Regulatory Progress and Financing Mechanisms for Renewable Energy Infrastructure under Ten Megawatts in Indonesia

For BAPPENAS and USAID

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Acronyms

ADB	Asian Development Bank
AFD	Agence Française de Développement
AMDAL	Environmental quality threshold valuation
APINDO	Indonesian Employers' Association
Bappeda	Local planning office
Bappenas	Government of Indonesia National Planning Agency
BCA	Bank Central Asia
BI	Bank of Indonesia
BKPM	Indonesia Investment Coordinating Board
BRI	Bank Rakyat Indonesia
CIRCLE	Capacity for Indonesian Reduction of Carbon in Land Use and Energy
DR	Reforestation Fund
EU	European Union
ICCTF	Indonesia Climate Change Trust Fund
ICED	Indonesia Clean Energy Development program
IDX	Indonesian Stock Exchange
IFC	International Finance Corporation
IGIF	Indonesia Green Investment Fund
IIF	Indonesia Infrastructure Finance
FDI	Foreign direct investment
FIT	Feed-in tariffs
GHG	Greenhouse gas
GIZ	Gesellschaft für Internationale Zusammenarbeit
GOI	Government of Indonesia
INGO	International non-governmental organizations
IPP	Independent power producers
JICA	Japan International Cooperation Agency
KADIN	Indonesian Chamber of Commerce
LSEs	Load-serving entities
MCC	Millenium Challenge Corporation
MEMR	Ministry of Energy and Mineral Resources
MHP-TSU	Micro Hydro Power Technical Support Unit
MHPP	Mini Hydro Power Project for Capacity Development
MW	Megawatt
NBFI	Non-bank financial institutions
OPIC	Overseas Private Investment Corporation
OSS	One-stop-shops
PE	Private Equity
PLN	Indonesian Power Utility
PPA	Power purchasing agreements
PPP	Public-private partnerships
PSDH	Forest Resource Provision
PV	Photovoltaic
RE	Renewable energy

SEBAR	Strengthening Business Associations for Reform
SMBC	Sumitomo Mitsui Banking Corporation
SPC	Special purpose company
TSOs	Transmission system operators
UKAID	United Kingdom Agency for International Development
UKCCU	UK Climate Change Unit
USAID	United States Agency for International Development
VAT	Value added tax
VC	Venture Capital

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DISCLAIMER:

The SEBAR Team's views expressed in this report do not necessarily reflect the views of the United States Agency for International Development or the United States Government.

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Executive Summary

With the depletion of fossil fuels and increased awareness about global warming, many countries are shifting their energy policy to focus more on renewable energy (RE). Similarly, Indonesia, a vast archipelago with an abundance of both thermal and renewable resources, realizes that RE can play a substantial role in providing clean energy to diverse communities while reducing dependence on coal and oil. In 2006, Indonesia set a goal to provide 15 percent of total energy production from renewable resources by 2025 earmarking 255 MW for wind, 9,500 MW from geothermal, 870 MW from solar and 500 MW from mini/micro hydro.

Unfortunately, RE projects are typically smaller than traditional thermal power plants while the cost of capital per kwh is still relatively more expensive. Moreover, commercial RE projects are relatively new to Indonesia, carrying a level of technology risk. This encourages local banks to take a conservative approach to financing RE projects because they are not yet accustomed to gauging RE probability of success and profitability. In order to open up the clean energy industry, the Indonesian Government (GOI) has implemented numerous regulations and incentives aimed at increasing the number of RE power plants in Indonesia.

One such regulation is the Ministerial Regulation on Small-scale Power Purchase Agreements, MD No.1122/K/30/MEM/2002, which allows independent power producers (IPP) to generate their own electricity and sell it back to the Indonesian Power Utility (PLN). Additionally, the Ministry of Finance and the Ministry of Energy and Mineral Resources (MEMR) have implemented incentives and feed-in tariffs on specific technologies to stimulate RE development. These policy adjustments have significantly opened up the RE market to developers that can come up with the capital and expertise to build projects. A number of developers and business people have stated that GOI and PLN are acting uncharacteristically progressive in RE.

Although such policies are beneficial, the electricity and fuel subsidies augment the Indonesian energy market, encouraging the development of large-scale, dirty, thermal power plants that can produce more energy at cheaper prices. Moreover, RE developers are having a hard time financing projects, which prevents them from constructing infrastructure. In order to better understand the Indonesian RE market, its potential and its barriers, the SEBAR Team conducted literature reviews and interviewed related stakeholders from the Ministry of Energy and Mineral Resources, Ministry of Finance, PLN, Agency for the Assessment and Application of Technology (BPPT), researchers, various local banks, and numerous RE developers.

By conducting this research, the SEBAR Team accumulated enough information to analyze the real situation developers when operating in Indonesia. On the one hand, there are many benefits such as the endowment of resources and favorable energy policies. On the other hand, there are still barriers where financing is difficult to obtain and fuel subsidies obscure the market. Based on these insights, Indonesia is moving in the right direction on RE, but more needs to be done to reach Indonesia's 2025 RE targets.

In this paper, the SEBAR Team focuses on RE infrastructure producing less than 10 MW. Furthermore, the SEBAR Team predominantly interviewed developers of micro/mini hydro and biomass/gas projects because these are the two most common types being developed in

Indonesia today. Technologies such as solar and wind are mentioned in this paper, but only briefly because there are only a few RE projects operating today. Finally, bigger hydro infrastructure and geothermal are mentioned in this paper but are not thoroughly explained because they are larger in scale and do not face the same regulatory constraints as the 1 to 10 MW projects face.

This paper is divided into three parts:1) regulatory environment; 2) feed-in tariffs; and 3) financing mechanisms available for less than 10 MW RE projects. The paper concludes with recommendations that GOI can consider to improve RE development in Indonesia. Based on this analysis, information gathered from discussion forums and interviews with Indonesian stakeholders, and the current situation of RE in Indonesia, the SEBAR team recommends GOI to consider six policy actions:

1. Create a revolving fund for early stage, small-scale renewable energy financing.
2. Create an educational certificate in renewable energy.
3. Make a feed-in tariff policy for all types of renewable energy.
4. Provide incentives in every phase of renewable energy development in accordance with renewable energy types.
5. Promote the renewable energy sector and supporting government regulations.
6. Simplify and standardize the procedure and process to obtain the permits needed for renewable energy development.

With these recommendations, the SEBAR Team believes that GOI can improve the overall RE sector in Indonesia, provide clean energy to urban and rural areas, diversify away from finite fossil fuels, and progress to meet its ambitious 2025 RE targets.

Introduction

Renewable energy (RE) technologies can provide clean power to Indonesians across the archipelago while reducing the overall output of greenhouse gas (GHG) emissions. Unfortunately, green power generation is still relatively more expensive in comparison to traditional thermal energy sources such as coal and gas. Moreover, commercial RE projects are relatively new to Indonesia, carrying greater technology risk for typically smaller scale projects. Although RE is, on average, more expensive than thermal power, the Government of Indonesia (GOI) has implemented favorable policies and feed-in tariffs to stimulate the development of RE infrastructure. Since 2007, Indonesia has realized significant growth in RE projects producing less than 10 megawatts (MW), primarily in hydro and biomass/gas. Even though there is sustained growth in this industry, more needs to be done to reach Indonesia's goal of providing 15 percent of total energy production from renewable resources by 2025, which sets targets at 255 MW for wind, 9,500 MW from geothermal, 870 MW from solar, 500 MW from mini/micro hydro.

Even though these policies have been implemented, the high subsidies for fossil fuel production and electricity distort the domestic energy market. In 2011, energy subsidies were raised to over US$22 billion to cover increases in oil prices while less than 2 percent of energy subsidies were targeted at promoting sustainable resources.[1] This offers an opportunity to gradually divert cash flows away from fossil fuels to RE development.

The dilatory deployment of RE infrastructure is not a problem unique to just Indonesia. Rather, it is a global issue where most countries struggle between providing cheap energy through traditional thermal resources to bolster the economy and protecting the environment and supply of natural resources through cleaner, sustainable power. Numerous barriers hamper the uptake of clean energy projects, especially in emerging economies such as Indonesia. Access to natural resources, supply of reliable technologies and spare parts, availability of human resources capable of building and maintaining such infrastructure, a favorable policy environment, and accessibility to investment and affordable financing all influence the rate at which RE projects can be implemented.

Luckily, Indonesia is endowed with a substantial amount of RE resources. Hydro, geothermal, and biomass/gas are the three technologies that show the most potential as they can be readily exploited en masse at moderate costs. Aside from tidal power, there is efficient technology available to extract energy from each of these natural resources. The one resource where proven technology is still relatively too expensive to commercialize in Indonesia is photovoltaic solar because there is still no feed-in tariff.

GOI has been progressively liberalizing the energy/renewable energy sectors. For example, GOI now allows independent power producers (IPP) to generate their own electricity and sell it back to the Indonesian Power Utility (PLN) while foreign developers can invest in RE projects less than 10 MW. Additionally, the Ministry of Finance and the Ministry of Energy and Mineral

[1] UNESCAP. (2011). "Case Study – Indonesia's Renewable Energy Policy." Web 30 Jul 2012 <http://www.unescap.org/esd/environment/lcgg/documents/roadmap/case_study_fact_sheets/Case%20Studies/CS-Indonesia-renewable-energy-policy.pdf>

Resources have implemented numerous incentives and feed-in tariffs to stimulate RE development. These policy adjustments have significantly opened up the RE market to developers that can come up with the capital and expertise to build projects. Although such policies are beneficial, the electricity and fuel subsidies create disincentives to developers and PLN who could generate more power and realize higher profits through traditional thermal resources in comparison to renewable energy. Chapter I covers the Indonesian regulatory and permitting environment while Chapter II describes the evolution of local feed-in tariffs and incentives for producing renewable energy.

Unfortunately, Indonesia does not yet have sufficient human resources to locally develop, administer, regulate, and maintain a substantial surge in diverse RE growth. For example, many local developers are quite new to the RE arena and they are not yet efficient at completing required feasibility studies, finding sufficient financing, and implementing and maintaining projects. PLN, the primary customer of energy resources, is not suitably staffed to adequately conduct the necessary due diligence on every RE feasibility study. Additionally, the utility does not have enough incentive to issue power purchasing agreements (PPA) to small renewable energy produces because they would rather focus on the larger thermal power plants that typically produce more energy and can service a greater number of people.

Further hindering the development of small RE infrastructure is the lack of financing available. The relative newness of RE in Indonesia, local banks' general aversion to risk, investors' appetite for larger projects with higher returns, and the tightening of global finance make it difficult for developers to find enough capital to get projects under way. Startup capital is especially challenging to find because the chance of project failure is highest at the pre-feasibility and feasibility stages. Moreover, PLN requires that a new project have at least 30 percent equity solidified before the utility will issue a PPA, one of the requirements commercial banks and external investors demand before issuing capital. This puts the onus on the developer to independently accumulate 30 percent of project costs that average around US$ 1 million per MW. Using this average, a typical developer will need to prove that it has US$ 3 million in equity before PLN will issue a PP--a substantial amount for a small- or medium-sized enterprise (SME). Although easier to obtain in comparison to startup financing, construction and/or project financing carries a relatively high interest rate that ranges between eight and twelve percent and a collateral requirement of at least 100 percent. Although RE projects in Indonesia can be profitable, finding the initial capital and building the infrastructure can be challenging and costly. A more detailed discussion of RE financing issues in Indonesia can be referenced in Chapter III.

Although there are constraints in available human resource capacity and financing, each of these factors can improve given time and effort. Already, GOI, international development agencies, development banks, donor countries, and international non-governmental organizations (INGO) are working to address these hindrances to spark RE development to meet Indonesia's demand for electricity and reductions in GHG emissions.

Characteristics of the Indonesian Renewable Energy Sector

In Indonesia, all electricity is essentially controlled by the state. Law No. 30/2009 on Energy states that new energy and RE resources shall be managed by the state and utilized in a just, sustainable, rational, optimum and integrated order for the greatest welfare and prosperity of the people. [2] According to this law, the control and management of energy resources is organized, controlled, and managed by both the central and local governments, depending on the jurisdiction. Moreover, the national state owned enterprise, PLN, is the sole purchaser and provider of electricity to the general public.

Currently, RE resources are underdeveloped when considering Indonesia's abundance of resources (reference Table 1). First, the overwhelming demand for energy prompts the development of large conventional fossil fuel power plants, such as coal, to quickly, reliably, and cheaply provide for the masses. Second, smaller RE projects can be deployed in rural areas where demand for electricity is much lower, and where it is unreasonable to place a large power plant for so few consumers.

Considering the diversity of energy resources and local demand across all the regions of Indonesia, an integrated approach must be taken to not only meet the demand for power, but also increase nationwide electrification (which currently stands at 65 percent[3]), efficiently manage natural resources, and ensure that the environment is maintained.

Table 1. Renewable Energy in Indonesia 2012

Renewable Energy	Potential	Utilization	
Hydropower	75,670 MW	4,264 MW	5.63%
Geothermal	27,510 MW	1,052 MW	3.82%
Mini-Hydropower	500 MW	86.1 MW	17.22%
Biomass	49,810 MW	445 MW	0.89%
Solar	4.8 kWh/m^2/day	12.1 MW	
Wind	9,190 MW	1.1 MW	0.01%
Ocean	35 MW	untapped	0.00%

Source: Blueprint of National Energy Management 2006-2025, Ministry of Energy and Mineral Resources

The data in the table above gives an overview of Indonesia's potential and current utilization of RE resources. Hydropower is the most utilized type of RE used in Indonesia, presently generating over 4,300 MW of energy. Although significant, there is an estimated 70,000 MW more of possible hydropower ready to be exploited. As Indonesia has one of the largest reserves of prospective geothermal energy, there is significant room for growth as just below four percent is currently being used today.[4] Biomass, solar, wind and tidal energy each are underutilized, not even reaching one percent of their possible power generating capacity. Biomass shows great

[2] Law No. 30/2007 article 4

[3] Asia Sustainable and Alternative Energy Program. (2011). "Indonesia." World Bank. Web 01/08/12 < http://web.worldbank.org/WBSITE/EXTERNAL/COUNTRIES/EASTASIAPACIFICEXT/EXTEAPASTAE/0,,contentMDK:21042053~menuPK:2900515~pagePK:64168445~piPK:64168309~theSitePK:2822888,00.html>

[4] Geothermal energy will not be covered in this paper as typical geothermal power plants are larger than 10MW.

potential in Indonesia, as there is an abundance of natural waste, such as palm kernels, that available technologies can turn into valuable energy. Even though Indonesia receives plenty of sun, solar power is still relatively expensive in comparison to other RE technologies, but solar panels can be used as a supplement to diesel generators, especially in remote areas where diesel is pricier. Similar to solar, wind generation is still expensive compared to biomass or hydro because wind is more intermittent and is not as strong along the equator. Finally, tidal technology is still in its infancy and is not yet deployed in Indonesia.

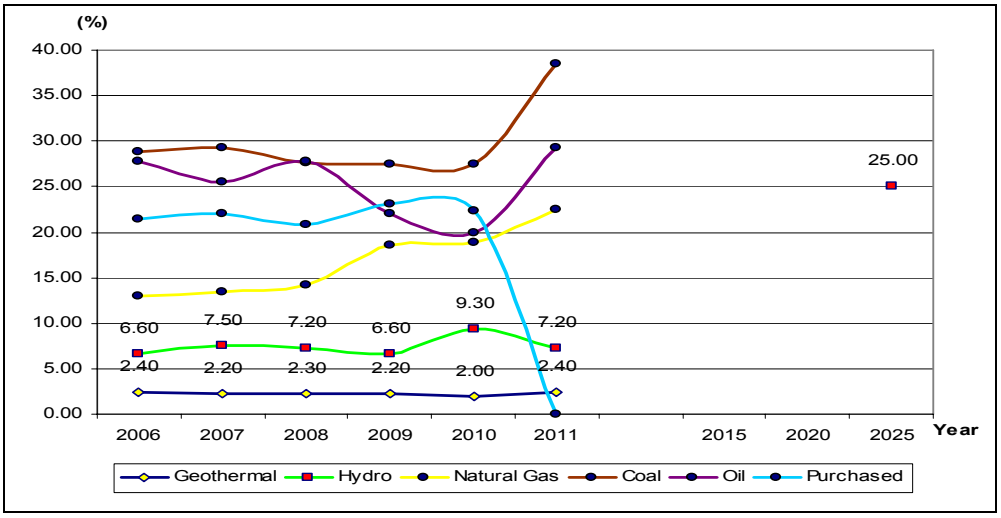
The data in the table below shows that in 2005, the total amount of electricity produced by renewable energy was 5,228.69 MW, reaching 8,772.50 MW by 2010. This shows an average annual growth rate of 10.9 percent and a total increase of over 60 percent. Despite the significant increase in RE production, it is still relatively small when considering the 10,000 MW accelerated coal-fired power plant project that began in 2006.[5]

Table 2. Progress of Renewable Energy Installed Capacity in Indonesia 2005-2010 (MW)

Renewable Energy Power Plant	2005	2006	2007	2008	2009	2010
Geothermal	852	852	982	1.052	1,189	1,189
Solar	1.23	2.91	5.63	8,67	13.50	13.50
Wind	1.03	1.19	1.67	1,87	1.87	1.96
Hydro	3,224.32	3,532.47	3,512.90	4.200,00	5,711.29	5,711.29
Micro hydro	215	215	216	218	218	229
Biomass	935.51	935.51	935.51	935,51	1,628.00	1,627.75
Total	**5,228.69**	**5,538.91**	**5,654.08**	**6,415.78**	**8,761.55**	**8,772.50**

Source: Directorate General of New Renewable Energy and Energy Conservation, Ministry of ESDM.

Table 3. The Role of Renewable Energy in Indonesia's Energy Mix



Source: PLN Statistic 2010 & 2011, Presidential Regulation No. 5/2006

[5] Petrominer. (2012). "Hasty Project." No. 7 Vol. XXXIX. Web 1/8/12 < http://www.iesr.or.id/english/wp-content/uploads/FT-at-Petrominer_07-2012.pdf>

The chart above shows the role of renewable energy in Indonesia's national energy consumption. In 2006, geothermal constituted 2.4 percent of Indonesia's energy mix and has not grown since then. Although geothermal energy generation has not increased over the past five years, exploration and a number of developments have been under way. Moreover, geothermal energy is capital intensive and takes a relatively long time to find and build. Currently, the potential for geothermal energy in Indonesia is 27,510 MW where only 1,052 MW (3.82 percent) is utilized.[6] In 2010, the installed capacity of geothermal energy reached only 1,189 MW, although there are a number of projects being considered today.[7] Based on installed capacity and its potential, it is obvious that geothermal energy can be a clean, abundant source of power if the right conditions are met. Hydro constituted 6.6 percent in 2006, growing to 7.2 percent in 2011. There is a slight increase of 0.6 percent over the past five years, hitting its peak in 2010**.** There is a slight reduction from 2010 to 2011 because the installed capacity of other power plants (steam, gas turbine, diesel, etc.) increased at a faster rate in comparison to hydropower. Overall the data in the chart above shows that over the last five years, the role of renewable energy to the national energy consumption, especially for hydro and geothermal has not shown significant progress, although this is on a gross level where thermal resources dominate domestic energy production. In the national energy policy objectives the role of other renewable energy sources such as biomass, solar and wind were not included in the Indonesian energy mix.[8]

Although this target is a laudable goal, investors, developers, academics, and government officials realize that there are various problems and obstacles in both technical and non-technical applications within the RE sector that slow the industry's overall development. A review of the literature and interviews with stakeholders in the RE sector identify many of the issues that hinder the development of clean energy infrastructure.

Table 4. Issues in Renewable Energy

Stakeholder	Issues
Producer: Developer, Investor	- Electricity and fuel subsidies encourage the development of thermal resources - RE infrastructure demands more capital per MW in comparison to thermal resources, making it more expensive - RE projects in rural areas may demand additional infrastructure such as transmission lines and roads - RE sites, resources, and technology carry a lower probability of success in comparison to thermal resources - There is a lack of startup and project financing available for RE projects from any financial institution – commercial banks, private equity, venture capital, etc. - Private equity and venture capital funds tend to want to exit an investment in 3-5 years while a RE project takes a longer time to realize profits

[6] See Table 1. Renewable Energy in Indonesia 2012, Blue Print of National Energy Management 2006-2025, MEMR

[7] See Table 2. Progress of Renewable Energy Installed Capacity 2005 – 2010, Directorate General of New Renewable Energy and Energy Conservation, MEMR.

[8] Presidential Regulation No. 5/2006 article 2

	- Investment funds and investment banks tend to prefer projects valued over US$50 million - The due diligence on a small project takes just as long and costs the same as a large project - Every individual RE project, no matter what the size, requires a new special purpose company (SPC) - It is challenging to sell secondary equity stakes in RE projects - Regional governments use their own carried interest rates which obscure pricing - Exposure to corrupt practices when implementing infrastructure projects - Aside from feed-in tariffs, GOI incentives for small-scale RE projects are limited - Very few developers currently have positive cash flows from RE projects yet - Trade system for renewable energy from upstream to downstream is still unclear and difficult for the developers. This is related to regulatory issues, licensing, procedures and services for renewable energy business at the central and local level - Manufacturing and service facilities for equipment and supplies of renewable energy in Indonesia are limited - General lack of human resource capacity in both public and private sector - In general, Indonesia presents a challenging business environment[9]
Consumer: PLN	- Technical problems such as determining the connection point of electricity transmission to grid of PLN. Developers must cooperate with PLN to decide the location of the power plant in order to secure developer's business from the other parties plan or PLN itself in developing electricity - Feasibility study for potential, development, construction, and operation of renewable energy power plant. Most of the feasibility studies conducted by developers are not completed in a professional manner, which inaccurately measures the potential resources and its capacity for long-term feasability. Developers typically do not take into account the closest connection point to the PLN transmission grid. - Lack of human resource capacity - RE is more expensive than thermal power
Regulator: Government	- Weak regulatory framework and weak implementation of policy to attract RE investors - Government subsidies for oil and electricity are very expensive and politically sensitive - Utilization and energy consumption in Indonesia is not efficient - It is challenging to manage an archipelago's energy needs - There is insufficient excess energy

[9] The World Bank ranks Indonesia 129th on the Ease of Doing Business ranking.

Creditor: Bank, Investment Fund	- RE financing is relatively new to Indonesia - Significant technology risk of various types of RE infrastructure - Many RE developers are new and do not yet have cash flows or observable projects - Many RE feasibility studies and loan applications are incomplete or inadequate - Small-scale RE carries large due diligence requirements for a relatively small return - Lack of human resource capacity

Although there are many challenges, RE in Indonesia offers great opportunities. Presently, the greater population does not sufficiently understand the benefits of deploying RE projects. Socialization on the potential benefits from RE could help increase RE infrastructure development. With a better understanding of the technologies, capability to provide clean energy, and economic viability, both the public and private sectors will more seriously consider using RE. Below are a number of the benefits to using RE.[10]

1. Country
   - Reduce the depletion of finite natural resources
   - Diversify the national energy mix while supplying more power
   - Create job opportunities
2. PLN
   - Additional installed capacity without paying investment costs
   - RE can be less expensive than diesel in rural/remote areas
3. Community
   - Producer: Business opportunities
   - Consumer: Availability of sufficient electricity
   - Local People: Opportunity to develop small industries, rural electrification
4. Environment
   - Reduction in greenhouse gas emissions

Moreover, volatile oil prices, global warming, and pollution negatively impact society. These challenges push populations to implement new means and methods of creating electricity to minimize the negative outcomes from traditional types of energy consumption.

As GOI is responsible for managing and directing the country's energy resources, the government must continue to develop policies to encourage RE infrastructure development. With a clear legal framework and proper incentives, the government can stimulate and increase the interest of the private sector to invest in and develop the renewable energy industry. In terms of increasing the utilization of renewable energy, GOI can create policies such as feed-in tariffs and fiscal and monetary incentives for RE projects. If the government and the private sector can work together, then Indonesia may one day be a global leader in the production of green energy and provide clean power to its population.

[10] Ministry of Energy and Mineral Resources Decree No.1122 K/30/MEM/2002

Chapter I: Indonesia Renewable Energy Regulation

I.1. Background on Renewable Energy Regulation

Indonesia is facing substantial energy issues. The current energy capacity is at its limits as the country's economy continues to grow at over 6 percent. As GOI looks to meet growing demand for power while expanding access to un-electrified areas, it is vital that the public and private sectors work together to create new energy sources from both thermal and renewable resources. One way in which GOI stimulated RE development was by passing a regulation encouraging private sector developers to build RE power plants where excess electricity would be sold to PLN, PSK Tersebar (Ministerial Regulation on Small-Scale Power Purchase Agreements – MD No.1122/K/30/MEM/2002). This allowed businesses to better contribute to Indonesia's energy needs while reducing PLN's responsibility to provide all energy.

PSK Tersebar requires PLN to purchase electricity generated from renewable energy sources by non-PLN producers for projects of up to 1 MW capacity. Institutions eligible to participate are cooperatives, private companies, and government-owned companies. Purchase tariffs will be calculated at 80 percent for medium voltage and 60 percent for low voltage of PLN's announced "Electricity Base Price," which is supposed to be its marginal production cost at the location where the plant is to be built.

Despite the clear potential of this regulation, only a small number of developers have entered this arena. Most developers produce micro-hydro and a few produce biomass/gas. Ministerial Regulation later improved this regulation on PLN's purchasing price for medium and small-scale renewable energy reactors (MEMR MD No. 4/2012),[11] increasing the feed-in tariff for RE purchased by PLN.

These two policies effectively launched Indonesia's commercialization of RE power production by IPPs, and stimulated the development of RE systems in the most cost-effective manner to reach rural areas. According to SEBAR interviews, GOI highly recommends and encourages RE development, especially in rural areas, to help alleviate PLN's burden in providing energy. Indonesia now aims to take advantage of the abundance of natural resources to cleanly meet its growing energy demands. Although Indonesia has made some progress developing a portion of its geothermal, biomass/gas, and hydro resources, there is a substantial amount of untapped RE resources available.

According to MEMR, Indonesia has significant new and renewable energy resources, which includes 450 MW of mini/micro hydropower, 50 GW of Biomass, 4.80 KWh/m2/day solar power, 3-6 M/sec wind power, and 3 GW of nuclear energy.

[11] Ministry of Energy and Mineral Resources, Government of Indonesia. (2012). Peraturan Menteri No. 4 Tahun 2012 Tentang Harga Pembelian Tenaga Listrik Oleh PT PLN (Persero) Dari Pembangkit Tenaga Listrik Yang Menggunakan Energi Terbarukan Skala Kecil Dan Menengah Atau Kelebihan Tenaga Listrik. Web. <www.esdm.go.id/regulasi/permen/doc_download/1206-peraturan-menteri-esdm-no04-tahun-2012.html>

The development of these renewable resources has three distinct advantages:

1. Provides additional capacity in rural areas, which will allow PLN to extend the grid to areas that have not yet received electricity.
2. Provides a cheaper alternative to the currently used diesel power plants, allowing PLN to reduce operating costs.
3. Provides a low carbon alternative to fossil fuel based power plants to meet Indonesia's growing electricity demand.[12]

I.2. Indonesia Regulations that Promote Renewable Energy

To continue developing the RE industry, GOI has employed regulations that will encourage individuals and companies to invest more into the sector. On the policy side, GOI signals great initiative to encourage RE by promulgating the "Policy on Renewable Energy and Energy Conservation," also called the "Green Energy Policy" (MEMR no. 0002/2004).[13] This policy provides the reference point for renewable energy development and energy conservation in Indonesia to support sustainable growth.

Under the Green Energy Policy, RE has been classified into three types:

A. Already developed commercially (biomass, geothermal, and hydro energy)
B. Already developed, but still limited (solar, wind)
C. Still being researched (ocean energy)

The Green Energy Policy defines action steps characterizing the formulation of more specific policies and programs. These include policies for investment and funding, incentives, energy pricing, human resources, information dissemination, standardization and certification, research and development and institutional development.

Following the Green Energy Policy, the MEMR published the Blueprint on Energy to serve as a roadmap for the development of different energy resources. The Blueprint gives an overview of available and potential resources and describes the strategies to exploit said resources. This document became the basis for Presidential Regulation on National Energy Policy No. 5/2006, which attempts to gradually shift Indonesia energy from fossil fuel dependency to sustainable power.

A. Presidential Regulation No. 5/2006 on National Energy Policy

Development of RE in Indonesia is regulated primarily by Presidential Regulation No.5/2006 regarding national energy policy. This regulation states that the contribution of new and RE by 2025 should consist of 17 percent RE usage, with 5 percent in biofuels, 5 percent from

[12] USAID - Indonesia. (2008). Indonesia Energy Assessment, 2008. Web. <http://indonesia.usaid.gov/documents/document/Document/400/USAID_Indonesia_Energy_Assessment>
[13] Ministry of Energy and Mineral Resources, Government of Indonesia. (2004). Keputusan Menteri ESDM No.0002 Tahun 2004 Tentang Kebijakan Pengembangan Energi Terbarukan Dan Konservasi Energi (Pengembangan Energi Hijau). Web. <www.esdm.go.id/regulasi/kepmen/doc_download/588-keputusan-menteri-esdm-no0002-tahun-2004.html>

geothermal power, and another 5 percent from biomass, nuclear, hydro, and wind. Liquefied coal is also proposed to account for 2 percent of this energy. The government will take measures to add capacity of micro hydro power plants to 2,846 MW by 2025, biomass to 180 MW by 2020, wind power to 0.97 GW by 2025, solar to 0.87 GW by 2024, and nuclear power to 4.2 GW by 2024. The total investment needed for this development of new and renewable energy sources up to the year 2025 is projected at US$13.197 billion.[14]

This foundational regulation brought together pieces of older regulations and was followed by several others that intend to improve and encourage the development of Indonesia's clean energy sector. Presidential Decree No. 5/2006 on the National Energy Policy, Law No. 30/2007 on Energy, Law No. 15/1985 on electricity, Government Regulation No. 10/1989 which is renewed by Government Regulation No. 03/2005 and No.26/2006 regarding the supply and usage of electricity, Ministerial Regulation No. 002/2006 on the commercialization of middle scale renewable energy power plants, and Minister of Energy and Mineral Resources Decree No.1122k/30/MEM/2002 on the spread of small scale power plants: all lawfully support the burgeoning RE industry.

B. Presidential Regulation No.4/2010 on the assignment to PT. PLN (State Electricity Company) to Conduct Acceleration of Power Plant Development using Renewable Energy, Coal and Gas

This regulation instructs PLN to actively accelerate the construction of new power plants that use renewable energy, coal and gas. The construction of these power plants can be carried out through cooperation with the private sector. In the process of construction, incentives such as no import tax on capital equipment and elimination of value added tax (VAT) will be given according to Ministry of Finance decisions.[15] Through this regulation, PLN is now collaborating with private businesses to construct RE power plants such as geothermal and hydro electricity. Many of these projects are offered to developers through public-private partnerships (PPP) that are organized by BAPPENAS. Although this regulation was meant for all types of RE, solar energy, wind, and biomass are still lacking as they are typically smaller in size while setting up a PPP is quite burdensome.[16]

[14] Indonesian Ministry of Energy and Mineral Resources. (2008, Aug 25). Indonesia's Renewable Energy Potential. *Press Release*. Web. <http://www.esdm.go.id/news-archives/general/49-general/1963-indonesias-renewable-energy-potential.html>

[15] Presidential Regulation, Government of Indonesia. (2010). Peraturan Presiden RI No.4 Tahun 2010 Tentang Penugasan Kepada PT Perusahaan Listrik Negara (Persero) Untuk Melakukan Percepatan Pembangunan Pembangkit Tenaga Listrik Yang Menggunakan Energi Terbarukan, Batubara Dan Gas. Web. <http://www.esdm.go.id/regulasi/perpres/doc_download/1015-peraturan-presiden-ri-no4-tahun-2010.html>

[16] The vast progress of decentralization that Indonesia is undergoing at present complicates the problems for making infrastructure PPP schemes work further. As the regional governments are now holding the authority to manage the development in their region independently, they also become the vocal points of the government contracting agencies (GCA) that identifies and manages the infrastructure PPP projects in their region. Unfortunately, the regional governments are often lacking in capacity for initiating and supporting such schemes, let alone resolving the coordination issues and regulatory conflicts at the central level.

C. Ministry of Energy and Mineral Resources Regulation No.15/2010, on Project List of Acceleration of the Establishment of Power Plant by Utilizing Renewable Energy, Coal, and Gas and Associated Transmission

According to this regulation, Indonesia can potentially exploit 3,967 MW of new geothermal, 1,204 MW of hydro, and 4,351 MW of thermal energy. This regulation stipulates that both PLN developers and non-PLN developers can build said infrastructure. According to the latest result, from this 3,967MW geothermal project, PLN has signed a geothermal energy sales contract as part of the second stage power plant development project with a total capacity of 1,455 MW. The other 2,512 MW has not yet been signed, so the contract has covered 37 percent of the project.[17] Compared with micro-hydro, PLN is expected to increase the capacity to 10,000 MW by 2020 and to 16,000 MW by 2025 and currently hydro only contributed around 4,000 MW.[18]

D. Ministry of Energy and Mineral Resources Regulation No. 4/2012 on Purchasing Price by PT. PLN (Persero) of Electricity Generated from Small and Medium Scale Renewable Energy Power Plant or Excess Power.

This regulation replaces the previous Ministerial Regulation No. 31/2009. Covering micro-hydro and biomass, this new law provides a feed-in tariff that PLN must pay for electricity generated from small and medium scale RE power plants.[19] According to SEBAR interviews, solar and wind energy will both be assigned a feed-in rate in the near future. Through this regulation, MEMR envisions that investment in each of these technologies will increase as developers are guaranteed a minimum amount of payment (reference growth rates in section II.5).

According to interviews with experts, the feed-in rate for biogas/mass and hydro is sufficient for developers to generate profits. Moreover, developers stated that PLN is complying with RE regulations, paying service providers the going rate on a timely basis. Through this regulation, PLN and GOI guarantee a standard that developers can work in and compete to produce clean energy.

E. Government Regulation No. 14/2012 on Electric Power Supply Business Activities

Government Regulation No. 14/2012 allows every kind of business entity -- state-owned or private, regional government business entities, cooperatives, and self-reliance community institutions (*lembaga swadaya masyarakat*) -- to take part and do business in RE. This regulation also mentions that every power plant must be controlled by specific special purpose companies (SPC) to avoid the situation in which if one SPC failed, others would as well.[20]

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[17] Priyambodo RH. (2011, Feb 23). PLN: 1,455 MW geothermal power plants under contract. *AntaraNews*. Web. <http://www.antaranews.com/en/news/68407/pln-1455-mw-geothermal-power-plants-under-contract>

[18] Rangga D. Fadillah. (2012, Feb 23). PLN to buy power from 130 micro-hydro plants. *JakartaPost*. Web. <http://www.thejakartapost.com/news/2012/02/23/pln-buy-power-130-micro-hydro-plants.html>

[19] Ministry of Energy and Mineral Resources, Government of Indonesia. (2012). Peraturan Menteri ESDM No.04 Tahun 2012 Tentang Harga Pembelian Tenaga Listrik Oleh PT PLN (Persero) Dari Pembangkit Tenaga Listrik Yang Menggunakan Energi Terbarukan Skala Kecil Dan Menengah Atau Kelebihan Tenaga Listrik. Web. <http://www.esdm.go.id/regulasi/permen/doc_download/1206-peraturan-menteri-esdm-no04-tahun-2012.html>

[20] Government Regulation, Government of Indonesia. (2012). Peraturan Pemerintah No.14 Tahun 2012Tentang Kegiatan Usaha Penyediaan Tenaga Listrik. Web. <http://www.esdm.go.id/regulasi/pp/doc_download/1215-peraturan-pemerintah-no14-tahun-2012.html>

No matter which entity is planning on building a RE project, that institution must obtain a Power Purchasing Agreement (PPA). To obtain a PPA, a developer must first ensure that PLN demands additional electricity capacity in the operating area and there is access to the electric power grid near the proposed area. After that, they must conduct an assessment in the area, gauging the potential to produce a certain amount of power. In order to conduct this feasibility study, developers must have a principal permit and location permit (izin prinsip and izin lokasi) from the local government (a further explanation about these permits can be referenced in section I.3). Once the feasibility study is complete, it will be reviewed by local and national PLN agencies, together with MEMR, to determine whether this project is feasible as the developer claims. After being approved, the developer must show that they have at least 30 percent of the total project's needed capital before PLN will issue the PPA. With a PPA in hand, the developer can commence construction and find the rest of the needed capital through various financing options (reference Chapter III). The duration of the PPA can range from 1 to 20 years depending on the resource used. According to SEBAR interviews, for geothermal energy PPAs may be issued for 20 or more years while for biomass projects may only receive a three-year PPA,[21] although the exact timeframe depends on the negotiation between PLN and the developer.

F. Ministry of Finance Regulation No. 139/PMK.011/2011 on Procedures For Granting Business-Feasibility Guarantee to PT. PLN (Persero) For the Development of Renewable Energy, Coal and Gas-Fueled Power Plants Through Cooperation With Independent Power Producers

This regulation replaced Ministry of Finance Regulation 77/PMK.01/2011, and provides support and guarantees to PLN's financial viability in case PLN cannot adequately meet their obligations to pay power producers. Some developers take issue with this regulation because it only guarantees payment disruptions resulting from disasters or political issues. Moreover, developers would like to receive guarantees during the exploration stage as well because there is risk that additional costs will be incurred because local government is slow in providing the necessary permits, lengthening the development process.[22] Nevertheless, it is understandable that GOI does not provide such a guarantee because there is risk that a developer may not complete the proposed project.

This regulation also works together with PLN's requirement for issuing PPAs, where PLN will not issue a PPA until the company completes the feasibility study and proves that the project already has 30 percent of its required capital.

[21] Institut Teknologi Bandung. (2011, Sep 29). Indonesia-German Workshop and Seminar: Menyoal Pemanfaatan Biomassa sebagai Sumber Energi Potensial. *Institut Teknologi Bandung*. Web. <http://www.itb.ac.id/news/3348.xhtml>

[22] Vega Aulia Pradipta. (2011, Sep 12). PMK 139 soal kelayakan usaha PLN perlu direvisi. *Bisnis Indonesia*. Web. <http://www.bisnis.com/articles/pmk-139-soal-kelayakan-usaha-pln-perlu-direvisi>

G. Bank of Indonesia Regulation No. 8/13/PBI/2006 on Legal Lending Limit for Commercial Banks

Bank of Indonesia (BI) Regulation No. 8/13/PBI/2006 is an amendment to BI regulation No. 7/3/PBI/2005 on the same subject. This regulation requires banks to apply prudential principles and risk management in the extension of the provision of funds, especially the provision of funds related to political parties, large exposures (a company or project that impacts the nation's economy), and/or provision of funds to other parties with significant BI interests. Banks are also required to have written policy guidelines and procedures for the lending process for each sector. This regulation could discourage commercial banks from financing some RE projects based on technology risk. Moreover, the RE sector is still new in Indonesia and only a small number of the traditional financial institutions have any experience in the industry.

H. Law No. 27 of 2003 on Geothermal Energy

Law 27/2003 sets out a new business structure for geothermal energy as GOI no longer recognizes Pertamina's monopoly over geothermal energy production in Indonesia. Law 27/2003 introduces a system where GOI offers a tender for geothermal projects which both public and private businesses can be bid on. However, only one business entity can hold jurisdiction over any one specified work area. If a business entity already holds a work area and wishes to obtain other work areas, it must set up a separate legal entity for each further work area.

I. Presidential Regulation No.10/2006 on Establishment of a National Team for Biofuel Development

Although this regulation explains more about the establishment of the National Team for Biofuel Development, this regulation also provides some incentives to developers who build biomass/gas power plants. Incentives such as the reduction on import tariffs for pure ester ethyl acid as raw material for biofuel and tax incentives for opening biofuel power plants in certain areas certainly benefit developers. As the largest producer of palm oil in the world, Indonesia has substantial potential to provide clean energy through biofuels. Unfortunately, this potential is still underutilized because developers face significant risk on the feed stock, both because of the raw material price volatility and because of suppliers' ability to consistently provide feed stock.

J. Presidential Regulation No. 56/2011 on the Partnership of Government with Business Entities for the Provision of Infrastructure

This regulation amends several provisions of Presidential Regulation No. 13 of 2010. Presidential Regulation No. 56/2011 allows foreign legal entities to apply for and initiate PPPs with respective Ministers/Heads of Institution/Heads of Region in accordance with the eligibility criteria specified therein. This differs from the previous regulation that allowed only Indonesian legal entities to submit such proposals. Although this regulation allows foreign entities to apply, they must establish an Indonesian legal entity in accordance with the applicable laws and regulations. The Indonesian legal entity will then act as the signatory as well as the party to the cooperation agreement. Concerning the language of the cooperation agreement, this regulation states that the agreement must be prepared in the Indonesian language and/or bilingually,

consisting of both the Indonesian and an English language version. This stipulation is an improvement from the previous regulation which stated that the Indonesian language version would prevail should the agreement be signed in more than one language.

K. Ministry of Finance Regulation No. 21/PMK.011/2010 on Tax and Customs Facilities for the Utilization of Renewable Energy

The aim of this regulation is to support the development of RE and attract investment by giving tax and customs facilities to entrepreneurs who develop clean energy projects. According to SEBAR interviews with diverse stakeholders, these incentives are not significant factors when developers consider what type of project they will implement. Feed-in tariffs are still more important as they provide the means for constant returns once a project is complete. The incentives and facilities simply help contractors obtain the inputs necessary to build RE power plants. Incentives and facilities are explained further in Chapter II.

I.3. Permits Required for Renewable Energy Infrastructure

Aside from the regulations that developers must abide by, there are permits that must be obtained to begin building. Permits include the Principal Permit (Izin Prinsip), Location Permit (Izin Lokasi), Restricted Forest Permit (if the project will be in a restricted forest), and the PPA itself. In order to obtain these licenses, developers must work directly with the local government, except for the Restricted Forest Permit that must be issued by the Ministry of Forestry. A PPA is issued by the National PLN through its local counterpart. The main issue in the permitting process is that the Principal Permit and Location Permit is issued by local governments, most of which do not follow uniform permitting procedures. These differences leads to uncertainty and confusion where both the developer and financing institutions cannot accurately predict project outcomes. Moreover, local autonomy creates opportunities for corrupt practices, leading to inflated development costs and delayed construction. According to interviews with stakeholders, local autonomy over the Principal and Location permit approval is one of the main factors that discouraged or hampered them when they tried to do their RE project, because to conduct the feasibility study they must obtain the principal permit from the local government first, which sometimes could cost millions of rupiah.

In a country as decentralized as Indonesia, where each region and local area has their own regulations and practices, it is challenging for developers to accurately estimate project costs and negotiate with local power holders. Despite all of this, Indonesia is slowly reforming and improving their licensing and permitting processes. One of the improvements is the creation of one-stop-shops (OSS) or *Kantor Pelayanan Perijinan Terpadu* (KPPT), which simplifies and shortens the number of procedures and time required to obtain business licenses and permits. In the case of Principal and Location permits, some local governments have integrated these permits into OSS, which eases the burden for developers. Below is an explanation of the necessary permits that must be obtained prior to constructing RE projects.

A. Principal Permit (*Izin Prinsip*)

Principal permits are issued by local governments, allowing developers to invest in the region. In some areas, this permit is known as Regent Recommendation Permit (*Izin Rekomendasi Bupati*) which is closely related with many local operational permits. Once the principal permit is issued, contractors can apply for the location permit and then construction permit. It should be noted that there are two types of principal permits. One is the permit that allows foreign and domestic companies as well as individuals to ask for fiscal benefits; this permit is not mandatory and companies or individual only need apply if they think they seek the benefits. To obtain this permit, companies must apply to the local Indonesia Investment Coordinating Board (BKPM).[23] The other principal permit is the one that allows a company to operate and build their business in a particular region. This permit is obtained from the local government or the local planning office (Bappeda) which is, in some areas, already included in their local one-stop-shop.[24] This principal permit from the local government is the one that is necessary for developers before they conduct their feasibility study for their renewable project.

As a result of decentralization in Indonesia, each local government has their own requirements, time constraints and costs. Though each locality has different requirements across the archipelago, the most common requirement is for developers to provide the local government with land utilization plans, which take between 6 to 30 days, and possibley more[25], in which the fee (with or without bribes) varies as well. For the permit, the local government will conduct a survey to determine whether the location mentioned in the land utilization plan is in line with local government plans and restrictions.

Because there is no standard cost or common procedure for the principal permit, the process is rife with corruption. According to interviews with stakeholders, this permit is the most expensive to obtain, sometimes costing tens of millions of rupiah. As this permit can be very expensive, the cost to obtain the principal permit may deter developers at the onset of a project. Furthermore, this permitting process can take a long time, keeping contractors from going forward with the proposed project. On the positive side, once a company has the principal permit, the developer can plan multiple projects in the same region, avoiding multiple transactions for the same permit.

B. Location Permit (*Izin Lokasi*)

The location permit is granted to a company when it is necessary to acquire land in a certain region. The procedure and process is outlined in Regulation of the Ministry of Agriculture, Head of Land Agency Number 2 Year 1999 on the Permit Area (Permenag. 2/1999). Principal permits

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[23] This permit is not mandatory and companies or individual only applied if they think they need the fiscal benefits. Indonesia Investment Coordinating Board. Government of Indonesia. (2009). Peraturan Kepala BKPM No. 12 tahun 2009 tentang Standar Pelayanan Minimal Bidang Penanaman Modal Provinsi dan Kabupaten Kota. Web. <http://www3.bkpm.go.id/file_uploaded/Perka%2014%20Tahun%202012.pdf>

[24] World Bank. (2012). Dealing with Construction Permits in Mataram-Indonesia. Web. <http://www.doingbusiness.org/data/exploreeconomies/indonesia/sub/mataram/topic/dealing-with-construction-permits>

[25] World Bank. (2012). Dealing with Construction Permits in Palangka Raya-Indonesia. Web. <http://www.doingbusiness.org/data/exploreeconomies/indonesia/sub/palangka-raya/topic/dealing-with-construction-permits>

are required before a developer can request the location permit. However, the location permit is not required and the land on which the development is being constructed is considered owned by the respective companies under the following conditions: [26]

- Land to be obtained is given (*inbreng*) by the shareholders.
- Land to be obtained is land that is already owned by another company, which in order to acquire it, the developer must receive approval from the owning authority.
- Land to be obtained is necessary for the operation of industrial enterprises in the area.
- Land to be obtained is given from the authority or agency of a regional development plan in accordance with the development plan of the region.
- Land to be obtained is necessary for the expansion of an existing business and is obtained through the purchase of the land adjacent to the location of the business.
- Land to be obtained is no more than 25 hectares (twenty five acres) for farming or not more than 10,000 m2 (ten thousand square meters) for non-agricultural activity.
- Land to be obtained is already owned by the company, provided that the land's location is in accordance with local government plan for intended use.

It should be noted that location permit will only be issued if the intended land is in line with the local government plan and its designated uses align with those intended by the local government.

The location permit itself is only granted for the following periods:

a. Location permit covering up to 25 hectares, 1 (one) year.
b. Location of more than 25 hectares until 50 hectares, 2 (two) years.
c. Location of more than 50 hectares, 3 (three) years.

If the land is not acquired within the time periods above, the location license can be extended for one year if fifty percent of the land area is designated in the permit Area. This short time period is considered a challenge for many developers because of the time that is necessary to negotiate with property owners and develop the long-term strategy for the final infrastructure. Although the location permit can be renewed multiple times, there is still a risk that the new regent or local government will change their spatial planning that will revoke a developer's permit and stall or stop the RE project.

C. Forest Area Use Permit (*Izin Pinjam Pakai Kawasan Hutan*)

Because RE power plants are long-term projects that depend on natural resources, many developers try to build their project inside or near restricted forest areas. This not only ensures that the power plant will not be affected by regional spatial use, but for mini/micro hydro power plants, it also ensures that supply of water is steady and the plant will therefore maintain operational capacity. Before an applicant can apply for the forest area use permit, the applicant must submit a forest areas use license to the Minister of Forestry with copies to the (i) Minister of Environment, (ii) local governor, (iii) local regent/mayor. The license application must include the following requirements:[27]

[26] Helen Taurusia. (2011). Izin Lokasi. *Leks&Co. Lawyers* Web. <http://www.hukumproperti.com/izin-lokasi/>
[27] Indonesia Ministry of Forestry – Forestry Planning. (2010). Sistem Informasi Penggunaan Kawasan Hutan (SIPKH). Web. <http://ppkh.dephut.go.id/>

- Plan for the project and the size of the forest area required, complete with 1:50,000 scale maps from the newest satellite pictures
- Recommendation from the local governor or regent in accordance with technical consideration from the local forestry institution
- Environmental feasibility study according to environmental quality threshold (AMDAL) valuation that is issued by the Minister of Environment and has been adjusted within the rules of the restricted forest
- Technical consideration from the state-owned-enterprise (*Perum Perhutani*) that manages the forest area
- Statement from the company to fulfill the obligations and cost of the forest area use permit (made before a notary).

When considering the permit application materials, the Minister of Forestry will examine the area proposed in the application. If the company meets all the requirements for the license, the Ministry will then require the applicant to fulfill the following obligations:[28]

- Pay non-tax state revenues for forest area utilization
- Pay the Forest Resource Provision (PSDH) and the Reforestation Fund (DR) in accordance with the prevailing regulations
- Carry out reclamation and reforestation of restricted forest areas that have been used: forest protection, prevention of forest destruction, soil erosion, landslides, forest fires, ease the burden for forestry officials to conduct monitoring and evaluation, bear the cost of land inaugural compensation, land compensation and carry out reforestation.
- The obligations should be finished in two years from the date of issuance. The date can be extended by the Ministry upon evaluation.

After the company/applicant has completed these obligations, the Ministry will issue a forest area use permit. This license is valid for up to 20 years (depending on the results of the feasibility study) and it can be extended pursuant to the principal license or agreement. This license can be transferred to other parties by granting prior approval from the Minister.

Compared to the principal permit, the forest area use permit is more standardized because it is covered by government regulation No. 24/2010 and all the processes must go through the Ministry of Forestry and Ministry of Environment at the national level. According to the Ministry of Forest decree, applicants will soon be able to obtain the forest area use permit through online services.[29]

[28] AK. (26 May 2011). Subversive Mining in Conservation Forest Areas. *Indonesia Investment Law.* Web. <http://coropendekar212.wordpress.com/2011/05/26/subversive-mining-in-conservation-forest-areas-2/>
[29] (25 July 2012). Kini izin pinjam pakai hutan cukup via online. *Kabarbisnis.* Web. <http://www.kabarbisnis.com/read/2831960>

D. Power Purchase Agreement (PPA)

The permits listed above prepare a developer to conduct their feasibility study for their RE power plant. A PPA is an agreement between a developer and PLN that covers the price of electricity and how much electricity will be bought by PLN. Prior to the formalization of feed-in tariffs, the price of electricity was determined by negotiations that were often inefficient. With the introduction of MEMR Regulation No. 4/2012 and the laws preceding it, the price determination process for electricity has become more streamlined.

According to interviews with PLN, the process to obtain a PPA is quite simple because regional PLNs only review required materials, conduct a site check, and consider how the power plant will be connected to the PLN power grid. To obtain the PPA, PLN requires an applicant to submit a full feasibility study. For this feasibility study, the developer must answer numerous questions such as: does PLN demand energy in the proposed area? How far away is the power plant from the nearest PLN electricity grid? How stable will the supply of electricity be? If the feasibility study does not adequately address any one of these issues, PLN is free to deny the application based on the deficiency. The feasibility study is an important piece for the issuance of a PPA and many developers fail or face delays because their feasibility study is not complete, provides inaccurate data, or does not address financial risk and risk management for the project. According to interviews with PLN, there are consultants that complete feasibility studies for developers.

PLN's review of a complete feasibility study may take up to two months because both the national and local PLN must conduct a survey and check whether the project can really provide the results as claimed by the feasibility study. Once all formal documentation is complete, PLN will mandate that the developer prove that they have at least 30 percent of the total capital necessary to complete the project, and will issue the developer a one-year time frame to start construction. Once all the requirements are met, PLN will issue the PPA and construction can commence. The PPA provides a guarantee that PLN will purchase all the energy supplied by said power plant at the designated rate.

Unfortunately, there is a fair amount of rent-seeking that goes on in the PPA arena. According to interviews with PLN and developers, some consultants will bring a project through the PPA stage but not construct the power plant. Instead, they try to sell their PPA to another developer for a substantial markup on the price. Not only does this raise the cost of developing RE projects, but it also limits the number of sites available as they have been snatched up, but with no development.

I.4. Summary of Indonesia's Renewable Energy Policy and Permit Processing

As the demand for energy continues to grow across Indonesia, GOI recognizes that RE will play an important role in providing clean power to both urban and rural communities. In order to spur RE infrastructure development, GOI has implemented numerous regulations, creating the foundation for RE growth. Presidential Regulation No. 5/2006 regarding the National Energy Policy formalized Indonesia's commitment to developing RE while it characterizes GOI's goals of providing 17 percent of energy generation through RE by 2025. This Presidential Regulation

further emphasizes previous regulations such as Ministerial Regulation on Small-Scale Power Purchase Agreement – MD No.1122/K/30/MEM/2002, that requires PLN to purchase electricity generated from RE sources by non-PLN producers for projects of up to 1 MW capacity. To further improve PLN's capability to buy the electricity from RE, GOI issued Ministry of Finance Regulation No. 139/PMK.011/2011 which provides support and guarantees to PLN in the case PLN can not fulfill their capability to pay the power producer in time. Taken together, Indonesian policy on RE provides a solid foundation for supporting the industry.

Regulation No. 4/2012 by the Minister of Energy and Mineral Resources on the Purchasing Price by PT. PLN (Persero) of Electricity Generated from Small- and Medium-Scale RE Power Plant improves upon the feed-in tariffs for RE developers, providing a basis for contractors to gauge potential profitability. This regulation not only provides the base for RE price but also eliminates the need for price negotiation in most circumstances. According to interviews with PLN and developers, this regulation has increased interest in the sector, with a significant up-tick in the number of PPA applications. Although more PPA applications are being processed, many are deficient while some developers find it challenging to meet the 30 percent equity requirement. This slows or halts RE project development.

While there are many governmental regulations supporting RE development, others discourage developers from building infrastructure. For example, GOI's political decision to retain the oil price subsidy distorts the energy market, encourages the exploitation of fossil fuels and creates a barrier for energy diversification and conservation. Aside from oil prices, the uneconomical nation-wide electricity tariff also hampers the growth of RE in Indonesia because it masks the true cost of supplying power to consumers. Both PLN and contractors prefer to build traditional thermal power plants that can be built on a larger scale and have a lower cost of capital per kwh in comparison to RE.

Although permitting is necessary, many developers encounter problems when applying for the various permits required. As RE project are going up across the archipelago, developers face varying procedures and costs from local regulations. This causes legal and regulatory ambiguity as well as exposure to corrupt practices. Problems are most rife with the principal permit which is needed to start any infrastructure project in a given region. Compared to the principal permit, the location permit and forest area use permit are relatively more standardized because there are national regulations that control them. Furthermore, the PPA is quite straightforward because it is issued by PLN at the national level, where procedures are standardized for the whole country.

Overall, the Indonesian regulatory environment is heading in the right direction. Even though there are still some issues hindering the widespread development of RE projects, with time and the realization that RE is a viable way of providing clean energy, both the public and private sectors can support the industry.

Chapter II: Indonesia Feed-In Tariffs

II.1. Policy Definition of Feed-in Tariffs

Feed-in tariffs (FIT)[30] are policy mechanisms designed to accelerate investment in RE technologies. FITS achieve this goal by offering long-term contracts to RE producers typically based on the cost of generating specific types of energy.[31] Feed-in tariffs often include "tariff digression," a mechanism that gradually lowers the price of the tariff as technologies improve and the cost of capital and/or power generation decreases. The goal of feed-in tariffs is to offer cost-based compensation to renewable energy producers, providing them with price certainty over the long-term to ensure that they can generate profits while implementing new technology.

FITs are typically offered within contracts ranging from 10-25 years and are extended for every kilowatt-hour of electricity produced. The payment levels offered for each kilowatt-hour can be differentiated by technology type, project size, resource quality, and project location to better reflect actual project costs. Policy makers can also adjust the payment levels to decline for installations in subsequent years, which will both track and encourage technological change.[32] In an alternative approach, FIT payments can be offered as a premium, or bonus, above the prevailing market price.[33] Under a feed-in tariff, a utility is contractually obligated to connect the RE generator to the grid and pay that generator for electricity at a fixed rate for the life of the FIT contract. The design of FITs can vary considerably in how rates are calculated, eligibility of different technologies and resource sizes, and the contract terms.

FITs have been implemented in many countries in Europe, America, Asia, and Africa. There are more than 40 countries around the world using FITs to stimulate growth in RE.[34] Countries such as Germany and Spain have applied aggressive FITs which have sparked a revolution in clean solar technology in their respective countries. In the European Union (EU), FIT policy has been used for approximately two decades, helping grow the sector and deliver cleaner energy.

FITs are the most widely used policy in the world for accelerating RE deployment, accounting for a greater share of RE development than either tax incentives or renewable portfolio standard (RPS) policies.[35] FITs have generated significant RE deployment, helping bring the countries that have implemented them successfully to the forefront of the global RE industry. In the EU, FIT policies have led to the deployment of more than 15,000 MW of solar photovoltaic (PV)

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[30] Feed-in tariffs can also be called a standard offer contract, advanced renewable energy tariff or renewable energy payment.

[31] Couture, T., Gagnon, Y., (2010). An analysis of feed-in tariff remuneration models: Implications for renewable energy investment. Energy Policy, 38 (2), 955-965

[32] Langniss et al. 2009, Fouquet and Johansson 2008 in Couture, Toby D., Cory, K., Kreycik, C., Williams, E., 2010. "A Policymaker's Guide to Feed-in Tariff Policy Design."

[33] IEA 2008, Rickerson et al. 2007 in Couture, Toby D., Cory, K., Kreycik, C., Williams, E., 2010.. "A Policymaker's Guide to Feed-in Tariff Policy Design."

[34] Grace, R. C.; Rickerson, W.; Corfee, K., 2008. "California Feed-in Tariff Design and Policy Options," prepared for the California Energy Commission. Stern, N., 2006. "Stern Review on the Economics of Climate Change," report to the Prime Minister and the Chancellor of the Exchequer in the United Kingdom.

[35] Renewable Energy Policy Network for the 21st Century (REN21), 2009. "Renewable Global Status Report: 2009 Update," in Couture et al., 2010.

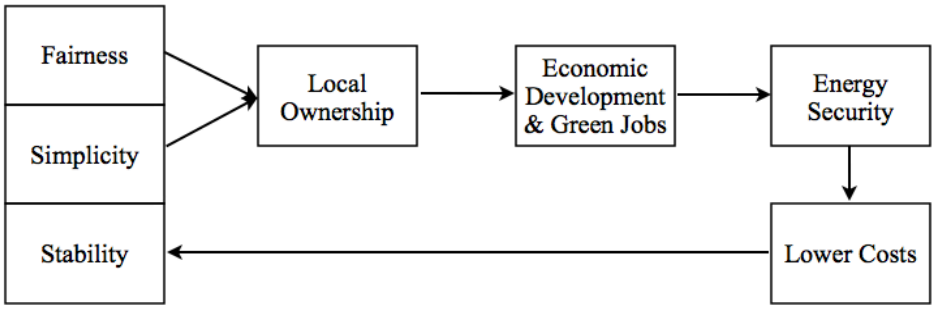
power and more than 55,000 MW of wind power between 2000 and the end of 2009.[36] In total, FITs are responsible for approximately 75 percent of global Photovoltaic (PV) and 45 percent of global wind deployment.[37] Countries such as Germany, in particular, have demonstrated that FITs can be used as a powerful policy tool to drive RE deployment and help meet combined energy security and emissions reductions objectives.[38]

II.2. Basic Principles of a Feed-in Tariff

According to Farrell, a feed-in tariff incorporates three basic principles for increasing renewable energy generation: [39]

- Fairness: A feed-in tariff makes the market fairer because it removes the barriers to participation for a number of players. A feed-in tariff allows people with little tax liability or non-taxable entities – cities, counties, state, non-profits – to pursue renewable energy projects.
- Simplicity: A feed-in tariff makes generating renewable energy simple. If a renewable energy electricity generator is built, the developer will get paid one specific price for every kilowatt-hour produced. The price is set to guarantee a reasonable rate of return, encouraging further development and more potential owners.
- Stability: A feed-in tariff makes the market stable. Utilities must connect renewable generators and buy IPP's electricity at the incentives rates for 15-20 years.

Figure 1. Basic principles of a Feed-in Tariff [40]



Policies based on these principles tend to achieve three goals: a) much broader and dispersed ownership of renewable energy, b) economic development and c) energy security. Evidence

[36] EPIA 2010, GWEC 2010 in Couture et al., 2010.
[37] Deutsche Bank, 2010. "Global Energy Transfer Feed-in Tariffs for Developing Countries," DB Climate Change Advisers (DBCCA) in Couture et al., 2010.
[38] Germany BMU, 2007 in Couture et al., 2010.
[39] Farrell, John, April 2009. "Feed-in Tariffs in America: Driving the Economy with Renewable Energy Policy that Works." The New Rules Project, Heinrich Boll Foundation North America, p.15-16.
[40] Farrell, John, April 2009. "Feed-in Tariffs in America: Driving the Economy with Renewable Energy Policy that Works." The New Rules Project, Heinrich Boll Foundation North America, p.15.

shows that countries with FITs often achieve these benefits at a lower cost than other RE incentives.[41]

II.3. Feed-in Tariff Payment Design and Differentiation

FITs are generally structured according to a standard power purchase contract. According to Couture et al. there are four main approaches used to set the overall FIT payment to RE developers: [42]

1. Base FIT payments on a standardized cost for RE generation, plus a targeted return (typically set by policymakers or regulators). The advantage of this approach is that the FIT payments can be specifically designed to ensure that project investors obtain a reasonable rate of return, while creating conditions more conducive to market growth.
2. Estimate the value of the renewable energy generation either to society or to the utility. Value to society is typically interpreted in terms of the value of the electricity plus climate change mitigation, health impacts, energy security, and other externalities. Value to the utility is generally understood in terms of avoided generation costs, and the time and location-specific value of electricity supply.
3. Fixed-price incentive that offers a purchase price for renewable electricity that is based neither on generation costs nor on the notion of value.
4. Auction-based mechanisms represent a fourth way to set payment levels. Both India and China are experimenting with this approach, and a few U.S. jurisdictions have expressed interest.

II.4. Feed-in Tariff Implementation

Couture et al. wrote that once a FIT payment structure is established, the implementation of FITs must consider the elements below:[43]

- Eligibility: This factor determines which entities can participate (e.g., citizens, corporations, nonprofit organizations, government entities, etc.) and whether there are limitations on which project types qualify (e.g., technology, project size, location, and in-service date). Many European FITs do not limit who can own RE projects and sell their electricity to the grid, thus enabling a range of sizes and types of projects to participate. Some jurisdictions extend the eligibility to utilities, which are typically provided the same purchase guarantee as other developers .

- Utility role: Many FIT implementation options center on the utility's role. Several countries use a FIT policy purchase obligation that requires utilities, load-serving entities (LSEs) or transmission system operators (TSOs) to purchase the entire output from eligible projects. In addition, jurisdictions often require utilities or TSOs to offer guaranteed grid

[41] Rickerson, W.H.; Sawin, J.L.; Grace, R. C. (May 2007). "If the Shoe FITs: Using Feed-in Tariffs to Meet U.S. Renewable Electricity Targets." The Electricity Journal, (v20, n4, May 2007), pp. 73-86

[42] Couture, Toby D., Cory, K., Kreycik, C., Williams, E., 2010. "A Policymaker's Guide to Feed-in Tariff Policy Design." National Renewable Energy Laboratory, U.S. Departement of Energy, p.vi

[43] Couture, Toby D., Cory, K., Kreycik, C., Williams, E., 2010. "A Policymaker's Guide to Feed-in Tariff Policy Design." National Renewable Energy Laboratory, U.S. Departement of Energy, p.viii-ix.

connection, which guarantees eligible project owners that they will be able to interconnect their projects to the grid.

- Contract duration: It is important to clearly outline the contract duration during which the FIT payments are awarded. Contract periods generally vary between 5-25 years, with the majority being 15-20 years. Longer contract periods help lower payments, ensure cost recovery, lower the cost of financing, and increase investor confidence.

- Grid access: FITs must provide clear protocols surrounding transmission and interconnection issues which ensure that RE projects can be connected to the grid in a timely way that minimizes bureaucratic overhead and fosters more efficient project development.

- Caps: Policymakers must also decide whether the FIT policy will include program or project spending caps. Caps can be imposed either on the total capacity of RE allowed (usually differentiated by technology type), on the maximum individual project size (also often differentiated by technology type), or according to the total program cost (either total dollars per year, or for the multi-year program).

- Forecasting: Forecasting is particularly important for integration of large RE projects, or multiple projects near each other, and can help significantly in balancing the variable output of renewable power on the grid. A forecast obligation can be imposed on project operators to help utilities and system operators deal with variable output from hydroelectricity, as well as large solar and wind power projects. Introducing penalties for deviation can create an incentive to improve the accuracy of forecasts which can increase penetration of variable RE generation.

II.5. Background on Feed-in Tariff Policy in Indonesia

The purpose of electricity policy in Indonesia is to ensure electricity is available in sufficient quantity and quality, and at a reasonable price in order to: 1) improve the welfare and prosperity of the community, 2) ensure fair and equitable distribution and 3) create sustainable development.[44] In order to meet demand for electricity as the population and economy continues to grow, GOI has reformed energy generation policy, including both the public and private sectors, to build energy generation facilities.

If we compare the achievement of renewable energy targets over the past five years with the government's target of reaching 17 to 25 percent by 2025, then the country will not reach its goals unless other measures are taken to stimulate further development. Utilization and development of RE resources should be increased by government from year to year with set targets and penalties to PLN if thresholds are not met. This will coerce both PLN and developers to continue implementing RE technologies quickly and as efficiently as possible.

[44] Law No. 30/2009 article 2

One of the main issues hampering the development of RE is that the consumer purchase price of power has not reached the economic price because electricity and fuel subsidies distort the market. These subsidies further hinder the development of RE infrastructure because the feed-in tariff incentives are typically smaller projects that cannot reach the potential profitability of a traditional fossil fuel power plant.

One of the major pieces of the Presidential Regulation No. 5/2006 on National Energy Policy is its commitment to gradually bring Indonesian's energy price in line with its economic price while still considering the interests of small businesses and assistance for the poor.[45] Law No. 30/2007 on Energy also mentions that energy price is set based on equitable economic value.[46] Equitable economic value is a value or cost that reflects the cost of energy production, environment and conservation costs, including benefits which are based on the ability of the community and set by the government.

Based on the National Energy Policy and its goals within the RE sector, GOI is trying to determine the economic price of energy with FITs. Through this policy, the feed-in tariff mechanism is applied to the process of buying and selling electricity between electricity producers (developers) and consumer (PLN). According to the Directorate General of New Renewable Energy and Energy Conservation, the decision to implement FITs stems from the overly long time frame of price negotiations between developers and PLN, hindering overall development. Moreover, even if PLN preferred to focus on traditional energy, RE is often times cheaper than building large, thermal resources, especially in more remote or less populated areas.

The implementation of FITs eliminates the negotiation process because the purchase price of electricity is already set by the government and PLN is obligated to buy. This condition shortens the tender process, saving substantial time, money, and electricity. Additionally, as the overall business environment for RE improves, investors will enhance their portfolio in Indonesia and the energy sector, where the country benefits from more clean energy while the investor realizes profits. Moreover, PLN benefits as its overall costs of providing electricity decreases while the utility is not burdened with developing and delivering on the full energy demand. PLN supports the feed-in tariffs set by the government for the purchase price of electricity using alternative energy sources.[47]

II.6. Indonesia Feed-in Tariff Policy

Currently, the government of Indonesia is paying a great deal of attention to the management and development of new and renewable energy to meet the nation's energy needs. This was demonstrated by the establishment of the Directorate General of Renewable Energy and Energy Conservation in the Ministry of Energy and Mineral Resources in mid-2010. Considering the success of several countries' experience with implementing FITs and encouraging RE development, GOI is implementing their own FITs to spur RE infrastructure. Feed-in tariff policy is created and set by the government through the Directorate General of Renewable Energy and Energy Conservation Ministry of Energy and Mineral Resources in cooperation with

[45] Presidential Regulation No. 5/2006 article 5
[46] Law No. 30/2007 article 7
[47] http://en.indonesiafinancetoday.com/read/12324/PLN-Supports-Feed-in-Tariff-

PLN. FITs are relatively new to Indonesia and they do not yet include all types of renewable energy, but the relevant ministries are working together to effectively spur clean energy development.

As mentioned in Chapter I, MEMR Regulation No. 04/2012,excess power can be sold back directly to PLN at the feed-in tariff rate and then sold off to the general public.[48] The determination of the electricity purchase price in the feed-in tariff was the result of discussions between government, employers, associations, and PLN. [49] Through this regulation and the implementation of FITs, companies have financial incentive and a lawful structure to profitably build RE infrastructure.

II.7. Setting Feed-in Tariff Rates

Domestic FITs are set by the MEMR. When implementing feed-in tariff rates, GOI must consider many factors such as inflation, the consumer price index, exchange rates, and interest rates.[50] Furthermore, governments determine feed-in tariff rates based on the type of renewable energy technology, the type of energy they want to produce, and the capacity of electricity produced by such technology. As each RE technology has varying advantages and disadvantages -- such as demand for natural resources or space, and construction and production costs -- governments and developers must decide which technology can provide the most significant benefits. Voltage can also affect the cost of a certain technology because there is a different rate between interconnection to middle voltage and low voltage.

The location of power plants can also affect FIT rates. As Indonesia is a vast archipelago, investing in power generation between one region and another augments the price. At the same time, logistics and access to the grid varies geographically. In order to account for this difference in cost, Indonesia implemented the base FIT price per technology and then added on a multiplier for harder to access regions that have a high demand for energy. Below, Table 4 outlines the current FIT rates per region.

Table 5. Indonesia Feed-in Tariffs for Renewable Energy ≤ 10 MW in 2012

Regulation	Renewable Energy		Region	Price (Rp/kWh)		Contract Length (Years)
				MV	LV	
MEMR Regulation No. 04/2012	1.	Hydro or excess power	Jawa, Bali	656.0	1,004.0	15
			Sumatera, Sulawesi	787.2	1,204.8	
			Kalimantan, NTB, NTT	852.8	1,305.2	
			Maluku, Papua	984.0	1,506.0	
MEMR Regulation No. 04/2012	2.	Biomass, Biogas or excess power	Jawa, Madura, Bali, Sumatera	975.0	1,325.0	15
			Sulawesi, Kalimantan, NTT, NTB	1,170.0	1,590.0	
			Maluku, Papua	1,267.5	1,722.5	

[48] Minister of Energy and Mineral Resources Regulation No. 04/2012 article 1
[49] http://www.bisnis.com/articles/harga-beli-listrik-akhirnya-pemerintah-terbitkan-regulasi-buat-pln
[50] Directorate General of Electricity, Ministry of Energy and Mineral Resources.

MEMR Regulation No. 04/2012	3.	Municipal waste zero waste[51] or excess power	Indonesia	1,050.0	1,398.0	15
MEMR Regulation No. 04/2012	4.	Municipal waste sanitary landfill[52] or excess power	Indonesia	850.0	1,198.0	15
FIT is being proposed	5.	Geothermal	-	-	-	15
FITis being proposed	6.	Solar	-	-	-	15
FIT is being proposed	7.	Wind	-	-	-	15
No FIT regulation	8.	Tidal and sea-thermal	-	-	-	15

Source: Ministry of Energy and Mineral Resources and PLN

**MV: Middle Voltage, LV: Low Voltage*

The purchase price of electricity and/or excess power used in PPAs does not require negotiation and/or price approval from MEMR as long as PLN issues the PPA.[53] As there is no negotiation process, the issues developers face now are completing an accurate feasibility study, raising 30 percent equity in the project, and waiting for PLN's approval. Although there are the standard FIT rates, PLN can buy electricity from state-owned enterprises, locally owned enterprises, private enterprises, cooperatives, and non-governmental organizations over the FIT rate if necessary, but this price will be based on PLN price estimates with mandatory approval from MEMR.[54] To speed up the process for infrastructure development and the provision of electricity, PLN must create a standard power purchase contract where developers know exactly what is required by them and what they will receive.

The price for geothermal energy is different from a normal FIT as it is based on the ceiling price for energy. MEMR Regulation No. 32/2009 states that the ceiling price for the purchase of electricity from geothermal power plants in high voltage is set at US$ .097 per kWh.[55] MEMR Regulation No. 2/2011 confirms this price, setting the maximum in which PLN will pay US$ .097 per kwh. The US dollar is used in this purchase price because a majority of the investment, financing, and trade transactions carried out by developers are usually in US dollars as most of the capital goods and technologies are imported. As geothermal energy typically does not fall under the 1 to 10 MW range, it will not be significantly covered in this paper, but the details can be referenced under MEMR Regulation No. 32/2009.

[51] Zero waste is a technology used for managing waste that results in a significant reduction in waste volume through integrated and gasification process or incineration and anaerobe. Electricity is produced by power plants using municipal waste without residual waste (zero waste).

[52] Sanitary landfill is a technology used to manage waste particularly in isolated areas. Waste is processed underground until its safe for the environment. Electricity is produced by the gases leftover from the decomposition of the waste, but waste residues are still left behind (landfill).

[53] Minister of Energy and Mineral Resources Regulation No. 04/2012 article 4

[54] Minister of Energy and Mineral Resources Regulation No. 04/2012 article 5

[55] Minister of Energy and Mineral Resources Regulation No. 32/2009 article 2

Interviews with government officials highlight that GOI is planning on raising FITs on numerous RE technologies. According to the Secretary Directorate General of New and Renewable Energy Conservation under MEMR, GOI will create a FIT for geothermal, solar, and wind energy, while raising the FIT for hydro, biomass/gas, and biofuels.[56] Although these FITs are conducive to stimulating development in RE infrastructure, there are some ownership limitations. According to MEMR, investment in small capacity projects less than 1 MW should be undertaken by Indonesian investors, although there are instances of foreign entities providing capital or assistance. For operations between 1 and 10 MW, investment is allowed through joint ventures between foreign and local investors, where foreigners can own no more than 95 percent of the project.

II.8. Impact of Feed-in Tariffs

The implementation of FITs in Indonesia is still evolving as the ones that have been implemented already have only been around for a couple of years while there are still some technologies without FITs. Although the statistics below do not show substantial growth, the change in power plant growth in 2011, at 4.9 percent, shows hope that the FITs are encouraging RE development.

The new renewable energy statistics from the Ministry of Energy and Mineral Resources shows that in 2010, before the enactment of MEMR Regulation No. 31/2009 (feed-in tariffs), the number of renewable energy power plant was 29 units with total capacity around 79,128 kW. After the enactment of MEMR Regulation No. 31/2009 the number of renewable energy power plant was 23 units with total capacity around 106,662 kW. One year after the implementation of FITs, the number of renewable energy power plant decreased, but there was an increase in its capacity to around 27,534 kW.

Table 6. Number of Power Plants in 2003 - 2011 (unit)

Year	Hydro	Steam	Gas Turbine	Combined Cycle	Geothermal	Diesel	Diesel Gas	Solar	Wind	Total	Δ %
2003	185	40	47	56	8	4,543	-	-	-	4,879	2.37
2004	190	41	55	51	8	4,776	2	-	-	5,123	5.00
2005	191	41	60	51	8	4,859	2	-	-	5,212	1.74
2006	203	43	60	53	8	4,670	2	-	-	5,039	(3.32)
2007	196	45	54	60	9	4,705	2	-	1	5,072	0.65
2008	189	48	58	61	9	4,635	2	-	4	5,008	(1.26)
2009	201	49	63	59	9	4,626	4	-	3	5,014	0.16
2010	199	55	73	50	11	4,619	8	4	4	5,023	0.18
2011	213	59	71	61	10	4,842	4	8	1	5,269	4.90

Source: PLN Statistic 2011, The power plants using RE are hydro, geothermal, solar, and wind.

The statistics in the table above show some progress in increasing the number of power plants built in Indonesia over the last eight years (2003-2011). For hydropower, the number of power plants went from 185 units in 2003 to 213 units in 2011. The last eight years has seen an increase of 28 units with the average increase by three units per year. Since the enactment of the

[56] http://www.bisnis.com/articles/energi-terbarukan-pemerintah-siapkan-insentif-untuk-dorong-investasi

hydropower FIT in 2009 (Minister of Energy and Mineral Resources Regulation No. 31/2009), the number of hydropower plant has grown from by 12 units in just two years. In the last eight years almost 50 percent of the addition of hydropower plants occurred after the enactment of the hydropower feed-in tariff. This is evidence that the FITs are starting to work and that Indonesia can expect an increasing trend in RE infrastructure development as developers become more familiar and comfortable with the policy.

Furthermore, for renewable energy systems that do not yet have a FIT assigned, the statistics show lethargic growth. In 2003, there were 8 geothermal power plants operating, and only 10 in 2011. For solar energy, from 2003 to 2009, there was no power plant construction, while in 2010, a total of 8 units were operating (Reference Table 6 for output in MW). For wind, the generating capacity has not increased significantly at all over the last four years.

Statistics in the table below show the progression of installed electrical capacity over the last eight years (2003-2011). Installed capacity for hydro in 2003 was 3,167.93 MW, growing to 3,511.20 MW by 2010. Over the last eight years hydropower energy grew 10.84 percent, averaging 1.35 percent per year. Geothermal energy output grew 14.47 percent since 2003 while solar capacity grew from 0.19 MW to 1.23 MW by 2011. Although Indonesia has realized some growth in the aforementioned technologies, power generation has only grown .24 MW over the past four years.

Table 7. Installed Capacity in 2003 – 2011 (MW)

Year	Hydro	Steam	Gas Turbine	Combine Cycle	Geothermal	Diesel	Diesel Gas	Solar	Wind	Total	Δ %
2003	3,167.93	6,900,00	1,224.72	6,863.22	380.00	2,670.42	-	-	-	21,206.29	0,45
2004	3,199.44	6,900,00	1,481.57	6,560.97	395.00	2,911.43	12.00	-	-	21,470.41	1,25
2005	3,220.96	6,900,00	2,723.63	6,280.97	395.00	2,994.54	12.00	-	-	22,515.09	4,87
2006	3,529.11	8,220,00	2,727.22	7,020.97	395.00	2,941.91	12.00	-	-	24,834.21	10,30
2007	3,501.54	8,534,00	2,783.62	7,020.97	415.00	2,956.25	12.00	-	0.10	25,223.48	1,57
2008	3,504.28	8,764,00	2,496.69	7,370.97	415.00	3,020.88	21.84	-	0.26	25,593.92	1,47
2009	3,508.45	8,764,00	2,570.59	7,370.97	415.00	2,980.63	26.00	-	1.06	25,636.70	0,17
2010	3,522.57	9,451,50	3,223.68	6,951.32	438.75	3,267.79	38.84	0.19	0.34	26,894.98	4,91
2011	3,511.20	12.052,50	2,839.44	7,833.97	435.00	2,568.54	25.94	1.23	0.34	29,268.16	8,82

Source: PLN Statistisc 2011, The power plants using RE are hydro, geothermal, solar, and wind.

In 2011 the percentage of installed capacity for conventional energy generation is: 12,053 MW (41.2 percent) for steam, 7,834 MW (26.8 percent) for gas and steam, 2,569 MW (8.8 percent) for diesel, and 2,839 MW (9.7 percent) for gas.[57] This shows that traditional energy generation facilities far outweigh RE utilization and can start taking a greater share of the overall energy mix.

[57] PLN Statistic 2011

To increase the usage of RE infrastructure, FITs should be streamlined to stimulate investment and public/private development for all types of RE. The creation of FITs has changed the old system of renewable energy tender. FITs encourage developers to build the power plants because developers are guaranteed a minimum rate of return. Previously, before FITs, the determination of electricity price between developers and PLN was very difficult to agree upon as the price for electricity had to be negotiated. This often made the business transaction process quite long, averaging three to four years.[58] Through FITs, the purchase price of electricity is set by the government so price negotiation is unnecessary. Overall, the mechanism for FITs makes the business transaction process more concise and efficient.

II.9. Incentive Policy for Renewable Energy

To further support the development of RE development, the Ministry of Finance offers a number of financial incentives to lower the overall cost of construction. The provisions of these incentives are dependent on the policy direction and program priorities in each technical ministry. Currently, the Ministry of Finance provides some incentives such as reducing income tax burden for a specific time period, reduction of the value-added tax (VAT) liability, duty free imports on capital goods, the provision of interest-free loans for investment in renewable energy, and awards to entrepreneurs who excel at innovation and utilization of renewable energy. Providing incentives and facilities for the utilization of renewable energy resources in Indonesia has a clear legal basis through Presidential Regulation No. 5/2006 on National Energy Policy[59] and Law No. 30/2007 on Energy[60]. Further, the provision of incentives and facilities can be arranged in relevant ministerial regulations, government regulations and/or local government regulation in accordance with their respective authorities[61].

Unfortunately, a majority of the incentives are geared towards larger-scale power plants. Developers of RE infrastructure between 1 and 10 MW marginally benefit as they rarely import large quantities of capital goods or pay VAT on energy sold to PLN. Interviews with developers highlight that favorable FITs are the best means to increase small-scale RE infrastructure.

The provision of fiscal and non-fiscal incentives is arranged through government regulations. These fiscal incentives for the development of renewable energy sources in Indonesia are as follows:

Table 8. Incentives for Renewable Energy 2012

Regulation	Incentive	Facility
Minister of Finance Regulation No. 21/PMK.011/2010 on the Provision of Tax and	• Reduction in net income by 30% of total investments for 6 years respectively at 5% per year	Income Tax

[58] http://www.bisnis.com/articles/energi-terbarukan-pemerintah-siapkan-insentif-untuk-dorong-investasi
[59] Presidential Regulation No. 5/2006 article 6 clause 2, 3
[60] Law No. 30/2007 article 20 clause 5, article 21 clause 3
[61] Law No. 30/2007 article 22 clause 1

	• Acceleration of depreciation and amortization	
Government Regulation No. 52/2011 on the Second Amendment to Government Regulation No. 1/2007 on Income Tax Facilities for Investment Activities in Specific Business Sectors and/or in Specific Areas.[63]	• Reduction on income tax on dividends paid to foreign taxpayers by 10%, or lower rate under agreement; avoidance of double taxation when applied; • Compensation for losses of over 5 years but not more than 10 years.	
Minister of Finance Regulation No. 130/PMK.011/2011 on the Exemption or Reduction of Corporate Income Tax Facility.[64] (Tax holiday)	• Exemption of corporate income tax for a maximum of 10 years, minimum of 5 years	Income Tax
Government Regulation No. 94/2010 on the Calculation of Taxable Income and Tax Income Payment in the Current Year.[65]	• Reduction of corporate income tax by 50% of the income tax payable for 2 years.	
Minister of Finance Regulation No. 21/PMK.011/2010 on the Provision of Tax and Customs Facilities for Activities on Utilization of Renewable Energy Sources..[66] **Government Regulation No. 31/2007**	• Exemption from value added tax on import of taxable goods that are classified as strategic in the formation of machinery and equipment (capital goods), whether attached or detached, but not including spare parts required by employers in the area of utilization of renewable energy sources to generate taxable goods.	Value-Added Tax

[62] Minister of Finance Regulation No. 21/PMK.011/2010 article 3
[63] Goverment Regulation No. 52/2011 article 2
[64] Minister of Finance Regulation No. 130/PMK.011/2011 article 2
[65] Government Regulation No. 94/2010 article 29
[66] Minister of Finance Regulation No. 21/PMK.011/2010 article 5
[67] Government Regulation No. 31/2007 article 1

on the Fourth Amendment of Government Regulation No. 21/2001 on Import and or Delivery of Taxable Goods that Classified in Strategic Goods which Exempted from Value Added Tax.[67]		
Minister of Finance Regulation No. 21/PMK.011/2010 on the Provision of Tax and Customs Facilities for Activities on Utilization of Renewable Energy Sources.[68]	• Tax paid by government that is regulated by state budget law and its implementing regulations.	Government-Borne Income Tax
Minister of Finance Regulation No. 76/PMK.011/2012 on the Amendment to Minister of Finance Regulation No.176/PMK.011/2009 on the Exemption from Import Duty on Machinery and Goods and Materials for Construction or Development of Industry in Investment Activities.[69] **Law No.17/2006** on the Amendment to Law No.10/1995 on Customs.[70]	• Exemption from import duties on machinery, goods, and materials for companies that operate in the area of industries producing goods or services • Exemption on import duty given for: goods and materials for construction and development of industrial in investment activities; • Machine for construction and industry development; • Goods and materials for construction and development of industrial areas within a certain period;	Customs Duty

[68] Minister of Finance Regulation No. 21/PMK.011/2010 article 7
[69] Minister of Finance Regulation No. 76/PMK.011/2012 article 2
[70] Law No.17/2006 article 26

PMK No. 128/PMK.011/2009 on the Amendment to Minister of Finance Regulation No.154/PMK.011/2008 on Exemption on Customs Duty from Import of Capital Goods in the Construction and Development of Power Plant Industry for Public Interest.[71]	• Exemption on customs duties on the import of capital goods for power plant industry.	Customs Duty

Source: Fiscal Policy - Ministry of Finance

II.10. Summary on Feed-in Tariffs

Although GOI is signaling a desire to develop the RE sector to provide cleaner energy to the population, Indonesia still prioritizes and depends on fossil fuel energy. The scale, utilization, and development of RE infrastructure in Indonesia are still very small in comparison to the availability and potential of RE sources. According to the archipelago's national energy policy, the purpose of developing energy is to ensure the electricity availability that is sufficient in quantity, good in quality and reasonable in price. Investment in RE can support this goal, often at a lower price while reaching previously un-electrified areas. At present in national energy consumption RE accounts for only five percent of the overall energy mix, leaving plenty of room for growth.

Previously, developers had to negotiate with PLN on the purchase price for electricity. This discouraged contractors from building RE infrastructure as it was too challenging and time consuming with marginal return rates. The FITs have since standardized the price for RE where developers can now gauge acceptable costs and revenues, sparking new development of the technologies where a FIT is assigned. Moreover, PLN is obligated to buy at the FIT price from any developer so long as the development is between 1 and 10 MW. Based on 2011 PLN statistics, the enactment of feed-in tariff policy since 2009 has increased the number of hydropower plants, suggesting that the feed-in tariff has had a positive effect.

In Indonesia, the policy-making and implementation of feed-in tariff is still relatively new, approximately three years old, and does not yet include all of the potential RE sources. Currently, GOI has already initiated feed-in tariffs for hydro, biomass, biogas and municipal waste. Additionally, government officials' state that they will develop FITs for geothermal, solar, and wind, hopefully stimulating their development in a similar fashion to hydro. On the other hand, the Ministry of Finance also offers fiscal incentives for some RE inputs and taxes. Although these incentives do not substantially encourage developers of small-scale RE products, it does show that GOI is working in the right direction to support the industry's growth. Interviews with developers highlight that they are content and able to make profits with the current FITs, signaling their bullishness on the industry's future.

[71] Minister of Finance Regulation No. 128/PMK.011/2009 article 2

Even with favorable RE policy, FITs, and incentives, there are still barriers preventing developers from jumping into the arena. Now, the primary constraint slowing the speed of RE development in Indonesia is the mismatch between RE project financing and the finance industries aversion to technological risk and the probability of project failure.

Chapter III: Financing Mechanisms Available for Less than 10 MW Renewable Energy Projects in Indonesia

Previous chapters highlight the steps GOI is taking to promote RE development. Legislation such as the Ministry of Finance Regulation 77 that guarantees PLN's ability to pay in the case of a budget shortfall, Ministerial Regulation of Ministry of Energy and Mineral Resources 31/2009 that obliges PLN to buy energy from RE IPP projects less than 10 MW, and Ministry of Finance Regulation 21 PMK.011/2010, creates the incentives for RE infrastructure development. Although GOI has engendered a favorable regulatory environment for clean energy development and contractor profitability, financiers and investors have yet to give their full vote of confidence through significant ownership stakes or issuance of loans. In order to increase investments in RE projects financial actors must have the technical know-how, experience, and the right instruments to adequately identify viable opportunities and potential risks.[72] As commercial RE is quite new to Indonesia, divergent stakeholders from government, RE contractors, bankers, etc. do not yet have the capacity or proven track record to entice substantial investment into small-scale, low-carbon energy generation facilities. Moreover, the fuel and electricity subsidies give incentives to both power plant builders and PLN to build large, carbon-based power plants at lower costs. In order to address these issues, many donor agencies and INGOs are working together with GOI, Indonesian banks, developers, and other SOEs to promote and improve capacity in RE systems and financing to build confidence in the industry.

III.1. Overview of Indonesian Financial Organizations and their Relation to Renewable Energy

The Indonesian economy has been resilient during the recent financial crises currently plaguing more developed markets. Indonesia's large domestic consumer base, strong macroeconomic fundamentals, and solid financial sector have helped the developing country realize impressive GDP growth and increases in foreign direct investment (FDI). Much of this success can be attributed to the Bank of Indonesia's prudent policies as well as the reformed financial industry that is continuously evolving to increase stability, transparency, liquidity, oversight, and confidence following the 1998 Asian Financial Crisis. Today, the Indonesian banking system is considered stable, well capitalized, and capable of absorbing moderate economic shocks.[73]

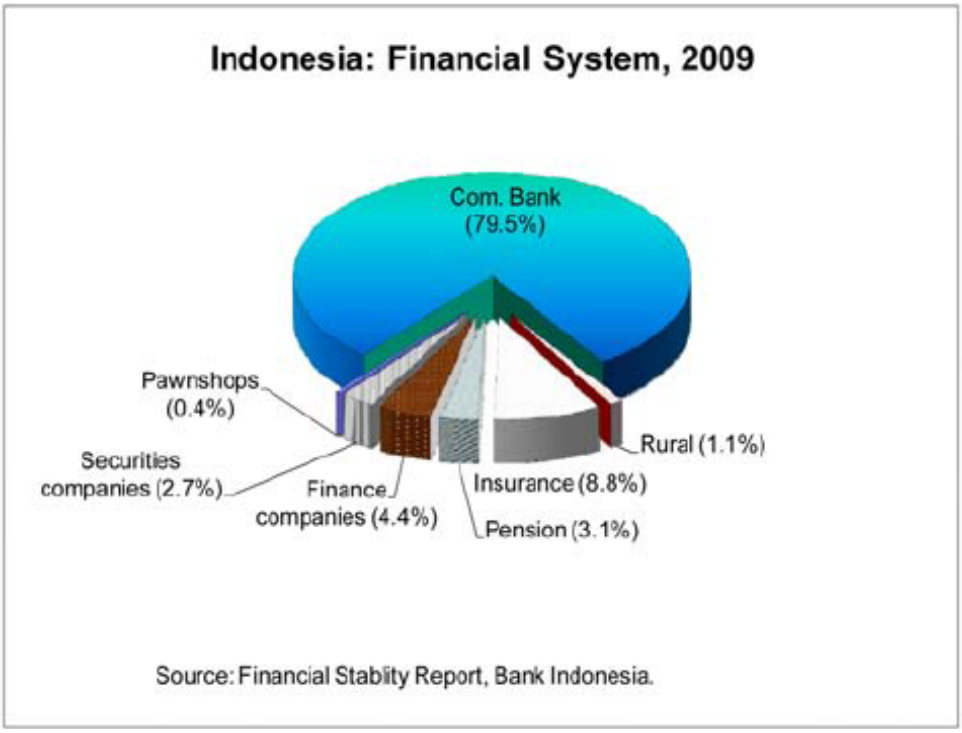
While Indonesian banks are stable, non-bank financial institutions (NBFI) such as securities companies, mutual funds, insurance, and pension funds remain underdeveloped. Although under-utilized in Indonesia, NBFI products can help defer risk or provide a conduit for developers and/or investors to sell equity stakes to raise capital for infrastructure development. For example, if a bank and/or project shareholder could affordably purchase credit default insurance in Indonesia, the customer could effectively place a floor on the downside risk of a RE project. On the other hand, conservative mutual funds often try to purchase long-term assets with consistent returns. RE energy infrastructure such as mini/micro hydro and biomass/gas projects provide

[72] United Nations Environment Program. (2011). *Catalyzing Early Stage Investment; Addressing the Lack of Early-Stage Capital for Low-Carbon Infrastructure in Developing Economies*. Ritchie, Duncan and Eric Usher.
[73] International Monetary Fund (2010). *Indonesia: Financial System Stability Assessment*. Washington, DC.

such an investment as PLN gives a 15-year PPA with a minimum level of payment (feed-in tariff rate), as long as there is not a significant draught or reduction in feed stock.

In order to stimulate growth of small-scale renewable energy projects, both Indonesian banks and NBFIs should continuously improve capacity, provide financing, and create specialized financial products capable of meeting the needs of RE developers. By expanding into the RE market, both bank and non-bank finance will not only diversify their core business, but also support GOI's goal of providing 15 percent of the country's energy mix through renewable energy. Both national and international organizations recognize this demand for capital and capacity and are trying to plug the deficiencies with numerous projects. Domestic infrastructure funds, INGOs, donor country development agencies, and development banks are all working to either build local capacity, help develop RE promoting policies, or provide outlets for financing. The sections below provide a brief description and role of the Indonesian financial system, financial institutions, and governmental and non-governmental organizations impact on the Indonesian renewable energy sector.

Figure 2. Indonesia Financial System



III.2. Indonesian Banking Sector

Today, the Indonesian banking system, which accounts for approximately 80 percent of all Indonesian financing, is substantially more efficient, capitalized, and prudent in comparison to pre-Asian Financial Crisis levels.

Since 1998, the banking sector has consolidated the number of banking institutions while each bank is now required by law to have at least Rp. 100 billion in minimum capital. As these banks have grown in size, they are also more heavily regulated. For example, based on minimum

capital requirements and Bank Indonesia regulations, the banks typically take a more risk-averse strategy, focusing on traditional markets and customers with short to mid-term financing that usually demands at least 100 percent collateral on debt financing. Moreover, banks cannot have exposure to non-bank finance exceeding 25 percent of bank's consolidated capital, which keeps them from directly investing in insurance, mutual funds, pensions, private equity, etc.[74]

Commercial banks do not provide start-up or project financing[75] to small-scale RE developments. Rather, they will loan money once a PPA is solidified and construction is about to begin. This problem is not unique to just Indonesia, but is a global issue where banks perceive a mismatch between risk and reward for investing in early-stage developments. Investing in projects during the feasibility stage incurs the highest risk, where the certainty of the project is questionable.[76] Although the investment required to fund a feasibility study in Indonesia is modest, ranging between $US 100,000 to $500,000,[77] commercial banks and non-bank financial institutions (see following section) rarely risk capital at this stage of the project. Moreover, Indonesian banks will not employ project financing that is based on the project's cash flows instead basing their financing on a company's balance sheet and credit history. This leaves project developers, especially those new to the industry, to independently fund the pre-construction studies that can significantly burden company operations and cash flows, hindering further developments.

The SEBAR team interviewed representatives from three of Indonesia's largest banks, Bank Mandiri, Bank Rakyat Indonesia (BRI), and Bank Central Asia (BCA). The bullets below show how these banks view the RE sector and the criteria they apply when considering a developer's loan application.

1. The banks are conservative when considering RE loan applications as they do not yet have sufficient experience or capacity to efficiently analyze the bankability of a new project under 10 MW. They tend to prefer working with clients who already have a relationship with the respective bank and a history of positive cash flows for at least three years. Moreover, it is easier for the banks to finance larger projects as the due diligence is the same, no matter what the size.
2. It is rare that any of the banks will consider financing feasibility studies or project financing. Normally, the banks will give loans to clients that already have their PPA and at least 30 percent equity invested in the project (required by PLN before issuing a PPA). It is much easier for the banks to finance construction, where there is a land title and collateral equal to the value of the loan.
3. The banks demand 100 percent collateral in fixed assets. Collateral can reach up to 150 percent if collateral must come from assets outside the project.

[74] Ibid.
[75] Project financing is a type of long term financing, usually for infrastructure, that is based on project cash flows, not company balance sheets or credit worthiness. Collateral comes in the form of project assets and revenue contracts. All risk is placed on the project, which is itself, its own special purpose vehicle – similar to any kind of power plant in Indonesia. Project financing typically carries more risk than other forms of financing due to limited liability.
[76] United Nations Environment Program. (2011). *Catalyzing Early Stage Investment*
[77] Range given by various RE project developers and financiers in personal interviews.

4. Each bank offers loans due in the medium term, anywhere between four and eight years, depending on the client's level of risk and proposed payback period.
5. Rupiah-denominated loans to RE projects range between 9 and 10.25 percent, depending on the client's risk profile.
6. It takes between one to three months to process a loan application.
7. Mandiri, BRI, and BCA rely heavily, but not solely, on the developer's feasibility study and PLN's assessment of the proposed project.
8. Parent company, international organization, and/or local government loan guarantees certainly raise the profile of a loan application.
9. The banks will employ a number of reporting requirements such as monthly progress reports, quarterly financial statements, and audits to ensure that the company is meeting loan stipulations.
10. Indonesian banks are forbidden to lend to private equity or venture capital funds, even if they have a focus on RE.
11. Each of the banks see the RE sector as a viable means for expanding their loan portfolio. All three have implemented staff trainings to improve capacity in order to accurately analyze RE loan applications to supply developers with demanded capital.

Interviews with RE developers showed a mixed response on the ease of finding commercial bank financing. Below are some of the comments from both biomass/gas and micro/mini hydro power developers:

a. Each developer stated that local commercial banks do not provide startup financing for feasibility studies or project financing on small-scale RE projects.
b. Developers confirmed that a past relationship with the banks and at least three years of positive cash flows was necessary for a bank to consider a loan application. The developers that did eventually receive bank financing all had a solid relationship with a particular bank based off other company cash flows. All the developers without a history of activity in Indonesia did not receive bank financing.
c. The developers' primary problem in starting new RE infrastructure is raising the 30 percent equity necessary to get a PPA. This is also a requirement from the banks when considering a loan application.
d. Many developers were unsure which banks actually offer financing to any type of renewable energy project.

Although the banks are somewhat more constrained in their lending practices, many are flush with cash and eager to lend, provided that consumers and companies meet loan requirements. Recently, many banks have started providing microfinance in an attempt to reach the millions of potential clients demanding formal, smaller-scale financing. Moreover, Indonesia has been encouraging SME and RE growth, where the banks have responded by increasing loan disbursements to non-traditional clients.

RE developers, which are typically small and medium sized operations, may be promising clients for banks to enhance their loan portfolio, support entrepreneurship, and the enhanced usage of clean power generation in Indonesia. With an incredible amount of untapped, small-scale RE

potential in micro/mini hydro, biomass/gas, solar, wind, and emerging technologies, the banks can reap substantial profits over the long-term as the country continuously tries to diversify the energy mix with renewable resources. Additionally, as PLN must purchase excess energy at the feed-in tariff rate for 15 years after issuing the original PPA, banks can accurately forecast project cash flows so long as there is not a shock to the renewable resource or damage to the infrastructure.

The main issues banks have with RE today is that it is a relatively new industry to Indonesia while there are substantial differences in the technologies employed depending on which kind of resource is exploited. As the overall RE industry does not yet have a sustained commercial history in Indonesia, the banks face challenges gauging whether projects will be bankable given individualized conditions. Additionally, RE projects producing less than 10 MW incur a similar amount of due diligence as a 200 MW coal-fired power plant. This requires loan officers to do the same amount of work for much smaller projects on technologies they are unfamiliar with. Based on the short history, plethora of technologies, and scale of projects, it should not be surprising that banks are lacking the capacity and financial mechanisms to adequately finance the majority of qualified developers. Additionally, as banks have increased loans to SMEs, they have also realized a rise in non-performing loans over the past few years. This shows that there is room for adjustment on banks' risk analysis model to continue encouraging growth of domestic businesses while ensuring profitability by selecting appropriate and/or promising companies to lend to.

Now the banks which are delving into RE employ their traditional corporate finance model that focuses on their relationship with existing clients that have a track record of success. All the banks interviewed inferred that their preferred RE customers, and the RE clients that they have already financed, are the ones who have achieved success in other industries and are now building clean energy infrastructure. These clients (whose other companies typically have at least three years of positive cash flows) have previously worked with respective banks, borrowing and repaying loans on time. Moreover, this breed of developer typically has over 30 percent equity in the project, and often times have financed the initial RE project on their own. The banks prefer working with these clients, where there is a history of cooperation and where the contractors are internalizing a large portion or risk by investing their own money, and where there is at least 100 percent collateral. This builds confidence that the borrower will not default on the project and the loan will be paid within negotiated the time frame.

III.3. Indonesian Non-bank Financial Institutions (NBFIs)

NBFIs are those financial institutions that do not have a full banking license or not directly supervised by a national or international banking regulatory agency. Non-bank financial services provide outlets for investment, risk pooling, insurance, and market brokering. Some examples of NBFIs are capital markets, private equity, mutual funds, private equity, insurance brokers, etc. Non-bank finance can play an important role in an economy because it opens up investment outlets where both sophisticated and not so sophisticated capital holders can allocate their money to realize higher returns. Moreover, non-bank finance can allay risk (insurance), give a foundation for long-term savings (pension funds), or provide investment capital to both companies and governments (mutual funds). Overall, NBFIs help promote economic growth in a

competitive environment as consumers can choose between a variety of products to more effectively use savings or investment.

In Indonesia, non-bank finance is still underdeveloped with the International Monetary Fund reporting "non-bank finance institutions in Indonesia are not a major source of funding or a significant vehicle for long-term investment.[78]" Less than 10 percent of GDP is covered by non-bank finance where insurance accounts for 30 percent of all domestic non-bank finance.[79] Although financial mechanisms such as mutual funds, pension funds, and bond markets are growing in popularity in Indonesia, each has low levels of market penetration. The Indonesian capital markets have been expanding and are providing means for liquidity and long-term investment, but a majority of the investors in the Indonesian Stock Exchange are foreigners while total market capitalization as a share of GDP at 36 percent is the lowest among middle income Asian countries[80].[81] Additionally, insurance coverage is low by international standards where the penetration ratio is 1.9 percent in Indonesia versus a 2.2 percent ASEAN average, and 9 percent in OECD countries.[82] As non-bank finance can be an effective tool to support and protect market participants, GOI and NBFIs must cooperate and further develop the regulatory environment and financial products in order to more provide customers with diversified investment opportunities managed by financial professionals.

If further developed, non-bank finance could be a useful instrument to support RE infrastructure development. Below is a description of various types of non-bank financial institutions and instruments with descriptions on how they can be applied to RE projects.

1. **Insurance** is defined as "a contract (policy) in which an individual or entity receives financial protection or reimbursement against losses from an insurance company. The company pools clients' risks to make payments more affordable for the insured."[83] There are a few kinds of insurance products a developer could use to protect against unforeseen risks and improve the bankability and appeal to investors.

    a. *Property insurance* will reimburse the owner in the case of damage. Property insurance could be purchased to protect against unplanned damage to the land and/or capital of a development. Property insurance ensures a minimum level of security in the form of cash payments from the insurer to either repair the problems or pay down debt. Property insurance can be purchased from most institutional insurance companies in Indonesia.
    b. *Political risk insurance* can be purchased from institutions such as the Overseas Private Investment Corporation (OPIC) to protect against civil strife, political violence, expropriation, and restrictions on the conversion and transfer of local currency. As Indonesia carries a fair amount of political risk, insurance can guarantee a contractor or creditors a level of protection in the case a project must

[78] International Monetary Fund (2010). *Indonesia: Financial System Stability Assessment*. Washington, DC.
[79] Ibid.
[80] The comparable figures were 40% in the Philippines, 65% in Thailand 100% in India and 150% in Malaysia.
[81] USAID. (2011). *Non-bank Finance*. Measure Plus: Indonesia.
[82] Ibid.
[83] Insurance. (2012). From Investopedia. Web 02/08/12
<http://www.investopedia.com/terms/i/insurance.asp#axzz22HnBTb3p>

be abandoned because of political issues. Moreover, investors and/or lenders will feel more protected as they will receive a portion of the insurance reimbursement based on their level of ownership.

c. *Credit insurance* - Investopedia describes this type of insurance as an instrument that allows for the transfer of credit risk without the transfer of an underlying asset. This allays some of the risk of a project's failure onto a third party. If for some reason a RE project could not be completed, creditors would be protected, to an extent, from this loss. Most investment banks can underwrite credit insurance.

Aside from developers being able to purchase insurance, insurance companies could invest in RE projects as assets. Because RE infrastructure provides relatively constant cash flows over a long period of time (PLN feed-in tariff contract is 15 years). Insurance companies could diversify into the RE arena to ensure a low-risk, steady stream of non-core business revenues.

2. **Debt financing** is when a firm issues bonds, bills, or notes in order to raise money for capital expenditures or working capital. The borrower agrees to pay both the principal and interest on debt over a predetermined period of time.[84] Debt financing is a very common means for companies to accumulate needed capital in OECD countries, but it is not yet readily employed in Indonesia, especially among SMEs or startup companies. Currently, SOEs and banks are the primary issuers of corporate debt.[85] If RE companies could issue corporate debt, minimizing project risk by placing risk on the purchasers of said debt, they could more easily find capital to build new infrastructure.

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3. **Private equity and venture capital** are two types of financial institutions available to RE developers. Both PEs and VCs will invest money into a prospective business for partial ownership of the company. PE and VC requirements are more flexible than commercial bank requirements, although both institutions will take on higher risk. Typically, PE and VC invest in companies that have positive potential for improvement or growth. Usually, a PE or VC fund will want to get out of an investment within 3 to 5 years, hopefully returning 14 to 20 percent return on investment. To sell their ownership stake, PE or VC will either sell their shares to the market, back to the developer, or renegotiate a stake in the company. PE and VC firms will consider multiple facilities to realize their return on investment. These are listed below.

    a. *Profit sharing* – PE and VC funds will often take a portion of a company's profits as repayment for investment. Unfortunately this mechanism is difficult to apply in the RE sector in Indonesia as a small-scale RE project will take at least 5 years to realize profits while the margins are quite small because they are simply based on the feed-in tariff.
    b. *Equity ownership* – Both PE and VC companies can take an equity stake in a RE project. Although equity is a more applicable investment tool for RE in

[84] Debt Financing. (2012). From Investopedia. Web 02/08/12 <http://www.investopedia.com/terms/d/debtfinancing.asp>

[85] International Monetary Fund (2010). *Indonesia: Financial System Stability Assessment*. Washington, DC.

comparison to profit sharing, it certainly does not fit the VC model where firms want to take high risks for high returns. On the other hand, there are green PE funds that purchase up RE projects to generate revenues from carbon credits and selling excess electricity to utilities. Interviews with developers and RE consultants all highlight the desire for VC or PE capital, but neither type of fund has a significant presence in Indonesia yet, especially in the RE sector. Moreover, both PE and VC want to invest at least US$50 million in a company/project. Given this investment profile, small-scale RE developers would need to package many projects together and then sell them all as a bundle to such a fund. Nobody interviewed stated that this has happened yet in Indonesia.

c. *Debt* – PE and VC can also issue loans to RE companies. Although similar to an equity stake, both prefer to lend to high value companies that may offer substantial returns in a relatively short period of time. This is not the case for small-scale renewable energy projects.
d. *Mezzanine capital* is defined by Investopedia as "a hybrid of debt and equity financing that is typically used to finance the expansion of existing companies. Mezzanine financing is basically debt capital that gives the lender the rights to convert to an ownership or equity interest in the company if the loan is not paid back in time and in full. It is generally subordinated to debt provided by senior lenders such as banks and venture capital companies." RE developers can solicit mezzanine capital from PE funds, VCs, some banks, and other investors. This type of financing allows the developer to find capital without immediately relinquishing an ownership stake, unless the company cannot pay the debt back on time. Moreover, there is very little due diligence required from the lender and collateral is not a requirement. Additionally, mezzanine financing is treated as equity on a company's balance sheet and may be regarded favorably by the banks if a developer is attempting to get commercial bank financing.[86] Unfortunately for small-scale RE developers, most issuers of mezzanine capital will want to make investments in projects/companies with a value of over US$50 million that can generate returns between 20 and 30 percent. This makes it difficult for smaller, inexperienced developers to find mezzanine capital unless the developer can package a sufficient number of projects together and show a track record of success to meet the issuers of mezzanine capital's demands.

Although both PE and VC are appealing institutions for RE investment, they do not yet have a substantial presence in Indonesia, their appetite for risk and demand for returns is typically higher than what small-scale RE returns offer, while developers would need to package many projects together in order to entice either a PE or VC fund. There may be international green PE funds that would be interested in investing in smaller RE projects in Indonesia, but it would be the developer's responsibility to find such an investor and create equity and/or loan terms favorable to each side.

[86] Mezzanine Financing. (2012). From Investopedia. Web 2/8/12 <http://www.investopedia.com/terms/m/mezzaninefinancing.asp#axzz22HnBTb3p>

4. **Capital markets**, such as stock and bond markets, are where companies and organizations from both the public and private sector sell stakes in respective institutions to raise capital. These include both primary and secondary markets.[87] Even though the Indonesian Stock Exchange (IDX) is not exceptionally large, it has realized moderate growth over the past 10 years. Furthermore, the IDX has performed quite well in comparison to other markets over the past two years as the U.S. and European markets have been floundering. As the IDX gains momentum, it is hoped that the capital markets can take some of the burden off the banking sector which dominates 80 percent of Indonesia's financing needs. This will have the dual effect of boosting institutional savings as mutual funds, pension funds, and other non-bank financial institutions can invest directly in a wider variety of assets.[88]

   Although the capital markets cannot directly invest in renewable energy companies, the developer could list its assets on the IDX[89] to court both national and international investors. If a company did list on the stock exchange, the value of the company would be determined by the free market. Even though this is a potential option, no small-scale renewable energy companies are listed on the IDX. Moreover, the company would need to be relatively large in order to gain the attention of potential shareholders.

5. **Angel investors** can be characterized as an external individual or group who provides startup funding without collateral or other formal bank requirements. In exchange for the angel investment, developers will provide interest revenues on the no-collateral loan, issues of shares in the company, and/or a percentage of profits. There is a commonly known term as 3F (Family, Friends, and Fools) of angel investment. Usually, the angel investor already knows the prospective entrepreneur and their investments are based on instinct and trust. Family and friends base their investment as a type of goodwill, helping their relatives of friends in a time of need. Fools, on the other hand, are high risk investors that hope to gain a significant return from their capital injection.

   In Indonesia, angel investors are the most common type of investor in small-scale renewable energy projects as families and individuals who care about efficiency and the environment will take a chance on the burgeoning RE market. Moreover, RE infrastructure under 10 MW does not demand such a substantial investment where an individual or group of angel investors could not provide some amount of capital to get a development underway. Many of the developers interviewed stated that either their families or groups looking to improve their image through green energy developments were investing in their companies.

[87] Capital Markets. (2012). From Investopedia. Web 2/8/12 <http://www.investopedia.com/terms/c/capitalmarkets.asp#axzz22HnBTb3p>
[88] USAID. (2011). *Non-bank Finance*. Measure Plus: Indonesia.
[89] Listing requirements can be referenced at the Indonesia Stock Exchange website: http://www.idx.co.id/Home/Regulation/ListingRegulations/tabid/134/language/en-US/Default.aspx

6. **Mutual funds and pensions** can both invest directly in RE projects as many like to take long-term positions in assets that provide constant cash flows over a period of time. A pension fund is typically established by an employer to invest and employee's retirement funds.[90] It is a common asset pool meant to generate stable growth over the long term. Mutual funds are a pool of funds collected from diverse investors to invest in a plethora of securities. Mutual funds can take many different forms covering most asset classes.

   As of yet, neither mutual funds nor pension funds have taken a stake in RE projects under 10 MW. Part of the reason may be that neither of the funds gained substantial headway in Indonesia. Over 80 percent of workers are not covered by a pension and approximately 2 percent of GDP is under mutual fund management (Thailand and Malaysia manage 12 and 20 percent respectively).[91]

III.4. National Development Initiatives for Renewable Energy in Indonesia

GOI has created a number of public/public-private institutions to channel financing to climate change and renewable energy projects. Although most of the institutions below focus on larger scale initiatives, they provide the institutional infrastructure and sophisticated financial mechanisms that could eventually fuel smaller RE projects.[92]

Indonesia Climate Change Trust Fund (ICCTF)

The purpose of the ICCTF is to align development assistance for climate change with GOI's overall development priorities. The fund acts as a place for international donors (DFID and AusAid) to deposit their development assistance into one place where capital can be delivered to diverse projects. This minimizes the number of transaction costs and susceptibility to corruption as only one institution needs to be monitored. The ICCTF gets its direction from BAPPENAS, the National Planning Agency, while the fund is managed by UNDP. Currently, the ICCTF is not investing directly in renewable energy projects, but rather in energy efficiency, peat land management, and climate change awareness programs.[93] Although the ICCTF has not yet invested in RE infrastructure, big or small, the system could be employed if appropriate projects were identified.

Indonesia Green Investment Fund (IGIF)

IGIF is an investment fund under the Ministry of Finance Government Investment Unit (*Pusat Investasi Permarintah, PIP)* that focuses on green energy infrastructure. The fund is attempting to accumulate US$1 billion in capitalization in order to fund projects that will cut the country's greenhouse gas emissions. This $1 billion will come from GOI, institutional investors, donor governments, and private investors. With this money, IGIF plans to leverage diverse investment capital to encourage public-private partnerships.[94]

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[90] Pension Fund. (2012). From Investopedia. Web 2/8/12 <http://www.investopedia.com/terms/p/pensionfund.asp>
[91] USAID. (2011). *Non-bank Finance*. Measure Plus: Indonesia.
[92] Neither ICCTF or IGIF was available for interviews.
[93] Overseas Development Institute. (2011). *Climate Finance Indonesia: Lessons for the Future of Public Finance for Climate Change Mitigation.* Brown, Jessica and Leo Peskett. Web 6/8/12 <http://www.edc2020.eu/fileadmin/publications/EDC_2020_-_Working_Paper_No_11_-_Climate_Finance_in_Indonesia.pdf>
[94] Ibid.

IGIF will offer a number of products such as grants, concessional loans, and equity not to new RE projects, but to projects where banks need an additional injection of capital to provide debt at a lower cost. Based on this model, IGIF is more aligned for large RE projects where the Fund will make investments between $US20 million to $80 million. Even though the IGIF is only providing financing to larger projects, there may be an opportunity in the future to scale investments down to fuel growth of smaller RE infrastructure around the archipelago, especially in more remote areas. As IGIF is relatively new, launching in 2010, the Fund can gain experience working on the larger projects first and continuously widen the portfolio to support smaller developers.

Indonesia Infrastructure Finance

PT Indonesia Infrastructure Finance (IIF) is a private non-bank financial institution under the Ministry of Finance that receives support from various international institutions such as the Asian Development Bank (ADB), International Finance Corporation (IFC), Gesellschaft fur Internationale Zusammenarbeit (GIZ), and the Sumitomo Mitsui Banking Corporation (SMBC). IIF focuses investments on numerous kinds of infrastructure projects. IIF aims to address the gaps in the regulatory and financial environment to efficiently provide outlets for investment, long-term financing, loan guarantees, and consulting services for infrastructure projects.[95] For financing mechanisms, IIF will utilize equity capital, mezzanine loans, and senior debt to support infrastructure in Indonesia.

As the Indonesian renewable energy sector is missing a diverse range of sophisticated financial products, IIF could play a role in promoting growth in domestic RE infrastructure. Although IIF has not yet worked with any small-scale developers, the institution could work with those who have a solid pipeline of projects because IIF prefers to invest in projects valued over US$10 million. Simply by entering the infrastructure finance arena, IIF diversifies and enhances the Indonesian financial markets. RE developers will be able to consider which financial product works best for their needs.

III.5. International Development Initiatives for Small-Scale Renewable Energy in Indonesia

Although the Indonesian infrastructure and development funds are working to provide capital to various types of projects, including RE, they have not yet delved into small-scale RE infrastructure. To encourage smaller developers to take advantage of Indonesia's abundance of RE resources across the country, international government and non-governmental institutions have taken an interest in promoting environmental awareness and clean energy in Indonesia as it is currently the world's third largest emitter of greenhouse gasses. The international community realizes that as the archipelago's economy and population continue to grow, Indonesia will demand substantially more energy. In order to avoid environmental catastrophe while simultaneously taking advantage of the abundance of renewable energy resources, many donor country development agencies and INGOs are helping build capacity, smooth policy, provide technical assistance, and deliver financing to the RE sector, including small-scale infrastructure.

[95] Indonesia Infrastructure Finance. (2012). *Overview*. Web 3/8/12 <http://www.iif.co.id/index.php?menu=overview&lang=en>

Below are a number of organizations and their projects addressing RE, with some focusing on infrastructure smaller than 10MW.

Millennium Challenge Corporation (MCC)
MCC is a U.S. bilateral foreign aid and development agency that promotes good governance and poverty alleviation. MCC takes a unique development approach, selecting compact/threshold receiving countries on a competitive basis. MCC goes on to empower recipient states by placing the responsibility of identifying, developing, managing and overseeing economic growth and poverty alleviation programs in their own hands. MCC's role is to deliver the financial means and ensure that countries follow through with pre-negotiated terms and conditions and monitoring and evaluation requirements.

In 2011, MCC signed a compact with Indonesia worth US$600 million. More than half this contribution (US$ 332.5 million) will go towards the Green Prosperity Project aimed at increasing the productivity and reduce reliance on fossil fuels by expanding renewable energy, efficiently managing natural resources, and improving land use practices.[96] To achieve these goals, MCC will take two stages, a development stage and an implementation stage.

During the development stage, MCC will do GIS mapping on a number of geographical locations to show which resources are where, where forestry borders are, which local governments have jurisdiction, etc. Next, the MCC contractor will determine how natural resources can best be utilized in a sustainable manner while conducting spatial planning to apply projects. Finally, the project implementer will build capacity in select regions, training identified parties on how to conduct feasibility studies, maintain RE infrastructure, manage the natural environment, and more. By mapping the area where projects will go, creating a natural resource management plan, and training local capacity, MCC foresees a higher probability of success when actually implementing RE infrastructure.

Once the project development stage is complete, MCC will work with local communities, governments, developers, suppliers, and PLN, to deliver small-scale, mostly less than 1MW RE technologies such as biomass/gas and micro hydro. MCC will deliver assistance on a proposal basis where communities that received technical assistance during the development stage will submit applications for project funding. Assistance may come in the form of a grant, low interest loans, or guarantees. Once a project is awarded, the community will work with the contractor and local businesses to complete the feasibility study, build the power plant, and begin production.[97] MCC will also cooperate with PLN to see whether selected communities will be connected to the grid at some point in time and how the receiving villages could potentially sell excess energy back to PLN.

The challenge MCC will face is distributing such a large amount of cash on small-scale projects over three years. Moreover, MCC has relatively strict conditions and monitoring and evaluation criteria that recipients must comply with.

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[96] Millennium Challenge Corporation. (2011). *Indonesia Compact*. Web 3/8/12 <http://www.mcc.gov/pages/countries/program/indonesia-compact>

[97] At the time of the interview with the MCC representative, the actual process on how this will be completed was not yet finalized.

U.S. Agency for International Development (USAID)

USAID is the government agency responsible for delivering foreign aid. USAID helps advance U.S. foreign policy and strategic objectives by addressing numerous factors that can obstruct access to economic opportunities such as lack of education, inefficient agricultural practices, or impacts from climate change. In Indonesia, USAID is working in a few environmental sectors including climate change adaptation, forestry management, and increased access to clean energy. USAID Indonesia has implemented two programs aimed at accelerating the usage of small-scale renewable energy - the Indonesia Clean Energy Development program (ICED) and Capacity for Indonesian Reduction of Carbon in Land Use and Energy (CIRCLE). A description of each program can be found below.

1. ICED is working with diverse stakeholders including both national and regional Indonesian government agencies, PLN, local communities, universities, and the private sector to accelerate the usage of clean energy in Indonesia. ICED will work with ESDM to improve energy sector policies and coordination, focusing on building capacity, improving the policy arena, and implementing projects in three provinces in northern Sumatra.

   ICED has four major program areas including energy sector policy and coordination, development of less than 10MW RE infrastructure, capacity building and public outreach, and program support and integration. Through these programs, ICED aims to eliminate 4 million tons of CO_2 from transport and energy, build 120 MW in small- to medium- scale RE projects, and increase access to energy for 1.2 million people.[98]

2. CIRCLE project aims to reduce greenhouse gas emissions in Indonesia by developing biogas systems to turn palm oil effluent into clean energy at palm oil mills. CIRCLE is developing incentives such as sustainability certification and biogas energy for personal usage or sale to PLN to encourage mills to implement such technologies. CIRCLE is working with three palm oil mills to develop sustainable effluent-to-energy biogas projects that can serve as models for other palm oil producers. In order to achieve project objectives, CIRCLE will build awareness and capacity among stakeholders, screen palm oil mills to assess their capacity to implement biogas projects, and implement biogas infrastructure at the three selected sites. By turning palm oil waste into energy, Indonesia can decrease its overall greenhouse gas emissions.[99]

Gesellschaft für Internationale Zusammenarbeit (GIZ)

GIZ is Germany's agency for international development that works on various development issues such as health, resource protection, and energy conservation. In Indonesia, GIZ is focusing on good governance, private sector development, and climate change. For small-scale RE, GIZ has two programs, Green PNPM[100] Micro Hydro Power Technical Support Unit (MHP-TSU) and Mini Hydro Power Project for Capacity Development ($MHPP^2$), both supporting the

[98] USAID Indonesia. (2012). *Indonesia Clean Energy Development*. Web 6/8/12 <http://indonesia.usaid.gov/en/USAID/Activity/291/Indonesia_Clean_Energy_Development_ICED>

[99] USAID. (2011). *Capacity for Indonesian Reduction of Carbon in Land Use and Energy.*

[100] *Program Nasional Pemberdayaan Masyarakat Mandiri* (PNPM) is a Government of Indonesia program for community empowerment

acceleration of mini and micro hydropower deployment. GIZ has also published a manual describing how to build micro hydro power plants. Interested individuals can contact GIZ Indonesia directly to get a copy. A description of GIZ's micro hydro programs can be referenced below.

1. MHP-TSU provides technical support to Green PNPM in order to more effectively deploy micro hydropower systems in rural communities. GIZ carries out feasibility studies, develops the construction plans, oversees the construction, assesses protocols, and provides trainings to local communities to build and maintain the hydropower plant. By helping the Green PNPM program, GIZ ensures that micro hydro facilities meet the required quality standards of construction and sustainable operations. This program is funded by the World Bank and the German-Dutch co-financing scheme "Energizing Development," so all resources are paid for donors.

   To date, GIZ has helped 37 manufacturers in Sulawesi and Sumatra produce hydropower turbines, built the capacity of 350 government employees to advise on mini hydropower implementation, trained 100 villagers on how to manage and maintain the power stations, and started the process to build 36 mini hydropower plants across Indonesia.[101]

2. MHPP^2 is an extension of MHP-TSU that promotes micro hydropower by exchanging technological know-how, sharing best practices, policy advice, and additional capacity building. By cooperating with the Directorate General for New and Renewable Energy and Energy Conservation, MHPP^2 will apply best practices learned through MHP-TSU to further improve the business environment for micro hydro production.[102]

Agence Française de Développement (AFD)

Agence Française de Développement is France's official foreign development assistance program. AFD works as a financial institution, funding projects, programs and studies through grants, loans, guarantee funds and debt reduction-development contracts. AFD will also help build capacity and supply development support to foreign institutions and implementing agencies.[103] In Indonesia, AFD in cooperation with JICA has lent money through three Climate Change Program Loans totaling US $800 million and provided Bank Mandiri with a US$100 million credit line specifically for RE projects.

AFD takes an approach different from USAID and GIZ in that it works just as a financing agency, building capacity and providing capital for directed initiatives. Although AFD is yet to directly finance small-scale renewable energy projects, the Climate Change Program Loans as well as the credit line to Mandiri will spark the institutionalization of the RE sector in Indonesia. As both the Indonesian government and banks learn more about the RE sector and how it can be exploited to provide clean energy and make profits, they will increase their support for the industry. Moreover, the loans and credit line lower the cost to providing financing, enabling the banks and government to take moderately more risky RE projects, thus spurring development.

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[101] GIZ. (2012). *Green PNPM Micro Hydro Power Technical Support Unit*. Web 6/8/12 <http://www.giz.de/themen/en/35397.htm>

[102] GIZ. (2012). Mini *Hydro Power Project for Capacity Development.* Web 6/8/12 <http://www.giz.de/themen/en/35392.htm>

[103] AFD. (2012). AFD Homepage. Web 6/8/12 <http://www.afd.fr/lang/en/home>

The $800 million dollar loan has already been disbursed while $95 million of the credit line has been applied to RE projects. AFD will open an additional $100 million in credit to Mandiri in the near future to maintain the progress that has been made.

United Kingdom Agency for International Development (UKAID, formerly known as DFID) - UK Climate Change Unit (UKCCU)

UKAID is the United Kingdom's international development agency. In Indonesia, UKAID opened the UK Climate Change Unit to assist Indonesia in meeting its own targets for green, sustainable development. The UK Climate Change Unit (UKCCU) is primarily working through GOI, Indonesian NGOs, and other development programs so that Indonesia will be able to conduct a majority of its own renewable energy development in the future. First, the unit advised the Ministry of Finance to develop the incentives for renewable energy. The UKCCU will continue to work with the Ministry to help develop new incentives and refine those already in place. Secondly, UKCCU is cooperating with NGOs and the local government through the Green PNPM to socialize the RE sector. Similar to AFD, although UKCCU is not working directly on infrastructure, it is working to liberalize the entire sector so both the public and private sector understand the dynamics and benefits to RE.

International Finance Corporation (IFC)

The IFC is a member of the World Bank Group that focuses solely on the private sector, providing investment, advisory, and asset management services in developing countries. The IFC aims to advance economic growth by directly investing in commercial projects that have the potential to reduce poverty and promote development through employment, innovation, and sustainability. In Indonesia, the IFC provides financing and advice to SMEs and larger entities in banking, infrastructure, and power generation - including RE companies.

IFC will provide a number of sustainability products such as long-term financing products to financial intermediaries, corporate governance advisory services, financing mechanisms for RE projects, and direct investments into promising RE infrastructure (although IFC cannot take more than a 20 percent equity stake). One example of IFC's work with Indonesian banks is their program with Bank Permata. The IFC is training Permata's management and loan officers to better understand the RE market and how to analyze project/technology risk in order to provide financing while still making a profit. Additionally, an IFC representative stated that the INGO is receiving many proposals for longer-term financing and advisory services from renewable energy developers, although most of the projects are over 10MW. As IFC works directly with the private sector, the institution was unable to divulge specific project information.

III.6. Summary on Indonesian Financing Mechanisms for Renewable Energy

The sections in this chapter show that there are quite a few institutions in Indonesia helping develop and providing financing to RE projects. Even though these diverse organizations are working to support the industry, there is still a wide gap in early stage project financing, especially for RE infrastructure smaller than 10MW. The banking system is unwilling to invest in the most risky, but essential, project development stage. Additionally, although there are a number of non-bank financial institutions investing in RE projects, the market is still small with the capital markets, PE and VC funds, and insurance industries each being underrepresented in

the RE industry as the risk-reward and time horizons do not align well. Moreover, neither mutual funds nor pension funds have started purchasing small-scale RE infrastructure as a secure long-term asset. Although commercial finance cannot yet meet the needs of RE developers in Indonesia, GOI, INGOs, and development agencies are working to build capacity, provide additional financing, develop projects, and socialize the benefits and profitability of RE. Below is a chart outlining the various national and international development initiatives aimed at support RE in Indonesia:

Organization	Nationality	Program	Goals
ICCTF	Indonesia	ICCTF	Donor coordination, RE financing
IGIF	Indonesia	IGIF	RE grants, equity, financing
IIF	Indonesia	IIF	Infrastructure finance
MCC	USA	Green Prosperity Project	GIS mapping, capacity building, RE project development/implementation, natural resource management
USAID	USA	ICED, Circle	Research, GIS mapping, RE project implementation, capacity building
GIZ	Germany	MHP-TSU, MHPP[2]	Micro-hydro infrastructure, education, capacity building
AFD	France	Climate Change Program Loans	Bank financing
DFID	United Kingdom	UK Climate Change Unit	Climate change/energy policy, RE promotion, capacity building
IFC	International Organization	General Operations	Promote low-carbon business, financing, infrastructure

Entrepreneurs, angel investors, and conglomerates that are environmentally progressive are the people driving the renewable energy sector in Indonesia. Because the archipelago has an exceptionally large amount of renewable resources, favorable energy policies, and potential for profit, groups that have the capital, passion, or appetite for risk can succeed in the RE market. As these clean energy pioneers develop successes and prove the profitability and potential of various technologies, larger institutions and investment funds will realize the benefit to investing in such projects.

Chapter IV: Conclusions and Recommendations

The utilization and development of renewable energy in Indonesia is still relatively new and needs the government's support to supply clean energy to the growing economy and population. The support is needed because RE carries relatively high technology risk while also typically is more expensive than thermal resources on a per kwh basis. To encourage the development of the RE industry in Indonesia, incentives from the government are needed. Incentives for renewable energy can be either through policy and/or fiscal and non-fiscal incentives. Fortunately, GOI has taken a favorable view on RE and has passed numerous laws that ease the overall business environment for implementing FITs and incentives to encourage development. Even though GOI has taken some positive steps, more can be done to help meet the country's energy goals of 2025. Below are some recommendations on how to facilitate RE development.

IV.1. Revolving Fund for Early Stage, Small-Scale Renewable Energy Financing

In order to address the early stage financing gap for renewable energy infrastrucutre under 10MW, the SEBAR team recommends that GOI establish a special revolving fund to help developers bring worthy business plans to a PPA. The SEBAR team also recommends using the Thai Energy Efficiency Revolving Fund as a model as it has proven quite successful over the past nine years. This revolving fund could operate as a branch of the already established ICCTF where international donors already deposit development assistance, while GOI could add to the fund if necessary. With the revolving fund, donors could request that a certain percentage of their assistance goes to funding early stage RE financing, helping experienced contractors build more power plants while maintaining cash flows.

Similarly to the Thai revolving fund, the institution would provide capital at no cost to Indonesian banks (similar to the AFD credit line to Mandiri) and low cost loans to potential project developers. With an injection of capital dedicated to financing early stage RE projects, the banks will be inclined to lend to the most promising developers at relatively low interest rates because they are not using bank capital. The only cost to the bank would be analyzing the loan application and assessing the potential of the project.

The major risk comes from the possibility of a feasibility study not resulting in a PPA. Even if a bank were to lend capital, the negative consequences of the default will affect the contractor the most because the banks would be able to seize collateral or restructure the loan at a higher interest rate over a longer time period.

As the early stage of a RE project is the most risky, banks should set a requirement demanding that potential clients already have at least one RE project running, generating previously forecasted cash flows that meet scheduled time frames. Because the contractor already has a project up and running, the banks can more easily analyze if a new venture will be successful given the technology employed. Moreover, the already constructed RE infrastructure can act as collateral. This type of loan from the banks benefits the developer as well because he/she will not have to sacrifice current cash flows for future investments. Furthermore, the developer will have sufficient motivation to conduct thorough due diligence on every project because the

consequences of defaulting on the early stage financing loan are relatively high due to forfeiture of previous project capital or a higher interest rate from a restructured loan.

The SEBAR team recommends that GOI pilot this revolving fund with US$50 million in capitalization. As a feasibility study can cost between $100,000 - $500,000, this provides some leeway to gauge how many projects have been successful. Once developers get a PPA, they can pay back the original early stage financing loan with a more formal construction or corporate finance loan (which the banks could benefit from as additional business). The principal plus interest will be recycled back into the fund and can be used to supply additional developers with capital.[104]

This revolving fund can partially fill the gap in financing for developers who already have at least one RE project complete and generating forecasted cash flows. Through the fund, developers will be able to approach a number of state owned banks' energy financing arms to apply for affordable loans with modest collateral requirements. As developers' cash flows are not too constrained, they will be able to start new projects to help meet Indonesia's goal of providing 15 percent of its energy through renewable resources.

IV.2. Educational Certificate in Renewable Energy

Indonesia needs more skilled professionals in the RE sector as the country's demand for energy continues to grow and the industry gains momentum. In order to supply qualified workers for this burgeoning sector, the SEBAR Team recommends that the Department of National Education in cooperation with the ESDM and Ministry of Research and Technology implement a professional certificate program in Renewable Energy Technology and Management. The SEBAR team further recommends that the program start at Indonesia's premier universities, University of Indonesia and Institute of Technology Bandung, to ensure that the program receives the best possible candidates with skilled staff.

The purpose of this program would be to facilitate the implementation of broad-based, interdisciplinary subject matter covering the sciences, economics, and policies of RE in Indonesia. This program will produce a technically competent RE workforce that is sufficiently experienced to work either at the banks analyzing RE loan applications, for the government developing RE policy, as a consultant examining the benefits to implementing RE or energy efficiency projects, or for a development agency working on any of the initiatives listed above.

Ideally, this program would consist of two parts. First, students would learn and study in the classroom with professors on a given subject. Secondly, there would be a seminar section where scientists, policy makers, and people from industry would present to these aspiring students on what is really happening within the applied RE sector. This format would provide a well-rounded education, in which the students will understand the job market and be prepared to enter it.

[104] Unfortunately the SEBAR team cannot recommend what interest rate to apply or how in depth the loan proposal should be as the SEBAR is inexperienced in loan processing procedures and risk pricing.

If the certificate in Renewable Energy Technology and Management is started soon, so that Indonesia can start supplying the professionals necessary to achieve the country's energy and environmental goals of 2025.

IV. 3. Making Feed-In Tariff Policy for All Renewable Energy

In order to improve the utilization and development of and also achieve Indonesia's target in RE, GOI should implement FITs for all clean energy sources. Currently, FITs are assigned to hydro, biomass, biogas and municipal waste. For geothermal, solar, and wind there is not yet any feed-in tariff. To achieve the target of new and renewable energy role in Indonesia energy mix by 25 percent in 2025, the government needs to combine and integrate the management and development of all RE sources in Indonesia under a common regime.

The payments for respective FITs can be differentiated based on the type of technology, project scale and the location of power plant to be constructed. FITs should not be standardized for each type, rather, selectively - measurable and in line with economic price. FITs should show fairness, simplicity and stability, so appropriate technologies are employed in the best possible area. Feed-in tariffs have to provide equal opportunity for all parties to engage in the business of RE projects. Feed-in tariffs will also make the process of business transactions become more concise and efficient. Considering that RE is a relatively high-risk business but provides consistent returns and clean power into the long-term, FIT payments must provide reasonable prices for up to 15 or 20 years. This condition is in line with the needs of investors who require transparency, longevity and certainty to invest in renewable energy sector. With FITs in place, it can be expected that the private sector will produce the infrastructure and the energy to supply Indonesia with the energy demanded.

II.4. Provide Incentives in Every Phase of Renewable Energy Development in Accordance with Renewable Energy Types.

Incentives are fiscal policies such as tax holidays, reductions on income tax, etc. that can be used to encourage a specific industry. Currently, the Ministry of Finance offers a number of fiscal incentives to the energy sector, but most of these incentives benefit larger producers of thermal or geothermal energy because they focus on capital intensive goods. To better support small-scale RE projects, GOI should consider crafting incentives tailored for RE developers to rural areas. Moreover, respective incentives should consider the type of RE being used and vary according to the demand for and need of each type of technology. These incentives should be measurable in their effectiveness and guide Indonesian energy pricing towards its economic value.

To better accelerate the development of RE and achieve GOI targets, the incentives should not be given only during the operation phase, but also during the feasibility study, development, construction, operation and commercialization stages. Below is a list of potential incentives that could help encourage further RE projects.

Proposal: Incentives for Renewable Energy Utilization under 10 MW.

Phase	Incentives	Objectives
Feasiblity Study	Zero-interest loan or grant for feasibility studies in priority areas	• Assist developers in conducting survey, exploration and the completion of a comprehensive RE feasibility study. • Increase the likelihood for developers to get electricity purchase approval from PLN and loans from creditor through completion of the feasibility study requirement
	Technical assistance and capacity building	• Provide information and data about the potential of RE sources in the area of exploration • Coordinate with PLN in regards to the location of power plant and the nearest connection point to PLN grid • Improve business management
Development	Simplicity in obtaining business licenses and operation permits at the national and local level through simplifying bureaucratic and licensing procedures.	• Accelerate business administration process • Reduce investment cost (high-cost economy)
Construction	Zero-interest loan with small guarantees or grants for RE projects under 10 MW	• Provide RE development fund (capital cost incentives) for developers to build RE for power generation and transmission.
	Loan guarantees from government to the banks or creditors special for RE projects under 10 MW	• Increase commercial lending to RE projects
	Fiscal incentive, namely exemption from VAT and exemption from import duties on capital goods such as machinery, and equipment on RE technology (incentives is available)	• Reduce RE investment costs. • Attract investors to invest in the renewable energy sector.
	Diverting oil subsidies to subsidize clean energy	• To build RE generation, transmission (grid connection), and electricity distribution infrastructure

Operation and Commercialization	Fiscal incentive, namely reduction in net income, exemption from VAT and exemption from import duties on capital goods such as material for producing, machinery, and equipment on RE technology (incentives are available)	• Reduce RE production and maintenance costs • Attract investors to the RE sector
	Feed-in Tariff (Already applied but not for all renewable energy sources)	• To determine the purchase price of electricity at an economic price that is also attractive to investors • To make the business transaction process more concise and efficient. FITs eliminate the negotiation process and obligates PLN to buy electricity at the FIT price level.
	Diverting oil subsidies as incentives for renewable energy.	• To make the price of RE competitive with fossil fuel prices • Reduce the state's financial burden of paying fuel subsidies

Although there are incentives and FITs, the investment and development cost of RE in Indonesia is still more expensive than fossil energy. One of the factors that makes RE less competitive than traditional energy sources is the government subsidies for oil and electricity. The government subsidy policies bolster developers and producers of fossil fuels as they can sell their total output to the government at the market price while GOI takes a loss when selling it back to consumers. This makes RE less competitive because it is typically more capital intensive and expensive per kwh. If the subsidy were removed, RE would be able to compete with thermal energy, especially in remote areas.

If GOI were to reduce the oil and electric subsidies, diverting funds into RE projects, clean energy infrastructure would blossom, provide cleaner electricity and diversify the energy mix. This policy will directly reduce the country's dependence on fossil energy consumption, lowering greenhouse gas emissions, and increase export revenues as unused thermal resources can be sold to other countries. Although the incentives and feed-in tariffs encourage RE development, the sector will never be able to compete effectively with the oil and electricity subsidies. This will cause sustained growth in dirty thermal power plants and the underutilization of RE facilities.

The application of incentive policies should have significant impacts in improving public services to achieve the government's targets. RE incentives must be transparent while implementing agencies need to be accountable. The government should be selective and fair when implementing incentive policy; therefore government should strengthen their monitoring

and evaluation systems. Providing incentives for the management of renewable energy power plants requires long-term planning, consistency of policy implementation, coordination between institutions and public participation. An active government role in making policy, regulation, incentives and coordination with various stakeholders would be a major success.

II.5. Promote the Renewable Energy Sector and Support Government Regulations

Even though GOI has been active, trying to improve the renewable energy sectors, it has not sufficiently informed the general public on its benefits and ability to supply energy across the nation. This lack of information and non-standardized business practices discourages both developers and the financial sector from aggressively investing in the sector. Moreover, misleading information can lead to misunderstandings especially when there is some new or specific draft regulation on renewable energy that changes the business environment.

In order to standardize RE business processes and address any misunderstandings, GOI should socialize the benefits of RE and inform all related stakeholders every time an old regulation changes or when a new regulation is implemented. This promotion could be done through seminars or by posting it on the website of the related ministry and/or by the PLN. GOI should also hold conferences about RE power production that inolve numerous stakeholders from national and local governments such as: producers of renewable energy machinery, bank employees, scientists, and developers. In such an event, the GOI could receive constructive feedback on how the industry is moving forward and what could be done to improve it. Moreover, GOI could highlight their commitment and willingness to improve the RE sector in Indonesia while attendees would spread the information they gained to other people, thus increasing overall public awareness.

II.6. Simplify and Standardize the Processes and Procedures to Obtain RE Permits

Developers face problems with the processes and procedures required to obtain mandatory permits to build RE projects. As already explained, it is necessary for developers to obtain permits such as the *Izin Prinsip, Izin Lokasi* and *Izin Pinjam Pakai Kawasan Hutan* (if their project takes place in the restricted forest). Unlike the procedure to obtain a PPA, the process to obtain these permits differs among various local governments. This difference could lead to confusion and corrupt practices, deterring developer from investing in renewable energy projects in areas demanding development.

To avoid this, GOI should standardize the processes and procedures that are required to obtain these permits. These procedures should transparently publicize the cost of each permit, create a register of local governments requesting developments, and list which government official or office should be contacted to get respective permits. GOI should mandate local governments to follow these standards and that the public has a venue for recourse in the case of incompliance. Another alternative could be to integrate the permit process into one-stop-shop service, similar to business registration procedures, that efficiently supplies all necessary permits under one office (when that office is functioning). With permit streamlining, the time needed by the developer in order to obtain the permits will decrease, the work by local government officials will decrease,

and by making all the process integrated, the chance for additional fees and bribery will also decrease.

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