DO-IT-YOURSELF RETROFIT

PAYING FOR AN ENERGY RETROFIT WITH MONTHLY SAVINGS IN FUEL CONSUMPTION
How?

• Insulation Is Your Friend
  – (Rich Seifert, Solar Hero)
Birth of the project

- Northern Alaska Environmental Center
- Fuel prices skyrocket
- Fairbanks Economic Development Corporation
  - Interior Issues Council
  - Cost of Energy Task Force
  - Supply vs Demand, EC/E
- Cold Climate Housing Research Center
- Tanana Valley Television
- F
- ""
DO-IT-YOURSELF RETROFIT

Northern Alaska Environmental Center
Energy Rating

• Visual walk-around inspection
• Blower-door test
• Infrared analysis
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Infrared Analysis
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Blower-door Analysis

Projected Annual Energy Costs
$6,479 per year

Amount of CO₂ Produced by the Home
83,464 pounds per year

BREAKDOWN OF HEATING COSTS

<table>
<thead>
<tr>
<th>Component</th>
<th>Energy Cost, $ per Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Floor</td>
<td>600</td>
</tr>
<tr>
<td>Wall/Door</td>
<td>900</td>
</tr>
<tr>
<td>Window</td>
<td>400</td>
</tr>
<tr>
<td>Ceiling</td>
<td>200</td>
</tr>
<tr>
<td>Air/Vent</td>
<td>500</td>
</tr>
<tr>
<td>Htg System</td>
<td>500</td>
</tr>
<tr>
<td>Hot Water</td>
<td>600</td>
</tr>
</tbody>
</table>
### Do-It-Yourself Retrofit

**Blower-door Analysis**

<table>
<thead>
<tr>
<th>COST-EFFECTIVE IMPROVEMENTS:</th>
<th>Location</th>
<th>Savings to Cost Ratio</th>
<th>Installed Cost</th>
<th>Annual Savings</th>
<th>Break-Even Cost</th>
<th>Rating Points Gained</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install a Setback Thermostat</td>
<td></td>
<td>24.81</td>
<td>$49</td>
<td>$113</td>
<td>$1,224</td>
<td>0.4</td>
<td></td>
</tr>
<tr>
<td>Caulk and Seal so that Home Air Leakage is Reduced by 1200 CFM at 50 Pascals.</td>
<td></td>
<td>9.27</td>
<td>$250</td>
<td>$309</td>
<td>$2,317</td>
<td>2.4</td>
<td></td>
</tr>
<tr>
<td>Install R-14 rigid foam board to exterior. Costs do not include siding.</td>
<td>Above-Grade Wall: House</td>
<td>3.08</td>
<td>$1,429</td>
<td>$322</td>
<td>$4,395</td>
<td>2.3</td>
<td></td>
</tr>
<tr>
<td>Install R-14 rigid foam board to interior or exterior side of wall. Does not include coverings or excavation costs.</td>
<td>Below- (part or all) Grade Wall: House-basement</td>
<td>2.55</td>
<td>$1,859</td>
<td>$348</td>
<td>$4,743</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Remove existing glass and install triple lowE arg glass.</td>
<td>Window/Skylight: House-Not south</td>
<td>2.23</td>
<td>$1,122</td>
<td>$183</td>
<td>$2,498</td>
<td>1.4</td>
<td></td>
</tr>
<tr>
<td>Install R-30 loose-fill insulation in attic.</td>
<td>Ceiling w/ Attic House</td>
<td>2.01</td>
<td>$1,020</td>
<td>$150</td>
<td>$2,051</td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Remove existing glass and install triple lowE arg glass.</td>
<td>Window/Skylight: House-South</td>
<td>1.33</td>
<td>$1,016</td>
<td>$99</td>
<td>$1,353</td>
<td>0.8</td>
<td></td>
</tr>
<tr>
<td>Remove existing door and install standard pre-hung R-7 metal insulated door, including hardware.</td>
<td>Exterior Door: House</td>
<td>1.17</td>
<td>$1,021</td>
<td>$88</td>
<td>$1,199</td>
<td>0.6</td>
<td></td>
</tr>
<tr>
<td><strong>Total, Cost-Effective Measures</strong></td>
<td></td>
<td>2.55</td>
<td>$7,766</td>
<td>$1,612</td>
<td>$19,780</td>
<td>11.4</td>
<td></td>
</tr>
</tbody>
</table>

**New Rating After Measures:** Five Stars, 90.4 points

**Annual CO2 Reduction:** 15,489 pounds per year
# DO-IT-YOURSELF RETROFIT

## NAEC Priority Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Cost</th>
<th>Savings / yr</th>
<th>Payback yrs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Foam cost</td>
<td>$3,400</td>
<td>$1,175</td>
<td>3</td>
</tr>
<tr>
<td>New windows</td>
<td>$3,800</td>
<td>$350</td>
<td>11</td>
</tr>
<tr>
<td>Caulk/wthrstrp</td>
<td>$300</td>
<td>$550</td>
<td>0.6</td>
</tr>
<tr>
<td>Cellulose ins (attic)</td>
<td>$1100</td>
<td>$250</td>
<td>4</td>
</tr>
<tr>
<td>Stucco materials</td>
<td>$8,000</td>
<td>-0-</td>
<td>0</td>
</tr>
<tr>
<td>Misc. supplies</td>
<td>$900</td>
<td>-0-</td>
<td>-0-</td>
</tr>
<tr>
<td>Total</td>
<td>$17,500</td>
<td>$2325</td>
<td></td>
</tr>
<tr>
<td>New Kitchen</td>
<td>$25,000</td>
<td>-0-</td>
<td>quick resale</td>
</tr>
<tr>
<td>Truck</td>
<td>$35,000</td>
<td>-0-</td>
<td>feel good</td>
</tr>
</tbody>
</table>
Financing the project

- Mount McKinley Bank
- State weatherization process
- Volunteer labor
Siding removal and reuse

- Embodied energy
• Tools of the Trade
Concrete foundation

Sheathing and
Tyvek Drain Wrap
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Wall Treatment

Foam

More Foam

(Insulation is your friend!)
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- Spray foam and caulk
- Vycor
- Tyvek
- Mesh
- Foam
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Wall Treatment

Mesh and cement adhesive

Stucco color finish
Additional work

- Attic
- Locating wires
- Closing air leaks
  - Weatherstripping and caulk-
  - Additional ventilation?
  - Adding cellulose insulation
Results
Coming soon!

Watch for the full process on local television this spring!
Before and After
DO-IT-YOURSELF RETROFIT

Resources

• PORTAL
• CCHRC
• Local Banks
• Northern Alaska Environmental Center
• Cooperative Extension Service
• fairbanksenergywise.wordpress.com
• Many others
Thank-you!

Cold Climate Housing Research Center
  Jack Hebert, Ty Keltner, Mike Musick
  Kristen Thomas

Ian Hebert, foam/stucco consultant

Arctic Technical Services
  Phil Louden

Greatland Window
  Chip Vaughan

Jack Schmidt, UAF Institute of Northern Engineering, infrared camera

Mt. McKinley Bank
  Bart Lebon

Bruce Delbridge, boiler replacement

GVEA
  Todd Hoener, Charles Davis

Stan Justice
Michael Armstrong
Bill St. Pierre, Emmett W. Evans and Victor Demoski
Kevin Karella and Jeremy Fultz
Fred Weiss
Pat Moodie
John Manthei and Sabe Flores
Mike Kerekes and Don Leistikow
Patrick Woolery, Heather MacDonnell
Woody and Russell Gaul
Franz Mueter and Kaarle Straley
Mario and Carlos Valderian and Alfred Penetac
Michael Riordan
Carl Rosenberg
Jennifer Reed
Dan Adams
QUESTIONS?