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## Power Sector Reform in Vietnam

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### ABSTRACT

*The power sector in Vietnam has been dominated by state owned corporation, namely Electricity of Viet Nam (EVN). The corporation is in charge of developing almost all power projects, covering generation, transmission and distribution aspects. Although some projects do not belong to EVN, the share of them is still quite minor. At present, there is no competition and no choice for customers dealing with this centralized decision making.*

*Up to 2010, Viet Nam is to invest in a number of power projects, which requires huge investment capital requiring high demand of capital. EVN alone does not seem to be capable to finance by itself. EVN has involved the participation of the private sector. Facing with challenges in marking the transition to a modern, industrialized economy, to meet the increasingly high demand for electricity, due to restriction of EVN itself capital as well as the willingness to participation of other entities, the Vietnam power sector will get more and more private sector participants. The trend is towards a free and efficient electricity market. This is the decentralized incentive to reform the power sector.*

*Together with the decentralized forces in creating incentives to reforms in power sector, Vietnamese Government has policy on diversifying the form of power entities. Furthermore, the Electricity Law has been designed with the main idea of creating a legal framework for power market to accommodate competitive power entities.*

*There is a very wide range of possible electric utility restructuring models. Three of many possible options can be described:*

*Model 1: (single buyer) sits at one extreme. In this model one simply supplements the existing industry with the competitive acquisition of all new generating plants.*

*Model 2: (full whole sale competition) is an intermediate restructuring option that creates a fully competitive wholesale generation sector. In this approach all generation would be subject to competition.*

*Model 3: (full retail competition) is a fully competitive retail and wholesale model. All generation services would be competitive from the generation to the retail consumption level. In this model only the transmission and distribution system would continue to have any form of regulation.*

*To modernize power sector and meet the increasing demand of energy, reforming power sector is very important in order to create a power market for all market players including EVN and other relevant entities. Vietnam is studying a Road Map for power sector reform, which would gradually restructure the power sector towards a more competitive market. The recommended road map complies with these three models applying to Vietnam circumstances.*

## **1. THE CURRENT STATUS OF POWER SECTOR IN VIETNAM**

The power sector in Vietnam has been dominated by the state owned corporation, namely Electricity of Vietnam (EVN).

The corporation is in charge of developing almost all power projects, covering generation, transmission and distribution aspects. Although some projects do not belong to EVN, the share of them is still quite minor.

By the end of 2002, Vietnam had a total electric generating installed capacity of 8860 MW, of which Independent Power Producers (IPPs) accounted for roughly 7%.

At present, the power transmission system of Vietnam consists of three voltage levels: 500kV, 220kV, and 110kV. These transmission lines have length of 1530 km, 4187 km, and 8410 km respectively. The capacities of substations are 2250 MVA, 8949 MVA, and 10806 MVA respectively. The transmission business has been totally implemented by EVN. The corporation has four regional power transmission companies numbered 1, 2, 3, and 4 managing transmission grids in their respective areas.

Except generation, all other areas of power sector are directly related to EVN. EVN is a national corporation established in 1995, consolidating all power entities engaged in generation, transmission and distribution, and associated services. The corporation is similar to a state holding company with members.

Power entities or business units belonged to EVN are grouped as either dependent (generation and transmission entities attached to EVN accounts) or independent accounting units (distribution and supply entities detached from EVN accounts). The first group includes 14 generating utilities (7 hydro power plants and 7 thermal power plants), the National Load Dispatch Center, 4 transmission companies, and the Institute of Energy. The second one includes 7 regional distribution power companies, 4 design and engineering companies, 2 power equipment manufacturing companies, and 1 electric telecommunication company. Moreover, a number of other utilities covering areas of research, education, manufacture, and construction are also belonged to EVN. Those business units and utilities, in turn, have belonged companies. So, many level (more than 3) of management are existed within EVN.

From a market structure perspective, the core functions of generation and transmission are integrated and under direct management of EVN headquarters. This core unit sells electricity in bulk to seven regional independent distribution companies.

In order to meet the current electricity demand in recent years, the EVN has invested in a number of power projects involving high capital investments. Mainly thanks to supports from the Government of Vietnam (GoVN), EVN received loans from international consortiums and domestic as well.

Through GoVN, EVN has received funds from various multilateral donors (WB, ADB) and bilateral donors (Japan, Sweden, Finland, Germany, Spain, France, Switzerland, Netherlands, Korea, and so forth). For 10 years (1993-2002), total amount of signed credit agreements are over USD 3.7 billion. Of which more than 2.1 billion was invested in generation projects, more than 1.2 billion in network projects and the rest in other fields such as control centers, assistance.

Over the past years, besides investment incentive credits from Government Development Assistance Fund supplied for power projects, EVN also received credit from domestic commercial banks with a total amount of about VND 10000 billion, equivalent to USD 667 million.

Due to the very little share of IPPs in generating area, the picture of Vietnam power sector now can be viewed as the picture of EVN. EVN monopoly is a historicity because Vietnam is still at very first stage of energy development process.

At present, there is no competition, no choice for customers, but put up with this centralized decision making system.

## **2. INCENTIVES FOR REFORM**

In recent years, Vietnam has achieved unprecedented economic growth while maintaining a remarkably stable macroeconomic balance. Because of international circumstances, Vietnam faces challenges in marking the transition to a modern, industrialized economy.

It is believed that the power sector can provide a foundation for future economic growth. Power supplies will need to grow about 2 times faster than GDP to meet the economic growth target. Facing rapid increasing energy demand, the Vietnam power sector has to be likewise adapted. Power resource mobilization, both public and private, will have to increase to ease financial constraints in the sector.

### **2.1 Decentralized Incentives**

The decentralized incentives focus on the demand for investment in power sector and the efficiency in management of the sector.

In the year 2010, GDP of Vietnam is projected to increase by at least 2 folds based on 2000 GDP figure. This means GDP growth rate is average 7.14% per year.

According to the Revised Power Development Master Plan of Vietnam for the period 2001-2010 approved by the Prime Minister on March 21st 2003, the load demand has been forecasted at 48.5 to 53 billion kWh for the year 2005 and 88 to 93 billion kWh for the year 2010. This means the average load growth rate is around 15% annually for the period 2001-2010.

Based on the master plan, to meet high growth rate of power demand, reliable supply of electricity as well as enough reserve capacity for power system in cases of maintenance and faults, there will be a number of new power plant to be put into operation.

Among new 62 power plants in the Master Plan, EVN itself invested in 29 owned generation projects (6912 MW), 3 joint venture projects (2623 MW), a number of new substation and lines. Other state corporations are to invest in 30 other generating projects (3661 MW).

Association with generation development, network expansion should be synchronously implemented. There will be 15 substations (8550 MVA) and 2326 km of lines to be constructed at 500 kV, 85 substations (15628 MVA) and 5064 km of lines at 220 kV.

It requires a huge investment for power sector in order to meet the high demand increase. As stated in the power master plan for the period 2001-2010, the power industry has to invest approximately USD 19.67 billion.

As of 2002, total liabilities of EVN were about USD 4.9 billion, of which only USD 2.2 billion is the owner's equity. The corporation is facing difficulties with capital for investment. To meet high demand in investment for power projects, EVN alone does not seem to be able to finance by itself. To reduce the investment burden and increase the self-financing ratio to ensure the debt payment ability, EVN needs other entities, including domestic and international ones, to participate in power development process.

Among solutions of mobilizing capital for investment, EVN appeals the outside entities to invest in power plants. EVN planned to call for investment from other state corporations under joint venture forms to invest in several hydropower projects.

Moreover, a number of domestic firms are interested in power development projects. According to the Master Plan, there will be 30 generating projects developed by state corporations outside EVN.

International firms also have concerns about it. Private participation is one of critical resolution to fulfill the shortage of investment demand.

To meet the increasingly high demand for electricity, EVN has involved the participation of the private sector. Due to restriction imposed by EVN itself, capital as well as the willingness to

participation of other entities will be limited. The Vietnam power sector will get more and more players if the trend is towards a free market for electricity.

## **2.2 Centralized Incentives**

The Government knows that effective institution is essential to an efficient, finance-able, consumer-focus power sector. Together with the decentralized forces in creating incentives to reforms in power sector, Vietnamese Government has policy on diversifying the form of power entities. Thanks to this policy, many other state corporations as well as private investors would be entities to develop power sector. Up to now, more than 30 power generation projects assigned to developers outside EVN. They take the form of IPPs, BOT, and joint venture.

Furthermore, the Electricity Law is under designed with the focus idea of creating a legal framework for power market of competitive power entities.

At present, Vietnam has two separate Laws of Domestic Investment Incentives and Foreign Investment. In broader environment, Vietnam prepares to merge the two laws into one. As the law is expected to be passed soon, domestic and foreign investors would be treated the same. This would provide an equal playing field for investors, both internal and external, of the industry in general, and power sector in particular.

## **3. RESTRUCTURING MODELS**

The following are some plans being considered. From practices in other countries, this can be applied to Vietnam.

Power sector restructuring means different thing to different people and different countries. No one model fits all countries and regardless what model one chooses initially, restructuring is an ongoing and an continuous evolving activity.

### **3.1 Goals and Constraints**

The most important step in any electric utility restructuring is to clearly understand and articulate the country's goals. Fundamental goals may include: Growth and Fairness; Capital Mobilization and Economic Efficiency.

A full and complete understanding of a country's goals will control the shape and pace of industry restructuring.

### **3.2 Prerequisites for Effective Competition**

There are several prerequisites for competitive markets to operate efficiently. Firstly, there must be no market power. This means that no buyer or seller acting alone or in collusion with others can influence prices in any significant or long lasting way. Market power may present itself as horizontal market power, i.e. any one player has too much control over a given market; or as vertical nature, in which case control of a monopoly service, for example transmission, is used to influence the price of competitive generation. Secondly, given the nature of electricity markets and the physicality of the transmission system, all participants in a competitive market must have equal access to transmission with non-discriminatory efficient prices. Finally, buyers and sellers should have access to all relevant information and all costs must be internalized.

### **3.3 Range of Restructuring Models**

There is a very wide range of possible electric utility restructuring models. Three of many possible options can be described. Model 1 sits at one extreme. In this model one simply supplements the existing industry with the competitive acquisition of all new generating plants. Model 2 is an intermediate restructuring option that creates a fully competitive wholesale generation sector. In this approach all generation would be subject to competition. Model 3 is a fully competitive retail and wholesale model. All generation services would be competitive from the generation to the retail consumption level. In this model only the transmission and distribution system would continue to have any form of regulation.

All of these options share a few common attributes. Firstly, they all have, to varying degrees, competitive generation markets. As a result the structures and institutions necessary to support and facilitate a competitive generation market such as an efficient spot market must be designed and put in place. Secondly, they all have aspects of a continuing monopoly transmission and distribution system. Thirdly, all options are based on arm's length transactions between any regulated and unregulated business. All three models are discussed further below.

#### **3.3.1 Single Buyer Model**

In this Model, existing generation and all transmission and distribution continue to be owned and operated by the existing utility. All new generation is added by independent power producers and sold to existing utilities, which then sell the electricity in the retail market. (This model and the next are called the single buyer model.). Single buyer buys generation services from the supplier of their choice.

Generation is subject to competitive bidding and is sold to the single buyer under a long-term contract. In this model, customers remain captive and hence there is a significant role for an independent regulatory commission. The role of the regulator is to create competitive conditions for the acquisition of new generation. Also, in this model, System Operator considerations are used to plan the system and to evaluate the competitive bids.

Questions such as risk allocation and risk reduction are among the many issues that continue to be considered by regulators in the context of their System Operator responsibilities. Other important conditions for this model include clear and enforceable contracts with credit worth buyers.

Competitive generation in this model continues to rest on the finance capability of the underlying power sales contracts. If contract is enforceable or the creditworthiness of the buyer is in doubt, other forms of credit guarantees will be needed.

This model has been an initial step for most countries that have restructured their power sector. Consequently, this model may be particularly appropriate for countries that are just beginning to consider industry restructuring and have a need to attract additional capital to meet growing electricity needs. It allows for competition to be introduced incrementally into an existing system. It provides new sources of private capital and a wider range of options for the purchasing utility than may otherwise have been the case. Risk can be distributed fairly between utilities and developers under the terms of the contracts. The greatest weakness of this model is that it fails to provide generating efficiencies in existing generating plants. While almost all countries have taken this first step the experience and results have been mixed. The model hinges on an effective and efficient competitive acquisition process. Many counties have signed long term contracts with IPPs, BOT developers without an effective bidding and evaluation process in place.

### **3.3.2 Full Wholesale Competition Model**

Model 2 is the fully competitive wholesale model. All generation, new and existing, is competitive and generation receives market prices. The utility becomes a transmission and distribution (T&D) company. There should be no affiliation between the utility and generators. The utility in this model continues to be the sole buyer of power and the sole retail seller. The utility is a monopoly and is regulated by an independent regulatory commission. Retailers buy generation services from the supplier of their choice.

Because the utility is a single buyer and customers remain captive. The regulatory role includes regulation of transmission and distribution (T&D) prices and services as well as system operator oversight of the utility's purchasing decisions. A significant regulatory role in this model is to create the institutions and rules needed for an efficient generation market. This model is particularly valuable because of the very powerful incentives it can create for the efficient operation and expansion of the generating sector. It can be very effective in reallocating risks in an efficient and fair fashion. It can also be very effective at raising capital and allowing in country capital to be used for other purposes including the upgrading and expansion of the transmission and distribution systems.

Some of the issues to be addressed, if this model is pursued, include price volatility and market design to give reasonable incentives to add capacity when needed. Also, the transition may provide countries with an opportunity to sell existing plants for prices that exceed their existing book value. The increased revenue can be used for a wide variety of purposes.

Market prices for existing generation has generally taken the form of long-term contracts, sometimes called vesting contracts. Many countries, including the UK, have used this model as intermediate step on the way to full retail competition. Countries that have created competitive wholesale markets, including the US, UK, Canada, Australia, and New Zealand have experienced the need to continually monitor the functioning of the market to make corrections to solve operational and market power issues. This has become a vital role of the regulatory commissions. Notwithstanding the need for continual improvements, the wholesale markets have performed reasonably well.

### **3.3.3 Full Retail Competition Model**

Model 3 extends the competitive model to all retail customers. In this model, the utility is no longer the single buyer. The utility provides the transmission and distribution system. It has an obligation to connect, but not an obligation to serve. Customers buy generation services from the supplier of their choice.

The role of regulation in this model is the least of all possible models. The regulators' focus will be on establishing market structures and market institutions which can assure the greatest level of competition and the greatest level of choice for customers, including prices, service quality, and consumer protection. There is no economic regulation of the generation sector. Regulation ensures open access, reasonable and competitive conditions and generally protection against monopoly power of buyers and sellers.

This model has been implemented in many countries including the UK, Norway, and parts of the US, Australia, and Canada. The success of adding retail competition to Model 2 is difficult to measure at this time.

## **4. POWER SECTOR REFORM SCHEME**

At present, Vietnam on one hand is preparing prerequisites for competitive, and on the other hand is moving towards Model 1. The situation is still at a very first stage of industry restructure process.

The reform plan envisages EVN as the sole or key buyer of power generation over the short and medium term. Competition will be encouraged in upstream generation, with a 20% target for private generation over medium term. Transmission will remain the responsibility of EVN but will be regulated by an independent agency. EVN's distribution functions will gradually be privatized through diversified ownership of assets. In short run, an electricity law plans to be passed. Transmission and distribution would be separated as profit centers. Balance sheets would be independently audited. All of them aim to create an equal level field for public and private participation.

More specific, power sector reform can be fundamentally separated into periods as follows:

Period 2001 – 2005

The main characteristics at the end of this period will be not much different from now. EVN is a state corporation responsible for the entire power system: production, transmission, and distribution.

In generation sector, to commercializing EVN units, an independent accounting mechanism will be introduced as pilot programs for some power generating. The objective is for utilities to lead the initiative in production costing and lowering losses, implementing accounting mechanism based on profits, facilitating capital mobilization and diversifying ownership of investment.

Besides that, privatization is being encouraged in general. EVN has proposal for privatizing some existing power plants such as Vinh Son (68 MW) and Song Hinh (70 MW) Hydro Power, Ba Ria Thermal Power.

In transmission sector, procedures of generation and transmission sectors will be still implemented by EVN on centralized accounting basis. Transmission companies will be in charge of management of power transmission expansion projects.

In distribution sector, all distribution companies will purchase electricity from EVN and sell to consumers and be responsible for investment in distribution networks. Besides EVN's distribution companies, independent distribution companies in the forms of private, or joint venture will be established through privatization process. EVN has plans to privatize three provincial distribution utilities.

Importantly, prerequisites for effective competition will be met at this period. The Electricity Law and supporting regulations has been drafting. The draft law defines regulatory functions, functions of other government agencies, principles to guide the formation of a regulatory agency, procedures and requirements for licensing sector operations by function (generation, transmission, bulk supply, distribution, retail supply), rights and obligations of licensed operators, and principles for setting and approval tariffs. Detailed implementing regulations are being drafted in parallel. The law is expected to be passed in this period and to supplement the law, secondary legislation will need to draft for covering the scope and structure of the regulatory agency, procedures for setting and regulating tariffs, and administrative regulations and standards. This body of legislation would then provide a consistent legal basis for sector regulation.

Moreover, it would be expected to privatize Dong Anh electro mechanical company, Thu Duc electro mechanical company and its 8 other subsidiaries.

Period 2006-2010

There will be a competitive market for EVN independent-accounting power plants and independent power producers. Based on Power Purchase Agreement under the regulation of National Load Dispatch Central, competitive generation utilities will sell bulk power to transmission companies. All power plants will operate according to independent accounting mechanism, produce and sell electricity to power transmission companies at transfer prices.

Restructuring transmission sector into single unified transmission body, splitting from generation, accounting based on profits, operate as independent utility under the financial and cost effective control of EVN.

The National Load Dispatch Central and the four existing regional transmission companies will be considered to integrate into single state owned Transmission Company. The integrated company will manage transmission lines with voltage level of 220 kV and above and take the role of transmission, single buyer, and system operator.

The single Transmission Company will buy power from generating power plants and sell to distribution companies and directly to big consumers.

From 2006, privatization will be implemented for a few power plants, power companies, provincial power distribution utilities and other subsidiaries of EVN.

#### Period after 2010

In generation, during this period, IPPs and BOT power plants will participate in the competitive power market and hourly pricing mechanism will be applied to reduce production cost and the selling tariffs.

IPPs are companies that build and usually operate generating facilities, but are not usually considered utilities. They provide the large capital resources needed to build or buy these plants and recover their costs from the sale of electricity. Depending on the restructuring model selected the role of IPPs can range from representing a fraction of new generating resources to the ownership and operation of all generation.

As with most aspects of electric utility industry restructuring the nature of a country's IPP program will be shaped by the country's goals. There are many possible goals that could shape a country's IPP program but the three that arise most often are:

- Attract outside capital to meet rapidly growing electricity needs without imposing large strains on the nation's internal financial capabilities;
- Reduce electricity costs though competitive pressures;
- and Assign risks in a more efficient or desirable manner. Which of these goals are adopted will influence the final design of an IPP program.

The distribution sector will be commercialized. Distribution companies will be restructured and classified into bulk and retailing. Distribution companies will purchase electric power via power pool and may select customers through Power Purchase Agreements. State will still manage Transmission Company in line with economic development strategy.

## **5. REFERENCES**

- [1] U.S. Agency for International Development. 2000. Best Practices Guide: Implementing Power Sector Reform.
- [2] The Electricity of Vietnam. 2003. Annual Report 2002.
- [3] Ministry of Industry. 2003. Power Sector Road Map (Draft).
- [4] Government of Vietnam. 2003. Power Development Master Plan for the period 2001-2010.