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The Hidden Flaw of 'Energy Efficiency'

Lowering the price of something means more of it will be consumed.

ROBERT J. MICHAELS | August 21, 2012

Mandated increases in energy efficiency—popular almost everywhere on the ideological spectrum—have been implemented around the world. Laws like the European Union's new requirement for 15% energy savings, or the U.S. Senate's proposed Clean Energy Standard Act of 2012, appear like clear winners for almost everyone. If the costs of new technologies are within reason, they promise consumers lower energy bills and producers more profit while mitigating the environmental costs of energy development and consumption.

There is just one problem: Basic economics says that the best way to promote some activity is to reduce its price. That often means efficiency requirements end up having the opposite effect than the one intended.

Consider Mexico's recent cash-for-coolers program, which subsidized the swapout of inefficient refrigerators and air conditioners for more efficient ones. A World Bank engineering study claimed that the new refrigerators would consume nearly 30% less energy. But the actual savings estimated by researchers at the University of California Energy Institute was only 7%, because buyers chose larger capacities and options like ice makers in the doors. Newer air conditioners actually consumed more electricity because they cut the cost of attaining previously unaffordable comfort levels in summer months.

Research on the effects of efficiency measures tells us that such overestimates of savings are significant, and economic theory suggests that they are to be expected.

Overestimating the energy savings from new refrigerators is an instance of "rebound." The more extreme case of increases in total consumption by new air conditioners is usually called a "backfire."

Your first reaction might be that people will lower their thermostats to 71 from 78 degrees, but that will be the end of the story. Not so.

Higher efficiency reduces the cost of cooling. A family that once had only a single air-conditioned bedroom may now choose to install a central unit, and one that suffered in the heat may purchase its first one. Direct rebounds like these, however, are only the start of the story.

Technology that improves energy efficiency and reduces its cost means people can consume more goods and services that use energy—home electronics, appliances and the like. And of course, businesses will use additional energy making them.

These direct and indirect effects are substantial, as I found in my recent Energy Institute Research survey, "The Rebound Dilemma," but they are small relative to the long-term consequences for the nation and the world.

America suburbanized with changes in energy markets and technology that allowed longer commutes and stand-alone houses. And an American factory that replaces an inefficient machine doesn't throw the old one away. A world-wide market means that it will remain employed in a workshop in some less-developed country. Investment in the efficient machine raises rather than lowers world energy consumption.

Rebound greatly complicates the politics of energy efficiency. Some organizations, including the Natural Resources Defense Council and the American Council for an Energy Efficient Economy, have attempted to refute it, but their studies have thus far examined only a minority of rebound findings and have yet to account for long-term and world-wide effects of greater efficiency.

Rebound gives critics of regulation both philosophical and practical rationales for their views: Some object to efficiency standards on libertarian grounds and rebound research now tells us that many standards will fall short of their initial promise. But for the Breakthrough Institute in Berkeley, Calif., which gives primacy to climate change, rebound increases the urgency of introducing large-scale governmental management of both markets and technologies.

The growing body of research on rebounds means that both the left and the right must rethink their stances on energy policy. Some efficiency regulations may be worth their costs, but the existence of rebound means that the nation can no longer accept legislation to improve efficiency without further thought.

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