

Home efficiency upgrades fall short, don't pay, study says

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In this Nov. 5, 2009 file photo, Nick Velasquez blows cellulose insulation into a client's home in Colorado Springs, Colo. Home efficiency measures such as installing new windows or replacing insulation may actually cost homeowners money in the long run, according to the surprising conclusion of a University of Chicago study released Tuesday, June 23, 2015. (Kirk Speer/The Gazette via AP)

Home efficiency measures such as installing new windows or replacing

insulation deliver such a small fraction of their promised energy savings that they may not save any money over the long run, according to the surprising conclusion of a University of Chicago study.

The study, which used data from a random sample of 30,000 low-income Michigan households that were eligible for an Energy Department home weatherization program, found that the projected energy savings were 2.5 times greater than actual savings. As a result, energy bills didn't decline nearly enough to eventually pay for the initial cost of the upgrades.

"The problem is that the real world is screwy," said Michael Greenstone, an energy economist and head of the Energy Policy Institute at the University of Chicago. "The models project much larger savings than are realized by homeowners."

The study, conducted by Greenstone and University of California at Berkeley economists Meredith Fowlie and Catherine Wolfram, has not yet been reviewed by a panel of peers. And energy efficiency experts who were shown the study say the authors' broad conclusions about energy efficiency in general aren't justified after a study of a single program in a single state focused only on low-income households.

But Greenstone says he is finding similar results in a second study of middle-income homes in Wisconsin. If his findings are correct, they could undermine the rationale for billion-dollar federal and state efficiency programs and call into question a long-held understanding that making existing homes and businesses more energy-efficient are among the cheapest ways to reduce emissions of carbon dioxide.

States are expected to expand efficiency programs like the federal weatherization program in the coming years to meet regulations now in development at the Environmental Protection Agency to reduce

emissions from power generation.



In this May 6, 2009 file photo, watt-hour meters track electricity used by residents of an apartment building in St. Marys, Pa., Wednesday, May 6, 2009. Home efficiency measures such as installing new windows or replacing insulation may actually cost homeowners money in the long run, according to the surprising conclusion of a University of Chicago study released Tuesday, June 23, 2015. (AP Photo/J. Scott Applewhite, File)

"It's urgent we find out which (programs) reduce carbon emissions at least cost," Greenstone said.

The researchers found that while homeowners saw their energy use fall by 10 percent to 20 percent after the upgrades, that put them in position

to save just \$2,400 in energy expenses, far less than the \$5,000 the upgrades in the study cost on average. The researchers calculated that it cost the federal program \$329 for every ton of carbon dioxide it saved. The government estimates the cost to society of a ton of carbon dioxide is \$38.

The Energy Department said in a statement that the program, which it says has upgraded more than 7 million homes and is saving families \$300 million a year, has been shown to work by previous national studies. Oak Ridge National Laboratory is set to release its own study on the program this summer that "should show that families are still saving more money in energy bills than money spent updating their homes," according to Energy Department spokesman Eben Burnham-Snyder.

Steven Nadel, executive director of the American Council for an Energy-Efficient Economy, said that weatherization programs for low-income households are typically among the least cost-effective energy efficiency measures. That's partly because it is so difficult to get low-income homeowners to sign up that, once they do, workers are encouraged to do as much work as possible on the homes, even if it has only marginal energy benefits.

And the study, Nadel says, neglects to factor in other benefits these homeowners receive, including lower maintenance expenses, reducing the likelihood of missed utility payments, and a more comfortable home.



In this May 10, 2012 file photo, Mark Delbeck, of Burlington Electric, checks the radio frequency of a newly-installed "smart" meter in Burlington, Vt. Home efficiency measures such as installing new windows or replacing insulation may actually cost homeowners money in the long run, according to the surprising conclusion of a University of Chicago study released Tuesday, June 23, 2015. (AP Photo/Toby Talbot, File)

It is well-known among efficiency experts that weatherization programs that replace windows, boilers and other equipment while the equipment is still in working order are particularly expensive. But other fixes, such as patching leaks in ducts and replacing lightbulbs, have shown a clear benefit. And it is still almost certain that buying more efficient windows and appliances or lightbulbs when it's time to replace them pays off in the long run.

"Paying for the more efficient appliance is still always the best decision, for your pocket book and the environment, regardless of what this study

says," says Noah Horowitz, an efficiency expert and senior scientist at the Natural Resources Defense Council who reviewed the study.

"Nothing in this study contradicts the well-documented fact that energy efficiency is the cheapest, fastest and cleanest way to reduce climate change emissions."

Still, efficiency measures in general often promise more savings than they deliver. Greenstone set out to study if that is true and to find out why.

Many experts believe that homeowners use more energy once their home is improved because it costs less, something called the "rebound" effect. Greenstone, Fowlie and Wolfram compared the temperature and thermostat settings in homes that were improved with those that were not, and found no statistical difference, and no such "rebound effect."

Instead, it seems the engineering models that predict how much energy is actually saved are wildly over-optimistic. "We are primarily relying on engineering estimates," Greenstone says. "That's a reasonable thing to do in the abstract but they need to be validated."

More information: Online: econresearch.uchicago.edu/content/n-assistance-program

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