

# Guidelines

For Ring-Fencing of the System  
Operator (Peninsular Malaysia) 2016



**ELECTRICITY SUPPLY ACT 1990**

**[Act 447]**

**GUIDELINES FOR RING-FENCING OF THE SYSTEM OPERATOR  
(PENINSULAR MALAYSIA) 2016**

**Guideline/ST/ No. GP0007/2016**

IN exercise of the power conferred by Section 50C of the Electricity Supply Act 1990 [Act 447], the Commission issues the following guidelines:

**Citation and Commencement**

1. These Guidelines may be cited as the Guidelines for Ring-Fencing of the System Operator (Peninsular Malaysia) 2016.
2. These Guidelines was issued by the Commission on 28 November 2013, and pursuant to Section 42 of the Electricity Supply Act (Amendment) 2015, these Guidelines shall continue in full force and effect from the date of registration.

**Purposes**

3. These Guidelines set the principles, rules and mechanism for the implementation of ring-fencing arrangement of the System Operator. It comprises of 7 sections as follows:

***Section 1 - Ring Fencing of SO within TNB*** – which sets the requirements for SO to be able to perform its functions in a non-discriminatory manner and outlines the measures that need to be adopted in undertaking its daily activities.

***Section 2 – Ring Fencing of Operation*** – which outlines the operational requirements for the SO in a ring-fenced environment and provides examples of procedures that would provide the basis for future ring fenced SO operations.

***Section 3 - Ring Fencing of Infrastructure and ICT*** – which sets the arrangement to be developed for the management of the SO's operational systems and the development of systems that it shares with the Single Buyer and other entities within TNB.

**Section 4 - Ring Fencing of Information and Data Flows** – which establishes the access controls for SO data on shared systems and rules for the transfer of data between market participants – including the Single Buyer and other departments of TNB.

**Section 5 – Governance and Oversight** – which provides the framework for the ensuring compliance, compliance requirements, arrangements for external parties to review the SO operation and the type of information that should be published on the SO website to enhance transparency.

**Section 6 – Real-time Security Constrained Economic Dispatch System** – This section defines the Least Cost Dispatch Scheduling Methodology which the SO shall be following for Real-time Security Constrained Economic Dispatch System and the requirements of the Dispatch Scheduling Model.

**Section 7 – Ring Fencing of Accounts** – which sets the requirement for unbundling of its accounts from TNB and the framework of the regulatory accounts as determined by the Energy Commission and described in the Regulatory Implementation Guidelines (RIGs).

**Section 8 - Reporting and Audits** – which outlines SO reporting and audit requirements.

#### **Application of these Guidelines**

4. These Guidelines shall apply to the System Operator which has been authorised through the Electricity Supply (Authorisation to be a System Operator) Order 2016, and any parties connected to the electricity transmission network or any person as notified by the Commission.

#### **Content of the Guidelines**

5. The content of these Guidelines shall be as in ANNEX 1.

#### **Notice by the Commission**


6. The Commission may issue written notices from time to time in relation to these Guidelines.

#### **Amendment and Variation**

7. The Energy Commission may at any time amend, modify, vary or revoke these Guidelines or any part thereof, under the following circumstances:
  - i) to effect changes in the electricity supply industry;

- ii) where it is expedient to ensure reliability of the electricity supply system;
- iii) to rectify any inconsistency or unintentional errors giving rise to grave consequences;
- iv) as recommended by the Grid Code Committee or Oversight Panel and approved by the Energy Commission;
- v) any other justifiable reason as the Energy Commission deems necessary.

**Dated:**



**DATUK IR. AHMAD FAUZI BIN HASAN**

Chief Executive Officer  
for Energy Commission

**ANNEX 1:**

**GUIDELINES FOR RING-FENCING OF THE SYSTEM OPERATOR**

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## **SECTION 1: RING FENCING OF SO WITHIN TNB**

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### **1.1 Purpose**

- 1.1.1 This chapter sets out the requirements for SO to be able to perform its functions in a non- discriminatory manner and outlines the measures to be adopted to allow the SO to demonstrate that it is properly ring fenced as it undertakes its daily activities.

### **1.2 Non – Discriminatory Conduct**

- 1.2.1 In performing its functions, the SO shall ensure that it operates in accordance with the MGC and does not act in a manner that unreasonably discriminates against any other participant. To provide transparency to the operation of the SO, the SO shall develop a set of non-discriminatory processes, which shall be published on its website together with enough information to allow an affected party to determine whether it is likely that discrimination may have taken place.
- 1.2.2 Any action specifically required of the SO under the Single Buyer Guidelines, the MGC or any other agreement in existence more than [12] months prior to date of the ring fencing of the SO and previously registered with the Commission shall not be deemed to be discriminatory.
- 1.2.3 Subject to clause 3.2.2, the Commission shall determine, on a case by case basis, whether the behavior of the SO is unreasonably discriminatory. In doing so, ST shall have regard to:
- the Law of Malaysia;
  - the TNB Licence under which the SO is required to operate;
  - the MGC;
  - the Single Buyer Guidelines;
  - the dispatch schedule provided to the SO by the Single Buyer; and
  - any other matters it considers relevant.

### **1.3 Ring Fencing of SO Activities**

- 1.3.1 For such period that the SO is a part of TNB, the SO shall identify circumstances where interaction with other divisions and units of TNB may give rise to a conflict of interest or have an impact on free competition within the electricity industry and implement appropriate operational ring fencing procedures to address the potential conflict of interest, or impact on competition.
- 1.3.2 These ring fencing procedures shall include, but are not limited to:
- a) Establishing separate work areas from the work areas of other divisions



within TNB, with the SO operating from clearly separate areas to which only SO staff and others under the direct supervision of SO staff have access;

- b) Restricting the access of the SO staff to the work areas of other parts of TNB such that they only have access to these work areas under the direct supervision of staff employed in the part of TNB responsible for these work areas;
- c) Establishing access controls for information systems used by the SO such that:
  - i. only SO staff can access systems that are only used by the SO;
  - ii. shared systems are partitioned such that staff of all divisions have access only to the information that they require in the performance of their tasks and that staff of other divisions do not have access to SO information that may result in competitive advantage to TNB;
  - iii. a record is maintained of the date and time that each information item is accessed and/or changed by each individual user of the information systems used by the SO;
- d) Ensuring that no person or persons responsible for management of the SO shall participate in internal TNB meetings or discussions regarding the operation of any of the competitive businesses of TNB, except to the extent that they would normally attend such meetings with external parties;
- e) Restructuring staff meetings and internal communications mechanisms of TNB so that members of staff from the SO do not attend the same staff or communications meetings as staff from the businesses of TNB that are open to competition. With the explicit consent of the Commission, all staff of TNB may be summoned to a single meeting where it is considered essential that all TNB staff receive exactly the same information at exactly the same time. The Commission may issue a standing approval for whole company meetings where there is a visiting VIP or for the announcement of significant events (as defined by Commission) affecting TNB.
- f) Establishing a mechanism for quarantining staff intending to leave the SO for any organisation involved in the competitive sectors of the electricity industry including competitive businesses in TNB and any part of TNB where confidentiality arrangements similar to those in the SO have not been established. The quarantine period must be appropriate for the type of

information to which the employee has had access.

- 1.3.3 Where corporate or other services are provided to the SO from elsewhere in the TNB organisation, these services shall be provided under Service Level Agreements (SLA) negotiated between the SO and the appropriate other parts of TNB. Each SLA shall include cost transfer arrangements that comply with the RIG7 guidelines established by Commission for the allocation of such costs and arrangements for the protection of information that are similar to those established for the protection and handling of information by the SO's own staff. These services include, but are not necessarily limited to the list of activities identified in Appendix B.

#### **1.4 Confidentiality**

- 1.4.1 The SO shall not disclose any information that is confidential to TNB or to any other party, or any information, the disclosure of which may provide competitive advantage to any party except:
- to the extent required in the licence under which it operates or the MGC for the performance of the SO functions under the licence and the MGC;
  - where the information can be proven to already be in the public domain;
  - as directed by the Commission or any court having appropriate jurisdiction.

## **SECTION 2: RING FENCING OF OPERATIONS**

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### **2.1 Purpose**

- 2.1.1 As the SO is ring fenced, many of its current operational tasks will, from a technical standpoint, remain the same. The procedures established to address these tasks are subject to certification under ISO 9001 and will continue as currently. However, some changes will be required to some procedures to ensure that the ring fencing principles are met. This chapter establishes operational requirements for the SO in a ring-fenced environment and provides examples of procedures that would provide the basis for future ring fenced SO operations.
- 2.1.2 As part of the drive towards greater transparency, it is expected that much of the information generated from many of these processes would become publicly available information on the ring fenced SO website.

### **2.2 Principles of Operational Ring Fencing of the SO**

- 2.2.1 Section 3 establishes the requirements for the ring fencing of the SO organisation, the principle established being that, on a day to day basis, the ring fenced SO shall operate as a separate organisation from all other parts of TNB, treating TNB in exactly the same manner as it treats those market participants that compete with TNB in the competitive industry sectors.
- 2.2.2 Within three months of the establishment of the ring fenced SO, SO shall review all of its operational practices and procedures to ensure that they reflect the principles stated in section 2.2.1.
- 2.2.3 Within three months of the establishment of the ring fenced SO, SO shall establish new operational practices and procedures to ensure that it takes the primary management responsibility for all aspects of the customer interface for transmission activities in a manner that reflects the principles stated in section 2.2.1.

### **2.3 Detailed Operational Procedures**

- 2.3.1 SO already has in place documented operational procedures to comply with the requirements of the MGC, most in the form required by its ISO 9001 certification. Many of these procedures are of a technical nature and are unaffected ring fencing. Some other documented procedures will require minor changes to take account of the migration to a ring-fenced environment. These

will require changes because they have been prepared reflecting the organisational structure of TNB prior to the ring fencing of SO.

2.3.2 The key documented procedures include:

**a) *Processes Involved in the Operation Planning Phase***

**i) Procedures Requiring Modification Not Related to SO Ring fencing**

**Two Year System Operation Plan (TNBT-TSO-750-01-OPU-WI-12)**

This procedure details out the processes involved with the preparation of the Two Year System Operation Plan.

**Changes are required in this Document:**

As the Grid Code requires the SO to prepare a Five Year Ahead Operation Plan (OC2.6.1) this procedure needs to be revised to address this shortcoming. As part of the parallel activity of ring fencing the Single Buyer, the demand forecast and generation addition will now be the responsibilities of Single Buyer and this should also be reflected in the revised document.

**ii) Procedures Requiring Modification Related to SO Ring fencing**

Changes are required in the following processes because Energy Procurement Department and the relevant staff of TNB Planning Division involved are now assigned to Single Buyer.

**Daily Docket Meeting (TNBT-TSOD-750-01-OPU-WI-02)**

This procedure states that the Daily Docket Meeting has to be carried out at 9.30am on every business day to audit the post operation, compare what has been planned and the reasons for the differences. In this meeting the day ahead operation planning is carried out to ensure the safe and secure operations of the Grid System.

**Weekly Coordination Meeting (TNBT-TSOD-750-01-OPU-WI-08)**

This meeting coordinate the week ahead generator outages and transmission outages. Members of the meeting also strategise the week ahead generation schedule in conjunction with forecast gas availability and weekly hydro draw down.

**Daily Security Assessment Report (TNBT-TSOD-750-01-OPU-WI-04)**

This document describes the process of preparation of Daily Security Assessment Report which looks into the stability of the Grid System under all  $n - 1$  contingencies and selected of the  $n - 2$  contingencies.

**iii) Procedures Not Requiring Modification Related to SO Ring fencing**

No changes are required to these procedures which are technical in nature and only involve units within SO. Consequently, they are not affected by the ring fencing exercise.

**Defence Plans & Mechanisms (TNBT-TSOD-750-01-OPU-WI-13)**

The procedures describe the processes involved in reviewing, formulating, approving and the implementation of the defence plans and mechanisms to be installed in the Grid System.

**Generator Annual Outage Plan (TNBT-TSOD-750-01-OPU-WI-26)**

This document sets out the procedure for planning year ahead generator outages.

**Generation Units Outage Scheduling (TNBT-TSOD-750-01-OPU-WI-06)**

SO follows this procedure to plan the month ahead, week ahead, day ahead and actual granting of generator outages.

**Transmission Operating Planning Data (TNBT-TSOD-750-01-OPU-WI-19)**

This document sets out the procedure for updating, storing and backing up Grid System data. It also determines the periodicity of data update.

**Transmission Operation System Study (TNBT-TSOD-750-01-OPU-WI-14)**

This document sets out the process for preparing Transmission Operation System Study reports. The study requests may come from TNB Transmission, TNB Generation, IPP and other parties.

System studies are normally carried out by the staff of SO. However, some of the system studies may be outsourced to specialist outside TNB. Staff of SO have to be mindful regarding the circulation of study results as some of the studies may contain sensitive information.

**Transmission Outage Management (TNBT-TSOD-750-01-OPU-WI-05)**

As the name suggests, this document details out the processes required to manage the outages of transmission lines and equipment in the Grid System. The outages have to be planned and coordinated in conjunction with generator outage plan so that the rest of the Grid System remains safe and secure. TNB uses the Integrated Commissioning and Outage Management System (ICOMS) to schedule outages and manage the database. ICOMS is used to plan for day ahead, week ahead, month ahead and year ahead outage planning.

***b) Processes Involved in the Real-time Control Phase***

**i) Procedures Requiring Modification Not Related to SO Ring fencing**

The following processes need some changes because Energy

Procurement Department and the relevant staff of TNB Planning Division involved are now assigned to Single Buyer.

**Real-Time Scheduling and Despatch Procedure (TNBT-TSOD-750-01-SOC-WI-03)**

This procedure guides the shift personnel to economically dispatch generating units following the Unit Commitment Plan and dispatch schedule prepared by Single Buyer to meet the system demand while ensuring the safe and secure operations of the Grid System.

**Procedure on Issuance of Non Compliance**

Penalties are imposed on generators if they do not comply with dispatch instructions. When shift personnel issue a dispatch instruction, the instruction given must strictly follow the guidelines given in this procedure. When a generator fails to comply with the dispatch instruction, the shift personnel has to follow strictly the guidance given in issuing the notice to the generator concerned and also informing the Single Buyer of such failure.

**ii) Procedures Not Requiring Modification Related to SO Ring fencing**

No changes are required as the procedure only involves units within SO and are not affected by the ring fencing exercise.

**Guideline to Manage Gas Curtailment (TNBT-INTG-TRAN-TSOD-09)**

This procedure guides the shift personnel in minimise the cost of generation during gas curtailment period.

**iii) Procedures being Prepared for ISO 9001 Certification**

**Gas Pressure at Various Metering Stations along the Peninsular Pipeline**

When natural gas is delivered to the gas turbine below a certain threshold pressure, the gas turbine control will automatically changeover from gas to distillate firing. There is a risk that such automatic changeover may result in tripping of the gas turbine. This procedure provides guidance to the shift personnel how to maximise the use of natural gas while minimising the risk during automatic changeover of gas to distillate firing.

**Spinning Reserve Operation Guide**

This procedure guides the shift personnel in keeping sufficient spinning reserve to cater for load regulation, forecast errors and that the loss of the largest generating unit does not result in automatic under-frequency load shedding.

### **Procedure for Voltage Management**

Shift personnel follow the guidelines given to ensure voltages in the Grid System meet the Transmission System Reliability Standards.

#### ***c) Processes Involved in the Post Operation Phase***

##### **i) Procedures Requiring Modification Partly Related to SO Ring fencing**

##### **Monthly System Performance Report (TNBT-TSOD-750-01-OPU-WI-24)**

This procedure describes the process of preparation of the Monthly System Performance Report. This report covers the transmission losses, the deviation of demand forecast with actual maximum demand, the planned against actual gas consumption.

This procedure needs to be revised as the former Energy Procurement Department is now part of the Single Buyer. Following SO ring fencing, this report should be posted in the SO website instead of given to Vice President TNB Transmission.

- 2.3.3 Following a complete review, which should take account of SO ring fencing, Single Buyer ring fencing and the requirements of ISO 9001, all routine operational procedures shall place the ring fenced SO in overall managerial control of the transmission system, responsible for the customer interface and undertaking system operation based on the dispatch instructions of the Single Buyer while recognising the ring fenced SO's responsibility for real time system management.

## **SECTION 3: RING FENCING OF INFRASTRUCTURE AND ICT**

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### **3.1 Purpose**

- 3.1.1 To ensure that the ring fenced SO is able to continue in operation, arrangements must be established for it to have continued access to ICT infrastructure and services and to be able to develop its ICT infrastructure to ensure compliance with the requirements of the MGC. This chapter outlines appropriate arrangements that should be put in place to ensure that both the ring fenced SO and the other TNB businesses are capable of operating successfully.
- 3.1.2 In identifying appropriate arrangements, it is recognised that the ICT infrastructure currently supporting the SO operations is highly integrated with that of other TNB departments and that the legal entity owning this infrastructure before and after ring fencing of the SO will be TNB. The management and Board of TNB retain an obligation to ensure the cost-effective operation of the company in compliance with all the company's obligations.

### **3.2 Existing Operational Systems**

- 3.2.1 To avoid unnecessary changes to supplier relationships, the continuing ownership of the SCADA/EMS, load forecasting software, power flow software and unit commitment and dispatch schedule software and supporting architecture should remain within the current TNB arrangements.
- 3.2.2 Appropriate SLAs shall be developed between the SO and other TNB departments to ensure that operational systems are developed and maintained, with the opportunity for them to be renewed when necessary, as required by the ring-fenced SO. At the time of system replacement, the ownership decision can be revisited.
- 3.2.3 Where software is used by both the Single Buyer and the SO, procedures shall be established to ensure changes to, or any upgrades to the existing systems, or the adoption of new software are coordinated between both parties such that the same version and parameters used are kept in step. In the event it is determined that new software should be acquired to replace such shared operational systems, this shall be evaluated by a cross functional team consisting of representatives of SO and Single Buyer to ensure that the replacement software is appropriate for use by both parties.



- 3.2.4 The SLAs established to support existing operational systems shall include provision for the SO accounts to bear the cost of software licensing and support and a realistic hardware and firmware lease charge. A realistic proportion of the corporate LAN and WAN costs shall also be charged to the SO accounts under the SLA, taking due account of the data volumes transmitted and the high security requirements of the SO operational systems.

### **3.3 Administrative Systems**

- 3.3.1 As is the case with all organisations, SO requires access to administrative systems which are, and will continue to be delivered by shared systems providing service to all of TNB. Provision of these services shall be subject to the terms of an SLA negotiated between the SO and TNB's ICT department. Costs for these services shall be established in accordance with the provisions of RIG7 guidelines relating to shared service provision.

## **SECTION 4: RING FENCING OF INFORMATION AND DATA FLOW**

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### **4.1 Purpose**

- 4.1.1 As SO uses shared ICT systems to support its operations, it is necessary to establish arrangements for the management and protection of data used by SO. For the successful operation of the wider electricity market, certain high level rules are required to govern the transfer of data between those parties that have a legitimate interest in that data. This chapter outlines appropriate arrangements that should be put in place to ensure that SO, the other TNB businesses and the wider electricity market are all capable of operating successfully.
- 4.1.2 The ICT infrastructure currently supporting the SO operations is highly integrated with that of other TNB departments and the legal entity owning this infrastructure will always be TNB. The management and Board of TNB retain an obligation to ensure the cost-effective operation of the company in compliance with all the company's obligations. However, within this framework, the data held by TNB is used to support the operation of different businesses and the effective business ownership of data elements is considered here.

### **4.2 Data Ownership**

- 4.2.1 The ownership of all data in the principal operational systems used by SO shall be established to rest with SO.
- 4.2.2 The ownership of all data in the operational systems used jointly by the SO and the System Buyer shall rest with the Single Buyer where their principal use is to support the development of the Day Ahead Schedule and/or the operation of market settlement. The ownership of all other data in operational systems used jointly by the SO and the Single Buyer shall rest with the SO.
- 4.2.3 The data held in corporate or shared administrative systems relating to the operation of the SO or to staff employed by the SO shall rest with the SO.

### **4.3 Access to SO Data**

- 4.3.1 Access to all SO owned data shall be subject to controls that ensure that it is only accessible by those individuals who have a legitimate interest in that data.
- 4.3.2 Access to SO data shall be controlled, at minimum, by only permitting access to it after the entry of an individual username and password pair that meets the

requirements of good industry practice. Where screens may be left open while the individual is not using them, data access shall close after a reasonable inactivity period.

- 4.3.3 Systems shall record access to data by individuals together with a date and time stamp. Similarly, the change of any data element shall be monitored by the storage of username, date and time of the change action.
- 4.3.4 All individuals having access to SO owned data shall be subject to the compliance code of conduct. This requirement shall be included in all SLAs concluded by the SO with other parts of the TNB organisation.
- 4.3.5 No individual shall be provided with access to any data that is not essential for the completion of tasks normally allocated to them.

#### **4.4 Transfer of Market Data**

- 4.4.1 The Commission shall ensure that the general rules established for the transfer on market related data shall apply to all market participants.
- 4.4.2 Where any party active or previously active in the electricity market holds data or other information and another party has a legitimate need of that data or other information for purposes in connection with the operation of the electricity market or for system operation reasons then the party holding the data or other information is required to provide it to the other party.
- 4.4.3 Where data is transferred as part of the routine processes necessary for purposes in connection with the operation of the electricity market or for system operation purposes then the data will be transferred free of all charges to the recipient.
- 4.4.4 Where any party requests a non-routine transfer of data (for example a resend of properly receipted data as a result of a failure in the recipient's IT systems) then the party holding that data shall be permitted to charge the recipient such reasonable costs as are incurred in preparing the data for transfer and for effecting the transfer of data.
- 4.4.5 All parties shall be free to agree the mechanism to be used for data transfer. This may be in written form (which may include letter, fax or email) provided it will be received within [24] hours of it being sent or by other means of electronic data transfer which can be used to automatically update the recipient's electronic systems.

- 4.4.6 Where data is transferred electronically using a public communications system or a private system to which other parties have access, it shall, at minimum, be transferred with a check digit to allow the receiving party to confirm the authenticity of the data received.
- 4.4.7 The choice of data transfer mechanism shall facilitate smooth operation of the electricity market while ensuring that there are no barriers to entry by small players. In this context, it is expected that persons or entities sending or receiving a small number of data messages may use a transfer in written form, while persons or entities sending or receiving a large number of data messages will agree the use of electronic data transfer systems.
- 4.4.8 Where parties, who do not have a contractual relationship, are unable to agree a means of data transfer for market related data, they will refer the issue to the Commission for resolution.
- 4.4.9 On each occasion that data is sent and received a receipt shall be returned and retained by the party sending the data. Only once the receipt has been obtained, has the sender of the data discharged its obligations to provide data.
- 4.4.10 If the parties by whom data or other information is shared use automated systems for the transfer of the data or other information, then the obligations of the parties in respect of section 4.4.9 shall be discharged when the recipient sends an acknowledgement generated by its automated systems or (as appropriate) the sender receives an acknowledgement generated by the recipient's automated systems.

## **SECTION 5: GOVERNANCE AND OVERSIGHT**

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### **5.1 Purpose**

- 5.1.1 To ensure that the SO complies with the requirements of a ring fenced organisation it is necessary to put in place the necessary governance arrangements, such as ensuring sufficient independence of the SO in terms of management decisions, finance and accounting, and the confidentiality of information within the TNB organization. This chapter outlines the governance arrangements for the ring fenced SO including its independence from the competitive businesses of TNB, the independent oversight of the SO and requirements for compliance with the MGC.

### **5.2 Appointment of the Head of the SO**

- 5.2.1 The appointment of the Head of SO, who shall report directly to the Chief Executive Officer of TNB, shall be undertaken in accordance with TNB's documented employment policies. The appointment or dismissal of the Head of SO shall require the endorsement of ST.
- 5.2.2 In the event that the position of the Head of SO is left vacant due to the departure of the incumbent at short notice, or the processes for appointment of the Head of SO have not been completed for any reason, the Chief Executive Officer of TNB, with the endorsement of ST, shall appoint a person to act in the position of Head of SO until the appointment process is completed. The acting Head of SO shall enjoy the same level of independence and be subject to the same operational regime as would the Head of SO.
- 5.2.3 TNB shall establish appropriate reporting arrangements for the Head of the ring fenced SO which ensures that:
- a) the Head of SO is responsible to the CEO of TNB for the operation of the SO in accordance with TNB's Corporate Governance arrangements;
  - b) the Head of SO has sole responsibility for the day to day operation of the SO;
  - c) unless they also have responsibility for approving all business plans and all financial plans which impact on the overall corporate operation of TNB, no person who has control of any part of the generation or retail supply businesses of TNB shall also have any control over any part of the operation of the SO;

- d) for any person who has control of any part of the generation or retail supply businesses of TNB, the extent of the control over any part of the operation of the SO that is permitted under c) above shall be limited to the approval of business plans and overall financial plans;
- e) the Head of SO shall not have any control over, or receive any direct benefit from, the operation of any part of the generation or retail supply businesses of TNB.

5.2.4 The terms of employment for the Head of SO and the staff of the SO shall be consistent with TNB's employment policy and shall include requirements to comply with the requirements of the Code of Conduct outlined in section 7.3.3 that are enforceable under the disciplinary processes of the SO. No part of the benefit package enjoyed by any member of the SO staff shall be dependent on any identifiable aspect of the performance of any part of TNB operating in a competitive sector of the Malaysian electricity industry.

### **5.3 Compliance with Ring Fencing Obligations**

- 5.3.1 The SO shall ensure that it has appropriate policies, systems and procedures in place to ensure that it is capable of complying with its legal and license obligations and the MGC.
- 5.3.2 In the event that the SO becomes aware that it is non-compliant with the MGC it shall immediately inform the GCC and ST and put in place procedures to address the non-compliance. Where the SO establishes that it is impossible to comply with the requirements of any provision of the MGC, it shall propose an amendment to the MGC that allows compliance with the spirit of the MGC as a whole and of the section it proposes to be amended.
- 5.3.3 Within [six] months of the establishment of the ring fenced SO, the SO shall prepare a statement detailing how it will comply with the ring fencing obligations. This statement shall include, but need not be limited to:
  - a) arrangements to ensure the independence of the senior staff of the SO;
  - b) arrangements for the protection of confidential and commercially sensitive information;
  - c) a Code of Conduct, enforceable in employment contracts, dealing with the handling of confidential information and the transparent and equal handling of all work on behalf of all network users;
  - d) training of current staff and inclusion in induction training arrangements;

- e) arrangements for the quarantine of staff leaving the system operator; and
  - f) routine audit of different compliance areas selected on a rolling basis.
- 5.3.4 The obligations placed on staff of the ring fenced SO shall also be placed on other staff in TNB providing corporate business services to the ring-fenced SO.
- 5.3.5 The SO shall identify a 'compliance officer', which need not be a single full time position, who shall be responsible for ensuring compliance arrangements are established and maintained, and for ensuring that any complaints of discrimination are appropriately investigated. The compliance officer shall prepare a periodic report, at least annually, and arrange that it is submitted to the Commission following approval by the Head of SO and the managerial board of TNB as the responsible legal entity. This report shall detail how compliance is achieved, the number of complaints of discrimination that have been received and the results of all complaint investigations undertaken.
- 5.3.6 In addition to any audits undertaken by the GCC, the Commission may undertake any actions that it considers necessary to monitor compliance by the SO of its ring fencing obligations.

#### **5.4 Oversight by the Grid Code Committee**

- 5.4.1 Section GC7 of the MGC establishes the mechanism for overseeing the operations of the SO in accordance with the requirements of the MGC. This oversight is the responsibility of the GCC, chaired by the Commission.
- 5.4.2 The MGC provides the Grid Code Committee with the right to appoint an external auditor to undertake an audit of all SO operations and imposes on the GCC the obligation to determine the rules and procedures for the external auditor subject to approval by the Commission.
- 5.4.3 Oversight by the GCC shall be limited to technical matters relating to the operation of the MGC.

#### **5.5 Oversight of Ring Fencing Compliance**

- 5.5.1 The Commission shall establish an oversight committee which shall be chaired by the Commission and may include representatives from other relevant parties to oversee compliance by the ring fenced SO of its ring fencing obligations.
- 5.5.2 Where the oversight committee determines that a review of the SO operations is necessary, the oversight committee shall determine the areas to be reviewed and the rules and procedures to be followed by an external auditor appointed

by the oversight committee to perform the review.

- 5.5.3 Except for representatives of the Commission, no members of such an oversight committee shall have the right to enter or inspect any activity undertaken by ring fenced SO staff.

## **5.6 Audits for Governance**

- 5.6.1 There is a requirement to undertake audits of some information about or used by the SO. This includes the requirement for regulatory financial reports for the SO to be audited by a licensed independent auditor as if they are statutory financial statements.
- 5.6.2 The accounting systems should be capable of accounting for system operation activities separately to ensure that all expenditure is correctly accounted for in the books of account and that it can be reported to auditors and regulators on demand quickly and transparently.
- 5.6.3 In regards to the organisational process and changes to organisational structure for information unbundling, the ring fenced SO must be able to demonstrate and prove that it is operating in accordance independently to TNB Transmission. This includes the separation of IT systems and of personnel with direct access to information and the separation of data between SO and TNB Transmission.
- 5.6.4 Financially and commercially sensitive information should be kept confidential and not disclosed to other business units of the vertically integrated company. This should be proved by selective routine audit.

## **5.7 SO Website and Publications**

- 5.7.1 The SO Website shall be owned, operated and maintained by the SO and developed in such a manner as to promote transparency in the performance of the functions of SO.
- 5.7.2 The SO shall ensure that the SO website:
- a) is accessible by the general public and that its security from cyber threat and/or attacks is consistent with good industry practice;
  - b) presents data and information clearly;
  - c) is updated regularly for new reports, market information and data;
  - d) provides a link to the websites of all market participants requesting that a link to their website be placed on the SO website and to the ST website;



- e) includes a market participant login area providing access to more sensitive data which should be available to authorised representatives of market participants.

5.7.3 The SO shall publish the following key reports, data sets and forecasts on the SO Website:

- a) public safety information;
- b) general information regarding the structure of the electricity industry in Malaysia;
- c) the organisational structure of the SO;
- d) contact details for customers and others wishing to contact the SO;
- e) the current version of the MGC, and details of proposed changes;
- f) the terms of reference for the GCC and membership of any SO or GCC working groups;
- g) financial accounts for the SO as presented annually to the Commission;
- h) statements of compliance with ring fencing obligations and routine compliance reports submitted to the Commission;
- i) any report following audit instigated by the GCC assessing the compliance of the SO with the requirements of the MGC;
- j) the SO complaints procedure detailing how customers can make a complaint, how it will be handled, target periods for response, complaint escalation process and arbitration arrangements;
- k) half hourly and real time system demand;
- l) the grid system performance report;
- m) except where issues of national security are involved, any other report required by the Commission.

5.7.4 Where appropriate, and by agreement with the Commission and the Single Buyer, the SO may copy from or insert links to that part of the Single Buyer website where any of the required information is provided.

5.7.5 The SO may provide paper based versions of any information provided on the SO website. Where paper based versions are provided, the SO may make a reasonable administration charge as approved by the Commission.

## **SECTION 6: REAL-TIME SECURITY-CONSTRAINED ECONOMIC DISPATCH SYSTEM**

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### **6.1 Purpose**

- 6.1.1 This Chapter defines the Least Cost Dispatch Scheduling Methodology which the SO shall follow for Real-time Security-Constrained Economic Dispatch System and the requirements of the Dispatch Scheduling Model.

### **6.2 Least Cost Dispatch Scheduling Methodology**

- 6.2.1 The SO shall develop the Real-time Security-Constrained Economic Dispatch System based on a Least Cost Dispatch Scheduling Methodology such that the lowest marginal cost Generating Unit is forecast to be dispatched first to meet demand followed by the next lowest marginal cost Generating Unit until all demand is met. The marginal cost of generation shall comprise all payments that vary with the amount of electricity procured, that are made by the Single Buyer to the Generators, pursuant to Generator Contracts.
- 6.2.2 At all times the SO shall ensure that the Real-time Dispatch System cater adequately for system security, Operating Reserve requirements, transmission constraints, generation constraints, fuel availability and any other factors which could influence the security and reliability of electricity supply as specified by the Malaysian Grid Code.
- 6.2.3 The SO shall ensure that it has the required data and information to accurately calculate its marginal cost for the procurement of generation from each Generating Unit.
- 6.2.4 SO shall ensure that it promotes transparency by publishing key results on the SO Website.

### **6.3 Dispatch Scheduling Model**

- 6.3.1 The SO shall ensure that the Dispatch Scheduling Model used to implement the Real-time Dispatch System minimises the cost of electricity procurement given all transmission and system constraints and the key input data. Specifically, the SO shall ensure that the Dispatch Scheduling Model is based on the Least Cost Dispatch Scheduling Methodology and is capable of adequately taking the following parameters into consideration in optimising the Real-time Dispatch:
  - a) transmission losses and System Constraints;
  - b) Operating Reserve requirements as set out in the Malaysian Grid Code;

- c) key input data for the Day Ahead Dispatch Schedule as specified by Single Buyer; and
  - d) any other system security measures as deemed appropriate by the SO in compliance with the Malaysian Grid Code.
- 6.3.2 If the Dispatch Scheduling Model does not satisfy the conditions as specified in clause 6.3.1, then the SO shall prepare a System Upgrade Plan which must specify the timeframe and the cost required to upgrade the current Dispatch Scheduling Model such that it is compliant with the requirements as specified in clause 6.3.1.
- 6.3.3 The SO shall submit the System Upgrade Plan to the Energy Commission for approval. Once the System Upgrade Plan has been approved by the Energy Commission the SO shall implement the System Upgrade Plan as per the timeline specified in the System Upgrade Plan.
- 6.3.4 The SO shall review the Dispatch Scheduling Model in the event of any revision to the Least Cost Dispatch Scheduling Methodology or every 12 months, whichever is earlier, to ensure that the Dispatch Scheduling Model is compliant with the provisions of clause 6.3.1. In conducting the review the SO shall ensure that:
  - a) the review is finalised no later than two months after expiration of the 12 month period;
  - b) the outcomes of the review are submitted to the Energy Commission within 15 days after the completion of the review; and
  - c) if the Dispatch Scheduling Model is non-compliant, a System Upgrade Plan to upgrade the model to ensure compliance is submitted to the Energy Commission.
- 6.3.5 The first review and any resultant System Upgrade Plan must be prepared no later than three months after the Commencement Date of the Ring-fenced SO.
- 6.3.6 If at any time the SO proposes to enhance or upgrade the Dispatch Scheduling Model then it shall seek prior approval from the Energy Commission before implementing its proposal.

## **SECTION 7: RING FENCING OF ACCOUNTS**

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### **7.1 Purpose**

- 7.1.1 The SO shall produce a chart of accounts for financial statutory purposes and a chart of accounts for regulatory purposes.

### **7.2 Ring Fencing of Financial Statutory Accounts**

- 7.2.1 As part of the unbundling process the ring fenced SO shall explicitly identify all direct and indirect costs incurred in the performance of the ring fenced SO function, establishing and maintaining a separate set of accounts relating to its functions as the SO only.
- 7.2.2 The SO shall prepare a chart of statutory accounts to be signed off by the Head of SO and submitted to the TNB management for approval, which shall not be unreasonably withheld
- 7.2.3 The financial accounts shall be based on the underlying accounting systems, specifically focused on the SO and the Generally Accepted Accounting Principles (GAAP) for Peninsular Malaysia.
- 7.2.4 In regards to the assets of the SO, the statement of assets shall include all SO assets, and accurately account for the historic value, age and remaining useful life of the assets required for the performance of the SO functions.
- 7.2.5 An asset register or statement of assets for the SO shall be separated within the corporate enterprise financial systems of TNB.
- 7.2.6 The ring fenced SO accounts shall be subject to a financial audit at least annually.
- 7.2.7 The financial accounts of the SO shall be published on the website.

### **7.3 Ring Fencing of Regulatory Financial Accounts**

- 7.3.1 The regulatory framework for SO is regulated by the Commission. As part of the electricity tariff that customers pay, system operations is one component that makes up this tariff – known as the system operation tariff.
- 7.3.2 In order to determine the system operations tariff, the Commission published RIGs setting out the Incentive Based Regulation (IBR).
- 7.3.3 In accordance with the requirements of the RIGs, the SO shall submit regulatory accounts to the Commission.
- 7.3.4 The information for the regulatory accounts shall be accompanied by a

submission setting out the process by which the regulatory accounts were drawn from the audited financial accounts.

- 7.3.5 The Commission shall set out guidelines for the SO on the type of information it requires for regulatory purposes.
- 7.3.6 SO shall adhere to the format of the data templates provided in by ST as set out in the RIGs.
- 7.3.7 SO accounts shall be consistent with the requirements from ST as set out in the RIG framework.
- 7.3.8 The regulatory accounts must comprise of the data requirements as requested by The Commission.

These include:

- a) Revenue based on the system operations tariff
- b) Operating expenditure incurred by the system operation in performing its functions
- c) Allocation of shared services / joint costs based on the cost allocation methodology by ST.
- d) Asset register/statement of assets required for system operation and useful life of these assets
- e) Depreciation of assets

#### **7.4 Cost Allocation**

- 7.4.1 SO shall ensure that the joint costs / shared services between TNB corporate or any other business unit within TNB are allocated between these parties and the SO in accordance with the RIG7 cost allocation methodology guidelines that have been approved by the Commission.
- 7.4.2 The translation of data from the audited financial accounts to the regulatory accounts (including compliance with the cost allocation methodology) shall be audited by a certified accounting firm.

#### **7.5 Framework for Calculation of Cost of Service for SO**

- 7.5.1 The RIGs by the Commission sets out the framework for the calculation of the cost of service for system operations.
- 7.5.2 SO shall follow and abide by the guidelines for the calculation of the cost of service for system operation as defined by the Commission.

- 7.5.3 SO shall accurately and clearly identify the costs of their services, including assets and activities related to the system operation function.
- 7.5.4 The RIG 3 states that the Commission will provide a Revenue Requirement Model for the calculation of revenue requirements for TNB business entities, in this case system operation.
- 7.5.5 This model describes the data requirements for system operation and the calculation of revenue requirements.
- 7.5.6 SO shall provide and submit to the Commission the data required for the calculation of the revenue requirements.
- 7.5.7 In accordance with the principles established in RIG1, charges for system operation services will be levied initially against TNB Customer Services. In the event that the electricity market is opened to competition, these charges shall be levied on all Retailers (TNB Customer Services being deemed to be a Retailer), customers able to buy at the wholesale market and exporting traders in proportion to their shares of total energy traded.
- 7.5.8 Where the applied SO tariff results in an over-recovery or under-recovery in any financial year, such sum shall be deducted from or added to the sum to be recovered during the following review period in accordance with the provisions of section 3.4 of RIG 2.

## **SECTION 8: REPORTING AND AUDITS**

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### **8.1 Operational Reporting**

- 8.1.1 Operational reporting is related to reports that are produced providing details of the grid system performance.
- 8.1.2 The information to be included at the minimum consists of:
- a) Transmission system performance statistics
  - b) Generation availability & outages
  - c) Grid maintenance
  - d) Network availability & outages
  - e) General system performance e.g. minutes lost, system frequency and frequency deviation
  - f) Incident investigation and analysis
- 8.1.3 Standardised reporting templates shall be developed so that the same format for the reports can be used each time.
- 8.1.4 The above listed reports shall be published on the SO's website to enhance transparency.

### **8.2 Regulatory Reporting**

- 8.2.1 SO shall provide information to the Commission as part of the Regulatory Implementation Guidelines (RIG).
- 8.2.2 SO shall establish and maintain accounting and financial accounts relating to its operations and functions as system operator.
- 8.2.3 For regulatory accounting, the SO shall present and submit the necessary information in the required format as requested by the Commission.
- 8.2.4 The regulatory financial accounts shall be subject to an audit on an annual basis and submitted to the Commission.

### **8.3 Financial Audits**

- 8.3.1 SO shall arrange that its accounts, ring fenced as established in section 6, are subject to the same minimum level of audit by a licensed independent auditor as it required for statutory accounts filed in Malaysia.
- 8.3.2 In undertaking the audit, the independent auditor shall comment on the

arrangements for the separation of the SO accounts from those of other parts of TNB in any shared accounting systems and shall comment on the appropriateness of the accounting systems used for an organisation having the number of staff and turnover of the SO.

#### **8.4 Audit – Compliance with Ring Fencing Obligations**

- 8.4.1 TNB Internal Audit or SO's own quality assurance (QA) personnel shall monitor, assess, and enforce compliance with processes using a number of monitoring processes to collect information in order to make assessments of compliance.
- 8.4.2 SO's audit and reporting programme should support the SO compliance programme to reassure stakeholders that processes are being adhered to and that where problems are identified mitigation procedures are in place.
- 8.4.3 The compliance programme process approved by the Commission shall set out the overall process steps for the compliance program and shall include:
  - a. Evidence of the independence of the senior management of SO from TNB;
  - b. A Code of Conduct enforceable by employment contracts is in place and applicable to all SO staff and those staff of TNB providing services to the SO.
  - c. Access controls in place relating to premises occupied by SO and IT systems used by the SO.
  - d. Training for existing SO staff regarding their obligations under the Code of Conduct and inclusion of such training in the SO's induction program for new staff;
  - e. Arrangements for the quarantining of staff leaving the SO who have had access to information of a commercially confidential information relating to a competitor of their new employer; and
  - f. The provision of an [annual] report to the Commission, most of which shall also be made publicly available, recording evidence of compliance with the requirements of the compliance programme. This report shall be prepared following an audit of the SO's arrangements for meeting the compliance provisions.
- 8.4.4 The Code of Conduct shall address confidentiality, non-discrimination and transparency.
- 8.4.5 IT system access controls shall be designed to prevent access to data by unauthorised persons and record the identity of system users inputting or



changing data items.

- 8.4.6 The compliance report to the Commission shall include details of each incidence of non-compliance detected by the SO or reported by stakeholders.
- 8.4.7 The public version of the compliance report shall contain details of the number of non-compliances of each type separately; by those detected by the SO, and those reported by stakeholders.
- 8.4.8 The compliance report shall not be prepared by a person with managerial responsibility for the matters being reported.

## Appendix A - Glossary

### Appendix A –Glossary

<b>CC</b>	Connection Code
<b>DTS</b>	Dispatcher Training Simulator
<b>EMS</b>	Energy Management System
<b>GAAP</b>	Generally Accepted Accounting Principles
<b>SO</b>	System Operator. As appropriate, this refers to the System Operations Department
<b>HR</b>	Human Resources
<b>ICOMS</b>	Integrated Commissioning and Outage Management System
<b>IBR</b>	Incentive Based Regulations
<b>ICT</b>	Information and Communications Technology
<b>IPP</b>	Independent Power Producer
<b>IPR</b>	Intellectual Property Rights
<b>IT</b>	Information Technology
<b>KPI</b>	Key Performance Indicators
<b>LAN</b>	Local Area Network
<b>M&amp;E</b>	Management and Engineering
<b>MESI</b>	Malaysian Electrical Supply Industry
<b>MGC</b>	Malaysian Grid Code
<b>MW</b>	Mega Watt
<b>NLDC</b>	National Load Dispatching Centre
<b>O&amp;M</b>	Operation and Maintenance
<b>OPU</b>	Operation Planning Unit
<b>PC</b>	Planning Code
<b>PPA</b>	Power Purchase Agreement
<b>RIG</b>	Regulatory Implementation Guidelines
<b>RTU</b>	Remote Terminal Unit
<b>SB</b>	Single Buyer
<b>SCADA</b>	Supervisory Control And Data Acquisition
<b>SLA</b>	Service Level Agreement
<b>SOD</b>	Systems Operations Department of TNB Transmission prior to ring fencing.
<b>ST</b>	Suruhanjaya Tenaga or Energy Commission
<b>TNB</b>	Tenaga Nasional Berhad
<b>UPS</b>	Uninterruptable Power Supply

## Appendix A - Glossary

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<b>Dispatch Schedule</b>	Instruction to load a generating unit to a certain quantum of energy by a specified time.
<b>Generator</b>	An entity licensed by the ST to generate electricity in Peninsular Malaysia.
<b>Grid Code Committee</b>	The committee responsible for keeping the MGC under review in accordance with the rules and procedures defined under the General Conditions of this Grid Code
<b>Grid System</b>	TNB transmission grid that covers the whole of Peninsular Malaysia at voltage levels of 132kV and above that the SO has authority to direct operation
<b>Unit Commitment</b>	Turning on or turning off of a generating unit
<b>Users</b>	A term utilised in various sections of the Grid Code to refer to the persons using the Transmission System

## Appendix B – Identified Shared and Corporate Services

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### Appendix B – Identified Shared and Corporate Services

During the analysis undertaken and as part of the performance of this project, Shared and Corporate Services to which the SO should continue to have access to include shared buildings, shared ICT infrastructure and services and corporate services. All should be made the subject of SLAs and, for those services which require the involvement of non SO staff in their provision, the SLAs should include obligations under the SO's Code of Conduct.

#### ***Shared Buildings***

Currently the SO occupies parts of TNB buildings. Access control arrangements should be initiated such that only members of the SO staff and visitors under the direct supervision of members of the SO staff have access to these areas. These areas include:

- a. Half of 3<sup>rd</sup> floor NLDC building: Operation Planning Unit, DTS training room;
- b. 5<sup>th</sup> floor NLDC building: SCADA/EMS units, DC battery room and UPS room;
- c. 6<sup>th</sup> floor NLDC building: NLDC control room, GM (SO), current day planning unit, technical support unit;
- d. 7<sup>th</sup> floor NLDC building: SCADA/EMS units, SCADA/EMS workstations, viewing gallery;
- e. Backup control centre; and
- f. Backup control room.

In considering the arrangements for the continued use of shared buildings, appropriate consideration must be given to facilities management services associated with these buildings including:

1. Main power supply and backup power supply (standby diesel generators);
2. Reception and security guard services;
3. Office cleaning services;
4. Landline telephone services (Telecom Malaysia);

#### ***Shared Services***

Two categories of shared services required by the SO are procured by TNB or provided by other parts of TNB to the SO to enable its operation. The first category includes services procured or directly provided by TNB for the exclusive use of the SO. These include:

1. Software licences;

## Appendix B – Identified Shared and Corporate Services

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3. Repair and maintenance of UPS;
4. Annual maintenance and development services for SCADA/EMS computer software;
5. Lightning locator service;
6. Fault/disturbance recorder & lightning detection;
7. Repair and maintenance of RTU's and distributed front ends;
8. Provision for maintenance of BARCO lamps – about RM 40,000 per annum; and
9. ICT – telecommunication services - Fibre optic links: main control centre, backup control centre and backup control room.

In addition, SO makes use of other services which, while clearly identifiable as a SO required service, are connected to communications networks or systems also used by others. These include:

1. ICT – telecommunication services;
  - a. Ethernet communication services to all power stations and substations: voice and data communication a hotline telephone service; and
  - b. Ethernet communication services between floor to floor within NLDC building.

Recognising that section CC6.6 of the MGC places responsibility with the network user for the remote end communication equipment required at power stations and substations, the SO should conclude SLAs with the ICT department for the continued provision of the ICT services where responsibility for their provision rests with the SO.

### ***Corporate Services***

The SO obtains corporate services from TNB and will require their continued provision. These include:

1. Human resources related and other administrative services such as salary payment, medical services for staff and families, staff training etc;
2. Finance services including management and regulatory accounts;
3. Legal services;
4. Procurement and Logistics;
5. Insurance;

## **Appendix B – Identified Shared and Corporate Services**

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SO should conclude SLAs with the relevant service provider departments of TNB for the continued provision of these services. These SLAs should include obligations under the SO's Code of Conduct.

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