A Sustainable Environment: Our Obligation to Protect God's Gift

by

George P. Nassos

Can Regulations Help Us Save Energy?

Not too long ago, I had the pleasure of meeting and listening to Denis Hayes, President of the Bullitt Foundation, an environmental philanthropy located in Seattle. He is probably better known as the member of Senator Gaylord Nelson's staff who helped organize the first Earth Day in 1970. Mr. Hayes talked about the importance of energy efficiency and used the electric clock as an example.

Most people own an electric clock, and most own a battery-operated watch. The clock is powered by electricity that costs, say, ten cents per kilowatt-hour. On the other hand, a tiny, long-lived battery that contains a trivial amount of electricity powers the watch. If you consider the price of the battery and the amount of electricity it generates, that electricity costs about $30,000 per kilowatt-hour, compared to the ten cents for the clock. Not surprising, watches are considerably more efficient than electric clocks.

A typical electric clock draws about four watts. The clock thus uses one kilowatt-hour about every ten days or 36 kilowatt-hours per year. If we assume that everyone in the U.S. owns one electric clock, the nation consumes the total output of two giant 500-megawatt power plants just running all the electric clocks. To operate these power plants requires about 100 railroad hopper cars every day.

If, however, every one of these clocks were as efficient as the average battery-powered watch, all the clocks in America, combined, would use a total of just four horsepower, or three kilowatts. Instead of requiring 100 railroad cars of coal per day, America's clocks would run for five years on just one railroad car of coal.

Now let's look at the impact of prices coupled with market imperfection. Let's say it costs $10 more to make a clock as efficient as a watch. At ten cents per kilowatt-hour, it costs about $3.60 to run a typical clock for a year. But by spending $10 for a more efficient clock, one could save almost $3.60 – a 36% annual return on your investment. Not bad, but unfortunately people won't chose one clock over another to save $3.60, even if the increased efficiency were free, rather than $10.

Yet, considering the environmental impact of consuming 100 railroad cars of coal per day – the greenhouse gases, the small particulates, the strip mines, the acid rain, the energy required to deliver the coal – it is clearly in our interest as a nation to encourage much more efficient clocks. Manufacturing more efficient clocks is not as critical, however, as improving the efficiency of appliances that consume much more electricity, such as refrigerators, furnaces, water heaters, and washing machines. Maybe we need regulations rather than the efficacy of markets.

Also, think about all the electronic equipment that operate with remote controls and consume electricity even when they are off. Assuming all of the televisions in the U.S. operate with a remote control, they would probably consume the output of two 500-megawatt power plants even when they are all off. There is a trickle of electricity going through the television that is necessary for the remote control to operate. Again we would need about 100 railroad hopper cars every day. But that is another story.

If you would like to receive copies of earlier articles in this series, please contact me at george.nassos@iit.edu.