Boom and Bust in Power Plant Construction: Lessons from the California Electricity Crisis

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Abstract. This article argues that competitive electricity markets are prone to the same cycles of boom and bust that appear in commodity markets and in a specialized industry like real estate. The article then demonstrates how boom and bust might appear in the western electricity system using computer simulation. A "business as usual" simulation shows that the west might be at the crest of a building boom and on the verge of a bust in wholesale prices. Without fundamental changes in the wholesale markets, the next construction boom would come too late to prevent a decline in reserve margins and the reappearance of price spikes. If we continue with the current market structure, we run the risk of exposing the western electricity markets to another round of reliability alerts and price spikes. The article concludes with suggestions for alternative market structures in California and a discussion of whether these suggestions apply to other countries engaged in electricity restructuring.

Keywords: power plant construction, computer simulation, investor behavior, boom and bust, system dynamics, western electricity markets

Introduction

The blueprint for a competitive electric industry in California was issued in 1994 and implemented by the Legislature in 1996. The new markets opened for business in 1998. By the summer of 2000, a full-blown crisis had emerged in the form of unprecedented outages and price spikes. The crisis conditions continued through the fall of 2000, spread throughout the west, and continued into the winter and spring of 2001. Then, to the surprise of many, chronic outages and price spikes did not appear in the summer of 2001. Demand was below levels reported in the previous year, and natural gas prices fell dramatically. New power plants came on line, and many more entered construction. As the year 2001 drew to a close some were predicting that the current building boom will lead to a glut of electricity supply. It appears that the western electric system is experiencing the boom and bust pattern that has appeared in other industries.

Many industries have experienced persistent cycles of boom and bust. The commodity industries suffer from chronic instability despite the fact that their products may be stored in inventory as a buffer between production and consumption. Buffer stocks do not exist in the electricity industry, so the industry looks to extra generating capacity to absorb the variations in supply and demand. In this sense, the electric industry is similar to the real estate industry with the reserve margin in the electric industry corresponding to the vacancy rate in the real estate industry. The industries are similar in several other respects as well. Developers in both industries face long delays for permitting and construction.
Both are capital intensive, so developers face the challenge of recovering high fixed costs through high utilization.

**Boom and bust in real estate**

The long history of real estate is dominated by a series of exuberant building booms and subsequent busts. To illustrate, Figure 1 shows the pattern of boom and bust documented in Homer Hoyt’s detailed account of land values in Chicago. The chart shows land values, new construction and business activity, all scaled in percent variation from a normal value. Hoyt described surges in population as an important external factor, but the key to the boom-bust pattern was the way investors reacted to the population surges. In a typical example, developers did not react in time to prevent land values from increasing far beyond the increase in population. The high prices then led to an exuberant response, described by Hoyt (1933, p. 387) as follows:

Developers scramble to build at many locations around the city, and a great many men work secretly and independently on a great variety of structures in many sections of the city. There is no central clearing house to correlate the impending supply of buildings with the probable demand, so that when all these plans came to fruition, an astonishing number of new structures had been erected.

This overreaction sets the stage for the bust: “Gross rents fall, and net rents fall even faster. Land values plummet, and foreclosures are everywhere.” Hoyt concluded by speculating that the “real estate cycle itself may be a phenomenon that is confined chiefly to young or rapidly growing cities.” But population surges are just one of many external factors that might set the stage for a boom and bust in construction. More recently, the external factor may take the form of a surge in income, as happened in cities like Dallas and Boston during the 1970s (DiPasquale, 1996; Sterm, 2000).

![Figure 1. Land values and construction cycles in Chicago.](image-url)