

Electricity

Smart move

The push for a more intelligent grid

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THE Illinois Institute of Technology (IIT) has always exemplified efficient design. Ludwig Mies van der Rohe, a master modernist, filled its Chicago campus with simple rectangular buildings. Critics quipped that IIT's only church spire was the chimney of its power plant. It is fitting, then, that IIT should herald a new era of efficiency. With the help of the Galvin Electricity Initiative, it is adopting the electric grid of the future. The hope is that the rest of the country will soon have one, too.

Electrocrats have been plugging the "smart grid" for years. Now others have joined them. Barack Obama's stimulus package contains about \$4.5 billion in grants for smart-grid investments and regional demonstrations. GE is promoting the smart grid with ads that show a scarecrow singing "If I only had a brain" from "The Wizard of Oz" while bouncing along an old power line. In January Mr Obama declared that a smart grid could "save us money, protect our power sources from blackout or attack, and deliver clean, alternative forms of energy to every corner of our nation"—grand goals indeed.

America's power system has changed remarkably little over the past century, with centralised utilities delivering electricity to passive consumers. A smart grid would use digital technology to collect, communicate and react to data, making the system more efficient and reliable. For example, sensors would help utilities locate problems and fix them quickly—power cuts now cost businesses more than \$100 billion each year. A nimble grid would integrate electricity from both predictable sources, such as coal, and fickle ones, such as the sun and wind.

Meters, to monitor both use and prices, would give consumers more control over their electricity bill. Advocates predict that some consumption would move to cheaper, off-peak hours, easing congestion and reducing the need for new infrastructure. Consumers would save money and emissions would fall. Installing smart meters in 25% of American homes, GE estimates, would be equivalent to removing 1.7m cars from the roads. Plug-in hybrids, meanwhile, could charge at night, when demand is low, and even pump power back to the grid while parked during the day.

The pilot at IIT is one of many. Xcel Energy, a utility, is transforming Boulder, Colorado, into what it calls the world's first "smart grid" city. The smart grid, however, should not be confined to pilots. But the problem is figuring out how to scale up.

Advocates have many tasks, not least of which is convincing consumers that a smart grid will lower their costs, not raise them. Changing regulations, meanwhile, is even thornier. For utilities, reducing consumption means reducing revenues, hardly an appealing prospect. The stimulus encourages rewarding utilities for efficiency, but it is local commissions that must change the rules, and they may be wary of what is still seen as a risky investment. Illinois's regulatory commission approved the installation of up to 200,000 smart meters in 2009. Wider investments, however, await a two-year cost-benefit study.

At the national level, standards are needed so that innovations can interact seamlessly. The National Institute of Standards and Technology, part of the Commerce Department, is expected to present only a rough framework by the summer. The momentum for a smart grid continues to build. But God, as Mies liked to say, is in the details.

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