Power Struggle: The Hundred-Year War over Electricity. By Richard Rudolph and Scott Ridley. New York: Harper & Row 1986

Review by Timothy Schoechle

For anyone with an interest in renewable energy and in the reshaping of the electric power system, Richard Rudolph and Scott Ridley's *Power Struggle* is both a "must-read" and an indispensable reference. For those simply interested in industrial and social history, it provides an informative narrative of how technological systems can be shaped by economic, cultural, and political forces. This book is perhaps even more relevant today than it was when it was published nearly thirty years ago. As a collaboration between a professor of Community Planning and an experienced Washington DC journalist, it is written in a flowing and engaging story-telling style that makes it hard to put down.

Electricity might be ranked along with the discovery of the wheel, of fire, or the introduction of agriculture in its importance in the context of human history. It is hard to imagine what life would be like without electricity, yet its introduction occurred barely 130 years ago. We take it for granted—generally without considering how and why its delivery has been shaped the way it has or what alternative shapes it might have taken. Today, our electricity system—generation, transmission, distribution, and use—is at a transition point brought about by enormous forces including the phenomenal effects of climate change, unacceptable environmental risks, and technological advances in renewable energy. Although Rudolph and Ridley recognized these factors thirty years ago, the primary difference today is the suddenly vanishing economies of scale that were the original foundation on which our electricity industry was built.

The book traces the history of political and technical intrigues underlying the 100-year struggle—among "…industry executives, community activists, consumers, environmentalists, Wall Street analysts, and governmental officials." It opens with a lively account of the 1982 $24 billion engineering and financing debacle of the Washington Pubic Power Supply System (WPPSS), then characterized in the press as "woops". The WPPSS was a bubble of industry hubris and overbuilding that—in spite of overwhelming political influence at state and federal levels—was brought down by persistent citizen action and its own financial missteps.

To understand how the industry became structured the way it is, the book then rewinds to the late 1800s and begins the chronicle of the technical and institutional history. In particular, it looks at the early role of financiers and bankers beginning with Thomas Edison and J.P. Morgan and their complex and stormy relationship. From the beginning the electricity industry was characterized by the need for enormous investment in generation and transmission infrastructure in the form of large centralized structures depending on major economies of scale. No industry was more capital intensive—three dollars of investment being required for every dollar of revenue. For this reason, the electricity industry became entwined with the banking industry and Wall Street from its very earliest days.

J.P. Morgan, a wealthy Manhattan banker and financier of the late 1800s, was one of Edison's first customers and backers—but early-on the two split over business strategy. Edison saw the new industry as a public service delivering electricity to consumers as a commodity, while Morgan saw it as a manufacturing industry selling equipment to the proliferation of private and municipal power generators that were springing up during the 1890s. The authors recount how Morgan, through much maneuvering, co-founded Edison General Electric, then eventually removed Edison and his name, ultimately taking it over entirely. By the late 1920's Morgan owned over a third of all electricity generation in the United States. At that time half of all industrial capital in the United States was invested in electric power.

One of the most revealing accounts in the book is the early evolution of the investor owned utility (IOU). Between 1897 and 1907, publicly owned municipal power systems grew twice as fast as investor owned power. By 1912 there were 1,737 public power systems and 3,659 private companies in operation. As the authors describe it,

> For the owners of private electric companies, the most disturbing fact about public power companies was that their charges for electricity were half that of the privately owned…
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> The brutal infighting between private power companies gave way to a wave of conflicts over whether a town government or private entities would control electricity. In major cities the debates raged behind meeting room doors and in public forums. It was the beginning of a far-reaching power struggle that would last for more that a century and come to have a deep impact on local communities, the nation's political atmosphere. On the one side were political reformers, aware of how far the control of the emerging electric trusts might eventually extend. At stake was the control not only of markets and geographic territories, but the expansion of political and economic influence, and ultimately the future of an industry to be worth hundreds of billions of dollars. (p. 32)

The mounting growth of public power brought great angst among the leaders of private power companies. Then, in 1907, Samuel Insull, protégé of Thomas Edison and head of Chicago Edison, came up with a creative and pivotal solution. He brought forward the notion that electricity was a "natural monopoly" and that competition was not in the public interest. Instead, he proposed the idea of the public utilities commission (PUC) as a means to regulate and thus legitimize private utilities as monopolies. His breakthrough idea was promoted heavily by the industry and PUCs were formed beginning in Wisconsin and New York, soon to be followed throughout the United States. The PUCs were to fix standards of service and electricity rates, including guaranteeing the IOUs high rates of return on capital assets. This move was highly successful and gave the IOUs a leg up on municipals and rural cooperatives because of their access to capital and their legislative and political influence. Over the following decades, the local municipally-owned (munis) found themselves increasingly hampered and hemmed-in, while IOUs and private holding companies expanded their domains of generation and transmission throughout the country. However, It was not long before the inequities and unintended consequences of regulation became apparent. Asset bubbles and industry excesses grew throughout the 1920s with increasing centralization and consolidation, ending abruptly in 1929 with the stock market crash that began the great depression.

The book goes on to cover subsequent eras in the electricity industry's evolution, including its major contribution to the 1929 crash, the subsequent collapse of the Insull and Morgan empires, and the ascendency of federal influence during the depression era. The authors offer absorbing accounts of the presidential nomination of Franklin D. Roosevelt, fiercely fought by the industry, and the subsequent New Deal landmark electrification projects including the Public Works Administration (PWA), the Rural Electrification Administration (REA), the Tennessee Valley Authority (TVA) and the Bonneville Power Administration (BPA) along with massive hydro and transmission projects that finally brought electricity to virtually the entire country.

The authors describe in detail the behind-the-scenes political scheming and manipulation around nuclear power that emerged during the 1950s and grew into the 1980s. Nuclear power, inherently tied with government subsidies and guarantees, was not as much about generating electricity as it was about generating money. The authors provide a fascinating account of how the industry was able to adroitly maneuver its way around the citizen push-back that emerged after the March 1979 accident at Three Mile Island and continue to build their money machine.

It was not until another accident in April 1986 at Chernobyl that the public resistance became effective.

The book recounts how a recurring theme over a century was used to deflect or disable citizens and environmentalists—the idea that public power was "socialist," or even "communist." A similar notion has also afflicted renewable energy initiatives—that they are "impractical." The authors describe these myths that persists today,

> A vastly different perception dominated the industry and federal government. Industry executives believed that alternative technologies (such as solar, wind, and geothermal energies) held promise for the future but were "impractical" in the short term. There was a more fundamental problem as well. Such decentralized power sources were not technologies that could be utilized for increasing centralization of the electric power industry and for laying the base for greater corporate expansion in the future… [T]he central issue of the energy debate and the one that had existed since the beginning: Who really controlled the decisions over choices of technology? …what the industry and Wall Street wanted or what the public wanted? (p. 140)

Power Struggle is a vital resource for those examining today's reemerging debates around such topics as renewable energy, municipalization, the "smart grid", nuclear power, developing countries, and utility regulation. The American electricity system is unique among industrialized nations in its privatized nature that springs from an ideological belief in capitalism and "free markets"—yet ironically, regulated monopolies are in fact anything but "free".

In the final chapter of the book, the authors describe how the electricity system is facing a fundamental "transition" away from a centralized structure. But at that time they were not aware of the dramatic drop in the costs of wind and solar (and natural gas) technologies that today suddenly undermine what has always been the fundamental organizing principle of the electricity industry—the advantages of centralized, capital-intensive economies of scale. One only need look at Germany's success of rooftop solar to see a spectacular example of the popularity and economic viability of decentralized renewable energy not reliant on economies of scale.

Perhaps an editorial complaint with the book might be the manner in which the references are organized. There are no footnotes or citations embedded in the text, but rather there are general summaries by page groups in the back of the book. Not only are these awkward to use, but they point only generally to the many important references cited. Nevertheless, *Power Struggle* is "required reading"—and quite engaging. The authors have provided an important historical sourcebook for those seeking to map the road a new clean energy future.