## Village Energy Efficiency Program AEA VEEP Grant # 7520001 Administered by Alaska Building Science Network Kiana Final Report Grant Amount: \$150,000



Center Photo: ©State of AK Division of Community and Regional Affairs

## **Community Summary**

7 community buildings received energy efficient lighting, weatherization and heating upgrades as follows: Community Building, City Office, Public Safety Building, VPSO House, Fire House, Native Village Office, Friends Church

Retrofits Completed: November 2011

### Village-Wide Energy Efficient Lighting, Weatherization and Heating Retrofit Summary:

| <ul> <li>Projected Annual Electrical Savings (kWh):</li> </ul> | 9,447                  |
|--|------------------------|
| Projected Annual Electrical Cost Savings:                      | \$6,000 <sup>1,2</sup> |
| Projected Annual Heating Fuel Savings (gallons):               | 2,285                  |
| Projected Annual Fuel Cost Savings:                            | \$15,995 <sup>3</sup>  |
| Total Projected Annual Energy Cost Savings:                    | \$21,995               |
| Total village wide In-kind contribution:                       | \$18,280               |
| Total project cost including In-kind contribution:             | \$168,280              |
| Simple Payback (including In-kind contributions):              | 7.65 years             |

<sup>&</sup>lt;sup>1</sup> kWh Rate [used to calculate electrical cost savings] for Lighting Measures (State of AK - AEA PCE Program Report FY 2011 avg): \$0.64

<sup>&</sup>lt;sup>2</sup> kWh Rate [used to calculate electrical cost savings] for Weatherization & Heating Measures (AkWarm Library): \$0.64

<sup>&</sup>lt;sup>3</sup> #2 Heating Fuel Rate [used to calculate heating fuel savings] (AkWarm Library): \$7.00/gal

# City Office

## **Total Building Savings All Measures:**

| <ul> <li>Projected Annual Electrical Savings (kWh):</li> <li>Projected Annual Electrical Cost Savings:</li> </ul> | 3,637<br>\$2,310 |
|---|------------------|
| <ul> <li>Projected Annual Heating Fuel Savings (gallons):</li> <li>Projected Annual Fuel Cost Savings:</li> </ul> | 712<br>\$4,984   |
| Total Projected Annual Energy Cost Savings:   | \$7,294          |

#### Weatherization Retrofit Summary:



- Installed four programmable thermostats.
- Added R-38 loose-fill fiberglass insulation to the attic.
- Air sealed building to reduce air leakage.
- Annual energy savings projection:

712 gallons

\$4,984

Estimated Annual Heating Fuel Cost Savings:

# City Office

### Lighting Retrofit Summary:

| Materials Installed                                       | <u>Quantity</u> |
|---|-----------------|
| Fluorescent 2-lamp electronic ballast, (2) 25 watt T8 lam | ps 3            |
| Fluorescent 3-lamp electronic ballast, (3) 25 watt T8 lam | ps 11           |
| Fluorescent 4-lamp electronic ballast, (4) 25 watt T8 lam | ps 4            |
| CFL-14 W  | 1               |
| CFL-19W   | 2               |
| CFL-23 W  | 3               |
| CFL-27 W  | 4               |
| CFL-9 W   | 2               |

| Pre-retrofit energy use:  |   | 3.637 Kilowa                               | atts  |
|---|---|--|---|
| Post-retrofit energy use:   |   | 1.559 Kilowa                               | atts  |
| <ul> <li>Energy savings projection:</li> </ul>                              |   | 2.078 Kilowatts                            |   |
| Pre-retrofit to post retrofit energy reduction:                             |   | 57%  |   |
| Estimated Annual Savings:   |   | kWh Saved: 3,637                           |   |
| 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<br><b>7 Hours/day</b><br>10 Hours/day<br>2000 Hours/year (Est.) | \$1,319.95<br><b>\$2,309.90</b><br>\$3,299.86<br>\$2,639.89 | 165.97<br>290.46<br>414.94<br>331.95       | \$622.40<br>\$1,089.21<br>\$1,556.01<br>\$1,244.8 |

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## Public Safety Building

## **Total Building Savings All Measures:**

| <ul> <li>Projected Annual Electrical Savings (kWh):</li> <li>Projected Annual Electrical Cost Savings:</li> </ul> | 2,412<br>\$1,532 |
|---|------------------|
| <ul> <li>Projected Annual Heating Fuel Savings (gallons):</li> <li>Projected Annual Fuel Cost Savings:</li> </ul> | 300<br>\$2,100   |
| Total Projected Annual Energy Cost Savings:   | \$3,632          |

### Weatherization Retrofit Summary:



- Installed single programmable thermostat, including village staff training.
- Added R-38 batts to the attic.
- Air sealed building to reduce air leakage.
- Installed weather-stripping and bottom door sweeper on the front door.
- Annual energy savings projection: 300 gallons
- Estimated Annual Heating Fuel Cost Savings: \$2,100

# Public Safety Building

## Lighting Retrofit Summary:

•



| Materials Installed                                       | <u>Quantity</u> |
|---|-----------------|
| Fluorescent 2-lamp electronic ballast, (2) 25 watt T8 lam | ips 7           |
| Fluorescent 4-lamp electronic ballast, (4) 25 watt T8 lam | ips 9           |
| CFL-23 W  | 1               |
| CFL-27 W  | 2               |

| Pre-retrofit energy use:                                  |  |   |  |
|---|--|---|--|
|   | 1.209 Kilowatts  |   |  |
|   | 1.378 Kilowatts  |   |  |
| reduction:  | 53%  |   |  |
|   | kWh Saved: 2,412   |   |  |
| Electrical<br>Savings                                     | Comparative<br>Avoided Diesel<br>Use (gal)   | Comparative<br>Avoided Diesel<br>Costs  |  |
| \$875.31<br><b>\$1,531.78</b><br>\$2,188.26<br>\$1,203.55 | 110.06<br>192.61<br>275.16<br>151 34   | \$412.74<br>\$722.29<br>\$1,031.85<br>\$567.52  |  |
|   | reduction:<br>Electrical<br>Savings<br>\$875.31<br><b>\$1,531.78</b><br>\$2,188.26<br>\$1,203.55 | 2.587 Kilowa<br>1.209 Kilowa<br>1.378 Kilowa<br>reduction: 53%<br>kWh Saved:<br>Comparative<br>Avoided Diesel<br>Use (gal)<br>\$875.31 110.06<br><b>\$1,531.78</b> 192.61<br>\$2,188.26 275.16<br>\$1,203.55 151.34 |  |

# VPSO House

## **Total Building Savings All Measures:**

| <ul> <li>Projected Annual Electrical Savings (kWh):</li> <li>Projected Annual Electrical Cost Savings:</li> </ul> | 644<br>\$409   |
|---|----------------|
| <ul> <li>Projected Annual Heating Fuel Savings (gallons):</li> <li>Projected Annual Fuel Cost Savings:</li> </ul> | 236<br>\$1,652 |
| Total Projected Annual Energy Cost Savings:   | \$2,061        |

### Weatherization/Heating Retrofit Summary:



• Replaced existing boiler with new energy efficient boiler and installed single programmable thermostat.

• Air sealed building to reduce air-leakage.

• Added R-30 fiberglass batts above existing batts in the attic, including over the attic hatch.

• Annual energy savings projection:

236 gallons

\$1,652

Estimated Annual Heating Fuel Cost Savings:

# VPSO House

## Lighting Retrofit Summary:

| <u>Materials Installed</u><br>Fluorescent 2-lamp electronic ballast, (2)    | ) 25 watt T8 Iam                                    | <b>Quantity</b><br>nps 10                  |  |
|---|---|--|--|
| Pre-retrofit energy use:  |   | 0.828 Kilow                                | atts   |
| Post-retrofit energy use:   |   | 0.460 Kilow                                | atts   |
| <ul> <li>Energy savings projection:</li> </ul>                              |   | 0.368 Kilow                                | atts   |
| Pre-retrofit to post retrofit energy re                                     | eduction:   | 44%  |  |
| Estimated Annual Savings:   |   | kWh Saved:                                 | : 644  |
| 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<br><b>7 Hours/day</b><br>10 Hours/day<br>1375 Hours/year (Est.) | \$233.75<br><b>\$409.07</b><br>\$584.38<br>\$321.41 | 29.39<br>51.44<br>73.48<br>40.42           | \$110.22<br>\$192.89<br>\$275.56<br>\$151.56 |

## Community Building

#### Weatherization Retrofit Summary:



- Replaced existing boiler with new energy efficient boiler.
- Annual energy savings projection: 516 gallons
   Estimated Annual Heating Fuel Cost Savings: \$3,612

# Fire House

#### Weatherization Retrofit Summary:



- Added R-38 loose-fill fiberglass insulation to attic; flash coated the eaves with 4" urethane foam.
- Air sealed building to reduce air leakage.
- Weather-stripping added outside to garage doors.
- Annual energy savings projection:
- Estimated Annual Heating Fuel Cost Savings:

243 gallons

\$1,701

## NATIVE VILLAGE OF KIANA OWNED BUILDINGS

# IRA Office

#### **Total Building Savings All Measures:**

| <ul> <li>Projected Annual Electrical Savings (kWh):</li> <li>Projected Annual Electrical Cost Savings:</li> </ul> | 1,663<br>\$1,056 |
|---|------------------|
| <ul> <li>Projected Annual Heating Fuel Savings (gallons):</li> <li>Projected Annual Fuel Cost Savings:</li> </ul> | 255<br>\$1,785   |
| Total Projected Annual Energy Cost Savings:   | \$2,841          |

#### Weatherization/Heating Retrofit Summary:



- Tuned up the boiler to 86% combustion efficiency, and installed two programmable thermostats.
- Insulated the boarded-up windows and caulked for airtightness.
- Air sealed building to reduce air leakage.
- Installed exterior flappers for the two exhaust fans in the bathroom.
- Annual energy savings projection: 255 gallons
- Estimated Annual Heating Fuel Cost Savings: \$1,785

# IRA Office

#### Lighting Retrofit Summary:

| Materials I<br>Fluorescent<br>CFL-23 W          | <u>nstalled</u><br>2-lamp electronic ballast, (2)                           | 25 watt T8 lam  | Quantity<br>ps 14<br>4  |                             |  |  |
|---|---|---|-------------------------|-----------------------------|--|--|
| Pre-retrof                                      | it energy use for all lighting  | g:  | 1.686                   | Kilowat                     | ts   |  |
| Post-retro                                      | fit energy use for all lightir  | ıg:   | 0.736                   | Kilowat                     | ts   |  |
| • Energy sa                                     | avings projection:  |   | 0.950                   | Kilowat                     | ts   |  |
| Pre-retrofit to post retrofit energy reduction: |   | 56%   |                         |                             |  |  |
| Estimated Annual Savings:                       |   | kWh   | Saved:                  | 1,663                       |  |  |
|   | Hours Per Day /<br>250 Days Per Year  | Electrical<br>Savings                                     | Compa<br>Avoided<br>Use | arative<br>Diesel<br>(gal)  | Comparative<br>Avoided Diesel<br>Costs       |  |
|   | 4 Hours/day<br><b>7 Hours/day</b><br>10 Hours/day<br>2000 Hours/year (Est.) | \$603.44<br><b>\$1,056.02</b><br>\$1,508.60<br>\$1,206.88 | 75<br>132<br>189<br>151 | .88<br>2.79<br>9.70<br>1.76 | \$284.54<br>\$497.95<br>\$711.36<br>\$569.09 |  |

## **KIANA FRIENDS CHURCH OWNED BUILDINGS\***

# Friends Church

#### Lighting Retrofit Summary:

| Materials Installed<br>Fluorescent 2-lamp electronic ballast, (2) 32 watt T8 lamp | <mark>Quantity</mark><br>os 26 |
|---|--------------------------------|
| Pre-retrofit energy use for all lighting:   | 2.184 Kilowatts                |
| <ul> <li>Post-retrofit energy use for all lighting:</li> </ul>                    | 1.560 Kilowatts                |
| <ul> <li>Energy savings projection:</li> </ul>                                    | 0.624 Kilowatts                |
| Pre-retrofit to post retrofit energy reduction:                                   | 29%                            |
| Estimated Annual Savings:   | kWh Saved: 1,092               |

|            | Comparative  | Comparative  |
|------------|--|--|
| Electrical | Avoided Diesel   | Avoided Diesel   |
| Savings    | Use (gal)  | Costs  |
| \$396.36   | 49.84  | \$186.90   |
| \$693.64   | 87.22  | \$327.08   |
| \$990.91   | 124.60   | \$467.25   |
| \$237.82   | 29.90  | \$112.14   |
|            | Electrical<br>Savings<br>\$396.36<br><b>\$693.64</b><br>\$990.91<br>\$237.82 | Comparative           Electrical         Avoided Diesel           Savings         Use (gal)           \$396.36         49.84           \$693.64         87.22           \$990.91         124.60           \$237.82         29.90 |

\*Note: The community of **Kiana** opted to purchase materials and provide labor In-kind to complete energy efficiency retrofits for the **Friend's Church**. To further maximize the value of the VEEP & EECBG, Alaska Building Science Network provided energy audits of various community buildings not included under VEEP/EECBG funding upon local request, while providing technical support and training as needed to complete upgrades.

|  | Record - AB                       | <u>SN Enei</u>            | ду Епісіє      | ency projects:    |  |
|--|-----------------------------------|---------------------------|----------------|-------------------|--|
| In-Kind Item   | Dates                             | Hours<br>Contri-<br>buted | Hourly<br>Wage | Value /<br>Amount | Notes  |
| Staff time for project contact,  |                                   | 3                         | \$20.00        | \$60.00           | Number of entities x 1 hour each   |
| Introduction & review of Intro materials   |                                   |                           |                |                   |  |
| Staff time for Attending teleconference  | 11/12/10                          | 1                         | \$20.00        | \$20.00           | City time  |
| Staff time for Attending teleconference  | 11/12/10                          | 1                         | \$20.00        | \$20.00           | TC/IRA time  |
| Staff time for Attending teleconference  | 11/12/10                          | 1                         | \$20.00        | \$20.00           | School time  |
|  |                                   |                           |                |                   |  |
| Maint. Staff time to accompany Field<br>Manager on building assessment   | 10/11/10                          | 4                         | \$20.00        | \$80.00           | School: Steve Sharrow - Building<br>Assessment   |
| Conservative village office administrative<br>percentage of total project cost less ABSN<br>Admin %. Total project cost =<br>\$190,000/village - our admin percentage<br>(around 14%) Approx: \$26,600 = \$163,400 x<br>4% = \$6,536 (this 4% village admin cost<br>estimate is spread across all entities we work<br>with for the course of the grant for completing<br>all energy efficiency measures). These are<br>for cumulative, otherwise unaccounted time<br>expense for village- based project support. | Feb, '09<br>through<br>Completion |                           |                | \$6,536.00        | Each time we call, email, or fax a village entity,<br>someone receives the communication, reviews and/or<br>forwards the information, follows-up on requests, etc.<br>Whether it is to set-up a teleconference, verify<br>maintenance staff participation in lighting or boiler<br>trainings, set-up in-kind lodging and transportation,<br>lighting trainings, track a shipment, verify completion of<br>lighting in a given building, ship lamps and ballasts out<br>of the village for recycling, request a labor<br>reimbursement agreement, or invoice etc. Village<br>expenses for phone charges, copying and fax costs,<br>office supplies, etc. are part of this amount. |
| Lodging for ABSN Field Managers  | 10/8/10 -<br>10/12/10             |                           |                | \$600.00          | 1st assessment site visit  |
| Transportation and fuel costs  | 10/10/10                          | 3                         | \$25.00        | \$75.00           | 1st assessment site visit  |
| Lodging for ABSN Field Managers  | 9/26/11 -<br>10/16/11             |                           |                | \$3,000.00        | City: Lodging for 2 Field Managers -<br>Weatherization & Lighting Upgrades   |
|  |                                   |                           |                |                   |  |
| Labor for heating - boiler and hot water system install  | 10/3/11 -<br>10/8/11              | 64                        | \$22.96        | \$1,469.44        | City: Labor - Heating Upgrades   |
| Labor for weatherization - adding R-30 insulation  | October '11                       |                           |                | \$6,400.00        | Completed by WH Pacific Contractor<br>through NANA funding - Weatherization<br>Upgrades  |
|  |                                   |                           |                |                   |  |
|  | ΤΟΤΑΙ                             |                           |                | ¢40.000.44        |  |
|  | TOTAL                             |                           |                | <b>φ10,200.44</b> |  |

# Kiana, In-Kind Contribution Tracking Record - ABSN Energy Efficiency Projects