



HOME ENERGY RATING CERTIFICATE

The Home Located At:

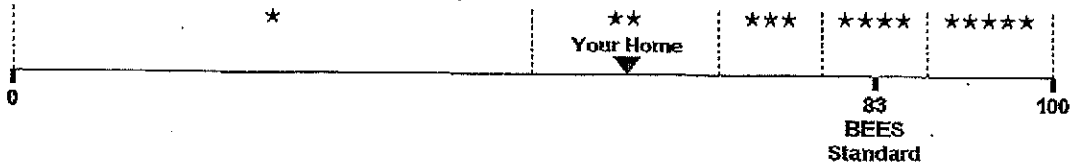


Has Been Energy-Rated As:



Two Stars

Overall Efficiency of Home
59.2 points



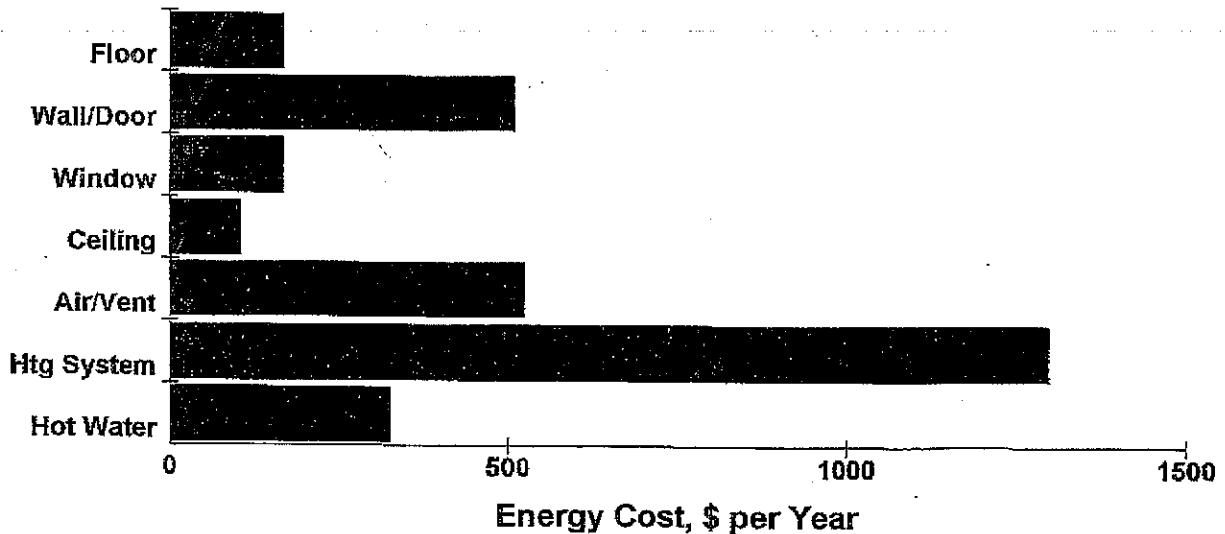
Projected Annual Energy Costs

\$3,920 per year

Amount of CO2 Produced by the Home

47,760 pounds per year

BREAKDOWN OF HEATING COSTS



Client: Peggy Kelly

Rater: Geoff Feiler, Heat Loss Analysis, Inc.

Date: 2/21/07

Rater's City: Anchorage, Alaska 99508
ver. 1.03d, library: 2/15/1907

Phone: 563-0773

FAX: 563-8061

ENERGY COST AND FEATURES REPORT

Property: [REDACTED]

Rater: Geoff Feller
Heat Loss Analysis, Inc.
4128 Wright Street
Anchorage, Alaska 99508

House: Single Family
Living Floor Area: 1,656 square feet
2-Car Attached Garage

Rating: As Is
ID: PK70221

ENERGY FEATURES

Envelope Efficiency

Floor Insulation	R-14.6 *
Wall/Door Insulation	R-9.7 *
Ceiling Insulation	R-26
Window R-Value	R-1.93
Window to Wall Ratio, Living Space	13.2%
South Facing Window Area	16 square feet
Air Leakage	9.0 Air Changes per Hour at 50 Pascals 0.56 Air Changes per Hour Natural

* Includes the insulating value of the ground in contact with these envelope components.

Space Heating System

System Efficiency	60%
Fuel Type	Natural Gas
Supplemental Fuel	None
Thermostat Setting	70.0 degrees F
Setback Thermostat	Yes, Controls Entire Home

Water Heater

Efficiency	53%
Location	Semi-Conditioned Space
Fuel Type	Natural Gas

Ventilation

System Type	None
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Other

Number of Occupants	4
Clothes Dryer Fuel	Natural Gas
Cooking Range Fuel	Natural Gas
Miscellaneous Lights/Appliances Use	Average

ESTIMATED ENERGY USE

Space Heating [REDACTED] \$2,767

Water Heating [REDACTED] \$324

Lights and Appliances [REDACTED] \$829

Space Heating	2,342 kWh of Electricity, 2,894 ccf of Natural Gas
Water Heating	383 ccf of Natural Gas
Lights and Appliances	5,431 kWh of Electricity, 103 ccf of Natural Gas

Actual use and costs may vary from these estimates depending upon weather conditions, occupant life styles and utility rates currently in effect.

Home at: [REDACTED]
Anchorage, AK 99507

Energy Flows below are in Btu/hour

Month	Hours	Gross Loss	Gross Internal	Net Internal	Gross Solar	Net Solar
1	744	47170	3838	3838	513	507
2	678	42394	3727	3727	1416	1410
3	744	36598	3577	3577	3074	3038
4	720	25556	3426	3426	3809	3678
5	744	16121	3315	3315	3883	3591
6	720	9785	3275	3275	4323	3462
7	744	7083	3315	3315	3965	2679
8	744	8285	3426	3426	3119	2530
9	720	14115	3577	3577	2207	2112
10	744	26131	3727	3727	1418	1412
11	720	38376	3838	3838	723	715
12	744	46261	3878	3878	309	305

ANNUAL ENERGY FLOWS

Gross Loss: 231.6 MMBtu

Gross Internal: 31.3 MMBtu

Useable Internal: 31.3 MMBtu

Internal Utiliz.: 1.000

Gross Solar: 21.0 MMBtu

Useable Solar: 18.6 MMBtu

Solar Utiliz.: 0.884

Net Heat Load: 181.7 MMBtu

DECEMBER UA VALUES AND DESIGN HEAT LOSS

Living Space UA: 696.3 Btu/hr/deg F

Garage UA: 199.9 Btu/hr/deg F

Design Heat Loss (70 deg Indoor, 70 deg Garage): 78,866 Btu/hr

ENERGY EFFICIENCY IMPROVEMENT OPTIONS

Property: [REDACTED]

Rater: Geoff Feiler
Heat Loss Analysis, Inc.
4128 Wright Street
Anchorage, Alaska 99508

House: Single Family
Living Floor Area: 1,656 square feet
2-Car Attached Garage

Rating: As Is
ID: PK70221

COST-EFFECTIVE IMPROVEMENTS:

Improvement Description	Location	Savings to Cost Ratio	Installed Cost	Annual Savings	Break- Even Cost	Rating Points Gained	Note
Add R-19 fiberglass batts to masonry wall. Cost does not include studs or furring strips.	Below- (part or all) Grade Wall: LowerFdn	7.78	\$212	\$107	\$1,646	2.1	1
Caulk and Seal so that Home Air Leakage is Reduced by 1500 CFM at 50 Pascals.		4.78	\$750	\$412	\$3,586	6.7	2
Replace Heating Plant with New Furnace (60,000-100,000Btu) having AFUE of 93%.	Primary Heating System	3.47	\$3,000	\$672	\$10,398	10.9	3
Add R-19 fiberglass batts to masonry wall. Cost does not include studs or furring strips.	Below- (part or all) Grade Wall: UpperFdn	2.12	\$169	\$23	\$358	0.4	4
Add R-13 batts to partially filled 2x10 cavity.	Exposed Floor: House	1.57	\$27	\$3	\$43	0.1	5
Install R-10 rigid foam board to exterior. Costs do not include siding.	Above-Grade Wall: House	1.50	\$2,096	\$205	\$3,153	3.8	6
Install R-19 loose-fill insulation in attic.	Ceiling w/ Attic: House	1.33	\$492	\$42	\$652	0.8	7
Install R-5 rigid foam board to exterior. Costs do not include siding.	Above-Grade Wall: Garage	1.03	\$518	\$35	\$535	0.0	8
Total, Cost-Effective Measures		2.80	\$7,265	\$1,499	\$20,371	24.8	

New Rating After Measures: Four Stars Plus, 84.0 points
Annual CO2 Reduction: 20,801 pounds per year

General Notes: In addition to the other recommendations consider a gas or woodstove fireplace inserts to reduce air leakage and to act as a supplemental heat source. Open fireplaces are very inefficient and, due to their large combustion air requirements, accentuate drafts throughout the house. Make sure that the insert uses outside air for combustion.

Consider installing new bathroom exhaust fans. They should be controlled by dehumidistats, be rated for continuous duty, and have a sone (noise) rating of 1.0 or less. The combined net flow should be at least 110 cfm. Fans generally only provide about 65% of their rated flow. Ducts should be rigid and insulated to at least R6 where they run through the attic. Duct joints should be sealed with mastic or foil tape. Do not use cloth duct tape. These ventilation changes are for indoor air quality purposes and do not affect the rating points.

The costs associated with these measures are estimated by the AKWarm software. Be sure to get at least three bids for major projects. Please feel free to call Geoff Feiler at 563-0773 if you have any questions.

Improvement Notes

1 - Currently there is an R11 batt along the upper 2' of the foundation wall. The standard insulation level for foundation walls is R19 from the mudsill to the footing. This is usually accomplished by stapling 4' long, R19 batts to the mudsill and letting them hang down to the footing or the crawlspace vapor retarder. You could remove the existing insulation and re-hang it vertically. Add a second layer of R11 over this and then purchase additional R19 batts to complete the job. Seal all rim joist gaps and penetrations before installing the new insulation. Alternatively, rigid insulation can be attached to outside of the foundation wall if the perimeter is excavated. Rigid insulation can also be attached to the inside of the foundation walls although in some communities the fire codes prohibit this practice in new construction. It takes about four inches of rigid, XPS insulation (blue or pink board) to equal an R19 batt. You might also look for batts that have been encapsulated in plastic, however, they are not in general use.

2 - Air sealing measures include:

- " If the garage doors are not replaced, install brush weatherstripping on the top and sides of the overhead garage door. Install a new gasket on the bottom. Have the doors adjusted for a tighter fit first.
- " Install gaskets and plugs on electrical outlets. Install gaskets on switches.
- " If windows and doors are not replaced, remove window and door trim. Seal the gap between the unit frames and the wall framing. Use spray foam where the gaps exceed ¼" and caulk for smaller gaps. Install new weatherstripping on operating windows as needed.
- " Seal the rim joist joints and penetrations in the crawlspace. Make sure you close and insulate the crawlspace vents in the winter. Reopen them in the summer. You could ventilate the crawlspace with a small (50 cfm) fan controlled by a dehumidistat and then permanently seal off the vents.
- " Seal around the attic access hatch.
- " Seal around electrical, mechanical, and plumbing penetrations through the ceiling. Also seal around the Solartube if there is any gap present. Do all this before adding insulation.
- " The forced air ducts in the crawlspace have cloth duct tape on the joints. This material is drying up and falling off. Have the ducts sealed with foam tape or mastic.

3 - The existing furnace's efficiency is more than 30% below what is available today. The software recommends a new unit with a 93% efficiency (AFUE), however, federal energy legislation may provide tax credits for systems with 95% efficiency or better. A new boiler should have a sealed system for combustion air (this reduces the need for a separate combustion air supply as well as the associated air leakage).

The heating load for your home (prior to other retrofits) is about 79,000 BTU's. The new furnace's output should not be significantly (15% or less) larger than that. The size, however, will probably come down after building envelope retrofits are completed and it may make sense to recalculate the design heating load when these are done.

Many mechanical contractors do not use proper heating load calculations to size heating systems and, as a result, oversized systems are often installed. Oversized systems operate inefficiently. Do not let a contractor sell you a system with an output that does not closely match your load.

You might consider one of the new combination space/domestic water heating systems, such as those made by Triangle-Tube. These require a smaller footprint and recent models may have modulating burners that can provide a range of outputs depending on demand. A fan coil unit (like a car heater) can provide heat through the existing ductwork.

4 - See previous foundation wall note. This area was divided into two sections because of the different insulation levels.

5 - Remove the soffit from the family room bay overhang and the living room overhang. Seal the joints in the blocking between the floor joists. Fill the cavity with fiberglass insulation to achieve a total of at least R30. It may be easier to have the cavities densepacked with cellulose from the crawlspace side and then seal the blocking.

6 - Consider this measure if new siding is ever contemplated.

7 - The current attic insulation standard standard is R38. You have about 14" blown fiberglass which is about R30, but it has been moved around and compacted in some areas. Add about 6" blown cellulose or R19 fiberglass batt over the existing material. At the eaves consider staggering rigid urethane board such as Thermax or R-max to increase the

potential R-value in this area and to keep eave openings clear for attic ventilation. Also, if new roofing is ever installed, have a ridge vent put on in the process. Prior to adding insulation, perform any needed attic air sealing measures.

8 - See previous wall notes. Garage insulation improvements don't affect the rating points but will reduce energy costs.

The following improvements were not found to be cost-effective based on energy savings:

Improvement Description	Location	Savings to Cost Ratio	Installed Cost	Annual Savings	Break-Even Cost	Rating Points Gained	Note
Remove existing door and install standard pre-hung R-7 metal insulated door, including hardware.	Exterior Door: House	0.71	\$390	\$18	\$275	0.3	1
Replace Gas/Propane Water Heater with a Unit having an Energy Factor of .6 or better.		0.70	\$500	\$32	\$348	0.5	2
Add R-11 to existing insulation.	Cathedral Ceiling: House	0.67	\$221	\$10	\$148	0.2	3
Remove existing glass and install triple lowE arg glass.	Window/Skylight: PatioDoor	0.52	\$522	\$18	\$273	0.4	4
Remove existing glass and install triple lowE arg glass.	Window/Skylight: NonSouthGlass	0.52	\$3,371	\$114	\$1,752	2.1	5
Remove existing glass and install triple lowE arg glass.	Window/Skylight: SouthGlass	0.48	\$251	\$8	\$121	0.1	6
Install R-19 loose-fill insulation in attic.	Ceiling w/ Attic: Garage	0.48	\$130	\$4	\$62	0.0	7
Replace existing garage door with better insulated, well sealing door	Garage Door: Garage	0.44	\$936	\$20	\$414	0.0	8
Total, All Measures		1.75	\$13,586	\$1,722	\$23,765	28.4	

New Rating After Measures: Four Stars Plus, 87.6 points
Annual CO2 Reduction: 23,821 pounds per year

Improvement Notes

- 1 - Consider the newer fiberglass, urethane-filled doors rather than metal.
- 2 - Consider installing a new, high-efficiency demand water heater with sealed combustion and an energy factor of at least .80. The sealed combustion feature will reduce the required size of the combustion air inlet. This may be eligible for a federal tax credit of up to \$300.
- 3 - Consider the newer fiberglass, urethane-filled doors rather than metal.
- 4 - Instead of triple-pane windows, use double-pane with Low E coatings and Argon fill. These windows have approximately the same insulating value as regular triple-pane glass. In the cost/benefit analysis, the AKWarm software does not consider the additional savings gained from reduced window air leakage.
- 5 - See previous window note.
- 6 - See previous window note.
- 7 - See previous attic insulation note. Again, garage insulation upgrades don't increase points.
- 8 - The existing garage overhead door has uninsulated wood panels with a damaged insulation blanket. Either repair the blanket or replace the door with insulated doors to reduce air leakage and conductive heat loss. In either case install new brush weatherstripping on the top and sides and a new gasket on the bottom. Please note that garage upgrades will not increase rating points unless air leakage is reduced.