

## OLLI Presentation NAEC Energy Retrofit

url for video;

<http://www.cchrc.org/alaska-energy-fit-northern-alaska-environmental-center-naec-retrofit>

1.

Intro

Cheapest unit

Presentation shows how to pay for an energy retrofit with the savings in fuel consumption,

2;

Insulation is your friend!!!

Thank you for your rapt attention. Any questions? :)

Two parts, this slide presentation then a video

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When I retired I had time to devote to community projects

In 2007 Northern Alaska Environmental Center board of directors.

Building was an energy sieve; drafty, the interior walls cool to the touch, and the heater was woking

Oil prices went through the roof

Weekly meetings of the Interior Issues Council Cost of Energy Task Force at Fbks Economic Development Corporation.

EC/E committee

People asking about the supply side of the energy equation.

Susitna, nuclear,, coal-to-liquids, gas like

But nobody talked about demand side of the equation.

cheapest unit of energy is the one you do not use!

EC/E decided that a video-taped, televised energy make-over of a typical Fairbanks home might be the best way to show how this could be done.

4.

Why NAEC?

highly visible

typical Fbks construction

Board member, non-profit needs to save money, aligned with

mission

5.

First visual inspection by an experienced contractor was also used and is very helpful.

Winter; uneven snow load, icicle formation, frost above

openings, melting around basement,  
breeze inward around windows, doors, outlets  
Summer; exposed concrete, siding integrity, window type, dust  
indicating air flow

There were renters in the basement of the building in a room  
with a broken pane of

Energy rating done; blower door test, using the AKWARM software.

We also included an infra-red analysis, good visual

6.

Psychodelic

The infrared camera simply measures temperature differences  
outside air temp was -42 that day.

Black areas are coldest, white warmest.

-roof is a fairly even gray

-east wall is warmer, egress window below or poor insulation.

-pavement. warmed somewhat by friction, and warmer ground

relative to the air

Upper right

-exposed concrete basement, concrete and stud wall losing 30  
degrees to the outside -frame wall above is only losing 5-10  
degrees.

Lower left

-cold air leaking in at the top plate-rafter junction. Once  
this was pointed out to me -could identify those areas  
without the infrared camera; the cold caused  
moisture to condense trapping any dust

-also identified cold air leaking in around all electrical and  
plumbing penetrations of the exterior walls and ceiling, as  
well as around doors and windows

Lower right

seive, poor construction, dismantled and recycled

7,

The blower door test indicated equivalent to having a hole in the wall  
10" by 22" in size!!

Floor; insulate below in new construction

Wall/door; foam

Window; replace

Ceiling; insulate

Air/vent; least costly, biggest, quickest bang-for-buck

Htg system; inherently inefficient, but ours is among the best

Hot water; beyond scope of project

8.

part of AKWARM report specific to NAEC

9.

convince the board

could have gotten a grant

calculated what I could save on a monthly average, then figured how much the loan payment would have to be and came up with a max of \$18,000 to work with.

Stucco; aluminum, steel, cedar, T-111. None add much in R value, all cost about the same

We could have re-used the aluminum siding

Total costs \$17,500, expected savings \$2325, for a 7.5 year payback.

-equal to a 10% annual return on investment.

-savings will continue as long as the building exists.

kitchen or a new pickup.

10.

Financing

-might have gotten grants to pay for this work, but decided to get a loan.

-banks are open to lending for this type of work.

-loan is \$17,500, 7% interest for 10 years, with monthly payments of \$175.

State program

Volunteers

Commercial quote \$28,000

11.

Actual work was begun in late May, 2008

-local homeowner removing the aluminum siding at no cost to us or her and reusing

- environmentally responsible

includes re-using as many products as possible,

-embodied energy

12.

Nothing fancy or expensive.

13;

"floor", the concrete basement walls, we dug down 2 feet below grade and installed 1 inch of foam to the wall to bring it to the same level as the exterior sheathing.

-Then Tyvek drain wrap. corrugated, moisture drain into the ground.

14.

Next we applied the foam.

-used 4 inches of rigid foam,

-because; repeat after me; INSULATION IS YOUR FRIEND :}).

-extra one inch of foam on foundation, ended up with 5" below

grade.

Ideally dug down to the footings and done the whole basement wall, even extending 2-4 feet horizontally for optimum efficiency

- limited budget
- 2 feet was all i had in me :)
- still got impressive results.

applied this foam from 2 feet below grade, all the way up to and past the top plate

- two 2 inch layers, the second overlapping the joints of the first
- ideally foam each joint

15.

Detail around the windows.

-removed any old insulation around the windows; dirt line on the pink insulation.

- filled the space with non-expanding foam.
- Vicor over that insulation,
- Tyvek.

-12 inch wide strip of fiberglass mesh,

We opted for slightly more expensive but more durable and energy efficient fiberglass windows

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applying the fiberglass mesh using the cement adhesive base layer

- then applying the acrylic color finish coat.

Notice the high tech equipment used here; a flat trowel and a 5 gallon plastic bucket lid for the finish

17.

Adding the cellulose to the attic area.

- no slides of sealing the air leaks
- identified every plumbing and electrical penetration

in the ceiling

-did not worry about the wall penetrations as the 4 inches of foam

THis area, air/vent is extremely important. If you do the walls only and ignore this area you might as well have done nothing, because all the warm air not leaving thru the walls will now leave via the ceiling.

Once the leaks are closed and the insulation level is raised,

- adequate ventilation
- prevent moisture from accumulating,
- damage to wood and paint surfaces
- health of the occupants with mold problems.

18.

Results

The small building behind the center poorly made and too expensive to

retrofit

-dismantled and recycled in its entirety. The fuel figures cited below do not include  
The video of the before and after infrared studies speaks for itself.  
Fuel use figures since completion of the retrofit.

-Prior to 2005, average fuel use was 2240 gallons per year. In  
-2005 a new boiler was added and some other minor efficiency improvements were made.

-average fuel use per year over 2005, 2006, and 2007 was 1733 gallons.

-new boiler reduced fuel use by 22%

Since the retrofit we have averaged only 960 gallons/yr, a 45% decrease.

-773 gallon reduction translates to a savings (@ \$2.72/gallon) of \$2102 for the year, or \$175

Had we done all these improvements at the same time, along with the retrofit,

-fuel savings would calculate at 1280 gallons per year, a 57% reduction,

-saving \$3456 per year, almost \$300 per month

Our energy rating was raised from 3 star to 4 star plus, missing 5 star by just one tenth of a point. Two years later two new doors which raised us to 5 Star rating.

19.

Before and after;

-more aesthetically pleasing building

-more comfortable and healthy

-more energy efficient,

-lower operating and maintenance costs for as long as we own the building,

-resale value will be higher due to the lower O/M costs.

And, the money we borrowed, as well as the money we continue to save, will stay in our community, helping the local economy, instead of to an oil company headquartered in the Lower 48.

The Northern Center agreed to do this as the "right" thing to do; but it has become apparent that it is also the economic thing to do

20.

Resources

One thing I did not research for this class is the resources currently available. I do believe the PORTAL no longer exists. Perhaps Rich can add to this list at the end of the video.

20.

crew of up to 8 people at a time

most was done by just two people.

about 8 weeks from start to finish, working about 30 hours per week.

I accomplished similar savings on my own home on Badger Road almost

20 years previously

- saved 2/3 on my fuel consumption.

- current owners and they are still reaping the benefits of that work.

So, this is something you could do by yourself if you wish. And, even if you have the work done for you you will have a great return on your investment and lower your carbon footprint as well.

Thank you. Any questions?