- CFL-14 W
- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
|                                                   | 20         |
|                                                   | 20         |
| • Pre-retrofit energy use:                        | 2640 watts |
| • Post-retrofit energy use:                       | 1200 watts |
| • Energy savings projection:                      | 1440 watts |
| • Pre-retrofit to post retrofit energy reduction: | 55%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$708.77              | 106.35                                     | \$439.23                               |
| 7 Hours/day                          | \$1,240.34            | 186.12                                     | \$768.66                               |
| 10 Hours/day                         | \$1,771.92            | 265.88                                     | \$1,098.08                             |
| 1375 Hours/year (Est.)               | \$974.56              | 146.23                                     | \$603.94                               |

## Bering Straits School District Owned Buildings



3 buildings and 32 teacher housing units owned by Bering Straits School District received energy efficient lighting upgrades as follows:

Unalakleet Elementary School, School District Office, Maintenance Trailer, School Gym

1945 Duplex, 1959 Teacher Housing, 3-Plex Teacher Housing, 5-Plex Apartment, Duplex By School, Echols Teacher Housing, FAA Double Wide Trailer, Gerskauskys Rental Unit, Middle Blue 4-Plex, North Tan 4-Plex, Old FAA House, South Green 4-Plex, Styles House, Styles Rental Duplex

- Lighting upgrades completed in: April 2010
- Retrofitted 737 light fixtures with electronic ballasts & T8 lamps
- Installed 707 compact fluorescent light bulbs
- Installed 14 T5 linear fluorescent fixtures
- Pre-retrofit energy use for all lighting: 128.398 Kilowatts
- Post-retrofit energy use for all lighting: 62.155 Kilowatts
- Energy savings projection: 66.243 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 52%
- Estimated Annual Savings:

| Hours Per Day /<br>250 Days Per Year<br>Locally Estimated | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided<br>Diesel Costs |
|-----------------------------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                                               | \$52,759.1            | 7916.57                                    | \$32,695.4                             |
| 7 Hours/day                                               | \$32,604.8            | 4892.39                                    | \$20,205.5                             |
| 10 Hours/day                                              | \$57,058.4            | 8561.69                                    | \$35,359.7                             |
|                                                           | \$81,512.0            | 12230.98                                   | \$50,513.9                             |



BSSD Maintenance Supervisor Ric Ried



BSSD Certified Electrician, Leland Oyoumick



## Elementary School



### Materials Installed

### Quantity

|                                                       |             |
|-------------------------------------------------------|-------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps       | 131         |
| 3-lamp electronic ballast, (3) 25 watt T8 lamps       | 22          |
| 3-lamp fixture, (2) 2-lamp electronic ballasts (3) 25 | 177         |
| 4-lamp electronic ballast, (3) 25 watt T8 lamps       | 13          |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps       | 2           |
| 4-lamp fixture (2) 2-lamp ballasts (4) 25 watt T8     | 29          |
| CFL-14 W                                              | 6           |
| CFL-20 W                                              | 12          |
| CFL-23 W                                              | 21          |
| CFL-27 W                                              | 2           |
| • Pre-retrofit energy use:                            | 41554 watts |
| • Post-retrofit energy use:                           | 26226 watts |
| • Energy savings projection:                          | 15328 watts |
| • Pre-retrofit to post retrofit energy reduction:     | 37%         |

• Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$7,544.44            | 1132.05                                    | \$4,675.38                             |
| 7 Hours/day                          | \$13,202.7            | 1981.09                                    | \$8,181.91                             |
| 10 Hours/day                         | \$18,861.1            | 2830.13                                    | \$11,688.4                             |
| 1800 Hours/year (Est.)               | \$13,579.9            | 2037.70                                    | \$8,415.68                             |



Note: With Unalakleet as the headquarters for the Bering Straits School District, the lighting scope for this entity was one of the largest since the beginning of the VEUEEM grants. The District Office with 17,545 square feet and the elementary side of the school including the gym and basement storage with 28,796 square feet, combined for a total of 46,341 building floor square footage, illuminated by more than 730 fluorescent light fixtures.

## School District Office Building



### Materials Installed

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

### Quantity

- Pre-retrofit energy use: 30360 watts
- Post-retrofit energy use: 18134 watts
- Energy savings projection: 12226 watts
- Pre-retrofit to post retrofit energy reduction: 40%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$6,017.64            | 902.95                                     | \$3,729.20                             |
| 7 Hours/day                          | \$10,530.8            | 1580.17                                    | \$6,526.10                             |
| 10 Hours/day                         | \$15,044.0            | 2257.39                                    | \$9,323.00                             |
| 2000 Hours/year (Est.)               | \$12,035.2            | 1805.91                                    | \$7,458.40                             |

Note: We reduced 50 fixtures from 4-lamp to 3-lamp fixtures in the BSSD District Office.

## Maintenance Trailer



### Materials Installed

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- CFL 3-Way: 12-20-26 W
- CFL-14 W
- CFL-20 W
- CFL-27 W

### Quantity

- Pre-retrofit energy use: 1559 watts
- Post-retrofit energy use: 488 watts
- Energy savings projection: 1071 watts
- Pre-retrofit to post retrofit energy reduction: 69%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$527.15              | 79.10                                      | \$326.68                               |
| 7 Hours/day                          | \$922.51              | 138.42                                     | \$571.69                               |
| 10 Hours/day                         | \$1,317.87            | 197.75                                     | \$816.70                               |
| 500 Hours/year (Est.)                | \$263.57              | 39.55                                      | \$163.34                               |

Note: We reduced 1 fixture from a 4-lamp to a 2-lamp fixture in the Maintenance Trailer.

## School Gym / Lunch Room



### Materials Installed

### Quantity

|                                                    |            |
|----------------------------------------------------|------------|
| Dimmable 2-lamp electronic ballasts, single T8 25w | 19         |
| T5 fixture, electronic ballast, (3) 54 watt T5 HO  | 14         |
| • Pre-retrofit energy use:                         | 5084 watts |
| • Post-retrofit energy use:                        | 3249 watts |
| • Energy savings projection:                       | 1835 watts |
| • Pre-retrofit to post retrofit energy reduction:  | 36%        |

• Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$903.19              | 135.52                                     | \$559.72                               |
| 7 Hours/day                          | \$1,580.58            | 237.17                                     | \$979.50                               |
| 10 Hours/day                         | \$2,257.97            | 338.81                                     | \$1,399.29                             |
| 1375 Hours/year (Est.)               | \$1,241.88            | 186.35                                     | \$769.61                               |

ABS N T5 Lighting plans are designed to increase the average light levels throughout the area when all fixtures are switched on - in comparison with former existing light output. Existing switching controls are normally retained - allowing users to choose the appropriate number of light fixtures / rows of light fixtures needed for various use patterns. In many cases school staff will choose not to use all fixtures available, thereby achieving more electrical savings than what is shown above. Considering light quality, ABS N T5 lighting plans employ 54-watt, high output T5 lamps with a color-rendering index (CRI) of 85. Existing light fixtures in rural high ceiling areas typically have a CRI ranging from 30 to 70. With the T5 retrofits, the boost in CRI greatly improves light quality – resulting in objects appearing much closer to their true color as seen under sunlight. This increased light quality can result in less light needed to illuminate a given space. Another advantage appreciated by building owners is the instant-on function of T5 lighting compared with long waiting periods for older HID fixtures to come on. With the waiting period eliminated, building owners have indicated they are more likely to keep lighting off until needed.

**Unalakleet - Alaska Building Science Network - T5 Lighting Upgrade Details**

These retrofits were completed in (April, 2010).

| Old School Lunch Room | Length (feet) | Width (feet) | Ceiling Height (feet) | Type of Existing Fixture                      | # of Existing Fixtures | Existing Fixture Wattage | Total Existing Wattage      | Existing Foot-candles | # of New Fixtures | New fixtures                         | New Fixture Wattage | Total New Wattage |
|-----------------------|---------------|--------------|-----------------------|-----------------------------------------------|------------------------|--------------------------|-----------------------------|-----------------------|-------------------|--------------------------------------|---------------------|-------------------|
| Quin's measurements:  | 55' 5"        | 32' 10"      | 13' 10"               | HPS 150 watt                                  |                        | 160                      | 0                           | 14 - 20               |                   | T-5 2 lamps                          | 114                 | 0                 |
| Color shade of walls  |               |              |                       | HPS 250 watt                                  | 14                     | 260                      | 3,640                       |                       | 14                | T-5 3 lamps                          | 171                 | 2394              |
|                       |               |              |                       | Dimmable 2-lamp ballasts, 38, single 34w T12s | 19                     | 76                       | 1,444                       |                       |                   | T-5 6 lamps                          | 342                 | 0                 |
|                       |               |              |                       |                                               |                        |                          | 0                           |                       | 19                | Dimmable 2-lamp ballasts, single 25w | 45                  | 855               |
|                       |               |              |                       |                                               |                        |                          | <b>Total Existing Watts</b> |                       |                   | <b>Total New Watts</b>               |                     | <b>3249</b>       |

|                                              |               |                                                 |
|----------------------------------------------|---------------|-------------------------------------------------|
| <b>Percent Savings Pre to Post Retrofit:</b> | <b>36.09%</b> | neg 1 (New watts / Old watts x 100 - 100) / 100 |
|----------------------------------------------|---------------|-------------------------------------------------|

**Savings & Payback Calculation for Gym:**

1750

New watts / old watts

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

Full cost of electricity: \$ 0.49 /kWh

Watts of existing lighting: 5,084

New wattage for T5 fixtures: 3,249

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

Existing Cost: \$ 4,379

Retrofitted Cost: \$ 2,799

T5 Materials costs \$ 3,546.50

**Annual Savings: \$ 1,581**

T5 shipping costs \$ 141.70

Material & shipping cost of Gym retrofit: \$3,688.20

**Simple Payback:** Materials cost / annual savings = **2.33** years (for retrofit to pay for itself in materials)

### 1945 Duplex



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 1          |
| 3-lamp electronic ballast, (3) 25 watt T8 lamps   | 1          |
| CFL-14 W                                          | 11         |
| CFL-20 W                                          | 12         |
| CFL-23 W                                          | 6          |
| CFL-27 W                                          | 1          |
| CFL-9 W                                           | 3          |
| • Pre-retrofit energy use:                        | 2443 watts |
| • Post-retrofit energy use:                       | 706 watts  |
| • Energy savings projection:                      | 1737 watts |
| • Pre-retrofit to post retrofit energy reduction: | 71%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$854.95              | 128.29                                     | \$529.82                               |
| 7 Hours/day                          | \$1,496.16            | 224.50                                     | \$927.19                               |
| 10 Hours/day                         | \$2,137.38            | 320.72                                     | \$1,324.56                             |
| 1375 Hours/year (Est.)               | \$1,175.56            | 176.39                                     | \$728.51                               |

Note: We reduced one fixture from a 4-lamp to a 2-lamp fixture and one fixture from a 4-lamp to a 3-lamp fixture.

### 1959 Teacher Housing



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| CFL 3-Way: 12-20-26 W                             | 1          |
| CFL-14 W                                          | 11         |
| CFL-20 W                                          | 1          |
| CFL-23 W                                          | 15         |
| CFL-27 W                                          | 3          |
| • Pre-retrofit energy use:                        | 2005 watts |
| • Post-retrofit energy use:                       | 620 watts  |
| • Energy savings projection:                      | 1385 watts |
| • Pre-retrofit to post retrofit energy reduction: | 69%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$681.70              | 102.29                                     | \$422.46                               |
| 7 Hours/day                          | \$1,192.97            | 179.01                                     | \$739.30                               |
| 10 Hours/day                         | \$1,704.24            | 255.72                                     | \$1,056.14                             |
| 1375 Hours/year (Est.)               | \$937.33              | 140.65                                     | \$580.88                               |

### 3-Plex Teacher Housing



**Materials Installed**

|                                                   |            |
|---------------------------------------------------|------------|
| CFL-14 W                                          | 19         |
| CFL-20 W                                          | 8          |
| CFL-23 W                                          | 16         |
| CFL-27 W                                          | 6          |
| • Pre-retrofit energy use:                        | 4120 watts |
| • Post-retrofit energy use:                       | 956 watts  |
| • Energy savings projection:                      | 3164 watts |
| • Pre-retrofit to post retrofit energy reduction: | 77%        |
| • Estimated annual savings:                       |            |

**Quantity**

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$1,557.32            | 233.68                                     | \$965.09                               |
| 7 Hours/day                          | \$2,725.31            | 408.94                                     | \$1,688.91                             |
| 10 Hours/day                         | \$3,893.30            | 584.19                                     | \$2,412.73                             |
| 1375 Hours/year (Est.)               | \$2,141.32            | 321.31                                     | \$1,327.00                             |

### 5-Plex Apartment



**Materials Installed**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 6          |
| CFL-14 W                                          | 10         |
| CFL-20 W                                          | 27         |
| CFL-23 W                                          | 19         |
| CFL-27 W                                          | 7          |
| CFL-9 W                                           | 6          |
| • Pre-retrofit energy use:                        | 5427 watts |
| • Post-retrofit energy use:                       | 1636 watts |
| • Energy savings projection:                      | 3791 watts |
| • Pre-retrofit to post retrofit energy reduction: | 70%        |
| • Estimated annual savings:                       |            |

**Quantity**

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$1,865.93            | 279.99                                     | \$1,156.34                             |
| 7 Hours/day                          | \$3,265.38            | 489.97                                     | \$2,023.59                             |
| 10 Hours/day                         | \$4,664.83            | 699.96                                     | \$2,890.85                             |
| 1500 Hours/year (Est.)               | \$2,798.90            | 419.98                                     | \$1,734.51                             |

## Duplex By School



### Materials Installed

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- CFL 3-Way: 12-20-26 W
- CFL-14 W
- CFL-20 W
- CFL-23 W
- CFL-27 W

### Quantity

- 2
- 2
- 4
- 9
- 15
- 3
- Pre-retrofit energy use: 2409 watts
- Post-retrofit energy use: 794 watts
- Energy savings projection: 1615 watts
- Pre-retrofit to post retrofit energy reduction: 67%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$794.90              | 119.28                                     | \$492.61                               |
| 7 Hours/day                          | \$1,391.08            | 208.73                                     | \$862.07                               |
| 10 Hours/day                         | \$1,987.26            | 298.19                                     | \$1,231.53                             |
| 1375 Hours/year (Est.)               | \$1,092.99            | 164.00                                     | \$677.34                               |

## Echols Teacher Housing



### Materials Installed

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- CFL-14 W
- CFL-20 W
- CFL-23 W
- CFL-27 W

### Quantity

- 1
- 12
- 11
- 1
- 1
- Pre-retrofit energy use: 1812 watts
- Post-retrofit energy use: 484 watts
- Energy savings projection: 1328 watts
- Pre-retrofit to post retrofit energy reduction: 73%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$653.64              | 98.08                                      | \$405.07                               |
| 7 Hours/day                          | \$1,143.87            | 171.64                                     | \$708.87                               |
| 10 Hours/day                         | \$1,634.10            | 245.20                                     | \$1,012.67                             |
| 1375 Hours/year (Est.)               | \$898.76              | 134.86                                     | \$556.97                               |

**FAA Double Wide Trailer**



**Materials Installed**

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- CFL 3-Way: 12-20-26 W
- CFL-14 W
- CFL-20 W
- CFL-23 W
- CFL-27 W
- CFL-9 W
- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

**Quantity**

- 2
- 5
- 4
- 5
- 10
- 6
- 6
- 2719 watts
- 794 watts
- 1925 watts
- 71%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$947.49              | 142.17                                     | \$587.17                               |
| 7 Hours/day                          | \$1,658.10            | 248.80                                     | \$1,027.54                             |
| 10 Hours/day                         | \$2,368.71            | 355.43                                     | \$1,467.92                             |
| 1375 Hours/year (Est.)               | \$1,302.79            | 195.49                                     | \$807.36                               |

**Gerskausky Rental Unit**



**Materials Installed**

- 2-lamp electronic ballast, (2) 25 watt T8 lamps
- 4-lamp electronic ballast, (3) 25 watt T8 lamps
- 4-lamp electronic ballast, (4) 25 watt T8 lamps
- CFL-14 W
- CFL-20 W
- CFL-23 W
- CFL-9 W
- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

**Quantity**

- 1
- 2
- 1
- 3
- 1
- 1
- 4
- 1039 watts
- 407 watts
- 632 watts
- 61%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$311.07              | 46.68                                      | \$192.77                               |
| 7 Hours/day                          | \$544.37              | 81.68                                      | \$337.35                               |
| 10 Hours/day                         | \$777.68              | 116.69                                     | \$481.94                               |
| 1375 Hours/year (Est.)               | \$427.72              | 64.18                                      | \$265.06                               |

Note: We reduced 2 fixtures from 4-lamp to 3-lamp fixtures in this teacher housing unit.

### Middle Blue 4-Plex



#### Materials Installed

|                                                   |            |
|---------------------------------------------------|------------|
| CFL-14 W                                          | 57         |
| CFL-20 W                                          | 35         |
| CFL-23 W                                          | 4          |
| CFL-27 W                                          | 3          |
| • Pre-retrofit energy use:                        | 7130 watts |
| • Post-retrofit energy use:                       | 1671 watts |
| • Energy savings projection:                      | 5459 watts |
| • Pre-retrofit to post retrofit energy reduction: | 77%        |
| • Estimated annual savings:                       |            |

#### Quantity

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$2,686.92            | 403.18                                     | \$1,665.12                             |
| 7 Hours/day                          | \$4,702.11            | 705.56                                     | \$2,913.95                             |
| 10 Hours/day                         | \$6,717.30            | 1007.94                                    | \$4,162.79                             |
| 1500 Hours/year (Est.)               | \$4,030.38            | 604.76                                     | \$2,497.67                             |

### North Tan 4-Plex



#### Materials Installed

|                                                   |            |
|---------------------------------------------------|------------|
| CFL-14 W                                          | 57         |
| CFL-20 W                                          | 35         |
| CFL-23 W                                          | 4          |
| CFL-27 W                                          | 3          |
| • Pre-retrofit energy use:                        | 7130 watts |
| • Post-retrofit energy use:                       | 1671 watts |
| • Energy savings projection:                      | 5459 watts |
| • Pre-retrofit to post retrofit energy reduction: | 77%        |
| • Estimated annual savings:                       |            |

#### Quantity

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$2,686.92            | 403.18                                     | \$1,665.12                             |
| 7 Hours/day                          | \$4,702.11            | 705.56                                     | \$2,913.95                             |
| 10 Hours/day                         | \$6,717.30            | 1007.94                                    | \$4,162.79                             |
| 1500 Hours/year (Est.)               | \$4,030.38            | 604.76                                     | \$2,497.67                             |

**Old FAA House**



**Materials Installed**

- 4-lamp electronic ballast, (4) 25 watt T8 lamps
- CFL-14 W
- CFL-20 W
- CFL-23 W
- CFL-27 W

**Quantity**

- 1
- 7
- 5
- 4
- 2
- Pre-retrofit energy use: 1329 watts
- Post-retrofit energy use: 434 watts
- Energy savings projection: 895 watts
- Pre-retrofit to post retrofit energy reduction: 67%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$440.52              | 66.10                                      | \$272.99                               |
| 7 Hours/day                          | \$770.91              | 115.68                                     | \$477.74                               |
| 10 Hours/day                         | \$1,101.30            | 165.25                                     | \$682.49                               |
| 1375 Hours/year (Est.)               | \$605.71              | 90.89                                      | \$375.37                               |

**South Green 4-Plex**



**Materials Installed**

- CFL-14 W
- CFL-20 W
- CFL-23 W
- CFL-27 W
- Pre-retrofit energy use: 7130 watts
- Post-retrofit energy use: 1671 watts
- Energy savings projection: 5459 watts
- Pre-retrofit to post retrofit energy reduction: 77%
- Estimated annual savings:

**Quantity**

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$2,686.92            | 403.18                                     | \$1,665.12                             |
| 7 Hours/day                          | \$4,702.11            | 705.56                                     | \$2,913.95                             |
| 10 Hours/day                         | \$6,717.30            | 1007.94                                    | \$4,162.79                             |
| 1500 Hours/year (Est.)               | \$4,030.38            | 604.76                                     | \$2,497.67                             |

### Styles House



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 12         |
| CFL 3-Way: 12-20-26 W                             | 2          |
| CFL-20 W                                          | 2          |
| CFL-27 W                                          | 1          |
| • Pre-retrofit energy use:                        | 1234 watts |
| • Post-retrofit energy use:                       | 659 watts  |
| • Energy savings projection:                      | 575 watts  |
| • Pre-retrofit to post retrofit energy reduction: | 47%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$283.02              | 42.47                                      | \$175.39                               |
| 7 Hours/day                          | \$495.28              | 74.32                                      | \$306.93                               |
| 10 Hours/day                         | \$707.54              | 106.17                                     | \$438.47                               |
| 1500 Hours/year (Est.)               | \$424.52              | 63.70                                      | \$263.08                               |

### Styles Rental Duplex



**Materials Installed**

**Quantity**

|                                                   |            |
|---------------------------------------------------|------------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 1          |
| 3-lamp electronic ballast, (3) 25 watt T8 lamps   | 8          |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps   | 5          |
| CFL 3-Way: 12-20-26 W                             | 1          |
| CFL-14 W                                          | 6          |
| CFL-20 W                                          | 15         |
| CFL-27 W                                          | 1          |
| CFL-9 W                                           | 4          |
| • Pre-retrofit energy use:                        | 3914 watts |
| • Post-retrofit energy use:                       | 1555 watts |
| • Energy savings projection:                      | 2359 watts |
| • Pre-retrofit to post retrofit energy reduction: | 60%        |
| • Estimated annual savings:                       |            |

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$1,161.10            | 174.22                                     | \$719.55                               |
| 7 Hours/day                          | \$2,031.92            | 304.89                                     | \$1,259.21                             |
| 10 Hours/day                         | \$2,902.75            | 435.56                                     | \$1,798.87                             |
| 1500 Hours/year (Est.)               | \$1,741.65            | 261.34                                     | \$1,079.32                             |

Note: We reduced 8 fixtures from 4-lamp to 3-lamp fixtures in this teacher housing duplex.

## Church Owned Buildings



5 buildings owned by local community supported Churches received energy efficient lighting upgrades as follows:

Covenant Church, Covenant Parsonage, Covenant Youth Facility, Assembly of God, Catholic Church

- Lighting upgrades for Covenant Church and facilities completed in January 2010. For the Assembly of God Church and Catholic Church, the church managers confirmed they would complete their lighting retrofits with their own labor resources in the Spring of 2010.

- Retrofitted 63 light fixtures with electronic ballasts & T8 lamps
- Installed 47 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 8.327 Kilowatts
- Post-retrofit energy use for all lighting: 4.288 Kilowatts
- Energy savings projection: 4.039 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 49%

- Estimated Annual Savings:

| Hours Per Day /<br>250 Days Per Year<br>Locally Estimated | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided<br>Diesel Costs |
|-----------------------------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                                               | \$2,203.87            | 330.69                                     | \$1,365.77                             |
| 7 Hours/day                                               | \$3,478.99            | 522.03                                     | \$2,155.97                             |
| 10 Hours/day                                              | \$4,969.99            | 745.75                                     | \$3,079.96                             |

### Covenant Church



**Materials Installed**

**Quantity**

- 2-lamp electronic ballast, (2) 25 watt T8 lamps 18
- 3-lamp electronic ballast, (3) 25 watt T8 lamps 5
- 8' Single Lamp Fixtures 2-lamp shared ballast, (2) 59w T8 12
- CFL-23 W 5
- Pre-retrofit energy use: 3244 watts
- Post-retrofit energy use: 2021 watts
- Energy savings projection: 1223 watts
- Pre-retrofit to post retrofit energy reduction: 38%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$601.96              | 90.32                                      | \$373.04                               |
| 7 Hours/day                          | \$1,053.43            | 158.07                                     | \$652.82                               |
| 10 Hours/day                         | \$1,504.90            | 225.81                                     | \$932.61                               |
| 900 Hours/year (Est.)                | \$541.76              | 81.29                                      | \$335.74                               |

### Covenant Parsonage



**Materials Installed**

**Quantity**

- 2-lamp electronic ballast, (2) 25 watt T8 lamps 5
- 4-lamp electronic ballast, (3) 25 watt T8 lamps 2
- CFL-20 W 15
- CFL-9 W 9
- Pre-retrofit energy use: 2045 watts
- Post-retrofit energy use: 761 watts
- Energy savings projection: 1284 watts
- Pre-retrofit to post retrofit energy reduction: 63%
- Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$631.98              | 94.83                                      | \$391.65                               |
| 7 Hours/day                          | \$1,105.97            | 165.95                                     | \$685.38                               |
| 10 Hours/day                         | \$1,579.96            | 237.08                                     | \$979.12                               |
| 1500 Hours/year (Est.)               | \$947.98              | 142.25                                     | \$587.47                               |

Note: We reduced 1 fixture from a 4-lamp to a 3-lamp fixture in the Parsonage.

## Covenant Youth Facility



### Materials Installed

2-lamp electronic ballast, (2) 25 watt T8 lamps  
 CFL-14 W  
 CFL-23 W

- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

### Quantity

5  
 6  
 8  
 1255 watts  
 498 watts  
 757 watts  
 60%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$372.60              | 55.91                                      | \$230.90                               |
| 7 Hours/day                          | \$652.04              | 97.84                                      | \$404.08                               |
| 10 Hours/day                         | \$931.49              | 139.77                                     | \$577.25                               |
| 1200 Hours/year (Est.)               | \$447.11              | 67.09                                      | \$277.08                               |

## Assembly of God Church



### Materials Installed

2-lamp electronic ballast, (2) 25 watt T8 lamps  
 CFL-23 W  
 CFL-27 W

- Pre-retrofit energy use:
- Post-retrofit energy use:
- Energy savings projection:
- Pre-retrofit to post retrofit energy reduction:
- Estimated annual savings:

### Quantity

11  
 3  
 1  
 1027 watts  
 602 watts  
 425 watts  
 41%

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$209.19              | 31.39                                      | \$129.63                               |
| 7 Hours/day                          | \$366.07              | 54.93                                      | \$226.86                               |
| 10 Hours/day                         | \$522.96              | 78.47                                      | \$324.09                               |
| 700 Hours/year (Est.)                | \$146.43              | 21.97                                      | \$90.74                                |

## Catholic Church



### Materials Installed

### Quantity

|                                                   |           |
|---------------------------------------------------|-----------|
| 2-lamp electronic ballast, (2) 25 watt T8 lamps   | 1         |
| 4-lamp electronic ballast, (4) 25 watt T8 lamps   | 4         |
| • Pre-retrofit energy use:                        | 756 watts |
| • Post-retrofit energy use:                       | 406 watts |
| • Energy savings projection:                      | 350 watts |
| • Pre-retrofit to post retrofit energy reduction: | 46%       |

### • Estimated annual savings:

| Hours Per Day /<br>250 Days Per Year | Electrical<br>Savings | Comparative<br>Avoided Diesel<br>Use (gal) | Comparative<br>Avoided Diesel<br>Costs |
|--------------------------------------|-----------------------|--------------------------------------------|----------------------------------------|
| 4 Hours/day                          | \$172.27              | 25.85                                      | \$106.76                               |
| 7 Hours/day                          | \$301.47              | 45.24                                      | \$186.83                               |
| 10 Hours/day                         | \$430.68              | 64.62                                      | \$266.89                               |
| 700 Hours/year (Est.)                | \$120.59              | 18.09                                      | \$74.73                                |

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

| In-Kind Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Dates                      | Hours | Hourly Wage | Value / Amount   | Notes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------|-------|-------------|------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Staff time for project contact, intro & review of intro materials                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            | 4     | \$ 20       | \$ 80            | (Number of entities x 1 hour each)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Staff time for Attending telecon                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            | 1     | \$ 20       | \$ 20            | TC/IRA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Staff time for Attending telecon                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            | 2     | \$ 20       | \$ 40            | City                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Staff time for Attending telecon                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            | 2     | \$ 20       | \$ 40            | Village Corp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Staff time for Attending telecon                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            | 8     | \$ 25       | \$ 188           | School                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Maint. Staff time with FM on building assessment - 1st site visit                                                                                                                                                                                                                                                                                                                                                                                                                                    | May 18, 2009               | 20    | \$ 25       | \$ 500           | Week of May 18, 2009 Jay Fretag-City =1.5 days, Harold Charles, Jr. UNC =1-(8r) day                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Maint. Staff time to attend ABSN lighting and PCB training                                                                                                                                                                                                                                                                                                                                                                                                                                           | Dec '09                    | 36    | \$ 15       | \$ 540           | 8 trainees for 3 hours of Lighting training. 6 trainees for 2 hours of PCB training                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Conservative village office administrative percentage of total project cost less ABSN Admin %. Total project cost = \$89,300/village - (our admin percentage , (around 12%) Approx: \$10,716) = \$78,584 x 5.5% = \$4,322.12 (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           |       |             | \$ 4,322         | 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                                                                                                                                                                                                                                                                                                                                                                                                                                          | May 18, 2009               | 8     | \$ 50       | \$ 400           | <b>Geoff/Dan-4 nights UNC (Corp) 14 plex.</b> Note: Larry Ivanoff prepared receipt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Transport & fuel costs - asses visit                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | May 18                     | 2     | \$ 75       | \$ 113           | Jay Fretag-City of Unk=1.5 days City truck.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Lodging for ABSN FMs - 2 <sup>nd</sup> visit                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12/7-11/09                 | 15    | \$ 25       | \$ 375           | Geoff, Dan, Anna BSSD bunks \$25/night                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Transport & fuel costs 2 <sup>nd</sup> visit                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 12/7-11/09                 | 5     | \$ 75       | \$ 425           | Use of Ford 150 truck and fuel, 1 week                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| City share of payroll contributions                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Dec '09                    |       |             | \$ 658           | Taxes & Workmans Comp from invoices                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Overtime Paid by City of Unalakleet                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Dec '09                    |       |             | \$ 405           | Over Time Paid by City of Unalakleet for primary lighting retrofits                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| City, Kenny Oyoumik - pack and ship backhaul equipment                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1/28/2010                  | 3     | \$ 15       | \$ 45            | 260 lbs from NAC 1-29-10, 5 ladders, 5 boxes 25w lamps, 3 boxes supplies,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| City Bailer bilding - inkind for electrician's wages                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3/10/2010                  | 40    | \$ 75       | \$ 3,000         | Replace 9 HID fixtures with 4-lamp T5s                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Village Corp Inkind for all their 8-foot lighting retrofits                                                                                                                                                                                                                                                                                                                                                                                                                                          | Jan, 2010                  | 80    | \$ 17       | \$ 1,360         | 83 fixtures w/ customization - replacing lamp-holders & rebuilding fixture ends.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| School assess & teacher housing upgrades in May w/ leland                                                                                                                                                                                                                                                                                                                                                                                                                                            | May, 2009                  | 8     | \$ 35       | \$ 280           | 1 full day with Leland, and 1.5 days with Quinn                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| School assessments and teacher housing upgrades in May w/ Quin                                                                                                                                                                                                                                                                                                                                                                                                                                       | May, 2009                  | 12    | \$ 20       | \$ 240           | 1.5 days with Quinn - verified his wage is \$18/hr plus at least \$2/hr for fringe                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| School-wide and district office-wide lighting retrofits, all thirty-some teacher housing units including linear and compact fluorescent installations                                                                                                                                                                                                                                                                                                                                                | May '09 through March 2010 | 736   | \$ 30       | \$ 22,080        | Estimated 623.5 labor for all this is: I added 18% (112 hrs) add. time to pack and ship the tonage of spent lamps and ballasts. Wage estimate of \$30/hr is likely low as Leland did a lot of this work at higher rates & the fringe match from the SD would add another at least 25% to the straight wage.                                                                                                                                                                                                                                                                                                                          |
| School T5s and dimmable ballasts in lunch room                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                            | 75    | \$ 35       | \$ 2,625         | wage is likely low for Leland.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| In-kind labor for Covenant Church, Youth facility and parsonage                                                                                                                                                                                                                                                                                                                                                                                                                                      |                            | 36    | \$ 25       | \$ 900           | Donated by West Coast Construction at \$25/hr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| labor for Assembly of God Church                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                            | 10    | \$ 15       | \$ 150           | Retrofits done by Church staff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| In-kind labor for Catholic Church                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |                            | 8     | \$ 15       | \$ 120           | Retrofits done by Church staff                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>TOTAL</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |                            |       |             | <b>\$ 38,905</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

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 Unalakleet to deliver 44% more energy savings measures beyond original grant funds.