

AESC Review Note 6

Electricity Market Reforms in Asia

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Introduction:

This review discussed the deregulation of electricity markets in major Asian economies, including Singapore, Japan, Korea, Taiwan, and China. The timeline of market reform, which include the liberalisation of generation, transmission, distribution and retail sectors are discussed. The positive impacts on market structure, electricity price, switching rate and system reliability are included. The citizen concerns related to the market structure, electricity tariff and energy security are highlighted. It thus provides good implication for Hong Kong restructuring the local electricity industry.

1. Electricity Market Reform in Singapore

Table 1. Timeline of Electricity Market Reform in Singapore

Timeline	Electricity Market Reform in Singapore
1995	The Singapore government corporatized the state-owned Public Utilities Board (PUB), which had been monopolized the electricity supply for more than 30 years
2001	Singapore's retail markets for industrial consumers were liberalised; Users with a maximum power requirement of 2 MW or above became contestable
2003	The Gencos were allowed to sell electricity to the National Electricity Market of Singapore (NEMS)
2015	The Electricity Futures Trading was initiated; Users with monthly consumption of 2,000 kWh or above became contestable
2018	The Open Electricity Market was expanded progressively to all users. It allows household and business users to select electricity retailers freely.

Source: (Energy Market Authority, 2011, 2019)

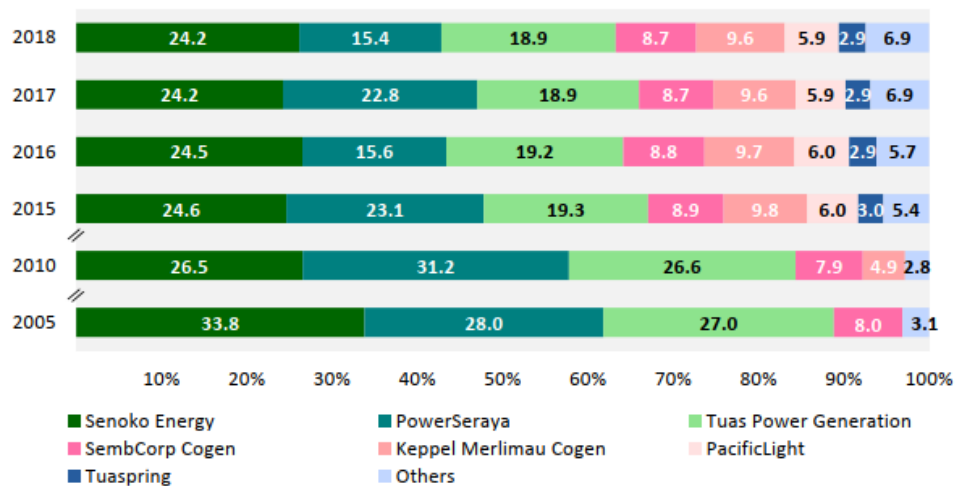


Figure 1. Electricity generation capacity by the generator; Source: (LegCo, 2019)

Singapore's market liberalization has created benefits towards the market structure, electricity price and system reliability. For market structure, the entry of small power producers has reduced the three MPPs. The generation capacity of three MPPs has been decreased from nearly 90% in 2005 to less than 60% in 2018 (LegCo, 2019). For electricity price, the adoption of cheaper fuel type has exerted downward pressure on wholesale electricity prices. It has led to a combinatorial decrease in wholesale electricity price up to 10% (Loi & Jindal, 2019). For system reliability, Energy Market Authority (EMA) has imposed strict performance target on interruption time. This certified the quality of services and helped Singapore's electricity grid maintain its status as one of the most reliable in the world (Loi & Jindal, 2019).

2. Electricity Market Reform in Japan

Table 2. Timeline of Electricity Market Reform in Japan

Timeline	Electricity Market Reform in Japan
1996	The competitive bidding for new generating capacity, along with the deregulation of market for independent power producers (IPPs) have been started
2000	Japan's retail markets for industrial consumers were liberalised; Users with contract power over 2 MW became contestable
2015	The market reform (phase 1) Enhance transmission capacity were started
2016	The market reform (phase 2) Expand retail competition to the residential sector were started; Users with contract power of below 50 kW became contestable
2020	The market reform (phase 3) Unbundle the transmission sectors were started

Source: (Goto & Sueyoshi, 2016; Prime Minister's Office of Japan, 2019; Shin & Managi, 2017)

Japan's market reform facilitates competition, drives down electricity cost and increases consumer choices. For market structure, users may purchase electricity from new market players, in addition to the monopolistic power company. The market shares of new players have been increased from 9% to 14% from 2016 to 2017 (Matsubara, 2016). For electricity price, some incumbents offer the dynamic pricing system, for instances, the Kansai Electric Power Company (KEPCO) provided the Metered Usage Lighting A and B for clients. This allows clients' reduce the electricity bill by shifting their peak-hour loading (Kansai Electric Power, 2019). For the switching rate, 1.5 million users had switched to new incumbents by the end of 2016, accounting for 2.4% of nationwide consumers (Obayashi, 2018).

3. Electricity Market Reform in South Korea

Table 3. Timeline of Electricity Market Reform in South Korea

Timeline	Electricity Market Reform in South Korea
2001	The Korean government privatized the generation sector to create a competitive electricity market; The generation portion of KEPCO was split into 6 companies
2003	The plans to restricting and privatization of distribution sector were ceased when President Roh came into power in 2003

Source: (Kim & Kim, 2011; Nicolas Simon & Buckley Tim, 2019)

In South Korea, the market reform has not been completed. Competition is allowed on the supply side, however, a monopoly exists on the demand side (Tsai, 2016). The literature discusses issues related to the current market structure. Firstly, there is imperfect competition among the generation companies, second, the system leaves

opportunistic interference by the government, and last, the public distrust exists in Korea (Kim & Kim, 2011). Therefore, officials may adopt the regulatory reforms, particularly price-setting mechanism, and consumer engagement are priority areas for market reform (Ngar-yin Mah et al., 2012).

4. Electricity Market Reform in Taiwan

Table 4. Timeline of Electricity Market Reform in Taiwan

Timeline	Electricity Market Reform in Taiwan
1995	The electricity market reform was planned, however, failed to raise the public consensus and realized liberalisation
2016	The Electricity Act was passed, which liberalized the renewable energy market. The RE producers could sell the electricity to end-users directly

Source: (Bureau of Energy, 2016; Environmental Information Centre, 2017)

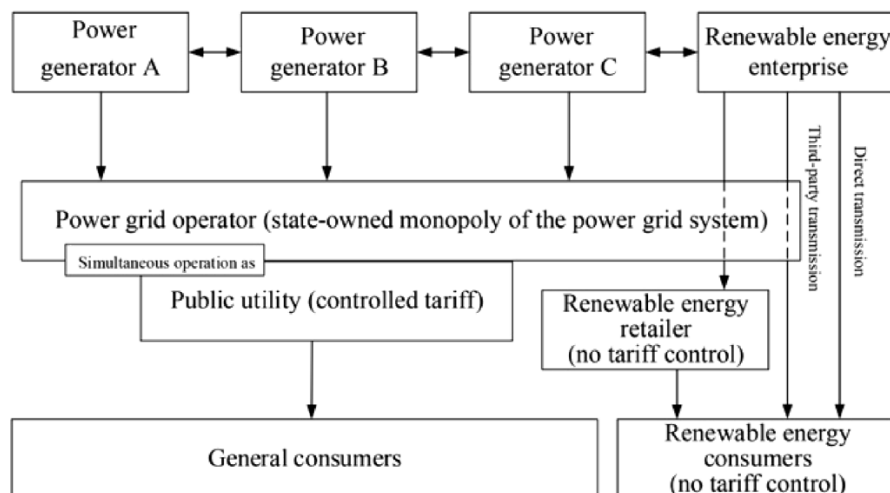


Figure 2. Electricity market structure after the Electricity Act; Source: (Tsay & Chen, 2019)

In Taiwan, the renewable energy market has been deregulated, however, the traditional power market has not been liberalised. The literature discussed the citizens' concerns regarding the electricity tariff and energy security. Firstly, residents worry that the low electricity tariff cannot be sustained. Referred to the International Energy Agency statistics, the Taiwan residential and industrial power price was the 2nd and 7th lowest in the world in 2016. Most residents feel anxious that the market competition would lead to inefficient operation, asymmetry of information and rising tariff (Tsay & Chen, 2019). Secondly, citizens feel puzzled about the energy security issues. Due to its specific political and economic status, Taiwan cannot import electricity from neighbouring. Once the innovative market mechanisms and system grids cannot operate efficiently, the power shortage would easily happen (Gao et al., 2018).

5. Electricity Market Reform in China

Table 5. Timeline of Electricity Market Reform in China

Timeline	Electricity Market Reform in China
1998	The pilots of “Separation of generation from grid and bidding for on-grid” were trialed in 6 provinces
2002	The Chinese government initiated the 1 st round of market reform to shift the power industry from vertical integration to fair competition; The former State Power Corporation (SPG) has been split into 2 major grid companies, 5 major power generation groups and 4 major auxiliary groups
2006	The 1 st Renewable Energy Law was enacted for the exploitation and utilization of renewable energy sources
2015	The Chinese official launched the 2 nd round of market reform. It aims to (1) increase generation asset efficiency, (2) reduce energy consumption, (3) facilitate renewable energy growth and (4) decrease industrial electricity prices

Source: (Guo et al., 2020; Mou, 2014; Ngan, 2010)

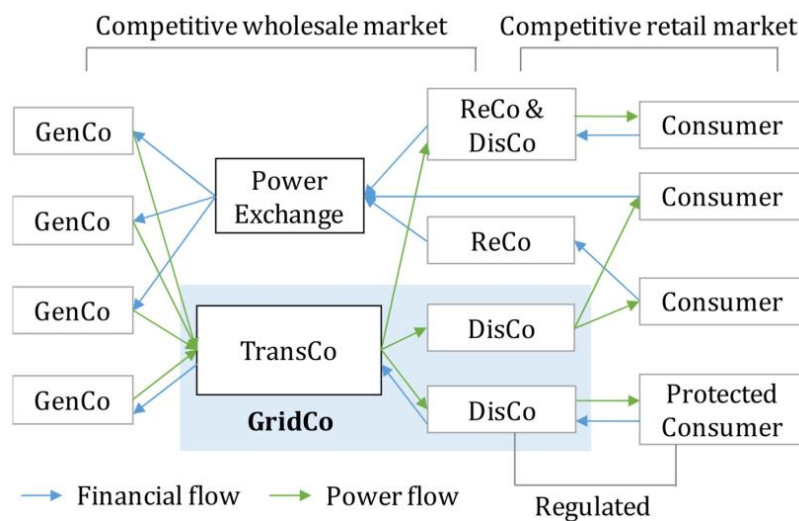


Figure 3. Electricity market structure after the 2nd electricity reform; Source: (Guo et al., 2020)

In China, the market reform has facilitated fair competition. For the generation sector, the market liberalization has reduced the dominance of the largest GenCos in Guangdong, Shandong and Shanxi provinces. The market shares of those GenCos have been reduced to below 30% by 2018 (Lin et al., 2019). For the retail sector, the number of ReCos and their transactions were increased significantly after the market reforms. Taking the Guangdong power market as an example, the number of consumers joining the ReCos agent transactions were increased from around 6,000 in 2017 to above 9,000 in 2018 (GPEC, 2019).

6. Electricity Market Reform of Major Asian Economies

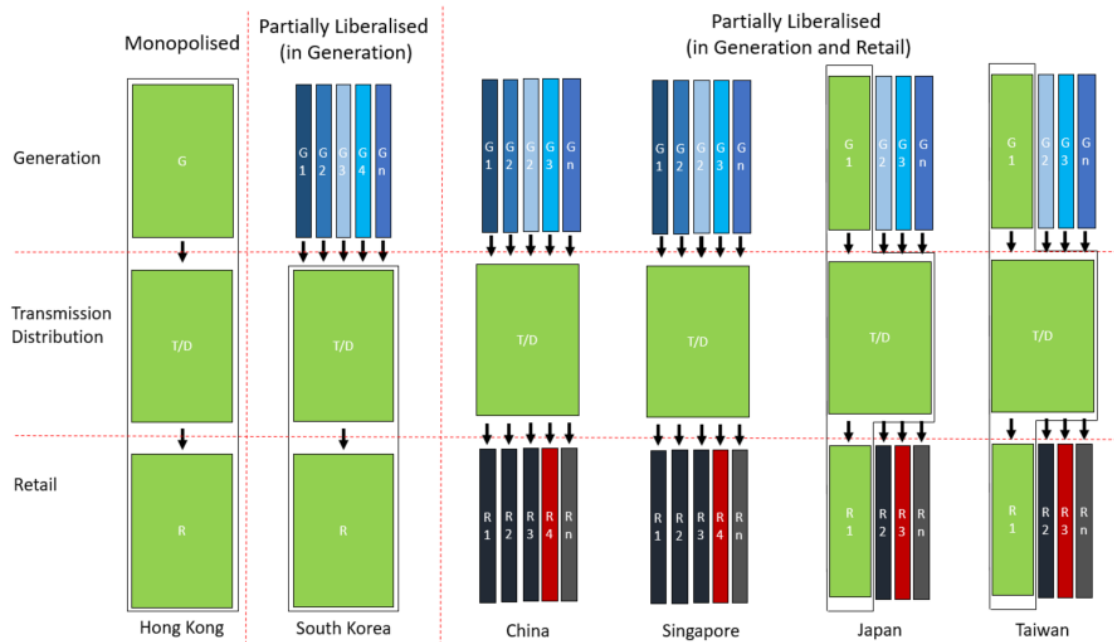


Figure 4. Electricity Market Reform of Major Asian Economies

Electricity market liberalisation is a key factor influencing the path and scale of sustainable energy transitions. The electricity market in Hong Kong is one of the very few in Asia that has remained completely vertically integrated and monopolised. In Hong Kong, the electricity market is monopolised by China and Lighting Power Company (CLP) and Hongkong Electric Company (HEC). Both power companies are vertically integrated with their own business. In the past two decades, there has been discussion in our society that electricity market reforms need to be introduced to improve competition, drive down electricity costs, and increase consumer choices (LegCo, 2019).

Among the Major Asian Economies, Singapore was the 1st country in Asia-Pacific to liberalise its electricity market. It thus improves competition, drives down electricity costs, and increases consumer choices (Energy Market Authority, 2019). Similar, China has launched the 2nd round of market reform in recent years, which created a competitive wholesale and retail market rapidly (Guo et al., 2020). On the other hand, the democratic countries, which included South Korea, Japan and Taiwan, liberalised their electricity market at a relatively slow pace. South Korea has only deregulated the generation sector, meanwhile, Taiwan has only liberalised its RE market. This mainly due to the new market concerns and energy security issues (Tsay & Chen, 2019).

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