

BIRTH THROES OF A NEW ELECTRICITY SYSTEM

The US experience

The California electricity crisis that has followed deregulation is less the evidence of incompetence on the part of California officials than it is an example of the inevitable birth pains that come with the arrival of a new electricity system, writes DAVID MORRIS.

Now another revolution is taking place, driven by new technological advances, by an increasing desire for control and security by electricity customers, and by a broad wish for an electricity system that is more environmentally benign – the public appetite for even more democracy in electricity generation has been whetted.

The rush to deregulate in the United States in the mid to late 1990s was driven by independent power producers (by then, often subsidiaries of conventional utility companies) who wanted to sell retail rather than wholesale, and large industrial customers that wanted to buy directly. In almost all states, the policies adopted to enable deregulation were largely a result of negotiations between these two advocates and initially very reluctant utilities.

Although the rallying cry for deregulation was 'consumer choice', there was no groundswell of popular demand for choosing electricity suppliers. Indeed, surveys of customers in several states in the mid 1990s found that choice of supplier was far, far down on the list of preferred features of a new electricity system.

By 2000, 24 states had embraced deregulation at the retail level. Ironically, the policies adopted at the state and federal levels in the name of consumer choice were moving both the power plant and the control of the electricity system further away from the electricity customer. The Federal Energy Regulatory (FERC) commission strongly urged the formation of ever-larger regional transmission authorities. State public utility commissions and FERC designed rules to accelerate the siting and construction of new central power plants and new high voltage transmission lines.

But at the same time the technological dynamic that had begun in the early 1980s, with the substitution of modestly sized power plants for the behemoths built in the late 1970s, accelerated with the introduction of power plants that were two orders of magnitude smaller than those built by independent power producers in the 1980s and 1990s. While policymakers were planning for a more centralized electricity future, technology – and

increasingly, popular demand – was enabling and demanding a more decentralized future for electricity.

The California crisis, in some respects, highlights the battle between these two electricity futures. In late April, the FERC finally agreed to impose modest wholesale price caps for electricity sold to California during the summer. But in return FERC insisted that by 1 June California agree to subordinate its authority over transmission to a multi-state regional transmission operator.

Yet from the ground up, a different revolution is taking place, driven in equal degrees by new technological advances, by an increasing desire for control and security by electricity customers, and by a broad desire for an electricity system that is more environmentally benign.

The advance in decentralized electricity generation is remarkable. In 1998, only a dozen or so microturbines were shipped. By 1999, the number had risen to 300. By 2000, 1200 more were shipped, with a total capacity of 53 MW. In 2001, more than 5000 may be delivered, with a collective capacity of 300 MW. Demand for solar cells has tripled since 2000. Information intensive businesses are installing 200 kW fuel cells to guarantee that their business remains uninterrupted.

In his State of the State Address in January 2001, California Governor Gray Davis announced that he would require state university and community colleges 'to move toward energy independence'. He signed a bill 'to increase self-sufficiency of consumers of electricity through the deployment of self-generation and cogeneration'.

Cities are devising innovative systems for establishing small-scale generation inside their borders. For example, the municipally owned Riverside Public Utilities has entered into a partnership with the local campus of the University of California. The university agrees to reduce consumption by

20% on demand from the utility. In return, the utility is investing US\$1 million in electricity conservation improvements, and is financing the installation of a half dozen small generators on university property.

In April the California Public Utilities Commission approved the expenditure of tens of millions of dollars to promote decentralized electric generation. And for the first time, it designated a local agency (the San Diego Regional Energy Office) rather than a utility, to design and fund the programme in its community. Interestingly, three years before, San Diego became the first county to include as part of its master plan an element dealing with decentralized power. Measure 14, Small Scale Distributed Power Generation is intended 'to ensure that institutional and legal barriers do not impede their development ... and to encourage their use when meeting small increments of the region's electric needs'.

Meanwhile, Texas has established uniform interconnection standards for small-scale power producers, and is putting into place a system for certifying decentralized power plants, preparing for the day when such units will be standardized, off-the-shelf items. California is well on the way to imitating Texas, although a bill that would have eliminated stand-by rates for on-site generation was squashed by the California legislature in mid-March. Arizona and Colorado, as a matter of regulatory policy, require utilities to compare the cost of expanding a distribution line with the cost of a PV/hybrid system (photovoltaic system with a gas generator back-up to serve new customer load).

Thirty-one states have net metering laws, which allow on-site generators to turn the meter backward. In half of them the on-site generator can receive payment from the utility for excess electricity sent into the grid. California is in the process of dramatically expanding its net metering provisions.

A combination of state and local incentives can cut the price of fuel cells and solar cells by half, making them competitive with current electricity prices. In Los Angeles, the city-owned utility has introduced a two-tiered incentive: US\$3 per peak watt for solar cells manufactured outside of city limits; \$5 per peak watt for those manufactured inside city limits.

Back in 1982, I wrote a book called *Be Your Own Power Company* (Rodale Press). It predicted the coming decentralizing dynamic in electric generation and the rise of on-site power generation. That prediction was delayed some twenty years because of the tidal wave of gigantic power plants that were planned in the 1970s and became operational in the 1980s. Until as late as 2000, utilities, states and the federal government were assuming that there was still a surplus in electricity generation capacity.

In early 2001, the nation awoke to the need for new power plants. The question now is, will they be big or small? That on-site power generation will increase significantly is unquestioned. But whether decentralized electricity generation becomes the way the electricity system of the future operates depends in a large part on what happens in the next three years. The federal government and many state governments have begun to revert to the policies of the 1970s, which focused on

accelerating the construction of big power plants to guarantee sufficient electricity to meet the rosier of economic projections. If all the power plants and transmission lines currently planned come on-line, it is likely that by 2005 the nation will again have a surplus, and on-site generation, although growing, will be on the margins of public policy.

On the other hand, the increasingly visibility of decentralized power, whether in the form of rooftop solar cells or basement fuel cells or cogeneration systems, whets the public appetite for even more democracy in electricity generation. Land-use ordinances, stand-by and back-up rates, distribution and transmission pricing, environmental regulations, all are being redesigned. Will they be redesigned to enable, or inhibit, a more democratic electricity system? This is the fundamental question that emerges from the California electricity crisis.

When electricity deregulation became a fact in the United States, electricity prices were expected to decline. Instead, they have increased. By the end of 2001 more than 20 million people could be paying 13-16 ¢/kWh for electricity. That makes decentralized electricity generation very attractive. And soaring natural gas prices make high efficiency cogeneration systems compelling. But as I argued in *Be Your Own Power Company*, 'The economic attractiveness of decentralization is becoming ever more apparent. Yet to emphasize only the economic value of decentralization would be a mistake. The political and psychological value of a widely distributed capacity to produce a commodity as essential as electricity is equally important.' Benjamin Franklin was considered the most famous American of his time: he carried out scientific investigations into electricity, and he believed that human genius, if properly channelled, could create technologies able to extract the maximum amount of useful work from our surroundings (sunlight, wind, the soil's warmth, falling water). And, he believed, the more successful we were, the more self-reliant we could become.

Franklin was also known as the author of *Poor Richard's Almanac*, famous for its pithy wisdoms. One of them in particular sums up his philosophy: 'The man who would trade independence for security usually deserves to end up with neither.' The citizens of California, and many other states, made that trade. The crisis in California has forced them to reconsider. And as they reconsider, they realize that such a trade is unnecessary. From the bottom up, policies that enable security without dependence are being fashioned.

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David Morris' most recent book *Seeing the Light: Regaining Control of our Electricity System* is available from ILSR, 313 5th St. SE, Minneapolis, MN 55414, USA (www.newrules.org)
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