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Development of a Competitive Electricity Market in Indonesia

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ABSTRACT

As a consequence of the Asian financial crisis of 1997, the Government of Indonesia decided to make greater use of market mechanisms in the power sector and embarked upon a sector reform program. The ultimate goal is the establishment of a fully competitive power market. It is, though, recognized that introduction of market mechanisms will have to be confined to the power system of Java and Bali, and that a gradual transition will be required. The reform process has already made substantial progress to date, but much needs to be done before the final stage of a fully competitive market system can be accomplished

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1. Introduction and Background

The Republic of Indonesia comprises some 3,000 inhabited islands, which is a unique feature that has a substantial impact on its electricity supply system and energy policy in general. A distinction often made is between Java and Bali on the one hand as the economically most advanced regions in the country, where about 60% of the country's population of 200 million live, and the so-called Outer Islands on the other, which comprise the remainder of the country.

The major player in Indonesia's power sector is PT Perusahaan Listrik Negara (PLN), which until the mid-nineties was the public utility that provided electricity as a vertically integrated entity throughout Indonesia. PLN had a monopoly in the generation, transmission and distribution of electricity until Independent Power Producers (IPPs) were permitted to enter the market as a first step of sector reform. In response to frequent blackouts and fluctuations in voltage levels, however, industrial self-generation (captive power) is also widely found and accounts for more than one third of the total generation capacity in the country.

Not taking into account captive power, total installed generation capacity in Indonesia, including IPPs, amounts to around 25,000 MW. More than 2,000 MW of PLN's capacity, however, is presently not available for generation. Total installed operational generation capacity in Java and Bali, where the competitive power market is to be introduced, is just above 18,000 MW. The fuel mix is heavily biased towards coal; close to fifty percent of the power plants in Java and Bali are fired by coal. 80% of IPPs are coal-fired. A further 36% of generation capacity are gas-fired combined cycle power plants and gas turbines. Growth of electricity consumption has picked up again substantially since the financial crisis, and growth rates of electricity consumption in the Java Bali system are estimated at around 9% per annum in the coming years.

Some general reform steps in the power sector had already been taken in the mid-nineties, usually with the support of international financing institutions, when the country was hit hard by the Asian financial crisis in 1997. As a result of this, the macroeconomic framework and the prospects for the power sector changed completely. GDP shrunk by 13% in 1997 and stagnated in 1998, inflation rose to more than 50% and the value of the local currency, the Rupiah, depreciated about 250% against the US dollar in 1998.

Combined with political and social unrest, the impact of the financial crisis meant for the power sector that the average tariff revenue of PLN (in real US-$ terms) decreased from a cost-covering level before the crisis to just 3 cents/kWh in 2000. This turned PLN from a marginally profitable

company into one with severe financial difficulties and weakened substantially its capability to make investments in the power system to improve and extend it. At the same time, international financial institutions, which had hitherto been continuous sources of financing for PLN and the Indonesian power sector, withdrew from power projects in the country. The situation was exacerbated by the fact that before the financial crisis, power supplies from all IPPs had been contracted with adjustment formulas for exchange rate variations, so that the sharp decline of the value of the Rupiah made power from IPPs much more expensive than what PLN earned from its customers.

This situation triggered the Indonesian Government to take up the idea of a comprehensive reform process for the power sector and PLN to improve the sector's performance, restore its financially viability and ensure a high-quality and efficient power supply to final customers. This move of the Government was also advocated, widely supported, and guided by the international financing institutions. The Asian Development Bank (ADB) financed the power sector reform process by providing technical assistance to the Government of Indonesia ("Capacity Building for Establishment of a Competitive Electricity Market"). The technical assistance consists of a number of consecutive assignments for the preparation of the competitive electricity market system, starting with the preparation of the Market Rules in 2000/2001. The World Bank supported the reform process through the Java Bali Sector Restructuring and Strengthening Project. This continuous support from international financial institutions has contributed much to maintaining the momentum of the reform process and ensuring the central role of competition in the process.

The Government of Indonesia embarked upon the restructuring program with its White Paper on "Power Sector Restructuring Policy" in 1998. The essence of the paper is to provide a framework that makes greater use of market mechanisms and introduces competition into the power sector. It is directed towards changing the government's role in the power sector and the development of a new legal framework with regulatory reform, industry restructuring and private sector participation. Moreover, new methods of tariff setting and management of subsidies are addressed. The White Paper also clearly recognizes that reform steps have to look different for Java-Bali on the one hand and the Outer Islands on the other, primarily due to geographical features and the differing stages of development of the power sectors in these two regions. The policy document of 1998 is still today the basic document for the reform process. Its ideas and visions remain valid up to the present and will do so into the future. Some timelines and due dates for certain activities and for implementation of specific steps as given in the document have been

exceeded, but this does not change the substance of what it sets out to achieve.

2. REFORMS COMPLETED TO DATE

2.1 Generation

Whereas all transmission and distribution assets are still owned by PLN as the public utility like in the past, changes in the ownership of generation assets have already occurred as a first step in the power sector reform process. There are now three groups of owners of generation assets: PLN, IPPs and owners of captive power.

This results from the fact that Indonesia was one of the first countries in Asia to open its power sector for private investors Presidential Decree No. 37/1992 on the "Supply of Electricity by Private Power" represents a milestone in this: it invites private participation in power projects based on a BOO scheme. As a response, quite a significant number of IPP Projects (11,260 MW) have been contracted for in Indonesia between 1994 and 1997, of which all except 1,300 MW are located in Java and Bali.

When the purchase prices under the Power Purchase Agreements increased significantly in Rupiah terms after the financial crisis, the development of a number of IPPs came to a halt and some were cancelled completely. For those that had either been completed or had reached an advanced stage, several rounds of renegotiation between the Government of Indonesia / PLN and the developers and owners of the IPPs took place, after a commission of the House of Representatives had urged the cancellation of all existing Power Purchase Agreements that had been signed by PLN. A small number of IPPs also went to the arbitration court. Meanwhile, for basically all the IPPs completed or under construction, agreements have been reached that substantially lower the tariffs under the PPAs, but which grant the owners of the IPPs a longer ownership right than originally envisaged, and PPAs have been extended accordingly.

2.2 Unbundling

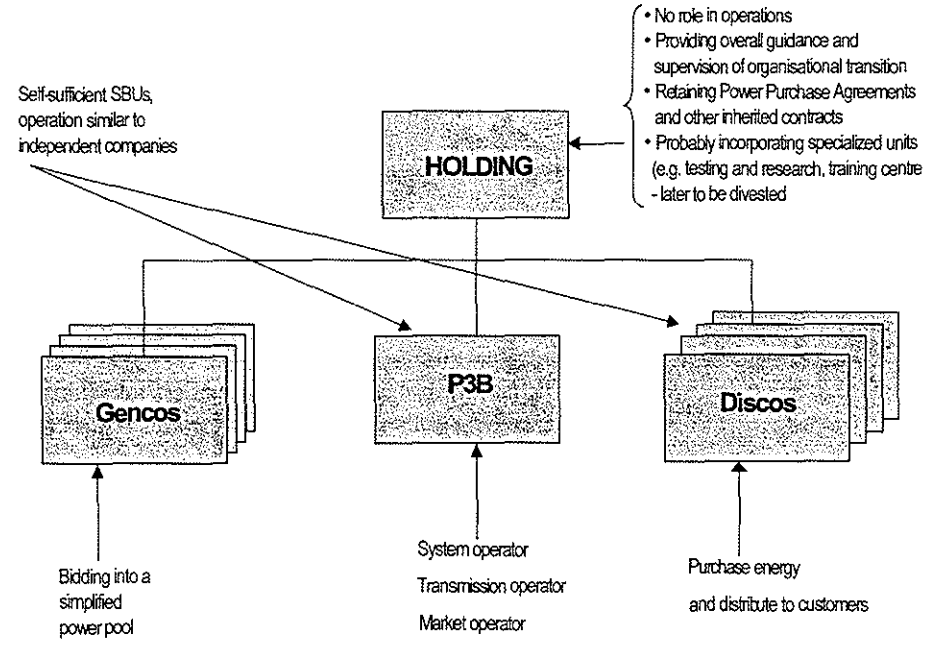
A number of steps have already been completed towards unbundling of PLN, although in essence PLN still operates as the state-owned enterprise in Java and Bali and owns the power supply chain from generation through to the transmission and distribution networks under a holding structure. Concerning generation plants, two legally separated companies have been created in Java-Bali that, up to now, are wholly

owned by PLN, and one generation company for a geothermal power station that is jointly owned by Pertamina and PLN.

On the transmission side, Penyaluran dan Pusat Pengatur Beban (P3B) has been established as a so-called Strategic Business Unit (SBU), but not as a separate legal entity. SBUs are units that are envisaged to gradually move from their present status – through a transformation first to cost centres and then to profit centres – to legally independent entities. P3B will perform the function of the transmission operator, the system operator and market operator.

So far, four distribution companies have also been established as SBUs for Java (Jakarta, West Java, Central Java and East Java) and one for Bali. These will initially purchase energy from the transmission company and supply it to final customers.

The following [Figure 2-1] depicts the present structure of the energy industry in Java-Bali after the reform steps just described.



SBU = Strategic Business Unit

Figure 2-1: Present structure of power sector in Java and Bali

On the basis of such a structure, an electricity market run by PLN as an internal exercise started operation in mid-2000. This internal market is based on the Single Buyer Market principle. The role of P3B as market operator is not formally reflected in the present organizational structure of the power sector.

3. The New Electricity Law

A further important step in the reform process has been the recent promulgation of the new Electricity Law after a comprehensive process of deliberation and consultation. The new Electricity Law for Indonesia had been under discussion and review for more than a year-and-a-half and had undergone a number of changes in various draft versions, before it was ultimately approved by the Indonesian Parliament on September 3, 2002. The law was then ratified by the President of the Republic and promulgated as Law of the Republic of Indonesia Number 20 of 2002 concerning Electricity, on September 23, 2002.

The new Electricity Law replaces Law No. 15 of 1985, which had hitherto governed the power sector in Indonesia. The old law had been designed for a power sector that operated under a vertically integrated system and it, therefore, had to be completely replaced so as to provide a basis for a competitive power sector environment. In line with the overall policy of decentralisation in the country, the new law also brings a substantial shift of rights, responsibilities and duties from the central government level to local governments and administrations. This is also reflected in the transfer of responsibilities (and financial resources) from PLN Pusat (PLN Headquarters) to the regional PLN offices in the Wilayahs.

The objectives of the new Electricity Law, in addition to the creation of a competitive framework for power generation and sales, include an enhanced involvement of the private sector in the power supply business and consequently increased investment opportunities to relieve public budgets from financing the required large future investment for the power supply system and non-discriminatory access of private investors to the power market. The law, moreover, stipulates the improvement of services to customers and their increased protection with improved electricity safety codes and environmental protection.

Law No. 20 of 2002 contains a number of timelines and milestones for the accomplishment of further steps and elements in the development of the competitive power system, but does not set a date for the commencement of the final retail market system. The Law foresees the formulation of twelve regulations as secondary legislation within one year

of its coming into force, i.e. by September 2003. It is envisaged that the process of preparation of the draft regulations will be managed by the Ministry of Energy and Mineral Resources, but all stakeholders will have a fair chance to express their opinions and concerns. This relates of course to PLN, but also to electricity associations, non-government organisations, etc.

The same timeframe of one year is given in the Law for the establishment of the Electricity Market Supervisory Agency. This agency will hold the role of a regulatory agency, but with different ideas regarding organisational setup, functions and responsibilities as compared to a "usual" regulator.

There is a general understanding that the implementation of a fully competitive power market in Indonesia requires substantial time. The new Electricity Law foresees considerably more time than originally envisaged. Moreover, it is also understood that the introduction of competition should best be undertaken in steps. The Law now stipulates that, as a first step, competition will be established in the generation sector within a maximum period of five years from its coming into force, i.e. by 2007 at the latest. The Law, however, does not clarify further what "competition limited to the generation aspect" means in detail, and whether it only expresses the concept of a single buyer market or if any further competitive elements are to be included.

The Law intends to introduce competition region by region, which, without doubt, is the most practical approach, since the power system is at completely differently stages of development in Java and Bali on the one hand and in the Outer Islands on the other. A government regulation will provide further details of this gradual process. Instead of laying down a concrete date for the implementation of competition in a particular area, which in the initial phase will only concern Java and Bali anyway, the Law lays down a number of prerequisites that need to be fulfilled before the power market can actually be opened up to competition in a region. In this regard, the final Electricity Law also differs from the draft version, which had originally included a fixed timetable for implementation of various steps towards the creation of the competitive power market.

4. FUTURE STRUCTURE OF COMPETITIVE POWER MARKET

A final decision on the ultimate structure of the energy industry in Java-Bali has not yet been taken, although the new Electricity Law provides the framework for that stage, and a clear vision of the competitive structure of the final power market exists. The Electricity Law however

does not include provisions that define the transitional stages before reaching the ultimate version of the competitive power market. But for this, too, models have been put forward by the relevant ministries and government agencies that describe these stages. Market Rules had already been developed under assistance from the Asian Development Bank for both a Single Buyer market and the final Multi-Buyer Multi-Seller market, but not for any type of transitional stage.

As it is planned now, initially a competitive power market in Java-Bali will involve generators competing against each other to sell to the new transmission company. This company will have the responsibility of purchasing electricity from all generators connected to the grid on behalf of the distribution companies (Discos). This is the Single Buyer market, where competition is limited to power generation. As the next step, a transitional stage is envisaged, under which the Single Buyer will purchase electricity under a spot market arrangement. Over time, the government will move to establish a fully competitive power market as the final model – the Multi-Buyer Multi-Seller market – and will lift restrictions on direct contracting between retailers and generators. The following sections will describe the reform steps for these three stages in more detail, whose implementation is expected to extend over at least the next ten years.

4.1 Single Buyer Market

The following [Figure 4-1] depicts the market context for the next stage of the reform process that will follow the present system of a PLN "internal market" and create a Single Buyer market.

The most important step of this Single Buyer market as compared to the present situation is the clear separation of the distribution companies from the transmission company, these being so far all Special Business Units of PLN. This organisational separation also allows the introduction of a new wholesale tariff arrangement, which is represented by the bulk supply tariff. Java-Bali Transmission Company (or P3B) will most likely not only be in charge of transmission, but also act as the System and Market Operator and the Single Buyer, since under the Electricity Law it can obtain and concurrently hold all three licenses. Although the Electricity Law foresees, in principle, separate entities for the three functions, it also allows a single, state-owned entity to perform all three functions at the same time, if and as long as these functions cannot be separated. All practical plans of the government therefore reckon with one single entity for all three functions in the foreseeable future.

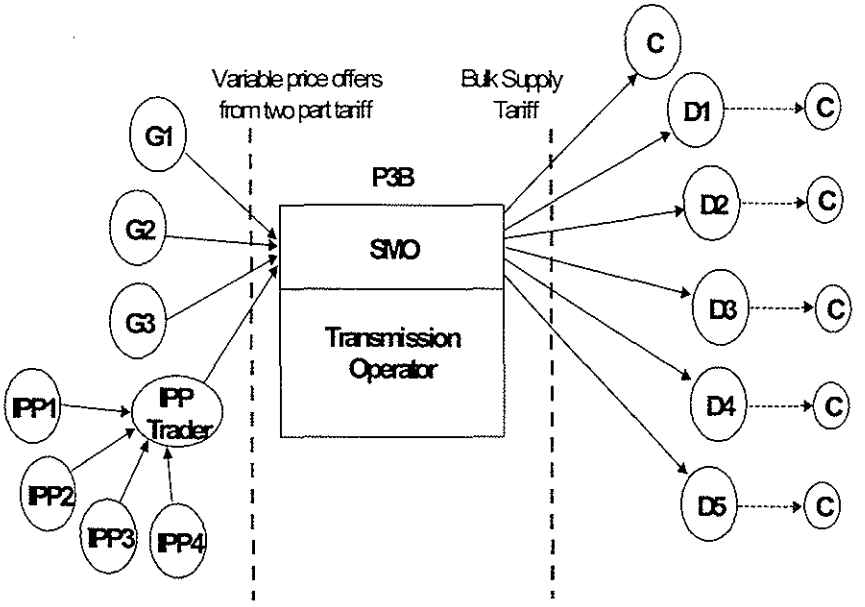


Figure 4-1: Market context for the single buyer market in Java-Bali

Generators, apart from IPPs, will bid to the Single Buyer, and on this basis a merit order will be established for dispatch. It is envisaged that the price offers will be based on a two-part tariff reflecting capital and fixed O&M costs on the one hand and fuel and variable O&M costs on the other. Competition is thus based on a pay-as-bid principle with the variable price (as approved in the PPA) acting as a cap on the offer by the generator.

A decision has not been taken so far on the structure of the generation side. Various options are under discussion, including the continuation of the presently existing two Gencos, Indonesia Power and PJB. Alternatives are structures with four Gencos created from the present two with and without a swap of power plants between them, and a number of other options with a larger number of Gencos, up to a maximum of twelve, that is to reflect an atomised market. It is expected that ultimately the generation side will be structured with three to five separate companies.

A further group of generators consists of the IPPs. They do not directly submit their bids to the Single Buyer, but through a so-called IPP trader. The purpose of the IPP trader is to establish a clear framework for dealing with the PPAs presently in place between PLN and Independent Power Producers. To what extent the IPP trader will be linked to future

IPPs, or whether these will bid directly to the Single Buyer (and later to the fully competitive market), is still under discussion. Without such an entity as the IPP trader, power from the IPPs could not be integrated into the merit order. IPPs will be fully compensated by the IPP trader, according to their PPAs, and the IPP trader will then try to sell as much power as possible to the Single Buyer in order to recoup as large a share as possible of the costs that result from purchase of the power from IPPs, which would have occurred anyway. The difference between costs of power purchase and power sales will have to be borne by the IPP trader. It is envisaged that the IPP trader will operate as a PLN-owned entity with the Government providing the necessary guarantees.

The Single Buyer sells the power he purchases from the generators and the IPP trader to the distribution companies for further supply to final consumers, as well as to a limited number of (eligible) large consumers. This is done at the bulk supply tariff, which is regulated by the Electricity Market Supervisory Agency, the regulator.

In the Single Buyer market, a certain degree of competition, although ultimately quite limited, is expected between the various generators, and competition will also, and in particular, result at the level of construction of new generation capacity. All in all, it is, however, expected that competition will remain limited at this stage, in particular when taking into account that power producers cannot sell directly to final consumers.

4.2 Transitional Stage

After the Single Buyer market, an intermediate step is envisaged before a fully competitive market is created. Figure 4-2 depicts the model of this transitional stage.

The arrangements used in this transitional phase would be based on most of those of the Single Buyer market as described above. A major development, however, is that the "pay-as-bid" arrangement will be transformed into a marginal clearing price, with abandonment of the fixed capacity payment contained in the PPA.

The transitional stage is generally seen as the step following the Single Buyer market, but this phase has not been formally recognized by the Directorate General of Electricity and Energy Utilization (DGEEU), which presently holds a (limited) regulatory role under the Ministry of Energy and Mineral Resources, nor by any other government organization. There has also been no date set for commencement of this stage of the market setup, and no market rules exist as yet for it.

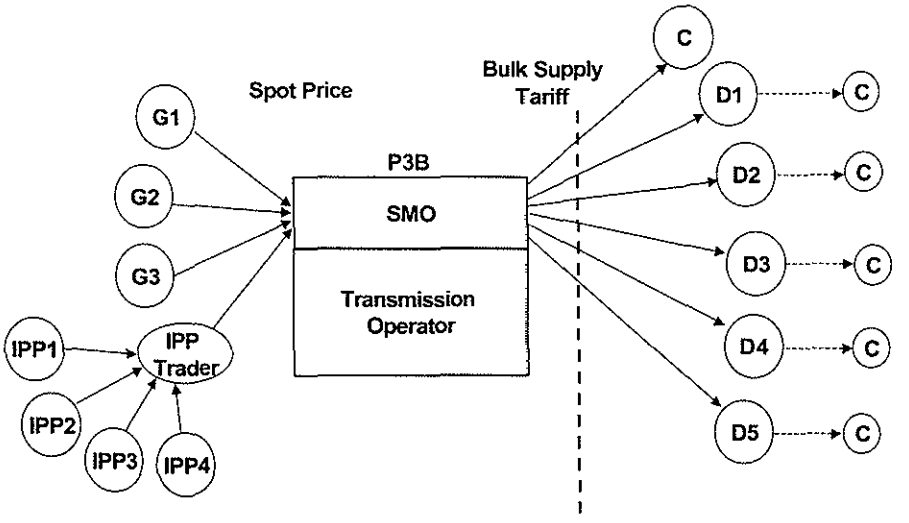


Figure 4-2: Market context for the transitional market stage in Java-Bali

Also under this transitional arrangement, the IPP trader acts as the purchaser of power and energy from the existing IPPs and bids the power and energy acquired in this way into the pool system. Any gap between the payments received form the pool and the payments made to the IPPs will have to be compensated in the same way as under the Single Buyer market.

4.2 Full Retail Competition

Figure 4-3 depicts the competitive power market in its envisaged final design. It shows substantial advancement in competitive elements. Basically, unregulated generators and the IPP trader, at the direction of the regulated System and Market Operator (SMO), deliver electricity to the transmission system. The transmission grid is owned and operated by the transmission company (Electricity Transmission Venture in the terminology of the Electricity Law), which is not subject to competition

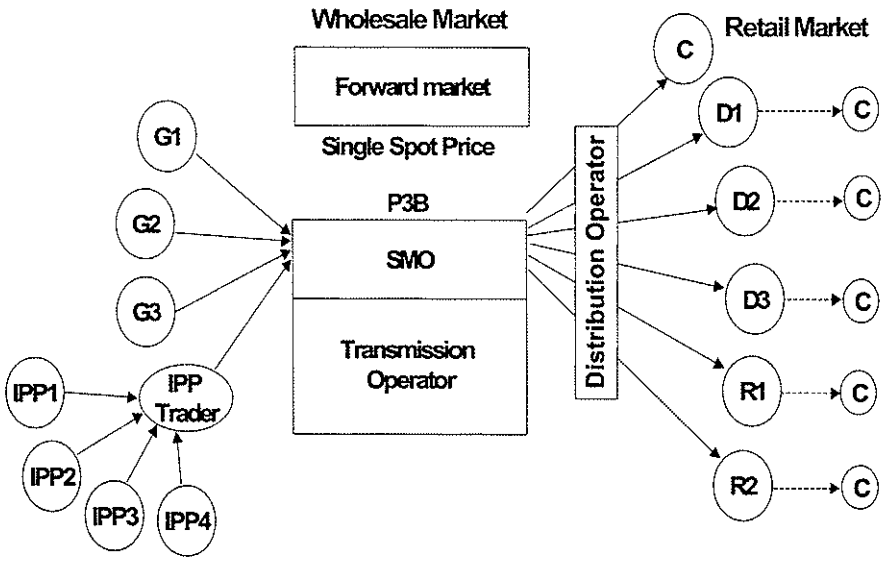


Figure 4-3: Market context for the final retail market in Java-Bali

and is regulated. The transmission company delivers electricity to the distribution system that is owned and operated by regulated distributors that supply electricity to final customers. Alternatively the transmission company delivers electricity directly to large customers.

This step from the transitional market stage to a fully competitive system leads to elimination of the PPAs, and thus a change will be made to a single spot price without a separately fixed capacity charge. Moreover, as can be seen from the figure, on the buyer side of the market, too, the Bulk Supply Tariff will be replaced with the spot price, which is the principal difference over the Single Buyer market setup. This constitutes the step to a Multi Buyer market.

The figure also indicates that a separation of the market operator (SMO) from the transmission company (JBTC) may be undertaken as part

of this reform process, although this is not foreseen in the present version of the Multi Buyer market rules.

A further major element of the final competitive market system is the separation of the distribution sector into wire business, which will have to be fully regulated since it will not be open to competition, and retail business that will operate in a competitive environment. This means that there will be several types of market participants in the distribution sector: in the terminology of the Electricity Law, electricity distribution ventures that provide distribution asset management services, electricity sales enterprises that sell electricity to low voltage grid consumers and provide customer related services, and electricity sales agents that sell electricity to consumers connected to the high and medium voltage grids and also provide customer related services to this group of customers. Both electricity sales enterprises and electricity sales agents can purchase electricity from the spot market or bilaterally from generators.

It is envisaged that at this stage the competitive electricity market comprises not only a real-time market, but also a day-ahead forward market. The core real-time energy market will serve as the widest standard for setting a market price. All potentially dispatchable generators and loads will submit their bids as price-quantity pairs. The SMO will then match the load with available supply and will determine the clearing price. The clearing price in the real-time market is the highest price in the price-quantity pair that would have been dispatched assuming that there were no transmission constraints on the system. All generators and loads that are dispatched receive the market clearing price except those that are constrained by transmission bottlenecks. Bidders with such a supply constraint obtain their lost opportunity costs, i.e. the market clearing price less their bid. Generators that substitute the constrained bidders receive their bid price.

The allowance for a day-ahead forward market is intended to provide a price and contracting standard that gives an early indication of the dispatch day's spot market price level. In this way it can provide a more predictable and potentially more stable alternative to the real-time market.

The Electricity Market Supervisory Agency, the regulator, will have to play a prominent role in the fully competitive market. Details and procedures for the regulator will be set out in a government regulation that has not yet been published. The functions of the agency mainly comprise licensing and monitoring compliance with regulations of licence holders, tariff setting (for transmission and distribution), consumer protection, dispute resolution, etc.

5. Outlook

Indonesia has been working on the power sector reform process for about ten years and more intensively over the past years after the Asian financial crises. It has made substantial progress during this time and has laid the groundwork for the establishment of a competitive power system in Java and Bali. But due to the nature of the power supply system on the Outer Islands, introduction of a competitive power system will have to be confined to Java and Bali for quite some time into the future.

The reform steps taken so far have shown that the original timeframe envisaged in the Power Sector Restructuring Paper of 1998 was too optimistic and could not be achieved. Deferments have occurred in basically all aspects of the reform process and the year 2003, which was to see the Government's vision of the new arrangements widely implemented, showed key elements of the reform process established, but with still a long way to go to accomplish the final goal.

A major milestone was reached when the new Electricity Law was promulgated in September 2002. This is an important step, but since this happened only after a lengthy process of discussions and consensus building, and with a number of substantial modifications as compared to the original draft bill, it also shows the difficulties that the overall reform process in the power sector has to face in Indonesia. Massive public protests against any kind of tariff increases for public services, which the country has frequently experienced in the recent past, certainly also play a role in this context, as one major aim of power sector reform is to re-establish its financial viability and this cannot be achieved without tariff increases.

The reform process appears to lack full coordination of all steps and activities. This could be because the Government and the international financing institutions that also drive the process appear to have differing timelines for when the reform process should be completed. As a consequence, not all elements that have been developed so far for the reform process are fully compatible with each other, since they were not always prepared in the most appropriate sequence and often also by different actors. Market Rules, for example, had been prepared even before the new Electricity Law was in place, so that now a revision of these appears to be unavoidable to bring them fully into line with the stipulations of the new law. Also, full compatibility between the Grid Code and the Market Rules has not yet been achieved.

The time period now foreseen is much longer than that originally envisaged back in 1998 until a fully competitive power market, including retail competition, will ultimately be implemented. The new Electricity

Law does not lay down a specific timeframe, but rather provides a number of preconditions that have to be met before a move to the next stage is considered possible after the stage of competition limited to generation. Moreover, although not explicitly mentioned in the Electricity Law, it is a common understanding that the final stage of the competitive power market will be introduced only after a transition period.

Such a transition stage will further put back the start of full competition. It is, though, an advantage that during such a transition phase all entities involved in the creation of the competitive system are allowed a reasonable period to adjust to the new framework and mechanisms. This is even more important as competition in public services is a comparatively new concept for Indonesia. It has also to be noted that most organisations that will operate in the competitive power market do not yet exist. This applies to the new transmission and distribution companies that have still to be established as separate legal entities and to a new structure and larger number of generation companies; it applies further to the IPP trader. The Electricity Market Supervisory Agency has meanwhile been set up. Since implementing regulations for the Electricity Law are still lacking, the power and effectiveness of the agency remains unclear, however.

To summarise, it can be concluded that the reform process in the power sector in Indonesia and the establishment of a competitive power sector in Java and Bali have made substantial progress. Much, however, needs to be done before the final stage of a fully competitive market system can be accomplished, and the time required to achieve this will be considerably longer than originally thought.