

SMART POWER: CLIMATE CHANGE, THE SMART GRID AND THE  
FUTURE OF ELECTRIC UTILITIES

by Peter Fox-Penner, Island Press 2009

Reviewed by William A. Mogel\*

Peter Fox-Penner, one of the energy industry's thought leaders, has written *Smart Power: Climate Change, the Smart Grid and the Future of Electric Utilities*. The 315 pages of *Smart Power* are divided into three major parts: (1) The Smart Grid; (2) Supply Side Challenges; and (3) Business Models for the New Utility Industry. In addition to the lucid text, almost 100 pages are devoted to three appendices, notes, and an extensive bibliography.

Fox-Penner opens with a folksy re-telling of the transformative effects from the introduction of electricity to the U.S. He labels the early years as the "First Electric Revolution." This introduction forms the backdrop for the discussion of the "Second Electric Revolution:"

[t]oday the electric power industry faces challenges far larger than any in its history. These challenges are motivated by two worldwide policy imperatives. The first . . . is the need to adopt policies reducing the impacts of global climate change . . . [t]he second is the need for greater energy security.

To meet these challenges, *Smart Power* suggests that the "new" electric power industry be redesigned to create "a decentralized control paradigm, [the] retooling [of] the system for low carbon supplies, [and] a business model that promotes much more efficiency"—all laudable goals. Significantly, Fox-Penner does not advocate a return to deregulation because of its "dismal track record."<sup>1</sup> Chapters three and four begin with a description of a trial experiment in Sequim, Washington involving 112 households that had installed custom designed computers which provided continuous feedback on both the price and quantity of power being used. Based on the feedback, a household's load was adjusted, saving an average of ten percent but at an equipment cost of \$1,000. Despite the savings, Fox-Penner argues that the obstacles to universal adoption of the Sequim-type experiment are consumers' "dislike [of] complex or volatile prices" and, in Chapter five, the mountain posed by state regulators reluctant to approve such investments by utilities.<sup>2</sup> He observes:

[s]marter electric pricing will be the single most important hallmark of the Smart Grid. Finding the political power to shift a nation built on flat power rates onto dynamic prices [time varying] will be regulation's first giant adjustment to the Smart Grid.

Chapter six offers a dim view as to future sales of electric power. According to *Smart Power*, sales will only grow by 0.15% from 2008 to 2030:

[s]ix major factors influence long-term sales, three of them positive and three negative. The positive factors are population growth, economic growth, and the

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1. Fox-Penner notes that today's electric power industry "is a contraption only a lawyer could love."

2. One of the investments needed is converting the "one-way grid" to a "two-way grid". Fox-Penner recognizes that to make the conversion to a two-way network "raises a plethora of thorny technical and regulatory issues."

trend toward electrification, especially automobiles. The negative factors are higher electric prices, energy efficiency policies and the onset of the Smart Grid.<sup>3</sup>

Don't panic! *Smart Power* is not predicting a "death spiral" for the electric industry, but a high level of risk from "sales uncertainty."<sup>4</sup>

Chapter eight, "The Great Power Shift", opens with Fox-Penner predicting, like so many others, that in the next fifty years the power industry will be forced to switch to low carbon fuels. Despite *Smart Power* providing a basic primer on renewables, it focuses on the problems to be faced from switching to renewables— availability, cost, and reliability.<sup>5</sup>

Chapters ten through thirteen of *Smart Power* take an incisive look at business models for the "new utility industry." Fox-Penner foresees two business models in the future— the "Smart Integrator" and the "Energy Service Utility."<sup>6</sup>

[t]he Smart Integrator business model is a utility that operates a regulated smart grid offering independent power and other services at market prices . . . the Energy Service Utility is vertically integrated, regulated, and must have strong EE [energy efficiency] incentives.

The analysis of business models would have benefited from a fuller discussion of financing issues, greater use of the internet, and the new technologies for storage of power that will supplant batteries.

In sum, *Smart Power* is a provocative and balanced thought piece that dissects the existing structure of the power industry to propose a new order. The future, according to Fox-Penner, is not control systems and generating technologies but in "provisioning the industry for change." Whether Fox-Penner's vision will or should become reality is more difficult to judge than the obvious merits of *Smart Power*.

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3. As to the role in the market place of electric vehicles, Fox-Penner is bullish:

"In the United States the largest use outside of the power sector is gasoline use for personal vehicles. As plug-in hybrid electric vehicles (PHEVs) are introduced, electricity will gradually displace gasoline."

4. Chapter seven, titled "The Aluminum Sky," discusses transmission issues:

"The regulatory approvals needed to build a large new transmission create one of the most difficult and time consuming regulatory labyrinths in the entire utility universe."

5. A helpful, multi-page chart showing current and future costs for each supply option, with an assumed \$50/ton emissions price, as well as a projected supply resource mix for 2030, are included.

6. A half-business model also is foreseen: the Smart Integrator with distributed generation.