CAKESYSTEMS™

Date: 9/27/11
Reference Number: 530002403
Address: 330 SW Custom Ave
Ticketyboo, WA 98001

Contents

Annual Estimated Energy Use and Fuel Costs

	Current Home			After Upgrades		
	Energy (kWhe)*	Fuel Cost†	Carbon (tons)	Energy (kWhe)*	Fuel Cost†	Carbon (tons)
Heating	17,300	$819	3.1	7,200	$343	1.3
Cooling	NA	NA	NA	NA	NA	NA
Water Heating	5,300	$253	1.0	3,300	$159	0.6
Lighting & Appliances	6,000	$478	3.4	6,000	$478	3.4
Total (Rounded-off)	29,000‡	$1,550	7.4	17,000	$979	5.3

*All energy forms are converted to their electrical energy equivalents, expressed in kilowatt-hours electric (kWhe).
†Fuel costs are based on prices at the time this report is issued and do not include taxes and surcharges.
‡Total Annual Estimated Energy Use is rounded to the nearest 1000 kWhe.

Comparing Your Utility Bills with the EPS Score

You can determine how your household's energy use compares to the estimated average use for your home by comparing the energy totals on your utility bills with the EPS Score.

To calculate your actual annual energy use, you will need to know the amount of energy that you used for each fuel type in your home for a full year. This information is available on your utility bills. The formulas on the back of the EPS Scorecard will allow you to convert combustion fuels to KWH. The EPS Score should be compared to the annual totals of all fuel types.

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If the totals from your utility bills are:

- **lower** than the Energy Score, you are using less energy than would be average for your home. Reasons for this may include housing fewer people than would be average in this home, and/or the occupants of this home are using energy more conservatively than is typical.
- **similar** to the Energy Score, you are using a typical amount of energy for the condition of your home.
- **higher** than the Energy Score, you are using more energy than average for your home. Reasons for this may include housing more people than would be average in this home, and/or occupants in this home are using more energy than is typical. There may be no- and low-cost ways that you can use to save energy.

Bedrooms: 3
Year Built: 1980
Audit Date: 02/24/2011
Auditor: Earth Advantage Institute
Jon Smith

SIMPLE EPS Version 2.0 v20110903

Summary of Energy Performance Related Elements

CAKESYSTEMS™

Element	Description	Notes	Current Performance Very Poor • Poor • Average • Good • Excellent
Air Leakage How tight your home is against air leaks.	Major leakage areas include: Recessed lights, Around heating registers	1x4 wood panels on vaulted ceilings are very leaky. Can lights and fan housings have high leakage as well.	Very Poor
Ceiling and Attic The amount of insulation above the ceiling or in the roof.	Poorly installed insulation, Batts, Fiberglass	The 5.5 inch batts in the attic are poor fitting and provide minimal R-value. Properly installed blown-in cellulose will make a big improvement.	Average
Ducts How well sealed and insulated are the ducts.	Flexible ductwork, Sealed	Ductwork is ok, but air sealing work in the attic is needed to seal the boots to the drywall before additional insulation is added to the attic.	Good
Walls The amount of insulation inside the walls.	Batts, Fiberglass, 2x4	Per our discussion during the audit, I have recommended adding foam insulation to the exterior of the home when you replace the siding.	Average
Floors The amount of insulation below the floors.	Foam, Crawlspace		Good
Windows The insulation value of the windows.	Double pane, Metal frame	A mix of unbroken metal frames with insulated clear glass, direct glazed dual pane, and single pane with internal storm windows.	Poor
Water Heating How efficient and insulated is the hot water system.	Storage tank	This upgrade should be contemplated in advance of the current tank's failure as purchasing a tankless unit can be difficult when needed immediately.	Average
Lights and Appliances How efficient are the lighting and appliances.	50% cfl's		Average
Heating How efficient is the heating system.	Gas, Programmable thermostat, Furnace, 90%+ efficient		Average
Cooling How efficient is the cooling system.	None		Not Applicable

General Notes

Andrew,

Thanks for the opportunity to assess your home. I enjoyed our visit, especially hearing about your ambitious plans for improving your home.

As we discussed there are some logical ways to stage the work for your home. The following breaks the work into three stages:

Stage One - Air seal and insulate the attic
Stage Two - Replace water heater
Stage Three - Replace windows and add exterior foam insulation while replacing siding.

Summary of Recommended Energy Upgrades

These recommended upgrades will improve the energy performance of this home. The cost for the upgrades will vary with the size and complexity of the home and the scope of work required. The Approximate Annual Savings are based on the estimated energy reductions with each upgrade.

	Notes	Typical Cost Range	Approximate Annual Savings	
			$	kWh Equivalent
Air Sealing	Seal air leaks to reduce leakage (air leakage rate remains above .35 ACHn).	$400 - $2,000	$143	3,000
Attic/Ceiling Insulation	Blow loose-fill insulation into open attic to R-49.	$1.75 - $3.00 /sf	$73	1,500
Duct Sealing				
Duct Insulation				
Wall Insulation	Add rigid foam to the exterior of the house when re-siding. (Savings based on R5 rigid foam)	$1.00 - $3.00 /sf	$69	1,500
Floors				
Windows	Upgrade to high efficiency windows.	$500 - $1,500 /window	$207	4,400
Water Heater Upgrade	Install a tankless water heater.	$1,500 - $3,500	$79	1,700
Solar Water Heater				
Appliances				
Heating System Upgrade				
Cooling System Upgrade				
Solar PV				

Financial Incentives

See web site for more sources of financial assistance.

See http://www.dsireusa.org/ for incentives in your area.

DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Established in 1995 and funded by the U.S. Department of Energy, DSIRE is an ongoing project of the N.C. Solar Center and the Interstate Renewable Energy Council.

Air Leakage

Fan box and recessed light are both leaky

Current Conditions Observed by Auditor

Currently the home is very leaky. There are approximately 0.8 air changes taking place under natural conditions. That is more than double the rate deemed acceptable for a new home built to Energy Star standards.

The vaulted ceilings are very leaky, as are the ventilation fans and recessed light fixtures.

Leakage through the floor has already been minimized with the installation of spray foam insulation under the subfloor.

Recommended Upgrades Detail

The penetrations into the attic spaces should be air sealed before the attic is insulated.

The vaulted ceiling could be air sealed if the current 1x4 wood is replaced or covered with a solid material like drywall.

When and if the siding is replaced, the use of a building wrap can help reduce air leakage through the wall assemblies.

Deep Energy Retrofit Options

Energy Upgrade Description

Air Sealing Air sealing is one of the most cost-effective energy upgrades you can make and should be done before installing insulation. Cold air can infiltrate small cracks and openings during the winter, while hot outdoor air can over- heat your home in the summer resulting in drafts, moisture, and indoor air quality issues. There are many types of air leaks and many strategies for sealing them. You can under- take this work yourself or hire a contractor who can use a blower door to identify and measure the effectiveness of various air sealing measures.

After your home is sealed, it is important to make sure that there is adequate ventilation to maintain proper indoor air quality and to prevent back drafting of combustion appliances. An EPS Auditor or qualified professional will identify any potential ventilation problems.

No-Cost or Low-Cost Strategies

Close your fireplace damper when your fireplace is not in use (but first allow the fireplace to cool completely). If you have fireplace doors, keep them closed.

Put bathroom ventilation fans on a timer or on a humidity sensor which will automatically switch off the fan when the room is dry.

Ceiling and Attic

Vaulted ceiling

Main attic above flat ceiling area

Current Conditions Observed by Auditor

The main attic has poorly installed 5.5 inch fiberglass batts. From the size of the rafters it is assumed that the vaulted ceiling also has 5.5 inch fiberglass batts.

Recommended Upgrades Detail

The main attic should be insulated with blown-in insulation placed over the existing batts. The target value for the is attic insulation is R-49. Care should be taken to maintain attic ventilation.

The vaulted areas could be insulated from below with foam board when then the ceiling is remodeled.

Any airsealing in the attic should be done before the attic is insulated.

Deep Energy Retrofit Options

Energy Upgrade Description

Ceiling & Attic Insulation Attic or ceiling insulation is one of the most cost-effective upgrades you can make and should be done after air sealing in the attic. Attic or ceiling insulation slows heat loss through the roof in the winter and also slows heat gain through the roof in the summer. The insulation is usually installed on the floor of an unfinished attic (the ceiling of the finished room below) and under the roof if the attic space is finished. Insulation is measured with an R-value, and the higher the R-value, the more effective the insulation value. Insulation is made of different materials and comes in several forms: batts, loose-fill or blown-in, foam, and rigid. Each type of insulation varies in terms of advantages, applications, and pricing.

Ducts

Current Conditions Observed by Auditor

Most of the current ducts are insulated. All the ductwork that is exposed appears to be sealed with mastic.

Recommended Upgrades Detail

The remaining sections of uninsulated ductwork should be insulated.

Deep Energy Retrofit Options

Energy Upgrade Description

Duct Sealing and Insulation Heating and cooling duct work that leaks into unconditioned space can be a major source of energy loss. Sealing and insulating your ducts helps to save energy by more effectively directing the heat or cooling to desired locations. Insulating ducts in semi-conditioned spaces such as basements may or may not be necessary depending on the circumstances.

Ducts should always be sealed before insulating.

Walls

Current Conditions Observed by Auditor

The walls are 2x4 and assumed to be insulated with 3.5 inch fiberglass batts.

Recommended Upgrades Detail

When the house is re-sided, one inch of foam should be installed underneath the new siding.

Deep Energy Retrofit Options

Energy Upgrade Description

Wall Insulation Insulating walls will help you to keep heat inside your home during the winter and slow heat gain into your home during the summer. Retrofitting walls with insulation is generally more work and more costly than insulating an attic ceiling or a floor. Walls may be insulated from the outside or inside and this is more easily accomplished during remodeling work which in- volves removal of or painting either of these surfaces.

Floors

Foam insulation under the floor

Current Conditions Observed by Auditor

The floors have already been upgraded with sprayfoam insulation.

Recommended Upgrades Detail

Deep Energy Retrofit Options

Energy Upgrade Description

Floor Insulation Floor insulation is mainly a cold climate energy saving measure. The importance of floor insulation varies with the type of foundation in the home. The lowest floor cavity in a home should only be insulated if the basement or crawlspace below it is unheated. In a heated basement or crawlspace the insulation will be found in a different location. Slab floors on-grade or in a basement can be retrofitted with insulation above the slab if no insulation was installed beneath the slab before it was poured.

Windows

Unbroken metal frames on the windows

Current Conditions Observed by Auditor

The home currently has a mix of window types: double-pane directly glazed, unbroken metal frames with double-pane glass, single-pane unbroken metal frames with storm windows.

Recommended Upgrades Detail

All metal frame windows should be replaced with double-pane low-E windows. It would be great to do this replacement in conjunction with the siding work you are planning.

Deep Energy Retrofit Options

The windows could be replaced with triple-pane glass instead of double pane. This would also help with blocking out road noise from the highway.

Energy Upgrade Description

Windows Older windows can be responsible for drafts, heat loss in winter and heat gain in summer. They can significantly impact your comfort and energy use for heating and cooling. Storm windows can help eliminate some of these issues. High efficiency, double-paned, low- e, argon-filled windows with insulated frames can help save energy, make rooms more comfortable and also makes them quieter.

No-Cost or Low-Cost Strategies

Capture free solar heat . On cooler days, open curtains to catch the heat from the sun and warm your home.

Blockthe sun in hot weather. To keep your home cool, adjust window coverings to block the sun's hot summer rays. In the evening, open windows to catch cool breezes.

Plant trees, bushes, and trellisesthat blockunwanted sun in the summer. Strategically located plants on the east, west, and south sides of a house can provide natural cooling through shade. Deciduous plants will shade in summer and allow more light in winter. Plants can also form windbreaks to protect your home from winter winds. Be sure to plant away from the house so you do not trap moisture against the building.

Water Heating

Standard gas water heater in crawl

Current Conditions Observed by Auditor

There is a standard gas water heater in the crawlspace.

Recommended Upgrades Detail

Upgrade to a tankless gas water heater. It would be smart to make this replacement before the current unit actually fails. In the rush to replace a failed water heater it can be hard to acquire a tankless unit in a timely fashion.

Deep Energy Retrofit Options

Energy Upgrade Description

Water Heater Upgrade The life cycle of water heaters is approximately 12-15 years. If your water heater is older, consider replacing it with a newer, more efficient one. All new tank water heaters have a built-in insulation layer to conserve energy. Solar water heating may also be an option: it can provide as much as 75% of your hot water needs and offers significant savings over time.

Solar Water Heater Installing a solar water heater on a roof that received adequate sunlight can be a relatively cost-effective means of reducing your energy costs over the long term. These systems can preheat the water going to your hot water heater and significantly reduce, and at times eliminate, the need for additional water heating.

No-Cost or Low-Cost Strategies

Lower your water heater thermostat to 120 degrees , or the lowest setting that is acceptable to you for bathing and dishwashing.

Turn off **hot water during vacations** Turn your electric water heater off at the breaker panel if you are leaving town for more than a couple of days. But don't do this during freezing weather. If you have a natural gas water heater, turn it to the "low" or "vacation" setting, but do not turn it off.

Don't let the hot water run while shaving or washing dishes.

Install high-efficiency **showerheads and faucet aerators** New showerheads are required to meet a 2.5 gallon per minute standard; the lower the number, the more you will save. If you have a pre-1992 showerhead, it could be using 5.5 gallons of water per minute or more. Look for low-flow aerators of 2.5 gallons or less to fit bath- room and kitchen faucets.

Lights and Appliances

Current Conditions Observed by Auditor

All appliances are standard.

2/3 of light fixtures use CFLs.

Recommended Upgrades Detail

Consider purchasing Energy Star appliance when it is time for replacement.

Change out remaining light fixtures to CFLs.

Deep Energy Retrofit Options

Energy Upgrade Description

Appliances Older appliances can use significantly more energy than newer, energy efficient appliances. Look for ENERGY STAR refrigerators, freezers, dishwashers, clothes washers, and air conditioners. Even within ENERGY STAR there are more and less efficient models and you should look for the most efficient appliance that fits your budget and needs. If you consider the full life cycle costs, more efficient appliances often make up for any difference in price within a few years of operations.

No-Cost or Low-Cost Strategies

Wash laundry in cold water whenever possible. Ninety percent of energy used for washing laundry goes toward heating water. Only run the washer when you have a full load.

Use the dishwasher energy-saver mode and run the dishwasher only when it is full.

Eliminate Phantom Loads. Many home electronics such as computers, televisions, and battery chargers use energy when not in use or turned off. Unplug these or plug them into a power strip that can be turned off when not in use.

Hang your clothes outside to dry whenever possible to reduce the use of your energy-intensive electric or gas dryer. Eliminate unnecessary lights and replace incandescent bulbs with energy-saving compact fluorescents (CFLs) or LED lights. You can save at least 75% of the energy used for lighting. CFLs that emit a warm color similar to in- candescent bulbs (soft white color) and that turn on more quickly are now available. It is important to handle and recycle broken and burned out CFLs appropriately as they contain small amounts of mercury. Motion detectors and timers can eliminate unnecessary lighting outside and in infrequently used rooms.

Heating

Current Conditions Observed by Auditor

The home has an older high-efficiency furnace.

Recommended Upgrades Detail

When it comes time for replacement, consider the improved performance of the building shell due to your upgrades. This may allow you to install a smaller furnace, or switch to a high-efficiency heat pump.

At a minimum, consider a furnace with a variable speed ECM motor. These units are better able to match their output the needs of a more efficient home.

Deep Energy Retrofit Options

Energy Upgrade Description

Heating System Upgrade Older, poorly maintained, and less efficient furnaces and heat pumps use more energy than newer, high-efficiency models. You may achieve energy savings by upgrading your system. Additionally, you should have your existing system periodically inspected to identify potential problems and extend the life of your system. When upgrading a heating system, you should also have any connected duct system inspected for air leaks and appropriate upgrades.

No-Cost or Low-Cost Strategies

Turn down the heat. A good energy-saving setting when you are at home is 67-68 degrees and 55 degrees at night or when you are away. Each degree you lower your thermostat saves an estimated two percent (2%) on your heating bill. In summer, turn off your heating system or raise the thermostat setting to save on air conditioning.

Higher heat is not faster heat. Turning the thermostat higher will not warm your house faster; it just wastes energy. Lowering the air conditioning setting won't cool your house faster either.

Use a programmable thermostat. Older, manual thermo- stats are often not as accurate as new electronic models, and they require that you manually set them back each night. Some programmable thermostats have smart features such as preprogrammed "night" and "vacation" energy-saving settings that lower the temperature auto- matically. Different heating systems require different thermo- stats. Check the owner's manual to be sure that your thermostat and heating system work effectively together.

Cooling

Current Conditions Observed by Auditor

None exists

Recommended Upgrades Detail

Deep Energy Retrofit Options

Energy Upgrade Description

Cooling System Upgrade. Cooling is not the predominant energy use in a home in our climate zone, however, older, poorly maintained cooling equipment will still use more energy than newer, more efficient equipment. Heat pumps should be commissioned and regularly maintained to maximize their efficiency potential. Air conditioners should be inspected and serviced by a professional to help extend the life of the system.

No-Cost or Low-Cost Strategies

Block the sun in hot weather. To keep your home cool, adjust window coverings to block the sun's hot summer rays. In the evening, open windows to catch cool breezes.

Use air movement to cool people during hot days. When it's warm, use natural ventilation or window and ceiling fans to keep cool. Remember that fans cool people, not rooms. If these are insufficient, consider installing a whole house fan which will vent warm air from the home and pull in cooler outside air throughout the house at night.

Plant trees, bushes, and trellises that block unwanted sun in the summer. Strategically located plants on the east, west, and south sides of a house can provide natural cooling through shade. Deciduous plants will shade in summer and allow more light in winter. Plants can also form windbreaks to protect your home from winter winds. Be sure to plant away from the house so you do not trap moisture against the building.