

Renewable Energy and Energy Efficiency in Indonesia

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1. Introduction

Indonesia is committed to increase its primary energy portfolio, i.e., electricity, from the current 4.5% of energy used from renewable resources and low carbon sources to over 17% by 2025. Our commitment was expressed in a Presidential Decree No. 5 announced in 2006, which set the direction for our National Energy policies. This target will be reached by creating an enabling environment, in which both private, including civil society organizations, and public sector organizations have the mandate, right and responsibility to work on actual undertakings to achieve these targets. Energy Law has been promulgated, which embed these principles. It also institutes the necessary tools for the Government to monitor the progress towards these targets. Our current national data collection instruments will be enhanced to provide, dynamic and timely statistical information, available for both Central and Provincial Governments, to enable Government to intervene when necessary. This new regulation has identified Renewable Energy as one of primary energy resource. It has mandated the use of Renewable Energy both for electricity generation (on-grid and off-grid) and as a transport fuel.

2. Accelerated Electricity Program

Due to Indonesia's rapid growing demand we have announced two crash programs to meet this demand. Crash program one establishes new coal based electricity generation with a total capacity of 10,000 MW. To assure that we accelerate the development of renewable resources, to reach the targets we committed too in 2025, a second crash program has been announced, to be realized in the period from 2009-2014, which will consist of over 60% new capacity from **renewable resources**, in particularly approximately 5,000 MW or 48% from Geothermal resources and 12% from Hydro resources. The structure of the energy sector in Indonesia follows its population curve, with most of the energy connections on the Islands of Java and Bali. The second crash program also aims to increase access to electricity in the outer islands. The Plan as put in place now is that 55% of the planned geothermal capacity will be developed outside the Islands of Java and Bali.

To meet the investment needs of such a program, we have targeted 70% of the investments in Geothermal to be financed and developed by the private sector. As this is a relative new phenomenon in Indonesia, we have already put in place Presidential Decree 67/2005, which provides regulations on entering into contracts with IPPs in infrastructure. Under this decree the Government has indicated, that when the contracting procedures have followed certain rules, such as international competitive tender, the Government will provide assurances that IPPs will be repaid in a timely manner for their investments even if the state owned companies to whom they supply might not have a positive cash flow due to public service obligations.

The new programs will enhance and expand renewable energy and energy efficiency programs already in place and executed through a number of programs of the Indonesia Government. Some of these programs have and continue to receive support from international Financial Institutions and bi-lateral agencies, such as the World Bank, UNDP and the Government of the Netherlands and Denmark. **We would like to see active participation in these programs from ADB as well.**

3. Renewable energy comes into play

As of November 2008, we had over 5MW of grid connected renewable commissioned with over 86MW being built. While Micro-hydro is still by far the largest contributor of renewable resources, the Government is now actively exploring the potential to utilize wind energy. A New wind map survey, based on satellite imagery for the whole of Indonesia has recently been commissioned. While we do not have the expectation that we can built wind parks like those in Europe, due to an overall lower wind pattern, there are good prospects for significant contributions with lower wind speeds.

An important Government consideration has been to use renewable energy for rural electrification projects. Of the 70,000 Indonesian villages over 91% has access to electricity either from the grid or stand alone. In spite of this, mainly due to the geographical difficulties of an Island nation, only 64% of households had access to electricity. The Government has set a target for 2025 to have 95% of all households with access to electricity by 2025. This means that on average we need to provide 1.3 million new connections/ year. This will require a serious scale-up program. The Government would be interested to explore with ADB, how we can work together in this effort.

To move towards a lower carbon transport sector, the Government has encouraged and is in the process of scaling up the supply chain and infrastructure for the production, distribution and use of bio-fuels. We will be producing bio ethanol to use as a substitute for Gasoline, Bio diesel (jatropa) as a diesel fuel substitute, and other bio oils and vegetables oils as substitutes for Bunker, Kerosene etc.

The Government is aware of the discussion not only related to land use: will valuable agricultural land be used for the production of fuel for transport, and in that way driving up the market price for food products, but also the concerns regarding the forest disappearances for palm-oil production. I can share with you that his is a topic of serious concern. The Ministry of Environment has recently announced much stricter conditions under which licenses will be issued and the Indonesia forestry maps have been redrawn, including previously unlicensed forest areas. This resulted in a new discussion with which the Government is struggling. While under the former areas only 5% of potential Geothermal prospects would be affected by the laws on pristine forests, the new legislation will affect over 60% of geothermal areas.

The roadmap for bio-fuel development currently under discussion, aims to replace 10% of diesel fuel consumption with Biodiesel as soon as 2010. This would amount to the production of over 2.4 million kilo liter of biodiesel. By 2025, over 20% of diesel fuel would be made up from biodiesel. Taking into account the overall growth, this would amount to a production of 10.2 million kilo liters. A similar rapid growth curve is expected for bio-ethanol, with a production of 1.45 million kilo liter

by 2010, constituting 5% of gasoline consumption by the end of 2010. By 2025 this should have increased to 6.28 million kilo liters, or 15% of gasoline consumption in that year. To accelerate the use of bio-fuels, the Government already in 2006 changed the domestic specifications, and allowed the use of 10% bio-fuel in the diesel and gasoline specification. In 2008 this regulation was changed from voluntary to mandatory use to be implemented over the period 2009 to 2025

4. Energy Efficiency

We are in the process of finalizing the Energy Conservation Regulations. These regulations will cover reduction in technical losses in electricity generation, transmission and distribution. The focus in the coming years is on the training and appointment of energy managers for large consumers. In 2007, we have formulated the required competency for this function, and in 2008 we the have also developed an accreditation mechanism for energy managers. Energy Managers will need to provide data on energy consumption to a central database, and also are responsible for the conduct of a company energy audit and the development and implementation of an energy conservation plan for each company.

One major asset, in the promotion of renewable energy and energy efficiency is the democratization of the Indonesian society. In the first half of this decennium, a number of laws in the energy and mining sector have been changed, to give Provincial Governments the right and responsibility to issue concessions, and operating licenses for renewable energy and energy efficiency. While the introduction of these laws is just the beginning, additional efforts are required to build the required capacity with the Provincial Governments. This is an important opportunity and investment for the rapid development of renewable energy and energy efficiency.

5. Case studies

a. Traditional Market Mechanism for Renewable and Energy Efficiency do not work in Indonesia

Traditional approaches to stimulate greater investments in Renewable Energy such as feed-in tariffs, and/or capital subsidies are not effective in Indonesia. Under the law, Indonesia has only one state owned company (PLN), which is responsible for the generation, transmission and distribution of electricity. However the Government determines the tariff for customers. In order to stimulate economic growth, the Government has made a choice to subsidize the electricity tariff. Thus PLN's, the Indonesia State Owned Company mandated with the generation, transmission and distribution, of electricity, production costs is already more than double the tariff they can collect. Therefore, traditional renewable strategies using a market mechanism are not applicable in the Indonesian situation. The Government has issued price guidelines to be used by PLN to be used in their negotiations with independet power producesr (IPPs).

Government is in the process to further refine this procedure, as the decentralized new structure, still requires further details on the content of Power Purchase Agreements, particularly regarding the plant load factor, take or pay arrangements, and other characteristics in which renewable energy differs from traditional fossil fuel generation.

The construction of having private sector investments in infrastructure projects is relatively new. This is even more so in the energy sector, with PLN as the only buyer. In order to stimulate and attract private sector investments, we have presidential decree 67, issued in 2005. The decree describes the required process for Public Private Partnerships in Indonesia. In the case of renewable energy, PLN, due to the current subsidy structure, is from a Banking point of view a loss making enterprise. Bank therefore require a letter of comfort from the Government, to assure them that the Government will pay PLN in time and sufficient to honor their obligations to private sector companies such as Independent Power Producers. Presidential Decree 67/2005 gives a detailed account of the procedures that need to be followed by the State owned Enterprise to receive such a letter of comfort.

b. Geothermal Development

As indicated above the accelerated development of geothermal resources is an initiative of the Government to increase investments in a cleaner electricity production method. Geothermal production produces significantly less CO₂ than Coal fired production. The proposed program of 5,000 MW will conservatively reduce annually 82 million ton CO₂ equivalent. The economic cost of not meeting this target is high. The proposed 5,000 MW, assuming a plant load factor of 90%, and a cost for coal of US\$55/ton, would represent an economic gain to the Government of US\$740 million annually, that being the value of the 13.5 million ton coal saved. In addition, the Government stands to gain substantial carbon credits benefits from the estimated 82 million ton of CO₂ that would be saved by the 5,000 MW of Geothermal. However since 1985, no significant investments in Geothermal Exploitation have been made.

Indonesia started in 1999 with an important democratization process, in which Provincial Governments are getting the rights and responsibility to govern the mineral and geothermal resources in their provinces. In 2002, the mining law, which till that time had governed geothermal exploitation, was changed to incorporate this important Governance objective. A new geothermal law was also required, which was passed by Parliament in 2003. This law, not only shifted the responsibility to the Provincial Governments, but also laid the foundation to enhance the efficient use of geothermal resources. However Provincial Governments will need guidance and resources from the Central Government to develop the capacity to tender and monitor the exploration and exploitation of Geothermal working areas.

6. Total Projects

In the past Geothermal working areas were developed in two stages. The first, upstream, would involve the generation of the steam, treatment and delivery to the downstream company which would then generate electricity. Often the two units would not be synchronized. Thus the upstream unit, owned by one company, would plan repairs and maintenance one day, while the down-stream company would schedule this a different time. Many such voluntary and involuntary conflicts occurred, reducing the efficiency of utilizing the steam effectively. The law now mandates that Geothermal projects must be developed as “Total Projects”, that is those directly producing electricity by the same company.

But the law does not by itself facilitate the development of “Total Projects”. While the law specifies that the tender for a geothermal concession will be won by the bidder who offers the lowest price per kWh generated, a standard draft Power Purchase Agreement (PPA) is not part of the tender documents. Standard PPA, which among others things specifies where, when, and how much electricity will be produced and the penalty for non-compliance, are not (yet) part of the tender. The result is confusion and delay. The current bidding practices make it possible for companies to bid low and try to sell their license or hold on to the geothermal resources without any real obligation to develop because of the absence of PPA. Moreover, considering the winning bidder has no performance bond or any real financial commitment, the government is unable to ensure rapid or timely development of the geothermal resources.

PLN, although having the benefit of the monopoly is also in a no-win situation. As a (recently) incorporated commercially company, they aim to make a profit, or at least break-even. But as the tariff is determined by the Government at less than their actual cost of generation, PLN is losing more money with every kWh, they buy. This loss will continue to exist, even if they buy the electricity generated from geothermal resources for 85% of the price they pay for the average weighted production cost in a specific region, as the Ministerial decree of August 2008, now recommends. If they buy for a price that parliament thinks is too high, their performance is not acceptable; if they buy for too low a price, no IPPs will investment in geothermal development and they will be perceived as obstructing economic development. With the Provincial Government issuing the tenders for geothermal working areas, it lacks the proper authority to issue the PPA.

7. What stands in the way of realizing this potential?

a. Government Guarantee for PPA or Reimbursement of Tendering Cost

Suggestions have been made to tackle issue described above that a government agency supervising PLN directly to undertake the development and issuance of a guarantees for a Power Purchase Agreement. An approach has been proposed to link the Local Government (the owner of the steam resource), IPP (the producer of electricity), and PLN (the buyer and distributor of electricity). In this mechanism, National Government would provide a guarantee for the winning bidder to enter into a PPA with PLN, or get reimbursed for the full costs of tendering. In addition the National Government is providing a guarantee for timely payments by PLN to the IPP to fulfill its repayment obligations, as is already regulate under Presidential decree 67, explained earlier.

b. Credit Enhancements

Investment cost of Geothermal is in general 2 to 3 times higher than that of a comparable fossil fuel plant. But the running costs of Geothermal are much less, because no purchases of coal, oil or gas are needed. Thus once the geothermal is operational, the costs are largely that of the repayment and interest cost of the finance. The cost per kWh of geothermal electricity is directly influenced by the number of years needed to repay the loan. Then the logic is that if the term can be extended with several years, the cost per kWh will be substantially reduced. When the investment

is repaid through an amortized loan and if loan repayment can be spread out over a longer period, the actual cost per kWh will be much reduced.

c. Sharing Exploration Risks

Last but not least, the new Geothermal law 27/2003, gives the responsibility to confirm geothermal resources to Provincial Governments. While some might have the financial ability to spend the approximately US\$8 to US\$12 million required (The cost of drilling 3 wells), most will not. A currently considered revolving trust fund would go a long way to cover these risks, with repayments to the fund, coming from the income Provincial Governments will receive from the exploitation of the Geothermal concessions. Both financial facilities and a technical assistance unit, which will actively support Provincial Governments with tendering, exploitation and monitoring the Geothermal working areas over time, through a simple management information system are currently under consideration. The Government has started with a feasibility study that would provide the above and other credit enhancements. **We would welcome ADB active support in developing and co-financing with other donors such facility.**

8. The World's Largest User of Geothermal Resources in 2014

The current efforts of all stakeholders indicate that 2009 will be the year in which Indonesia will see the first new investments in Geothermal development after a period of 15 years. Several in the Government and the private sector, have expressed the hope that Indonesia, in spite of the upcoming competition from the USA, will have become the world's largest country in terms of electric power production from geothermal sources with a total installed capacity of over 5,000 MW in 2014.