

# Energy Efficiency: What It Is and Why It Matters

By Ann Berwick

## Editor's Note:

*Ann Berwick is Newton's Co-director of Sustainability, and her recent talk in Green Newton's lecture series called "Continuing the Course of Greening Our Community" reminds us how important the threat of climate change is to all of us. Whether we are championing solar energy or concerned with land use and protecting biodiversity, we all need to take measures to reduce our carbon footprint. The following article reminds us of how important energy efficiency is in achieving these goals.*

## Energy efficiency sounds so dull....



Ann Berwick

Here's why it's sometimes referred to as the "first fuel" and why it's way more important than you might think.

First, what is energy efficiency? People often include "conservation" in the general heading of energy efficiency. Sometimes it's hard to tell which is which, but it doesn't really matter: both save energy and are fairly grouped together.

In the energy context, conservation means taking actions that result in the use of less energy. Turning off the lights when they're not in use, putting the heat on a cooler setting or the air conditioner on a warmer setting, and even riding a bike instead of driving are all examples of conservation.

Energy efficiency means using the energy that does get used more efficiently and, thereby, using less of it. Using more efficient light bulbs like LEDs instead of incandescents, air source heat pumps instead of baseboard electric heaters or window air conditioners, and low-emitting cars instead of SUVs are all examples of using energy more efficiently. Installing wall or roof insulation or better-insulating windows is referred to as an energy efficiency because such measures enable fuel to be used more efficiently: less fuel delivers the same level of comfort.

Second, why is energy efficiency sometimes called the "first fuel"? The reason is that in lots of circumstances it's a cheaper way of achieving the same amount of work (e.g., heating, cooling, moving from place to place) than the alternatives. Think about an LED as compared to an incandescent light bulb. The LED is more expensive to buy, but because an incandescent loses 90 percent of its energy to heat (remember how hot it is when you touch it) and an LED wastes much less of its energy, over time the LED supplies light at a lower cost.

The same principle applies to insulation. It costs money to insulate a house, but over time it saves money on heating. In

Massachusetts currently, energy efficiency measures cost the equivalent of about three to four cents per kilowatt-hour, while generating electricity with conventional power plants costs about three times that amount. Of course, there's a point of no return: at some point a house is so well insulated that you can't save money by insulating it further.

Energy efficiency is also sometimes referred to as "negawatts." This is because the size of an electric generating plant is often measured in "megawatts." Avoiding the use of electricity generation — often done with coal or oil — can be thought of as using negative watts, or negawatts.

Third, why is it so important? Everyone who believes in science knows that climate change is mostly caused by human activity — mostly by the use of fossil fuels — and is a huge threat to human health, biodiversity, and even to the continued existence of life on the planet.

And although addressing climate change is a huge political challenge, many of the technical solutions are well within reach. We mostly use energy for three purposes: to power electric appliances, for building heating, and for transportation. For the first purpose — generating electricity — it's possible to substitute clean resources like wind and solar power for coal, oil, and natural gas. In other words, we can clean the electric grid; but the fossil fuels that we use to heat buildings (mostly oil and natural gas) and power vehicles (mostly gasoline and diesel fuel) can't be made much cleaner. However, we can use the cleaner electricity to heat buildings and drive cars. The politics are tough, but the solutions are remarkably uncomplicated: use less energy; generate electricity with renewable resources like the wind and the sun; and electrify everything. Using less energy — energy efficiency — is the first step.

In fact, reducing the use of fossil fuels through energy efficiency and clean electric generation has significant additional benefits, besides limiting climate change. Coal, oil, and natural gas all cause air pollution, leading, for example, to smog and causing asthma and other respiratory difficulties. Energy efficiency and renewable power reduce that pollution. They also mean lots of jobs, doing things like installing insulation and solar panels that can't be outsourced to other countries. ■