Renewable Energy Guideline on

Solar Photovoltaic (Large) Project Development in Malaysia

> 72 kWp

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Authors

Ir. Shan Suleiman, Khairunisa Shan (SSM Associates, Malaysia)

International Consultants

Jan Benjamin Spitzley (Eclareon, Germany), Dr. Matthias Eichelbrönner (E.Quadrat, Germany)

Editors

Ms. Azah Ahmad (SEDA), Dr. Anant Shukla, Ms. Maria-José Poddey (GIZ)

Design & Layout

Thachatat Kuvarakul, Stephanus Widjanarko, Intan Cinditiara (GIZ)

www.ssmassociates.com.my

www.eclareon.com

E.Quadrat

www.equadrat-gmbh.de

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- ASEAN Centre for Energy (ACE) under Renewable Energy Support Programme for ASEAN (ASEAN-RESP)

Kuala Lumpur, September 2016

Disclaimers

RE-Guidelines for Solar Photovoltaics (large) project development in Malaysia are developed by Renewable Energy Support Programme for ASEAN (ASEAN-RESP), a jointly implemented project by ASEAN Centre for Energy *ACE) and GIZ. ASEAN-RESP is a regional project implemented on behalf of Federal Ministry for Economic Cooperation and Development (BMZ).

Highest effort has been given to ensure and maintain accuracy of the Guidelines. Regulations and procedures for RE project development in Malaysia are complex, include numerous actors and are likely to be changed or updated over time. It is therefore not possible to cover all aspects and eventualities of RE project development with these Guidelines. Highest efforts have been made to maintain the accuracy of existing processes however, GIZ and its implementing partners cannot be held responsible for any error and misuse of the Guidelines. The Guidelines shall not, in any case, replace or be used instead of existing laws, regulations and official guidelines issued by the relevant authorities in Malaysia.

Foreword

Ms. Catherine Ridu

Chief Executive Officer
SEDA Malaysia

Sustainable Energy Development Authority (SEDA) Malaysia

2011 was a transformative year for the development of renewable energy in Malaysia with the passing of the Renewable Energy Act [Act 725] and the Sustainable Energy Development Authority Act 2011 [Act 726]. This in turn ushered in the establishment of the Sustainable Energy Development Authority (SEDA) in Malaysia.

As a statutory body under the direct supervision of the Ministry of Energy, Green Technology and Water Malaysia, SEDA operates under 5 strategic thrusts as meted out in the National Renewable Energy Policy and Action Plan (2010) and is primarily responsible for sustaining the renewable energy agenda in the country. The core function of SEDA concerns the implementation of the Feed-in Tariff (FiT) mechanism as a means to foster growth in the nation's renewable energy (RE) market.

As Malaysia is equatorial in nature and thus receives an abundance of sunshine yearly, solar energy is positioned to play a crucial role in the future energy mix. As of July 2016, 9,406 applications out of a total of 9,586 approved applications were for solar PV alone, with 95% (8,989 applications) coming from applications for small installations of <72 kWp. The number of applications signifies the increasing awareness and acceptance from the general public of the importance of clean and renewable energy. With Net-metering and Large scale solar programmes announced for this year, it is expected that the number of solar power plants will continue to grow and contribute at an increasing rate in the coming years. While the target seems small at first glance, the market for solar energy has shown the most growth compared to other RE technologies, and it is the only technology where the public can participate as "prosumers" (both producer *and* consumer).

Foreword

In order for the PV market to grow, it is important to develop soft infrastructure such as human capital in order to support the PV industry. In this regard, SEDA is also responsible for providing a conducive environment to support the development of the PV industry by offering competency development training to members of the PV industry. SEDA also offers workshops and dialogue sessions to its stakeholders to ensure the transparency of the administrative procedures that uphold the good governance practiced in SEDA Malaysia.

As such, SEDA Malaysia supports the ASEAN Centre for Energy (ACE) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH in their joint effort to develop this Renewable Energy Guideline on Solar Photovoltaic (Large) Development in Malaysia (>72 kWp).

As Malaysia is one of the active members supporting the ASEAN RE agenda, we hope that this guideline will deepen the talent pool regarding the development of large PV systems both in the country and around the ASEAN region. We sincerely hope this guideline will be of some benefit to all potential developers and investors in the development of solar PV projects in Malaysia.

Ms. Catherine Ridu,
Chief Executive Officer, SEDA

Foreword

ASEAN Centre for Energy (ACE)

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Dr. Sanjayan Velautham

Executive Director
ASEAN Centre for Energy

Maria-José Poddey

Principal Advisor
ASEAN-RESP, GIZ

Malaysia, as one of the front runners in terms of renewable energy (RE) technology implementation in ASEAN, aspires to achieve the targets set forth in the ASEAN Plan of Action for Energy Cooperation (APAEC) 2016 – 2025, i.e. 23% share of RE by the year 2025 in ASEAN Energy Mix. In addition to promoting an increased share of RE in the total energy mix, Malaysia aims to reduce greenhouse gas emissions by 45% of GDP until 2030, based on the levels of 2005.

Malaysia incorporated RE as early as 1980 with the introduction of Solar Photovoltaic System for rural electrification. After 21 years, RE was formally adapted in April 2001 under the Five Fuel Policy with the 8th Malaysia Plan. In 2011, Malaysia established the National Renewable Energy Policy and Action Plan (NREPAP), which enabled acts viz. Renewable Energy Act 2011 and the Sustainable Energy Development Act 2011. This resulted in the introduction of the Feed-in Tariff (FiT) and other measures to promote the use of RE.

Successively, Malaysia introduced various financial incentives and strategies such as the FiT mechanism, Green Technology Financing Scheme (GTFS), Facilitation Fund from TERAJU, UKAS/PPCU and Pioneer Status/Investment Tax Allowance among others.

The Renewable Energy Support Programme for ASEAN (ASEAN-RESP) - a jointly implemented programme 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) - is actively supporting ASEAN Member States (AMS) through various measures.

Foreword

The measures include capacity building, trainings and Focus Group Discussions with stakeholders and actors both in the region and worldwide. One such activity is to streamline the procedures for permitting/approving projects in AMS. In this direction, the Sustainable Energy Development Authority (SEDA) of Malaysia and ASEAN-RESP have developed this *RE Guideline on Solar Photovoltaic (SPV) Project Development in Malaysia*. This guideline presents an overview of steps involved in the implementation of SPV projects.

The RE Guideline aims to document the existing permits and steps involved in the implementation of SPV projects in Malaysia in an easy-to-use and concise format. The Guideline provides an overview of the various steps involved and approvals required from concerned departments or authorities. The RE Guideline provides a means to improve, strengthen and further the development of SPV in Malaysia. The RE Guideline intends to support the deployment of Solar PV from presently installed capacity of 263.94 MW under FiT. Net Energy Metering (NEM). scheme allocates 100 MW and 250 MW per year for small SPV (2016-2020) and large SPV (2017-2020) respectively. This will result in a total installed capacity addition of 500 MW and 1000 MW respectively. An overview of the procedures and steps involved will result in the increase of RE share in the total energy mix, improved energy security, self-dependence on energy, as well as job creation in the ASEAN region.

We are grateful to the Ministry of Energy, Green Technology and Water (KeTTHA), Malaysia and SEDA for their insights and active engagement in the review and development of the Guideline. We hope that this publication will help increase the understanding of the various permits and procedures required for SPV project development in Malaysia, thus motivating various stakeholders to be involved in SPV projects.

Ms. Maria-José Poddey

Principal Advisor
ASEAN-RESP, GIZ

Dr. Sanjayan Velautham

Executive Director
ASEAN Centre for Energy

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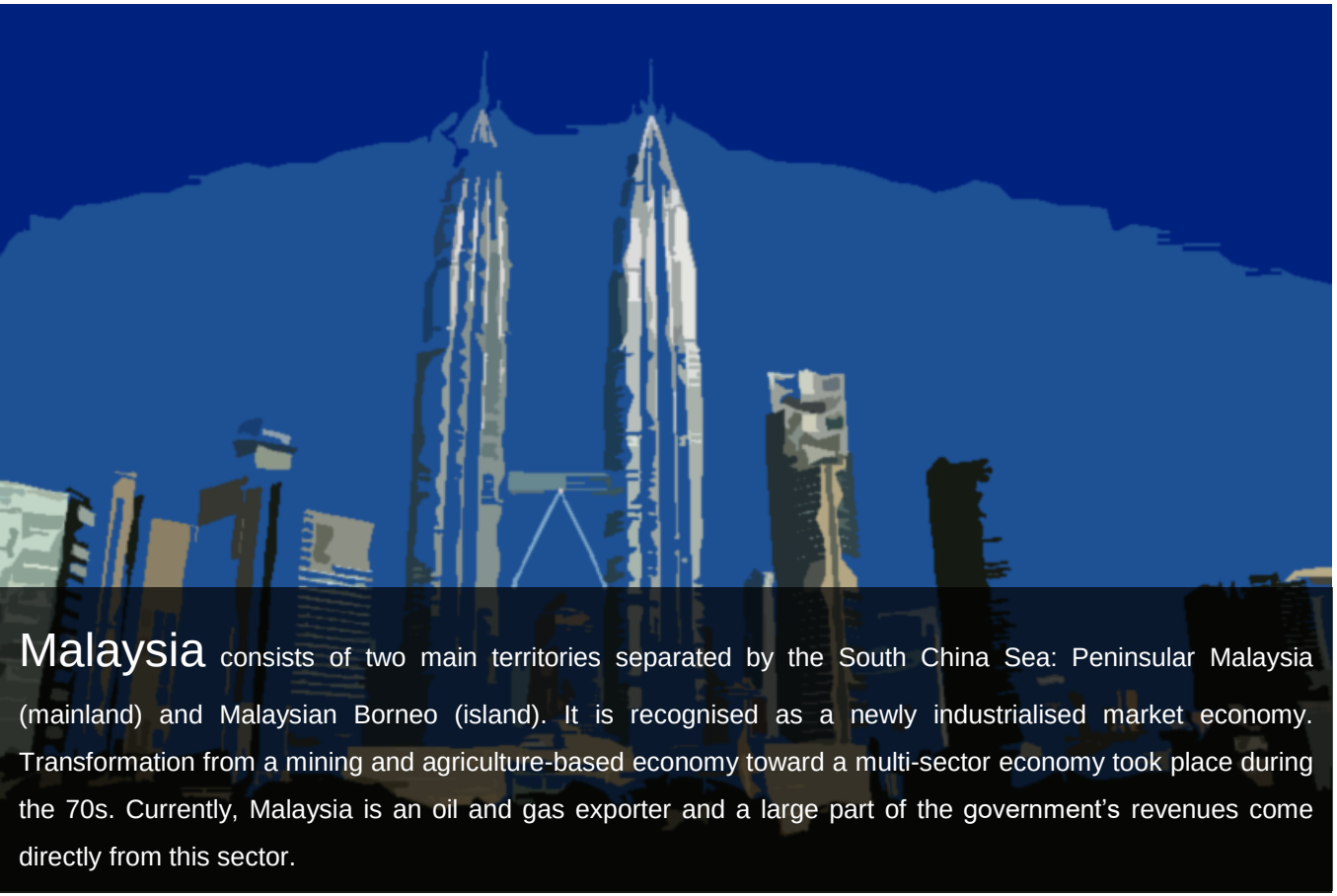


Malaysia consists of two main territories separated by the South China Sea: Peninsular Malaysia (mainland) and Malaysian Borneo (island). It is recognised as a newly industrialised market economy. Transformation from a mining and agriculture-based economy toward a multi-sector economy took place during the 70s. Currently, Malaysia is an oil and gas exporter and a large part of the government's revenues come directly from this sector.

Population (2016 estimation)

31.3 million [1]

Nominal GDP (2014 estimation)

USD 337 billion [2]

Nominal GDP per capita (2014 estimation)

USD 2,790 [2]

Capital

Kuala Lumpur

Currency

Malaysian Ringgit (RM)
(exchange rate: USD 1 = RM 4.21 - as of September 2015)

[1] Department of Statistics, Malaysia (2016); [2] International Monetary Fund (Oct 2014)

Solar Photovoltaic (PV) in Malaysia

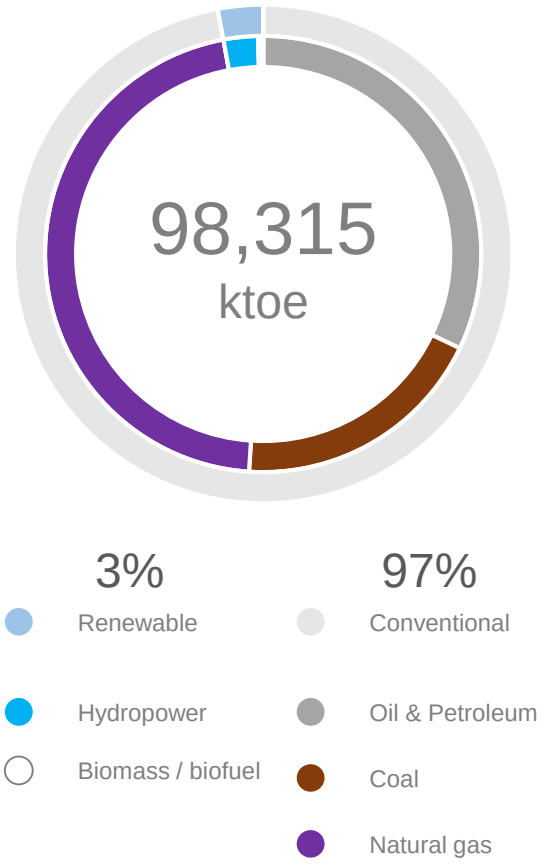
Background information

Malaysia possesses an abundance of energy resources, both conventional and renewable. Its primary energy demand was 98,315 ktoe in 2013. The share of conventional energy resources is very high at 97%, while Renewable Energy (RE) resources still play a very small role in the national energy mix. The installed capacity of Solar PV in Malaysia is 249.61 MW (June 2016).

Malaysia's National Energy Policy was established in 1979, consisting of three objectives: (1) securing a sufficient supply of energy in a cost-efficient manner, (2) promoting efficient use of energy, and (3) ensuring environmental protection in energy uses and productions. The Fuel Diversification Policy (1981 and 1999) was introduced to ensure the country is not overly dependant on a single source of energy. The four fuels initially defined include oil, natural gas, hydro and coal. The 8th Malaysia Plan 2001-2005 included RE as a fifth fuel, thereby adjusting the four fuel policy to five.

The Ministry of Energy, Green Technology, and Water (KeTTHA; *Kementerian Tenaga Teknologi Hijau dan Air*) is a governmental institution that oversees the Malaysia energy sector. The Energy Commission (ST; *Suruhanjaya Tenaga*) is a regulatory body mainly responsible for the natural gas sector and the power sector in Peninsular Malaysia and Sabah.

Primary energy mix (2013)[1]



1: Total primary energy supply from Malaysia Energy Statistics Handbook 2015, www.seda.gov.my

ktoe: kilo tons of oil equivalent

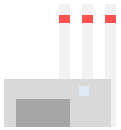
Solar Photovoltaic (PV) in Malaysia

Background information

The power market in Malaysia is generally monopolistic in nature, with three main vertically integrated power utility providers responsible for three different areas.

- Tenaga Nasional Berhad (TNB) in Malaysia Peninsular
- Sabah Electricity Limited (SESB) in Sabah
- Sarawak Electricity Company (SESCO) in Sarawak

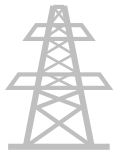
The Electricity Supply Act (Act 447) was initially passed in 1990, establishing a framework for the private sector to participate in the generation of power as independent power producers (IPP); the act was later amended in 2001. The Ministry of Energy, Green Technology, and Water issued several regulations under Act 447. Important regulations note include the Electricity Regulation (first issued in 1994 and later amended two times in 2013 and 2014), and Licensee Supply Regulation (issued in 1990).



Generation

29.8 GW
(18 GW from IPP)

134,077 GWh



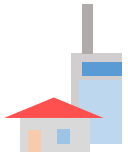
Transmission

24,535 kmc
(66 kV, 132 kV, 275 kV, and 500 kV)

Distribution

1,432,936 kmc
(below 66 kV, overhead lines and underground cables)

Consumption



9 million customers
(grid-connected)

116,353 GWh

Note: Unless stated otherwise, data taken from 2012.
Source: Malaysia Energy Statistics Handbook 2014

Solar Photovoltaic (PV) in Malaysia

Background information

The potential to harness solar PV in Malaysia remains high year-round. Plenty of solar PV sites can be found throughout Peninsular Malaysia, Sabah and Sarawak. As of 2016, there are a total of 8,606 solar PV systems in the Feed-in Tariff programme under Sustainability Energy Development Authority (SEDA) Malaysia [1].

As of 2016, the installed capacity of commissioned solar PV plants under the Feed-in tariff scheme is 256.5 MW, resulting in power generation of around 45.12 GWh in 2016 [2]. Most solar PV sites are located in the eastern part of Malaysia.

An effort to promote RE in Malaysia was initiated by the government in the past. The concept and idea of a Feed-in Tariff (FiT) was first proposed by Malaysia Building Integrated Photovoltaic (MBIPV note 1) Project as a potential policy to promote Malaysia's RE Sector in 2004. Following several extensive studies, consultation workshops and joint co-operation with international partners, invested parties sought to tailor the policy and supporting mechanisms to best fit Malaysia's needs.

[1]: FiAH Listing (www.seda.gov.my); [2]: Operational Plants (www.seda.gov.my)

Note 1: Malaysia Building Integrated Photovoltaic (MBIPV) Project was a joint initiative between the Government of Malaysia, the United Nations Development Program (UNDP) and Global Environment Facility to promote a nationwide and sustainable solar PV market in Malaysia. MBIPV was active from 2006 to 2010.

Solar Photovoltaic (PV) in Malaysia

Background information

The National Renewable Energy Policy and Action Plan (NREPAP) was proposed in 2009 and adopted in April 2010. The NREPAP consists of five objectives:

- To increase RE portion in the national energy mix
- To facilitate growth of RE sector
- To ensure reasonable cost of RE
- To conserve and protect the environment
- To enhance awareness on RE

Not long after, FiT was incorporated into the 10th Malaysia Plan in June 2010 and later into the National Budget of 2011. The RE sector gained a strong foothold in 2011 when the Renewable Energy Act (Act 725) was passed. It sets the framework for RE project development under the FiT scheme. The Sustainable Energy Development Authority (SEDA) was also established by the SEDA Act (Act 726) concurrently. SEDA is a special regulatory body under the Ministry of Energy, Green Technology, and Water that administrates and manages the implementation of the FiT mechanism under the RE Act.

Solar Photovoltaic (PV) in Malaysia

Background information

As of January 2016, the feed-in tariff for Solar PV is between sen 84.29 and sen 59.3 (~ cent 20 US to cent 14 US), depending on the installed capacity. The FiT duration is 21 years. There is a digression rate of 15% for the solar PV plant.

Installed capacity	FIT rate (per kWh)
Above 72 kW and up to 1000 kW	59.3 sen (US 14.09 cent)

About the Guidelines

Solar PV (Large) Project Development in Malaysia

In recent years, ASEAN Member States (AMS) have made a considerable effort to tap into the vast reserves of renewable energy (RE) in the region. Several countries introduced feed-in-tariffs (FiT) or regulations for RE, as well as other supportive policies, for example tax and customs exemptions or tax holidays.

Despite those efforts and some promising developments, a large scale market for RE applications has not yet been established in the region. In particular, complex administrative procedures, a lack of transparency in the project cycle and permitting procedures as well as insufficient access to financial resources are but some of the obstacles preventing an effective market and satisfactory industry development.

The ASEAN RE Guidelines were developed to facilitate increased private sector activity and investment in the RE sector of the ASEAN region. Since the confidence of project developers and investors is a prerequisite to boost region-wide RE deployment, the provision of transparent project development and permit procedures is indispensable.

To this end, the Renewable Energy Support Programme for ASEAN (ASEAN-RESP), jointly implemented by the ASEAN Centre for Energy (ACE) and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, is devleoping a comprehensive, easy-to-access and regularly updated online tool which includes complete information on ideal RE project development cycles in the respective AMS. The ASEAN RE Guidelines:

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

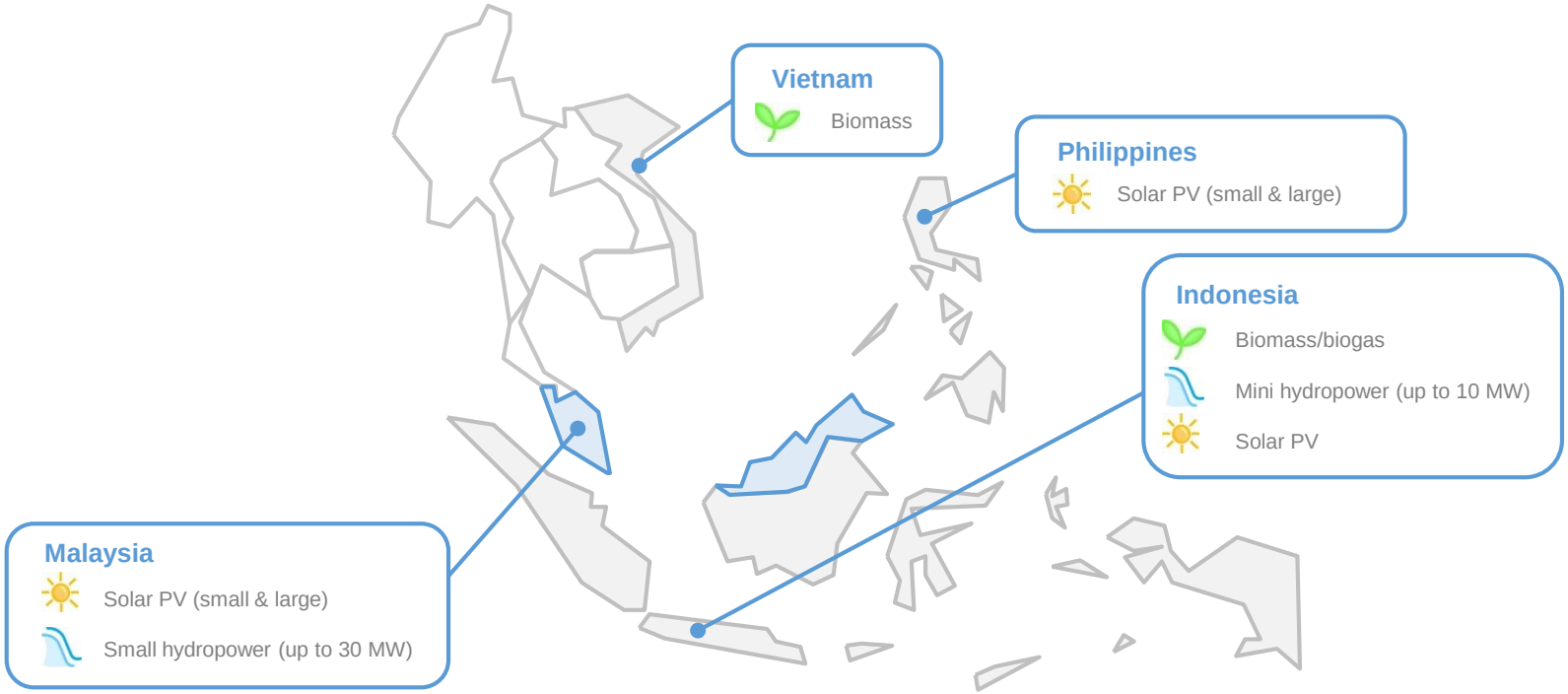
The ASEAN RE Guidelines are designed as best as possible to meet the needs of project developers and potential investors, as well as promote transparency and clarity in the RE projects' pathway. The Guidelines explain in detail the various procedures and help identify the risks associated with each step so that proper mitigation measures can be designed and put in place.

About the Guidelines

Solar PV (Large) Project Development in Malaysia

The ASEAN RE Guidelines were developed for different technologies and several ASEAN Member States. To promote RE development, as a precondition a clear legal framework must exist, along with minimum market readiness. The ASEAN-RESP is working closely with relevant organisations and projects in the respective member states in order to ensure quality, completeness and accuracy of data.

A series of four ASEAN RE Guidelines have been developed and published in four ASEAN Member States: Indonesia, Malaysia, the Philippines, and Vietnam.



About the Guidelines

Solar PV (Large) Project Development in Malaysia

This guideline, which is one of three publications in the ASEAN RE Guidelines initiative, focuses on small Solar Photovoltaic development. The other guidebooks in this series are (1) small Solar PV project development and (2) small Hydropower project development, scheduled to be published simultaneously.

The Renewable Energy Support Programme for ASEAN (ASEAN-RESP) identified regional and international consultants for the development of the RE Guidelines. This guideline **"Solar Photovoltaic (Large) Project Development in Malaysia"** was developed jointly with regional consultant SSM Associates Sdn Bhd in close co-operation with Sustainable Energy Development Authority (SEDA) Malaysia. The guidelines were reviewed by international consultants Eclareon GmbH and E.Quadrat GmbH to ensure that the information and content which are local in nature can be easily accessible and understood by foreign investors/ developers.

The primary target group of the guideline include project developers and investors who are investigating the feasibility of pursuing a solar PV project in Malaysia. It is also useful for bankers and policy makers. The objective of the guidelines is to provide an overview of processes, and they are not written from the perspective of engineering, procurement, and construction (EPC), engineering consultant, or equipment suppliers.

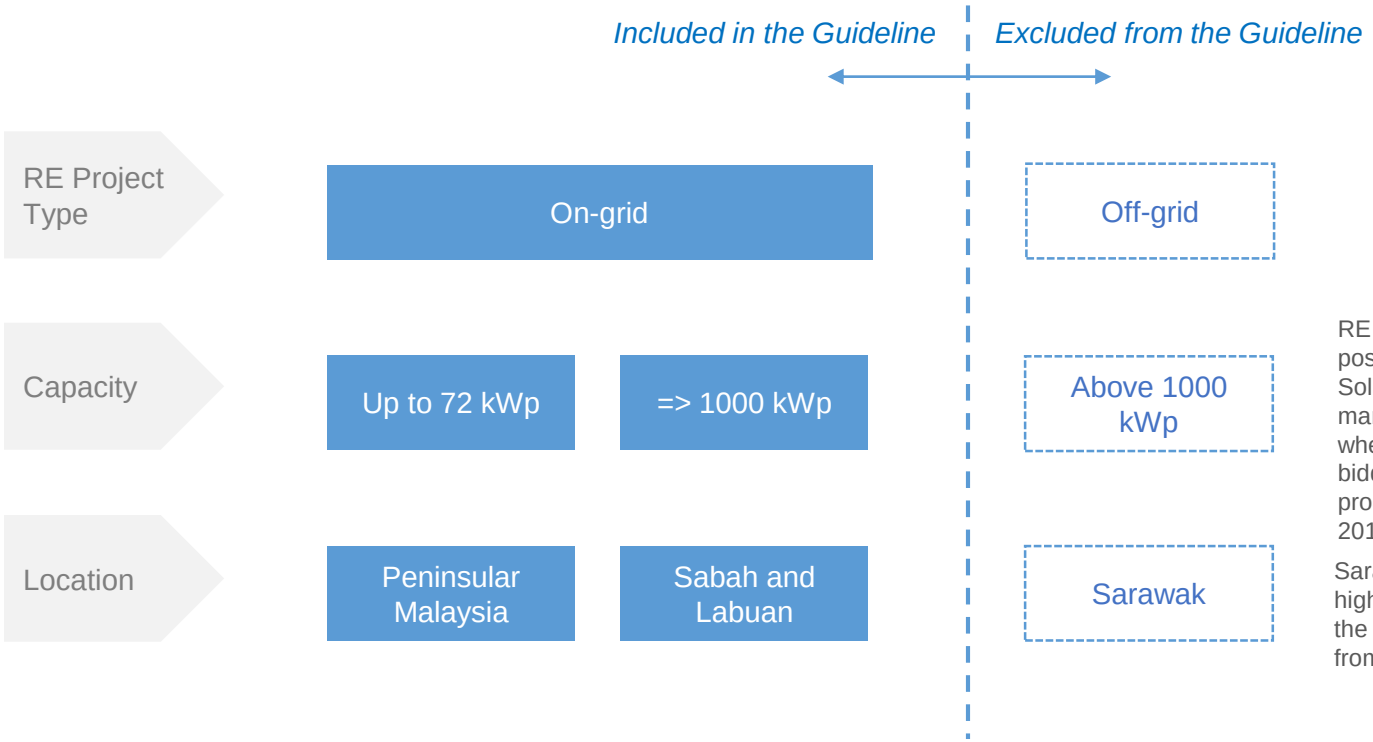
This guideline covers only grid-connected large Solar PV projects with capacities greater than 72 kWp. Development of an off-grid project is subject to different procedures comprised of different technical details. The procedure outlined in the following slides is for projects with the objective to obtain a FiT as stipulated under the Renewable Energy Act of 2011.

Based on the regulatory framework and different governing system, development of large Solar PV projects in Sarawak need to follow different laws and regulations; the procedures for doing so are also different. This guidebook covers the legal and regulatory framework for the Peninsular Malaysia and Sabah areas only.

About the Guidelines

Solar PV (Large) Project Development in Malaysia

ASEAN RE Guidelines | This Guideline



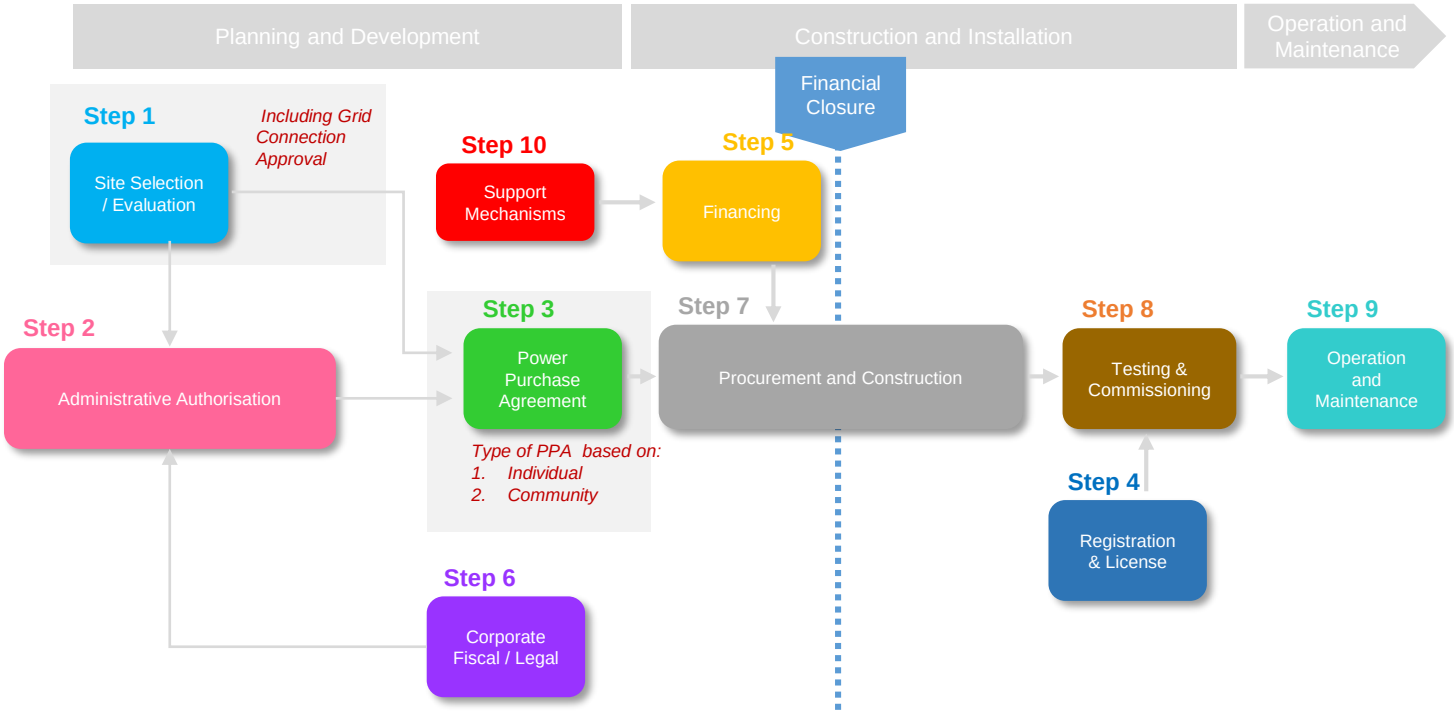
RE projects larger than 1000 kWp are possible but fall under the Utility Scale Solar PV (USSPV) programme managed by the Energy Commissioner where they have to go through a bidding process. The first bidding process is scheduled for the 2nd half of 2016

Sarawak is a state in Malaysia with higher level of autonomy. Therefore, the laws and regulations are different from the federal ones.

Procedures: Step-by-Step

Solar PV (Large) Project Development in Malaysia

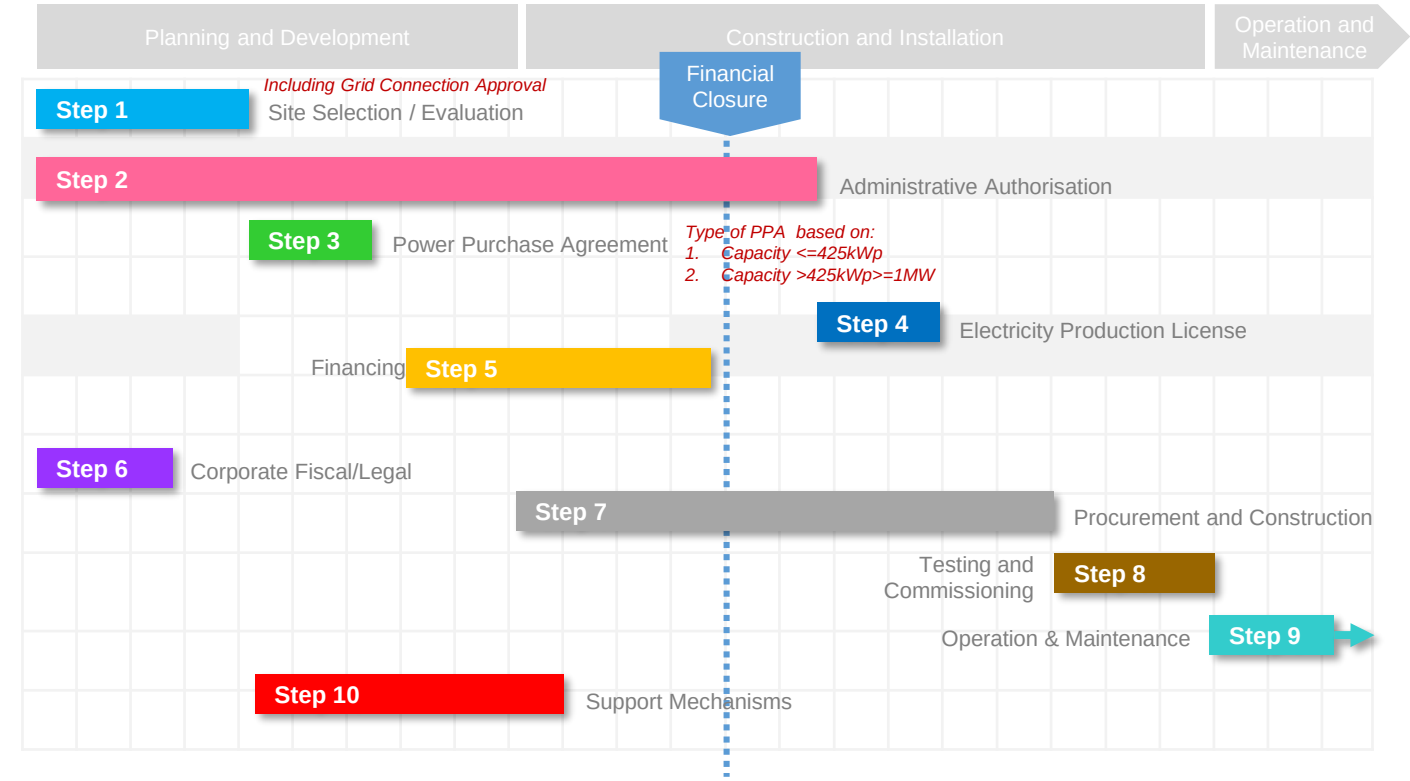
Gantt's Chart | Flow Chart | **Description**



Procedures: Step-by-Step

Solar PV (Large) Project Development in Malaysia

Gantt's Chart | Flow Chart | **Description**



Note: The bar length on the Gantt's chart is not to scale. It should be used for qualitative comparison only.

Procedures: Step-by-Step

Solar PV (Large) Project Development in Malaysia

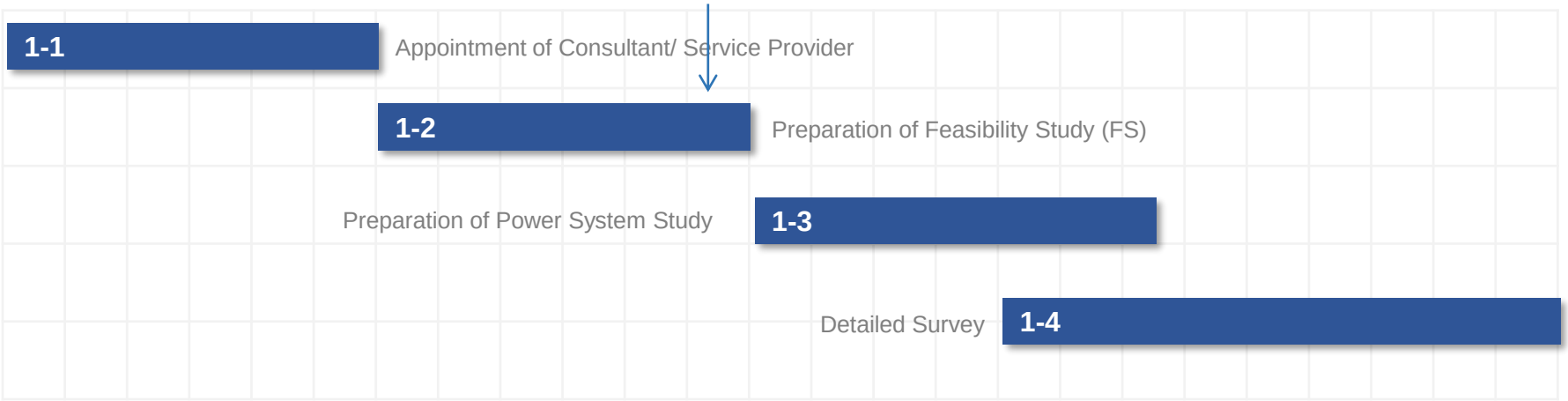
- To develop a large Solar PV project in Malaysia, project developers must first identify and select a suitable site for building a large Solar PV plant.
- Concurrently, permission for grid connection must be obtained.
- Typically, project developers establish a special purpose company (SPC) to develop, construct, and operate a large Solar PV plant. Establishment of a special purpose company must be done from the outset.
- A number of permits must also be obtained from the government and relevant authorities.
- A provisional license must be obtained from the Energy Commission, thereby allowing the project developer to generate electricity in Malaysia.
- Financing must be secured from banks or financial institutions.
- After the financial closure, procurement and construction may commence.
- After completion of a large Solar PV power plant's construction, inspection and testing must take place.
- After COD, operations at the large Solar PV plant may commence.

Gantt's Chart | Flow Chart | More Details…

2-1 Power System Study (PSS)

2-2 Connection Confirmation Check (CCC)

Step 1 | Site Selection / Evaluation



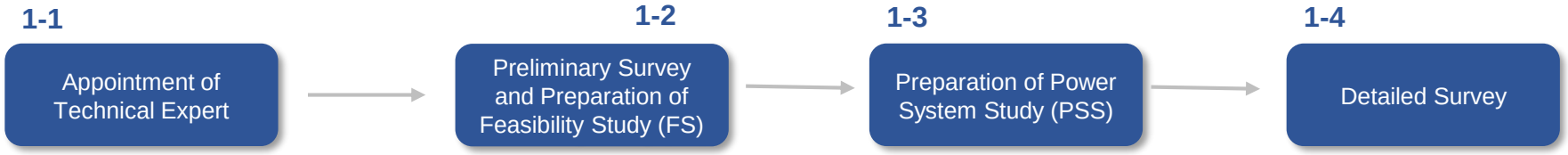
- Conditional sub-step
- Mandatory sub-step

Gantt's Chart | Flow Chart | More Details…

2-1 Power System Study (PSS)

2-2 Connection Confirmation Check (CCC)

Step 1 | Site Selection / Evaluation



Step 1 | Site Selection / Evaluation

… Gantt's / Flow Chart

Step Description

The first step for project developers is to select a suitable location for large Solar PV project development. For Solar PV project development, the project site should have good solar insolation with a sufficient number of sunny days (little to no clouds/rains) throughout the year to ensure the project remains economically viable.

According to the regulatory framework in Malaysia, an engineering-related study to select a site must be performed only by a registered professional engineer (PE). In case the project developer is not qualified or lacks sufficient capability to perform site selection and evaluation, an external consultant must be contracted to assist in this step (Sub-step 1-1).

The contracted professional engineer will help the project developer in preparing a feasibility study (FS) - (Sub-step 1-2). While conducting a Feasibility Study, necessary input must be collected to allow a Power System Study to be performed (Sub-step 1-3), followed by a detailed survey (Sub-step 1-4).

Appointment of Consultant/Service Provider

DESCRIPTION

Appointment of Consultant/Service Provider

The appointment of a technical consultant/service provider is required in order to conduct the Feasibility Study and assist the developer/client in all related works prior to the submission of the renewable energy scheme application to the Sustainability Energy Development Authority (SEDA), as well as provide assistance in the preparation of the Power Purchase Agreement (PPA). A technical consultant is also needed in the implementation stages.

RELATED AUTHORITIES

Federal level	▪ Sustainable Energy Development Agency (SEDA)[1] – Review and evaluate the FS
State government	-
Local government	▪ Pihak Berkuasa Tempatan ▪ Should be informed about the survey

Appointment of Consultant/Service Provider

DESCRIPTION

Typically, a technical expert will be involved in the two stages of project development.

Pre-PPA Stage

This is from inception of the project until a power purchase agreement (PPA) is signed. The tasks of a consultant/service provider are:

- Preparation of the FS (Refer to Sub-step 1-2)
- Assist the developer in preparing PPA document

Same technical consultant can be contracted for both stages. Alternatively, different consultants may be contracted separately for each stage. In the latter case, the developer must ensure complete transfer of information.

Post-PPA Stage

Activities relating to Post-PPA or implementation stage (explained separately in Sub-step 7-1). Typically, the tasks of technical experts are:

- Detailed design of the system
- Tendering
- Supervision of the supply and installation of equipment and facility
- Supervision of the testing and commissioning of equipment and facility

Appointment of Consultant/Service Provider

DESCRIPTION

These stages include the detailed design, the tendering of work, the local authority's code of compliances, the supply and installation of the facility and equipment as well as the testing and commissioning.

This sub-step is an interaction between two businesses; there is no regulation governing the exact procedure. Typically, the applied procedure to appoint a technical consultant could be as follows:

- The project developer requests proposals from one or more potential consultants. A request for proposal (RFP) must be prepared (see documents).
- Consultants submit their proposals. Typically, a proposal from the potential consultant will consist of:
  - The technical proposal, covering the scope and duties to be carried out by the consultant
  - The financial proposal, indicating the service cost and reimbursable costs
- The project developer evaluates and compares the received proposals. A face-to-face negotiation may be arranged, allowing detailed negotiations on scope of works, deliverables, timeframe, service costs, and terms and conditions.
- The developer makes a decision and notifies the winning consultant through a letter of appointment. The contract must then be signed.

Appointment of Consultant/Service Provider

REQUIRED DOCUMENTS

The only document required for this stage is the request for proposal (RFP). There is no uniform template for a request for proposal document. Typically, it should consist of:

- Project background

  Location of the project, possible RE technology

- Scope of work and responsibilities of the consultant
- Contract timeframe including crucial milestones

  The contract duration is typically made until the signing of the Renewable Energy Power Purchase Agreement (REPPA). In case the developer/investor plans to use the same consultant for the post-PPA phase, the consultant will remain involved until the commissioning and handing over of the completed installation to the developer/investor

- List of deliverables
- Performance guarantee and warranty period
- Scope and responsibilities of the developer

  This is to indicate what is excluded from the consultant's scope and covered by the project developer.

- Additional terms and conditions (T&C)

  Additional terms and conditions from the project developer are standard practice.

Appointment of Consultant/Service Provider

$RM FEES / COST

- The fee for a Feasibility Study is mentioned in Sub-step 1-2. The professional fee for post-PPA activities ranges from **1.5% to 2.5%** of the capital expenditure (CAPEX)

DURATION

- As this sub-step is an interaction between the developer and the consultant, there is no specific timeframe for finalising the contract.

  However, finalising the contract in as little time as possible will help lower project costs and keep any unforeseen escalation in costs to a minimum.

Appointment of Consultant/Service Provider

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act No. 138 Year 1967	Registration of Engineer Act 1967 This act describes the role of a Professional Engineer. According to this act, the feasibility study (FS) is deemed part of “Professional engineering services” and must be performed by a registered professional engineer only.

Appointment of Consultant/Service Provider

REFERENCE DOCUMENTS / SOURCES

Document name	Description
SEDA Guidelines	Guidelines and Determination of the Sustainable Energy Development Authority, Malaysia This guideline can be downloaded from the official SEDA website.

Appointment of Consultant/Service Provider

CHALLENGES AND RISKS

Risk	Details
Poor consultation services	Engaging inexperienced consultants can lead to poor implementation of the scheme and improper project planning.
Poor suppliers	Unscrupulous suppliers and contractors may try to undermine the authority of and working relationship with the consultant. The developer must therefore develop a clear scope of work and deliverables for the consultant and properly define the relationship with the suppliers and contractors. Regular checks must be conducted to maintain the quality of work and ensure timely implementation of deliverables/activities.

Preparation of Feasibility Study (FS)

DESCRIPTION

This sub-step outlines the process for conducting a feasibility study (FS). This must be done by a contracted consultant (Sub-step 1-1). The FS is to be carried out to determine whether the development of a large scale Solar PV project is technically feasible and economically viable. The FS must be submitted as part of the RE application to the Sustainable Energy Development Agency (SEDA), Malaysia in addition to the required documents for the feed-in Approval Holder (FiAH) application (Sub-step 2-2) as set forth by the SEDA Guidelines.

In Malaysia, the Registration of Engineer Act (Act 138) considers the preparation of a feasibility study (FS) a “professional engineering service”. Therefore, it must be performed by registered professional engineers only.

Typically, a preliminary survey of the site must also be performed in this sub-step. This is to ensure that the actual site conditions are suitable for the feasibility study and subsequent project development.

The project developer shall perform a desktop study and a preliminary site survey. They will in turn provide the input needed for the feasibility study (FS).

RELATED AUTHORITIES

Federal level	▪ Sustainable Energy Development Agency (SEDA)[1] – Review and evaluate the FS
State government	-
Local government	-

Note 1: The submission of the FS to SEDA is done during the Feed-in approval holder (FiAH) application process (described in Sub-step 2-2)

Preparation of Feasibility Study (FS)

DESCRIPTION

The scope of the preliminary survey should cover the following aspects, at minimum:

- Check of potential locations, accessibility and availability of:
  - Solar insolation
  - Shadow analysis
  - Sunny days
  - Transmission route
  - Power injection point
- Electricity demand and load patterns
- General geological features of the site
- Collecting any other necessary input that may be required for the Power System Study (PSS) to be conducted later (see Sub-step 1-3)

A more detailed survey must also be conducted, though it can take place at a later stage (see Sub-step 1-4)

Preparation of Feasibility Study (FS)

REFERENCE DOCUMENTS / SOURCES

Technical Analysis

The technical analysis aspect of FS should consist of the following information / data at minimum:

- Project description, location and interconnection point

  A brief description of the project objective and intended output, i.e. results.

- Solar irradiation availability of proposed project site

  i.e. insolation, clouds, shadow, etc..

- Geological and geotechnical assessment of the project site

  Assessment of geological information and its impact on the operation of the project and end user

- Power and energy determinations

  Installed capacity (kW) and estimated power generation (MWh) from the proposed project

- Conceptual design and work programme

  Solar array, inverter, switchgear, transformer, layout interconnection, etc.

Economic Analysis

The economic analysis (vital to FS) should consist of the following information / data:

- Basic economic analysis, methodology and approach
- Cash flow calculation
- Internal rate of return (IRR) analysis

  For debt financing, IRR should be more than 10%. For equity financing, IRR should be more than 12%.

- Payback period calculation

  For debt financing, expected payback period should be around 8 years. For equity financing, expected payback period should be around 7 years.

- Debt service coverage ratio (DSCR) calculation

  DSCR should be kept above 1.3 for the duration of the project

Preparation of Feasibility Study (FS)

$RM FEES / COST

- The service cost for FS preparation and finalisation (including associated preliminary site survey) depends on proposed project location, project size, etc.

  Typical range is:

Lower end	RM 100,000 (~ USD 24,000)
Higher end	RM 300,000 (~ USD 72,000)

DURATION

- Conduction and finalisation of the FS may take around **3 months**. However, the duration of the Feasibility Study depends on various factors such as project size, technology used, location, social factors, etc.

Preparation of Feasibility Study (FS)

RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act No. 138 Year 1967	Registration of Engineer Act This act describes the role of Professional Engineer. According to this act, the feasibility study (FS) is considered “Professional Engineering Services” and must be performed by a registered professional engineer only.

Preparation of Feasibility Study (FS)

REFERENCE DOCUMENTS / SOURCES

Document name	Description
SEDA Guideline	Guidelines and Determination of the Sustainable Energy Development Authority Malaysia This guideline can be downloaded from the SEDA website (www.seda.gov.my)
FiT Application form	Feed-in Tariff (FiT) application form This guideline can be downloaded from the SEDA website (www.seda.gov.my)

Preparation of Feasibility Study (FS)

CHALLENGES AND RISKS

Risk	Details
Poor FS	Incomplete data and inexperienced consultants can lead to poorly prepared FS and subsequently a refusal of proposal by banks.
Change of PSS	Delays in completing the FS report due to last-minute changes will subsequently result in delays to the Power System Study (PSS). Thus, to avoid such situations developers are encouraged to engage a PSS consultant from the outset so that the power evacuation and required finds are determined in order to complete the FS in a timely manner.

Preparation of Power System Study (PSS)

DESCRIPTION

The purpose of the Power System Study is to identify the feasible interconnection option for the proposed development to the off-taker electrical grid system. Power System Studies are only required for installations with a capacity greater than 425 kWp. The Study covers the following:

An indication of the stability and load demand / absorption of the nearest viable TNB grid injection point

A load flow and short circuit analysis are conducted, and assurance that the proposed scheme operation is within the limits set by the electricity transmission/grid code is given

RELATED AUTHORITIES

Federal level	-
State government	-
Local government	-

Preparation of Power System Study (PSS)

DESCRIPTION

The procedure to be followed for the sub-step Power Step Study is as follows:

1. The applicant submits application to respective DL; in case of the TNB's area, the application shall be submitted to the TNB Renewable Energy unit (RE TNB)
2. RE TNB (or DL) reviews completeness of the documents submitted and checks for the following:
   a. Documents submitted are in order and proper: RE TNB (or DL) issues order to developer for payment of application fee
   b. Developer pays required fees and submits proof of payment to TNB RE (or DL)
   c. RE TNB (or DL), after verifying payment details, approves PSS consultant
   d. PSS consultant conducts Power System Study and submits report

   The Power System Study is one of the main steps involved in ensuring the success of the project development, thus due care is required.

Preparation of Power System Study (PSS)

REQUIRED DOCUMENTS

The study focuses on the site conditions for power systems; their demand and supply have two major requirements.

The following documents are to be prepared:

- Scheme location and plan

  Information on placing equipment and related plan

- Proposed equipment configuration

  Configuration of equipment to be installed and their configuration

- Equipment parameters/characteristics

  Various parameters, specification of equipment that enable estimating the installed capacity and operation characteristics

- Other technical matters and site information

  Further to the above three aspects, any information which is relevant to future development of the project may be stated at this stage

Preparation of Power System Study (PSS)

FEES / COST

- The fees for the granting of a license are regulated by SEDA, Malaysia and are fixed. The fees are charged according to the size of the plant as given below:

Above 425 kW and up to 1 MW (including 1 MW capacity)	RM 20,000 (~ USD 4660)
Above 1 MW and up to 10 MW (including 10 MW capacity)	RM 40,000 (~ USD 9320)
Above 10 MW and up to 30 MW (including 10 MW capacity)	RM 60,000 (~ USD 14000)

DURATION

- Conducting a Power System Study (PSS) usually takes around **2-3 months**. However, several factors can lengthen or shorten the duration, e.g., project size, applied technology, equipment availability in market, location, etc.

Note: The cost and duration data are based on market survey and an interview with project developer.

Preparation of Power System Study (PSS)

RELATED LAWS AND REGULATIONS

Regulation No.	Name
Legal Reference: **PU (A) 120 RE**	Electricity Supply Act 1990 P. U. (A) 120 RE (Technical and Operational Requirements) Rules 2014 of RE Act 2011 (Act)
Official Reference:	TNB Transmission Grid Code TNB Distribution Grid Code TNB Technical Guidebook for the Inter-connection of Generation of Distribution Network

Preparation of Power System Study (PSS)

REFERENCE DOCUMENTS / SOURCES

Document name	Description
Peninsular Malaysia Grid Code	The document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html
Labuan and Sabah Grid Code	This document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html
Distribution Code	This document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html
TNB Interconnection Guidebook	"Technical Guidebook for the Connection of Generation to the Distribution Network" is published by TNB Research Sdn. Bhd. It is to be used by distributed generation (DG) developers, plant managers or engineers, technical consultants and engineers of power utility. The document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html. The latest guidebook is the first edition (published in March 2005)

Preparation of Power System Study (PSS)

CHALLENGES AND RISKS

Challenges	Recommendation
Validity of Power System Study is limited	An assessment of the situation and next steps are recommended to complete formalities related to PSS.
Delays in performing PSS may result in reanalysing PSS	A pre-check of the situation and next steps are useful for the timely submission of PSS. Timely submission of PSS will enable timely interconnection conditions and identifying location for the project.

Detailed Survey

DESCRIPTION

The project developer must contract a licensed land surveyor to perform a detailed survey at the selected project site. In Malaysia, only a licensed land surveyor can conduct the survey. The purpose of this survey is to identify the topography and contours of the project site; this enables the developer to identify potential locations for the facility. Identification of boundaries for the site location, establishment of a profile of the surrounding area, and a demarcation survey are all located in Sub-Step 1-4.

This survey aims to produce a plan for the land acquisition process (Sub-step 2-3)

There is no regulation that governs the procedure in this sub-step. It is up to the developer to select a suitable approach when negotiating with a land surveyor. Typically, the procedure for identifying and contracting a land surveyor may be as follows:

- The project developer prepares the Terms of Reference (TOR) to define the scope of work and sends it to potential surveyors.
- Interested surveyors submit their quotation to the project developer/investor. The quotation typically consists of the following:
  - Financial proposal
  - Detailed scope of work
- The project developer reviews the quotations received and selects a suitable surveyor for the contract. To officially appoint a surveyor, a letter of award shall be prepared and signed for documentation purposes.

Detailed Survey

REQUIRED DOCUMENTS

The only document required for this stage is the Request for Proposal (RFP). There is no uniform template for an RFP. Typically, it should consist of the following:

- Project background and Scope of Work

  Location of the project, possible RE technology, detail tasks, results, etc.

- Financial proposal by licensed surveyor

- List of deliverables

  Reports and necessary drawings / documents must be clearly mentioned.

- Other terms and conditions (T&C)

  Additional terms and conditions necessary for a successful survey.

Detailed Survey

FEES / COST

- The service cost for conducting a detailed survey is not regulated. This is based on an agreement and negotiations between two private businesses. It depends on the project's size and the location to be surveyed, among other factors.

  Typically, a project developer can expect the cost to be between:

Lower range	RM 50,000 (~ USD 11,550)
Higher range	RM 400,000 (~ USD 93,000)

DURATION

- Conducting a detailed site survey usually takes around **2-4 months**. However, several factors can lengthen or shorten the duration, e.g., project size, applied technology, location, etc.

Note: The cost and duration data are based on market survey and an interview with project developer.

Detailed Survey

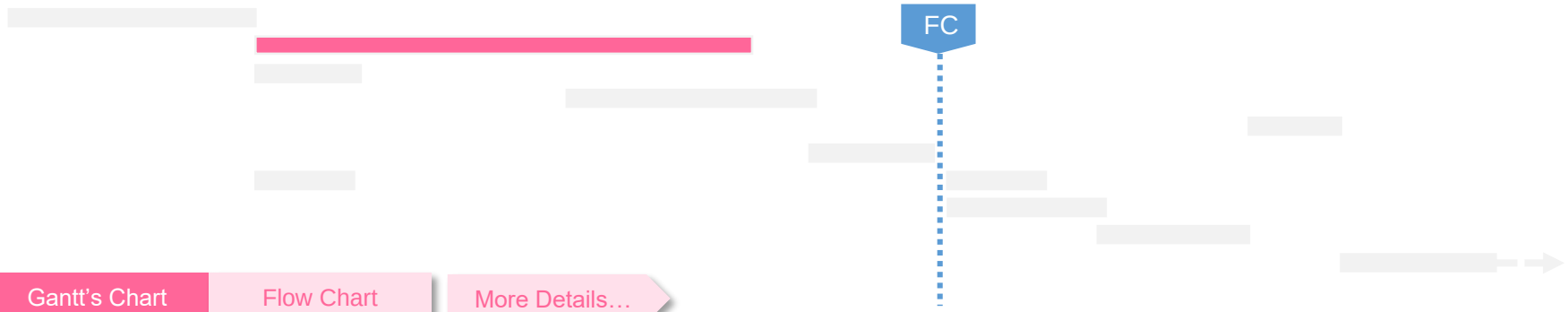
RELATED LAWS AND REGULATIONS

Regulation No.	Name
ACT 486	Land Acquisition Act
National Land Code	

Detailed Survey

CHALLENGES AND RISKS

Challenges	Recommendation
Sites are usually located in remote areas; thus, the surrounding environment can be very challenging. This can lead to delays.	It is imperative to have an experienced and licensed surveyor with sufficient manpower. It is also recommended to engage them early on during the implementation stage.
Local communities in some areas may object to the surveyor carrying out surveys.	Reach out to local communities in the early stages. Also, initial site visits can be co-ordinated with respective state officials. Ensure joint briefings and presentations on the benefits of the project and work to be carried out are shared with the affected people/communities.

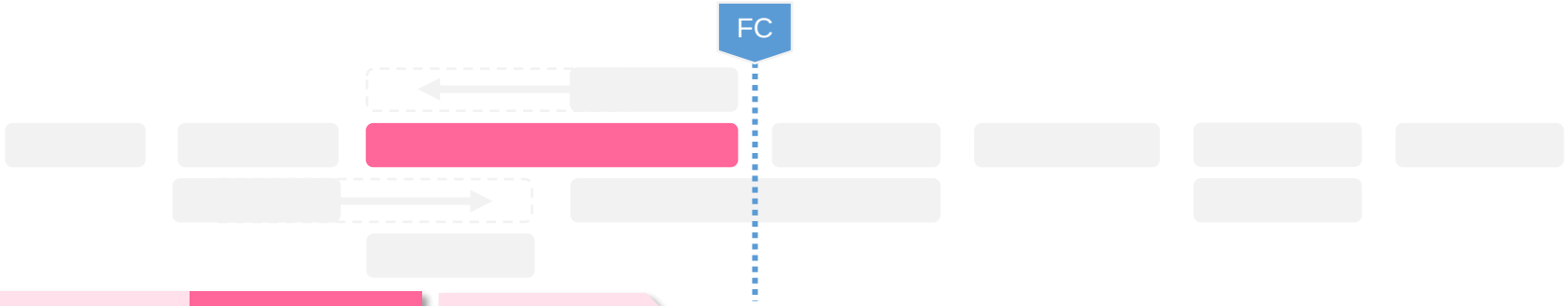


Gantt's Chart | Flow Chart | More Details…

Step 2 | Administrative Authorisation

2-1 State Economic Planning Unit (EPU) Consent

2-2 Applying for Feed-in Account Holder



Step 2 | Administrative Authorisation

2-1

State Economic Planning Unit (EPU) Consent

2-2

Applying for Feed-in Account Holder

Step 2 | Administrative Authorisation

… Gantt's / Flow Chart

Step Description

This step describes the procedures for obtaining authorisation from various administrative offices, including state consent to develop a large Solar PV plant. Administrative approval for large Solar PV are given on the basis of joint site visits to the potential site for Solar PV installation and presentation on the proposed Solar PV plant. The concerned authority issues its authorisation after consulting with the relate authorities.

This step includes two sub-steps as given below:

State Economic Planning Unit (EPU) consent

Application for Feed in Account Holder

State Economic Planning Unit (EPU) Consent

DESCRIPTION

This sub-step involves obtaining state consent for the right to develop a large Solar PV project. As land rights are under the jurisdiction of the state, consent is required when applying for a feed-in approval holder (FiAH) with SEDA (see Sub-step 3-2).

According to the Act, the procedures are as follows:

- Project developer submits the filled-out forms with supporting documents to the State EPU
- Joint site visit along with relevant authorities conducted at the project site
- Presentations to the development committee chaired by State EPU chief
- State EPU will source comments and principal approval from various state departments
- Upon obtaining consent, State EPU issues consent letter with conditional approval terms

RELATED AUTHORITIES

Federal level	▪ (none)
State level	▪ State Economic Planning Unit (State EPU) – Evaluate the application, conduct a site visit, issue a consent letter
Local Level	▪ (none)

State Economic Planning Unit (EPU) Consent

REQUIRED DOCUMENTS

- Filled-out application form
  The form can be obtained from the relevant state EPU office
- Layout plan of the project scheme
- Solar PV scheme proposal:
  Preliminary technical parameters
  Economic analysis
  (refer to Sub-step 1-2)

Note: The exact list of required documents can be different from state-to-state. The list provided in this guidebook is only typical documents usually requested by state EPU office. The developer must check with the EPU office in the respective state for the exact list.

State Economic Planning Unit (EPU) Consent

$RM FEES / COST

- The processing fee is calculated per location. It varies from state-to-state (in some states, there is no fee).

Lower end	No fee
Higher end	RM 10,000 (~ USD 3,125)

DURATION

- Typically, this sub-step can take around **3 - 12 months**. The exact processing time depends on the state and the completeness of the documents being submitted.

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

State Economic Planning Unit (EPU) Consent

REQUIRED DOCUMENTS

Regulation No.	Name
Act No. 172	Town and Country Panning Act (1976)

State Economic Planning Unit (EPU) Consent

CHALLENGES AND RISKS

Challenges	Details	Recommendation
Time-consuming procedure	The process of obtaining Economic Planning Unit (EPU) consent may take longer than expected due to unexpected issues, e.g., competing interests among parties who aim to use the same project site for different purposes (agricultural, mining, etc.)	Project developer should frequently meet and discuss with the State EPU offices to expedite approval / consent. It is recommended that the developer assign a dedicated team to handle this issue.

Risk	Details
Rejection from State EPU	The State EPU may reject applications at this stage after the developer has already invested considerable time and money in performing a preliminary study, e.g., feasibility study (FS), site visit, PSS, etc.

Application for Feed-in-Account Holder (FiAH)

DESCRIPTION

This sub-step outlines the process for obtaining a Feed-in-Account. An individual who is a citizen of Malaysia or a registered society, co-operative or a company majority-owned by a Malaysian or owned by a Malaysian citizen can apply for a Feed-in Approval certificate. The approved Feed-in certificate can be obtained from SEDA.

The application for a Feed-in-Account can be found and filled out online, though a hard copy of a completed form must also be submitted. The required fee(s) must be paid when submitting the application form.

Proof of payment for a FiAH certificate can be obtained from SEDA, provided the application has been approved.

The final decision on approval is subject to the available quota for FiT.

Holders of a Feed-in certificate are eligible to sell Renewable Energy at the Feed-in-Tariff (FiT) rate as stipulated by SEDA as set out in the RE Act 2011.

RELATED AUTHORITIES

Federal level	▪ Sustainable Energy Development Authority (SEDA), Malaysia
State level	▪ (none)
Local Level	▪ (none)

Application for Feed-in-Account Holder (FiAH)

DESCRIPTION

To obtain FiAH the following steps must be followed:

1. Check the available quota and commissioning period
2. Interested companies to submit their Feed-in Application (FiA) drafts via e-FiT
3. Companies that have completed 100% of their draft application will qualify for the balloting process
4. Preparation and listing of completed drafts from e-FiT for balloting exercise
5. Balloting for queue numbers
6. Total queue numbers awarded will depend on total installed capacity of applications submitted
7. Companies allotted a queue number will be required to attend a session at SEDA Malaysia's office (Putrajaya) to submit their Feed-in Application Online

RELATED AUTHORITIES

Application for Feed-in-Account Holder (FiAH)

REQUIRED DOCUMENTS

- **Profile Registration Document (in case the applicant is a company)**

The latest audited accounts of the applicant

The memorandum and articles of association of the Applicant

Form 8 (Certificate of Incorporation of Public Company) or

Form 9 (Certificate of Incorporation of Private Company) in connection with the Applicant under the Companies Act 1965

All Forms 24 (Return of Allotment of Shares) lodged by the applicant with the Registrar of Companies under the Companies Act 1965

The latest Form 49 (Return giving particulars in Register of Directors, Managers and Secretaries and change of particulars) lodged by the applicant with the Registrar of Companies and written confirmation from the company's secretary on the current shareholding of the applicant

A Share-holding/Ownership Structure Diagram; detailing the shareholding percentages of each ultimate shareholder in the company

Copy of the MyKad of each individual shareholder in the company; or, a certified copy of Form 24 and 49 of each shareholder (if the shareholder is a company) by the company's secretary and confirmation letter from the company's secretary confirming the list of shareholders

Certified copies of Form 24 and 49 of the company(s) where each ultimate shareholder has a shareholding percentage direct or indirect

An extract of the company's board resolution authorising the applying person to make present an application on behalf of the applicant and to execute and submit all document in relation thereto

Note: The exact list of required documents can vary from state-to-state. The list provided in this guidebook includes the documents usually requested by a state EPU office. The developer must check with the EPU office in the respective state for the exact list.

Application for Feed-in-Account Holder (FiAH)

REQUIRED DOCUMENTS

- **Profile Registration Document (in case the applicant is a registered society)**

A copy of the certificate of registration (Form 3) issued by the Registrar of Societies under section 8 of the Societies Act 1966;

Certified true copy of the relevant minutes of a meeting of the society duly signed by the Chairman of the meeting and at least 2 other office bearers of the society authorising the representative to apply for FiT on behalf of the society and to execute & submit all documentation in relation thereto

- **Profile Registration Document (in case the applicant is a Firm)**

A certificate of registration (Form D) of the firm issued by the Registrar of Businesses; or the letter or certificate relating to the constitution of the firm from bodies regulating the profession in which the firm is practicing in

The relevant minutes of proceedings of a meeting of the firm duly signed by the chairman of the meeting (who must be a partner of the firm), authorising the representative to make this application on behalf of the firm and to execute and submit all documentation in relation thereto

Note: The exact list of required documents can vary from state-to-state. The list provided in this guidebook includes the documents usually requested by a state EPU office. The developer must check with the EPU office in the respective state for the exact list.

Application for Feed-in-Account Holder (FiAH)

REQUIRED DOCUMENTS

- **Profile of the applicant together with CVs of the Project management team**
- **Submit hard copy of Feed-in-Approval application form and the following supporting documents:**

Application Form (hard copy)

Declaration Form

Summary of the application according to template form SEDA

Detailed engineering design of the renewable energy installation, including all relevant calculations to justify the installed capacity and claimed efficiencies, proposed plant layout and AC single line diagram certified by Professional Engineer (PE) and all supporting documents justifying bonuses applied for

The power system study (PSS) Sub-step 1-X, report and letter of approval from the Distribution License (DL);

A list of Feed-in Approval (FiA) currently or previously held by the Applicant, if any

Documents proving Applicant's ownership of the site

Land title (all pages) and site map

A certificate in solar photovoltaic system design registered with the Authority

Note: The exact list of required documents can vary from state-to-state. The list provided in this guidebook includes the documents usually requested by a state EPU office. The developer must check with the EPU office in the respective state for the exact list.

Application for Feed-in-Account Holder (FiAH)

REQUIRED DOCUMENTS

A certificate of registration of each Qualified Person with the Board of Engineers Malaysia as a Professional Engineer (Electrical)

A copy of the quotation(s) from the EPC/SP showing the total capital cost of the Renewable Energy Installation

Bankers Cheque/ Cash Order (RM100/kW)

EPC track record – Agreement or contract of appointment as EPC

Projects requiring a loan from banks or financiers are to be supported by the following documents:

- Financing agreement with the entity(ies) that will provide or has/have provided financing to the applicant for the project, or
- Letter of intent/offer letter(s)/financing term sheet(s) form the entity(ies) that will be or has/have provided financing to the applicant for the project

For self-financed projects, relevant documents confirming the financial capacity (e.g., bank account statement showing credit balance of at least equivalent to the total capital cost of the RE installation)

For all cases, the applicant must show proof of funds of at least 5% of the capital expenditure necessarily in the form of liquid assets

Note: All documents to be certified according to the Guidelines and Determinations of the Sustainable Energy Development Authority Malaysia.

Application for Feed-in-Account Holder (FiAH)

$RM FEES / COST

- The processing fee is determined by SEDA and must be paid to SEDA Malaysia

Processing Fees with each submission	RM 1000
Earnest Money Issued in the form of bankers cheque (RM 100/kW) payable to SEDA. The earnest money is reimbursable within 21 days upon issuance of result/s	RM 10 per kW

DURATION

- Typically, the time taken for the FiAH depends on the completeness of documents as advised by SEDA

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Application for Feed-in-Account Holder (FiAH)

RELATED LAWS AND REGULATIONS

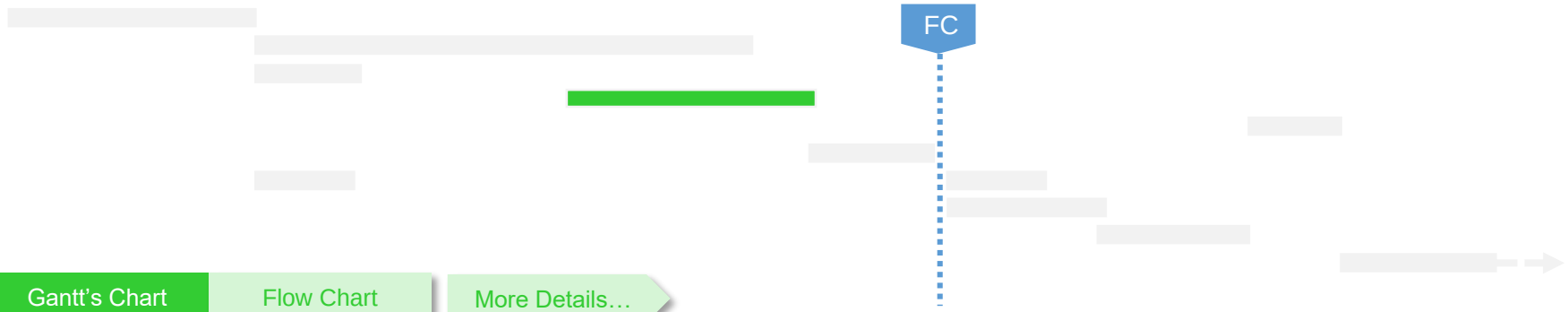
Regulation No.	Name
Act 725	Renewable Energy Act (Act 725)
Act 726	SEDA Act (Act 726)

Application for Feed-in-Account Holder (FiAH)

CHALLENGES AND RISKS

Challenges	Details	Recommendation
Application rejected	Application may be rejected due to non-conformity to document requirement	Thoroughly check for completeness when filling out the application form
Large number of applications received	Large number of applications received by SEDA	Timely submission of application for FiA along with any additional documentation needed/requested
Ultimate ownership	Ultimate ownership exceeded 30 MWp for cumulative installation of Solar PV plants	The applicant must ensure that the total installed capacity will not exceed 30 MWp

Risk	Details
Rejection from SEDA	SEDA may reject applications for FiA for failure to submit the documentation requested and may do so in some instances even after the developer has already invested considerable time and money in conducting a preliminary study, e.g., feasibility study (FS), site visit, PSS, etc.

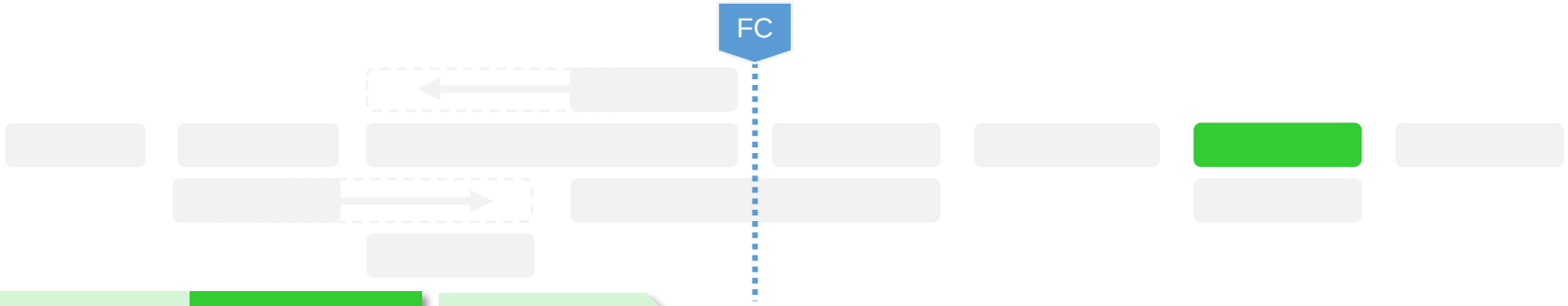


Gantt's Chart | Flow Chart | More Details…

Step 3 | Power Purchase Agreement

3-1 Registration of DL vendor

3-2 Power Purchase Agreement (PPA)



Step 3 | Power Purchase Agreement

3-1

Registration of DL vendor

3-2

Renewable Energy Power Purchase Agreement (REPPA)

Registration of Distribution Licensee Vendor

DESCRIPTION

Approval for grid connection will be required to inject power generated by large Solar PV plants. This step identifies the various steps involved in securing approval from various bodies involved for injecting power generated from a large Solar PV to the grid. The various steps to be followed in this regard are discussed in Sub Step 2-1 and Sub Step 2-2.

This step consist of two sub-steps as given below:

Registration of Distribution Licensee (DL) vendor

Renewable Energy Power Purchase Agreement (REPPA)

Registration of Distribution Licensee Vendor

DESCRIPTION

This step describes the process for registering a company as a Distribution Licensee vendor with TNB. A DL vendor is vital to the generation and distribution of power. This is to ensure that a TNB can process and provide payments to the installation owner for the energy generated by a large Solar PV plant. The following steps are needed to register as a Distribution Licensee (DL) vendor with TNB:

1. Submission of documents to TNB RE unit
2. TNB reviews completeness of the documents
3. Developer is approved as a TNB DL vendor
4. DL vendor number issued by TNB

RELATED AUTHORITIES

Federal level	▪ TNB
State level	▪ (none)
Local level	

Registration of Distribution Licensee Vendor

REQUIRED DOCUMENTS

The technical documents that must be prepared and submitted during registration for a DL vendor are as follows:

- Copy of FiAH certificate (Sub Step 2-2)
- Copy of developer Forms 24 and 44
- Copy of developer Form 49
- Copy of Form Q
- Copy of electricity bill
- Copy of approval letter and PSS report (Sub Step 1-3)

Registration of Distribution Licensee Vendor

$RM FEES / COST

- There is no fee for this sub-step

DURATION

- This sub-step usually takes around **2 to 3 weeks**

Registration of Distribution Licensee Vendor

CHALLENGES AND RISKS

Challenges	Details	Recommendation
Non-registration as DL vendor	Due to non-compliance with requirements your application may be rejected	It is recommended to prepare and thoroughly check all required documents in advance to avoid rejection and reapplication for registration as a DL vendor

Step 3 | Power Purchase Agreement

… Gantt's / Flow Chart

Step Description

This section describes the various steps involved in the registration of an applicant to become a distribution licensee (DL) vendor in order to process payments for the energy generated by a large Solar PV plant.

Renewable Energy Power Purchase Agreement (REPPA)

DESCRIPTION

This sub-step outlines the procedure for obtaining a signed Renewable Energy Power Purchase Agreement (REPPA) from the Distribution License (DL).

The following are to be adopted when applying for REPPA:

1. RE developer submits documents to TNB RE unit
2. TNB RE unit reviews the documentation and checks for completeness
3. When documents are deemed complete, TNB RE issues a payment order to the applicant and fees for energy meter
4. RE project developer submits proof pf payment
5. REPPA is signed

RELATED AUTHORITIES

Central government	▪ TNB
Provincial government	▪ (none)
Local government	▪ (none)

Note: The determination penalty is regulated. The calculation formula is given in the REPPA. It is: LD = DC x [(0.7 x DAA) – MRE] x 1000, where LD is the sum in RM payable by the Feed-in Approval Holder to the Distribution Licensee, DC is the prevailing displaced cost (in RM/kWh), DAA = the Declared Annual Availability (in MWh) of such Contract Year, and MRE = the aggregate Metered Renewable Energy (in MWh) generated by the Renewable Energy Installation for every hour of each day

Renewable Energy Power Purchase Agreement (REPPA)

REQUIRED DOCUMENTS

- The following documents are to be submitted for REPPA

Filled-out REPPA form along with copies of the following documents:
a. Feed-in Application Holder (FiAH) certification
b. Appendices according to the REPPA standard list

Renewable Energy Power Purchase Agreement (REPPA)

$ RM FEES / COST

- There is no fee for this sub-step

DURATION

- This sub-step usually takes around **2 to 3 months**

Renewable Energy Power Purchase Agreement (REPPA)

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 725 (2011)	Renewable Energy Act (Act 725)
Act 726 (2011)	Sustainable Energy Development Authority (SEDA) Act (726)

Renewable Energy Power Purchase Agreement (REPPA)

REFERENCE DOCUMENTS / SOURCES

Guidelines and Determination of the Sustainable Energy Development Authority Malaysia

This guideline is known as “SEDA Guidelines”. It can be downloaded from the SEDA website (www.seda.gov.my)

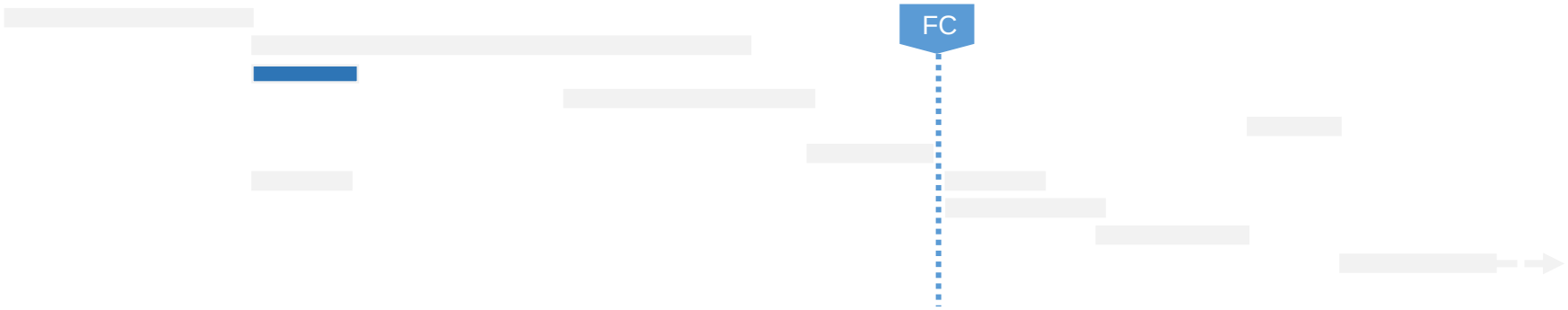
Official REPPA form

The official REPPA forma can be downloaded from the SEDA website (www.seda.gov.my)

Renewable Energy Power Purchase Agreement (REPPA)

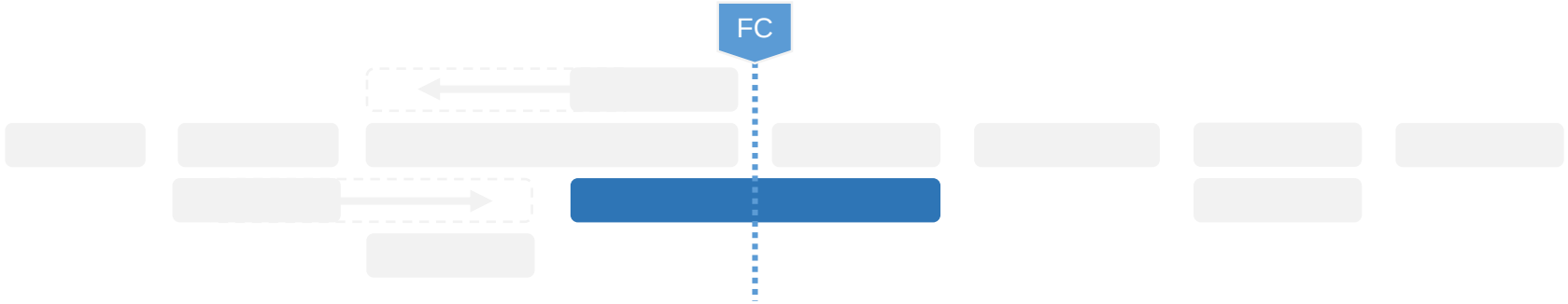
CHALLENGES AND RISKS

Risk	Details
Delay in signing the REPPA	Delays due to failure to satisfy the DL requirement; incomplete supporting documents, drawings and appendices. The developer must identify the requirements for REPPA with the DL officer before submitting REPPA.



Step 4 | Registration and License

4-1	Obtaining Public Generating License from Energy Commission



Step 4 | Registration and License

4-1

Obtaining Public Generating license from Energy Commission

Obtaining Public Generating License from Energy Commission

DESCRIPTION

To obtain a Public Generating License from Energy Commission, Malaysia the following steps are to be taken.

The Electricity Supply Act 1990 (and later amendment in 2001) provides the need for any activity related to the supply of electricity to be licensed. A Provisional License is obtained for construction of RE plants. Therefore, a public generating license must be obtained at least three months prior to commission of a renewable energy plant.

Steps for acquiring a Public Generating License are as follow:

1. Register Developer details online at the EC website
2. Upload documents to EC website and submit hard copy to EC office
3. EC reviews complete set of documents submitted
4. If complete, EC issues order for payment and of License Fees to developer
5. Developer to submit proof of payment
6. Permanent is issued post COD

RELATED AUTHORITIES

Federal level	Energy Commission Malaysia (EC)
State level	▪ (none)
Local level	

Obtaining Public Generating License from Energy Commission

REQUIRED DOCUMENTS

Applications for obtaining a Public Generating License have to be submitted online along with the following documents:

- Duly filled-out application form
- The following supporting documents:
  a. Certified copy of FiAH Certificate issued by SEDA
  b. Site location map
  c. Single Line Diagram (SLD) of Grid Interconnection
  d. Summary of RE project

Obtaining Public Generating License from Energy Commission

$RM FEES / COST

- The fee charged for the issue of Public Generating Licensee is as follows:

Processing Fees	RM 100
Per kW capacity of RE plant up to 5 MW	RM 0.011 per kW
Above 5 MW	RM 1.65 per kW
The minimum fee for a permanent license is RM 100 and maximum fee is RM 2,200	

DURATION

- Issue of Public Generating Licensee takes 4 weeks

Obtaining Public Generating License from Energy Commission

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 725	RE Act 2011 (Act 725)
Act 1990	Energy Supply Act 1990 (Amendment 2001)

Obtaining Public Generating License from Energy Commission

REFERENCE DOCUMENTS / SOURCES

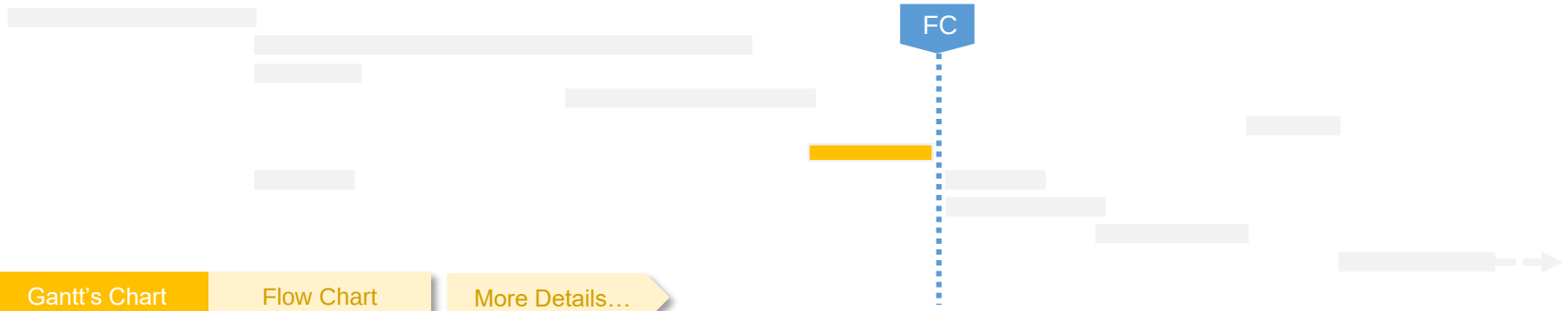
Document name	Description
Peninsular Malaysia Grid Code	This document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html
Labuan and Sabah Grid Code	This document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html
Distribution Code	This document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html
TNB Interconnection Guidebook	"Technical Guidebook for the Connection of Generation to the Distribution Network" is published by TNB Research Sdn. Bhd. It is to be used by distributed generation (DG) developers, plant managers or engineers, technical consultants and engineers of power utility. The document can be downloaded from http://www.st.gov.my/index.php/download-page/category/94-guidelines-electricity.html. The latest guidebook is the first edition (published in March 2005)

Obtaining Public Generating License from Energy Commission

CHALLENGES AND RISKS

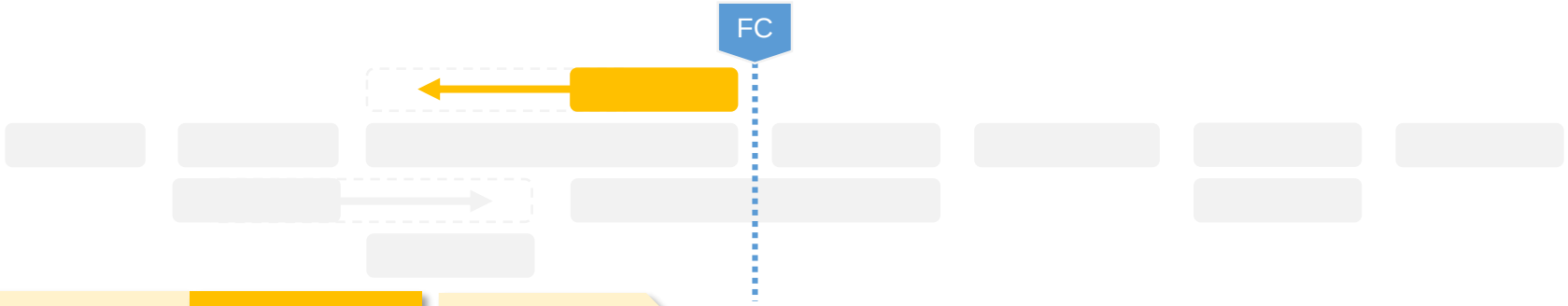
Challenges	Details	Recommendation
Delays due to failure to satisfy EC documentation requirements	Issuance of a Public Generating License from the Energy Commission may be delayed due to failure to submit the required documents	It is recommended to co-ordinate with the Energy Commission for supporting documents

Risk	Details
Cost escalation due to delays	Overall project costs may increase due to delays and may lead to project failure



Step 5 | Financing

5-1	Financing Facility - Term Loan



Step 5 | Financing

5-1

Financing Facility - Term Loan

10-1

Green Tech Financial Scheme (GTFS)

Financial Closure

Step 5 | Financing

… Gantt's / Flow Chart

Step Description

The following step discusses the documentation that must be submitted to banks in order to obtain a financing facility. The documents required and the procedure for submitting them vary from bank to bank. To comply with a specific bank's requirements, a list of the documents and forms needed can be obtained from the loan department of the bank or may be downloaded from its website, if available online.

Financing Facility - Term Loan

DESCRIPTION

The following step discusses the documentation that must be submitted to banks in order to obtain a financing facility. The documents required and the procedure for submitting them vary from bank to bank.

Applied Procedure:

To comply with a specific bank's requirements, a list of the documents and forms needed can be obtained from the loan department of the bank or may be downloaded from its website, if available online

RELATED AUTHORITIES

Federal level	▪ (none)
State level	▪ (none)
Local level	▪ (none)

Financing Facility - Term Loan

REQUIRED DOCUMENTS

- Background of the company (brief history), commencement of business, principal activities, number of employees, business plan, etc.
- Shareholding structure
- Profile of Shareholders
- Profile of Board of Directors
- Profile of Key Management Personnel
- Memorandum & Articles of Association (M&A) of the company
- Latest Forms 24, 49, 9, 13 and 44 under the Companies Act 1965, latest annual returns and photocopy of NRIC of Directors
- Detailed list of completed projects (where applicable)
- Detailed list of on-going projects (where applicable)
- New incorporated - support by the ultimate holding company
- Full valuation report on project land/asset/machinery/ equipment
- Details and status of the land and copy of land title (where applicable)
- Declaration form (DFIA 2002, Section 28) to be signed by individual directors/individual shareholders/guarantors in the presence of Commissioner of Oath
- Personal Net Worth Statement to be filled out by individual guarantor
- Statutory documents and information of corporate guarantors (where applicable)
- Economic planning unit / ministry of finance or other relevant approvals / support letters

Financing Facility - Term Loan

REQUIRED DOCUMENTS

- Environment Impact Assessment Report/DOE approval if falls under the category that requires EIA
- Relevant licenses
- Project description
- Project implementation schedules/timeline
- Study on market, technical and financial aspects
- Project feasibility study
- Background of contractors/suppliers
- Contract structure
- Project Implementation Schedule and timeline
- Background of Contractors / Consultants / Suppliers
- Comments on Performance up to date
- Projected Financial Performance: Profit & Loss / Cash Flow / Balance Sheet / Underlying Assumptions / Sensitivity Analysis
- Risk Analysis and Mitigation Measures
- Shareholders / Joint Venture Agreements
- Project Management Agreements
- Operations and Maintenance Agreements
- Approved GTFS certificate (Step 10-1)

Financing Facility - Term Loan

A | Fee

- The average processing fee varies from one bank to another and may range between 1.5% - 2.0% of the loan amount sanctioned

B | Duration

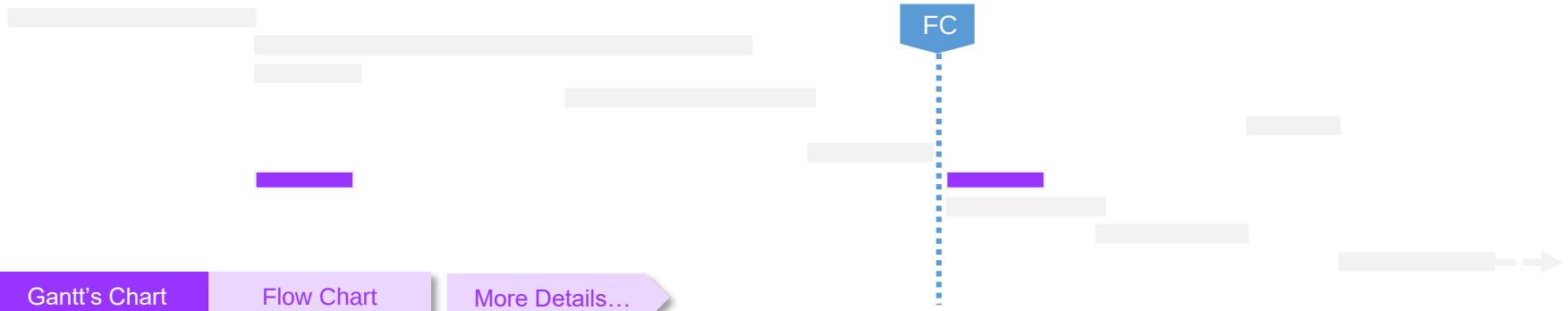
- 3 - 12 months

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Financing Facility - Term Loan

REQUIRED DOCUMENTS

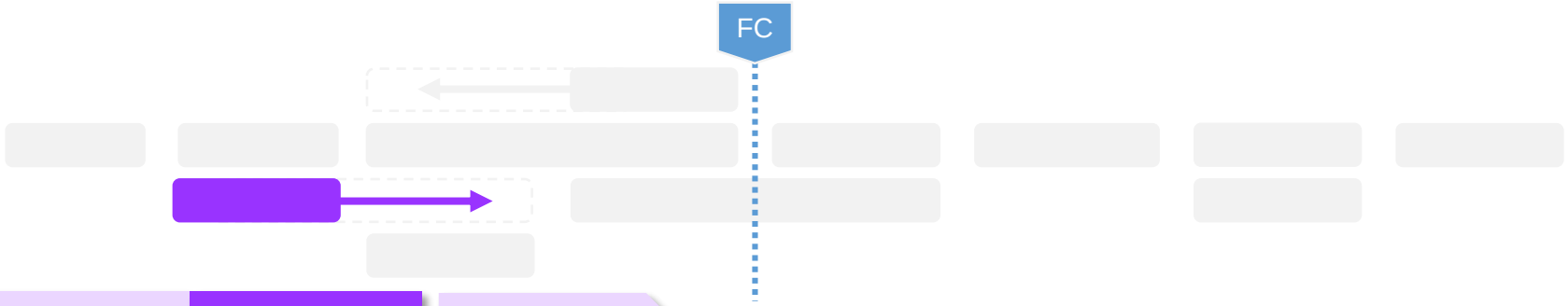
Challenges	Details
Banks are quite new to renewable energy projects. This can lead lengthy processing periods and high collateral requirements, or even higher interest rates	It is imperative to engage with a bank official early on to explain the technology. Holding joint site visits as well as having previously obtained GTFS certification may also help.
Risk analyses are not truly assessed due to limited technical accessibility and know-how	A centralised unit dealing with the assessment of RE-based projects will enable financial institutions to sanction loans faster and to the appropriate entity



Gantt's Chart | Flow Chart | More Details…

Step 6 | Corporate Fiscal / Legal

6-1	Registration with the Companies Commission of Malaysia (CCM / SSM)



Step 6 | Corporate Fiscal / Legal

6-1

Registration with the Companies Commission of Malaysia (CCM / SSM)

Step 6 | Corporate Fiscal / Legal

… Gantt's / Flow Chart

Step Description

This section outlines the process for setting up a Special Purpose Vehicle/Entity (SPV) for the development of large solar PV schemes. The process itself involves incorporation and registration with the Companies Commission of Malaysia, or in Malay Suruhanjaya Syarikat Malaysia (CCM / SSM). It should be noted that some states require state-nominated companies to be shareholders. For RE projects to be eligible for FiT, the developer must be at least 51% Malaysian-owned. Ultimate individual shareholding in all cumulative solar installation must not exceed 30MW.

Registration with the Companies Commission of Malaysia (CCM/SSM)

DESCRIPTION

This section shares the steps for setting up a Special Purpose Vehicle/Entity (SPV) for the development of small hydro schemes. The process itself involves both incorporation and registration with the Companies Commission of Malaysia (CCM/SSM). It should be noted that some states require state-nominated companies to be shareholders. For RE projects to be eligible for FiT, the developer must be at least 51% Malaysian-owned.

The procedure for registering with the Companies Commission of Malaysia is given below.

One may proceed with incorporation or registration by having a licensed company secretary report to the CCM/SSM offices. The following activities must be conducted before approaching CCM/SSM:

- Name search to ensure the proposed name for the company is available
- Incorporation documents are then lodged with SSM

RELATED AUTHORITIES

Related Authority

Central government	▪ Federal SSM
Provincial government	▪ State branch offices
Local government	

Note: The State of Perak requires the state linked company, Perak Hydro Renewable Energy Corporation Sdn Bhd (PHREC) to have a 30% stake of any small hydro developer.

Registration with the Companies Commission of Malaysia (CCM/SSM)

REQUIRED DOCUMENTS

- Form 13A CA for Name Search

- Incorporation Documents
  - Memorandum and Article of Association
  - Form 48A (Statuary Declaration by a director or promoter)
  - Form 6 (Declaration of Compliance)
  - Original copy of Form 13A
  - Copy of letter from CCM/SSM approving the company name
  - Copy of identity card/passport of each director and company secretary

Registration with the Companies Commission of Malaysia (CCM/SSM)

$ RM FEES / COST

▪ The fee for authorised share capital of RM 1,000 *(USD 230)* varies to capital of RM 400,000 and above *(USD 92,230)*	RM 1,000 *(USD 230)* RM 40,000 *(USD 92,230)*

DURATION

- If the proposed name is approved, incorporation may take place within 5 working days

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Registration with the Companies Commission of Malaysia (CCM/SSM)

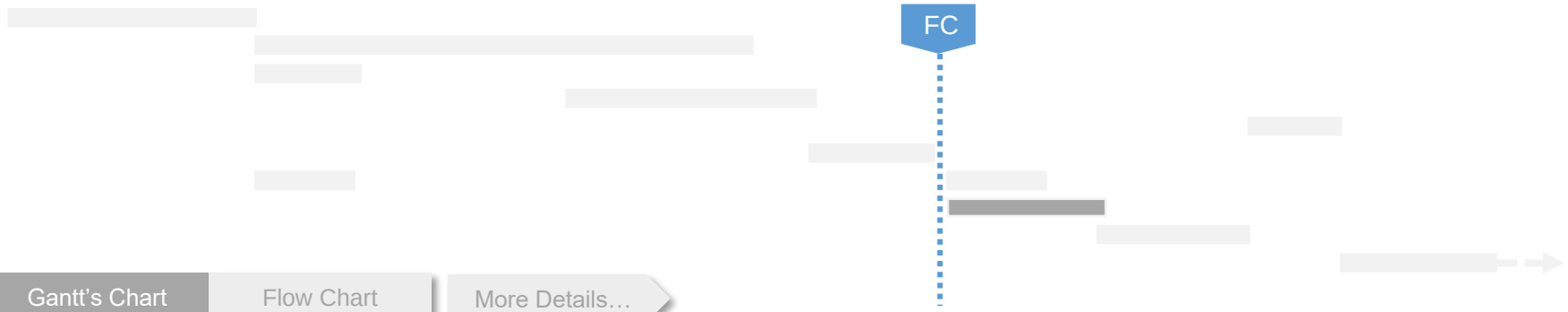
§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 65 (1965)	Companies Act 1965 (Act 65)
Act (2011)	Renewable Energy Act 2011

Registration with the Companies Commission of Malaysia (CCM/SSM)

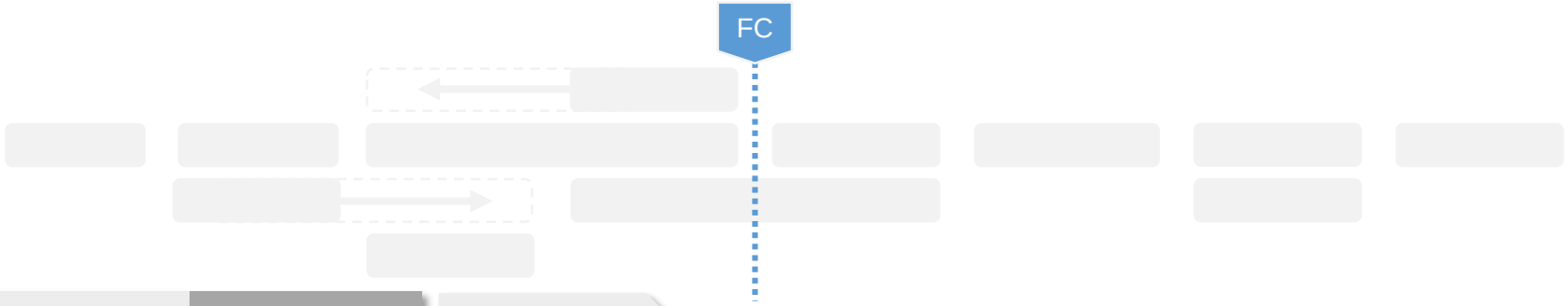
REFERENCE DOCUMENTS / SOURCES

Document Name	Description
Guidelines and form available on SSM website	www.ssm.com.my



Step 7 | Procurement and Construction

7-1	Procurement of Technical Consultant
Procurement of Solar Equipment and Ancillaries	7-2
Procurement of Civil and Structural Work	7-3
Procurement of Transmission Facility	7-4
Inspection and Factory Acceptance Test (FAT)	7-5



Step 7 | Procurement and Construction

7-1 Procurement of Technical Consultant

7-2 Procurement of Electromechanical Equipment

7-4 Procurement of Transmission Facility

7-3 Procurement of Civil and Structural Work

7-5 Inspection and FAT

Step 7 | Procurement and Construction

… Gantt's / Flow Chart

Step Description

This step involves the procurement of technical consultancy services to provide assistance during the preparation of large solar PV and transmission facility designs, drafting of tender documents and supervision at work. Service provider companies must be registered with SEDA. This step is sub-divided into five steps; each activity is explained in detail.

The first step deals with the procurement or hiring of technical consultants to assist the project developer. The second step focuses on the procurement of Solar equipment and ancillaries. The third step meanwhile focuses on the civil and structural work needed to ensure successful project implementation. The fourth step covers taking proper care of the transmission facility for power produced by the large SPV plant. Lastly, the fifth and final step focuses on inspection and the Factory Acceptance Test (FAT).

Procurement of Technical Consultant

DESCRIPTION

- This step involves the procurement of technical consultancy services to provide assistance during the implementation stages, i.e. civil structure, transmission facility design, preparing tender documents and the supervision at work. The company must be registered with the Sustainability Energy Development Authority (SEDA) Malaysia.

Applied procedures for procurement of a technical consultant are provided below:

Official appointment via Letter of Appointment (LoA) and consultancy contract (FIDIC – Blue Book) for technical consultants and a normal letter of award with Term of References (ToR) for service providers.

RELATED AUTHORITIES

Related Authority

Central government	▪ Sustainability Energy Development Authority (SEDA) Malaysia
Provincial government	
Local government	

Procurement of Technical Consultant

REQUIRED DOCUMENTS

- The technical consultant will provide a proposal consisting of:
  - A technical proposal covering the scope and duties
  - Financial proposal indicating the professional fees and reimbursable charges

- Deliverables during the implementing stages are:
  - Design report
  - Tender Documents
  - Drawings
  - Project Reporting Deliverables
  - Liaising with local authorities and obtaining approval as needed

Procurement of Technical Consultant

$RM FEES / COST

- Fees none
- Consultants usually charge 1.5% to 2.5% of capital expenditure

DURATION

- Procurement during the construction period

Procurement of Technical Consultant

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 138 (1967)	Registration of Engineer Act 1967 (Act 138)

Procurement of Technical Consultant

CHALLENGES AND RISKS

Challenges	Details
Unscrupulous suppliers and contractors may try to undermine the authority of and working arrangement with the consultant	Recommendation: The developer shall be clear on the scope of the consultant and the relationship with the suppliers and contractors. This is to ensure the implementation of the scheme is done in a professional manner.
Engaging inexperienced consultants can lead to poor implementation of the scheme	Hiring a consultant who is inexperienced in procurement may result in project delays, improper procurement and even outright failure.

Procurement of Solar Equipment and Ancillaries

DESCRIPTION

This step describes the process for procuring solar equipment and ancillaries: solar panels, inverters, cabling and equipment in powerhouse/control house areas (switchgear, transformers, etc.), including installation, testing and commissioning.

RELATED AUTHORITIES

Related Authority

Central government	▪ SEDA ▪ TNB ▪ EC
Provincial government	▪ TNB State ▪ Factory and Machinery Department
Local government	▪ TNB District

Procurement of Solar Equipment and Ancillaries

DESCRIPTION

Applied Procedures:

i. The technical consultant prepares the documents for the bidding as explained in Sub-Step 7-1
ii. Potential suppliers and contractors are invited to bid and submit technical and financial proposals
iii. Evaluation of the submitted bids/proposals is done jointly with the developer and consultants
iv. Approval of successful bidders/suppliers is confirmed by the developer board
v. Appointment via Letter of Award and contract (FIDIC - Yellow Book)
vi. Design stage
vii. Fabrication stage
viii. Delivery stage
ix. Installation stage

RELATED AUTHORITIES

FIDIC: International Federation of Consulting Engineers

Procurement of Solar Equipment and Ancillaries

REQUIRED DOCUMENTS

- Financial proposal
- Technical proposal
- Technical drawings and design
- Test procedures
- Test reports
- Operation and Maintenance (O&M) manuals

Procurement of Solar Equipment and Ancillaries

$ RM FEES / COST

- The project cost varies depending on type and parameters of Solar PV cells/modules, type of PV, inverter, Balance of Plant, etc.

DURATION

- 3 - 4 months for the tendering stage
- 12 - 16 months for the post-award period

Procurement of Solar Equipment and Ancillaries

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Electrical Supply Act (1990)	Electricity Supply Act 1990

Procurement of Solar Equipment and Ancillaries

REQUIRED DOCUMENTS

Document Name	Description
TNB Technical Guidebook	TNB Technical Guidebook for Generation in Distribution Network 2005
TNB Distribution Grid Code	
Relevant IEC, IEEE, BS EN standards	

Procurement of Solar Equipment and Ancillaries

REQUIRED DOCUMENTS

Challenges	Details
Bidding/tender stage takes too long. Design not finalised on time, thereby affecting the civil work design and construction	Start these processes as soon as possible and award contract/assignment in a timely manner.
Equipment components are substandard, resulting in frequent failure and downtime	To ensure that all components are properly designed, manufactured and tested so as to meet quality standards, thorough checks must be conducted. An in-house check must be considered in coordination with the hired consultant to ensure quality.
The network parameters during testing do not match PSS outcome, resulting in poor equipment performance	Check the current TNB parameters frequently and ensure they are within the norms of the PSS report.
Installing inferior equipment due to budgetary concerns can lead to frequent equipment failures and downtime, and in some cases may even lead to rejection from TNB and SEDA	Focus on long-term gains by ensuring quality. Sub-standard and poor quality components may lead to poor performance and equipment failure. This will ultimately lead to higher project costs.

Procurement of Civil and Structural Work

DESCRIPTION

This step involves civil and structural work covering preliminaries, earthwork, roads, drainage, solar panel support, inverter, control switchgear, control room/building installation and other construction as needed.

- Applied Procedures:
  i. The technical consultant prepares documents for the bidding as explained in Sub-step 7-1
  ii. Potential suppliers and contractors are invited to bid and submit technical and financial proposals
  iii. Evaluations of the submitted bids/proposals are done jointly with the developer and consultants
  iv. Approval of successful bidders/suppliers is confirmed by the developer board
  v. Appointment via Letter of Award and contract (FIDIC – Red Book)
  vi. Fabrication stage
  vii. Delivery stage
  viii. Construction stage

RELATED AUTHORITIES

Related Authority

Central government	▪ -
Provincial government	▪ -
Local government	▪ Jabatan Kerja Raya (Public Works Department) ▪ Jsbatan Perancangan Bandar dan Desa (Town Planning Department) ▪ District Office

FIDIC: International Federation of Consulting Engineers

Procurement of Civil and Structural Work

REQUIRED DOCUMENTS

- Completed Bill of Quantity (BOQ) and financial proposal
- Method or statements for work procedures
- Test procedures
- Test reports and certificates
- As-built documents and drawings
- Operation and Maintenance manuals

Procurement of Civil and Structural Work

$RM FEES / COST

- Project costs may vary depending on location and size

DURATION

- 3 - 4 months for bidding/tender process
- The construction period lasts for approximately 24 months but depends on the project developer

Procurement of Civil and Structural Work

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Contract Act (1950)	Malaysian Contract Act 1950
CIBD Act (1994)	Construction Industry Development Board Act 1994
Factories and Machinery Act (1967)	Factories and Machinery Act 1967
OSHA (1994)	Occupational Safety and Health Act 1994

Procurement of Civil and Structural Work

REFERENCE DOCUMENTS / SOURCES

Document Name	Description
Relevant standards	BS EN Standards
Relevant guidelines and manuals	American Society of Civil Engineer (ASCE) guidelines

Procurement of Civil and Structural Work

CHALLENGES AND RISKS

Challenges	Details
A protracted bidding/tender stage may affect civil work/construction	Start these stages as soon as possible to ensure timely finalisation
Hiring an inexperienced contractor can lead to delays and inferior workmanship	Hiring a competent consultant may prove helpful in ensuring the project's success

Procurement of Transmission Facility

DESCRIPTION

- The procurement of transmission facilities covers the supply, installation and construction of transmission lines from the powerhouse to the off-taking grid. This includes the transmission line substation and ancillaries.
- Applied Procedures:
  - i. The technical consultant prepares the documents for bidding as explained in Sub-Step 7-1
  - ii. Potential suppliers and contractors are invited to bid and submit technical and financial proposals
  - iii. Evaluations of the submitted bids/proposals are done jointly with the developer and consultants
  - iv. Approval for successful bidders/suppliers is confirmed by the developer board
  - v. Appointment via Letter of Award and contract (FIDIC –Yellow Book)
  - vi. Design stage
  - vii. Fabrication stage
  - viii. Delivery stage
  - ix. Installation stage

RELATED AUTHORITIES

Related Authority

Central government	▪ TNB ▪ EC ▪ SEDA
Provincial government	▪ TNB State
Local government	▪ TNB District ▪ Local authorities

Procurement of Transmission Facility

REQUIRED DOCUMENTS

- Financial proposal
- Technical proposal
- Technical drawings and design
- Test procedures
- Test reports
- Operation and Maintenance manuals

Procurement of Transmission Facility

FEES / COST

- The project costs may vary depending on capacity, transmission facility scope and location

DURATION

- The tendering stage takes roughly 3 - 4 months
- The post-award period ranges from 18 - 24 months

Procurement of Transmission Facility

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Electrical Supply Act (1990)	Electrical Supply Act (1990)

Procurement of Transmission Facility

REFERENCE DOCUMENTS / SOURCES

Document Name	Description
TNB Technical Guidebook for Generation in Distribution Network 2005	TNB Technical Guidebook for Generation in Distribution Network 2005
TNB Distribution Grid Code	TNB Distribution Grid Code
IEC, IEEE, BS EN standards	Relevant IEC, IEEE, BS EN standards

Procurement of Transmission Facility

CHALLENGES AND RISKS

Challenges	Details
Bidding/tender stage taking longer than expected. Design could not be finalised on time, thereby affecting fabrication, installation and construction	Ensure contracts and awards are issued in a timely manner. Any delays due to tendering and awarding contract may delay the commissioning and transmission of power. This will negatively impact the cost-economics and profit calculations.
Substandard equipment not in accordance to TNB specifications/standards	Install equipment that complies with TNB standards/specifications
Network parameters do not match PSS outcome, resulting in poor performance	Cross-checking to ensure TNB parameters comply with PSS norms

Risk	Recommended solution
Installing inferior equipment may lead to equipment failure and frequent downtime, and even possible rejection from TNB and SEDA	Quality of equipment is of utmost importance when transmitting power. Any failure in transmission may decease reliability, thus ensuring reliable supply of power serves to help maintain profitable revenues

Inspection and Factory Acceptance Test (FAT)

DESCRIPTION

- This section covers the activities concerning the inspection of the installation, civil and structural factory acceptance testing and the transmission facility.

- Applied Procedures:

  Generally, the testing procedures are included in the technical proposal as mentioned in sub-steps; 7-2, 7-3 and 7-4; this also applies to the civil and structural works, solar equipment and transmission facility respectively.

RELATED AUTHORITIES

Related Authority

Central government	▪ TNB ▪ EC ▪ SEDA
Provincial government	▪ TNB State
Local government	▪ DID ▪ JKR ▪ District Office ▪ JPBD ▪ TNB District

Inspection and Factory Acceptance Test (FAT)

REQUIRED DOCUMENTS

- SEDA testing procedures
- Inspection procedures
- FAT procedures
- Test certificates
- Test results

Inspection and Factory Acceptance Test (FAT)

$ RM FEES / COST

- Deemed inclusive in the contract costs/price

DURATION

- The inspection and FAT procedures are undertaken throughout the installation and construction period

Inspection and Factory Acceptance Test (FAT)

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Electrical Supply Act (1990)	
Contract Act (1950)	
CIBD Act 1994	**Construction Industry Development Board 1994**
Factories and Machinery Act (1967)	
OSHA 1994	**Occupational Safety and Health Act 1994**

Inspection and Factory Acceptance Test (FAT)

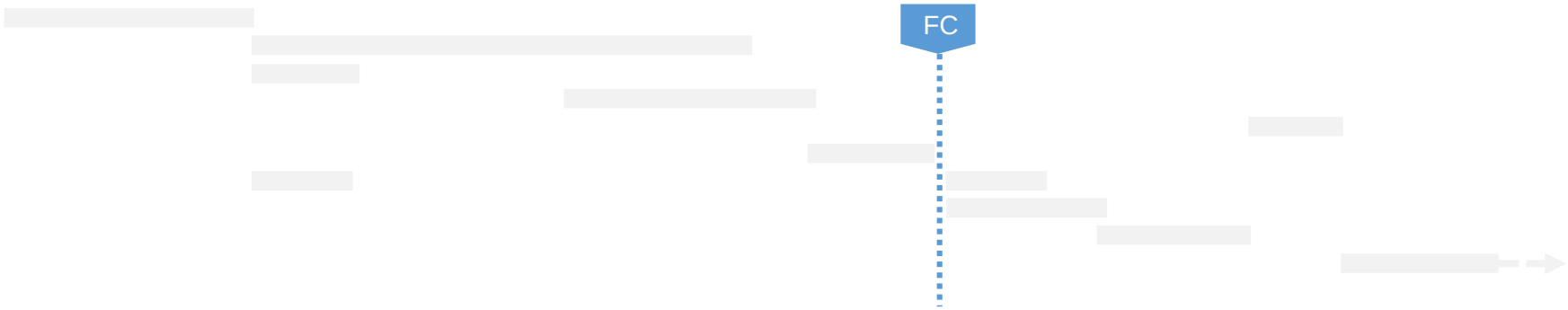
REFERENCE DOCUMENTS / SOURCES

Document Name	Description
TNB Technical Guidebook for Generation in Distribution Network 2005	
TNB Distribution Grid Code	
Relevant IEC, IEEE, BS EN standards	
Relevant American Society Civil Engineer (ASCE) guidelines and manuals	
SEDA testing procedures	

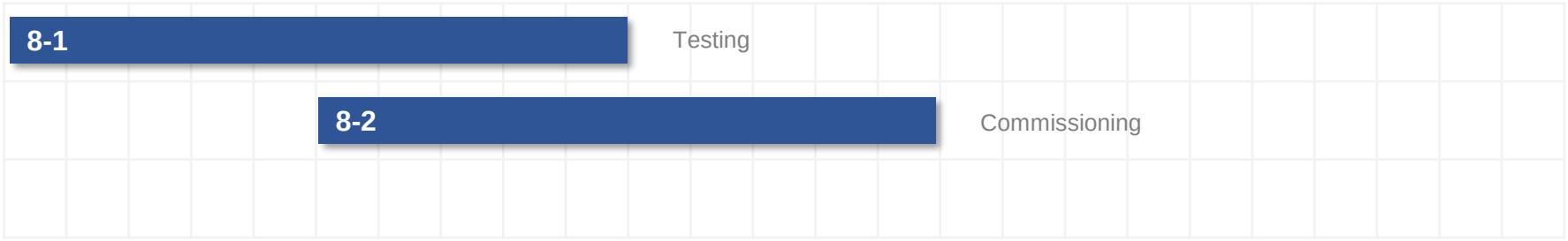
Inspection and Factory Acceptance Test (FAT)

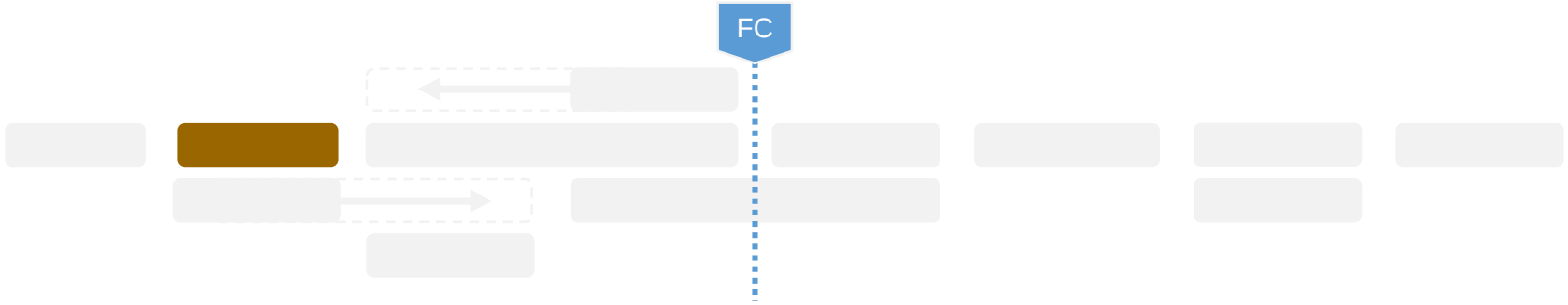
CHALLENGES AND RISKS

Challenges	Details
Improper inspection and FAT procedures can lead to rejection	Ensure all inspection and FAT procedures adhere to the relevant standards



Step 8 | Testing and Commissioning





Step 8 | Testing and Commissioning

Step 8 | Testing and Commissioning

Step Description

This step covers the ways in which the test results of large Solar PV plants must meet the requirements set forth in order to obtain approval for the Initial Operating Date (IOD) and Commercial Operation Date (COD). The testing to be conducted includes tests at electromechanical and transmission facilities. A full-load test may also be carried out upon connection to the grid. However, such testing may only commence once the IOD has been approved.

Testing

DESCRIPTION

This step covers the ways in which the test results of large Solar PV plants must meet the requirements set forth in order to obtain approval for the Initial Operating Date (IOD) and Commercial Operation Date (COD). The testing to be conducted includes tests at electromechanical and transmission facilities. A full-load test may also be carried out upon connection to the grid. However, such testing may only commence once the IOD has been approved.

Applied procedure:

Generally, test procedures are included in the technical proposal as mentioned in sub-steps 7-2, 7-3 and 7-5. This applies to civil and structural works, electromechanical and transmission facilities respectively.

RELATED AUTHORITIES

Central government	▪ TNB ▪ EC ▪ SEDA
Provincial government	▪ TNB State
Local government	▪ TNB District

Note 1:

Testing

REQUIRED DOCUMENTS

The following documents are required for this sub-step:

- SEDA testing procedure
- Test certificates
- Test results

Note: All documents to be certified according to the Guidelines and Determinations of the Sustainable Energy Development Authority Malaysia

Testing

$RM FEES / COST

- Deemed inclusive of the contract costs/price

DURATION

- The duration usually begins **3 months** prior to the COD and lasts until the COD is approved

Testing

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 725 (2011)	Renewable Energy Act 2011 (Act 725)
Act 726 (2011)	Sustainable Energy Development Agency Act (Act 726)
Elect**ricity Supply Act 1990**	

Testing

REFERENCE DOCUMENTS / SOURCES

- TNB Technical Guidebook for Generation in Distribution Network 2005
- TNB Distribution Code
- Relevant IEC, IEEE, BS EN Standards
- SEDA testing procedure

Testing

CHALLENGES AND RISKS

Challenges	Recommendation
Failure to adhere to SEDA and TNB procedures	Plant must undergo due diligence prior to commencement of testing
Parameters do not match the PSS outcome, resulting in poor equipment performance	Proper scrutiny must be maintained before the components are purchased and installed. The parameters set forth by TNB and the PSS report must also match in advance.

Commissioning

DESCRIPTION

The commission process occurs after completion of successful testing at the facility. It includes obtaining approval from SEDA for the Commercial Operating Date (COD).

Applied procedure:

Generally, test procedures are included in the technical proposal as mentioned in sub-steps 7-3 and 7-4 and apply to the structural work and transmission facilities respectively.

RELATED AUTHORITIES

Central government	▪ TNB ▪ EC ▪ SEDA
Provincial government	▪ TNB State
Local government	▪ TNB District

Note 1:

Commissioning

REQUIRED DOCUMENTS

The following documents are to be submitted:

- Test certificates
- Test results

Note: All documents to be certified according to the Guidelines and Determinations of the Sustainable Energy Development Authority Malaysia

Commissioning

$ RM FEES / COST

- Deemed inclusive of the contract costs/price

DURATION

- The duration is usually **1 month** prior to the COD

Commissioning

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 725 (2011)	Renewable Energy Act 2011 (Act 725)
Act 726 (2011)	Sustainable Energy Development Agency Act (Act 726)
Elect**ricity Supply Act 1990**	

Commissioning

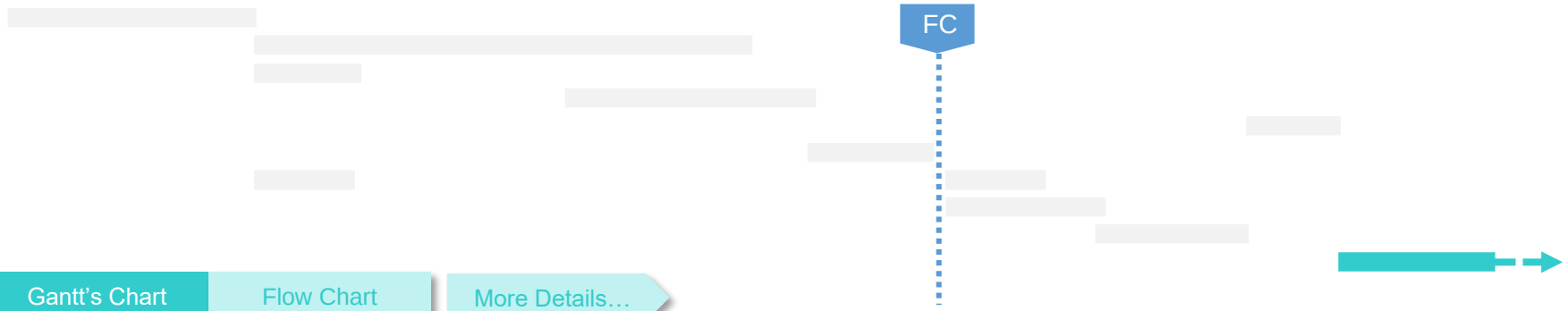
REFERENCE DOCUMENTS / SOURCES

- TNB Technical Guidebook for Generation in Distribution Network 2005
- TNB Distribution Code
- Relevant IEC, IEEE, BS EN Standards

Commissioning

CHALLENGES AND RISKS

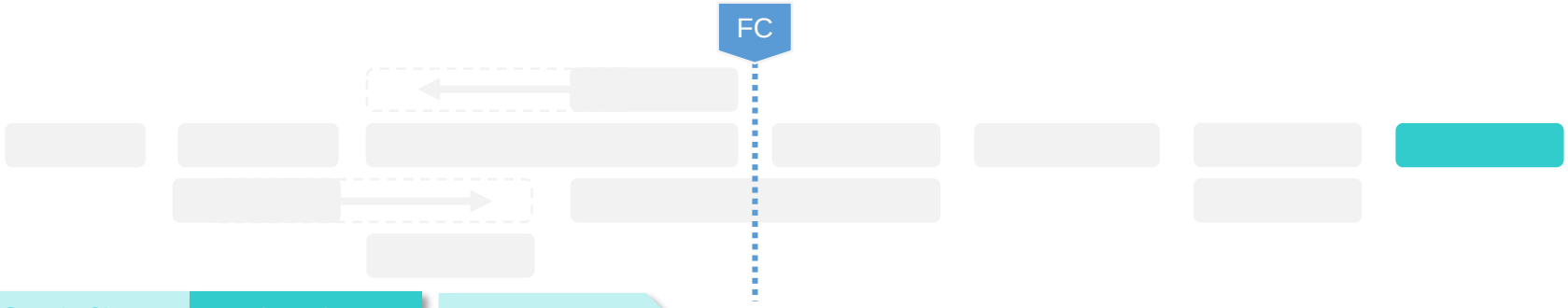
Challenges	Recommendation
Failure to adhere to SEDA and TNB procedures	Plant must must undergo due diligence before testing commences
Parameters do no match	Proper scrutiny must be maintained before the components are purchased and installed. The parameters set forth by TNB and the PSS report must also match in advance.



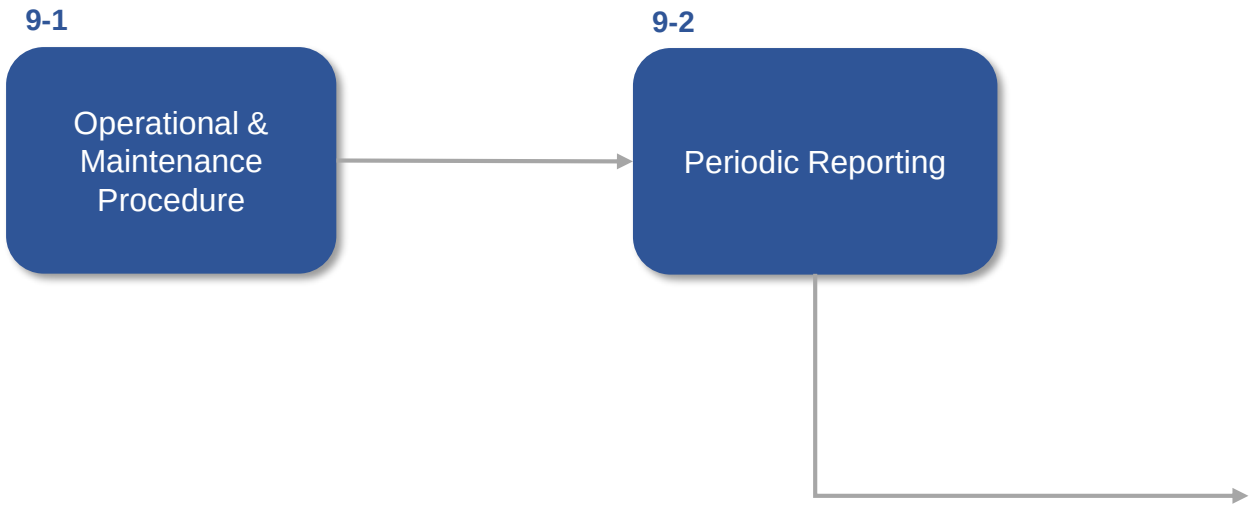
Gantt's Chart | Flow Chart | More Details…

Step 9 | Operation and Maintenance

9-1	Operational & Maintenance Procedure
9-2	Periodic Reporting



Step 9 | Operation and Maintenance



Step 9 | Operation and Maintenance

… Gantt's / Flow Chart

Step Description

This step covers the requirements for operation and maintenance (O&M) at a solar PV power plant and the importance of maintaining optimal efficiency. The operational reliability of the solar generating units at the power plant shall be such that they are able to maintain the highest efficiency output available.

Operational & Maintenance Procedure

DESCRIPTION

The purpose of this sub-step is to define the technical requirements and procedures for the operation and maintenance (O&M) of large Solar PV plants. This is to ensure that operation of a plant remains smooth, thereby allowing it to last for the entirety of the project's lifetime. Good O&M procedures increase operational reliability and allow the PV plant to generate higher output with greater efficiency under the given conditions. Such procedures should be made available even before the commissioning of the plant (Sub-step 8-2)

In principle, the power plant must be operated according to the standards and requirements as defined by the Energy commission (EC), e.g., grid code, distribution code, etc. Hence, the operation and maintenance (O&M) manual must reflect those requirements.

Depending on the technical capability of the project developer, the O&M manual may be developed solely by an engineering, procurement, and construction (EPC) contractor or jointly between the developer and the EPC contractor. The plant design documents and technical documents for each piece of equipment / module are to be included in the O&M manual.

RELATED AUTHORITIES

Central government	▪ EC
Provincial government	▪ EC State office
Local government	▪ -

Operational & Maintenance Procedure

DESCRIPTION

Typically, the procedure for developing an O&M manual is as follows:

1. Equipment manufacturers to submit all O&M drawings and plans or maintenance schedules to developer
2. Developer to have a dedicated team operate the station according to the O&M procedures
3. Alternatively, the developer can engage a qualified third party to carry out O&M tasks

The content of an O&M manual can be decided on jointly by the project developer, EPC contractor and plant operator. The following are important aspects of a Solar PV plant that should be covered by the manual:

- As-built drawings and diagrams
- Manuals
- Maintenance schedules
- List of spare parts
- Additional documents, etc.

Operational & Maintenance Procedure

$RM FEES / COST

- Typically, there is no additional fee for this sub-step as the preparation of an O&M manual should already be included in the EPC contractor's scope of work.

DURATION

- The amount of time it takes to prepare and finalise an O&M manual is based solely on the agreement reached between the developer and the EPC contractor.

Operational & Maintenance Procedure

RELATED LAWS AND REGULATIONS

Regulation No.	Name
Electrical Supply Act (1990)	Electrical Supply Act

Operational & Maintenance Procedure

REFERENCE DOCUMENTS / SOURCES

Energy Commission Guidelines

The relevant guidelines can be downloaded from the official EC website at www.st.gov.my

TNB Distribution Code

The latest distribution code can be downloaded from the official EC website at www.st.gov.my

TNB Technical Guide Book of DL

i.e., operation code / standard

Relevant technical standards

i.e., IEC, IEEE and BS EN standards, etc.

Operational & Maintenance Procedure

CHALLENGES AND RISKS

Challenges	Recommendation
Untrained staff	Untrained staff may lead to breakdown or permanent damage of parts, thus due care must be taken when selecting staff for O&M. Be sure to involve staff during installation, testing and commissioning
Available spare parts are inadequate	Selection of spare parts must be conducted according to SOP and sufficient spares must be stored in order to avoid a halt in operations at the plant
Non-compliance with maintenance schedule	Improper operation of plant may result in loss of revenue, though this situation can be avoided by having properly trained staff and selecting qualified personnel.

Periodic Reporting

DESCRIPTION

Over the lifetime of a large Solar PV project, the developer is required to regularly report to the authorities. There are three authorities involved in this sub-step: TNB or Distribution Licensee (DL), the Sustainable Energy Development Authority (SEDA), and the Energy Commission (EC)

	DL	SEDA	EC
Purpose	Payments and billing	Monitoring	Monitoring
Required information	Data recorded at the interconnection point (i.e., voltage, power factor, frequency, power (kW), reactive power (kVAr), etc.)	Power generation	Power generation
Frequency	Monthly	Monthly	Yearly
Reporting method	Electronically via TNB Regional SCADA system and manual forms	manual forms	manual forms

RELATED AUTHORITIES

Federal level	▪ TNB ▪ EC ▪ SEDA
State level	▪ TNB State
Local level	▪ TNB District

Periodic Reporting

§ RELATED LAWS AND REGULATIONS

Regulation No.	Name
Act 725 (2011)	Renewable Energy Act
Act 726 (2011)	Sustainable Energy Development Authority (SEDA) Act
Act 447 (1990)	Electricity Supply Act

Periodic Reporting

REFERENCE DOCUMENTS / SOURCES

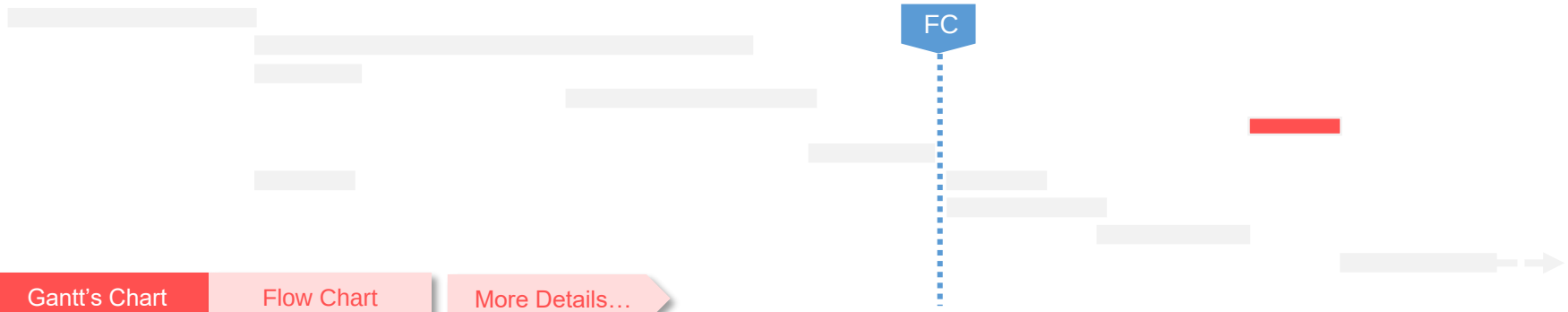
Standard reporting forms / templates

Forms and templates for periodic reporting are determined by the respective DL, SEDA, and EC. Project developers must obtain the latest forms / templates directly from the respective authorities.

Periodic Reporting

CHALLENGES AND RISKS

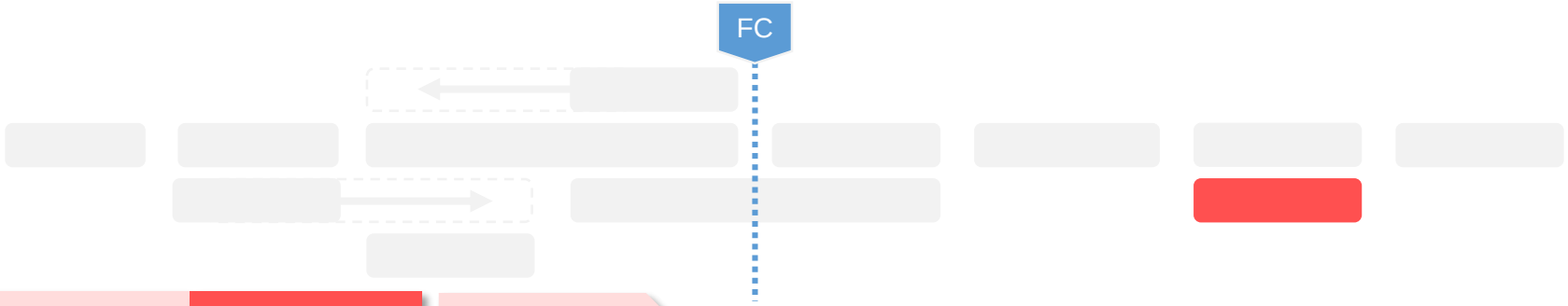
Risk	Details
Revocation of FiAH certification	Non-compliance can lead to non-payment and result in revocation of FiAH certification and expulsion from FiT programme



Gantt's Chart | Flow Chart | More Details…

Step 10 | Supporting Mechanism

10-1	Green Tech Financing Scheme (GTFS)
10-2	Facilitation Fund from TERAJU
10-3	Facilitation Fund from UKAS/PPCU
10-4	Pioneer Status/Investment Tax Allowance



Step 10 | Supporting Mechanism

10-1
Green Tech Financing Scheme (GTFS)

10-2
Facilitation Fund from TERAJU

10-3
Facilitation Fund from UKAS/PPCU

10-4
Pioneer Status/ Investment Tax Allowance

Step 10 | Supporting Mechanism

… Gantt's / Flow Chart

Step Description

This step details the various support schemes available for promoting Large Solar PV plants. These schemes are not available and may depend on the quota or with a timeline.

This step describes various sub-steps and procedures for various support mechanism existing in Malaysia. The step discusses on the following support schemes:

Green Technology Financing Scheme (GTFS)

Facilitation Fund from TERAJU

Facilitation Fund from UKAS/PPCU

Pioneer Status/Investment Tax Allowance

Green Tech Financing Scheme (GTFS)

DESCRIPTION

This section shares the steps for applying for Green Technology Financing Scheme (GTFS). Acquisition of GTFS allows for a susbsidy of 2% applied against the loan/funds received from the 24 approved financial institutions. Banks will also require proof of GTFS certificate before issuance on financial term of offer. The funds for the subsidy are limited to RM50m (USD 11.53 mil).

The procedures for GTFS are as follow:

1. All applications shall be submitted to GreenTech Malaysia
2. GreenTech Malaysia will screen and evaluate all complete and valid applications
3. Should the GTFS team require clarification or any issue or matter during the evaluation period, applicants must furnish the information within 3 days from the date of notification
4. Applicants will be invited for a Business Review Presentation meeting to present the viability of their business models, product market, potential project financial performance, company management and the company's exit strategy.

RELATED AUTHORITIES

Related Authority

Central government	▪ GreenTech Malaysia – Evaluate the application, approve the financing scheme
Provincial government	
Local government	

Note: As of November 2014, the approved financing amounts to RM 2,000 million (~ USD 549 million), while a share of RM 1,500 million (~ USD 412 million) is still available.
Check the latest available quota at www.gtfs.my

Green Tech Financing Scheme (GTFS)

DESCRIPTION

5. The project will be tabled at the GTFS Committee (GC) meeting for final approval
6. GreenTech Malaysia will issue a notification letter to successful and unsuccessful applicants
7. A successful applicant will be issued a Green Project Certificate
8. Developer is required to perform presentation to the vetting commitee on the project's technical and financial viability

RELATED AUTHORITIES

Green Tech Financing Scheme (GTFS)

REQUIRED DOCUMENTS

- Certified true copy of Forms 9, 24 and 49
- Memorandum of Article (MOA)
- Approved layout drawing indicating the project boundary
- Organisational structure of the project management team
- Feasibility Study (FS)

  Refer to Sub-step 1-2
- Undertaking letter
- There may be additional documents requested by GTFS depending on the type of project[note1]

Green Tech Financing Scheme (GTFS)

$ RM FEES / COST

- There is no application fee

DURATION

- Typically, the processing time takes around **2 – 3 months**

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Green Tech Financing Scheme (GTFS)

§ RELATED LAWS AND REGULATIONS

Malaysia National Green Technology Policy 2009

Standard form and online procedures from Malaysia Green Technology Corporation (GreenTech Malaysia)

These documents can be downloaded from the official website of GreenTech at www.greentechmalaysia.my

Official website of GTFS

www.gtfs.my

Green Tech Financing Scheme (GTFS)

REFERENCE DOCUMENTS / SOURCES

Standard reporting forms / templates

Forms and templates for GTFS can be obtained from the following websites:

www.gtfs.my

www.greentechmalaysia.my

Green Tech Financing Scheme (GTFS)

CHALLENGES AND RISKS

Risk	Details
Delay of GTFS approval	If the submitted documents are incomplete, do not contain sufficient details or fail to meet the requirements as set forth, this may cause delays in GTFS approval. The developer must ensure the supporting documents are complete prior to submission.

Facilitation Fund from TERAJU

DESCRIPTION

This section explains the process for applying for a Facilitation Fund. This fund is a financing support scheme under TERAJU (Unit of Prime Minister's Department) used for investment in preliminary and infrastructural works. The fund is available for companies with at least 51% Bumiputra shareholding or 35% Bumiputra shareholding and listed in Bursa Malaysia (KL Stock). The fund is limited to 15% of the eligible project cost and RM50m to RM200m (USD15.6m- USD62.4m).

The applied procedure is as follows:

1. Applications to be submitted directly to TERAJU HQ.
2. Preliminary assessment will then be conducted by the Facilitation Fund Committee Secretariat ("Secretariat") situated at TERAJU HQ or at each Corridor economic region
3. Evaluation and recommendation(s) to be submitted by the Secretariat

RELATED AUTHORITIES

Federal level	▪ TERAJU of Prime Minister's Department – Evaluate the application, approve the fund
State level	▪ State TERAJU office
Local level	▪ (none)

Note 1: Bumiputera or Bumiputra is a Malaysian term that describes the Malay ethnic group

Facilitation Fund from TERAJU

DESCRIPTION

4. Endorsed projects by TERAJU HQ and Corridors will be tabled at the TERAJU Executive Committee (TERAJU EXCO) for final approval

5. Successful applications screened by TERAJU will be forwarded to Public-Private Partnership Unit (PPPU), whereby the applicants are then invited to deliver a final presentation at the Facilitation Fund Committee (JKAS)

6. Upon endorsement by JKAS Committee and obtaining final approval, a Conditional Approval letter will then be issued by the Government

7. A tripartite agreement shall then be formed between the Government-Bank Pembangunan (BPMB)-Applicant Company once all parties agree with the clauses as stipulated in the agreement

RELATED AUTHORITIES

Facilitation Fund from TERAJU

REQUIRED DOCUMENTS

- Company profile
- Business Plan of the proposed project with the following:
  - Executive Summary of the project
  - Objective of the project
  - Background and scope of the project
  - Current status of the project
  - Overall cost of the project
  - Relevant information on the project site
- Impact of implementation of the project
- Information of the fund application
- Details of the financial analysis of the project

Facilitation Fund from TERAJU

$ RM FEES / COST

- There is no application fee

DURATION

- Obtaining approval for funding usually **takes around 3 months**
- Finalisation of the facilitation fund agreement usually takes around **2.5 months**

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Facilitation Fund from TERAJU

REFERENCE DOCUMENTS / SOURCES

Guidelines for the application

This can be downloaded from the official TERAJU website at www.teraju.gov.my

Application form

This can be downloaded from the official TERAJU website at www.teraju.gov.my

Facilitation Fund from TERAJU

CHALLENGES AND RISKS

Risk	Details
Delay of GTFS approval	If the submitted documents are incomplete, do not contain sufficient details or fail to meet the requirements as set forth, this may lead to delays in obtaining approval from TERAJU. The developer must ensure the supporting documentation is complete before submission.

Facilitation Fund from UKAS/PPCU

DESCRIPTION

This section explains the application of a Facilitation Fund under UKAS/PPPU (Private Public Partnership Unit of Prime Minister's Department). This fund is financial support used for investment in preliminary and infrastructural works. The company has to be incorporated in Malaysia under Company Act 1965. The fund is limited to 10% of project costs of RM100m (USD23.06mil) and above.

The applied procedure is as follows:

1. Applications can be made directly to PPPU office
2. Evaluation and recommendation(s) will be handled by the Facilitation Fund Committee (JKAS)
3. Endorsed projects by JKAS will be tabled for consideration of Prime Minister to approve Facilitation Fund
4. PPPU to issue Facilitation Fund Letter of Approval to successful applicant companies together with a copy of the Facilitation Grant Agreement to be signed

RELATED AUTHORITIES

Federal level	▪ UKAS/PPP of the Prime Minister's Department – Evaluate the application, approve the fund
State level	▪ (none)
Local level	▪ (none)

Note 1: Bumiputera or Bumiputra is a Malaysian term that describes the Malay ethnic group

Facilitation Fund from UKAS/PPCU

REQUIRED DOCUMENTS

- Company profile
- Business Plan of the proposed project with details as follows:
  - Executive Summary of the project
  - Objective of the Project
  - Background and scope of the project
  - Current status of the project
  - Overall cost of the project
  - Relevant information on the project site
- Impact of project implementation
- Information on application for funding
- Details of financial analysis for the project

Facilitation Fund from UKAS/PPCU

$ RM FEES / COST

- There is no application fee

DURATION

- Approval of funding usually takes **around 3 months**
- Finalisation of the facilitation fund agreement usually takes around **2.5 months**

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Facilitation Fund from UKAS/PPCU

RELATED LAWS AND REGULATIONS

Guideline for the application

This can be obtained from the official UKAS/PPP website at www.ukas.gov.my

Application form

This can be obtained from the official UKAS/PPP website at www.ukas.gov.my

Facilitation Fund from UKAS/PPCU

CHALLENGES AND RISKS

Risk	Details
Delay of GTFS approval	If the submitted documents are incomplete, do not contain sufficient details or fail in any other way to meet the requirements as set forth, this may cause delays in obtaining approval from UKAS/PPCU. The developer must ensure the supporting documents are complete before submission.

Pioneer Status/Investment Tax Allowance

DESCRIPTION

A company that is granted Pioneer Status (PS) will enjoy tax exemption benefits for the RE technology being developed, e.g., a large Solar PV plant. Submissions requesting tax exemption must be completed on or before 31 December of each year. The incentive is extended until the year 2020.

Applied procedure:

Obtain an application form from the website www.mida.gov.my
Submit three copies of the completed application form to MIDA

RELATED AUTHORITIES

Related Authority

Central government	▪ Ministry of Finance, Malaysia
Provincial government	
Local government	

Pioneer Status/Investment Tax Allowance

REQUIRED DOCUMENTS

- Form 24: Latest Return of Allotment of Shares certified by a Company Secretary
- Form 49: Latest Return giving particulars in Register of Directors, Managers and Secretaries and Change of Particulars certified by a Company Secretary
- Latest Annual Return certified by a Company Secretary
- Copy of approval by the Authority (EPU and SEDA)
- Copy of REPPA
- Project Proposal or Feasibility Study

Pioneer Status/Investment Tax Allowance

$ RM FEES / COST

- There is no application fee

DURATION

- Typically, the processing duration takes around **2 - 3 months**

Note: Indicated fee in USD is only approximate based on the currency conversion of USD 1 = PHP 3.27 (as of October 2014)

Pioneer Status/Investment Tax Allowance

RELATED LAWS AND REGULATIONS

Malaysia Industry Development Authority (MIDA) Act 1967
Income Tax Act 1967

Pioneer Status/Investment Tax Allowance

REFERENCE DOCUMENTS / SOURCES

Malaysia Annual Budget Guidelines/Rules (Ministry of Finance)

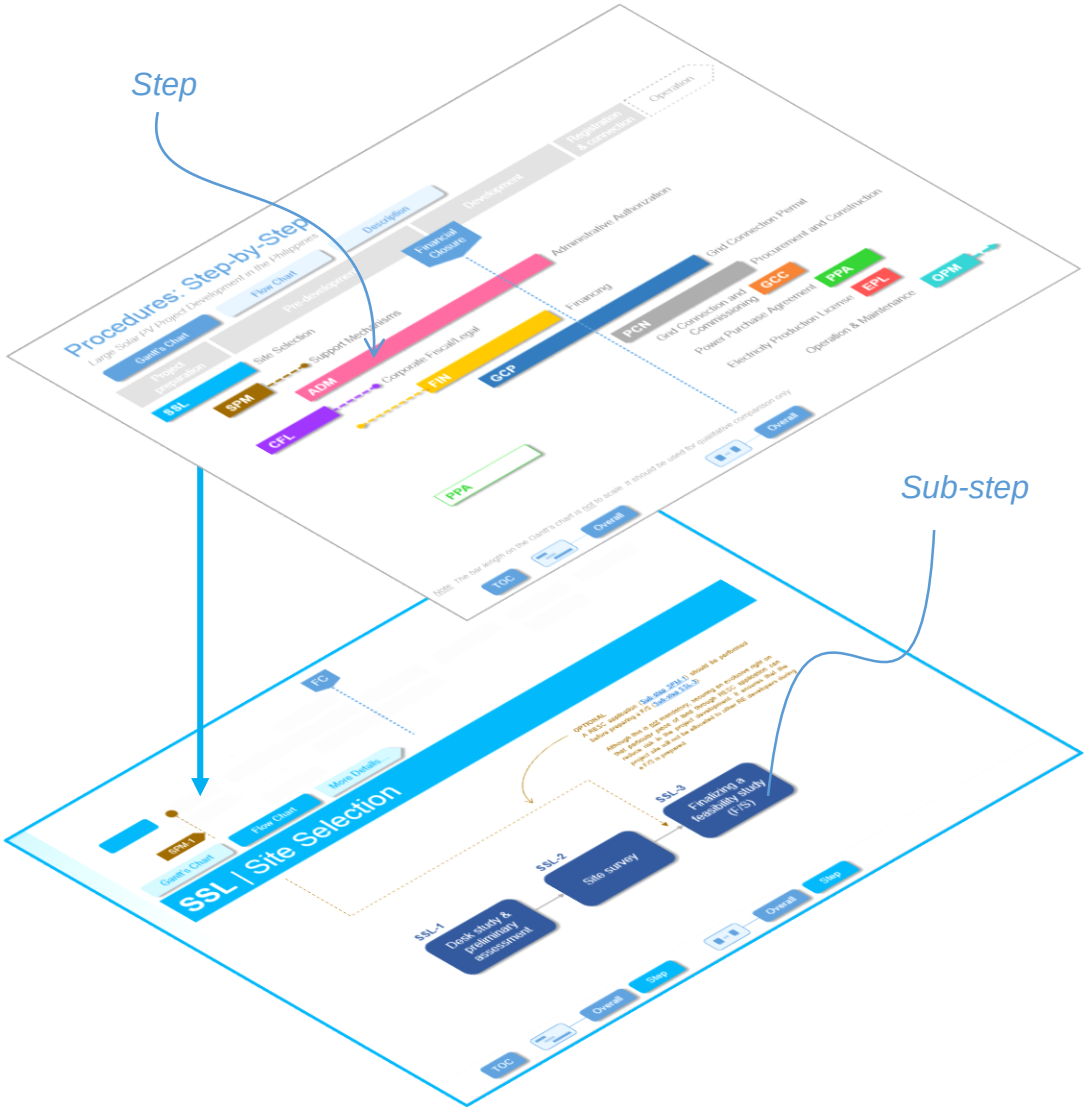
List of Abbreviations

Unless stated otherwise, the following abbreviations shall be used throughout this guidebook:

ACE – ASEAN Centre for Energy
ASCE – American Society of Civil Engineers
AWWA – American Water Works Association
Board Engineers Malaysia
BS EN – British European Standards
CapEx – Capital Expenditure
CCM – Companies Commission of Malaysia
COD – Commercial Operation Date
DID – Drainage and Irrigation Department
DL – Distribution Licensee
DSCR – Debt Service Coverage Ratio
DO – Development Order or District office
DOE – Department of Environment
EC – Energy Commission
EIA – Environment Impact Assessment
EPU – Economic Planning Unit
EXCO – State Executive Committee
FAT – Factory Acceptance Test
FS – Feasibility Study
FiAH – Feed-in Account Holder
FIDIC – International Federation of Consulting Engineers
FiT – Feed-in Tariff
GC – GTFS Committee
GTFS – Green Tech Finance Scheme
IEC – International Electrotechnical Commission
IEEE – Institute of Electrical and Electronics Engineers
IOD – Initial Operating Date
IRR – Internal Rate of Return
JKR – Jabatan Kerja Raya (Public Works Department)
JPBD – Jabatan Perancangan Bandar dan Desa (Town Planning Department)
kW – kilo Watt
kWp – kilo Watt peak
LAP – Land Acquisition Plan
M&A – Memorandum and Article of Association
MIDA – Malaysia Industry Development Authority
MOA – Memorandum of Article
MSMA – Storm Water Management Manual by DID
OSHA – Occupational Safety and Health
PBT – Phak Berkuasa Tempatan
PPA – Power Purchase Agreement
PPPU – Private Public Partnership Unit
PSS – Power System Study
PV – Photovoltaic
PWD – Public Works Department
RE – Renewable Energy
RE – Ringgit Malaysia
SEDA – Sustainable Energy Development Authority Malaysia
SLD – Single Line Diagram
SSM – Suruhanjaya Syarikat Malaysia (Malay for CCM)
TERAJU – Unit Peneraju Agenda Bumiputera
TNB – Tenaga Nasional Berhad
UKAS – Unit Kerjasama Awam Swasta
USD – United States Dollar

How to use the Guideline

Guideline Structure



"Two levels of details"

Overview Layer

From the overview layer, readers can see the entire procedure for project development (from site selection to operation and maintenance). It offers a big picture on how biomass/biogas project development in Indonesia has to be done. Only predefined steps are shown in this layer in different colour codes (e.g., site selection, administrative authorisation, etc.). These steps are standardised for every guideline.

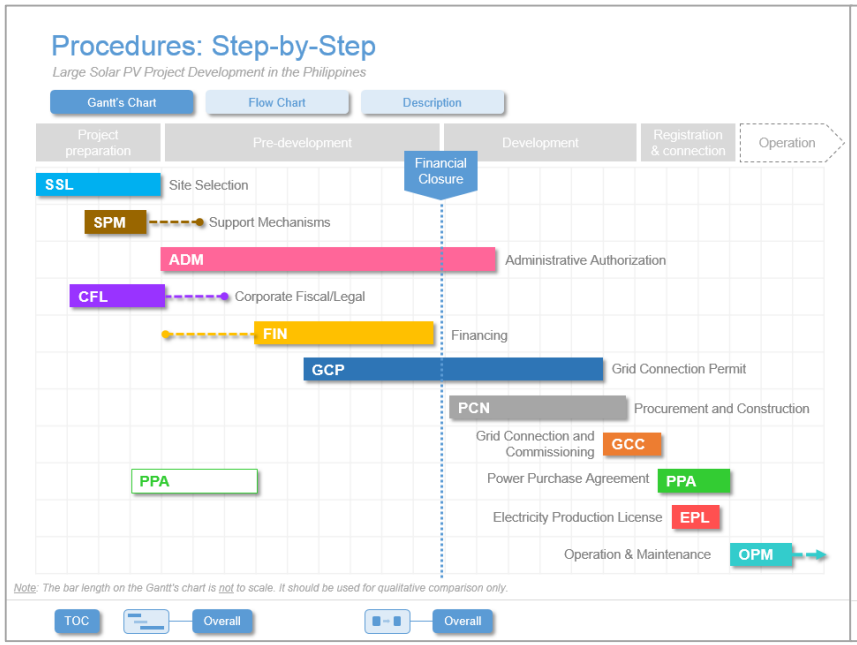
Detailed Layer

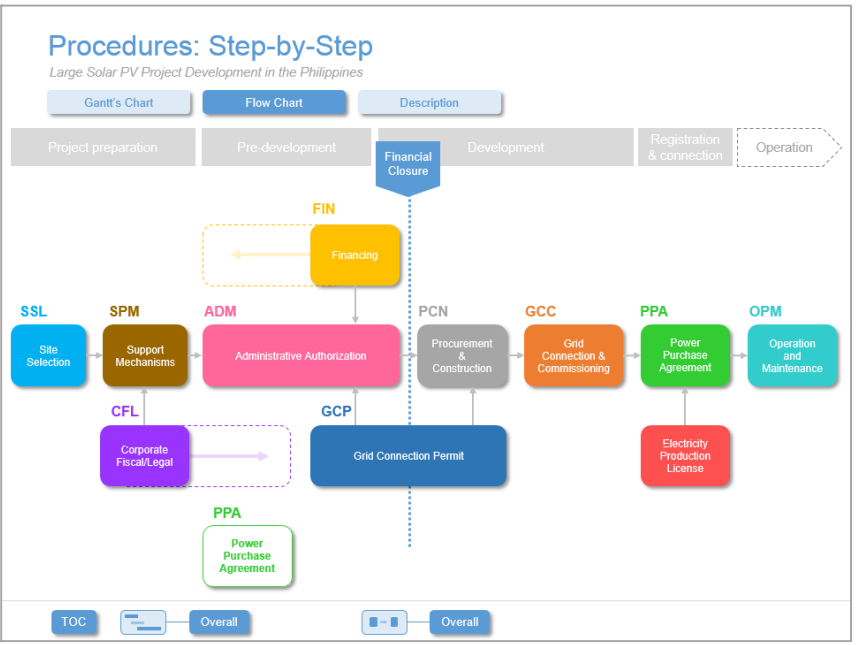
The detailed layer provides more information for each step shown in the overview layer. This allows for more flexibility in providing additional details to readers on a specific phase of project development.

How to use the Guideline

Guideline Structure

"Two ways to illustrate the procedural flow"





Gantt's Chart View

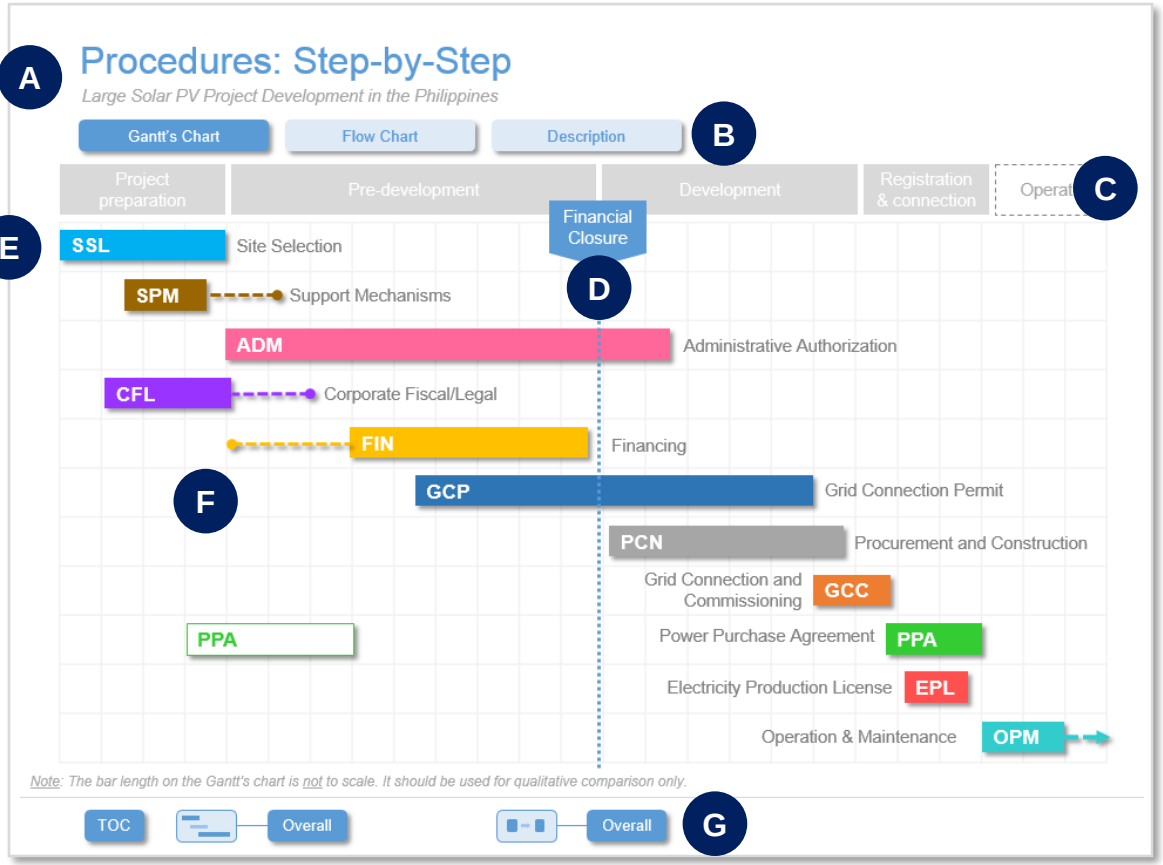
The Gantt's chart is a typical planning tool for project developers. It can show sequences of steps / sub-steps.

Fow Chart View

The flow chart is a simplified version to illustrate procedural flow. It can better show the relationship between steps / sub-steps.

How to use the Guideline

Page details – Overall Gantt's Chart



A **Page title and sub-title**

B **Section navigation**

Click these navigational icons to jump directly to the respective sub-section. There are three icons: Gantt's Chart (change to Gantt's chart view), Flow Chart (change to flow chart view), and Description (go to the overall description page). The current page is always highlighted in dark

C **Phase of project development**

The typical phase of project development

D **Financial Closure milestone**

Financial closure is an important milestone in RE project development. It is clearly marked on the Gantt's chart and flow chart, allowing for comparisons about the procedure in different countries.

E **Step bar**

Click these coloured icons to jump directly to the respective step

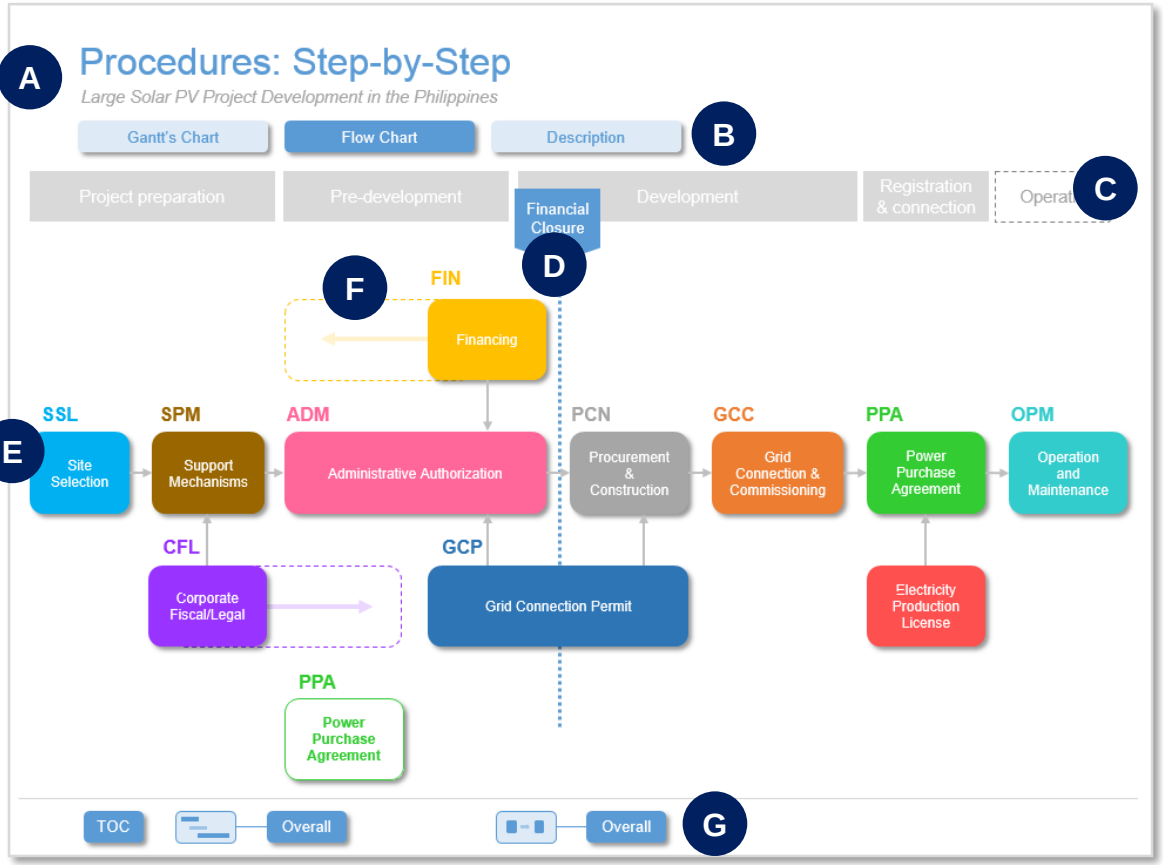
F **Flexibility indication**

Some steps can be done at different times or in parallel with one another. The dotted line represents the flexibility of the step.

G **Main navigation**

How to use the Guideline

Page details – Overall Gantt's Chart



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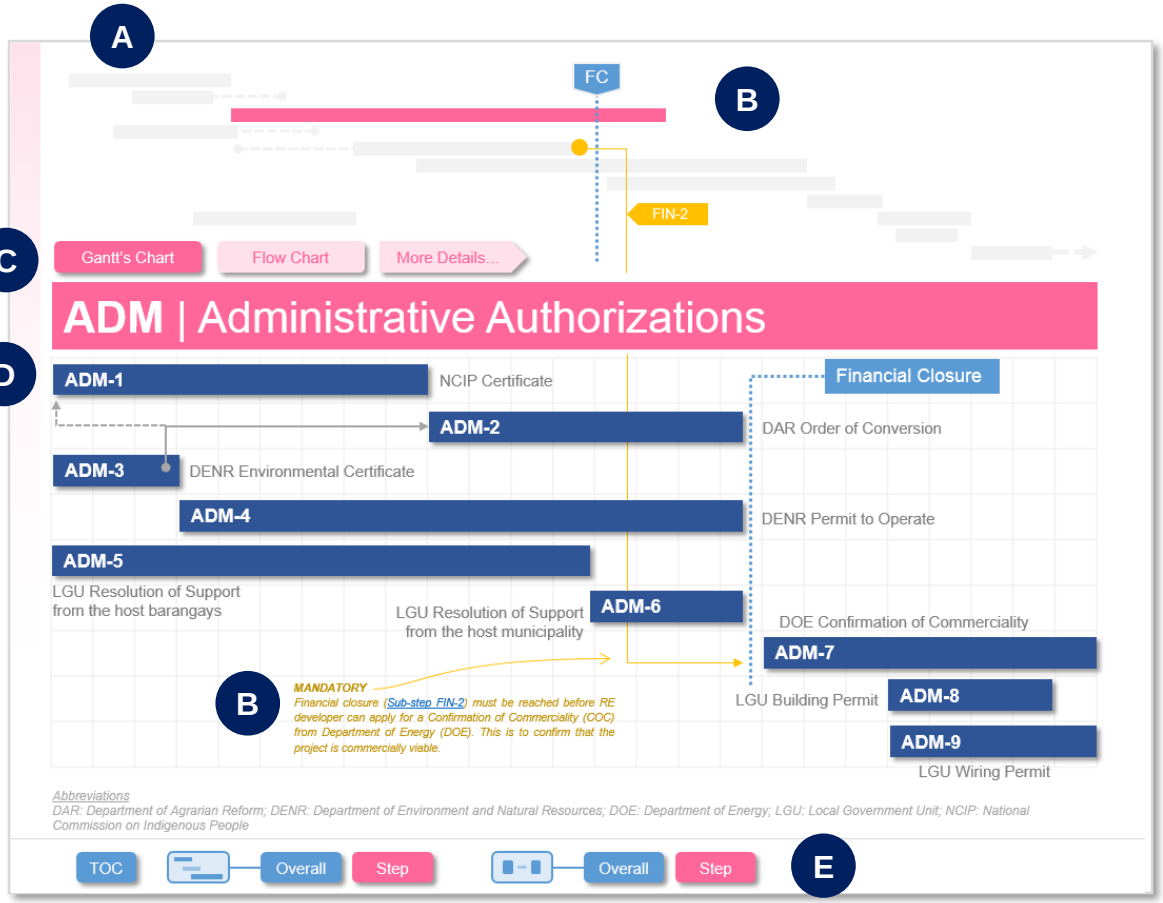
How to use the Guideline

Page details – Step Flow Chart



A **Navigation Gantt's chart**

The overall Gantt's chart is shown with the current step highlighted. Click on any Gantt's icon to jump to the respective step.

B **Relationship to other steps**

The relationship of this step to others is shown with a short explanation. There are two types of relationships: (1) Recommendation – Based on good practice; and (2) Mandatory relationship – By regulations

C **Section navigation**

Click these navigational icons to jump directly to the respective sub-section. There are three icons: Gantt's Chart (change to Gantt's chart view), Flow Chart (change to flow chart view), and More Details (go to the detailed description page). The current page is always highlighted in dark

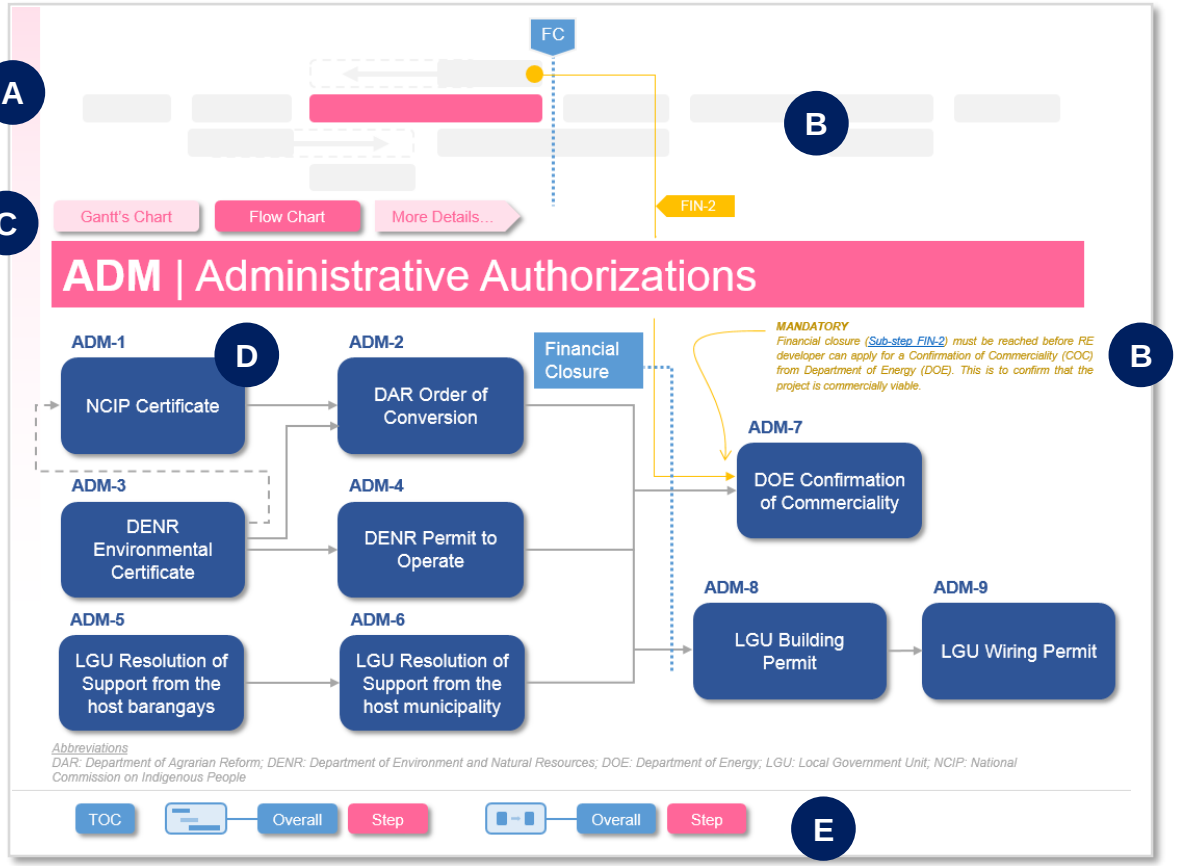
D **Sub-step bar**

Click these coloured icons to jump directly to the respective sub-step

E **Main navigation**

How to use the Guideline

Page details – Step Flow Chart



A **Navigation flow chart**

The overall Gantt's chart is shown with the current step highlighted. Click on any Gantt's icon to jump to the respective step.

B **Relationship to other steps**

The relationship of this step to others is shown with a short explanation. There are two types of relationships: (1) Recommendation – Based on good practice; and (2) Mandatory relationship – By regulations

C **Section navigation**

Click these navigational icons to jump directly to the respective sub-section. There are three icons: Gantt's Chart (change to Gantt's chart view), Flow Chart (change to flow chart view), and More Details (go to the detailed description page). The current page is always highlighted in dark

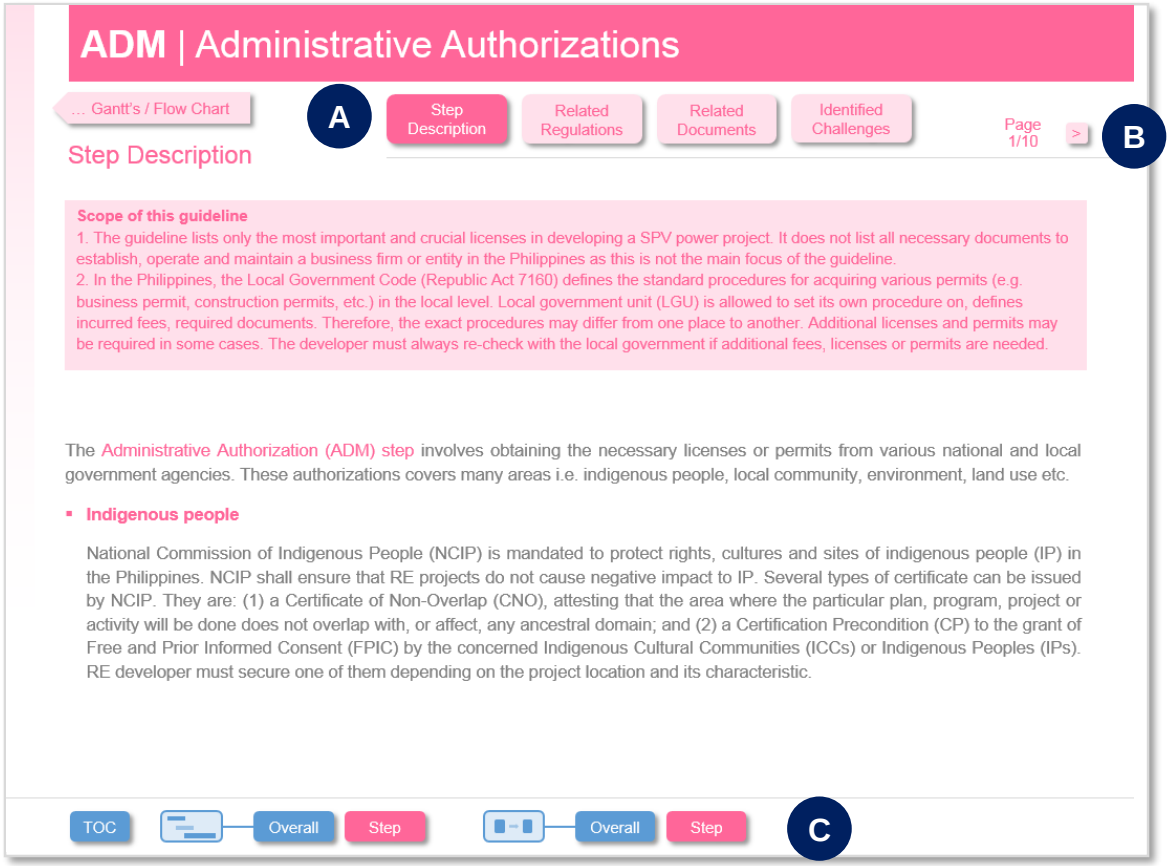
D **Sub-step icon**

Click these coloured icons to jump directly to the respective sub-step

E **Main navigation**

How to use the Guideline

Page details – Step Flow Chart



A **Section navigation**

Click these navigational icons to jump directly to the respective sub-section. There are four icons:
Step description – Click to see explanation of the step
Related regulations – Go to the list of relevant laws or regulations
Related documents – Go to the list of reference documents (not legal documents, e.g., guidebook, study, etc.)
Identified challenges – Go to the list of challenges associated with this step

The current page is always highlighted in dark

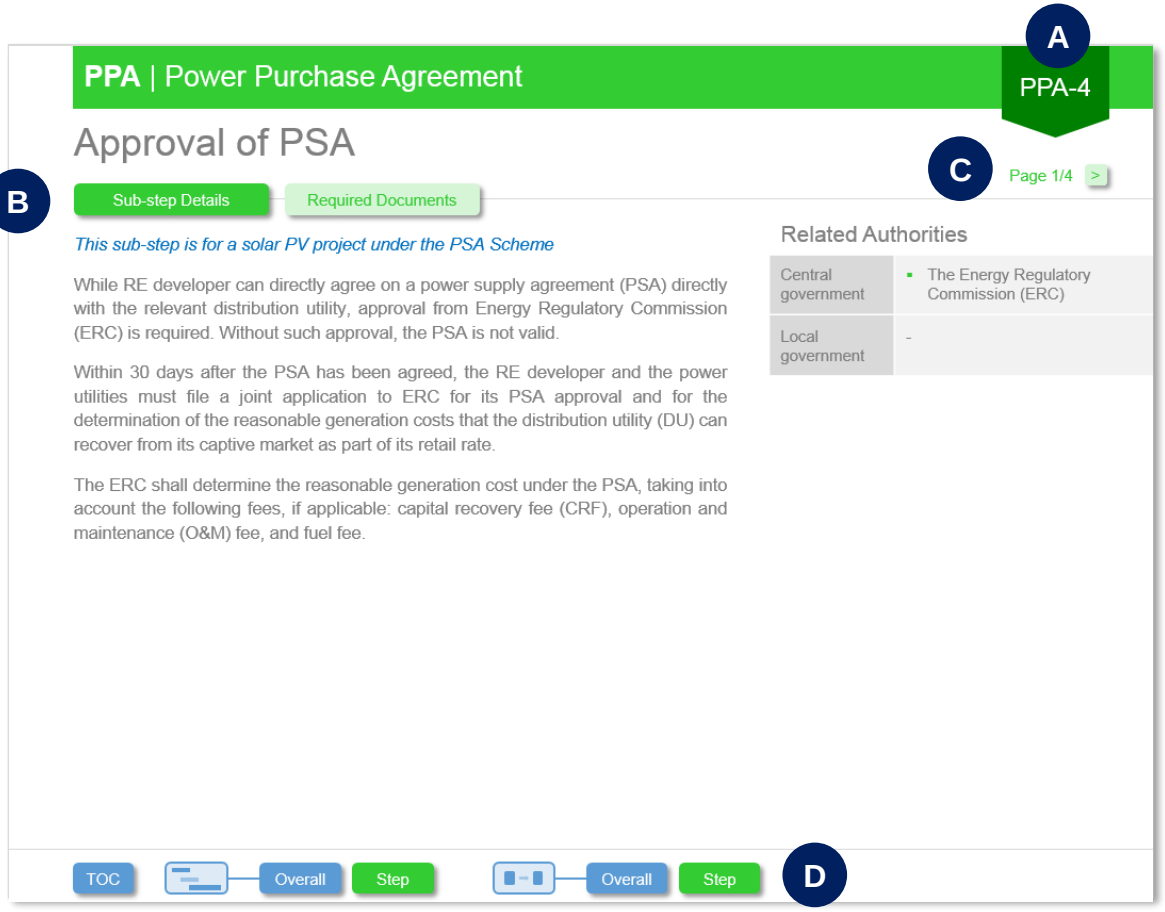
B **Section page**

The current and total number of pages for the section

C **Main navigation**

How to use the Guideline

Page details – Step Flow Chart



A **Sub-step identifier**

The identifier of sub-step for cross-reference purpose. The number doesn't represent the flow sequence.

B **Section navigation**

Click these navigational icons to jump directly to the respective sub-section. In the sub-step level, there is no predefined structure for the sub-section. Each sub-step has a different structure. Nevertheless, sub-steps generally consist of three sub-sections:
Sub-step details – Click to see explanation of the sub-step
Required documents – Go to the list of documents a RE developer must prepare and submit to proper authority
Incurred fee – Click to see information regarding regulated fee for each sub-step

C **Section page**

The current and total number of pages for the section

D **Main navigation**

How to use the Guideline

Main Navigation

Main navigation icon (general)

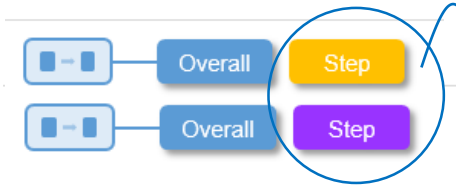
Normally, three navigational icons appear at the bottom of each page

Main navigation icon (in step & sub-step level)

On the pages at the step or sub-step level, two additional icons are present.

*In the Financing (**FIN**) Step…*

*In the Corporate Fiscal / Legal (**CFL**) Step*



The colour varies depending on the current step.

A **Table of Contents (TOC)**

Click to go back to the Table of Contents page

B **Overall Gantt's Chart**

Click to go back to the overall Gantt's Chart

C **Overall Flow Chart**

Click to go back to the overall Flow Chart

D **Step Gantt's Chart**

Click to go back to the respective Gantt's Chart of the step. For example, if the current page is part of the Site Selection (SSL) step, this icon will lead to the Gantt's chart of the SSL step.

E **Step Flow Chart**

Click to go back to the respective Flow Chart of the step. For example, if the current page is part of the Site Selection (SSL) step, this icon will lead to the Gantt's chart of the SSL step.

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Solar Photovoltaic (Large) Project Development in Malaysia

> 72 kWp

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