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Regulatory reform of the electricity industry in Japan: What is the next step of deregulation?

Hiroshi Asano

Central Research Institute of Electric Power Industry (CRIEPI), 1-6-1 Otemachi, Chiyoda-ku, Tokyo 100-8126, Japan

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Abstract

In Japan, competitive bidding for new generating capacity (IPPs) is in progress since 1996. Retail competition was introduced for large customers (contract demand over 2 MW) after March 2000. Although the liberalization is limited in part by the fact that the retail power market has only about 30% share of total electricity demand, the eligible customers now have a choice among the nine major utilities and ten new entrants. Since November 2001, the electricity industry committee has been discussing the next step of liberalization, including the opening of the market for medium-size industrial and commercial high voltage (6 kV) customers from 2004 and 2005 on. This paper presents the experiences so far acquired and the technical issues for further deregulation. The process includes the creation of nationwide power exchange and of a neutral organization to coordinate the transmission system by 2005. The paper deals with the characteristics of the new regulatory reform of the electricity supply industry in Japan during the period of 2003–2007. We show that it is important to understand the complexity of market behavior and design the market reform carefully.

Keywords: Deregulation; Electricity; Japan

1. Introduction

The electricity industry is facing radical restructuring that aims at improving efficiency and stimulating technological innovation in industrial and developing countries. Regulatory reform of the Japanese electricity industry, which includes deregulation and re-regulation of the industry, is currently taking place following the experiences in many other countries. The transition from a vertically integrated, state-owned energy sector to a private industry that faces competition requires adjustments that cannot be accomplished overnight in Asian countries, including China, Korea and Taiwan. A long transition from regulatory regime to another is not yet concluded. In addition to this transitional problem, each region should adapt their own liberalization model, considering individual specific factors such as natural resource availability and demand characteristics.

Although the Japanese economy began to improve slowly at the beginning of 1999, the improvement never gained solid footing. By the end of 2000, the economy fell into recession again, ending a somewhat short-lived recovery. Consumer spending has been weak, and exports and plant investment decreased. Japan's GDP shrank by 1.9% in 2001, the first decline since 1998 and the largest since 1980. However, GDP grew by 1.6% in real term during fiscal year 2002, and Central Research Institute of Electric Power Industry (CRIEPI) forecasts 1.4% expansion in fiscal year (FY) 2003 and 0.8% in FY 2004.

In Japan competitive bidding of new generating capacity (IPPs) has started, beginning in 1996. By 2000 retail competition was introduced for the large customers with contract demand over 2 MW. Although the liberalization is limited in part by the fact that the retail power market accounts for only about a 30% share of total electricity demand, the eligible customers now have a choice among the nine major utilities and ten new entrants. Since November 2001, the Electricity Industry Committee, the Advisory Committee for Natural

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Resources and Energy of METI[1] has been discussing the next step of liberalization, including the possible opening of the market for medium, industrial and commercial high voltage (6 kV) customers. The panel has reviewed the experiences in the US and Europe. Japan adopted a scheme of phased liberalization.

The restructuring in the Japanese electricity industry started later than in many other countries because Japan's government and industry have stressed energy security and global warming issues, compared to improvement in the efficiency of supply. The choice of the liberalization models depends on public perception concerning the electricity supply industry. Consumers expect reliable, stable supply of electricity as their top priority, having observed power crisis elsewhere, such as in California (Ariu, 2003). In February 2003, the Electric Utility Industry Committee reported to METI, recommending a step-by-step approach for developing market-based systems in the longrun, and the Cabinet approved the future direction of regulatory reform. The law was revised in June 2003 and will become effective in December 2003.

While maintaining vertical integration, the government mandated accounting separation in electric power companies and it plans to establish an independent organization to monitor the operation of power systems and coordinate transmission planning. It also decided to open the retail market to competition, except for low voltage customers[2]. A nationwide Power Exchange will be established in 2005.

This paper presents the experiences so far acquired and the technical issues for further deregulation. We show that it is important to understand the complexity of market behavior and design the market reform carefully. The paper deals with the characteristics of the new regulatory reform of electricity supply industry in Japan (JEPIC) during the period, 2003a, b–2007.

2. Current market structure and short history of deregulation

2.1. The structure of electric power industry in Japan

Japan's electric power industry comprises five types of entities: general electric utilities, referred to as the electric power companies (the EPCos, integrated utilities), as well as wholesale electric utilities, wholesale suppliers, special electric utilities, and electric suppliers of specified scale (Fig. 1). There are ten integrated utilities: Hokkaido, Tohoku, Tokyo, Chubu, Hokuriku, Kansai, Chugoku, Shikoku, Kyushu, and Okinawa. These are investor-owned, vertically integrated companies, each of which supplies customers with electric power on a retail basis in its service area.

Wholesale electric utilities with a capacity of 2 GW or above, including Electric Power Development Company (EPDC) and Japan Atomic Power Company (JAPC), sell electric power to the integrated utilities on a wholesale basis (long-term bilateral contract).

Wholesale suppliers[3] are plant operators selected through a competitive bidding systems implemented by each integrated utility to supply that integrated utility with electric power (long-term bilateral contract).

Special electric utilities, on the other hand, are permitted to engage in retail electric power sales to meet demand at designated delivery points. These are components of industrial complexes with generators and are independent from the utility. Electric suppliers of specified scale[4] are new entrants after partial deregulation in 2000 and use the transmission lines of the EPCos to engage in retail electric power sales to certain deregulated customers (above 2 MW, 20 kV). This unique player is generator and retailer for eligible customers of specified scale.

In FY 2001, ended March 2002, the integrated utilities generated 72.3% of all the electric power production, 1076 TWh. The power source mix in FY 2001 was 52.9% of thermal power, 8.3% hydroelectric power and 38.7% of nuclear power. The combined summer peak load for the integrated utilities in FY 2001 reached 182.4 GW and the annual load factor 56.7%. The ten integrated utilities sold a total of 824 TWh of electricity in FY 2001. Two large wholesale electric utilities generated 6.9% of the total, while wholesale suppliers generated 6.5%. Self-generators, mostly owned by large industrial customers, accounted for 14.3%. Special electric utilities and suppliers of specified scale currently provide only a small fraction of total retail supply (1.4% in April 2003).

2.2. Short history of deregulation

In 1951, Japan's electric power industry was corporatized and divided into nine regional electric utilities. Regional utilities are integrated. Before the current privatization, there was one government-owned generation and transmission company with regional distribution companies. In addition to the nine general utilities, there were two major wholesale utilities and some dozens of municipal wholesale companies. Before 1995 no IPPs were allowed to enter the industry. For the next half-century, these companies applied advanced technologies and have provided a stable power to support

[1]Ministry of Economy, Trade and Industry (METI).

[2]After 2005, the regulated market share will be around 5% of LV customers (small business customers) and 31% of residential customers. The remaining 63% will be competitive.

[3]Independent Power Produce (IPP).

[4]Called PPS (Power Producer and Supplier) in Japan.