For discussion
on 16 January 2001

Legislative Council Panel on Economic Services
Overseas Electricity Market Restructuring Experience

Introduction

This paper briefs members on the key findings of overseas visits made by the Economic Services Bureau (ESB) and the Electrical and Mechanical Services Department (EMSD) on the electricity market restructuring experience in other places and seeks members' comments on the way forward. There will be a PowerPoint presentation at the meeting to supplement the information in this paper.

Background

2. At the meeting of the Legislative Council Panel on Economic Services held on 9 June 2000, Members were briefed on the public comments received on the consultancy study on interconnection and competition in the electricity supply sector in Hong Kong. Thereafter, we have publicly stated our position that we would be conducting further studies with a view to mapping out the broad direction for the electricity supply sector before the next interim review of the Scheme of Control Agreements with the power companies scheduled for 2003.

3. To take forward the issue of increased interconnection, we have drawn up the scope for further technical studies and are going through the public tendering process. We will shortly be appointing a consultant to examine a number of planning, reliability and logistics issues and the time-frame required for the construction of additional interconnectors between the two power companies. The objective of the study is to resolve the technical issues to enable the taking forward of increased interconnection between the power systems of the two power companies to meet the needs under different including competitive market structures. It would also examine the corresponding impacts on the transmission network of the two power companies including interconnection transfer capability, system stability, load flow and other aspects associated with the reliability of electricity supply to Hong Kong

consumers. The findings and recommendations of the study are expected to facilitate us to determine the viable option or options for increasing the interconnection capacity between the two power companies to meet the needs of different possible market structure and operations.

4. In parallel, ESB and EMSD are examining market restructuring in other places with a view to identifying practicable and reliable options for the Hong Kong market in future. We have paid brief visits to regulators, grid operators, power companies and other players in the electricity markets in the United Kingdom (UK), the United States (US) and Australia in July and August 2000 to study the regulatory and institutional structure there and the operation of their competitive market. The key findings are summed up below.

Overseas Experience

5. The electricity markets of the three places are different in many aspects, including their situation prior to restructuring, the new regulatory and operational set up and the results of the market reform. A summary of the characteristics of these markets and our observations is at the Annex. The salient points are highlighted below.

6. The UK and Australia introduced competition in tandem with privatization of their state-owned electricity industry. The UK has seen some reduction in tariff since competition was introduced in 1990, but there are questions as to whether the benefits arose from competition or other factors, such as efficiency gain through privatization or falling primary fuel costs. On the other hand, there has been continuing concern about market manipulation by the major generators and the regulators are considering a revamp of the market rules for electricity bidding. The Australian competitive market has started for two years and is still at an early stage of development. The result is satisfactory so far with some reduction in electricity tariffs. Both the UK and Australian markets have so far been able to maintain acceptable reliability of electricity supply.

7. The electricity markets in New York and in San Diego of California were just opened to competition in summer 2000. Probably because this coincided with a period of tight margin in generation capacity, there was significant increase in electricity prices. Between June and July 2000, wholesale prices for electrical power in California

have increased on average 270%[1] over the same period in 1999. There were also press reports about electricity bills soaring by 40% to 100% in New York and San Diego, as well as blackouts in the Californian Bay Area and Silicon Valley. The situation has triggered widespread public concerns and calls for "re-regulation" in California. In response to the energy crisis in December 2000, the Public Utilities Commission of California granted on 4 January 2001 the utilities temporary rate increases ranging from 7 percent to 15 percent. During the crisis, the US Energy Secretary issued an emergency order requiring out-of-state power generators to sell excess electricity to California during severe shortages. The root causes of the problems are still a subject of much debate and investigations in the US, but, as far as California is concerned, it is suggested that the economic boom, particularly in Silicon Valley, has pushed demand for electricity to new heights while stiffer environmental regulations and the uncertainty of deregulation have caused the power companies not to build any significant new electric generators in years.

Lessons for Hong Kong

8. When considering whether to introduce a competitive market structure for the electricity sector in Hong Kong, it is important to recognize that electricity is different from most other commodities in that electricity cannot be economically stored on a large scale. Supply and demand need to be balanced almost instantaneously or electricity supply would be adversely affected at potentially significant social and economic costs. However, increase in supply (in the form of additional generation capacity) takes a long lead time after the need has been identified, and demand is relatively inelastic as users are normally not prepared to curtail their own load even at times of tight supply. The result is that interaction between supply and demand is sometimes not as responsive as desired.

9. In a totally competitive market, the role of centralised planning of new generation facilities would greatly diminish. It would be left to the market to interpret the market signals (e.g. movement in electricity prices, shortage of supply) and decide whether and when to plan for a new generation plant. The US experience however indicates that depending on the design, a market mechanism might not always be able to ensure that supply of generation facilities would match the

[1] Report submitted by the Chairman of the Electricity Oversight Board and President of the Public Utilities Commission to the Governor of California dated 2 August 2000.

demand growth. The result could be shortage of generation capacity with resulting price spikes or even black-outs.

10. In addition, Hong Kong has some structural shortcomings that need to be addressed if competition is to be introduced in the electricity market. For example, we have only a limited number of electricity suppliers, the supply of land for new generation facilities is very limited, and our local electricity market is relatively small.

Way Forward

11. We are taking forward the Investigation Study referred to in para. 3 above.

12. In parallel, ESB and EMSD are obtaining resources for creating additional posts for professional staff, including an Electricity Adviser for reviewing and mapping out the future market and regulatory structure for our electricity supply sector. We plan to make use of the new team to conduct further in-depth studies into various possible market options.

13. In the remaining part of this year and the next, we will examine the experience in other places in greater detail to see what other lessons could be learned and try to identify the key elements for effective and economic operation of a competitive market, bearing in mind that in Hong Kong we must uphold reliability of supply while bringing benefits to consumers.

14. As we proceed with further evaluation of various aspects of a competitive market, it would be prudent for us to also examine whether there are other forms of administrative regulatory arrangements that could equally bring benefits to consumers.

15. At the same time, we are looking across the border for potential sources of electricity supply. We visited Guangdong in September 2000 to understand more about the development of the electricity market there and explore scope for further cooperation with them. Although the Mainland is also pushing ahead with market reform of the power industry with a view to privatization and introducing competition, the situation is still very fluid. In addition, we have been advised that the electricity supply situation in Guangdong is expected to continue to be tight in the next few years. It is unlikely that they would

be in a position to provide us with economic supply of electricity in the short term. Notwithstanding that, we will maintain liaison with the Mainland authorities to keep in view developments there.

16. We will keep an open mind and actively study different options for restructuring the electricity market in Hong Kong with a view to maintaining continued adequacy and reliability of supply while delivering economic benefits for consumers compared to our existing system. At a later stage, we would crystallise our thinking into various options to provide a basis for further discussions at the Energy Advisory Committee, with this Panel and stakeholders concerned and among the community at large.

Economic Services Bureau
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Annex

Summary of Key Findings of Visits on the UK, US and Australian Electricity Market Restructuring

	US (New York and California)	UK (England and Wales)	Australia
Situation before restructuring	Mixture of private investor owned utilities, independent power producers and State-owned power generation facilities; price regulated by Public Services Commission (PSC)/Public Utilities Commission (PUC) using a rate-of-return type approach; power pooling arrangement existed in the East Coast for economic dispatch	Government-owned Central Electricity Generating Board (CEGB) ran all power stations (except for a few private plants run by large customers) and owned the transmission system; tariff set with reference to the estimated long-run marginal cost of power supply	State-owned utilities; electricity prices set by State Government regulation to cover the industry's costs plus any returns required by State Governments as shareholders
Legal instruments for present market structure	Public Utility Regulatory Policies Act 1978 (PURPA), which stipulated that electric utilities had to interconnect with independent power producers (IPP) and buy from them capacity and energy at the utilities' avoided cost Energy Policy Act 1992 (EPACT), which opened access to transmission networks Federal and Energy Commission (FERC) Order 888 of 1996, which opened transmission access to non-utilities, thereby establishing wholesale competition, and Order 889, which requires utilities to establish electronic systems to share information about available transmission capacity	Electricity Act 1989, which set up the Office of the Electricity Regulation (OFFER) and restructured the CEGB into three power generators, a transmission company and a distribution network consisting of twelve regional electricity companies Also rely on licensing conditions for generators to impose various requirements and controls	National Electricity Law, which supports the effective operation of the National Electricity Code National Electricity Code (NEC), which defines rules for wholesale electricity trading and access to electricity networks Individual State laws and regulations will determine when customers become eligible to participate in the wholesale electricity market or in the retail supply.

	US (New York and California)	UK (England and Wales)	Australia
Regulator	Many layers: FERC on federal rules, wholesale electricity price and inter-state power transmission services price; PSC/PUC on retailing of electricity at State level; Board of Independent System Operator on rules and regulations for operation of the transmission system and bidding process; Oversight Board on political oversight of the ISO, Siting Board on site selection for new power stations, etc.	Primarily Office of the Gas and Electricity Markets (Ofgem)	National Electricity Code Administrator Limited (NECA) on monitoring and reporting on Code compliance, managing changes to the Code and providing a means of effective dispute resolution where other dispute mechanisms created by the Code fail National Electricity Market Management Company (NEMMCO), being the independent market and system operator, on operation of a bidding and central dispatch process for balancing the power system supply and demand and maintenance of power system security in accordance with the Code Australian Competition and Consumer Commission (ACCC) on administering national competition law
Power pool	A power pool for each state, with trading on many different products like forward contracts, transmission constraints, etc.	England and Wales Power Pool	A power pool applies across the interconnected power system comprising the Australian Capital Territory, New South Wales, South Australia and Victoria. A separate pool will apply across the Queensland power system until a planned electricity interconnection with New South Wales is established next year
Generators	Many, including inter-state trading of power	About 60 generators, with participation of generators from Scotland (hydro) and France (nuclear)	Over 20 generators

	US (New York and California)	UK (England and Wales)	Australia
Grid owner /operator	Transmission lines individually owned but operated by ISO (also required by FERC to police market malpractice)	National Grid to own and operate high voltage transmission lines	Individually owned and operated in accordance with NEMMCO's dispatch arrangements
Distribution network	Incumbent utilities	12 regional electricity companies	Individually owned and operated
Retailer /distributor	Many	About 50	Over 30
Regulatory framework for segments without competition	RPI-x	RPI-x	CPI-x
Responsibility for demand forecast and facility planning	For the market to decide, but the Energy Information Agency produces short and long term forecasts for reference	For the market to decide; but National Grid publishes forecasts 7 years ahead for private companies to draw reference from	NEMMCO is responsible for co-ordinating global power system planning in conjunction with Network Service Providers and in consultation with market participants
Present state of competition (e.g. retail, wholesale, pool)	All customers can choose their suppliers, immediately following introduction of competition in 1998 in California or 1999 in New York	Restructuring process started in 1990, with competition being introduced for different categories of consumers; all users started to be able to choose suppliers in 1999	A competitive wholesale market commenced in December 1998. For the retail market, each participating State has defined a timetable for when a franchise customer, based on their level of electricity consumption or demand, will be eligible to have their choice of suppliers. Based on the timetable, the retail market will be fully opened up by January 2003

	US (New York and California)	UK (England and Wales)	Australia
Noticeable benefits of the restructured market	Considerable private sector interest in building new generation facilities; consumers may be benefited when more generation facilities come on stream to provide more competition	Tariffs fell by around 20%-30% compared to 1990, but it is not possible to tell whether the benefit is a result of competition or other factors like privatization or lower fuel price	The phased opening-up of retail competition has seen average price reductions of 14% in Victoria and 20% in New South Wales
Problems encountered	Lack of investment in generation facilities in the past decade, partly owing to uncertainties in future regulatory structure, leading to shortage of generation facilities Wholesale price in California increased on average 270% in June/July 2000, electricity bills increased by 40-100% Brown-outs in California in summer 2000	There have been continued price manipulation and market abuse in the power pool by a number of dominant generators, leading to a need for introduction of New Electricity Trading Arrangements to revamp the pool bidding arrangements	When a generating unit or transmission network failure occurs and all reserves are used, NEMMCO, as a last resort, may need to direct the reduction of customer consumption involuntarily to ensure that the power system always has a balance between supply and demand. With less than 2 years of operation, it is not possible to draw a definitive conclusion on the effectiveness of the National Electricity Market. Appropriate new investment and adequate supply and demand-side responses to pricing signals, are crucial to sustaining reliability in the longer term.