Indonesia's New Small-Scale Power Generation Law: A practical reconciliation of regional growth with the promotion of renewable energy projects

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ABSTRACT

For emerging economies, addressing a society's environmental goals must be balanced with its development targets, especially where regional variances in economic growth result in uneven electric demand and supply. Such variances also necessitate that the structure of energy and climate change policy address both equitable considerations and practical development considerations. In addition, a regulatory framework must both address localized demand peaks and also seek to integrate specific regional considerations into an overall national energy framework.

After several attempts to address its electricity shortage and regional unevenness in electricity supply, Indonesia's new regional Small Scale Power Generation Law which directly addresses and incentivizes electricity generation emphasizes a renewables approach, and allows for regional flexibility in order to provide a practical solution to Indonesia's electricity supply challenges.

EXECUTIVE SUMMARY

For emerging economies, addressing a society's environmental goals must be balanced with its development targets, especially where regional variances in economic growth necessitate that the structure of energy and climate change policy be equitable for such lagging regions. In such context, the regulatory framework must seek to integrate specific regional considerations into an overall national energy framework.

Indonesia provides an illustrative example of a large emerging economy spread over a vast geography with a range of regions in differing stages of economic development. National growth has put a great strain on the energy generation system; in turn, electricity shortages have negatively impacted critical sectors of the economy, especially for export related industries. Instituting a national energy policy though has been hindered by the destructive centripetal forces of regionalism, separatism, local corruption, and religious and cultural conflict.

In that context, Indonesia has implemented a small-scale electric power law to encourage the development of regional IPPs. Interestingly, the encouragement of local and regional power generation actually provides a systemic incentive to develop renewable energy, increase small-scale sustainable projects, and strengthen harmonization of regional growth initiatives back into a national framework.

Although the legal framework is recent, there has been a surge of activity at the grassroots level for commercially feasible renewable energy power projects across the country, especially with respect to utilizing the plentiful biomass, abundant lower cost

labor, and taking into account the weaker regional distribution grids, and emphasizing a small-scale approach. Even with respect to the localized power purchase offtake arrangements, more practical financing packages are possible through the integration of CDM revenues, the smaller risk profile of each project and the ability to customize inclusion of smaller local captive offtakes. In other words, the small, renewable projects may actually be quicker, simpler, and more financially attractive for the regions than seeking a larger baseload power plant based on fuels such as coal. In turn, by having such a region-focused regulatory framework, it actually promotes the regions to try to integrate their power generation policies into the national framework rather than to independently seek their own isolated solutions.

The paper will specifically discuss the nature of the national/regional electricity shortfall and crisis in Indonesia, the recent small-scale IPP law and its framework, and recent activity in renewable power projects in response to such law.

I. Electricity in Indonesia

A. Regional Characteristics of Economic Growth

Indonesia provides an illustrative example of a large emerging economy spread over a wide geography with a range of regions in differing stages of economic development and electrification.

Indonesia has a population of 245 million, making it the world's fourth most populous country after China, India, and the USA. More than 6,000 of Indonesia's 17,000 islands are inhabited by more than 100 different ethnic groups, stretching across 5,100 km (roughly the distance from New York to California). Although there is a national language, the various ethnic groups have different languages, customs, religions and other segregating factors.

Its economy is based primarily on manufacturing, the export of petroleum and other energy related products, and agriculture, with a per capita GDP of approximately USD USD 3,600 (in terms of purchasing power parity) and an overall GDP of USD 270 billion (in terms of official exchange rates). However, even this national GDP is misleading as there are significant variations in the national economic configuration. The island of Java (roughly the size of Indiana) has a population of 100 million and actually holds the great majority of Indonesia's industrial base of manufacturing and industrial plants. Jakarta, the capital, with a population of approximately 15 million in the metropolitan area, enjoys per capita incomes which are approximately 70% higher than the national average. Conversely, Indonesia's oil and gas sector is mostly located in Papua and North Sumatra, the extreme ends of the country. As Southeast Asia's only OPEC member, Indonesia's oil and gas sector contributed approximately USD12.1 billion in 2002, which was equivalent to 21.2% of total national export earnings. Oil, gas, and other extractive industries such as forestry and mining have rendered the Indonesian economy dependent on its natural resources exports.

B. Strains of Regional Development

As a large, geographically widely dispersed country, Indonesia's regional variances mean that the economy is also varied in composition and depth. However, said regional variances also mask centrifugal forces that could potentially undermine both the country's economic growth as well as its very stability and national existence.

In the aftermath of the 1997 Asian Financial Crisis and the resulting political turmoil, the nation experienced severe centrifugal forces which some commentators feared would even break up the country. These included armed and violent regional separatist movements in Aceh and Papua, bloody and sustained religious conflicts in Ambon and Sulawesi, and ethnic rioting in Java and Kalimantan

The variations in regional development proved to be a significant exacerbating factor. With half of the country's population and its capital, the island of Java has received a disproportionate amount of the economic development and industrial growth. For example, the majority of Indonesia's manufacturing and industrial capacity is located on Java. Although the nationally important oil and gas sector is located in the more remote "outer islands", the nation's refinery and petrochemicals industries tend to cluster in Java as well. Historically, more than half of the nation's revenues from such sector went to Java, thereby building regional discontent at the perceived "outflow" of regional wealth to Java. Because the Javanese are also a distinct ethnic, linguistic and historic group, the perceived separation extended to both ethnic and political levels as well.

C. Indonesia's Electricity Background

Similar to many developing markets, there are many opportunities as well as hurdles in developing a viable electric power infrastructure in Indonesia. Indonesia's state owned electricity company ("PLN") owns and controls all of the public electricity infrastructures in Indonesia, and currently owns 24,000 MW of power generation capacity. PLN forecasted that the country's electricity demand will grow to almost double its current installed electric capacity within five years. Indonesia has trouble meeting its power demands even today: already utilizing 92% of its installed electricity capacity for demand, Indonesia's spare capacity levels are dangerously low, with resulting blackouts and brownouts becoming increasingly frequent.

The electricity crisis is even more acute in the outer islands of Indonesia where there is a lack of adequate transmission lines and a working power grid infrastructure. For the outer islands, PLN forecasted a growth in demand of 6-8% annually. Yet, with a national electrification rate of only 54%, which is one of the lowest electrification rates in Southeast Asia, the Government must take concrete steps to address the growing electricity crisis, especially in the outer islands of Indonesia.

Such market conditions would normally mean that there is a considerable opportunity for independent power plant ("IPP") developers in Indonesia to create projects that will contribute much needed power supply for the country. Yet, although PLN is allowed by the government to buy electricity from private power producers under a long term purchase agreement, so far there has been no realization of a new IPP in Indonesia since the 1997 Asian financial crisis. For IPP developers, building a power project in this country signifies a rather risky project because of Indonesia's high country risk, changing policies, and recent political instability.

D. Indonesia's Electricity Crisis

Although Indonesia urgently needs foreign direct investment ("FDI"), there has been virtually no FDI since 1997 into the power generation sector. The Indonesian power sector was hit particularly hard by the fall of President Suharto in 1998. To meet an earlier electricity shortfall, the Indonesian Government had made several large power purchasing agreement ("PPA ") contracts denominated in US dollars with foreign electricity generation firms. When Indonesia underwent IMF supervision after the Asian Financial Crisis, one of the IMF's conditions was to cancel or suspend all such PPAs due to their foreign currency link and possible issues of irregularities in the awarding of some of the contracts.

Since 1998, Indonesia has seen five presidents and a correspondingly large number of Government policy changes, especially with respect to regional issues and the resolution of the electricity generation crisis. Most of the PPAs which had initially been cancelled or suspended were eventually resolved through laborious and lengthy renegotiations, some of which have lasted since 1998 to even this year. Several such negotiations have also resulted in highly visible international arbitrations such as those for the CalEnergy geothermal fields and for the Karaha Bodas geothermal fields. These arbitrations were a public reminder of the Indonesian Government's vacillation with respect to contesting official Government Letters of Support for a US dollar denominated offtake. The Karaha Bodas arbitration in particular has been quite damaging to Indonesia's attempts to induce foreign investment in the electric generation sector as it has lingered to this day, and has resulted in highly public reporting in the major international media, as well as attempts to seize Indonesian Government assets overseas. Given those circumstances, many electric generation companies as well as foreign financial institutions felt that the Indonesian electric generation sector was not yet ready for a return of FDI.

E. PLN's Main Challenges

Today, PLN faces two main obstacles in terms of electricity generation: 1. providing sufficient capacity to meet growing electricity demand, and 2. equitably distributing such capacity to all of Indonesia's islands.

Indonesia's recent economic recovery from its period of instability following the Asian Financial Crisis of 1997 and steady population growth have increased power demand considerably in recent years. The Minister of Energy and Mineral Resources Purnomo Yusgiantoro has estimated that, in order to keep up with the expected growth in power demand, Indonesia will need over 30,000 MW of new generation capacity in the next 10 years, including 21,000 MW in Java alone. Currently, 80% of electricity is generated and consumed within the Java-Bali grid, home to Indonesia's capital Jakarta and most of its large industrial sites. The government's focus on supplying electricity to said grid for economic and political reasons has, however, given rise to significant inequalities in terms of access to infrastructure and thus economic development.

Although Indonesia has an abundant amount of fossil fuels, especially coal, the increasing cost of oil and decreasing government subsidy has posed a serious challenge for PLN to generate enough electric capacity to meet current demand. Coal

transportation to islands outside of the Java-Bali grid is becoming increasingly expensive because of the Government's recently announced diesel oil's price increase of 200%. Thus, even traditional fossil fuel IPPs have become increasingly costly.

F. "Outer Island" Challenge

Largely due to Indonesia's geographical structure as an archipelago, it is not efficient for PLN to ship electricity from fossil-fuel sources to distant islands without facing a further loss of profits. It is interesting to note that, despite the recent oil price hike, most of Indonesia's outer islands are still fuelled by diesel. Approximately 89% of electricity in the outer islands is generated from fossil fuels, with diesel accounting for 42% thereof. These diesel shipments are increasingly economically unsustainable and impractical for PLN. At present, diesel fuelled plants are the only choice for PLN since large coal fired power plants are a challenge to build due to the lack of foreign investment and international financing. As yet, local banks – themselves recovering from the IMF managed recovery to the 1997 Asian Financial Crisis - do not have the financial capability to fund such projects, whereas PLN has been experiencing major financial difficulties since 1997 and cannot fund these large power projects by itself. Thus lacking a stable, affordable supply of electricity, the level of economic activity on most of the outer islands remains intensively agricultural.

A number of outer islands have attempted to solve their own power problems, although this is not always the most efficient solution for them. Certain islands rely on their own independently created and managed power infrastructure, developing their own electricity cooperatives and sourcing and managing their own electricity generation. Unfortunately, such attempts are piecemeal without a more comprehensive framework. As a result, even where such cooperatives exist, the electricity supply varies widely from locality to locality.

Without foreign investment, PLN must increasingly look into other local sources of fuel. Due to the regional imbalance in electricity generation, policies from the national Government tend to be viewed with skepticism. Addressing the outer islands' electricity problems through new installed capacity is thus important in promoting national unity as well as in improving electricity supply.

G. Why Renewables Make Sense

On the other hand, the outer islands' problems and their reliance on diesel also points to a naturally elegant solution.

Indonesia's renewable energy sources are tremendous: geothermal, biomass, and hydro entail a potential of almost 100,000 MW, enough to supply all of Indonesia's electricity needs for the foreseeable future.

Geothermal:	20,000MW
Biomass:	50,000MW
Hydro:	76,000MW

Other renewable energy sources, such as wind and solar, are not presently considered for specific technical reasons, but may also be feasible in certain locations. However, the extent of the "mainstream' renewables of geothermal, hydro, and biomass may be particularly relevant to Indonesia. Amongst these, in particular, we look at biomass as it is most possibly linked to the outer islands (regional imbalance) issue. (Hydro faces certain environmental and community challenges, while geothermal features a financial resources constraint as costs tend to be heavily front-ended.)

H. Biomass

Indonesia produces significant quantities of biomass and does so broadly, across the entire country. Biomass waste has the potential to become a significant source of electricity in the outer islands. As a predominantly agricultural country, for the vast majority of the population Indonesia's economic strength lies in agribusiness. Indonesia thus has a very large, diverse, and steady supply of biomass waste already at hand. The estimated potential for biomass energy in Indonesia of approximately 50,000 MW is distributed widely across all of its islands:

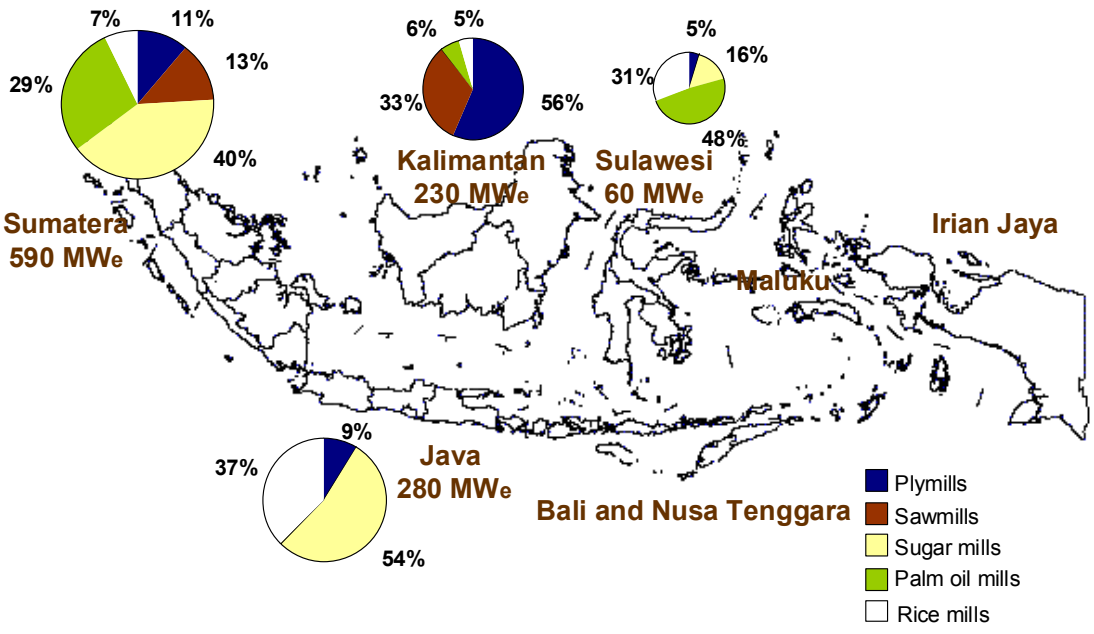

Figure 1: Potential market for biomass power generation (ZREU, 2000)

A significant feature of biomass power generation which makes it especially attractive for a geographically diverse and fragmented country such as Indonesia is that it allows for regional flexibility. Depending on their local economic structures and resources, each region can chose and develop the types of biomass power plants that fit its needs. Thus, a national energy framework which encourages biomass power will allow each region to meet its needs flexibly while conforming to and thus supporting the national overall energy framework.

The following table illustrates the existing regional flexibility in biomass fuelled power generation:

Fig. 2: Level of Potentially Available Biomass Residues for Power Generation[1]

Biomass	Main Region	Production (million ton/year)	Technical Energy Potential (million GJ/year)
Rubber wood	Sumatra, Kalimantan, Java	41 (replanting)	120
Logging residues	Sumatra, Kalimantan	4.5	19
Sawn timber residues	Sumatra, Kalimantan	1.3	13
Plywood and veneer production residues	Kalimantan, Sumatra, Java, Papua, Maluku	1.5	16
Sugar residues	Java, Sumatra, South Kalimantan	Bagasse: 10 Cane tops: 4 Cane tissues: 9.6	78
Rice residues	Java, Sumatra, Sulawesi, Kalimantan, Bali, Nusa Tenggara	Husk: 12 Bran: 2.5 Stalk: 2 Straw: 49	150
Coconut residues	Sumatra, Java, Sulawesi	Shell: 0.4 Husk: 0.7	7
Palm oil residues	Sumatra, Kalimantan, Sulawesi, Maluku, Nusa Tenggara, Papua	EFB: 3.4 Fibres: 3.6 Palm shells: 1.2	67

[1] Source: Dadan Kusdiana, “Biomass for Electricity Production,” Directorate General of Electricity and Energy Utilization, Indonesia (2004/5)

In addition to the flexibility they provide, small-scale biomass IPPs offer several other major advantages. First, their relatively smaller size (usually 1 – 30 MW) discourages strong corrupt interests since projects of such size are of little interest to those "strong" enough to exert potentially negative influence. Second, because of their more modest size and required investment, biomass IPPs tend to remain a mostly local issue, wherein there is strong local interest from each level to make sure the project stays on track. From a political point of view, biomass projects attract the interest of politicians and NGOs because of strong local interest that the project addresses.. Finally, external frameworks such as the Kyoto Protocol's Clean Development Mechanism ("CDM") can serve as catalyst for renewable energy IPPs of this size. As a result, for Indonesia, a renewable such as biomass may actually be more appropriate than conventional fossil fuel power, and recent project initiatives bear out this "ground level" market development. It may appear somewhat odd that, even in the absence of a subsidy, a renewable fuel - biomass – may be the most practicable route for IPPs. Although biomass IPPs feature positive social and environmental impacts, developing biomass IPPs in Indonesia is a logical, commercial solution for the growing electricity crisis, simply because they are actually financeable and commercially practical.

Another important social impact is the economic opportunity the project brings by providing much needed electricity to local businesses, as well as new employment opportunities, be it from the transportation of biomass to the project site, the construction of the plant, or its daily maintenance. A biomass IPP project may also increase the income of local farmers by buying their agricultural waste. Most importantly, a biomass project that involves the local community from all stages is beneficial to the region, as the project is also a part of the social fabric of the local community. Said fabric helps the community develop an alternative economic infrastructure that fits into its agricultural economy.

II. Policy Implementation

I. Policy Background

Since the 1997 Asian Financial Crisis and IMF program period, Indonesia's electricity program has been based mostly on short-term "quick fixes" to address pressing needs rather than a more comprehensive policy. Also, the backbone underlying such policy has been the heavy subsidy program for fossil fuels (e.g., kerosene, gasoline, diesel) which pervaded all levels of Indonesian business and society. For example, to address the electricity supply shortage in 2002-2004 in the absence of foreign investments into large baseload power plants, the Government and many private consumers simply installed small diesel generators across Indonesia. Only with the dismantling of the system of heavy fossil fuel subsidies and the return of FDI interest to Indonesia could the Government now address implementing a more comprehensive policy to encourage regional electrification and use of renewables.

In that context, Indonesia has implemented several small-scale electric power laws to encourage the development of regional IPPs. Prior to the Asian financial crisis, 26 IPPs had been installed in Indonesia. Well aware of its financial limitations with regards to installing new generating capacity and of the difficulties in adding large-scale fossil fuel

plants to the national grid, the Indonesian government has thus issued several new laws to attract new small-scale IPP development.

J. Ministerial Decrees No. 1122/2002 & No. 002/2006

Both of the above decrees demonstrate the significant progress that has been made toward the creation of a legal environment which will allow for the growth of renewable energy developments in Indonesia. By introducing a legal framework for the participation of the private sector in the otherwise purely public electricity market, these decrees are opening the doors to foreign investors. The decrees define a pricing scheme whereas renewable energy IPPs receive 60% or 80% of PLNs specific production costs of electricity for medium and high voltage, respectively. The power purchasing agreements, as defined under the above decrees, generally last for 10 years and are extendable. What is more, electricity off-take is guaranteed for energy producers.

The Small-Scale Renewable Energy Law (the "Renewables Law") – Ministerial Decree No. 002/2006

This keystone legislation provides a legal framework as well as concrete steps and assurances which are geared toward attracting investors and facilitating the development of renewable IPPs.

1. *Guaranteed off-take*

The Renewables Law mandates that in order to meet electricity demand, public electricity companies (namely PLN) "should purchase electricity from renewable energy power plant[s]" (Article 2, Paragraph 2), given that the energy falls within this Renewables Law's boundaries of 1MW – 10 MW.

2. *Tax Advantages*

The Renewables Law frees renewable energy equipment purchases, imports, and its electricity sales from VAT taxes. While the Indonesian tax framework is currently receiving a general overhaul, these types of tax exemptions geared toward increasing FDI have been deemed especially important and are unlikely to be annulled.

3. *Flexible Pricing Mechanisms*

The Renewables Law defines more clearly than Ministerial Decree No. 1122/2002 the pricing mechanisms for renewable energy PPAs.

First, the Renewables Law reiterates that 60%-80% of avoided production costs for low and medium voltage, respectively, still applies as a pricing mechanism for PPAs. After the first three years of operation, the price is to be renegotiated in order to provide increased flexibility and to accommodate new developments in electricity markets.

4. *Regional Flexibility*

The Renewables Law provides regional flexibility in part by providing a special pricing mechanism for IPPs in regions which are heavily dependent on diesel for their current electricity production. The Renewables Law states that the purchasing price should be tied to diesel for the first three years of an IPP's operation. The reasoning for this clause is presumably that PLN is unlikely to replace diesel with other generation within the next three years. Thus, if there is diesel connected to the grid where renewable energy can substitute for diesel, then the PPA offtake price should be set to save the avoided cost of diesel regardless of average grid cost.

5. Simplified Processes

The Renewables Law attempts to provide a more straight-forward process by which businesses can sell their renewable energy to the grid. What is more, the Renewables Law mandates that

> (Article 6, Paragraph 2): The Process of electricity purchase as mentioned in paragraph (1) and the signing of the electricity sale contract should be done the latest within 90 (ninety) days upon the receipt of complete bid documents.

In other words, the Renewables Law encourages straight-forward, timely project development. While some may criticize the lack of detail or samples given with regards to the exact formats and procedures required for the writing and completion of PPAs, it may be exactly this flexibility which can help the Renewables Law in becoming a success.

The requirements for IPPs to be subject to this law are essentially threefold: first, that the fuel be renewable; second, that the region be one deemed to be in an electricity shortfall crisis; three, that the size be less than 10 MW. These conditions were drafted specifically to promote the types of small-scale renewables of which Indonesia has abundant local fuel but previously failed to draw sufficient interest.

K. Assessment of Framework Approach

Concerns about the new laws stem mainly from their framework structure. Rather than detailed and in-depth legislation, these Ministerial Decrees are broad and skeletal in nature. As a result, some criticism raised has been about the lack of detailed specificity on the provisions, the implementing and executing mechanisms, sample PPAs, detailed, steps, etc. In other words, concerns about the degree of certainty granted by these laws persist.

On the other hand, for an emerging market economy such as Indonesia without a strong history of a developed jurisprudence, waiting for a comprehensive and detailed legislation may not be practical. For example, Indonesia's bankruptcy laws which were critical in helping to bring order to the markets following the general collapse of the economy after the 1997 Crisis, were also very skeletal and framework in nature and, similarly, did not contain many details. While, in practice this lack of details lead to difficulties in obtaining results and solving problems, the framework laws did bring some overall structure to what had been a policy void. Similarly, rather than seek to construct a legal jurisprudence based on a legislative approach, by having a framework legislation, there is then a basis upon which to build a practical jurisprudence of decisions. For example, with respect to PPAs, rather than wait for the PLN or the Government to come up with its own fixed PPA, the framework approach gives each developer some flexibility to customize PPA requirements. Over several IPPs, a generally harmonized and standardized PPA structure will arise, in practice, without having to wait for its theoretical construct to first be established. While such a "doing is believing" approach may seem less theoretically rigorous, it does provide a practical structure for the development of actual IPPs.

III. The Experience of the New Legislation

L. Scorecard – Government

While the Renewables Law is too new to be seen as a clear success, its impact has been strongly positive in two respects. First, it is a new policy direction from the Indonesian Government directly aimed for a longer-term, more comprehensive solution, as opposed to past attempts which were often haphazard and short-term in nature. By taking this longer-perspective view, regardless of the possible shortcomings of the specific regulations, developers, investors, and users could all also assume a longer-term planning view. Then, any shortcomings would be seen in the context of an implementation or execution problem to be addressed, rather than a fundamental questioning of the entire policy direction itself.

Second, the Renewables Law breaks new ground by tying in the Government's dealing with issues of regionalism, regional tensions and imbalances, with an economic policy initiative for basic infrastructure. Rather than separating political from economic issues, this law actually acknowledges the deeper, longer-term tie-in of these two factors. Previously, the initiatives with respect to the economy and with respect to regionalism were treated as fundamentally separate policy objectives.

Therefore, as a matter of policy, the Renewables Law, simply by being in existence, is a success in the longer-term policy directions of the Government and its attendant signaling of a longer-term framework of projections and expectations to the market participants, both on the electricity generating side and the local communities' side.

M. Scorecard – Private Sector

Although less than a year has passed, and although due to the long time horizons in electric power generation projects, development data is necessarily anecdotal in nature at this point in time, already, there has been a noticeable increase in new IPP projects being developed as well as the entrance into the markets of new developers. Departing from past trends, the IPPs under development are now mostly those under the Renewables Law whereas in the past, the market appetite has been mostly with respect to larger baseload plants.

As envisioned by the policymakers, developments are not just being pursued in Java, but also across both North and South Sumatra, Kalimantan, rural Sulawesi (north and south), but also in much smaller "outer islands" such as Belitung, Lingga, Dairi, Bali, Lombok and Sumbawa. This increase in activity has been at the grassroots level for commercially feasible renewable energy power projects across the country, especially with respect to utilizing the plentiful biomass, abundant lower cost labor, and taking into account the weaker regional distribution grids, and emphasizing a small-scale approach. These include biomass based on rice, cassava, corn, palm, coffee, woodwaste, etc.

Much of the information to date comes from initial discussions with local governments and local PLN, equipment and technical support services providers, and with the Indonesian National CDM Board ("DNA") monitoring early stage applications for carbon credits under the Kyoto Protocol. The plants are more or less uniformly under 10 MW in generating capacity. There has also been an increase in media coverage and industry conference presentations for such developments as well.

The relation to the carbon credit process is especially noteworthy - projects under the Kyoto Protocol's Clean Development Mechanism ("CDM") provide additional revenues for renewable energy projects which offset greenhouse gas emissions. Such CDM revenues decrease the risks associated with renewable energy projects and enable developers to profitably customize and generate plants for small, local offtake. In other words, the small, renewable projects may actually be quicker, simpler, and more financially attractive for individual regions than seeking a larger baseload power plant based on fuels such as coal, thanks to the CDM. Even though the Indonesian DNA itself has been in existence for less than one year, already four CDM projects have already been registered with the United Nations, including a 9.7 MW biomass power plant fuelled by palm oil waste products in Sumatra. As a comparison, the Thai DNA has been in existence for 2 years already but have yet to register a project. The increase in activity under the Renewables Law is in a virtuous reinforcing cycle with the enactment of the decrees since Indonesia's ratification of the Kyoto Protocol in 2004. There have also been at least 24 mini hydro projects currently in development under the PLN-private partnership framework, which are expected to contribute more than 47 MW to the grid over the next few years.

Most of the activities, however, have evolved around private-public partnerships in biomass fuelled energy. The Ministry of Energy and Mineral Resources has been evaluating projects under development which accumulate to more than 145 MW of electricity using biomass sources as diverse as rice husks, palm oil waste, and city waste.

The number of projects taking advantage of the new laws and the biological potential to generate electricity from biomass is increasing rapidly. AES Corporation, one of the world's largest power companies, currently has plans to develop a series of sub-10 MW power plants throughout Indonesia using rice husks and other biomass energy.

N. Bali Biomass Project

For the past 10 years, the demand for electricity in Bali has risen markedly, in part due to the increase of the island's population, which currently stands at approximately 3 million,. Bali has been having difficulties with its electricity supply to support its growing demand in recent years. Continued growth of demand from both the household sectors and the industrial sectors, namely the tourism and garment industries, have fueled this demand. Currently, Bali must depend on Java for much of its electricity. While tourist resorts do have back-up generation, the local communities will come under increasing brownouts and blackouts as PLN struggles to supply the electricity demand. The Bali Biomass Power Project ("Project") is meant to help to alleviate the shortage of supply through the construction of two 9.6 MW rice husk and straw-fired power plants on Bali. The 19.2 MW will be sold to the local grid for local use through a power purchasing agreement with the national utility, while the rest will be used to power the plant itself.

Given its large production of rice, Bali has the potential to generate electricity through the combustion of rice husks, which are often disposed of as agricultural waste. The project aims to utilize the abundance of husks to generate electricity and address the acute shortage. The Project will require roughly 150,000 tons of rice husks. Bali has a more than sufficient supply of rice husks, and what is more, the Project has obtained a commitment from the Rice Association of Bali to provide rice husks up to the entire supply needed, including an offer to arrange for all local transportation and loading, if required. On the financing side, the stability in revenue planning that comes from the Renewables Law has been critical in making the project "bankable". Also, the Project offers three types of revenue streams: the sale of electricity to the grid, the carbon credits sold, and the sale of ash to nearby cement producers. Although there are some factors such as local currency risks and comparatively high tariffs, these factors could also be structured around more constructively.

IV. Conclusion

Economic development is often seen as being at odds with environmental considerations or sustainable development. Especially for emerging economies, one frequently made argument claims that in order to obtain the needed shortfall size in electricity quickly, reliance on large baseload power plants are a pragmatic tradeoff. However, as shown in the case of Indonesia, by a longer-term approach to renewable energy commitments and regional development, policy could encourage the use of renewables, regional infrastructure development, and electric generation. Further, the existing legislative framework sets the tone for market players and signals to them the longer-term direction of the market, thus allowing them to plan for the longer-term perspective within the more immediate term.

Especially in the case of Indonesia, the Renewables Laws are structured to utilize local inputs. Among the thousands of islands of Indonesia, renewable fuels, and in particular biomass, provide a more tied-in local community involvement, and due to the absence of a national transmission grid means that such renewables directly compete with expensive diesel oil. Also, due to the additional factor of CDM revenues, renewables are more practically financeable since they have an additional revenue stream. In such circumstances, biomass is commercially competitive with fossil fuels.

The Renewables Law, by guaranteeing electricity offtake at a certain price and by allowing regional flexibility through private sector involvement, have in less than one year already successfully encouraged the development of local and customized electricity in the various island and regional communities which would otherwise have not been targeted for electrification. As a policy result, the implementation of the projects currently under development should equalize the infrastructure and resources available throughout Indonesia, thereby strengthening the harmonization of regional growth initiatives as well and reducing societal tensions caused by imbalances in regional development. In other words, by encouraging regional flexibility rather than enforcing uniformity, the government has created the basis for a more equal and uniform energy sector thought its vast and diverse economy, ultimately benefiting regional stability, political harmony, the economy, as well as the environment.