Policy Recommendation Paper

Permit Procedures on Renewable Energy Development in the ASEAN Region

November 2016

Imprint

This report is part of the Renewable Energy Support Programme for ASEAN (ASEAN-RESP), a jointly implemented project by the ASEAN Centre for Energy (ACE) and the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ). The report reflects results of the ASEAN RE Guidelines. For more information on the guidelines, visit: www.re-guidelines.info

Published by

ASEAN Centre for Energy (ACE)
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

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Place and date of publication

Jakarta, Indonesia
November 2016

Contents

List of Abbreviations

ACE	ASEAN Centre for Energy
APAEC	ASEAN Plan of Action for Energy Cooperation
AEDP	Alternative Energy Development Plan
ASEAN-RESP	Renewable Energy Support Programme for ASEAN
BMWi	Federal Ministry for Economic Affairs and Energy
BMZ	Federal Ministry for Economic Cooperation and Development
BoS	Balance of System
BOT	Build Operate Transfer
CapEx	Capital Expenditure
CE	CE Mark, products comply with European regulations
CGC	Corporate Guarantee Corporation, Malaysia
CHP	Combined Heat and Power
COD	Commercial Operations Date
DIN	German Institute for Standardisation
DIW	Department of Industrial Works
ERC	Energy Regulatory Commission
EPC	Engineering Procurement Construction
EU	European Union
FiT	Feed-in-Tariff
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
IEC	International Electro-technical Commission

ISO	International Organization for Standardization
IRR	Internal Rate of Return
IPP	Independent Power Producer
MEA	Metropolitan Electricity Authority
NDC	Nationally Determined Contribution
O&M	Operation and Maintenance
OpEx	Operation Expenditure
PDP	Project Development Programme
PEA	Provincial Electricity Authority
POME	Palm Oil Mill Effluent
PPA	Power Purchase Agreement
PV	Photovoltaic
SPV	Solar Photovoltaic

List of Measures

W	Watt
kW	Kilowatt
MW	Megawatt
GW	Gigawatt
Wp	Watt peak
kWp	Kilowatt peak
MWp	Megawatt peak
GWp	Gigawatt peak
Wh	Watt hour
kWh	Kilowatt hour
MWh	Megawatt hour
GWh	Gigawatt hour

Executive Summary

The two days "Focus Group Discussion on Permit Procedures for RE development in the ASEAN Region" was organised on 26-27 January 2016 in Jakarta, Indonesia with an objective to identify challenges and recommend solutions in the existing Permit Procedures for Renewable Energies.

Twelve challenges were highlighted and recommendations to streamline the procedures were finalised based on the five brainstorming sessions dedicated to every aspect of project development that included participants from stakeholders viz. government, financing institution, project developer, authorities, private players, academia, civil society, etc.

The following twelve identified challenges and respective recommendations are being discussed in detail in this recommendation paper:

1. Government: Perception of Renewable Energy (RE)
2. Administration: Unclear Project development/approval Procedures
3. Administration: High number of involved authorities
4. Administration: Complex and lengthy procedures
5. Administration: Authorities lack experience in new and RE technologies
6. Market development: Quality standards and availability of certified products
7. Market development: Local content
8. Finance Sector: Missing finance products for RE investments from the private sector
9. Support Scheme: Bankability of Power Purchase Agreement (PPA)
10. Utilities: Perception of RE as Competitor Technology
11. Industry: RE not Core Business
12. Capacity development: Unskilled personnel

The scope of the policy recommendation paper addresses challenges faced by other players e.g. utility, project developer, investor, financing institution, etc. in addition to the administration and government. This will help in identifying challenges faced by other players in the development of RE and find potential solutions for the overall development of the RE market in ASEAN.

1. Introduction

1.1 About ASEAN Centre for Energy (ACE)

The ASEAN Centre for Energy (ACE), established on January 1, 1999 as an inter-governmental organization, is guided by a Governing Council composed of the Senior Officials on Energy of the ASEAN Member States (AMS). Established by Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam, ACE is hosted by Indonesia. The ACE accelerates the integration of energy strategies within ASEAN by providing relevant information state-of-the-art technology and expertise to ensure that over the long term, necessary energy development policies and programs are in harmony with the economic growth and the environmental sustainability of the region.

1.2 About GIZ

The Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH is a German public-benefit federal enterprise. GIZ works through commissioning procedures for national and international public and private commissioners. GIZ is active in more than 130 countries worldwide in the field of development cooperation for sustainable development and has over 50 years of experience in a wide variety of areas, including renewable energy in South East Asia and ASEAN. GIZ supports the introduction and deployment of renewable energies (e.g. wind energy, bioenergy, solar energy, and hydropower) in the partner region through methodological approach, technical and financial competence and enable partner organisations to move towards a sustainable energy supply using their own potential.

1.3 About ASEAN-RESP

The Renewable Energy Support Programme for ASEAN (ASEAN-RESP) is a joint programme implemented by the ASEAN Centre for Energy (ACE) and GIZ on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ). Main activities of ASEAN-RESP include providing policy advice on mechanism to promote RE, strengthening and developing local competences, delivering training, implementing pilot projects and initiating projects involving cooperation between the public sector and private business.

2. Background

In recent years, the ASEAN Member States (AMS) have made considerable efforts to tap potential renewable energy (RE) resources. The ASEAN region relies significantly on fossil fuels to meet increasing energy demand and there is a strong need for diversifying the regional energy mix with increased share of Renewable Energy. A commitment exists on RE development at national and regional level. In this regard ASEAN Plan of Action for Energy Cooperation (APAEC) 2016-2025 set a collective regional target of 23 % share of RE in the Total Primary Energy Supply by the year 2025. To achieve this, some AMS implemented feed-in-tariffs (FiT) scheme as a means to promote RE development (i.e. Indonesia, Malaysia, the Philippines, Thailand, and Vietnam). Supporting mechanisms such as tax and import duty exemption, tax holiday, etc. have been introduced to encourage investments by the private sector in RE projects.

3. ASEAN RE Guidelines for RE Project Development in ASEAN Member States

ASEAN RE-Guidelines were developed to facilitate development of RE in ASEAN Member States through improving Policies and Procedures resulting in an increase in private sector activity and investment in the RE sector. Since the confidence of project developers and investors is needed in order to boost region-wide RE deployment, the provision of transparent project development and permit procedures is a necessity. The ASEAN RE Guidelines are enabled to:

a. highlight administrative procedures, including requirements for project developers and/or investors;
b. list legal and regulatory provisions as well as necessary permits;
c. identify country-specific challenges for project development; and
d. provide information on how to obtain financial closure

The ASEAN RE Guidelines (www.re-guidelines.info) were developed to meet the needs of project developers/investors, as well as promote transparency and clarity. The RE-Guidelines define the various steps and procedures and help identify risks embedded in each step, to design and implement proper mitigation measures. The RE-guidelines were developed for select countries and technologies as given below:

No.	Country	Technology/Size	Additional Information
1	Indonesia	Biomass/Biogas	NA
2	Malaysia	Solar PV (small)	Up to 72 kW
3	Malaysia	Solar PV (large)	Above 72 kW
4	Malaysia	Small Hydropower	Up to 30 MW
5	Philippines	Solar PV (small)	Up to 100 kW
6	Philippines	Solar PV (large)	Above 100 kW

Table 1: List of RE-Guidelines published

4. Regional Focus Group Discussion on Permit Procedures

Despite introducing ambitious policies at regional and national level and supporting mechanisms, large-scale region-wide deployment of RE has not yet taken place but remain limited to certain locations. The reasons behind slow adoption to RE is often due to the following reasons:

a. Complex and time-consuming administrative procedures
b. Unclear and non-transparent regulations
c. Difficulty in securing necessary financing
d. Despite continuously reduction in RE equipment cost 'Soft cost' remain high
e. Challenges in accessing subsidy or incentives

To collect possible solutions and recommendations based on best practices and experiences a Focus Group Discussion was organised in Jakarta during 26-27 January 2016. The workshop was attended by the representatives from AMS (government, project developers, utilities, RE association, etc), and provided inputs, which form the basis of this recommendation paper. The Focus Group Discussion was structured along five Sessions focusing on government schemes/subsidy, technical, financial, grid access, etc. Recommendations from the participants are being included in the present Policy Recommendation Paper to provide a comprehensive document to the stakeholders on strategy to overcome barriers in the development of RE.

The policy recommendation paper addresses challenges faced by project developers due to the existing permits and processes in the government and authorities. However, other players viz. utility, project developer, investor, financing institution, manufacturers, etc. play an important role in the success of RE as a substitute of conventional energy.

This paper identifies challenges faced by all the players responsible for the development of RE and find potential solutions collaboratively.

Figure 1 Participants of Regional FGD on Permit Procedure held in Jakarta, 26-27 January 2016.
Credit: GIZ Indonesia/Intan Cinditiara

5. Summary of Identified Challenges and Recommendations

Twelve major challenges were identified under various headings e.g. financing, market, support scheme, administration and utilities, among others towards the RE project development in the region. The identified challenges were in either general or specific to certain ASEAN Member State (AMS); they are recommended to be adapted in national context. The Table 2 below highlights the twelve main challenges and possible recommendations discussed during the workshop.

Table 2: Identified challenges and recommended procedures/steps

No	Challenge	Recommendation
1.	**Government: Perception of Renewable Energy (RE)**	
	• RE is not perceived as a viable energy solution and alternative to fossil fired power plants • Costs of renewable energy technologies are often inaccurately perceived and compared, especially in comparison with subsidized fossil fuel technologies (price distortion) • There is a misperception of the market readiness of RE, as it is still considered to be a technology in testing mode • Techno-economics of RE has often suffered in ASEAN Member States (AMS) through installation failures due to high costs, cost overrun and/or underperformance • Level of commitment by government to meet or exceed their Nationally Determined Contribution (NDC) obligation	• Government develop a RE policy and roadmap to reform the electricity supply industry, ensure RE contributes significantly to the energy mix, and phase out fossil fuel-based power plants • Implement national agencies for RE development, in case they do not exist. Provide sufficient funds to train the administration and financing personnel • National agencies shall provide transparent information on national energy costs and subsidies to render a clear and realistic picture of the national market situation and incentive to RE deployment and related benefits e.g. environmental impact • Phase-out subsidies from electricity generated from fossil fuel, and internalize the cost of externalities for fossil fuel electricity to create a level playing field for RE electricity • Use international market intelligence to understand and transfer costs component and drivers to national circumstances • Implement pilot projects, based on international standards

		• International support (funding, capacity development, technology transfer) to help ASEAN countries implement RE policy to meet respective NDC obligations
2.	**Administration: Unclear Project Development/Approval Procedures**	
	• Lack of transparency in the majority of AMS regarding the administrative development procedures for RE • Absence of central information platforms on RE development procedures; or information not easily accessible • In some AMS procedures have not fully been defined; resulting in case-by-case procedures, which often only larger projects are able to perform • Substantial obstacles for smaller projects and international developers and investors	• Develop transparent, clear and easy processes to perform development procedures for RE projects • Procedures should reflect circumstances of the individual technology and the respective capacity sizes • Avoid as much as possible the case-by-case procedures. The procedure must be made transparent, in case exists and made available through transparent information system • Provide a central information platform on RE development with comprehensive and up-to-date information • Authorities provide comprehensive check-list of all documents and data required and application approval procedure • Platform could have a national focus or ASEAN-wide platform – RE Guidelines
3.	**Administration: High Number of Involved Authorities**	
	• Development procedures in the majority of AMS are characterised by the involvement of a high number of authorities • Often developers and investors face challenges between clearly distinct competencies and responsibilities of the involved authorities	• Streamline procedures, especially regarding the number of involved authorities. Reform to integrate authorities to be in line with the process and take time bounds decisions • Eliminate the involvement of authorities not compulsory for the RE project development process • Install on a medium term a true one-stop-shop/single-window-clearance

	• Often lack of coordination between involved authorities; leading ultimately to the reduplication of processes and application procedures • Situation is resulting in lengthy processes and high realisation costs for RE	
4.	**Administration: Complex and Lengthy Procedures**	
	• Time consuming and lengthy processes, especially during the administrative development steps • Duration of process is defined by actual time, required to interact with the competent authority in addition to waiting time • Waiting time for approval is even larger issue, resulting in substantial higher costs for the developer	• Streamline existing procedures, by accounting for requirements of the individual RE technologies and respective capacity/size • Identify and address root causes for time consuming processes • Introduce clear deadlines for the involved authorities • Introduce and enforce legal measures, which empower the developer to take legal means in case of inactivity of the competent authority • Introduce procedure to compensate the developer in case of delays by the competent authority
5.	**Administration: Authorities Lack Experience in New and Renewable Energy Technologies**	
	• Administrative procedures for RE installations are often introduced without a comprehensive training of the administrative personnel on the new technologies and the related requirements. • The administrative personnel are generally not experienced with the new technologies and face difficulties in adapting the procedures correctly • The inexperience results in lengthy procedures/delayed approval as well as in the application	• Provide comprehensive training to the administrative personnel on the new technologies and related administrative procedures • Analyse and streamline the existing procedures regularly on adequacy • Identify existing barriers in policy/procedures for developers but also for the administration itself regarding the defined administrative procedures • Take experience of international lessons learned and identified solutions to overcome existing barriers

6.	**Market: Quality Standards and Availability of Certified Products**	
	• The consideration of quality standards is not common and not strictly monitored in AMS • Certification, standardization of products and installations according to international standards is not common • Manufacturers sell cheap and low-quality equipment at higher costs. Controlling quality can avoid bad reputation	• Define applicable international standards, codes and norms adapted to local conditions and publish them with respective guidelines • Authorities should involve international agencies/institutions for defining quality assurance and surveillance concerning production, manufacturing processes and RE installations on site • Approval authorities should hire third party inspection/appraisals periodically for production and manufacturing
7.	**Market: Local Content and market development**	
	• Local content is often requested by the government to stimulate the market for local manufacturing • Local products, for example PV modules and inverter suffer from competitive pricing due to the higher cost of small manufacturing quantities • Some local products show quality deficits due to uncertified manufacturing and poor product quality control • For example, bioenergy plants in some nations specific components like incineration engines, biomass boilers, steam turbines can only be sourced from abroad	• Local content can be achieved through skilled and experienced local companies taking over more and more steps of the value chain while maintaining the quality for key components at international standards. This will ensure quality yield • In case local content should cause competitive production a sound business model approved by international third party consulting is recommended, considering investment and net employment benefits, lead, construction and ramp up time and competitive market pricing • Creation of transparent markets will allow local companies to become a role and gain experience and participate through local content
8.	**Finance Sector: Missing Finance Products for RE Investments from the Private Sector**	
	• The Capital Expenditure (CapEx) on RE technologies are high. Due to this payback/Internal Rate of Return (IRR) on investment is high; payback for RE technologies is often	• Need for banks to innovate new mechanism and offer specific products (technology, size, location specific) for RE finance: soft loans (backed by state bank or bank regulator) of different type and size

	more than five years (depending on technology, size, etc.). Finance/interest rates are also high • Finance volume vary between some 10,000 USD to more than 100 million USD, missing applicable finance model for private investors; large projects receive state backed securities • Only traditional finance products available which require high collaterals; non-recourse finance products for larger projects are not available • Lack of project experience and subsequently quality and controlling structures by the developers and investors to achieve bankability • Risk assessments involve project costs and/or time overrun and/or underperformance, currency exchange/valuation risks, delayed PPA payments may make it non-viable	• Develop specific RE-finance-products for recourse and non-recourse finance by technology and size of investment • Develop the product "Non-recourse RE-finance" which will create additional margin for banks: risk premium and fees and make banks partner of project developer • Banks to enforce quality standards, benchmarks and controlling procedures to facilitate bankability through building techno-economic assessment capability within the finance sector • Commercial banks introduce specific branches and nodal offices to deal with RE related financing • Capacity building of commercial banks by banking authority • State banks to implement RE-finance sector development programme: soft-loans, risk coverage, capacity building
9.	**Support Scheme: Bankability of Power Purchase Agreement (PPA)**	
	• PPA in some countries are not bankable, and not accepted as security (collateral) because of the financially weakness of the utility	• State bank or government can provide additional guarantees for payments or loans to compensate/bridge the gap
10.	**Utilities: Perception of RE as Competitor technology**	
	• Utilities are apprehensive of situations with distributed RE generation increase and electricity consumers defect from the grid with the increasing declining cost of PV & energy storage systems. • Utilities are experienced in managing and operating large power plants, one-way distribution grids, constant growth of demand, blackouts, shortage of capital. High skilled personal in RE is missing	• Utilities should develop new business concepts in evacuating power from RE installations and operate the grid two ways in order to make profit out of renewable energy supply • Utilities should plan for increased share of RE in the grid • Existing grid must be developed in order to take increased share of RE micro-grids (MGs) especially for remote communities into business model

	• RE requests smaller to micro power plants, two-way grids, huge volumes of capital, intensive engineering and management • Perception of high cost of RE due to poor RE reliability and performance • Grid access prohibitive for third parties to avoid system instability, breakdowns and blackouts • PPAs offered not bankable due to missing credibility of utility or state/legal guaranty of FIT payments • Utilities refuse to pay FIT or to close PPA through creation of bureaucratic hurdles	• Girds are developed as smart grids which is flexible to cater variable RE (vRE) • Utilities have the capacity to play a key role in serving energy balancing market in high vRE scenario, • Utilities introduce specific RE divisions equipped with high skilled personal and investment capital. RE division should be able to manage high numbers of RE installations and streamlined approval procedures • The grid operation division should implement grid monitoring mechanism for remote access and online grid surveillance • National governments ensure that national utilities participate in promotion schemes for RE and intervene in case utility refuse to countersign PPA or pay FiT (mandated by government through regulatory framework) • Utilities quickly learn from international best practices and adopt RE in their business models
11.	**Industry: RE not Core Business, suitable schemes/incentives are introduced**	
	• The time being industry focuses on core business and short term profit; RE have longer returns on investment • Energy investment must have low CapEx; life cycle Operation Expenditure (OpEx) and benefits are not in focus • RE cause attention while decision to invest in RE technology has to be made specially when the management is not aware of RE technology and advantages • Grid access is not existing or of low capacity to evacuate surplus power	• Government incentive to migrate industry from a brown to green economy • New business models have to be developed for both the industry and the utilities to work towards a strong collaboration. • The FiT for industry CHP surplus power (or heat) must be reasonably high to attract the companies to investments. • Awareness is created that energy from bio-waste is a national resource. A discourse with industry and utilities is advised to create awareness from the stakeholders involved.

		• Government introduces campaign for industry advising in good practice of various technologies such as RE, CHP, waste to heat, etc. industry and energy efficient production processes
12.	**Capacity Development: Unskilled Personnel**	
	• RE market suffer from unexperienced and unskilled personnel • Project developers intend to enter the market with lack of experience in the technology, O&M, financing availability and in administrative and legal procedures • Government's administration and approving bodies are/will be overloaded from high numbers of applications. Lack of skilled person to deal with such application delays it further • Utilities face similar problems to that of administration i.e. not being prepared for managing numerous RE PPA • Banks are key for providing project finance but are wither not updated on the technical knowledge, economics and government policies. Hence could not finance even feasible projects • Operation & management (O&M) personnel are not experienced in benchmarking of technology	• Implement capacity building programmes and training institutions by nodal authorities. Train the trainer might be supported from expertise and experience available internationally to achieve international standards and skills • Shorten and strengthen internal processes and structures for smooth procedures for administration, banks and utilities involved • Start a recruitment planning and process to meet the needs of administration, banks and utility • Developers are encouraged to build capacity of related human resource (financing, manpower, project size, project volume, etc.) in order to collaborate with international experts and companies • O&M personnel may be trained on the new technologies, as required

ASEAN RE Guidelines on Solar PV, Biomass Biogas and small Hydropower Project Development

Step-by-step approval process for Project Implementation

The structure of the ASEAN RE-Guidelines for RE development follows the generally observed process/procedures/steps starting from site identification, through administration and institutions considering promotion schemes like FiT, project finance, implementation and operation. RE-Guidelines were developed based on the experiences from the development of projects in the identified countries. The necessary steps involved in the development of the guidelines focused on the challenges and their solution in the form of possible recommendation. Addressing challenges based on recommendation is not only exhaustive and lengthy procedures but also requires intensive coordination between concerned departments; other challenges include low FiT for bankability of the project, experience with underperformance or others. These RE-Guidelines identify inherent challenges not only administrative but also technical and need for capacity building.

These RE Guidelines summarise challenges to a more general and common to AMS taking experience from Indonesia, Malaysia and the Philippines.

ASEAN RE-Guidelines can be accessed on www.re-guidelines.info

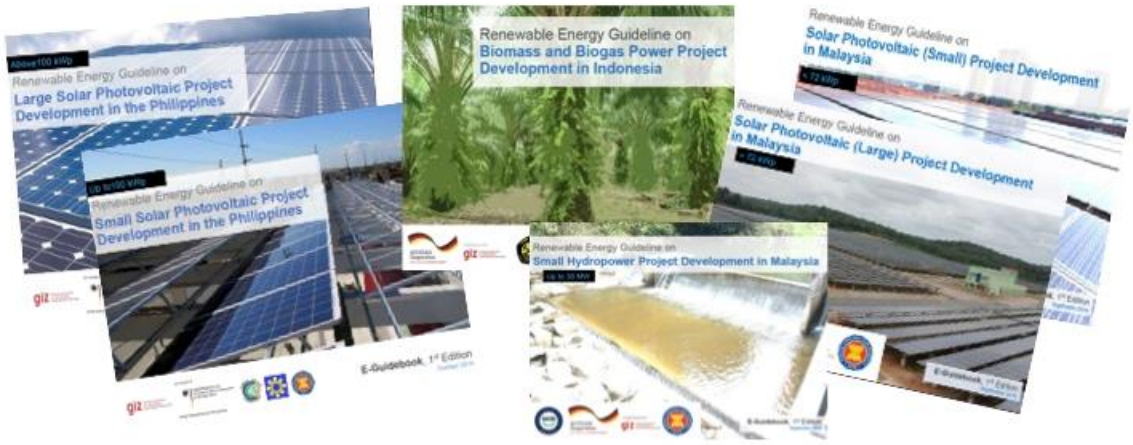

Figure 2 Series of ASEAN RE Guidelines that are developed with respective AMS (Indonesia, Malaysia, Philippines). Credit: GIZ Indonesia

6. Administrative Procedures and Challenges: Experience from Previous Projects

Efficient and effective administrative processes for the development of RE projects have a positive impact on the overall project development. Proper administrative procedures could lower the costs for the development of a national RE sector ensuring national energy security, reliable power supply and hence reducing dependencies/import of conventional fuel.

6.1 Effect of Administrative Procedures on Project Cost

Administrative procedures have an indirect effect on project soft cost components such as costs of capital and profit. High administrative costs indicate inadequate administrative risks, which reduce the predictability and cost security of the overall RE project. As a reaction to increased risks, investors demand a risk premium, which consequently increases overall project cost. On the other hand, favourable governmental policies increase investment security and drive down the costs for the development of the RE sector thereby increasing RE share. The impact of administrative procedures and its impact on the overall cost of the project need not be taken lightly as inefficient and unclear administrative procedures may lead a viable project become unviable.

6.2 Administrative Procedures and Project Stakeholder

RE Guidelines were taken as the basis of the analysis, identification of challenges and possible recommendation. The present Recommendation Paper analyse each and every step involved in the project development in the region starting from the very first planning step, through the administrative process, financing, construction, grid connection to the O&M of the installation.

The analysis identified barriers in the development of RE which included the administrative procedure that included technical and financial issues, pose as major challenge to RE project development. In the recommendation paper, much focus is given to administrative procedures as these administrative procedures have critical impact on project viability including technical and financial. These administrative procedures affect the project development cycle, which covers every stakeholder from project developer, financing institution, grid, utility, economics, etc.

7. Analysis of the Identified Challenges for RE Development in ASEAN Region

The FGD identified twelve challenges and potential solutions. This section discusses the identified twelve challenges in detail with possible solutions citing international experiences as deemed important. The sections divided into two main sub-headings challenges and recommendation.

7.1 Government: Perception of Renewable Energy (RE)

7.1.1 Challenges

The following challenges were identified as a part of the topic perception of RE in government:

a. Renewable Energy is often perceived as non-market ready technology and under testing mode as compared to power generation through fossil-fired power plants.

b. It is often perceived that the intermittent nature of RE will hinder the normal operation of conventional energy supply

c. RE is often considered as non-viable energy solution compared to the subsidised conventional energy generation

d. RE installations has suffered (or failed) due to poor techno-economics. RE is not perceived as reliable and financially viable technology due to installation failures, cost overrun, under performance

e. Level of commitment by national governments to meet or exceed respective Nationally Determined Contribution (NDC) obligation are not sufficient

Often RE is compared with conventional power plants when it comes to power generation without considering the fact that the conventional power is subsidised. The techno-economics are often delinked with environment benefits and impacts. Installations fail due to unavailability of demonstration project citing financial reasons. RE is often linked to source of energy e.g. sun in case of Solar PV and the options of battery storage and grid connection aspects are not considered due to several reasons.

Due to the above perception and reasons, the share of RE remains minimal in the national energy mix.

7.1.2 Recommendation

Above challenges can be effectively overcome through the following recommendations deliberated during the FGD:

a. Government develop RE policy and roadmap to reform the electricity supply industry, ensure RE contributes significantly to the energy mix slowly phasing out fossil fuel based power plants

b. By forming national agencies with mandate to develop RE based projects. The agencies must be provided sufficient funds for activities like training and capacity building of the officers/staff

c. National agencies provide transparent information on energy costs, resource availability, subsidies, policies

d. International support (funding, capacity development, technology transfer) to help ASEAN countries implement RE policy to meet respective NDC obligations

It seen that RE is often considered as technology in its initial phase and still under testing and development phase, which is yet to commercialise. This is because in most of the cases the responsibility of RE projects lies in the hands of the existing authorities and not much focus could be given due to routine activities.

The solution to this challenge is to form a dedicated authority/agency which has mandate to work on RE and related projects/activities. This central authority/agency needs to be self-sufficient in terms of funding, decision-making, approval and introducing updated rules and regulations in coordination with other related authorities e.g. the authority dealing with RE coordinate internally with authority responsible for finance, grid, utility, etc. enabling smooth project approval and support.

The authority/agency is empowered through trainings and capacity building to provide required information to project developer and stakeholders.

To address this AMS could use the available international market intelligence on costs, components, implementation, experiences, etc. The international experiences and best practices can be adapted to national context and requirement e.g. performance of Solar PV may vary in Indonesia compared to Germany due to factors like ambient conditions, grid reliability, etc.

In addition to the desk study practical experiences are also required to crosscheck the performance of the technology in the given ground conditions. This can be achieved through setting up lighthouse (pilot) projects, which improves learning curve of the responsible authorities. These projects may be implemented with support available locally in AMS or through international development partners or companies experienced and well known in the field.

7.2 Administration: Unclear Development Procedures

7.2.1 Challenges

Key challenges identified are as given below:

a. The procedures for the development of RE in the AMS are not transparent - it is experienced by the project developers that the procedure followed by the administrative authorities is not often followed in transparent manner.
b. Absence of central information platforms on RE development procedures; or information not easily accessible; clear procedures for project approval are often missing.
c. Procedures are not adapted to renewable energy technology and often not updated in some AMS
d. In some AMS procedures have not fully been defined; resulting in case-by-case procedures, which often only larger projects are able to perform
e. Substantial obstacles for smaller projects and international developers and investors

There is urgent need of transparent procedures in the AMS on the procedures for RE project development. The deficit of information is either in form of missing information, procedures or platforms that guide developers through the correct and expected project approval procedures.

Some of the AMS have defined procedures for renewable energy project development; yet, the information not made available or not disseminated for developers and investors. On the other hand, in few AMS there is none or incomplete procedures for renewable energy technology projects. The development procedures contain steps, which are not adapted to specific RE technology and lack clarity on the approval procedures.

Due to this unclear procedures project developers are forced to find alternative administrative "path" to ensure successful project completion. Situation like this becomes difficult for project developers and investors who intend to invest in the RE projects. This is even more difficult for project developers from foreign countries who are not fully familiar with local administrative structures and procedures. The attractiveness of the market is substantially lowered under these conditions.

This situation leads case-by-case approval and procedure followed to grant approval. Procedures that are developed and applied only for a specific project or limited to few cases can only be followed by large investors and for large projects. The smaller RE projects discriminated not find it viable and will most likely not able to successfully implement projects under these conditions.

7.2.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Develop clear and easy process guidelines for RE project development
b. Procedures reflect technology specific requirement and project size
c. Procedures updated regularly to provide latest information and trends
d. Case-by-case procedures must be avoided
e. Provide platform for centralised information on RE development
f. Platform focus on national or ASEAN-wide project requirement

To address the obstacles viz. missing or undefined development procedures, it is strongly recommended to introduce clear and easy process guidelines for the development of RE projects including all the stakeholders' requirements.

Procedures could cover the cases that range from dealing with specific RE technology as well as the capacity/size of the individual installation. Case-by-case approval procedures must be avoided to ensure that the common procedures are uniformly applied and no discrimination is done between technology, intervention of project developer is minimised.

For projects with small size, simplified procedures may be introduced, this will enable clear requirements and simplified project approval procedures keeping overall project cost at minimum. International experiences available worldwide show that online portal for small installations substantially reduces time required and minimum project costs.

Platform providing central information for RE project development containing up-to-date information on the development processes, legal developments and support opportunities is very helpful. The platform could also be used to advertise upcoming tenders, tender requirements to market players. The platform providing centralised information ensures easy access to the information and requirements. The platform must contain contacts in case specific information is sought from the authority.

The platform providing information and approval procedures can be implemented at national level (e.g. national energy agency) or for the ASEAN region as a whole.

For example, RE Guidelines Platform (www.re-guidelines.info) offers information on the requirements in different AMS on select RE technologies (please see section 3). The platform could be strengthened by adding information on additional ASEAN Member States. The development of information should be performed in cooperation with the competent national authorities to ensure that all information is in line with the official specifications.

Online platform by providing transparent and clear permit procedures with timeline will invite participation from the international community of project developers.

7.2.3 International Experiences

The non-adopted procedures for renewable installations are well known across the globe and one such example is from one of the AMS Thailand. Actions taken by authorities in Thailand to the former Thai solar regulation can be seen as role model for a procedure analysis:

Initially Thai solar regulation defined rooftop installations as a power plant under Factory Act 1992. Electrical installations with a capacity of more than 5 Horse Powers (~3.73 kW_p) were considered as power plant. According to law, a power plant requires a factory operation license issued by the Thai Department of Industrial Works (DIW). For the calculation of the Horse Power of a PV installation, the definition referred was the cumulative capacity of the installation including the inverters. Through this definition, smaller rooftop installations on private households were treated as power plants. The regulation in addition foresaw that "power plants" were not allowed in residential areas and were to be installed with a 100 m safety zone around public places. The applied procedure as well as the compliance with the defined criteria made the application of solar rooftop almost impossible, at least for private residential buildings, even though the regulation defined these building as a clear target group and for self-consumption purpose.

The Thai government analysed its regulation very carefully, realised the non-adopted regulation and corrected the existing barrier by revaluating the applied procedure and waiving the factory license requirement for rooftop solar installations up to 1 MWp.

Learning from the above example it is recommended to carefully screen applied procedures for solar installations to identify specific requirements and approvals; checking for roadblocks in the development of solar projects that are not suitable.

An alternative approach is to introduce mandatory, internationally accepted certificates for solar power installations. This will allow the application of secure technologies without tedious individual checks.

7.3 Administration: High Number of Involved Authorities

7.3.1 Challenges

Challenges identified on the number of involved authorities are as given below:

a. High number of authorities are involved in granting permits and approvals.

b. Responsibilities of authorities needs to be clearly defined. Competencies of authorities needs to be identified.

c. Lack of coordination between involved authorities leads to the reduplication of processes and application procedures.

d. Overall time taken for granting permit/approval is more than stipulated/calculated.

High number of authorities involved in granting permits or licenses of approvals result in project delays and in turn increase project implementation duration. Delays in project implementation and commissioning results in increased project costs. Higher project cost may lead project to become unviable.

It has been observed that processes are often not followed in parallel but in series or depending on the outcome of prior step. In this case, the developer interacts initially with the first authority before being able to address the second involved administrative body. Developers and investors often face difficulties in clearly differentiating the individual competencies and responsibilities of the involved authorities. This results in increased time until final approval is obtained and hence increased costs as was anticipated originally while planning the project.

Sometimes the processes are repeated with minor variation between the requirements by different authorities leading to a duplication of processes and application procedures. In these reduplication processes, same documents are required to allow the project developer to proceed with next step. An opportunity was not provided to the developer to provide feedback on the processes and procedures.

Due to the above steps, substantial time is spent on coordination and follow-up with authorities and hence increased project costs.

7.3.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Streamline procedures, especially regarding the number of involved authorities

b. Reform to integrate authorities to be in line with the process and take time bounds decisions

c. Eliminate the involvement of authorities not mandatory for approval procedures

d. Introduce one-stop-shop/single-window-clearance for specific technologies/projects

The first step to simplify approval procedures is to streamline existing procedures especially regarding the number of involved authorities. Official bodies that are not necessarily required for the approval processes can be skipped or completely avoided from the approval/permit procedure, if required the government could play an active role in facilitating the whole process.

In addition, an immediate but not permanent solution could be to set-up single-window-clearance procedure to enable the developer to interact with limited number of authorities; the best possibility is to nominate one competent body to solve all the queries and requests made by developers.

Single-windows may not solve the inherent problems in the procedures but may limit the access of the developer to the concerned authorities and may prove another barrier by transferring the follow-up responsibility from the developer to the newly created single-window authority still maintaining the same procedures.

The recommendation could be to reduce the number of authorities not necessarily required in the process.

7.3.3 International Experiences

Single-window System

On-line information platforms and applications in Europe are being used in few countries in Europe. In Portugal small installations, the Portuguese "*Sistema de Registro Microprodução*" (SRM), being an online registration system for micro generation installations, could be a best practice example in this regard. Through the renewable industry online portal "*Portal Renováveis na Hora*"[1], developers are able to perform the required project registration as well as all required permitting procedures. At the same time, one single authority is taking care of the entire process; thus providing a true one-stop-shop. Single windows approval system in Netherlands led to significant decrease in the lead times of projects.

Flanders and the Walloon region of Belgium merged environmental and building permits, thus effectively creating a single permit procedure, which still involves different authorities but can be applied in one-step. One-stop-shop to provide permits in Austria is only partial, as only some permits (e.g. environmental and building permits) can be obtained together. The United Kingdom has introduced a twelve months' time-limit for planning permits, which includes the necessary time for appeals."

Some European countries have introduced facilitated notification procedures for small renewable energy installations such as rooftop photovoltaic installations. This facilitates that an approval is considered granted upon notification as long as the project follows the criteria for the procedure, and explicit approval of the authorities is not necessarily required.

In addition to the above examples physical proximity of the involved authorities in the development process help ease the interaction between authorities and accelerate the process.

7.4 Administration: Complex and Lengthy Procedures

7.4.1 Challenges

Administrative procedures face the following key challenges:

a. Lengthy and time consuming administrative processes impact project implementation
b. Time duration for approval often does not reflect waiting time and causes unexpected and unintended delays
c. Waiting time in most cases is greater than the actual time taken for approval duration

[1] Referred to the official website: www.renovaveisnahora.pt

In AMS, the development process for RE is characterized by complex and lengthy procedures. Root cause is the involvement of high number of involved authorities, non-streamlined or undefined development procedures lack of relevant experience further delays the approval.

The length of the administrative process is defined by the actual time, required to interact with the competent authorities; whereas the waiting time, being the time during which the developer is waiting for a decision/communication from the administration. The waiting time is often dominant factor for the definition of length of a certain process.

For the developer it is highly important to realise the project in the shortest time possible. Processes that are stretched by waiting time substantially increase the project costs for the investors as the revenue stream of the installation is further delayed.

7.4.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Streamline existing procedures, by accounting for requirements of the individual RE technologies and by differentiating between project size and capacity
b. Identify and address root causes for time consuming processes
c. Introduce clear deadlines for the developer and authorities involved
d. Introduce and enforce legal measures, which empower the developer to take legal means in case of unexpected delays caused due to pending action from authorities
e. Introduce compensation to the developer for delays caused by authorities

Generally, it is advised to streamline existing procedures by accounting for the requirements of the individual RE technology and the individual capacity sizes. Root causes for time-consuming processes should be identified and addressed.

Streamlining of procedures along with clear deadlines are introduced for the developer as and authorities involved. Deadlines are defined for both developer and authorities.

For delays caused due to authorities' inactivity, authorities may be asked to pay appropriate compensation to the project developer. In this case, the project developer needs to be empowered legally. On the other hand, in case project developer defaults, an appropriate penalty is recovered from the project developer.

7.4.3 International Experiences

Simple and predictable procedures attract the highest attention from developers and investors; this enables compensating lower support scheme levels. The best example is comparison of administrative procedures (during 2011) between Germany and France (European PV Legal Project, www.pvlegal.eu):

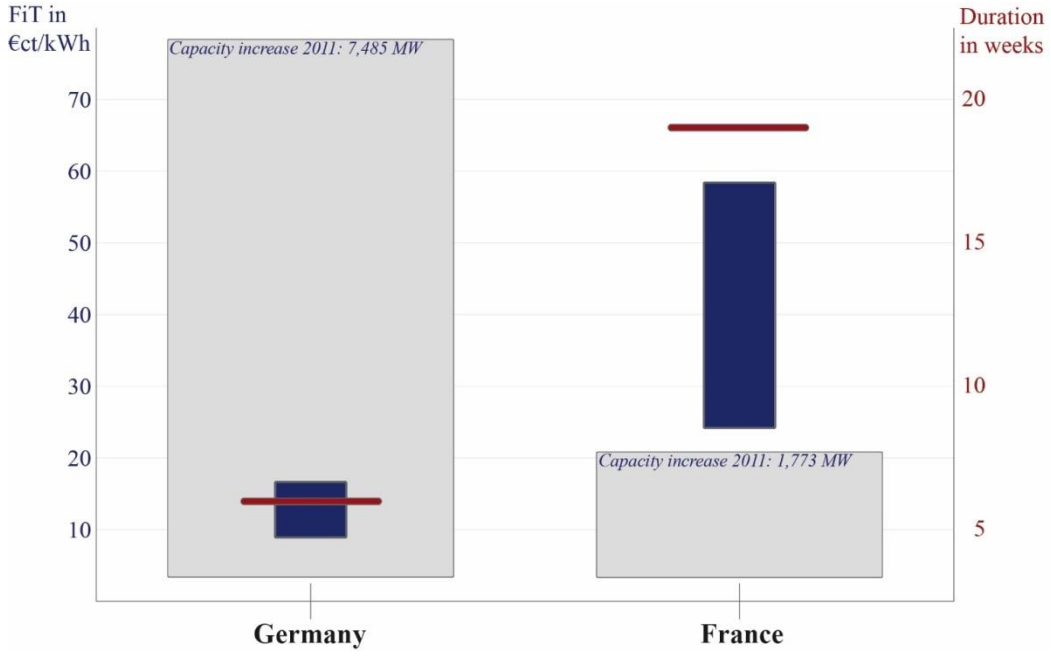

Figure 3 Capacity addition in Germany and France during 2011 due to simplified procedures

The figure shows that clear and simplified procedures enabled Germany to increase its FiT substantially as compared to its neighbouring country France.

7.5 Administration: Authorities Lack Experience in New and RE Technologies

7.5.1 Challenges

Following challenges were identified on the level of experience on RE technology and economics:

a. Approval for RE installations are often handled by authorities without proper in-house capacity

b. Comprehensive training of the administrative personnel on the new technologies and the related requirements are generally missing

c. The administrative personnel are generally not experienced with the new technologies and face difficulties in adapting new procedures correctly and as expected

d. Lengthy procedures with additional requirement of not relevant document

Authorities are not prepared for new and innovative technologies and this takes long time to prepare schemes and approval procedures. Training needs of personnel is often overlooked due to work pressure and other assignments at hand. Often, training needs are not addressed well in time.

Due to missing experience in new technologies, often administrative authorities end with additional documentation. These documents are generally based on their previous experience and knowledge and may not match with the requirement of new technologies.

Projects based on new technology/design suffer during initial phase and sometimes become inviable and affect the following project developers.

7.5.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Comprehensive training to the administrative personnel on new technologies and related administrative procedures

b. Analyse and streamline existing procedures on regular basis

c. Identify existing barriers for administration staff and developers

d. Adapting international lessons learned and identified solutions for existing barriers

Comprehensive training and capacity building is required for all personnel dealing with administration of approvals and permits related to renewable energy. Trainings may focus on introducing the personnel to new technologies, its advantages and disadvantages and impact on national planning must be given. The training must cover procedures and experiences available worldwide for adapting to national needs.

There is a need to regularly analyse and streamline administrative procedures matching with the needs of project developers and RE development. This will enable authorities/personnel to adapt to changes, technology updates, if any.

In addition to this, periodic analysis and status check of the administrative procedures, existing barriers and other factors which affect the development of RE is recommended. To this direction, AMS may make use of international lessons learned. International experience good or bad may provide direction to the next steps with regard to approval procedures in national context.

7.6 Market: Quality Standards and Availability of Certified Products

7.6.1 Challenges

RE technology, market and implementation face the challenges as given below:

a. Quality standards are not available for every component of RE technology

b. Quality standards are not strictly followed, if available

c. Certification, standardization of products and installations matching with international standards is often required

d. Due to missing or lack of quality control, cheap low-quality equipment at higher costs are sold

The new and rising markets in ASEAN region suffer due to low quality and missing existing quality standards and awareness of certified products.

Detailed knowledge of international quality standards is often missing. Related standards, norms and codes applicable to a given RE technology, product or application are often required for successful deployment of RE technology. Awareness of international codes and norms is low; in case international standards are referred in legislation or approval procedures consideration and enforcement including penalty is not introduced or implemented.

Some AMS supply high-class and certified photovoltaic modules from semiconductor material down to the ready to use module. The modules fulfil International Electro-Technical Commission (IEC) standards and are surveyed periodically by independent auditors to achieve bankable products. However, on the other hand photovoltaic modules production lines in other AMS cannot compete in terms of quality, productivity and price. Despite this, the latter sell and push their products into the market to create revenues neglecting potential warranty issues, which might appear at a later point in time.

RE project development and implementation often, face low quality of project development, based on inexperience, combined with low quality of the products to be installed; this might cause significant cost overrun and underperformance during project life cycle. Thus, it does not come as a big surprise that banks either have already experienced such projects or come to know about poor installation. Subsequently, the risk awareness of finance institutions is quite high and the exposure for project finance is limited.

Procuring low quality products at premium price may end up total failure of the project concept. Such projects will prove a hurdle for projects with better and quality component due to already bad reputation.

7.6.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Nodal agencies shall define the applicable international standards, codes and norms adapted to local conditions and publish them with respective guidelines

b. Approval authorities should involve international agencies/institutions for defining quality assurance and surveillance concerning production, manufacturing lines and processes and RE installations on site

c. Approval authorities should hire third party inspection/appraisals periodically for production and manufacturing

A clear legal framework of international standards for RE products and services are made mandatory e.g. for FiT or respective promotion scheme. Reference can be provided wherever it is required. Penalties must be introduced for non-performing and sub-standard installations.

All nodal agencies, authorities and regulatory institutions must introduce a reference list of the particular standards for the given RE technology. If there are no existing standards, international experts may be involved to draft respective listings and applications.

Controlling and surveillance structure to approve RE applications fulfilling the standards may be set-up. It is necessary to control manufacturing lines and to approve installations before commercial operational date (COD). Independent certification bodies may be authorised to certify the products on behalf of the authorities.

7.7 Market: Local Content

7.7.1 Challenges

Market face following challenges when competitive RE technology has to be imported :

a. Local content is often recommended by some AMS which includes additional support as compared to international products

b. Local products compete on pricing with quality and economical international products due to scale of manufacturing

Often local content is requested by the governments to stimulate the market for local manufacturing of RE components, especially solar photovoltaic panels/modules with an intention to create new employment opportunities and jobs in the respective country to contribute in the value chain. However, locally available resources and manufacturing capabilities play a major role in the manufacturing of quality products.

7.7.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Local content covers regional skills, expertise and resources. Priority is given to quality and reliability

b. Creation of transparent markets will allow local companies to develop the quality of product and become more competitive

To make use of local content successful an analysis may be done for locally available resources and compared to international quality. It has to be noted that the scale of production will play a major role. Third party inspection must be conducted for the success of locally made equipment/component quality. An analysis of complete production chain must be conducted to ensure success of the local production.

If the concept of local content seems unviable for components used in overall project, components that can be manufactured locally and with good quality could be identified and produced locally. This will ensure quality and reliable performance of the system as a whole. Quality check still needs to be done to maintain performance and efficiency of installation.

7.7.3 International Experiences

Malaysia exports more than 90% of its solar PV production due to the fact Malaysia has a small requirement in the local RE market. Vietnam has robust tower manufacturing business for wind power plants/wind turbines. Thailand's biogas companies are experienced in Palm Oil Mill Effluent (POME) digestion and biogas to energy conversion.

The European Commission and national Governments like in Germany created the market with information campaigns promoting best practice examples accompanied with evaluations from research institutes by continuously improving experience and quality.

7.8 Finance: Missing Finance Products for RE Investments of the Private Sector

7.8.1 Challenges

Available financial mechanisms and products are not adjusted to RE project financing and the FGD identified the following challenges:

a. The CapEx on RE technologies are high given the fact that payback/Internal Rate of Return (IRR) on investment is high

b. Missing applicable finance model for private investors; large projects receive state backed securities

c. Traditional finance products require high collaterals; non-recourse finance products for larger projects are often not available

d. Lack of project experience, quality and controlling structures fail to achieve bankability

Risk assessments involve project costs and/or time overrun and/or underperformance, currency exchange/valuation risks, delayed PPA payments may make it non-viable.

National finance institutions often fail to finance RE project on the contrary international funding in terms of debt and equity is available for investments in the RE sector. As RE projects often do not perform due to various reasons as discussed above, the risk for banks is high.

7.8.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Need for banks to innovate new mechanism and offer specific products (based on technology, size, location specific) for RE finance: soft loans (backed by state bank or bank regulator) of different type and size

b. Develop specific RE-finance-products for recourse and non-recourse finance by technology and size of investment

c. Develop the product "Non-recourse RE-finance" which will create additional margin for banks: risk premium and fees and make banks partner of project developer.

d. Banks to enforce quality standards, benchmarks and controlling procedures to facilitate bankability through building techno-economic assessment capability within the finance sector

e. Commercial banks introduce specific branches and nodal offices to deal with RE related financing

f. Capacity building of commercial banks by banking authority

National governments are advised to support state securities to facilitate project finance through limited or non-recourse, soft-loans and risk coverage schemes. This could be achieved through state owned/linked agency providing corporate guarantee or loan insurances against default. Such state guarantee would assist the developer in raising the required equity for investment.

The banks involved could strengthen the capacity by hiring employees who have exposure to RE technologies and projects. This will enable banks to finance RE projects and evaluate in between about the success of projects. With right capacity employed banks could develop specific products for the RE market.

Banks are advised to develop recourse and non-recourse RE products for project finance from small investments to large investments. Non-recourse products would expose banks to a higher risk, which could be compensated by due diligence fees and risk premiums. One-stop shop branches may be set-up for RE projects. This will ensure that every application is scrutinised carefully involving experts.

7.8.3 International Experiences

Corporate Guarantee Corporation (CGC) of Malaysia, state owned/linked agency provide corporate guarantee or loan insurance against default. Under the National Green Technology Policy, Malaysia provides a 60% finance security for RE projects to support limited recourse finance schemes and adds a 2% interest rate subsidy for RE investments. Such state guarantee would assist the developer in raising the required equity for investment.

7.9 Support Scheme: Bankability of Power Purchase Agreement

7.9.1 Challenges

Some challenges identified is that the Power Purchase Agreement (PPA) in some countries are not bankable, and not accepted as security (collateral) because of the financially weakness of the utility.

The PPA is the legally viable document between the project owner and the (usually) state owned utility to receive a compensation for energy evacuated to the grid. The PPA regulates the relation between both parties, economic wise and often technical wise. The economic element defines the applicable monetary compensation per energy unit in kilowatt-hours (kWh) and the duration of the compensation including potential inflation compensation or international currency hedging elements. The PPA regulates the terms of payment, penalty for delayed payments, accounts etc. The technical definitions describe the point of grid access, limitations and restrictions and often detailed technical preconditions for the connected electrical devices e.g. inverter, generator, transformer among others. The PPA applies for FiT promotion schemes as well as for direct appointment agreements between the utility and the project owner. In both cases, the PPA is the basic economic element for the project finance structure and therefore subject to detailed due diligence and bankability checks.

Depending on the PPA sometimes, penalties are defined for not supplying electricity to the purchaser within certain criteria.

From bank perspective, the rating of the utility must be sufficient for accepting the PPA as collateral. In case the PPA is not bankable and therefore cannot serve as collateral an additional security is necessary like a state guarantee to back the PPA respectively the utility.

A non-bankable PPA presents a severe obstacle for the investor and the bank, because the bank subsequently requests collaterals to compensate the missing security. In this case, the investor is made liable for the not bankable PPA. Non-bankable PPA will fail to invite international investors who may be willing to bring in new and latest technology.

7.9.2 Recommendation

To address the above challenges following recommendation may be considered viz. state bank or government can provide additional guarantees for payments or loans to compensate/bridge the gap.

To bridge the gap between non-bankable PPA, governments may issue a FiT promotion scheme, which are:

a. strong and is non-revocable with duration or around 15 years or more
b. bankable and reflects the local laws and requirements

The PPA, which is often defined as FiT or the direct appointment agreement, should consider additional aspects like inflation rate for OpEx costs or international currency hedging where investments are dominated by the import of costly RE components.

7.9.3 International Experiences

For instance, in Germany the FiT is regulated by law over a 20 years' period and therefore bankable. The PPA regulates the economic, legal and technical procedures around the FiT.

7.10 Utilities: Perception of RE as Competitor Technology

7.10.1 Challenges

Perception of RE by important players e.g. utilities is not encouraging and face major challenges such as given below:

a. Utilities are experienced of large power plants, one-way distribution grids, constant growth of demand, blackouts, shortage of capital
b. Requirement of RE often are micro power plants, two-way grids, huge volumes of capital, intensive engineering and management
c. Perception of high cost of RE due to poor RE reliability and performance
d. Grid access prohibitive for third parties to avoid system instability, breakdowns and blackouts
e. PPAs offered not bankable due to missing credibility of utility or state/legal guaranty of FIT payments
f. Utilities refuse to pay FiT or close PPA through creation of bureaucratic hurdles

Utilities are apprehensive of situations with increased distributed RE generation would result in electricity consumers defect from the grid with the increasing declining cost of PV & energy storage systems

Utilities have experience in generating and distributing electricity to the final customer at reasonable costs, it is often seen that RE is considered competitor technology and the variable nature is cited as challenge to the stability of grid.

Utilities are experienced in handling one-direction flow of electricity and are not prepared for bi-directional metering. To operate bi-directional metering enabling final customer into an energy supplier will be new business structure. Currently there is no business model at all which allow the utilities to make profit from the other end of the grid.

Utilities are often concerned with grid operational and focused to prevent black out of the grid. Utilities deal with large size power plants, as compared to RE projects, which involve extensive project management compared on same scale.

7.10.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Utilities develop grid for increased RE integration, new business concepts in evacuating power from RE installations and operate the grid two ways in order to make profit out of renewable energy supply

b. Utilities introduce specified RE divisions equipped with high skilled personal and investment capital. The new division should be able to manage high numbers of RE installations and is managed along streamlined processes for fast approval procedures

c. The grid operation division implement grid-monitoring devices to allow remote access for online grid surveillance

d. It is advised that national governments intervene in case the national utilities neglect promotion schemes for RE or refuse to countersign PPA or refuse to pay the FIT

e. Utilities learn from international best practices and adopt successful business models

Utilities develop and promote business with RE technology by employing skilled persons with understanding of RE as energy source. Utilities prepare themselves to handle large number of small RE power fed into the grid. This could be achieved through grid monitoring devices to allow remote access for online grid surveillance.

Utilities are enabled by local laws to follow guidelines to allow RE energy sources and provide grid for easy access to RE based sources.

Events such as brown/black outs are addressed through grid impact analysis and technically matched through IEC definitions and requirements.

7.11 Industry: RE not considered as Core Business

7.11.1 Challenges

Some challenges identified are as follows:

a. Industry focus on business which gives profit in short time, RE often is considered as capital intensive

b. Benefits of RE (sustainability, environmental, reliability, etc.) in longer run is often neglected

c. RE often fail to seek attention of management as alternate option to energy

d. Grid access does not exist; or low capacity to evacuate surplus power

Low-hanging fruits like utilizing bio-waste/bio-energy are not encashed. Industry has not yet recognized its own potential business model, additional revenue. In case of surplus power from RE source, evacuation is seen as major obstacle; this affects the cost-economics negatively.

There is a challenge to change this paradigm to build a grid and connection points not only one-way but two ways to transport the excess power to the demand centres of and cities.

7.11.2 Recommendation

To address the above challenges following recommendations may be considered:

a. New business models need to be developed for both industry and the utilities

b. FiT for surplus power from RE must be reasonable to attract investments e.g. CHP (palm oil, sugar, etc.), bio-waste

c. Grid is made available for RE projects eligible for FiT

d. Government introduces incentives to migrate industry from a brown economy to green economy

e. International market pressure for industry to adopt RE as part of their sustainability measures in their businesses to be climate friendly

Awareness on RE technologies as potential business has to be increased to invite investments from private players. Preference must be given to installations with waste heat recovery and energy efficiency among others. This will enable development of RE market and supply. In longer run, this makes RE cheaper and more competitive to conventional technologies. To achieve this objective quality campaign within the industry is advised in relation to energy efficiency. Development and evolution of RE technology in the international market enables industries/businesses/user to switch to best performing and environment friendly RE technologies.

7.12 Human Resources: Unskilled Personnel

7.12.1 Challenges

Availability of skilled manpower is often a challenge in growing RE market and the following challenges need to be addressed:

a. Unexperienced and unskilled personnel impact RE development

b. Lack of experience on technology, O&M, financing, administrative and legal procedures impact RE development

c. Government's administration and approving bodies are overloaded by high numbers of other tasks

d. Need of skilled person to deal with RE project application

e. Utilities are not prepared for large number of PPA

f. Banks are not updated on the technology, application and economics

g. Due to lack of awareness on government policies and technical know-how banks could not finance feasible projects

h. Operation & maintenance (O&M) is not taken over by experienced personnel

The availability of skilled personnel is a key requirement to develop the RE market for high penetration of RE. Stakeholders involved in RE project development often not inadequately skilled. Many project developers enter the market realising large potential of RE business opportunities and fail due to missing expertise and experience.

Due to lack of skilled resource persons on technology, laws and regulations, international developers willing to enter market find it difficult or even impossible.

Considering new technology as business model often face challenge due to lack of skilled manpower in business houses/companies. Lack of know-how delays the adoption of technology resulting in increased costs. Utilities often are not prepared for PPA and many successful project fail due to lack of infrastructure. Financing institutions often find it convenient and fast to support conventional technologies due to known standards and procedures. It is highly recommended that know-how on RE has to be built in these institutions.

Often RE is considered as secondary source of energy and it is perceived as free source of energy. This leads to poor O&M and hence poor performance and discontinuation forces the project developer/user to switch to other energy sources.

7.12.2 Recommendation

To address the above challenges following recommendations may be considered:

a. Organisation of capacity building programmes and training programs institutions
b. Streamlining the capacity of involved institutions
c. Stakeholders recruit personnel having experience on RE, development, implementation, financing, etc.
d. O&M workers must be educated on technology and impact of maintenance on performance
e. Stakeholders keep themselves updated on technology advancement and development

Stakeholder awareness is the key to promote and develop RE market. The stakeholder includes, government, project developer, management, financing institution, technical persons, etc. The management and human resources need to be educated on selecting qualified candidates and train the existing workforce/employees. Various approaches can be followed:

a. General understanding of the technology
b. Skills to execute the Re project development, O&M, etc. as best practice
c. best practices available worldwide
d. Capacity building programs of training institutions, etc.
e. Cross-sectoral streamlining processes initiated by the government to improve administrative efficiency

8. Conclusion

The above challenges provide an insight into the existing permits and procedures into the existing practices and examples in the ASEAN region. Recommendation to these challenges will be useful in streamlining the process for faster and easier deployment of Renewable Energy in the region and achieve target of 23 % share of RE (APAEC 2015-2025) in the primary energy supply in ASEAN region by the year 2025.

Print:
Deutsche Gesellschaft für
Internationale Zusammenarbeit (GIZ) GmbH

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