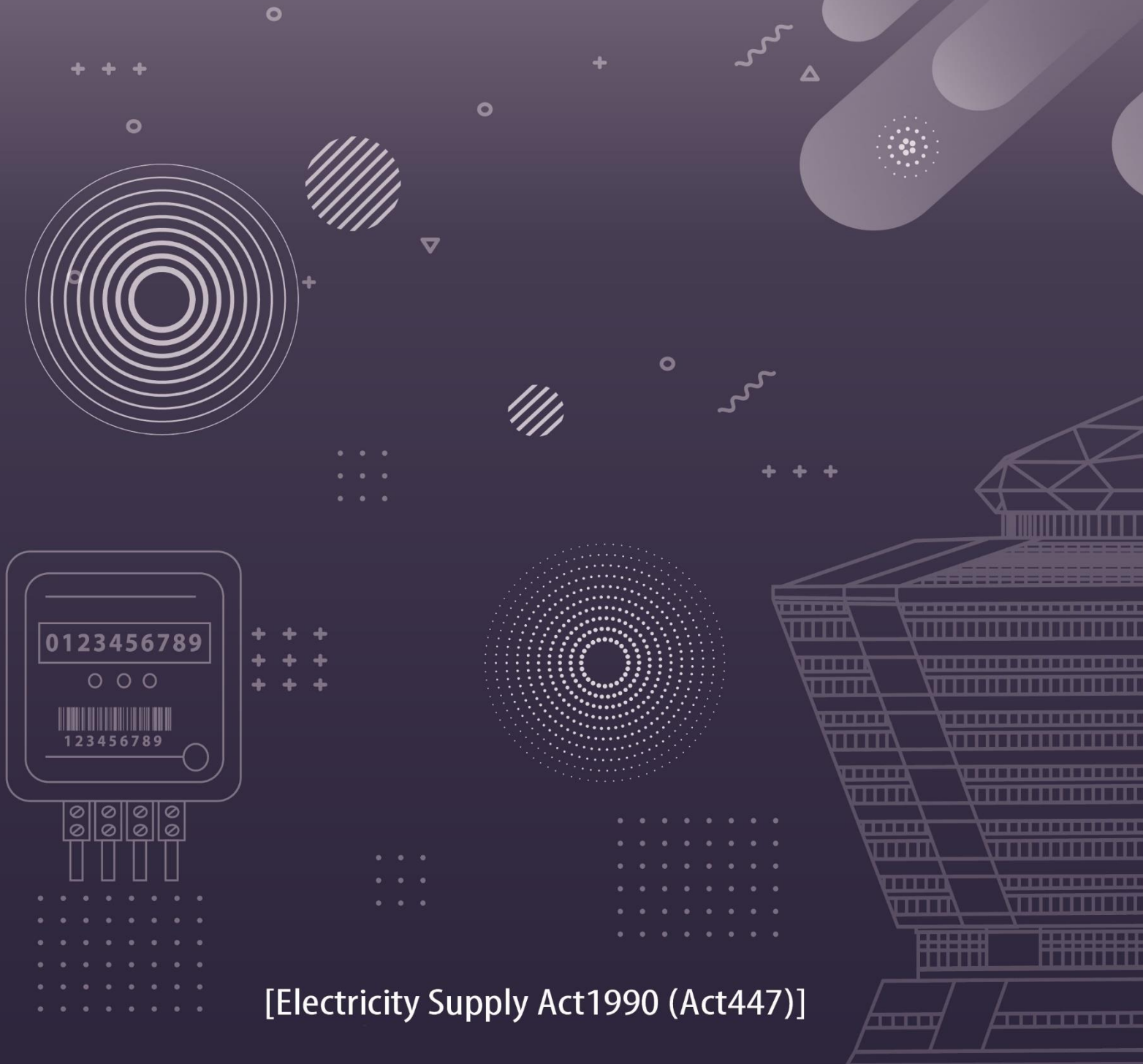


# Guidelines

## On Advanced Metering Infrastructure





**ELECTRICITY SUPPLY ACT 1990**  
**[ACT 447]**

**GUIDELINES ON ADVANCED METERING INFRASTRUCTURE**  
**GP/ST/No.24/2020**

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 on Advanced Metering Infrastructure (“Guidelines”).
2. These Guidelines shall come into operation on the date of its registration.

**Purpose of these Guidelines**

3. The purpose of these guidelines is to set out the requirements to be fulfilled in the introduction of new technology for electricity metering (smart meters) and its supporting infrastructure, and outline the respective parties’ obligations in respect of the same.

**Amendment and Variation**

4. The Commission may at any time modify, vary, review or revoke these guidelines.

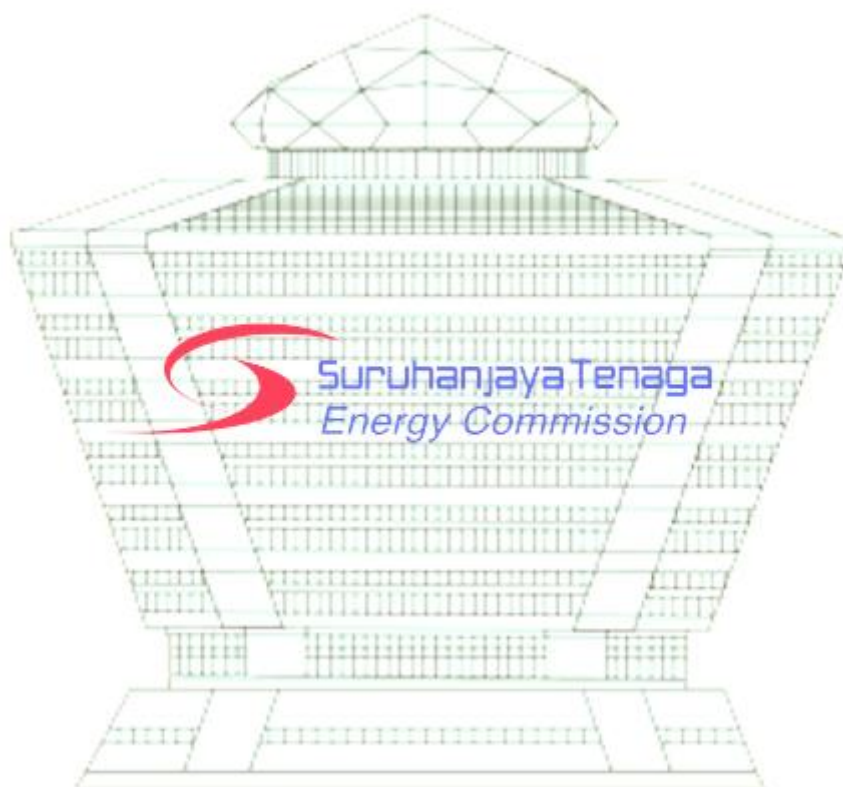
Dated: 20 February 2020



**Abdul Razib Bin Dawood**  
Chief Executive Officer  
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## 1. OBJECTIVES

- 1.1. These Guidelines are developed by the Commission for the following objectives:
- (a) to set out to be fulfilled in the introduction of new technology for electricity metering (smart meters) and its supporting infrastructure; and
  - (b) to outline the respective parties' obligations in respect of the same.

## 2. SCOPE

- 2.1. These Guidelines shall apply to any person who provides or utilises any AMI or part of an AMI in Peninsular Malaysia and Sabah.
- 2.2. These Guidelines are not intended in any way to circumvent the application of and obligations or requirements under any other written law or standards.

## 3. DEFINITIONS AND INTERPRETATION

- 3.1. In these Guidelines, the following terms shall bear the following meanings:

<b>“Act”</b>	means the Electricity Supply Act 1990 [Act 447], as amended, modified or supplemented from time to time;
<b>“AMI”</b>	means advanced metering infrastructure, which is an integrated system of smart meters, communications networks, and data management systems that enables two-way communication between utilities and customers;
<b>“AMI device”</b>	means the equipment or hardware of the AMI, including the smart meter and communication hardware;
<b>“AMI meter”</b>	means smart meter;
<b>“Commission”</b>	means Suruhanjaya Tenaga;

<b>“COSEM”</b>	means Companion Specification for Energy Metering, which is an interface model of communicating energy metering equipment;
<b>“CAAM”</b>	means the Civil Aviation Authority of Malaysia;
<b>“consumer data”</b>	means data that is collected from the AMI that consists of:  (a) the amount of electricity used by the consumer; and (b) the power factor, which is the index used to measure the efficient use of electricity;
<b>“data”</b>	means consumer data and non-consumer data;
<b>“DLMS”</b>	means Device Language Message Specification, which is the suite of standards developed and maintained by the DLMS User Association;
<b>“EMS”</b>	means energy management system;
<b>“enterprise system”</b>	means a large-scale application software package that supports business processes, information flows, reporting, and data analytics, for example billing systems, SCADA and EMS;
<b>“Energy Laws”</b>	means the Act and all subsidiary legislations made thereunder;
<b>“HES”</b>	means head-end system, which is hardware and software that transmits and receives data, sends operational commands to smart meters, and stores data for a limited period of time from the smart meters to support billing systems or data management via MDMS;
<b>“IEC”</b>	means the International Electrotechnical Commission;
<b>“licensee”</b>	means any person issued with a license pursuant to section 9 of the Act and who is the provider of an AMI;

<b>“MCMC”</b>	means the Malaysian Communications and Multimedia Commission;
<b>“MDMS”</b>	means meter data management system;
<b>“non-consumer data”</b>	means data that is collected from the AMI but excludes any consumer data;
<b>“OIML”</b>	means the International Organisation of Legal Metrology;
<b>“RF”</b>	means radio frequency;
<b>“SCADA”</b>	means supervisory control and data acquisition, which is a control system architecture that uses computers, networked data communications and graphical user interfaces for high-level process supervisory management, but uses other peripheral devices to interface with the process plant or machinery;
<b>“SIRIM”</b>	means SIRIM Berhad, a corporate organisation owned wholly by the Malaysian Government, under the Minister of Finance Incorporated;
<b>“smart meter”</b>	means an electronic device that records the consumption of electric energy and communicates the information to the electricity supplier for monitoring and billing purposes;
<b>“User”</b>	means a user of an AMI, including but not limited to a consumer.

3.2. Subject to paragraph 3.1 and unless expressly indicated to the contrary or unless the context otherwise requires, terms adopted and used in these Guidelines shall bear the same meaning as they are defined in the Energy Laws.

3.3. If there are any conflict between the provisions of these Guidelines and of those contained in the Energy Laws, the provisions in the Energy Laws shall prevail.

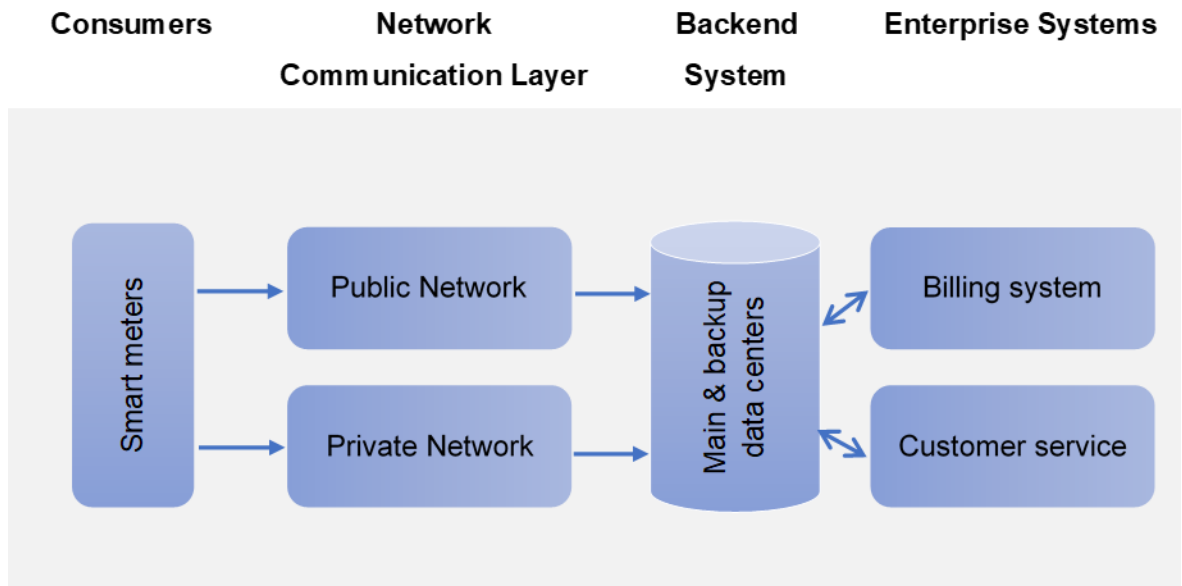
#### **4. INTRODUCTION TO AMI**

- 4.1. Previously, consumers utilise traditional mechanical meters to record their electricity consumption where the licensee conducts premise-to-premise reading of electricity meters. With the advent of new technology in AMI, smart meters remove the need for premise-to-premise readings as these meters can take remote readings and send the data to the licensees. The concept of this new technology has also been embedded in section 32(5) of the Act.
- 4.2. The transition to AMI is an integral part of the larger smart grid initiative. With a smart meter, consumers are empowered to manage their electricity consumption and play an important role to reduce the national carbon footprint. Licensees may utilise the AMI to improve field operations, manage load effectively and reduce non-technical losses which will benefit the consumers vis-à-vis reduced tariff from AMI efficiency.
- 4.3. These Guidelines are developed to guide any person who provides or utilises any AMI or part of an AMI in Peninsular Malaysia and Sabah.

#### **5. COMPONENTS OF AMI**

- 5.1. An effective AMI shall embody the following characteristics:
  - (a) consumer information availability, for the purposes of assisting electricity consumers to better understand their electricity usage patterns and pricing options; and
  - (b) metering information availability (as agreed by users of the metering installation) for the purposes of allowing regular and accurate remote readings of meters, network data and event logs).
- 5.2. The diagram below shows a summary of the components of an AMI:





5.3. The AMI consists of three major components:

- (a) The smart meter, which:
  - (i) records readings at an interval specified by the Commission;
  - (ii) automatically records and sends data daily to the licensee via the network communication layer;
  - (iii) records anomalies and disruption in electricity supply; and
  - (iv) sends information of such disruption to the licensee;
  
- (b) The network communication layer, which:
  - (i) provides the connectivity between the smart meter and the data management and analytics layer; and
  - (ii) supports various access modes including but not limited to RF networks, 4G/3G/GPRS, ethernet and low voltage power line carrier data; and
  
- (c) The data management and analytics layer, which:
  - (i) contains a head-end system that interacts with devices, manages communications protocols, adapts internet protocols, and collects and stores metering data;
  - (ii) contains a MDMS that focuses on business applications, manages data analysis, monitors the operating status of systems, compiles statistics, analyses reports, manages operations and maintenance and connects with enterprise systems.

## 6. AMI KEY AREAS OF IMPLEMENTATION

6.1. The following are AMI key areas of implementation:

- (a) general requirements of smart meters;
- (b) communications and network infrastructure;
- (c) data security: access, storage and transportation;
- (d) protection of consumer interest;
- (e) RF implementation and public safety and
- (f) installation and electronic notice.

### 6.2. General Requirements of Smart Meters

(a) Interface Protocol

The interface protocols of any smart meter employed shall either be widely used computer industry protocols or well-established electricity industry protocols.

(b) Communication

- (i) To qualify as an AMI meter, two-way communication between the HES and the metering point shall be provided.
- (ii) All AMI meters shall comply with IEC 62056 and DLMS/COSEM.

(c) Metrology

- (i) Meter metrology is the portion of an electricity meter which measures the unit of electrical energy flow. It is governed by OIML and IEC standards and licensees are expected to comply with these standards.
- (ii) As AMI meters are likely to be able to have their programming altered via the network communication layer, the licensee shall ensure that this shall not impact the metrology of any AMI device. Any changes to the meter metrology part of an AMI meter shall require the re-evaluation of pattern approval of each meter model that has been programmed.

### 6.3. Communications and Network Infrastructure

(a) Communication Network Equipment

- (i) Communication networks transmit data from smart meters to a licensee's data centers and back-offices and connect smart meters to a HES, which manage data communications between smart meters and other enterprise systems.
  - (ii) Any communication equipment used for an AMI shall be approved by MCMC in accordance with relevant laws and regulations.
- (b) Communication Technology Selection
- (i) Licensees shall select the most viable communication technology combination to fully support the implementation of AMI based on the following considerations:
    - cost-effectiveness;
    - availability of bandwidth and spectrum;
    - latency;
    - reliability and coverage;
    - power supply needs;
    - cybersecurity considerations;
    - regulatory technical standards and specifications including but not limited those set by MCMC, SIRIM and CAAM;
    - public safety and health regulations including but not limited to those issued by MCMC, SIRIM and CAAM; and
    - potential implementation challenges.
  - (ii) Licensees shall leverage on its own existing assets such as fibre optic network, power lines, buildings, poles, land etc. when selecting the communication technology.
  - (iii) Licensees shall implement technologies that use frequency bands declared by MCMC.
  - (iv) Licensees shall fit the communication technology that they use with their operational goals, service area characteristics, and business process constraints/requirements.
  - (v) Any information on the communication technology adopted by an AMI shall be made available by the party in possession of such information to the Commission at the Commission's request
  - (vi) The Commission may request for a change in the communication technology being adopted if it deems fit or necessary, and the party

using such technology shall comply with such a request within the period specified by the Commission.

#### 6.4. Data Security: Access, Storage and Transportation and Meter Reading

##### (a) Data Access

- (i) The licensee is the owner of the data and the consumer is the owner of the consumer data.
- (ii) To maintain the security of the data, the licensee shall ensure the following:
  - all data shall only be accessible at the back-office level, where appropriate controls on access and suitable firewalls shall be provided by the licensee.
  - a strong and upgradable encryption is used for the network communication layer to reduce any risk of theft, tampering, inappropriate access or mischievous actions.
- (iii) The licensee shall obtain the written consent of the consumer before disclosing any consumer data to third parties, including a User.
- (iv) Subject to the foregoing, a User's access to data is restricted to metering information through the licensee's access control system. Licensees shall give Users access to only the back office server of the AMI system. Licensees shall ensure that their AMI systems have the highest integrity and security.
- (v) Consumers shall be given access to consumer data and any related billing information through a reasonable medium to be provided by the licensee such as web portals and mobile application.

##### (b) Storage and Transportation of Data

- (i) The licensee shall be responsible for establishing and maintaining the relevant processes to ensure the robustness and integrity of all data being moved and stored within the AMI.
- (ii) All data collected by an AMI shall be kept for a minimum period of seven (7) years or for such longer periods as may be determined by the relevant laws.

##### (c) Meter Reading

- (i) Licensees shall ensure that AMI meters are able to provide readings to allow consumers to view their energy usage for each billing cycle.

- (ii) Estimated meter readings may be created in accordance with applicable laws.
- (iii) The licensee shall ensure that all meter readings are secure.

#### 6.5. Protection of Consumer Interest

- (a) The licensee shall comply with all related laws, guidelines and policies relating to their standards of performance, including but not limited to the Guaranteed Service Level (GSL) and/or Minimum Service Level (MSL) determined by the Commission.
- (b) Pricing of Services
  - (i) The licensee shall not discriminate in terms of prices imposed on Users for utilising the AMI or any portion thereof. The same price for the same service or use shall be charged to all Users.
  - (ii) However, subject to the approval of the Commission, the licensee may recover costs for additional or unique requirements that Users may request from or impose on the AMI.
  - (iii) The licensee may also, subject to the approval of the Commission, recover the cost of additional developments to the AMI.

#### 6.6. RF Implementation and Public Safety

- (a) Compliance and Adherence

In implementing the AMI, the licensee shall at all times comply with and adhere to all standards and guidelines issued by the relevant authorities including but not limited to the following:

  - (i) Technical Specification for GSM Mobile Terminals [SKMM WTS GSM-MT Rev. 1.01:2007];
  - (ii) Technical Specification for IMT-2000 Third-Generation (3G) Cellular Mobile Terminals [SKMM WTS IMT-MT Rev. 1.01:2007];
  - (iii) Technical Code for the Specification for Short Range Devices (SRD) [MCMC MTSFB TC T007:2014];
  - (iv) Technical Code for the Long Term Evolution (LTE) – User Equipment (UE) [MCMC MTSFB TC T015:2017];
  - (v) EN300 328 V1.8.1 (2012-06) Rev 2.0: 2012; and

(vi) International Commission on Non-Ionizing Radiation Protection (ICNIRP) Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields.

(b) Public Safety Awareness

(i) The licensee shall at all times comply with and adhere to the reference level for general public exposure to time-varying electric, magnetic and electromagnetic fields stated in Table 7 of ICNIRP Guidelines for Limiting Exposure to Time-Varying Electric, Magnetic and Electromagnetic Fields (up to 300GHz).

(ii) The licensee shall provide consumer with clearly understandable information about RF emissions or any network communication layer used related to smart meters. This is to ensure that the technology is safe to be used.

6.7. Installation and Electronic Notice

(a) Smart Meter Installation

The licensee may determine the appropriate type of smart meter to be installed at a consumer's premises and the location of the meter which shall be reasonably placed without requiring any further costs to be incurred by the consumer.

(b) Electronic Bill and Disconnection Notice

(i) Once a smart meter has been commissioned successfully at consumer's premises, the licensee may render the consumer's monthly bill via electronic means, and any other means which is in accordance to Energy Laws.

(ii) The licensee may enable the option of serving a notice to disconnect electricity supply via electronic means for all consumers who have been fitted with smart meters, subject to such consumers providing their email address to the licensee.

## **7. COMMITTEE REPRESENTATION**

These Guidelines were developed by a working committee which consists of representatives from the following organisations:

- The Commission;
- The Ministry of Domestic Trade and Consumer Affairs (KPDNHEP);
- The Ministry of Health (KKM);
- SIRIM QAS International;
- The National Metrology Institute of Malaysia (NMIM);
- The Malaysian Communications and Multimedia Commission (MCMC);
- CyberSecurity Malaysia (CSM);
- Tenaga Nasional Berhad (TNB).