

Sobering Realities of Liberalizing Electricity Markets

By Fereidoon P. Sioshansi*

Introduction

England, Wales and Norway are credited with starting a new chapter in electric power sector governance. About the same time, both countries started to liberalize and/or restructure their electricity supply industries (ESI) along different paths. The former two established a centralized, mandatory pool while privatizing a previously government-owned and highly centralized bureaucracy¹. The latter broadened and formalized what used to be a thriving voluntary bilateral market, while leaving much of the industry in the hands of government-owned or municipal entities².

The initial success of these two countries has resulted in restructuring, liberalizing, privatizing, or corporatizing in many parts of the world (Figure 1). For a definition of terms,

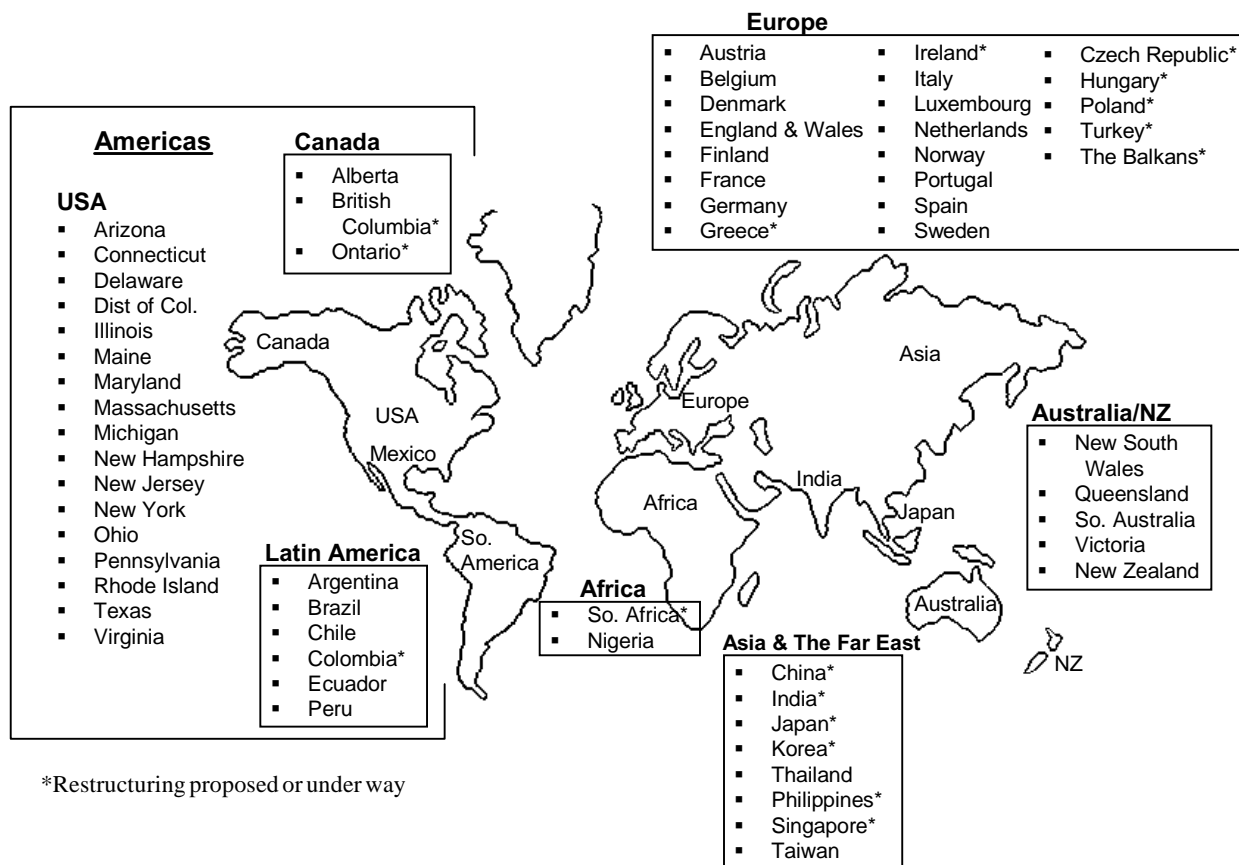
reorganize the roles of market players and/or redefine the rules of the game, but not necessarily deregulate the market. California, for example, restructured its market, deregulated its wholesale market by lifting nearly all restrictions, but kept its retail market fully regulated. Many problems ensued.

Liberalization: Synonymous with restructuring. It refers to attempts to introduce competition in some or all segments of the market, and remove barriers to trade. The European Union, for example, refers to their efforts under this umbrella term.

Privatization: Generally refers to selling government-owned assets to the private sector, as was done in Victoria, Australia, and in England and Wales. It must be noted that one can liberalize the market without necessarily privatizing the industry, as has successfully been done in Norway. The experience in New South Wales, in Australia has been a mixed success.

Corporatization: Generally refers to attempts to make

Figure 1
Restructured, Liberalized, Privatized, and Corporatized Markets Around the World



see the following.

Restructuring, Liberalizing, Privatizing or Corporatizing: What's the difference?

Restructuring: A broad term, referring to attempts to

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state-owned enterprises (SOEs) look, act, and behave *as if* they were for-profit, private entities. In this case, the SOE is made into a corporation with the government treasury as the single shareholder. For example, former SOEs in New South Wales, Australia, have been corporatized. They vigorously compete with one another, while all belong to the same, single shareholder, namely the Government of

¹ See footnotes at end of text.

NSW. The Islamic Republic of Iran has been considering such a move for generators.

Deregulation: Essentially a misnomer. No electricity market has been (or, in fact, can be) fully deregulated. Experience suggests that even well functioning competitive markets need a regulator, or as a minimum, a market monitoring and anti-cartel authority. Germany is the only major country attempting to do without a regulator. Even in this case, there is an anti-cartel office, monitoring the behavior of the market participants.

Despite a few setbacks and early disappointments, these efforts have generally been successful and are proceeding in North America and elsewhere³. A synopsis of recent developments in the U.S., including the California debacle follows.

Restructuring of U.S. Electric Power Sector Continues Despite Setbacks

What started as a restructuring debate in California in 1994, quickly spread across the U.S. At one point, 24 states had passed legislation to open their electricity markets to competition. But the recent problems in California have cooled the early enthusiasm to liberalize the markets in many states. Consequently, a number of states have postponed their plans to restructure. Currently, 16 states and the District of Columbia may be counted in this camp. The result is an incoherent hodge-podge of competition, not here and not quite there, and in the case of California, re-regulation. According to the Energy Information Administration, the states now fall into the following categories:

Restructuring Active: Arizona, Connecticut, Delaware, District of Columbia, Illinois, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Texas, and, Virginia.

Restructuring Delayed: Arkansas, Montana, Nevada, New Mexico, Oklahoma, Oregon, and West Virginia.

Restructuring Suspended: California.

Restructuring Not Active: Alabama, Alaska, Colorado, Florida, Georgia, Idaho, Hawaii, Indiana, Iowa, Kansas, Kentucky, Louisiana, Minnesota, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, South Carolina, South Dakota, Tennessee, Utah, Vermont, Washington, Wisconsin, and Wyoming.

Source: Energy Information Administration.

Several states —Alabama, Colorado, Idaho, Kentucky, and Louisiana— have studied the issue and have decided that there will be no tangible benefits, at least in the short-run, from restructuring. This conclusion is based on what they can see from developments in other states. Following the well-publicized problems in the California market, a handful of other states have postponed the opening of their markets.

There has not been strong support from consumers. In a number of states, notably Arizona, Michigan, Montana, New Hampshire, New Jersey, Nevada, Pennsylvania, and Vermont, there has been mild to significant opposition to the implementation of the legislation. Policymakers, consumers, regulated utilities, competitive suppliers, and environmental groups have all discovered that there is a dark side to restructured markets:

- Policymakers in a handful of states have decided to delay

or postpone the implementation of restructuring for a variety of reasons.

- Consumers and their advocates have discovered that the savings—at least in the short-run—can be non-existent, small, or elusive at best. This is particularly true of states with significant stranded costs, which have to be paid off before meaningful competition can truly start. The scale of stranded costs, once estimated to exceed \$300 billion for the U.S., however, has turned out to be significantly smaller. Consumers have also found that prices can be highly volatile and unpredictable, something that many do not like.
- Load serving entities have found that they can be caught short if they have not secured their resource requirements with long-term, fixed-price contracts. A number of LSEs in the West, for example, were badly burned when prices shot up while their retail rates were capped. This has led to the bankruptcy of the nation's largest investor-owned utility, Pacific Gas & Electric Company, as well as financial problems for many others, including Sierra Pacific.
- Competing suppliers have found—surprise—that it costs a lot to acquire customers; it is not easy to hang on to them; it is difficult to sell them additional *value-added services*; and enormously expensive to launch new brands and products. Many have left the business altogether, while others have concentrated exclusively on large commercial and industrial customers, leaving the residential mass market virtually unattended. Green energy has turned out to be a niche market, but even here the going is tough.
- Environmental and advocacy groups have found that in the competitive environment nobody will look after the social goods (e.g., the environment, R&D, energy efficiency, renewable energy, low-income customer assistance, etc.). This means that new mechanisms for funding and implementing such services must be found.

But the glass is not just half empty. Competitive pressures have unleashed enormous forces to reduce costs, improve operational efficiencies, enhance customer services, and offer a host of new products and services. Moreover, a number of new players have entered the previously closed electric power sector. The most notable among these are power marketers and traders (see Table 1) who can increasingly take advantage of federal and state legislation to operate in competitive wholesale markets. While there were a handful of such companies as recently as 1992, at the end of 1999, there were 566. The collapse of Enron and subsequent consolidation has reduced the number, but trading and risk management are now considered as permanent features of the electric power business.

Despite frequent complaints about the *unfair* nature of competition in retail markets in many jurisdictions, customers are beginning to make choices. The turnover rates are not impressive, so far, particularly in the residential sector. In California's failed market, retail competition was suspended in September 2001. Texas, which opened its retail market in January 2002, is expected to have a thriving market – but the jury is still out on this.

Motivations to Liberalize Markets Vary

Although the motivations to restructure were, and continue to be, vastly different in various parts of the world, they

Table 1
Top North American Power Marketers
 Ranked by 2001 volume of trade as reported

| Company | Volume (MMwh) | Change | Company | Volume (Bcf/d) | Change |
|----------------------------|----------------------|---------------|---------------------------|-----------------------|---------------|
| American Electric Power | 576.0 | 48.2 | Mirant | 13.3 | 92.8% |
| Reliant Energy | 380.4 | 88.4 | BP Energy | 12.6 | 50.0 |
| Mirant | 343.4 | 87.7 | Duke Energy North | | |
| Duke Energy North | | | American Wholesale Energy | 12.4 | 4.2 |
| American Wholesale Energy | 335.3 | 21.8 | Reliant Energy | 12.2 | 37.1 |
| Dynegy Wholesale | | | Aguila Inc. | 12.0 | 14.3 |
| Energy Network | 317.0 | 130.0 | Dynegy Wholesale | | |
| Williams Energy | | | Energy Network | 11.3 | 16.5 |
| Marketing and Trading | 306.3 | 133.6 | American Electric Power | 10.6 | 178.9 |
| Aquila Inc. | 301.1 | 61.3 | Sempra Energy | 10.5 | 18.0 |
| El Paso | 221.1 | 86.3 | Coral Energy | 9.2 | -9.8 |
| Constellation Power Source | 173.0 | 8.1 | El Paso | 9.2 | 17.9 |
| Entergy-Koch Trading LP | 109.0 | -7.0 | Conoco Inc. | 7.1 | -5.3 |

Enron and PG&E's numbers were not available for 2001, and these companies are *not* ranked in the above table.
 Source: *Energy Markets*, March 2002

generally fall into two broad categories (see Table 2). In developed countries, the industry is mature, infrastructure is already in place, and growth rates are modest at best. In these countries, the prime motivation is to make the industry more efficient by introducing competition and customer choice. Local and regional price disparities are typically among the reasons for large industrial users to push for competition. Another objective is to transfer risks of investment to the private sector, which in developed countries is well developed and fully capable to assume such risks.

Table 2
Different Strokes for Different Folks

Main motivations for restructuring the ESI vary among developed and developing countries

In Developed Countries

- Customer choice
- Make industry more efficient
- Improve operational efficiencies
- Better cost management
- Investment risks borne by private sector
- Remove/reduce price disparities

In Developing Countries

- Attract infrastructure investment
- Reduce government bureaucracy
- Decentralize planning
- Reduce/remove price subsidies
- Support private sector growth
- Keep up with growing demand

In developing countries, the industry usually needs massive infusions of investment in infrastructure to meet growing demand. Governments are often unable to meet the insatiable demand for investments. The prime motivation in these cases is to attract private investment – domestic and foreign – into the sector, and to cut down on bureaucratic red tape and the inefficiencies of centralized, government-controlled planning. In many developing countries, electricity prices are kept artificially low, which further discourages

additional investment in the power sector. Privatization is one way to remove price subsidies. There are a multitude of other factors, varying from one country to another.

Regardless of the motivations, during the 90s, it was naively assumed that:

- ESI restructuring is a relatively straightforward process;
- many benefits (e.g., higher operating efficiencies) would *automatically* flow from the introduction of competition and would naturally lead to lower retail prices; and
- the newly liberalized markets would essentially self-regulate themselves, operating as a plane flies on auto-pilot once the coordinates of the destination are specified.

The experience of the markets to date, however, suggests otherwise⁴.

Restructured Markets not as Advertised

Recent well-publicized problems with dysfunctional markets⁵ such as the one in California have clearly demonstrated that:

- the power market is highly complex;
- many of the assumed benefits of restructuring (e.g., higher operating efficiencies) will *not* occur automatically, nor necessarily accrue to the expected beneficiaries (e.g., lower retail prices for small consumers); and
- even well-functioning competitive markets require constant and diligent monitoring, and a powerful, independent regulator.

As it turns out, California is not alone in experiencing major problems with its electricity market liberalization experiment. The province of Alberta, Canada started on a similar path beginning in 1995 and opened its market to full competition on January 1, 2000. Alberta's problems, while trivial compared to California, nevertheless, demonstrate the potential pitfalls of restructuring. Demand in the province grew by 16% between 1996 and 2000, but supplies did not keep up. What new capacity has come online uses natural gas. More importantly, even though some 70% of the province's

energy is generated from low-cost coal plants, the market clearing prices on the Power Pool of Alberta are increasingly set by the much higher cost natural gas plants.

This, coupled with abnormally high natural gas prices in 2000, led to price spikes in the wholesale market during the early stages of the liberalized market. Since every generator gets paid the price set by the last plant at the margin, average pool prices increased to unprecedented levels. Critics charge that the government failed to spell out the details of how the power market would transition to competition, thus discouraging early investments in additional coal-fired capacity.

High prices began to moderate in 2001, falling to around CAN\$30/MWh (approximately \$20/MWh) by end of 2001. Moreover, high prices have attracted additional investments, which have resulted in lower prices. The Alberta experience suggests that unexpected and unintended things can happen, and it may take months to stabilize prices and/or to restore investors' confidence in the market.

Far to the south of both Alberta and California, Brazil has also had a difficult time with its power markets. But unlike Alberta and California, this one can be mostly blamed on nature. The worst drought to hit the country in 70 years significantly reduced the output of hydroelectric energy, which normally accounts for 90% of the country's needs. As in the case of California and Alberta, uncertainties about market rules and market prices resulted in little or no investment in additional thermal capacity.

In 2001, the government ordered Brazilians to cut down electricity usage starting in June by 20% to avert widespread blackouts. Rationing, which lasted 6 months, affected all consumers. Residential users were asked to cut back usage by 20% or face surcharges as high as 200%. Small consumers who could cut down their usage by 1/3 were exempted from paying any bills. Large industrials were to cut down usage between 15-25%. Violators were fined, or had their power cut off. The situation has improved since these draconian measures were introduced.

As the preceding examples illustrate, there is now a new maturity of expectations in at least three areas:

- **Complexity** – Every one recognizes the enormous complexities of the electricity markets⁶.
- **Benefits** – While the introduction of competition unleashes powerful forces to improve operating efficiencies and reduce costs, the benefits do *not* automatically flow to the expected beneficiaries. For example, a disproportionate percentage of the significant cost savings resulting from the initial liberalization and privatization of the ESI in England and Wales allegedly went to the investors – not the customers.
- **Vigilant regulator** – Despite initial beliefs to the contrary, the necessity and the workload of regulators have usually *increased* following the introduction of competition in many jurisdictions. Germany, the only major liberalized market in the world which does *not* currently have a regulator, sorely needs one.

Does Competition Inevitably Lead to Lower Prices?

The popular belief used to be that competition will *inevitably*—and *automatically*—lead to lower electricity prices. The reality is never that simple. True, competition *generally* leads to improved efficiencies in operations (e.g., in power

generation), cost reductions in certain functions, the introduction of new—and sometimes improved—services. But its impact on retail electricity prices is more complicated for several reasons:

- **Large vs. small customers.** The intense pressures to cater to large and strategically important customers tends to lead to lower prices and/or customized services at little or no cost. Conversely, many small and marginally profitable customers may experience little or no price reductions, end up paying higher prices, and/or suffer service quality degradations. It makes perfect business sense to look after the big customers. That may be the reality of competitive markets. Large customers with their high load factors and high-voltage service levels are cheap to serve. They can also use their high volume to negotiate better deals. Not true for small customers.
- **Profitable customers.** United Airlines estimates that a mere 9% of its customers, the frequent business flyers, account for 40% of the company's profits. Similar numbers apply to the electric power business with the implication that a lot of time and effort will go to cater to these customers, and not much on the others. This was not necessarily the case under regulation.
- **Cost attribution and price rationalization.** Another factor further complicating a meaningful comparison of *pre-* and *post-*competition prices is the disappearance of many subsidies among and across customer classes. Cost allocation and price adjustments, which are highly important and necessary by-products of industry restructuring, tend to result in significant cost shifting among customer classes. Consequently, some prices rise while others decline even in the absence of any net cost reductions.
- **Risk and return.** The introduction of competition to monopoly functions (e.g., power generation and competitive energy supply) introduces certain risks not previously present. This, in turn, requires higher returns on investment to attract and retain capital. The higher risk premium may partially—or totally—offset the gains in efficiency improvements. Moreover, competitive companies have the prerogative to increase management salaries, pay higher dividends to their investors, make investments in business operations, and/or reduce customer prices.

Combine these factors, and one can appreciate why it is no easy task to provide a simple answer to the simple question, “does competition lead to lower prices?” In most cases, the only correct answer is “it depends.”

Perhaps because of these complicating factors, politicians in a number of U.S. jurisdictions that have passed restructuring legislation have insisted on mandated price reductions. Legislatively mandated 10-15% price reductions targeted at small residential customers, combined with a price freeze for everyone else, appears to be a popular political formula. It guarantees the support of a majority of the voters, while permitting larger customers to cut special deals with competing suppliers—something they will demand anyway. Some customers are made better off, while nobody is made worse off.

A 1999 report titled, *The Impact of Competition on the Price of Electricity*, conducted by J. A. Wright and Associates of Marietta, GA, supports the notion that legislatively mandated price reductions may be the *only* pragmatic way to

guarantee immediate lower prices. The report, which is focused on competitive markets in California, Massachusetts, and Rhode Island, concludes that the lower prices initially experienced were the result of legislative mandates, not competitive market forces. The report, however, is not critical of competition. It points out that most of the benefits of competition are yet to come—once the transition period is over and utility's stranded costs have been written off.

Moreover, the report points out that, even setting the recovery of stranded costs aside, the costs of transitioning to a competitive electricity market are significant—and tend to be overlooked or underestimated. Finally, there are other subtle costs associated with a restructured market, including more volatile prices.

Why Do Competitive Markets Need a Regulator?

Many countries do not have a well-functioning, independent regulatory authority. All decision making, rate setting, and investment planning is done within the same central bureaucracy. Since they have always done things in this way, the question comes up why change. In other cases, naïve policymakers may assume that market discipline should self-regulate competitive markets, controlling prices and player's behavior. The experience of liberalized markets clearly suggests otherwise:

- **Myth?** – A well-designed, competitive market should be able to operate without much regulatory oversight, sustained by powerful competitive forces. Right? Wrong.
- **Soccer analogy** – To understand why, a sport analogy may be helpful. Consider a competitive game, say soccer. It has very well-known and highly defined rules which specify how the game is to be played, the number of players, what each can and cannot do, how one team can score against the other, and so on. On the surface, it would seem that experienced teams should be able to play without a referee. Obviously, this is not the case. The same is true of practically all other games, including chess.
- **What is the role of the referee?** To ensure that the rules of the game are adhered to, and there is no cheating. To keep the game fair, to prevent one team from abusing another, to keep the playing field *level*, as the saying goes. The function of the regulator is identical to that of a referee – to interpret the rules and to enforce them. To catch cheating, misbehaving, disorderly conduct, and otherwise ensure a fair game.
- **What does it take to be an effective referee?** For a referee to be effective, s/he must have ultimate and absolute authority. Moreover, s/he must be fully independent of political or other pressures. The same principles apply to a regulator. In the absence of authority and independence, no regulator can function properly.

Sobering Experiences

The realities of newly restructured markets, notably the chilling problems experienced in California in 2000-01, have had a sobering effect on the thinking of regulators across the United States.. According to a survey of 46 regulatory agencies⁷, U.S. regulatory agencies by a thin margin believe that consumers are better served under the *regulated* monopoly model, still prevailing in many states. Three-quarters of respondents in the survey said that events in California

have slowed or stopped deregulation in their jurisdiction. A surprising 40% said their agency lacks the *powers, tools, and resources* to prevent a California-style meltdown.

In another recent survey, conducted by Standard and Poor's and RKS Research and Consulting, many regulatory agencies identified the unclear jurisdiction between the federal and state-level regulatory agencies as a major unresolved issue. In the case of California, unclear jurisdictional issues delayed the introduction of many important remedies that could have eased the ensuing crisis when problems first started in 2000⁸.

The current push to create regional transmission organizations (RTOs), by the Federal Energy Regulatory Commission (FERC), will only make these turf issues more contentious. In summarizing the survey findings, Richard W. Cortright, Jr., Director of Standard and Poor's says, "This report provides a clear picture of a regulatory community in the midst of a difficult transition."

As described below, the word *deregulation* has become a dirty word in some circles. A report recently published by the Consumer Federation of America concludes that *deregulation has been a costly failure in the United States*. Another study by the Natural Resources Defense Council (NRDC), prepared for the Silicon Valley Manufacturing Group, concludes that California would have had a bleak summer in 2001 had it not been for remarkable voluntary conservation efforts of consumers.

Is Deregulation a Dirty Word Now?

The fiasco in California has had two consequences; one positive, one not so:

- Policymakers in other countries and states now have a model of how things may go wrong – and its disastrous consequences. This is a hugely positive contribution.
- The worldwide momentum towards liberalizing electricity markets has suffered a serious blow in many places, as regulators take time out to see if similar things are likely to happen to them. In the process, deregulation has become a dirty word. This is unfortunate.

In the United States, for example, several states have now delayed the opening of their markets pending a review of the lessons from California. These include Nevada and New Mexico, but also states geographically removed including Arkansas, Minnesota, Oklahoma, and North Carolina.

On a positive note, many states have taken special measures to avoid the problems that have plagued California. For example, politicians in Texas, which opened its market in January 2002, made sure that their system would not experience the problems of the Golden State. Others like Wisconsin are working on beefing up their transmission network to avoid the transmission bottlenecks that plague California.

Costs and Benefits

Another important question, which did not seem as important in earlier, naïve days of deregulatory stampede, is that of the costs and expected benefits of introducing competition. As the experience of California suggests, deregulation is not necessarily cheap, nor risk free. Hence, the policymakers must ask many hard questions about the expected benefits. Even if the expected benefits outweigh the costs, one must ask

Table 3
Switching to a Competing Supplier

Switchover rates in states with total or partial retail competition

| State | Total Customers | # Using Alternative | % Alternative |
|----------------------|-----------------|---------------------|---------------|
| Pennsylvania | 4,600,000 | 574,661 | 12.5 |
| Ohio | 3,900,000 | 204,868 | 5.3 |
| New York | 5,503,003 | 189,352 | 3.4 |
| Maryland | 1,831,372 | 38,456 | 2.1 |
| Texas* | 5,300,000 | 90,553 | 1.7 |
| Virginia* | 2,600,000 | 34,000 | 1.3 |
| New Jersey | 3,110,701 | 35,094 | 1.1 |
| California* | 10,424,143 | 64,787 | 0.6 |
| District of Columbia | 198,258 | 1,056 | 0.5 |
| Maine | 684,656 | 2,090 | 0.3 |
| Massachusetts | 2,200,000 | 981 | 0.04 |
| Rhode Island | 460,500 | 1 | 0.0002 |
| Delaware | 300,000 | 0 | 0 |
| Michigan | 3,800,000 | 0 | 0 |

* Residential choice is currently limited to a pilot program or otherwise available only in some areas. In California, retail competition has ended.

Source: *The Wall Street Journal*, September 17, 2001.

if these benefits would automatically accrue and inevitably lead to lower prices.

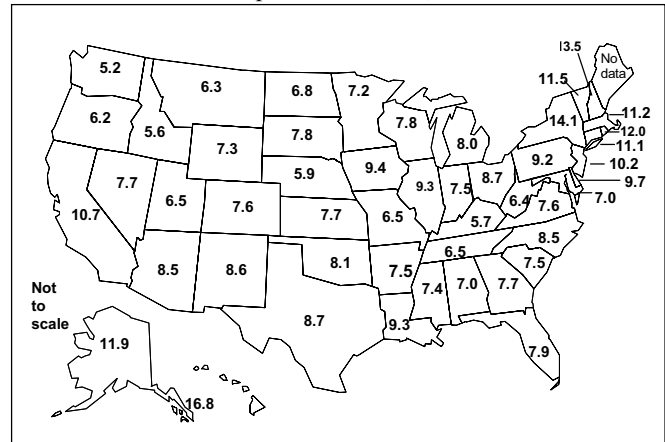
There is also the issue of the *incidence of costs* – stranded and otherwise – and the *distribution of benefits*. These are not trivial questions. Many industry observers, having studied liberalized markets, have concluded that there may be little, if any, net gain from extending competition to the retail markets⁹. These critics correctly point out that most of the benefits of competitive markets are in the wholesale market and may be captured at relatively little cost.

The benefits of extending competition to small customers, the critics argue, tend to be relatively small – while the costs are quite high. According to this line of thought, competition may be introduced in stages, starting with the wholesale market, and by allowing large customers to engage in bilateral contracts. Smaller customers may have to wait or selectively be given a chance to participate. The switchover rates (see Table 3) among residential customers have generally been low, and the savings relatively small considering the costs. The reasons are easy to explain. The potential savings to small consumers may simply not be worth the bother.

Is There a Net Gain in all This Pain?

The National Audit Office (NAO), the watchdog for the UK's parliament, published a report suggesting that the costs of introducing competition in the domestic supply business have virtually wiped out all the benefits. The NAO report concluded that the savings to customers have amounted to roughly £143 million/year (\$215 million). Not a huge amount, but respectable. But the costs of introducing competition, which has been passed on to the same customers, has been around £121 million (\$182 million), making the *net* annual savings a measly £22 million (\$33 million). NAO says that this small net benefit is likely to be lost due to additional costs of “*sorting out the remaining problems with the domestic competition systems.*” These costs are yet to be quantified, and may exceed the net benefits. Problems and cost over-runs associated with various IT, settlement, and billing systems have been excessive. The most common and persistent

Figure 2
U.S. Retail Electricity Prices*
(per kilowatt hour)



Average retail electricity prices in the US, Oct 2000

Source: Energy Information Administration, data for Oct 2000

* Prices in California have gone up by as much as 40% or more since the recent crisis has led to two price increases.

problem is switching customer accounts when they change suppliers – which they do often¹⁰.

If deregulation is pursued primarily to harmonize regional price disparities, such as those prevailing across the United States (Figure 2) and in Europe, there may be other ways to accomplish this objective. The point of the argument is to ask the right questions – and be realistic about the answers. Everyone now realizes that market liberalization is not a panacea, and will not solve all the industry's ills. It has significant costs, risks, and may occasionally backfire.

Market Structure and Market Performance

Assuming, for the moment, that a decision has been reached to liberalize the electricity market, there are a host of difficult *how to* questions. For example, how to structure the competitive market and establish the market rules. These go to the heart of many of the problems now plaguing poorly functioning markets such as California.

The following section lists some of the critical market structure issues. Getting any one item on the list wrong, can wipe out all the gains from getting all the others right. There is a strong correlation between market structure and market performance – as one would expect.

Market Structure Issues: Points to Ponder

- centralized mandatory pool, voluntary bilateral trade, or hybrid system
- combining market operator (MO) and transmission system operator (TSO) function into one organization or keeping them separate
- design and implementation of the competitive wholesale auction
- design and implementation of real-time balancing market including the provision of ancillary services
- requirements for functional unbundling of vertically integrated companies or accounting ring-fencing
- design and enforcement of open access transmission network and non-discriminatory transmission tariffs

- design and implementation of unbundled retail bills
- the design and implementation of settlement system for generators, distributors, and competing retailers and resellers
- design and implementation of demand-side bidding into the wholesale auction and/or the real-time balancing market
- design and implementation of transmission pricing and congestion management schemes (e.g., zonal, nodal, locational marginal pricing or other)
- rules governing customer switching, metering, billing, and settlements
- design and implementation of load profiles or requirements for interval meters and real-time pricing
- rules and policies governing mergers and acquisitions
- rules and policies on dealing with issues of market power and unfair pricing or marketing practices
- rules governing the statutory authority of the regulator, market monitor, and enforcement agencies
- policies on customer protection, service quality standards, and consumer education
- policies and funding mechanisms to support social goods (e.g., low income assistance, energy efficiency, R&D, renewable energy, etc.)

The right answers to the right questions vary depending on the prevailing circumstances, existing infrastructure, history, political, economic, socio-demographic and even geographical factors. For example, in many developing countries, the private equity markets are non-existent or feeble. In this case, policymakers wishing to introduce competition among power stations to increase operating efficiencies may not have the option to liberalize the market. They may have to resort to corporatization where individual power stations remain as state-owned enterprises in government hand; but each station is made into a separate profit and loss center, and forced to compete with its peers in a competitive wholesale power auction. With properly defined market rules and incentives, such a scheme can work quite well, mimicking a fully liberalized market with competing private investors.

Experience in South Africa, New South Wales and Australia, for example, demonstrates that similar schemes may work in other countries. In Norway, a highly successful competitive market, most of the industry is still state-owned.

Vertical Integration, Harmonization, and Other Matters

Aside from market structure and design issues, is the question of what to do with the existing vertically integrated nature of the industry prevailing in many parts of the world. Most experts agree that it would be hard to have meaningful competition in a market with powerful incumbents that own and/or control strategic assets such as generation or transmission. One way to resolve this problem is to require *functional unbundling* – forcing existing players to divest – or at least give up operational control – of critical assets¹¹.

Similarly, it is generally agreed that competitive markets need an *independent* system operator or its equivalent. Finally, open access to transmission and distribution assets with transparent and non-discriminatory tariffs is generally accepted as a must. The European Union’s directive on

liberalization is generally criticized as being overly lax and/or vague on these central issues.

Another important issue is the harmonization of prices and regulations across state boundaries. This is a major problem in countries (e.g., U.S.) or continents (e.g., Europe) with vastly different systems and regulatory regimes. How can federal (in the case of the U.S.) or European Union (in the case of Europe) policymakers introduce competition in an otherwise heterogeneous industry and harmonize prices and regulations across state boundaries? This has proven to be a difficult problem in North America, eluding an answer up to now. Likewise, it has kept the EU regulators in Brussels frustrated for many years. The experience of Germany, the largest fully liberalized European energy market, suggests that in the absence of unbundling, open access to transmission grid, and a regulator, liberalized markets do not achieve their full potential.

Germany’s Liberalized Electricity Market: Half Full Or Half Empty?

Germany opened both its electricity and natural gas markets in 1998. The German brand of liberalization, however, is unique in many respects. For example:

- there is no requirement to physically *unbundle* generation, transmission, and distribution—leaving the dominant incumbents in a strong position to control the market;
- there is no independent system operator (ISO), nor a central market operator (MO) to set market clearing prices;
- access to the transmission network is *theoretically* open with access charges to be negotiated by parties involved in transactions;
- there is *no regulator*, instead they rely on the good faith of the parties to negotiate transactions on a case-by-case basis.

So, how well is the German market performing after four years? The answer is the proverbial *the glass is half empty or half full*—depending on how one looks at it. The glass is half full because:

- all consumers have the right to switch suppliers and 3% of residential customers, and over 10% of industrial customers have taken advantage of customer choice;
- the transmission grid is *theoretically* open for use by third parties and some are taking advantage of this;
- there is *virtual* competition in the generation sector and a few new IPPs have come into play; and,
- retail electricity prices have fallen—significantly for most customers—although prices have firmed recently.

VDEW, the association of German electricity companies, estimates that residential consumers have collectively saved \$1.8 billion and the industry some \$5 billion since 1998. Customers have a choice, and this has led to major efforts to improve service quality. Not bad for starters.

The glass, however, is half empty because:

- industrial prices, which initially dropped by 30% or more, are now rising;
- electricity trading, which theoretically should be flourishing, represents a mere 2-3% of the physical volume of

consumption compared to 25% in the Scandinavian Nordpool, and much higher volumes in other liberalized markets;

- grid access charges, due to the nature of bilateral negotiation process, are incredibly slow and opaque;
- the lack of market transparency and the one-on-one nature of transactions means that no one knows the prevailing prices;
- there have been isolated complaints from IPPs and others that it is difficult or impossible to gain access to utility grids at any price;
- six big generators (RWE, e.ON, EnBW, Veag, Bewag, and HEW), who also control the country's high voltage grid, account for 80% of the generation;
- the dominant generators have, shall we say, strongly discouraged retailers from switching suppliers by offering highly attractive, long-term contracts; and,
- newcomers have had a hard time establishing a foothold due to bureaucratic and contractual hurdles that binds parties to the big incumbents and lack of price transparency.

The six big dominant players, who control and/or own many other players, are extremely powerful and can effectively thwart the efforts of their competitors. Germany's anti-cartel office, the closest thing it has to a regulator, has published a list of mischiefs allegedly perpetrated by the big suppliers against their competitors, including

- illegal switching of rates charged by municipal utilities (*Stadwerke*);
- requiring highly restrictive contractual terms to prevent access to local distribution lines;
- restricting access to customers' meters; and,
- making it difficult for competitors to offer a simple and single contract covering both energy and delivery charges.

The European Union's (EU) Electricity Directive in Brussels has repeatedly suggested that Germany, like all other EU member countries, appoint an independent market regulator that can set and enforce the rules for uniform network access charges. The EU must also insist on unbundling of existing players, and while they are at it, why not set up an ISO and an MO to make the glass full, not just half full.

Similarly, California's unsuccessful experience offers many useful insights that might not have been obvious until recently. The California experience, for example, shows that there are so many ways to get things wrong, a feat that was accomplished in the Golden State with rather serious consequences (see Table 4). Policymakers in other states and the rest of the world are studying California as a model to avoid.

Although there is a tendency to trivialize the issues, and to draw hasty – and sometimes wrong – conclusions, this re-examination is warranted. For example, many observers of the California market quickly concluded that heavy reliance on the spot market is to be avoided at all cost. Others point to the success of the Pennsylvania, New Jersey, and Maryland (PJM) Pool as a counter example. Spot markets aren't necessarily evil, but like everything else in life, work best when taken in moderation.

Transition and Implementation: The Final Hurdles

Implementation and transition issues are equally daunting. Even with the best market design and market structure, there are many ways to end up with a poorly functioning market due to poor implementation or a botched-up transition strategy. These problems are equally daunting, whether one is dealing with a developing or a developed country. Since restructuring radically changes the rules of the game and upsets the balance of power among existing players, powerful groups with vested interests tend to intervene through the political process. The result is often a political compromise

Table 4

Lessons from California: There are So Many Ways to Screw Things Up

Avoid heavy reliance on volatile spot market – This may sound so obvious as to be redundant. But it was not so obvious to California's market designers in 1996.

Pay for capacity – California's PX auction did not pay generators for capacity. It paid for energy, only when a given unit was used. (The ISO, of course, pays for capacity in the ancillary services market.)

Don't deregulate wholesale prices while keeping retail tariffs frozen – This has driven the utilities in California to the brink of insolvency.

Don't leave demand out of the equation – The California market would have self-corrected itself to a great extent had customers been exposed to higher prices.

Don't deregulate if network is already constrained – If the network is already severely constrained, be it in generation or transmission capacity, competition is likely to *increase* prices.

Don't promise lower prices – Politicians love to make promises they cannot keep, including lower electricity prices.

Don't panic when generators make profits –

Other markets, say oil or natural gas, rely heavily on futures and options to handle price volatility. How *could* any market, especially one as volatile as electricity, and with no inventory, work otherwise?

This scheme works well – from the customers' point of view – when capacity is plentiful and demand is low; but not when demand is high and supplies are tight. It certainly did not encourage additional investments in capacity when prices were low in 1998-99.

The regulators in California unconsciously created the worst of all possible worlds, a self-contradictory paradigm when wholesale prices were allowed to go high, while retail prices remained frozen.

The California market was at best a half market. Consumers had no incentive to respond to prices even when they were exorbitantly high.

A good time to introduce competition is when there is excess capacity. This can result in lower prices. More importantly, it will provide a safety period during which the kinks in the market rules can be worked out.

If lower prices materialize, so much the better. But it is not a good idea to build up customers' expectations.

In capitalistic systems, high prices and profits provide important signals to investors.

that pleases no one and offers too many loopholes and too many exceptions.

In the case of California, many experts blame the state's politically expedient restructuring law, known as Assembly Bill 1890, as the main culprit for the ensuing problems. AB 1890 unanimously passed both houses of the California Legislature, and was signed by the then Republican Governor Pete Wilson amidst grand fanfare in 1996. Virtually no laws ever pass with such a strong base of support. Is it possible that too many political compromises were made to get everyone's support for the bill? As any seasoned politician would attest, if a law passes unanimously, then it must have too many loopholes and too many giveaways.

Finally, there is the issue of provision of social goods, long provided and paid for through hidden subsidies. These include massive cross subsidies among and across customer groups, subsidies for farmers, low-income customers, pensioners, selected industries, and so on. There are subsidies for renewable energy, for local coal, for vocal unions, etc. Some subsidies may be socially justified and must be sustained. In such cases, new ways must be found to fund and sustain the programs. Private industry is not likely to offer many social goods free of charge. Restructured markets can be structured to continue to provide social goods through special levies, license fees, taxes, and other charges. But these must be explicit, and their incidence designed not to interfere with the competitive aspects of the market, nor to disadvantage some players *vis-à-vis* others.

The Road Ahead

Despite enormous bad publicity coming out of California, Brazil, and a few other problem areas, the experience with market restructuring has been generally positive. Many markets, like the one in the Nordic countries, are regarded as highly successful. The market in England and Wales, which initially suffered from problems associated with the influence of two dominant generators, has now been redesigned. Other markets around the world may be characterized as moderately successful. Even in cases where there are a few known shortcomings, the overall experience has been worth the effort.

Moreover, markets have made us aware of new opportunities, just as it has identified new perils and challenges. One of the enormously positive lessons of restructured markets is that there is a new recognition of the significance of *elasticity* of demand¹². There is now a much better understanding that customer demand can – and should – play a more active role in balancing supply and demand in real time. Markets provide the incentives – through market price volatility – to influence demand when and where it is cost-effective to do so.

Beyond these generalities, one can draw a list of what to do – and avoid – from restructured markets, which have experienced serious problems so far. The following is one such list from the California experience.

- Don't fix it if it ain't broke
- Don't restructure if capacity is tight
- Don't over-promise what you cannot deliver
- Don't push the process beyond what is reasonable and necessary
- Don't liberate part of the market, while keeping the rest regulated

EFCEE Discontinues Operation

Pieter vander Meiren has advised the IAEE that the European Federation for Cooperation in Energy Economics (EFCEE) has ceased operation primarily due to the continued unavailability of funding from the European Commission.

The IAEE had loaned the EFCEE \$6000 early in its career to assist in getting started. Only \$1478 of that loan has been repaid. Unfortunately, IAEE will have to write-off the balance of \$4522.

- Make sure somebody is in charge when things go wrong – and everybody knows who it is
- Closely monitor the market for signs of trouble – and be prepared to take decisive action before problems get out of hand
- Don't over-rely on the spot market
- Encourage risk-hedging
- Ask if retail competition is necessary and cost-justified
- Don't forget demand elasticity
- If the *market* is supposed to take care of demand and invest in infrastructure, make sure the *market* receives correct and clear signals in time to respond
- Test the market rules before they are implemented

Policymakers who do not heed these lessons will only have themselves to blame.

Footnotes

¹ UK's Competitive Electricity Market, April 1999, Convecton Consulting NA, Inc., Menlo Park, CA

² Sioshansi, F. P. & Morgan, C., Market Structure and Market Performance, *The Electricity Journal*, 1999.

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⁴ Sioshansi, F. P., Competition in the Liberalized European Electricity Markets, *The Electricity Journal*, March 2001

⁵ Sioshansi, F. P., California's Dysfunctional Electricity Markets: Policy Lessons on Market Restructuring, *Energy Policy*, 29, 2001, 735-742.

⁶ Sioshansi, F. P., California's Electricity Market, Finally Turning the Corner, *Energy Policy*, Vol. 30, No. 3, Feb. 2002, pp 246-248.

⁷ Several surveys of regulatory agencies conducted by various firms have substantiated this. These include surveys by Standard and Poor's and RKS Research and Consulting (Standard & Poor's Survey of State Regulators, Conducted by RKS Consulting, April 2001, Santa Clara, CA), Fitch Investors Services, Inc., and R. J. Rudden Associates, Inc.

⁸ California's Restructured Electricity Market: How Did we Get Into this Mess and How Do We Get Out? Menlo Energy Economics, Menlo Park, CA, July 2001.

⁹ Is there a net gain in all this pain? *EEnergy Informer*, April 2001.

¹⁰ Power in Europe, 12 January 2001

¹¹ Competition in the Liberalized European Electricity Markets, Menlo Energy Economics, Menlo Park, CA, October 2000.

¹² Sioshansi, F. P., and Vojdani, A. What Could Possibly be Better than Real-Time Pricing? Demand Response, *The Electricity Journal*, June 2001.