(Conservation Corner #15, Appeared in the ***Ferry County View Extra***)

Choose Your Fuel Wisely –
Conservation Considerations for Home Heating

Two years ago, we wrote about a number of relatively easy steps you could take to conserve energy and money while staying warm and cozy in your house. Hopefully you have incorporated a few of those ideas and you are now looking for more ways to conserve.

Perhaps you are considering retrofitting your heating system, or you will be building a new house and choosing a heating method. Do you presently heat with propane, electricity (baseboard, wall heater, heat pump), fuel oil, cordwood or pellets? Though the devices used to generate heat from each of these fuels vary greatly, a reasonable comparison can be made of the costs of generating a given amount of heat from each one (dollars per million British Thermal Units (BTU)).

Before taking a broad look at all these heat sources, a close-up examination of cordwood BTU values is necessary. Why is it more efficient to burn western larch than ponderosa pine? This is because a cord of larch has more BTUs than a cord of ponderosa pine. It has more BTUs because it is denser (heavier). All firewood has an approximate heating value of 6,500-7,500 BTU/pound (at 20% moisture content [air-seasoned]). So, for example, a cord of seasoned ironwood weighs 4,250 pounds while a cord of seasoned balsa weighs 935 pounds. Therefore, it will take more than 4 cords of balsa to produce the same amount of heat as one cord of ironwood. While larch (3,145 pounds/cord) is not as dense as ironwood, it is denser than ponderosa pine (2,380 pounds/cord) and will therefore provide more BTUs per cord.

So, let's compare. How much would it cost to get one million BTUs from each fuel?

Heat Source — Price: $/Million BTUs (MBTU)

Cordwood (@ $150 /cord, cut, split and delivered; 20% moisture content [air-seasoned]. Standard stove efficiency. [BTUs/cord from www.chimneysweeponline.com]):

- Western Larch — $7.65
- Douglas Fir — $8.53
- Ponderosa Pine — $10.14 (More difficult to split than fir or larch)
- Quaking Aspen — $10.95

Processed wood waste heating products:

- Pressed Wood Waste Logs — $15.93 (@$260/pallet - local price) This is calculated from information on www.chimneysweeponline.com website. The manufacturer of locally available pressed wood logs claims a slightly lower $/MBTU.)
- Wood Pellets (@$195 or $220/ton) — $11.61/$13.10 (two qualities available locally)

Electricity (based on current PUD rate [$.08298 per Kilowatt Hour (KWH)]; 1 KWH provides 3415 BTUs; prices given for heat pump BTUs reflect a range of efficiency):

- Electricity (wall heater, baseboard heater, space heater, etc.) — $24.93
- Electricity (Air source [ductless] heat pump) — $15.59- $12.47
- Electricity (Geothermal heat pump) — $7.13-$5.80

Oil and Propane (based on local prices; range of prices reflects differences of efficiency in heating units [70%-90%]):

- Heating oil (@$2.00/gal; 138,690 BTUs/gal.) — $20.67-$16.07
- Propane (@$1.69/gal; 84,000 BTUs/gal.) — $28.38-$22.31

Of course, there are several additional factors to consider when comparing these prices ($/MBTU):

- Local prices for various heating fuels change often.
- Green or wet wood is much less efficient, because energy is used to evaporate the moisture in/on the wood before heat is given off.
- Cutting your own cordwood can save you a lot of money, but requires considerable time and effort.

- Pellets and pressed logs are a more expensive than cordwood, but are more convenient, create less mess, and generate less particulate pollution.
- Electric heating, with no backup, leaves you vulnerable during a power outage. Oil furnaces require electricity to operate. Even pellet stoves require electricity for their feeders, making them less convenient than a cordwood stove during a power outage. Backup battery systems and generators are available but are expensive.
- Heat pumps are extremely efficient, but the upfront cost is steep, especially with geothermal.
- Variations in initial costs and efficiency of heating units (e.g. different models of wood stoves) must be factored in. Efficiency of heating unit can vary tremendously depending on level of maintenance.
- Many of these systems can be used with radiant floor heat, which is potentially more efficient, as radiant floors (electric or hot water) heat the lower part of the room and can provide the same feeling of warmth at up to 5 degrees cooler overall temperature. While the cost of radiant floor heat as a retrofit might be prohibitive, it would be more cost efficient with new construction or major renovation. (http://www.scientificamerican.com/article/underloor-radiant-heating/)

Is a major retrofitting, renovation or new construction project on the horizon? Carefully consider the placement of your home. Build your house on a south-facing slope with no coniferous shade trees. Large windows on the south side will provide passive solar heating. This can help conserve energy in the winter, but make sure you incorporate overhangs or awnings to prevent overheating in summer. Other energy efficient design elements include proper landscaping, sufficient insulation, use of energy-efficient windows, skylights and doors, and designing for good daylighting. Ferry P.U.D. will provide some reimbursements for home conservation efforts (primarily insulation) for electrically heated homes meeting certain criteria. For details, contact Ed Forsman at 775-3325 before beginning your project.

The subject of energy efficient building and renovation is much too broad to adequately cover here. To explore further, visit the U.S. Dept. of Energy website: http://energy.gov/public-services/homes/home-design-remodeling or the Passive Home Building website: http://www.phius.org/ .

Other sources included https://catalog.extension.oregonstate.edu/ec1643 and readingstove.com. Information on heating costs varies slightly from source to source. I have attempted to present figures as accurately as possible.

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