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Assessment of independent power producers in Indonesia

Mini hydropower developers in Indonesia operating under
the governments Small Power Producer Program for
Renewable Energy Projects <10 MW.

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Executive Summary

Up until the late nineties, renewable energy (RE) development in Indonesia was largely the domain of the national utility PLN. Numerous large and small-scale hydropower plants and a small number of geothermal projects were developed throughout the archipelago during the 70s, 80s and 90s, mostly financed through soft loans provided by bilateral and multilateral development banks. The emergence of private investment in the RE sector was facilitated by the introduction of government legislation aimed at encouraging private sector participation in order to meet the rapidly increasing energy demands of the country. The legislation provides attractive power purchase tariffs for private suppliers of renewable energy to the PLN grid. Given the favourable climatic and geographical conditions existing throughout many regions of Indonesia, mini hydropower represents the most attractive form of small-scale RE generation. Consequently over the past decade (and in particular since 2009) investment in the small-scale hydro sector has experienced a mini “boom” with numerous projects currently under construction or in the development pipeline. There are a small number already completed and in operation.

The relatively rapid emergence of private sector MHP projects on one hand has triggered increased activity in the sector driving technological development and creating a range of new opportunities for service providers active in the related disciplines. On the other hand, however, it has exposed a number of areas in the project development cycle where there clearly exists a lack of specific know how and experience necessary to ensure that projects are implemented to acceptable technical and financial viability standards.

The purpose of this study was to ascertain what the main hurdles are for small-scale mini hydropower project developers and consider what measures could be taken to alleviate or mitigate these problems. In order to collect the relevant information and experiences to date, IPPs, bank representatives and other relevant persons active in the MHP sector were interviewed. Additionally the interviewers attended a number MHP related events and made a field trip to one of the projects under construction.

Analysis of the IPP situation indicated that overall the developers are well informed about the current government legislation and the feed in tariff / PPA environment. In general they appeared comfortable with dealing with central and local authorities even where procedures could be somewhat laborious. They were also positive about PLNs attitude and support towards their projects with the exception of those having contracts that pre-dated the new feed in legislation (November 2009). For these developers, revision of their agreements in line with current standards is still pending with no clear end in sight. They currently have tariffs <IDR500 / kWh meanwhile their post 2009 counterparts have all secured tariff levels above >IDR 700 / kWh.

For post November 2009 projects, PLN has applied the feed in tariff as per regulation issuing PPAs on average for 15-20 years. Feedback from developers whose projects were in operation, highlighted as the main constraint the reliability of the PLN grid to receive power generated. Due to frequent grid failure, the power producers were unable to sell to the grid during the downtimes with no compensation for lost revenue provided by PLN.

The technical capacity of the IPPs varied significantly. Those supported or sponsored by large established engineering companies didn't complain of lack of expertise and stated that procuring the required engineering did not pose a problem for them. For the smaller developers, however, for whom the majority were new to the sector, the process of securing the required technical expertise for specific tasks was clearly an issue. Notably all projects without exception had experienced time and cost overruns, which in some cases were significant. This fact clearly indicates that there is a tendency on behalf of the developers to underestimate the difficulty and complexity of developing MHP projects.

Engineering services for project preparation was almost exclusively procured locally. There was only one example where international expertise had been mobilized to carry out technical due diligence. For the projects above 1MW in size, electro mechanical equipment was exclusively imported, predominantly from China and to a lesser extent India. For schemes below 1 MW the tendency was to procure locally manufactured equipment with the exception of the imported generators. Only time will tell whether this is a prudent approach in terms of overall efficiency and long-term reliability of the projects.

The government's role in private sector energy projects includes issuing the necessary approvals and permits for the various project elements. The Ministry of Energy and Natural Resources (ESDM) at central level issue the energy generation permit (IUKU) upon completion of the project. Meanwhile district government is responsible for issuing the appropriate business license, land use permit and approving the environmental impact management & mitigation plan. District authorities also assist in facilitating land acquisition with local communities. The general consensus from the IPPs was that local governments were constructive and supportive of their initiatives and whilst the administrative process was sometimes overly cumbersome and time consuming, overall they did not perceive this as being a major obstacle. Moreover recent streamlining measures implemented at district government level whereby a "single window" permit issuing authority handles multiple permit requests was noted as having a significant effect on easing the administrative burden. The most complex aspect of project preparation on a technical level was that of land acquisition particularly where it involved individuals rather than formal institutions (such as government).

Regarding financing, in response to the increased interest in the sector, a number of Indonesian banks are now involved in financing projects in the <10 MW size range. Bank Bukopin and Bank Mandiri in particular already have portfolios of MHP projects on their books. They are applying conventional project finance models and don't currently adopt any special financing programs geared specifically for RE projects. They are able to finance up to 70% of total project cost and on average provide grace periods of 2 years. Interest rates applied are between 11-13%. Banks will only consider project proposals where the developer already has a signed PPA with PLN. Their collateral requirements are relatively demanding and risk becoming more so due to the high rate of projects experiencing cost and time overruns. As collateral the banks require either cash or property assets. They conduct stringent analysis of the potential borrowers credit credentials and in particular assess the credibility of individuals perceived as primary sponsors of the enterprise.

The majority of IPPs had entered into agreements for the sale of CERs with various organizations and companies active in CDM trading. Unfortunately due to the plunge in the price paid for CERs over the

past years, IPPs deem this not sufficiently attractive to warrant the transaction costs incurred, hence their enthusiasm for pursuing this in the future has dropped significantly.

With regard to alternative sources of financial support from national and international financial institutions, although there have been a number of organizations exploring possibilities for engaging in the sector, these have so far not materialized into anything tangible.

In conclusion, the mini “boom” currently underway in the MHP sector is testament to the vastly improved legislative environment that now prevails in Indonesia. The relatively attractive tariffs have attracted investors from a variety of backgrounds to enter the market. Some of these developers are supported by large engineering companies having track records in the hydropower sector, however, the majority are newcomers to the business. As a result it is very apparent there are numerous areas of project development where developers have underestimated the degree of difficulty resulting in the very high percentage of cost and time overruns. To what extent these shortfalls and deficiencies will impact the performance of the schemes will only be apparent after they have been in operation for a reasonable period of time. There will certainly be a lot more empirical data available for analysis over the next 5 years.

What is undeniable is the impact the presence of so many MHP projects is having on the local MHP equipment manufacturing and service provider sector. Demand for local solutions particularly for electro mechanical equipment for schemes in the <1 MW size range is driving technological development amongst manufacturers engaged in the sector. Other related engineering disciplines are also acquiring experience all of which will contribute to enhancing the quality of future projects.

The legislative environment has evolved enormously over the past decade. Whilst not perfect, it clearly provides adequate incentive and a satisfactory legal basis to attract investors. PLN has also embraced the governments RE agenda and is clearly supporting private sector initiatives.

This upswing in private sector activity has in turn has triggered the involvement of local banks to participate in project financing. Although not yet specifically geared to the nature of RE projects, their willingness to consider MHP proposals represents a major step forward from earlier times. Nevertheless the collateral requirements they demand implies that for small fledgling developers without the backing of large asset rich sponsors, securing loan finance is still the biggest hurdle they face. Unfortunately efforts from a variety of national and international financing institutions to engage with local banks to create special financing facilities targeting this group have so far failed to progress beyond exploratory stage.

The Indonesian mini hydropower sector although still in its relative infancy is moving very quickly. There are a multitude of areas where improvements still need to be made. The coming years when the majority of schemes currently under construction will go into operation will provide a valuable source of empirical data on the actual technical and financial performance of the projects. Analysis of this data would be complimentary to the findings of this study and provide a valuable basis for defining appropriate support activities to further enhance the Indonesian MHP sector into the future.

1 Introduction

Following the introduction of government legislation in 2002 which made it possible for private renewable energy (RE) producers to generate and sell electricity to the national utility (PLN), there have been a number of revisions to this legislation making it more attractive to private project developers. Nevertheless, there are still numerous elements within the project development process that still require attention if it is to fulfil the expectations of both the Indonesian government and other national and international stakeholders supporting renewable energy development in the country. The existence of a suitable regulatory and legislative framework is paramount to the success of any national renewable energy development program. It's evolution in a country the geographical size and political complexity of Indonesia requires patience and a judicious assessment of key factors to ensure the interests of all stakeholders are adequately addressed and considered. Although in Indonesia this is still a "work in progress", there does already exist a number of projects at varying levels of completion. The collective experience and knowhow acquired by these project developers on the challenges of actually implementing commercial MHP projects in Indonesia represents an important resource for future renewable energy stakeholders in particular future MHP project developers. It is therefore important that this information is collected and documented whereby enabling it to serve as a usable resource for future stakeholder initiatives in the sector.

As mentioned above, the current legislative framework governing private renewable energy generation and supply, has evolved since 2002. The most recent fundamental changes effecting renewable energy and in particular the mini hydropower sector were introduced under Ministerial Decision No.31 in 2009. This law defines the tariffs to be paid for private renewable energy producers between 1 – 10 MW in size throughout the country. A baseline tariff is defined applicable for projects on the islands of Java and Bali. For the outer islands an increase factor is applied which varies depending on PLNs generation costs in these regions. The more remote inaccessible islands where dependency on diesel generators is high command higher tariffs than regions with more established energy infrastructure. Initiatives to harness renewable energy sources in the country have been gaining momentum since the introduction of this legislation.

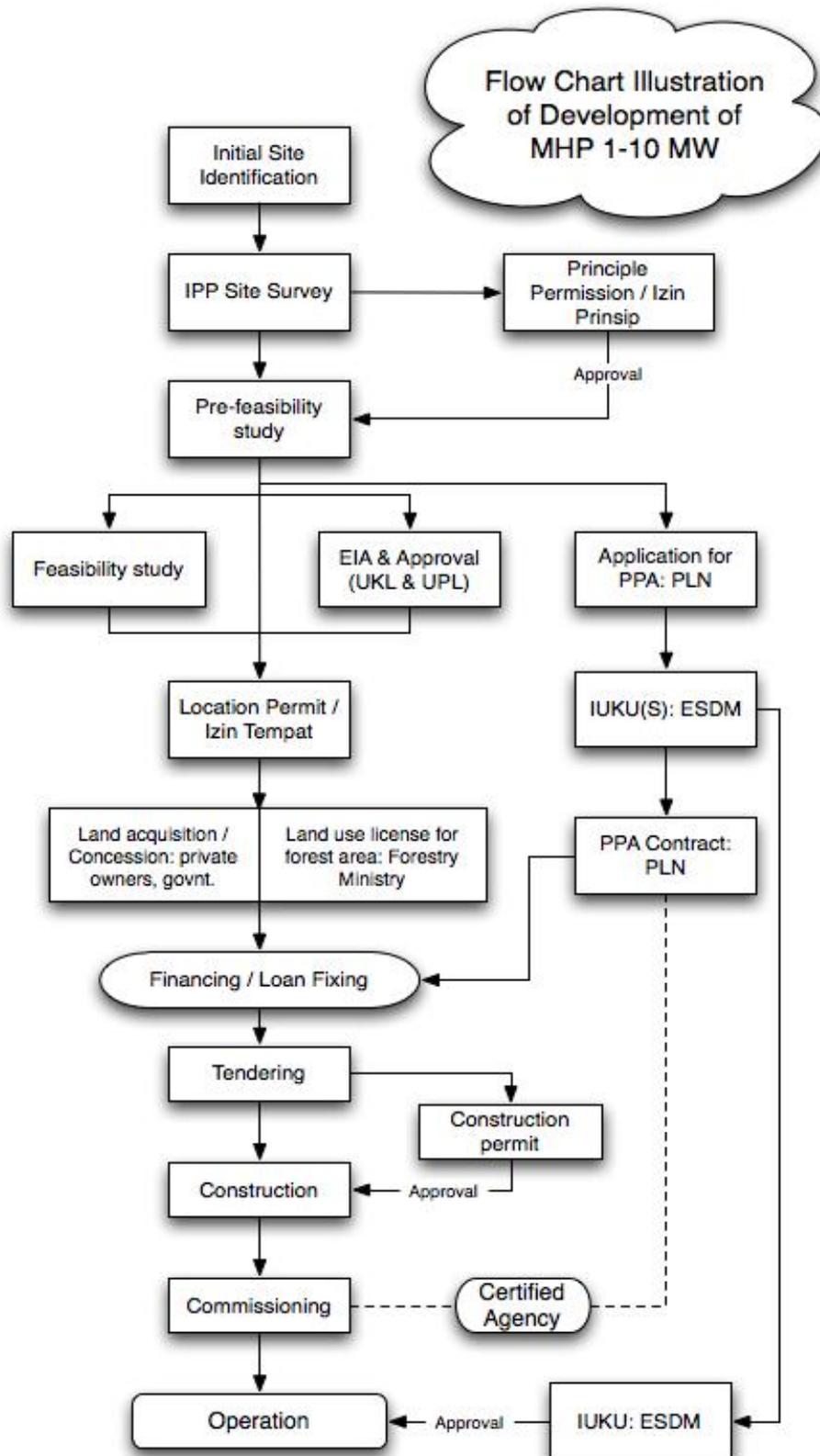
In order to assess what the current status of private sector MHP development is from as diverse a perspective as possible, as part of their "Mitigation Momentum" program, ECN commissioned a study to assess the prevalent situation of IPPs operating under the renewable energy small power producer program. Between April and July 2013 a total of 7 private project developers involved in 8 different projects were interviewed in order to collect as much information as possible relevant to their experiences in planning, implementing and operating their projects. Of the 8 related projects, 2 were already in operation and 6 were at an advanced stage of construction. Of the 8 projects, 4 PPAs were signed prior and 4 after the introduction of the 2009 legislation. They range in size between 0.4 – 8 MW and are located throughout 5 provinces.

Additionally representatives from 3 local banks were interviewed in order to ascertain to what extent the banking sector has participated in the recent increase in MHP projects being developed in the country, whether they adopted special conditions for this type of project and what their overall opinion and perspective was towards RE projects in the future.

To further compliment the findings derived from these sources, a number of representatives from various NGOs, forums and associations engaged in the MHP sector in Indonesia were also interviewed. A number of MHP events and presentations where representatives from IPPs were present were also attended. A detailed table of the interviews and events attended is included under annex 3.

The following flow chart (fig. 1) provides the reader with a reference on the various steps and requirements in the development of an MHP by a private Independent Power Producer (IPP) under the current legislation.

Figure 1: Flow chart showing the development process of a MHP project under the RE small power producer program



Report Structure:

The main findings from the interviews conducted have been arranged under 3 main thematic categories namely:

1. Independent Power Producers (IPP) & Developers
2. Government Institutions
3. Financial Institutions

Additionally, summarized conclusions are presented under section 4.

Factsheets for each of the interviews made are included as annex 2 to the report.

A summary matrix listing the various stakeholders, actions, conclusions and some preliminary recommendations for possible activities addressing the perceived shortfalls in the program at present is included as annex 1.

2 Independent Power Producers (IPP) & Project Developers

General

The technical capacity of the IPPs interviewed varied greatly. Some of the IPPs are supported by large engineering conglomerates enabling them to draw on the extensive in-house engineering and financial resources these companies have at hand. These tend to be involved in larger scale projects and indicated they do not have difficulty in sourcing the required engineering know how for their needs.

There are also numerous smaller sized companies having entered the MHP sector. Some of these companies have experience in the energy sector, however, predominantly in conventional power generation projects.

Overall the hydropower specific experience of IPPs is limited. This fact is reflected in the relatively high rate of problems and difficulties they experience. It is clear that the IPPs overall underestimate the inherent technical and non-technical complexity of developing MHP projects in geographically and socially challenging environments.

To qualify as an Independent Power Producer (IPP) entitled to sell power to PLN, private companies must fulfil a range of criteria. The approval procedure requires the companies to obtain approvals at central, provincial and district government levels. Additionally the contracting process requires them to deal with PLN at Central, Regional and Branch level. A list of the approvals required by IPPs arranged under different categories is included as annex 4.

Project Preparation

Feed back regarding project preparation varied significantly with some developers claiming this was not problematic whilst others indicated a lack of available expertise to carry out quality site assessments, feasibility studies and detailed engineering designs.

Information regarding access to relevant site material such as topographical maps and hydrological data was varied. Developers unanimously agreed that recent developments and improved access to topographical maps, satellite images (google earth etc.) had improved enormously over the past 5 years making desk studies a much more viable option as a first stage of project development.

Access to accurate hydrological data, however, clearly represents one of the most problematic aspects of project preparation. Although the Government does have gauging stations installed in many rivers, the quality of the data kept by the authorities overall was reported as being poor with many gauging stations in a state of disrepair and therefore not able to provide qualitative data of any use.

Many of the developers interviewed informed that detailed engineering designs were often changed over the course of the construction as a result of on site conditions encountered. Most of these were related to the civil components. Sometimes the positioning of civil structures had to be changed due to land acquisitions problems. Landslides triggered by excavation works were also a common problem experienced by developers. These factors indicate the level of detail of feasibility studies is likely lower than it should be and subsequent technical due diligence procedures are not given sufficient priority at project preparation stage.

Project Implementation

Firstly, the most notable feed back from all the IPPs interviewed was the fact that all projects experienced time and cost overruns, some of which were significant. As mentioned earlier this clearly indicates the tendency of developers to underestimate the level of difficulty of their projects.

Of most concern for developers were the time overruns because of the effect they had on cash flow and liquidity. Loans from banks are disbursed based on progress in the field. Where delays occur with limited progress achieved and fixed monthly operational costs continue to accrue, a squeeze on liquidity can result. This situation was reported as being one of the most critical obstacles faced by developers.

Engineering services for all stages of project development are almost exclusively procured locally. Only one developer interviewed had used external knowhow in the form of a value engineering / technical due diligence consultant. The larger companies possess in-house technical capacity for carrying out feasibility studies and detailed engineering designs, whereas the smaller less experienced developers tend to sub contract specific project components to local consulting and engineering companies. Many of these companies are based in Bandung, a city well known for its surveying and MHP engineering knowhow.

Electro-mechanical equipment for the larger projects (>1 MW) was predominantly imported from China or India. Developers stated that past experience was a major factor in selecting their supplier. The smaller projects (<1 MW) tended to use locally manufactured turbines and control systems combined with imported generators.

Some of the smaller developers complained about the lack of availability of specific MHP expertise for work at key stages of project preparation. The general feed back from the developers, was that whilst for some specific requirements, sourcing the required technical expertise can be problematic, overall

the technical aspects of project development don't pose a significant problem compared with other aspects such as financing.

To what extent the previous statement is valid and how well exactly detailed engineering has been carried out can only be effectively assessed once projects go into operation and their actual performance can be compared with that of the engineering design. As most of the projects of developers interviewed are still under construction, this assessment will only be possible in the future (most projects should be completed in 2013).

Project Operation

Of the developers interviewed, only 2 had projects in operation. The remainder were still under construction at varying levels of progress.

IPPs who had successfully commissioned their plants found the process relatively simple and easy to arrange, however, complained about the cost. The relatively few organizations being certified to undertake commissioning means they effectively command a monopoly.

The process of commissioning requires that a certified organization (most commonly PLN – LMK¹) is contracted to carry out commissioning after which a certificate stating the plant is technically fit to operate (Sertipikat Laik Operasi) is issued.

Once operational, the most common problem experienced by the 2 operating projects is the limited availability of the PLN grid to receive the power generated. The nature of many mini hydropower schemes means that they are mostly located in remote locations. Exactly this type of location is normally where the PLN grid tends to experience problems and the frequency of grid down time is at its highest. Moreover, even when the PLN grid is operating, frequent tripping as a result of unstable grid voltage remains a common occurrence.

Regarding administrative issues, feedback from all operational IPPs was that the meter reading and payment procedure applied from PLN was satisfactory. There were no serious complaints that PLN deliberately delayed payments or attempted to avoid their financial obligations.

3 Government Institutions

Local Government

With the majority of approvals for MHP projects being issued at district level, the role of the district government is extremely critical. Without a constructive and supportive district government, it would be impossible for an IPP to operate effectively.

The local government situation can vary enormously between one district and another. The level of support from local authorities depends on numerous factors such as their general understanding of the

¹ LMK is a technical certification unit established and operating within PLN. Besides furnishing PLN with its services LMK also can be contracted by private sector to conduct commissioning of power plants.

sector, attitude to IPPs and outside investors, human resource capacity to process necessary permits and their general commitment to the governments national renewable energy development program.

In general district government's knowledge of MHP projects is more associated with community based "stand alone" rural electrification projects. The development of on-grid commercial MHP schemes by IPPs is something relatively new for most provincial and district governments. Consequently their appreciation of the long-term characteristics of these projects and the implications this has on operational aspects is still somewhat lacking. This situation can lead to unrealistic expectations and demands being placed on the developers. A number of developers cited examples where this had happened, although overall the IPPs interviewed did not complain about lack of support provided from government authorities at provincial or district level. In general they were very positive about their supportive and constructive attitude towards their presence. They were comfortable with dealing with local authorities and local communities even though sometime their demands could be complex and irrational.

The recent introduction of an Integrated Investment and Permit Approval Centre (Pusat Penanaman Modal dan Perizinan Terpadu) at district level, was welcomed by developers as a significant help in arranging the various permits and approvals required. This "single window" concept according to the IPPs, reduces time and cost of securing the required permits, which otherwise can be cumbersome and time consuming. Annex 4 provides a list of all the various permits required by an IPP before being able to go proceed with the construction of a MHP.

Without question the most problematic aspect of project development at field level faced by developers is the issue of land acquisition. Once again the situation encountered by IPPs can vary enormously from one region to another where location specific cultural and economic factors come into play. Where land is state owned, local government are entitled to issue long-term lease concessions to developers. These are usually for 20-25 years and extendable at the end of the lease term. Where plans encroach into areas of protected forest, approval from the respective ministry is required prior to concessions being awarded. One IPP had even successfully negotiated permission to construct a project within a National Park area² highlighting the fact that given the right approach is adopted, obtaining the necessary permits etc. can be achieved even in difficult environments. Although often lengthy, land acquisition procedures and costs via government authorities are at least relatively predictable.

The more complex and unpredictable land acquisition arrangements are usually where privately owned land is involved. Private landowners often attempt to maximise their return by demanding unrealistic and irrational sums for land if they know it has a strategic value for the developer. This happens even where land is non-productive and of relatively low value.

² National Parks are the most protected areas in Indonesia having tougher restrictions than protected forest areas for example. This is because they are normally home to protected species and consequently come under the auspices of international regulations governing fauna and flora protection.

Of the 8 eight projects assessed, surprisingly there was only one example of where the local district government were involved directly as a stakeholder rather than simply an administrative authority. The respective project had agreed a revenue sharing arrangement whereby the local government were entitled to 10% of total project revenue against the provision of a 20 year concession for the land upon which the the project was constructed. Other developers questioned on the viability of adopting such a concept viewed the idea as positive and potentially a means of generating greater ownership on behalf of the local authorities.

Central Government

Following the introduction of the legislation in 2009 (Ministerial Regulation No. 31 2009) governing the critical issues of a) *Feed in Tariff* (FIT) and b) *Power Purchase Agreement* (PPA), the development and operation of schemes by IPPs has become much clearer and transparent.

The continued shift of authority and responsibility to provincial and district governments as part of the government's decentralization policy, the role of central government within the small-scale private renewable energy program has become relatively small.

ESDM at central level is only involved in issuing the temporary and permanent "license to generate power for public use" (Izin Usaha Ketenagalistrikan Umum Sementara [IUKUS] and Izin Usaha Ketenagalistrikan Umum [IUKU]). This requires the project developer to submit a formal request to the Directorate General for Electricity and Energy Utilization. Upon issuance of the IUKU, the subsequent steps of developing the project are administered at regional and district level.

Of the developers interviewed, all were in possession of a valid IUKU and stated that the process of securing this licence was uncomplicated, transparent and relatively fast. None had experienced any difficulties in in fulfilling the requirements.

PLN

The objective of establishing a specific program for small-scale renewable energy developers was to streamline procedures with the adoption of standard power purchase agreements including fixed and clearly defined tariffs. PLN has traditionally tended to drag its feet on issues of fundamental policy change imposed by ESDM and during the early years following the introduction of the first IPP RE program they were slow to embrace this initiative. However, following the gradual evolution of a program more compatible with the multiple stakeholders in Indonesia, PLN have made a genuine commitment to support this program. PLN's consistent adoption of the 2009 legislation is proof of this.

All post 2009 IPPs interviewed stated that negotiations with PLN were very straightforward and uncomplicated with PLN adopting the tariff as per the regulation and providing Power Purchase Agreements (PPA) for terms of between 15 – 20 years. This fact implies that PLN are fully familiar with the legislation and indicates full compliance from PLN towards the legislation.

Unfortunately there are still 13 projects existing that precede the introduction of the current legislation. These early projects were already planned and implemented under legislation formulated in 2002 governing projects up to 1 MW in size that was subsequently expanded to encompass projects up to 10 MW in size³. PLN claims it is legally not able to simply transfer these “pre-2009” projects under the coverage of the new legislation. As a result these projects remain in a “grey zone” with nobody really knowing what to do with them.

To address this problem, on 16th August 2012 PLN issued a directive (431-1.K/DIR/2012) stipulating 13 IPPs deemed to be “terkendala” (problematic) as a result of the defined purchase tariffs applied by PLN being well below those of the post 2009 IPPs. The majority of the 13 problematic IPPs have purchase tariffs below IDR 500,000 / kWh, significantly less than the IDR 787 /kWh that IPPs in Sumatra for example are currently receiving. This is purely because they negotiated their contracts under the old legislation governing renewable energy projects pre 2009. Ironically this effectively means that the early project developers are being punished for being the pioneers of the small renewable energy power producer program.

Although PLN appointed an internal team to find a solution to this problem, as of mid 2013 almost 1 year after the issuing of the directive, little progress has been made much to the frustration of the developers. The consequence is that these projects continue to be bound by the contractual conditions they initially agreed, thus inflicting irretrievable financial losses on these companies which continue to accrue as long the issue is not settled.

4 Financial Institutions

Local Banks

The vast majority of developers interviewed cited mobilizing finance as the main hurdle they faced in developing their projects. The unconventional nature of RE projects and limited opportunity for private sector participation has meant that Indonesian banks have traditionally not been active in the sector. The emergence of the small private power producer program over the past decade has changed this situation. Entry into the MHP sector by a number of large-scale engineering conglomerates has brought with it banking sector involvement. Moreover the relative boom in the number of projects particularly following the introduction of more attractive feed in tariffs in 2009 has resulted in a significant number of <10 MW MHP projects being financed by local banks.

Representatives from 3 different banks were interviewed as part of the study. These banks were Bank Muamalat and Bank Permata in Bandung and Bank Bukopin, Jakarta.

The larger Indonesian banks such as Bank Mandiri and Bank Bukopin already have portfolios of MHP projects currently under finance. These are handled by their “Energy Project Division⁴” for loan amounts

³ This legislation was called PSK Tersebar and stipulated tariffs for inter-connection at low and medium voltage. This legislation was later superseded by a new law which defined that tariffs were to be calculated based on PLNs HPP.

⁴ Based on information from Bank Bukopin.

above IDR 25 milyar (approx. US\$ 2.5 million) whereas for amounts below this figure the Usaha Kecil & Menengah (UKM – Small and Medium Enterprises) department is responsible for handling loan requests. It was notable that the “syariah” division of Bank Mandiri was active in financing a number of MHP projects. Feed back from one developer indicated that the “syariah” approach actually lent itself more favourably to the characteristics of financing renewable energy projects than conventional banking approaches. Syariah banks see themselves much more as a stakeholder in the ventures they support rather than purely a provider of finance. This approach is deemed as being more compatible with the long-term nature of commercial renewable energy projects and in particular MHP projects.

All the banks interviewed stated that handling for renewable energy proposals was conducted essentially along the same lines as normal conventional project finance. Nevertheless, due to the perceived risk of the sector, slightly higher interest rates can be applied. The actual lending terms are ultimately decided on a “case to case” basis depending on the specific characteristics and situation of the individual developer and project. The banks cited the unpredictable nature of MHP projects as being the main factor increasing the perceived risk from their perspective. Reliance on natural resources such as fluctuating stream flow makes accurate future revenue calculation and subsequent financial analysis more speculative and therefore more risky in the eyes of the banks. This is a situation that they are not familiar with.

Moreover, Bank Bukopin reported that from approximately 10 projects within their MHP portfolio, all had or were experiencing time and cost overruns, some of these significant. This factor had clearly raised their awareness to the somewhat unpredictable nature of RE projects with the result that Bank Bukopin had imposed an additional requirement on lenders to deposit 20 – 30% of the total borrowed amount in a deposit account with the bank as a form of additional guarantee. Favorable interest is paid on these deposits with the exact amount and terms of this deposit decided by the bank’s loan commission, who convene periodically to assess the various proposals.

As a basic rule of thumb they considered investments of between US\$ 1,500 – US\$ 2,000 / kW installed capacity as being potentially bankable. Financial Internal Rates of Return (IRR) of at least >15% for this type of project are required for it to be considered financially attractive.

To qualify for receiving a loan, the banks define relatively stringent criteria. The borrower must be able to provide collateral with a value at least equal to the loan amount. This is legal requirement and exceptions can only be made for State Owned Companies (BUMN) where the respective approval from the Government is provided. Collateral can be in the form of firm assets such as property or simply cash deposits. Additionally and it seems more importantly from the perspective of the banks, they need to know detailed information about the company and its shareholder base and structure and above all, who are the main sponsors of the potential borrower. Where large established companies with significant financial clout are behind the borrower then banks are clearly more willing to consider their proposals and be more flexible on lending conditions.

Given this environment, it can be deduced that whilst banks are willing to participate in the sector, the companies able to secure loans under the current conditions imposed by banks are largely limited to those who would anyway be able to mobilize the equity capital if really required. It is clear that small-

scale companies with limited financial resources would struggle to secure finance from a conventional bank loan program under current lending conditions. Moreover, the negative experiences of time and cost overruns as described earlier, resulting in more stringent qualification criteria being imposed will make this even more difficult for fledgling companies in the future.

The lending conditions provided by the banks are similar to more conventional projects. The following is a summary of the lending terms based on feedback from the interviewed banks:

- Interest rate: 11 – 13%
- Loan term / payback period: 5 – 7 years
- Grace period: 2 – 3 years
- Maximum loan to equity ratio: 70 – 30

The above figures are indicative and reflect the average lending conditions applied by banks. The exact figures applied obviously depend on various factors specific to the individual project in question.

Given the relatively long construction period of MHP projects, banks can also provide Interest During Construction (IDC) to enable borrowers to furnish the interest requirements of the loan prior to the flow of revenue from energy sales.

Interest rates applied are also variable over the course of the loan period, gradually decreasing as the amount of loan reduces.

The banks also impose restrictions on the use of loan capital for specific project components. Project components not eligible for loan financing include:

- Pre and full feasibility studies
- Land acquisition

These restrictions in particular the restriction on land purchase become very relevant when considering the additional bank requirement that all construction of project facilities can only be carried out on land legally owned or leased by the borrower. This implies that the borrower must be financially in a position to secure the full acquisition of land required for the project prior to financial closure with the bank.

Project feasibility study and detailed bill of quantities of the proposed project are assessed by the bank by commissioning an external consultant / specialist at the cost of the potential borrower. If a loan is approved, the bank will disperse the loan in tranches in accordance with the rate of progress of construction. To verify the level of progress prior to subsequent disbursement of the loan, the bank commissions a technical consultant to conduct on site assessment of the project, the costs of which are paid by the borrower.

To date the only renewable energy project they have received have been for mini hydropower projects.

Non Bank Financial Support Programs

With the exception of the Clean Development Mechanism (CDM), a mechanism developed as part of the Kyoto Protocol aimed at supporting developing countries reduce their green house gas emissions, there is no evidence amongst the IPP community of any third party programs having provided any tangible assistance to the sector to date.

The majority of developers interviewed had entered into CDM arrangements with a third party company brokering the sale of Certified Emission Reductions (CERs). In its early days the CDM mechanism was well received by project developers as it provided them with additional complimentary funds. In cases where payments were made up front, these payments effectively helped subsidize their investment to some extent (refer PT. AMS – MHP Salido Kecil, West Sumatra).

Following the end of the Kyoto Protocol in 2012 the attraction of participating in the CDM program has diminished drastically. The price of CERs has dropped from levels of EUR 5 at the start of the program to EUR 0.3 as of 1st quarter 2013 effectively removing it as a financially attractive complimentary program for IPPs.

For example PT. Fajar Futura Energi Luwu (FFEL – 2.4 MW) participated selling CERs in 2008, however, now stated they are not interested in pursuing this due to the low price currently being paid. They informed that at current price levels the costs incurred in verification process does not justify the effort and is therefore not financially viable.

Feedback from IPPs interviewed highlighted 2 areas where outside assistance would be appreciated and welcomed. Without question the main complaint IPPs had was the difficulty of securing finance for their projects. To a lesser extent, however, still very relevant particularly for the smaller developers was access to technical expertise for specific components of project preparation and construction.

With regard to initiatives to improve access to finance for developers, Bank Bukopin informed on efforts from a number of organizations aimed at establishing a form of guarantee fund in collaboration with local banks. The government organization Pusat Investasi Pemerintah (PIP) had in the past explored establishing such a guarantee program, however, this had not materialized. Bank Bukopin had discussed possibilities for such a loan guarantee program with IFC - World Bank, however, these had not materialized beyond a preliminary stage and have since been dropped. Negotiations on a similar concept with the French organization ARD, however, were on-going and progressing satisfactorily.

Nevertheless the fact remains that even after numerous initiatives to establish some form of financial stimulus program in the form of a bank guarantee fund enabling the respective banks to relax somewhat their quite stringent lending criteria, no tangible progress has been achieved on this front to date.

5 Conclusions

The following is a brief summary of the conclusions drawn based on the information acquired during the study.

General

- There has been a mini boom in the <10 MW MHP sector, and in particular since the 2009 legislation providing transparent and relatively attractive feed in tariff policy.
- There are currently numerous projects under construction and at planning stage, however, still relatively few that are fully operational, thus there is still little empirical data on actual performance of projects.
- Land acquisition especially where it involves privately owned land is one of the most problematic and complex hurdles experienced by developers.
- So far there have been no contributions from third party organizations, development projects etc. that have had any tangible impact on enhancing the developers projects.

Technical

- The majority of MHP projects are still under construction therefore actual information on performance of these projects can only be assessed they have been in operation for a reasonable period of time (at least one cycle of seasonal performance).
- There is sufficient information acquired from interviews and observations during site visits of on-going projects to suggest that quite some technical deficiencies exist within the designs.
- In general there is a relatively good local engineering capacity available for handling <10 MW projects, however, a reluctance to compliment this with international expertise.
- The vast majority of projects to date experience both time and cost overruns indicating a fundamental under estimation of the technical and institutional challenges of such projects.
- Local engineering and manufacturing capacity exist for projects at the <1 MW size range, however, imported equipment is predominantly used for schemes above this size.
- Imported Chinese electro-mechanical equipment is most favoured by developers due to its competitive price and relatively good performance characteristics.

Policy

- The introduction of the Ministerial Decision No 31 in 2009 and has a major impact on encouraging private sector involvement in the sector primarily due to the transparent method of feed in tariff calculation. This has created a much more conducive and financially attractive environment for IPPs.
- The process of securing a licence to produce and sell power (IUKU) at ESDM in Jakarta functions well.
- The permit process at provincial and district level although somewhat cumbersome does not represent a major problem for developers. They are comfortable dealing with authorities at this level.
- The recently introduced “single window” permit facility established at district government level helps significantly in streamlining and accelerating the processing and acquisition of the necessary permits.

PLN

- PLN is embracing the small power producer program and adopting a constructive approach in dealing with IPPs.
- PLN is applying the defined tariffs and PPA conditions consistently and in accordance with the current legislation therefore IPPs are not required to negotiate these conditions with PLN.
- Negotiating with PLN on a bilateral basis is extremely difficult due to the size and hierarchal management structure. The tight scrutiny of all aspects where contracts and tariffs are concerned further compounds this situation.
- The high level

- PLN still needs to find a solution for the IPPs (approximately 13) having pre-November 2009 signed PPAs. The related IPPs are becoming increasingly frustrated by the lack of progress in solving this long-standing issue that threatens to undermine the reputation of the program.
- Operational IPPs do not experience problems with PLN on contractual and payment related issues. PLN pays punctually in accordance with the terms of the contract.
- The main complaint from IPPs regarding PLN was the relatively low grid availability. This is due to both grid down time and periods when low grid voltage does not permit inter connection of embedded generation such as the MHPs. One developer reported their average monthly down time as a result of restricted grid access was 20%.

Finance

- There are already a number of Indonesian banks financing MHP projects although they are financing them under normal project financing facilities.
- Banks consider investment costs of US\$ 1500 – US\$ 2000 / kW installed capacity as bankable.
- Financial Internal Rates of Return (IRR) in the > 20% as are considered attractive, however, with costs overruns experienced by many of the projects financed, IRR levels drop below this figure.
- None of the banks currently have any special programs or conditions that are applied for MHP or renewable energy projects in general.
- The relatively stringent lending conditions applied by the banks means that its only possible for companies having strong financial support from larger parent or partner companies to secure a loan.
- It is very difficult for small-scale developers with limited financial resources and collateral to secure a loan for a MHP project.
- The extent to which on-going MHP projects have experienced cost and time overruns does not bode well for convincing banks to adopt more accommodative policies for RE projects in the future.
- The fact that bank loans if secured cannot be used for project preparation (feasibility study, etc.) activities and land acquisition means that significant up front equity is required by developers. This represents a disincentive for investors.
- The Clean Development Mechanism (CDM) initially was well received by developers with almost all having sale agreements with CDM brokers, however, this is now of little interest to them due to the very low price.
- There have been exploratory efforts from various national and international finance organizations looking into the possibility of establishing a form of “guarantee fund” in collaboration with Indonesian banks, however, none of these have so far come to fruition.

6 Annexes

Annex 1: Summary Matrix

Stakeholder:	Actions:	Characteristics:	Legislative	Technical Aspects	Finance
1. Government policy makers (Indonesian Ministry of Energy – ESDM):	Introduction of favourable renewable energy policy encompassing feed in tariffs and power purchase agreements.	<p>Limited experience in dealing with private sector projects. Often unwilling to fully enforce conformance with government policy by PLN.</p> <p>Legislation introduced by the government is not always in line with the aspirations of the state utility PLN potentially leading to misinterpretations.</p>	<p>Conclusion: The prevalent legislative environment has improved significantly following the introduction of the most recent law defining tariffs in 2009. In general the private sector developers are familiar with its content and requirements, nevertheless particularly for less aware regions further socialization efforts would be valid.</p> <p>Recommendation: Media (website, printed, etc.) providing clear guidelines of procedures to be followed by IPPs and PLN would provide IPPs, district governments, PLN and other involved institutions with a clear and transparent reference to follow, particularly in regions where less experience exists with this type of project.</p>	<p>Conclusion: ESDM are sufficiently familiar with the type of technology involved for MHP projects in the 1 – 10MW range although they don't have any direct involvement in technical issues of IPP projects</p> <p>Technical due diligence / value engineering is currently a very weak part of the implementation process whereby there is limited control over the IPPs technical design. In some cases this leads to sub optimal harnessing of resources.</p> <p>Recommendation: Ultimately it is in the interests of the government to ensure that IPPs develop natural resources optimally therefore a strategy on how to enforce proper technical standards are achieved is required. Given that the technical capacity of local government to enforce this is very limited, ESDM needs to explore how proper technical standards via a due diligence process be can be more effectively enforced in the future.</p>	<p>Conclusion: ESDM are not involved in aspects of project finance for IPPs beyond hosting various renewable energy support programs financed from foreign development organizations or financial institutions. ESDM does not have close connections with financial institutions and its capacity to influence and participate in project finance related issues is currently very limited. It is not particularly well informed on financial support programs for RE projects and is not able to advise potential IPPs on any finance related aspects.</p> <p>Recommendation: ESDM should be adequately informed on financing programs offered by local and international banks and other financial institutions in the country allowing them to facilitate the dissemination of this information. They should be furnished with relevant material allowing them to disseminate this as appropriate.</p>

Stakeholder:	Actions:	Characteristics:	Legislative	Technical Aspects	Finance
2. Local Government Authorities (Provincial and District – Pemprov & Pemda):	<p>They have the authority for issuing the numerous permits including ijin prinsip (principle agreement) required by IPPs at local level.</p> <p>They are responsible for facilitating land acquisition from private and state owned entities and mediating during this process.</p>	<p>In general they are not very familiar with commercial MHP projects and the specific characteristics of these projects and have limited specific knowhow and human resources to handle and deal with them. Nevertheless they are usually keen to encourage investors to invest in their districts as they view such projects as a potential source of revenue / PAD (Pendapatan Asli Daerah).</p>	<p>Conclusion: Local governments in general could be better informed about the most recent legislative developments and the importance of renewable energy projects as part of the countries national energy policy.</p> <p>There still remain numerous grey areas regarding responsibilities for the various approvals and standard procedures (example standardized process of calculating water rights payment / retribusi air) etc. This sometimes leads to misunderstandings between developers and local authorities</p> <p>Recommendation: Media (website, printed, etc.) providing clear guidelines of procedures to be followed by IPPs and at district level district governments, PLN and other involved institutions with a clear and transparent reference to follow.</p>	<p>Conclusion: Local governments are not very familiar with MHP technology and do not always appreciate that these projects are developed based on a long-term perspective of >25 years. This leads to unrealistic expectations from local governments when negotiating issues such as land acquisition, concession etc. with IPPs.</p> <p>Recommendation: Awareness building initiatives targeting local governments should be conducted aimed at familiarizing them with the specific nature of MHP projects. In particular their dependency on a sustainable and well functioning natural environment and the relatively long lifespan of a MHP project and the implications this has on aspects such as investment payback, preservation of catchment area etc.</p>	<p>Conclusion: Local government has very little knowledge of finance related aspects of MHP projects. The majority of existing projects have or are being developed by Jakarta based IPPs whereby financing is arranged almost exclusively at Jakarta level.</p> <p>There is only one example of where local government has actively taken a stake (effectively as a shareholder) in a project rather than playing the role of administrator. Given that the nature of MHP projects lends itself very favourably to involving municipalities as shareholders, this is still an unexplored opportunity.</p> <p>Recommendation: To provide examples and references for district governments to apply in the development of future projects, media (printed, video, etc.) presenting examples of progressive and innovative ownership models should be prepared and disseminated as a means of generating ideas from local authorities.</p>

Stakeholder:	Actions:	Characteristics:	Legislative	Technical Aspects	Finance
<p>3. National Electricity Utility (PLN):</p>	<p>They are a very large national utility of extremely high strategic importance. They have a monopoly in the supply of electricity in the country.</p>	<p>They still adopt very traditional management principles and structure.</p> <p>Due to their position as a state owned utility and their size it is extremely difficult for small-scale energy producers to negotiate favourable conditions unilaterally (David and Goliath scenario)..</p>	<p>Conclusion: It is extremely difficult for IPPs to negotiate any issues related to their contracts on a bilateral basis with PLN at central level and regional representatives are reluctant to negotiate sensitive issues such as tariffs without the support of headquarters. This often results in a stalemate situation therefore following standard policy avoiding negotiation with PLN is by far the best option. PLN authorities are familiar with current legislation and appear to be applying it for new projects without negotiation.</p> <p>Unfortunately for projects preceding the 2009 legislation, the stalemate situation prevails. PLN is still undecided on how to effectively deal with these projects with the result that no progress has been made. There have already been initiatives, however, so far these have not produced any concrete results much to the frustration of the respective projects and their developers.</p> <p>Recommendation: Agreement needs to be made and formalized between PLN and the “terkendala” IPPs on the revision of their PPAs including tariffs. Given the slow progress made so far this process needs to be facilitated and moderated by ESDM or another appropriate third party body.</p>	<p>Conclusion: PLN are fully familiar with MHP technology in the 1 – 10MW range and are able to scrutinize the proposed plans of IPPs to ensure compatibility of their systems with the PLN grid network, however, it is apparent strict technical due diligence / value engineering is not always carried out by project developers.</p> <p>Recommendation: PLN should be more involved at the stage of technical due diligence / value engineering to ensure projects are implemented in accordance with the specific requirements of PLN therefore optimizing resources. Ways should be explored on involving PLN more intensively in a technical capacity regarding the design and construction of schemes particularly where the developers are relatively inexperienced.</p>	

Stakeholder:	Actions:	Characteristics:	Legislative	Technical Aspects	Finance
4. Small Scale MHP Independent Power Producers (IPP)	Following the improved attractiveness of energy generation private sector are interested to develop MHP sites as they see this as being potentially lucrative business.	<p>There are 2 main category of IPP operating in the <10 MW range. There are those having good access to capital and finance and also access to useful site data / existing feasibility studies etc. These IPPs are also able to draw on relatively extensive technical expertise and knowhow either in-house or through their established networks. These tend to be companies being supported by larger sponsors / conglomerates.</p> <p>There are also smaller scale IPPs, with limited experience in the sector and limited access to the required technical expertise to plan, design and develop projects effectively.</p>	<p>Conclusion: The private IPPs entering the sector are fully aware of and up to date with current legislation governing the sector. They are also comfortable with dealing with authorities at central, provincial and district levels.</p>	<p>Conclusion: They frequently over estimate the capacity of projects resulting in lower financial rates of return than anticipated.</p> <p>They tend to underestimate the technical complexity of building a MHP scheme and there is a tendency to “cut corners” which leads to problems and undermines performance. In many cases these mistakes are quite elementary and could be easily eliminated. To compound this situation there is a clear lack of awareness of the importance of putting in place proper technical due diligence measures (external consultant) to assess and scrutinize designs at planning stage. The reason for neglecting the step of technical due diligence is more due to lack of awareness rather than economic considerations (the cost of a consultant to carry out this work is largely irrelevant in the context of the overall project cost).</p> <p>Recommendation: The provision of an informal / semi-formal support facility comprising the necessary technical knowhow to which IPPs could draw on. This would facilitate a relatively easy due diligence process for IPPs. This could comprise a network / pool of experts who could be commissioned for specific value engineering tasks upon request paid for by the individual IPPs. Their presence could also be complimented with the preparation of media that could be disseminated amongst the IPP community highlighting the most common mistakes etc.</p>	<p>Conclusion: Singularly the biggest complaint from IPPs interviewed was the issue of difficulty in securing finance. Although Indonesian banks are willing to finance MHP projects, they currently apply the same procedures and requirements as for conventional projects. In particular the collateral requirements often disqualify small-scale developers from participating in the sector.</p> <p>Recommendation: See financing institutions</p>

Stakeholder:	Actions:	Characteristics:	Legislative	Technical Aspects	Finance
<p>5. Financing Institutions: (Banks)</p>	<p>Providing loan finance for renewable energy projects either from their own funds or as an agent for third parties such as foreign banks, renewable energy financial support programs etc.</p>	<p>They have limited experience in financing RE projects or projects with similar characteristics. They have very limited capacity in being able to assess accurately RE business proposals and financial viability of proposed schemes.</p>	<p>Conclusion: Banks having experience with financing MHP projects (Bukopin, Mandiri for example) are sufficiently familiar with current legislation, however, other smaller banks are less familiar.</p> <p>Recommendation: Introductory activities and information dissemination need to be carried out in particular for smaller regional banks that could be suitable for smaller scale projects. Although the larger banks referred to are more familiar with legislation this is limited to the main branches in Jakarta therefore socialization for regional offices would also be relevant for these banks.</p>	<p>Conclusion: The banks do not possess “in house” in depth technical knowledge of the MHP sector. They hire independent technical consultants to carry out technical assessment of project proposals from prospective borrowers. Similarly they hire consultants to carry out verification of construction progress as a basis for fund disbursement once a loan has been agreed. However, they reported that it was sometimes difficult to procure the necessary expertise.</p> <p>Recommendation: A more comprehensive pool of suitable experts and consultants able to conduct the specialist tasks on behalf of banks should be established and made available to banks.</p> <p>Media prepared targeting other areas of the IPP sector could also incorporate elements specifically aimed at improving the banking sectors awareness to the technical characteristics of MHP.</p>	<p>Conclusion: Banks have in the last 5 years acquired quite some experience in financing such projects.</p> <p>With the emergence of private sector participation in the renewable energy sector banks are now becoming more familiar with financing this type of project. The banks that are currently financing mini hydro projects handle the project similarly as with other conventional commercial projects. They require similar types of collateral, generally apply similar interest rates and provide on average 2 year grace periods for loans. They currently do not have special programs geared specifically for RE projects.</p> <p>The relatively stringent lending conditions in particularly the collateral requirements mean that it is difficult for small developers without the support of larger sponsor companies to secure loans. The increased collateral requirements imposed as a result of costs and time overruns experienced on on-going projects has further compounded this situation.</p> <p>Recommendation: The establishment of a guarantee fund deposited with selected banks in the country to alleviate the risk level for the banks in lending to RE projects. Through this facility, technical and financial assessment of proposals and assessment of the IPP would be the main lending criteria meaning that committed genuine companies having good project proposals, however, with limited collateral would still be able to qualify for lending.</p>

Stakeholder:	Actions:	Characteristics:	Legislative	Technical Aspects	Finance
6. NGOs, Bilateral RE support programs, etc.:	Provide support and technical assistance to the development of sustainable private sector initiated renewable energy projects in Indonesia.	Their impact is often limited often due to a lack of traction and capacity to be able to provide tangible usable products. Program time frames are often incompatible with the relatively long gestation periods inherent to RE projects and in particular MHP projects. Their actions are often compromised due to their obligations to work through Government counterpart organizations.	<p>Conclusion: Sufficiently well informed about legislation covering the sector and able to facilitate further dissemination of information to other relevant parties.</p> <p>Recommendation: Where willing, RE development programs should be mobilized to assist in dissemination of information related to the IPP RE program as a means of awareness building.</p>	<p>Conclusion: These organizations do possess know how and have access to technical resources which could be of use for IPPs particularly those with having limited experience in the sector. IPPs, however, are sceptical about the capacity of such programs to be able to deliver tangible benefits for their projects. Due to their obligation to work through government counterparts, private sector are often reluctant to cooperate with them unless they are convinced of the benefits.</p> <p>Recommendation: Programs implemented by these organizations need to focus their resources in addressing the actual technical needs of IPPs for example facilitating better technical due diligence practices at critical stages of project development.</p> <p>To be able to do this, clear areas of intervention need to be agreed between the programs and their government counterparts enabling activities to be focussed and target orientated thus gaining the confidence of the target groups.</p>	<p>Conclusion: So far the main involvement of third parties has been regarding CDM. Due to the current low value of CERs this is not anymore attractive for developers.</p> <p>For IPPs without the backing of large established companies access to appropriate financing facilities is still a serious shortfall. So far nobody has been able to effectively address this problem.</p> <p>Recommendation: For organizations active in financing aspects of RE, collaboration with local banks should be sought with the view to establish guarantee facilities, enabling the banks to become more progressive in their approach to RE financing. Depending on the size and scale and the specific objectives of the programs, guarantee fund facilities could be orientated towards guaranteeing loans for actual project capital or limited to project preparation components (FS, DED etc.).</p>

Annex 2: Interviewee Fact Sheets

REDACTED - CONFIDENTIAL



Annex 3: List of interviewees and events attended

REDACTED - CONFIDENTIAL

Annex 4: List of the various approvals required by IPPs⁵:

1. Company related:
 - a. NPWP: Nomor Pokok Wajib Pajak / Official Tax Number
 - b. SIUP: Surat Izin Usaha Perdagangan / Business License
 - c. TDP: Tanda Daftar Perusahaan / Company Registration Form
 - d. Sertifikas Usaha / Business Certificate
 - e. Sertifikas Kompetensi / Competence Certificate
 - f. Keselamatan Kerja / Health & Safety Certificate
2. Izin prinsip Bupati / Principle approval from Regent / District Government
3. Izin prinsip izin penanaman modal dari Badan Koordinator Penanaman Modal (BKPM) / Principle approval for investment from Investment Coordination Board
4. Izin lokasi / Location approval (issued from local government)
5. Izin gangguan / Disturbance approval (issued from local government)
6. IUKU and IUKU sementara / Licence to generate power for public use
7. Izin mendirikan bangunan / Building permit
8. Izin pengunaan air permukaan / Approval to utilize surface / river water
9. Dokumen Upaya Pengelolaan Lingkungan (UKL) dan Upaya Pemantauan Lingkungan (UPL) / Environmental Management and Monitoring Assessment Study
10. Power Purchase Agreement (PPA)
11. Sertifikat Uji Laik Operasi / Commissioning Certificate

⁵ This list is not necessarily exhaustive as it can be the individual district governments have their own additional requirements, however, this list can be seen as representing the average condition.



Annex 5: IPP Questionnaire

Pengantar

Pemerintah Indonesia bertekad menurunkan emisi gas rumah kaca (GRK) sebesar 26-41% pada tahun 2020. Berbagai langkah mesti dilakukan, baik pada tingkat kebijakan maupun pada tingkat pelaksanaan di lapangan. Energi Terbarukan adalah salah satu sektor yang menjadi sasaran kegiatan pengurangan emisi GRK tersebut.

Hasil dari questioner ini akan menjadi masukan bagi pemerintah dan MitigationMomentum.org, untuk menyusun dan membuat kebijakan serta rencana aksi dalam menurunkan emisi GRK di sektor energi, khususnya bagi pengembang IPP (*Independent Power Producer*) energi terbarukan yang memasok listrik ke jaringan PLN.

1. Nama Pengembang

2. Berapa pembangkit yang dimiliki

No	Lokasi	Kapasitas (mW)	Jarak Titik Interkoneksi - pembangkit	Biaya penyambungan (Rp)	
1					
2					
3					
4					
5					
3.	Berapa <i>capacity-factor</i> nya?	Pada saat didesain	%	Setelah beroperasi	%
4.	Bagaimana Proyek IPP ini dibiayai?	Bank	%	Equity	%
5.	Apakah ada perbedaan biaya proyek antara perencanaan, pembangunan dan setelah selesai?				
6.	Bagaimana dengan IRR pada saat perencanaan dan setelah selesai?				
	Berapa IRR-nya pada saat perencanaan?	%	Berapa IRR-nya setelah proyek selesai?	%	
7.	Bagaimana pandangan anda sebagai IPP di bawah 10MW terhadap Feed in Tariff di Indonesia?				

21. Dukungan apa yang paling bermanfaat

22. Bagaimana peran pemerintah daerah bagi anda? Apakah mereka mendukung atau justru menghambat?

23. Sejauh mana keterlibatan masyarakat setempat dalam proyek anda?

24. Adakah hal-hal/masalah sosial yang sensitif yang muncul selama pembangunan dan beroperasinya pembangkit?

Aspek Teknis

25. Bagaimana kondisi teknis pembangkit anda?

26. Bagaimana proses identifikasi lokasi dilakukan? Apakah mendapatkan layanan dari surveyor yang berpengalaman?

27. Bagaimana proses pengumpulan data hidrologinya? Apakah datanya akurat?

28. Apakah data dan peta topografinya tersedia?

29. Apakah DED dan RAB yang anda terima memuaskan?

30. Apakah konsultan perencana memberikan prakiraan biaya dan prakiraan waktu pembangunan yang akurat?

31. Apakah kapasitas terbangkit sesuai dengan desainnya?

Hubungan dengan PLN

32. Pada tahap mana melakukan pendekatan kepada PLN?

33. Apakah menurut anda PLN merujuk kepada peraturan pemerintah pada saat membahas mengenai tarif?

34. Apakah PLN menuntut persyaratan yang mengada-ada atau sebaliknya?

35. Apakah PLN secara umum mendukung pembangunan pembangkit atau biasa saja/acuh-tak-acuh?

36. Apakah PLN menunjukkan sikap yang membangun pada saat melakukan perjanjian dengan anda sebagai pengembang?

37. Sejauh mana peran dan wewenang PLN daerah dalam mengambil keputusan yang berkaitan dengan IPP?

38. Apakah PLN dapat diandalkan sehubungan dengan pembayarannya?

39. Bagaimana kehandalan jaringan PLN untuk dapat melakukan interkoneksi?

40. Apa kesulitan utama berhubungan dengan PLN sebagai klien?

41. Berapa harga tarif per kW yang diperoleh dari PLN pada saat ini?

42. Berapa lama periode perjanjian penjualan listrik (PPA) yang anda dapatkan?



43. Siapa yang menandatangani PPA yang mewakili PLN?
44. Dalam **pembangunan proyek**, dukungan dari pihak ketiga seperti apa yang paling diharapkan?
- a. Modal awal?
 - b. Pinjaman lunak jangka panjang?
 - c. Meningkatkan kapasitas teknis dan konstruksi
 - d. Kemudahan perijinan dan regulasi
 - e. Dukungan untuk biaya grid-connection
 - f. Lainnya ?
45. Sehubungan dengan upaya pemerintah dalam **mengurangi Emisi Gas Rumah Kaca**, yang mendorong pada pengembang dan investor untuk membangun energi terbarukan, apa yang diharapkan oleh anda sebagai IPP?

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