As the twenty-first century begins, the U.S. electricity business is in the midst of a revolution. An industry that has been dominated by monopoly utility companies, and regulated from top to bottom by the states and the federal government, is now seeing competition and deregulation in the generation and sale of electric power.

These changes are both facilitating and being facilitated by the wider role that new, independent generators are playing in the electricity sector. In addition, promoting competition has become associated with rules, regulations, institutions, and in some cases divestitures that are designed to ensure that power markets operate efficiently and competitively. For that reason, the process of enacting and implementing laws and policies to bring more competition to electric power markets has come to be known as restructuring.

Opening markets to competition generally gives firms better incentives to control costs and introduce innovations. Competition among firms means that the benefits of such efforts get passed down to consumers as better service at lower prices. The hope underlying restructuring is that the $200 billion electricity sector will see benefits comparable to those achieved from opening other industries to the market.

Although the term restructuring may be unique to electricity, the sometimes painful process of undergoing a transformation from regulation to competition is not. Electricity is one of the last of a series of industries in which market forces have been introduced to take over the duties of choosing product characteristics, determining supplies, and setting prices. The U.S. economy has coped with, and in large degree profited from, similar upheavals in the banking, transportation, and telecommunications sectors. Like those other sectors, electricity is itself a major industry, as well as forming part of the country’s economic backbone. Thus, much of the experience with opening other sectors is useful in designing policies to restructure the electricity industry.

Yet electricity has some unusual attributes that present thorny problems for those charged with expanding competition. To explain these problems, we provide in Part I some background on the electricity industry, including the technology for
producing and delivering power, the history of policy and regulation directed toward it, and recent experience with restructuring both in the United States and internationally. The dominant episode in restructuring so far is the California crisis, beginning in the summer of 2000. We assess the events and the long list of possible causes of the disaster in Chapter 5.

We then turn to the major questions facing policymakers as they deal with deciding whether, when, and how to implement restructuring. These include matters such as industry structure, future regulation, maintaining system integrity and reliability, promoting competition, and protecting the environment. The “issue chapters” that make up Part II can be read on their own for readers interested in particulars, although we provide links to other chapters to highlight the frequent and significant occasions when one policy issue affects and is affected by others.

We conclude with some background on other political controversies associated with electricity restructuring, including disputes between households and industrial users, between consumers and marketers, and between states where electricity is cheap and those where it is expensive. Although these issues are important, they can divert attention from the most crucial question, which in our view is whether the United States can reap the benefits of competition in electricity while preserving the reliability upon which the nation depends.

**Background: Technology, History, and Recent Experience**

Evaluating whether and how to bring competition to the electricity industry requires first some understanding of how electricity gets from power plants to the outlets in the wall. The path entails generation of the power, transmission over long distances, and local distribution into the home. Electricity can be generated using different technologies, with different properties regarding how quickly they can be brought online to meet power needs and how much they pollute the air when they operate. The transmission and distribution sectors are subject to important economic conditions that are likely to preclude competition in those sectors in the near future. Transmission, in particular, also exhibits some important technical characteristics that make pricing and management particularly complex when generators want to send more power through the lines than the lines were designed to carry.

Seeing why the move to expand competition in the industry is happening now also requires some understanding of how we regulate the power industry. The industry has a long history of policy attention, dating back to state regulation of electricity rates starting around the beginning of the twentieth century. Major federal laws include the Public Utility Holding Company Act of 1935 and the Public Utility Regulatory Policies Act of 1978 (PURPA). The earlier law set the rules for organizing utility companies, while the later statute opened wholesale electricity markets to selected new power producers, primarily as a means of reducing use of fossil fuels.

The 1992 Energy Policy Act, followed by the Federal Energy Regulatory Commission’s (FERC’s) Orders 888 and 889 in the summer of 1996, expanded PURPA’s initiative by allowing all generation companies to use interstate transmission lines.
About three and half years later, FERC issued Order 2000, the successor to Orders 888 and 889, which required each utility to either commit their transmission assets to an independent “regional transmission operator” or explain why it was not doing so. These federal rules have set the stage for the states, which have the primary role in deciding if, when and how to bring competition to the retail buyers—households, offices, shops, and factories. As we write, the federal government is pondering the extent to which it should become involved in this effort.

Unlike other movements to introduce competition into formerly regulated industries, such as telecommunications, banking, and transportation, the United States is not among the first to open its markets. Experiences of states and other countries that have established retail electricity markets provide important lessons for federal and state policymakers still evaluating these issues, and also for the consumers and businesses that depend on how well this industry and its regulators do their jobs. These domestic and international experiences offer lessons to teach others just setting out on the road to electricity competition, or deciding whether or not to begin the journey.

Foremost among these experiences is the imposition of higher rather than lower prices, accompanied by rolling blackouts and utility bankruptcies, arising in California in the summer of 2000. The specific phenomena that have raised angry voices against restructuring include very high prices during times when electricity is most in demand, usually hot summer afternoons. We review the history of these important developments, identifying 10 possible culprits relating to supply conditions, market design, and market power. Our assessments reflect that the factual issues, financial calamities, political controversies, and regulatory responses remain open, and that these issues may arise in different forms in other states.

**Leading Issues**

Knowing something about generation and delivery technology, regulatory history, and recent restructuring experience allows us to provide some answers to the 11 most compelling questions facing electricity policymakers today. We introduce these questions here; each of them is analyzed in detail in its own chapter in Part II of this book.

1. **How—and why—do we draw a line between regulated and competitive sectors of the electricity industry?** In many industries where we as a society have elected to replace regulation with competition, such as trucking or banking, much if not most of the industry has been largely freed from continued regulatory oversight. But in some sectors—telecommunications, for example—the process of deregulation has been only partial, with continued regulation of some segments. If we could just deregulate and walk away, the policy task would be much simpler.

   When deregulation is partial, it becomes more complicated. Policymakers need to decide where regulation should end and deregulation ought to begin, how best to continue regulation where necessary, and how to manage the new problems of controlling how the regulated and newly competitive portions of the industry relate to one another. We look at why electricity is one of those industries where parts of it—the wires that carry electricity from the power plant to the home, office, and fac-
tory—will remain regulated. Paradoxically, regulating less of the electricity industry could make regulation itself more complex. Perhaps technologies in the offing allowing generation at the user’s location could reduce the need to regulate the industry altogether.

2. Should the same companies own and control both regulated “wires” and competitive generation? Much of the effort to eliminate price regulation during the past couple of decades in the United States has involved more or less complete deregulation throughout the entire sector. Electricity is an exception. Policymakers are opening power markets to competition, but local distribution and long-distance transmission are unlikely to be deregulated any time soon.

Electricity is not the first deregulated industry to be split into regulated and competitive sectors. The telecommunications industry has seen a transformation from one in which regulation set all prices, to one in which markets for telephone equipment and long-distance service have been opened while local telephone service has, until very recently, been treated as a regulated monopoly. U.S. experience with that sector provided the lesson that letting the regulated monopoly continue to operate in competitive markets could subvert competition in a number of ways. The regulated firm might put one firm ahead of others in the queue for getting access to the regulated service or have the customers of its regulated services bear the costs of its competitive ventures.

Ultimately, these concerns led in 1984 to the draconian solution of keeping most regulated local telephone companies out of the long-distance business, a restriction only slowly changing since the Telecommunications Act of 1996. In electricity, state and federal policymakers must wrestle with a similar decision: Should regulated wire monopolies be prevented from owning generation facilities? Can other operational institutions and rules ensure that transmission and distribution monopolies promote competition without forcing utilities to divest all of their generators? The widespread use of the term restructuring to describe the introduction of power competition into the electricity industry illustrates just how fundamental these concerns are.

3. Because we have to regulate prices for the wires, how do we set their rates? As we will see in Chapter 6, the wires segments of the electricity sector—transmission and distribution—will continue to be regulated. Regulation, of course, is not a new issue in this industry, but most regulation before restructuring has been devoted to setting the electricity rates that users pay. With restructuring, power prices will be set by the market, with prices users pay directly or indirectly including those power prices plus the regulated charges for delivering electricity from the generator to the customers’ premises. We discuss first methods for setting rates for transmission and distribution, describing both traditional “rate-of-return” regulation and new “incentive-based” methods that could lead to lower costs and more efficient operation.

Although these principles apply to both distribution and transmission, the latter presents difficult problems. A generator may have to go through lines owned by a number of different utilities in a number of different states. Consequently, policymakers must consider whether transmission prices should be set by broad geographical regions and independent of distance, or include charges that increase
with distance or the number of times the path crosses a state line or uses a different utility’s facilities. An even more complex set of questions related to pricing and incentives is associated with the possibility that transmission lines may be congested.

4. **What do we need to do to keep electricity markets competitive?** The belief that opening retail markets will lead to lower prices and better service for households, offices, and industrial users is predicated on the belief that electricity generation markets will be competitive. Such markets may fail to be competitive if only one or a small number of firms supply power to a particular area, or if the power producers agree among themselves not to compete. As we observe an industry in flux, with numerous mergers, divestitures, entrants, and volatile prices, how to ensure competition becomes an ever more pressing question.

The antitrust laws are the main legal means of ensuring that competitive markets remain that way. Because those laws are not designed to control markets, such as electric power, where monopolies arose as a matter of prior regulation, a first policy step in some states could be to require divestiture of power plants in such a way as to increase the number of independent competitors.

One concern, presented by the California electricity crisis, is that generators may unilaterally find it profitable to withhold output to raise prices, even when the markets appear competitive by conventional structural indicators. Such concerns have been behind calls for temporary federal caps on wholesale prices. Evidence supporting assertions that market power is being exercised needs to be handled with care. Modifying the operations of electricity markets or programs to make consumers more sensitive to prices (e.g., installing “real-time meters”) may reduce the incentive for anticompetitive withholding. If not, then wholesale price caps, particularly during peak periods, could become a permanent feature of “deregulated” wholesale electricity markets.

Mergers among firms that compete could give the firms the ability to raise prices on their own, facilitate collusion among all the competitors, or make competition less intense. Deciding whether to block a merger requires understanding who competes with whom, how competitive the market might be, and who might enter if the price goes up. In some cases, mergers between a generation company and gas companies could cause problems if the gas company is a primary supplier to that generation company’s competitors. Finally, although the industry is in transition, merger evaluation could be so speculative that antitrust authorities may have too hard a time proving that a merger may be harmful.

5. **Who should be responsible for keeping loads balanced and dispatching power?** Electricity stands out in that, unlike virtually every other commodity, disaster can strike unless producers supply exactly the amount that people want to buy at any given time. Keeping power production and use in line—load balancing—will require the active involvement of generators, transmission companies, local distributors, and customers, as well as the regulators who oversee the industry. In implementing electricity restructuring, policymakers must consider how to guarantee the provision of ancillary services needed to keep loads balanced on a minute-by-minute basis and provide emergency power when generators or transmission lines unexpectedly fail or demand is unexpectedly great.
A first question is whether each generation company should be responsible for keeping its own power supply in balance with its own customers’ desires. Because failure to meet power demands causes a breakdown of the system as a whole and not just a blackout to that company’s customers, letting the market take care of it may not suffice. Generators may need to meet standards for maintaining power and having reserves available, or they may need to be held liable when their inability to meet demand brings down the larger grid. If those measures prove inadequate, distribution and transmission companies may need to take on the responsibility of providing ancillary services and holding power in reserve.

Involving grid operators in the business of maintaining loads has led many states to also involve them in the overall management of power markets, through taking bids from producers and users and dispatching generators as needed. The grid need not be involved in this aspect to control generation costs; the electricity market, like any other, can handle that through letting generators compete for customers. But whether such a market is compatible with keeping loads balanced and systems secure is perhaps the crucial question facing electricity policymakers.

6. As utilities compete, how can we ensure reliability? The U.S. electric power system has had a strong record of uninterrupted service made possible through the cooperative efforts of the utilities that are linked together on the three major U.S. transmission grids. As the electric power industry becomes more competitive, this voluntary approach to ensuring reliability is threatened at the same time that the transmission system is facing greater stress from more intensive use.

Reliability can be classified in terms of adequacy and security. In a competitive world, the market is expected largely to handle generation adequacy. However, transmission and distribution adequacy will still be subject to regulatory oversight. The security of the power system will remain a responsibility of centralized system operators due to the large spillovers associated with failure of generators or transmission lines.

Restructuring poses challenges for the reliability of both the distribution system and the bulk power transmission system. However, the threats to its integrity and the consequences of failures are greater for the transmission system than for a local distribution grid. To maintain the security of the bulk power transmission grid, power control area operators and security coordinators may need to interfere with the commercial transactions on the electricity grid. However, distinguishing an action taken to protect system security from an action taken for other reasons, perhaps anticompetitive ones, may be difficult.

Given the potential threats to reliability posed by electricity restructuring, legislators and energy regulators should develop a strategy to protect system reliability as they design and implement policies that set the course for electricity markets in the future. Such a reliability strategy is likely to include expanding the role of industry reliability councils and federal regulators in overseeing reliability and increased use of incentives to promote efficient use of the transmission and distribution systems.

7. Should the states or the federal government control the course of retail electricity competition? So far, state governments have been the key actors in developing and implementing policies to encourage retail electricity competition.
A policy question has been whether states are acting quickly enough, or whether the federal government should step in to encourage or force them to open markets by a particular time.

Keeping control with the states allows the nation as a whole to learn from what worked in one place and what did not work so well somewhere else. One size may not fit all, in that the benefits of opening markets may be considerably greater in some states than others. In addition, to impose a federal solution could cause needless and costly difficulties in trying to amend or reverse the delicately balanced solutions achieved by states that are moving ahead in opening retail markets.

However, a presumption that state actions might reflect a proper balance of interests is less convincing when that state’s decisions have effects that go across their boundaries. When interstate effects are significant, the federal government can help improve policies by serving as a venue where all affected parties have a say. Specific areas in which the federal government can play an effective role include reforming existing federal laws that may inhibit competition, regulating interstate transmission grid prices and operation, enhancing market liquidity, enforcing antitrust and environmental laws, and coordinating commercial standards and practices. Also, states themselves may be able to negotiate solutions and set up regional authorities to manage issues that affect an entire region but not the nation as a whole.

8. What should be the role of public power after restructuring? Unlike most of the other industries that have made the transition from regulation to competition, the electricity sector has a substantial nonprofit component. Roughly 25% of all retail electricity sales in the United States comes from publicly or cooperatively owned utilities. The combination of privately and publicly owned utilities (at local, state, and federal levels of government) operating under different objectives and rules greatly complicates the task of restructuring the electric power industry.

The debate over bringing competition to electricity generation and retail sales markets has highlighted several differences between publicly and cooperatively owned utilities and investor-owned utilities. These differences can be categorized into three types: financial, regulatory, and scope of activities. The first category refers to the special privileges granted to public utilities and cooperatives, which include preferential access to low-cost hydroelectric power produced at federally owned facilities, the ability to issue tax-exempt debt, and exemption from income tax payments. The second category refers to the exclusion of publicly owned and cooperatively owned utilities from the state and federal regulatory structures governing investor-owned utilities and other regulations that could limit the ability of publicly and cooperatively owned utilities to participate in regional transmission organizations. The third category refers to the fact that many federally owned hydroelectric generation facilities have multiple purposes, such as flood or navigational control in addition to electricity production. If publicly owned and cooperative utilities are going to compete in electricity markets, policymakers must address these differences as they seek to make those markets fair and truly competitive.

How public power will evolve in this era of competition remains an open question to be decided at different levels of government. The federal government must define the new role for the federal power marketing authorities and for the Ten-
nessee Valley Authority. Decisions about whether or not municipal utilities or rural cooperatives will continue to hold an exclusive franchise for retail electricity sales are best made at the local level.

9. Will it cost utilities to adapt to competition and, if so, who should pay? Before the California electricity crisis, perhaps the most highly charged (pun intended) issue associated with opening electricity markets to competition was whether and how to compensate utilities for capital expenses they incurred during the regulatory era. If competition brings about lower prices, as its advocates would hope, utilities fear that they would not make enough money to recover some of these costs—hence that they would be stranded. The primary sources of stranded costs, once estimated at upward of $135 billion, are associated with nuclear power plants and long-term contracts to purchase renewable and cogenerated power under the PURPA (see Chapter 3).

Utility advocates argue that a “regulatory compact” implicitly guaranteed cost recovery as part of the utilities’ obligations to provide service. Those opposed to stranded cost recovery allege that utilities should not be rewarded for unwise investments and that forcing consumers to pay for stranded costs will thwart the objective of reducing electricity rates. In principle, deciding who is right should turn on a determination of whether regulators or utilities were in the best position to foresee restructuring, and which of them were better able to adapt to the prospect of competition.

As a practical matter, stranded cost recovery has generally been part of the package necessary to build sufficient political support to implement opening retail markets. In addition, the federal government supports stranded cost recovery—perhaps not incidentally because the federal government is itself exposed by virtue of its ownership of electricity generation in the Tennessee Valley and the Pacific Northwest (see Chapter 13). If stranded costs (i.e., investments that a utility cannot recoup because competitive prices are low) are recovered through surcharges on electricity purchases, it is important to devise methods that preserve competitive neutrality (i.e., do not introduce fees that create artificial cost advantages for either incumbent utilities or new merchant generators). Designing such a recovery system may be easier said than done.

10. What are the implications of restructuring for environmental protection? Electricity generation is a major source of air pollution in the United States. In the midst of searching for new ways to reduce air pollution in general, environmental regulators and other policymakers are eager to understand how increased competition in electricity markets is likely to affect the size of that sector’s contribution to different air pollution problems. The effect of electricity restructuring on the amount of air pollution emitted by the electricity-generating sector will depend on three key factors: how competition affects the size of the market for electricity, how competition changes the mix of technologies used to generate electricity, and the form of existing environmental regulations governing electricity generators. In general, competition could lead to greater emissions of those pollutants, which are not subject to strict caps, such as carbon dioxide, unless additional provisions are made to make the use of renewables and cleaner technologies more attractive.
Opening electricity markets is also likely to affect the performance of environmental regulation. Competition will likely limit voluntary actions to reduce emissions. At the same time, it will enhance incentives for electricity generators to take advantage of emissions trading. Environmental regulation and plant-siting requirements could limit incentives for investment in new generation by potential competitors, with adverse effects on market performance. However, the magnitude of these effects is largely unknown and may be dwarfed by the investment-reducing effects of general uncertainty about the future of electricity restructuring.

11. What happens to utility-funded “public benefit” programs in a competitive electricity market? Regulated electric utilities historically have performed several public service functions in addition to selling electricity. These activities range from offering rebates to consumers who purchase energy-efficient appliances—so-called demand-side management programs—to funding industrywide research and development of more efficient generating technologies. All have been made possible by the fact that regulators have, for the most part, allowed the regulated utilities to recover the costs of these activities in the prices that they charge electricity consumers.

In the newly competitive environment, utilities face greater pressures to reduce costs and therefore are reducing discretionary spending on optional activities, such as public purpose programs, that do not contribute directly to profits. At the same time, competition brings with it important changes in the incentives facing electricity suppliers and consumers that could eliminate or reduce the need for certain public purpose programs or require change in the means of provision to make them consistent with the reality of a competitive electricity market.

Public purpose activities traditionally funded by electric utilities on the policy agenda include the programs mentioned above as well as promoting renewable energy and protecting low-income users. Competition may affect the sustainability and implementation of these programs. However, competition also can change the justification for public policies to promote these activities. New and proposed policies to promote public purpose programs may better suit a more and more open electricity market.

Reliability in a Competitive Environment: The Bottom Line

In addition to the fallout from the California crisis and the policy issues outlined above, legislators and regulators dealing with restructuring must handle several other political “hot potatoes.” Some complain that big industrial users are benefiting at the expense of households. Consumer advocates want to ensure that residential customers possess sufficient and useful data on prices and environmental effects to make informed choices among different electricity service offerings. Citizens of states where electricity is currently cheap may fear that they will now have to pay higher prices if their suppliers can now sell in “high-cost” states that open their markets to new competition.

These concerns are all significant, but they are the kinds of problems that we as a society have addressed before in dealing with deregulation in other industries. The
matters that should continue to hold our attention here are those affected by the factors that make electricity different than any other good or service. In our view, the primary differences arise from the combination of three characteristics of electricity: it is critical to the economy; it is technically exacting, in that supply needs to equal demand at all times; and it is interrelated, in the sense that one firm’s inability to serve its customers could bring down the entire network.

Together, these factors suggest that the make-or-break issue in electricity restructuring is whether the kind of cooperation that is necessary to maintain reliability in an interrelated, exacting industry is compatible with the degree of competition that is necessary to bring about greater efficiency and lower prices. The importance of electricity to the U.S. economy means that this issue deserves the attention of the public and those elected and appointed to serve it.