Chapter 7A   Metering

Note:

Chapter 7A has no effect in this jurisdiction until 1 July 2019 and 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.

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 *meters* and *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 and *Metering Coordinators*;

(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*;

(f)   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

(g)   metrology and service level obligations for the provision of *metering* services in this jurisdiction.

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*.

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

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

NT Ombudsman means the person holding or occupying the office of Ombudsman for the Northern Territory established by section 9 of the *Ombudsman Act* (NT).

physical inventory means a physical count of devices.

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*.

7A.1.4   Interpretation

(a)   This clause applies in relation to the following:

      (1)   the provisions of this Chapter;

      (2)   the provisions of Chapters 11 and 11A to the extent the provisions operate in relation to this Chapter;

      (3)   the definitions in Chapter 10, to the extent the definitions are mentioned in a provision mentioned in subparagraph (1) or (2).

(b)   In a provision mentioned in paragraph (a), a reference to the "relevant *Network Service Provider*" must be regarded as a reference to "Power and Water Corporation ABN 15 947 352 360".

7A.1.5   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.

Part B   Roles and Responsibilities

7A.2   Role and responsibility of financially responsible participant

(a)   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 the *metering installation* is registered in accordance with any *applicable regulatory instruments*; and

   (3)   a *NMI* has been obtained with respect to the *connection point*.

(b)   If a *retailer* is the financially responsible participant for a *connection point*, the *retailer* must comply with paragraph (a) before providing retail services relating to the *connection point*, and for so long as the *retailer* continues to provide retail services relating to the *connection point*.

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 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*.

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*.

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.9;

    (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*; and

    (5) the *Metering Provider* it appoints for the *connection point* complies with the obligations imposed on *Metering Providers* by this Chapter.

(d) The *Metering Coordinator* at a *connection point* with a type 4 *metering installation* must ensure that *energy data* is retrieved from the *metering installation* via remote access.

(e) A *Metering Coordinator* must not prevent, hinder or otherwise impede a *Network Service Provider* from locally accessing a *metering installation* or *connection point* for the purposes of *reconnecting* or *disconnecting* the *connection point*.

Metering data services

(f) 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.

Access to type 4 metering installations

(g)   The *Metering Coordinator* at a *connection point* with a type 4 *metering installation* must:

(1)   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, in accordance with this Chapter, to access the *metering installation*, the services provided by the *metering installation* or *energy data* held in the *metering installation*;

(2)   not arrange a *disconnection* or *reconnection* except:

(i)   on the request of the financially responsible participant or relevant *Network Service Provider*;

(ii)   if the *disconnection* or *reconnection* is effected via remote access; and

(iii)   in accordance with *jurisdictional electricity legislation*; and

(3)   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*.

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)   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 relevant *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 relevant *Network Service Provider* as the *Metering Provider* 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:

(1) the relevant *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 relevant *Network Service Provider* as the *Metering Provider* for the *connection point*.

(d) 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) 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 relevant *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 relevant *Network Service Provider* as the *Metering Data Provider* for the *connection point*.

(c) 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 relevant *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 relevant *Network Service Provider* as the *Metering Data Provider* for the *connection point*.

(d) 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 relevant *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 relevant *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 relevant *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*.

(b)   The *Metering Coordinator* at a *connection point* must ensure that *energy data* held in the *metering installation* is based on units of watthour (*active energy*) and where required varhour (*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.

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);

(2)   is accurate in accordance with clause 7A.6.4;

(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*;

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

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

(6)   records *energy data* in a manner that enables *metering data* to be collated;

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

(8)   has a *measurement element* for *active energy* and, if required in accordance with schedule 7A.1, a *measurement element* for *reactive energy*, with both measurements to be recorded;

(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*;

(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.3 if the *metering installation* is a type 4A or 5 *metering installation*;

(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

(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 financially responsible participant for a *connection point*   must:

(1) apply to the relevant *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   relevant   *Network   Service Provider*.

(d) The relevant *Network Service Provider* must issue a unique *NMI* for each *metering installation* on its *network* to the financially responsible participant.

7A.6.3   Metering point

The *Metering Coordinator* at a *connection point* must ensure   that:

(a) 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

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

7A.6.4 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.1.

(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.1.

(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.3.

7A.6.5 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.6.6 Altering a metering installation

(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 relevant *Network Service Provider* and the alteration is reasonably required to enable the relevant *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 subparagraph (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.6.7 Metering installation malfunctions

(a) A *Metering Coordinator* must, in respect of a *connection point* with:

    (1) a type 1, 2 or 3 *metering installation*, if a *metering installation malfunction* occurs to the *metering installation*, cause repairs to be made to it as soon as practicable but no later than 2 *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 subparagraph (1), if a *metering installation malfunction* occurs to the *metering installation*, cause repairs to be made to it as soon as practicable but no later than 10 *business days* after the *Metering Coordinator* has been notified of the *metering installation malfunction*.

(b) 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 paragraph (a) must notify the *Metering Coordinator* of the *metering installation malfunction* within 1 *business day*.

7A.6.8 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*.

7A.7 Maintenance (including inspection and testing) 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) 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.2.

(b) 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.

(c) The *Registered Participant* who requested the testing under paragraph (b) may make a request to the *Metering Coordinator* to witness the tests.

(d) The *Metering Coordinator* must not refuse a request received under paragraph (c) 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.

(e) If the *Metering Coordinator* has arranged testing of a *metering installation* under this clause and schedule 7A.2, 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 (f) and (g).

(f) If the test results mentioned in paragraph (e) 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.9.3.

(g) If the test results mentioned in paragraph (e) 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.9.3; or

(2) to a *Registered Participant* if requested by that *Registered Participant*, if the tests are not the result of a request for testing.

(h) The cost of any testing under paragraph (b) must be borne by:

(1) if paragraph (f) applies – the *Metering Coordinator*; or

(2) otherwise – the *Registered Participant* who requested the test.

7A.7.3 Actions in event of non-compliance

If the accuracy of the *metering installation* does not comply with the requirements of the *Rules*, the *Metering Coordinator* must arrange for the accuracy of the *metering installation* to be restored within 10 *business days* or, if a timeframe is agreed with the relevant financially responsible participant, within that timeframe.

7A.7.4 Errors found in metering tests or inspections

(a) Subject to paragraph (c), if a *metering installation* test or inspection, carried out in accordance with clause 7A.7.2, demonstrates errors in excess of those prescribed in schedule 7A.1, the *Metering Coordinator* must ensure the *metering data* is substituted in accordance with this clause and clause 7A.8.6 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.1, no substitution of readings is required.

7A.7.5 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.1.5.1(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

Metering Data Providers must provide *metering data services*, including the following, in accordance with the *Rules*:

(a)   collecting *energy data* by local access or *remote acquisition*;

(b)   the validation and substitution of *metering data* for types 1, 2, 3 and 4 *metering installations*;

(c)   the validation, substitution and estimation of *metering data* for types 4A, 5 and 6 *metering installations*;

(d)   the calculation, estimation and substitution of *metering data* for type 7 *metering installations*;

(e)   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;

(f)   ensuring the *metering data* and other data associated with the *metering installation* is kept secure and disclosed only in accordance with the *Rules*;

(g)   maintaining the standard of accuracy of the time setting of the *metering installation* in accordance with clause 7A.8.7;

(h)   notifying the *Metering Coordinator* of any *metering installation malfunction* in accordance with clause 7A.6.7;

(i)   management and storage of *metering data* in accordance with clause 7A.8.3.

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 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.3.

(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)   online, in an accessible format, for at least 13 months; and

         (ii)   following the retention under subparagraph (1)(i), in an accessible format for at least 7 years; and

     (2)   archive, in an accessible format, for 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*; and

     (3)   provide the persons mentioned in clause 7A.9.3(c)(1) to (5) with access to the *metering data* and *NT NMI data* in the *metering data services database*; and

      (4)   except for the persons mentioned in clause 7A.9.3(c)(1) to (5), ensure that no person has access to the *metering data services database*.

(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 any jurisdictional obligations and clause 7A.8.4.

(c)   *Metering data* may only be altered by a *Metering Data Provider*.

(d)   A *Metering Data Provider* may only alter *metering data* in the *metering data services database* in accordance with schedule 7A.3.

(e)   A *Metering Data Provider* must arrange with the *Metering Coordinator* to obtain the relevant *metering data* if *remote acquisition*, if any, becomes unavailable.

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.9.3(c)(1) to (5) as required by, and in accordance with, the *Rules*.

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* for:

(a)   validation;

(b)   substitution; and

(c)   estimation,

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

7A.8.6   Validation, substitution and calculation 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.3.

(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.3;

(2)   the *Metering Data Provider* must provide the status flag of the *substituted metering data* to the financially responsible participant for its record; 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 7 years and provide access to the record at reasonable times to the relevant financially responsible participant.

Type 7 metering installations

(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.3; and

    (2)   is validated in accordance with schedule 7A.3.

(e)   If validation under paragraph (d)(2) demonstrates that a measurement error exists, the *Metering Data Provider* must ensure the *metering data* is substituted in accordance with schedule   7A.3.

7A.8.7   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.1 relevant to the *load* through the *connection point* when installing, testing and maintaining *metering installations*.

(b)   The *Metering Data Provider* must maintain the *metering data services database* clock within +/– 1 second of *Australian Central Standard Time*.

(c)   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.1 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.1 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).

Part F Security of metering installations, energy data and metering data

7A.9 Security of metering installations, energy data and metering data

7A.9.1 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.

Provision of seals

(b) The *Metering Coordinator* for a *metering installation* must:

(1) provide seals or other appropriate devices to detect interference; and

(2) maintain a register of all relevant security fitting tools and seals.

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)   70 *business 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.9.2   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.

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

(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.

7A.9.3   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.9.2.

(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* or *NT NMI data* 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) the *Network Service Provider* associated with the *connection point*; and

(6) 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 NT 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*.

7A.9.4 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 relevant *Network Service Provider* and the financially responsible participant;

         (ii)   a remote *reconnection* service and the *metering data* in connection with that service – to the relevant *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 an end use 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 an end use 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 relevant *Network Service Provider*, the financially responsible participant and a person to whom an end use 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 relevant *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 relevant *Network Service Provider*, but only to the extent that, in the *Metering Coordinator's* reasonable opinion, the access is reasonably required by the relevant *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 end use 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* and *Metering Data Provider*; 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*.

7A.9.5   Confidentiality of data

(a) *Energy data*, *metering data*, *NT NMI data* 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 taken to have been provided by the *retail customer*.

Schedule 7A.1   Types and accuracy of metering installations

S7A.1.1   General requirements

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

S7A.1.2 Accuracy requirements for metering installations

Table S7A.1.2.1   Overall Accuracy Requirements of Metering Installation Components

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

Type	Volume limit per annum per connection point	Maximum allowable overall error (±%) at full load (Item 6) active reactive		Minimum acceptable class or standard of components	Metering installation clock error (seconds) in reference to ACST
6	less than y MWh (Item 4)	2.0	n/a	CT or whole current general purpose *meter* Wh recording *accumulated energy data* only. Processes used to convert the *accumulated metering data* into *recording interval metering data* and *estimated metering data* where necessary are included in schedule 7A.3. (Item 1)	
7	volume limit not specified (Item 5)	(Item 6)	n/a	No *meter*. The *metering data* is *calculated metering data* determined in accordance with schedule 7A.3.	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.3.

(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 VT 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.3.

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 in paragraph (a) will only be allowed for *connection points* that satisfy relevant jurisdictional requirements.

Note:

The requirements referred to in paragraph (b) will be considered as part of the phased implementation of the *Rules* in this jurisdiction.

(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 (±%) at different *loads*   and *power factors* is set out in Table S7A.1.2.2 to Table   S7A.1.2.6.

Table S7A.1.2.2   Type 1 installation – Annual Energy Throughput greater than 1 000 GWh

% 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.1.2.3   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.1.2.4 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.1.2.5 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.1.2.6   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%

% Rated Load	Power Factor		
	Unity	0.866 lagging	0.5 lagging
	active	active	active
100	2.0%	n/a	n/a

Note:

All measurements in Tables S7A.1.2.2 – S7A.1.2.6 are to be referred to 25 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.1.3   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.1.2.1	Check Metering Requirements
1	*Check metering installation*
2	Partial check *metering*
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 the provision of a separate *metering installation* using separate *current transformer* cores and separately fused *voltage transformer* secondary circuits, preferably from separate secondary windings.

(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)   *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*.

S7A.1.4   Resolution and accuracy of displayed or captured   data

Programmable settings available within a *metering installation* or 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.3; 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.1.5   General design standards

S7A.1.5.1 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.3; 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.3; 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.1.5.2 Design guidelines

In addition to the design requirements specified in clause S7A.1.5.1, 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 scheme where more than one *voltage transformer* is available.

Schedule 7A.2 Inspection and testing requirements

S7A.2.1 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.2.1.1.

   (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 clause 7A.7.2 and this schedule;

        (2)   to the same requirements as for new equipment where equipment is to be recycled for use in another site; and

(3) so as to include all data storage and processing components specified in schedule 7A.3, including algorithms used to prepare agreed *load* patterns.

(d) The testing intervals may be increased if the equipment type/experience proves favourable.

(e) The maximum allowable level of testing uncertainty (±) for all *metering* equipment must be in accordance with Table S7A.2.1.1.

Table S7A.2.1.1   Maximum Allowable Level of Testing Uncertainty (±)

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/cosφ%	0.1/cosφ%	0.2/cosφ%	0.2/cosφ%	n/a
	Meters varh	n/a	0.2/sinφ%	0.3/sinφ%	n/a	0.4/sinφ%
In Field	CTs ratio Phase	0.1% 0.15 crad	0.2% 0.3 crad	n/a	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/cosφ%	0.2/cosφ%	0.3/cosφ%	0.3/cosφ%	n/a
	Meters varh	n/a	0.3/sinφ%	0.4/sinφ%	n/a	0.5/sinφ%

Where $\cos\varphi$ is the *power factor* at the test point under evaluation.

Table S7A.2.1.2   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.2.1.2.

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
VT	10 years	10 years	10 years		n/a
Burden tests	When *meters* 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. **Note:** The requirements in relation to approval of an asset management strategy for the purposes of this provision will be considered as part of the phased implementation of the *Rules* in this jurisdiction.				

Table S7A.2.1.3   Period Between Inspections

Unless the *Metering Coordinator* has developed an approved asset management strategy that meets the intent of this schedule, the maximum period between inspections must be in accordance with Table   S7A.2.1.3.

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

S7A.2.2   Technical guidelines

(a)   *Current transformer* and *voltage transformer* tests are primary injection tests or other approved testing procedures that may include secondary injection testing.

(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)   For sinφ and cosφ refer to the ISO "Guide to the Expression of Uncertainty in Measurement", where cosφ is the *power factor*.

(e)   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.3   Metrology procedure

Part A

S7A.3.1   General

S7A.3.1.1 Purpose

The purpose of this schedule is to set out:

(a)   the obligations on *Metering Providers* in relation to the provision, installation, routine testing and maintenance of a *metering installation*; and

(b)   the obligations on *Metering Data Providers* in relation to the provision of *metering data services*.

S7A.3.1.2 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*;

          (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.3.1.3 Definitions

In this schedule:

data stream means a stream of *energy data* or *metering data* associated with a *metering point*, as represented by a *NMI*. For example, a *NMI* will have multiple data streams where one or more *meters* or one or more channels or registers comprise a single *meter*. Each data stream is identified by a suffix, which is associated with the *NMI* to which it belongs.

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

estimation, estimate, estimated means the processing of *metering data*, undertaken by a *Metering Data Provider*, for the forward estimation of *metering data* where the scheduled meter reading cycle does not support the delivery time frames of *metering data* to *Registered   Participants*.

final reading means the last actual meter reading for an end-use 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.3.14.2(c) and   S7A.3.14.3(c).

load table means a table of unmetered device *loads* as described in clause S7A.3.14.1.

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.

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

reasonable endeavours, in relation to a person, means the person must act in good faith and do what is reasonably   necessary   in   the circumstances.

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.

substitute, substitution, substituted means a process undertaken by a *Metering Data Provider* for the substitution of missing (null) or erroneous *metering data* or where the *metering data* has failed the validation process.

unmetered means a *load* or a *connection point* at which a *meter* is not necessary under schedule 7A.1.

validate, validation, validated means a process undertaken by the *Metering Data Provider* to test the veracity and integrity of *metering data* prior to transfer to other *Registered Participants*.

S7A.3.1.4 References

This schedule makes reference to the *Australian Standards* listed below as in force from time to time:

General:	
AS 1199	Sampling procedures for inspection by attributes – Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection
AS 2490	Sampling Procedures and Charts for Inspection by Variables for Percent Nonconforming
Voltage transformer standards:	
AS 60044.2	Instrument transformers – Inductive voltage transformers
AS 60044.3	Instrument transformers – Combined transformers
AS 60044.5	Instrument transformers – Capacitor voltage transformers
AS 1243	Voltage Transformers for Measurement and Protection (for three phase voltage transformers only)
Current transformers standards:	
AS 60044.1	Instrument transformers – Current transformers
AS 60044.3	Instrument transformers – Combined transformers
Electricity meter standards:	
AS 1284.1	Electricity metering – General purpose induction watthour meters
AS 1284.10.2	Electricity metering – Data exchange for meter reading, tariff and load control – Direct local data exchange via hand-held unit (HHU) – ANSI Standard interface

AS 1284.13	Electricity Metering in-service compliance testing
AS 62052.11	Electricity metering equipment (AC) – General requirements, tests, test conditions – Metering equipment
AS 62052.21	Electricity metering equipment (AC) – General requirements, tests and test conditions – Tariff and load control equipment
AS 62053.21	Electricity metering equipment (AC) – Particular requirements – Static meters for active energy (classes 1 and 2)
AS 62053.22	Electricity metering equipment (AC) – Particular requirements – Static meters for active energy (classes 0.2S and 0.5S)
AS 62054.11	Electricity metering (AC) – Tariff and load control – Particular requirements for electronic ripple control receivers
AS 62054.21	Electricity metering (AC) – Tariff and load control – Particular requirements for time switches
AS 62056.21	Electricity metering – Data exchange for meter reading, tariff and load control – Direct local data exchange

S7A.3.2   Meter Provision

S7A.3.2.1 Application

The requirements of this clause S7A.3.2 are applicable to type 1, 2, 3, 4, 4A, 5 and 6 *metering installations.*

S7A.3.2.2 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)   New *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) New *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) The *Metering Coordinator* at a *connection point* with a type 4 *metering installation* must ensure that *energy data* is retrieved from that type 4 *metering installation* via remote access.

(e) The *Metering Provider* must ensure that *metering* equipment purchased must 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.

(f) The *Metering Provider* must ensure that a visible display is provided to display, at a minimum, the cumulative total *energy* for each data stream measured by that *metering installation*.

(g) *Metering data* is required for all *recording intervals* on a daily basis at a level of availability of at least 95% per annum from type 1, 2, 3 and 4 *metering installations*.

(h) In relation to summation *metering*:

(1) 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;

(2) 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 Provider* must on request demonstrate that the summation techniques reliably and accurately transfer data;

(3) *current transformer* secondaries can only be paralleled using appropriate arrangements of links; this must not be done at the *meter* terminals; and

(4) 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 *CTs* are permitted provided that the overall errors of the installation are considered.

(i) Where a *metering installation* records *interval energy data* the interval periods are based on:

    (1) 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*);

    (2) the end of each interval for a 30 minute interval period must be on the hour and on the half-hour (*ACST*); and

    (3) other sub-multiple intervals, where agreed with the relevant *Network Service Provider* and the financially responsible participant, provided that the ends of the intervals correspond each and every exact hour (*ACST*) and half-hour (*ACST*).

(j) 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*.

(k) The *Metering Provider* 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 being requested by a financially responsible participant to provide such facilities.

(l) 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 this schedule, such as, for example, a 'use of system' agreement between the relevant *Network Service Provider* and the financially responsible participant.

(m) 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*.

(n) A type 4A or 5 *metering installation* must have an optical port that meets the relevant requirements of *AS* 1284.10.2 or *AS* 62056.21 or a computer serial port to facilitate downloading of 90 *days* of half hourly *interval energy data*, for each *meter* associated with the *metering installation*, in 35 seconds or less.

(o) 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 accordance with the following requirements, and the maximum drift in the type 5 *metering installation* clock permitted between successive *meter* readings is ± 300 seconds:

(1) the *Metering Provider* must reset a type 4A, 5 or 6 *metering installation* clock when inspecting, maintaining or commissioning the *metering installation*;

(2) the *Metering Data Provider* must reset a type 4A or 5 *metering installation* clock when *interval metering data* is collected from the *metering installation*.

(p) A type 4A or 5 *metering installation* must have provision for future upgrade to a type 4 *metering installation* without the need for replacement of the *measurement element*.

(q) For type 6 *metering installations* with different time of day rates, the *metering installation* must meet the relevant requirements of *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 relevant *Network Service Provider*.

S7A.3.2.3 Routine testing and inspection of metering installations

(a) The *Metering Coordinator* must ensure that type 1, 2, 3, 4, 4A, 5 and 6 *metering installations* are tested and inspected in accordance with rule 7A.7, schedule 7A.2 and this schedule.

(b) If the accuracy of the *metering installation* does not comply with the requirements of the *Rules*, the *Metering Coordinator* must undertake the actions in accordance with clauses 7A.7.3 and 7A.7.4.

(c) If, for type 4A, 5 and 6 *metering installations*, a *metering installation* test or inspection demonstrates errors in excess of those prescribed and the time at which those errors arose is not known, the error is deemed to have occurred at a time half way between the time of the most recent test or inspection which demonstrated that the *metering installation*, or the *meter* family to which the *meter* of the *metering installation* belongs, complied with the relevant accuracy requirement and the time when the error was detected.

S7A.3.3 Metering Data Services Provision

S7A.3.3.1 Application

The requirements of this clause are applicable to type 4A, 5, 6 and 7 *metering installations.*

S7A.3.3.2 Verification of metering data for type 4A, 5, 6 and 7 metering installations

(a) The *Metering Coordinator* must ensure that a sample test plan is established and maintained, in accordance with *AS* 1199 or *AS* 2490 to validate that the *metering data* stored in the *metering data*

services database with respect to a type 4A, 5 or 6 *metering installation* is consistent with the data stored in the metering installation.

(b)   The verification test must be conducted at a frequency in accordance with the sample test plan described in paragraph (a), which must not be less than once every 12 months.

(c)   If there is an inconsistency between the *energy data* held in a *metering installation* and the *metering data* held in the *metering data services database*, the *energy data* in the *metering installation* is to be taken as prima facie evidence of the amount of electricity supplied to that *metering point*, except if the *meter* or components of the *metering installation* are found to be not compliant.

(d)   The *Metering Coordinator* must ensure that a sample test plan is established and maintained to validate that the *calculated energy data* stored in the *metering data services database*, with respect to a type 7 *metering installation*, is consistent with the physical inventory.

(e)   A verification test must be conducted at a frequency in accordance with the sample test plan described in paragraph (d), which must not be less than once every 12 months.

(f)   The *calculated metering data* stored in a *metering data services database* for a type 7 *metering installation*, for a *NMI*, is consistent with the physical inventory if the error associated with calculating the *energy* value for the sample, that is,

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

where i = device type

is within the accuracy requirement determined in accordance with paragraph (g).

(g)   The accuracy requirement for the *calculated metering data* for a type 7 *metering installation*, based on the formula in paragraph (f), is within ± 2.0%.

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

(h)   If there is an inconsistency between the inventory table held in the *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 devices.

S7A.3.3.3 Request for testing type 7 metering installation calculated metering data

(a) If requested, in accordance with clause 7A.7.2, by a *Registered Participant* with a financial interest in the type 7 *metering installation* or the *calculated metering data* for a type 7 *metering installation*, the *Metering Coordinator* must make arrangements to test that the *calculated metering data* stored in the *metering data services database* is consistent with the physical inventory for the type 7 *metering installation*.

(b) Where the *Registered Participant* requests a type 7 *metering installation calculated metering data* test in accordance with paragraph (a):

   (1) the *Metering Coordinator* must use reasonable endeavours to conduct the test within 15 *business days* of the request; and

   (2) the *Metering Coordinator* must, prior to any test being undertaken, provide an estimate of costs associated with the test.

(c) Where there is a discrepancy between the *calculated metering data* held in the *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 devices.

(d) Where the *Metering Coordinator* has undertaken testing of a type 7 *metering installation calculated metering data* under paragraph (a), the *Metering Coordinator* must make the test results available in accordance with clause 7A.7.2.

(e) If the *calculated metering data* accuracy does not comply with the requirements of clause S7A.3.3.2(g), the *Metering Coordinator* must undertake the actions in accordance with clauses 7A.7.3 and 7A.7.4.

Part B

S7A.3.4 Substitution for type 1 to 4 metering installations

S7A.3.4.1 Application of clause S7A.3.4

(a) The requirements of clauses S7A.3.4.2 and S7A.3.4.3 apply to type 1, 2, 3 and 4 *metering installations*.

(b) The requirements of clauses S7A.3.4.2 and S7A.3.4.3 are applicable to all *metering data* substitution types to be undertaken by *Metering Data Providers* accredited for the collection, processing and delivery of *metering data* from type 1, 2, 3 and 4 *metering installations*.

(c) For all *metering data* substitutions undertaken under clauses S7A.3.4.2 and S7A.3.4.3, for type 1, 2, 3 and 4 *metering installations*, the *Metering Data Provider* must ensure the selected *metering data* substitution values correctly align with the adjoining

intervals of *metering data* and that any intervals of *metering data* adjacent to the substituted period are valid.

S7A.3.4.2 Type 1 to 4 substitution rules

(a)   The *Metering Data Provider* must carry out all *metering data* substitutions in accordance with this schedule.

(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)   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.

(d)   Subject to paragraph (e), SCADA *metering data*, where available, may be used by the *Metering Data Provider* as *check metering data* for substitutions.

(e)   *Metering Data Providers* may only undertake substitution type 13 where substitution types 11 and type 12 are not applicable or cannot be carried out.

(f)   For *connection points* where the financially responsible participant is a *Generator*:

(1)   *Metering Data Providers* may directly undertake type 11, type 12 or type 13 substitutions as a consequence of missing or erroneous *metering data* that has failed validation;

(2)   *Metering Data Providers* may undertake type 16 (Agreed Method) or Type 18 (Alternate) substitutions following consultation and agreement with the *Generator* that the substituted *metering data* is an accurate reflection of the *interval metering data* concerned; and

(3)   in the situation where *metering data* cannot be recovered from the *metering installation* or substituted in accordance with this paragraph (f) within the required *metering data* delivery performance time frames, the *Metering Data Provider* must undertake type 19 substitutions as an interim until *metering data* can be recovered from the *metering installation* or substituted.

(g)   *Metering Data Providers* 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.

(h)   *Metering Data Providers* may perform all *metering data* substitution types except type 16 or type 18 without prior agreement from the affected parties. *Metering Data Providers* may however undertake to

change the quality flag to an existing type 16 or type 18 substitution without seeking further agreement from the affected parties.

(i)   The *Metering Data Provider* must notify the relevant *Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point* of any *metering data* substitution within 2 *business days* of the *metering data* substitution being carried out by the *Metering Data Provider*.

(j)   Where a *metering installation malfunction* is a failure of the *remote acquisition* system, and the financially responsible participant and *Metering Provider* cannot repair the data communications within the periods specified in the *Rules* (2 *business days* for type 1, 2 and 3 *metering installations* and 10 *business days* for type 4 *metering installations*), the *Metering Data Provider* must:

(1)   request from the *Metering Provider*, the provision of a manual download of *metering data* from the *metering installation* in the time frames to meet *metering data* delivery requirements; and

(2)   where the malfunction includes a failure of the *meter* to correctly record *interval energy data* and the *Metering Provider* has acquired an exemption to repair the *metering installation*, then the *Metering Data Provider* must substitute for the missing *metering data* in accordance with this schedule.

(k)   The *Metering Data Provider* must ensure that all *metering data* substitutions are replaced with actual *metering data* when that *metering data* becomes available.

S7A.3.4.3 Type 1 to 4 substitution types

Type 11 – Check Data

(a)   The *Metering Data Provider* must use *interval metering data* obtained from another *metering installation* that has been identified by the *Metering Provider* as being the *check metering installation* for that *metering point*. The *metering data* used must be for the same *recording intervals* as the *recording intervals* that are being substituted. *Metering installations* of this type include but are not limited to:

(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 line losses can be accurately determined; and

(3)   *metering installations* across a parallel set of feeders having similar line impedances between a common set of *busbars*.

Type 12 – Calculated

(b)   The *Metering Data Provider* must calculate the *interval metering data* values 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)   The *Metering Data Provider* must use EMS or SCADA data for substitution purposes, which originates from a similar measurement point as the *meter*.

(d)   EMS or SCADA data may be data which is inferior in accuracy or resolution and which is 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 in order that the substitution is acceptable.

(e)   In any instance 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

(f)   The *Metering Data Provider* must substitute for the missing or erroneous *metering data* using the nearest equivalent day or like day method, as detailed in the following Table.

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##

Metering data substitutions for **like day** to be as detailed above,   unless:

(a)   No *metering data* is available on the first listed day, then the next listed preferred day is to be used. If there is no other suitable listed day, or no *metering data* is available on any of the listed days then type 15 substitution must be used.

(b)   The substitution day was a public holiday, in which case the most

	recent Sunday is to be used.
(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.
#	Occurring in the same week as the substitution day.
##	Occurring in the week preceding that in which the substitution day occurs.

Type 15 – Average Like Day

(g) The *Metering Data Provider* may substitute for the missing or erroneous *metering data* using the **average like day** method, as detailed in the following Table.

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 part thereof. 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 interval(s) 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 interval(s) to be substituted.
Type 15 substitutions must not be used for public holidays.

Type 16 – Agreed Method

(h) Where the *Metering Data Provider* is required to undertake a *metering data* substitution for any period greater than 7 days, consultation and agreement must be obtained from the financially responsible participant, the relevant *retailer* and the relevant *Network Service Provider* for the *connection point* as to the *metering data* substitution to be performed. This may include changes to existing *metering data* substitutions for any period which were carried out where the affected parties have directed that as a result of site or customer specific information, the original *metering data* substitutions are in error and a correction is required.

Type 17 – Linear Interpolation

(i) The *Metering Data Provider* may substitute *metering data* for consecutive interval periods up to, but not exceeding 2 hours, by using simple linear interpolation.

Type 18 – Alternate

(j) The *Metering Data Provider* may use an alternate method of *metering data* substitution subject to an agreement between the

financially responsible participant, the relevant *retailer* and the relevant *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 which affect consumption (for example, local holiday or customer shutdown), or where alternate *metering data* may be able to be used for quality checks and minor adjustments of an estimated profile.

Type 19 – Zero

(k) The *Metering Data Provider* must undertake *metering data* substitutions of 'zero' where:

(1) either the relevant *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; or

(2) *metering data* substitutions are applicable for *connection points* where the financially responsible participant is a *Generator* in accordance with clause S7A.3.4.2(f)(3).

S7A.3.5 Substitution and forward estimation for type 4A and 5 metering installations

S7A.3.5.1 Application of clause S7A.3.5

(a) The substitution and forward estimation types, as detailed within clauses S7A.3.5.2 and S7A.3.5.3, are to be undertaken by *Metering Data Providers* accredited for the collection, processing and delivery of *metering data* from a type 4A or 5 *metering installation*.

(b) For all *metering data* substitutions and forward estimations undertaken under clauses S7A.3.5.2 and S7A.3.5.3, for type 4A or 5 *metering installations*, the *Metering Data Provider* must ensure the selected *metering data* substitution values correctly align with the adjoining *interval metering data* and that any *interval metering data* adjacent to the substituted period is valid.

S7A.3.5.2 Type 4A and 5 substitution and forward estimation rules

(a) The *Metering Data Provider* must carry out all *metering data* substitutions and forward estimations in accordance with this schedule.

(b) The *Metering Data Provider* must ensure that all *metering data* substitutions and forward estimations are replaced with actual *metering data* if and when that *metering data* becomes available.

(c) The *Metering Data Provider* must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which *metering data* substitutions are required.

(d) The *Metering Data Provider* must only use type 56 or type 57 substitutions or forward estimations where the historical *metering data* does not support the application of a type 51 or type 52 substitution or forward estimation.

(e) Subject to paragraph (d), the *Metering Data Provider* must only apply the following substitution and forward estimation types:

  (1) substitutions may be type 51, 52, 54, 55, 56, 57 or 58;

  (2) forward estimations may be type 51, 52, 56, 57 or 58.

(f) The *Metering Data Provider* must notify the relevant *Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point* of any *metering data* substitution or forward estimation within 2 *business days* of the *metering data* substitution or forward estimation being carried out by the *Metering Data Provider*.

(g) *Metering Data Providers* may not perform type 55 substitutions or type 56 substitutions or forward estimations without prior agreement with the affected parties. *Metering Data Providers* may however undertake to change the quality flag to an existing type 55 substitution or type 56 substitution or forward estimation without seeking further agreement from the affected parties.

S7A.3.5.3 Type 4A and 5 substitution and forward estimation types

Type 51 – Previous Years Method (Nearest Equivalent Day or Like Day)

(a) The *Metering Data Provider* must provide a substitution or forward estimation for the *metering data* 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 A in paragraph (b).

Type 52 – Previous Meter Reading Method (with the Nearest Equivalent Day or Like Day method)

(b) The *Metering Data Provider* must provide a substitution or forward estimation for the *metering data* 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 the following Table A.

Type 51 or 52 Table A	
Substitution or Forward Estimation 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#

Metering data substitutions or forward estimations for like day to be as detailed above, unless:

(a) no *metering data* is available on the first listed day, then 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 then Type 52 must be used;

(b) the substitution or forward estimation day was a public holiday, in which case the most recent Sunday is to be used; or

(c) the substitution or forward estimation 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, Saturday or Sunday is to be used.

##	For type 51 utilise *metering data* from the corresponding week in the previous year.
##	For type 52 utilise *metering data* from the corresponding week of the previous *meter* reading period.
#	For type 51 utilise *metering data* from the week preceding the corresponding week in the previous year.
#	For type 52 utilise *metering data* occurring in the week preceding the corresponding week of the previous *meter* reading period.

(c) Alternatively, the *Metering Data Provider* must provide substitution or forward estimation *metering data* using the average like day method, as detailed in the following Table B.

Type 52 (alternate)
Table B

The *interval metering data*, for which a substitution or forward estimation is to be provided, will be calculated using an average of the *metering data* from each corresponding interval from the preceding 4 weeks, or part thereof. 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 interval requiring substitution or forward estimation;

(b) where the averaged *interval metering data* is used to provide the profile and are scaled to a pre-determined consumption value for

> the interval(s) that are the subject of substitution or forward estimation.
>
> Type 52 substitutions or forward estimations must not be used for public holidays.

Type 54 – Linear Interpolation

(d) The *Metering Data Provider* may substitute *metering data* for consecutive interval periods up to, but not exceeding 2 hours, by using simple linear interpolation.

Type 55 – Agreed Substitution Method

(e) The *Metering Data Provider* may undertake to use another method of *metering data* substitution (which may be a modification of an existing substitution type), where none of the existing substitution types is applicable, subject to an agreement between the financially responsible participant, the relevant *retailer* and the relevant *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

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

Type 57 – Prior to First Reading – Customer Class Method

(g) Prior to the first actual meter reading and where no previous *metering data* history exists for the *connection point*, the *Metering Data Provider* may provide a substitution or forward estimation for the *metering data* based on the given average daily *load*. The *interval metering data* must be profiled to suit the relevant customer class. *Metering Data Providers* electing to undertake this type of substitution or forward estimation must develop a suite of profiles acceptable to the *Metering Coordinator* for use and application.

Type 58 – Zero

(h) The *Metering Data Provider* must undertake *metering data* substitutions or forward estimations of 'zero' where either the relevant *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.3.6   Substitution and forward estimation for type 6 metering installations

S7A.3.6.1   Application of clause S7A.3.6

The *metering data* substitution and forward estimation types as detailed within clauses S7A.3.6.2 and S7A.3.6.3 are to be undertaken by *Metering Data Providers* accredited for the collection, processing and delivery of *metering data* from a type 6 *metering installation*.

S7A.3.6.2 Type 6 substitution and forward estimation rules

(a) The *Metering Data Provider* must carry out all *metering data* substitutions and forward estimations in accordance with this schedule.

(b) The *Metering Data Provider* must replace all *metering data* forward estimations with either actual or substituted *metering data*:

(1) when actual *metering data* covering all or part of the forward estimation period is obtained; or

(2) when the next scheduled meter reading was unable to be undertaken, the *Metering Data Provider* must replace the forward estimated *metering data* with substituted *metering data* with a quality flag of F (final substitution).

(c) Any final substituted *metering data* provided by the *Metering Data Provider* must be re-validated, updated or recalculated 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 from the financially responsible participant, the relevant *retailer* and the relevant *Network Service Provider* for the *connection point* a new agreed value as per clause S7A.3.6.3(d) (type 64) must be   provided.

(d) The *Metering Data Provider* must obtain clear and concise identification as to the cause of any missing or erroneous *metering data* for which *metering data* substitutions are required.

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

(f) The *Metering Data Provider* may use type 63 substitutions   or forward 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 (i.e. when type 61 and type 62 substitution or forward estimation methods cannot be   used).

(g) The *Metering Data Provider* may use type 65 substitutions   or forward 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 (i.e. when type 61 and type 62 substitution or forward estimation methods cannot be   used).

(h) The *Metering Data Provider* must only use a type 67 substitution when:

(1) directed by the *Metering Coordinator*;

(2) it is not expressly disallowed in this   jurisdiction;

(3) the end-use customer provided *meter* reading meets the validation rules for that data stream;   and

(4) the *Metering Data Provider* has no actual *metering data* for the scheduled reading date for this *connection   point*.

(i) Subject to paragraphs (e) to (h), the M*etering Data Provider* may apply the following substitution and forward estimation   types:

(1) substitutions may be type 61, 62, 63, 64, 65, 67 or   68;

(2) forward estimations may be type 61, 62, 63, 65 or   68.

(j) *Metering Data Providers* may not perform type 64 substitutions without prior agreement with the financially responsible participant, the relevant *retailer* and the relevant *Network Service Provider* for the *connection point*. *Metering Data Providers* may however undertake to change the quality flag to an existing type 64 substitution without seeking further agreement from the financially responsible participant, the relevant *retailer* and the relevant *Network Service Provider* for the *connection point*.

(k) The *Metering Data Provider* must notify the relevant   *Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point* of any *metering data* substitution or forward estimation within 2 *business days* of the *metering data* substitution or forward estimation being carried out by the *Metering Data Provider*.

S7A.3.6.3 Type 6 substitution and forward estimation   types

Type 61 – Previous Year Method (Average Daily Consumption Method)

(a) The *Metering Data Provider* must provide a substitution or forward estimation of the *meter* reading by calculating the *energy* consumption as per the following   formula:

Energy Consumption = ADC_{LY} * 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) The *Metering Data Provider* must provide a substitution or forward estimation of the *meter* reading by calculating the *energy* consumption as per the following formula:

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

where

ADC$_{PP}$ = average daily consumption from the previous *meter* reading period.

Type 63 – Customer Class Method

(c) The *Metering Data Provider* must provide a substitution or forward estimation of the *meter* reading by calculating the *energy* consumption as per the following formula:

Energy Consumption = ADC$_{CC}$ $*$ 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) The *Metering Data Provider* may undertake to use another method of *metering data* substitution (which may be a modification of an existing substitution type), where none of the existing substitution types is applicable, subject to an agreement between the financially responsible participant, the relevant *retailer* and the relevant *Network Service Provider* for the *connection point*. The specifics of this substitution type may involve a globally applied method.

Type 65 – ADL Method

(e) The *Metering Data Provider* must provide a substitution or forward estimation of the *meter* reading by calculating the *energy* consumption in accordance with the following formula:

Energy Consumption = Average Daily Load * number of days required.

Type 67 – End-use Customer Reading

(f) Subject to clause S7A.3.6.2(h), the *Metering Data Provider* must substitute any previously substituted or forward estimated *metering data* based directly on an end-use customer provided *meter* reading.

Type 68 – Zero

(g) The *Metering Data Provider* must undertake data substitutions or forward estimations of 'zero' where either the relevant *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.3.7 Substitution and forward estimation for type 7 metering installations

S7A.3.7.1 Application of clause S7A.3.7

The substitution and forward estimation types detailed in clauses S7A.3.7.2 and S7A.3.7.3 are to be undertaken by *Metering Data Providers* accredited for the calculation and delivery of *metering data* from a type 7 *metering installation*.

S7A.3.7.2 Type 7 substitution rules

(a)   The *Metering Data Provider* must carry out all *metering data* substitutions and forward estimations in accordance with this schedule.

(b)   The *Metering Data Provider* must obtain clear and concise identification as to the cause of any missing or erroneous *calculated metering data* for which *metering data* substitutions are required.

(c)   The *Metering Data Provider* must ensure that all *metering data* substitutions and forward estimations are based on *calculated metering data* and not on any previous substitutions.

(d)   The *Metering Data Provider* must base *calculated metering data* for type 7 *metering installations* on inventory table data as follows:

(1)   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 a forward estimated value;

(2)   where the inventory table is correct for the period concerned, the *calculated metering data* must be provided as an actual value; and

(3)   where the inventory table in subparagraph (2) has a subsequent update for the period concerned, the *calculated metering data* must be provided as a substituted value.

(e)   Subject to paragraph (d), the *Metering Data Provider* may apply the following substitution and forward estimations types:

(1)   substitutions may be type 71, 72, 73, or 74;

(2)   forward estimations must be type 75.

(f)   The *Metering Data Provider* must notify the relevant *Network Service Provider*, the relevant *retailer* and the financially responsible participant for the *connection point* of any *calculated metering data* substitution by the *Metering Data Provider* within 2 *business days* of the *calculated metering data* substitution being carried out by the *Metering Data Provider*.

(g)   The *Metering Data Provider* must flag all *calculated metering data* substitutions as **final** (F).

(h)   *Metering Data Providers* may not perform a type 74 substitution without prior agreement with the affected parties.

S7A.3.7.3 Type 7 substitution and forward estimation types

Type 71 – Recalculation

(a) 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 or on/off table, the *Metering Data Provider* must substitute *calculated metering data* obtained 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 the algorithm, 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 an agreement between the financially responsible participant, the relevant *retailer* and the relevant *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 a forward estimate for the *calculated metering data* based on the most recent inventory table information until such time as an updated inventory table is received for the period concerned.

S7A.3.8 General data validation requirements

S7A.3.8.1 Validation requirements for type 1 to 7 metering   installations

(a) *Metering Data Providers* are requested to manage systems and processes on the basis that:

    (1) stored *metering data* held in the *meter* buffer may be subject to installation measurement error; and

    (2) data delivered by reading systems, (for example, Remote reading systems, hand held readers and conversion software) may not be recovered from the field *meters* without   corruption.

(b) The market use of validation procedures is of critical importance and may have a direct impact on disputes. It is essential that *Metering Data Providers* comply with these validation procedures   and that all

metering data is subjected to validation prior to delivery to *Registered Participants*.

S7A.3.8.2 Validation of interval metering data alarms for type 1 to 5 metering installations

(a) The *Metering Data Provider* must validate *interval metering data* from type 1, 2, 3, 4, 4A and 5 *metering installations* against the following significant *metering data* alarms when these are provided in the *meter*:

(1) power failure/*meter* loss of supply;

(2) *VT* or phase failure;

(3) pulse overflow;

(4) CRC error;

(5) time tolerance.

(b) Where interval *metering installations* assign alarms to the data channel or the *interval metering data* concerned, the *Metering Data Provider* must process the alarm along with the *metering data* as part of the required *metering data* validation process.

(c) As a minimum requirement, the *Metering Data Provider* must have systems and processes in place that capture *metering data* alarms and process them by exception reporting.

(d) 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 process.

(e) The *Metering Data Provider* must validate all interval *metering data* with all *metering data* alarms prior to despatch to *Registered Participants*.

(f) All *Metering Data Provider* exception reports must provide, for all instances where the *interval metering data* was found to be corrupted, for example, intervals substituted, an indication of the subsequent actions undertaken by the *Metering Data Provider*.

S7A.3.9 Validation within meter reading process

S7A.3.9.1 Application of clause S7A.3.9

(a) The requirements of clause S7A.3.9.2 are applicable to *Metering Data Providers* accredited for the provision of *metering data services* for type 4A and 5 *metering installations*.

(b) The requirements of clause S7A.3.9.3 are applicable to *Metering Data Providers* accredited for the provision of *metering data services* for type 6 *metering installations*.

S7A.3.9.2 Validations to be performed for type 4A and 5 metering data collection

The *Metering Data Provider* responsible for the collection of *metering data* from type 4A and 5 *metering installations* must undertake the following validations within the *meter* reading process:

(a) The *meter* serial number is correct against the recorded *meter* serial number.

(b) The security of the *metering installation* is intact, for example *meter* seals in place and in good order.

(c) The time synchronisation of the *metering installation* is correct to *ACST* inclusive of any *load* control devices.

S7A.3.9.3 Validations to be performed for type 6 metering data collection

The *Metering Data Provider* responsible for the collection of *metering data* from type 6 *metering installations* must undertake the following validations within the *meter* reading process:

(a) the value of *metering data* from the current *meter* reading $\geq$ the value of *metering data* from the previous *meter* reading;

(b) the value of *metering data* from the current *meter* reading is valid against an expected minimum value;

(c) the value of *metering data* from the current *meter* reading is valid against an expected maximum value;

(d) the *meter* serial number is correct against the recorded *meter* serial number;

(e) the security of the *metering installation* is intact, for example, *meter* seals in place and in good order;

(f) the time synchronisation of the *metering installation* is correct to *ACST* inclusive of any *load* control devices;

(g) the dial capacity is checked against the recorded dial capacity.

S7A.3.10 Validation of metering data type 1 to 4

S7A.3.10.1 General

(a) Type 1 and 2 *metering installations* must have a *check metering installation* in accordance with the *Rules*.

(b) Type 3, 4, 4A, 5 and 6 *metering installations* are not required to have (but may have) a *check metering installation* in accordance with the *Rules*.

S7A.3.10.2 Application of clause S7A.3.10

(a) The requirements of clause S7A.3.10.3 are applicable to all *Metering Data Providers* accredited for the provision of *metering data services* for type 1, 2, 3 and 4 *metering installations*.

(b) The requirements of clause S7A.3.10.4 are applicable to *Metering Data Providers* accredited for the provision of *metering data*

services for type 1, 2, 3 and 4 *metering installations* that have associated *check metering installations* or partial *check metering installations*.

S7A.3.10.3 Validations to be performed for all metering installations

The *Metering Data Provider* must, as a minimum, undertake the following validations on *metering data* within the *metering data services database*:

(a)   a check of all *interval metering data* against a nominated maximum value. This validation is to ensure that erroneous *interval metering data* spikes are trapped and substituted. This check may additionally be performed in the polling software;

(b)   a check of the maximum value of *active energy* and *reactive energy*. For *current transformer metering installations* the maximum value   is to be initially defined by the applied *current transformer* ratio of the *metering installation*. For whole current *metering installations* the maximum rating of the *meter* is to be used;

(c)   check against a nominated minimum value or, alternatively, a 'zero' check which tests for an acceptable number of zero interval values per day to be derived from the site's historical *metering   data*;

(d)   check for null (no values) *metering data* in the *metering   data services database* for all *metering* data streams. 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). 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;

(e)   check for significant *meter* alarms (power failure, *voltage transformer* or phase failure, pulse overflow, CRC error and time tolerance). A process must be in place that captures these significant *meter* alarms within the *metering data* validation process and ensures that any *meter* alarm occurrences are retained. Refer to clause S7A.3.8.2. The *Metering Data Provider* must provide the occurrences of these alarms to relevant *Registered Participants*;

(f)   where supported by the *meter(s)*, validation, for a given period, of *interval metering data* by comparison of the totalised *interval energy data* values (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*.

S7A.3.10.4   Validations to be performed for metering installations with check metering or partial check metering

(a) The *Metering Data Provider* must undertake the following validations by comparison of 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 level, the *Metering Data Provider* must validate the *metering installation* data streams and *check metering installation* data streams on a per interval basis. The average of the 2 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*), the *Metering Data Provider* must construct a validation algorithm within the *metering data services database* that will facilitate this test:

(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 value for each *connection point*, based on historical *metering data*; and

(iv) the maximum error difference considered acceptable for any *connection point* is 1% on a per interval basis. The *Metering Data Provider* should minimise this value for each *connection point*, based on historical 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*), the validation system must employ the following functionality:

(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 line losses;

(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 *metering data* from the *metering installation* and *check metering installation* is 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 maximum error difference considered acceptable for any *connection point* is 5% on a per interval basis. The *Metering Data Provider* should minimise this value for each *connection point*, based on historical data;

(4)   for installation *connection points* where SCADA *metering data* is available for the purposes of *metering data* validation, the *Metering Data Provider* must validate the *metering data* by comparison of the *interval metering data* against the SCADA *metering data*. The validation system must employ the following functionality:

(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 *metering 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 *metering data* is 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 *metering data* may be derived from a different measurement point, have a different interval collection period and/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 *metering data* on the primary data channel (that is, only 'B' channel validation for *Generators* and only 'E' channel validation for *loads* such as pumps).

S7A.3.11 Validation of metering data type 4A and 5

S7A.3.11.1 Application of clause S7A.3.11

Metering Data Providers accredited for the provision of *metering data services* for type 5 *metering installations* must apply the requirements of:

(a) clause S7A.3.11.2 for *current transformer* connected type 4A or 5 *metering installations*; and

(b) clause S7A.3.11.3 for whole current type 4A or 5 *metering installations*.

S7A.3.11.2 Validations to be performed for type 4A and 5 metering installations with CTs

The *Metering Data Provider* must, as a minimum, undertake the following validations on *metering data* within the *metering data services database*:

(a) check of all *interval metering data* against a nominated maximum value as follows:

   (1) this validation is to ensure that erroneous *interval metering data* spikes are trapped and substituted;

   (2) this check may additionally be performed in the collection software;

   (3) a check of the maximum value of *active energy*. (Maximum *reactive energy* checks may also be performed as an option);

   (4) the maximum value in subparagraph (3) is to be initially defined by the applied *current transformer* ratio of the *metering installation*;

   (5) on a per installation basis, the maximum value in subparagraph (3) may be increased to cater for situations where the *Metering Coordinator* has confirmed that the *current transformer* is overloaded on a short-term basis;

(b) check against a nominated minimum value or, alternatively, a 'zero' check which tests for an acceptable number of zero interval values per day to be derived from the site's historical *metering data*;

(c) check for null (no values) *metering data* in the *metering data services database* for all *metering* data streams as follows:

   (1) 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);

   (2) 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;

    (d)   check for significant *meter* alarms (power outage or power failure, *VT* or phase failure, pulse overflow, CRC error and time tolerance) as follows:

        (1)   a process must be in place that captures these significant *meter* alarms within the *metering data* validation process and ensures that any *meter* alarm occurrences are retained. Refer to clause S7A.3.8.2;

        (2)   the *Metering Data Provider* must provide the occurrences of these *meter* alarms to relevant *Registered Participants*;

    (e)   where supported by the *meter*(*s*), validation, for a given period, of *interval metering data* by comparison of the totalised *interval energy data* values (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*;

    (f)   a check of the *metering data* for continuity and reasonability over the *meter* reading period as follows:

        (1)   check that no gaps in the *metering data* exist;

        (2)   check that *metering data* for the expected period has been delivered based on the expected reading date.

S7A.3.11.3 Validations to be performed for whole current type 4A and 5 metering installations

The *Metering Data Provider* must, as a minimum, undertake the following validations on *metering data* within the *metering data services database*:

    (a)   check of all *interval metering data* against a nominated maximum value as follows:

        (1)   this validation is to ensure that erroneous *interval metering data* spikes are trapped and substituted;

        (2)   this check may additionally be performed in the collection software;

        (3)   a check of maximum value of *active energy*. (Maximum *reactive energy* checks may also be performed as an option). The maximum value is to be initially set to the rating of the *meter*;

    (b)   check for null (no values) *metering data* in the *metering data services database* for all *metering* data streams as follows:

        (1)   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);

(2) 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;

(c) check for significant *meter* alarms (*voltage transformer* or phase failure, pulse overflow, CRC error and time tolerance) in accordance with subparagraphs (1) and (2). The *Metering Data Provider* is not required to validate the *interval metering data* for power outage or power failure alarms:

(1) a process must be in place that captures these significant *meter* alarms within the *metering data* validation process and ensures that any *meter* alarm occurrences are retained. Refer to clause S7A.3.8.2; and

(2) the *Metering Data Provider* must provide the occurrences of these *meter* alarms (inclusive of the occurrences of power outage or power failure alarms) to relevant *Registered Participants*;

(d) where supported by the *meter(s)*, validation, for a given period, of *interval metering data* by comparison of the totalised *interval energy data* values (accumulation register reading) and the change in the *meter* cumulative registers (*energy* tolerance);

(e) a check of the *metering data* for continuity and reasonability over the *meter* reading period as follows:

(1) check that no gaps in the *metering data* exist;

(2) check that *metering data* for the expected period has been delivered based on the expected reading date.

S7A.3.12 Validation of metering data type 6

S7A.3.12.1 Application of clause S7A.3.12

The requirements of clause S7A.3.12.2 are applicable to *Metering Data Providers* accredited for the provision of *metering data services* for type 6 *metering installations*.

S7A.3.12.2 Validations to be performed for type 6 metering installations

The *Metering Data Provider* must undertake the following validations on *metering data* within the *metering data services database*:

(a) check against a nominated minimum value of *metering data* collected from the *metering installatio*n;

(b) check against a nominated maximum value of *metering data* collected from the *metering installation*. This is to be applied to both the *metering data* collected from the *metering installation* and the calculated *energy* consumption values;

(c)　the current value of *metering data* collected from the *metering installation* ≥ previous value of *metering data* collected from the *metering installation*.

(d)　the current value of *metering data* collected from the *metering installation* is numeric and ≥ 0;

(e)　the current date that *metering data* is collected from the *metering installation* > the previous date that *metering data* was collected from the *metering installation*;

(f)　check for null (no values) *metering data* in the *metering data services database* for all *metering* data streams. 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).

S7A.3.13 Validation of metering data type 7

S7A.3.13.1　Application of clause S7A.3.13

The requirements of clause S7A.3.13.2 are applicable to *Metering Data Providers* accredited for the provision of *metering data services* for type 7 *metering installations*.

S7A.3.13.2　Validations to be performed for type 7 metering installations

The *Metering Data Provider* must undertake the following validations on *calculated metering data* within the *metering data services database*:

(a)　check against a nominated maximum calculated *metering data* value;

(b)　*calculated metering data* value is numeric and ≥ 0;

(c)　check for null (no values) *calculated metering data* in the *metering data services database* for all *metering* data streams. 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);

(d)　check the inventory tables, load tables and on/off tables with a process approved by the *Metering Coordinator* to ensure that the correct version of the tables is being used for the production of *calculated metering data*;

(e)　check against a nominated minimum value or alternatively a 'zero' check which tests for an acceptable number of zero interval values per day;

(f)　*calculated metering data* date > previous *calculated metering data* date.

S7A.3.14　Unmetered loads – Determination of metering data

S7A.3.14.1　Requirement to produce calculated metering data: Load table

(a)　The load table must set out:

    (1)　the device *load* (in watts) for controlled unmetered *loads* for use in calculating *interval metering data* for each device type in accordance with clause S7A.3.14.2. The *load* per device type must be the wattage of the device and associated control gear; and

    (2)　the annual *energy* consumption for other unmetered *loads* that do not have constant *load*, and where *energy* is calculated based on annual *energy* consumption. 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 = device type i.

(b)　New device types must be included in the load table prior to installation of the device.

(c)　Proposals to add a new *load* value for an unmetered device type to the load table must be accompanied by a relevant unique description of the device and evidence of the device *load* or *energy* consumption whichever the case may be. Wherever possible, the device *load* should be determined from measurement tests conducted by a *NATA* accredited laboratory or overseas equivalent.

S7A.3.14.2　Controlled unmetered loads

(a)　This clause is applicable to all agreed "controlled unmetered *loads*".

Metering data calculation

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

Half-hourly *metering data* for *recording interval* 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 = *recording interval*

k = proportion of device attributable to that *NMI*

Recording interval is period in minutes.

Device wattage is determined from the load table.

Device count is determined from the inventory table.

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

Inventory table

(c)   The following applies in relation to inventory   tables:

(1)   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:

(i)   the device type;

(ii)   the form of on/off control – photoelectric cell   control, timer control, ripple control or other   control;

(iii)   if timer control or ripple control, the on/off times for the controlling device;

(iv)   if other control, the on/off times;

(v)   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). Each   k factor will be less than 1. The sum of the k factors for a shared device across each respective *NMI* must be equal to 1;

(vi)   if a device is not shared with another *NMI*, the k factor must be equal to 1;

(vii)   number of such devices installed;

(viii)   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*;

(ix)   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

(x)   last change date – the date that record in the inventory table was most recently created or   modified.

(2)   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*;

(3)   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 or the relevant end-use   customer;

(4)   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.3.3.2(g) are met. Such additions, deletions or modifications to the inventory table may only be made on a retrospective basis where:

    (i)   agreed by the *Metering Coordinator* and the relevant financially responsible participants; or

    (ii)   necessary to comply with clause 7A.7.4.

(5)   the *Metering Coordinator* must communicate any material changes to the inventory table to the relevant financially responsible participants;

(6)   the *Metering Coordinator* must provide the inventory table to the relevant financially responsible participants when requested.

On/off table

(d)   In relation to the on/off table, the form of on/off control may be:

(1)   photoelectric cell control;

(2)   timer control or ripple control; or

(3)   other control.

Photoelectric cell control

(e)   In relation to photoelectric cell control, the *Metering Coordinator* must ensure that the appropriate sunset times and sunrise times are obtained from the Australian Government Geoscience Australia website (www.ga.gov.au/geodesy/astro/sunrise.jsp), based on the longitude and latitude of the relevant town and *Australian Central Standard Time*.

Timer control

(f)   The following applies in relation to timer control:

(1)   if the on/off times for a device are controlled by a timer or ripple injection system, then:

    (i)   on time = ON time set on timer or ripple injection system; and

    (ii)   off time = OFF time set on timer or ripple injection system;

(2)   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 *recording intervals*	Period *load* is switched on = 1

Recording interval	Period load is switched on
commencing after on time and finishing prior to off time	
For the *recording intervals* commencing after off time and finishing prior to on time	Period *load* is switched on = 0
For the *recording interval* during which the on time occurs	(Period *load* is switched on) = $\dfrac{(\text{End time of recording interval}) - (\text{On time})}{30}$
For the *recording interval* during which the off time occurs	(Period *load* is switched on) = $\dfrac{(\text{Off time}) - (\text{Start time of recording interval})}{30}$

Other control

(g) The following applies in relation to other control:

   (1) where the on/off times for a device are not in accordance with paragraphs (e) or (f), the following alternative forms of control may be used:

   (i) on time = sunset time + ON delay or ON time set on timer or ripple injection system;

   (ii) off time = sunrise time + OFF delay or OFF time set on timer or ripple injection system or a fixed duration after ON time;

   (2) where sunrise or sunset times are used, the time is determined in accordance with paragraph (e);

   (3) 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 *recording intervals* commencing after on time and finishing prior to off time	Period *load* is switched on = 1

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

S7A.3.14.3   Other unmetered loads

(a)   This clause is applicable to all agreed "other unmetered *loads*".

Energy calculation

(b)   The *Metering Coordinator* must ensure that the *interval metering data* for other unmetered *loads*, which have   been classified as a type 6 *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)   The following applies in relation to inventory   tables:

(1)   for each *NMI*, a separate inventory table is required that identifies each device type which forms part of the *NMI load* and for each device type   lists:

(i)   the device type;

(ii)   the form of on/off control (24 hours per   day);

(iii)   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). Each k factor will be less than 1. The sum of the k factors for a shared device across each respective *NMI* must be equal to 1;

(iv)   if a device is not shared with another *NMI*, the k factor must be equal to 1;

(v)   number of such devices installed;

<ol type="i" start="6">
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*;
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
last change date – the date that record in the inventory table was most recently created or modified;

<ol start="2">
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*;
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;
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.3.3.2(g) are met. Such additions, deletions or modifications to the inventory table may only be made on a retrospective basis where:

<ol type="i">
agreed by the *Metering Coordinator* and the relevant financially responsible participants; or
necessary to comply with clause 7A.7.4.

The *Metering Coordinator* must communicate any material changes to the inventory table to the relevant financially responsible participants. The *Metering Coordinator* must provide the inventory table to relevant financially responsible participants when requested.

On/off table

(d) For the on/off table, other unmetered *loads* are assumed to operate 24 hours per day. For each *recording interval* period *load* is switched on = 1.

Schedule 7A.4   Service level procedures

Part A   Metering Providers

S7A.4.1   General

S7A.4.1.1 Application

Part A of this schedule details the requirements that *Metering Providers* must comply with when undertaking installation, provision and maintenance services for type 1, 2, 3, 4, 4A, 5 and 6 *metering installations*.

S7A.4.1.2 Purpose

(a) Part A of this schedule details the obligations, technical requirements, measurement process and performance requirements that are to be performed, administered and maintained by a *Metering Provider*.

(b) Part A of this schedule details the obligations and technical/operational requirements in the provision, installation and maintenance of the *metering installation* by a *Metering   Provider.*

(c) Part A of this schedule relates to category B *Metering Providers*, which are *Metering Providers* who are accredited to undertake the provision, installation and maintenance of various *metering installation* types as stipulated.

(d) Part A of this schedule sets out minimum requirements for *Metering Providers*.

S7A.4.1.3 Interpretation

(a) In this schedule:

reasonable endeavours, in relation to a person, means the person must act in good faith and do what is reasonably necessary in the circumstances.

(b) In Part A of this schedule diagrams are provided as an overview. If there are ambiguities between a diagram and the text, the text takes precedence.

S7A.4.2   Metering Provider obligations

S7A.4.2.1 Obligations

(a) All category B *Metering Providers* must comply with Part A of this schedule.

(b) The *Metering Provider* has responsibility for the provision of metering provision services for all *connection points* for which they are appointed *Metering Provider* by a *Metering   Coordinator*.

S7A.4.3 Metering Provider services

S7A.4.3.1 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 a Metering Asset Management Plan.

S7A.4.3.2 Maintenance of metering installations

(a) The *Metering Coordinator* must ensure that all facets of the *metering installation* are maintained.

(b) For *regulatory control periods* subsequent to the *1st regulatory control period*, the *Metering Coordinator* may appoint any number of *Metering Providers* to undertake the different components of work for each *metering installation* (for example, to design the installation; install *instrument transformers*; install *meters*; install data communications; conduct tests; conduct ongoing maintenance).

Note:

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

S7A.4.3.3 Use of contractors

(a) If a *Metering Provider* engages a contractor to assist it to perform any of its obligations under the *Rules* (including this schedule) (see clause 7A.4.1(d)), the *Metering Provider* must ensure that processes are in place to certify that all work performed by the contractor on behalf of the *Metering Provider* is compliant with the *Rules* (including this schedule).

(b) While the *Metering Provider* may contract out *metering* work, the *Metering Provider* may not delegate any of its responsibilities under the *Rules*. The *Metering Provider* is responsible and liable for all acts and omissions of the contractor as if they were acts and omissions of the *Metering Provider*.

S7A.4.3.4 Insurance

(a) A *Metering Provider* must effect and maintain:

(1) general liability insurance; and

(2)   for a period of 7 years after the person ceases to be a *Metering Provider*, professional indemnity insurance, for an amount of not less than $10,000,000 total, covering potential claims against the *Metering Provider*.

(b)   The *Metering Provider* must provide the *Utilities Commission* with certified copies of the insurance policy required under Part A of this schedule, when requested.

S7A.4.3.5 Professionalism

(a)   *Metering Providers* must ensure that sufficient competent people are recruited and maintained in order to meet the *Metering Provider's* obligations and performance requirements.

(b)   *Metering Providers* must use *reasonable endeavours* to establish the necessary working relationships with other *Metering Providers* and *Metering Data Providers* to ensure that matters affecting customer transfer, *meter* installation, provision and maintenance, and maintenance of *NT NMI data* are achieved proficiently.

S7A.4.4 Performance

S7A.4.4.1 Metering Provider processes

(a)   For the services that they provide, *Metering Providers* must have processes and systems in place in the following   areas:

    (1)   purchasing of *metering* equipment;

    (2)   provision of *metering* equipment;

    (3)   installation of *metering* equipment;

    (4)   commissioning and verification of *metering*   equipment;

    (5)   testing and inspection of *metering* equipment;

    (6)   maintenance of *metering* equipment;

    (7)   programming of *metering* equipment;

    (8)   asset management planning;

    (9)   security of *metering installations* and *energy   data*;

    (10) *NT NMI data* management;

    (11) quality system certification;

    (12) training and maintenance of resource skills.

(b)   The *Metering Provider* must also have processes and systems in place for review of the matters referred to in paragraph (a) in the event of a change in the *Rules* or an instrument made under or for the purposes of the *Rules*.

S7A.4.4.2 Connection point transfer

The *Metering Provider* is required to facilitate the timely commissioning of the *metering installation* and the confirmation of the *metering installation* details.

S7A.4.4.3 Metering Provider interfaces

(a) Category A *Metering Providers* are *Metering Providers* who are accredited to undertake installation only of type 5 and 6 whole current *meters*.

(b) For *regulatory control periods* subsequent to the *1st regulatory control period*, where a category A *Metering Provider* is appointed by the *Metering Coordinator* to perform installation work only, the category B *Metering Provider* must, on behalf of the *Metering Coordinator*, ensure that processes are in place to ensure that interfaces with the category A *Metering Provider* are established to ensure that:

   (1) provision of *metering* equipment is undertaken in a timely manner;

   (2) transition of relevant *metering installation NT NMI data* information into systems and processes are carried out;   and

   (3) the *metering* equipment is maintained by inclusion in the relevant test strategy within the associated Metering Asset Management Plan.

Note:

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

S7A.4.4.4 Compliance

While the overall responsibility lies with the *Metering Coordinator*, *Metering Providers* are required to provide copies of test or commissioning details to any new *Metering Provider* or *Metering Coordinator* upon request.

S7A.4.4.5 General commissioning requirements

(a) The *Metering Provider* must use *reasonable endeavours* to ensure that the *metering installation* is compliant and carry out the *metering installation* commissioning checks and other requirements specified in paragraphs (b) to (r).

Wiring checks

(b) The *Metering Provider* must verify that the:

   (1) *metering installation* equipment and associated wiring is correct;

(2) *metering installation* complies with manufacturer requirements, relevant standards and jurisdictional documents;

(3) all wiring terminations are tight and correctly terminated;

(4) cable type and sizes used are correct; and

(5) phase sequence and polarity are correct.

Accuracy requirements

(c) The *Metering Provider* must establish that the accuracy class of all the *metering* equipment associated with a *metering installation* and any documentation verifying the errors of *current transformers*, *voltage transformers* and *meters* show compliance with the *Rules*. The name plate data reflects the design accuracy class of the *metering* equipment.

(d) The *Metering Provider* must carry out all reasonable directions of the *Metering Coordinator* to establish *metering installation* compliance.

Multiplier validation

(e) For *metering installations* that utilise *instrument transformers*, (*voltage transformers* and/or *current transformers*), the *Metering Provider* must verify the connected ratios of all *instrument transformers* on site and calculate the constant to be applied to the *meter* readings and *metering data*.

Metering transformer burden measurement

(f) For *metering installations* that utilise *instrument transformers*, (*voltage transformers* and/or *current transformers*), the *Metering Provider* must undertake measurements of the actual secondary burdens of the *instrument transformers* pertaining to the *metering installation* to ensure that the burdens applied to the *instrument transformers* are within the rated burden specified on the nameplate.

Phase sequence

(g) The *Metering Provider* must verify that the *metering installation* voltage phase sequence relationships are correct unless the *Metering Provider* can verify the accuracy of the *meter* type when non-standard phase sequence is applied.

Vector relationships

(h) For *metering installations* that utilise *instrument transformers*, (*voltage transformers* and/or *current transformers*), the *Metering Provider* must verify that the combined current and voltage phase relationships at the *meter* terminals are correct.

Meter validation

(i) For all *metering installation* types, the *Metering Provider* must verify that the *meter* programming parameters, display and error functions are all correct in accordance with manufacturer

specifications. This includes the measurement of the forward rotation of energy applied to the *meter*, and verifying that the correct pulse rates (for interval meters) have been programmed into the *meter* for the best possible resolution of   *energy data* measurement   and recording.

(j) For *metering installations* that involve the use of *instrument transformers*, the *Metering Provider* must validate register readings to the measured customer *load* where applicable and possible. The validation process may also include a timing check by comparing the output on the *meter* display and/or pulse indicators against *load* and time.

(k) For sites involving *remote acquisition* of *metering data*, the *Metering Provider* must have processes as follows in place to aid in the validation of *interval metering data* with the *Metering Coordinator* and/or *Metering Data Provider*:

    (1) these processes must confirm that remote communication with the *meter* is established and is of sufficient quality to support communication and *metering data* transfer;

    (2) this verification is to be done at the time of *meter* installation, *meter* change, *meter* test or *meter* reprogramming;

    (3) the *Metering Provider* must also aid any end to end verification of the measured and stored *interval metering data* within the *meter's* buffer with the *interval metering data* value(s) as remotely read and stored within the *Metering Data Provider's metering data services database*; and

    (4) the *Metering Provider* must have processes in place to aid in the validation of *metering data* with the *Metering Coordinator* and/or *Metering Data Provider*. Where a validation failure has occurred, the *Metering Provider* is required to have a process in place to verify *metering installation* compliance.

Sites that cannot be validated

(l) For sites that cannot be fully validated, the *Metering Provider* must inform the *Metering Data Provider* and the *Metering Coordinator* that the *metering installation* cannot be fully validated. The *Metering Provider* is required to liaise with the *Metering Coordinator* to undertake other alternative measurements and commissioning checks that enable the *Metering Coordinator* to agree that the *metering installation* is compliant.

(m) The *Metering Provider* must undertake one or more of the following checks:

    (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 *meter energy* measurement;

(3) wiring checks which visibly verify correct connection and phase relationships of voltage and current circuits;

(4) compare *meter* measurement of *energy/load* with an alternative measurement of demand, current etc.

Alarm settings

(n) Where the *meter* supports alarm functionality as an attachment to the *interval metering data*, the *Metering Provider* is required to enable the following alarms:

(1) power failure;

(2) voltage failure;

(3) pulse or interval data overflow;

(4) checksum error;

(5) time reset.

(o) Where there are alarm sensitivity settings, these must be set at appropriate levels to ensure meaningful alarm outputs (for example, for contestable customer supplies a Voltage drop of -15% is nominally appropriate).

In situ testing of type 1, 2, 3 and 4 metering installations

(p) Where a *Metering Provider* undertakes to perform in situ testing of a type 1, 2, 3 and 4 *metering installation*, the *Metering Provider* must note the start and end times of the *meter* test and any applicable register readings and record these on the relevant test sheet.

(q) On completion of the tests the *Metering Provider* must ensure that the following is undertaken before the *Metering Provider* leaves the site:

(1) the *metering installation* is commissioned into service and all connections are correct, tight and that the measurement system is operating correctly. Adherence to this clause, is required;

(2) the *Metering Provider* contacts the relevant *Metering Data Provider* and verifies that the *Metering Data Provider* still has operational communications with the *meter* and that the communications are of sufficient quality to support *metering data* transfer; and

(3) the *Metering Provider* informs the *Metering Data Provider* of the start and end times of the test and the *metering* details concerned. (This is to facilitate the *Metering Data Provider* validating and substituting out any erroneous *metering data* as a result of the *meter* test.)

(r) On completion of the *metering installation* test, the *Metering Provider* must provide to the relevant *Metering Data Provider*, by formal communication, confirmation of the details and test times mentioned in paragraphs (p) and (q).

S7A.4.4.6 Meter change process

(a) The *Metering Provider* must only undertake *meter* churn when it is authorised to do so by a *Metering Coordinator*.

(b) Prior to conducting *meter* churn from a type 1, 2, 3 or 4 *metering installation* to a type 1, 2, 3, 4, 4A or 5 *metering installation* the *Metering Provider* must use *reasonable endeavours* to:

   (1) provide the current *Metering Data Provider* with details of the new *Metering Data Provider* and new *Metering Provider*; and

   (2) request and verify that the current *Metering Data Provider* undertakes a final reading to recover any *metering data* since the *meter* was last interrogated.

(c) Prior to conducting *meter* churn from a type 4A, 5 or 6 *metering installation* to a type 1, 2, 3, or 4 *metering installation*, the *Metering Provider* must use *reasonable endeavours* to contact the current *Metering Provider* and/or relevant *Network Service Provider* and provide confirmation that a *meter* change is to be carried out.

(d) On completion of the installation of the *metering installation* the *Metering Provider* must ensure that the following is undertaken before the *Metering Provider* leaves the site:

   (1) note the *metering installation* details, times, and any accumulation readings on the relevant Meter Change Installation Notice or site commissioning test sheet;

   (2) the *metering installation* is commissioned into service and all connections are correct, tight and that the measurement system is operating correctly. Adherence to clause S7A.4.4.5 is required;

   (3) for a site remaining a type 1, 2, 3 or 4 *metering installation*, use *reasonable endeavours* to contact the new *Metering Data Provider* to verify:

      (i) that there are operational communications with the *metering installation*;

      (ii) that the communications are of sufficient quality to support the *remote acquisition* of *metering data*; and

      (iii) the commissioning time of the *metering installation*.

(e) The *Metering Provider* is required to provide to the new *Metering Data Provider* formal confirmation of the above *metering installation* details and commissioning times.

S7A.4.4.7 Meter change information requirements

The *Metering Provider* must provide, where applicable to the specified *metering installation*, the following information in an electronic format to the *Metering Coordinator*, relevant financially responsible participants or any other *Metering Providers* and *Metering Data Providers* who have a right of access to the information, as a minimum, pertaining to any *metering installation* changes.

Equipment installation

Information Category	Details
NMI details	*NMI*
	Check Sum
NMI address	Street
	State
	Postcode
Registered Participants	financially responsible participant
	Metering Coordinator
	relevant *retailer*
	Metering Provider
	Metering Data Provider
	relevant *Network Service Provider*
Modem details	Modem Make
	Modem Type
	Modem Plant
	Modem Phone
	Modem Baud
	Modem Carrier
Meter details	Meter Make
	Meter Type
	Meter Rating
	Meter Serial Number
	Meter Pulse Rate
	Meter Multiplier
	Unit Address
	Load Survey Interval
	Programmed Current Transformer Ratio

Information Category	Details
	Programmed Voltage Transformer Ratio
Current Transformer(s)	Current Transformer Make
	Current Transformer Type
	Current Transformer Class
	Current Transformer Ratios
	Current Transformer Tap
	Current Transformer Rated Burden
	Current Transformer Serial Number Phase 1
	Current Transformer Serial Number Phase 2
	Current Transformer Serial Number Phase 3
	Current Transformer Secondary Wiring Size
	Current Transformer Secondary Wiring Route Length
	Primary Current
	Secondary Current
Voltage Transformer(s)	Voltage Transformer Make
	Voltage Transformer Type
	Voltage Transformer Class
	Voltage Transformer Ratios
	Voltage Transformer Tap
	Voltage Transformer Rated Burden
	Voltage Transformer Serial Number Phase 1
	Voltage Transformer Serial Number Phase 2
	Voltage Transformer Serial Number Phase 3
	Voltage Transformer Secondary Wiring Size
	Voltage Transformer Secondary Wiring Route Length

Equipment removal

Information Category	Details
NMI details	*NMI*
	Check Sum
NMI address	Street

Information Category	Details
	State
	Postcode
Registered Participants	Old *Metering Data Provider* ID
	Old *Metering Provider* ID
Meter details	Meter Make(s)
	Meter Type(s)
	Meter Rating
	Meter Serial number(s)
Current transformer(s)	Removed Current Transformer Serial number(s)
	Removed Current Transformer Type(s)
	Removed Current Transformer Make(s)
Voltage Transformer(s)	Removed Voltage Transformer Serial Number(s)
	Removed Voltage Transformer Type(s)
	Removed Voltage Transformer Make(s)
Removal details	Service Order Number
	Work Order Number
	Meter Remove Date
	Meter Remove Time
Meter readings	Meter Reading(s)
	Data downloaded (Type 1, 2, 3 and 4)
	Date/time of download

Forms

Samples of the following forms appear at Attachment 1 of "Service Level Procedure: Metering Provider Services Category B for Metering installation Types 1, 2, 3, 4, 5 and 6", version 4.4 as in force on 1 September 2015, published by *AEMO*:

- Meter Read and Meter Change Sheet

- LV Metering Installation Sheet

- LV Metering Commissioning Sheet

- HV Metering Installation Sheet

- HV Metering Commissioning Sheet

S7A.4.4.8 Asset management plans

The *Metering Provider* must develop, maintain and execute a Metering Asset Management Plan (**MAMP**) for all *metering installation* assets for which the *Metering Provider* has been engaged to provide maintenance and testing services by the *Metering Coordinator*, which is to be approved by the *Metering Coordinator*.

S7A.4.4.9 Telecommunications

(a) The *Metering Provider* must notify the *Metering Data Provider* and *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 assist the *Metering Coordinator* and/or the *Metering Data Provider* with the collection of *metering data* from the *metering installation* where *remote acquisition* becomes unavailable.

(c) Paragraph (b) does not apply in relation to instances of a *telecommunication network* failure where the logistics of collection of *metering data* from significant volumes of *metering installations* is not practical. However, this does not remove the obligation of the *Metering Coordinator* to resolve the instance of the *telecommunication network* failure.

S7A.4.4.10   Systems

Systems procured or used by the *Metering Provider* to provide the services specified in Part A of this schedule must be maintained in reasonable working condition in an accessible manner.

S7A.4.4.11   Disaster recovery

(a) The *Metering Provider* must have a 'Disaster Recovery Plan' in place that, in the event of an IT system failure, the system is returned to normal operational service within 5 *business days*. Recovery to operational service is measured by evidence that the software and the most recent back-up of data has been restored to operational service within the 5 *business days*.

(b) It is a requirement of the *Metering Provider* to demonstrate evidence to the effect that:

(1) detailed documentation of a Disaster Recovery Plan is maintained fully up-to-date. The documentation to show revisions and 'last check date';

(2) the Disaster Recovery Plan is witnessed and dated at least annually by the *Metering Provider* as being current for the systems and processes in place; and

(3)   the Disaster Recovery 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.

S7A.4.4.12 Metering installation security

The *Metering Provider* must not remove an asset if there is evidence of tampering or electricity theft. The *Metering Provider* must inform the existing *Metering Data Provider* and/or *Metering Coordinator*, and the *metering installation* must remain as is until the *Metering Coordinator* has investigated. The new *metering* equipment can only be installed once the *Metering Coordinator* has given permission.

S7A.4.4.13 Safety

(a)   *Metering Providers* must maintain appropriate levels of OH&S policies according to jurisdictional and legislative requirements. Minimum requirements include the identification of risks and hazards and application of control measures prior to any work being performed on site.

(b)   It is expected that relevant site safety information is openly shared amongst *Metering Providers*, including the dispatch of safety alerts where applicable.

(c)   The *Metering Provider* must satisfy or perform any site induction requirements as required by the *Metering Coordinator* or financially responsible participant.

S7A.4.4.14 Work standards

(a)   The *Metering Provider* must comply with the current:

(1)   *Australian Standard* 3000 Wiring Rules;

(2)   *Telecommunications Cabling Provider Rules 2014* (Cth) (where applicable); and

(3)   jurisdictional and *Network Service Provider* requirements.

(b)   If the *Metering Provider* identifies a *metering installation* that does not comply with paragraph (a), it is expected that the *Metering Provider* will inform the financially responsible participant, *Metering Coordinator,* appropriate jurisdictional administrator and/or the relevant *Network Service Provider* (as appropriate).

S7A.4.4.15 Time synchronisation

The *Metering Provider* when installing, testing and maintaining the *metering installation* must ensure the time setting of the *metering installation* is referenced to *Australian Central Standard Time*.

Part B   Metering Data Provider

S7A.4.5   General

S7A.4.5.1 Definitions

In Part B of this schedule:

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

data stream has the meaning given in clause S7A.3.1.3 of schedule 7A.3.**estimate, estimation, estimated** has the meaning given in clause S7A.3.1.3 of schedule 7A.3.

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

substitute, substitution, substituted has the meaning given in clause S7A.3.1.3 of schedule 7A.3.

validate, validation, validated has the meaning given in clause S7A.3.1.3 of schedule 7A.3.

S7A.4.5.2 Purpose

(a)   The purpose of Part B 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 the *Metering Data Provider* in the provision of *metering data services*;

    (2)   the obligations of the *Metering Data Provider* to establish and maintain a *metering data services database*; and

    (3)   the obligations of the *Metering Data Provider* in support of the *Metering Coordinator*.

S7A.4.6   Obligations

S7A.4.6.1 Metering data services

The *Metering Data Provider* must:

(a)   provide *metering data services* in accordance with the *Rules* and relevant jurisdictional codes and policies;

(b)   establish, maintain and operate a *metering data services   database*;

(c)   ensure that the *metering data services database* including all distributed systems, personal computers and equipment used for collection is synchronised to *Australian Central Standard Time* in accordance with the accuracy requirements of clause 7A.8.7(b);

(d) ensure that all *metering installations* are synchronised to *Australian Central Standard Time* through the collection process in accordance with the accuracy requirements of clause 7A.8.7(c), for the relevant *metering installation* type;

(e) maintain the security and confidentiality of any *metering installation* passwords;

(f) undertake the collection, processing and delivery of *metering data* and significant *meter* alarms; and

(g) make all reasonable endeavours to cooperate in good faith with all *Registered Participants*, *Metering Providers* and *Metering Data Providers* within this jurisdiction.

S7A.4.6.2 Use of contractors

(a) If a *Metering Data Provider* engages a contractor to assist it to perform any of its obligations under the *Rules* (including this schedule) (see clause 7A.4.2(d)), the *Metering Data Provider* must ensure that processes are in place to certify that all work performed by the contractor on behalf of the *Metering Data Provider* is compliant with the *Rules* (including this schedule).

(b) While the *Metering Data Provider* may contract out *metering* work, the *Metering Data Provider* may not delegate any of its responsibilities under the *Rules*. The *Metering Data Provider* is responsible and liable for all acts and omissions of the contractor as if they were acts and omissions of the *Metering Data Provider.*

S7A.4.6.3 Specific obligations for Metering Data   Provider

(a) The *Metering Data Provider* must:

(1) undertake validation, substitution and estimation of *metering data* in accordance with schedule 7A.3, Part B;

(2) provide *metering data services* which relate to the collection, calculation, processing and delivery of *metering data*;   and

(3) ensure *metering* details and parameters within the   *metering data services database* are correct such that the *metering data* is accurate.

(b) Where the *metering installation* includes the measurement of *reactive energy*, the *Metering Data Provider* must store this *metering data* with the active *metering data* in the *metering data services database*.

S7A.4.7   System architecture and administration

S7A.4.7.1 System requirements

(a) The *Metering Data Provider* must maintain and operate a *metering data services database* to facilitate the:

(1) collection of *metering data*;

(2) processing, calculation, validation, substitution and estimation of *metering data*;

(3) delivery of *metering data* to *Registered Participants* and other Service Providers;

(4) assignment and version control of participant roles for *connection points*;

(5) commissioning of each *metering installation* into the *Metering Data Provider's metering data services database*; and

(6) storage and archiving of *metering data* and validated *metering data* from the *metering installation*.

(b) The *Metering Data Provider* must maintain and operate a *metering data services database* that provides a full auditable trail and version control capability. This functionality must be applied to:

(1) *metering data*;

(2) assigned data quality flags;

(3) substitution and estimation types;

(4) significant *metering data* alarms (listed in schedule 7A.3, Part B);

(5) the delivery of *metering data* to *Registered Participants* and other *Metering Data Providers*; and

(6) the mapping of all *metering* data streams (including logical *metering* data streams).

(c) The *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:

(1) missed reads and missing intervals of *metering data* within the *metering data services database*;

(2) long-term substitutions and estimations;

(3) *metering data* errors and data overlaps;

(4) validation errors;

(5) failed batch processing, database errors and hardware failures;

(6) the capture of file syntax errors, failed and rejected *metering data* deliveries;

(7) status management of collection interfaces; and

(8) status management of *metering installation malfunctions*.

S7A.4.7.2 Collection process requirements

(a) The *Metering Data Provider* must use reasonable endeavours to ensure actual *metering data*, including significant *meter* and *metering data* alarms, is collected for all *connection points* for which it has responsibility for *metering data services*.

(b) The *Metering Data Provider* must operate a process that:

    (1) records and logs faults and problems associated with the reading function of *meters*. The 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 synchronisations;

    (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*; and

    (3) provides notification of any *metering installation malfunction*, to the *Metering Coordinator* and the *Metering Provider*, in accordance with clause 7A.6.7, so that repairs can be effected in a timely manner.

S7A.4.7.3 Specific collection process requirements for type 1, 2, 3 and 4 metering installations

(a) The requirements of this clause are applicable to type 1, 2, 3 and 4 *metering installations*.

(b) The *Metering Data Provider* must be capable of initiating a remote reading where *metering data* is missing, erroneous or has failed validation.

(c) The *Metering Data Provider* must operate and maintain a process which:

    (1) initiates an alternate method to collect *metering data* where *remote acquisition* becomes unavailable; and

    (2) provides a reading event log detailing successful read events for each *metering installation*, or alternatively an exception report of failed *meter* reads.

S7A.4.7.4 Specific collection process requirements for type 5 and 6 metering installations

(a) The requirements of this clause are applicable to type 5 and 6 *metering installations*.

(b) The *Metering Data Provider* must:

(1) develop and maintain a *meter* reading schedule in accordance with schedule 7A.3, Part A;

(2) maintain read routes with particular attention to any specific access requirements and hazard information;

(3) use reasonable endeavours to ensure that *metering data* is collected at a frequency which is at least once every 3 months;

(4) ensure that scheduled meter reading lists and programmed reading equipment are provisioned, updated and maintained;

(5) use reasonable endeavours to ensure that the *metering data* is collected within 2 *business days* prior to, or 2 *business days* subsequent to, the scheduled meter reading date; and

(6) 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.4.7.5 Metering data processing requirements

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

(1) confirm and utilise the participant 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, in accordance with schedule 7A.3, Part B, all *metering data* is stored in the *metering data services database* with the correct:

(i) Quality Flag;

(ii) Substitution or Estimation Type Code (where applicable); and

(iii) Substitution or Estimation Reason Code (if applicable); and

(4) check the *metering data services database* for missing *metering data* and overlaps.

(b) Where the *Metering Coordinator* or the *Metering Provider* informs the *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.3, Part B.

(d) Where the *meter* assigns alarms to the *metering data*, the *Metering Data Provider's* system must process the alarm along with the *metering data* as part of the validation process in accordance with schedule 7A.3, Part B.

(e) The *Metering Data Provider* must use reasonable endeavours to load *metering data* in an alternative format provided by the *Metering Provider* where there is a communications or reading malfunction, or a *metering installation malfunction*, that prevents the normal collection of *metering data* from the *metering installation*.

(f) The *Metering Data Provider* must have a process to aggregate *interval metering data* for a *connection point* into a 30 minute interval net data stream.

S7A.4.7.6 Specific metering data processing requirements for type 1, 2, 3 and 4 metering installations

(a) The requirements of this clause are applicable to type 1, 2, 3 and 4 *metering installations*.

(b) The *Metering Data Provider* must have a process to be capable of undertaking simple cumulative or subtractive processes to manage complex *metering* configurations. Typically the system must support:

(1) an A+B+C or A-B-C aggregation configuration;

(2) *metering data* validation capability for standard, partial or *check meter connection points* which incorporates a simple comparison of single data stream of *metering data* to a single data stream of *check metering data* within an acceptable tolerance; and

(3) 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. The average of the 2 validated data sets must be delivered to *Registered Participants*.

S7A.4.7.7 Specific metering data processing requirements for type 7 metering installations

(a) The requirements of this clause are applicable to type 7 *metering installations*.

(b) The *Metering Data Provider* must store inventory tables, load tables and on/off tables, as defined in schedule 7A.3, Part B, in the *metering data services database*.

(c) The *Metering Data Provider* must ensure:

(1) inventory tables are updated with any changes provided by the relevant *Network Service Provider* or *Metering Coordinator*;

(2)   on/off tables are correct and compliant with details specified in schedule 7A.3, Part B; and

(3)   load tables are correct.

(d)   The *Metering Data Provider* must validate that load tables, inventory tables and on/off tables are complete and correct.

(e)   The *Metering Data Provider* must ensure the inventory table, load table and on/off table are versioned for *metering data* calculations.

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

S7A.4.7.8 Specific metering data estimation requirements for types 5, 6 and 7 metering installations

(a)   The requirements of this clause are applicable to type 5, 6, and 7 *metering installations*.

(b)   The *Metering Data Provider* must have a process for the creation of *estimated metering data*.

(c)   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 current reading event to a period beyond the newly published next scheduled read date for types 5 and 6 *metering installations*; or

(ii)   from the current calculation event to a period beyond the next scheduled calculation event for type 7 *metering installations*.

S7A.4.7.9 Delivery performance requirements for metering data

(a)   The *Metering Data Provider* must ensure only *metering data* which has passed validation is delivered to other *Metering Data Providers* and *Registered Participants*.

(b)   The *Metering Data Provider* must:

(1)   deliver to other *Metering Data Providers* and *Registered Participants* all actual *metering data* which has passed validation within 2 *business days* of the actual *metering dat*a being received into the *metering data services database*;

(2)   substitute, validate and deliver to other *Metering Data Providers* and *Registered Participants* the *substituted metering data* within 2 *business days* of the actual *metering data* being received into the *metering data services database* and failing validation; and

(3) substitute, validate and deliver to other *Metering Data Providers* and *Registered 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*.

(c) The *Metering Data Provider* must validate and deliver to other *Metering Data Providers* and *Registered Participants* all *substituted metering data* within 2 *business days* of the *metering data* being substituted.

(d) For type 5, 6 and 7 *metering installations* the *Metering Data Provider* must validate and deliver to other *Metering Data Providers* and *Registered Participants* all *estimated metering data* within 2 *business days* of the *metering data* being estimated.

(e) The *Metering Data Provider* must provide *metering data* to the financially responsible participant within 2 *business days* of receiving a completed notification of a change of financially responsible participant, including *estimated metering data*, for a type 5, 6 or 7 *metering installation*.

(f) The *Metering Data Provider* must ensure that all failed validations are reviewed promptly such that:

(1) where the initial review of the failed validation identifies that the actual *metering data* is valid, deliver the actual *metering data* other *Metering Data Providers* and *Registered 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 *metering data*, and the receipt of such information identifies that the actual *metering data* is valid, deliver the actual *metering data* to other *Metering Data Providers* and *Registered Participants* within 2 *business days* of the *metering data* passing validation.

(g) The *Metering Data Provider* must notify affected participants of any operational delays which impact on normal expected *metering data* delivery.

S7A.4.8 System architecture and administration

S7A.4.8.1 Data back-up

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

S7A.4.8.2 Disaster recovery

(a) The *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, the system 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.

(c) Where the *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.

(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.

(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.

(f) In the event a system failure does occur, the *Metering Data Provider* must ensure that its *metering data services database* is restored to operational service within 2 *business days*.

S7A.4.8.3 System administration and data management

The *metering data services database* must be operated and administered to facilitate:

(a) controlled access to systems and data using unique identification and passwords for each user;

(b) the restriction of access to the underlying database tables to nominated System Administrators; and

(c) a minimum of 95% system availability (i.e. hardware and systems downtime do not exceed a maximum of 438 hours per annum).

S7A.4.9   Administration

S7A.4.9.1 Bilateral agreements

(a) A *Registered Participant* may request the *Metering Data Provider* to do any of the following:

(1)   provide *metering data* in an alternate format;

(2)   deliver *metering data* by an alternate method;

(3)   deliver *metering data* in an alternate time frame;

(4)   provide any other *metering data services*.

(b) Under paragraph (a), there is no mandated requirement for a *Metering Data Provider* to implement system changes and processes to facilitate bilateral agreements.

(c) Any acceptance by the *Metering Data Provider* to deliver *metering data* to a *Registered Participant* in accordance with paragraph (a) must not impact on *metering data* delivery to any other *Registered Participant* for the *connection point(s)* concerned.

S7A.4.9.2 Quality systems

The *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.

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

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 kVArh 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 kVArh 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.