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A Century Plus of Power and Light

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On September 4, 1882,[1] the great Thomas Edison's new business venture, Edison Illuminating Company, commenced operation of the first commercial central power plant in the world.[2] Edison named it the Pearl Street Station because it was located at 255–257 Pearl Street in the downtown financial district of Manhattan. The plant ran on coal and could illuminate up to 1,400 incandescent light bulbs continuously using direct current. History does not tell us whether there were lawyers standing beside Edison when the Pearl Street Station commenced operations. We do know, however, that bankers were present, for it is said that Edison inaugurated his commercial electric service by gathering the press and publicly switching on the lights in the office of his financier, J.P. Morgan.[3] The electric current that the Pearl Street Station supplied was, for reasons of primitive technology, limited to illuminating Edison's light bulbs, thus the name Edison Illuminating Company. This was, after all

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1882, some five years before Nikola Tesla, working with George Westinghouse, developed an induction motor that ran on current reversing its direction many times a second—what would become known as alternating current. While electrical lighting that ran on direct current was itself a great thing, it was the electric motor running on alternating current that would become the muscle of mankind.[4]

In the early decades of the twentieth century, the rapid commercialization of electricity would transform the way people lived, the industry that Edison created would transform the practice of law, and the distribution of electricity would come to be seen as an essential public service. Even at this early date, over 100 years ago, the leaders of the new industry had a need for lieutenants who could supervise increasingly narrow and specialized forms of work, including legal services. For the electric industry, bond lawyers created the first open-ended mortgages to finance the phenomenal growth of capital, political lawyers were necessary

intermediaries between the growing industry and the state, and labor lawyers mediated the often contentious relationships between management and the emerging unions. Among the legal specialties required and most valuable, however, were the public utility administrative lawyers, who dealt with the various regulatory authorities that almost all states established in the first two decades of the twentieth century to supervise the accounting, financial, territorial, and rate aspects of electric utility service. In the 1880s infancy of the industry, however, there was hardly a need for such specialized talent, legal or otherwise. Electric utility service was expensive and dominated by residential lighting service. Electric service was, in other words, something of a luxury service and available primarily to the wealthy.

Insull and the Business Model of Affordable Electric Power

If Edison was responsible for creating "light" technology and Tesla and George Westinghouse were responsible for inventing "power" technology, it was another person, Samuel Insull, who more than anyone was responsible for the business model that made light and power affordable. Insull saw that reducing electric rates was the critical path to growth and profitability. In his own unique way, Insull was the Jeff Bezos of his day, and his company, Chicago Edison, his Amazon. Insull realized that he could not achieve the necessary economies of scale to offer cheap service because of the multiple competing franchises and private competitors that fractured the potential customer base and made planning and financing of large capital-intensive plant both extraordinarily difficult and risky. When Insull arrived in Chicago in 1892, Chicago Edison had over thirty competitors. Municipal regulation, moreover, was incompetent, if not corrupt, so that a non-exclusive municipal franchise was not the solution to exploiting scale but rather part of the problem.[5] Insull was also the first person to appreciate that the capital-intensive nature of the business had certain pricing and marketing consequences, primarily due to the fact that electricity could not be stored. Insull realized that the night-time "peaking" nature of residential lighting service needed to be complemented with extremely low rates for certain industrial and commercial applications, like electric railways, that had a steadier and more consistent use for electricity throughout the day. The resulting load diversity that Insull pioneered improved profits and lowered rates. It is noteworthy in this regard that the basic price of Insull's power fell from 20 cents per kWh in 1892 to 2.5 cents by 1909.[6]

The Regulatory Compact and Early Principles of Regulation

For lawyers and the regulatory paradigm they would help define, perhaps the most significant of Insull's early achievements was his popularizing the idea of a "regulatory compact" for private electric utilities modeled somewhat on state and federal regulation of railroads. He did so in a famous speech he gave in Chicago on June 7, 1898, before the National Electric Light Association (now the Edison Electric Institute). The speech began with Insull's highlighting the advantages of private ownership of utilities compared to municipal ownership and with a criticism of municipal regulation.[7] However, the next part of the speech must have surprised Insull's audience of utility managers and entrepreneurs. For having just questioned the competence and trustworthiness of municipal legislative bodies, Insull went on to say that competition was not the answer and that what was needed was a regulatory compact—that is, a state grant of a monopoly franchise to power companies in exchange for cost-of-service regulation of pricing.

It is not surprising perhaps that Insull's idea in 1898 of rejecting competition in favor of a state regulatory compact would have considerable appeal. There was the personal authority his argument carried by virtue of his accomplishments and leadership of the fledgling industry. But this was not all. This was the beginning of the Progressive Era. Many progressives believed that government regulation at the state and federal levels could curb the abuses of monopoly power and municipal corruption and thereby mediate commercial arrangements between powerful corporations and the consumer in a scientific and professional manner. In 1908, Wisconsin and New York became the first two states to establish regulatory authorities to supervise electric utilities. By 1917, when the Public Utility Section (now, the Infrastructure and Regulated Industries Section) of the American Bar Association was formed, forty-three more states had followed the example of New York and Wisconsin.[8] As early as 1917, most progressive intellectuals believed that the basic organization of the new state agencies and the principles of regulation had been mostly settled. Writing in the *Michigan Law Review* in 1917, Professor Edwin C. Goddard stated:

> "And so it comes to pass that now, after about twenty-five years of experimentation, we have a pretty well defined field of public service problems, and an elaborate and measurably well adapted organization of commissions, with expert lawyers, engineers and economists, working under a body of fairly well understood principles. . . . It is also to the public interest to assure, as far as possible, to the investor in public utilities, a return on what is really put into the utility, in good faith and with prudence and good judgment."[9]

In fact, looking back, it is amazing to observe to what extent and how fast the basic principles of public utility regulation had been established by 1917.

But as we know, not everything established one day is settled the next, and so for the next 100 years the regulatory compact has evolved, sometimes slowly and sometimes, due to crises and market disruptions, rapidly. Notwithstanding Professor Goddard's confidence that the principles of the regulatory framework were well understood circa 1917, it would take almost thirty years to resolve the utility valuation issue in setting rates; within that thirty-year timeline, many new issues would emerge in need of answers, such as:

- Are state regulatory authorities in a position to regulate sprawling, interstate electric utility empires?
- How is the state to ensure universal electric service, especially for those living in poverty in rural America?
- Is there a need for federal control over utilities?
- If so, what is the nature of that control relative to the states?
- And is there a danger of "regulatory capture" by the utilities?

Beyond these matters of public policy were issues that remain unsettled today, such as alternatives to administrative control over pricing and market entry, and questions regarding the alignment, or lack thereof, of utility incentives and regulatory and market designs with social concerns such as the environment. Separate and apart from the question of administrative control over pricing and market entry—and what would come to be called "externalities"—there were then (though unrecognized), as there are to some extent today, important questions concerning how government should mediate appropriate risk, leverage, and disclosure concerns for the electric power companies that perform vital public services. Finally, as we shall see, some sixty years after Professor Goddard's article appeared, market disruptions and the prudent utility standard that he mentions would transform the electric utility industry and set the stage for a fundamental rethinking of the regulatory compact.

Samuel Insull, more than anyone, was responsible for the business model that made light and power affordable.

Giant Power and the Federal Power Commission

And so, notwithstanding the optimism of the Progressives, the decades after 1917 were far from a time of stability and political and regulatory consensus. Technology broadly increased the operational footprint of utilities and fired the imaginations of politicians and experts who championed the virtues of central planning. In 1917, American Electric Power had built the first big mine-mouth power plant, called Windsor Plant, at the Windsor Coal Mine in West Virginia. The company built the first long-distance transmission line to take power from the Windsor Plant to Canton, Ohio, fifty-five miles away.[10] As the technology of transmission continued to improve throughout the 1920s, it became possible to imagine the expansion of power to impoverished rural communities. During this same period, mergers and consolidations reduced the number of electric utilities and vastly expanded the reach of single utility owners and talented management. The public utility holding company form of organization facilitated the merger boom. Insull's holding companies alone would eventually provide service in thirty-two states and account for one-eighth of the nation's total output of electricity and gas.[11]

The success and reach of new electric technology, such as long-distance, high-voltage transmission lines, would fuel concerns about monopoly power. The new technology, as well as the widespread presence of underserved rural communities, caused some reformers to tout the advantages of more social control over the electric utility industry. The reform movement had a name, "Giant Power," and it was not above using scary rhetoric to make its point:

"Combinations of power companies . . . have raised in the public mind the fear of an all-powerful monopoly—a monopoly which has been pictured for the future as "reaching into every household" and "dominating the industrial life of the nation."[12]

The reform movement enjoyed some prominent leaders, none more so than Governor Gifford Pinchot of Pennsylvania. In 1924, Pinchot wrote a three-page pamphlet called "Giant Power," promoting the societal planning of utility systems limited only by technical considerations.[13] One year later, in 1925, the Power Survey Board of the Pennsylvania General Assembly issued a report at the behest of Governor Pinchot. Among other things, the report criticized utilities for maintaining an unreasonable disparity in electric rates between commercial and residential customers. The report also blasted utilities for not extending service to rural America and urged "the rescue of the regulation of electric service from the deconstruction now threatened by its conversion

into interstate commerce."[14] For those like Governor Pinchot holding to the belief that federal action was urgent, the U.S. Supreme Court added fuel to the fire. In *Public Utilities Commission of Rhode Island v. Attleboro Steam & Electric Co.*, the Supreme Court held that states were constitutionally prohibited from regulating power that was produced in the state but sold across state lines.[15] President Hoover eventually took action in response but did not fill the regulatory gap. In 1930, he proposed that Congress create a full-time, independent Federal Power Commission (FPC). The result was the Federal Power Act of 1930, which established the FPC as a five-member, bipartisan body appointed by the president with the advice and consent of the Senate.[16] But the powers and duties of the FPC were limited and in the view of progressives, ineffectual.

Stock Market Crashes and a Man Without a Job

For electric utility lawyers, the political skirmishes and controversies of the early 1920s did not much change the practice of law. But then, the deepest depression of the 20th century struck the United States with a crash in the stock market in October 1929. In the immediate aftermath of the stock market crash, many electric and gas utility businesses continued to expand and prosper. With a growing business, Insull, for example, continued to raise capital to finance expansion, using mostly debt because of dysfunctional equity markets. However, in 1930, Insull made the mistake that would seal his fate and, in its ripple effects, vastly expand the practice of utility law. That summer Insull, using a portfolio of stock in his own companies as collateral, borrowed heavily from Chicago and New York banks to finance the purchase of Cyrus Eaton's stock interests in Insull's businesses.[17] The bankers had urged the purchase, knowing that Insull distrusted Eaton and viewed him as something of a corporate raider.

In September 1931, England went off the gold standard, and the stock markets again collapsed. With the collapse of the markets, Insull's portfolio of stock collateral fell under water and the bankers moved in for the kill. After a brief fight to survive, Insull acceded to the demands of the bankers. On June 6, 1932, Insull dictated and signed papers resigning from over sixty corporations. Afterwards he had a single sentence statement for the press: "Well, gentlemen, here I am, after 40 years a man without a job."[18]

"Well, gentlemen, here I am, after 40 years a man without a job."

—Samuel Insull

Insull was brought to trial in October 1934 on charges of mail fraud. On November 24, 1934, the jury retired and after two hours of deliberations announced their verdict of not guilty on all charges. In 1935, Insull was acquitted of state and federal charges of embezzlement. Insull's biographer, Forrest McDonald, summed up the meaning of the verdicts thus: "For his fifty-three years of labor to make electric power universally cheap and abundant, Insull had his reward from a grateful people: He was allowed to die outside prison."[19]

Depression Era Reforms Frame a Changing Regulatory Scope

Much like the early twenty-first century Enron scandal, the Insull scandal created headlines in newspapers across the country and changed attitudes about electric power regulation. Franklin Roosevelt campaigned for president in 1932 as a champion of public power.[20] In a campaign address on "Progressive Government" at the Commonwealth Club in San Francisco on September 23, 1932, Roosevelt famously vowed to fight "the Ishmaels and Insulls, whose hand is against everyman's . . . "[21] Roosevelt won the election in a landslide, but he did not proceed to nationalize the electric utility industry, as some had feared. Instead, in 1935 Congress passed a series of landmark legislation that fundamentally changed the regulatory scope of the electric utility industry and transformed the practice of utility law:

- *Public Utility Holding Company Act of 1935 (PUHCA)*[22]— PUHCA was intended to ensure that financial arrangements like Insull's would never be allowed to exist again. The meat of the Act required electric utility holding companies to register with the Securities and Exchange Commission and to operate in a single state or, if operating in more than a single state, to operate as a single integrated system.
- *Federal Power Act of 1935*[23]—The 1935 Act closed the regulatory gap that the Supreme Court had created in *Public Utilities Commission of Rhode Island v. Attleboro Steam & Electric Co.* by expanding the FPC's jurisdiction to include rates and market entry in connection with the transmission of power in interstate commerce and the sale of power for resale.
- *Rural Electrification Act*—President Roosevelt issued Executive Order 7037 in 1935 establishing

the Rural Electrification Administration (REA), and Congress followed by enacting the Rural Electrification Act in 1936.[24] The REA provided federally guaranteed loans to public agencies and cooperatives for the construction of electrical supply infrastructure in rural regions.[25]

This legislation created for the first time the need for a federal electric utility practice, focusing on administrative law and the intricacies of compliance with PUHCA and wholesale power regulations. Meanwhile, the rapid proliferation of electric cooperatives expanded the public utility practice in the states by creating hundreds of new entities in need of legal representation.

The "Golden Age" of Electric Utilities

The early 1940s brought world war but relative peace between private industry and public power advocates as America united to win the war. After the war's end, the SEC finished the work of divesting utility holding companies. By 1948, the number of subsidiaries that holding companies controlled fell from 1,983 to 303.[26] The electric utility industry then entered a golden age that would last until the early 1970s—"an age of build and grow." In this period of prosperity and stability, however, new legal specialties nonetheless emerged. Economies of scale and improvements in plant efficiency served to accelerate the reduction in the cost of electricity and the rates customers paid.[27] Transmission systems also became more efficient in moving power, allowing utility companies to pool their power systems, which enabled them to reduce fuel costs by dispatching the most fuel-efficient plant regardless of the owner of the plant. The increased interconnectivity of the grid also enhanced the reliability of customer service by allowing utilities to back each other up during emergencies. All of this created the need for utility lawyers to handle the increasing regulatory work occasioned by the proliferation of interstate wholesale transactions and their impact on retail rates.[28]

In 1935, Congress passed a series of landmark legislation that changed the regulatory scope of the electric utility industry.

Even more consequential for the utility bar, perhaps, was the development of nuclear power. Hiroshima and Nagasaki demonstrated the horror and the power of nuclear weapons, as well as the vast potential of nuclear fission as a source of electric power. In the early 1950s, national pride and a fear of falling behind opened the door for the commercial development of nuclear power stations by private industry. Congress adopted the Atomic Energy Act of 1954, which permitted for the first time the broad use of atomic energy for peaceful applications. Consistent with the optimism of the period, Atomic Energy Commission Chair Lewis Strauss, in a 1954 address to science writers, famously predicted that nuclear energy would become "too cheap to meter." The meaning and context of that phrase would be much disputed over the years, with Strauss's defenders explaining that the chair was referring to fusion technology, not fission technology, and that in context he did not intend to suggest that meters would go the way of the horse and buggy industry any time soon.

The post-World War II era also saw the beginnings of regulatory dysfunction in the fuel markets, which ironically enough created a dramatic expansion in legal work for public utility lawyers. In 1954, the Supreme Court ruled that natural gas producers that sold natural gas in interstate commerce to pipeline companies are "natural gas companies" and therefore subject to the regulatory oversight of the FPC.[29] This meant that wellhead prices would be regulated as public utility rates under the "just and reasonable" standard, much the same as for natural gas that interstate pipelines sold to local distribution utilities. The decision caught industry and its lawyers by surprise, and it would have a far-reaching impact on the electric utility industry. Faced with the Supreme Court's mandate to set the price of fossil fuels, the FPC experimented with different forms of price control for producers of natural gas over the next two decades.[30] These various methods for setting "just and reasonable" rates had two things in common. First, each relied on the cost of providing the service, rather than the market value of that service, to establish the regulated price of production. Second, no matter what the methodology, the price the FPC set was often below market value as measured by what economists refer to as the opportunity cost of producing natural gas. The result took some twenty years in coming, but in the delay it was no less consequential in its effect: uncertain, changing, and inaccurate price signals followed by disruptive changes in fuel markets and power plant investment metrics. By the 1970s, the industry had entered a period of crises.

The 1970s: Opportunities and Crises

The decade of the 1970s began, however, with new opportunities for the electric utility bar premised on the

twin hopes that new environmental legislation would clean up the air and water pollution that industry had caused and that nuclear power would provide a new, low-cost, and clean resource to significantly reduce pollution. In 1970, President Richard Nixon created the Environmental Protection Agency to fix national guidelines for environmental protection and to monitor and enforce them,[31] and in the same year, on April 22, 1970, the first Earth Day demonstrations were observed. Senator Gaylord Nelson of Wisconsin was the inspiration for the first Earth Day, which in keeping with the early civil rights and antiwar demonstrations, he conceived as a consciousness raising teach-in.[32] Barry Commoner, Paul Ehrlich, and many other notable environmentalists spoke at different locations throughout the country. Echoing today's climate change debate, the speakers emphasized that the issue was a matter of survival and that time was running out. CBS newscaster Walter Cronkite, the nation's preeminent anchor at the time, hosted an hour-long special that night, "Earth Day: A Question of Survival." The program opened thus:

> Professor Barry Commoner: This planet is threatened with destruction and we who live in it with death. The heavens reek, the waters below are foul, children die in infancy, and we and the world which is our home live on the brink of nuclear annihilation. We are in a crisis of survival.[33]

It is said that an estimated twenty million people gathered at the Earth Day teach-ins.[34] On the CBS broadcast, however, Cronkite reported that the gatherings did not attract the broad cross-section of America that its sponsors wanted,[35] a reference perhaps to the fact that the participants were mostly anti-war and anti-Nixon youth. Regardless, Earth Day was a tremendous success. In 1972, Congress adopted the Clean Water Act[36] and the Clean Air Act.[37]

However, the emerging fuel crises of the 1970s were as momentous to the utility industry as this new environmental legislation. Responding to incentives created by federal regulation, in the late 1960s and early 1970s, the electric utility industry increased its utilization of crude oil and natural gas to produce electricity. What was once a source of peaking power, price-capped natural gas was being used more and more broadly so that usage of gas doubled from 10 percent to 20 percent of electricity production. In the same way, the Clean Air Act encouraged utilities to burn the more environmentally friendly crude oil that was produced overseas. However, the screw began to turn in 1971, when the FPC, concerned with dwindling reserves of natural gas, raised price ceilings in an effort to stimulate production. Then the OPEC oil embargo from October 1973 to March 1974 caused sharp increases in the price of fossil fuels and disruptions in supply. Five years later, in 1979, a second shock occurred in the wake of the revolution in Iran and the hostage crisis. Crude oil prices again rose sharply with more supply disruptions.

At the time of these disruptions, crude oil and natural gas were substitutes for each other, with both being capable of fueling the production of electricity, so that the opportunity cost—the market value—of natural gas increased with the price of oil. Natural gas prices increased especially sharply in the intrastate markets, which the Natural Gas Act did not reach and did not control. The upshot was that gas sold in the interstate market became scarce as producers withheld their supplies from the price-controlled interstate market and sold to intrastate pipelines that could pay unregulated prices. In response, the FPC ordered pipeline companies doing business in interstate commerce to adopt curtailment plans to ration the use of natural gas. Electric utilities, however, were given the lowest priority among users of natural gas because other customers of natural gas pipelines, such as local natural gas distribution companies, had no alternative ways to serve their customers; electric utilities that lacked access to intrastate supplies of natural gas were forced to find alternative fuels in a crises environment.

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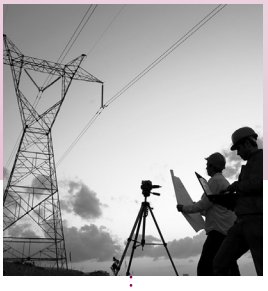

The electric and natural gas public utility bar was on the front lines of the controversies that would ensue. At the time, many scientists and other professionals were predicting an age of profound scarcity in which oil and gas would soon become unavailable on reasonable terms. Industry saw nuclear power and coal as the best, if not the only option, to keep the lights on and keep up with the growing demands for electricity that industry anticipated. Accordingly there was a rush to order new nuclear and coal plants, which gained additional impetus when Congress adopted the Fuel Use Act (1978)[38] with its prohibition on new power generators using natural gas except as a peaking resource. Rates for the average residential customer doubled from 1969 to 1977 and continued

increasing at rapid rates, due in part to rising costs but also due to lower usage of electricity and the resulting distribution of fixed costs over fewer billing units. The latter especially shocked industry and regulators because up until the mid- to late-1970s most everyone believed the demand for electricity was fairly unresponsive to price changes.

As electric rates increased, however, the industry was surprised by the efforts that customers made to curb consumption.[39] The country had entered a new cultural world where, increasingly, small was beautiful and conservation was chic. In what would become a symbol of the time, President Carter, wearing a sweater, famously urged Americans to turn down their thermostats. The lower growth rates and higher costs of electric service would lead to all sorts of controversies in the 1980s regarding imprudent planning of utility generation and excess capacity. Nuclear prudence proceedings would go on for months and even years as regulatory authorities and customers resisted the price increases. But the resistance would also trigger new legislation and the beginnings of deregulation and restructuring of the electric industry.

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The DOJ Lawsuit Against AT&T: Nothing is Sacred

In the electric industry, restructuring would expand the practice of public utility law, not shrink it as some feared. Restructuring of the electric and natural gas pipeline industries was borne of restructuring reforms in other infrastructure industries. In April 1974, MCI filed an antitrust lawsuit against AT&T because the communications monopoly refused to provide MCI's telecommunications network reasonable access to the local networks of the Bell Operating Companies. The lawsuit had been in the works for some years because new technologies had lowered the technological barriers to entry by would-be competitors to the Bell System.[40] Throughout the spring of 1974, the Department of Justice had been exploring its own antitrust lawsuit against AT&T. The DOJ attorneys anticipated that AT&T would urge that such a lawsuit was not in the public interest and that consumers had been well served by AT&T and the monopoly status that protected it from competition, i.e., the regulatory compact. The attorneys for the DOJ also assumed that the Department would never obtain the political support to file such a momentous action. In August 1974, however, President Nixon resigned from office, and the politically weak Gerald Ford succeeded him. Nixon's last Attorney General, William Saxbe, was persuaded that the AT&T lawsuit had merit. On November 24, 1974, when President Ford was on a visit to Japan, the DOJ filed the lawsuit. Apparently, President Ford had not been briefed or given advance notice of the filing.[41]

Of course, we understand today as we did in 1974 that telecommunications and electric service are two very different industries with different antitrust issues. Nonetheless, the biographies of Alexander G. Bell and Thomas A. Edison and the industries they created are similar in many respects. Bell was an inventor like Edison. Bell organized AT&T in 1885; just three years earlier, Edison flipped the switch on his Pearl Street Station. The famous Menlo Park laboratory of Edison is said to have been the model of the equally famous Bell Labs. Having started their own transformative personal commercial revolutions in the 1880s, both were succeeded by entrepreneurs who grew the business and exploited the technology they created under the protection of a regulatory compact and with the assumption of a natural monopoly. More importantly, the industries they invented still enjoyed tremendous prestige in the early 1970s after a near century of productivity gains and consistently lower and lower costs of service and commercial progress. Thus the AT&T lawsuit was a shock and a signal that changes were not only possible but would be forthcoming. Nothing is sacred, least of all in the commercial world of free societies.[42]

"Marginal Costs with Wings"

In 1976, two-and-a-half years after the AT&T lawsuit was filed, Jimmy Carter was elected president. In one of his early acts, Carter appointed Alfred Kahn, the former chair of the New York Public Service Commission, to be head of the Civil Aeronautics Board. Kahn was a former economics professor and a vocal supporter of deregulation. The academic in him had little patience for politics or tradition, and he believed in seeing the big picture. Even though that picture was often abstract, he had a great wit. He once referred to airplanes as "marginal costs with wings."[43] Later in the Carter administration, he would refer to the economic bad times as a "banana," having been admonished to never refer to an economic downturn as a depression. To the great shock of the establishment, Kahn engineered the deregulation of the airline industry. Although Kahn would later claim his role in

deregulation was exaggerated and that others, including President Ford and Stephen Breyer, deserved equal credit, another brick had fallen from the walls that protected the natural monopoly industries. Before Carter left office in 1980, two more bricks would fall, these with a more direct and significant impact on the electric utility industry. The Natural Gas Policy Act of 1978 provided for the immediate deregulation of some supplies of natural gas, such as "new" gas, and it provided for a phased, seven-year deregulation of certain other supplies of natural gas. Two years later, the Staggers Rail Act of 1980 deregulated the American railroad industry to a significant extent, replacing the regulatory structure that had existed since the 1887 Interstate Commerce Act.

The FPC becomes FERC, and PURPA Makes Waves

For the electric industry and its utility lawyers, the oil embargo, fuel shortages, and sharp price increases had changed everything. The public was demanding action, and President Carter was committed to the ideas of conservation and energy security. Most boldly, the Carter administration wanted to make the regulatory functions of the FPC subject to the control of the executive branch. This was too much for Congress, but the agency's name was changed to the Federal Energy Regulatory Commission (FERC).

In 1978, Congress adopted the Public Utility Regulatory Policies Act (PURPA), which appeared at the time to be a fairly modest piece of legislation. The intent was to promote energy efficiency and the use of domestic energy. It did so, however, by opening the electric grid for the first time to non-utility generation, with utilities required to purchase power at a price no greater than the utility's "avoided cost." To effectuate the must-buy obligation, PURPA identified two classes of non-utility generators, called Qualifying Facilities (QFs), for special, preferential treatment. In the first category were "small power production" facilities, which operated on renewable fuels like hydro, wind, solar, geothermal, municipal solid waste, or landfill gas. In the second category were cogeneration facilities, which were industrial facilities that, consistent with certain efficiency standards that FERC (successor to the FPC) established by rule, combined the production of electricity from a petrochemical or other industrial facility with the production of steam. Bearing in mind that the 1970s saw multiple crises and disruptions in the supply of fuel to electric utilities, in its simplest and most direct form, PURPA was intended to reduce and conserve fossil fuel costs; utilities would reduce their consumption of fossil fuels by buying more fuel efficient PURPA power instead of dispatching their own units with higher fuel costs. At the time, the QFs were not widely seen as avoiding the long-term, fixed capital cost of new generation.

All of that was about to change. The petrochemical and refining industries had some experience building large-scale generation for self-use. They were good at it. These industries looked at the economics of power plants and quickly discovered that they could build very large-scale cogeneration units, sometimes derogatively referred to as "PURPA Machines," that would meet the efficiency standards of FERC. As the QF industry saw things, compensation should be premised on investment costs avoided by the utility rather than just short-term avoided fuel costs—even though PURPA power was arguably no substitute for utility-controlled generation because oftentimes the PURPA power was non-firm and unscheduled and it could not be freely dispatched when needed to serve electric load. The QF business model, however, was greatly advantaged by some fundamental changes in markets.

For the electric industry, the oil embargo, fuel shortages, and sharp price increases changed everything.

The End of the Golden Age

It had always been understood that nuclear and coal plants were more expensive to build than natural gas or oil plants. During the fuel crises of the 1970s, however, nuclear power and coal plants had been conceived as cost effective, despite this cost disadvantage, by avoiding the expensive, unreliable, and dwindling supplies of fossil fuels involved in operating a natural gas or oil-fired electric plant. Even if it were assumed that fossil fuels would continue to be available—an assumption contradicted by the Fuel Use Act in 1978—it was believed that the fuel savings from operating nuclear and coal plants compared to the fossil fuel costs of oil and gas generation would "pay for" the incremental capital costs of nuclear and coal power. With the benefit of time, this belief proved to be an epic mistake. On January 29, 1981, President Reagan lifted the last price controls on oil. Two years later, he announced the accelerated deregulation of all categories of natural gas to be completed in 1986. Meanwhile, the proliferation of nuclear and coal plants and the lingering effects of high prices and a sluggish economy

had curtailed the demand for oil and gas. The FERC for its part eliminated the practice of "rolled-in" pricing of natural gas at the retail market, so that new gas supplies had to stand on their own value rather than being averaged with historically low cost, price-controlled volumes of gas. With the end of price controls, there was a so-called "glut" of oil and the shortage of natural gas vanished.

The changing fuel landscape and lower cost of capital borne of lower inflation was a boon for natural gas-fired electric generation facilities and the emergence of an independent power industry. Power plants, like airplanes, are "marginal costs with wings," and so natural gas power plants took flight. The lift came at precisely the wrong time for utilities attempting to convince regulatory authorities to put their new and very costly nuclear and coal power plants in rate base. As interest rates fell along with fossil fuel prices, the capital-for-fuel trade off involved in constructing coal and nuclear plants began to look, at least in hindsight, increasingly improvident.

On March 28, 1979, the Three Mile Island (TMI) Unit 2 reactor, near Middletown, Pennsylvania, partially melted down. A combination of mistakes and equipment failures caused the TMI accident. In its wake, public fear and distrust of utilities in general and nuclear power in particular reached crescendo levels. The regulations and oversight of the Nuclear Regulatory Commission became broader and more robust, and the management of the plants and their construction was scrutinized more carefully. Public utility lawyers found themselves in lengthy and complicated administrative hearings to obtain operating licenses for nuclear power plants that had been under construction for a decade with billions of dollars of sunk costs. One of the first responses to TMI on the state level came from the Pennsylvania Public Utility Commission, which issued an order on May 23, 1980, finding that Unit 1 of TMI was not "used and useful" in the public service and should therefore be removed from the rate base of the utility. More generally, in the post-TMI decade, changing safety designs for nuclear power prolonged the construction of power plants and doubled or tripled their cost.

All of that was happening as growth in electricity demand slowed dramatically and the changing fuel markets and interest rates turned the economics of power on its head. For utility lawyers, there were numerous rate cases with grave and potentially crippling financial consequences on utility shareholders and customers. Thus, much of the electric utility industry lost prestige and the confidence of the public and state regulatory authorities in the 1980s. The outcome was a rethinking of utility planning and ratemaking and, in many states, the adoption of integrated resource planning and so-called performance-based ratemaking. The era of "build and grow" in the Golden Age was officially buried as conservation, load control, demand side management, and energy efficiency took a featured place in utility planning.

Power plants, like airplanes, are "marginal costs with wings," and so natural gas power plants took flight.

PURPA's Offspring: Independent Power Producers and Renewable Energy

PURPA gave birth to the independent power producer—a private generation-only company with no ownership of wires and functioning independently of the electric utility. The success of large scale "PURPA Machines" demonstrated that there were no scale barriers to entering the power generation business. Perhaps as important, the success of the power generation developer allowed regulators to separate in their minds and in the regulatory model the power generation function from the transmission, distribution, and sales functions of providing electric service. Until then, most private utilities were vertically integrated on the assumption that one company could produce and deliver power more efficiently and economically by providing all four functions of electric service: generation, transmission, distribution, and retail sales. The PURPA experience, along with the successful restructuring of the natural gas pipeline industry into functionally separate production, sales, and transportation components, established that electric utility functions could be separated as well, and so challenged the business necessity of the vertically integrated utility. Accordingly, many in and outside of industry conceived that the fundamental regulatory compact of the electric utility industry needed to be re-evaluated.

In the same vein, PURPA's creation of a privileged status for the small power producer that used renewable energy lit a fire of entrepreneurial ambition under that industry. Indeed, it could be said that PURPA gave birth to the renewable energy utility bar. Although today we think of renewable energy as the cornerstone of climate change policies, in reality PURPA had nothing to do with

climate change. If anything, in North America, the 1970s had been a period of cool temperatures with alarmist reports of a coming ice age. *Time* and *Newsweek* magazines, among others, famously published articles about "ominous signs" that Earth's weather patterns had begun to change and the planet was cooling. Four years before, in 1971, two researchers at NASA's Goddard Institute published a paper in *Science* warning that increasing concentrations of aerosols in the atmosphere may be sufficient to reduce the Earth's atmosphere enough "to trigger an ice age." In 1975, however, a preface to a National Academy of Science report, "Understanding Climate Change, A Program for Action," would cast doubt on the fears of a new ice age. The preface stated: "[W]e do not have a good quantitative understanding of our climate machine and what determines its course. Without the fundamental understanding, it does not seem possible to predict climate. . . ."[44]

By 1981, however, six years later, the famous climatologist James Hansen was lead author of a paper that identified measured increases of atmospheric carbon dioxide and projected global warming;[45] in 1988, as head of NASA's Goddard Institute, he told Congress in a much publicized appearance that human-caused warming was a significant problem. In the same year, two United Nations (UN) organizations, the World Meteorological Organization and the UN Environmental Program, established the Intergovernmental Panel on Climate Change (IPCC). Two years later, the IPCC issued its 1990 Report,[46] the first of now five reports, predicting that, under the "business as usual" scenario for emissions of greenhouse gasses, the rate of warming over the next century would exceed anything seen in 10,000 years. After issuance of the 1990 IPCC report, federal and state governments and regulatory authorities would adopt numerous laws and regulations to stimulate the development of renewable energy.

Many state regulatory authorities supported the new wholesale markets . . .

The 1990s: The Revolution Has Begun

The wholesale market for electricity began to more fully emerge in the 1990s. In 1992, FERC gave independent power producers and QFs non-discriminatory access to the national transmission grid so they could wheel their power as they saw fit to wholesale markets and utility customers outside of the service territory of their local utility. FERC also broadened the scope of market-based rates. Power plant developers were granted exemptions to PUHCA, so they could spread far and wide geographically with few, if any, limits on corporate structure or leverage. The renewable energy industry received a boost of its own with the adoption of a production tax credit in 1992, the first of what would be many incentives to follow. Many state regulatory authorities supported the new wholesale markets and even began to investigate the possibility of retail competition.

In the wake of restructuring, the need to manage and schedule the wheeling of power between remote entities and purchasers of power while maintaining the integrity of the grid created the need for regional Independent System Operators (ISOs), sometimes referred to as Regional Transmission Organizations (RTOs). For the federal interstate grid, FERC created seven regional RTOs, while Texas, enjoying the only intrastate grid in the lower forty-eight states, created its own ISO (the Electric Reliability Council of Texas [ERCOT]) and was allowed to operate mostly independent of FERC rules. Some states continued to experiment with performance-based ratemaking, while controversies from the 1980s involving stranded power plant costs and PURPA-pricing continued. All these changes broadened the opportunities to practice "utility" law, which now seemed far too narrow a word to define what electric industry lawyers did.

With the blossoming of the independent power producer, PURPA began to lose much of its relevance except as a spur to renewable energy. To be sure, some disputes between utilities and QFs regarding the application of avoided cost pricing would continue. These disputes, however, served as a reminder of the difficulties in administered pricing that many regulatory authorities and industry participants hoped industry restructuring could avoid. By the second half of the 1990s, the industry had undergone sweeping restructuring activity, including a movement by some states to develop retail competition, the growing divestiture of generation plants by traditional electric utilities, a significant increase in the number of mergers among traditional electric utilities and among electric utilities and gas pipeline companies, large increases in the number of power marketers and independent generation facility developers entering the marketplace, and the establishment of ISOs as managers of large parts of the transmission system. The 1995 Report of the Electricity Committee of the ABA

Public Utility, Communications and Transportation Section began as follows:

> "The revolution has begun. During the past twelve months, the electric utility industry and its regulators began ushering in the new era with varying degrees of caution. The industry appears to be headed for a near total restructuring, with the Federal Energy Regulatory Commission (FERC or the Commission), state regulators, and industry participants all jockeying to have their say in determining the ultimate shape of the industry. A number of factions began to question seriously whether the traditional, vertically integrated utility model would or should survive the revolution. The deconstruction of this traditional model and the related advent of comparable open-access transmission has given rise to a host of related issues, such as allocating responsibility for stranded investment, the continued viability of the obligation to serve, and the need for the Public Utility Holding Company Act (PUHCA) and the Public Utility Regulatory Policies Act (PURPA). Contracts between utilities and qualifying facilities (QFs) continued to spawn litigation, because utilities recognized that these often uneconomic contracts were hindering their ability to compete."

The revolution continued apace in the late 1990s, when FERC issued three orders that set the foundation for "Open Access" competition. On April 24, 1996, FERC issued Order No. 888,[47] a final rule that established the basic framework for electric industry restructuring by requiring every transmission owner to offer non-discriminatory, comparable transmission service to others seeking such services over its facilities. In conjunction with Order No. 888, FERC issued Order No. 889, requiring the posting of available capacity on an electronic bulletin board, called the Open Access Same-Time Information System, and requiring Standards of Conduct that were modeled after similar regulations covering natural gas pipelines.[48] And in 1999, FERC issued Order 2000,[49] which required that each public utility that owns, operates, or controls facilities for the transmission of electric energy in interstate commerce make filings with respect to forming and participating in an RTO. The Commission also codified minimum characteristics and functions that a transmission entity must satisfy in order to be considered an RTO. Voluntary ISOs were formed in California (CAISO), the Southwest (SPP), the Midwest (MISO), the Mid-Atlantic (PJM), New York (NYISO), and New England (NEISO), and, as indicated above, albeit outside of FERC's jurisdiction, Texas (ERCOT).

The 2000s: The Revolution Continues Despite Disruptions

The restructuring of the industry continued in the new century, perhaps somewhat surprisingly in light of the two early century market disruptions involving California on the one hand and Enron on the other. The proximate cause of the California events appears to have been basic defects in the regulatory model that California used to restructure its electric industry. In 1996, the California Legislature restructured the industry with incumbent utilities being required to divest generation.[50] By design, under new and independent ownership, generation would be subject to competition with power purchased and sold on two exchanges and then passed on to retail customers by the incumbent investor-owned utilities (IOUs). The rules of the exchanges, however, discouraged hedging and long-term contracting practices, resulting in a wholesale market dominated by spot prices. To protect customers against volatile prices in the spot markets, California established bid caps in the wholesale market. Retail prices were also deregulated but subject to a default price cap. Thus, California entered restructuring with a market that would clear based on spot pricing, but with bid caps in the wholesale market and price caps in the retail market that were designed to put the brakes on excessive price increases.

The restructuring of the industry continued in the new century, perhaps somewhat surprisingly . . .

Numerous out-of-state independent power generation companies entered the new market by acquiring the generation that the incumbent utilities were required to divest. In early 2000, fuel prices spiked and wholesale prices followed, increasing beyond all expectations. The result was to trigger the operation of the bid caps in the wholesale market and a price squeeze on the IOU middlemen that were subject to the retail price cap. As the IOUs teetered on the edge of bankruptcy, payment concerns spread among wholesale suppliers, and wholesale markets seized up. The out-of-state power generation companies that had purchased the incumbents' generation were accused of manipulating the wholesale market

by engaging in such anti-competitive practices as withholding supplies. One of the out-of-state companies, Enron, was accused of shutting down a critical natural gas pipeline and engaging in manipulative bidding and trading practices in the wholesale energy markets. Regardless of the cause, California suffered a critical shortage of electricity. The state experienced multiple large-scale blackouts, and one of the state's largest energy companies collapsed in bankruptcy. As bid caps were eased to resolve the crisis, wholesale prices of electricity increased 800 percent from April 2000 to December 2000.

About a year later, the commercial face of natural gas and electric deregulation, Enron, filed for bankruptcy. Enron, like Insull's Empire, was a victim of leverage, a lack of transparency, accounting irregularities, and eventually a crisis in confidence. Like Insull's Empire, the stock market had inflated the price of Enron's stock premised on unrealistic growth expectations. Executives, struggling to meet those expectations, leveraged the balance sheet to juice earnings and increasingly engaged in risky ventures. Executives were also accused of hiding debt through so-called off-balance-sheet financings. Ironically, the same accounting firm that helped bring down the Insull Empire by questioning its accounting practices, Arthur Andersen, helped bring down Enron and itself by sanctioning what were said to be Enron's accounting irregularities. Neither would survive the scandal. Just prior to the scandal, Enron had become the seventh largest corporation in the United States. Once Enron lost the confidence of the markets, the company quickly unraveled and filed for bankruptcy on December 2, 2001. The Enron bankruptcy, at $63 billion in assets, was the largest on record at the time. In the aftermath of Enron, however, there was surprisingly little movement for reform of corporate structures and leverage.

The Energy Policy Act of 2005 did not dramatically restructure the industry as some had hoped and others feared.

Despite these twin scandals in the early years of the century, restructuring efforts continued, especially in the wholesale markets. George W. Bush had become president in 2001. As governor of Texas, Bush had signed restructuring legislation that would deregulate the wholesale and retail electricity markets in Texas. He and his appointees to FERC remained committed to restructuring and deregulation, notwithstanding the California and Enron debacles. In 2002, FERC began promoting restructuring by proposing a "one size fits all" standard market design (SMD).[51] The proposed SMD, however, would have shifted more authority to the regional RTOs than some regions of the country supported. The SMD also introduced into the national policy conversation such issues as real-time pricing, day-ahead pricing, transmission congestion pricing, and locational marginal cost pricing. All of this was too much for certain areas of the country, whose political leaders applied pressure on FERC through their elected representatives in Congress. As 2005 approached, FERC suspended the SMD pending the expected adoption of federal legislation. FERC, however, would continue its reform efforts by more narrowly pursuing adoption of SMD principles in a few regions of the country.

The anticipated federal legislation, the Energy Policy Act of 2005, did not dramatically restructure the industry as some had hoped and others feared. The Act repealed PUHCA and allowed FERC to relieve utilities of the obligation to purchase power from QFs in circumstances where there was reason to believe the wholesale market was operating reasonably.[52] The Act also offered tax and ratemaking incentives for the development of bulk transmission; addressed nationwide reliability standards in response to the 2003 blackout that affected widespread areas of eight U.S states and Ontario, Canada; and, for the first time, granted FERC siting authority for transmission located in so-called national security corridors. The Act also greatly enhanced FERC's enforcement powers. FERC's penalty authority increased to $1 million per day and, at the same time, FERC was granted authority to impose personal sanctions on violators. FERC would continue to make incremental changes to policy in such areas as market pricing, transmission access, and incentive rates for transmission investment. In 2011, FERC issued Order 1000, which among other things sought to facilitate competition in the market for developing new bulk transmission facilities.[53] It did so by eliminating to some extent the preference that incumbent utilities sometimes enjoyed in connection with the development of new transmission facilities that would be subject to regional cost allocation.

Here and Now: Restructuring Status

In the new century, the lower forty-eight states have restructured their electric industries at the retail level with different approaches, different market designs, and

varied results. Many states have stuck more or less with the traditional model of rate regulation for retail rates, augmented in some cases with some performance standards. Only a small minority of states have adopted retail competition. Texas has two regulatory models for IOUs: (1) retail competition and an unbundled market structure for customers residing in ERCOT, and (2) integrated electric service at regulated rates premised on cost of service ratemaking for customers located in the state but outside of ERCOT. A few of the early states to adopt retail competition backtracked after controversy or failed experiments, particularly after witnessing the turmoil in California. Studies have compared the retail cost of electricity in states with retail competition and those without, but with inconclusive results. As of today, the advantages and disadvantages of retail competition continue to be debated.

There is some regional variety in the design and administration of wholesale markets. At one end of the spectrum lies the ERCOT market in Texas. ERCOT is an "energy only" market, meaning that there is no separate capacity market for power, and the operator of the state grid, ERCOT, does not guarantee sufficient long-term planning reserves through administered capacity auctions or reserve requirements for load-serving entities. Instead, ERCOT issues periodic reports on planning reserves, and otherwise private actors in the market are relied upon to respond appropriately to those reports based primarily on expected price and profit incentives. All other power pools have some form of capacity market and administrative control over planning reserves.

The 21st century would see the widespread development of "utility scale" renewable energy power plants.

The Dawn of Utility-Scale Renewables

The twenty-first century would see the widespread development of "utility scale" renewable energy power plants. In 1992, as we have seen, the federal government adopted the first production tax credit. And in the aftermath of the first IPCC reports on climate change, states began adopting various preferences for renewable energy, including integrated resource planning rules, with set asides for renewables and renewable portfolio standards. By the early 2000s, most states had adopted renewable portfolio standards that either required or set goals for load-serving entities to include in their generation portfolios a prescribed amount of renewable energy to serve customers. These goals were effectuated through renewable energy credits, which were designed to serve as a currency of sorts that would fluctuate in value depending on the scarcity of renewable resources. As a sign of the rapid development of renewable energy, the credits would lose value quickly in markets like ERCOT because of the plentiful supplies of renewable energy in relation to the mandated requirements. In addition to direct incentives to support renewable energy in the form of mandates and credits, there were notable indirect ones, including transmission pricing. FERC began experimenting with transmission policies in the new century to encourage the regional development of bulk power and facilitate the access of remotely located renewable power projects to retail markets.

Texas had its own unique experiment with transmission pricing incentives. Texas had adopted postage-stamp ratemaking for transmission in ERCOT in the 1990s as a way to facilitate entry of new generation into the newly restructured market for wholesale generation. As its name implies, postage-stamp ratemaking is one basic charge for all, regardless of distance concerns and costs of service. In Texas, some of the best wind is located in remote areas of the state, far away from load centers. The combination of great wind, postage-stamp ratemaking, and production tax credits created an enormous boom for wind farms in those remote areas; however, the capacity of wind projects in those remote regions exceeded the ability of the transmission grid to export the power to load centers. Rather than curtailing their power and losing the benefit of the indispensable production tax credit, wind developers placed bids to sell their power at negative values. The negative prices distorted the market and penalized traditional generation, which was forced to operate inefficiently or even be shut down. The Texas Legislature's solution to the problem was the competitive renewable energy zone (CREZ) policy. Under CREZ, the state approved the construction by utilities of some $7 billion worth of projects to build out the transmission grid in the remote windy areas.

In the development of utility scale renewables, 2007 and 2008 were to be turning points. In 2007, the Nobel Peace Prize was shared by the IPCC and Al Gore for their efforts "to build up and disseminate greater knowledge about man-made climate change, and to lay the foundations for the measures that are needed to counteract such change." The economy crashed in 2008, and Barack Obama was elected president. The first

legislation to pass Congress was a stimulus bill that included direct grants, government guaranteed loans, and tax incentives for renewable energy.[54] The tax incentives included a 30 percent investment tax credit (ITC) for the cost of renewable energy plant. It also included accelerated depreciation of the plant over five years based on 80 percent of the cost of the plant. Developers would use the ITC and accelerated depreciation to leverage the scale of renewable generation, such as wind and solar, by using so-called tax equity financings. The combined federal tax benefits of such projects were large, roughly fifty-six cents on the dollar, and, as equity markets began to recover from the 2008 crash and the heavily subsidized capital costs of renewable projects decreased, the scale and number of the renewable energy projects grew substantially. On February 12, 2017, the Southwest Power Pool set a wind-penetration record of 52.1 percent, becoming the first RTO in North America to serve more than 50 percent of its load at a given time with wind energy. Texas grid operator ERCOT also surpassed the 50 percent wind energy penetration level in 2017, reaching 54.22 percent at one time on October 27, 2017.

The increasing penetration of renewable energy has fostered challenges and disputes regarding ancillary services and congestion management. Renewable energy is an intermittent resource that is difficult to schedule. For this reason, grids with a high penetration of renewable energy need to invest in additional ancillary services, such as various types of quick-response back-up generation. Traditional, base-load generation is not designed for load-following; thus it is forced to operate inefficiently due to the very low, short-term incremental cost of renewable energy. For renewables that are often located in remote areas with weak transmission access, there is a frequent need for so-called congestion management services and a significant investment in bulk transmission, such as the CREZ build-out in ERCOT. Often, renewable energy is not available during certain hours of the day, which has given rise to the so-called "duck curve" phenomenon in California—an expensive and potentially difficult to manage steep increase in the need for power at the peak hours of demand when the sun sets and solar power is not available.

Proponents of renewable energy, however, urge that, despite its ancillary costs and tax subsidies, renewable energy offers profound if not life-or-death benefits. Climate change, they believe, is a national emergency with the survival of the planet at issue. For many, the decarbonization argument alone is enough to support an aggressive renewable energy build-out incentivized by targeted tax and regulatory policies. In addition, separate and apart from decarbonization, proponents urge that conservation, energy independence, and the very low operating cost of renewables are real benefits, as is the potential for renewables to carve out a role of independence and freedom for individuals, not quite living off the grid perhaps, but close, with solar panels, micro-grids, and community sourcing of power improving quality of life.

What Does the Future Hold?

We have reached the end of this short history and the first centennial of the ABA Infrastructure and Regulated Industries Section. Last year, we appropriately changed our Section name to remove, as too narrow, the reference to "public utility" as a core organizing principle of what we do as lawyers. We are now infrastructure and regulated industries lawyers. As this report demonstrates, the name change captures the reality of lawyers practicing in the electric industry today, even for those of us who represent vertically integrated electric utilities. To be sure, all of the market participants in the electric industry are performing services that in one way or another are essential to the public welfare, so that in this respect we lawyers who represent them remain in heart, if not in name, public utility lawyers. So, too, are the lawyers who serve the regulatory authorities or customers that play an important oversight role in the electric markets. All lawyers who represent or monitor those market participants must attend to the realities of restructuring, regional power pools, new entrants, and new competitors as well as the numerous and complex laws, regulations, and protocols that supervise market behavior. With the field open to market disruptors and new forms of generation and competition, we represent industries that are no longer the only game in town.

So what does the future hold? As we have seen in this history, for the first 100 years of the electric industry, the future would be influenced by new technology and entrepreneurship on the one hand, and cultural attitudes toward control, planning, and distribution of opportunities and wealth on the other. The overall trend was one of technological progress followed in recent decades by a maturing technology and eventually a reduction in growth and productivity rates. Whether as cause or effect, the increase in laws and regulations as well as micro-management of the industry have accompanied a slowdown in productivity, but also achievements such as cleaner air and water, and greater diversity of supplies and market participants. And perhaps in response to the increasing number of laws and regulations, lawyers have become far more specialized in what they do. Like the first 100 years, the next century of legal practice is likely to depend on changes in technology, entrepreneurship, and cultural attitudes, although of course we cannot know the particulars. Obviously, advances in storage and renewable energy or other new technologies could be game changers, but so far it seems that entrepreneurs in these fields have mainly leveraged tax benefits and a different regulatory paradigm as opposed to game changing new technology breakthroughs. Changes in

cultural attitudes are perhaps even harder to predict than new technology. It is probably safe to say, however, that in the next century, electric power will remain the muscle of mankind, and lawyers will continue to play their essential role in representing people and whatever institutions are in place to provide what will still be, in whatever form, an essential public service.

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