Abstract

Taiwan is on the brink of embarking on an industrial reform in the electricity supply sector. A key plank to this reform is the establishment of the independent System Operator (ISO) to allow for competition for the electricity supply to consumers, which is an important step toward further liberalization of the Taiwan electricity supply industry. The future electricity market of Taiwan will be operated under the framework set out in the Electricity Act Amendment. According to the Act, ISO will be the core body of the future power market operations and its establishment will therefore be the key to the liberalization process. This paper presents the proposed implementation plan based on diverse factors considered by the Taiwanese officials. A three steps phased introduction of Taiwan ISO is discussed.

During the proposed Phase I interim market arrangements, Taiwan Power Company (Taipower)’s System Operation Department will assume the role of independent System Operator for the market. The dispatch rules are largely based on the existing Taipower internal procedure. As competition increases, the need for increased transparency will necessitate the establishment of a fully independent ISO outside Taipower in Phase II to provide the real time dispatch services. This will be completed within two years after the passage of the Electricity Act Amendment Bill. In the last phase of the deregulation process a multilateral market arrangement for managing energy imbalance and transmission constraints will result in better outcomes in relation to the policy objectives of power security and economic efficiency.

The two-year timeframe stipulated in the Electricity Act Amendment Bill is a challenge for the Government and the industry. To achieve the policy objectives requires firm commitments from officials, Taipower, IPPs and other key stakeholders including scholars and consumer groups. Currently, the reform has been suspended temporarily by the Legislative Yuan due to the concerns about the security and reliability in the power supply after deregulation. However, a well functioning Taiwan ISO should bring benefits and security to the industry and the country in general.

Keywords: Taiwan-ISO, Deregulation, Electricity supply industry
1. Introduction

Sufficient power is fundamental to the growth of Taiwan’s economy. As the result of the strong economic growth over a long period, electricity demand of Taiwan, with an average annual growth rate of more than 7%, has more than doubled in the last decade and for next 10 years the forecast demand growth rate will reach 3.5% per annum. This puts considerable pressures on the electricity system. To be successful in the economic sustainable growth requires a suitable investment environment to be developed for the power sector. So Taiwan's government plans to open and reform its electricity market.

Electrical power operation in Taiwan is now moving toward liberalization and privatization due to the influence of the global economic trend. To open up private investment opportunities and enable funds to be more easily obtained the government had proposed in 1999 to pass new legislation in 2000 to improve the investment environment, restructure the industry and privatize the state electricity utility Taipower company.

1.1 Generation

At the end of 2004, Taipower operated 79 power plants with a total installed capacity of 34,598 MW. Taipower has 5,144 MW of nuclear generating capacity at 3 plants; 24,939 MW of thermal generating capacity at 34 plants; 4,510 MW of hydro generating capacity at 41 plants. Peak demand is approximately 29 GW in 2004. Installed capacity had been forecast to increase to almost 40,000 megawatts by 2005.

Due to concerns about the pollution effects of coal fired stations, the government energy policy promotes the use of LNG as the fuel for thermal generation. To comply with Taiwan's energy diversification policy and to meet increasing environmental concerns, the installed capacity of LNG-fired units is expected to increase. This will include both new Taipower plant and new Independent Power Producers (IPPs). However, LNG is more expensive than coal as input for electricity generation and the government considers its policy goal of promoting LNG fired generation plant can’t be achieved without policy intervention.

1.2 Transmission and Distribution
Taipower has the monopoly power in transmission sector. Almost all transmission and distribution lines in Taiwan are owned by Taipower and dispatched by the Taipower's central or local dispatch control centers. More than 45% of demand is concentrated in the northern region of the island. However, the northern region has insufficient installed capacity and this results in heavy reliance on northward transmission. Due to the imbalance of the location of load and generation, in 2002 a third extra voltage transmission line, with a capacity of 2500MW was added to the original two high voltage transmission lines of 4500MW capacity. Currently, Taipower devotes its efforts to promote the Sixth Transmission and Substation Scheme and invests more than NT $ 540 billions. Transmission congestion will be greatly relieved after 2006.

Apart from transmission congestion, Taiwan has a significant electronics manufacturing industry that has been a major factor in achieving its earlier economic growth. This industry has very high requirements regarding both electric reliability and quality standards such as frequency deviation and voltage quality standards. Taipower invests continuously to strengthen the power system and to enhance the development of related industries, so as to improve the national power system.

1.3 Independent Power Producers

Taipower, the state-owned electric power utility, currently dominates Taiwan's electric power sector. In 1994, the Ministry of Economic Affairs (MOEA) of Taiwan produced documents entitled Operational Guidelines for Unbundling the Power Generation Industry, and Main Points in Handling Independent Power Programme. These were intended to promote operating standards for independent power production. In 1994 Taiwan's government allowed independent power producers (IPP's) to provide Taiwan's electricity. Binding by Taipower’s franchise granted, Independent power producers are required to sign 25 years' power purchase agreements (PPA) with Taipower. To the end of 2001, Taipower has signed Power Purchase Agreements, totaling 5,267MW.

In conjunction with the electrical power liberalization policy, through two stages of open bidding for power generation, eleven independent power producers (IPPs) were selected with total capacity of 10,300MW. Of the first 11 independent power producer (IPP) projects, only three had started construction by 1999 and only one of these had reached commercial operation. Despite the above difficulties in the construction sector, Taiwan today has an excellent diversified mix of generation plant types, helping it to manage fuel costs and also achieves a sufficient spare capacity.

Taiwan's first major IPP, the coal-fired Mailiao plant owned by Formosa Plastics, began operation in 1999. It currently has a capacity of 1,800 MW in three 600-MW generating units, and sells about three-quarters of its output to Taipower. Besides, a second, coal-fired IPP plant, Ho-Ping Power, begins commercial operation of its first 660-MW unit in March 2002, with a second unit beginning operation in September 2002. Ho-Ping is a joint venture including Taiwan Cement Corporation and Hong Kong's China Power and Light Corporation. Besides, another two gas-fired IPPs (Shin Tao, Ever Power) have been commercial operation in recent years.

In 1999, the Ministry of Economic Affairs held another open bidding 3rd stage of open bidding. Four IPPs were accepted, a total of 2,910MW of new capacity. By the end of 2001, Taipower has signed Power Purchase Agreements totaling 1,905 MW with Star Energy, Sunba, Kuokuang Power Companies.
In 2004, Taiwan's private and co-generation power plants accounted for 26.2% of the electricity generated in Taiwan, indicating that government's efforts to open and diversify its power resources has progressed. Taipower plays a very active role in helping these IPPs in building their power plants on schedule by providing them with technical consulting services, so as to solve the power shortage problem.

1.4 Taiwan Power Company

Taiwan Power Company (Taipower) is a state-owned company and responsible for production, transmission and distribution of electric power in Taiwan. Nearly two-thirds of Taiwan's power stations are owned by Taipower. In 2004, Taipower's annual operating revenues are more than $335 billion and employed about 26,000 people. Thermal plant accounts for more than 66% of Taiwan's current power generation capacity and nuclear plant supplies a 14.9%. Oil and coal are the primary fuels for thermal power plant. Gas power plant currently provides more than 17.6% of thermal capacity. However, Taipower's monopoly status has been undermined by cogens and independent power producers (IPP's) that provide up to 22% of Taiwan's installed generation capacity. Besides, Taipower currently retains exclusive control over nuclear and hydropower plants.

The MOEA's proposal outlined at the end of 1999 was for Taipower to be privatized as a single vertically integrated company. The proposed "Electricity Act" becomes legislation then this will divide the power industry into the segments of generation, transmission and distribution, with only Taipower remaining as a vertically integrated company.

Under the basic framework envisioned, Taipower would retain a franchise on transmission and distribution networks, but Taipower's generation assets would be split into several firms. Taipower retains exclusive control over nuclear and hydropower plants. The government will continue to own these assets after Taipower is privatized.

Since the cabinet has concerns over nuclear power and monopoly status of Taipower after deregulation the privatization program for Taipower is likely to be delayed. The current planned privatization date for Taipower was originally 2005, but the timing is now uncertain due to the delays in passing the enabling legislation. The government has decided that the privatization of Taipower will await the completion of the Electricity Act amendment.

2. Electricity Liberalization

2.1 Electricity Act amendment

The current version of Electricity Act was promulgated in 1954 mainly designed for a state-owned monopolized utility. Over recent years of power deregulation trends in the world it has been shown to be inadequate and obsolete. In December 1999 the Executive Yuan completed its review of the draft Electricity Act amendment and proposed it to the Legislative Yuan.
However, due to the transition to a new cabinet, the Act was not discussed until September 2000.

While the Electricity Act Amendment Bill has yet to be passed by the Parliament, it stipulates that within 2 years after the passage of the Bill, the ISO shall be responsible for the dispatch of generation and co-ordination of the 69Kv and higher voltage transmission system. It also outlines the role of the ISO and its relationship with the Ministry of Economic Affairs (as the Regulator) and market participants.

According to the Electricity Act Amendment (Energy Commission, 2003), the future electricity market of Taiwan will be operated under the framework of the deregulated electricity market set out in the amendment. Independent System Operator (ISO) will be the core body of the future market operations and its establishment will therefore be the key to the liberalization process.

2. 2 The Guideline of the Electricity Liberalization

MOEA has a policy of opening industry to private investment. In 1999, the Deputy Premier outlined the direction of electricity liberalization. For the electricity industry, its aims are:

1. respect market mechanisms and avoid unnecessary intervention and discretion by regulatory institutions and individuals
2. electricity reform legislation should aim at simplifying government regulation
3. government intervention should be aimed at ensuring consistency with the energy policy and establishing a level playing field for competition, including:
   (a) open and non-discriminatory access to transmission services
   (b) reasonable (efficient) transmission (wheeling) charges
   (c) adequate supply to remote areas
   (d) a balancing mechanism to address the cost differential between LNG and coal based generation

The Ministry of Economic Affairs has, based on the above guidelines and after reviewing reform experiences in other jurisdictions and allowing for Taiwan’s own situation, developed the following eight measures for guiding the direction of liberalization:

1. introduction of competition into generation, transmission and distribution
2. establishing the first priority as competition in generation
3. transmission and distribution to be “common carriers” and treated as public utilities
4. independent dispatch to ensure fairness and objectivity
5. gradual introduction of consumer switching
6. co-ordination between energy policy and competition in electricity sector
7. balancing welfare of end consumer with development of the industry
8. government's role shifting from central planning and full regulation to “establishing market order and maintaining a level playing field”.

2. 3 The Objectives of Electricity Liberalization

For the electricity liberalization, we want to reach following objectives:

2. 3. 1 Competition for supply of end consumers

Our understanding is that one key aim of the liberalization process is to achieve efficiency gains in the cost of electricity to consumers through the introduction of competitive generation. This is to be secured through a regulatory and competitive environment in which competing generators can have open non-discriminatory access to the transmission and distribution systems and compete for supply to end consumers.

2. 3. 2 Ensure Security

Any liberalization of the electrical supply industry needs to ensure security of supply being improved and maintained at an efficient level through the liberalization process. The decision on split of responsibilities between parties needs to take into account security standards and ensure the real time dispatch is subject to these standards. Security standards are also an issue for fair, open and transparent access to the common carrier and the governance structure needs to address the process by which standards are set and implemented.

2. 3. 3 Fair and open access to transmission services

To achieve supply competition the liberalization policy should allow open and non-discriminatory access to transmission services. The key is to define and establish transmission and dispatch services that meet these criteria.

2. 3. 4 Competition for supply to achieve economic efficiency
A key aim of the proposed liberalization process is to allow competition for supply of consumers by new entrant generators in order to achieve competitive pressure on the cost of supply to consumers. Economically efficient investment in new generation plant needs to meet the load growth. These lead to short-term (productive and allocative) efficiency in the supply process and long-term (dynamic) efficiency in the investment process.

2. 3. 5 Fuel diversity targets

The real time dispatch process and the long-term investment decision-making process need to take into account the government’s fuel diversity policies.

3. Independent System Operator

3. 1 Introduction

The Executive Yuan’s Electricity Act Amendment proposal sets out operation objectives (principles) for the ISO (Article 8). While dispatch is about co-ordinating the real time operation of the electricity system, the industry principles will require a mixture of real time and long-term objectives and outcomes. It is important that the industry structure in its transitional and final form meets these principles. Article 8 of the Amendment states that a Dispatch Centre (independent System Operator) will be set up to manage the real time dispatch function with the principles of security, fairness, openness, economic efficiency, and being consistent with the Government’s energy policy.

3. 2 Taiwan ISO

The term ISO is used to refer to the “Dispatch Centre” as described in Article 8. The term is borrowed from other jurisdictions that have considered similar issues in liberalizing their electrical supply industries, even if the final Taiwan ISO proposal may not meet the strict definition of an “Independent” System Operator as envisaged in other jurisdictions. The role of a “Dispatch Centre” was developed in the Executive Yuan’s specific proposals for the Electricity Act Amendments. Chapter 2 of the Executive Yuan’s Electricity Act Amendment proposal outlines, in broad terms, the role of the Dispatch Centre, the reform time-table, and its relationship with market participants and the Regulator.

3. 3 ISO's Phase-in Setup

In order to meet the proposed legislative timetable for introduction of an ISO and allow the industry to continue to function through the implementation of an ISO, a three stages approach is proposed (Energy Commission, 2002).
3.3.1 Starting Point – Taipower Purchase Energy from IPPs

Under current condition as illustrated in Figure 1, new entrant IPPs supply directly to Taipower via a 25-year Power Purchase Agreements (PPAs). Taipower continue to self manage all transmission service issues and remain the sole supplier to end consumers. There is no external price discovery process for transmission services. The dispatch service remains within Taipower.

![Figure 1. Current market organization before the reform.](image)

3.3.2 Phase 1 Design (Taipower as System Operator of Interim Market)

In phase 1 illustrated by Figure 2, new entrant IPPs are able to supply directly to end consumers via transmission services supplied by Taipower (called wheeling services). A regulated process for transmission service pricing is assumed. The dispatch service remains with Taipower as a separate business unit. This may be seen as a “System Operator” rather than an “Independent System Operator”. There are some features in this stage:
- Differentiates between three roles of Taipower: generation, transmission and distribution
- Requires cost separation, but not physical separation, of Taipower roles.
- Formalize Taipower dispatch process as rules to make transparent.
- Regulate price for all Taipower services.
- IPPs given priority dispatch and access to the transmission system.
- Costs of uplift (losses, congestion and ancillary services) shared between Taipower and IPPs.
- Allocate cost of transmission losses based on estimated usage.
- Imbalance price set by regulated contract, quantities measured in reconciliation.
- Congestion costs based on estimated usage and determined from difference between unconstrained dispatch solution and actual dispatch.
- Costs allocated between users based on regions determined from historical usage patterns.
- Ancillary service costs determined by Taipower dispatch rules and allocated on basis of MWh delivered.
- Minimum system development required.
- Taipower would operate an interim market based on above and progressively hand over to ISO.
- Minimum additional operating cost above current duties.
3.3.3 Stage 2 – Independent System Operator Established and Regulated Taipower Charges

In phase 2, illustrated by Figure 3, the primary means of trading will be long term bilateral contracts. All trading parties will need to submit to the ISO, by gate closure, their final contract positions (net position both of long term and day ahead trading) and offers to increment or decrement generation from that position. A truly independent system operator that is organizationally separated from Taipower is proposed. The option still assumes that the transmission assets are managed within the Taipower organization as a separate division with its own cost structures and pricing systems.

The ISO will dispatch generation to meet the contracted positions subject to a set of rules that include an economic objective and a set of security rules. The increment and decrement offers will be used as the means of deriving an economic ordering of generation, or dispatch merit order and used in accounting for imbalance, losses and constraint management. The dispatch objective will account for losses in determining real time dispatch.
The cost of supplying losses and congestion will be identified by the dispatch algorithm, based on increment and decrement adjustment prices, and allocated to both generators and consumers in the settlement process. The exact cost allocation methodology will be a balance between the economic efficiency gains of the allocation method and the cost of implementation.

Due to its position of market power the prices Taipower offers in for both energy adjustment offers and ancillary service offers will need to be regulated. The regulated price will be short run cost based with a margin to cover long run costs. The ancillary service costs may have an availability element. A higher level of competition for both generation dispatch and the supply of end consumers emerges, justifying a more arms length approach by Taipower to the monopoly services critical to the competing generators.

3. 3. 4 Stage 3 - Fully Liberalized Market
For full open competition of supply of consumers it would be necessary to create a fully liberalized market for all energy and ancillary services.

This option as illustrated in Figure 4 would almost certainly require separating Taipower generation from transmission and breaking it into smaller competing units, none of which is able to exercise a position of market power for any service. As to the nuclear and hydro power plants, they would be retained by Taipower as regulated power generators. Moreover, five to eight regional distribution companies have to be established or separated from Taipower to enhance retail competition.

This option is outside the scope of the Electricity Act Amendment and is not fully pursued by the government due to concerns about the feasibility of being able to eliminate the exercise of market power because of an expected shortage of both generation and transmission capacity.

Figure 4. Market organization after stage 3.
4. Market Design Features

The proposed Electricity Act amendments divide the industry into private producers and a public utility sector (i.e. transmission, distribution and vertically integrated utilities such as Taipower). Regulation of the prices offered by Taipower to end users will provide a means of controlling prices, because private producers will be competing to capture customers. This could in turn influence the rates of return that can be achieved in the market.

4.1 Taipower - Keep a Vertically Integrated Utility

A key factor that underpins the structural options is the aim of the government to retain Taipower as a single vertically integrated utility. Taipower provides an important social and environmental policy role in the electrical supply industry, and a “solid centre” around which liberalization can evolve. Options for separating Taipower’s generation and transmission business or splitting up the generation business are unlikely to be seriously considered in the short to medium term.

However, where a natural monopoly participates in related contestable markets further competitive issues arise. As a vertically integrated utility, Taipower has incentives, whether exercised or not, to use its dominant position in transmission ownership to seek competitive advantage in the competitive generation and retail markets.

4.2 Regulator

The concern over market power leads to the design of regulated trading arrangements. The regulator’s functions need to be extended and its capacity enhanced to govern the new industry in order to achieve the policy objectives. The regulatory design includes:

- Separation of Taipower into separate Generation, System Operation, Transmission and Distribution business units to avoid suggestions of cross subsidization and increase the transparency in the dispatch process.
- Establishment of a specialist electricity regulatory body with adequate technical expertise in power system operation, legal and economics.
- Creation of a relationship between the Regulator and the ISO to ensure the Regulator has adequate information on the day to day operation of the industry.
- Responsible for developing the dispatch rules, the dispatch boundary, services, processes, standards and emergency procedures that would be implemented through the dispatch centre.

4.3 Generation

The purpose of the proposed Electricity Act amendment is to divide the industry into the three segments of generation, transmission and distribution, though Taipower may be allowed to
remain as a vertically integrated company. None of these sectors will be monopolies by right, since private investment is being sought in all sectors.

New IPPs will be allowed to choose their own customers, presumably starting with the largest first, and transmission companies will be required to carry the energy. In conjunction with the electrical power liberalization policy, IPPs will select to contract with Taipower or sell the power directly to the large users through the wheeling and bilateral contract.

Besides, to encourage a reduction in carbon dioxide emissions, the government has provided financial incentives for renewable power plant, which increases the conflict between environmental protection and liberalization. The current power purchase contracts of IPPs will continue, with Taipower effectively remaining the single buyer. However, a renewable obligation scheme based on generators’ capacity is to be designed for all new fusil fuel generators.

4.4 Transmission

In the market structure, Taipower will have the monopoly power in transmission sector. Transmission and distribution sector will be treated to be the "public sector" and regulated by the government. All transmission networks will be dispatched by the ISO. Besides, the proposed Electricity Act Amendment is expected to state that the transmission asset owners will plan grid expansion and investment. Taipower as a transmission asset owner will therefore plan grid expansion, which may raise competitive issues if such expansion planning were to restrict other party’s competitive position.

4.5 ISO

The establishment of the ISO is an important first step toward further liberalization of the electricity sector. Unbundling of the dispatch services and creation of market structures for determination of the real time costs provision of each service exposes the IPP to a real time price signal for use of each component of the dispatch service. They are then able to maximize their real time efficiency in use of these services.

The draft proposed market structure provides for a transition period, expected to be about two years, in which an independent organization (ISO) will ensure the impartial scheduling of generation plant and operation of the grid system. In the liberalized market the role of the ISO will be expanded to include the functions of power exchange, system operation and demand forecasting.

4.6 Distribution and Power Supply Option

In the future, end users will have the right to choose the power suppliers. A possible schedule of retail liberalization includes three stages. Initially within two years after the passage of the proposed Electricity Act it is expected that the identified users with 69kV and 161kV will be contestible. Then, followed by the small to medium users with >11.4kV and this will happen
within two to five years after the passage of the Act while ISO is established. Finally, five years after the passage all the users will have the freedom of choice to decide their power suppliers. If the end users choose to be contract users with IPPs, the tariff will not be regulated. If the end users choose to remain as Taipower's customer, the tariff will be regulated.

At initial start up of the new electricity trading arrangements, Taipower will represent some 95% plus of all available generation and load supply. They are also the default suppliers to any load not contracted to an IPP or any load the IPP is contracted to supply but fails to supply. As such they have an initial role as supplier of last resort, or if you prefer the default supplier. They will therefore be unable to determine their final contract position ahead of time, as they don’t know what load they have to pick up as supplier of last resort. In fact their final contract position will be unknown until reconciliation is complete. It will therefore be necessary for Taipower to offer the bulk of their generation capacity in as imbalance energy with an increment and decrement offers.

5. Current Situation

Currently, the reform has been suspended temporarily by the Legislative Yuan due to the concerns about possible detriments to the security and reliability in the power supply if the deregulation process continues. In 2003 there were many incidents of extended power blackouts around other jurisdictions in the world such as PJM, London and Italy, etc. Although the reasons contributed to those outages were not really related to the deregulation causes. Politician here concerns about their own interests and can change policy overnight. Since the Taiwan Parliamentary election began at the end of 2004 and to proceed the agenda of the power deregulation possibly would increase the price of electricity and violate the interests of both current government and the opposition parties. Therefore, the agreement in the Parliament to suspend the deregulation process temporarily was achieved in 2004. The suspension of power deregulation policy here was therefore mainly caused by a political expediency, though the security of supply provided one good excuse to justify such policy change. So far, the election was over and the deregulation process was rejuvenated. However, current focus on the deregulation has been somewhat switched to the issue that whether the establishment of a Taiwan-ISO is really a necessity to the liberalization of power market. If policy makers believe that Taiwan-ISO is no longer needed for the deregulation, the above-mentioned three steps deregulation process would reach cessation at the stage one. However, a strong-handed approach to the establishment of monitoring and governing system has to be designed for the regulator.

6. Discussions and Conclusion

6.1 Start Simple and Add Complexity

A key lesson from other jurisdictions is that complexity of market design adds costs to both set up and operating costs for the ISO. Complex trading arrangements can lead to net economic efficiency gains if the efficiency gains of trading outweigh the costs of the trading mechanism. This is a key argument for having market structures and competition in supply of electricity. However it is clear that such complex arrangements will be more efficient if they are allowed to
evolve over time and in response to industry and consumer requirements.

Key examples of this can be seen from a comparison of the history of evolution of the Californian, PJM and UK trading arrangements. California opted for a “big bang” approach of attempting to develop a very complex market structure in one step. This resulted in very high set up and operating costs. Yet the complexity of the market design did not lead to the hoped for economic efficiency gains. In fact severe problems with the volatility of the price lead to state and federal intervention.

By comparison PJM has existed as a pool since 1927 and the trading arrangements have evolved more gradually in response to both industry requirements and regulatory pressure. PJM does operate relatively complex market structures relative to, for example, Australia, or Power Pool of Alberta. Yet its overall staffing numbers and costs are comparable to such jurisdictions and are considered by many to be a world leader.

The UK is also an interesting example in that a relatively simple trading arrangement, the England and Wales Pool, has been superceded by a more complex arrangement (NETA). The reasons given for the replacement are that the previous arrangements were yielding some (new generation investment) but not all (lower wholesale prices) of the hoped for economic gains. Yet, even with the more complex trading arrangements under NETA, National Grid Company (NGC) still operate a relatively efficient staff numbers.

Hence the key lesson from the above comparison is that the complexity of the trading arrangements can effect the organization design and operating staffing requirements of the ISO. Trading arrangements may not be perfect initially but can evolve over time. A simple initial arrangement avoids high initial set up and operating costs and can be adapted as the need arises. In the case of Taiwan, estimated initial set up and operating costs of a system operator for stage 1 amount only up to 6 million US dollars. After separation from Taipower the set up and operation of an Independent System Operator would cost as high as 40 million US dollars (Energy Bureau, 2002). A complex design will inevitably be involved in making trade-offs among different policy objectives.

6.2 Concern of Market Power

A key factor that underpins the design is the aim of the Government to retain Taipower as a single vertically integrated utility. Over the next few years, Taipower will continue to be the dominant generator, own the transmission system, and provide the wheeling services to other generators. The credibility of the liberalized electricity market will be dependent on whether other market participants have confidence that the transmission service is open and non-discriminatory.

It is expected that Taipower’s generation, transmission, distribution and system operation functions be separated, by establishing separate accounting systems. This will provide a measure of transparency. In addition, it is recommended for a regulatory process for setting Taipower’s charges for services where it has as dominant market position; namely, transmission, generation and ancillary services. The dispatch rules and operation of the market will need to safeguard against the abuse of market power - in particular, by Taipower - and ensure a level playing field.
6.3 Congestion Cost shared between IPPs and Taipower

The cost of providing the congestion management service should be shared between the IPPs and Taipower in proportion to the use each made of the available transmission capacity. In the absence of a transmission rights allocation model the simplest way of doing this cost allocation initially may be a simple charge per generated MWh over all supplied load. More sophisticated transmission cost allocation methodologies could be developed over time as the level of competition justifies the additional cost.

6.4 Phased introduction of ISO

Having a fully functional ISO does not happen overnight. The two-year timeframe stipulated in the Electricity Act Amendment Bill is extremely challenging by international standards. It is prudent that a transitional arrangement be implemented for the interim market. This would allow IPPs to enter into contracts directly with end consumers while using Taipower’s wheeling services.

During the proposed Phase I interim market arrangements, Taipower’s System Operation Department will assume the role of System Operator for the market, as it has always done so. The dispatch rules are largely based on the existing Taipower internal procedure. However, the dispatch process will now be transparent, which means the internal process will become the dispatch rules for the interim market and Taipower will be subject to surveillance and compliance if disputes in relation to dispatch rules arise. Taipower’s System Operation Department will have to manage transmission congestion and energy imbalances and continue to provide ancillary services. Most of all will have to develop a cost recovery so that the costs associated with providing uplift services are equitably shared by all market participants. As competition increases, the need for increased transparency will necessitate the establishment of a fully independent ISO to provide the real time dispatch services.

Taipower should split itself organizationally in to separate business units, namely generation, transmission, distribution and system operations. In splitting the business units within Taipower the contractual arrangements between business units should, as far as practical, emulate the arrangements that will be required between a fully independent ISO and the transmission arm of Taipower and the generation arm of Taipower / the IPPs.

The Taipower System Operation division would form the ideal basis for establishment of an ISO. In phase 2 ownership would transfer to a separate government owned company or department. A separate governance structure and relationship with the regulator would be established. The contracts with Taipower would need to be formalized and a greater degree of commercial rigour would be required in these relationships.

The final step towards liberalization would be to break Taipower up. Both full separation of the transmission from the generation and breaking the generation up into sufficiently small units that no one unit is able to exercise market power in any service. At this point a more light-handed approach to regulation could be adopted. However, the break up of Taipower is not part of the Act and is not anticipated in the moment.
The timeframe stipulated in the Electricity Act Amendment Bill is a challenge for the Taiwan Government and the industry. To achieve the policy objectives requires firm commitments from officials, Taipower, IPPs and other key stakeholders including scholars and consumer groups. The next two years will see the implementation team comprising officials, industry representatives and expert consultants busy going through the design, build, implementation phases in an extremely tight timeframe. A well functioning ISO should bring benefits to the industry, and the country in general.

References

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