

## ALTERNATING CURRENTS

**E**lectricity underpins modern civilization. This fundamental truth is often expressed in terms of “keeping the lights on,” which is appropriate, as lighting was electricity’s first major market and remains a necessity. But today that phrase is also a metaphor for its pervasiveness and essentiality. Electricity delivers a precision unmatched by any other form of energy; it is also almost infinitely versatile in how it can be used.

Consider what would not work and would not happen without electric power. Obviously, no refrigerators, no air-conditioning, no television, no elevators. It is essential for every kind of industrial processing. The new digital world relies on electricity’s precision to drive everything that runs on microprocessors—computers, telephones, smart phones, medical equipment, espresso machines. Electricity makes possible and integrates the real-time networks of communications, finance, and trade that shape the world economy. And its importance only grows, as most new energy-consuming devices require electricity.<sup>1</sup>

Electricity may be all-pervasive. But it is also mostly taken for granted, much more so than oil. After all, gasoline usage requires the conscious activity once or twice a week of pulling into the filling station and filling up. To tap into electricity, all one needs to do is flip a switch. When people think about power, it’s usually only when the monthly bill arrives or on those infrequent times when

the lights are suddenly extinguished either by a storm or some breakdown in the delivery system.

All this electrification did indeed begin with a flip of a switch.

## THE WIZARD OF MENLO PARK

On the afternoon of September 4, 1882, the polymathic inventor Thomas Edison was in the Wall Street offices of the nation's most powerful banker, J. P. Morgan. At 3:00 p.m., Edison threw the switch. "They're on!" a Morgan director exclaimed, as a hundred lightbulbs lit up, filling the room with their light.<sup>2</sup>

Nearby, at the same moment, 52 bulbs went on in the offices of the *New York Times*, which proclaimed the new electric light "soft," and "graceful to the eye . . . without a particle of flicker to make the head ache." The current for these bulbs flowed underground, through wires and tubes, from a coal-fired electric generating plant that Edison had built a few blocks away, on Pearl Street, partly financed by J. P. Morgan, to serve one square mile of lower Manhattan. With that, the age of electricity had begun.

The Pearl Street station was the first central generating plant in the United States. It was also a major engineering challenge for Edison and his organization; it required the building of six huge "dynamos," or generators, which, at 27 tons each, were nicknamed "Jumbos" after the huge elephant from Africa with which the circus showman P. T. Barnum was then touring America.

Another landmark event in electric power occurred a few months later, on January 18, 1883. That was the first electricity bill ever—dispatched to the Ansonia Brass and Copper Company, for the historic sum of \$50.44.<sup>3</sup>

It had required a decade of intense, almost round-the-clock work by Thomas Edison and his team to get to that electric moment on Pearl Street. Still only in his midthirties at the time, Edison had already made himself America's most celebrated inventor with his breakthroughs on the telegraph and the phonograph. He was also said to be the most famous American in the rest of the world. Edison was to establish the record for the greatest number of American

patents ever issued to one person—a total of 1,093. Much later, well into the twentieth century, newspaper and magazine polls continued to select him as America's "greatest" and "most useful citizen."

Edison was largely self-taught; he had only a couple of years of formal schooling, plus six years as an itinerant telegrapher, making such achievements even more remarkable. His partial deafness made him somewhat isolated and self-centered, but also gave him an unusual capacity for concentration and creativity. He proceeded by experiment, reasoning, and sheer determination, and, as he once said, "by methods which I could not explain." He had set up a research laboratory in Menlo Park, New Jersey, with the ambitious aim, as he put it, of making an invention factory that would deliver "a minor invention every ten days and a big thing every six months or so."<sup>4</sup>

## "THE SUBDIVISION OF LIGHT"

That was not so easy, as he found when he homed in on electricity. He wanted to replace the then-prevalent gas-fired lamp. What he also wanted to do, in his own words, was to "subdivide" light; that is, deliver electric light not just over a few large streetlights as was then possible, but make it "subdivided so that it could be brought into private homes."

Many scoffed at Edison's grand ambition. Experts appointed by the British Parliament dismissed Edison's research as "good enough for our transatlantic friends" but "unworthy of the attention of practical or scientific men."

To prove them wrong and successfully subdivide light, Edison would have to create an entire system—not just the lightbulb but also the means to generate electricity and distribute it across a city. "Edison's genius," one scholar has written, "lay in his ability to direct a process involving problem identification, solution as idea, research and development, and introduction into use." His aim was not just to invent a better lightbulb (there had already been 20 or so of one kind or another) but to introduce an entire system of lighting—and to do so on a commercial basis, and as quickly as possible.<sup>5</sup>

The inventor had to start somewhere, which did mean with the lightbulb. The challenge, for a practical bulb, was to find a filament that, when electricity

flowed through it, would give off a pleasing light but that also could last not just one hour but for many hours. After experimenting with a wide variety of possible sources—including hairs from the beards of two of his employees—he came up with a series of carbon filament, first made from cotton thread and then from cardboard and then bamboo, that passed the test.

Years of acrimonious and expensive litigation followed among Edison and other competing lightbulb inventors over who had infringed whose patents. The U.S. Court of Appeals finally resolved the legal fight in the United States in 1892. In Britain, however, the court upheld competing patents by the English scientist Joseph Wilson Swan. Rather than fight Swan, Edison established a joint venture with him to manufacture lightbulbs in Britain.

To create an entire system required considerable funding. Although not called such at the time, one of the other inventions that could be credited to Edison and his investors was venture capital. For what he developed in Menlo Park, New Jersey, was a forerunner of the venture capital industry that would grow, coincidentally, around another Menlo Park—this one in Silicon Valley in California. As an Edison biographer has observed, it was his melding of the “laboratory and business enterprise that enabled him to succeed.”<sup>6</sup>

Costs were a constant problem, and as they increased, so did the pressures. The price of copper, needed for the wires, kept going up. “It is very expensive experimenting,” Edison moaned at one point. The rising costs strained his relations with his investors, leading him to complain, “Capital is timid.”

But he did keep happy his lead investor—J. P. Morgan—by wiring up Morgan’s Italianate mansion on Madison Avenue in the East 30s in New York City with 385 bulbs. That required the installation of a steam engine and electric generators in a specially dug cellar under the mansion. The clanging noise irritated not only the neighbors but also Mrs. Morgan. Moreover, the system required a technician to be on duty from 3:00 p.m. to 11:00 p.m. every day, which was not exactly efficient. Making matters worse, one night Edison’s wiring set J. P. Morgan’s library on fire. But, through it all, Morgan remained phlegmatic, with his eye on the objective. “I hope the Edison Company appreciates the value of my house as an experimental station,” the banker dryly remarked.<sup>7</sup>

## “BATTLE OF THE CURRENTS”

Except for Morgan's mansion, Edison concentrated on developing central generating stations that would supply part of the city. But Edison's system had a major limiting flaw. Because of its low voltage, Edison's direct current electricity could not travel very far. If Edison had had his way, every square mile of a city would have needed its own generating plant, which would have certainly minimized the economies of scale and much slowed the spread of electric power.

Alternating current—otherwise known as AC—provided an alternative. The Pittsburgh industrialist George Westinghouse had acquired the patent of a brilliant but eccentric Serbian inventor, Nikola Tesla, that made alternating current practical. A transformer would step up electricity to much higher voltage, which meant it could be economically transported long distances over transmission lines, and then stepped down at the other end for subdivision into individual homes. That made possible larger generating plants, serving a much greater area. With that came true economies of scale and much lower costs.

What followed was a titanic struggle between Edison and Westinghouse. Because electricity was a networks system, there could be only one winner, and the outcome would be winner takes all.

Edison threw all his formidable prestige into his furious battle against alternating current, denouncing it as unsafe and warning that it would lead to people's accidental electrocution. At that time, electrocution happened to be much in the news, as the state of New York was considering the electric chair as the preferred method for executions. The state's electrocution expert, also secretly working for Edison, sought to inextricably link alternating current with electrocution and death by the electric chair. As part of the campaign, Edison himself electrocuted animals to demonstrate the dangers of alternating current. Edison's group went further and tried to dub the electric chair “the Westinghouse” and to describe execution by electrocution as being “Westinghoused.”<sup>8</sup>

Yet the superiority of alternating current was so clear that Westinghouse's alternating current system prevailed. Westinghouse grabbed market share from Edison and established the foundations for large-scale generation. Edison's technological stubbornness weakened his company financially during a time of business difficulties. His company, Edison General Electric—against his own

fervent protestations—was forced into a merger with a competitor. To add to the ignominy and Edison's pain, the merger stripped his name from the merged company. Thereafter, it would be known simply as General Electric.

Electricity's ascendancy was on display at the Chicago World's Fair of 1893, which was so popular that the number of people attending it over six months was equivalent to more than a third of the entire population of the United States. The throngs were amazed by the demonstrations of all the versatile things electricity could do. One of them was something remarkable that most had never seen before: the world's fair emblazoned the night, earning Chicago the nickname "the white city." At the fair's center the General Electric Company erected the "Tower of Light" as a tribute to Edison. But the exposition also demonstrated Westinghouse's victory over Edison, for it was Westinghouse and Tesla's alternating current that powered most of the lighting and the exhibits.<sup>9</sup>

The technical pieces were now in place for the growth of electric power. But what would be the business model?

## THE METER MAN

Samuel Insull first went to work in London at the age of fourteen as an office boy at the British magazine *Vanity Fair*. Then, answering a classified advertisement, he was hired as a secretary in the office of the European representative of Thomas Edison. There he made such a good impression that the chief engineer recommended him to the inventor, and in 1881 Insull emigrated to America to work as Edison's secretary. The first day Insull arrived in Menlo Park, Edison kept him up to midnight, dictating to him, and then told him to get some rest, as they would start again at six in the morning. The 117-pound Insull quickly established himself as the dynamo in Edison's organization. After Edison lost control of the company in 1892, Insull moved to Chicago to take over one of the 20 or so competing generating companies in the city.<sup>10</sup>

In the early 1890s, electricity was still a luxury product. Customers were charged by the number of bulbs installed in their homes or offices. Insull had much grander ambitions. He wanted scale: he wanted to lower prices and sell to as many people as he could and by so doing democratize electricity. He couldn't

get there by having people pay by the bulb. But how to do it? As often happens in innovation, Insull stumbled upon the answer by accident.

On a trip to England in 1894, Insull, worn out by his frenetic pace, decided to go down to the seaside resort of Brighton for a little rest. As evening rolled in, he was stunned to see the town light up. All the shops, no matter what their size, were bright with electric lights. How could this be? The manager of the local power plant, it turned out, had invented a meter that could measure how much electricity each store or home used. This made possible a new business model: instead of paying by the bulb, people could pay by their usage, along with an additional charge covering the capital invested in the project. "We had to go to Europe," Insull explained afterward, "to learn something about the principles underlying the sale of the product."<sup>11</sup>

The meter, imported by Insull to Chicago, would become the interface, the middleman so to speak, between the generating company and the customer. Electricity could be priced by consumption, not by the number of bulbs. This facilitated the scale that Insull wanted and helped propel the vast growth in his business. Insull did everything else he could to get scale, from aggressive marketing to installing the world's largest generators to gaining new customers like the rapidly expanding trolley lines, which he could electrify—all in order to sell to the most people he could, at the lowest prices possible. Insull assured other utility executives in 1910 that if they priced their product cheaply enough, they would greatly increase their sales and "you will begin to realize the possibilities of this business, and these possibilities may exceed your wildest dreams."<sup>12</sup>

## "NATURAL MONOPOLY": THE REGULATORY BARGAIN

To build his empire, Insull used the great financial innovation of the day—the holding company—a company that controls part of or all the interest in another company or companies. Insull constructed a pyramid of these holding companies, with each tier holding a controlling interest in the one below, on down to the base—the power plants themselves. In such a way, Insull, through his holding companies, could control a huge amount of assets with a relatively small outlay of capital, and thus reap outsize returns.

To build out the pyramid base, Insull would acquire local electric utilities and close their small, inefficient power plants, and build much larger central stations plus the transmission lines to serve groups of localities. Access to electricity would be much expanded, and prices would come down. In this way his companies became the provider of electricity to millions of Americans.

But chaotic competition threatened this new model. An electric generating company typically had to obtain a franchise from the municipality, and the municipality might grant franchises to a number of competing companies. Moreover, in many cases, the whole business of franchising could become quite corrupt—a franchise granted could also be a franchise withdrawn.

Altogether, between 1882 and 1905, the city of Chicago granted 29 power franchises, plus another 18 from towns that it had absorbed. Some of the franchises were as small as “a few blocks on the northwest side” or “the old twelfth ward.” Three of them covered the entire city. At one point, members of the Chicago City Council and their friends set up a competitive power company with the obvious purpose of forcing Insull to purchase it at vastly inflated prices. Such was Insull’s muscle, however, that he was able to knock down the price. The political instability surrounding a franchise made capital raising difficult; yet this industry had an enormous appetite for investment capital in order to expand and achieve the greater efficiencies and lower costs that came from larger scale.<sup>13</sup>

Faced with such a treacherous business environment, Insull promoted yet another innovation—this, not technical, but political: it was the regulatory bargain. Because of the large investment required by the business, the economics of this industry dictated, in his view, that it be a monopoly. But he argued it was a particular kind of monopoly—a “natural monopoly.” It was very wasteful to have two companies laying wires down the same alley and building capacity and competing head to head to supply the same customer. Costs to the customer would end up higher, not lower. By contrast, because of the efficiency of its investment, a natural monopoly would deliver lower prices to the consumer.

This was where the bargain came in. Insull recognized the political reality: If “the business was a natural monopoly,” he said, “it must of necessity be regulated by some form of governmental authority”—specifically a state public utility commission, which would determine the “fairness” of its rates. For, he said, “competition is an unsound economic regulator” in the electricity business.

This call for government regulation hardly endeared him to many of his fellow electricity entrepreneurs, but it became the way the business worked. In due course, this regulatory bargain was ingrained into public policy: as a natural monopoly, the electric power business had to be treated as a regulated industry with its rates and its profits determined by a public utility commission. What was required of the regulators in turn was, as Supreme Court Justice Oliver Wendell Holmes Jr. wrote in 1912, “fair interpretation of a bargain.”<sup>14</sup>

Wisconsin and New York established the first such commissions in 1907. By the 1920s, about half the states had done so, and eventually all of them did. This new regulatory bargain imposed a fundamental responsibility on the natural monopolist—the utility had the obligation to “serve”—to deliver electricity to virtually everyone in its territory and provide acceptable, reliable service at reasonable cost. Otherwise, it would lose its license to operate.

## ELEKTROPOLIS: TECHNOLOGY TRANSFER ACROSS THE SEAS

Chicago, lit up by Insull, became the world’s showcase for electricity. It had only one rival: Berlin, which became known around the world as Elektropolis.

The inventor Werner von Siemens and an engineer named Emil Rathenau would be decisive figures in Berlin’s—and Germany’s—electrical preeminence. Rathenau acquired the German rights to Edison’s electrical inventions. His company achieved recognition in 1884 when it succeeded in lighting up the popular Café Bauer, on the Unter den Linden, the most prominent boulevard in Berlin. Rathenau built up what eventually became AEG—Allgemeine Elektrizitäts Gesellschaft—German for the “General Electric Company.”

By 1912 Berlin would be described as “electrically, the most important city” in Europe. Siemens and AEG became formidable companies, competing head-on for contracts to electrify cities and towns throughout Germany.

Electricity was the hallmark of progress in the late nineteenth and early twentieth centuries. Illuminating that progress, Berlin, with three million people, and Chicago, with two million, easily outshone London, which, with seven million people, was the largest—and most important—city in the Western world.

Whereas Chicago and Berlin both had centralized systems, London was

highly fragmented, with 70 generating stations, about 70 different methods of charging and pricing, and 65 separate utilities, including such variegated firms as the Westminster Electric Supply Corporation, the Charing Cross Electric Supply Company, and the St James and Pall Mall Company, and many more. "Londoners who could afford electricity toasted bread in the morning with one kind, lit their offices with another, visited associates in a nearby office building using still another, and walked home along streets that were illuminated by yet another kind."

London lagged because of the lack of a regulatory framework that would have promoted a more rational unified system. A prominent engineer complained in 1913 that London used "an absurdly small amount of electricity" for a city its size. "There is a very great danger of our not only being last, but of our remaining last." London continued to lag for years after.<sup>15</sup>

## "AIM FOR THE TOP"

In the United States by the 1920s, Samuel Insull had implemented his formidable business model—taking advantage of the economies of scale derived from centralized, mass production to provide an inexpensive product to a diverse customer base—on a grand scale. His great electric power empire stretched across the Middle West and into the East. Chicago itself showed the scale of what had been achieved. When Insull took over Chicago Edison in 1882, there were just 5,000 customers in the entire city, and they paid by the number of electric bulbs. The optimistic view at that time was "as many as 25,000 Chicagoans might ultimately use electricity."

But by the 1920s, 95 percent of the homes in Chicago were wired for electricity. And they paid by usage. This was the prototype of Insull's vision for the world: "Every home, every factory and every transportation line will obtain its energy from one common source, for the simple reason that that will be the cheapest way to produce and distribute it." By the boom years of the 1920s, Insull himself had become not only one of the most famous businessmen in the world but also an icon of capitalism. Many saw him as the greatest business statesman of the age, his words were venerated like those of a sage, and "Insullism" was applauded as the future of capitalism.<sup>16</sup>

At the peak, in 1929, Insull's empire of holding and operating companies,

valued in the billions, controlled power companies in 32 states; and he held 65 chairmanships, 85 directorships, and 11 presidencies. He was a man of wide renown and a great benefactor. He was the "presiding angel" of the Civic Opera House in Chicago and was responsible for its building.

Reporters constantly sought out his wisdom. Asked by one reporter for his advice to young men starting out, he said, "Aim for the top." And what was his "greatest ambition in life"?

"To hand down my name as clean as I received it," he replied.

That was not quite to be.<sup>17</sup>

## "I HAVE ERRED": TOO MUCH DEBT

In the booming late 1920s, Insull's empire went on a buying spree, acquiring new companies and consolidating control of its holdings—all of this at higher and higher prices. In December 1928 he created a new company, Insull Utilities Investments, and to assure his control over his empire, he issued shares to the public at \$12. Before the summer of 1929 was out, the stock had hit \$150.<sup>18</sup>

The business required continually greater scale to bring down costs, deliver cheaper power, expand the customer base—and to assure profits. But such expansion created enormous capital needs, which Insull met by taking on more debt and by selling common stock to customers and the public. Insull relentlessly pursued growth. Even after the 1929 stock crash, his companies were still making investments, and taking on still more debt with some abandon. The enterprise became leveraged to an extraordinary degree. Moreover, Insull's accounting practices were suspect. His companies, it was said, would overcharge each other for services. They would also sell assets among themselves, marking up the book values after the sales; they virtually ignored accounting for the depreciation of assets. The whole business was predicated on Insull's ability to continue raising massive sums, even as investors had little understanding of the actual finances of the companies. But time was running out.

As the Great Depression deepened and the stock market continued to decline, banks began to call in their loans from Insull. The ugly reality became clear: the debt he had taken on for acquisitions far exceeded the value of the stock that had been pledged as collateral, for the value of this stock had been

plummeting. "I have erred," Insull said. "My greatest error was in underestimating the effect of the financial panic."<sup>19</sup>

In 1932 Insull's whole empire collapsed, done in by its debt and intricately complex corporate structure. When the bankers, at a meeting in New York, told Insull that they would give him no more respite and were pulling his loans, he is reported to have said, "I wish my time on earth had already come."

The *New York Times* had described Insull as a man of "foresight and vision . . . one of the foremost and greatest builders of American industrial empires." But now Insull was disgraced; "too broke to be bankrupt," said one banker. Insull's fall from the pinnacle was as precipitous and calamitous as any in American history.<sup>20</sup>

Thousands of small investors were left holding securities worth only pennies on the dollar. The federal government launched criminal charges against him for fraud and embezzlement. Not only was he now poor, he had also become, according to both prosecutors and much of the public, a scoundrel, an embezzler, and a crook. Everything else was forgotten.

But Insull was more than the scapegoat for the Great Depression. He had very quickly become the very embodiment of the evils of capitalism in an economically prostrate country that was close to losing faith in the system. Franklin Roosevelt, campaigning for president in 1932, pledged "to get" the Insulls.

Insull fled the country. He chartered a Greek freighter to cruise the Mediterranean while considering taking up an offer to become minister of power of Rumania or seeking political asylum elsewhere. When he docked in Istanbul, the Turkish authorities arrested him and packed him back to the United States, where the small, white-haired 74-year-old was transited, under armed guard, to a Chicago courthouse. Formidable prosecutorial talent was arrayed against Insull.

The jury took just five minutes to come to its decision. But the jurors, in order to avoid any suspicion, used various ruses to stall, including ordering in a cake and coffee and holding a birthday party for one of them. Finally, the jurors walked back into the courtroom with their decision. Insull was not guilty.

Despite his acquittal, Insull decided it would be better to live out his life in Paris. He had lost virtually all his money; even the ownership of his shirt studs became the subject of a lawsuit. In order to save money, Insull made his way around the city on the Paris Metro. In 1938 he collapsed from a heart attack at the Place de la Concorde station. There he died clutching a subway ticket in his

right hand. The press pounced on the fact that the great capitalist, the architect of the modern electric power industry, had died so poor that he was found virtually penniless, with just a few centimes in his pocket. He had little in personal effects to leave behind. His legacy was the business model for electric power.<sup>21</sup>

## THE NEW DEAL: COMPLETING THE ELECTRIFICATION OF AMERICA

The hostility toward Insull and the holding-company structure was enormous. It was widely believed that speculators and bankers had used the holding-company system to gouge customers, loot the utilities, and make inordinate and unconscionable profits. The Federal Trade Commission left no doubt of its view of the system epitomized by Insull with the following words—“fraud, deceit, misrepresentation, dishonesty, breach of trust and oppression.”<sup>22</sup>

But Insull's vision had also made electricity available to millions of Americans. “The decades of complex system-building were easier to ignore or forget,” wrote one scholar of the electric power industry. “They involved difficult concepts, esoteric technology, uncommon economics, and sophisticated management.” Insull's empire, and the business model he developed, brought the U.S. public affordable reliable electric power in a remarkably short period of time.

A top New Deal priority was to eliminate the holding-company system pioneered by Insull and by which most of the U.S. power industry operated. The utilities and their supporters fought back in the most contentious and bitter domestic political battle of the entire New Deal. “I am against private socialism of concentrated power as thoroughly as I am against governmental socialism,” Roosevelt declared. And in the end the New Deal did prevail with the historic Public Utility Holding Act of 1935, which defined the new legal structure of the electric power industry. Designed to get the Insulls out of electric power, it dealt what was triumphantly called “the death sentence” to the kind of complex holding-company network that Insull had masterminded. Holding companies were effectively permitted only for utilities that were geographically adjacent and in some way physically integrated.<sup>23</sup>

But when it came to electricity, the nation was divided in two. City dwellers had easy access to power, provided either by investor-owned utilities or

municipality owned. But rural dwellers had almost no access. Investor-owned utilities were not stringing lines out into the countryside because, they said, the costs were too high and the load density too low.

This left farmers stuck in the nineteenth century with endless hours of back-breaking labor. Cows had to be milked by hand. There were no refrigerators to keep food fresh long enough to get it to market. It was even worse for the farmer's wife. Hours had to be spent tending the hot stove; more hours beating the laundry clean outside. By one estimate, it took 63 eight-hour days a year per farm to pump and haul water back to the house. Half of all farm families did their laundry and bathed their children outside. All because there was no electricity.<sup>24</sup>

This changed with the New Deal, beginning with a federally owned dam at Muscle Shoals, in Alabama, which had been built to provide power for manufacturing explosives during the First World War. After a bruising political battle, it became the starting point for the government-owned Tennessee Valley Authority, with another 20 or so dams to be built as part of the system.

In 1936 Roosevelt signed legislation creating the Rural Electrification Administration. It provided loans to rural cooperatives, which built transmission and distribution lines to isolated farms across America that, until then, had had to depend upon kerosene lamps for their light and exhausting labor for their power. Some of the co-ops also went into electricity generation.

Other legislation established marketing authorities that gave preference to rural cooperatives and municipals for the power generated by the big new federal dams, like Bonneville and Grand Coulee in the northwest, and the Hoover Dam on the Colorado. The REA and the cooperatives that worked with it transformed the life of rural America.

## "LIVE BETTER ELECTRICALLY"

The 1950s and 1960s were the years in which America really became an electrified society. With the end of World War II, millions of U.S. soldiers returned home. Rising marriage and birth rates, combined with the G.I. Bill that made it easier for veterans to purchase homes, led to a surge in demand for new houses. A great suburban house-building movement rolled out from the cities, with more than 13 million new homes built in the United States between 1945

and 1954—and with electricity playing an increasingly important role in the American home and American life. During the postwar years of the 1950s, U.S. electricity demand grew at an astounding annual rate of 10 percent (compared with about 1 percent in recent years) as more and more uses were found for electricity in homes, offices, and factories.<sup>25</sup>

Nothing so much captured the build-out of electricity in the postwar era as General Electric's "Live Better Electrically" campaign, launched in the mid-1950s and supported by 300 utilities. But such a campaign needed a spokesman, indeed a national champion. It turned toward Hollywood.

In the early 1950s, Ronald Reagan's movie career was not going all that well. Yes, he was a well-known screen actor, but not quite a top leading man. As president of the Screen Actors Guild, the actors union, he had certainly honed his political skills behind the scenes, but that had done nothing to advance his presence on the silver screen. He and his wife Nancy had a baby at home, but no scripts or paychecks were coming into the house. Finally, his agent landed him a job at the Last Frontier Hotel in Las Vegas, doing stand-up comedy and opening for a singing group called the Continentals. Though Reagan protested that he neither sang nor danced, the money was good, and the two-week show was sold out, but he found the work boring, and he and Nancy had no interest in the gaming tables. This was not why he had become an actor.

Then his agent called with a more interesting offer: to host a proposed television series called *GE Theater* and become the roving ambassador for General Electric. The pay was very good—\$125,000 a year (\$1 million in today's money). He took it. Over the next eight years he spent a great deal of time on the road—the equivalent of two years—visiting 135 GE plants around the country, giving speeches, and meeting 250,000 GE workers. The time away from home was lengthened by his contract, which permitted him to avoid airplanes and crisscross the country only by train and car because of his fear of flying. (As he wrote to a friend in 1955, "I am one of those prehistoric people who won't fly.") In the course of those years on the road for GE, he developed "the speech"—the thematic amalgam of patriotism, American values, criticism of big government and regulation, and anecdotes and affable good humor—that would launch him into the governorship of California and then onto the presidency. But that was all in the future. In the meantime, *GE Theater*, with Ronald Reagan at the helm, became one of the top-rated shows on Sunday night.<sup>26</sup>

General Electric also turned the Reagan home in the Pacific Palisades section of Los Angeles into a stunning showcase for the all-electric home—"the most electric house in the country," Reagan called it. "We found ourselves with more refrigerators, ovens and fancy lights than we could use," Nancy Reagan said. GE kept finding new appliances to deliver—a color television, a refrigerated wine cellar, and an amazing new innovation, an electric garbage disposal. So great was the extra electric load that it had to be accommodated with additional wiring and a three-thousand-pound steel cabinet on the side of the house. Reagan would joke that they had a direct electric line to Hoover Dam.<sup>27</sup>

And so, long before Ronald Reagan became the fortieth president of the United States and the global proponent for freedom and free markets, he already became the fervent advocate for the "all-electric home." In a series of television commercials, he and Nancy invited viewers into their all-electric home, where they extolled many of their GE appliances, ranging from a toaster oven to a vacuum cleaner to a waffle iron to a portable television that they proudly carried onto their patio and out by the pool.

"My electric servants do everything," said Nancy Reagan, as her husband savored the coffee from an electric coffee maker.

"That's the point of living better electrically," replied a beaming Reagan.

After giving their young daughter, Patti, a tour around the house, and letting her identify all their household appliances, Nancy Reagan said, "It makes quite a difference in how we live."

To those who had lived through the deprivation of the Depression in America's cities and on its farms, the electric home and those "electric servants" truly did mean a veritable revolution in the quality and ease of domestic life. With what was already that characteristically affable shake of his head, Reagan summed it up, "You really begin to live when you live better . . ." And then his daughter jumped in to enthusiastically add, "Electrically!"<sup>28</sup>

Here it was—the American Dream and what would become a dream around the world—all electric. Or, at least, increasingly electric. Living better electrically was reflected in the rapid growth in the nation's consumption of electricity. But how to generate the electricity to meet the nation's growing demands for power?