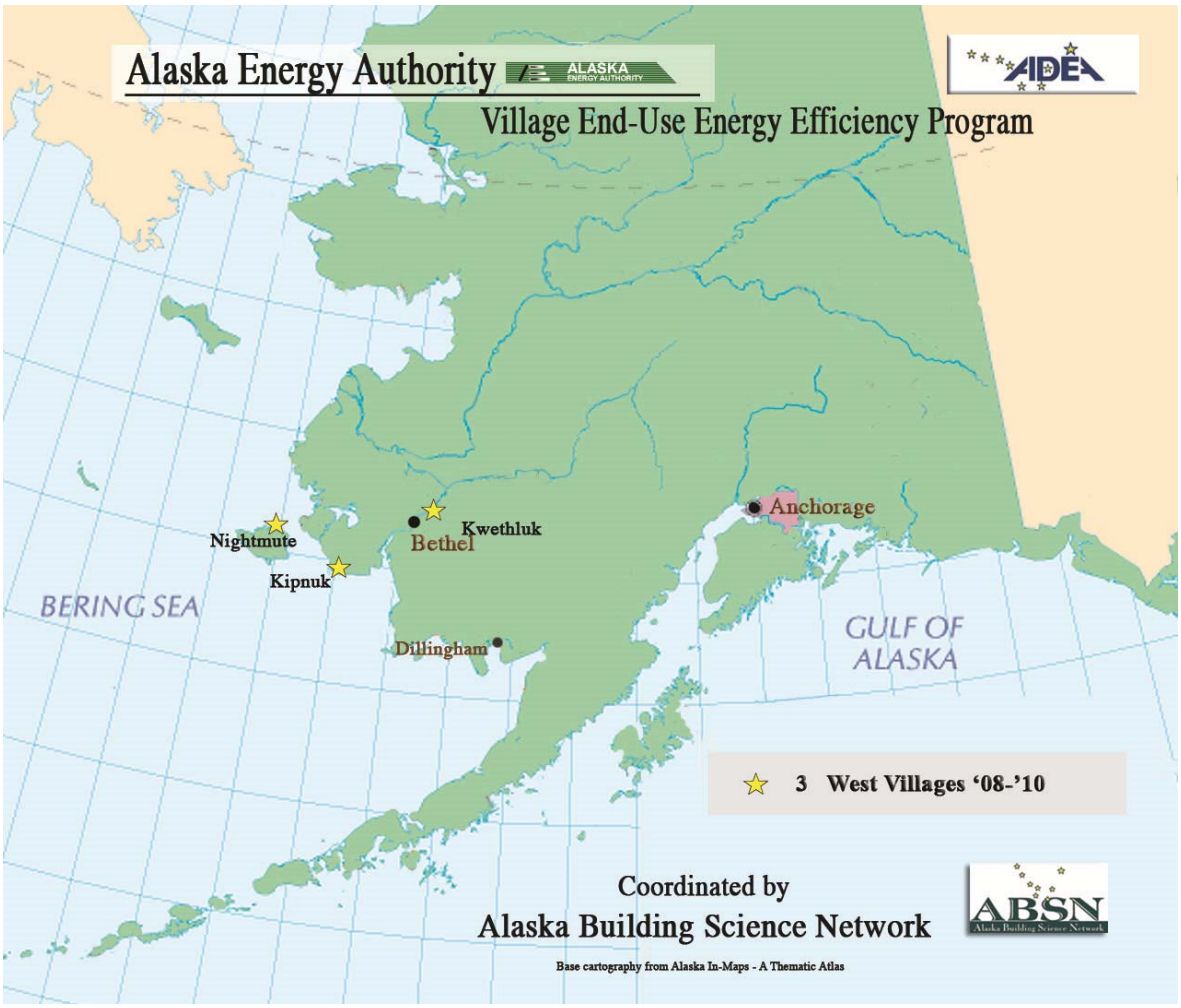
Village End Use Energy Efficiency Measures Program

AEA Grant # 2195234 Administered by Alaska Building Science Network

Nightmute Final Report

Lighting & Weatherization Measures 2008 – 2010



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Village End Use Energy Efficiency Measures Program

AEA Grant # 2195225 Administered by Alaska Building Science Network

Nightmute Final Report

Lighting & Weatherization Measures 2008 – 2010

- by Geoff Butler, ABSN Project Manager, June 30, 2010



Contents

Project Summary

This report details energy efficiency lighting and weatherization upgrades in 13 community buildings and 4 teacher-housing units in Nightmute, Alaska. These energy retrofits took place as part of a “Whole Village” energy efficiency retrofit project spearheaded by The Alaska Energy Authority, with the Alaska Building Science Network (ABSN) completing community building upgrades from Feb. ’08 through Feb. 2010. This project was an effort to maximize energy savings to the community in the wake of the highest oil price spike in world history - with a barrel of oil topping $150 during the summer of 2008. At the beginning of this project heating fuel in Nightmute cost residents and most community building owners $7.90 / gallon. In June, 2010, at the time of compiling this report, heating fuel in Nightmute cost $6.60 /gallon with an expected price increase later that summer. The FY 2009 full cost of electricity rate was .53 cents/kWh.

ABSN Project Coordinator Anna Hilbruner, center, and AEA Project Manager Rebecca Garrett, right, visit with children at the Nightmute Community Hall

ABSN Field Manager Harry Morgan with Nightmute in the background

ABSN Project Manager Geoff Butler, starting a blower door air leakage test at the Nightmute Post Office

Project Summary Continued

We at ABSN are excited to report findings and pleased with the results of this first community building weatherization program that we are aware of in the State. While residential weatherization programs have been on going for decades, many rural Alaska community buildings have remained outside official weatherization programs and have in many cases been left without focused energy efficiency and building maintenance resources. Another challenging aspect of older rural construction is that many buildings were built in the 70s and early 80s when oil was inexpensive. Many typical community buildings and residences were built with 2 x 4 construction and have low thermal resistance values in walls, floors and ceilings. Structures were often built with little or no building science knowledge or application and without Alaska's harsh northern climate in mind. Without resources and education, the primary heat-loss mechanism of air leakage and the related area of building ventilation are not well understood. Parts of building thermal envelopes remain un-insulated, and frequently, older, poorly maintained heating systems assure much higher than necessary fuel use and cost.

The challenges in these trends, coupled with extremely high fuel prices reveal great need, but also great opportunity: The reality of low-hanging fruit in the area of weatherization and the potential for substantial energy and cost savings at a comparatively low price tag. A blower door tool kit, sealants, spray foam and locally trained labor can achieve measurable and valuable air sealing improvements. Adding blown fiberglass insulation in attics is relatively simple, inexpensive and effective at placing thermal resistance where it's needed. Older, ductless forced air heating systems can be swapped out with direct-vent, more efficient space heaters by local, knowledgeable installers. Where there is strong community participation and match funding, outside rigid foam insulation and new siding can bring excellent thermal protection and cost savings for relatively low cost. These are the primary weatherization strategies ABSN pursued in the Nightmute weatherization project.

Considering budget, spending, savings and pay back figures

For figuring energy and cost savings in this report, we compared pre and post AkWarm weatherization fuel use estimates. For our overall savings and payback figures, we added fuel use and savings estimates from all buildings together and multiplied by the cost of fuel (a hypothetical $5.00 / gallon and $6.60/gallon pricing was used), to get an annual, village-wide dollar savings figure. Simple payback, village-wide and by building comes from dividing grant funds spent by fuel dollars saved. To reduce admin costs we did not track materials and labor spending by building. Instead, we used the pre/post AkWarm savings estimates and figured per building spending based on the same proportion of per/building savings in comparison to the village-wide savings figure. Using the Chinuruk store as an example: fuel savings for that building amounted to 33% of the village-wide savings figure. To figure payback for that building we used an assumed weatherization grant cost of 33% of total weatherization grant funds.

Working with local labor

One of ABSN's overriding principles is to utilize and train local village workers for energy efficiency retrofit projects to the greatest extent possible. This achieves the related goals of providing employment and training opportunities in the communities we serve, while also transferring energy efficiency and building science knowledge to local workers who may then pass on that experience and education to other residents and projects in their village. Through local lighting and weatherization training provided by ABSN field managers, we were able to expand the available labor pool in Nightmute. With a blower door on-site, weatherization workers in training get to see and feel the difference an effective caulking and air-sealing job can make. The local village labor force that did most of the work in Nightmute was paid through force-account as employees of the local entities who own the buildings. The wages paid were comparable to maintenance and weatherization techs working for regional housing authorities and weatherization providers. Approximately 12 - 14 local village maintenance and weatherization workers received training and worked for several weeks in 2008 and 2009.



Lessons Learned

During this first rural Alaska community building weatherization program we learned some valuable lessons worth sharing in consideration of further efforts: It is best for initial building assessments to be done in spring or summer when building foundations and roofs are free of snow and can be thoroughly inspected. Two of the larger buildings we worked on required foundation leveling and new roofs to remain viable buildings. We discovered this in stages after ordering and shipping some weatherization materials. Fortunately in the case of the Chinuruk Store and Church, both entities were willing and able to pay for a good share of labor and materials including all materials for their new roofs – making it possible to complete weatherization measures within a small budget. With many community buildings left out of maintenance and weatherization programs, most villages will have buildings in need of structural repairs that don't bring energy savings but that are necessary for energy upgrades to have lasting value. It is important to factor this into the assessment process and decide with partner village building managers weather and how far to proceed on a given building.

Considering materials, shipping and the short construction season: These elements factor into difficult logistics and the need for advanced planning and early action for ordering materials. For these reasons it is best and depending on scope of work sometimes essential to have two summer seasons to complete projects. In many rural Alaska villages buildings are not free of snow until late May / early June. If ordering materials happens in June and it takes 4 – 8 weeks for materials to arrive by barge then it will likely be mid-August before work can begin. Six weeks later ice and snow begin arriving again. When it comes to ordering materials that will be shipped by barge, vessel departure deadlines necessitate timely and early materials orders, which is sometimes difficult or not possible to achieve considering site visit scheduling for snow-free assessments. While it's possible to air-freight materials to the villages it is also more costly which squeezes budgets and good paybacks. Local labor is also a challenging and unpredictable factor. The short Alaska summers are often the only opportunity for finding jobs and income for rural Alaskans. Fire fighting jobs and local or regional construction and residential weatherization work become competing labor arenas that thin out the available labor pool during the time it is needed most.

Although the challenges are many, we found the motivation to reduce energy costs in rural Alaska is equally as strong. The sprit of cooperation on the part of rural Alaska building managers and owners as well as local workers really helped make these projects possible. With a creative and flexible approach, and plenty of village coordination and communication, the many hurdles can be surmounted.



Lighting Retrofit Summary for all Community Buildings



- Retrofitted 72 light fixtures with electronic ballasts & T8 lamps
- Installed 148 compact fluorescent light bulbs
- Installed 8 T5 linear fluorescent fixtures in the School Gym

• Pre-retrofit energy use for all lighting:	17.054	Kilowatts
• Post-retrofit energy use for all lighting:	7.009	Kilowatts
• Energy savings projection:	10.045	Kilowatts
• Pre-retrofit to post retrofit energy reduction:	59%	

- Estimated Annual Savings:

kWh Rate (FY 2009 AVE): $0.5309 Fuel Cost (FY 2008 Ave): $2.60 (FY09 bulk fuel price not available in PCE Report)

Hours Per Day/ 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated Use	$8,128.90	1176.91	$3,059.96
4 Hours/day	$5,332.89	772.10	$2,007.46
7 Hours/day	$9,332.56	1351.17	$3,513.05
10 Hours/day	$13,332.23	1930.25	$5,018.64

- Total project cost for all lighting measures: $20,000*
  *($17,500 lighting funds spent in Kwethluk and Kipnuk lighting programs that had much larger lighting scope)

- Simple Payback (lighting measures only, using 7 hours/day lighting use run-time): 2.14 years
- Total village wide in-kind contribution: Is covered in the weatherization summary below.



Geoff Butler, ABSN PM, speaks with Mike Joe, General Manager of Chinuruk Inc.

Weatherization Scope of Work for Ten Community Buildings

- Completed As Is and Post weatherization AkWarm / blower door analysis for 9 community buildings
- Installed blow-in fiberglass insulation in 10 community building attics achieving R40 – R50
- Completed air sealing measures in 10 community buildings
- Installed rigid foam insulation in partial floors and ceilings of two community buildings
- Installed rigid foam insulation on full building exterior envelope for the Chinuruk Inc village store
- Installed 7 new triple-pane vinyl windows in the Nightmute Community Church
- Installed 1 new insulated metal door in the Chinuruk Inc village store
- Installed new weather stripping and door sweeps on all exterior doors
- Replaced 2 Miller forced air furnaces with direct vent sealed-combustion Toyo Stoves
- Installed 1 programmable Thermostat in the City Head Start Bldg for added fuel savings
- Completed extensive foundation jacking & leveling for two community buildings (too retain building viability)
- Installed new galvanized metal roofs on two buildings (to retain building viability)

Village-Wide Weatherization Savings and Payback Figures

- Average pre-weatherization AkWarm energy rating for nine buildings: 55.8 rating points , 2 Star rating
- Average post-weatherization AkWarm energy rating for nine buildings: 79.7 rating points , 4 Star rating
- Average Air Leakage reduction pre verses post Weatherization: 48%

- Average community building square footage excluding school gym: 997 sq'
- Range of community building square footage (nine buildings): 361 sq' to 1,901 sq'

- Average annual fuel consumption per building - pre weatherization: 961 gallons / year
- Average annual fuel consumption per building - post weatherization: 423 gallons / year

- Average annual heating fuel cost per building - pre weatherization: $ 5,114
- Average annual heating fuel cost per building - post weatherization: $ 2,222
- Average annual savings percentage in dollars and gallons of fuel: 56%

- Total estimated fuel use – pre weatherization: 8,646 gallons
- Total estimated fuel use – post weatherization: 3,811 gallons
- Annual Fuel Saved in 9 bldgs – comparing pre & post Wx AkWarm runs: 4,835 gallons

- Annual Dollar Savings in 9 bldgs – comparing pre & post AkWarm runs (with $5.00 /gal fuel): $ 26,028
- Annual Dollar Savings in 9 bldgs – comparing pre & post AkWarm runs **(with $6.60 /gal fuel): $ 31,911**

Village-Wide Weatherization Savings and Payback Figures, Cont'd

• Total ABSN Weatherization grant funds: $ 164,955
• Simple Payback: Total Wx funds divided by annual dollar savings ($5.00 /gal fuel): 6.3 years
• Simple Payback: Total Wx funds divided by annual dollar savings **($6.60 /gal fuel): 5.2 years**

• Total village entity / partner funding contributions: $ 75,703 (see appendix for detailed account)
• Total combined AEA grant + village contributed funds: $ 240,658

• Simple Payback: Total AEA grant + village funds divided by annual dollar savings ($5.00 /gal fuel): 9.2 years
• Simple Payback: Total AEA grant + village funds divided by annual dollar savings **($6.60 /gal fuel): 7.5 years**

Local weatherization worker Genevieve Anthony air sealing in the City Post Office

Local workers prepare the Chinuruk Store ceiling for new plywood and air sealing

ABSN field manager Harry Morgan and Elliot Tulik adding roof overhang and blow-in insulation to the Chinuruk Store.

Notes: While AEA as the grantor, will realize the lower payback figures shown above, the projects are more realistically budgeted using the higher payback figures that include the full funding level of the projects. Without the substantial village funding contributions the projects could not have achieved the full scope of work completed.

Additionally, the figures using June, 2010 Nightmute fuel prices of $6.60 /gallon, reflect current and expected future realities for rural Alaska weatherization projects. For the foreseeable future, higher fuel prices are likely with increasing demand and decreasing supply of oil globally.

Village Entity Sections and Individual Building Reports



Village Entity Sections and Individual Building Reports appear in the order below. Most buildings have both lighting and weatherization measures reported, but some buildings only received one or the other measure. Each village entity has a lighting summary for all buildings owned by the entity. Following this is a lighting summary for each building owned or operated by a village entity. Weatherization village contribution and payback figures are reported by building and village entity, whereas Weatherization measures and results are reported by building only.

The City of Nightmute:

Lighting Summary for City of Nightmute buildings

The City of Nightmute Office	(Lighting and Weatherization)	
Community Hall	(Lighting and Weatherization)	
Head Start Building	(Lighting and Weatherization)	(This building was the old Umkumiut Office)
PAP/ Public Safety Bldg	(Lighting and Weatherization)	
Post Office	(Lighting and Weatherization)	
Water Treatment Plant	(Lighting only)	
Warm Storage Bldg	(Lighting only)	

The Native Village of Nightmute (Nightmute Traditional Council):

NTC Office Building	(Lighting and Weatherization)

The Native Village of Umkumiut:

Umkumiut Office Building	(Weatherization only)

Chinuruk Inc. (the local village corporation:

Chinuruk village Store	(Lighting and Weatherization)

Nightmute Community Church:

Lighting Summary for Church buildings

Community Church	(Lighting and Weatherization)
Church Housing	(Lighting and Weatherization)

Lower Kuskokwim School District (LKSD):

Lighting Summary for School Facilities

School Gym T5 Lighting	(Lighting only)
4 Teacher Housing Units	(Lighting only)

City Of Nightmute Owned Buildings



7 buildings owned by the City of Nightmute received energy efficient lighting upgrades as follows:

City Offices, Community Hall, Headstart Building, PAP/ Public Safety Bldg, Post Office, Water Treatment Plant, Warm Storage

Lighting Summary for all City of Nightmute Buildings:

- Lighting upgrades completed in March, 2008
- Retrofitted 36 light fixtures with electronic ballasts & T8 lamps
- Installed 33 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 5.011 Kilowatts
- Post-retrofit energy use for all lighting: 2.412 Kilowatts
- Energy savings projection: 2.599 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 52%

- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$2,216.03	320.84	$834.18
4 Hours/day	$1,379.81	199.77	$519.40
7 Hours/day	$2,414.67	349.60	$908.95
10 Hours/day	$3,449.52	499.42	$1,298.50

Weatherization Village contribution and payback figures, City-wide:

- ABSN Weatherization grant funds spent on City of Nightmute Buildings: $ 47,837
- City of Nightmute contributed funding resources: $ 5,253
- ABSN grant funds + City of Nightmute contributions $ 53,090
- City of Nightmute annual dollar savings from Wx measures: $ 7, 045
- Simple payback: Wx grant funds + village contribution / annual $ saved: 7.1 years

City Office Building



Lighting Measures and Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	6
CFL-27 W	2

- Pre-retrofit energy use: 572 watts
- Post-retrofit energy use: 330 watts
- Energy savings projection: 242 watts
- Pre-retrofit to post retrofit energy reduction: 42%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$128.48	18.60	$48.36
7 Hours/day	$224.84	32.55	$84.63
10 Hours/day	$321.19	46.50	$120.91
2000 Hours/year (Village Est.)	$256.96	37.20	$96.73

City Office Building Weatherization Measures

Blown fiberglass insulation on top of existing R19 fiberglass bats combine for an R47 ceiling

Local Weatherization worker Genevieve Anthony adjusts a blower door frame

ABSN Project Manager Geoff Butler prepares rigid foam to insulate the City Office attic hatch cover

The City Office building is a 1,053 square foot, 2 x 6 framed structure built in 1983. With an efficient space heater already providing heat, the low cost weatherization measures for this building were air sealing and attic insulation, along with weather stripping and door sweeps for exterior doors.

- Existing insulation R-values: R19 in floor, walls and ceiling.
- Pre-weatherization AkWarm energy rating: 66.2 rating points, 2 Star+ rating
- Post-weatherization AkWarm energy rating: 82.1 rating points, 4 Star rating

- Annual fuel consumption pre weatherization: 697 gallons / year
- Annual fuel consumption post weatherization: 370 gallons / year
- Annual fuel saved through weatherization measures: 327 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 47%
- Air Leakage reduction pre verses post Weatherization: 69%

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, windows and doors
- Added blown fiberglass insulation on top of existing R19 fiberglass bats to achieve R47 in ceiling
- Installed new exterior door weather stripping and door sweeps
- Installed attic gable end vent with wind baffle cover

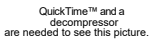
Weatherization Results at $5.00 /gal fuel price

- Annual heating fuel cost - pre weatherization: $ 3,669
- Annual heating fuel cost - post weatherization: $ 1,941
- Annual dollars saved through weatherization: $ 1,728
- Weatherization grant funds spent: $11,547
- Simple payback: Wx grant funds / annual $ saved: 6.7 years

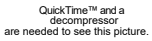
Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

- Annual heating fuel cost - pre weatherization: $ 4,600
- Annual heating fuel cost - post weatherization: $ 2,442
- Annual dollars saved through weatherization: $ 2,158
- Simple payback: Wx grant funds / annual $ saved: 5.4 years

Nightmute City Office : Pre-Weatherization AkWarm Rating



Nightmute City Office: Post Weatherization AkWarm Rating



Nightmute City Office: Comparing Pre & Post AkWarm runs
"Current Run" is Post Weatherization

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decompressor
are needed to see this picture.

City Community Hall



Lighting Materials and Measures Installed	Quantity
2-lamp electronic ballast, (2) 32 watt T8 lamps	6
CFL-27 W	3

- Pre-retrofit energy use: 624 watts
- Post-retrofit energy use: 441 watts
- Energy savings projection: 183 watts
- Pre-retrofit to post retrofit energy reduction: 29%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$97.15	14.07	$36.57
7 Hours/day	$170.02	24.62	$64.00
10 Hours/day	$242.89	35.17	$91.43
2000 Hours/year (Village Est.)	$194.31	28.13	$73.14

City Community Hall Weatherization Measures



The City Community Hall is a 1,728 square foot, 2 x 4 framed structure built in 1970. After 40 years of steady use this building was in fairly rough shape. It still is other than it's using just over half the fuel it used pre-weatherization. A 12' x 48' addition was added to the original 24' x 48' building. Vapor barriers were not connected between walls, floors and ceiling. Like many older rural Alaska community buildings the interior is painted plywood, affording fairly straight forward air-sealing using caulking sealants at all joints and cracks. Somewhere around 16 person-hours went into thorough air sealing to achieve a 32% air leakage reduction.

- Existing insulation R-values: R19 in floor and ceiling and R11 in walls.
- Pre-weatherization AkWarm energy rating: 63.7 rating points, 2 Star+ rating
- Post-weatherization AkWarm energy rating: 79.6 rating points, 4 Star rating

- Annual fuel consumption pre weatherization: 1049 gallons / year
- Annual fuel consumption post weatherization: 645 gallons / year
- Annual fuel saved through weatherization measures: 404 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 39%
- Air Leakage reduction pre verses post Weatherization: 32%

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, former furnace chimney penetration, windows and doors
- Built attic access hatch extension, removed stored items from attic and added 16 bags of blown-in attic insulation after replacing some rotted plywood at roof peak in south end of building. Added blown fiberglass insulation on top of existing R19 fiberglass bats to achieve R44 in original building (24' x 48') ceiling.
- Removed one broken, boarded up window, insulated and air sealed former window rough opening.
- Installed 2" rigid polyicocyanurate foam on ceiling of 12' x 48' community hall addition to achieve R49
- Installed new exterior door weather stripping and door sweeps
- Replaced 74% forced air furnace with new 84% efficient direct-vent space heater
- Installed a 110 cfm continuous-run rated fan on a timer switch for adding additional building ventilation.
- Installed attic gable end vent with wind baffle cover

Anna Hilbruner and Genevieve Anthony air sealing where addition meets original bldg. Vacuum is used to clear debris before sealing

Plywood seating is removed and cracks are vacuumed before air sealing

Geoff Butler sets up a blower-door test

Weatherization Results at $5.00 /gal fuel price

- Annual heating fuel cost - pre weatherization: $ 5,634
- Annual heating fuel cost - post weatherization: $ 3,366
- Annual dollars saved through weatherization: $ 2,268
- Annual savings percentage in dollars and gallons of fuel: 39%
- Weatherization grant funds spent: $14,846
- Simple payback: Wx grant funds / annual $ saved: 6.5 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

- Annual heating fuel cost - pre weatherization: $ 6,923
- Annual heating fuel cost - post weatherization: $ 4,257
- Annual dollars saved through weatherization: $ 2,666
- Simple payback: Wx grant funds / annual $ saved: 5.6 years

New plywood ceiling covering 2” rigid foam installed in 12’ x 48’ building addition

Old 70% forced-air furnace was removed and replaced

New Toyo-Stove, 84% efficient space heater installed by local technicians

Nightmute City Community Hall : Pre-Wx AkWarm Rating

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decompressor
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Nightmute City Community Hall: Post-Wx AkWarm Rating

QuickTime™ and a
decompressor
are needed to see this picture.

Nightmute City Community Hall: Comparing Pre & Post AkWarm runs "Current Run" is Post Weatherization

QuickTime™ and a
decompressor
are needed to see this picture.

Air sealing cracks with spray foam

Continuous run-rated exhaust fan on timer switch installed for adding building ventilation as needed.

Installing 2" of rigid foam to ceiling of community bldg addition where roof is too low pitched for new blow-in insulation

City Headstart Building



Lighting Materials and Measures Installed **Quantity**

2-lamp electronic ballast, (2) 25 watt T8 lamps	6
CFL-11 W	5
• Pre-retrofit energy use:	668 watts
• Post-retrofit energy use:	331 watts
• Energy savings projection:	337 watts
• Pre-retrofit to post retrofit energy reduction:	50%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$178.91	25.90	$67.35
7 Hours/day	$313.10	45.33	$117.86
10 Hours/day	$447.28	64.76	$168.37
1400 Hours/year (Village Est.)	$250.48	36.26	$94.29

City Headstart Weatherization Measures



The City Headstart Building is an 805 square foot, 2 x 6 framed structure built in 1985.

- Exhisting insulation R-values: R19 in floor, walls and ceiling.
- Pre-weatherization AkWarm energy rating: 59.9 rating points, 2 Star rating
- Post-weatherization AkWarm energy rating: 75.7 rating points, 3+ Star rating

- Annual fuel consumption pre weatherization: 519 gallons / year
- Annual fuel consumption post weatherization: 306 gallons / year
- Annual fuel saved through weatherization measures: 213 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 41%
- Air Leakage reduction pre verses post Weatherization: 49%

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, windows and doors
- Added blown fiberglass insulation on top of existing R19 fiberglass bats to achieve R48 in ceiling
- Installed a programmable thermostat for added fuel savings
- Installed new exterior door weather stripping and door sweeps
- Installed attic gable end vent with wind baffle cover

Weatherization Results at $5.00 /gal fuel price

- Annual heating fuel cost - pre weatherization: $ 2,773
- Annual heating fuel cost - post weatherization: $ 1,632
- Annual dollars saved through weatherization: $ 1,141
- Weatherization grant funds spent: $6,598
- Simple payback: Wx grant funds / annual $ saved: 5.8 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

- Annual heating fuel cost - pre weatherization: $ 3,425
- Annual heating fuel cost - post weatherization: $ 2,020
- Annual dollars saved through weatherization: $ 1,406
- Simple payback: Wx grant funds / annual $ saved: 4.7 years

Nightmute City Head Start: Pre-Wx AkWarm Rating

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Nightmute City Head Start: Post-Wx AkWarm Rating

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decompressor
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Nightmute Head Start: Comparing Pre & Post AkWarm runs
"Current Run" is Post Weatherization

QuickTime™ and a
decompressor
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VPSO Building (Formerly PAP, Computer/ Youth Building)



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

- Pre-retrofit energy use: 447 watts
- Post-retrofit energy use: 186 watts
- Energy savings projection: 261 watts
- Pre-retrofit to post retrofit energy reduction: 58%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$138.56	20.06	$52.16
7 Hours/day	$242.49	35.11	$91.28
10 Hours/day	$346.41	50.15	$130.40
1500 Hours/year (Village Est.)	$207.85	30.09	$78.24

VPSO Building (Formerly PAP, Computer/ Youth Building) Weatherization Measures

The VPSO Building is a 361 square foot, 2 x 6 framed structure built in 1991. This building was a youth program / computer lab building at the start of the projects in 2008 and was converted to a VPSO / public safety building in 2009.

- Exhisting Insulation R-values: R19 in floor, walls and ceiling.
- Pre-weatherization AkWarm energy rating: 78.6 rating points, 4 Star rating
- Post-weatherization AkWarm energy rating: 84.1 rating points, 4 Star+ rating

- Annual fuel consumption pre weatherization: 197 gallons / year
- Annual fuel consumption post weatherization: 139 gallons / year
- Annual fuel saved through weatherization measures: 58 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 29%
- Air Leakage reduction post/ pre Weatherization: 60%

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, windows and doors
- Added blown fiberglass insulation on top of existing R19 fiberglass bats to achieve R47 in ceiling
- Installed new exterior door weather stripping and door sweeps
- Installed attic gable end vent with wind baffle cover

Weatherization Results at $5.00 /gal fuel price

- Annual heating fuel cost - pre weatherization: $ 1,024
- Annual heating fuel cost - post weatherization: $ 723
- Annual dollars saved through weatherization: $ 301
- Weatherization grant funds spent: $1,650
- Simple payback: Wx grant funds / annual $ saved: 5.5 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

- Annual heating fuel cost - pre weatherization: $ 1,300
- Annual heating fuel cost - post weatherization: $ 917
- Annual dollars saved through weatherization: $ 383
- Simple payback: Wx grant funds / annual $ saved: 4.3 years

Nightmute VPSO Building: Pre-Wx AkWarm Rating

QuickTime™ and a
decompressor
are needed to see this picture.

Nightmute VPSO Building: Post-Wx AkWarm Rating

QuickTime™ and a
decompressor
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Nightmute VPSO Building: Comparing Pre & Post AkWarm runs
"Current Run" is Post Weatherization

QuickTime™ and a
decompressor
are needed to see this picture.

Post Office

Lighting Materials and Measures Installed	Quantity
CFL-23 W	5
CFL-27 W	5

- Pre-retrofit energy use: 725 watts
- Post-retrofit energy use: 250 watts
- Energy savings projection: 475 watts

- Pre-retrofit to post retrofit energy reduction: 66%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$252.18	36.51	$94.93
7 Hours/day	$441.31	63.89	$166.12
10 Hours/day	$630.44	91.28	$237.32
1800 Hours/year (Village Est.)	$453.92	65.72	$170.87

Post Office Weatherization Measures

Air leakage from a dry-rotted corner. Budgets didn't allow re-building the floor, but the source of water damage had already been contained.

A low-budget patch job that doesn't clash to badly with existing decor will pay for itself many times over.

Anna Hilbruner air seals around the attic hatch cover.

The City Post Office is a 529 square foot, 2 x 6 framed structure built in 1972. This building was extremely weathered and had several glaring energy efficiency problems at the time of assessment. Some years back most of the existing fiberglass bat insulation had been pulled out of place and stacked or randomly tossed around so that a good portion of the building's ceiling was un-insulated. On the East end of the building there were two former stove vent holes leading to the outside that had been patched with aging tape allowing unnecessary air leakage. The northeast corner of the floor had sustained water damage in the past and was soft enough to push through by hand. The entry door after many years of constant use did not close properly and had a very poor seal. This post office was a good example of how many older buildings left un-attended concerning fuel efficiency can end up costing far more than necessary to heat. All these problems were easy and inexpensive to remedy, resulting in exceptional payback for time and money invested. Additionally, this tiny building had an archaic forced air heating system as it's primary heat source using large quantities of fuel to heat a good share of air that was regularly leaving the building. Replacing the old furnace with an efficient direct-vent space heater coupled with air sealing and additional attic insulation reduced annual fuel cost by 66%. The air sealing for this building took roughly 12 person-hours to complete.

- Exhisting Insulation R-values: R19 in floor, walls and ceiling.
- Pre-weatherization AkWarm energy rating: 41.1 rating points, 1 Star+ rating
- Post-weatherization AkWarm energy rating: 84.1 rating points, 4 Star+ rating

- Annual fuel consumption pre weatherization: 582 gallons / year
- Annual fuel consumption post weatherization: 197 gallons / year
- Annual fuel saved through weatherization measures: 385 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 66%
- Air Leakage reduction, pre verses post Weatherization: 51%

Harry Morgan finding air leakage zones during a blower door test

Condition of attic insulation at time of pre-weatherization assessment. Much of it was removed for some reason in the past and left uninstalled

New blown-in attic insulation combines with existing reinstalled R19 fiberglass bats for a total of R49

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, former furnace chimney penetration, windows and doors
- Built attic access hatch extension, reinstalled existing R19 fiberglass bat insulation and added blown-in attic insulation to achieve R49 in ceiling.
- Re-hung exterior door for better seal and Installed new exterior door weather stripping and door sweeps
- Replaced a 60% efficient, ancient forced air furnace with a new 84% efficient direct-vent space heater
- Removed existing walls around former forced air furnace and framed in air circulation wall vents to facilitate uniform heating of building
- Installed attic gable end vent with wind baffle cover

Tightening up cracks in wall – ceiling trim in preparation for air sealing

Original 40-year-old 60% efficient forced air furnace

New 84% efficient space heater installed by local talent

Weatherization Results at $5.00 /gal fuel price

• Annual heating fuel cost - pre weatherization:	$ 3,068
• Annual heating fuel cost - post weatherization:	$ 1,027
• Annual dollars saved through weatherization:	$ 2,041
• Weatherization grant funds spent:	$13,196
• Simple payback: Wx grant funds / annual $ saved:	6.5 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

• Annual heating fuel cost - pre weatherization:	$ 3,841
• Annual heating fuel cost - post weatherization:	$ 1,300
• Annual dollars saved through weatherization:	$ 2,541
• Simple payback: Wx grant funds / annual $ saved:	5.2 years

New passive air-flow vents (top) framed into wall to allow heat to disperse throughout the post office

Installing new plywood over former forced air chimney penetration and water-damaged plywood

New gable-end vent with wind baffle cover

Nightmute Post Office: Pre-Wx AkWarm Rating

QuickTime™ and a
decompressor
are needed to see this picture.

Nightmute Post Office: Post-Wx AkWarm Rating

QuickTime™ and a
decompressor
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Nightmute Post Office: Comparing Pre & Post AkWarm runs
"Current Run" is Post Weatherization

QuickTime™ and a
decompressor
are needed to see this picture.

Water Treatment Plant & Bunkhouse

Lighting Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	4
2-lamp electronic ballast, (2) 32 watt T8 lamps	4
CFL-11 W	8

- Pre-retrofit energy use: 1237 watts
- Post-retrofit energy use: 512 watts
- Energy savings projection: 725 watts

- Pre-retrofit to post retrofit energy reduction: 59%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$384.90	55.73	$144.89
7 Hours/day	$673.58	97.52	$253.55
10 Hours/day	$962.26	139.32	$362.22
1800 Hours/year (Village Est.)	$692.82	100.31	$260.80

Warm Storage

Lighting Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	7
CFL-20 W	2

- Pre-retrofit energy use: 738 watts
- Post-retrofit energy use: 362 watts
- Energy savings projection: 376 watts

- Pre-retrofit to post retrofit energy reduction: 51%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$199.62	28.90	$75.14
7 Hours/day	$349.33	50.58	$131.50
10 Hours/day	$499.05	72.25	$187.86
800 Hours/year (Village Est.)	$159.69	23.12	$60.11

Nightmute Traditional Council Offices



1 building owned by the Nightmute Traditional Council received energy efficient lighting upgrades as follows:

Lighting Materials Installed	Quantity
4-lamp electronic ballast, (3) 25 watt T8 lamps	3
CFL-20 W	5
CFL-23 W	3
CFL-27 W	1

- Lighting upgrades completed in March, 2008
- Retrofitted 3 light fixtures with electronic ballasts & T8 lamps

- Installed 9 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 1.179 Kilowatts
- Post-retrofit energy use for all lighting: 0.421 Kilowatts
- Energy savings projection: 0.758 Kilowatts

- Pre-retrofit to post retrofit energy reduction: 64%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$402.42	58.26	$151.48
7 Hours/day	$704.24	101.96	$265.10
10 Hours/day	$1,006.06	145.66	$378.71
2000 Hours/year (Village Est.)	$804.84	116.53	$302.97

Traditional Council Office Weatherization Measures

Nightmute Traditional Council Office attic pre weatherization – with many items stored in the attic compressing existing insulation

NTC Office during blow-fill insulation, with stored items from attic outside

New gable-end vent with wind baffle cover installed on windward side of building.

The Traditional Council Office Building is a 989 square foot, 2 x 6 framed structure built in 1983. Basic weatherization measures of air sealing and additional attic insulation saved 24% of fuel use in this building.

- Exhisting insulation R-values: R19 in floor, walls and ceiling.
- Pre-weatherization AkWarm energy rating: 64.2 rating points, 2 Star+ rating
- Post-weatherization AkWarm energy rating: 73.3 rating points, 3 Star+ rating

- Annual fuel consumption pre weatherization: 710 gallons / year
- Annual fuel consumption post weatherization: 538 gallons / year
- Annual fuel saved through weatherization measures: 172 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 24%
- Air Leakage reduction post/ pre Weatherization: 33%

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, windows and doors
- Added blown fiberglass insulation on top of existing R19 fiberglass bats to achieve R51 in ceiling.
- Installed new exterior door weather stripping and door sweeps
- Installed attic gable end vent with wind baffle cover

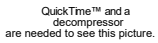
Weatherization Results at $5.00 /gal fuel price

- Annual heating fuel cost - pre weatherization: $ 3,777
- Annual heating fuel cost - post weatherization: $ 2,858
- Annual dollars saved through weatherization: $ 919
- Weatherization grant funds spent: $6,598
- Simple payback: Wx grant funds / annual $ saved: 7.2 years

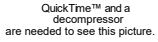
Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

- Annual heating fuel cost - pre weatherization: $ 4,686
- Annual heating fuel cost - post weatherization: $ 3,551
- Annual dollars saved through weatherization: $ 1,135
- Simple payback: Wx grant funds / annual $ saved: 5.8 years

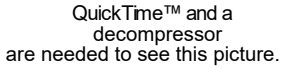
Nightmute Traditional Council Office: Pre-Wx AkWarm Rating



Nightmute Traditional Council Office: Post-Wx AkWarm Rating



Nightmute Traditional Council Office: Comparing Pre & Post AkWarm runs
"Current Run" is Post Weatherization



The Native Village of Umkumiut Office Building

Umkumiut Office Building Weatherization Measures

Two former furnace chimney / ceiling penetrations patched

Local weatherization worker installing wind-baffel gable end vent cover

The Umkumiut Office Building is a 696 square foot, 2 x 4 framed structure built in the 1970s. This building was leased by the Native Village of Umkumiut after the project's lighting phase and pre-weatherization building assessments had been completed. Therefore only weatherization measures were done in this building, and no AkWarm data is available. The measures of air sealing and attic insulation are expected to follow village averages for fuel savings and payback.

- Exhisting R-values: R19 in floors and, ceiling, R11 in walls
- Pre-weatherization AkWarm energy rating: No energy rating data available

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, two former furnace chimney penetrations, windows and doors.
- Built attic access hatch extension, removed stored items from attic and added blown-in attic insulation on top of R19 fiberglass bats to achieve ~R45 in ceiling
- Installed new exterior door weather stripping and door sweeps
- Installed attic gable end vent with wind baffle cover

Weatherization Results at $5.00 /gal fuel price

Expected savings and payback Figures:

- Average annual savings percentage in dollars and gallons of fuel: 56%
- Average Air Leakage reduction post/ pre Weatherization: 48%
- Simple Payback: Total Wx funds divided by annual dollar savings **($6.60 /gal fuel): 5.2 years**

Chinuruk Inc. Village Store



1 building owned by the Village Corporation received energy efficient lighting upgrades as follows:

Chinuruk Inc. Village Store

Lighting Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	21

- Lighting upgrades completed in March, 2008
- Retrofitted 21 light fixtures with electronic ballasts & T8 lamps
- Pre-retrofit energy use for all lighting: 1.62 Kilowatts
- Post-retrofit energy use for all lighting: 0.966 Kilowatts
- Energy savings projection: 0.654 Kilowatts

- Pre-retrofit to post retrofit energy reduction: 40%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$347.21	50.27	$130.70
7 Hours/day	$607.62	87.97	$228.72
10 Hours/day	$868.02	125.67	$326.75
2750 Hours/year (Village Est.)	$954.82	138.24	$359.42

Chinuruk Inc. Village Store, Weatherization Measures

The old Chinuruk Store buried by winter snowstorms

The old store was cobbled together and in very rough shape. A new roof was necessary for building viability

Extensive foundation Jacking and leveling was necessary before energy measures could take place

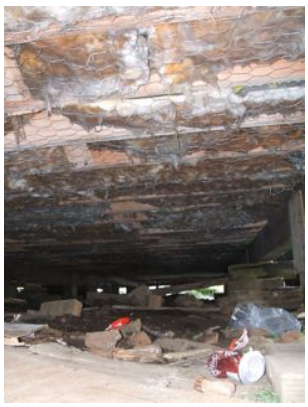
The Chinuruk Inc. Village Store is a 1,901 square foot, 2 x 4 framed structure built in 1970. The pre-weatherization Chinuruk Store was like an old horse put out to pasture for years, then brought back into emergency service to pack loads over the Chilkoot Pass. The old worn out building should have been left to gracefully pass back to the earth. Chinuruk Inc. had built and moved into it's replacement years ago - a spacious new store near the school that boasted 12' ceilings and extensive square footage. But as fuel prices soared and revenues tailed off, the extra floor space became a liability and the new Chinuruk Store closed its doors to return to their only available space – the old store on the River.

The former "new" Chinuruk Store was vacated and sold to the school district. The old store building became the only option for a village store

When ABSN field managers arrived for assessments it was clear the building needed a lot of help on the efficiency front. Parts of the old Chinuruk store building had no insulation in the floor. Other areas had R19 fiberglass held in place with chicken- wire.

"We'd sometimes get a snow drift right there . . . with 15 - 20 mph winds . . ! "

-said Jimmy George, Chinuruk bookkeeper, pointing to the floor inside his office where an interior door joined to an exterior wall: We thought he was joking, but with further assessment of the building, soon realized he wasn't.



Areas of uninsulated and poorly insulated floor, as well as many air leakage sites insured high heating costs for the old store.

Out of place ceiling tiles leave large air leakage zones

Removed ceiling tiles reveal exposed insulation and open roof area beyond

Old Miler forced-air furnace – discontinued as part of weatherization measures

A large portion of the ceiling inside the building was covered in 12" x 12" ceiling tiles stapled directly onto roof trusses with no vapor barrier - assuring a constant effort on the part of the old forced air furnace and more recent Monitor space heater to heat the area inside the roof trusses, and the great outdoors beyond the roof.

" The old forced air furnace and Monitor heater used to run constantly and struggle to keep up. They gobbled lots of fuel trying to do so. Now the new Monitor heats the whole building and only runs part time," said Mike Joe, Chinuruk Inc General Manager in Oct, 2009. Mike went further to explain how the waste heat from their glass-front pop cooler carries much of the heating load for the building during spring, fall and times of milder winter temperatures.

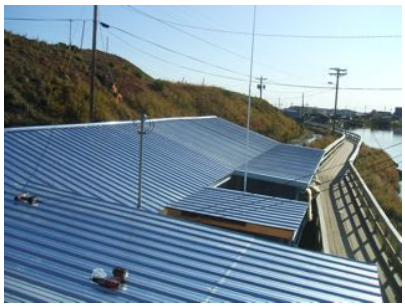
Local workers prepare ceiling for new plywood and air sealing

Local worker Joe Kosbruk removes old roofing panels

New galvanized metal roof in progress

In order to remain a viable building for the coming years, and in order to receive any energy upgrades the store had to first have a new roof installed and the foundation leveled. These extensive non-energy saving measures would have spent a great deal of the available grant funds leaving little left to fund energy saving measures. Fortunately Chinuruk Store Manager Mike Joe had the foresight and funds to generously contribute toward transforming the old store to a useful and affordable building. Within the two summers of Nightmute weatherization activities, Chinuruk Inc contributed $39,643 in direct materials and labor costs to the project, enabling the extensive scope of energy savings measures outlined below: Pre verses post AkWarm energy ratings show an annual savings of $ 10,639 at June, 2010 Nightmute fuel prices of $6.60 /gallon.

Local Wx workers add roof overhangs to the bldg perimeter – preparing for rigid foam installation on the exterior.



New metal roof

Chinuruk Inc. Village Store Weatherization Measures, Cont'd

- Exhisting insulation R-values: R19 in floor* and ceiling and R11 in walls. *Two large existing floor sections were uninsulated pre-Wx).
- Pre-weatherization AkWarm energy rating: 45.0 rating points, 1 Star+ rating
- Post-weatherization AkWarm energy rating: 87.5 rating points, 4 Star+ rating

- Annual fuel consumption pre weatherization: 2,195 gallons / year
- Annual fuel consumption post weatherization: 583 gallons / year
- Annual fuel saved through weatherization measures: 1,612 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 73%
- Air Leakage reduction post/ pre Weatherization: 47%

Attic space pre-Wx: Stored items compress and de-value existing insulation R-values

New blown-in fiberglass insulation to achieve total value of R42. After adding insulation Chinuruk requested permanently sealing attic hatch to prevent use as a storage area.

Weatherization Measures Completed

- Completed substantial building foundation leveling and repairing (for continued viability of building)
- Removed existing leaky old tin roof and replaced it with new galvanized roofing metal for building viability
- Added roof overhangs around bldg perimeter to accommodate exterior rigid foam on building exterior.
- Installed 2" extruded polystyrene rigid foam to full exterior of building (OIT, outside Insulation Technique) achieving R22 for exterior walls.
- Rebuilt inside ceiling section where former 12" x 12" ceiling tiles had been stapled directly to roof trusses with no vapor barrier. New plywood ceiling was installed and air sealed
- Air-sealed building including floors, walls, ceiling, attic hatch, former furnace chimney penetration, windows and doors
- Built attic access hatch extension, removed stored items from attic and added blown-in attic insulation on top of R19 fiberglass bats to achieve R42 in ceiling
- Installed new insulated metal exterior entry door
- Installed attic gable end vent with wind baffle cover

Chinuruk Store receives OIT, Outside Insulation Technique: 2" extruded polystyrene and new siding around full building exterior.

Completed store upgrades with new wind-baffle gable-end vent cover

Chinuruk Inc. Store Weatherization Results at $5.00 /gal fuel price

• Annual heating fuel cost - pre weatherization:	$ 11,726
• Annual heating fuel cost - post weatherization:	$ 3,048
• Annual dollars saved through weatherization:	$ 8,678
• Weatherization grant funds spent:	$54,435
• Simple payback: Wx grant funds / annual $ saved:	6.3 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

• Annual heating fuel cost - pre weatherization:	$ 14,487
• Annual heating fuel cost - post weatherization:	$ 3,848
• Annual dollars saved through weatherization:	$ 10,639
• Simple payback: Wx grant funds / annual $ saved:	5.1 years

New insulated metal exterior door with weather stripping replaces old solid core door with no door jamb seal.

Chinuruk Inc. Village Store: Pre-Wx AkWarm Rating

QuickTime™ and a
decompressor
are needed to see this picture.

Chinuruk Inc. Village Store: Post-Wx AkWarm Rating

QuickTime™ and a
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Chinuruk Inc. Village Store: Comparing Pre & Post AkWarm runs "Current Run" is Post Weatherization

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decompressor
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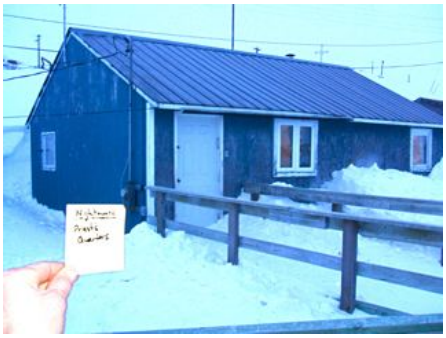
Nightmute Catholic Community Church Owned Buildings





2 buildings owned by the Catholic Community Church received energy efficient lighting upgrades as follows: Community Church, Church Housing

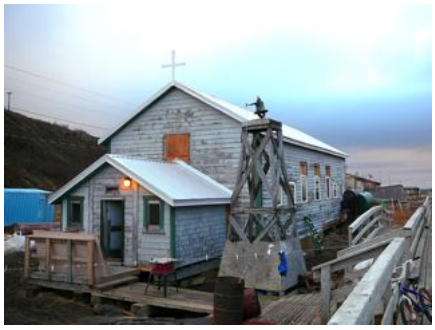
Lighting Summary for Church buildings

- Lighting upgrades completed in March, 2008
- Retrofitted 4 light fixtures with electronic ballasts & T8 lamps
- Installed 14 compact fluorescent light bulbs
- Pre-retrofit energy use for all lighting: 1.596 Kilowatts
- Post-retrofit energy use for all lighting: 0.532 Kilowatts
- Energy savings projection: 1.064 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 67%

- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$451.90	65.43	$170.11
4 Hours/day	$564.88	81.78	$212.64
7 Hours/day	$988.54	143.12	$372.11
10 Hours/day	$1,412.19	204.46	$531.59

Church Lighting Summary



Community Church with new roof

Pre-weatherization interior

Post-weatherization interior

Lighting Materials Installed	**Quantity**
2-lamp electronic ballast, (2) 25 watt T8 lamps	1
CFL-14 W	1
CFL-27 W	8

- Pre-retrofit energy use: 924 watts
- Post-retrofit energy use: 276 watts
- Energy savings projection: 648 watts
- Pre-retrofit to post retrofit energy reduction: 70%

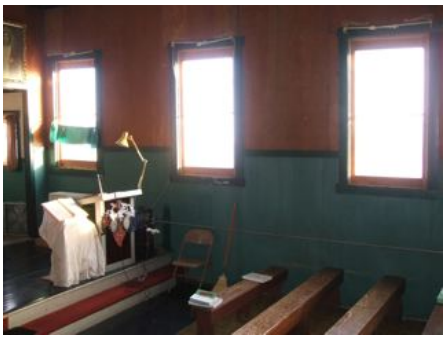
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$344.02	49.81	$129.50
7 Hours/day	$602.04	87.16	$226.63
10 Hours/day	$860.06	124.52	$323.75
800 Hours/year (Village Est.)	$275.22	39.85	$103.60

Community Catholic Church Weatherization Measures

Old church roof – cedar shakes installed in 1947

Water-damaged walls from leaking roof



Old home-made plexi-glass windows with moisture trapped between panes

The Community Catholic Church is a 1,107 square foot, 2 x 6 framed structure built in 1947. The floor had remained un-insulated since that time, and the walls and ceiling contained a mere 1.5 inches of fiberglass insulation. For 61 years the Nightmute Church had provided basic shelter from the harsh weather around Nelson Island, but with out upgrades the building was facing the end of its useful service. The original cedar shake roof still held most of the water out, but in order to remain a viable building a new roof was needed, along with some foundation leveling.

Upgrades to the church were a high priority for the community including a number of village elders. This, along with substantial locally raised funds from a sister Parish in the lower 48 made the church a good fit for VEUEEM energy upgrades. Through the efforts of many local maintenance workers, both paid and volunteer the church was transformed into a functional and energy efficient building.

"We are saving lots of fuel! I don't have to worry about it anymore, and I am so happy for that! We used to use maybe 2 drums / month in the cold winter (110 gallons). Now we use maybe 30 gallons / month in winter."
- Parish Administrator Jane Tulik, 4-26-10

Former attic insulation:
1.5 inches: R4 fiberglass

New framing to drop the ceiling 4' in preparation for adding R41 blown fiberglass

New Church interior

- Exhisting insulation R-values: No existing insulation in the floor, R7 in walls and ceiling.
- Pre-weatherization AkWarm energy rating: 24.7 rating points, 1 Star rating
- Post-weatherization AkWarm energy rating: 78.8 rating points, 4 Star rating

- Annual fuel consumption pre weatherization: 2,230 gallons / year
- Annual fuel consumption post weatherization: 729 gallons / year
- Annual fuel saved through weatherization measures: 1,501 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 67%

• Air Leakage reduction post/ pre Weatherization: 56%

Weatherization Measures Completed

• Air-sealed building including floors, walls, ceiling, attic hatch, former forced air furnace chimney penetration, windows and doors
• Built a dropped ceiling in meeting hall area attic and a raised floor in attic storage area above Church's back area, then added blown-in attic insulation over existing R4 fiberglass insulation bats to achieve R41 in ceiling
• Removed 7 existing windows and replaced with new triple-pane vinyl windows: Five new fixed windows have a U-value of .18 (R5.5), and two new opening windows have a U-value of .20 (R5).
• Installed R21 fiberglass batt insulation and 2" of extruded polystyrene rigid foam to formerly un-insulated floor
• Installed a 110 cfm continuous-run rated fan on a timer switch for adding additional building ventilation
• Replaced a 60% efficient, ancient forced air furnace with a new 84% efficient direct-vent space heater
• Installed new exterior door weather stripping and door sweeps
• Installed a 110 cfm continuous-run rated fan on a timer switch for additional building ventilation

Attic with framed-in raised floor and attic hatch, ready for adding blown fiberglass insulation

Blown fiberglass insulation going into new dropped ceiling area

Local weatherization worker installs 2" rigid foam on main hall floor

"Boy, . . . wow what a difference! The heater has been running on and off - before it used to never stop running. Fuel usage is much more efficient than before. I think we are looking at about 50% savings in fuel." - Chris Tulik, Nightmute Church Decon, 2-18-10

Weatherization Results at $5.00 /gal fuel price

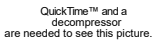
• Annual heating fuel cost - pre weatherization: $ 11,921
• Annual heating fuel cost - post weatherization: $ 3,824
• Annual dollars saved through weatherization: $ 8,097
• Weatherization grant funds spent: $51,136
• Simple payback: Wx grant funds / annual $ saved: 6.3 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

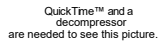
• Annual heating fuel cost - pre weatherization: $ 14,718
• Annual heating fuel cost - post weatherization: $ 4,811
• Annual dollars saved through weatherization: $ 9,0907
• Simple payback: Wx grant funds / annual $ saved: 5.2 years

Total Community Church Funding Contribution: $28,125

Nightmute Community Catholic Church: Pre-Wx AkWarm Rating



Nightmute Community Catholic Church: Post-Wx AkWarm Rating


QuickTime™ and a
decompressor
are needed to see this picture.

Nightmute Community Catholic Church: Comparing Pre & Post AkWarm runs "Current Run" is Post Weatherization

QuickTime™ and a
decompressor
are needed to see this picture.

Local weatherization workers add trim to new triple-pane windows

Completed new window installation

ABSN Field Manager: Harry Morgan and Project Coordinator, Anna Hilbruner

Community Church Housing

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

- Pre-retrofit energy use: 672 watts
- Post-retrofit energy use: 256 watts
- Energy savings projection: 416 watts
- Pre-retrofit to post retrofit energy reduction: 62%

- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$220.85	31.98	$83.14
7 Hours/day	$386.50	55.96	$145.49
10 Hours/day	$552.14	79.94	$207.84
800 Hours/year (Village Est.)	$176.68	25.58	$66.51

Community Church Housing Weatherization Measures

The Community Catholic Church Housing is a 537 square foot, 2 x 4 framed structure built in 1970. During initial building assessments in March, 2008, there was a large trash can in the middle of the floor, along with several other buckets - positioned under drip zones on the ceiling. A fairly steady “rain” from these areas indicated a substantial leakage problem. With the roof completely clear of snow there had to be another source inside the attic. Sure enough, an abandoned stove pipe no longer connected to a heating appliance had been plugged with fiberglass insulation where the flue exited the roof. The late winter blizzards that can pound this area of the Bering Sea coast had forced a fine mist of snow through the porous insulation - building a giant attic snow-cone to melt in the spring. An estimated 300 pounds of snow and slush was removed from the attic. During the air sealing work for this building, local workers removed the abandoned chimney, patched and sealed the roof and air sealed the ceiling penetration from the old chimney.

- Exhisting insulation R-values: R19 in floor and ceiling, R11 in walls.
- Pre-weatherization AkWarm energy rating: 58.5 rating points, 2 Star rating
- Post-weatherization AkWarm energy rating: 71.8 rating points, 4 Star rating

- Annual fuel consumption pre weatherization: 467 gallons / year
- Annual fuel consumption post weatherization: 304 gallons / year
- Annual fuel saved through weatherization measures: 163 gallons / year
- Annual savings percentage in dollars and gallons of fuel: 35%
- Air Leakage reduction pre verses post Weatherization: 40%

Weatherization Measures Completed

- Air-sealed building including floors, walls, ceiling, attic hatch, abandoned forced air furnace chimney penetration, windows and doors
- Built attic access hatch extension, removed stored items from attic and added blown-in attic insulation on top of R19 fiberglass bats to achieve R48 in ceiling
- Installed new exterior door weather stripping and door sweeps
- Installed attic gable end vent with wind baffle cover

(Possible Picture row here for more extensive weatherization scope)

Adding blow-in fiberglass insulation

ABSN Field Manager collecting blower-door test figures

Foam air-sealing around a ceiling light fixture box

Weatherization Results at $5.00 /gal fuel price

• Annual heating fuel cost - pre weatherization:	$ 2,437
• Annual heating fuel cost - post weatherization:	$ 1,582
• Annual dollars saved through weatherization:	$ 855
• Weatherization grant funds spent:	$4,949
• Simple payback: Wx grant funds / annual $ saved:	5.8 years

Weatherization Results with June, 2010 fuel prices in Nightmute ($6.60 /gal)

• Annual heating fuel cost - pre weatherization:	$ 3,082
• Annual heating fuel cost - post weatherization:	$ 2,006
• Annual dollars saved through weatherization:	$ 1,076
• Simple payback: Wx grant funds / annual $ saved:	4.6 years

Nightmute Community Church Housing: Pre-Wx AkWarm Rating

QuickTime™ and a
decompressor
are needed to see this picture.

Nightmute Community Church Housing: Post-Wx AkWarm Rating

QuickTime™ and a
decompressor
are needed to see this picture.

Nightmute Community Church Housing: Comparing Pre & Post AkWarm runs
"Current Run" is Post Weatherization

QuickTime™ and a
decompressor
are needed to see this picture.

Lower Kuskokwim School District Owned Buildings



Lighting Summary for School Facilities

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

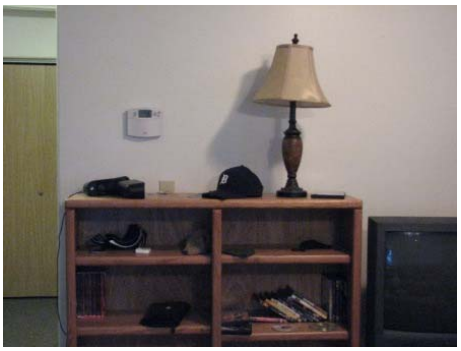
School Gym T5s, Teacher Housing #17, Teacher Housing #18, Teacher Housing #19, Teacher Housing #20

- Lighting upgrades completed in June, 2009
- Installed 92 compact fluorescent light bulbs
- Installed 8 light fixtures with electronic ballasts & t8 lamps
- Installed 8 t5 linear fluorescent fixtures
- Pre-retrofit energy use for all lighting: 7.648 Kilowatts
- Post-retrofit energy use for all lighting: 2.678 Kilowatts
- Energy savings projection: 4.97 Kilowatts
- Pre-retrofit to post retrofit energy reduction: 65%

- Estimated Annual Savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
Locally Estimated	$3,701.30	535.88	$1,393.28
4 Hours/day	$2,638.57	382.01	$993.24
7 Hours/day	$4,617.50	668.52	$1,738.16
10 Hours/day	$6,596.43	955.03	$2,483.09

Teacher Housing #17

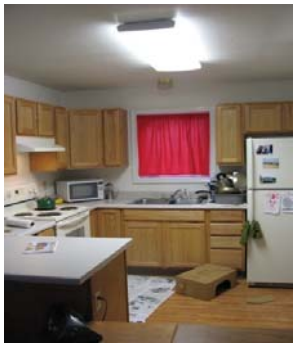


Lighting Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	1
4-lamp electronic ballast, (4) 25 watt T8 lamps	1
CFL-11 W	13
CFL-14 W	9
CFL-20 W	1

- Pre-retrofit energy use: 1666 watts
- Post-retrofit energy use: 425 watts
- Energy savings projection: 1241 watts
- Pre-retrofit to post retrofit energy reduction: 74%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$658.85	95.39	$248.01
7 Hours/day	$1,152.98	166.93	$434.02
10 Hours/day	$1,647.12	238.47	$620.02
1375 Hours/year (Village Est.)	$905.91	131.16	$341.01

Teacher Housing #18



Lighting Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	1
4-lamp electronic ballast, (4) 25 watt T8 lamps	1
CFL-11 W	10
CFL-14 W	8
CFL-20 W	5

- Pre-retrofit energy use: 1518 watts
- Post-retrofit energy use: 458 watts
- Energy savings projection: 1060 watts
- Pre-retrofit to post retrofit energy reduction: 70%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$562.75	81.48	$211.84
7 Hours/day	$984.82	142.58	$370.71
10 Hours/day	$1,406.89	203.69	$529.59
1375 Hours/year (Village Est.)	$773.79	112.03	$291.28

Teacher Housing #19

Lighting Materials Installed	Quantity
2-lamp electronic ballast, (2) 25 watt T8 lamps	1
4-lamp electronic ballast, (4) 25 watt T8 lamps	1
CFL-11 W	13
CFL-14 W	9
CFL-20 W	1

- Pre-retrofit energy use: 1666 watts
- Post-retrofit energy use: 425 watts
- Energy savings projection: 1241 watts
- Pre-retrofit to post retrofit energy reduction: 74%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$658.85	95.39	$248.01
7 Hours/day	$1,152.98	166.93	$434.02
10 Hours/day	$1,647.12	238.47	$620.02
1375 Hours/year (Village Est.)	$905.91	131.16	$341.01

Teacher Housing #20

Lighting Materials Installed	Quantity
CFL-11 W	10
CFL-14 W	8
CFL-20 W	5
2-lamp electronic ballast, (2) 25 watt T8 lamps	1
4-lamp electronic ballast, (4) 25 watt T8 lamps	1

- Pre-retrofit energy use: 1518 watts
- Post-retrofit energy use: 458 watts
- Energy savings projection: 1060 watts
- Pre-retrofit to post retrofit energy reduction: 70%
- Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$562.75	81.48	$211.84
7 Hours/day	$984.82	142.58	$370.71
10 Hours/day	$1,406.89	203.69	$529.59
1375 Hours/year (Village Est.)	$773.79	112.03	$291.28

School Gym T5s

Lighting Materials Installed	**Quantity**
T5 fixture, electronic ballast, (2) 54 watt T5 HO	8
• Pre-retrofit energy use:	1280 watts
• Post-retrofit energy use:	912 watts
• Energy savings projection:	368 watts
• Pre-retrofit to post retrofit energy reduction:	29%

• Estimated annual savings:

Hours Per Day / 250 Days Per Year	Electrical Savings	Comparative Avoided Diesel Use (gal)	Comparative Avoided Diesel Costs
4 Hours/day	$195.37	28.29	$73.54
7 Hours/day	$341.90	49.50	$128.70
10 Hours/day	$488.43	70.71	$183.86
1750 Hours/year (Village Est.)	$341.90	49.50	$128.70

ABSN 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, ABSN 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.

Former Nightmute school gym lighting with poor light levels and quality

Nightmute- Alaska Building Science Network - T5 Lighting Upgrade Details

These retrofits were completed ????? When ????

Nightmute Gym	Length (feet)	Width (feet)	Ceiling Height (feet)	Type of Existing Fixture	# of Existing Fixtures	Existing Fixture Wattage	**Total Existing Wattage**	Existing Foot-candles	New Foot-Candles	# of New Fixtures	New fixtures	New Fixture Wattage	**Total New Wattage**
	44.5	28.75	19	HPS 150 watt	8	160	**1,280**	Average 20 - 30	40	8	T-5 2 lamps	114	**912**
				HPS 250 watt		260	**0**				T-5 3 lamps	171	**0**
						415	**0**				T-5 4 lamps	228	**0**
Lights 1' lower than ceiling				Other School Gym (A)			**0**				T-5 6 lamps	342	**0**
Ceiling slopes from 16'4" to 22'6"					Total Existing Watts		1,280				Total New Watts		912

Percent Savings Pre to Post Retrofit:	**28.75%**

Savings & Payback Calculation for Gym:

1750 — New watts / old watts

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

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

Full cost of electricity: $0.5041 /kWh

Watts of existing lighting: 1,280

New wattage for T5 fixtures: 912

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

Existing Cost: $1,129

Retrofitted Cost: $ 805

Annual Savings: $ $ 325

Est material cost of Gym retrofit: $ 1,395.40

Est shipping cost of Gym retrofit: $ 103.27

Simple Payback: Materials cost / annual savings = **4.62** years (for retrofit to pay for itself in materials)

Appendix

Electronic Appendices

Lighting Tally Sheet

Nightmute AkWarm files

Nightmute AkWarm Data spreadsheet

Nightmute Contact information spreadsheet

AEA 2010 Energy Conference Power Point Presentation

ABSN Project Coordinator Anna Hilbruner, Field Manager Harry Morgan
and AEA Project Manager Rebecca Garrett in Nightmute, October, 2009

Nightmute, VEUEEM Community Building Weatherization 2008-2010, By ABSN

Note: AkWarm algorithms calculate annual heating fuel use and cost using more info than straight fuel price.

Before Weatherization					After Weatherization					
Building	Rating points	Rating	Est Heat Cost Dollars/Yr (Fuel cost: $5/gal)	Est Gal Heating Fuel / Yr	Rating points	Rating	Est Heat Cost Dollars/Yr (Fuel cost: $5/gal)	Est Gal Heating Fuel / Yr	Square Feet Lvg Area	Payback on ABSN funding
Head Start	59.9	2	$ 2,773	519	75.7	3+	$ 1,632	306	805	5.8
Community Hall	63.7	2+	$ 5,634	1,049	79.6	4	$ 3,366	645	1,728	6.5
City Office	66.2	2+	$ 3,669	697	82.1	4	$ 1,941	370	1,053	6.7
VPSO Building	78.6	4	$ 1,024	197	84.1	4+	$ 723	139	361	5.5
Post Office	41.1	1+	$ 3,068	582	84.1	4+	$ 1,027	197	529	6.5
Traditional Council Office	64.2	2+	$ 3,777	710	73.3	3+	$ 2,858	538	989	7.2
Chinuruk Store	45.0	1+	$ 11,726	2,195	87.5	4+	$ 3,048	583	1,901	6.3
Community Church	24.7	1	$ 11,921	2230	78.8	4	$ 3,824	729	1,071	6.3
Church Living Qtrs	58.5	2	$ 2,437	467	71.8	3	$ 1,582	304	537	5.8
TOTALS		19.5	$ 46,029	**8,646**		35.5	$ 20,001	**3,811**	8,974	
		Average Annual Energy & Cost Reduction in Dollars and Gallons of Fuel								**56%**

Before Wx Averages				After Wx Averges				
Rating points	Rating	Est Heat Cost	Est Gal Heating Fuel / Yr	Rating points	Rating	Est Heat Cost	Est Gal Heating Fuel / Yr	Square Feet Lvg Area
55.8	2	$ 5,114	961	79.7	4	$ 2,222	423	997

Nightmute, VEUEEM Community Building Weatherization 2008-2010, By ABSN

Annual Savings and Payback Figures at $5.00 /gallon fuel price						
Building	Annual Dollar Savings (Fuel cost: $5/gal)	Annual Fuel Savings (gallons)	Annual Energy & Cost Reduction in $ and Gallons of Fuel	% of Overall Savings	ABSN Wx Cost (based on fuel savings percentage)	Payback on ABSN funding
Head Start	$ 1,141	213	41%	4%	$ 6,598	5.8
Community Hall	$ 2,268	404	39%	9%	$ 14,846	6.5
City Office	$ 1,728	327	47%	7%	$ 11,547	6.7
VPSO Building	$ 301	58	29%	1%	$ 1,650	5.5
Post Office	$ 2,041	385	66%	8%	$ 13,196	6.5
NV Office	$ 919	172	24%	4%	$ 6,598	7.2
Chinuruk Store	$ 8,678	1,612	73%	33%	$ 54,435	6.3
Community Church	$ 8,097	1,501	67%	31%	$ 51,136	6.3
Church Living Qtrs	$ 855	163	35%	3%	$ 4,949	5.8
TOTALS	$ 26,028	4,835		100%	$ 164,955	
Average Annual Energy & Cost Reduction in $ and Gallons of Fuel						**56%**
Simple Payback in Years: Total Wx funds divided by annual savings achieved						6.3

Annual Savings and Payback Figures for all nine buildings, using June, 2010 Nightmute heating fuel price of $6.60 /gallon

Total gallons of fuel saved annually in all nine buildings	**4,835**
Annual Dollar Savings combined for all buildings (Fuel cost: $6.60 /gal)	**$ 31,911**
Total ABSN Weatherization Funds:	**$164,955**
Simple Payback in Years: Total Wx funds / Annual savings achieved	**5.2**

Air Leakage Improvement Pre verses Post Weatherization

The City of Nightmute Office Pre: 1,369 CFM50 & 10.64 air changes, Post: 419 CFM50 & 3.26 air
• Air Leakage reduction pre verses post Weatherization: 69%

Community Hall Pre: 1,240 CFM50 & 6.38 Air changes, Post: 840 CFM50 & 4.32 Air changes
• Air Leakage reduction pre verses post Weatherization: 32%

Head Start Building Pre: 950 CFM50 & 9.55 Air changes, Post: 487 CFM50 & 4.89 Air changes
• Air Leakage reduction pre verses post post Weatherization: 49%

PAP/ Public Safety Bldg Pre: 223 CFM50 & 4.63 Air changes, Post: 90 CFM50 & 1.87 Air changes
• Air Leakage reduction pre verses post Weatherization: 60%

Post Office Pre: 580 CFM50 & 8.22 Air changes, Post: 287 CFM50 & 4.07 Air changes
• Air Leakage reduction pre verses post Weatherization: 51%

NTC Office Building Pre: 1,277 CFM50 & 8.85 Air changes, Post: 850 CFM50 & 5.89 Air changes
• Air Leakage reduction pre verses post Weatherization: 33%

Chinuruk village Store Pre: 2,416 CFM50 & 10.06 Air changes, Post: 1,272 CFM50 & 5.29 Air changes
• Air Leakage reduction pre verses post Weatherization: 47%

Community Church Pre: 1,240 CFM50 & 5.80 Air changes, Post: 546 CFM50 & 2.55 Air changes
• Air Leakage reduction pre verses post Weatherization: 56%

Church Housing Pre: 625 CFM50 & 9.86 Air changes, Post: 373 CFM50 & 5.89 Air changes
• Air Leakage reduction pre verses post Weatherization: 40%

• **Average Air Leakage reduction pre verses post Weatherization: 48%**

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

In-Kind Item	Dates	Hours Contri-buted	Hourly Wage	Value / Amount	Notes
Conservative village office administrative percentage of total Weatherization project cost less ABSN Admin %. Total project cost = $164,955 - (our admin percentage , (around 12%) Approx: $19,794) = $145,160 x 5.5% = $7983 (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.	2008 & 2009			$7,983.00	Each time we call, email, or fax a village entity, someone receives the communication, reviews and/or forwards the information, follows-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 for recycling, 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.
Chinuruk Store Contributions:	**$31,153.25**				
OIT & Metal Roofing materials paid for by Chinuruk Inc., Pac Rim Bid # JWCT942, 7-31-09				$9,006.37	$9,006.37 for single 2" OIT around whole building and metal roofing to complete west wing of store.
In-kind hours Chinuruk Store foundation, roof & insulation during Summer '08.	Summer '08	789.6	Varried	$11,154.67	According to Chinuruk Inc. Accounting
In-kind hours for Chinuruk Store foundation, roof & insulation Summer '09.	Summer '09	322.69	Varried	$4,824.06	According to Chinuruk Inc. Accounting
Est # in-kind hours for Chinuruk Store foundation & roof during Summer '09.		200	13	$2,600.00	Estimated additional labor not accounted for by Chinuruk, OIT, installation of boilers, etc.
Transportation and fuel costs - 3rd Visit	Inv. 8.30.08	3	$50.00	$150.00	Weatherization Visit - Corp 4-Wheeler $50 ea. day
Transportation and fuel costs - 4th Visit	Inv. 9.30.08	3.5	$50.00	$175.00	Weatherization Visit - Corp 4-Wheeler $50 ea. day
Transportation and fuel costs - 5th Visit	Inv. 10.31.08	2	$50.00	$100.00	Weatherization Visit - Corp 4-Wheeler $50 ea. day
Transportation and fuel costs - 6th Visit	Inv. 11.30.08	3	$50.00	$150.00	Weatherization Visit - Corp 4-Wheeler $50 ea. day
Transportation and fuel costs - 7th Visit	Inv. 7.2.09	1.5	$50.00	$75.00	Weatherization Visit - Corp 4-Wheeler $50 ea. day
Transportation and fuel costs - 8th Visit	Inv. 8.13.09	3.5	$50.00	$175.00	Weatherization Visit - Corp 4-Wheeler $50 ea. day
Transportation and fuel - Chinurk Inkind				$2,000.00	Rough guestimate for a couple months worth of on-call as needed transport for materials and crew
Payrol contributions, workers comp Ins				$743.15	Guestimate
Church Contributions:	**$21,658.98**				
Total village labor provided by the Community Church's fundraising		567	15	$8,500.00	1st inkind invoice for church labor was $2,947.50 , 7-21-09 through 7-31-09, 196.5 hours @ $15/hr for 6 maintenance staff - for new metal roof and other work. Back-up in financial report: 9-15-09. There were two or three in-kind payments to the City of Nightmute after the 1st payment.
Nightmute Church, Materials payment for new roof, etc				$6,269.98	PacRim roofing and other weatherization materials, see Bk-up w/ West 7-2-09 financial report.
volunteer work on church by Daniel Joe		8	15	$120.00	for 7-22 and 7-23-09, Back-up in financial report: 9-15-09
New carpent for church floor				$1,800.00	From Sister Parish

New Monitor to allow old one to serve as a back-up, and to allow removal of aold forced air furnace and chimney				$1,869.00	From Sister Parish
Lodging for ABSN Field Managers 5th	Inv. 10.31.08	8	$100.00	$800.00	Weatherization Visit - Church - Living Quarters
Lodging for ABSN Field Managers - 6th	Inv. 11.30.08	16	$100.00	$1,600.00	Weatherization Visit - Church - Living Quarters
Lodging for ABSN Field Managers - 7th	Inv. 7.2.09	3	$100.00	$300.00	Weatherization Visit - Church - Living Quarters
Lodging for ABSN Field Managers - 7th	Inv. 8.13.09	4	$100.00	$400.00	Weatherization Visit - Church - Living Quarters
City Contributions	**$4,700.00**				
City Payrol contributions, workers comp Ins. For City and Church labor				$800.00	Estimate - 4% of payroll
Transportation and fuel - City Inkind				$1,000.00	Rough guestimate for a month's worth of on-call as needed transport for materials and crew
City In-kind labor for heating retrofits in PO and community hall, and other paid labor covered throughout projects				$2,500.00	Conservative estimate
City of Nightmute, credit to the grant - contribution for Church window expense				$400.00	West financial report Oct, '09
Native Village of Umkumiut Contributions	**$2,000.00**				
Umkumiut purchase of Northland Services container # SCXU 269 538				$1,600.00	
Umkumuit Tribal Council, Nightmute, credit to the grant - contribution for Church window expense				$400.00	
Nightmute Traditional Council, credit to the grant - contribution for Church window expense				$400.00	
Other Contributions	**$7,807.98**				
ATS in-kind backhaul of PCB ballasts	1/15/09			$82.98	110 lbs - drum of PCB balasts, airwaybill # 251 - 96873
Knik Construction donation of barge services from Bethel to Nightmute, for a 20' container weighing 9,600 lbs				$7,000.00	This is a direct savings in discounted barge fees for not having to contract with Northland services from Bethel to Nightmute.
ATS in-kind backhaul of scaffolding for church roof.	10/6/09	1000	0.725	$725.00	Back hauled ~1,000 lbs vaued at $.725 / lb
Cross check per/entity contributions	$75,703.21				
	TOTAL			**$75,703.21**	

Nightmute, VEUEEM Community Building Weatherization 2008-2010, By ABSN

In-kind and Payback Figures by village entity with Fuel price at 5.00 / gal							
Nightmute Village Entity/ In-Kind Contributors	Annual Dollar Savings per Entity (Fuel cost: $5/gal)	In-Kind Contribution without village admin combined	Total Inkind Contributions with village admin combined	ABSN Weatherization Funds per entity	**ABSN + In-Kind funds per Entity**	Payback in Years - on ABSN funding per entity	Payback in Years - on ABSN & Community funding per entity
City of NIghtmute	$ 7,479	$ 4,700	$ 5,253	$ 47,837	**$ 53,090**	6.4	**7.1**
Nightmute Traditional Council	$ 919	$ 400	$ 447	$ 6,598	**$ 7,045**	7.2	**7.7**
Native Village of Umkumiut, (No AkWarm Data)		$ 2,000	$ 2,235		**$ 2,235**		
Chinuruk Inc. (Village corp)	$ 8,678	$ 31,153	$ 39,643	$ 54,435	**$ 94,078**	6.3	**10.8**
Catholic Community Church	$ 8,952	$ 21,659	$ 28,125	$ 56,085	**$ 84,210**	6.3	**9.4**

Other Contributions:							
ATS in-kind backhaul of PCB ballasts		$ 83	(This inkind adds to Chinuruk Inc.)				
Knik Construction donation of barge services from Bethel to Nightmute, for a 20' container weighing 9,600 lbs		$ 7,000	(This inkind adds half to Chinuruk Inc. and half to Community Church)				
ATS in-kind backhaul of scaffolding for church roof.		$ 725	(This inkind adds to Community Church.)				
In-kind Village Admin percentage (all entities combined)		$ 7,983	(This inkind divided proportionately amoung entities)				
Totals for All Entities	$ 26,028	$ 75,703	$ 75,703	$ 164,955	$ 240,658	Cross Check	$ 240,658
	$ 31,911	Total Annual Dollar Savings (Fuel cost: $6.60/gal)					

Program-wide Payback Figures for all ABSN and community funds: Fuel price of $5.00 / gallon	9.2	Years
Program-wide Payback Figures for all ABSN and community funds: Fuel price of $6.60 / gallon	7.5	Years

Program-wide Payback Figures for ABSN grant funds only: Fuel price of $5.00 / gallon	6.3	Years
Program-wide Payback Figures for ABSN grant funds only: Fuel price of $6.60 / gallon	5.2	Years