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a service of **THE PUBLIC PRESS** : Solar Heating : Thursday, 29 November 2007 13:29 EDT

Conservation and the Economics of Solar Heating

by Bob Ramlow and Benjamin Nusz

WHATEVER BROUGHT YOU to this point, whether it was the realization that we are trashing our environment or the simple need to lower your living expenses, now you are here and you want to do something. But what to do first? The answer is simple: start by conserving the energy you use to heat water. Three general principles that are easy to follow will also save you money: reduce losses, increase efficiency, and reduce consumption.

To start, examine your heating system from top to bottom and look for places where heat might leak out. Heat losses in the system end up wasting the energy you just used to heat your water. Many can be reduced by just a little bit of cheap insulation. For instance, insulate all of your hot pipes. If you are working on a new construction, insulating the hot pipes is easy. Even if you don't have access to all your pipes, insulating the ones you can get at will make a noticeable difference. You should also insulate your water heater. A tank- type water heater heats a whole batch of water. As this water sits there waiting for use, it slowly cools down. The more you insulate it, the better it will retain its heat. Heat losses can also come from leaks. A faucet that leaks 30 drops of water a minute will waste almost 100 gallons a month. Fix leaky faucets promptly.

Next, try to increase the efficiency of everything in your home that uses hot water, for instance, the washing machine and the dishwasher. Upgrading these appliances to more energy efficient models will significantly reduce the amount of energy consumed. A front-loading washing machine uses half the hot water of a standard top- loading model. This results in around 10 20 gallons of hot water saved in each load you do. You can save thousands of

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gallons of hot water a year.

Finally, you can conserve energy by simply using less. Much can be done without a significant change in your daily habits. For instance, when washing dishes in the sink by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water. Soak pots and pans instead of letting the water run while you scrape them clean, and if you are using a dishwasher, only wash full loads. Use cold water with the garbage disposal. Cold water solidifies grease, allowing the disposal to get rid of it more effectively. You can take short showers instead of baths. You should first install a low-flow shower-head. Most standard showerheads use three to four gallons per minute. Even if you take a relatively brief 5 minute shower, you can end up consuming 20 gallons of hot water. Low-flow showerheads will use half of that. A family of four can save well over 1,000 gallons a month. If you are particularly attached to your showerhead, you can install a flow restrictor that will reduce the number of gallons per minute that it uses. For only a couple of dollars, you can reduce your load substantially.

Reducing losses, increasing efficiency, and reducing consumption: these are the first steps. What should be stressed more than quick fixes, though, is the notion of conscious consumption. We have forgotten the financial and environmental costs of hot water. If everyone recognized that whenever they turned on the hot water faucet they were using up energy produced by non-renewable sources, this would reduce energy consumption more than any other measure.

People often say to me, "Bob, I have done a lot of energy conservation and now I am ready to invest in a renewable energy system. What should I do next?"

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Today, homeowners and business people can choose from a wide range of renewable energy technologies. Popular options include photovoltaic (solar electric) systems, wind electric systems, and solar water heaters. In almost every case, a solar water heating system is the best place to start. It provides a higher return on your investment than any other renewable energy system. A solar water heater works 12 months a year providing hot water to your home or business with little or no additional costs, thus offsetting your previous bill for heating water with conventional energy sources. Depending on your particular situation, the savings in conventional fuel can pay for the cost of the solar water heating system in as little as three years. Most often the payback is around five to ten years still a great investment, even without taking into account the ecological benefits of not burning all that fossil fuel.

In fact, I think its time to let you in on a little secret. Solar water heaters don't cost anything. They're FREE! I know it may sound absurd, but it's true. Now I'm not recommending that you run over to the nearest solar distributor and just take a system. Don't do that. I'm just asking you to take a step back and think about solar in a different way. With a little change in perspective, you will see that in the end solar water heaters have a net cost of zero dollars.

There are two ways to take this in. The first one is easy: when you install a solar water heater you are increasing your home's value. You gain in equity what you spent on the cost of installation. Solar water heaters typically have a life span of at least 30 40 years. In most cases, the solar collectors will outlast your roof. So if you decide to sell your home you should get back most of what you

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decide to sell your home, you should get back most of what you paid for the cost of installation. I said this was easily understood, I didn't say it would be convincing. Just because something retains its value over time isn't usually reason enough to go out and buy it.

The second part of this shift in perspective takes a bit more explanation, but I assure you it is even more convincing.

The True Cost of Fossil Fuel

We'll start by comparing solar with the alternatives. Unless you are reading this to find out how to fix your existing system, you probably heat your water with some type of fossil fuel like natural gas, propane, or electricity.

When you purchase fossil fuels you do not pay anywhere near their whole cost. Because our taxes subsidize the oil companies, for instance, the true cost of gas is not reflected in the price we pay at the pump. Let me say it again: oil companies don't pay taxes on all the money they earn so you and I must pay higher taxes to make up for it! It goes without saying that if they paid their fair share of taxes, our tax rates would be lower and the price we pay for fossil fuels would be higher. The same scenario holds true for electricity and all other fossil fuels.

How can this be? First, the fossil fuel companies are among the richest corporations in the world, with tremendous influence in politics. For nearly a century they have manipulated the government into granting them numerous tax breaks and outright payments that are not enjoyed by any other class of corporation. The end result is that they pay little if any taxes themselves, but significantly influence how our tax dollars are spent. They have managed to get the government to pay for lots of expensive research for their industry.

The costs to the environment of using fossil fuels are also hidden. Burning fossil fuels releases carbon into the atmosphere, leading to global climate changes that will disrupt life as we know it on every corner of the Earth. The costs of dealing with these changes will be astronomical, and are directly linked to burning fossil fuels. When we burn fossil fuels, especially coal, chemicals are released into the atmosphere that cause acid rain, polluting our rivers, lakes, and



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soil. Acid rain kills wildlife, trees, and vegetation, and degrades our buildings, roads, and anything else exposed to it. Although we are already paying some of the costs to fix these problems, we are not paying them all. Eventually, someone will have to pay them.

Then there are health-related costs. Whenever we burn any fossil fuel, pollutants are released into the air that harm our health. Our health insurance costs go up to help pay for the care required by those most affected. Our taxes are increased to help pay for those who cannot afford their own care, and our general health care costs go up for the same reason. Again, we do not pay these costs at the pump or with our utility bill.

Some of our electricity is generated in nuclear power plants. The waste generated by these plants is one of the most toxic substances known to [science. *missing end of sentence -ed*]

Bob Ramlow is the solar thermal consultant for the Wisconsin Focus on Energy Program. The owner of a renewable energy company, he has over 30 years experience with solar energy systems and is a founder and a director of the Midwest Renewable Energy Association (MREA). Benjamin Nusz currently works as a solar water heating consultant and site assessor in Wisconsin.

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