

Energy Costs Eatin' Your Lunch Yet?

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How high can they go?

Higher still, for sure. We had the instant shock wave, and now can settle into a constant growth curve of higher energy costs to run our homes – even if we are lucky enough to experience an occasional short term dip in prices. Most homes are real energy hogs, and we can do something about it.

One solution might be to buy a newer more energy efficient home. When most people buy a newer home it tends to be larger in size. Newer homes may be more energy efficient, but larger homes still use more energy than smaller ones. Some newer homes are more energy efficient than others, so just because it is new doesn't necessarily mean lower energy costs. Older homes can often be improved at far less cost than buying a new one.

What is energy anyway?

We use it in terms of electricity and natural gas. Some areas also use heating oil. We can readily measure the use of heating oil in terms of gallons. Natural gas is commonly measured in terms of cubic feet. Since it comes thru a pipe, we don't as easily visualize its usage rate. Both gas and oil are used to make a fire in the house for heat.

Electricity is much less graphic in its consumption. We can't see it, hear it or feel it. We sense its effects, but they are difficult to quantify by our normal senses. Large plants burn fires to make steam which runs generators, making electricity. Some plants use natural processes to generate electricity like wind, geothermal heat and other processes, but these are still very few. Nuclear plants bring pieces of radioactive material close enough to generate heat, making steam, which runs generators – until the radiation eventually destroys the equipment. With an inherent toxicity of hundreds of thousands of years, these radioactive materials are the ultimate toxic waste, with no safe place for disposal, but that's another story.

We experience the benefits of electricity by turning on a switch for all sorts of appliances. We only receive a feel for our usage rate from the monthly bill.

Energy has become very easy to use.

To increase the heat, we no longer have to shovel coal or carry logs to the fire. Just turn up the thermostat, and it happens. Water heaters make hot water virtually automatic. Want light? Turn on

a switch. Air conditioning has been a big growth industry for many years, especially in the warmer climates. Now computers and home entertainment are grabbing their share of the pie as well. The typical size of the American home has grown much larger in the last 40 years. More space means more energy use. As long as it was cheap little thought was given to the increasing usage. Just plug it in and go. With prices jumping by more than 50%, we are moving into a new way of looking at our energy costs.

Energy costs are not magic.

Gas and oil are used to make a fire in the house for heat. Fires have noxious combustion products we vent out of the house. The heat used to vent the combustion gasses is lost as well. The combustion process efficiency can vary from about 35 % to as much as 95%.

We pay for electricity by the kilowatt-hour, which is a measurement of quantity over time. If you burn ten 100 watt bulbs at the same time you have 1,000 watts or one kilowatt. Do that for an hour and you have used a kilowatt hour of electricity. At ten cents a kw-hr that doesn't seem like much, but multiply by 12 hours a day times 30 days and you have 360 kw-hrs. At ten cents per kw-hr your cost would be \$36. At 15 cents your cost balloons to \$54. How many lights do you run in your house and for how long? Heating appliances suck a lot more juice.

Some basic principles are helpful.

Heat is a form of energy. Cold is an absence of heat. Heat flows from warm to cool. Insulation slows the heat flow, but does not eliminate it. When we heat or cool a space, it takes energy. When the structure allows the heat to spill in or out, it is like filling a bucket with a hole in it. A small hole with a large flow, and we can still fill the bucket. The larger the holes the more flow we need to fill it. Enough holes and it never fills.

Appliances use energy, but are never 100% efficient. They all give off some form of heat, some more than others. Electrical heat in our homes is viewed as high efficiency at the house, but there are many losses along the generation and transmission path, so it is actually much less efficient than it may appear in most cases.

Attack the biggest users first.

Lots of small things can add up

quickly but by far the biggest chunk of your energy costs goes to heating/cooling. Think of your house as a big energy bucket. You pay lots of money each month to heat or cool it most of the year. Every place with thin or no insulation is an energy hole. Single pane aluminum windows are big energy holes. Vents and blowers [bathroom and kitchen] are energy pumps, sending large quantities of your conditioned air outside, so you can pay to condition more. Uninsulated walls and ceilings act like big energy holes.

Attics tend to gather heat, maybe nice in the winter, but your enemy in the summer. In warmer climates there are many houses that have the coldest part of the AC system in the attic – the hottest part of the house. That design can put a big hole in your energy bucket.

The next largest energy hogs are appliances – especially those generating heat, followed by lighting. Home electronics and entertainment are moving rapidly into prominence. Just cutting back on extravagant use can help, but energy holes in your home and system inefficiencies are where you will find your biggest leverage.

How can you reduce your energy costs for your present home? Let us count the ways.

Newer homes are not immune

They usually have much better energy efficiency than older homes. Maximum savings in newer homes can be achieved through more efficient operation of the systems, using energy efficient appliances and avoiding errors in construction like missing insulation and leaky HVAC ducts. Attic ventilation is often inadequate. If your attic is more than 10-15 degrees warmer than the outside air, it is a hot-box, costing you money.

Avoid common new home pitfalls before you buy

- Be sure all attic space is well ventilated – at least one square foot of ventilation for every 150 square feet of attic space. 40 – 50% of that area should be at the top to let the hot air out. More is better.
- Insulation should not block ventilation from the lower vents. Vaulted or cathedral ceilings are common culprits with only six inches, or less, insulation and blocked air space at the roof. Twelve inches is considered to be the minimum desirable fiberglass insulation thickness.

- Avoid power ventilation. Why should you pay the power company to ventilate your attic when it should be done by natural forces? In worst case, specify solar powered top venting.

- Use light colored roof coverings. Dark shingles can raise the attic temperature by as much as 20 F.

- Be sure there are no open holes in the attic floor. Such holes allow hot attic air to convert the lower uninsulated walls into heaters in the summer and coolers in the winter, and are a fire hazard.

- Skylights should be double glazed. Have the shafts fully insulated and install an additional plastic cover at the bottom of the shaft.

- Vertical walls in the attic need 12 inches of insulation too. Six inches is typical. Be sure the batts are complete and well attached.

- Attic flooring should be well insulated underneath. This is an often neglected detail. Keep the flooring to a minimum as the insulation thickness is usually not more than 6 inches underneath.

- Attic access openings should be provided with a good seal and be well insulated as well. This is virtually never done, especially with pull down ladders, providing a large energy hole into your attic.

- HVAC systems should be well sealed so they do not leak any conditioned air into the attic space. This too, is seldom complete.

- Avoid recessed lights in your attic space, especially those not rated for insulation contact. They act as significant energy holes into your attic, year 'round.

- Minimize your window losses. Locate your windows to minimize the effect of the sun in warm climates and maximize it in cooler climates. Minimize the number and size of windows. Use non metallic window types. Overhangs are very helpful.

- Be sure your attic includes a radiant barrier. They do work. The cheapest and simplest way is to use roof panels with the radiant barrier built in.

- Add a designed source for an external air intake. Ideally this would include a heat exchanger to preserve the energy

from heat or cooling and a filter. The tighter the house, the more important this becomes.

- Take a real step into the future and plan for smaller, tankless, local water heaters, so you can avoid running two separate water lines everywhere.

Older homes have many popular sources of wasted energy.

- Attics with thin insulation is number one on the hit parade, with inadequate attic ventilation right behind. These attic temperatures can reach more than 140 F on hot days. This represents a huge hole in your energy bucket. The days of just getting a bigger AC to compensate are now gone. A radiant barrier is also a good addition, especially in warm climates.

- Older HVAC systems that “still work” may not really be doing the job. Dirty cooling coils and blowers can cut your efficiencies way down. Corroded furnaces can be downright dangerous. Any gaps in ventilation ductwork or uninsulated ducts suck your money like a vacuum cleaner. When was the last time you had a thorough HVAC annual maintenance check? Newer systems are significantly more efficient. If you recently installed a new system, be sure, when comparing energy costs, you include the rate differences in your comparison. Each year the rates are higher, so if you spent the same before and after, you may still be saving money. Better yet, compare the energy input instead of the total cost.

- Tighten the air leaks in your home. That means caulking around the windows and doors. Plug any other holes you find. All the outside air that comes in is unconditioned.

- Insulate over your attached garage, [at least 3 inches] and insulate your garage door. Your inside walls probably have only three inches of insulation. If your garage is a hot box in the summer and freezer in the winter, you're paying a high price for your discomfort.

- That old refrigerator/freezer in the garage can cost you as much as \$50 a month, maybe more. It is old, thus inefficient, and it is placed in a thermally unfriendly place, so it works even harder. When did you last clean your refrigerator coils? Dust and dirt on your coils cost you even more, and shorten the life of your appliance.

- Water heaters are another big energy pit. In a few short years, the tanks build

a heavy collection of minerals inside which destroys any efficiency they may have had. With a typical life expectancy of 8 – 10 years, most water heaters are prime candidates for replacement. Consider a tankless type, especially if you are not running hot water around the clock. Most domestic water heater manufacturers still do not make tankless, so they are not fond of them, yet. Shop around for brands and costs. There is still a wide range of costs for both heaters and installation.

- Old, single pane windows, are virtually energy holes in your walls. Aluminum frames are even worse. You don't necessarily have to replace them all at once. Double glazed windows with non metallic frames will also improve your home comfort level.

Psychology and physiological effects

Running excessively high or low AC or heating settings cost you money. The body takes about 30 days to acclimatize to a surrounding temperature change. If you work where the AC setting is on “meat-locker”, wear heavier clothes. That way, when you get home, a few degrees warmer room temperature will still be comfortable. The reverse is true in colder climates. Spend more time outdoors so your body can adapt to the prevailing climate.

Don't expect a major drop in energy costs by making only one change, even if significant. Your total bill is a combination of many factors, all of which need your attention.

Once you start thinking about what you can do to cut your energy bills, many more ideas will attract your attention. The most important step is to get started, now.

Arrange for your own Home Energy Tune-Up inspection. Learn how to start saving money on your energy bills every month. Call Stephen Ruback at 832-489-1071

Every home needs an inspection, even new ones.

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