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Who Needs More Coal?

Amory B. Lovins

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Amory B. Lovins is chief executive officer of Rocky Mountain Institute and is a consultant experimental physicist educated at Harvard and Oxford. This piece appeared in ORION magazine and is reprinted with permission .

Coal-fired power plants generate half of U.S. electricity. Yet mountaintop removal, smokestack pollution, and global warming aren't inevitable; they're artifacts of using electricity in ways that waste money. Most of the electricity used today, whether in the U.S. or in even more coal-intensive countries like China, can be saved by using it far more efficiently.

Fifteen years ago, the utility industry's Electric Power Research Institute (EPRI) and a team of researchers at Rocky Mountain Institute (RMI), the resource efficiency center I cofounded, came to essentially the same conclusion. In a joint Scientific American article, EPRI found that it would be cheaper to save 39 to 59 percent of all the electricity used in the United States than pay to run coal-fired (or nuclear) power plants and deliver that same power to customers; RMI concluded the number was at least 75 percent. Either way (the differences are largely methodological), running coal-fired power plants, let alone building more, is uneconomic when compared to other widely available, but officially disfavored, ways to do the same tasks. Recent drops of 2 percent per year in the electricity that's used to make a dollar of U.S. gross domestic product barely scratch the surface of what's possible—and electricity-saving techniques are getting better and cheaper faster than we're using resources up.

These dramatic savings come not from privation or discomfort, but from smarter technologies that wring more work from each kilowatt-hour. They deliver the same comfort, light, hot showers, cold beer, and other services with the same or better quality and reliability but use less energy and less money. For example, my refrigerator keeps a power plant from burning enough coal to fill the refrigerator every year, because it uses 92 percent less electricity than most—and newer technologies could raise that to at least 97 percent. The refrigerator costs more up front because it's made by a small firm, but in mass production it would probably cost less than a normal unit.

Saving electricity is extremely lucrative, but the United States has long been slow to do it. Why? For starters, electricity is the most heavily subsidized form of energy, is often used in devices chosen by a different person than the bill-payer (for example, a landlord and a tenant, respectively), and is usually priced at the average of cheap old supplies and costly new ones, hiding the true cost of using more. But some states have striven to overcome these obstacles. California's policies have held per-capita use of electricity flat for about thirty years even as per-capita income rose by two-thirds. New England has lately followed suit; Vermont is reducing household electricity use. Yet most states use ever more electricity: all but Oregon and California reward distribution utilities for selling you more

and penalize them for cutting your bill. If that sounds as dumb as a possum... well, it is. State utility regulators nationwide unanimously agreed in 1989 to fix this perverse incentive, and about nine states did, but then restructuring derailed reform. Some other states are reconsidering, but it's not on the federal agenda.

The fix is easy. First, state utility commissions must decouple utilities' profits from how much energy they sell, escrowing profits from years when energy sales are unexpectedly large, returning them in years when sales fall short of projections. Second, regulators must let utilities keep part of any savings as extra profit.
Thus in 1992, rather than make costly investments in new energy production, Pacific Gas and Electric Company invested more than $170 million to help customers save energy. Eighty-nine percent of the nearly $400 million saved went to customers in the form of lower bills; the remaining 11 percent was returned by regulators to utility shareholders as higher dividends, rewarding both parties.

How much electricity can be saved through efficient use? Most existing houses can be modified to cut their electricity use by half, repaying the retrofitting cost in a few years. My four-thousand-square-foot demonstration house at 7,100 feet in the Rockies uses $5 of electricity per month, a tenth of normal consumption. It stays comfortable without a heating or cooling system, saving 99 percent of space- and water-heating energy and combining natural light with efficient off-the-shelf lights and appliances. All this efficiency paid for itself in ten months in 1983, but if built today, the house would use only $2 of electricity per month and cost less to build than a typical home. Well-designed houses in a dry climate at up to 115 degrees Farenheit have saved 100 percent of air-conditioning energy at lower construction cost, and nearly 90 percent in tropical Bangkok at no extra cost.

Big buildings and factories also offer huge, cheap "negawatts" (saved electricity), as RMI consultants have lately shown in some $20 billion worth of major facilities. Integrative design often makes big energy savings cost less than small ones. Two examples: a redesigned industrial pumping loop in an Interface carpet factory in Shanghai used 92 percent less electricity than the original design, yet was cheaper to build (it substituted fat, short, straight pipes for thin, long, crooked pipes); and a new Texas Instruments microchip factory saved 20 percent of its electricity compared to the best previous design, yet cost 30 percent less to build (the next one will save far more and cost even less).

Like retrofits and smart design, decentralized low- or no-carbon electric generators such as gas-fired cogeneration of heat and power, microhydro, and windfarms can be built quickly. Worldwide, they're already bigger than nuclear power and are growing far faster. In 2004, they added 2.9 times as much annual electricity output as nuclear power did. Their installed capacity grew 5.9 times faster than nuclear power's. Within a few decades, if allowed to compete fairly, these supposedly small, slow, and unrealistic "micropower" competitors could be cost-effectively making more electricity than coal plus nuclear plants—for less money than it costs to build new plants, and often less even than to run existing ones.

If coal is responsibly mined and its carbon kept out of the air, it could have a sound long-term future. But even in the short term, mountaintop removal's scalped landscapes and destroyed communities are neither necessary nor economic. America won't need to turn Appalachia upside down if federal energy policy simply allows all ways to save and produce energy to compete fairly at honest prices, no matter which kind they are, what technology they use, how big they are, or who owns them. On such a level playing field, efficiency and some low- or no-carbon electrical generators cost us less than coal's market price (even if its environmental and social costs were zero). Avoiding coal's burdens is not costly; it's profitable. Smart coal companies are starting to see such alternatives not as a threat but as a key business opportunity. One of these years they may even come out and say so.

(Supporting papers may be found at RMI's website including: **"More Profit With Less Carbon"** and **"Nuclear Power: Economics and Climate Protection Potential"**)

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