Single Buyer

A RING-FENCED ENTITY

PURSUANT TO ESA 1990

SINGLE BUYER OPERATIONS MANUAL

Version: 2.0

Effective Date: 17 March 2022

DOCUMENT CONTROL

Document No	Effective Date	Remarks
SB/CPL/OM/1	13 March 2017	Version 1.0. Established pursuant to Compliance Audit Y2016; Single "SB Operations Manual" reflecting the ring-fenced nature of SB's operations
SB/CPL/OM/2	17 March 2022	Version 2.0

SINGLE BUYER OPERATIONS MANUAL VERSION 2.0

In line with the Guidelines for Single Buyer Market (Peninsular Malaysia) 2018, Single Buyer issues this Single Buyer Operations Manual Version 2.0.

Background

1. Malaysia adopts a Single Buyer Market model in managing its electricity supply industry. By virtue of the Electricity Supply Act 1990 (Act 447), an entity called Single Buyer is entrusted to manage the procurement of electricity and related services in Peninsular Malaysia.

2. The Guidelines for Single Buyer Market (Peninsular Malaysia) 2018 requires Single Buyer to develop appropriate policies, systems and procedures.

3. Pursuant to the audit recommendations in Compliance Audit 2016, the Operations Manual Version 1.0 was established in 2017 with an intention to reflect the ring-fenced nature of Single Buyer's operation.

Purposes

1. This Operations Manual Version 2.0 ("Operations Manual") is established to set out the detailed processes and procedures in performing each function in Single Buyer.

Application of the Guidelines

1. This Operations Manual shall apply to all Single Buyer employees and remains confidential except for the main section in which Single Buyer has published to promote transparency.

Citation and Commencement

1. This Operations Manual shall come into operation on 17 March 2022.

Dated: 17 March 2022

Ir. Zainudin Md Yusof
Chief Executive Officer/Head
Single Buyer

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1 INTRODUCTION

1.1 Background

1.1.1 The Energy Commission has pursuant to the Electricity Supply Act 1990 (Act 447) issued the Guidelines for Single Buyer Market (Peninsular Malaysia) 2018 ("Guidelines") to govern the operation of the Single Buyer market as well as the role and functions of the Single Buyer. The roles of the Single Buyer are as follows:

(a) to procure electricity to meet demand at the least cost;

(b) to facilitate security of electricity supply;

(c) to monitor the adequacy of the supply of fuel to Generators;

(d) to promote transparency in the performance of its functions;

(e) to facilitate competition in the generation sector; and

(f) to promote confidence in the Electricity Industry.

1.2 Objectives of this Operations Manual

1.2.1 The objectives of this Operations Manual are:

(a) to detail the functions of the Single Buyer and the applicable standard operating policies and procedures (subject to para 3.3.1 below);

(b) to provide Participants in the Single Buyer market insights into the operations of the Single Buyer;

(c) to promote transparency and market confidence in the operations of the Single Buyer; and

(d) to serve as a reference for the day-to-day operations for Single Buyer staff.

1.2.2 This Operations Manual shall be read in conjunction with the Guidelines and shall apply without derogating from the general principles and requirements as detailed in the Guidelines.

1.2.3 Unless otherwise defined herein, all capitalised words appearing herein shall have the meanings ascribed in the Guidelines.

2 SINGLE BUYER GOVERNANCE

2.1 Oversight of the Single Buyer Market

2.1.1 The Energy Commission and the Guidelines have established various panels, working groups and committees to oversee the operations of the Single Buyer market to facilitate the monitoring and improve the transparency of the Single Buyer market.

(a) Single Buyer Oversight Panel

(i) The Single Buyer Oversight Panel has the main functions of overseeing the compliance of the Single Buyer with the Guidelines and providing advice and guidance to the Single Buyer and Participants on achieving the objectives of the Single Buyer market.

(ii) The Single Buyer Oversight Panel is chaired by the Energy Commission and comprised of suitable members as selected by the Energy Commission.

(b) Dispatch Scheduling Working Group

(i) The Dispatch Scheduling Working Group is responsible for reviewing the efficiency and effectiveness of dispatch scheduling procedures performed by the Single Buyer to ensure the Single Buyer is minimizing the cost of electricity procurement while promoting transparency and facilitating competition in the Electricity Industry.

(ii) The Dispatch Scheduling Working Group meets at least quarterly and comprises (at a minimum) of representatives from the Energy Commission, the Single Buyer and the Grid System Operator.

(c) Long Term Demand and Supply Working Group

(i) The Long Term Demand and Supply Working Group is responsible for reviewing the development and content of the Ten Year Ahead Load Forecast Report and Ten Year Ahead Generation Capacity Report to ensure security of electricity supply in Malaysia.

(ii) The Long Term Demand and Supply Working Group meets at least once every six months and comprises of representatives from the Energy Commission, ministry in charge of energy, other relevant Government agencies or authorities, the Nominated Gas Supplier, the Single Buyer, the Grid System Operator and the Grid Owner.

(d) Single Buyer Website Working Group

(i) The Single Buyer Website Working Group is responsible for reviewing the content, format and accessibility of information published on the Single Buyer Website to ensure compliance with the Guidelines and applicable disclosure requirements.

(ii) The Single Buyer Website Working Group meets at least quarterly and comprises (at a minimum) of representatives from the Energy Commission, the Single Buyer, the appointed information communication and technology service provider and the Grid System Operator.

(e) Gas Supply Committee

(i) The Gas Supply Committee is responsible for ensuring the adequacy of gas supply for electricity generation in Peninsular Malaysia based on the relevant Three Month Ahead Dispatch Schedule, the relevant Five Year Ahead Dispatch Schedule Report and the Power Sector Gas Allocation.

(ii) The Gas Supply Committee will assess any risk to the availability and reliability of gas supply and put in place measures to mitigate the impact of any disruption, including the Urgent Gas Procedures for any urgent unplanned disruptions.

(iii) The Gas Supply Committee meets at least once every six months and comprises of representatives from the Economic Planning Unit of the Prime Minister's Department, ministry in charge of energy, the Energy Commission, the Nominated Gas Supplier, Grid Owner, Grid System Operator and the Single Buyer.

(f) Coal Supply Committee

(i) The Coal Supply Committee is responsible for monitoring and reporting on the supply of coal for the electricity generation sector.

(ii) The Coal Supply Committee will monitor and report on global coal supply and pricing trends and develop early warning systems to ensure no interruption to coal based electricity generation.

(iii) The Coal Supply Committee meets at least quarterly and comprises of representatives from the Economic Planning Unit of the Prime Minister's Department, ministry in charge of energy, the Energy Commission, the Nominated Coal Supplier, Grid Owner, Grid System Operator and the Single Buyer.

(g) Rule Change Panel

(i) The Rule Change Panel is responsible for assessing and recommending on proposed changes to the Guidelines which may better facilitate the objectives of the Guidelines.

(ii) The Rule Change Panel meets as and when required by the Energy Commission and comprises of representatives from the Single Buyer, Generators, Grid System Operator, Grid Owner and other independent experts as deemed appropriate by the Energy Commission.

2.1.2 The Energy Commission and the Single Buyer may establish additional panels, working groups and committees from time to time and invite appropriate representatives from Participants and other stakeholder groups to the meetings to facilitate the development of the Electricity Industry in Malaysia.

3 GENERAL OBLIGATIONS OF THE SINGLE BUYER

3.1 General Obligations of the Single Buyer

3.1.1 The Guidelines require the Single Buyer to purchase electricity and perform its functions as the Single Buyer in a fair and non-discriminatory manner while promoting competition in the energy generation sector and enhance public confidence in the Electricity Industry. In doing so, the Single Buyer shall:

(a) purchase electricity on a least cost basis in accordance with the terms and conditions of the Generator Contracts and bidding data from NEDA Participants such as Variable Operating Rate Bids, Price-Quantity pairs and Bid Price while taking into account any generation and transmission network constraints;

(b) facilitate the security of electricity supply by maintaining oversight of demand and supply issues in the performance of dispatch scheduling and planning the long term supply and demand;

(c) monitor the adequacy of supply of gas, coal and hydro levels to meet the dispatch schedules and respond to any unplanned curtailments or disruptions;

(d) perform its functions in a transparent and consistent manner and, subject to any confidentiality obligations and requirements, publish information with regard to the performance of its functions in a clear, concise, understandable and readily accessible manner;

(e) deal with Participants in the Single Buyer market in a fair and balanced manner and not make decisions or act in a manner that is biased and/or unreasonably discriminates against any Participants;

(f) instill confidence in the Electricity Industry by avoiding conflicts of interests which may have an effect of reducing competition in the Single Buyer market or providing a competitive advantage to any Participant (including another division or unit of TNB);

(g) at all times ensure it performs its functions in a manner that is consistent with the Malaysian Grid Code, Guidelines and other applicable laws, codes, rules, regulations and guidelines; and

(h) provide advice and recommendation when required, on relevant Malaysian Electricity Supply Industry issues to key stakeholders, such as the ministry on charge of energy and Energy Commission.

3.2 Functional Units

3.2.1 The Single Buyer is organised in the following functional units which are responsible for the following scope of work.

(a) System Planning Unit

The System Planning unit is responsible for maintaining oversight over demand and supply of electricity in Peninsular Malaysia through forecasting load demand over the long term and planning for new generation capacities to meet such demands.

(b) Market Operation and Assessment Unit

The Market Operation and Assessment unit is responsible for short term load forecasting and scheduling the day-to-day dispatch of Generators based on the Least Cost Dispatch Scheduling Methodology and forecasting dispatch over the medium term based on fuel supply and curtailments, scheduled Generator outages and relevant forecast data including assessment on expected participations from NEDA Participants.

(c) Technical Advisory and Industry Development Unit

The Technical Advisory and Industry Development unit is responsible for providing technical expertise, guidance and advice on generation, transmission and electricity industry related matters to the Single Buyer and other related agencies as necessary including the ministry in charge of energy to advance development of the Malaysian Electricity Supply Industry.

(d) Contract & Resources Management Unit

The Contract & Resource Management unit is responsible for negotiating and managing Generators Contracts including contracting for new energy, monitoring contract performance and fuel planning for power sector consumption.

(e) Finance & Enterprise Management Unit

The Finance and Enterprise Management unit is responsible for settlement and clearance of invoices, performing the reporting obligations of the Single Buyer under the Guidelines and Incentive Based Regulations, monitoring compliance of the Single Buyer with the Guidelines and any applicable laws, codes, rules, regulations and guidelines, lead and facilitate risk matters for Single Buyer, oversee the operations of Single Buyer ICT services and infrastructure requirements, manage office administration and human resources.

(f) Legal Management Unit

The Legal Management Unit's main function is to assist other units in Single Buyer on legal matters, specifically the Contract and Resources Management unit in preparing, negotiating the Generator Contracts, managing dispute resolution process under the Generator Contracts and providing legal opinions as and when required.

3.3 Business Functions and Processes of Single Buyer

3.3.1 This Operations Manual detailed out the core business functions and daily processes in Single Buyer. The descriptions provided herein are not exhaustive. Single Buyer may possess other support functions and processes which are necessary to enhance further Single Buyer's daily operations.

4 LOAD FORECASTS

4.1 Load Forecasts

4.1.1 The Load Forecast section within the System Planning unit is responsible for carrying out long term and regional load forecasting studies.

4.1.2 The Short Term Scheduling section within the Market Operation and Assessment unit is responsible for carrying out short term load forecasting which covers the daily, weekly and monthly operational forecasts.

4.1.3 The studies are used to meet internal and external requirements as they are critical inputs to the capacity planning, scheduling and system operation processes.

4.1.4 The scope of load forecasting horizons includes the following:

(a) Day Ahead Load Forecast (including current day revision);

(b) Week Ahead Load Forecast;

(c) Three Month Ahead Load Forecast; and

(d) Ten Year Demand and Supply Forecast (in accordance to Clause 15.2 of the Guidelines).

4.2 Long Term Load Forecast Data Collection and Model Update

4.2.1 The Load Forecast section shall collect data to update the forecasting models using relevant software (e.g Itron Metrix ND & MetrixLT, ForecastPro, ForecastX, LoadMAP, etc). The data to be collected includes of the following:

(a) Annual and monthly aggregate and sectoral sales from TNB Retail;

(b) Annual and monthly generation data from TNB Grid;

(c) Annual and monthly peak demand data from the Market Operation and Assessment unit;

(d) Annual system losses data as provided by TNB;

(e) Annual load factor which is calculated based on the historical peak demand and generation;

(f) Annual and quarterly Malaysian GDP from the Bank Negara Malaysia or Department of Statistics of Malaysia;

(g) Number of customers and average selling electricity price as provided by TNB;

(h) Peninsular Malaysia population and number of household from the Department of Statistics of Malaysia;

(i) Actual Commercial floorspace from National Property Information Centre (NAPIC);

(j) Renewable energy from Sustainable Energy Development Agency (SEDA) and TNB Retail;

(k) Temperature from the Malaysian Meteorological Department;

(l) Energy efficiency performance from the Energy Commission;

(m) Electric vehicles from Malaysian Green Technology and Climate Change Centre;

(n) Cogeneration from the Energy Commission;

(o) Malaysian GDP forecasts from Single Buyer's analysis;

(p) Peninsular Malaysia population forecast from Department of Statistics and Single Buyer's analysis;

(q) Peninsular Malaysia number of household forecast from Department of Statistics and Single Buyer's analysis;

(r) Commercial floorspace from Single Buyer's analysis;

(s) Temperature forecast from Single Buyer's analysis; and

(t) Weather forecast updates from the Malaysian Meteorological Department.

4.3 Long Term Load Forecast Simulation Studies and Results Analysis

4.3.1 The Load Forecast section employs a Hybrid Load Forecasting Model to forecast Sales. This hybrid model may include the following:

(a) Sectoral Econometric Sales regression models with specific drivers for each sectors;

(b) Energy Efficiency model; and

(c) Post-estimation model to account for new emerging trends

4.3.2 Peak demand and generation are also derived from a hybrid model, which may consist of the following:

(a) a regression model which captures economic, demand and weather trends to forecasts hourly underlying peak demand and generation; and

(b) a post-estimation model to adjust the underlying forecast for future distribution-side technology shape impact on system demand profile.

4.3.3 The Load Forecast section shall then integrate the forecast results from the various forecasting models and perform a qualitative and quantitative analysis to verify the forecast results from the various models. A forecast error analysis is also conducted to evaluate the accuracy of past electricity demand forecast.

4.3.4 Findings from the Load Forecast section shall be presented to the Load Forecast Working Group ("LFWG") which comprises various representatives such as from the Energy Commission, SEDA, Single Buyer, Grid System Operator, TNB Retail and Grid Owner. The LFWG shall discuss the forecast results quantitatively and qualitatively to come up with a unified electricity demand forecast.

4.3.5 The finalised demand forecasts from the LFWG shall be presented and approved or endorsed by the Demand Forecasting Committee ("DFC"), chaired by the Energy Commission. The DFC comprises of various representatives which includes the relevant government agencies and ministries such as the ministry in charge of energy, industry experts, relevant consumer associations, Single Buyer, Grid System Operator as well as the relevant utilities. The composition of DFC and its functions are provided in the TOR under the Energy Commission. The approved or endorsed demand forecasts by the DFC will be used in the Capacity Planning process, as provided in Section 5 herein.

4.4 Preparation of Short Term Load Forecasts

4.4.1 The Short Term Scheduling section shall prepare the:

(a) Day Ahead Load Forecast which is to be presented in the Daily Operational Review Meeting (weekdays); and

(b) Week Ahead Load Forecast which is to be presented in the Weekly Coordination Meeting held every Thursday.

4.4.2 Relevant data collected such as weather parameters and latest load data shall be used to renew the coefficients in the Itron Metrix forecast models. An analysis is then conducted on the results of the various forecast models to produce a preliminary forecast. The preliminary forecast shall be discussed, verified and approved internally before being presented in the Daily Operational Review Meeting / Weekly Coordination Meeting before dissemination to the Short Term Scheduling section and the Grid System Operator.

5 CAPACITY PLANNING

5.1 Capacity Planning

5.1.1 The Capacity Planning section within the System Planning unit is responsible for carrying out medium to long term capacity planning to ensure adequate generation capacity to meet forecast future demand. This planning role supports the Energy Commission in relation to contracting for new capacity.

5.1.2 The capacity planning activities include demand-supply analysis, site study and determination of maximum capacity for each of the identified sites, and other technical and economic studies related to generation capacity issues.

5.1.3 The generation development plan shall be presented and discussed in the Long Term Demand and Supply Working Group which shall consist of representatives from the Capacity Planning section, other members of the System Planning unit together with representatives of the Energy Commission and ministry in charge of energy via the Planning and Implementation Committee for Electricity and Supply Tariff of Malaysia (JPPPET).

5.2 Long-term Generation Development Plan

5.2.1 The Capacity Planning section shall prepare the Long-term Generation Development Plan annually.

5.2.2 The Capacity Planning section shall initiate the process by establishing a work plan with the other units of the Single Buyer, the Energy Commission, ministry in charge of energy and such other persons with data relevant for the Long-term Generation Development Plan for delivery of the requisite input data.

5.2.3 The Capacity Planning section shall compile, review and verify the requisite input data which includes the following:

(a) Electricity Demand Forecast from the Load Forecast section;

(b) Generation Plants Data from TNB, IPPs or the Contract and Resource Management unit;

(c) New Options Plant Data from TNB Generation and THERMOFLOW (a power plant design and cost estimation software);

(d) Fuel price projections from TNB Fuel, Fuel Management Unit, PETRONAS and other publicly available resources;

(e) Renewable Energy Data from the Sustainable Energy Development Authority of Malaysia and the Energy Commission; and

(f) Economic parameters from the TNB Group Finance.

5.2.4 The data shall then be updated and processed using the PLEXOS Software and used to prepare the Long-term Generation Development Plan including new capacity expansion, generation mix, fuel requirement projection and emission projection.

5.2.5 The Long Term Supply and Demand Working Group shall discuss, verify and approve the key assumptions used for simulation of the base case and other scenarios.

5.2.6 The proposed Long-term Generation Development Plan shall then be submitted for the necessary verifications and approvals by the Head of the System Planning unit and the Head of Single Buyer before dissemination to the Energy Commission and the ministry in charge of energy.

6 SCHEDULING

6.1 Scheduling

6.1.1 The Short Term Scheduling and Medium Term Scheduling sections within the Market Operation and Assessment unit are responsible for the short to medium term scheduling and planning for dispatch of Generators. Its related functions include fuel requirement nomination for gas and coal, coordination with the Grid System Operator for generator outages and analysis for Incentive Based Regulation documentation and submission.

6.1.2 The scope of dispatch scheduling includes the following:

(a) Day Ahead Dispatch Schedule;

(b) Week Ahead Dispatch Schedule;

(c) 3-Month Ahead Dispatch Schedule; and

(d) One Year Demand and Supply Outlook.

Note: The dispatch schedules refer to the planned dispatch of all generating units to meet the load profiles for the corresponding time horizon.

6.1.3 The Scheduling sections shall use the Least Cost Dispatch Scheduling Methodology to prepare the dispatch schedules to minimize the cost of electricity procurement in accordance with the Guidelines.

6.2 Preparation of Forecast Dispatch Schedules

6.2.1 The Short Term Scheduling section shall prepare the Day Ahead Dispatch Schedule / Week Ahead Dispatch Schedule / Three Month Ahead Dispatch Schedules in accordance with the Guidelines. The Medium Term Scheduling section shall prepare the One Year Demand and Supply Outlook in accordance with the Guidelines.

6.2.2 The Scheduling sections shall collect the relevant input data, including:

(a) Daily Availability Declarations and bid information from TNB Generators and IPPs;

(b) Load forecast from the Manager (Short Term Scheduling & Bidding);

(c) Weekly Production Plan from the Manager (Short Term Scheduling & Bidding);

(d) Weekly Outage Plan from Generator Outage Coordinator;

(e) Hydro Drawdown/ Drawup Plan from the Manager (Short Term Scheduling & Bidding);

(f) Gas Curtailment Schedule and Gas Allocation from Petronas Gas Control Center;

(g) System Constraint (if any) from the Grid System Operator; and

(h) Generator Testing Pattern (if any) from the Generator(s).

6.2.3 Using the PLEXOS Model with the updated input data, the Scheduling sections shall conduct the production simulation to prepare and submit the relevant dispatch schedules for approval at the relevant working group and/or coordination meetings.

6.2.4 The Dispatch Schedules once finalized shall be submitted to the National Load Dispatch Centre, Petronas Energy and Gas Trading, Fuel Management section, Grid System Operator, TNB Group Finance, individually to Generators and the Energy Commission, as relevant.

7 PLEXOS MODEL

7.1 PLEXOS Model

7.1.1 PLEXOS Integrated Energy Model Software is a simulation software that uses mathematical optimization to provide simulation integrating energy production, transportation and demand over simulated timeframes. PLEXOS is predominantly used by the System Planning and Market Operation and Assessment units for simulation of forecasts and scheduling dispatch based on verified input data.

7.2 Simulation Model Review and Updates

7.2.1 The System Planning and Market Operation and Assessment units are responsible for updating and reviewing the data for the PLEXOS database. The data which are necessary for the simulation model includes:

(a) Demand forecast;

(b) Forced outages;

(c) Fuel availability;

(d) Fuel conversion factors;

(e) Fuel prices;

(f) Gas curtailment;

(g) Generator availabilities;

(h) Heat rates;

(i) Hydro energy production;

(j) Interconnection availabilities;

(k) Major public holidays;

(l) Minimum down times for generators;

(m) Minimum up times for generators;

(n) Planned outages;

(o) Plants ups and retirements;

(p) Solar profiles;

(q) Start up costs;

(r) System constraints;

(s) Test energy and testing patterns;

(t) Tested annual available capacities;

(u) Transmission line constraints; and

(v) Variable operating rates.

7.2.2 Data is collected from other units of the Single Buyer, Grid System Operator, Generators and other relevant Participants via emails, official letters, minute of meetings, websites and information in SLAs and PPAs. All information shall be reviewed, verified and approved before updating the simulation model.

7.2.3 Data revisions shall be approved by the Senior Managers of the System Planning and Market Operation and Assessment units before the Database Controllers updates the models. Only Database Controllers who are authorised can do amendments on the PLEXOS Database. Database Controllers must record all the changes and details of the changes made in a log.

8 FUEL MANAGEMENT

8.1 Fuel Management

8.1.1 The Fuel Management section is responsible for activities related to fuel billing, planning and monitoring. It also conducts risk assessment of fuel supply. Other roles of this section include:

(a) Management of Appendix J and any other fuel related matters under the PPA;

(b) Operate the Gas Framework Agreement for the power sector such as billing settlement and Reference Market Price (RMP) management

(c) Fuel Price management including ACP price verification and declaration and gas price (RMP) price declaration.

(d) Produce fuel price forecast;

(e) Assist the Energy Commission in gas sector reforms;

(f) Assist relevant stakeholders in the process of fuel procurement for gas, coal and liquefied natural gas;

(g) Coordinate coal and gas committees under the Guidelines for Single Buyer Market (Peninsular Malaysia); and

(h) Provide commercial, technical and legal advisory on fuel matters.

8.2 Coal Stock Monitoring

8.2.1 The Fuel Management section will monitor coal stock at all coal fired plants in Peninsular Malaysia. The Fuel Management section will monitor the coal stock through the following:

(a) Coal Dispatch Forecast;

(b) Daily Availability Declarations submitted by Generators;

(c) Generators Outage Update;

(d) Meter reading from TNB Transmission Metering Portal; and

(e) Weekly Coal Delivery Schedule submitted by TNB Fuel Services.

8.2.2 The Fuel Management section then monitors the coal stock level for each Generator on a weekly basis and compares it with the minimum level of coal stock as per the PPA. If any of the Generators does not meet the minimum level of coal stock as per PPA, the Fuel Management section shall, if necessary, prepare a non-compliance letter and submit it to the respective generator in a timely manner.

8.2.3 The Fuel Management section will also produce the weekly Coal Stock Monitoring Reports to Scheduling Unit. A KPI is set for 100% completion and timely preparation of the Weekly Coal Stock Monitoring Report.

8.3 Gas Billing

8.3.1 The Fuel Management section will process gas invoices from Petronas for power sector gas consumption.

8.3.2 The settlement process begins with receipt of Petronas's invoice which data will be checked and verified the invoice data including the volume (SM), Energy (GJ), Gross Heating Value (GHV), Pressure (kPag), Gas Price (RMP) and Gas Differential Price. OSSC and excel are used for this purpose. The output is payment Advice Letter.

8.3.3 Upon the necessary internal checks, verifications and approvals, the Advice Letter will be submitted to TNB Group Finance team for payment.

9 MONTHLY PRICE QUOTATION FOR THAILAND

9.1 A Monthly Price Quotation ("MPQ") is required to be submitted to the Electricity Generating Authority of Thailand ("EGAT"), Settlement & Clearance section, Short Term Scheduling section and the Grid System Operator as a price indicator of selling electricity to EGAT.

9.2 The Contract Performance section is responsible for data collection and it includes the LNG price from the Fuel Management section, the Transmission Use of System price from the Finance & Reporting section and the Merit Order List from the Short Term Scheduling section.

10 PPA/CONTRACT MANAGEMENT

10.1 Preparation of the new PPAs

10.1.1 New Energy section is responsible to assist Energy Commission in providing inputs for Request for Proposal ("RFP") documents which include preparation of draft PPAs for bidding exercises of new power plant projects.

10.1.2 New Energy section coordinates the discussion of the new PPAs with the relevant stakeholders such as Energy Commission, Grid Division, Grid System Operator and TNB Metering to ensure the PPAs prepared are in line with the Prudent Utility Practices and the Grid Code for Peninsular Malaysia.

10.1.3 Upon completion of the bidding exercises conducted by Energy Commission, New Energy section is responsible to undertake discussions with the selected bidders to finalise the draft PPAs. Upon finalisation of the draft PPAs, New Energy section arranges for the signing and execution of the PPAs by TNB.

10.2 Operationalisation of the PPAs

10.2.1 Upon signing and execution of the PPAs, New Energy section operates the PPAs until the occurrence of the Commercial Operation Date ("COD"). New Energy section is responsible to monitor the progress of the projects and to ensure the projects are in full compliance with the requirements and obligations in the PPAs which involve various meetings regarding such projects with Energy Commission, TNB Grid, Grid System Operator and the project developers.

10.2.2 From the occurrence of the COD until the end of the term of PPAs/ SLA contracts, Contract Performance section perform various operationalisation tasks as per requirement in PPAs/SLAs. The activities include:

(a) Coordination of yearly Tested Annual Available Capacity (TAAC), Revalidation Test, etc.

(b) Coordination of Monitoring Test (up to 6 times per year)

(c) Providing various input for monthly generators' invoice settlement, namely Annual Scheduled Available Capacity (ASAC) approval, consequences of Failed Despatch Instruction (FDI) and other operational matters (test vs commercial energy, start-up etc.)

(d) Coordinate with Metering team to perform activities related to metering namely meter verification (yearly), meter replacement (every 10 years / due to faulty), remote meter reading and any other meter issues (missing data, inconsistency etc.)

(e) Other arise issues (tailored to specific agreements) namely:

(i) Perform Cost Saving / Tariff Adjustment for direct negotiation PPAs;

(ii) Verification process of heat rate declaration;

(iii) Perform risk analysis on impact for Change in Law implication;

(iv) Perform technical capability analysis for PPA / SLA extension;

(v) Managing different interpretation of provisions in the agreements between affected parties;

(vi) Promote Global Settlement Arrangement for all IPP/ TNB power plants; and;

(vii) Perform expiry, extension & renegotiation of Agreements.

10.3 Providing Input, Data and Opinions to the Stakeholders

10.3.1 New Energy section provides input and data to both internal and external group for various purposes namely update on the projects progress, projects technical and commercial data for simulation purposes.

10.3.2 New Energy section contributes constructive opinions that are in line with the PPAs and for the benefit of electricity industry, to ST on the rising issues such as on the Force Majeure Event treatment, views on the delayed projects and others.

10.3.3 Contract Performance section is responsible in managing, extracting and compiling all the data which require either by internally use (unit in Single Buyer) and or for external parties (Energy Commission, ministry in charge of energy, RMSD, TNB Finance, etc). The timeline of the input require is varies from short term timeframe until to 20 years' generation plan which is the long-term horizon. The data required is been use for a lot of purpose ranging from:

(a) for simulation and study purpose;

(a) for the stakeholders to decide on the outcome or direction on certain issues;

(b) for least cost dispatching and merit order and iv) for audit purpose – Base Tariff and Imbalance Cost Past Through.

11 SINGLE BUYER FILE SHARE

11.1 Single Buyer File Share

11.1.1 Single Buyer file sharing server ("SB File Share") is a platform to store documents and files for Single Buyer. The Single Buyer File Share is maintained and supported by the Information Communications Technology ("ICT") Division of TNB and has the following features:

(a) Resilient service;

(b) Data are backed up regularly;

(c) Controlled access to read and write the data to provide security of the folders and files;

(d) Central support via the TNB MySSC; and

(e) Departmental and localised security.

12 SINGLE BUYER WEBSITE

12.1 In accordance with Rule 19.2 of the Guidelines for Single Buyer Market, Single Buyer shall develop a Single Buyer Website to promote transparency in performing its functions, and to ensure the website presents data and information clearly.

12.2 Single Buyer Website Change Request Process:

12.2.1 In order to ensure that the data and information contained on Single Buyer Website are clear, Single Buyer Website Administrator has developed a process to manage any changes on Single Buyer Website's content ("Change Request Process").

12.2.2 This Change Request Process requires any person who wishes to change, remove or alter any contents of Single Buyer Website, to fill-up the form in accordance with the Change Request Process and get approval from Head of Unit.

12.2.3 Single Buyer Website Administrator will implement the requested changes accordingly.

13 ONE STOP SETTLEMENT CENTRE (OSSC)

13.1 OSSC System

13.1.1 OSSC is a billing system to process the monthly payment for the power generators in Peninsular Malaysia. OSSC is used by Single Buyer, Grid System Operator and Power Plants.

13.2 OSSC Access

13.2.1 The OSSC system administrator is responsible in managing the user access and token. Request for the access is via submission of the respective request form (whichever applicable):

13.2.1 New OSSC access request:

(a) To get access to the OSSC system, the requestor is required to fill in the OSSC New Token Form and get the necessary approval from the requestor's Head of Unit/Company;

(b) The form needs to be submitted to Single Buyer (Enterprise Management) to be processed by OSSC system administrator;

(c) OSSC system administrator will require authorization from Single Buyer management to configure the requested access; and

(d) OSSC system administrator will provide the requestor with the OSSC token and user ID for them to access the OSSC system.

13.2.2 OSSC token replacement:

(a) In the event of the provided OSSC token is missing or faulty, the user is required to fill in the OSSC Token Replacement Form and get the necessary approval from the requestor's Head of Unit/Company;

(b) The form needs to be submitted to Single Buyer (Enterprise Management) to be processed by OSSC system administrator; and

(c) Once the OSSC system administrator received the OSSC Token Replacement Form from the requestor, the OSSC system administrator will configure new OSSC token and provide the requestor with the new OSSC token and OSSC New Token Form for them to fill in.

13.2.3 OSSC token return:

(a) In the event of the power plant is decommissioned, the agreement has expired or OSSC user has no longer needed to access the system due to change in job roles or moved out from the department or company, the OSSC user is required to return the token and fill in the OSSC Token Return Form and submit it to OSSC system administrator; and

(b) OSSC system administrator will disable the access to the system

13.2.4 Change in OSSC user access:

(a) OSSC user need to submit the OSSC User Access Change Request Form to the OSSC system administrator if there are any changes required on the existing access permission and roles of the OSSC user; and

(b) Once the OSSC system administrator received the OSSC User Access Change Request Form, the OSSC system administrator will configure the changes accordingly.

14 RELATED SUBMISSIONS FOR THE PURPOSE OF INCENTIVE BASED REGULATION

14.1 Overview

14.1.1 Under the Incentive Based Regulations ("IBR") framework, SB is responsible for two tariffs; (1) SB Generation tariff and (2) SB Operations tariff. In accordance to the Guidelines on Electricity Tariff Determination under IBR for Peninsular Malaysia 2018 ("IBR Guidelines"), SB is required to submit a 3-year forecast proposal on SB Generation and SB Operations (which includes operational cost and Performance Indicators ("SBPIs")) for every Regulatory Period to Energy Commission.

14.1.2 The SB Generation cost (under the actual cost regime) is reviewed semi-annually via Imbalance Cost Pass-Through ("ICPT") mechanism while SB Operations cost (under the revenue cap regime) is reviewed annually. SBPIs are monitored quarterly and the incentives adjustment (reward, penalty, or zero reward/penalty) will be applied on a 3-year basis.

14.1.3 Both IBR and ICPT submissions are coordinated by Finance and Reporting section within the Finance & Enterprise Management unit.

14.2 SB Generation Proposal for IBR

14.2.1 SB Generation cost includes the cost incurred by SB for the procurement of electricity generation from all generators in the system based on their respective PPAs, SLAs and other cost associated with purchasing electricity from the generators. This also includes generation cost incurred by TNB Distribution Network and TNB Retail.

14.2.2 For IBR submission, it involves a four-step process, which comprises of:

(a) setting the input parameters (which consist of sales, generation, fuel prices and commercial rates);

(b) establishing the generation mix via PLEXOS run;

(c) calculating the SB Generation cost and deriving the SB Generation base tariff via SB Generation Cost model; and

(d) preparing SB Generation proposal report.

14.2.3 The proposed forecasts cost and tariff, will be submitted to Regulatory and Stakeholder Management Division ("RSMD") for TNB Regulatory Council's approval before submitting to Energy Commission.

14.3 SB Operations and Performance Indicators Proposal for IBR

14.3.1 As per the IBR Guidelines, SB Operations cost includes operating expenses, cost of working capital, return on assets, depreciation, regulatory tax, efficiency carry-over scheme on operating and capital expenditure and incentives adjustment (reward, penalty, or zero reward/penalty with regard to the SBPIs).

14.3.2 For the purpose of IBR submission, SB is required to derive a 3-year forecast of the Operating Expenses and Capital Expenditure. These forecasts and the actual cost incurred for current Regulatory Period will be submitted to RSMD. The actual performance of SBPIs will also be submitted to RSMD in order to derive the incentives adjustment (reward, penalty, or zero reward/penalty).

14.3.3 Based on the data provided by SB, RSMD will derive the total forecast cost for SB via the Revenue Requirement Model (RRM) established by the Energy Commission and SB will then review the derived cost by RSMD. Currently, the RRM is centrally managed by RSMD for all regulated entities.

14.3.4 Following from the above, SB will prepare the proposal report which covers the SB Operations and SBPIs.

14.3.5 The proposed forecasts cost, tariff and SBPIs will be tabled to TNB Regulatory Council for approval before submitting to Energy Commission.

14.4 Single Buyer Actual Performance Indicators Submission for IBR

14.4.1 The Enterprise Management section within the Finance & Enterprise Management unit is responsible for the submission of the Single Buyer's performance indicators in accordance with the Incentive Based Regulation ("IBR"). The Enterprise Management section will receive inputs from the respective performance indicators' owner.

14.4.2 Regulatory targets apply for each of the performance indicators in accordance with the IBR as approved by the Energy Commission.

15 SETTLEMENT AND CLEARANCE

15.1 Settlement and Clearance unit is responsible in managing and facilitating settlement processes for all power purchase contracts in peninsular Malaysia and interconnection agreements.

15.2 Settlement and Clearance shall:

15.2.1 Ensure timely issuance of invoice for Import Energy for Generators with the PPA;

15.2.2 Facilitate and monitor timely payment of the generators' invoices (30 days credit term). Settlement is carried out monthly in arrears following receipt of the participant's actual invoice;

15.2.3 Ensure all settlement are managed in accordance to the agreements, codes and relevant acts and technical performance;

15.2.4 Provides estimation of generators cost of generators in peninsular Malaysia on monthly basis. This function is to facilitate Finance team with detailed and comprehensive cashflow management.

15.3 It is compulsory to ensure that all invoices are checked, verified and approved prior to submission to TNB Global Business Solutions for payment purposes.

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