

## **The Grid: A Journey Through the Heart of Our Electrified World**

Written by Phillip F. Schewe

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The modern electrical grid is one of the greatest achievements of the industrial age. It is everywhere, supplying the energy for the discoveries that are far more exciting than the pedestrian world of lines, poles, substations and power plants. The omnipresence of the grid causes modern man to take it for granted; after all, it has been at our disposal with the flip of a switch our whole lives. Of course, from time to time, the grid humbles us; the omnipresence is replaced by total absence, the lights go dark and the stars suddenly reappear over whatever metropolis we call home.

In *The Grid*, Phillip Schewe uses the great Northeast Blackout of 2003 as a vehicle to teach us the history of the modern American grid. He also attempts to conjure some images of the future. At times, the author adopts the tone and style of a dedicated high school science teacher, breaking down complex scientific laws and theories into simple parts and then building back toward complexity with metaphor and simile. Alternately, his words take on all aspects of popular history, painting the big historical picture with anecdote and biographical sketches of the great men of twentieth century electricity.

Of course, the author is neither a high school science teacher, nor a popular historian. Phillip Schewe holds a Ph.D. in particle physics and is the Chief Science

Writer for the American Institute of Physics. He has written for numerous national magazines and newspapers. When not engaged in research or scholarly writing, the author is an accomplished playwright whose plays have been staged in New York and Washington, D.C.

The morning of September 4, 1882 was perhaps the dawn of our electrified world. That morning, Edison, the “wizard of Menlo Park”<sup>1</sup> flipped the switch on a bank of steam generators that would light 1200 light bulbs in Lower Manhattan. The next several decades saw advancement after advancement in the world of electricity. Edison, Tesla, and Westinghouse, the leading electrical men of the day, discovered how to send the bottled lightning farther and farther, from the falls at Niagara to Buffalo, then to Rochester. Eventually the electricity was forced all 410 miles to New York, the birthplace of the grid. As the grid grew, subscribership and dependence increased.

Samuel Insull, another electrical founding father, grew the grid by giving free irons to the women of Chicago, in exchange for their subscribing to the Chicago Edison Company for their power needs. Insull also saw the chief advantages of a power monopoly - no expensive and messy duplication of wires and poles and greater economy of scale during power generation. Under his tenure, Chicago Edison squeezed out all competition in the Windy City, and then as Commonwealth Edison, the Midwest as a whole. Meanwhile, demand continued to grow and generation costs decreased as power plants were perfected.

The explosive growth of the grid continued through the Great Depression and the Second World War. The New Deal created the Tennessee Valley Authority (“TVA”),

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<sup>1</sup> PHILLIP F. SCHEWE, THE GRID: A JOURNEY THROUGH THE HEART OF OUR ELECTRIFIED WORLD 30 (2007).

whose hydroelectric plants would provide cheap power to hundreds of thousands who had previously been, quite literally, off of the grid. TVA power was used to extract aluminum needed to build the bombers that were dropping their payloads over Berlin and Tokyo. It was also used to power the atomic lab at Oak Ridge, Tennessee, where the nuclear deterrents that kept the Cold War cold were being developed. Consumer electrical goods were getting cheaper and cheaper and the Baby Boom was providing more and more future consumers.

The author describes November 9, 1965 as the worst day in grid history and the end of the ascendancy of the power company. That evening, the lights went out in the Northeast and 30,000,000 people found themselves lighting candles. At 5:16pm the lights went out in Buffalo. By 5:22pm they were out in Boston, and the Massachusetts National Guard was alerted for the first time since World War II. New York held out the longest, until 5:28pm, but it would also pay the highest price. While the blackout lasted only a few hours in most of the other cities between Buffalo and Boston, power was not restored in New York until the next morning. Some commuters spent 14 hours in powerless subway cars beneath the East River.

The causes of the outage were simple enough: a power surge in Canada had tripped a cascade of automatically closing breakers, and the local power companies could not fill demand after the sudden revocation of pooled power. The result changed public perception, and the corporate model, of the power company, something that had been fixed for almost eighty years. Throw in the energy crisis of the early 1970's and a fledgling environmental movement and you have a new era in electricity.

The second part of Schewe's work deals with the changes to the traditional power company occurring over the last forty years, the most important of which is deregulation. For the entire history of the American grid, power companies existed as private monopolies subject to federal regulations that pegged profit levels to certain benchmarks. In short, you could make a good living as a power man, but you would never get rich. Legislation passed during the Carter administration removed most federal regulation. With the absence of federal regulation, the states were free to completely deregulate the industry by breaking the private monopolies.

The prophets of deregulation claimed that competition would lower prices. Those seeking green power alternatives cited an option given to the consumer to choose green energy not available before deregulation. However, people - even smart people - seemed to forget that in the open market, prices not only go down, but they also go up. It is against this backdrop that deregulation led to spectacular failure.

California deregulated in 1998 – sort of. The traditional utilities, most of which had spun off their power generation capabilities during the tumultuous 1970's, were still heavily regulated. The prices they charged for electricity were pegged at certain levels by state regulations. The power generators, on the other hand, existed in a free market with the likes of power traders like Enron. As rolling blackouts hit California for the first time since World War II in 1998, the largest utility, Pacific Gas & Electric (“PG&E”), was at the mercy of Enron. PG&E was forced to buy power at a loss from Enron as long as it could, for it was PG&E that had to answer to the people. This resulted in bankruptcy for PG&E, as well as other traditional utilities, while Enron executives actually asked

independent power generators to shut down in order to drive up prices. Apparently deregulation was not the utopian silver bullet imagined by many.

In the final section of the book, the author attempts to explain what this all means, as well as chart a course for the future. The traditional power company, that of the first half of the twentieth century, suffers from our nation's anathema toward monopoly. It also suffers from an inertia that resulted from the completion of the grid in the mid-twentieth century. With the grid complete and the power monopoly established, the best new engineers were not drawn to the industry as Edison and Westinghouse were. Our growing national reluctance toward fossil fuel dependence and carbon emissions create another hurdle to the traditional model of the power company, in fact this is likely the straw that broke the camel's back during the Carter administration.

The author paints a picture of, and advocates, a world of small scale, predominantly green, power generation. He envisions houses with solar panels that not only power the house, but also put power back into the grid. We are told that we can accomplish this. The author states that:

If we're clever, we ought to be able to have air conditioning in Dallas while also keeping the ice sheet attached to Greenland. Let's combine the engineering genius expended on Apollo..., add it to J.P. Morgan's shrewd ability to marshal financial resources, and soften the venture with Thoreau's wise circumspection.<sup>2</sup>

That almost makes it sound easy.

*The Grid* is far more rewarding than one, ignorant of all things electric, may initially believe. The book is written as popular science and history. It lacks the academic denseness and pomposity of tone that makes it impossible to finish the dust jacket, let alone the body, of certain scientific treatises. However, do not confuse this for

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<sup>2</sup> *Id.* at 283-84.

lack of worth or slipshod background research. The book contains a wealth of knowledge spreading the dawn of the electrical age, its heyday, and deregulation. In addition, the author is neither afraid to paint his vision of the future, nor to predict something far less utopian. *The Grid* is an engaging discussion of the future and a thorough set of Cliff's Notes for the electrical past.