

CHAPTER 7A



7A. Metering

Note

Chapter 7A applies in substitution for Chapter 7 (which establishes the metering framework that applies in the other *participating jurisdictions*). Chapter 7A operates as a transitional framework until Chapter 7 takes effect in this jurisdiction.

Criteria for assessing when the transition to Chapter 7 will take effect will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

The application of requirements in Chapter 7A relating to market and institutional arrangements will also be considered as part of the phased implementation of the *Rules* in this jurisdiction.

Part A Introduction

7A.1 Introduction to the Metering Chapter

7A.1.1 Purpose and application

This Chapter provides the framework for *metering* for local electricity systems by establishing the requirements for *metering installations* at *connection points* on *transmission networks* or *distribution networks*.

7A.1.2 Contents

This Chapter sets out provisions relating to:

- (a) roles and responsibilities of financially responsible participants, *Metering Coordinators*, *NTESMO* and the *Utilities Commission* relating to metering;
- (b) the appointment of, and the qualifications and requirements applying to, *Metering Providers* and *Metering Data Providers*;
- (c) the appointment of *Metering Coordinators*;
- (d) *metering installation* requirements;
- (e) *metering data services* and the *metering database*;
- (f) *metering register* requirements, the disclosure of *NMI* information, and the provision of *metering data* to *retail customers*;
- (g) security of, and rights to access, *metering installations*, services provided by *metering installations*, *energy data* held in *metering installations* and *metering data* from *metering installations*; and
- (h) relevant *metering* procedures.

7A.1.3 Definitions

In this Chapter:

actual meter reading means the collection of energy data from a metering installation by local access or remote acquisition.

data stream means a stream of metering data associated with a *connection point*, as represented by a *NMI*. A *NMI* may have multiple data streams (for example, from one or more *meters*, or one or more channels or registers that comprise a

single *meter*). Each data stream is identified by a unique suffix associated with the *NMI* to which it belongs.

financially responsible participant means a person who is *financially responsible* for a *connection point*.

MDFF Specification means the Metering Data File Format Specification NEM 12 and NEM 13, published by *AEMO*, with an effective date of 1 December 2017 (Version 1.06).

Metering Data File Format means *metering data* that is in a form that complies with the MDFF Specification.

metering provision services means the provision, installation and maintenance of *metering installations*.

prepayment device means a *metering installation* that requires a prepayment for the supply of electricity prior to consumption.

scheduled meter reading means an actual meter reading performed in accordance with the usual reading cycle for the *meter*.

special meter reading means an actual meter reading performed outside of the usual reading cycle for the *meter*.

vending services means, for a *metering installation* at a *connection point* that is a prepayment device, services that allow the financially responsible participant to sell electricity that will flow through the prepayment device in the future for consumption, and to receive payment in advance for selling that electricity.

Note

The following are examples of vending services:

- (a) services for prepayments made by credit card through a website or app, or over the telephone;
- (b) services for prepayments made in person by cash or credit card to purchase a physical token or unique code that must be entered into a prepayment device.

7A.1.4 Inconsistency

(a) If there is an inconsistency between substantive Chapter 7A and the schedules to this Chapter, substantive Chapter 7A prevails to the extent of the inconsistency.

(b) In this clause:

substantive Chapter 7A means this Chapter other than the schedules to this Chapter.

Note

To the extent that there is an inconsistency between the *Rules* and the *National Measurement Act*, the Act prevails to the extent of the inconsistency: see Rule 1.7.1A.

Part B Roles and Responsibilities

7A.2 Role and responsibility of financially responsible participant

(a) Before participating in a *market* in respect of a *connection point*, and for so long as the financially responsible participant continues to participate in a

market, the financially responsible participant for a *connection point* must ensure that:

- (1) a *Metering Coordinator* is appointed in respect of the *connection point* in accordance with Part C of this Chapter;
- (2) the *connection point* has a *metering installation* and information about the *metering installation* is provided to *NTESMO* for inclusion on the *metering register*, where this is required by clause 7A.10.1;
- (3) a *NMI* has been obtained with respect to the *connection point*; and
- (4) if information about the *metering installation* is required to be provided to *NTESMO* for inclusion on the *metering register* by clause 7A.10.1, the *NMI* is obtained prior to that information being provided to *NTESMO*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) *NTESMO* may refuse to permit a financially responsible participant to participate in a *market* in respect of a *connection point* used for the purposes of *settlements* if the financially responsible participant is not compliant with its obligation under paragraph (a) with respect to the *connection point*.
- (c) Where, following a request made by a financially responsible participant in accordance with clause 7A.6.14, the *metering installation* at a *connection point* is a prepayment device, the financially responsible participant is responsible for ensuring that an arrangement for vending services is in place.

7A.3 Role and responsibility of Metering Coordinator

7A.3.1 Responsibility of the Metering Coordinator

For the term of its appointment in respect of a *connection point*, the *Metering Coordinator* is the person responsible for:

- (a) the provision, installation and maintenance of a *metering installation* at the *connection point* in accordance with Part D of this Chapter;
- (b) the collection of *metering data* with respect to the *metering installation*, the processing of that data, the retention of that data in the *metering data services database* and the delivery of that data to the *metering database* and other persons in accordance with Part E of this Chapter; and
- (c) managing the security of and access to:
 - (1) the *metering installation*;
 - (2) services provided by the *metering installation*;
 - (3) *energy data* held in the *metering installation*; and
 - (4) *metering data* from the *metering installation*,in accordance with Part F of this Chapter.

7A.3.2 Role of the Metering Coordinator

Appointment of a Metering Provider

- (a) The *Metering Coordinator* at a *connection point*, other than a *connection point* with a type 7 *metering installation*, must appoint a person who is accredited to provide metering provision services in this jurisdiction to be the *Metering Provider* to provide metering provision services for the *connection point*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

Appointment of a Metering Data Provider

- (b) The *Metering Coordinator* at a *connection point* must appoint a person who is accredited to provide *metering data services* in this jurisdiction to be the *Metering Data Provider* to provide *metering data services* for the *connection point*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

Metering installations

- (c) The *Metering Coordinator* at a *connection point*, other than a *connection point* with a type 7 *metering installation*, must ensure that:
- (1) the *metering installation* is provided, installed and maintained in accordance with the *Rules*;
 - (2) the components, accuracy and testing of the *metering installation* comply with the requirements of the *Rules*;
 - (3) the security control of the *metering installation* is provided in accordance with rule 7A.13;
 - (4) if *remote acquisition* is used or is to be used – a *communications interface* is installed and maintained to facilitate connection to the *telecommunications network*;
 - (5) *NTESMO* is provided (when requested) with any information required for the purposes of Schedule 7A.1 for any new or replacement *metering installation* or any altered *metering installation*; and
 - (6) the *Metering Provider* it appoints for the *connection point* complies with the obligations imposed on *Metering Providers* by this Chapter.
- (d) A *Metering Coordinator* must not prevent, hinder or otherwise impede the *Local Network Service Provider* from locally accessing a *metering installation* or *connection point* for the purposes of *reconnecting* or *disconnecting* the *connection point*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

Metering data services

- (e) The *Metering Coordinator* at a *connection point* must:
- (1) ensure that the *Metering Data Provider* it appoints for the *connection point* complies with the obligations imposed on *Metering Data Providers* by this Chapter;
 - (2) ensure that *metering data services* are provided in accordance with the *Rules*; and
 - (3) arrange for the provision of relevant *metering data* to the *Metering Data Provider* if *remote acquisition*, if any, becomes unavailable.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

Access to type 4 metering installations

- (f) The *Metering Coordinator* at a *connection point* with a type 4 *metering installation*:
- (1) must ensure that access to the *metering installation*, the services provided by the *metering installation* and *energy data* held in the *metering installation* is only granted to persons entitled to access the *metering installation*, or the services provided by the *metering installation* or *energy data* held in the *metering installation*, in accordance with this Chapter;
 - (2) must not arrange a *disconnection* except:
 - (i) on the request of the financially responsible participant or *Local Network Service Provider*;
 - (ii) where the *disconnection* is effected via remote access; and
 - (iii) in accordance with *jurisdictional electricity legislation*;
 - (3) must not arrange a *reconnection* except:
 - (i) on the request of the financially responsible participant, *Local Network Service Provider* or incoming *retailer*;
 - (ii) where the *reconnection* is effected via remote access; and
 - (iii) in accordance with *jurisdictional electricity legislation*; and
 - (4) must not arrange a *retailer* planned interruption of the supply of electricity at the *metering installation* except:
 - (i) on the request of the *retailer*; and
 - (ii) in accordance with *jurisdictional electricity legislation*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.4 Qualification and requirements of Metering Providers and Metering Data Providers

7A.4.1 Qualification and requirements of Metering Providers

- (a) This clause applies in respect of the *1st regulatory control period*.

Note

The application of this clause in respect of subsequent *regulatory control periods* will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

- (b) A *Metering Provider* must have an ISO 9000 series quality system in place.
- (c) For a *connection point* in respect of which a type 1, 2 or 3 *metering installation* is installed, or is required to be installed under this Chapter:
- (1) the *Local Network Service Provider* is taken to be accredited to provide metering provision services in this jurisdiction (including the services mentioned in the schedules in respect of which a *Metering Provider* requires accreditation); and
 - (2) the *Metering Coordinator* at the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Provider* for the *connection point*.
- (d) For a *connection point* in respect of which a type 4, 4A, 5 or 6 *metering installation* is installed, or is required to be installed under this Chapter:
- (1) the *Local Network Service Provider* is taken to be accredited to provide metering provision services in this jurisdiction (including the services mentioned in the schedules in respect of which a *Metering Provider* requires accreditation); and
 - (2) the *Metering Coordinator* at the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Provider* for the *connection point*.
- (e) A *Metering Provider* may, in providing metering provision services under this Chapter, contract with another person to assist it in the provision of those services, provided that person meets all relevant safety and technical requirements in any *applicable regulatory instruments* or other relevant law.

7A.4.2 Qualification and requirements of Metering Data Providers

- (a) This clause applies in respect of the *1st regulatory control period*.

Note:

The application of this clause in respect of subsequent *regulatory control periods* will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

- (b) A *Metering Data Provider* must have an ISO 9000 series quality system in place.
- (c) For a *connection point* in respect of which a type 1, 2 or 3 *metering installation* is installed, or is required to be installed under this Chapter:

- (1) the *Local Network Service Provider* is taken to be accredited to provide *metering data services* in this jurisdiction (including the services mentioned in the schedules in respect of which a *Metering Data Provider* requires accreditation); and
 - (2) the *Metering Coordinator* at the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Data Provider* for the *connection point*.
- (d) For a *connection point* in respect of which a type 4, 4A, 5, 6 or 7 *metering installation* is installed, or is required to be installed under this Chapter:
- (1) the *Local Network Service Provider* is taken to be accredited to provide *metering data services* in this jurisdiction (including the services mentioned in the schedules in respect of which a *Metering Data Provider* requires accreditation); and
 - (2) the *Metering Coordinator* at the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Data Provider* for the *connection point*.
- (e) A *Metering Data Provider* may, in providing *metering data services* under this Chapter, contract with another person to assist it in the provision of those services, provided that person meets all relevant safety and technical requirements in any *applicable regulatory instrument* or other relevant law.

Part C Appointment of Metering Coordinator

7A.5 Appointment of Metering Coordinator

- (a) This rule applies in respect of the *1st regulatory control period*.

Note:

The application of this rule in respect of subsequent *regulatory control periods* will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

- (b) For a *connection point* in respect of which a type 1, 2 or 3 *metering installation* is installed, or is required to be installed under this Chapter, the financially responsible participant for the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Coordinator* for the *connection point*.
- (c) For a *connection point* in respect of which a type 4, 4A, 5 or 6 *metering installation* is installed, or is required to be installed under this Chapter, the financially responsible participant for the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Coordinator* for the *connection point*.
- (d) For a *connection point* with a type 7 *metering installation*, the financially responsible participant for the *connection point* is taken to have appointed the *Local Network Service Provider* as the *Metering Coordinator* for the *connection point*.

Part D Metering installation

7A.6 Metering installation arrangement

7A.6.1 Metering installation requirements

- (a) The *Metering Coordinator* at a *connection point* must ensure that there is a *metering installation* at that *connection point*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) The *Metering Coordinator* at a *connection point* must ensure that *energy data* held in the *metering installation* is based on units of watt-hour (*active energy*) and where required var-hour (*reactive energy*).
- (c) Installation and maintenance of a *metering installation* must be carried out in a safe manner, and only by a *Metering Provider* appointed under clause 7A.3.2.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.6.2 Metering installation components

- (a) A *Metering Provider* must, in accordance with the *Rules*, ensure that a *metering installation*, other than a type 7 *metering installation*:
- (1) contains a device that has either a visible or an equivalently accessible display of the cumulative total *energy* measured by that *metering installation* (at a minimum);

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (2) is accurate in accordance with clause 7A.6.6;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (3) in the case of a type 1, 2, 3 or 4 *metering installation*— has *electronic data transfer* facilities from the *metering installation* to the *metering data services database*;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (4) includes a *communications interface* to meet the requirements of clause 7A.3.2(c)(4);

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (5) is secure in accordance with rule 7A.9;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (6) records *energy data* in a manner that enables *metering data* to be collated in accordance with clause 7A.8.6;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (7) is capable of separately recording *energy data* for *energy* flows in each direction where bi-directional *active energy* flows occur or could occur;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (8) has a *measurement element* for *active energy* and, if required in accordance with schedule 7A.4, a *measurement element* for *reactive energy*, with both measurements to be recorded;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (9) includes facilities for storing *interval energy data* for a period of at least 35 *days* if the *metering installation* is a type 1, 2, 3 or 4 *metering installation*;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (10) includes facilities for storing *interval energy data* for a period of at least 200 *days* or such other period as specified in schedule 7A.7 if the *metering installation* is a type 4A or 5 *metering installation*;

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (11) in the case of a type 6 *metering installation*, includes facilities capable of continuously recording the total accumulated *energy* supplied

through it by a visible display in accordance with subparagraph (1), over a period of at least 12 months; and

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (12) is suitable for the range of operating conditions to which it will be exposed (for example temperature or impulse levels) and operates within the defined limits for its components.
- (b) A *metering installation* may consist of combinations of:
- (1) a *current transformer*;
 - (2) a *voltage transformer*;
 - (3) secure and protected wiring from the *current transformer* and the *voltage transformer* to the *meter*;
 - (4) *communications interface* equipment such as a modem, isolation requirements, telephone service, radio transmitter and data link equipment;
 - (5) auxiliary electricity supply to the *meter*;
 - (6) an alarm circuit and monitoring facility;
 - (7) a facility to keep the *metering installation* secure from interference;
 - (8) test links and fusing;
 - (9) summation equipment; and
 - (10) several *metering points* to derive the *metering data* for a *connection point*.
- (c) The *Local Network Service Provider* or financially responsible participant may, with the agreement of the *Metering Coordinator*(which agreement must not be unreasonably withheld), arrange for a *metering installation* to contain features which are in addition to, or which enhance, the features specified in paragraph (b).
- (d) The financially responsible participant for a *connection point* must:
- (1) apply to the *Local Network Service Provider* for a *NMI*; and
 - (2) provide the *Metering Coordinator* at the *connection point* with the *NMI* for the *metering installation* within 5 *business days* of receiving the *NMI* from the *Local Network Service Provider*.
- (e) The *Local Network Service Provider* must:
- (1) issue a unique *NMI* for each *metering installation* on its *network* to the financially responsible participant; and
 - (2) provide information about the *NMI* to *NTESMO*, where this is required for the purposes of clause 7A.10.1.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (f) The *Metering Coordinator* must ensure that *NTESMO* is provided with the relevant details of the *metering installation* as specified in Schedule 7A.1 within 10 *business days* of receiving the *NMI* under paragraph (d)(2), where this is required for the purposes of clause 7A.10.1.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (g) Where a *metering installation* is used for operational purposes in addition to metrological purposes, the *Metering Coordinator* must:
- (1) use reasonable endeavours to ensure that there will be no infringement of the requirements of the *Rules*; and
 - (2) co-ordinate with the persons who use the *metering installation* for such other purposes.

7A.6.3 Emergency management

Note

Emergency management will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

7A.6.4 Network devices

Note

Network devices will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

7A.6.5 Metering point

- (a) The *Metering Coordinator* at a *connection point* must ensure that:
- (1) the *metering point* is located as close as practicable to the *connection point*, but is in a position that allows safe and unimpeded access to the *metering installation* by the *Metering Provider*, *Metering Data Provider* and any other person required or permitted to have access to the *metering installation* under the *Rules* or any other law; and

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (2) any *instrument transformers* required for a *check metering installation* are located in a position that achieves a mathematical correlation with the *metering data*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) The financially responsible participant, the *Local Network Service Provider* and *NTESMO* must use their best endeavours to agree to adjust the *metering data* which is recorded in the *metering database* to allow for physical losses between the *metering point* and the relevant *connection point* where a *meter* is used to measure the flow of electricity in a power conductor.

7A.6.6 Metering installation types and accuracy

- (a) The type of *metering installation* and the accuracy requirements for a *metering installation* are to be determined in accordance with schedule 7A.4.

Note

This Chapter 7A makes provision for type 7 *metering installations* and imposes requirements on type 7 *metering installations*, including obligations about calculating *metering data*. Those obligations will only apply in this jurisdiction in the event of a type 7 *metering installation* being available in this jurisdiction and after a 12 month transitional period allowing all participants to achieve compliance.

- (b) A *check metering installation* is not required to have the degree of accuracy required of a *metering installation* but the *Metering Coordinator* must ensure that it has mathematical correlation with the *metering installation* and complies with the requirements of schedule 7A.4.
- (c) The *Metering Coordinator* at a *connection point* must ensure that the accuracy of a type 6 *metering installation* is in accordance with regulations issued under the *National Measurement Act* or, in the absence of any such regulations, with schedule 7A.7.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.6.7 Functionality requirements for type 1, 2, 3 and 4 metering installations

- (a) This clause applies in respect of a type 1, 2, 3 or 4 *metering installation*.
- (b) The *Metering Coordinator* at a *connection point* must ensure that the *metering installation* complies with the functionality requirements specified in schedule 7A.5.

7A.6.8 Meter churn

- (a) A *Metering Coordinator* may arrange to alter a type 5 or 6 *metering installation* to make it capable of *remote acquisition* if:
 - (1) the alteration is reasonably required to address operational difficulties;
or
 - (2) the *Metering Coordinator* is the *Local Network Service Provider* and the alteration is reasonably required to enable the *Local Network*

Service Provider to meet its obligations to provide a safe, reliable and secure *network*.

- (b) An alteration of a *metering installation* by a *Metering Coordinator* in accordance with paragraph (a) does not alter the classification of that installation to a type 4 or 4A *metering installation*.
- (c) For paragraph (a)(1), operational difficulties arise if the *metering installation* is difficult or unsafe to access because:
 - (1) it is on a remote property;
 - (2) it is within a secure facility;
 - (3) it is in close proximity to hazardous materials; or
 - (4) accessing or arranging access to it otherwise poses a risk to the safety and security of persons or property.

7A.6.9 Metering installation malfunctions

- (a) Unless an exemption is obtained by the *Metering Coordinator* from *NTESMO* under this clause 7A.6.9, the *Metering Coordinator* must, if a *metering installation malfunction* occurs in respect of a *connection point* with a type 1, 2 or 3 *metering installation*, cause repairs to be made to the *metering installation* as soon as practicable but no later than 2 *business days* after the *Metering Coordinator* had been notified of the *metering installation malfunction*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) Unless an exemption is obtained by the *Metering Coordinator* from *NTESMO* under this clause 7A.6.9, if a *metering installation malfunction* occurs, the *Metering Coordinator* must, in respect of a *connection point* with:
 - (1) a type 4 *metering installation*— cause repairs to be made to the *metering installation* as soon as practicable but no later than 10 *business days* after the *Metering Coordinator* has been notified of the *metering installation malfunction*; or
 - (2) a *metering installation* other than the installations mentioned in paragraph (a) or subparagraph (1) – cause repairs to be made to the *metering installation* as soon as practicable but no later than 10 *business days* after the *Metering Coordinator* has been notified of the *metering installation malfunction*.
- (c) *NTESMO* must establish, maintain and *publish* a procedure applicable to the provision of exemptions for the purposes of paragraphs (a) and (b).
- (d) If an exemption is provided by *NTESMO* under this clause 7A.6.9, then the *Metering Provider* must provide *NTESMO* with a plan for the rectification of the *metering installation*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (e) A *Registered Participant, Metering Provider* or *Metering Data Provider* who becomes aware of a *metering installation malfunction* that cannot be rectified within the applicable timeframes as specified in paragraphs (a) and (b) must notify the *Metering Coordinator* of the *metering installation malfunction* within 1 *business day*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.6.10 Timeframes for meters to be installed – new connection

- (a) Subject to paragraph (b), where a *new connection* is requested at a *retail customer's* premises, the relevant *retailer* must arrange a *meter* to be installed:
 - (1) by a date agreed with the *retail customer*; or
 - (2) failing agreement with the *retail customer*, on a date no later than 6 *business days* from the date the *retailer* is informed that the *connection service*(as defined in clause 5A.A.1) is complete.
- (b) The timeframe under paragraph (a)(1) or (2) (as applicable) will not apply where:
 - (1) the *retail customer* has not entered into an agreement with the *retailer* for the meter to be installed;
 - (2) the proposed site for the meter at the *retail customer's* premises is not accessible or safe or ready for the *meter* to be installed, or the *connection service* (as defined in clause 5A.A.1) has not been completed; or
 - (3) installing the *meter* requires interrupting supply to another *retail customer*.
- (c) Subject to the reapplication of paragraph (b), on and from the date that an exception under paragraph (b) ceases to apply, the *retailer* must arrange for the *meter* to be installed:
 - (1) by a new date agreed with the *retail customer*; or
 - (2) failing agreement, on a date no later than 5 *business days* from the date that the exception ceases to apply.
- (d) A *retailer* must inform its *retail customers* of its obligations under this clause.

7A.6.11 Timeframes for meters to be installed – where a connection service is not required

- (a) Subject to paragraph (b), if a *retail customer* has requested the *retailer* to install a *meter* at the customer's premises and a *connection service*(as

defined in clause 5A.A.1) is not required, the *retailer* must arrange for the *meter* to be installed:

- (1) by a date agreed with the *retail customer*; or
 - (2) failing agreement with the *retail customer*, on a date no later than 15 *business days* after the *retailer* received the request from the *retail customer* for the *meter* to be installed.
- (b) The timeframe under paragraph (a)(1) or (2) (as applicable) will not apply where:
- (1) the *retail customer* has not entered into an agreement with the *retailer* for the *meter* to be installed;
 - (2) the proposed site for the meter at the *retail customer's* premises is not accessible, safe, or ready for the *meter* to be installed; or
 - (3) installing the *meter* requires interrupting supply to another *retail customer*.
- (c) Subject to the reapplication of paragraph (b), on and from the date that an exception under paragraph (b) ceases to apply, the *retailer* must arrange for the *meter* to be installed:
- (1) by a new date agreed with the *retail customer*; or
 - (2) failing agreement, on a date no later than 15 *business days* from the date that the exception ceases to apply.
- (d) For the avoidance of doubt, the timeframes for *meters* to be installed under this rule 7A.6.11 do not apply for a *retailer* initiated installation of a *meter*, or for a *new connection*.
- (e) A *retailer* must inform its *retail customers* of its obligations under this clause.

7A.6.12 Timeframes for meters to be installed – where a connection alteration is required

- (a) Subject to paragraph (b), if a *retail customer* has requested a *meter* to be installed at the customer's premises and a *connection alteration* is also required:
- (1) the *retailer* must arrange for the *meter* to be installed:
 - (i) by a date agreed with the *retail customer* and the *Distribution Network Service Provider* where the *Distribution Network Service Provider* is providing the *connection alteration*; or
 - (ii) failing agreement, on a date no later than 15 *business days* after the *retailer* received the request from the *retail customer* for the *meter* to be installed; and
 - (2) where a *Distribution Network Service Provider* is providing the *connection alteration*, the *Distribution Network Service Provider* must co-ordinate the *connection alteration*, with the *retailer* and other relevant parties, in order to allow the *retailer* to comply with its obligation under subparagraph (1).

- (b) The timeframe under paragraph (a)(1) (i) or (ii) (as applicable) will not apply where:
 - (1) the *retail customer* has not entered into an agreement with the *retailer* for the *meter* to be installed;
 - (2) the proposed site for the meter at the *retail customer's* premises is not accessible, safe, or ready for the *meter* to be installed;
 - (3) installing the *meter* requires interrupting supply to another *retail customer*;
 - (4) the *retail customer* has not met the conditions that it is required to comply with under its *connection contract*; or
 - (5) *augmentation* is required for the purposes of the *connection alteration* and has not yet been completed.
- (c) Subject to the reapplication of paragraph (b), on and from the date that an exception under paragraph (b) ceases to apply:
 - (1) the *retailer* must arrange for the *meter* to be installed:
 - (i) by a new date agreed with the *retail customer* and the *Distribution Network Service Provider* where the *Distribution Network Service Provider* is providing the *connection alteration*; or
 - (ii) failing agreement, on a date no later than 15 *business days* from the date that the exception ceases to apply; and
 - (2) where a *Distribution Network Service Provider* is providing the *connection alteration*, it must co-ordinate the *connection alteration*, with the *retailer* and other relevant parties, in order to allow the *retailer* to meet its obligation under subparagraph (1).
- (d) If the *retailer* receives a request from a *retail customer* for a *meter* to be installed at the customer's premises where a *connection alteration* is also required, the *retailer* must inform the *Distribution Network Service Provider* of the request no later than the next *business day* after receiving the request.
- (e) For the avoidance of doubt, the timeframes for *meters* to be installed under this rule 7A.6.12 do not apply for a *retailer* initiated installation of a *meter*, or for a *new connection*.
- (f) A *retailer* must inform its *retail customers* of its obligations under this clause.

7A.6.13 Changing a metering installation

- (a) Subject to this clause, nothing in these *Rules* prevents the financially responsible participant (on its own behalf or, in the case of a *retailer*, on its own behalf or on behalf of a *retail customer*) or *Network Service Provider* in respect of a *connection point* from requesting the *Metering Coordinator* to arrange for:
 - (1) the alteration of the *metering installation* at that *connection point*; or

- (2) the installation of a new *metering installation* at that *connection point*.
- (b) The incremental costs of the alteration of the *metering installation* or the installation of the new *metering installation* must be borne by the person who requests the alteration of the *metering installation* or the installation of the new *metering installation*.
- (c) The *Metering Coordinator* at a *connection point* must ensure that changes to parameters or settings within a *metering installation* are:
 - (1) implemented by a *Metering Provider*; and

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (2) confirmed by the *Metering Coordinator* within 2 *business days* after the alteration has been made; and

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (3) reported to *NTESMO* where required to enable *NTESMO* to record the changes in the *metering register* in accordance with clause 7A.10.2.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.6.14 Prepayment metering

- (a) This clause applies if, in accordance with clause 7A.6.13, the financially responsible participant in respect of a *connection point* requests the *Metering Coordinator* to arrange for:
 - (1) the alteration of a *metering installation* so that it is a prepayment device; or
 - (2) the installation of a new *metering installation* that is a prepayment device.
- (b) The *Metering Coordinator* must ensure that the *Metering Provider*:
 - (1) alters the *metering installation* so that it is a prepayment device, if so requested; or
 - (2) installs a new *metering installation* that is a prepayment device, if so requested.

7A.7 Maintenance, inspection, testing and auditing of metering installations

7A.7.1 Maintenance

The *Metering Coordinator* for a *connection point* must ensure that any maintenance (including inspection and testing) of a *metering installation* at the

connection point is carried out in a safe manner by an appropriately qualified person.

7A.7.2 Responsibility for inspection and testing

- (a) The *Metering Coordinator* for a *connection point* must ensure that any inspection or testing of a *metering installation* at the *connection point* is carried out in a safe manner by an appropriately qualified person.
- (b) A person who arranges or carries out an inspection or testing of a *metering installation* under this clause must do so in accordance with:
 - (1) this clause; and
 - (2) the relevant inspection and testing requirements set out in schedule 7A.6.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (c) A *Registered Participant* may request that the *Metering Coordinator* make arrangements for the testing of a *metering installation* and, if the request is reasonable, the *Metering Coordinator*:
 - (1) must not refuse the request; and
 - (2) must make arrangements for the testing.
- (d) The *Registered Participant* who requested the testing under paragraph (c) may make a request to the *Metering Coordinator* to witness the tests.
- (e) The *Metering Coordinator* must not refuse a request received under paragraph (d) and must, no later than 5 *business days* prior to the testing, advise:
 - (1) the party making the request; and
 - (2) the financially responsible participant,of:
 - (3) the location and time of the tests; and
 - (4) the method of testing to be undertaken.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (f) If the *Metering Coordinator* has arranged testing of a *metering installation* under this clause and schedule 7A.6, the *Metering Coordinator* must:
 - (1) inform the financially responsible participant that testing has been undertaken in respect of the *metering installation* in accordance with this clause; and
 - (2) make the test results available in accordance with paragraphs (g) and (h).

- (g) If the test results mentioned in paragraph (f) indicate deviation from the technical requirements for the *metering installation*, the *Metering Coordinator* must ensure that the test results are provided as soon as practicable to the persons who receive the *metering data* for the *metering installation* under clause 7A.8.4.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (h) If the test results mentioned in paragraph (f) indicate compliance with the technical requirements for the *metering installation*, the *Metering Coordinator* must ensure that the test results are provided as soon as practicable:
- (1) in circumstances where the tests were requested by a *Registered Participant*, to the *Registered Participant* and persons who receive the *metering data* for the *metering installation* under clause 7A.8.4; or
 - (2) to a *Registered Participant* if requested by that *Registered Participant*, if the tests are not the result of a request for testing.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (i) The *Utilities Commission* may check the test results recorded in the *metering register* by arranging for audits of *metering installations* to satisfy itself and *NTESMO* that the accuracy of each *metering installation* complies with the requirements of this Chapter 7A.
- (j) The *Metering Coordinator* must store the test results in accordance with clause 7A.7.7 and provide a copy to the *Utilities Commission* on request or as part of an audit.
- (k) The cost of any testing under paragraph (c) must be borne by:
- (1) if paragraph (g) applies – the *Metering Coordinator*; or
 - (2) otherwise – the *Registered Participant* who requested the test.

7A.7.3 Actions in event of non-compliance

- (a) If the accuracy of the *metering installation* does not comply with the requirements of the *Rules*, the *Metering Coordinator* must:
- (1) advise *NTESMO* as soon as practicable of the errors detected and the possible duration of the existence of the errors;
 - (2) arrange for the accuracy of the *metering installation* to be restored within:
 - (i) 10 *business days*; or
 - (ii) if a timeframe is agreed with the financially responsible participant, in that timeframe; and

- (3) correct the *metering data* and provide the corrected *metering data* to *NTESMO*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) *NTESMO* may make appropriate corrections to the *metering data* to take account of errors referred to it under paragraph (a) for the purposes of *settlements*.

7A.7.4 Audits of information held in metering installations

- (a) The *Utilities Commission* is responsible for auditing *metering installations*.
- (b) A *Registered Participant* or *NTESMO* may request the *Utilities Commission* to conduct an audit to determine the consistency between the data held in the *metering database* and the data held in the relevant *metering installation*.
- (c) If there are inconsistencies between data held in a *metering installation* and data held in the *metering database*, the *Metering Coordinator* and *Registered Participants* with a financial interest in the *metering installation* or the *energy* measured by the *metering installation* must liaise together to determine the most appropriate way to resolve the discrepancy.
- (d) If there are inconsistencies between data held in a *metering installation* and data held in the *metering database*, the data held in the *metering installation* is to be taken as *prima facie* evidence of the *connection point's energy data*, except if the *meter* or components of the *metering installation* are found to be non-compliant with the *Rules*.
- (e) The cost of any audit conducted under paragraph (b) will be borne by:
 - (1) if paragraph (c) applies, the *Metering Coordinator*; or
 - (2) otherwise, the *Registered Participant* who requested the audit or *NTESMO*, as the case may be.

7A.7.5 Appointment of external auditor

- (a) The *Utilities Commission* may, upon reasonable notice to the *Metering Coordinator*, appoint an independent auditor to audit *metering installations* to confirm compliance with the *Rules*.
- (b) If the *Utilities Commission* appoints an independent auditor under paragraph (a):
 - (1) the *Utilities Commission* will nominate the standards and requirements and the auditor will report in accordance with those standards and requirements; and
 - (2) the *Metering Coordinator* must cooperate with any reasonable requests made by the independent auditor in undertaking the audit.
- (c) The *Utilities Commission* will provide a copy of the auditor's report to:
 - (1) the *Metering Coordinator*;

- (2) *NTESMO*; and
- (3) the relevant financially responsible participant, as soon as reasonably possible after it has been completed.
- (d) The *Metering Coordinator* must ensure that the *Utilities Commission* (or its agents) have unrestricted access to *metering installations* for the purpose of carrying out external audits provided that the *Utilities Commission* agrees to comply with the *Metering Coordinator's* reasonable security and safety requirements and has first given the *Metering Coordinator* at least 2 *business days* notice of its intention to carry out an audit.
- (e) A notice under paragraph (d) must include:
 - (1) the name of the representative who will be conducting the audit on behalf of the *Utilities Commission*; and
 - (2) the time when the audit will commence and the expected time when the audit will conclude.
- (f) The *Metering Coordinator* will be responsible for the costs of undertaking the audit.

7A.7.6 Errors found in metering tests, inspections or audits

- (a) Subject to paragraph (c), if a *metering installation* test, inspection or audit, carried out in accordance with this rule, demonstrates errors in excess of those prescribed in schedule 7A.4, the *Metering Coordinator* must ensure the *metering data* is substituted in accordance with this clause and clause 7A.8.1 as appropriate.
- (b) If the *Metering Coordinator* is not aware of the time at which the error arose:
 - (1) the error is taken to have occurred at a time halfway between the time of the most recent test or inspection which demonstrated that the *metering installation* complied with the relevant accuracy requirement and the time when the error was detected; and
 - (2) the time that the error was taken to occur is to be used by the *Metering Data Provider* in performing substitution of the *metering data*.
- (c) If a test of a *metering installation* demonstrates an error of measurement of less than 1.5 times the error permitted by schedule 7A.4, no substitution of readings is required.
- (d) The *Metering Coordinator* must arrange for a suitable substitution of the incorrect *metering data* to be undertaken in accordance with the substitution requirements of schedule 7A.7.

7A.7.7 Retention of test records and documents

- (a) All records and documentation of tests prepared under or for this Chapter must be retained in accordance with this clause.
- (b) The *Metering Coordinator* must ensure records and documentation are retained as follows:
 - (1) for a period of at least 7 years:

- (i) sample testing of *meters* while the *meters* of the relevant style remain in service;
 - (ii) the most recent sample test results of the *meters* mentioned in subparagraph (i) after the *meters* are no longer in service;
 - (iii) non-sample testing of *meters* while the *meters* remain in service;
 - (iv) the most recent non-sample test results after the *meters* are no longer in service;
 - (v) the most recent sample test results of *instrument transformers* after *instrument transformers* of the relevant type are no longer in service;
 - (vi) the most recent non-sample test results of *instrument transformers* after they are no longer in service;
 - (vii) tests of new *metering* equipment of the relevant style while the equipment remains in service; and
 - (viii) tests of new *metering* equipment of the relevant style after the equipment is no longer in service;
- (2) for a period of at least 10 years:
- (i) sample testing of *instrument transformers* while *instrument transformers* of the relevant type remain in service; and
 - (ii) non-sample testing of *instrument transformers* while the *instrument transformers* remain in service.
- (c) In addition, the *Metering Coordinator* must ensure records of type tests and pattern approvals carried out or obtained in accordance with clause S7A.4.5.1(f) are retained while *metering* equipment of the relevant type remains in service and for at least 7 years after it is no longer in service.

Part E Metering data

7A.8 Metering data services

7A.8.1 Metering data services

- (a) *Metering Data Providers* must provide *metering data services*, including the following, in accordance with the *Rules*:
- (1) collecting *energy data* by local access or *remote acquisition*;
 - (2) the validation and substitution of *metering data* for types 1, 2, 3 and 4 *metering installations*;
 - (3) the validation, substitution and estimation of *metering data* for types 4A, 5 and 6 *metering installations*;
 - (4) the calculation, estimation and substitution of *metering data* for type 7 *metering installations*;
 - (5) establishing and maintaining a *metering data services database* associated with each *metering installation* and providing access to the *metering data services database* in accordance with clause 7A.8.3;

- (6) the delivery of *metering data* and relevant *NT NMI Data* for a *metering installation* in accordance with clause 7A.8.4;
 - (7) the delivery to *NTESMO* of the following for *settlements*:
 - (i) *metering data*;
 - (ii) any *metering register* data requested by *NTESMO*;
 - (8) the delivery to relevant financially responsible participants of *metering data* for *billing transactions*;
 - (9) ensuring the *metering data* and other data associated with the *metering installation* is kept secure and disclosed only in accordance with the *Rules*;
 - (10) maintaining the standard of accuracy of the time setting of the *metering installation* in accordance with clause 7A.8.8;
 - (11) notifying the *Metering Coordinator* of any *metering installation malfunction* in accordance with clause 7A.6.9;
 - (12) management and storage of *metering data* in accordance with clause 7A.8.3; and
 - (13) in respect of a *metering installation* that is a prepayment device, subject to paragraph (b), services required to support the energisation and de-energisation of the *metering installation*.
- (b) *Metering Data Providers* are not responsible:
- (1) for the provision of a prepayment device; or
 - (2) in relation to a *metering installation* that is a prepayment device, unless there is an agreement with the financially responsible participant to the contrary, for the provision of vending services.

Note

The installation of prepayment devices is dealt with in clause 7A.6.14.

The provision of vending services for prepayment devices is dealt with in rule 7A.2.

- (c) *Metering Data Providers* may provide additional data services that exceed the minimum requirements of the *Rules* at the request of a relevant financially responsible participant provided that:
- (1) the full cost of providing such additional data services is met by the financially responsible participant; and
 - (2) the provision of additional data services does not affect the provision of *metering data services*.

Note

For example, vending services for a prepayment device could be an additional service, if the financially responsible participant arranges for them to be provided by the Metering Data Provider, noting that in accordance with clause 7A.2(c) the financially responsible participant is responsible for ensuring that an arrangement for vending services is in place.

7A.8.2 Collection of energy data and estimation of metering data

- (a) A *Metering Data Provider* must, in accordance with this rule, collect *energy data* from, and estimate *metering data* in respect of, a *metering installation*

at a *connection point* for which it has been appointed the *Metering Data Provider*.

Scheduled meter reading

- (b) The *Metering Data Provider* must use reasonable endeavours to ensure that *energy data* is collected from a *metering installation* by way of an actual meter reading at least once every 3 months or, where a greater frequency has been agreed with a financially responsible participant, at that greater frequency.
- (c) Despite paragraph (b), the *Metering Data Provider* must ensure that *energy data* is collected from a *metering installation* by way of an actual meter reading at least once every 12 months.

Special meter reading

- (d) The *Metering Data Provider* must perform a special meter reading (including a final *meter* reading) at the request of a financially responsible participant.
- (e) The *Metering Data Provider* may charge the financially responsible participant or *retail customer*(as the case may be) for the collection of *energy data* under paragraph (d) to the extent that its costs of collection are higher than they would otherwise be.

Estimated metering data

- (f) When *energy data* is not collected by the *Metering Data Provider* from a *metering installation* by way of an actual meter reading at the applicable *meter* reading frequency under paragraph (b), the *Metering Data Provider* must estimate *metering data* for that *metering installation* in accordance with schedule 7A.7.
- (g) *Estimated metering data* for the purposes of paragraph (f) must be provided to the *retailer* within 10 *business days* of the scheduled meter reading date under paragraph (b).

Altering energy data

- (h) The *energy data* in a *metering installation* must not be altered except when the *metering installation* is reset to zero as part of a repair or reprogramming.

7A.8.3 Data management and storage

- (a) A *Metering Data Provider* must:
 - (1) retain *metering data* for all relevant *metering installations* in the *metering data services database*:
 - (i) in electronic format for at least 13 months; and
 - (ii) following the retention under subparagraph (i), in an accessible format for at least 7 years;
 - (2) archive, in an accessible format, for at least 7 years:

- (i) *metering data* in its original form as collected from the *metering installation*; and
 - (ii) records of each substitution to *metering data* in respect of a *metering installation*;
- (3) enable the persons mentioned in clause 7A.13.5(c)(1) to (6) to access or receive the *metering data* and *NT NMI data* in the *metering data services database*; and

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (4) except for the persons mentioned in clause 7A.13.3(c)(1) to (6), ensure that no person has access to the *metering data services database*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) A *Metering Data Provider* must maintain *electronic data transfer* facilities in order to deliver *metering data* from the *metering data services database* in accordance with schedule 7A.8 and clause 7A.8.4.
- (c) *Check metering data*, where available, and appropriately adjusted for differences in *metering installation* accuracy, where applicable, must be used by the *Metering Data Provider* to validate *metering data*.
- (d) If the *Metering Data Provider* becomes aware that the *metering data* that has been delivered into the *metering database* from a *metering data services database* is incorrect, then the *Metering Data Provider* must provide corrected *metering data* to the financially responsible participant and *NTESMO* within 1 *business day* of detection.
- (e) *Metering data* may only be altered by a *Metering Data Provider*, except in the preparation of *settlements ready data*, in which case *NTESMO* may alter the *metering data* in accordance with clause 7A.9.2(c).
- (f) A *Metering Data Provider* may only alter *metering data* in the *metering data services database* in accordance with schedule 7A.7.
- (g) A *Metering Data Provider* must arrange with the *Metering Coordinator* to obtain the relevant *metering data* if *remote acquisition*, if any, becomes unavailable.
- (h) A *Metering Data Provider's* rules and protocols for supplying *metering data services* must be approved by *NTESMO* and *NTESMO* must not unreasonably withhold such approval.

7A.8.4 Provision of metering data to certain persons

A *Metering Data Provider* must give *metering data* and relevant *NT NMI data* to the persons mentioned in clause 7A.13.5(c)(1) to (6) and clause 9A.13.5(g)(1) as required by, and in accordance with, the *Rules*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.8.5 Use of check metering data

Check metering data, if available and if it has been appropriately adjusted for differences in *metering installation* accuracy, must be used by *Metering Data Providers* or *NTESMO*, as the case may be, for:

- (a) validation;
- (b) substitution; and
- (c) estimation,

of *metering data* as required by clause 7A.8.1.

7A.8.6 Periodic energy metering

(a) Subject to paragraph (b), a *Metering Data Provider* must:

(1) for type 1, 2, 3, 4, 4A and 5 *metering installations*, collate *metering data* relating to:

- (i) the amount of *active energy*; and
- (ii) *reactive energy* (where relevant) passing through a *connection point*,

in *recording intervals* within a *metering data services database*; and

(2) for type 6 *metering installations*, collate *accumulated energy data* relating to an interval of up to 3 months.

(b) However:

(1) in relation to paragraph (a)(1):

- (i) for local electricity systems with a *market* administered by *NTESMO*– it may be agreed between *NTESMO* and the financially responsible participant that *metering data* may be recorded in sub-multiples of a *recording interval* where a *metering installation* is used for the purposes of *settlements*; and
- (ii) for local electricity systems without a *market* administered by *NTESMO* – it may be agreed between the *Metering Coordinator* and the financially responsible participant that *metering data* may be recorded in sub-multiples of a *recording interval* where a *metering installation* is used for the purposes of *billing transactions*; and

(2) in relation to paragraph (a)(2):

- (i) for local electricity systems with a *market* administered by *NTESMO*– it may be agreed between *NTESMO* and the financially responsible participant that some other period will apply either on an ongoing basis or once-off basis; and
- (ii) for local electricity systems without a *market* administered by *NTESMO* – it may be agreed between the *Metering Coordinator*

and the financially responsible participant that some other period will apply either on an ongoing basis or once-off basis.

- (c) A *Metering Data Provider* must, for type 7 *metering installations*, prepare *estimated metering data* relating to the amount of *active energy* passing through a *connection point* in accordance with clause 7A.8.1(a)(4) in 3 months or, where a greater frequency has been agreed with a financially responsible participant, at that greater frequency within a *metering data services database*.

7A.8.7 Verification of metering data Metering installations other than type 7 metering installations

- (a) A *Metering Data Provider* responsible for a *metering installation*, other than a type 7 *metering installation*, must ensure that the *metering data* collected from the installation is validated in accordance with schedule 7A.7.
- (b) If validation under paragraph (a) demonstrates that there has been a failure of the *metering installation* or that a measurement error exists:
 - (1) the *metering data* must be substituted in accordance with schedule 7A.7;
 - (2) the *Metering Data Provider* must provide the quality flag of the *substituted metering data* to the financially responsible participant for its record in accordance with clause S7A.7.8.4; and
 - (3) for *connection points* associated with a *retail customer*– the *Metering Data Provider* must provide the *substituted metering data* to the *retailer* so that the *retailer* can meet its billing obligations.
- (c) The *Metering Data Provider*:
 - (1) must make a separate record of any substitution made under this clause, including:
 - (i) the reasons for the substitution;
 - (ii) the methodology used for the substitution; and
 - (iii) the *substituted metering data*; and
 - (2) must maintain the record for at least 7 years and provide access to the record at reasonable times to the relevant financially responsible participant or *retail customer*(as the case may be).

Type 7 metering installations

Note

Obligations relating to type 7 metering installations, including requirements for calculating metering data under this clause, will only apply in this jurisdiction in the event of a type 7 metering installation being available in this jurisdiction and after a 12 month transitional period allowing all participants to achieve compliance.

- (d) A *Metering Data Provider* responsible for a type 7 *metering installation* must ensure that the *metering data* for that installation:

- (1) is calculated in accordance with the *Network Service Provider's* applicable procedure, which must be based on a methodology in, or otherwise be consistent with, schedule 7A.7; and
 - (2) is validated in accordance with schedule 7A.7.
- (e) If validation under paragraph (d)(2) demonstrates that there has been a failure of the *metering installation* or that a measurement error exists, the *Metering Data Provider* must ensure the *metering data* is substituted in accordance with schedule 7A.7.

7A.8.8 Time settings

- (a) The *Metering Provider* must set the times of clocks of all *metering installations* with reference to *Australian Central Standard Time* to a standard of accuracy in accordance with schedule 7A.4 relevant to the *load* through the *connection point* when installing, testing and maintaining *metering installations*.
- (b) *NTESMO* must ensure that the *metering database* clock is maintained within ± 1 second of *Australian Central Standard Time*.
- (c) The *Metering Data Provider* must ensure that the *metering data services database* clock is maintained within ± 1 second of *Australian Central Standard Time*.
- (d) The *Metering Data Provider* must:
 - (1) check the accuracy of the clock of the *metering installation* with reference to *Australian Central Standard Time* to a standard of accuracy in accordance with schedule 7A.4 relevant to the *load* through the *connection point* on each occasion that the *metering installation* is accessed;
 - (2) reset the clock of the *metering installation* so that it is maintained to the required standard of accuracy in accordance with schedule 7A.4 relevant to the *load* through the *connection point* if the clock error of a *metering installation* does not conform to the required standard of accuracy on any occasion that the *metering installation* is accessed; and
 - (3) notify the *Metering Provider* if the *Metering Data Provider* is unable to reset the clock of the *metering installation* in accordance with subparagraph (2).

7A.8.9 Metering data performance standards

- (a) Where required for the purposes of *settlements*, the *Metering Coordinator* must ensure that *metering data* is provided to *NTESMO* for all *recording intervals* where the *metering installation* has the capability for *remote acquisition* of *metering data*, and that the data is:
 - (1) derived from a *metering installation* compliant with clause 7A.6.5(a);
 - (2) provided within the timeframe for *settlements* required in accordance with *jurisdictional electricity legislation*;
 - (3) actual or substituted in accordance with schedule 7A.7; and

- (4) provided in accordance with the performance standards specified in schedule 7A.7.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) Where:

- (1) the *metering installation* is a type 4A *metering installation*, or does not have the capability for *remote acquisition* of *metering data*; and
- (2) *metering data* is required for the purposes of *settlements*,
the *Metering Coordinator* must ensure that *metering data* is provided to *NTESMO* and that the data is:
 - (3) derived from a *metering installation* compliant with clause 7A.6.5(a);
 - (4) provided within the timeframe required for *settlements* in accordance with *jurisdictional electricity legislation*;
 - (5) actual, substituted or estimated in accordance with schedule 7A.7; and
 - (6) provided in accordance with the performance standards specified in schedule 7A.7.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (c) The *Metering Coordinator* must ensure that, for all *metering installations* used for *billing transactions*, *metering data* is provided to the financially responsible participant for all *recording intervals* where the *metering installation* has the capability for *remote acquisition* of *metering data*, and that the data is:
 - (1) derived from a *metering installation* compliant with clause 7A.6.5(a);
 - (2) provided to the financially responsible participant every 35 days for *billing transactions* unless it has been agreed between the *Metering Coordinator* and the financially responsible participant that some other timeframe will apply;
 - (3) actual or substituted in accordance with schedule 7A.7; and
 - (4) provided in accordance with the performance standards specified in schedule 7A.7.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (d) For type 6 *metering installations*, *metering data* relating to the amount of *active energy* passing through a *connection point* must be provided to the financially responsible participant:
 - (1) every 3 months; or

- (2) where a greater frequency has been agreed with the financially responsible participant – at that greater frequency.

7A.9 Metering data and data base

7A.9.1 Metering database

- (a) *NTESMO* must create, maintain and administer a *metering database* (either directly or under a contract for provision of the database) containing information for each *metering installation* registered with *NTESMO*.
- (b) The *metering database* must include *metering data*, *settlements ready data*, and information for each *metering installation* registered with *NTESMO* in accordance with this rule 7A.9.
- (c) *NTESMO*:
 - (1) must enable the persons referred to in clause 7A.13.5(c)(1) to (4) and clause 7A.13.5(f)(1) to access or receive data in the *metering database*; and
 - (2) except as specified in subparagraph (1), must ensure that no other person has access to the *metering database*.
- (d) For all types of *metering installations*, the *metering database* must contain *metering data* that is:
 - (1) retained in an electronic format for at least 13 months; and
 - (2) following the retention under subparagraph (1), archived in an accessible format for an overall period of not less than 7 years.
- (e) The *settlements ready data* held in the *metering data base* must be used by *NTESMO* for *settlement purposes*.
- (f) The *settlements ready data* held in the *metering database* may be used by *Distribution Network Service Providers* for the purpose of determining *distribution service charges* in accordance with clause 6.20.1.
- (g) *NTESMO* must retain *settlements ready data* for all *metering installations* for at least 7 years.
- (h) Despite anything to the contrary in this *Rule*, *NTESMO* may provide the *energy ombudsman* with *metering data* relating to a *Registered Participant* from a *metering installation*, the *metering database*, or the *metering register*, if the *energy ombudsman* has received a complaint to which the data is relevant from a *retail customer* of the *Registered Participant*.
- (i) *NTESMO* must notify the relevant *Registered Participant* of any information requested by the *energy ombudsman* under paragraph (h) and, if it is requested by that *Registered Participant*, supply the *Registered Participant* with a copy of any information provided to the *energy ombudsman*.

7A.9.2 Data validation, substitution and estimation

- (a) If *NTESMO* in the preparation of *settlements ready data* detects *metering data* that fails validation *NTESMO* must notify the *Metering Data Provider* within 1 *business day* of detection.
- (b) Where a *Metering Data Provider* receives notification under paragraph (a), the *Metering Data Provider* must use its best endeavours to provide corrected *metering data* to *NTESMO* within 1 *business day* or advise *NTESMO* that this time limit cannot be achieved, and the reason for delay, in which case the parties must agree on a revised time limit by which the corrected *metering data* will be provided.
- (c) Where *metering data* fails validation by *NTESMO* in the preparation of *settlements ready data* and replacement *metering data* is not available within the time required for *settlements* then *NTESMO* must prepare a substitute value in accordance with schedule S7A.7.

7A.9.3 Changes to energy data or to metering data

- (a) The *Metering Coordinator* must ensure that *energy data* held in a *metering installation* is not altered except when the *meter* is reset to zero as part of a repair or reprogramming.
- (b) If an on-site test of a *metering installation* requires the injection of current, the *Metering Coordinator* must ensure that:
 - (1) the *energy data* stored in the *metering installation* is inspected;
 - (2) if necessary following the inspection under subparagraph (1), alterations are made to the *metering data*, to ensure that the *metering data* in the *metering data services database* and the *metering database* is not materially different from the *energy* consumed at that *connection point* during the period of the test.
- (c) If a *Metering Coordinator* considers alterations are necessary under paragraph (b)(2), the *Metering Coordinator* must:
 - (1) for local electricity systems with a *market* operated by *NTESMO*, notify *NTESMO* that alteration to the *metering data* is necessary; and
 - (2) advise the financially responsible participant of the need to change the *metering data*, and the *Metering Coordinator* must arrange for the *Metering Data Provider* to:
 - (i) alter the *metering data* for the *connection point* held in the *metering data services database* in accordance with the validation, substitution and estimation procedures in schedule 7A.7; and
 - (ii) provide the altered *metering data* to the persons who receive that *metering data* under clause 7.13.5(c).
- (d) If a test referred to in paragraph (b) is based on actual *connection point loads*, no alteration is required.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.10 Register of metering information

7A.10.1 Metering register

- (a) As part of the *metering database*, *NTESMO* must maintain a *metering register* of all *metering installations* and *check metering installations* which provide *metering data* for *settlements*.
- (b) The *metering register* referred to in paragraph (a) must contain the information specified in Schedule 7A.1.

7A.10.2 Metering installation registration process

- (a) For the purpose of maintaining the *metering register*, *NTESMO* must establish, maintain and publish a registration process in respect to the following (where *metering data* provided is used for *settlements*):
 - (1) new *metering installations*;
 - (2) modifications to existing *metering installations*; and
 - (3) decommissioning of *metering installations*.
- (b) For the *1st regulatory control period*, if information about a *metering installation* is included in the *metering register*, then the metering installation is to be, taken, for the purposes of this Chapter 7A, to be registered with *NTESMO*.

7A.10.3 Metering register discrepancy

- (a) If the information in the *metering register* indicates that the *metering installation* or the *check metering installation* does not comply with the requirements of the *Rules*, *NTESMO* must advise affected *Registered Participants* of the discrepancy.
- (b) The *Metering Coordinator* must arrange for the discrepancy to be corrected within 2 *business days* of receipt of notification under paragraph (a) unless otherwise agreed by *NTESMO*.

Discrepancies between database and other data

- (c) If there is a discrepancy between *energy data* held in a *metering installation* and *data* held in the *metering database*:
 - (1) the affected *Metering Coordinator* and *NTESMO* must liaise together to determine the most appropriate way to resolve the discrepancy; and
 - (2) for the purposes of this Chapter the *energy data* for the *metering point* in the *metering installation* is to be taken to be correct, unless it is proven to be incorrect.
- (d) If there is a discrepancy between information held in a *metering register* and the same category of information in any other database, then for the

purposes of this Chapter the information recorded in the *metering register* is to be taken to be correct, unless it is proven to be incorrect.

Metering Coordinators must keep the registry accurate

- (e) If a *Metering Coordinator* becomes aware of a change to, or an inaccuracy in, information in the *metering register*, then it must as soon as practicable and no later than 2 *business days* after the *day* it becomes aware of the change or inaccuracy notify *NTESMO* and provide details of the change to, or inaccuracy in, the information.

NTESMO may amend metering register

- (f) If *NTESMO* is notified of an inaccuracy in information by a *Metering Coordinator* or other *Registered Participant* in relation to the *connection point* it is financially responsible for, *NTESMO* must undertake investigations to the standard of good industry practice to determine whether the *metering register* should be updated.
- (g) If *NTESMO* determines that the *metering register* should be updated as a result of an investigation conducted in accordance with paragraph (a), *NTESMO* must update the *registry* to reflect the change to, or correct the inaccuracy in, the information.
- (h) If information for a *connection point* is updated in the *metering register*, *NTESMO* must, within 2 *business days* after the update, notify the update to:
 - (1) the financially responsible participant; and
 - (2) if the financially responsible participant is a *retailer* and there was a change in *retailer*, the previous *retailer* where that updated information relates to a period or periods when the previous *retailer* was the *retailer* for that *connection point*.

Note

In paragraph (h)(2), references to “previous *retailer*” means a *retailer* who was previously recorded in the *metering register* as the financially responsible participant for the *connection point* referred to in paragraph (h).

7A.11 Disclosure of information

7A.11.1 Provision of data to retailers

NMI and NMI checksum

- (a) A *Distribution Network Service Provider* must, at the request of a *retailer*, and within 1 *business day* of the date of the request, provide the *retailer* with the *NMI* and *NMI* checksum for premises identified in the request by reference to:
 - (1) a unique meter identifier held by the *Distribution Network Service Provider*;
 - (2) a street address; or
 - (3) the code used by Australia Post to provide a unique identifier for postal addresses.

- (b) If a computer search by the *Distribution Network Service Provider* does not produce a unique match for the information provided by the *retailer*, the *Distribution Network Service Provider* must provide the *retailer* with any computer matches achieved up to a maximum of 99.

NT NMI Data

- (c) A *Distribution Network Service Provider* must, at the request of a *retailer*, and within 2 *business days* of the date of the request, provide the *retailer* with the *NT NMI Data* for premises identified in the request by reference to the *NMI* for the premises.

7A.12 Metering data provision to *retail customers*

Note

The application of this rule will be revisited as part of the phased implementation of the *Rules* in this jurisdiction.

Part F Security of metering installations and energy data

7A.13 Security of metering installations, energy data and metering data

7A.13.1 Confidentiality of data

- (a) *Energy data, metering data, NT NMI data*, information in the *metering register* and passwords are confidential and must be treated as *confidential information* in accordance with the *Rules*.
- (b) For the purposes of clause 8.6.2(c), *metering data* from a *metering installation* at a *retail customer's connection point* is deemed to have been provided by the *retail customer*.

7A.13.2 Security of metering installations

General security

- (a) The *Metering Coordinator* at a *connection point* must ensure that the *metering installation* is secure and that associated links, circuits and information storage and processing systems are protected by appropriate security mechanisms.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) In respect of a *connection point* used for *settlements*, *NTESMO* may override any of the security mechanisms fitted to a *metering installation* with prior notice to the *Metering Coordinator*.

Broken seals

- (c) If a *Network Service Provider*, financially responsible participant, *Metering Provider* or *Metering Data Provider* becomes aware that a seal protecting

metering equipment has been broken, it must notify the *Metering Coordinator* within 5 *business days*.

- (d) If a broken seal has not been replaced by the person who notified the *Metering Coordinator* under paragraph (c), the *Metering Coordinator* must ensure that the broken seal is replaced no later than:
 - (1) the first occasion on which the metering equipment is visited to take a reading; or
 - (2) 100 days,
after receipt of notification that the seal has been broken.
- (e) The costs of replacing broken seals as required by paragraph (d) are to be borne by:
 - (1) the financially responsible participant if the seal was broken by a *retail customer* of the financially responsible participant;
 - (2) a *Registered Participant* if the seal was broken by the *Registered Participant*;
 - (3) the *Metering Provider* if the seal was broken by the *Metering Provider*;
 - (4) the *Metering Data Provider* if the seal was broken by the *Metering Data Provider*; or
 - (5) otherwise by the *Metering Coordinator*.
- (f) If it appears that, as a result of, or in connection with, the breaking of a seal mentioned in paragraph (c) the relevant *metering* equipment may no longer meet the relevant minimum standard, the *Metering Coordinator* must ensure that the *metering* equipment is tested in accordance with clause 7A.7.2.

7A.13.3 Security controls for energy data

- (a) The *Metering Coordinator* at a *connection point* must ensure that *energy data* held in the *metering installation* is protected from local access and remote access by suitable password and security controls.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (b) The *Metering Provider* must keep records of passwords secure.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

- (c) The *Metering Provider* must allocate suitable passwords to the *Metering Data Provider* to enable the *Metering Data Provider* to collect the *energy data* and maintain the clock of the *metering installation* in accordance with clause 7A.8.7.

- (d) The *Metering Data Provider* must keep all *metering installation* passwords secure and not make the passwords available to any other person.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.13.4 Additional security controls for type 4 metering installations

In respect of a type 4 *metering installation*:

- (a) the *Metering Coordinator* must ensure that access to *energy data* held in the *metering installation* is given only:
- (1) to a person who is permitted to have access to it under the *Rules*; and
 - (2) for a purpose that is permitted under the *Rules*;
- (b) the *Metering Coordinator* must ensure that access to services provided by the *metering installation* and *metering data* from the *metering installation* is given only:
- (1) in respect of:
 - (i) a remote *disconnection* service and the *metering data* in connection with that service – to the *Local Network Service Provider* and the financially responsible participant;
 - (ii) a remote *reconnection* service and the *metering data* in connection with that service – to the *Local Network Service Provider*, the financially responsible participant and the incoming *retailer*;
 - (iii) a remote on-demand *meter* reading service and the *metering data* in connection with that service – to *Registered Participants* with a financial interest in the *metering installation* or the *energy* measured by that *metering installation* and a person to whom a *retail customer* has given its consent under subparagraph (3)(ii);
 - (iv) a remote scheduled *meter* reading service and the *metering data* in connection with that service – to *Registered Participants* with a financial interest in the *metering installation* or the *energy* measured by that *metering installation* and a person to whom a *retail customer* has given its consent under subparagraph (3)(ii);
 - (v) a *metering installation* inquiry service and the *metering data* in connection with that service – to the *Local Network Service Provider*, the financially responsible participant and a person to whom a *retail customer* has given its consent under subparagraph (3)(ii); and
 - (vi) an advanced *meter* reconfiguration service and the *metering data* in connection with that service – to the *Local Network Service Provider* and the financially responsible participant;
 - (2) to a person who is permitted to have access to it under the *Rules* and for a purpose that is permitted under the *Rules*; or

- (3) except as otherwise specified in subparagraph (1) or (2):
 - (i) to the *Local Network Service Provider*, but only to the extent that, in the *Metering Coordinator's* reasonable opinion, the access is reasonably required by the *Local Network Service Provider* to enable it to meet its obligations to provide a safe, reliable and secure *network*; or
 - (ii) to a person and for a purpose to which the *retail customer* has given prior consent;
- (c) the *Metering Coordinator* must ensure that the services provided by the *metering installation* are protected from local access and remote access by suitable password and security controls in accordance with paragraph (e);
- (d) the *Metering Provider* must keep records of passwords secure; and
- (e) the *Metering Provider* must:
 - (1) forward a copy of a password allowing local access and a copy of a password allowing remote access to the *metering installation*, services provided by the *metering installation* and *energy data* held in the *metering installation*, to the *Metering Coordinator*, *Metering Data Provider* and *NTESMO*; and
 - (2) ensure that no other person receives or has access to a copy of a password allowing local access or remote access to the *metering installation*, services provided by the *metering installation* or *energy data* held in the *metering installation*.

Note

This provision is classified as a civil penalty provision under the National Electricity (NT) Regulations. (See regulation 6(1) and Schedule 1 of the National Electricity (NT) Regulations.)

7A.13.5 Access to data

- (a) Access to *energy data* recorded by a *metering installation* must only be given if passwords are allocated in accordance with clause 7A.13.3.
- (b) The *Metering Coordinator* must ensure that access to *energy data* from the *metering installation* is scheduled appropriately to ensure that congestion does not occur.
- (c) Subject to this clause, the only persons entitled to access or receive *metering data*, *settlements ready data*, *NT NMI data* or data from the *metering register* for a *metering installation* are:
 - (1) the financially responsible participant in respect of the *connection point* for the *metering installation* and any other *Registered Participant* with a financial interest in the *metering installation* or the *energy* measured by the *metering installation*;
 - (2) the *Metering Coordinator* appointed in respect of the *connection point* for the *metering installation*;
 - (3) the *Metering Provider* appointed with respect to the *metering installation*;

- (4) the *Metering Data Provider* appointed with respect to the *metering installation*;
 - (5) *NTESMO* and its authorised agents;
 - (6) the *Local Network Service Provider* associated with the *connection point*; and
 - (7) the *AER* and the *Utilities Commission*.
- (d) In addition to the persons mentioned in paragraph (c), the following persons may access or receive *metering data* in accordance with the *Rules*:
- (1) a *retail customer* or *customer authorised representative*, upon request by that *retail customer* or its *customer authorised representative* to the *retailer* or *Distribution Network Service Provider* in relation to that *retail customer's metering installation*;
 - (2) the *energy ombudsman*.
- (e) A *retailer* or *Distribution Network Service Provider* must, upon request by a *retail customer* or its *customer authorised representative* under paragraph (d)(1), provide information about the *retail customer's energy consumption* for the previous 2 years.
- (f) Without limiting this clause:
- (1) a *retailer* is entitled to access or receive *NT NMI data*;
 - (2) a *customer authorised representative* may receive *metering data*; and
 - (3) a *retailer* or a *Distribution Network Service Provider* may access or receive *metering data* or provide *metering data* to a *customer authorised representative*,
- after having first done whatever may be required, if relevant, under any applicable privacy legislation and clause 7A.9.5 including, if appropriate, making relevant disclosures or obtaining relevant consents from *retail customers*.
- (g) For the avoidance of doubt and without limiting this clause:
- (1) a *Metering Data Provider* must provide relevant *NT NMI data* to a *Distribution Network Service Provider* to the extent that *NT NMI data* is required for the *Distribution Network Service Provider* to fulfil its obligations under this Chapter 7A of the *Rules*; and
 - (2) a *Distribution Network Service Provider* is authorised to, and must provide, relevant *NT NMI data* to a *Metering Data Provider* to the extent that *NT NMI data* is required for the *Metering Data Provider* to fulfil its obligations under this Chapter 7A of the *Rules*.

Schedule 7A.1 Metering register

S7A.1.1 General

The *metering register* forms part of the *metering database* and holds static *metering* information associated with *metering installations* defined by the *Rules* that determine the validity and accuracy of *metering data*.

S7A.1.2 Metering register information

Metering information to be contained in the *metering register* must include, but is not limited to, the following:

- (a) serial numbers;
- (b) the *metering installation* identification name; and
- (c) the information required to assign loss factors.

S7A.1.3 Communication guideline

- (a) *NTESMO* must develop, maintain and *publish* a communication guideline in accordance with the *Rules consultation procedures*.
- (b) A communication guideline must be in place at all times.
- (c) The communication guideline is intended to set out specific details as to how *metering* and *energy data* and other information exchange processes will be implemented.
- (d) The communication guideline must:
 - (1) specify, or incorporate by reference, detailed technical specifications (including file formats, protocols and timeframes) as to how data and information communication is to be processed, and how the necessary information systems are to be designed and developed; and
 - (2) be sufficient to enable a *Registered Participant* to design and commission the information systems necessary for it to engage in communications with *NTESMO* for the purposes of the *Rules*.
- (e) The communication guideline may include types of *metering* information that must be included in the *metering register*.

Schedule 7A.2 Metering provider

Note

The detail of this schedule will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

Schedule 7A.3 Metering data provider

Note

The detail of this schedule will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

Schedule 7A.4 Types and accuracy of metering installations

S7A.4.1 General requirements

This schedule sets out the minimum requirements for *metering installations*.

S7A.4.2 Accuracy requirements for metering installations

Table S7A.4.2.1 Overall accuracy requirements of metering installation components

Type	Volume limit per annum per connection point	Maximum allowable overall error ($\pm\%$) at full load (Item 6)		Minimum acceptable class or standard of components	Metering installation clock error (seconds) in reference to ACST
		active	reactive		
1	greater than 1 000GWh	0.5	1.0	0.2CT/VT/ <i>meter Wh</i> 0.5 <i>meter varh</i>	± 5
2	100 to 1 000GWh	1.0	2.0	0.5CT/VT/ <i>meter Wh</i> 1.0 <i>meter varh</i>	± 7
3	0.75 to less than 100 GWh	1.5	3.0	0.5CT/VT 1.0 <i>meter Wh</i> 2.0 <i>meter varh</i> (Item 1)	± 10
4	less than 750 MWh (Item 2)	1.5	n/a	Either 0.5 CT and 1.0 <i>meter Wh</i> ; or whole current general purpose <i>meter Wh</i> meets requirements of clause 7A.6.2(a)(9) and 7A.8.9(a) (Item 1)	± 20
4A	less than x MWh (Item 3)	1.5	3.0	Either 0.5 CT and 1.0 <i>meter Wh</i> ; or whole current general purpose <i>meter Wh</i> meets requirements of clause 7A.6.2(a)(10) and 7A.8.9(b)	± 20
5	less than x MWh (Item 3)	1.5	n/a	Either 0.5 CT and 1.0 <i>meter Wh</i> ; or whole current connected general purpose <i>meter Wh</i> meets requirements of clause 7A.6.2(a)(10) and 7A.8.9(b). (Item 1)	$\pm/-20$

Type	Volume limit per annum per connection point	Maximum allowable overall error ($\pm\%$) at full load (Item 6)		Minimum acceptable class or standard of components	Metering installation clock error (seconds) in reference to ACST
		active	reactive		
6	less than y MWh (Item 4)	2.0	n/a	CT or whole current general purpose <i>meter</i> Wh recording <i>accumulated energy data</i> only. Processes used to convert the <i>accumulated metering data</i> into <i>recording interval metering data</i> and <i>estimated metering data</i> where necessary are included in schedule 7A.7. (Item 1)	
7	volume limit not specified (Item 5)	(Item 6)	n/a	No <i>meter</i> . The <i>metering data</i> is <i>calculated metering data</i> determined in accordance with schedule 7A.7.	n/a

Item 1: (a) For a type 3, 4, 4A, 5 and 6 *metering installation*, whole current *meters* may be used if the *meters* meet the requirements of the relevant *Australian Standards* and *International Standards* identified in schedule 7A.7.

(b) The *metering installation* types referred to in paragraph (a) must comply with any applicable specifications or guidelines (including any transitional arrangements) specified by the National Measurement Institute under the *National Measurement Act*.

Item 2: *High voltage* customers that require a *voltage transformer* and whose annual consumption is below 750 MWh, must meet the relevant accuracy requirements of Type 3 *metering* for *active energy* only.

Item 3: In relation to a type 4A and type 5 *metering installation*, the value of 'x' in this jurisdiction is 0 MWh per annum.

Item 4: The following requirements apply in relation to a type 6 *metering installation*:

(1) the value of 'y' in this jurisdiction is 750 MWh per annum;

- (2) devices within the *metering installation* may record *accumulated energy data* in predetermined daily time periods where such time periods are specified in schedule 7A.7.

Item 5:

- (a) A type 7 *metering installation* classification applies where a *metering installation* does not require a *meter* to measure the flow of electricity in a power conductor and accordingly there is a requirement to determine by other means the *metering data* that is deemed to correspond to the flow of electricity in the power conductor.
- (b) The condition referred to in paragraph (a) will only be allowed for a *connection point* if:
 - (1) the operation of an unmetered device at the *connection point* results in a type of unmetered *load* that is authorised under the terms of a *local instrument*; and
 - (2) NTESMO in consultation with *Metering Coordinator* determines:
 - (i) that the *load* pattern is predictable;
 - (ii) that, for the purposes of *settlements*, the *load* pattern can be reasonably calculated by a relevant method set out in schedule S7A.7; and
 - (iii) that it would not be cost effective to meter the *connection point* taking into account:
 - (A) the small magnitude of the *load*;
 - (B) the *connection* arrangements; and
 - (C) the geographical and physical location.

Note

The effect of paragraph (b) is that if a type of unmetered load is authorised under a local instrument, a connection point with that type of unmetered load may be used for the purposes of settlements, and be eligible for a type 7 metering installation, if NTESMO makes a determination under (b)(2) in relation to that connection point.

The *National Electricity (Northern Territory) (National Uniform Legislation) (Modification) Regulations 2016* are an example of a local instrument.

- (c) A *connection point* that meets the condition for classification as a type 7 *metering installation* does not prevent that *connection point* from being subject to *metering* in the future.

Item 6:

The maximum allowable overall error ($\pm\%$) at different *loads* and *power factors* is set out in Tables S7A.4.2.2 to S7A.4.2.6.

Table S7A.4.2.2 Type 1 installation – Annual energy throughput greater than 1 000GWh

% Rated Load	Power Factor					
	Unity	0.866 lagging		0.5 lagging		Zero
	Active	Active	Reactive	Active	Reactive	Reactive
10	1.0%	1.0%	2.0%	n/a	n/a	1.4%
50	0.5%	0.5%	1.0%	0.7%	1.4%	1.0%
100	0.5%	0.5%	1.0%	n/a	n/a	1.0%

Table S7A.4.2.3 Type 2 installation – Annual energy throughput between 100 and 1 000 GWh

% Rated Load	Power Factor					
	Unity	0.866 lagging		0.5 lagging		Zero
	Active	Active	Reactive	Active	Reactive	Reactive
10	2.0%	2.0%	4.0%	n/a	n/a	2.8%
50	1.0%	1.0%	2.0%	1.5%	3.0%	2.0%
100	1.0%	1.0%	2.0%	n/a	n/a	2.0%

Table S7A.4.2.4 Type 3 installation – Annual energy throughput from 0.75 GWh to less than 100 GWh and Type 4A installation – annual energy throughput less than 0.75 GWh

% Rated Load	Power Factor					
	Unity	0.866 lagging		0.5 lagging		Zero
	Active	Active	Reactive	Active	Reactive	Reactive
10	2.5%	2.5%	5.0%	n/a	n/a	4.0%
50	1.5%	1.5%	3.0%	2.5%	5.0%	3.0%
100	1.5%	1.5%	3.0%	n/a	n/a	3.0%

Table S7A.4.2.5 Type 4 or 5 installation – annual energy throughput less than 0.75 GWh

% Rated Load	Power Factor		
	Unity	0.866 lagging	0.5 lagging
	Active	Active	Active
10	2.5%	2.5%	n/a
50	1.5%	1.5%	2.5%
100	1.5%	1.5%	n/a

Table S7A.4.2.6 Type 6 installation – annual energy throughput less than 0.75 GWh

% Rated Load	Power Factor		
	Unity	0.866 lagging	0.5 lagging
	Active	Active	Active
10	3.0%	n/a	n/a
50	2.0%	n/a	3.0%
100	2.0%	n/a	n/a

Notes to Tables S7A4.2.2 to S7A4.2.6

All measurements in Tables S7A4.2.2 to S7A4.2.6 are to be referred to 24 degrees Celsius.

(a) The method for calculating the overall error is the vector sum of the errors of each component part (that is, a + b + c) where:

a = the error of the *voltage transformer* and wiring;

b = the error of the *current transformer* and wiring; and

c = the error of the *meter*.

(b) If compensation is carried out then the resultant *metering data* error must be as close as practicable to zero.

S7A.4.3 Check metering

(a) Where a *check metering installation* is in place, it is to be applied in accordance with the following Table:

Metering Installation Type in accordance with Table S7A.4.2.1	Check Metering Requirements
1	<i>Check metering installation</i>
2	Partial check <i>metering</i>

Metering Installation Type in accordance with Table S7A.4.2.1	Check Metering Requirements
3	No requirement
4, 4A, 5 and 6	No requirement

- (b) Where a *check metering installation* is not in place, and a financially responsible participant requests the installation of a *check metering installation* at a *connection point*, the *Metering Coordinator* at the *connection point* must arrange for the installation of a *check metering installation* that complies with the requirements of this schedule.
- (c) A *check metering installation* involves either:
 - (1) the provision of a separate *metering installation* using separate *current transformer* cores and separately fused *voltage transformer* secondary circuits, preferably from separate secondary windings; or
 - (2) if *NTESMO*, in its absolute discretion, considers it appropriate, in the case of a metering installation located at the *facility* at one end of the *two-terminal link*, a *metering installation* located at the *facility* at the other end of a *two-terminal link*.
- (d) Where the *check metering installation* duplicates the *metering installation* and accuracy level, the average of the 2 validated data sets will be used to determine the *energy* measurement.
- (e) Partial *check metering* involves the use of other *metering data* or operational data available in 30 min electronic format as part of a validation process in accordance with Schedule 7A.7.
- (f) *Check metering installations* may be supplied from secondary circuits used for other purposes and may have a lower level of accuracy than the *metering installation*, but must not exceed twice the level prescribed for the *metering installation*.
- (g) The physical arrangement of partial check metering will be determined by the *Metering Coordinator*.

S7A.4.4 Resolution and accuracy of displayed or captured data

Programmable settings available within a *metering installation* of any peripheral device, which may affect the resolution of displayed or stored data, must:

- (a) meet the requirements of the relevant *Australian Standards* and *International Standards* specified in schedule 7A.7; and
- (b) comply with any applicable specifications or guidelines (including any transitional arrangements) specified by the National Measurement Institute under the *National Measurement Act*.

S7A.4.5 General design standards

S7A.4.5.1 Design requirements

Without limiting the scope of detailed design, the following requirements must be incorporated in the design of each *metering installation*:

- (a) for *metering installations* greater than 1 000 GWh pa per *connection point*, the *current transformer* core and secondary wiring associated with the *meter(s)* must not be used for any other purpose;
- (b) for *metering installations* less than 1 000 GWh pa per *connection point*, the *current transformer* core and secondary wiring associated with the *meter(s)* may be used for other purposes (for example, local *metering* or protection) provided the *Metering Coordinator* is able to demonstrate that the accuracy of the *metering installation* is not compromised and suitable procedures/measures are in place to protect the security of the *metering installation*;
- (c) where a *voltage transformer* is required, if separate secondary windings are not provided, then the *voltage* supply to each *metering installation* must be separately fused and located in an accessible position as near as practical to the *voltage transformer* secondary winding;
- (d) secondary wiring must be by the most direct route and the number of terminations and links must be kept to a minimum;
- (e) the incidence and magnitude of burden changes on any secondary winding supplying the *metering installation* must be kept to a minimum;
- (f) *meters* must:
 - (1) meet the requirements of relevant *Australian Standards* and *International Standards* (if any) specified in schedule 7A.7; and
 - (2) have a valid pattern approval issued under the authority of the National Measurement Institute or, until relevant pattern approvals exist, a valid type test certificate;
- (g) new *instrument transformers* must:
 - (1) meet the requirements of relevant *Australian Standards* and *International Standards* (if any) specified in schedule 7A.7; and
 - (2) have a valid pattern approval issued under the authority of the National Measurement Institute or, until relevant pattern approvals exist, a valid type test certificate;
- (h) suitable *isolation* facilities are to be provided to facilitate testing and calibration of the *metering installation*;
- (i) suitable drawings and supporting information, detailing the *metering installation*, must be available for maintenance purposes.

S7A.4.5.2 Design guidelines

In addition to the design requirements specified in clause S7A.5.1, the following guidelines should be considered for each *metering installation*:

- (a) the provision of separate secondary windings for each *metering installation* where a *voltage transformer* is required;
- (b) a *voltage* changeover where more than one *voltage transformer* is available.

Schedule 7A.5 Metering functionality requirements for type 1, 2, 3 and 4 metering requirements

S7A.5.1 Introduction

S7A.5.1.1 Purpose

This schedule specifies the *meter* functionality requirements for type 1, 2, 3 and 4 *metering installations* in this jurisdiction.

S7A.5.1.2 Definitions

In this schedule:

communications network means all communications equipment, processes and arrangements that lie between the *meter* and the NMS.

end user customer means the customer or retail customer who consumes electricity at the point of use.

export means the delivery of *energy* from the *network* to an end-use customer.

import means the delivery of *energy* from an end-use customer into a *distribution network*.

local disconnection means the operation of the supply contactor to effect a *disconnection of supply* performed locally at the *meter* by alternative electronic means.

metering system means the installed *metering installation*, communications network or infrastructure, and any other systems required under this schedule.

NMS (Network Management System) means the component of a metering system that manages the communications network.

remote disconnection means the utilisation of the communication system to *disconnect* the end-use customer's *supply* at the *meter* by the operation of a contactor.

supply contactor means the contactor in the *meter* that, when opened, causes the *supply* to be *disconnected* and, when closed, allows the *supply* to become *connected*.

total accumulated energy means the total or accumulated amount of *energy* measured and recorded per channel of a *meter* since the installation of the *meter* or the resetting of the value.

S7A.5.2 Functionality Requirements for Meters in Type 1, 2, and 3 metering installations

S7A.5.2.1 Application

Clause S7A.5.2 applies to *meters* in type 1, 2 and 3 *metering installations*.

S7A.5.2.2 Applicable meter configurations

- (a) The configuration for a *meter* must be:
 - (1) three phase Low Voltage *CT* connect (excluding supply contactor); or
 - (2) three phase *CT/VT*.
- (b) *Meters* must meet the relevant requirements of *AS 62052.11*, *AS 62053.22* and *AS 62053.21*, and any pattern approval requirements of the National Measurement Institute.

S7A.5.2.3 Metrology

Meters must comply with the following requirements:

- (a) three phase *meters* must be four quadrant *meters* and must be able to separately record *active energy* and *reactive energy*, import and export in *recording intervals*;
- (b) *meters* must record total accumulated energy for each recorded channel of interval data;
- (c) the resolution for collection of *interval energy data* must be at least 0.1 kWh for *active energy* and 0.1 kVArh for *reactive energy*;
- (d) *meters* must have a minimum storage of 35 *days* per channel of *interval energy data*;
- (e) all channels of *interval energy data* must be able to be read locally as well as remotely read;
- (f) it must be possible to remotely and locally select or configure whether import *interval energy data* is recorded or not;
- (g) it must be possible to remotely and locally select or configure whether *reactive energy interval energy data* is recorded from three phase *meters* or not.

S7A.5.3 Functionality Requirements for Meters in Type 4 metering installations

S7A.5.3.1 Application

Clause S7A.5.3 applies to *meters* in type 4 *metering installations*.

S7A.5.3.2 Applicable meter configurations

- (a) The configuration for a *meter* must be:
 - (1) single phase, single element;
 - (2) single phase, two element;
 - (3) three phase direct connect; or
 - (4) three phase *CT* connect (excluding supply contactor).
- (b) *Meters* must meet the relevant requirements of *AS 62052.11*, *AS 62053.22* and *AS 62053.21*, and any pattern approval requirements of the National Measurement Institute.

S7A.5.3.3 Metrology

Meters must comply with the following requirements:

- (a) single phase *meters* must be two quadrant *meters* and must be able to separately record *active energy* for import and export in *recording intervals*;
- (b) three phase *meters* must be four quadrant *meters* and must be able to separately record *active energy* and *reactive energy*, import and *export* in *recording intervals*;
- (c) *meters* must record total *accumulated energy data* for each recorded channel of *interval energy data*;
- (d) the resolution for collection of *interval energy data* must be at least 0.1 kWh for *active energy* and 0.1 kVAh for *reactive energy*;
- (e) the resolution of *energy* consumption displayed on a *meter's* display must be at least 0.1 kWh and 0.1 kVAh for direct connected *meters*;
- (f) *meters* must have a minimum storage of 200 *days* per channel of *interval energy data*;
- (g) all channels of *interval energy data* must be able to be read locally as well as by *remote acquisition*;
- (h) the values that must be recorded for *import* and *export* are the actual values at the *connection point* for direct connect *meters*;
- (i) it must be possible to remotely and locally select or configure whether *import interval energy data* is recorded or not;
- (j) it must be possible to remotely and locally select or configure whether *reactive energy interval energy data* is recorded from three phase *meters* or not.

Note:

Export is when energy is exported from the network to a customer and import is when the customer delivers energy into the network. See clause S7A5.1.2.

S7A.5.3.4 Remote and local reading of meters

- (a) If a *meter* is remotely read:
 - (1) the *meter's* total *accumulated energy data* per collected channel must be able to be collected once every 24 hours; and
 - (2) the *interval energy data* per collected channel must be able to be collected once every 24 hours.
- (b) If a *meter* is locally read, the *meter's* total accumulated energy per collected channel and the *interval energy data* per collected channel must be able to be collected.
- (c) For individual reads of *meters*, it must be possible to select up to 35 *days* of *interval energy data* to be collected per channel.

S7A.5.3.5 Supply disconnection and reconnection

S7A.5.3.5.1 General requirements

- (a) *Meters* excluding *CT* connected *meters* must have a supply contactor.
- (b) *Meters* must support both local and remote disconnect, and local and remote *reconnection* of end-use customer *supply* via the supply contactor. When a *meter* performs a *disconnection* operation, all outgoing circuits from the *meter* must be *disconnected*.
- (c) To confirm the current state of a *meter*, the *meter* must support "on-demand" remote polling of the *meter* to determine whether the supply contactor is open or closed.
- (d) A *meter* must provide clear local visual indication of the status (open/closed) of the supply contactor.

S7A.5.3.5.2 Disconnection

- (a) A *meter* must support both local and remote end-use customer supply disconnection functionality.

Local disconnection

Note:

The circumstances in which local disconnection may occur include where:

- (a) a technician is already on-site performing works and it is most efficient for the technician to perform the *disconnection*; or
 - (b) a *meter* that is capable of remote reading is installed; however the communications infrastructure has not been rolled out or has failed.
- (b) Local disconnection via the *meter* must only be able to be performed by an authorised technician. Unauthorised persons must be physically prevented from operating the supply contactor to *disconnect supply*.
 - (c) A *meter* must support the following:
 - (1) opening of the supply contactor performed locally;
 - (2) remote communication of the status (open/closed) of the supply contactor (if communications are active) from the *meter* to the NMS;
 - (3) event logging of the local disconnection at that *meter*.

Remote disconnection

- (d) A *meter* must support the following:
 - (1) opening of the *supply contactor* performed remotely;
 - (2) remote communication of the status (open/closed) of the *supply contactor* (if communications are active) from the *meter* to the NMS;
 - (3) event logging of the *remote disconnection* at that meter.

S7A.5.3.5.3 Reconnection

- (a) A *meter* must support both local and remote end-use customer *supply reconnection* functionality.

Local reconnection

- (b) *Reconnection* via the *meter* must only be able to be performed locally by an authorised technician. Unauthorised persons must be physically prevented from operating the supply contactor to *reconnect supply*.
- (c) A meter must support the following:
 - (1) closing of the supply contactor performed locally;
 - (2) remote communication of the status (open/closed) of the supply contactor (if communications are active) from the *meter* to the NMS;
 - (3) event logging of local *reconnection* at that *meter*.

Remote reconnection

- (d) A *meter* must support the following:
 - (1) closing of the supply contactor performed remotely;
 - (2) remote communication of the status (open/closed) of the supply contactor from the *meter* to the NMS; and
 - (3) event logging of remote *reconnection*.

S7A.5.3.6 Time clock synchronisation

Date and time within *meters* must be maintained within 20 seconds of *Australian Central Standard Time*.

S7A.5.3.7 Quality of Supply and other event recording

- (a) A *meter* must support the recording of Quality of Supply (QoS) events and other events that occur at each *meter* as detailed as follows:

ID	Events
1	Import energy detected
2	Supply contactor opened – local
3	Supply contactor opened – remote
4	Supply contactor closed – local
5	Supply contactor closed – remote
6	Undervoltage event
7	Overvoltage event
8	Tamper detected
9	Whenever there is a change of meter settings locally

Undervoltage and overvoltage recording

- (b) A *meter* must support the recording of undervoltage and overvoltage events. The thresholds shall be remotely and locally settable for undervoltage in the range of at least -5% to -20% in 1% steps and for overvoltage in the range of at least +5% to +20% in 1% steps.

Tamper detection

- (c) A *meter* must support the detection and recording of an attempt to tamper with the *meter* as an event.

S7A.5.3.8 Tamper detection

A *meter* must support the detection and *recording* as an event attempts to tamper with the *meter*.

S7A.5.3.9 Communications and data security

All device elements must contain the necessary security to prevent unauthorised access or modification of data.

S7A.5.3.10 Remote firmware upgrades

Meters must have the capability for their firmware to be remotely upgraded. It must be possible to remotely change firmware without impacting the metrology functions of the *meter*.

S7A.5.3.11 Remote arming

Meters must have the capability to be remotely armed.

Schedule 7A.6 Inspection and testing requirements

S7A.6.1 General

- (a) The *Metering Coordinator* must ensure that equipment comprised in a purchased *metering installation* has been tested to the required class accuracy with less than the uncertainties set out in Table S7A.6.1.1.
- (b) The *Metering Coordinator* must ensure appropriate test certificates of the tests referred to in paragraph (a) are retained.
- (c) The *Metering Coordinator* (or any other person arranging for testing) must ensure that testing of the *metering installation* is carried out:
 - (1) in accordance with:
 - (i) clause 7A.7.2 and this schedule; or
 - (ii) an asset management strategy that defines an alternative testing practice (other than time based) determined by the *Metering Coordinator* and approved by *NTESMO*;
 - (2) in accordance with a test plan that has been registered with *NTESMO*;
 - (3) to the same requirements as for new equipment where equipment is to be recycled for use in another site; and

- (4) so as to include all data storage and processing components specified in schedule 7A.7.
- (d) The testing intervals may be increased if the equipment type/experience proves favourable.
- (e) The maximum allowable level of testing uncertainty (\pm) for all *metering* equipment must be in accordance with Table S7A.6.1.1.

Table S7A.6.1.1 Maximum allowable level of testing uncertainty (\pm)

Description		Metering Equipment Class				
		Class 0.2	Class 0.5	Class 1.0	General Purpose	Class 2.0
In Laboratory	CTs ratio phase	0.05% 0.07 crad	0.1% 0.15 crad	n/a	n/a	n/a
	VTs ratio Phase	0.05% 0.05 crad	0.1% 0.1 crad	n/a	n/a	n/a
	Meters Wh	0.05/cos ϕ %	0.1/cos ϕ %	0.2/cos ϕ %	0.2/cos ϕ %	n/a
	Meters varh	n/a	0.2/sin ϕ %	0.3/sin ϕ %	n/a	0.4/sin ϕ %
In Field	CTs ratio Phase	0.1% 0.15 crad	0.2% 0.3 crad	n/a	n/a	n/a
	In Field	CTs ratio Phase	0.1% 0.15 crad	0.2% 0.3 crad	n/a	n/a
VTs ratio Phase		0.1% 0.1 crad	0.2% 0.2 crad	n/a	n/a	n/a
Meters Wh		0.1/cos ϕ %	0.2/cos ϕ %	0.3/cos ϕ %	0.3/cos ϕ %	n/a
Meters varh		n/a	0.3/sin ϕ %	0.4/sin ϕ %	n/a	0.5/sin ϕ %

Where cos ϕ is the *power factor* at the test point under evaluation.

Table S7A.6.1.2 Maximum Period Between Tests

Unless the *Metering Coordinator* has developed an approved asset management strategy that defines practices that meet the intent of this schedule, the maximum period between tests must be in accordance with Table S7A.6.1.2.

Description	Metering Installation Type				
	Type 1	Type 2	Type 3	Type 4 & 4A	Types 5 & 6
CT	10 years	10 years	10 years	10 years	10 years

Description	Metering Installation Type				
	Type 1	Type 2	Type 3	Type 4 & 4A	Types 5 & 6
VT	10 years	10 years	10 years		n/a
Burden tests	When <i>meters</i> are tested or when changes are made				
CT connected meter (electronic)	5 years	5 years	5 years	5 years	5 years
CT connected meter (induction)	2.5 years	2.5 years	5 years	5 years	5 years
Whole current meter	The testing and inspection requirements must be in accordance with an approved asset management strategy. Guidelines for the development of an asset management strategy are set out in Schedule 7A.7				

Table S7A.6.1.3 Period between inspections

Unless the *Metering Coordinator* has developed an approved asset management strategy that meets the intent of this schedule and is approved by *NTESMO*, the maximum period between inspections must be in accordance with Table S7A.6.1.3.

Description	Metering Installation Type			
	Type 1	Type 2	Type 3	Type 4, 4A, 5 & 6
<i>Metering installation equipment inspection</i>	2.5 years	12 months (2.5 years if check metering installed)	> 10 GWh: 2 years 2 ≤ GWh ≤ 10: 3 years <2 GWh: when <i>meter</i> is tested.	When <i>meter</i> is tested.

S7A.6.2 Technical guidelines

- (a) *Current transformer* and *voltage transformer* tests are primary injection tests, or other approved testing procedures as approved by *NTESMO*.
- (b) The calculations of accuracy based on test results are to include all reference standard errors.
- (c) An "estimate of testing uncertainties" must be calculated in accordance with the ISO "Guide to the Expression of Uncertainty for Measurement".
- (d) Where operational *metering* is associated with *settlements metering* then a shorter period between inspections is recommended (but is not mandatory).

- (e) For $\sin\phi$ and $\cos\phi$, refer to the ISO "Guide to the Expression of Uncertainty in Measurement", where $\cos\phi$ is the *power factor*.
- (f) A typical inspection may include:
 - (1) check the seals;
 - (2) compare the pulse counts;
 - (3) compare the direct readings of *meters*;
 - (4) verify *meter* parameters and physical connections; and
 - (5) *current transformer* ratios by comparison.

Schedule 7A.7 Metrology procedure

Part A

S7A.7.1 Introduction

S7A.7.1.1 General

- (a) This schedule applies to *NTESMO, Registered Participants, Metering Coordinators, Metering Providers, Metering Data Providers* and the *Utilities Commission* in relation to *connection points* in this jurisdiction.
- (b) This schedule provides information on the application of *metering installations* to *connection points* and sets out provisions for *metering installations* and *metering data services*.
- (c) For service provision at *connection points* where:
 - (1) the *Metering Provider* and the *Metering Data Provider* are part of the same company; and
 - (2) *metering installation*, provision or maintenance work is performed using internal processes and procedures,those internal processes and procedures will be taken to be compliant with this schedule if the *metering* work satisfies the performance and quality outcomes of this schedule.

S7A.7.1.2 Definitions

In this schedule:

accumulation meter means a *meter* where the *energy data* recorded in the *meter* represents a period in excess of a *recording interval*.

estimated reading means:

- (a) an estimate of a *meter* reading where an *actual meter reading* has not occurred; or
- (b) a *substitute* of a *meter* reading used for the purposes of transferring a *retail customer* to a new *Retailer* where an *actual meter reading* has not occurred.

final reading means the last *actual meter* reading for a *retail customer* when they vacate an address or change *retailer* or the last *actual meter* reading taken before

all or any part of a metering *installation* is removed or modified and where the modification affects the *energy data* in the *metering installation*.

ILAC means International Laboratory Accreditation Cooperation.

inventory table means a table of devices for unmetered *loads* associated with each *NMI* as described in clauses S7A.7.14.2(c) and S7A.7.14.3(c).

load table means a table of unmetered device *loads* as described in clause S7A.7.14.1.

on/off table means a table recording the switching status (On = 1, Off = 0) for each *recording interval* for the unmetered *loads* associated with a *NMI* as described in Part B of this schedule.

physical inventory means a physical count of devices.

public holiday means a day that is a public holiday, as defined in section 17 of the *Interpretation Act 1978*(NT), that is observed in the City of Darwin, other than a public holiday that is part of a day.

routine testing, for the purposes of this schedule, includes the ongoing and regular maintenance testing, compliance testing and in-service testing of *metering installation* components initiated by the *Metering Coordinator* or *Metering Provider* to fulfil their obligations in accordance with schedule 7A.6.

Sample Test Plan means a statement of the sample size or sizes to be taken, the frequency of sample testing and the required accuracy.

scheduled reading date means the date of the next scheduled meter reading.

unmetered means a *load* or a *connection point* at which a *meter* is not necessary under schedule 7A.6.

S7A.7.1.3 Relevant retailer

In this schedule, a reference to the relevant *retailer* is a reference to Power Retail Corporation (trading as Jacana Energy) ABN 65 889 840 667.

Part B

S7A.7.2 Purpose and scope

S7A.7.2.1 Purpose

The purpose of this Part is to set out:

- (a) the obligations of the *Metering Coordinator*, in relation to *metering installations* that are referred to in the *Rules*;
- (b) the obligations of *Metering Providers* in relation to the provision, installation, routine testing and maintenance of a *metering installation*; and
- (c) the obligations of *Metering Data Providers* in relation to the provision of *metering data services*.

S7A.7.2.2 Scope

This schedule provides information on the application of *metering installations to connection points*. In particular, this schedule sets out provisions for *metering installations* and *metering data services* relating to:

- (a) *Metering Providers*, which include:
 - (1) the type of *metering installation* permitted for the measurement of *active energy*;
 - (2) the provision, installation, testing, inspection and maintenance of *metering installations*;
 - (3) the components of each type of *metering installation*; and
 - (4) storage of, and access rights to, *energy data* in the *metering installation*; and
- (b) *Metering Data Providers*, which include:
 - (1) the collection or calculation, processing and delivery of *metering data*; and
 - (2) storage of *metering data* in the *metering data services database* and rights of access to *metering data*.

S7A.7.3 Metering provision

S7A.7.3.1 Responsibility for metering provision

- (a) *Metering Coordinators* must use *Metering Providers* to provide, install, test and maintain the relevant components, characteristics and service requirements of the *metering installation* as specified in the *Rules*.
- (b) *Metering Coordinators* are responsible for the design of a *metering installation* and warrant that the design complies with the components, characteristics and service requirements specified in the *Rules*.
- (c) *Metering Coordinators* must ensure the components have been selected, installed, tested and commissioned by the *Metering Providers* so that the *metering installation* satisfies the relevant accuracy and performance requirements in the *Rules*.

S7A.7.3.2 Metering installation components

- (a) *Meters* used in type 1, 2, 3, 4, 4A, 5 and 6 *metering installations* must comply with any applicable specifications or guidelines (including transitional arrangements) specified by the National Measurement Institute, under the *National Measurement Act*, and must also meet the relevant requirements of *Australian Standards* and *International Standards*:
 - (1) for type 1, 2, 3, 4, 4A, and 5 (including type 3 and 4 whole current) *metering installation measurement elements*: *AS 62052.11*, *AS 62053.21* and *AS 62053.22*; and
 - (2) for type 6 *metering installation measurement elements*: *AS 1284.1*, *AS 62053.21* and *AS 62052.11*.

- (b) *Current transformers* for type 1, 2, 3, 4, 4A, 5 and 6 *metering installations* must meet the relevant requirements of *AS 60044.1* and must also comply with any applicable specifications or guidelines (including transitional arrangements) specified by the National Measurement Institute under the *National Measurement Act*.
- (c) *Voltage transformers* for type 1, 2, 3, 4, 4A, 5 and 6 *metering installations* must meet the relevant requirements of *AS 60044.2*, *AS 60044.3*, *AS 60044.5* and *AS 1243* and must also comply with any applicable specifications or guidelines (including transitional arrangements) specified by the National Measurement Institute under the *National Measurement Act*.
- (d) New *current transformers* and *voltage transformers* must comply with current *Australian Standards*.
- (e) In-service *current transformers* and *voltage transformers* must comply with the *Australian Standard* that applied at the time of installation.
- (f) Unless otherwise permitted by the *Rules*, the *Metering Coordinator* must ensure that new *meters* and related equipment used at a *connection point* have a valid pattern approval issued under the authority of the National Measurement Institute or, until relevant pattern approvals exist, a valid type test certificate issued by a *NATA* accredited laboratory or a body recognised by *NATA* under the ILAC mutual recognition scheme. Relevant approval certificates must be provided to the *Utilities Commission* on request.
- (g) A visible display must be provided to display, at a minimum, the cumulative total *energy* for each register measured by that *metering installation*.
- (h) Any programmable settings available within the *metering installation*, or any peripheral device, which may affect the resolution of displayed or stored data, must meet the relevant requirements of *AS 62052.11*, *AS 62053.21* and *AS 62053.22* and must comply with any applicable specifications or guidelines (including transitional arrangements) specified by the National Measurement Institute under the *National Measurement Act*.

S7A.7.3.3 Use of optical ports and pulse outputs

- (a) Where requested by a financially responsible participant, the *Metering Coordinator* must provide pulse output facilities representing the quantity of electricity measured in accordance with the relevant *Australian Standard* for that *meter* within a reasonable time of receiving the request.
- (b) For type 1, 2, 3, 4, 4A and 5 *metering installations* with a pulse output, the *measurement element* pulse output must provide a number of energy pulses in each integrating period commensurate with the accuracy class of the *metering installation* when operating at the top of the range of measurement of the *metering installation* but may be set at a lower rate where the anticipated operating range is significantly lower than the top of the range of measurement of the *metering installation*.
- (c) A type 4A or 5 *metering installation* must have an optical port that meets the *AS 1284.10.2* or *AS 62056.21* or a computer serial port to facilitate downloading of 90 *days of interval energy data* for each *meter* associated with the *metering installation* in 35 seconds or less.

S7A.7.3.4 Load control equipment

Where the *metering installation* includes equipment for load control or the measurement of *reactive energy*, the installation and operation of that equipment will be governed by an instrument other than the *Rules*, for example, a 'use of system' agreement between the *Local Network Service Provider* and the financially responsible participant.

S7A.7.3.5 Data storage requirements for meters

Note

No specific requirements are included under this heading for this jurisdiction at this stage. The clause may be used as part of the phased implementation of the *Rules* in this jurisdiction.

S7A.7.3.6 Metering installation clock

- (a) A type 4A, 5 or 6 *metering installation* clock is to be reset to within ± 20 seconds of *Australian Central Standard Time* on each occasion that the *metering installation* is accessed in the circumstances referred to in paragraphs (b) and (c), and the maximum drift in the type 4A or 5 *metering installation* clock permitted between successive meter readings is ± 300 seconds.
- (b) A *Metering Provider* must reset a type 4A, 5 or 6 *metering installation* clock when inspecting, maintaining or commissioning the *metering installation*.
- (c) A *Metering Data Provider* must reset a type 4A, or 5 *metering installation* clock when *interval metering data* is collected from the *metering installation*.
- (d) For type 6 *metering installations* with different time of day rates, the *metering installation* must meet AS 62054.11, AS 62054.21 and AS 62052.21, or have the switching between the different rates controlled by a frequency injection relay or time clock operated by the *Local Network Service Provider*.

S7A.7.3.7 Interval meters

Where a *metering installation* records *interval energy data* the interval periods must be based on *recording intervals* or parts of a *recording interval* in accordance with the following requirements:

- (a) the end of each interval for a 15-minute interval period must be on the hour, on the half-hour and on each quarter of an hour (*ACST*);
- (b) the end of each interval for a 30-minute interval period must be on the hour and on the half-hour (*ACST*);
- (c) for other sub-multiple intervals –where agreed with *NTESMO*(in respect of a *metering installation* that is used for the purposes of *settlements*), the *Local Network Service Provider* and the relevant financially responsible participant, provided that the ends of the intervals correspond each and every exact hour (*ACST*) and half- hour (*ACST*).

S7A.7.3.8 Alarm settings

- (a) Where an *interval meter* supports alarm functionality, the *Metering Provider* is required to enable the following alarms:
 - (1) power failure/*meter* loss of supply for instrument transformer connected *metering installations* only;
 - (2) *voltage transformer* or phase failure;
 - (3) pulse overflow;
 - (4) cyclic redundancy check error; and
 - (5) time tolerance.
- (b) Where there are alarm sensitivity settings, these must be set at appropriate levels to ensure meaningful alarm outputs (for example, for contestable supplies a voltage drop of -15% is nominally appropriate).

S7A.7.3.9 Summation metering

- (a) If summation *metering* is achieved by paralleling *current transformer* secondary circuits, the overall *metering system* must meet the minimum standards for a new *metering installation* under all load combinations of the individual *current transformer* secondaries.
- (b) If summation *metering* is achieved by the arithmetic sum of data registers or the accumulation of pulses, each individual *metering point* must meet the minimum standards for a new *metering installation* and the *Metering Coordinator* must on request demonstrate that the summation techniques reliably and accurately transfer data.
- (c) *Current transformer* secondaries can only be paralleled using appropriate arrangements of links; this must not be done at the *meter* terminals.
- (d) For type 2 *metering installations* only – direct summation, in which secondary wiring from a multiple number of feeders are connected directly into the terminals of a *meter*, or summation *current transformers*, are permitted provided that the overall errors of the installation are considered.

S7A.7.3.10

Note

No requirements are included in this clause for this jurisdiction at this stage. The clause may be used as part of the phased implementation of the *Rules* in this jurisdiction.

S7A.7.3.11 Routine testing and inspection of metering installations

- (a) Unless a *Metering Coordinator* has an Asset Management Strategy approved by *NTESMO*, *metering installations* must be tested and inspected in accordance with rule 7A.7 and schedule 7A.6. Paragraphs (b) to (f) provide guidelines that:
 - (1) the *Metering Coordinator* will need to take into consideration when seeking approval of an Asset Management Strategy; and
 - (2) *NTESMO* will need to take into consideration in approving a proposed Asset Management Strategy.

- (b) An acceptable alternative testing practice or test plan for in-service *meter* performance must demonstrate compliance with *Australian Standard*"AS 1284.13: Electricity Metering in-service compliance testing".
- (c) Unless the *Metering Coordinator* has developed an alternative accuracy assessment method for type 5 and 6 *metering installations* that meets the intent of Tables S7A.4.2.5 and S7A.4.2.6 and is approved by *NTESMO*, the overall *metering installation* error is calculated by the vector sum of the errors of each *metering installation* component, being $a + b + c$ where:
 - a = error of VT and wiring
 - b = error of CT and wiring
 - c = error of *meter*.
- (d) Where the *Metering Coordinator* is not testing and inspecting *metering installations* in accordance with rule 7A.7 and schedule 7A.6 (that is, not time-based), the *Metering Coordinator* must include in its Asset Management Strategy an alternative inspection practice that meets the requirements of schedule 7A.6.
- (e) The *Metering Coordinator* must provide a copy of the Asset Management Strategy to each relevant *Metering Provider*.
- (f) For those *meters* for which new or amended pattern approval has been received from the National Measurement Institute or, in the absence of pattern approval, new or amended type testing has been undertaken by a *NATA* accredited laboratory or a body recognised by *NATA* under the ILAC mutual recognition scheme, the *Metering Coordinator* must ensure that the Sample Test Plan stipulates that this population of *meter* is tested at least once in the first three years of being placed in service.

S7A.7.3.12 Requests for testing type 1 – 6 metering installations

- (a) If requested by a *Registered Participant* with a financial interest in the *metering installation* or the *energy* measured by the *metering installation*, the *Metering Coordinator* must make arrangements for the testing of the *metering installation* in accordance with clause 7A.7.2 of the *Rules*.
- (b) If requested by a *Registered Participant* with a financial interest in the *metering installation*, the *Utilities Commission* must make arrangements in accordance with clause 7A.7.4 of the *Rules* to determine the consistency of *metering data* held in the *metering data services database* and the *energy data* held in the type 1, 2, 3, 4, 4A, 5 and 6 *metering installation*.
- (c) Where the *Registered Participant* requests a *metering installation* test in accordance with paragraphs (a) and (b):
 - (1) the *Metering Coordinator* or the *Utilities Commission*(as applicable) must use *reasonable endeavours* to conduct the test within 15 *business days* of the request;
 - (2) if the requirement under subparagraph (1) would prevent the *Registered Participant's* customer witnessing the test, then the *Metering Coordinator* or the *Utilities Commission* may agree to a mutually convenient time to conduct the test; and

- (3) the *Metering Coordinator* or the *Utilities Commission* (as applicable) must, if requested, provide an estimate of costs associated with the test prior to any test being undertaken.

S7A.7.4 Installation of meters and de-commissioning

S7A.7.4.1 General installation requirements

The *Metering Coordinator* must use reasonable endeavours to ensure that, at the time of installation, a *metering installation* is:

- (a) protected against damage;
- (b) installed in such a way that it allows safe and unimpeded access to the *retail customer* or any person whose obligation it is to test, adjust, maintain, repair, or replace the *metering installation*, or to collect *metering data* from the *metering installation*; and
- (c) available to the *retail customer* or any person whose obligation it is to test, adjust, maintain, repair, or replace the *metering installation*, or to collect *metering data* from the *metering installation* via safe, convenient and unhindered access when it is not located at the site.

S7A.7.4.2 Type 4A, 5 and 6 metering installations

The *Metering Coordinator* must ensure that when each type 4A, 5 or 6 *metering installation* is installed at a *connection point*, it is checked such that it has the optical port, communications port and visual display located so that the optical port, communications port, or visual display can be readily accessed for meter reading.

S7A.7.4.3 Preliminary de-commissioning and removal of metering equipment requirements

- (a) Before de-commissioning all or any part of an existing *metering installation* the *Metering Provider* undertaking the work must ensure that:
 - (1) arrangements are put in place to ensure a final reading is taken at the time of de-commissioning of all *metering data* maintained in the existing *meter*; and
 - (2) the ownership of the existing *meter* is ascertained and arrangements made for the *meter* to be returned to its owner within 10 *business days* unless otherwise agreed with the asset owner.
- (b) Where the *metering data* from the final reading is not transferred to the relevant *Metering Data Provider* at the time of de-commissioning, the owner must ensure the *metering data* or final reading (as applicable), is provided to that *Metering Data Provider* within 2 *business days* of receipt of the *meter*.

S7A.7.4.4

Note

No requirements are included in this clause for this jurisdiction at this stage. The clause may be used as part of the phased implementation of the *Rules* in this jurisdiction.

S7A.7.5

Note

No requirements are included in this clause for this jurisdiction at this stage. The clause may be used as part of the phased implementation of the *Rules* in this jurisdiction.

S7A.7.6 Responsibility for metering data services

S7A.7.6.1 Metering data storage

Note

No requirements are included in this clause for this jurisdiction at this stage. The clause may be used as part of the phased implementation of the *Rules* in this jurisdiction.

S7A.7.6.2 Verification of metering data for type 4, 4A, 5, 6 and 7 installations

To facilitate the verification of *metering data* for type 4, 4A, 5, 6 and 7 *metering installations*:

- (a) each *Metering Coordinator* must ensure that a Sample Test Plan is established and maintained in accordance with *Australian Standards*"AS 1199: Sampling procedures for inspection by attributes – Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection" or "AS 2490: Sampling Procedures and Charts for Inspection by Variables for Percent Nonconforming" to validate that all *metering data* stored in the *metering data services database* is consistent with the *energy data* stored in the *metering installation* or the physical inventory (as applicable);
- (b) verification tests must be conducted in accordance with the Sample Test Plan, which must not be less than once every 12 months;
- (c) the *calculated metering data* stored in a *metering data services database* for a *NMI* is consistent with the physical inventory if the error associated with calculating the *energy* value for the sample, that is:

$$\frac{\sum_{i=1}^n (\text{Agreed load per device type as per load table})_i * (\text{Actual number of device type in the sample geographic area})_i}{\sum_{i=1}^n (\text{Agreed load per device type as per load table})_i * (\text{Number of device type in the sample geographic area as per inventory table})_i} - 1$$

where *i* = device type

is within ± 2.0%; and

- (d) if there is an inconsistency between the inventory table held in a *metering data services database* for a type 7 *metering installation* and the physical inventory, the physical inventory is to be taken as prima facie evidence of the actual number of unmetered devices.

Note

Provisions relating to type 7 metering installations will only apply in this jurisdiction in the event of a type 7 metering installation being available in this jurisdiction and after a 12 month transitional period allowing all participants to achieve compliance.

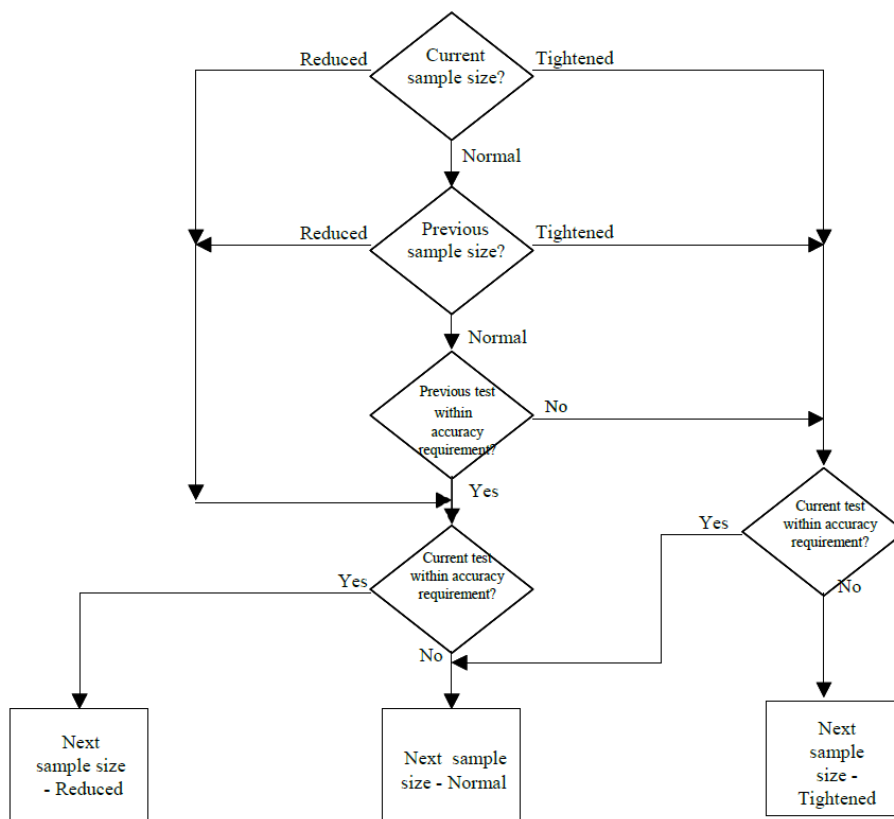
S7A.7.6.3 Metering installation type 7 – sample testing

- (a) For the purposes of sample testing type 7 *metering installations*, the *Metering Coordinator* must ensure that the sample size is determined using Table S7A.7.5.3.1. The sample is to be selected from unmetered devices in the inventory table for a *Metering Coordinator*.
- (b) The *Metering Coordinator* must ensure that the sample size for the first two validation tests is based on a 'normal' sample size indicated in Table S7A.7.5.3.1.

Table S7A.7.5.3.1 Unmetered devices in inventory table

Number of Unmetered Devices in Inventory Table	Sample Size		
	Reduced	Normal	Tightened
2 to 8	2	2	3
9 to 15	2	3	5
16 to 25	3	5	8
26 to 50	5	8	13
51 to 90	5	13	20
91 to 150	8	20	32
151 to 280	13	32	50
281 to 500	20	50	80
501 to 1200	32	80	125
1201 to 3200	50	125	200
3201 to 10000	80	200	315
10001 to 35000	125	315	500
35001 to 150000	200	500	800
150001 to 500000	315	800	1250
500001 to over	500	1250	2000

- (c) The *Metering Coordinator* must ensure that the sample size for subsequent variation tests is based on the following:



- (d) The *Metering Coordinator* must select sample unmetered devices for a validation test from random geographic areas depending on the sample size. The selection of the geographic area must be such that each unmetered device has an equal chance of being included in the sample.
- (e) The *Metering Coordinator* must ensure that the validation test is conducted at least once every 6 months, commencing from the first validation test.
- (f) Should the results of two consecutive validation tests, based on a reduced sample size, be within the accuracy requirements for that test, the *Metering Coordinator* must ensure that the next validation test is conducted at least once every 12 months.

S7A.7.6.4 Request for text of calculated metering data

If requested to test a type 7 *metering installation* by a *Registered Participant* under clause 7A.7.2, the *Metering Coordinator* must:

- (a) arrange to test that the *calculated metering data* stored in the *metering data services database* reflects the physical inventory for the type 7 *metering installation*;
- (b) use reasonable endeavours to conduct the test within 15 *business days* of the request; and
- (c) prior to any test being undertaken, provide an estimate of costs associated with the test.

S7A.7.6.5 NTESMO's metering data substitution obligations

- (a) Where *metering data* has been substituted, *NTESMO* must advise affected *Registered Participants* at the same time as that *metering data* is sent to financially responsible participants for *settlements*.
- (b) If *metering data* has not been transferred to *NTESMO* to meet the *settlements* time frames or such *metering data* has been transferred but is unusable, *NTESMO* must, in accordance with clause 7A.9.2:
 - (1) take action to obtain the *metering data*; or
 - (2) request the *Metering Coordinator* take action to obtain the metering data.

Part C

S7A.7.7 Purpose and scope

S7A.7.7.1 Purpose

The purpose of this Part is to set out obligations concerning the validation, substitution and forward estimation of *metering data* to satisfy the *Rules*.

S7A.7.7.2 Scope

- (a) This Part applies to *Metering Data Providers*, *NTESMO* and *Metering Coordinators*.
- (b) This Part must be read in conjunction with Schedule 7A.8 Part B.

S7A.7.8 Principles for validation, substitution and estimation

S7A.7.8.1 General validation, substitution and estimation requirements

The principles to be applied to validation, substitution and estimation include the following:

- (a) the *Metering Coordinator* must coordinate the resolution of issues arising from the non-performance of *metering systems*, including any liaison with associated *Registered Participants*, *Metering Providers* and *Metering Data Providers*, and the *Metering Coordinator* must respond promptly to requests for remedial action from the *Metering Data Provider* or *NTESMO*;
- (b) the *Metering Data Provider* must identify *metering data* errors resulting from data collection and processing operations using validation processes in accordance with this Part.

S7A.7.8.2 Substitution requirements

- (a) The *Metering Data Provider* must undertake substitutions on behalf of *NTESMO* or the *Metering Coordinator*, as appropriate, in a manner consistent with this Part.
- (b) Substitutions may be required in the following circumstances:
 - (1) where the system or equipment supporting the remote or manual collection of *metering data* has failed or is faulty;

- (2) where the *metering installation* for a *connection point* has failed or is removed from service;
- (3) to enable timely provision of *metering data* to financially responsible participants or *NTESMO* for *billing transactions* or *settlements* purposes, as relevant;
- (4) in situations where *metering data* has been irretrievably lost;
- (5) where the *metering data* is found to be erroneous or incomplete;
- (6) where *metering data* has not completed validation as part of the registration or transfer of a *connection point*;
- (7) where *metering data* has failed or has not completed the validation process;
- (8) where *metering data* cannot be obtained in the performance timeframes required for the data period in question:
 - (i) *metering data* for *metering installations* with *remote acquisition* must be substituted if *metering data* cannot be obtained to meet either *settlements* or *billing transactions* timeframes, as relevant, or the required performance in Schedule 7A.8 Part C; and
 - (ii) *metering data* for manually read *metering installations* must be substituted if *metering data* cannot be obtained on or within the expected timeframe of the next scheduled reading date for a *connection point*, and any historical or previous *estimated metering data* must be replaced with *substituted metering data*;
- (9) when an inspection or test on the *metering installation* establishes that a measurement error exists due to a *metering installation* fault;
- (10) when the affected financially responsible participant, the relevant *retailer* and *Local Network Service Provider* have all agreed and subsequently informed the *Metering Data Provider* that a previous substitution was inaccurate and that a re- substitution of *metering data* is required;
- (11) where the *metering data* calculation has failed the validation tests for a *metering installation* with *calculated metering data*;
- (12) in response to customer transfers authorised in this jurisdiction;
- (13) in situations involving meter churn.

S7A.7.8.3 Estimation requirement

- (a) The *Metering Data Provider* must undertake estimations on behalf of the *Metering Coordinator* in a manner consistent with this Part.
- (b) Estimations may be required in the following circumstances:
 - (1) routinely for a period equal to or just greater than the period to the next scheduled reading date or another forward period;
 - (2) in response to customer transfers authorised in this jurisdiction;
 - (3) where the current published scheduled reading date has changed due to a revised scheduled reading route and the existing *estimated*

metering data does not extend to or beyond the revised next scheduled reading date, and in this case the *Metering Data Provider* must adjust the *estimated metering data* for the revised next scheduled reading date.

S7A.7.8.4 Metering data quality flags

- (a) The *Metering Data Provider* must assign the relevant *metering data* quality flags to *metering data* as follows:

Quality Flag	Description
A	Actual <i>metering data</i> .
S	For any <i>substituted metering data</i> that is considered temporary and may be replaced by actual <i>metering data</i> . Substitutions apply to historical date/time periods at the time of substitution.
E	For any <i>estimated metering data</i> that is considered temporary and may be replaced by actual <i>metering data</i> or <i>substituted metering data</i> . Estimations apply to a period that has an end date/time in the future.
F	For substitutions that are of a permanent or final nature and, subject to paragraph S7A.7.8.5(b) and (e), the <i>metering data</i> would not be replaced by actual <i>metering data</i> at any time.
N	This quality flag is only utilised within the <i>interval metering data</i> file for instances where no <i>metering data</i> exists in the <i>metering data services database</i> for the periods concerned.

- (b) Unless specified otherwise in this Part, *Metering Data Providers* must apply the following quality flag rules in the *metering data services database*:
- (1) 'A' *metering data* can only be replaced with 'A', 'S' or 'F' *metering data*;
 - (2) 'S' *metering data* can only be replaced with 'A', 'S' or 'F' *metering data*;
 - (3) 'E' *metering data* can only be replaced with 'A', 'E', 'S' or 'F' *metering data*;
 - (4) 'F' *metering data* can only be replaced with 'F' *metering data* as per paragraph S7A.7.8.5(f) or 'A' *metering data* as per paragraph S7A.7.8.5(b) or S7A.7.8.5(h).

S7A.7.8.5 Final substitution

The *Metering Data Provider* must undertake final substitutions in the following circumstances:

- (a) where a notice has been received from either the *Metering Coordinator* or the *Metering Provider* detailing a failure of the *metering installation* that affects the quality of the *energy data*;

- (b) if actual *metering data* is unexpectedly recovered from the *metering installation* and a final substitution has been undertaken in accordance with paragraph (1), and in this case the *Metering Data Provider* must replace the final *substituted metering data* with the actual *metering data* and maintain a record of the reason;
- (c) where the *Metering Data Provider* must undertake final substitutions following a meter churn;
- (d) where the *Metering Data Provider* has received a notice that the affected financially responsible participant, the relevant *retailer* and *Local Network Service Provider* have agreed that the *metering data* is erroneous and that a final substitution is required;
- (e) where *NTESMO* requests the provision of substitutions and final readings in response to customer transfers authorised in this jurisdiction where required for the purposes of *settlements*;
- (f) where the *Metering Data Provider* may undertake to replace existing final *substituted metering data* with new final *substituted metering data* in accordance with this Part;
- (g) where the *Metering Data Provider* has found actual *metering data* to be erroneous;
- (h) where the *Metering Data Provider* is replacing type 6 final *substituted metering data* with *accumulated metering data* that spans consecutive *meter* readings on agreement with the financially responsible participant, the relevant *retailer* and the *Local Network Service Provider*.

S7A.7.9 Substitution for acquisition of metering data from remotely read metering installations

S7A.7.9.1 Application of S7A.7.9

- (a) For *metering installations* with *remote acquisition* installed in accordance with paragraph 7A.6.8(a), the *Metering Data Provider* may perform substitutions in accordance with clause S7A.7.10.
- (b) For all other *metering installations* with *remote acquisition*, the *Metering Data Provider* must perform substitutions in accordance with clause S7A.7.9.

S7A.7.9.2 Substitution rules

The *Metering Data Provider* must apply the following rules when performing a substitution:

- (a) the *Metering Data Provider* must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which substitutions are required;
- (b) the *Metering Data Provider* must undertake to do a type 11 substitution and use *metering data* obtained from any *check metering installation* associated with the *connection point* as the first choice considered for the source of *metering data* for any substitutions undertaken;

- (c) SCADA data, where available, may be used by the *Metering Data Provider* as *check metering data* for substitutions;
- (d) the *Metering Data Provider* may only undertake substitution type 13 where substitution types 11 and 12 are not applicable or cannot be carried out;
- (e) for *connection points* where the financially responsible participant is a *generator*:
 - (1) the *Metering Data Provider* may directly undertake type 11, type 12 or type 13 substitutions if *metering data* has failed validation;
 - (2) the *Metering Data Provider* may undertake type 16 or 18 substitutions following consultation and agreement with the affected *generator* that the *substituted metering data* is an accurate reflection of the *interval metering data* concerned;
 - (3) if *metering data* cannot be collected from a *metering installation* or substituted within the required timeframes, the *Metering Data Provider* must undertake type 19 substitutions as an interim until *metering data* can be collected from the *metering installation* or substituted;
- (f) the *Metering Data Provider* may only undertake substitution types 14, 15, 16, 17, 18, or 19 where substitution types 11, 12 and 13 are not applicable or cannot be carried out;
- (g) the *Metering Data Provider* may perform all substitution types except type 16 or 18 without the agreement of the affected financially responsible participant, *Local Network Service Provider* or relevant *retailer* and the *Metering Data Provider* may change the quality flag to an existing type 16 or 18 substitution without seeking further agreement from those parties;
- (h) the *Metering Data Provider* must notify the *Local Network Service Provider*, relevant *retailer* and the financially responsible participant for the *connection point* of any substitution within two *business days* of the substitution being carried out, and this notification is to be achieved via the participant *metering data* file as detailed in the MDFFF Specification;
- (i) where there is a *metering installation malfunction* that cannot be repaired within the periods specified in clause 7A.6.9, the *Metering Data Provider* must:
 - (1) where the *metering installation malfunction* is due to a failure of the *meter* to correctly record *interval energy data* and the *Metering Coordinator* has been granted an exemption to repair the *metering installation*, substitute the missing *metering data* in accordance with this Part;
 - (2) for type 1-3 *metering installations* and other *instrument transformer* connected *metering installations*, and where a *metering installation malfunction* is due to a failure of the *remote acquisition* system, arrange for an alternative method for the collection of *metering data* from the *metering installation* in a timeframe that ensures the *Metering Data Provider* complies with *metering data* delivery requirements; or

- (3) for non-*instrument transformer* connected *metering installations*, and where a *metering installation malfunction* is due to a failure of the *remote acquisition* system, substitute the missing *metering data* in accordance with this Part;
- (j) the *Metering Data Provider* must ensure that all *substituted metering data* is replaced with actual *metering data* when it becomes available.

S7A.7.9.3 Substitution types

Type 11 – Check data

- (a) To perform a type 11 substitution, the *Metering Data Provider* must use *interval metering data* obtained from the *check metering installation* for that *metering point* where:
 - (1) the *metering installation* and *check metering installation* are installed at the same *connection point*;
 - (2) the *metering installation* and *check metering installation* are installed on different ends of a *transmission* line where the difference due to *transmission line* losses can be accurately determined; or
 - (3) the *metering installation* and the *check metering installation* are installed across a parallel set of feeders having similar line impedances between a common set of busbars.

Type 12 – Calculated

- (b) To perform a type 12 substitution, the *Metering Data Provider* must calculate the *interval metering data* to be substituted where they relate to a single unknown feed to a node based on the other known *energy* flows to or from that node.

Type 13 – SCADA

- (c) To perform a type 13 substitution:
 - (1) the *Metering Data Provider* must use SCADA data provided by *NTESMO* in the agreed format for substitution purposes, which originates from a similar measurement point as the *meter*;
 - (2) where SCADA data is inferior in accuracy or resolution and in a dissimilar format to the *metering data*, (for example, 30 Min. demand values). the *Metering Data Provider* may have to adjust the data in both magnitude and form so that the substitution is valid; and
 - (3) where SCADA data is to be used for Substitution, both the provided 'E' channel and 'B' channel SCADA data streams must be used.

Type 14 – Like day

- (d) To perform a type 14 substitution, the *Metering Data Provider* must substitute missing or erroneous *metering data* using the nearest equivalent day or like day method, as detailed in Table 1.

Table 1

TYPE 14	
Substitution day	Nearest equivalent day or like day (in order of availability)
Monday	Monday ##
Tuesday	Tuesday## Wednesday## Thursday## Wednesday# Thursday#
Wednesday	Wednesday## Tuesday# Thursday## Thursday# Tuesday##
Thursday	Thursday## Wednesday# Tuesday# Wednesday## Tuesday##
Friday	Friday##
Saturday	Saturday##
Sunday	Sunday##
<p>Substitutions for like day to be as detailed above, unless:</p> <p>(a) No <i>metering data</i> is available on the first listed day, the next listed preferred day is to be used. If there is no other suitable listed day, or no <i>metering data</i> is available on any of the listed days type 15 substitution must be used.</p> <p>(b) The substitution day was a public holiday, in which case the most recent Sunday is to be used.</p> <p>(c) The substitution day was not a public holiday and the listed day is a public holiday, then the next listed preferred day that is not a public holiday is to be used.</p> <p># Occurring in the same week as the substitution day.</p> <p>## Occurring in the week preceding that in which the substitution day occurs.</p>	

Type 15 – Average like day

- (e) To perform a type 15 substitution, the *Metering Data Provider* may substitute missing or erroneous *metering data* using the average like day method, as detailed in Table 2.

Table 2

TYPE 15

The *interval metering data* to be substituted will be calculated using an average of the *metering data* from each corresponding interval from the preceding 4 weeks, or any part of those. This averaging technique may be applied in either of the following ways:

- (a) where the averaged *interval metering data* is used to provide the value for the *metering data* requiring substitution;
- (b) where the averaged *interval metering data* is used to provide the *profile* and is scaled to a pre-determined consumption value for the *metering data* to be substituted.

Type 15 substitutions must not be used for public holidays.

Type 16 – Agreed method

- (f) Where the *Metering Data Provider* is required to undertake substitution for any period greater than seven *days* for type 1 – 3 *metering installations* or greater than 15 *days* for other *metering installation* types, the *Metering Data Provider* must consult and use reasonable endeavours to reach an agreement with the financially responsible participants, relevant *retailer* and the *Local Network Service Provider* for the *connection point*. This may include changes to existing substitutions for any period where those affected parties have directed that as a result of site or end user information, the original substitutions are in error and a correction is required.

Type 17 – Linear interpolation

- (g) To perform a type 17 substitution, the *Metering Data Provider* may substitute *metering data* for consecutive intervals up to, but not exceeding two hours, by using simple linear interpolation.

Type 18 – Alternative

- (h) To perform a type 18 substitution, the *Metering Data Provider* may use an alternative method of substitution subject to agreement with the financially responsible participants, relevant *retailer* and the *Local Network Service Provider* for the *connection point*. The specifics of this substitution type may involve a globally applied method or a method where an adjusted *profile* is used to take into account local conditions that affect consumption (for example, local holiday or end user shutdown), or where alternative *metering data* may be available for quality checks, such as using *metering register* data.

Type 19 – Zero

- (i) The *Metering Data Provider* must undertake substitutions of 'zero' where:
 - (1) the *Local Network Service Provider* or the *Metering Provider* has informed the *Metering Data Provider* of a de-energised *connection point* or an inactive *meter* and the consumption is reasonably believed to be zero; or

- (2) substitutions are applicable for *connection points* where the financially responsible participant is a *Generator* in accordance with clause S7A.7.9.2.

S7A.7.10 Substitution and estimation for manually read interval metering installations

S7A.7.10.1 Application of S7A.7.10

- (a) The substitution and estimation requirements in this clause S7A.7.10 are only to be used for *metering installations* where:
 - (1) *interval metering data* is manually collected as a scheduled meter reading; or
 - (2) the *metering installations* have been installed with *remote acquisition* in accordance with paragraph 7A.6.8(a).
- (b) Where *remote acquisition* of *metering data* has failed at the *metering installation* and manual collection of *interval metering data* is required, the substitution requirements specified in clause S7A.7.9 apply.

S7A.7.10.2 Substitution and estimation rules

- (a) The *Metering Data Provider* must ensure that all *substituted metering data* and *estimated metering data* are replaced with actual *metering data* when it becomes available.
- (b) The *Metering Data Provider* must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which substitutions are required.
- (c) Where there is a *metering installation malfunction* that cannot be repaired within the periods specified in clause 7A.6.9, the *Metering Data Provider* must substitute the missing *metering data* in accordance with this Part.
- (d) The *Metering Data Provider* must only apply the following substitution and estimation types:
 - (1) substitutions may be type 51, 52, 53, 54, 55, 56, 57 or 58;
 - (2) estimations may be type 51, 52, 56, 57 or 58.
- (e) The *Metering Data Provider* must only use type 56 or 57 substitutions or estimations where the historical data does not support the application of a type 51 or 52 substitution or estimation.
- (f) The *Metering Data Provider* must notify the *Local Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point* of any substitution or estimation within 2 *business days* of the substitution.
- (g) *Metering Data Providers* must not perform type 53 or 55 substitutions or type 56 substitutions or estimations without the agreement of the *Local Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point*. *Metering Data Providers* may change the quality flag to an existing type 53 or 55 substitution or type

56 substitution or estimation without seeking further agreement from those parties.

S7A.7.10.3 Substitution and estimation types

Type 51 – Previous years method (nearest equivalent day or like day method)

- (a) To perform a type 51 substitution, the *Metering Data Provider* must provide a substitute or estimate using the *metering data* from the nearest equivalent *day* or like *day* from the same, or similar, *meter* reading period in the previous year. The nearest equivalent *day* or like *day* is to be determined from Table 3.

Type 52 – Previous meter reading method (nearest equivalent day or like day method)

- (b) To perform a type 52 substitution, the Metering Data Provider must provide a substitute or estimate using the metering data from the nearest equivalent day or like day from the previous meter reading period. The nearest equivalent day or like day is to be determined from Table 3.

Table 3

TYPE 51 or 52	
Substitution day	Nearest equivalent day or like day (in order of availability)
Monday	Monday ## Monday#
Tuesday	Tuesday## Wednesday## Tuesday# Wednesday#
Wednesday	Wednesday## Tuesday## Thursday## Wednesday# Thursday# Tuesday#
Thursday	Thursday## Wednesday## Tuesday## Thursday# Wednesday# Tuesday#
Friday	Friday## Friday#
Saturday	Saturday## Saturday#
Sunday	Sunday## Sunday#
Substitutions or estimations for like day to be as detailed above, unless: <ul style="list-style-type: none"> (a) no <i>metering data</i> is available on the first listed day, in which case the next listed preferred day is to be used. If there is no other suitable day, or no metering data is available on any of the listed days, type 52 must be used; (b) the substitution or estimation day was a public holiday, in which case the most recent Sunday is to be used; or (c) the substitution or estimation day was not a public holiday and the listed 	

<p>day is a public holiday, in which case the next listed preferred day that is not a public holiday, Saturday or Sunday is to be used.</p> <p>## For type 51 utilise <i>metering data</i> from the corresponding week in the previous year.</p> <p>## For type 52 utilise <i>metering data</i> from the corresponding week of the previous <i>meter</i> reading period.</p> <p># For type 51 utilise <i>metering data</i> from the week preceding the corresponding week in the previous year.</p> <p># For type 52 utilise <i>metering data</i> occurring in the week preceding the corresponding week of the previous <i>meter</i> reading period.</p>

- (c) Alternatively, the *Metering Data Provider* must provide *substituted metering data* or *estimated metering data* using the average like day method, as detailed in Table 4.

Table 4

<p>TYPE 52 (Alternative)</p> <p>The <i>interval metering data</i> for which substitution or estimation is to be carried out will be calculated using an average of the <i>metering data</i> from each corresponding interval from any part, or all, of the preceding 4 weeks. This averaging technique may be applied in either of the following ways:</p> <ul style="list-style-type: none"> • where the averaged <i>interval metering data</i> is used to provide the value for the <i>metering data</i> requiring substitution or estimation; • where the averaged <i>interval metering data</i> is used to provide the <i>profile</i> and are scaled to a pre-determined consumption value for the <i>metering data</i> that are the subject of substitution or estimation. <p>Type 52 substitutes or estimates must not be used for public holidays.</p>
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Type 53 – Revision of substituted metering data

- (d) To perform a type 53 substitution, the *Metering Data Provider* must re-substitute or change *substituted metering data* to collecting an actual *meter* reading, where the financially responsible participant, the relevant *retailer* and the *Local Network Service Provider* have agreed, on the basis of site or end user information, that the original *substituted metering data* is in error and a correction is required.

Type 54 – Linear interpolation

- (e) To perform a type 54 substitution, the *Metering Data Provider* may substitute *metering data* for intervals up to, but not exceeding 2 hours, by using simple linear interpolation.

Type 55 – Agreed substitution method

- (f) To perform a type 55 substitution, the *Metering Data Provider* may undertake to use another method of substitution (which may be a modification of an existing substitution type), where none of the existing substitution types apply, subject to using reasonable endeavours to form an agreement with the financially responsible participant, the relevant *retailer* and *Local Network Service Provider* for the *connection point*. The specifics of this substitution type may involve a globally applied method.

Type 56 – Prior to first reading – agreed method

- (g) Prior to the first actual *meter* reading and where no historical data exists for the *connection point*, the *Metering Data Provider* may provide a substitution or estimation for the *interval metering data* using a method agreed between the financially responsible participant, the relevant *retailer* and *Local Network Service Provider*.

Type 57 – Prior to first reading – customer class method

- (h) [Not used]

Type 58 – Zero

- (i) The *Metering Data Provider* must undertake substitutions or estimations of 'zero' where either the *Local Network Service Provider* or the *Metering Provider* has informed the *Metering Data Provider* of a de-energised *connection point* or an inactive *meter* and where the consumption is known to be zero.

S7A.7.11 Substitution and estimation for metering installations with accumulated metering data

S7A.7.11.1 Substitution and estimation rules

- (a) The *Metering Data Provider* must replace all *estimated metering data* with either actual *metering data* or *substituted metering data* when:
- (1) actual *metering data* covering all or part of the estimation period is obtained;
 - (2) the scheduled *meter* reading could not be undertaken, by replacing the *estimated metering data* with *substituted metering data* with a quality flag of 'F'; or
 - (3) the scheduled *meter* reading could not be undertaken, by replacing the *estimated metering data* with *substituted metering data* with a quality flag of 'F' unless it was identified that the *metering installation* no longer has an accumulation *meter* installed, in which case a quality flag of 'S' may be used.
- (b) Any final *substituted metering data* provided by the *Metering Data Provider* must be re-validated, updated or re-calculated by the *Metering Data Provider* when:
- (1) the value of the *metering data* obtained at the next actual *meter* reading is found to be less than the previous final substitution; or

- (2) the final substituted value is disputed and following consultation and agreement with the financially responsible participant, the relevant *retailer* and the *Local Network Service Provider* for the *connection point*, the new agreed value will be determined using type 64 substitution.
- (c) The *Metering Data Provider* must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which substitutions are required.
- (d) The *Metering Data Provider* may apply the following substitution and estimation types:
 - (1) substitutions may be type 61, 62, 63, 64, 65, 66, 67 or 68;
 - (2) estimations may be type 61, 62, 63, 65 or 68.

When to use Type 62 substitution

- (e) Where the scheduled *meter* reading cycle is less frequent than monthly, the *Metering Data Provider* may only use a type 62 substitution or estimation method when *metering data* from the same, or similar, *meter* reading period last year (that is, type 61) is not available.

When to use Type 63 substitution

- (f) The *Metering Data Provider* may use type 63 substitutions or estimations only when the *metering data* from the same, or similar, *meter* reading period last year and *metering data* from the previous *meter* reading period is not available (that is, when type 61 and type 62 substitution or estimation methods cannot be used).

When to use Type 65 substitution

- (g) The *Metering Data Provider* may use type 65 substitutions or estimations only when the *metering data* from the same, or similar, *meter* reading period last year or the *metering data* from the previous *meter* reading period is not available (that is, when type 61 and type 62 substitution or estimation methods cannot be used).

When to use Type 67 substitution

- (h) The *Metering Data Provider* must only use a type 67 substitution when:
 - (1) directed by the *Metering Coordinator*;
 - (2) not expressly disallowed in this *jurisdiction*;
 - (3) the *retail customer*-provided *meter* reading meets the validation rules for that data stream; or
 - (4) the *Metering Data Provider* has no actual *metering data*.

When to use Type 64 or 66 substitution

- (i) *Metering Data Providers* must not perform type 64 or 66 substitutions without seeking the agreement of the financially responsible participant, the relevant *retailer* and the *Local Network Service Provider* for the *connection point*. *Metering Data Providers* may, however, undertake to change the

quality flag to an existing type 64 or 66 substitution without seeking further agreement from those parties.

- (j) The *Metering Data Provider* must notify the relevant parties for the *connection point* of any substitution or estimation within 2 *business days* of the substitution or estimation. Notification must comply with the obligations set out in S7A.8.9.11.

S7A.7.11.2 Substitution and estimation types

Type 61 – Previous year method (average daily consumption method)

- (a) To perform a type 61 substitution, the *Metering Data Provider* must provide a substitution or estimation of the *meter* reading by calculating the *energy* consumption as per the following formula:

$$\text{Energy Consumption} = \text{ADC}_{\text{LY}} * \text{number of days required}$$

where

ADC_{LY} = average daily consumption from the same or similar *meter* reading period last year.

Type 62 – Previous meter reading method (average daily consumption method)

- (b) To perform a type 62 substitution, the *Metering Data Provider* must provide a substitution or estimation of the *meter* reading by calculating the *energy* consumption as per the following formula:

$$\text{Energy Consumption} = \text{ADC}_{\text{PP}} * \text{number of days required.}$$

where

ADC_{PP} = average daily consumption from the previous *meter* reading period.

Type 63 – Customer class method

- (c) To perform a type 63 substitution, the *Metering Data Provider* must provide a substitution or estimation by calculating the *energy* consumption as per the following formula:

$$\text{Energy Consumption} = \text{ADC}_{\text{CC}} * \text{number of days required}$$

where

ADC_{CC} = average daily consumption for this customer class with the same type of usage.

Type 64 – Agreed method

- (d) To perform a type 64 substitution, the *Metering Data Provider* may undertake to use another method of substitution (which may be a modification of an existing substitution type), where none of the existing substitution types are applicable, subject to using reasonable endeavours to form an agreement with the financially responsible participant, the relevant

retailer and Local Network Service Provider for the connection point. The specifics of this substitution type may involve a globally applied method.

Type 66 – ADL method

- (e) [Not used]

Type 66 – Revision of substituted metering data

- (f) To perform a type 66 substitution, the *Metering Data Provider* must re-substitute or change *substituted metering data* prior to collecting an actual *meter* reading where the financially responsible participant, the relevant *retailer* and the *Local Network Service Provider* for the *connection point* have agreed to revise the original *substituted metering data*, on the basis of site or end user specific information.

Type 67 – Customer reading

- (g) Unless the *Metering Data Provider* is required to apply a type 68 substitution, the *Metering Data Provider* must substitute any previously *substituted metering data* or *estimated metering data* based directly on a *meter* reading provided by an end user.

Type 68 – Zero

- (h) The *Metering Data Provider* must undertake substitutions or estimations of 'zero' where either the *Local Network Service Provider* or *Metering Provider* has informed the *Metering Data Provider* of a de-energised *connection point* or an inactive *meter* and where the consumption is known to be zero.

S7A.7.12 Substitution and estimation for calculated metering data

S7A.7.12.1 Substitution rules

- (a) The *Metering Data Provider* must:
- (1) obtain clear and concise identification as to the cause of any missing or erroneous *calculated metering data* for which *substituted metering data* are required;
 - (2) ensure that all *substituted metering data* and *estimated metering data* are based on *calculated metering data* and not on any previous substitutions or estimations (as applicable);
 - (3) base *calculated metering data* for type 7 *metering installations* on inventory table data as follows:
 - (i) where the inventory table has not been updated for the period concerned, *calculated metering data* must be based on the most recent available information and provided as an estimate; and
 - (ii) where the inventory table is correct for the period concerned, the *calculated metering data* must be flagged as 'A' *metering data*, however, when the inventory table is subsequently updated for the period concerned, the *calculated metering data* must be flagged as 'F' *metering data*;

- (4) notify the *Local Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point* of any substituted *calculated metering data* within 2 *business days* of the substitution, and this notification is achieved via the Participant *metering data* file as detailed within Schedule 7A.8; and
 - (5) flag all *calculated metering data* substitutions as 'F'.
- (b) The *Metering Data Provider* may apply the following substitution and estimations types:
- (1) substitutions may be type 71, 72, 73, or 74;
 - (2) estimations may be type 75.

S7A.7.12.2 Substitution and estimation types

Type 71 – Recalculation

- (a) To perform a type 71 substitution, the *Metering Data Provider* must substitute *calculated metering data* with the *calculated metering data* obtained by a recalculation based on the current inventory tables, load tables and on/off tables.

Type 72 – Revised tables

- (b) Where the error in the *calculated metering data* is due to errors in the inventory table, load table and on/off table, the *Metering Data Provider* must substitute *calculated metering data* by a recalculation based on the most recent inventory tables, load tables and on/off tables in which there were no errors.

Type 73 – Revised algorithm

- (c) Where the error in the *calculated metering data* is due to an error in its calculation, the *Metering Data Provider* must substitute the most recent *calculated metering data* for which there was no error.

Type 74 – Agreed method

- (d) The *Metering Data Provider* may use another method of *calculated metering data* substitution (which may be a modification of an existing substitution type), where none of the existing substitution types is applicable, subject to using reasonable endeavours to form an agreement between the financially responsible participant, the relevant *retailer* and *Local Network Service Provider* for the *connection point*. The specifics of this substitution type may involve a globally applied method.

Type 75 – Existing table

- (e) The *Metering Data Provider* must provide an estimate for the *calculated metering data* based on the most recent inventory table until such time as an updated inventory table is received for the period concerned.

S7A.7.13 Data validation requirements

S7A.7.13.1 Validation requirements for all metering installations

Metering Data Providers must manage systems and processes on the basis that:

- (a) stored *metering data* held in the *meter* buffer might be subject to installation measurement error;
- (b) data delivered by reading systems, (for example, remote reading systems, hand-held readers and conversion software) might not be recovered from the *meters* without corruption; and
- (c) auditable validation procedures are of critical importance and can have a direct impact on disputes. It is essential that *Metering Data Providers* comply with these validation procedures and that all *metering data* is subject to validation prior to delivery to *NTESMO, Registered Participants* and financially responsible participants.

S7A.7.13.2 Validation of interval metering data alarms

- (a) The *Metering Data Provider* must validate *interval metering data* against the following *meter* alarms when these are provided in the *meter*:
 - (1) power failure/*meter* loss of supply;
 - (2) *voltage transformer* or phase failure;
 - (3) pulse overflow;
 - (4) cyclic redundancy check error; and
 - (5) time tolerance.
- (b) Where *interval metering installations* assign alarms to the data channel and the *interval metering data* concerned, the *Metering Data Provider* must process the alarm along with the *metering data* as part of the required validation.
- (c) The *Metering Data Provider* must ensure that all *metering data* alarm reports are signed off and dated by the person actioning the data exception report review as part of the validation.
- (d) The *Metering Data Provider* must validate all *interval metering data* with all *metering data* alarms prior to providing to *NTESMO, Registered Participants* or financially responsible participants.
- (e) All *Metering Data Provider* exception reports must provide, for all instances where the *interval metering data* was found to be corrupted, an indication of the subsequent actions undertaken by the *Metering Data Provider*.

S7A.7.13.3 Validation within the meter reading process for manually read metering installations

Validations during collection of interval metering data

- (a) The validations to be performed by *Metering Data Providers* responsible for the collection of *interval metering data* from manually read *metering installations* are as follows:
- (1) the *meter* serial number matches the recorded *meter* serial number;
 - (2) the security of the *metering installation* is intact, for example, *meter* seals are in place and in good order;
 - (3) the time synchronisation of the *metering installation* is correct to *ACST* inclusive of any *load* control devices.

Validations during collection of accumulated metering data

- (b) The validations to be performed by *Metering Data Providers* responsible for the collection of *accumulated metering data* are as follows:
- (1) the value of *metering data* from the current *meter* reading \geq the value of *metering data* from the previous *meter* reading;
 - (2) the value of *metering data* from the current *meter* reading is valid against an expected minimum value;
 - (3) the value of *metering data* from the current *meter* reading is valid against an expected maximum value;
 - (4) the *meter* serial number matches the recorded *meter* serial number;
 - (5) the security of the *metering installation* is intact, for example, *meter* seals are in place and in good order;
 - (6) the time synchronisation of the *metering installation* is correct to *ACST* inclusive of any *load* control devices;
 - (7) the dial capacity is checked against the recorded dial capacity.

S7A.7.13.4 Validation as part of the registration process

General requirements

- (a) *Metering Data Providers* must confirm information about the *NMI* is provided to *NTESMO*, where this is required in accordance with clause 7A.10.1, after any installation or change to a *metering installation* prior to the provision of any *metering data* to *NTESMO* or *Registered Participants* for the purposes of *settlements*.

Validation of metering data from remotely read metering installations

- (b) *Metering Data Providers* must carry out the following validations after any installation or change to a *metering installation* with *remote acquisition* of *metering data* prior to the distribution of any *interval metering data* to *NTESMO*, *Registered Participants* or financially responsible participants for the purposes of *settlements* or *billing transactions*:

- (1) for instrument transformer connected *metering installations*, the *metering installation* is recording *metering data* correctly, in conjunction with the *Metering Provider*;
- (2) for whole current *metering installations*, the *metering data* correctly pertains to the registered *metering installation*;
- (3) all data streams are captured.

Validation of interval metering data from manually read metering installations

- (c) The *Metering Data Provider* must carry out the following validations in conjunction with the *Metering Provider* for manually read interval *metering installations* after any changes to a *metering installation* prior to the provision of any *interval metering data* to *NTESMO*, *Registered Participants* or financially responsible participants for the purposes of *settlements* or *billing transactions*:
 - (1) the *metering data* correctly pertains to the registered *metering installation*;
 - (2) all data streams are captured.

Validation of accumulated metering data from manually read metering installations

- (d) *Metering Data Providers* must carry out the following validations, following any changes to a *metering installation* and prior to the provision of any *accumulated metering data* to *NTESMO*, *Registered Participants* or financially responsible participants for the purposes of *settlements* or *billing transactions*:
 - (1) the *metering data* correctly pertains to the registered *metering installation*;
 - (2) all data streams are captured.

Validation of type 7 metering installations

- (e) *Metering Data Providers* must validate the *calculated metering data* on registration of all *metering installations* to verify that the inventory tables, load tables and on/off tables are complete and correct for the specifics of the *metering installation*.

S7A.7.13.5 Validation of metering data

General

- (a) For *metering installations* with *remote acquisition* installed in accordance with paragraph 7A.6.8(a), the *Metering Data Provider* may perform validation in accordance with clauses S7A.7.14.4 and S7A.7.14.5, instead of clause S7A.7.14.2.

Validations for remotely read metering installations

- (b) *Metering Data Providers* must, as a minimum, undertake the following validations within the *metering data services database* for *metering installation* types with *remote acquisition* of *metering data*:
- (1) a check of all *interval metering data* against a nominated maximum value:
 - (i) this validation is to ensure that erroneous *interval metering data* spikes are trapped and substituted;
 - (ii) this check may additionally be performed in the polling software;
 - (2) a check of the maximum value of *active energy* and *reactive energy*:
 - (i) for *current transformer metering installations*, the maximum value is to be initially determined by the connected *current transformer* ratio of the *metering installation*;
 - (ii) for whole current *metering installations* the maximum rating of the *meter* is to be used;
 - (3) a check against a nominated minimum value or, alternatively, a 'zero' check that tests for an acceptable number of zero intervals values per day to be derived from the site's historical *metering data*;
 - (4) a check for null (no values) *metering data* in the *metering data services database* for all data streams:
 - (i) the aim of this check is to ensure that there is a 100% *metering data* set (and substitution for any missing *interval metering data* is undertaken);
 - (ii) the minimum check required is to ensure that there is at least one non-null *active energy* or *reactive energy* value per interval per *metering data stream*;
 - (5) a check for the *meter* alarms referred to in clause S7A.7.13.2 and ensure:
 - (i) that a process is in place that captures these *meter* alarms within the validation and ensures that any *meter* alarm occurrences are retained as part of the *metering data* audit trail;
 - (ii) the provision of details of the occurrences of *meter* alarms to relevant *Registered Participants* within the *metering data* file in accordance with the MDFP Specification.

Validations for metering installations with checking metering or partial check metering

- (c) *Metering Data Providers* must undertake the following validations by comparing the *metering data* and *check metering data* for all *metering installations* that have associated *check metering installations* or *partial check metering installations*:
- (1) for *metering installations* where the *check metering installation* duplicates the *metering installation* accuracy, the *Metering Data*

- Provider* must validate the *metering installation* data streams and *check metering data* streams on a per interval basis, and the average of the two validated *metering data* sets will be used to determine the energy measurement;
- (2) for installations where the *check metering data* validation requires a comparison based on nodal balance (comparing the sum energy flow to the busbar against energy flow from the busbar):
 - (i) the *Metering Data Provider* must construct a validation algorithm within the *metering data services database* that will facilitate comparison of *interval metering data* for each *energy flow* on a per interval basis;
 - (ii) the *Metering Data Provider* must conduct an analysis of the historical *metering data* for each *connection point* to ascertain whether error differences in nodal balance are acceptable;
 - (iii) the *Metering Data Provider* should use this information to refine its validation algorithms to minimise the error difference for each *connection point*, based on historical *metering data*;
 - (iv) the maximum error difference considered acceptable for any *connection point* is 1% on a per interval basis, and the *Metering Data Provider* should minimise this for each *connection point*, based on historical *metering data*;
 - (3) where the *check metering installation* is remote from the *metering installation*(for example, at the other end of a *transmission line* or the other side of a *transformer*):
 - (i) the *Metering Data Provider* must construct a validation algorithm within the *metering data services database* that will facilitate comparison of *interval metering data* from the *metering installation* and the *check metering installation* on a per interval basis with adjustment for respective *transformer* or *transmission line* losses;
 - (ii) the *Metering Data Provider* must conduct an analysis of the historical *metering data* for each *connection point* to ascertain whether the error differences between the *metering data* from the *metering installation* and *check metering installation* are acceptable;
 - (iii) the *Metering Data Provider* should use this information to refine its validation algorithms to minimise the error difference for each *connection point*, based on historical *metering data*;
 - (iv) the maximum error difference considered acceptable for any *connection point* is 5% on a per interval basis, and the *Metering Data Provider* should minimise this for each *connection point*, based on historical *metering data*;
 - (4) for *connection points* where SCADA data is made available by *NTESMO* for the purposes of validation, the *Metering Data Provider* must validate the *metering data* by comparison of the *interval*

metering data against the SCADA data as provided by *NTESMO* in the agreed format:

- (i) the *Metering Data Provider* must construct a validation algorithm within the *metering data services database* that will facilitate comparison of *interval metering data* from the *metering installation* and the SCADA data on a per interval basis;
 - (ii) the *Metering Data Provider* must conduct an analysis of the historical *metering data* for each *connection point* to ascertain whether error differences between the *interval metering data* from the *metering installation* and the SCADA data are acceptable;
 - (iii) the *Metering Data Provider* should use this information to refine its validation algorithms to minimise the error difference value for each *connection point*, based on historical *metering data*;
 - (iv) the *Metering Data Provider* must construct an appropriate validation algorithm as the SCADA data may be derived from a different measurement point, have a different interval collection period or have a different base unit of measurement, (for example, power not *energy* value) with allowances for a larger error of measurement;
- (5) the *Metering Data Provider* is only required to undertake validation of *metering data* against the SCADA data on the primary data channel i.e. only 'B' channel validation where the financially responsible participant is a *Generator* and only 'E' channel validation for *loads*, such as pumps.

Validations for interval metering data from manually read metering installations with current transformers

- (d) *Metering Data Providers* must, as a minimum, undertake the following validations on *interval metering data* from *manually read metering installations with current transformers* within the *metering data services database*:
- (1) a check of all *interval metering data* against a nominated maximum value:
 - (i) this validation is to ensure that erroneous *interval metering data* spikes are trapped and substituted;
 - (ii) this check may additionally be performed in the collection software;
 - (2) a check of the maximum value of *active energy*, which must initially be determined by the connected *current transformer* ratio of the *metering installation*(maximum *reactive energy* checks may also be performed as an option);
 - (3) a check against a nominated minimum value or, alternatively, a 'zero' check that tests for an acceptable number of zero interval values per day to be derived from the site's historical *metering data*;

- (4) a check for null (no values) *metering data* in the *metering data services database* for all *metering data* streams:
 - (i) the aim of this check is to ensure that there is a 100% *metering data* set (and that substitution for any missing *interval metering data* is undertaken);
 - (ii) the minimum check required is to ensure that there is at least one non-null *active energy* or *reactive energy* value per interval per *metering data* stream;
- (5) a check for *meter* alarms referred to in clause S7A.7.13.2 and ensure that:
 - (i) a process is in place that captures these *meter* alarms within the validation and ensures that any *meter* alarm occurrences are retained as part of the *metering data* audit trail; and
 - (ii) the relevant *Registered Participants* are notified of the occurrences of these *meter* alarms within the *metering data* file in the MDFF specification;
- (6) where supported by the *meter(s)*, validation for a given period of *interval metering data* by comparison of the totalised *interval energy data* (accumulation register reading) and the change in the *meter* cumulative registers (*energy tolerance*); it is acknowledged that this check would not identify *current transformer* ratio changes that have occurred after initial commissioning and have not been advised to the *Metering Data Provider*;
- (7) a check of the *metering data* for continuity and reasonability over the *meter* reading period:
 - (i) check that no gaps in the *metering data* exist;
 - (ii) check that *metering data* for the expected period has been delivered based on the scheduled meter reading date.

Validations for interval metering data from whole current manually read metering installations

- (e) *Metering Data Providers* must, as a minimum, undertake the following validations on *metering data* from whole current manually read interval *metering installations* within the *metering data services database*:
 - (1) a check of all *interval metering data* against a nominated maximum value:
 - (i) this validation is to ensure that erroneous *interval metering data* spikes are trapped and substituted;
 - (ii) this check may additionally be performed in the collection software;
 - (2) a check of the maximum value of *active energy* (maximum *reactive energy* checks may also be performed as an option), and the maximum value is to be initially set to the rating of the *meter*;

- (3) a check for null (no values) *metering data* in the *metering data services database* for all *metering data* streams:
 - (i) the aim of this check is to ensure that there is a 100% *metering data* set (and that substitution for any missing *interval metering data* is undertaken);
 - (ii) the minimum check required is to ensure that there is at least one non-null *active energy* or *reactive energy* value per interval per *metering data* stream;
- (4) a check for *meter* alarms referred to in clause S7A.7.13.2 and the *Metering Data Provider* is not required to validate the *interval metering data* for power outage or power failure alarms, but must ensure that:
 - (i) a process is in place that captures these *meter* alarms within the validation and ensures that any *meter* alarm occurrences are retained as part of the *metering data* audit trail;
 - (ii) the relevant *Registered Participants* are notified of the occurrences of these *meter* alarms within the *metering data* file in accordance with the MDFD specification;
- (5) where supported by the *meter(s)*, validation for a given period of *interval metering data* by comparison of the totalised *interval energy data* (accumulation register reading) and the change in the *meter* cumulative registers (*energy tolerance*);
- (6) a check of the *metering data* for continuity and reasonability over the *meter* reading period:
 - (i) check that no gaps in the *metering data* exist;
 - (ii) check that *metering data* for the expected period has been delivered based on the scheduled meter reading date.

Validations for accumulation metering data from manually read metering installations

- (f) *Metering Data Providers* must undertake the following validations within the *metering data services database* for *metering installations* with *accumulated metering data*:
 - (1) a check against a nominated minimum value of *metering data* collected from the *metering installation*;
 - (2) a check against a nominated maximum value of *metering data* collected from the *metering installation*, and this is to be applied to both the *metering data* collected from the *metering installation* and the calculated *energy* consumption values;
 - (3) the current value of *metering data* collected from the *metering installation* \geq previous value of *metering data* collected from the *metering installation*;
 - (4) the current value of *metering data* collected from the *metering installation* is numeric and ≥ 0 ;

- (5) the current date that *metering data* is collected from the *metering installation* > the previous date that *metering data* was collected from the *metering installation*;
- (6) a check for null (no values) *metering data* in the *metering data services database* for all *metering data* streams, and the aim of this check is to ensure that there is a 100% *metering data* set and substitution for any missing *metering data* is undertaken.

Validations for type 7 metering installations

- (g) *Metering Data Providers* must undertake the following validations of *calculated metering data* within the *metering data services database*:
 - (1) a check against a nominated maximum *calculated metering data* value;
 - (2) for subparagraph (1), *calculated metering data* value is numeric and ≥ 0 ;
 - (3) a check for null (no values) *calculated metering data* for all *metering data* streams, and the aim of this check is to ensure that there is a 100% *calculated metering data* set (and substitution for any missing *calculated metering data* has been undertaken);
 - (4) a check of the inventory tables, load tables and on/off tables using a process approved by the *Metering Coordinator* to ensure that the correct version of these tables is being used for the production of *calculated metering data*;
 - (5) a check against a nominated minimum value, or alternatively, a 'zero' check that tests for an acceptable number of zero Interval values per day;
 - (6) *calculated metering data* date > previous *calculated metering data* date.

S7A.7.14 Determination of metering data for unmetered loads

Note

Obligations for determination of *metering data* for unmetered load, including requirements and methodologies for calculating *metering data* and associated responsibilities, will be considered in the event of a type 7 *metering installation* being available in this jurisdiction and after a 12 month transitional period allowing all participants to achieve compliance.

S7A.7.14.1 Load table

Note

Responsibility for developing, maintaining and *publishing* the load table will be considered in the event of a type 7 *metering installation* being available in this jurisdiction and after a 12 month transitional period allowing all participants to achieve compliance.

- (a) The load table must set out:
 - (1) for each controlled unmetered device, its *load* (which includes any associated control gear, in watts) for use in calculating *interval metering data* in accordance with clause S7A.7.14.2; and

- (2) for each uncontrolled unmetered device, its annual *energy* consumption in accordance with clause S7A.7.14.3. The annual *energy* consumption is used to calculate the calculated device wattage (in watts) which is used to calculate the *interval metering data* for each device type as follows:

$$(\text{Calculated device wattage})_i = \frac{(\text{device annual energy consumption})_i}{365 * 24}$$

Where i = Uncontrolled unmetered device type i .

- (b) Proposals to add a new unmetered device *load* to the load table must include load measurement tests conducted by a *NATA* accredited laboratory or an overseas equivalent.
- (c) Agreement for an unmetered device *load* to be added to the load table does not replace any obligation for an interested party to obtain appropriate approvals related to the performance and acceptance of use of the unmetered device.

S7A.7.14.2 Controlled unmetered devices

Metering data calculation

- (a) The *Metering Coordinator* must ensure that the *interval metering data* for controlled unmetered devices classified as a type 7 *metering installation* are calculated in accordance with the following algorithm:

Interval metering data for TI $_j$ for *NMI*(in watt hours) =

$$\frac{\sum_{i=1}^n (k) * (\text{Device wattage})_i * (\text{Device count for NMI})_i * (\text{Period load is switched on})_j * (\text{Recording interval})}{60}$$

where:

i = device type

j = TI

k = proportion of device attributable to that *NMI*

TI is in minutes.

Unmetered device wattage/device wattage is determined from the load table.

Unmetered device count/device count is determined from the inventory table.

Period load is switched on is determined from the on/off table.

Inventory table

- (b) For each *NMI*, a separate inventory table is required that identifies each unmetered device type that forms part of the *load* and for each unmetered device type lists:
- (1) the unmetered device type;
 - (2) the form of on/off control – photoelectric cell control, timer control, ripple control or other control;

- (3) if timer control or ripple control, the on/off times for the timer control or the ripple control system;
 - (4) if other control, the on/off times;
 - (5) if an unmetered device is shared with another *NMI*, the proportion of *load* that is agreed by affected *Registered Participants* to be attributable to that *NMI* (k), and each k factor will be less than 1 and the sum of the k factors for a shared unmetered device across each respective *NMI* must be equal to 1;
 - (6) if an unmetered device is not shared with another *NMI*, the k factor must be equal to 1;
 - (7) the number of such unmetered devices installed;
 - (8) the effective start date – the first day on which that record in the inventory table is to be included in the calculation of *metering data* for that *NMI*;
 - (9) the effective end date – the last day on which that record in the inventory table is to be included in the calculation of *metering data* for that *NMI*; and
 - (10) the last change date – the date that record in the inventory table was most recently created or modified.
- (c) Each unmetered device in the inventory table is a unique combination of physical hardware, time control classification and shared portion. For example, if an unmetered device is shared with another *NMI*, the individual portions of the unmetered device(s) must be included in the inventory table as a separate unmetered device type on each *NMI*.
- (d) Each *Metering Coordinator* must develop the initial inventory table for the *NMI* s for which it is responsible. The initial inventory table must be agreed by each affected *Registered Participant* and the relevant end user.
- (e) Each *Metering Coordinator* must update the inventory table for the *NMIs* for which it is responsible on at least a monthly basis to ensure that the accuracy requirements in clause S7A.7.6.2 are met. Any changes to the inventory table may only be made on a retrospective basis where:
- (1) agreed by the *Metering Coordinator* and the affected *Registered Participants*; or
 - (2) necessary to comply with clause 7A.7.4.
- (f) The *Metering Coordinator* must communicate any material changes to the inventory table to the affected *Registered Participants*.
- (g) The *Metering Coordinator* must provide the inventory table to relevant *Registered Participants* when requested.

On/off table

- (h) The form of on/off control may be:
- (1) photoelectric;
 - (2) timer control, or ripple control; or

- (3) other control.

Photoelectric cell control

- (i) The *Metering Coordinator* must ensure that the appropriate sunset times and sunrise times are obtained from the Australian Government Geoscience website (www.ga.gov.au/geodesy/astro/sunrise.jsp), based on the longitude and latitude of the relevant town and *Australian Central Standard Time*.
- (j) The *Metering Coordinator* must ensure that the period that the *load* is switched on during a *recording interval* is calculated as follows:

Recording interval	Period load is switched on
For the <i>recording intervals</i> commencing after sunset and finishing prior to sunrise	Period <i>load</i> is switched on = 1
For the <i>recording intervals</i> commencing after sunrise and finishing prior to sunset	Period <i>load</i> is switched on = 0
For the <i>recording interval</i> during which the sunset occurs	$\frac{(\text{Period load is switched on}) = (\text{End time of recording interval}) - (\text{Time of sunset})}{30}$
For the <i>recording interval</i> during which the sunrise occurs	$\frac{(\text{Period load is switched on}) = (\text{Time of sunset}) - (\text{Start time of recording interval})}{30}$

Timer control

- (k) If the on/off times for an unmetered device is controlled by a timer or ripple injection system:
- (1) On time = ON time set on timer or ripple injection system;
 - (2) Off time = OFF time set on timer or ripple injection system.
- (l) The *Metering Coordinator* must ensure that the period that the *load* is switched on during a *recording interval* is calculated as follows:

Recording interval	Period load is switched on
For the <i>recording intervals</i> commencing after on time and finishing prior to off time	Period <i>load</i> is switched on = 1
For the <i>recording</i>	Period <i>load</i> is switched on = 0

Recording interval	Period load is switched on
<i>intervals</i> commencing after off time and finishing prior to on time	
For the <i>recording interval</i> during which the on time occurs	$\frac{(\text{Period load is switched on}) = (\text{End time of recording interval}) - (\text{On time})}{30}$
For the <i>recording interval</i> during which the off time occurs	$\frac{(\text{Period load is switched on}) = (\text{Off time}) - (\text{Start time of recording interval})}{30}$

Other control

- (m) Where the on/off times for an unmetered device are not in accordance with paragraphs (i) to (m), the following alternative forms of control may be used:
 - (1) On time = sunset time + ON delay or ON time set on timer or ripple injection system;
 - (2) Off time = sunrise time + OFF delay or OFF time set on timer or ripple injection system or a fixed duration after ON time.
- (n) Where sunrise or sunset times are used, the time is determined in accordance with paragraph (j).
- (o) The *Metering Coordinator* must ensure that the period that the *load* is switched on during a *recording interval* is calculated as follows:

Recording interval	Period load is switched on
For the <i>recording intervals</i> commencing after on time and finishing prior to off time	Period <i>load</i> is switched on = 1
For the <i>recording intervals</i> commencing after off time and finishing prior to on time	Period <i>load</i> is switched on = 0
For the <i>recording interval</i> during which the on time occurs	$\frac{(\text{Period load is switched on}) = (\text{End time of recording interval}) - (\text{On time})}{30}$
For the <i>recording</i>	(Period <i>load</i> is switched on) =

Recording interval	Period load is switched on
<i>interval</i> during which the off time occurs	$(\text{Off time}) - (\text{Start time of recording interval})$
	30

S7A.7.14.3 Uncontrolled unmetered devices

- (a) [Not used]

Energy calculation

- (b) The *Metering Coordinator* must ensure that the *interval metering data* for other unmetered *loads*, which have been classified as a type 7 metering installation, is calculated in accordance with the following algorithm:

$$\frac{\sum_{i=1}^n (k) * (\text{Device wattage})_i * (\text{Device count for NMI})_i * (\text{Period load is switched on})_j * (\text{Recording interval})}{60}$$

Inventory table

- (c) For each *NMI*, a separate inventory table is required that identifies each device type that forms part of the *NMI load* and for each device type lists:
- (1) the device type;
 - (2) the form of on/off control (24 hours per day);
 - (3) if a device is shared with another *NMI*, the proportion of *load* that is agreed by relevant financially responsible participants to be attributable to that *NMI(k)*, and each *k* factor will be less than 1 and the sum of the *k* factors for a shared unmetered device across each respective *NMI* must be equal to 1;
 - (4) if a device is not shared with another *NMI*, the *k* factor must be equal to 1;
 - (5) the number of such devices installed;
 - (6) the effective start date – the first day on which that record in the inventory table is to be included in the calculation of *metering data* for that *NMI*;
 - (7) the effective end date – the last day on which that record in the inventory table is to be included in the calculation of *metering data* for that *NMI*; and
 - (8) the last change date – the date that record in the inventory table was most recently created or modified.
- (d) Each device in the inventory table is a unique combination of physical hardware, time control classification and shared portion. For example, if a device is shared with another *NMI*, the individual portions of the device(s) must be included in the inventory table as a separate device type on each *NMI*.
- (e) Each *Metering Coordinator* must develop the initial inventory table for the *NMIs* for which it is responsible. The initial inventory table must be agreed

by the relevant financially responsible participants and the relevant end-use customer.

- (f) Each *Metering Coordinator* must use reasonable endeavours to update the inventory table, for the *NMIs* for which it is responsible, on at least a monthly basis for any additions, deletions and modifications to ensure that the accuracy requirements in clause S7A.7.6.2 are met. Such additions, deletions or modifications to the inventory table may only be made on a retrospective basis where:
 - (1) agreed by the *Metering Coordinator* and the relevant financially responsible participants; or
 - (2) necessary to comply with clause 7A.7.6.
- (g) The *Metering Coordinator* must communicate any material changes to the inventory table to the relevant financially responsible participants.
- (h) The *Metering Coordinator* must provide the inventory table to relevant financially responsible participants when requested.

On/off table

- (i) Other unmetered *loads* are assumed to operate 24 hours per day.
- (j) For each *recording interval* period *load* is switched on = 1.

Schedule 7A.8 Service level procedures

Part A Introduction

S7A.8.1 Introduction

S7A.8.1.1 Purpose and scope

- (a) This schedule applies to *Metering Providers* and *Metering Data Providers*.
- (b) This schedule sets out:
 - (1) the requirements for the provision, installation and maintenance of *metering installations* by *Metering Providers*;
 - (2) requirements for the systems and processes for the collection, processing and delivery of *metering data* by *Metering Data Providers*;
 - (3) the performance levels associated with the collection, processing and delivery of *metering data*;
 - (4) the data formats that must be used for the delivery of *metering data*;
 - (5) the requirements for the management of relevant *NT NMI Data*; and
 - (6) the requirements for the processing of *metering data* associated with *connection point* transfers and the alteration of *metering installations* where one or more devices are replaced.

S7A.8.1.2 Definitions

In this schedule:

collect, collection, collected mean a process undertaken by the *Metering Data Provider* to obtain *metering data* from a *meter* or *metering installation*.

Service Providers means *Metering Data Providers*, *Metering Providers* and *Local Network Service Providers*.

Part B Metering provider services

S7A.8.2 Introduction

S7A.8.2.1 Purpose and exclusions

- (a) Part B of this schedule:
- (1) details the obligations, technical requirements, measurement process and performance requirements that are to be performed, administered and maintained by a *Metering Provider*;
 - (2) details the obligations and technical/operational requirements in the provision, installation and maintenance of the *metering installation* by a *Metering Provider*;
 - (3) relates to *Metering Providers* who undertake the provision, installation and maintenance of various *metering installation* types as stipulated; and
 - (4) sets out minimum requirements for *Metering Providers*.
- (b) For service provision at *connection points* where:
- (1) the *Metering Provider* and the *Metering Data Provider* are part of the same company; and
 - (2) *metering installation* provision or maintenance work is performed using internal processes and procedures, those internal processes and procedures will be deemed to be compliant with this Part if the *metering* work satisfies the performance and quality outcomes of this Part.

S7A.8.2.2 Services

The *Metering Provider* is responsible for the provision of metering provision services, including but not limited to:

- (a) maintaining the ongoing *metering installation* compliance with the *Rules*;
- (b) the provision and maintenance of physical *metering installation* security controls;
- (c) the provision, installation and maintenance of the *metering installation*;
- (d) the maintenance of *metering installation* password security; and
- (e) the development and maintenance of an Asset Test Plan.

S7A.8.3 General requirements

S7A.8.3.1 Metering Provider capability and competency

Metering Providers must:

- (a) employ personnel with the skills, knowledge and expertise necessary for the discharge of the responsibilities under Chapter 7A and have procedures for ensuring that personnel maintain their knowledge and understanding of the requirements of the *Rules*;
- (b) maintain a register of employees, which for each employee must include:
 - (1) skills, knowledge and expertise;
 - (2) qualifications, registrations and accreditations where applicable to the discharge of *Metering Provider* duties;
 - (3) training undertaken and planned;
 - (4) authorisations to provide opinions and interpretations of technical information; and
 - (5) authorisations to access *metering installations* within secure and restricted areas;
- (c) have policies and procedures for making statements of opinions and interpretations, documented within the quality system;
- (d) comply with:
 - (1) *AS 3000 Wiring Rules*;
 - (2) applicable Australian Communications and Media Authority (ACMA) communications and cabling requirements; (3) C-Tick compliance requirements;
 - (4) jurisdictional legislation, including safety legislation and regulations; and
 - (5) any reasonable requirements of the *Local Network Service Provider* when working on or around *Local Network Service Provider*.

S7A.8.3.2 Use of contractors

Where a *Metering Provider* engages a sub-contractor to perform any of its obligations specified in the *Rules*, the *Metering Provider*:

- (a) must have policies and procedures for assessing the sub-contractor's capability, competency and processes, procedures and systems, to ensure that they are compliant with the *Rules*;
- (b) must ensure that auditable processes are in place to certify that all work performed by the sub-contractor complies with the *Rules*;
- (c) remains liable for all acts and omissions of any sub-contractor; and
- (d) must authorise the sub-contractor to provide any specific opinion or interpretation of technical information.

S7A.8.3.3 Insurance

The *Metering Provider* must:

- (a) hold public liability insurance for an amount not less than \$10,000,000 per occurrence;

- (b) hold professional indemnity insurance for an amount of not less than \$1,000,000 per occurrence; and
- (c) provide the *Utilities Commission* with certified current copies of insurance policies on request.

Note

If a *Metering Data Provider*, *Metering Provider* and *Metering Coordinator* are the same legal entity, a single insurance policy for public liability insurance for an amount not less than \$10,000,000 per occurrence and professional indemnity insurance for an amount of not less than \$1,000,000 per occurrence that covers the operations of the *Metering Data Provider*, *Metering Provider* and *Metering Coordinator* roles will satisfy the insurance requirements under this schedule.

S7A.8.4 Device management and test equipment

S7A.8.4.1 Procurement

The *Metering Provider* must have processes and systems in place for the procurement of *meters*, *instrument transformers* and any other devices that can be installed by the *Metering Provider* within a *metering installation*, and ensure that *metering installation* components are suitable for use in accordance with the *Rules*.

S7A.8.4.2 Storage, handling and transport

- (a) The *Metering Provider* must have processes that are consistent with good industry practice, specifying the requirements for storage, handling (including packaging) and transport (including return to owner) of any equipment that is calibrated including *meters*, *instrument transformers* and test equipment. The processes must be designed to:
 - (1) minimise the risk of physical or environmental damage to the equipment; and
 - (2) identify conditions under which the physical condition of the equipment or accuracy is compromised as a result of storage, transport or handling.
- (b) The *Metering Provider* must ensure that *meters*, *instrument transformers* and devices removed from the *metering installation* are returned to their owner within 10 *business days* following their removal, unless otherwise agreed with the owner.

S7A.8.4.3 Management of test equipment

The *Metering Provider* must:

- (a) establish a register of test equipment used for testing *metering installations*, *meters* and *instrument transformers*;
- (b) maintain records of test equipment, including records of calibration certificates, for at least 7 years from the issue date of the calibration certificate;
- (c) ensure that all test equipment is calibrated by a *NATA* accredited testing laboratory holding ISO 9001 and 17025 accreditation for the calibration of test equipment, current at the time of calibration; and

- (d) ensure that all tests are undertaken with test equipment where the calibration certificate is current and stated calibration due date has not passed.

S7A.8.4.4 Management of meter programming and authorised software

The *Metering Provider* must:

- (a) establish a register of equipment and authorised software used for programming *meters*; and
- (b) maintain records of equipment, authorised software and programs used for programming *meters*, including any changes to firmware or software within the *meter*, for at least 7 years from the most recent date of use.

S7A.8.5 Installation and commissioning requirements

S7A.8.5.1 General commissioning requirements

The *Metering Provider* must develop, maintain and operate processes and procedures for the installation and commissioning of *metering installations* for which they are accredited, which must include installation and verification requirements to ensure that:

- (a) electrical wiring at the *metering installation* is:
 - (1) wired and terminated in compliance with *meter* and *instrument transformer* manufacturer requirements, relevant *Australian Standards* and jurisdictional requirements;
 - (2) terminated in a manner that ensures no electrical conductors are exposed, that the cable type and size, and number of cables terminated in any one termination are appropriate and that all terminations are tight;
 - (3) of an appropriate cable type, size and insulation that meets the requirements of *AS 3000*;
 - (4) connected with the correct polarity at each termination and connection; and
 - (5) connected with the correct phase sequence, where three phases are connected at the *metering installation*; in the case of a change to an existing *metering installation*, the existing phase sequence is maintained;
- (b) the accuracy class of *metering installations* and any documentation from a certified body verifying the errors of *meters* and *instrument transformers* comply with the *Rules*;
- (c) nameplate information reflects the design accuracy class of the *meters* and *instrument transformers*;
- (d) the actual connected ratios of all *instrument transformers* at a *metering installation* and the calculation of the constant to be applied to the collection and processing of *metering data* by the *Metering Data Provider* are aligned;
- (e) burdens applied to *instrument transformers* are within the rated burden specified on the name plate of the *instrument transformer*;

- (f) *voltage* phase sequence relationships are correct unless the *Metering Provider* can verify to the satisfaction of *NTESMO* the accuracy of the *metering installation* when a non-standard phase sequence is applied;
- (g) the combined current and *voltage* phase relationships at the *meter* terminals are correct;
- (h) the *meter* programming parameters, display and error functions are all correct in accordance with manufacturer specifications, including the measurement of the forward rotation of *energy* applied to the *meter*, and that the correct pulse rates have been programmed into the *meter*;
- (i) where the *metering installation* includes *instrument transformers*, register readings are validated by use of a *load* being placed on the load side of the *metering installation* and may include a timing check by comparing the readings on the *meter* display or pulse indicators against load and time;
- (j) where the *metering installation* has *meter* alarms, occurrences of alarms identified on commissioning are investigated and resolved prior to leaving the site;
- (k) where an aerial or antenna is installed as part of the *metering installation*, it is installed in accordance with the manufacturer's instructions and in a manner that maintains the integrity of the *meter* enclosure, including water and environmental seals; and
- (l) the time setting of the *metering installation* is referenced in accordance with clause 7A.8.8.

S7A.8.5.2 Metering data validation requirements

The *Metering Provider* must develop, maintain and operate processes and procedures for the validation of *interval metering data* with the *Metering Data Provider* on the installation or alteration of that *metering installation*, which must include processes to ensure that:

- (a) *metering* data is validated in accordance with schedule S7A.7;
- (b) where validation has failed or cannot reasonably be undertaken, the *Metering Provider* informs the *Metering Data Provider* and the *Metering Coordinator* that the *metering installation* cannot be validated and undertake wiring checks which visibly verify correct connection and phase relationships of *voltage* and current circuits and also undertake one or more of the following alternative measurements and commissioning checks to enable the *Metering Coordinator* and *Metering Provider* to confirm that the *metering installation* complies with the *Rules*:
 - (1) utilisation of *meter energy* measurement to calculate *load/ demand* and that this value is reflective of expected magnitude;
 - (2) use of a dummy *load* or phantom *load* box to verify correct *energy* measurement at the *metering installation*; and
 - (3) compare *meter* measurement of *energy* or *load* with an alternative measurement of demand, current and other measurements of electrical energy;

- (c) where the *Metering Provider* has undertaken in-situ testing to verify correct *energy* measurement at the *metering installation*, the *Metering Provider* informs the *Metering Data Provider* of the start and end times of the test to facilitate the *Metering Data Provider* substituting and validating *metering data*.

S7A.8.6 Metering installation maintenance

S7A.8.6.1 Test plans

- (a) The *Metering Provider* must develop and maintain Asset Test Plans that provide confirmation of the *Metering Provider's* testing approach to ensure *metering installations* are maintained:
 - (1) in accordance with the testing and inspection requirements of the *Rules*;
 - (2) in accordance with approved Asset Management Strategies; or
 - (3) in any combination of the above.
- (b) As a minimum, the *Metering Provider's* Asset Test Plans must include:
 - (1) the approach to testing and inspecting for each *metering installation*, or groups of *metering installations*;
 - (2) where appropriate, the approach to testing and inspecting various device types; and
 - (3) the details of the test equipment and test methodology to be employed in undertaking works considered in the test plan.

S7A.8.6.2 Management of metering installation malfunctions

- (a) The *Metering Provider* must have processes and systems to support the *Metering Coordinator* in identifying and rectifying a *metering installation malfunction* in the timeframes specified in clause 7A.6.9.
- (b) Where a *Metering Provider* identifies a *metering installation malfunction*, the *Metering Provider* must advise the *Metering Data Provider* and the *Metering Coordinator* within 1 *business day* of identification in accordance with paragraph 7A.6.9(d).

S7A.8.6.3 Telecommunications

- (a) The *Metering Provider* must advise the *Metering Data Provider* and the *Metering Coordinator* if communications equipment is to be temporarily disconnected such that it may affect the *remote acquisition* of *metering data*.
- (b) The *Metering Provider* must use reasonable endeavours to assist the *Metering Coordinator* and the *Metering Data Provider* with the manual collection of *metering data* from the *metering installation* where *remote acquisition* becomes unavailable.

S7A.8.6.4 Non-conforming test results or calibrations

The *Metering Provider* must have a process for the management of non-conforming test results or calibrations at a *metering installation*, and for devices removed from a *metering installation* for testing and evaluation, which must include:

- (a) a process to perform the evaluation of the non-conformance;
- (b) authority for management of the non-conformance;
- (c) notification of the non-conformance to parties affected by the non-conformance, which must include the *Metering Coordinator*, *Metering Data Provider*, financially responsible participant, *Local Network Service Provider* and *NTESMO*; and
- (d) initiation of corrective action.

S7A.8.7 Systems and administration

S7A.8.7.1 Register of metering installations

- (a) The *Metering Provider* must establish and maintain a register of *metering installations* which must include:
 - (1) the identity and characteristics of *metering* equipment (*instrument transformers*, *metering installation* and *check metering installation*), including:
 - (i) serial numbers;
 - (ii) *metering installation* identification name;
 - (iii) *metering installation* types and models;
 - (iv) *instrument transformer* ratios (available and connected);
 - (v) current test and calibration programme details, test results and references to test certificates;
 - (vi) asset management plan and testing schedule;
 - (vii) calibration tables, where applied to achieve *metering installation* accuracy;
 - (viii) *Metering Provider*(s) and *Metering Data Provider*(s) details;
 - (ix) summation scheme values and multipliers; and
 - (x) data register coding details;
 - (2) for *metering installations* for *connection points* in a *market* operated or administered by *NTESMO*– any matters identified by *NTESMO* in a communication guideline issued in from time to time accordance with clause S7A.1.3.
- (b) The register must be retained electronically for at least 13 months for each *metering installation* from when the details of the *metering installation* are first recorded in the register and may be archived after this period.
- (c) The register must be retained for at least 7 years for each *metering installation* from when the details of the *metering installation* are first

recorded in the register and any archiving retrieval mechanisms must facilitate analysis and management of information using the same processing rules applied to the electronic register.

- (d) The *Metering Provider* must provide information from their register of *metering installations* to a party authorised to receive data in accordance with clause 7A.13.5 in a timeframe agreed with that party.

S7A.8.7.2 Disaster recovery

- (a) The *Metering Provider* must establish and maintain a disaster recovery plan and business continuity processes that include:
 - (1) detailed documentation that is maintained up to date, showing revisions and the date of the last review;
 - (2) confirmation at least annually by the *Metering Provider's* management that the plan is current for the systems and processes in place; and
 - (3) confirmation that the plan has been subjected to an annual end-to-end test that facilitates both a 'fail-over' from and 'recovery' back to the production system.
- (b) In the event of an IT system failure, the *Metering Provider* must ensure that systems are returned to normal operational service within 5 *business days* of the failure, as evidenced by:
 - (1) the software and the most recent back-up of data being restored to operational service within the 5 *business days*; and
 - (2) no outstanding processing or delivery of *NT NMI Data* to *NTESMO* and *Registered Participants*.
- (c) The *Metering Provider* must at its earliest opportunity notify *NTESMO* of any failure where the *Metering Provider* has a requirement to implement its disaster recovery plan.

S7A.8.7.3 Audits undertaken by the Utilities Commission

The *Metering Provider* must undertake all services in a manner that is auditable by the *Utilities Commission* and must provide all reasonable assistance to the *Utilities Commission* in discharging its obligations under the *Rules* and any relevant jurisdictional legislation in relation to *metering installations*.

Part C Metering Data Provider services

S7A.8.8 Introduction

S7A.8.8.1 Purpose

- (a) The purpose of Part C of this schedule is to detail the obligations, technical requirements, measurement processes and performance requirements that are to be performed, administered and maintained by the *Metering Data Provider*.
- (b) This Part details:

- (1) the obligations of *Metering Data Providers* in the provision of *metering data services*;
- (2) the obligations of *Metering Data Providers* to establish and maintain a *metering data services database*; and
- (3) the obligations of *Metering Data Providers* in support of the *Metering Coordinator*.

S7A.8.8.2 Obligations

Metering data services

- (a) Each *Metering Data Provider* must:
 - (1) provide *metering data services* in accordance with the *Rules* and relevant jurisdictional codes and policies;
 - (2) establish, maintain and operate a *metering data services database*;
 - (3) ensure that *metering data* is kept confidential and secure and only provided to persons entitled to have such access in accordance with the *Rules*;
 - (4) undertake the collection, processing and delivery of *metering data* and meter alarm occurrences; and
 - (5) co-operate in good faith with *NTESMO*, and all *Registered Participants*, *Metering Providers* and *Metering Data Providers*.

Insurance

- (b) The *Metering Data Provider* must:
 - (1) hold public liability insurance for an amount not less than \$10,000,000 per occurrence; and
 - (2) hold professional indemnity insurance for an amount of not less than \$1,000,000 per occurrence.

Note

If a *Metering Data Provider*, *Metering Provider* and *Metering Coordinator* are the same legal entity, a single insurance policy for public liability insurance for an amount not less than \$10,000,000 per occurrence and professional indemnity insurance for an amount of not less than \$1,000,000 per occurrence that covers the operations of the *Metering Data Provider*, *Metering Provider* and *Metering Coordinator* roles will satisfy the insurance requirements under this schedule.

Use of sub-contactors

- (c) Where a *Metering Data Provider* engages a sub-contractor to perform any of the *Metering Data Provider's* obligations specified in the *Rules*, the *Metering Data Provider*:
 - (1) must have policies and procedures for assessing the sub-contractor's capability, competency, processes, procedures and systems, to ensure that the sub-contractor complies with the *Rules*;
 - (2) must ensure that auditable processes are in place to certify that all work performed by the sub-contractor complies with the *Rules*;

- (3) remains liable for all acts and omissions of its sub-contractor;
- (4) must authorise the sub-contractor to provide any specific opinion or interpretation of technical information where a *Metering Data Provider* so engages a sub-contractor; and
- (5) must provide the *Utilities Commission*, on request, with any information pertaining to the sub-contractor that the *Utilities Commission* reasonably considers necessary for the discharge of the *Metering Data Provider's* responsibilities under the *Rules*.

Specific obligations

- (d) Each *Metering Data Provider* must:
 - (1) undertake validation, substitution and estimation of *metering data* in accordance with schedule S7A.7 Part C;
 - (2) provide *metering data services*;
 - (3) ensure registered details of the *connection point* are fully recorded in the *Metering Data Provider's metering data services database*;
 - (4) ensure *metering* details and parameters within the *metering data services database* are correct such that the *metering data* in the *metering data services database* is accurate;
 - (5) facilitate the timely commissioning and registration of the *metering installation*; and
 - (6) establish and maintain a metering register in its *metering data services database*.

Metering register

- (e) Each *Metering Data Provider* must ensure that information in its metering register is:
 - (1) registered in co-operation with the *Metering Coordinator* and *Metering Provider*;
 - (2) provided on request to persons entitled to have access to that information in accordance with paragraph 7A.13.5(c);
 - (3) communicated to other *Metering Data Providers* having the right of access as a result of the transfer of a *connection point*;
 - (4) populated with the following:
 - (i) connection and metering point reference details, including:
 - (A) agreed locations and reference details (for example, drawing numbers);
 - (B) loss compensation calculation details;
 - (C) site identification names;
 - (D) details of financially responsible participants and *Local Network Service Providers* associated with the *connection point*;
 - (E) details of the *Metering Coordinator*;

- (ii) the identity and characteristics of *metering* equipment (that is, *instrument transformers*, *metering installation* and *check metering installation*), including:
 - (A) serial numbers;
 - (B) *metering installation* identification name; (c) *metering installation* types and models;
 - (D) *Metering Provider(s)* and *Metering Data Provider(s)* details;
 - (E) summation scheme values and multipliers; and
 - (F) data register coding details;
- (iii) for types 1, 2, 3 and 4 *metering installations*, data communication details, if relevant, including:
 - (A) telephone number(s) for access to energy data;
 - (B) communication equipment type and serial numbers;
 - (C) communication protocol details or references;
 - (D) data conversion details;
 - (E) user identifications and access rights; and
 - (F) 'write' password (to be contained in a hidden or protected field);
- (iv) data validation, substitution and estimation processes agreed between affected parties, including:
 - (A) algorithms;
 - (B) data comparison techniques;
 - (C) processing and alarms (for example, voltage source limits; phase angle limits);
 - (D) *check metering* compensation details; and
 - (E) alternate data sources; and
- (5) for *metering installations* for *connection points* in a *market* operated or administered by *NTESMO*, includes any relevant matters identified by *NTESMO* in a communication guideline issued from time to time in accordance with clause S7A.1.3.

S7A.8.9 Service requirements

S7A.8.9.1 System requirements

Each *Metering Provider* must maintain and operate a *metering data services database* to facilitate the:

- (a) *collection of metering data*;
- (b) processing, calculation, validation, substitution and estimation of *metering data*;
- (c) delivery of *metering data* and *metering register* data to *NTESMO*, *Registered Participants*, financially responsible participants and other Service Providers;

- (d) assignment and version control of participant roles for *connection points*;
- (e) commissioning of each *metering installation* into the *Metering Data Provider's metering data services database*;
- (f) loading of *metering data* relating to meter churn; and
- (g) storage and archiving of *metering data* and *validated metering data* from the *metering installation*.

S7A.8.9.2 Metering data services database

Each *Metering Data Provider* must maintain and operate a *metering data services database* that provides a full audit trail and version control capability. This functionality must be applied to:

- (a) *metering data*;
- (b) assigned data quality flags;
- (c) substitution and estimation types;
- (d) *meter* alarms;
- (e) metering register information;
- (f) the delivery of *metering data* to *Registered Participants*, financially responsible participants and *NTESMO*; and
- (g) the mapping of all *metering data* streams (including logical *metering data* streams).

S7A.8.9.3 Exception reports

Each *Metering Data Provider* must maintain, operate and monitor a system that supports the detection of system or process errors. These exception reports must include, but not be limited to:

- (a) missed reads and missing intervals of *metering data* within the *metering data services database*;
- (b) long term substitutions and estimations;
- (c) *metering data* errors and data overlaps;
- (d) validation or metering register errors;
- (e) failed batch processing, database errors and hardware failures;
- (f) the capture of file syntax errors, failed and rejected *metering data* deliveries;
- (g) status management of collection interfaces; and
- (h) status management of *metering installation malfunctions*.

S7A.8.9.4 Collection process requirements

- (a) Each *Metering Data Provider* must use reasonable endeavours to ensure actual *meter* readings and occurrences of *meter* alarms are collected for all *connection points*.
- (b) Each *Metering Data Provider* must operate a process that:

- (1) records and logs faults and problems associated with the reading function of *meters*, and this process must record and log, but is not limited to, any:
 - (i) access problems;
 - (ii) *metering installation* security problems;
 - (iii) *metering installation* faults;
 - (iv) read failures; and
 - (v) *metering installation* time synchronisation errors; and
 - (2) supports the *Metering Coordinator*, the *Metering Provider*, or both, in the rectification of any *metering installation malfunctions* or problems associated with the reading function of *meters*.
- (c) On request by the financially responsible participant, a *Metering Data Provider* must use reasonable endeavours to carry out a special *meter* reading or final reading within 3 *business days* of the receipt of the request unless an alternative timeframe has been agreed.

S7A.8.9.5 Specific collection process requirements for remotely read metering installations

- (a) Each *Metering Data Provider* must be capable of initiating a *remote acquisition* for *metering data* from type 1 to 3 *metering installations* where relevant *metering data* is missing, erroneous or has failed validation.
- (b) Each *Metering Data Provider* must operate and maintain a process that:
 - (1) initiates an alternative method to collect *metering data* where *remote acquisition* becomes unavailable; and
 - (2) provides a log detailing successful reading events for each *metering installation*, or alternatively an exception report of failed *meter* readings.

S7A.8.9.6 Specific collection process requirements for manually read metering installations

Each *Metering Data Provider* must:

- (a) develop and maintain a *meter* reading schedule in accordance with Schedule 7A.7 Part B;
- (b) maintain reading routes with particular attention to any specific access requirements and hazard information;
- (c) use reasonable endeavours to ensure that *metering data* is collected at least once every 3 months;
- (d) ensure that scheduled reading date lists and programmed reading equipment is provisioned, updated and maintained;
- (e) use reasonable endeavours to ensure that *metering data* is collected within 2 *business days* prior to or 2 *business days* subsequent to a scheduled reading date; and

- (f) ensure that all *metering data* collected and any fault reason codes associated with a reading failure are transferred to the *metering data services database* within 1 *business day* of the data being collected or attempted to be collected from the *metering installation*.

S7A.8.9.7 Metering data processing requirements

General

- (a) Each *Metering Data Provider* must have a process to:
 - (1) confirm and utilise the roles for *connection points*;
 - (2) assign and store the date/time stamp of when the *metering data* was entered into the *Metering Data Provider's metering data services database*;
 - (3) ensure that all *metering data* is stored in the *metering data services database* with the correct:
 - (i) quality flag;
 - (ii) applicable substitution or estimation type code; and
 - (iii) applicable substitution or estimation reason code;
 - (4) check the *metering data services database* for missing *metering data* and overlaps;
 - (5) aggregate *interval metering data* for a *connection point* into a 30-minute interval net *metering data* stream prior to delivery to *NTESMO* or financially responsible participants in accordance with the *Rules*;
 - (6) load *metering data* in an alternative format provided by a *Metering Provider* where there is a communications error, failed reading or *metering installation malfunction* that prevents the normal collection of *metering data* from a *metering installation*; and
 - (7) whenever any substitutions or estimations are carried out, notify:
 - (i) *NTESMO*(in respect of a *metering installation* used for the purposes of *settlements*);
 - (ii) *Registered Participants* for the *connection point*; and
 - (iii) financially responsible participants (in respect of a *metering installation* used for the purposes of *billing transactions*).

Erroneous data

- (b) Where the *Metering Coordinator* or *Metering Provider* informs a *Metering Data Provider* of a situation that may cause *metering data* to be erroneous, the *Metering Data Provider* must identify and substitute any erroneous *metering data*.
- (c) Where any *Registered Participant* for the *connection point* disputes *metering data*, the *Metering Data Provider* must investigate, and, if necessary correct the *metering data* in accordance with Schedule 7A.7 Part C.

Meter alarms

- (d) Where a *meter* alarm has occurred, the *Metering Data Provider* must process the occurrence of the *meter* alarm along with the *metering data* as part of the validation process in accordance with Schedule 7A.7 Part C.

S7A.8.9.8 Specific metering data processing requirements for type 1, 2, 3 and 4 metering installations

Each *Metering Data Provider* must be able to undertake simple cumulative or subtractive processes to manage complex metering configurations. Typically, the system must support:

- (a) an A+B+C or A-B-C aggregation configuration;
- (b) validation capability for standard partial or *check meter connection points* that incorporate a simple comparison of a single *metering data* stream to a single *check metering data* stream within an acceptable tolerance; and
- (c) the calculation of the average of the 2 validated data sets for *metering installations* where the *check metering installation* duplicates the *metering installation* and accuracy level, and the average of the 2 validated data sets must be delivered to:
 - (1) *NTESMO* (in respect of a *metering installation* used for the purposes of *settlements*);
 - (2) *Registered Participants*; and
 - (3) financially responsible participants (in respect of a *metering installation* used for the purposes of *billing transactions*).

S7A.8.9.9 Specific metering data processing requirements for type 7 metering installations

Inventory tables, load tables and on/off tables

- (a) Each *Metering Data Provider* must store inventory tables, load tables and on/off tables in the *metering data services database*
- (b) Each *Metering Data Provider* must ensure:
 - (1) inventory tables are complete, correct and updated with any changes provided by the *Local Network Service Provider* or *Metering Coordinator*;
 - (2) on/off tables are complete and correct; and
 - (3) load tables are complete and correct.
- (c) Each *Metering Data Provider* must ensure the inventory table, load table and on/off table are versioned for *metering data* calculations.

Processing of calculated metering data

- (d) Each *Metering Data Provider* must ensure that all *calculated metering data* is validated and processed into *recording intervals*.

S7A.8.9.10 Specific metering data estimation requirements for manually read and type 7 metering installations

- (a) Each *Metering Data Provider* must have a process for the creation of *estimated metering data* for type 4A, 5, 6 and 7 *metering installations*.
- (b) To meet *metering data* delivery requirements, this process must either:
 - (1) create individual blocks of *estimated metering data* on a daily basis;
or
 - (2) create a single block of *estimated metering data*:
 - (i) from the date of the last *meter* reading to a period beyond the next scheduled reading date for type 4A, 5 and 6 *metering installations*; or
 - (ii) from the date of the last calculation to a period beyond the next scheduled calculation for type 7 *metering installations*.

S7A.8.9.11 Delivery performance requirements for metering data

Obligation to deliver information to NTESMO

- (a) Where this clause S7A.8.9.11 imposes an obligation on a *Metering Data Provider* to deliver *metering data* or other information to *NTESMO*, that obligation only applies in respect of a *metering installation* that is used for the purposes of *settlements*.

Obligation to deliver information to financially responsible participants

- (b) Where this clause S7A.8.9.11 (other than paragraph S7A.8.9.11(e)) imposes an obligation on a *Metering Data Provider* to deliver *metering data* or other information to financially responsible participants, that obligation only applies in respect of a *metering installation* that is used for the purposes of *billing transactions*.

Validated metering data to be delivered

- (c) Each *Metering Data Provider* must ensure only validated *metering data* is delivered to *NTESMO*, *Registered Participants* and financially responsible participants.

Delivery timing requirements

- (d) Subject to any agreement to the contrary as contemplated by clause S7A.8.13.1, each *Metering Data Provider* must:
 - (1) deliver to *NTESMO*, *Registered Participants* and financially responsible participants all actual *meter* readings that passed validation within 2 *business days* of the actual *meter* readings being received into the *metering data services database*;
 - (2) substitute, validate and deliver to *NTESMO*, *Registered Participants* and financially responsible participants the *substituted metering data* within 2 *business days* of the actual *meter* readings being received into the *metering data services database* and failing validation;

- (3) substitute, validate and deliver to *NTESMO, Registered Participants* and financially responsible participants the *substituted metering data* within *2 business days* of the receipt of any fault reason codes associated with a reading failure or failed interrogation event, into the *metering data services database*;
 - (4) validate and deliver to *NTESMO, Registered Participants* and financially responsible participants all *substituted metering data* within *2 business days* of the *metering data* being substituted;
 - (5) ensure that all *metering data* is delivered to *NTESMO, Registered Participants* and financially responsible participants for the full period of any retrospectively created *metering data* streams within *2 business days* of that *metering data* streams being created; and
 - (6) for type 4A, 5, 6 and 7 *metering installations*, validate and deliver to *NTESMO, Registered Participants* and financially responsible participants all *estimated metering data* within *2 business days* of the *metering data* being estimated.
- (e) Each *Metering Data Provider* must provide *metering data* to the relevant financially responsible participants within *2 business days* of receiving a completed notification of a change of financially responsible participants, including *estimated metering data*, for a type 4A, 5, 6 or 7 *metering installation*.

Review of failed validations

- (f) Each *Metering Data Provider* must ensure that all failed validations are reviewed promptly so as to:
- (1) where the initial review of the failed validation identifies that the actual *meter* readings are valid, deliver the actual *meter* readings to *NTESMO, Registered Participants* and financially responsible participants within *2 business days* of the *metering data* being received into the *metering data services database*; and
 - (2) where further information is required to validate the actual *meter* readings, and the receipt of such information identifies that the actual *meter* readings are valid, deliver the actual *meter* readings to *NTESMO, Registered Participants* and financially responsible participants within *2 business days* of the *metering data* passing validation.

Operational delays

- (g) The *Metering Data Provider* must notify *NTESMO* and affected *Registered Participants* immediately upon the identification of any operational delays impacting on normal *metering data* delivery.

S7A.8.10 Data management following the alteration of type of metering installation at a connection point

S7A.8.10.1 Meter churn scenarios

- (a) Meter churn can result in a change to the configuration of *metering data* recorded by a *metering installation*. This change in *metering data* may result in an alteration to the Metering Data File Format file.
- (b) Where a meter churn takes place, each *Metering Data Provider* must:
 - (1) comply with the Metering Data File Format requirements when constructing the Metering Data File Format file associated with the change in type of *metering installation*; and
 - (2) for a meter churn scenario described in an item of column 1 of the following table, comply with the requirements for the management of *metering data* described in the provision listed in column 2 of that item of the following table:

Column 1 Meter churn scenario	Column 2 Provision
A <i>metering installation</i> is changed from a type 6 <i>metering installation</i> to a new type 6 <i>metering installation</i> (Scenario 1)	Clause S7A.8.10.2
A <i>metering installation</i> is changed from a type 6 <i>metering installation</i> to a type 1, 2, 3, 4, 4A, or 5 <i>metering installation</i> (Scenario 2)	Clause S7A.8.10.3
A <i>metering installation</i> is changed from a type 1, 2, 3, 4, 4A, or 5 <i>metering installation</i> to a type 6 <i>metering installation</i> (Scenario 3)	Clause S7A.8.10.4
A <i>metering installation</i> is changed from a type 1, 2, 3, 4, 4A, or 5 <i>metering installation</i> to a new type 1, 2, 3, 4, 4A, or 5 <i>metering installation</i> (Scenario 4)	Clause S7A.8.10.5

S7A.8.10.2 Scenario 1

The *Metering Data Provider* must have a process to ensure that:

- (a) the final accumulation *meter* reading(s) from the removed type 6 *metering installation* are applied at the end of the *day* prior to the meter churn;
- (b) the start reading(s) for a new type 6 *metering installation* are applied at the start of the *day* of the meter churn; and
- (c) *estimated metering data* is provided for any *metering* data streams made active as a result of the meter churn.

S7A.8.10.3 Scenario 2

(a) The *Metering Data Provider* must have a process to ensure that:

- (1) the final accumulation *meter* reading(s) from the removed type 6 *metering installation* are applied at the end of the *day* prior to the meter churn;
- (2) the *metering data* for the new type 1, 2, 3, 4, 4A, or 5 *metering installation* commences at the start of the *day* of the meter churn; and
- (3) *estimated metering data* is provided for any *metering* data streams made active as a result of the meter churn for a new type 4A or type 5 *metering installation*.

(b) The *Metering Data Provider* must have a process to ensure that the *metering data* for the period of the meter churn *day* between the start of the *day* and the commissioning of the new *metering installation* is provided as zeroes with a quality flag of F.

S7A.8.10.4 Scenario 3

Where reversion from a type 1, 2, 3, 4, 4A, or 5 *metering installation* to a type 6 *metering installation* is permitted, the *Metering Data Provider* must have a process to ensure that:

- (a) the final reading(s) from the removed type 1, 2, 3, 4, 4A, or 5 *metering installation* cease at the end of the *day* of the meter churn;
- (b) the *metering data* for the period of the meter churn *day* between commissioning of the new *metering installation* and the end of the *day* of the meter churn is provided as zeroes with a quality flag of F; and
- (c) the start reading(s) for the new type 6 *metering installation* are applied at the start of the *day* following the *day* of the meter churn.

S7A.8.10.5 Scenario 4

Each *Metering Data Provider* must have a process to ensure compliance with the following requirements:

- (a) the final reading(s) from the removed type 1, 2, 3, 4, 4A, or 5 *metering installation* is collected up to the removal of the old *metering installation* on the *day* of the meter churn;
- (b) the *metering data* for the new type 1, 2, 3, 4, 4A, or 5 *metering installation* commences at the start of the *day* of the meter churn;

- (c) the *Metering Data Provider* related to the new *metering installation* must obtain *metering data* for the period of the meter churn *day* between the start of the meter churn *day* and the removal of the old *metering installation* from the *Metering Data Provider* related to the old *metering installation*;
- (d) the *Metering Data Provider* related to the new *metering installation* must combine the *metering data* from the old *metering installation* and the new *metering installation* for the day of meter churn and deliver *metering data* for the whole *day* of meter churn;
- (e) where meter churn results in a change to the recording of *metering data* from 15-minute to 30-minute intervals, the 15-minute intervals of *metering data* from the start of the meter churn *day* until the commissioning of the new *metering installation* are to be aggregated to form *interval metering data*;
- (f) where meter churn results in a change to the recording of *metering data* from 30-minute to 15-minute intervals:
 - (1) the 15-minute intervals of *metering data* from the commissioning of the new *metering installation* to the end of the meter churn *day* are to be aggregated to form 30-minute *interval metering data*; or
 - (2) the 30-minute intervals of *metering data* for the start of the meter churn *day* may be disaggregated to form 15-minute interval *metering data*, where agreed with the *Metering Coordinator*;
- (g) *estimated metering data* is provided for any *metering data* streams made active as a result of the meter churn for a new type 4A or type 5 *metering installation*;
- (h) where meter churn results in a *metering data* stream being made active, the *Metering Data Provider* related to the new *metering installation* must provide *metering data* from the start of the *day* to the commissioning of the new *metering installation* by providing zeroes with a quality flag of F;
- (i) where meter churn results in a *metering data* stream being made inactive, the *Metering Data Provider* must provide *metering data* from the commissioning of the new *metering installation* to the end of the *day* by providing zeroes with a quality flag of F; and
- (j) the *Metering Data Provider* must create final *substituted metering data* for the period between the existing *metering installation* being removed and the commissioning of the new *metering installation*.

S7A.8.11 System architecture and administration

S7A.8.11.1 Metering data archival and recovery

Each *Metering Data Provider* must have retrieval mechanisms (both electronic and archived) that allow the *metering data* retained in its *metering data services database* under clause 7A.8.3 to be accessed, recovered, re-evaluated and delivered in agreed timeframes to *NTESMO*, *Registered Participants* or financially responsible participants.

S7A.8.11.2 Data backup

All *metering data* and metering register information must be backed-up, at a minimum, on a daily basis and held in a secure environment.

S7A.8.11.3 Disaster recovery

Requirement for disaster recovery plan

- (a) Each *Metering Data Provider* must ensure that a disaster recovery plan is established and in place to ensure that in the event of a system failure, its IT systems can be returned to normal operational service within 2 *business days*.
- (b) The *Metering Data Provider* must ensure that the disaster recovery plan is:
 - (1) up to date with all documentation showing revisions; and
 - (2) witnessed and dated at least annually by the *Metering Data Provider* as being current for the systems and processes in place.

Fall-over system approach

- (c) Where a *Metering Data Provider* adopts a disaster recovery plan that has a complete 'fail-over' system approach, the disaster recovery plan must be subjected to a test annually that facilitates a full 'fail-over' to the recovery system.

Segmented system approach

- (d) Where the *Metering Data Provider* adopts a disaster recovery plan that has a segmented system approach, the disaster recovery plan must:
 - (1) detail the interfaces and relationships between system segments;
 - (2) be established for each individual system segment;
 - (3) be tested annually with evidence retained to show disaster recovery for each individual system segment; and
 - (4) have, for each individual system segment, a procedure that clearly details the process to establish a return to full operation.

Testing

- (e) Expected evidence to support disaster recovery plan testing should include, but not be limited to:
 - (1) a test plan of the fail-over;
 - (2) results of the fail-over including timing;
 - (3) system logs indicating fail-over and recovery; and
 - (4) logs or notations evidencing resumption of *Metering Data Provider* operations.

Actions following system failure

- (f) If a system failure occurs, the *Metering Data Provider* must ensure that within 2 *business days*:

- (1) its *metering data services database* is restored to operational service; and
- (2) all processing and delivery backlogs of *metering data* to *NTESMO* and *Registered Participants* is completed.

Notice to NTESMO of activation of disaster recovery plan

- (g) The *Metering Data Provider* must, at its earliest opportunity, notify *NTESMO* of any failure where the *Metering Data Provider* has a requirement to activate its disaster recovery plan.

S7A.8.11.4 System administration and data management

Metering data services database

- (a) The *metering data services database* must be operated and administered by a *Metering Data Provider* to facilitate:
 - (1) controlled access to systems and data using unique identification and passwords for each user;
 - (2) the restriction of access to the underlying database tables to nominated system administrators;
 - (3) the restriction of *Registered Participant* access to *metering data* and *NT NMI data* in accordance with paragraph 7A.13.5(c);
 - (4) a minimum of 95% system availability (that is, hardware and systems downtime do not exceed a maximum of 438 hours per annum).

Metering register

- (b) Each *Metering Data Provider* must maintain full audit trails and version control of metering register information, *metering data* for at least 7 years so that any data output produced by the system can be re-produced from source data.

S7A.8.12 Quality control

S7A.8.12.1 Audits

- (a) Audits may be undertaken at any time by the *Utilities Commission* in accordance with the *Rules* and may be carried out following a request from a *Registered Participant*.
- (b) Where an audit of a *metering installation* is conducted by the *Utilities Commission* under clause 7A.7.4, and *metering data* must be obtained from the *Metering Data Provider* in support of this audit, the *Metering Data Provider* must provide the *metering data* within 2 *business days* of the *Utilities Commission's* request.
- (c) Each *Metering Data Provider* must assist the *Utilities Commission* with reasonable requests for the provisioning of *metering data* and relevant information relating to *connection points* that are part of the audit process of *Metering Coordinators*, *Metering Providers* and *Metering Data Providers*.

S7A.8.12.2 Corrective action

- (a) Each *Metering Data Provider* must take corrective action on any reported instances of non-compliance identified by *NTESMO* or through a *Metering Data Provider* audit process.
- (b) Where a *Metering Data Provider* becomes aware that incorrect *metering data* has been delivered to *NTESMO* and *Registered Participants*, the *Metering Data Provider* must provide corrected *metering data* to all affected parties within 1 *business day* as required by paragraph 7A.8.3(d).
- (c) *NTESMO* may request corrective action where errors or omissions are found within the *settlements* process and such requests are to be actioned as a priority by the *Metering Data Provider*.
- (d) Where the *Metering Data Provider* cannot deliver the corrected *metering data* in the timeframe specified above, the *Metering Data Provider* must advise *NTESMO* and agree on an alternative delivery time.

S7A.8.13.1 Administration

Provision of data

- (a) A *Registered Participant* may request a *Metering Data Provider* to:
 - (1) provide *metering data* in an alternative format, method or timeframe;
 - (2) provide any other *metering data services*; or
 - (3) any combination of the above.

No data to be provided

- (b) A *Registered Participant* may request a *Metering Data Provider* to not provide or deliver any *metering data* to the *Registered Participant* as required under this Part.

System changes not required

- (c) There is no requirement for a *Metering Data Provider* to implement system changes and processes to facilitate bilateral agreements.

Bilateral agreement not to impact metering data delivery to NTESMO

- (d) Any acceptance by a *Metering Data Provider* to deliver *metering data* to a *Registered Participant* in accordance with any agreement contemplated by this clause S7A.8.13.1 or acceptance to not provide any *metering data* in accordance with such an agreement must not impact on *metering data* delivery to *NTESMO* or any other *Registered Participant* for the *connection point(s)* concerned.

Bilateral agreement to be auditable

- (e) Any bilateral agreement established between a *Registered Participant* and a *Metering Data Provider* must be in writing and made available to the *Utilities Commission* on request for audit purposes.

S7A.8.13.2 Quality systems

Each *Metering Data Provider* must operate and retain a quality system that is at least equal to a quality accreditation to the ISO9001 or ISO9002 standards.