



Reducing Energy Demand

Until a few years ago most of us gave little thought to our energy demands, or what they cost. Electricity was cheap, propane economical and you could fill up your car with gas for \$10. Sadly that's not the case today.

It's even worse here in the islands where nearly all our energy comes from the mainland, whether by undersea cable, ferry or barge. Besides the added cost there's always the danger of severe weather or political upheaval cutting off our supplies. Crude oil is becoming increasingly expensive with continued conflict in the middle east.

The first step towards energy independence is to reduce your demand as much as possible. If you are building a new home then you can use the principles of passive solar design to harvest energy from the sun - by orienting your house correctly, using mass to store heat (such as clay floor tiles) and optimizing window size and orientation. Eaves can be sized to shade windows in summer while letting much needed light and heat through in winter. It's also important to avoid over-glazing on the sunny side which can cause your house to overheat in summer. You can also build a smaller house, and reduce the ratio of surface area to volume by simplifying the design.

The next step would be to insulate your home to higher levels. The Washington State Energy Codes are some of the most stringent in the US, and they specify the minimum standard to which you must insulate your home. Since San Juan County falls within Climate Zone 1, you must have walls insulated to at least R19 and your ceilings to R38.

But this is only a minimum standard - you are free to insulate to higher values - and it pays to do so. It's harder to upgrade insulation if your home is already built but it is still possible. It also pays to make your house as airtight as possible since air movement is a major source of heat loss.

One way to check on the state of your insulation is to use an infrared thermometer with a laser sight (\$75 upwards). You aim the laser at any point for which you wish to know the surface temperature. Pull the trigger

and you get an instant temperature read out. I measured my outside walls at 1 foot intervals and found many cold spots. I upgraded the insulation by installing foam panel insulation on the outside of the walls and installing new siding.

Next you can reduce the energy used by your appliances. Compact Fluorescent Lights (CFLs) uses typically 20% of the electricity of their conventional counterparts and last many times longer. Costs have come down significantly and many utilities on the mainland sell them at subsidized prices (I bought mine for 99c each at Fry's in Renton.)

Replace the bulbs that you use the most first, then work your way round to less frequently used bulbs. Bulbs that need to come on instantly - such as at the top of stairs - should be left with conventional incandescent bulbs. LED bulbs are also now becoming available and these use only a few watts each and will last for many years.

Another interesting new technology is hybrid lighting. These systems collect sunlight from collectors mounted outside and direct the light to where it is needed by fiber optic cables. Sensors adjust the light levels and trigger auxiliary lighting sources when needed (on dull days and at night).

Installing more energy efficient appliances will make the biggest difference. At a minimum all your appliances should be Energy Star rated (www.energystar.gov). The appliance labels will show you the typical range of electricity used by appliances of that type, and how much that particular appliance uses.

Generally speaking European built or designed appliances are more economical (since European energy costs are usually much higher than the USA.) When choosing a washing machine front loaders are usually much more efficient than top loaders and they also use much less

water (often 50% less) and detergent. Some models have integrated driers to save space.

If you are replacing your appliances gradually it pays to replace the ones that use the most electricity first. For instance a toaster may use 1500 watts but it is only used a few minutes a day, while your fridge or hot water heater will be running 24 hrs a day.

One way to measure your actual consumption (as opposed to what the label specifies as a typical maximum) is to use a watt meter such as the 'Watts Up?' meter. This device plugs into your wall receptacle, then you plug the appliance into it. It measures the instantaneous electricity consumption and the total used over a period of time (say one day).

Using this you can calculate what percentage of your utility bill is being used by each appliance, and knowing the price of your electricity (per KwH) you can calculate what it is costing you and how much you can save by replacing it with a more efficient appliance.

Next month we'll look at how you can produce your own energy, to offset what you purchase.