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INDONESIA

# ON THE HORIZON — RENEWABLE ENERGY IN ASIA

A PRACTICAL GUIDE





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PREPARED BY MERITAS LAWYERS IN ASIA

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RMB	Chinese Renminbi	PHP	Philippine Peso
HKD	Hong Kong Dollar	SGD	Singapore Dollar
INR	Indian Rupee	TWD	New Taiwan Dollar
IDR	Indonesian Rupiah	THB	Thai Baht
JPY	Japanese Yen	USD	United States Dollar
KRW	Korean Won	VND	Vietnamese Dong
MYR	Malaysian Ringgit		

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## ON THE HORIZON — RENEWABLE ENERGY IN ASIA

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As this book goes to press, the global economy is still struggling to climb out of its worst downturn since the Great Depression. At the same time, Japan faces its most significant crisis since 1945 as it deals with the impact of the tsunami and damaged nuclear reactors at Fukushima. While some countries such as China, Singapore, and India have successfully rebounded, most nations are facing dual threats of exceptionally slow economic growth combined with chronic levels of high unemployment. Unlike past recessions, this one has hit developed economies just as hard as less developed countries, which have traditionally borne the brunt of economic downturns.

No matter how the world economy performs over the next few years, two factors stand out that will strongly influence global economic prospects over the next decade. One factor is population growth. Most experts predict that the world's population will grow from 6.9 billion today<sup>1</sup> to 8 billion by 2025 and will add another billion by 2050. This projected increase is as many people who currently live in China and India. Continual population growth places high demands on the world's resources, as more people are demanding more goods and services. Equally significant, the large and rapidly growing economic powerhouses like China and India are accelerating their demand for energy and the goods and services it provides. Between just these two countries, over 3.5 billion people will be pushing their governments to promote rapid industrialization in order to meet the demands of their burgeoning middle classes. These are pressures that neither China nor India, nor any government for that matter, can resist for political reasons.

Economics aside, the combination of these two factors is also putting a heavy strain on our world's delicate environmental balance. The problem is that the energy resources supplied today to meet a growing population's increasing needs for goods and services are mainly derived from carbon-based sources that have significant long-term impacts on the environment. Coal is the dominant fuel in Asia and accounts for 54 percent of energy used today. While this share will go down over time (to an estimated 44 percent share in 2030), the use of coal in developing Asia is expected to increase by nearly 40 percent by 2030.<sup>2</sup>

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<sup>1</sup> U.S. Census Bureau estimate at [www.census.gov/main/www/popclock.html](http://www.census.gov/main/www/popclock.html)

<sup>2</sup> Estimates from USAID ECO-Asia Clean Development and Climate Program, based on data from International Energy Agency, Asian Development Bank, and Asia-Pacific Energy Research Center

For example, the Peoples Republic of China in 2011 is over 70 percent dependent on coal for its total energy needs, and it is the fastest growing economy in the world. As energy needs increase, so does the degradation of the environment. Adding another 2.5 billion people over the next 40 years will magnify the imbalance even more.

Another consideration involves the political climate where carbon-based energy is extracted and consumed. For example, much of the global oil supply is located in geographic areas that regularly experience bouts of political instability. Think about Venezuela, Nigeria, Libya, and points throughout the Middle East. As we have seen time and time again since the oil crisis of the 1970s, any even minor disruption in the assured supply of oil, gas, or other energy sources can and will have a significant impact on global prices.

And the trends of oil import dependency are going in the wrong direction. Over the past decade, oil imports to Asia have increased by 140 percent, and in 2010 the Asia region imported 60 percent of its oil.<sup>3</sup> China's dependence on foreign oil is expected to keep rising, reaching 65 percent by 2015 and 80 percent by 2030.<sup>4</sup>

For all of these reasons, the current global energy mix, which is primarily carbon-based, is untenable over the long run. China, India, and other nations need to find alternate ways to fulfill their energy demands. The only real answer — and our best chance to bring balance back to the environment — is to turn toward alternative sources of energy, which can at least in part replace existing coal and oil sources.

The most cost-effective way of weaning ourselves from fossil fuels is through energy efficiency, and this can be done by taking actions to make homes, buildings, factories, and our transport systems more efficient.<sup>5</sup> But at the same

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<sup>3</sup> National Association of State Energy Officials, "What's Hot in Trade and Imports," available at: [http://www.naseo.org/committees/energyproduction/oil/Trade\\_Hot.htm#What's%20Hot:%20The%20Asian%20Magnet](http://www.naseo.org/committees/energyproduction/oil/Trade_Hot.htm#What's%20Hot:%20The%20Asian%20Magnet)

<sup>4</sup> Estimates for China's oil import dependency in 2030 range from 75%-82% based on these references: The World Bank, "Winds of Change: East Asia's Sustainable Energy Future," available at: [http://www.recoalition.com/re2010/userfiles/files/Winds%20of%20Change%20\(Full%20Text\).pdf](http://www.recoalition.com/re2010/userfiles/files/Winds%20of%20Change%20(Full%20Text).pdf) and Japan Times, "What is Beijing willing to do to secure oil and gas supplies?" (stating US Dept. of Defense predicts oil imports will amount to four-fifths of oil consumption by 2030), available at: <http://search.japantimes.co.jp/cgi-bin/ea20101227mr.html>

<sup>5</sup> Based on estimates in International Energy Agency (IEA), World Energy Outlook 2010



time, it is also important to aggressively develop the most feasible alternatives for supplying sustainable fuel and power directly – through renewable energy. Some examples of renewable energy with real potential are solar, wind, hydro, biomass, biogas, and tidal. While some of these technologies have been commercialized and entered the market, none of them has yet reached anywhere near their full economic and market potential.

Such renewable energy sources cannot become commercially viable without long-term financial incentives and comprehensive pricing policies backed by national governments around the world. Just the sheer size of the capital investments required in order to develop and exploit renewable energy demands that governments underwrite part of those costs, at least initially. This includes government-backed targeted incentives and grants for research and development of these emerging technologies, funding renewable energy demonstration projects, and adopting tax regimes for renewable energy that will attract private investors over the long run. Without the right policies and regulatory incentives, renewable energy sources are unlikely to succeed in Asia or elsewhere.

Globally, investments in clean energy have quadrupled over the past five to six years, from USD46 billion in 2004 to USD173 billion in 2008, and then falling slightly to USD162 billion in 2009.<sup>6</sup> And the upward trend is expected to continue, as technological developments, in combination with the policies and incentives mentioned above, boost the market for clean energy. The total expected investment in clean energy, for just the G-20 countries alone, is expected to be USD2.3 trillion over the next 10 years.

The real growth in global energy demand will occur in developing Asia — most notably China and India — which will demand access to greater and greater levels of energy over the next several decades. The overall demand for energy in the developing Asia region is expected to increase by 65 percent in the next 20 years, and electricity consumption is expected to increase by 114 percent.

Given these strong trends, we wanted to find out where key countries in Asia stand now on renewable energy as a workable alternative and what we can expect in the future.

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<sup>6</sup> UNEP, 2010, Global Trends in Sustainable Energy Investment 2010. Sustainable Energy Initiative (SEFI), in cooperation with Bloomberg New Energy Finance

In order to find the answers, we approached 12 of the leading Asian law firms and asked each to comment on 10 basic questions about renewable energy policies and the regulatory framework in their individual countries:

- 1. What are the driving factors for increasing renewable energy production?*
- 2. Which renewable energy sources are viewed as the best opportunity for your country and why?*
- 3. What role does your government play in regulating the energy industry? Describe the regulating environment and trends in deregulation in your country.*
- 4. What agencies or bodies of government oversee the energy sector? What goals or mandates has your government set for electricity generation or fuels production from renewable sources?*
- 5. What are the opportunities for private ownership (vs. public ownership) in clean energy development and technologies?*
- 6. What is the level of government investment or what incentives are in place to support these goals and targets?*
- 7. What kind of emphasis is placed on researching and developing renewable energy technologies versus looking to outside energy resources?*
- 8. Is your country on track to be a clean energy importer or exporter from the standpoint of power production supply and manufacturing?*
- 9. How developed is your country's workforce to support innovation, development and the production of renewable energy?*
- 10. What are the key barriers to increasing renewable energy as a part of your country's energy mix?*

Each chapter of this book is devoted to insights on a specific country in Asia. Our hope is that this book will spark the beginning of an ongoing dialogue among government officials and planners, venture capitalists, individual entrepreneurs, researchers, multinational corporations in the energy sector, and NGOs as they focus their attention on how best to accelerate the deployment of renewable energy resources in Asia and elsewhere. The stakes are high for all of us. We cannot afford to step back from the challenges and ignore the great opportunities renewable energy technologies offer.

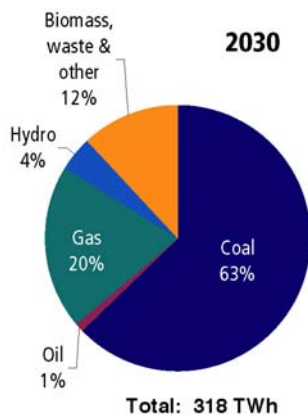
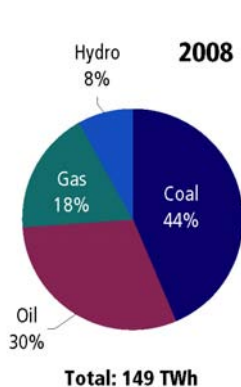
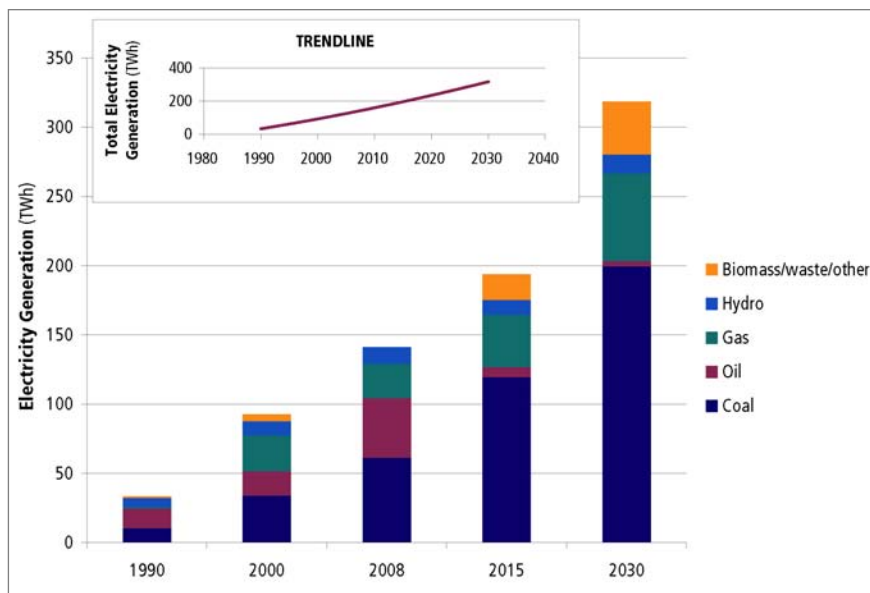
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## Editor's Note:

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USAID's ECO-Asia CDCP program uses policy and market interventions to promote the scale up of investment and implementation in clean energy in developing Asian economies. The program is active in China, India, Indonesia, the Philippines, Thailand, and Vietnam. ECO-Asia CDCP partnered with Meritas in the development of this guide as part of its Asia Clean Energy Policy and Regulatory Dialogue, which is aimed at building capacity in the region to design and implement effective policy, regulatory, and legal frameworks for energy efficiency and renewable energy.

## Electricity Generation by Fuel Type: Indonesia



Source: Asian Development Bank, International Energy Agency, Asia-Pacific Energy Research Center, and The World Bank

## 1. What are the driving factors for increasing renewable energy production in Indonesia?

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Energy is a critical factor needed for the development of economic activity and national defense.

- ♦ Ensuring domestic energy supply security.
- ♦ National energy needs continuously increase, both for electrical power and for transportation as both activities hold a vital and strategic role for the national economy.
- ♦ Limited nonrenewable energy reserves make it important to activate a diversity of indigenous energy sources including renewable energy.
- ♦ Indonesia's geographical condition offers diverse prospective renewable energy sources.

The change of paradigm from energy-supply-side management to energy-demand-side management in Indonesia's energy management has contributed to an increase in renewable energy production. Renewable energy was deemed an alternative source of energy to fossil sources. Considering that energy acts as a critical factor for economic development and energy itself constantly has to be provided, the need for energy must be fulfilled. Thus, the future aim is to maximize the supply of and utilization of renewable energy with fossil energy acting to cover the balance of energy needs.

Indonesia has also adopted a "green energy" concept with a mandatory implementation of renewable energy supply and a commitment to energy efficiency as the main keys. One of the reasons for the green energy concept is the global issue of climate change, i.e., the accumulation of greenhouse gases (GHG) that move freely within the atmosphere, caused by among others the burning of fossil energy and bringing climate change globally.

The potential of renewable energy is huge and so its utilization will increase energy independency, create opportunities for employment, and possibly reduce GHG emissions as much as CO<sub>2</sub> emissions.

## 2. Which renewable energy sources are viewed as the best opportunity for Indonesia and why?

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In Indonesia, the development of renewable energy is focused on geothermal, biofuel, biomass, small/mini hydro, and solar energy for the following reasons:

### **Geothermal**

Indonesia's geographical location is blessed with abundant geothermal resources. It is estimated that Indonesia has approximately 40 percent of the world's geothermal resources.

### **Biofuel**

The wealth of Indonesia's natural resources, particularly in its agricultural products, means a huge potential supply of raw materials for biofuel and bioethanol. It is stated in a report by APEC that raw materials in the form of agricultural waste, bagasse, and waste coming from the palm-oil and coconut industries have a large potential for bioethanol and bioethanol which can be used as substitutes for gasoline. The report states that up to 82.9 percent of gasoline could be replaced by bioethanol.

### **Biomass**

Biomass feedstock comes from agricultural products and plants and Indonesia has a very large resource base. Indonesia's natural biomass resources come from plantation or agricultural plants, forests, animal husbandry or even garbage. Organic biomass can be used to make fuel, and to provide heat and electrical power.

### **Small/Mini Hydro**

A preliminary study in 2010 has registered a potential of more than 500 MW in more than 100 sites all over Indonesia. The resources can be developed for off-grid rural electrification or under a power purchase agreement (PPA) with the state-owned utility company. With its relatively small investment requirement and attractive PPA pricing regulated by the government, small/mini-hydropower projects under a 10 MW capacity have been gaining traction and popularity among local investors and contractors.

### **Solar**

Indonesia's geographical condition as a tropical country gives it a large potential for solar energy. Two technologies utilize solar energy, i.e.,

photovoltaic solar energy that is used to meet rural electricity requirements of water pumps, televisions, telecommunications, and refrigerators; and solar thermal energy, which is used for cooking (solar stoves), drying for agricultural products (plantation, fishery, forestry, food crops), and water heaters.

### Hydro

On renewable energy, hydro is mentioned as a potential source of power in Indonesia, but at present hydro has yet to be developed for the following reasons: Potential hydro locations in Indonesia are difficult to reach (usually in the sparsely populated isolated areas) and a huge amount of investment would be required, making it less economical.

### Tidal power

Like hydropower, tidal power is mapped as a potential source of power in Indonesia but its development has not yet been maximized since it requires fairly sophisticated technology to develop tidal power.

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### 3. What role does the government play in regulating the energy industry? Describe the regulating environment and trends in deregulation.

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Currently, the prevailing laws and regulations related to the energy industry are:

- ♦ Law No. 27/2003 concerning Geothermal Energy and Government Regulation No. 59/2007 as amended by Government Regulation No.70/2010 concerning Geothermal Energy Business Activities (Geothermal Regulations).
- ♦ Law No. 30/2007 concerning Energy, Government Regulation No. 70/2009 concerning Energy Conservation, Presidential Regulation No. 5/2006 concerning National Energy Policy, and Presidential Regulation No. 5/2006 concerning National Energy Policy and Decree of the Minister of Energy and Mineral Resources No. 002 Year 2004 concerning Policy of Development of Renewable Energy and Energy Conservation (Development of Green Energy) (Energy Regulations).
- ♦ Law No. 30 of 2009 concerning Electricity and Government Regulation No. 10/1989 as amended by Government Regulation

No. 26/2006 concerning Supply and Utilization of Electric Power (Electricity Regulations).

The Geothermal Regulation gives the Indonesian government the role of acting as the administrator of geothermal mining businesses, since geothermal energy belongs to the state. There is a division of authority between central, provincial, and municipality/city governments in exercising the Indonesian government's authority in their respective jurisdictions with regard to the following:

- ♦ Making laws and regulations in the geothermal mining sector
- ♦ Making national policy
- ♦ Monitoring management and supervising geothermal mining
- ♦ Granting licenses and supervising geothermal mining
- ♦ Management of geothermal potential sources and geological information
- ♦ Compiling an inventory of geothermal sources and reserves
- ♦ Community development inside or around the geothermal working areas

To promote the development of more geothermal resources, the Minister of Energy and Mineral Resources issued a new regulation in early 2011 obligating PLN to enter into a PPA with geothermal project developers at a ceiling price of USD0.097/kWh. To enter into this PPA, project developers will have to bid for the right for exploration and commercialization of the Geothermal Working Area (GWA) to the local government.

The Indonesian government has certain roles in relation to the Energy Regulation:

- ♦ Forming the National Energy Council (DEN) with the following tasks:
  - drafting and formulating national energy policy
  - determining a national energy blue print
  - determining steps to overcome any crisis and emergency energy situation
  - supervising implementation by sector of energy policy
- ♦ Being responsible for energy conservation, dividing authority between the central government, provincial governments and municipality/city governments.
- ♦ Facilitating the research and development of knowledge and technology in relation to the supply and utilization of energy.



Under the Electricity Regulation, the Indonesian central and regional governments are designated as administrators of the electric power supply with possession still belonging to the state. Management authority is delegated to state and regionally owned enterprises (BUMN and BUMD). However, the participation of private business entities, cooperatives, and NGOs formed as legal entities is also allowed. In administering the electric power supply, the Indonesian government has the authority to control, supervise, and determine policies of electric power supply businesses. This authority is divided between the central and regional governments. The Indonesian government also has a role as the issuer of business licenses for the operation and support of both operational and supporting electric power businesses.

Due to the close linkages of energy and renewable energy development related with other sectors and authorities, the tendency in the development of the energy and renewable energy industry is to harmonize the laws and regulations in the energy field in order to stimulate implementation with due attention to the interest of each sector, such as a one-stop policy program in the issuance of business licenses.

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#### 4. What agencies or bodies of government oversee the energy sector? What goals or mandates has the government set for electricity generation or fuels production from renewable sources?

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The energy sector is overseen by the Ministry of Energy and Mineral Resources of the Republic of Indonesia (ESDM) which supervises the Directorate General of New and Renewable Energy and Energy Conservation. In performing its duties, the Directorate General of New and Renewable Energy and Energy Conservation (EBT DG) has the following functions:

- ♦ Policy formulation in the field of new and renewable energy, and energy conservation
- ♦ Policy implementation in the field of new and renewable energy, and energy conservation
- ♦ Preparation of norms, standards, procedures and criteria in the field of new and renewable energy, and energy conservation

- ♦ Providing technical guidance and evaluation in the field of new and renewable energy, and energy conservation
- ♦ The administration of the Directorate General of New and Renewable Energy, and Energy Conservation

In the Presidential Regulation No. 5 of 2006 concerning National Energy Policy, the Indonesian government states that the national energy policy aims to direct efforts toward the realization of domestic energy supply security, with the objective that by the year 2025, the country achieves an energy elasticity (ratio between energy consumption development and economic development) of less than one, and realizes an optimum mix of primary energy, with the following proportion of renewable energy compared to total national energy consumption:

Biofuel	> 5%
Geothermal	> 5%
Liquefied coal	> 2%
Other new energy and renewable energy, particularly nuclear, hydroenergy, solar energy, and wind energy	> 5%
Total	> 17%

Further, in discussions between the Indonesian National Energy Council (DEN) and the People's Representative Council (DPR), DEN explained that the renewable energy policy would be directed as follows:

- First:** Renewable energy will be focused on geothermal, biomass, solar, and biofuel energy resources;
- Second:** Provide special funds for renewable energy research and development in order to decrease production costs;
- Third:** Special price effectiveness and controls;
- Fourth:** Increase the development of the domestic equipment industry for areas such as biofuel distillation, and solar cells and panels;
- Fifth:** Fund allocation with specific schemes or smart funding for renewable energy development other than biofuels, particularly for small-scale projects;

**Sixth:** Regulate and allocate funds from the Clean Development Mechanism (CDM) program, in order to make credit carbon incentives more widely available.

On 8 October 2010, the Indonesian Minister of ESDM declared what he called “Visi Energi 25/25” (“Energy Perspective 25/25”) whereby the Indonesian government aims for renewable energy utilization to contribute 25 percent of national energy consumption in the year 2025.

Energy Perspective 25/25 emphasizes two items: (a) conservation efforts in the use of energy to increase national energy use efficiency, and (b) energy diversification efforts in provision with an emphasis on renewable energy. To better focus the efforts of conservation and energy diversification, the Directorate General of New and Renewable Energy and Energy Conservation was established under Presidential Decree No. 24 of 2010 concerning Position, Duty, and Function of State Ministries and Organizational Structure, Duties, and Function of Echelon I of State Ministries. Achieving Energy Perspective 25/25 will need the support and commitment of all parties, not just governments, but also all actors in the field of renewable energy, consisting of government agencies, research institutions/universities, academics, practitioners, state enterprises, and the private sector. The commitment of all parties in the development of new renewable energy will be manifested in a “Statement of Support for Energy Vision 25/25.” With this support the new and renewable energy community is committed to answering the challenge of sustainable national energy security and improving access to environmentally friendly energy for the community.

Indonesia’s Energy Sources in 2025:

Renewable Energy	25%
Coal	32%
Gas	27%
Oil	20%

## 5. What are the opportunities for private ownership (vs. public ownership) in clean energy development and technologies?

By the issuance of Presidential Regulation No. 67/2005 as amended by Presidential Regulation No. 13/2010 concerning Cooperation between Government and Business Entities in Infrastructure Availability (Public Private Partnership, known as PPP), the Indonesian Government has opened up opportunities for the private sector to cooperate with the Indonesian government to provide types of infrastructure relevant to energy development and technologies, i.e., electricity infrastructure that covers power stations, including electric power development coming from geothermal energy, transmission, or electric distribution. The partnerships will be in the form of entering into cooperation agreements (*perjanjian kerjasama*) or the granting of licenses to manage energy infrastructure; both forms will be established through public auction. The private sectors that can cooperate with the Indonesian government are business entities in the form of limited liability companies, state-owned enterprises (BUMN), regional state-owned enterprises (BUMD), and cooperatives. The infrastructure provided for through PPP is activities consisting of construction work in developing or increasing infrastructure ability and/or infrastructure management activities and/or infrastructure maintenance for the purpose of increasing infrastructure benefits. In managing possible risks that might arise from PPP, the Indonesian government provides government support and government guarantees. “Government support” means fiscal or non-fiscal contributions granted by the Minister/Head of Institution/Head of Region and/or the Minister of Finance in accordance with their respective competencies based on prevailing laws and regulations in order to increase the financial feasibility of the PPP, while “Government guarantee” means financial compensation and/or other means of compensation to the business entity granted by the Minister of Finance through the risk distribution scheme of the PPP with due attention to management principles and financial risk control as referred to in the state budget (APBN).

Further, in relation to the opportunities for private ownership in clean energy development and technologies, in principle the Indonesian government provides opportunities for and is open to the private sector in the development of clean energy and technologies. As an example, the

Indonesian government has recently issued Regulation of the Minister of Energy and Mineral Resources No. 15 of 2010 concerning List of Accelerated Projects for Electric Power Stations Using Renewable Energy, Coal, and Gas and The Related Transmission, whereby the government establishes in cooperation with private electricity developers electric power station projects and their related transmission using renewable energy, such as Geothermal Electric Power Station (PLTP) Tangkuban Perahu I in West Java Province with an estimated capacity of 2 x 55 MW and transmission project from PLTP Tangkuban Perahu I to North Bandung (West Java) having 150 kV with an estimated distance of 10 km.

## 6. What is the level of government investment or what incentives are in place to support these goals and targets?

In supporting the Indonesian government's goal or target in relation to electricity generation or fuel production from renewable sources, the Indonesian government provides the following investment or incentives among others:

- ♦ The issuance of Regulation of Minister of Energy and Mineral Resources No. 31 of 2009 concerning Prices for Purchases of Electricity by PT PLN (Persero) from Excess Electricity or Small or Medium Scale Electric Power Stations Using Renewable Energy, provides incentives for business entities and communities to commercially develop electric power stations using renewable energy with capacities of up to 10 MW by:
  - inserting "incentive factor = F" in determining the electric power purchase price in accordance with the location of the purchase of the electric power by PT PLN, called the EPP Price; and
  - if the EPP Price is in an electric power sale and purchase contract using renewable energy, the contract price will not need negotiation and approval from the Minister of Energy & Mineral Resources.
- ♦ The issuance of Presidential Regulation No. 4 of 2010 concerning Giving PT PLN (Persero) the Task of Accelerating the Construction of Electric Power Stations Using Renewable Energy, Coal, and Gas issued 8 January 2010, allows the State Electricity

Company (PT PLN [Persero]) to cooperate with private electric developers through electric power sale and purchase schemes to implement and accelerate the construction of renewable energy electric power stations. This includes the construction of transmission grids. The Indonesian government provides PLN and private electric developers with incentives to cooperate by providing them with import duty exemptions. Other incentives may additionally be stipulated by the Minister of Finance.

As a result of these incentives, several biomass and mini-hydro projects have been successfully implemented. Projects based on geothermal resources are currently undergoing the financing phase.

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## **7. What kind of emphasis is placed on researching and developing renewable energy technologies versus looking to outside energy resources?**

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The Indonesian government emphasizes research and development of its own renewable energy technologies through a variety of renewable energy research and development programs, such as: compilation of R&D development priorities based on a national research agenda; domestic industry development based on national research; R&D development to support local/small grids (smart grids); implementing a second generation of biofuel R&D; implementing R&D to make the energy utilization more efficient; energy conservation technology R&D program; and R&D to support data accuracy.

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## **8. Is Indonesia on track to be a clean energy importer or exporter from the standpoint of power production supply and manufacturing?**

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Though clean energy imports or exports are not included in the Indonesian Energy Perspective 25/25 they would support the implementation of Indonesian Energy Perspective 25/25. Currently, the Indonesian government (through PT PLN [Persero]) is at the stage of working with the private sector to explore renewable energy coming from geothermal energy to fulfill the supply of electric power for the state. The Indonesian

government has given PT PLN (Persero) the task of purchasing electric power from geothermal electric power stations produced by the private sector with the terms and conditions specified in the Regulation of the Minister of Energy and Mineral Resources No. 02 Year 2011 concerning Giving PT PLN (Persero) The Task of Purchasing Electric Power Derived From Geothermal Electric Power Stations and Benchmark Prices for the Purchase by PT PLN (Persero) of Electric Power Derived From Geothermal Electric Power Stations. This shows that Indonesia is hoping to become a clean energy exporter or importer and is on track for that. Indonesia has begun working towards clean energy though it is in the first stages with forests and clean carbon as evidenced by the issuance of Regulation of Minister of Forestry No. P.36/Menhut-II/2009 concerning Licensing Procedures for Carbon Exploitation, Absorption, and/or Storage Businesses in Productive and Protected Forests, which basically regulates as follows:

- ◆ The Indonesian government categorizes carbon absorption (RAP-KARBON) and/or carbon storage (PAN-KARBON) businesses as a type of environmental services exploitation business in productive and protected forests;
- ◆ Applications for RAP-KARBON and/or PAN-KARBON exploitation permits can be applied for with regard to forest areas subject to a license as well as for those not subject to licenses;
- ◆ For forest areas not subject to a license, applications for RAP-KARBON and/or PAN-KARBON exploitation permits may be filed by private persons, cooperatives, state and regional owned enterprises, limited liability companies, CVs, or firms);
- ◆ RAP-KARBON and/or PAN-KARBON exploitation permits will be issued by the Minister of Forestry, the relevant governor, or the relevant regent/mayor depending on the type of license (for those already subject to a license) and the forest areas for which a RAP-KARBON and/or PAN-KARBON exploitation permit is being applied for (for those not subject to a license); and
- ◆ It also regulates project development and carbon marketing, including provisions regarding RAP-KARBON and/or PAN-KARBON Environment Services Purchase Value (NJ2L = income received from the purchase of certified carbon credits and paid based on Emission Reduction Purchase Agreements/ERPA).

## 9. How developed is Indonesia's workforce to support innovation, development and the production of renewable energy?

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The Indonesian government, through the Ministry of ESDM, has been developing human resources by conducting the following actions:

- ♦ Holding regular renewable energy technology contests to stimulate and showcase renewable energy inventions by high school and college students and researchers.
- ♦ Providing information and literature that can be utilized and developed by non-experts and stakeholders.
- ♦ Developing and providing an e-learning system for renewable energy in order to save costs, time, and classroom expenses.
- ♦ Placing several vocational high schools from certain Indonesian provinces as role models for integration of renewable energy technology into the vocational high schools' curriculum in Indonesia with the aim of preparing skilled technicians in the renewable energy field in support of regional energy planning and development.

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## 10. What are the key barriers to increasing renewable energy as a part of Indonesia's energy mix?

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There is insufficient research and applied technology in the development of renewable energy utilization. Since renewable energy is a new development in the energy sector having the role of a substitute for fossil energy in humans' need for energy, the Indonesian people's understanding of the use of renewable energy and its potential for utilization in supporting human lives is still low, which means research and applied technology in the development of renewable energy utilization is not a priority.

- ♦ Limited manpower resources and technical education and training centers for field researchers.
- ♦ Lack of funding systems and mechanisms that urge the supply and utilization of renewable energy. New inventions require huge funding and there needs to be a clear basis for the funding with



regard to how the new invention is workable and can be optimally utilized. Due to a limited clear basis in the form of proper laws and regulations with regard to how energy and renewable energy work and the common benefits they could provide, it is not easy to obtain funding. This acts as a barrier to increasing renewable energy as part of the country's energy mix.

- ♦ Low understanding from the community of renewable energy and energy saving culture.
- ♦ Certain energy sources are located in areas where the energy consumption is still low so that utilization cannot be maximized.
- ♦ Conflicting laws and regulations on energy in general and renewable energy in particular, either between sectors or between central and regional governments. In addition, the mandate reflected in the prevailing laws and regulations on energy and renewable energy has not yet been implemented properly. Indonesia's geographical location covers a huge area and the implementation of regional autonomy, which allows each region to manage its own assets, creates extra administration for the government in implementing the energy and renewable energy laws and regulations properly.

The barriers can be eliminated or improved by adopting a policy of encouraging the development of renewable energy and energy conservation in the form of mandating utilization of renewable energy and committing to the implementation of energy efficiency and creating an energy-saving culture. To eliminate barriers, the Indonesian government, through Decree of the Minister of Energy and Mineral Resources No. 0002 Year 2004 concerning Policy in the Development of Renewable Energy and Energy Conservation (Development of Green Energy), has set forth the following policy groups: investment and funding; incentives; energy price; human resources development; information; standardization and certification; research and development; and institutional development. There is no exact schedule as yet but the Indonesian government has committed itself and is implementing that commitment, as shown by the formation at the end of August 2010 of a specific institution, the EBT DG (Directorate General of New and Renewable Energy and Energy Conservation at the Ministry of Energy and Mineral Resources), which has tasks and responsibility in the development and implementation of

renewable energy and energy conservation under Presidential Regulation No. 24 of 2010 concerning Position, Duty, and Function of State Ministries and Organizational Structure, Duties and Function of Echelon I of State Ministries. This EBT DG unites the types of renewable energy sources that previously came under different institutions. This will make it easier for the Indonesian government to organize the development and implementation of renewable energy and energy conservation.

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