ENERGY WATCH

Deregulation: Friend or Foe?

The fallout from California's electric power crisis has spurred renewed debate on whether deregulation is a villain or an ally to consumers. Did the deregulated market in California fuel wild trading by energy brokers? Or can free-market trading keep energy prices low? Can regulators be counted on to stamp out illegal or manipulative practice? Proponents of deregulation can point to the transmission grid that includes Pennsylvania, New Jersey, and Maryland and to a system that is apparently working well. These people fear that the recent meltdown of Enron will squelch political support for free markets and to power the thinking that regulation is the lesser of two "evils."

In 1996, California became the first state to deregulate its energy market in this country. Under the plan, the utility companies sold some of their power plants and repurchased electricity through a wholesale auction. On paper this free market system would foster intense competition and thus serve to drive down prices. It did not work—wholesale power prices shot up an order of magnitude. Recession coupled with surges in power demand and aging power plants led to the now-familiar spectacle of rampant blackouts in the state. Ultimately long-term contracts had to be drawn up by the state government with energy companies at prices well above the market level.

The power crisis and the Enron disaster bring to light the broader issue of viability of the New Economy. The New Economy depends on innovation and markets rather than status quo and government regulation. Investors have to be willing risk-takers in this partnership. On the other hand, consumers have to trust that the deregulated companies are not taking advantage of them. Manipulation of markets and opaqueness in the information given by the deregulated companies to investors, employees, and the public at large, go not only against the moral grain that underpins the New Economy, but also to undermine its effectiveness. Only time will tell whether irreparable damage has been wrought to the drive for deregulated markets, be it in energy or in other sectors.

Ethanol: Miracle Fuel?

Ethanol currently makes up just 1.2% of the nation's automotive fuel supply but this market share may change thanks to changing political winds on both side of the partisan line. The fuels agreement included in the Senate's energy bill phases out the use of methyl tert-butyl ether (MTBE) as a gasoline additive because of environmental concerns (*Editor's note: see also* Interface, *Vol. 8, No. 4, p. 22*). The notion that gradual phasing in of MTBE replacements such as ethanol and other bio-derived fuels would prevent price hikes, has gained currency with the added bonus of possible improvements in air quality. The federal mandate calls for the use of 5 billion gallons of ethanol in the nation's gasoline by the year 2012. This mandate would send billions of badly-needed dollars into the nation's farm belt creating opportunities for the corn growers and ethanol producers alike.

Opponents of this mandate argue that the environmental gains are questionable. Studies have been quoted that indicate that adding ethanol to gasoline in summer could increase smog. They also argue that energy savings are negligible, because even under the mandate, just 3 % of oil imports would be replaced by ethanol. The projected gas prices also have been conflicting. While a study by the Energy Information Administration shows a cost increase of less than half a penny per gallon, other studies put the increase upward of 9 cents. Other hidden costs, such as more frequent fill-ups because of lowered fuel economy, and price hikes in ethanol wrought by drought-related supply declines, are also problematic issues. Indeed, the size of the role of ethanol in this nation's future energy use may well be ultimately played out in the marketplace and not in Washington, DC.

Is It Really Fusion This Time?

Nuclear fusion, the energy producing process that takes place in the sun and stars, could well emerge as a viable source of safe, renewable power generation in 25 years. Finding a way to extract more energy than is used to fuel the fusion process has been an elusive goal for scientists for half a century. However, recent advances have given cause for optimism that this technology may ultimately displace its environment-unfriendly fission counterpart. New understanding of plasmas and materials advances for containing and stabilizing the active isotopes have been keys to this outlook. Two approaches to forcing deuterium to fuse have revolved around magnetic confinement and laser bombardment. Two projects, Joint European Torus (or JET) and the JT-60 project in Japan, form the first step in the push for nuclear fusion. The second step involves the International Thermonuclear Experimental Reactor (ITER for short) — a collaboration between Canada, Japan, Europe, and Russia, to build the first demonstration device at the level of an electrical power station. At the time of this writing, the U.S was thinking about rejoining the program (it had pulled out in 1999 because of concerns about the sky-rocketing costs) and groundbreaking is expected around 2003 or 2004.

Superconductors: Moving More Juice Through the Grid

Copper and aluminum cables lose roughly 7% of the power they transmit because of ohmic (resistive) losses. Other losses within the transmission system (transformers, motors, and the like) add up leading to a net loss of ca. 8% of the generated power as heat. This wastage may not seem much, but given America's insatiable appetite for power, it is worth billions of dollars — and even more in Europe and Japan. Trimming these losses with the use of high-temperature superconducting materials could thus produce enormous cost benefits. Unlike copper wires, these ceramic wires are flat and they are cooled by liquid nitrogen flowing through their cores. A superconducting cable can carry as much as 3-5 times more power than their metal counterparts. These cables are not cheap (they can cost up to 50 times a copper cable) but cities are one place where this high cost can be justified. These first generation superconductor materials are based on Bi-Sr-Ca-Cu oxides ("bisco" for short) and further cooling with (expensive) liquid helium is necessary because of the loss of superconductive properties in magnetic fields. Second-generation Y-Ba-Cu based ceramics are also being considered because of their relative immunity to magnetic fields, although drawing these into wire form is proving to be more difficult than bisco. The search for new superconducting materials (perhaps in nanotubular form?) must obviously continue and cost-effective preparation and processing are keys to significant market penetration in the future. ■

The above news items were excerpted from wire releases. Further information may be obtained by contacting the Editor.