

ENERGY ADVISORY COMMITTEE

Electricity Market Review: Market Power

The Issue

To review the range of practices in assessing and mitigating market power in the electricity supply industry, and to consider possible options for the electricity market in Hong Kong.

Background

2. **Market power** is the ability of a market participant to influence market characteristics (e.g. prices, market share, etc.) to advance its profitability. When applied to a traditional regulated electricity market, market power would mean the ability of an incumbent power company to change prices and/or exercise its influence to disadvantage potential market entrants. When applied to a liberalised electricity market, market power would mean the ability of a power company to raise prices consistently and profitably above the competitive market price level.

3. In the electricity supply business, market power normally exists to some extent irrespective of the market structure owing to the following reasons:

- (a) Electricity is an essential commodity of which continuous, reliable supply is depended upon for everyday living and business operation. This makes the short-term demand for electricity quite inelastic in response to price changes. Suppliers holding sizable market share can take advantage of this inelasticity to vary prices, where not regulated, without suffering from reduced sales volume and revenue;
- (b) In a competitive market where the price for electricity is largely determined by the supply/demand margin, suppliers having sizable market share can influence the short-term supply/demand margin to drive market price upward; and
- (c) The electricity supply business is very capital intensive. Together with other constraints such as environmental restrictions and land scarcity, potential new participants often find it very difficult to enter an established market. Even when new generators can be

built to compete for supplying existing or new customers, it is often impractical and cost prohibitive to replicate the power grid to deliver electricity to the end users. Lack of access to the power grid virtually blocks any potential new participants from competing with the incumbent suppliers that also own the grid.

4. In a regulated electricity market, it is not uncommon that the incumbent power company generally assumes the role of sole supplier, either by being granted the franchise right or by historical market development. This supplier virtually enjoys full market power although its ability to exercise such power is confined or restrained in varying degree by the regulatory regime that governs the rate of return, development plans and tariff. In a liberalised electricity market where regulatory control on tariff is largely removed, suppliers who possess a certain degree of market power may manipulate the market to their advantage. Regulating market power and minimising its abuse are therefore key considerations in ensuring proper market performance.

Types of Market Power

5. Three types of market power are pertinent to the electricity market, namely, the horizontal, vertical and locational market power. **Horizontal market power** is exercised when an entity profitably drives up prices through its control of a single segment, such as electricity generation. An entity would possess horizontal market power when it owns a significant share of the total generating capacity available to the market. **Vertical market power** is exercised when an entity involved in two related segments, such as electricity generation and transmission, uses its dominance in one segment¹ to raise prices and earn extra profits for the overall enterprise or to disadvantage other suppliers. **Locational market power** is the result of the existence of transmission constraint, which limits the ability for a region to access external supply sources. The local electricity suppliers may therefore charge the local customers a higher tariff without rivalry from external sources.

¹ Such as by imposing more limitations to competitor's generation in using its transmission network to reach the customers.

Market Power and Mitigation Measures

(I) Overseas Practices

6. Often, the existence of market power is not the real concern but rather, the potential and the extent to which market power can be abused is of importance. In traditional regulated markets, market power is usually confined through tariff regulation and hence is not a major issue. A well-designed regulatory regime can help to minimise market power abuse. In liberalised markets, a number of measures have been developed to mitigate existing and potential market power.

7. The following market power mitigation measures are commonly employed in the liberalised markets in the U.S.A., Canada, UK and Australia. Details are provided in Annex I.

(a) Measures to Mitigate Horizontal Market Power

- (i) Facilitating Ease of Market Entry* by creating an environment to encourage and facilitate easy entry of new suppliers to increase competitive forces. Issuing supplier licenses to qualified participants as opposed to granting franchise rights, and mandating open grid access are some of the means to facilitate ease of market entry.
- (ii) Limiting Market Shares* by imposing a maximum limit of market share on individual suppliers to balance competitive forces and eliminate market dominance.
- (iii) Enabling Demand Side Response* to effect a reduction in demands in response to increasing prices, thereby reducing market price through widening the demand/supply margin.
- (iv) Contracting for Supply* by facilitating and encouraging bilateral power purchase agreements between a seller (e.g. a generating company or a supplier) and a buyer (e.g. a large industrial customer or a wholesaler) thus reducing the incentive and ability for sizable suppliers to exploit market power in the near term (spot) market.

- (v) *Capping² Market Price* to limit the effect of market power abuse exercised by sizable suppliers in the near term (spot) market.

(b) Measures to Mitigate Vertical Market Power

- (i) *Decoupling Control of Transmission Grid from Generation* by creating an Independent System Operator (ISO) that has no financial interests in the generation and/or wholesale/retail businesses to manage access and deployment of the power grid.
- (ii) *Vertical unbundling* the generation and network functions of the incumbent power companies, and mandating the provision of open and non-discriminating grid access to facilitate ease of market entry.

(c) Measures to Mitigate Locational Market Power

- (i) *Reducing Transmission Constraints* by building more transmission facilities including interconnectors, thereby increasing the capability for local regions to access external supply sources.

(II) Hong Kong Situation

8. In Hong Kong, the two power companies do not possess franchise right and new entities can enter the market to supply electricity without any regulatory restrictions. However, by virtue of historical development and owing to the high cost to participate in the market, new suppliers have yet to emerge. Due to the lack of new market entrants, the two vertically integrated power companies virtually possess full horizontal market power within their respective supply areas. And owing to the relatively weak interconnection, the two companies also possess locational market power. Potential abuse of their market power is in essence mitigated by regulation via the Scheme of Control Agreements signed with the Government.

9. The virtually monopolised position of the two power companies would enable them to continue to possess full market power. Regulatory control on the return on investment, development plans and tariff would minimise the possible exercising of market power by these companies.

² Capping here refers to imposing a price ceiling in the spot market but not price regulation on network.

Increasing interconnection capability with provision made to enable customers to access external supply sources could mitigate the locational market power. However, this will incur significant cost that needs to be justified by the perceived benefits. In any event, there will be an immediate impact on the tariff, which needs to be fully assessed, carefully managed and considered in the overall electricity market review. On the other hand, increasing the interconnection capability also requires the concurrence of the two power companies, and a number of related issues such as new regulatory measures, legal implications, liability, funding and cost recovery mechanism also need to be fully addressed. The new interconnection issue will form a separate item for discussion at this forum.

Observations

10. While most of the market power mitigation measures (Annex I) currently found in some sizable overseas markets have been employed solely for liberalised markets, consideration may be given to exploring and implementing some of these measures in Hong Kong even if its electricity market remains regulated. This will help to create an environment that can facilitate easier entry for new participants, and pave the way for introducing market changes to facilitate more competition if so desired in the future.

Advice Sought

11. Members are invited to offer views on the issue and possible approaches for market power mitigation having regard to the situation in Hong Kong.

Market Power Mitigation Measures Employed in Overseas Countries

Many of the electricity markets in the U.S.A., Canada, U.K. and Australia are now open for competition in various sectors and at different levels. The following measures are generally adopted in these countries to mitigate market power in their liberalised markets.

(a) *Ease of Entrance to Market*

Market power can be mitigated by creating an environment to encourage and facilitate easy entry of new suppliers to increase competitive forces. The perceived potential of increased competition can deter the exercising of market power by existing suppliers³. Vertical segregation of the incumbent power companies and provision of non-discriminatory access to the power grid are sometimes cited as ways to provide ease of entry.

(b) *Limitation of Market Shares*

Imposing a maximum limit on the market shares of the individual suppliers, especially those of the dominant players, can reduce the potential for exercising market power. Sometimes this is done through mandatory horizontal unbundling or divestiture of generation assets.

(c) *Demand Side Response*

This measure would depend on the ability and willingness of the customers to reduce demands in response to increasing prices. Market design that facilitates demand side participation is a way to channel demand side response to the market. However, extra cost for introducing demand side response (e.g. cost of complicated metering) has to be carefully considered.

³ A "perceived increase in level of competition" can be the awareness or belief of the existing supplier that more competitors may compete with him in the market. If he exercises his market power to raise price or lower quality of his products or services, etc., he may lose his sales to the other competitors.

(d) *Contracts for Supply*

Bilateral power purchase agreements between a seller (e.g. a generating company or a supplier) and a buyer (e.g. a large industrial customer or a wholesaler) can help to mitigate market power of sizable suppliers. When a predominant share of the suppliers' output is covered by such agreements, there will be less incentive and ability for the suppliers to exploit their market power in the near term market at which market power has a dominating effect.

(e) *Price Cap*⁴

Market power can manifest in much higher price than the competitive level. Capping of the price of electricity supply is a way of mitigating the effect of market power abuse. However, price cap may reduce the incentives to invest in new generation, especially those suitable for meeting peak demand (i.e. peaking plants). Price cap may also lead to the distortion of market signal.

(f) *Independent System Operator (ISO)*⁵

An Independent System Operator (ISO) would provide a means for mitigating or eliminating vertical market power. It is important that the ISO should be non-discriminatory and truly independent, with no financial or political interests in the generation or wholesale/retail sector of the business. This will help to further lessen the chance for undue market influence of a generator who also own and control the transmission grid. Requirements for independent operation of the transmission system, and non-discriminatory access to the power grid are widely accepted mechanism for addressing vertical market power.

⁴ Price cap here refers to a price ceiling in the spot market but not price regulation on network.

⁵ A System Operator is a body responsible for the real time operation of the system to ensure that the system resources including generation and transmission are deployed reliably to meet the system demand. ISO refers to the system operator that is independent from the owners of any supply resources so that it will not favour some resources over the others when deploying them to meet the demand.

(g) *Relieving Transmission Constraints*

Relieving transmission constraints by building more facilities thereby increasing the capacity of congested transmission corridors can help to mitigate the locational market power problem. This would provide increased capability to import resources to mitigate market power being exercised in a “local” region.

2. Some countries adopted certain mitigating measures during transition to market reform and gradually included other measures after the reformed market has been up and running. The following summarizes the various measures adopted by these countries through stages of market liberalisation.

U.S.A.

3. Most of the electricity utilities in the U.S.A. are investor owned. They used to be vertically integrated in structure, and many of their transmission networks are interconnected. In 1996, the Federal Energy Regulatory Commission required the transmission owners to open their networks for third party access, which to certain extent mitigated the capability of exercising market power of the incumbent utilities. When the electricity market was further liberalized at the states, the state regulations introduced other mitigation measures, such as mandated divestiture of generation assets, price cap, etc. On the issue of market concentration, the Department of Justice and the Federal Trade Commission use a Herfindahl-Hirschman Index as a primary screening tool to examine proposed mergers.

Canada

4. In Canada, Ontario and Alberta are the two provinces which have advanced progress in liberalizing their electricity markets down to retail level. Ontario mitigates the market power of the incumbent Ontario Power Generation Company (OPG) by requiring it to give up control of the generation assets in phase, such as by leasing off these assets to other companies. In transition, OPG is required to cap its revenue and some fixed rate contracts are established with the large industrial customers. In addition, the generation asset was segregated from the transmission asset and an Independent Electricity Market Operator was set up to manage the electricity market thus mitigating the vertical

market power. Alberta requires the transmission owners to hand over the network access control and management to an independent company – the Transmission Administrator. In addition, divestiture of the generating capacity of the three dominating utilities was established through Power Purchase Arrangement (PPA) auctions. PPA contracts of 20-year terms were auctioned for purchasing power from the power generating plants of existing utilities.

U.K.

5. In the U.K., two dominating generation companies: PowerGen and National Power, were created and privatized at the time of reform in late 1980's/early 1990's. The market shares of these companies were gradually reduced through divestitures, some of which were responding to the threat of other mitigation steps by the regulator, such as the threat to refer the alleged cases of market power abuse to the Monopolies and Mergers Commission. Price caps were also introduced at some stages of the market development. The change of the compulsory pool-based market to a contract-based one under the New Electricity Trading Arrangements was also aimed to address the market power abuse manifested in price gaming in the pool and to provide more demand side participation in the market.

Australia

6. When National Electricity Market (NEM) was introduced in 1998, the participating jurisdictions had their state-owned utilities unbundled both vertically and horizontally. In some states, the generation assets were divested through privatization. Price cap was also introduced in the NEM. Transmission constraints are reduced by increased interconnection.