ELECTRIC COMPETITION

Electricity is a basic supply good for industry and consumers. Most economists and public officials long assumed that electric utilities represented quintessential “natural monopolies,” inasmuch as duplication of transmission lines made no economic sense and the minimum efficient scale of generation was equal to or larger than most local markets. However, this notion has been shattered in recent decades by decreasing economies of scale in power generation, enhanced ability to transmit electricity over long distances, and the explosive growth of many metropolitan markets. The related view that generation, transmission, and retail distribution necessarily are “naturally integrated” likewise has crumbled in the face of such changes.

The principal objective of deregulating the electric utility industry is to change an industry characterized by highly regulated vertically integrated monopoly franchises into a diversified competitive market. As in all deregulations, the aim is to promote greater efficiency and lower consumer prices than are attainable in constrained regulatory environments that inhibit market processes.

Under the regulatory regime that has characterized the electric industry virtually since its inception, utilities have enjoyed government-sanctioned regional monopolies and consumers have been forced to accept whatever services (or lack thereof) and prices that public utility commissioners have dictated. The relatively modest aim of the current deregulation is to restructure the industry so that retail customers have some choice among electric power suppliers — and the related current debate is centered largely on the questions of whether and how to separate the generation of electricity from other electric services.

The electric industry is one of the most capital intensive sectors of the economy and generates more than $220 billion in annual revenues. Investor Owned Utilities (IOUs) have $585 billion in assets, more than the big three automakers combined. Although rural coops and municipals have only $60 billion in assets, they command an important role as well. These utilities control 73 percent of the total area served and 50 percent of all wires; and with 25 percent of all customers, they generate 20 percent of all industry revenues.

Electric utility deregulation thus will be one of the largest industrial restructurings ever, and dozens of coalitions are forming to fight for or against deregulation. Given their interest in lowering production costs, manufacturers are a key group in support of deregulation. On the other hand, the Edison Electric Institute, a group of 100 IOUs that produce 75 percent of the nation’s electricity, is leading the fight against radical restructuring. Aligned with the IOUs, are the rural coops, the municipalities, and the International Brotherhood of Electrical Workers (IBEW), which estimates it has already “lost 25,000 jobs” due to restructuring.

Retail competition (also called retail wheeling or direct access) and stranded costs (or stranded investments) have become the central issues to be resolved. Wheeling refers simply to the sale to customers of power by one provider through the transmission facilities of another. Stranded costs refer to financial obligations that were incurred by utilities in a regulated market that will be unrecoverable once deregulation takes effect.

Increasing competitiveness, and most notably international competition, has forced many industries to seek ways to lower costs — and one need not be a rocket scientist to understand that in today’s technological environment regulation is perceived as a major obstacle to reducing electricity-related costs. Both the cost of producing electricity and the scale required to do so have dropped sharply as a result of recent decreases in natural gas prices and advances in technology, especially improvements in gas turbine generators. Vast discrepancies remain, however, between current marginal costs of power production and retail prices: from costs as little as 2 cents per kilowatt hour (kWh) for the lowest-cost technology to prices as great as 8-12 cents per kWh charged in many areas.

The problem is that electric utility regulation has created cartel arrangements that perpetuate inefficiencies by proscribing price discrimination even when it clearly has been justified by costs. An even more destructive aspect of such regulation, which has become more apparent with the current restructuring, resides in the regulated monopolies’ perverse incentives to increase costs and capital stock under cost-plus rate setting. If their authorized return is “too high” — as it was in the 1950s and 1960s — such utilities have an incentive to overinvest in capital intensive plants. On the other hand, if the return is set “too low” they will underinvest and choose the least capital-intensive generating assets, even if this means higher operating costs.

Why Competition Should Lower Electricity Prices

For a number of reasons, discussed below, increased competition in the industry can be expected to lower retail electricity prices:

**Lowering Operating Costs.** When generators convert from a cost-of-service regulated environment where allowed profits are based on capital cost to a market based on price competition, they will have every incentive to lower operating costs and
capital base. In addition, the direct costs of regulation and associated delays for both the regulators and the regulated should decrease (a significant cost of regulation for both sides is litigation).

While there is a question about whether horizontal concentration will decrease in the industry, it should be possible to guarantee free entry of new generators and suppliers that would force former monopolies to respond to market discipline. In such an environment, there will be strong incentives to cut administrative and general costs, as has happened in unregulated industry in general. Since fuel costs are a major part of variable costs, generators will have a clear incentive to maintain a portfolio of plants with the optimal fuel mix. Presumably, management unburdened by regulatory restraints and counter-market incentives will be able to run existing plants more economically by cutting labor costs, renegotiating supplier contracts, and at the same time increasing output.

Existing transmission system operation methods already exploit some opportunities to minimize industry costs. However, since this dispatch process organizes output based on only a subset of variable costs (fuel and some other variable costs), it could become more efficient as low-cost plants compete for dispatch orders via the spot market and bilateral contracts. Dispatch in a competitive environment will be based upon spot price bids and contracts. Suppliers interested in maximizing operating time in order to recover capital costs will have substantial incentives to bid at prices below marginal costs during off-peak load periods.

Retirement of High Cost Plants. In a competitive market, the closing of high cost plants will lower average and marginal production costs into the future. Even allowing for generous stranded cost recovery, there will still be some plants that have high enough operating costs or continuing requirements for future capital investment to make them unattractive retirement candidates. Closing plants will be particularly tempting if demand can be reduced at peak load periods, which would eliminate the need for much high cost reserve capacity that operates infrequently and is outdated technologically.

Generating plants usually are now divided into three categories: baseload plants that run close to full time, intermediaries that run 30-70 percent of the time, and peakers that are used only at peak hours, sometimes less than 100 hours per year. Baseload plants tend to have relatively low operating costs and relatively high capital costs, peakers low capital costs and high operating costs and intermediaries something in between. Currently, the highest-cost peak load periods occur only in a few hours per year, but expensive reserve capacity must be maintained in full readiness to accommodate these periods. Peak demand can be expected to decrease substantially in response to price sensitivity. Thus a large part of surplus capacity would not need to be maintained, reducing overall costs. Because costs of generators vary widely, this factor can be expected to have significant impact on average costs. Moreover, increased use of low-cost power imported from distant suppliers could accelerate this process.

Expansion of Low Cost Capacity. The expanding use of low-cost technology (e.g., combined cycle gas turbines) could result in significant lowering of average production costs and prices. Because of volatility in fuel costs, the most flexible design of a baseload plant provides interruptible gas with oil backup. New plants now take 5-7 years to build on account of permitting and site plan requirements. This process could be shortened, however, and the main limiting factors on new building likely will be transmission and gas supply restraints. Imported power (e.g., hydroelectric power from Canada, or coal-based power from the Midwest to New England) could also significantly lower prices.

It should be noted, however, that the relationship between prices and capacity, particularly in industries with fairly inelastic demand, tends toward the complicated. At an extreme, increased capacity can so reduce prices that many high-cost plants are closed, which decreases total capacity and raises prices. This, in turn, encourages more new entry, lowering prices again, and so on. The usual experience in such situations has been that technological progress and new investment go forward and production costs and prices fall steadily in the long-run. Even large losses due to writeoffs of old capital are quickly offset by the reduced costs. Despite this general experience, however, the dynamic interaction of all factors affecting supply, demand, and prices in so complex an environment may be difficult to forecast reliably.

Lowering Peak Demand. Because of the typical shape of the electricity load duration curve, reserve capacity must be great to meet peak demand. Average costs are much higher than they would be with a much flatter curve. If the highest-cost 5 percent of total hours have costs that are on average ten times the level of the other 95 percent of hours average costs, average total costs increase by 45 percent (20x + 5*10x = 145x. 145/100 = 1.45). Real-time pricing and new technology, such as microchips that would turn off appliances and machinery during peak load hours, could change residential and commercial demand patterns considerably and so lower peak demand and reserve requirements. New real-time meters might not be necessary. Microchips sensitive to signals sent through electric or phone wires, or even via radio signals, could be used and customers equipped with them could be given special rates, as is done in Sweden. Advances in computer technology are making these things possible at increasingly lower costs, and the new technology is likely to be available as soon as the sale of metering technology is deregulated. The energy conglomerate Enron is now gearing up for wireless metering and building a billing center with capacity for 30 million customers. Software and other controls to manage every electric appliance for optimal energy use are in development at many firms.

A very small number of hours are responsible for most of the peak load experience. This means that consumers would need to
change consumption at only a small number of hours in order to lower peak demand substantially. If they did, ongoing capital costs in the industry could be lowered. Conservation or demand side management (DSM) programs in recent years have impacted average loads rather than peak and so have not exhausted this area of energy use savings. Comprehensive national studies performed by Resource Data International suggest that this is a promising area for both operating cost and capital savings. DSM programs will not always be in utilities’ interest in a competitive market and some environmentalists argue that monopolies ought to be preserved in order to protect DSM and resource planning programs. In our view, however, price sensitivity is a preferable conservation method.

**Market Mechanisms Can Minimize Stranded Costs.** The problem of stranded costs (or stranded investments) is the most disputed issue in deregulation. Moody’s estimates industry-wide stranded costs at $135 billion. This total represents 24 percent of industry total assets of $570 billion, and 80 percent of equity. Consumers already are paying for these costs under rules that guarantee regulated monopolies “fair return” on investment. And they almost surely will be used as a bargaining chip by both sides in the political bickering yet to come. For purposes of this discussion, it may be useful simply to consider how allowing market processes to function unimpeached might largely obviate the need for “corporate welfare” related to stranded costs.

Although a conventional financial analysis based on utility cost and revenue model projections might yield a range of estimates, a variety of market-based alternatives such as auctions or corporate spinoffs and restructurings would seem to provide a more reliable means of ascertaining the extent, if any, of such costs. Market valuations of existing generating plant assets at auction could yield relatively higher prices than most of the current estimates would allow. This would imply stranded cost allowances much lower than many in the industry now forecast. There are reasons to believe that the site values alone may be high enough that these auctions would produce prices close to or even above net book values of most assets. Site values include land, location, access to transmission lines, railroad lines, water, operating permits, legal rights, engineering and planning studies. Relatively high bids for many facilities can be expected because of the strategic importance of generating locations, and because of the motivation of both existing and new suppliers to maintain or expand capacity and market share in a competitive environment. If the existing utility’s name and goodwill are sold or passed on along with the physical plant and site values, market values could be even higher. That many firms now protesting that stranded costs have rendered their facilities worthless are reluctant actually to part with them would seem to suggest that stranded costs could be far less than claimed.

Auctions not only would provide quantification of the value of existing capital but also would promote more efficient allocation of existing capital resources. New owners would have no perverse incentives to maintain inefficient plants, nor could they afford to underutilize valuable sites or other assets. Improved capital allocation would increase productivity and lower consumer prices.

A large proportion of estimated stranded costs is tied up in nuclear generating plants. The original $70 billion in capital costs of nuclear plants (which nationwide generate about 25 percent and in some states account for as much as 80 percent of all electricity consumed) was much higher than initial estimates. But the retirement costs may be so high as to make many of them unsaleable. High fixed costs make most nuclear plants uncompetitive. In 1995 costs per kilowatt hour averaged 6.98 cents per kWh for nuclear power (2.13 variable and 4.85 fixed), compared to only 3.63 cents for steam power (2.25 variable and 1.38 fixed), and 3.09 cents for hydroelectric power (0.49 variable and 2.60 fixed).

**Innovation.** Innovation is the primary goal of restructuring. To expect this is consistent with the adage that necessity is the mother of invention. Competitive markets make for better capital allocation decisions because good decisions are rewarded and bad decisions are punished in the free market. All types of cost-saving innovations are rewarded. The benefits of free markets flow from and depend upon informed and unrestricted customer choice on the demand side and freedom of entry and exit on the supply side. The history of industrial enterprise suggests that there will be ongoing opportunities for improving productive efficiency when investment is free to flow to the most potentially profitable firms. Removing the cost-based incentives of regulation should promote healthy innovation.

**What Next?**

Power generation may likely evolve into a commodity business driven by cost efficiency and reliability considerations. In such an environment, a small number of independent wholesale power generation and marketing companies would sell power into the transmission grid on a very cost competitive basis. A small number of regional transmission companies would continue to operate as regulated monopolies, but competitive bids might determine which firms would manage transmission facilities. Almost surely, there will be spinoffs of various components of the vertically integrated companies, including a larger number of local distribution companies, regulated by rate caps or on a rate-of-return basis as in gas pipelines. Intermediaries or aggregators will solicit consumer groups and package demand, and some diversified firms will provide customers with full energy service (gas companies already have expertise in risk management and marketing). The likely result will be fewer firms, less vertical integration, and much lower cost structures.

Independent system operators will probably manage transmission grids and reserves. System operation is a basic and important function: energy must be kept constantly in balance, as fluctuations can damage machinery or cause the system to crash. Emergency needs require “spinning reserves,” that can be used in the event of the loss of even the largest plant. It is not yet clear how a deregulated and cost-conscious industry will handle these system needs.

**Will the Regulators Give Up This Easily?**

Wherever it has proceeded, deregulation has produced generally favorable results for consumers. In New Hampshire, a pilot program that allowed 30 power providers to compete for retail customers resulted in substantial electricity price reductions. In other industries, deregulation has produced average long-run consumer savings estimated at 25 percent. Electricity has been deregulated in Great Britain, New Zealand, Australia, Chile, Brazil, and Argentina with generally favorable results. In Argentina, for example, wholesale prices stabilized at about 40 percent below pre-deregulation levels. When oil and natural gas prices were deregulated, commodity markets provided a contract vehicle that became widely accepted.

Still, deregulation continues to have its detractors. It is said, for example, that a number of presumed social benefits associ-
ated with the current regulatory structure could be lost in mov-
ing to a more competitive structure. These include energy effi-
ciency mandates, low-income rate programs, and more rigid
environmental standards. It is further argued that a commit-
tment to universal electric service entails cross subsidies that are pos-
sonally only with government-sanctioned monopolies: a deregu-
lated industry either would not enjoy these subsidies or would
need to find new ways to finance them. Moreover, the fallout
from closing plants could include layoffs, tax losses for commu-
nities, and possibly increased air pollution from use of fossil
fuels. Lower prices could mean that much higher long-run growth
in demand — which is thought to exacerbate environmental
problems. And so on ad infinitum.

What this litany of disaster — and others like it — fails to
recognize, however, is that virtually all economic decisions have
a downside (economics is the “dismal science” after all). At any
time and in any economy, greater efficiency is often achieved at
the temporary expense of the few — but usually to the long-
term benefit of the many. It has yet to be demonstrated that
economic growth per se, which seems to propel at least some of
the opposition to deregulation, is detrimental to either the polity
or the environment. More machines are in use and more energy
consumed in the United States than ever before. Even so, all but
the most uninformed zealots concede that by almost any measure
both the general welfare of the population and the quality of the
environment have improved markedly over the past half century.

Nevertheless, in response to the above and other concerns,
legislators already are considering a variety of new methods for
regulating the restructured electric utility industry. It is virtually
certain that they will set mandatory standards for minimum ser-
vice and fair trade, and impose a variety of nondiscriminatory
requirements. But the new regulatory agenda is more ambitious,
and includes plans for “flexible regulation,” “targeted incentive
plans,” “external performance indexing,” “price and revenue
caps,” “performance-based regulation,” etc. We can only hope
they will heed the late Frank Knight’s “main injunctions of
Economics . . . not to go too fast, not to oversimplify, not to
grap at easy solutions to hard problems.” We would also hope
that they would note the findings of Kees Koedijk and Jeroen
Kremers, who in a recent issue of Economic Policy


demonstrated a distinct inverse correlation between the number of regu-
lations governing an economy and its rate of growth. Countries
with the least regulation clearly enjoyed the most rapid growth.
Taken in this context, the regulation/competition issue is simply
a sideshow in the larger debate over the relative merits of planned
economies vs. market economies. Recent history has provided
ample evidence for the relative advantages of the latter.

Recommended related reading:

Backhouse, Roger E., Economists and the Economy: The
Evolution of Economic Ideas, Transaction, 1994
Baumol, William J., On the Perils of Privatization, C.V.
Starr Center for Applied Economics, 1993
Blaug, Mark, Economic Theory in Retrospect, Cambridge
University Press, 1997
Bull, Mike, Restructuring the Electric Industry, Minnesota
House of Representatives, 1997