ENERGY ADVISORY COMMITTEE
Electricity Market Review:
Transmission Access

The Issue

To review the range of practices in providing third-party access to the power grid in the electricity supply industry, and consider options for development of the electricity market in Hong Kong.

Background

The Power Grid

2. The **power grid** (transmission and distribution networks) plays a critical role in the electricity supply business. It is the common carrier via which electricity is delivered from the generators to the end-users. Because of the high cost involved and other practical limitations such as land availability and environmental constraints, it is generally uneconomical and impractical for potential new market entrants to duplicate the power grid for supplying to existing or new consumers. The power grid thus becomes a virtual barrier to new market entrants, which inhibits increased competition in the electricity supply sector.

3. On the other hand, third party's access to the power grid will raise issues concerning cost, reliability and liability -

(i) connection and use-of-network charges for recovering the costs of investment;

(ii) cost in managing the grid access with the setting up of a separate administration organization such as an at-arms-length/independent regulator;

(iii) to maintain grid system security and supply reliability, grid system operating authorities must be clearly defined, and technical codes or rules specifying the grid connection requirements are needed to ensure that all facilities connected to the grid are compatible with the power system; and

(iv) liability, or apportionment thereof, of all concerned parties may need to be defined in a legislative framework, an industry code or a set of bilateral agreements between the grid owners and third-party users.

Mechanisms for Providing Third-Party Access to the Power Grid

4. There are two basic approaches in providing third-party access to the power grid – **Voluntary** and **Mandated**. Under the voluntary approach, grid access is negotiated between the grid owner and the users on an individual case basis. Access agreement, where reached, would cover such key aspects as use-of network charges, connection charges and technical requirements, reliability requirements and liabilities. However, there is no assurance that provision of third-party grid access will always result from the negotiation process.

5. Under the mandated approach, grid owners are required by legislation to provide grid access to third-party users and hence the outcome is assured. Nonetheless, the mandatory approach would require close monitoring of compliance.

Oversight Bodies for Third-party Access to the Grid

6. With the voluntary approach, regulatory oversight is not required to monitor provision of grid access. With the mandatory approach, however, the government or an at-arms-length/independent regulator will oversee the administration of the grid access. The regulator's purview may also include development of grid connection and access rules and codes, monitoring compliance of all participants (including the grid owner) with such rules and codes, reviewing and approve grid expansion and reinforcement plans, the cost recovery proposals for such plans and the connection and use-of-network charges. A grid operator, which could be a part of the regulator, may be set up to direct power system operations to ensure system security and supply reliability. In addition there is also the need for a mechanism to handle disputes among market participants.

Overseas Practices

7. The mandatory approach has been adopted in many liberalised electricity markets overseas. In Germany, third-party access to the grid is mandated by law. Details of the access arrangements such as use-of-network charges and technical standards for connection, however, are negotiated between the grid owners and users basing on a general framework established amongst relevant associations of the electricity supply industry. This approach is less commonly found as it relies heavily on self-regulation of the industry. In the

absence of regulatory oversight, there have been a number of disputes which required regulatory assistance to reach resolutions.

8. A more closely regulated mandatory approach is commonly found in the U.S.A., U.K. and Australia. Under this approach, third-party access to the grid is mandated by law, and connection and use-of-network charges are regulated. Compliance to the business practice of providing network service is closely monitored. In addition, appropriate resolution mechanism is put in place to handle possible disputes that may arise. To ensure power system security and supply reliability, users must conform to established technical standards in terms of its connection interface and operating protocol (e.g. the Grid code).

9. Overseas experience has indicated that in order to avoid the conflict of interest and to provide a level playing field for all market participants, accounting and functional separation or even asset segregation of the power grid from other business sectors, i.e. generation and retailing, of the power companies are normally required. For example, in Germany and the U.S.A., the requirements for accounting separation are specified by legislation, while in Australia and the U.K., further steps are taken to segregate the vertically integrated utilities into separate generation, transmission, distribution and retail companies.

10. In the U.S.A., U.K. and Australia, in order to ensure connection compatibility and to prevent potential adverse impacts on supply reliability, a set of common technical standards, codes or rules is established for all participants to follow before they get connected and gain access to the power grid. The development of the technical standards, codes and rules is usually under the regulator's oversight. This adds administrative burden and costs to the regulators. Experience of third-party access to the power grid in the above mentioned countries is summarised in Annex I.

Hong Kong Situation

11. In Hong Kong, both CLP Power and HEC are vertically integrated investor-owned power companies that plan, construct and operate their own power grid to deliver electricity from generation resources to customers in their respective supply areas. There are neither independent power producers nor large-scale self-generation in Hong Kong, and hence third-party transmission access has not been a contending issue. While some customers have installed small generators to provide back-up supply to their own essential loads, these

generators are only turned on following loss of normal supply from the power companies and hence do not give rise to the transmission access issue.

12. Recently, some of the larger consumers begin to consider prototype projects of installing individual generation resources (mainly from renewable energy such as photovoltaic systems). As these generators are rather small in size and therefore insufficient to meet the total load demand of the consumers concerned, parallel connection to the power grid for supplementary electricity supply from the power companies is required to ensure supply reliability. Connection of these independent generation resources to the power grid is currently arranged through bilateral negotiation between the resource owners and the power companies concerned on a case-by-case basis, subject to meeting the technical requirements and connection charges set by the power companies.

Possible Options

13. Provision of third-party access to the power grid can facilitate market entry for new participants. The following options are set out for Member's reference and views on their merits or otherwise.

(I) Voluntary Provision of Transmission Access

14. Under this option, new participants may request for connection and use of the grid through negotiation with the grid owner. The right to access the power grid, and the associated connection and use-of-network charges are determined by the grid owner on a case-by-case basis. To ensure compatibility with the power system and to ensure reliable operation, third-party users will have to meet the technical requirements and operation protocol defined by the power companies before connections and access rights are granted. The liabilities of each party involved will also need to be specified in the agreement.

15. The advantages of this option include -

(i) the power companies will retain the overall accountability of granting third-party grid access and maintaining system reliability;

(ii) liabilities of the power companies and third-party grid users are clearly defined in the bilateral agreements established between them;

(iii) no need for additional regulations to oversee grid access requests and provisions, thus minimizing the administrative burden; and

(iv) no intrusion into the private property rights.

16. Under this option, the government will neither be involved in the negotiation process, monitoring the contractual agreement nor setting up a dispute resolution mechanism. The drawbacks of this option are -

(i) possible abuse of de-facto monopoly power by the network owners through unfair conditions or excessive charges, thus maintaining the virtual barrier for new market participants;

(ii) lack of monitoring mechanism to ensure non-discriminatory and fair access to grid, hence more disputes; and

(iii) difficulty in promoting wider use of renewable energy and alternative resources.

(II) Mandated Access

17. A stipulation for grid owners to provide fair and non-discriminatory third-party access to the grid may be included as a condition for granting the companies their rights to supply electricity, or their supplier licenses. Regulation of access could either be conformed –

(i) to ensuring technical compatibility and supply reliability, the stipulation will include provisions to ensure that (a) all third-party connections meet specified technical standards and reliability targets, and (b) the liabilities of both the grid owners and the users be clearly specified in the access agreements between them;

(ii) with details pertaining to the terms and conditions of connection and use of the network, e.g. charges, technical conformance requirements, liability, etc. will be determined through bilateral agreements between the grid owners and third-party users. Periodic publication of the average indicative prices by the power companies for previous and existing grid access contracts will provide a reference for market participants as the basis for their negotiated charges; and

(iii) to ensure that disputes are resolved, there will be a mechanism to review and settle all disputes arising from the grid access negotiation processes.

18. Or the stipulation may go further to having details of grid access requirements including connection and use-of-network charges, code of conduct, technical standards for connection, liability and dispute resolution issues stipulated as conditions for being granted the franchise rights or supplier licenses. The connection and use-of-network charges will be submitted by power companies for approval by the government or an independent regulator. Since the charging mechanisms are clearly defined in the regulatory framework, the use-of-network charges will be more transparent to all market participants. To ensure public safety and supply reliability, a set of technical standards or codes will be developed and enforced so that new connections to the power grid are compatible with the entire power system, and the integrated grid is operated properly.

19. The advantages of the former option set out in paragraph 17 are –

(i) system reliability and liability of relevant parties are not compromised;

(ii) access to grid is available to any interested party and when needed;

(iii) flexibility in the bilateral agreements between grid owners and users; and

(iv) minimum involvement of and administrative burden on the government.

20. The disadvantage of this option include -

(i) bilateral agreements between the grid owners and third-party users on connection details may not always result in fair and non-discriminatory grid access for all users; and

(ii) heavy reliance on industry self-regulation and negotiation can lead to a fair number of protracted disputes.

21. In the latter option in paragraph 18, as the terms and conditions of grid access are clearly defined and compliance is legally enforceable, fair and non-discriminatory grid access to all market participants could be assured. However, the drawbacks are that this will give rise to perceived interference by the government into private property rights and business operations, as well as increased administrative burden and costs to the government for developing and implementing the regulatory framework, establishing and maintaining the technical standards/codes, and monitoring compliance.

Observations

22. Transmission access provides the platform for competition, and is generally regarded as a prerequisite for introducing competition into other segments in the electricity market.

23. Since commercial interests and private properties are involved, the readiness of grid owners to make available access would have to be reviewed in the context of the electricity market after 2008.

Advice Sought

24. Members are invited to offer views on the issue and recommend possible approaches on transmission access taking into account the situation in Hong Kong, i.e. the private ownership of the power grid.

Economic Development and Labour Bureau
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Annex I

Overseas Experience in Transmission Access

Australia

Before restructuring of the electricity market, the electricity supply industry in Australia was dominated by vertically integrated state-owned utilities. In general, each utility built its own power grid mainly for transmitting electricity from its generation sources to its own captive customers. In early 1990s, this mode of operation began to change in the evolution to form the National Electricity Market (NEM), requiring the utilities to open up their power grid for access and use by third-party users. Together with the development of the national electricity market rules, detailed requirements for power grid access were also prepared and incorporated in the National Electricity Code (the Code). Regulated access regime is described in the Code for implementation by all utilities participating in the NEM.

2. Two key laws, namely the National Electricity Law (NEL) and the Trade Practices Act provide the legal basis to the development of the NEM and the Code, including the implementation of grid access. The NEL is a Law passed by all participating States that are kept in perfect unison by referring to the Law passed by South Australia. All States must agree to any amendment to this Law, before it is enacted by South Australia. The Trade Practices Act is a federal law that applies to all forms of trade and commercial conduct and it provides powers for the Australian Competition and Consumer Commission (ACCC) to accept the Code as an industry access code for electricity transmission and distribution facilities in the participating jurisdictions, and authorize the market rules.

3. Each NEM participating State/Territory also has some related state laws and regulations to provide powers for the state regulator to issue licenses to market participants and regulate network charges of distribution companies. While state regulators are responsible for regulating distribution networks, ACCC looks after transmission price regulation.

U.K.

4. In the U.K., prior to restructuring of the electricity supply sector, generation and transmission assets in England and Wales were owned and controlled by the government-owned utility, the Central Electricity Generating

Board (CEGB), while the distribution and retail assets were owned and administered by twelve regional Area Boards. The restructuring of the electricity supply sector started in late 1980s along with the privatisation of government-owned enterprises when the ownership of generation and transmission assets was separated. A transmission company called the National Grid Company (NGC) was formed under the Electricity Act 1989 to own and operate the transmission network, while 12 Regional Electricity Companies (REC's) were formed to replace the Area Boards for the distribution businesses. An electricity regulator was set up which was subsequently merged with the gas regulator in 1999 to become the Office of the Gas and Electricity Markets (OFGEM).

5. The OFGEM was granted powers under the law to issue generation, transmission, distribution and supply licenses. NGC is the transmission license holder and the REC's are distribution license holders rested with the responsibilities of operating the power grid and providing non-discriminatory access to all market participants. The transmission and distribution businesses are effectively natural monopoly and hence under regulatory control by the OFGEM. Regulated grid access regime is adopted in the U.K. and requirements are stipulated in the license conditions that NGC and REC's have to publicize their charging principles, the connection and use of system charges which are to be agreed by the regulator. All technical requirements related to grid connection were written down in the Grid Code and Distribution Code that were developed and administrated by NGC and REC's.

U.S.A.

6. In the U.S.A., most of the electricity utilities are investor-owned. Before liberalisation of the electricity market, the electricity supply sector was dominated by vertically integrated utilities that owned and operated generation, transmission and distribution facilities for supplying electricity. Power grid was built by the utilities for their own use.

7. Restructuring of the electricity supply sector had brought about open access to the transmission network, which enabled competition to be introduced in the electricity market. Two key legislations, namely the Public Utility Regulatory Policies Act (PURPA) of 1978 and the Energy Policy Act (EPACT) of 1992 provided the legal basis for open access to the transmission network. PURPA was passed in response to the unstable energy climate of the late 1970s to promote conservation of electric energy and required utilities to

buy all electricity from certified non-utilities generators, called Qualifying Facilities (usually cogeneration or renewable energy) at the utilities' avoided cost (i.e. the cost utilities avoided by not producing the electricity received from the Qualifying Facilities). EPACT created a competitive wholesale framework whereby transmission access was opened to wholesale generators. EPACT specified the Federal Energy Regulatory Commission's (FERC) jurisdiction over the wholesale electricity market. It also specified that retail electricity competition would remain within state regulatory commission's authority.

8. In 1996, FERC issued two final rules (Order 888 and 889) on transmission access. Under Order 888 (the Open Access Rule), transmission owners are required to offer both point-to-point and network transmission services under comparable terms and conditions that they provide for themselves. Order 889 (the Open Access Same-time Information System – OASIS Rule), established standards of conduct to ensure a level playing field. It requires utilities to separate their wholesale power marketing and transmission operation functions. Grid access charges are regulated and all utilities that own, operate or control interstate transmission must file tariffs that offer others the same transmission service they provide for themselves, under comparable terms and conditions.

Germany

9. Before the electricity market was liberalised, electricity regulation in Germany was subjected to the Energy Industry Act 1935 and utilities were operated under exclusive franchises to provide electricity to customers in their supply areas. The change from the traditionally regulated to a liberalised market was mainly for the improvement of national economic efficiency through introduction of competition in the electricity market and partly for the implementation of the EU Directive 96/92/EC. The EU Directive set out basic rules, which the EU Member Countries have to incorporate in their legislation, for moving towards a liberalised electricity market including the provision of non-discriminatory access to the power grid.

10. Germany amended the Energy Industry Act (EnWG) and the Anti-competition Law (Act Against Restraints of Competition) to implement the EU Directive and liberalised the electricity market in 1998. In accordance with the new EnWG, the vertically integrated utilities must separate the accounts for their generation and network segments to ensure a level playing field for all market participants. The new EnWG also contains an explicit right to access

the power grid and grid owners are obliged to transport the energy to the customers under conditions no less favorable than for comparable services to affiliated companies. In addition to the EnWG, the Anti-competition Law also stipulates a right to access power grid. The rights to access are enforceable in civil courts. In case of unjustified refusal of third-party access, damage claims are possible.

11. The EnWG provides power for the Federal Ministry of Economics and Technology (BMWi) to regulate the arrangement of the third-party access contracts and the criteria for calculating of transmission charges. However, no such ordinance has yet been issued mainly because such regulation is considered not necessary as the electricity supply sector is able to self-organise third-party access according to the spirits of the EnWG and disputes are only limited to individual cases which can be resolved using the Anti-competition Law. The Federal Cartel Office is an independent regulatory body responsible to the BMWi and is empowered by the Anti-competition Law for ensuring fair competition for all commercial activities including the electricity market. The Federal Cartel Office monitors closely whether there is any anti-competitive behavior that prohibited grid access and see if there is abuse of market dominating position.

12. While other EU member countries have opted for regulated access regimes, Germany is the only member that has adopted the negotiated access approach where the users and the grid owners are free to negotiate the connection and charges in accordance with a voluntary industry framework called the “Association Agreement (AA)”. AA stipulates the rules and charging principles for grid access and is the framework jointly prepared by major industry associations. Informal endorsement of the AA by the BWMi and the Federal Cartel Office was sought before implementation. Being a private, voluntary framework, this gentlemen’s agreement has no formal legal status. However, it can be binding if the participating companies enter into contracts that take the agreement into account. The latest version of AA is called AA II Plus, which will remain valid until December 2003. Indicative range of prices for use of transmission and distribution networks must be published for reference by all market participants on a regular basis. A Grid Code and a Distribution Code which document the respective technical standards and requirements of connection and use of the transmission and distribution networks are in place for all market participants to observe.