

Winter 2010

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Recommended Citation

Noah M. Sachs, *Reinventing Fire Making Energy Efficiency a Reality*, Richmond Law, Winter 2010 at 15

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Reinventing Fire

Making energy efficiency a reality

By Noah M. Sachs



Outside my window at Rocky Mountain Institute (RMI) in Snowmass, Colo., I see the stunning 14,000-foot peaks of the Elk Range, now covered with snow in early October. Inside I'm looking at banana trees growing in the middle of my office. It's a self-sufficient building, powered mainly by the sun, and it's a toasty 68 degrees.

My office is in the home of RMI's founder, Amory B. Lovins, one of the world's leading gurus of energy efficiency and sustainable design. Lovins, who was recently named by *Time Magazine* as one of the



Built in 1983, Lovins' house features high-efficiency lighting, 16-inch thick walls, photovoltaic panels, and a greenhouse that grows bananas and guavas year-round.

100 most influential people on the planet, argues that the United States must end its reliance on fossil fuels by embracing energy efficiency and renewable energy, and he believes we can do so and make a profit. Lovins always thinks big. His name for RMI's programs to spur this energy transition? "Reinventing Fire."

I decided to spend my fall research leave at Rocky Mountain Institute to learn more about Lovins' work and the role of energy efficiency in environmental protection. Last summer, I published an article in *Duke Environmental Law and Policy Forum* that showed that energy efficiency is an important and forgotten part of the U.S. environmental agenda. We've focused much

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more on ensuring stable energy supply and cleaning up pollution than on curbing energy demand.

In my research for the article, I found that the United States uses twice as much energy per capita as the United Kingdom, Germany, and Japan, and we use five times as much per capita as China. This high U.S. consumption is not only a major contributor to climate change, but it also leaves our economy dangerously exposed to oil supply shocks (or \$4 a gallon gas). In my article, I advocated several legislative changes to bring down U.S. energy demand in the next decade, including changes in utility regulation and enacting a cap-and-trade system for greenhouse gas emissions.

RMI is making dramatic energy efficiency gains a current, practical reality. It is a "think-and-do" tank that publishes reports on energy efficiency and also consults with Fortune 500 companies to green their operations—and save them money. RMI's motto is "Abundance by Design," and Amory often says, "RMI doesn't do incrementalism, it does transformationalism."

Here's one example of a recent RMI project: In 2007, RMI landed the Empire State Building as a client and consulted, with several other companies, on a top-to-bottom energy efficiency retrofit. RMI recommended improvements designed to achieve energy savings of nearly 40 percent in the building, including upgrading chillers, ventilation, air handlers, lighting, and every window in the iconic skyscraper. The building owners plan to implement these recommendations by 2013.

The Empire State Building project was an important one for RMI. Cost-effective energy efficiency retrofits on a building built in 1934 show the potential for improving existing buildings throughout the United States.

The University of Richmond should take note. The University has launched a sustainability initiative, and it has an admirable record of green construction for new buildings on campus. But it's time to turn our attention to upgrading the older, leaky buildings on campus—for both environmental reasons and cost savings.

Lovins' home, built in 1983, is another example of how RMI has put ideas into practice. It features a bank of photovoltaic panels on the roof, high-efficiency LED lighting, solar water heating, 16-inch thick stone walls to assist with building cooling, and a greenhouse for growing bananas and guavas year-round (the plants absorb heat during the day and release it to the house



at night). At 4,000 square feet, Lovins' house uses one-tenth the energy of a typical U.S. home of that size.

The house has no furnace. The extra money spent on its super-efficient design allowed Lovins to save money by eliminating the furnace and associated ductwork altogether. He calls this "tunneling through the cost barrier," by which he means designing smarter systems from the beginning rather than settling for the diminishing returns of typical building improvements, such as adding extra insulation. A lot of people thought Lovins was crazy to build a house at 7,000 feet in the Rockies with no furnace, but his 25 years of living in the house have proven the critics wrong.

The lesson here is that efficiency pays, and working at RMI has made me think about how I use energy in my own 1969 split-level in Richmond (time to get rid of those last few incandescent bulbs).



Lovins (left) and Sachs

While I'm based here at RMI for the semester, I'm working on a project that matches my own research interests and RMI's work. I'm analyzing recent legislation in the European Union that sets minimum energy efficiency targets for a wide variety of appliances and consumer electronics, from cell phones and video game consoles to computers and air conditioners.

According to the International Energy Agency, the global growth in energy consumption for consumer electronics, between now and 2030, will equal the total current electricity consumption of the United States and Japan combined. It is clear to me that the

United States needs to address electricity consumption from these products, and I am researching what the European experience can teach us about the right mix of tools to do so. RMI is interested in learning more about the latest practices in energy-efficient product design in the electronics sector.

Research at RMI has been inspiring. As an environmental law professor, I have been trained to view pollution as primarily a legal problem—one that the U.S. has traditionally addressed through a complex system of permits, enforcement, and technological controls.

RMI views pollution from a different perspective. Pollution is, by definition, a waste—a waste of inputs, a waste of resources, and a waste of potential profit. RMI has been remarkably effective at making the business case for reducing both pollution and energy use, and it has been fascinating for me

to work side-by-side with the economists, scientists, and MBA's who staff the institute.

Unless Americans widely embrace sustainable design and energy efficiency, the United States will not come anywhere close to achieving improvements in energy security or addressing climate change. RMI is helping to point the way forward. ■

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