



The Rules

Metering and Consumption

Version 1.3 – July 2021



NABERS is a national initiative managed by the New South Wales Government.

Cover photo: A series of diaphragm-type cumulative gas meters servicing an office building.

Published by
Department of Planning, Industry and Environment
4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150
PO Box A290
Sydney South NSW 2000
Ph: (02) 9995 5000 (switchboard)
Ph: 131 555 (environment information and publications requests)
Fax: (02) 9995 5999
TTY: 133 677 then ask for 131 555
Speak and Listen users: 1300 555 727 then ask for 131 555
Email: nabers@environment.nsw.gov.au
Website: www.nabers.gov.au

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1 Introduction

1.1 Summary

The National Australian Built Environment Rating System (NABERS) is a performance-based rating system managed by the **National Administrator**.

NABERS ratings are expressed as a number of stars, for example:

NABERS rating		Performance comparison
6 stars	★★★★★★	Market leading building performance
5 stars	★★★★★	Excellent building performance
3 stars	★★★	Market average building performance

An accredited NABERS Energy or Water rating is awarded when the **National Administrator** certifies a rating completed by an **Assessor**. The **National Administrator** may independently audit the rating and assist in resolving complex technical issues.

This document presents the metering and consumption rules that are common across NABERS energy and water ratings. It is intended that this document be read alongside the following documents:

- a) *NABERS The Rules – Energy and Water for Offices*
- b) *NABERS The Rules – Energy and Water for Shopping Centres*
- c) *NABERS The Rules – Energy and Water for Residential Aged Care and Retirement Living*

Note: NABERS is undertaking a programme of works to integrate these **Rules** with the existing **Rules** for the NABERS tools. **Rules** not listed above will be integrated progressively over the course of several years.

The purpose of this document is to provide the standard for the collection and assessment of metering and consumption data for energy and water in our built environment. As such, it presents the minimum requirements of what **Assessors** must adhere to when they are conducting a NABERS rating.

In addition to the **Rules**, an **Assessor** is to make use of relevant **Rulings** and the **NABERS rating input form**.¹ A list of the documentation required in relation to this document is given in Chapter 9.

¹ **Rules** texts are amended as required by additional **rulings** which are published on the NABERS website: www.nabers.gov.au.

1.2 Interpretation and use of the Rules

Assessments for an accredited rating must comply with the version of the **Rules**, and any relevant **Rulings**, current on the day the rating application is lodged to NABERS, unless—

- a) the **National Administrator** has specifically approved otherwise in writing, or
- b) the assessment is conducted under the terms of a NABERS Commitment Agreement which specifies an earlier version of the **Rules**.

A **Ruling** takes precedence if there is any conflict with the **Rules**. If there is a conflict between **Rulings**, the most recent takes precedence.

The implementation of these **Rules** is summarised as follows:

Application	<p>These Rules will apply to buildings seeking a NABERS Energy and/or NABERS Water rating.</p> <p>These Rules can be used from the date of publication and are mandatory from the launch of the NABERS Residential Aged Care and Retirement Living Ratings tool on NABERS Perform and from midnight Monday 30th August 2020 onwards for other building types.</p>
Feedback and support	<p>Assessors are encouraged to provide feedback, as well as any concerns or queries, to the NABERS mailbox at nabers@environment.nsw.gov.au</p>

1.3 Situations not covered by the Rules

These **Rules** are intended to cover most ratings. If an exceptional situation is encountered and the **Rules** are not easily applicable, the **Assessor** must contact the **National Administrator** for assistance.

Where an **Assessor** is unsure how to apply the **Rules**, the **National Administrator** may resolve the issue by making an interpretation of the **Rules** or by advising the use of a specific procedure that aligns with the intention of the **Rules**. Written correspondence from the **National Administrator** is required as evidence if this occurs.

Procedures not contained within these **Rules** may only be used for a particular rating with prior written approval from the **National Administrator**. Approval to use the same procedure must be sought from the **National Administrator** each time it is proposed to be used. Approval is entirely at the discretion of the **National Administrator**.

1.4 How to use this document

1.4.1 Overview

Table 1.1 below is an overview of what is presented in this document. Each step contains important information in the process of determining energy and water usage and conducting a NABERS rating.

Table 1.1: Overview of metering and consumption requirements

	Summary step	Reference
1	Identify all the sources and supply points of energy and/or water and confirm that they are permitted by NABERS.	Section 3.2
2	Check the sources and supply points to confirm that the required minimum energy and water coverage can be met.	Section 3.3
3	Confirm the types of supply points and meters that are present and adhere to validation requirements as applicable.	Section 3.4
4	Calculate the consumption from each of the utility metering systems to be considered when calculating the rating, including correction for any estimates or missing data.	Chapter 4
5	Calculate the consumption from each of the non-utility metering systems to be included in the rating, including correction for any estimates or missing data.	Chapter 5
6	Where non-utility metering systems have been used to calculate consumption, validate these meters in accordance with these Rules .	Chapter 6
7	Calculate the consumption from any small end use estimations and batch supplies.	Chapter 7
8	Calculate the consumption from any renewable energy and water captured on-site.	Chapter 8

1.4.2 Formatting conventions and referencing

The term '**Rules**' refers to a body of works produced by NABERS that specify what must be examined, tested and documented when an **Assessor** conducts a rating. Wherever the term is used in this document from Chapter 3 onwards, it refers to this particular document, *NABERS The Rules — Metering and Consumption*. Other **Rules** documents mentioned in the text are distinguished from the present document by the inclusion of their title.

Notes and examples: Text appearing with a grey tint in the background is explanatory text only. It is not to be read as part of the **Rules** and/or is not essential for the proper use of this document.

Text appearing **dark green and bold** is a defined term (see Chapter 2).

All main references to documentation requirements appear *italicised and in aqua font*.

Internal cross references appear as numbered sections (e.g. Section 4.2) or chapters (e.g. Chapter 6) and are hyperlinked. Cross references to an individual **Rules** text (e.g. *NABERS The Rules – Energy and Water for Offices*) are numbered appropriately together with the title of the specific text.

1.5 What is new in this version?

For a list of changes, see Appendix B.

1.6 Related documents

NABERS The Rules – Apportioning Shared Thermal Energy Systems, v1.0, 2021

NABERS The Rules – Energy and Water for Offices

NABERS The Rules – Energy and Water for Shopping Centres

NABERS The Rules – Energy and Water for Residential Aged Care and Retirement Living

NABERS Ruling – On-site Renewable Electricity Generation Systems, v1.0, 2020

AER Discussion Paper, *Classification of Metering Services in NSW*, December 2012

Energy Saver Electricity Metering and Monitoring Guide

Interim Methodology for the treatment of Cogeneration and Trigeneration Systems in NABERS ratings, v1.1, 2013

2 Terms and definitions

This chapter lists the key terms and their definitions that are integral to the proper use of this document.

Term	Definition
acceptable data	Data which meets the applicable accuracy and validity requirements of these Rules .
acceptable estimate	<p>The values derived from an estimation method permitted by these Rules in place of incomplete or uncertain data.</p> <p>Estimates that do not satisfy the above specifications are deemed unacceptable and cannot be used in the rating.</p>
Assessor	An accredited person authorised by the National Administrator to conduct NABERS ratings.
billing period	The continuous 12-month period of data which is used for an individual meter in the rating.
cloud metering system	An electrical metering system where voltage, current and phase data is gathered from an electrical network by sensors. This data is then transmitted via the cloud (a type of RMRS) to software that calculates energy usage. Cloud meters are considered “non-cumulative” meters for the purposes of NABERS.
co-assess	An application process that allows Office Tenancy, Base Building and Whole Building ratings to be conducted within the same application.
embedded network	A private electricity network that is connected to the parent electricity network or ‘grid’. Most buildings in Western Australia, South Australia, Queensland and Tasmania have an embedded network.
end use	A purpose or activity (or a group of related purposes and activities) that water or energy is used for.

Term	Definition
Gross Lettable Area Retail (GLAR)	<p>The floor area, determined in accordance with the measurement standard for shopping centre area, of spaces that can be used as retail tenancies within the premises to be rated.</p>
	<p>Note: This is essentially the space within the permanent walls of the building, but excluding spaces for:</p> <ul style="list-style-type: none">a) Public access and use (including stairs, escalators, lift lobbies and passageways);b) Building mechanical, air conditioning, electrical and other utility services;c) Staff and cleaning facilities (including toilets, tea rooms, and cleaners' cupboards) which are not part of a tenant's fitout. <p>Tenant storage areas not adjacent to the tenancy are also excluded.</p>
metering system	<p>A system of one or more devices providing an individual measurement.</p>
NABERS rating input form	<p>The rating input form provided by NABERS for use by Assessors in the calculation of accredited ratings.</p>
	<p>For NABERS ratings for Offices, this is in the NABERS Rate application.</p>
	<p>For NABERS co-assess ratings, this is the NABERS Co-Assess Office Rating Calculator.</p>
	<p>Note: A new online platform called NABERS Perform is being developed by the National Administrator that will consolidate the functions of NABERS Members and NABERS Rate. It is the National Administrator's intent that future rating applications will be submitted through this new online platform.</p>
National Administrator	<p>The body responsible for administering NABERS, in particular—</p>
	<ul style="list-style-type: none">a) establishing and maintaining the standards and procedures to be followed in all aspects of the operation of the system, andb) determining issues that arise during the operation of the system and the making of ratings, andc) accrediting Assessors and awarding accredited ratings in accordance with NABERS standards and procedures.
	<p>The functions of the National Administrator are undertaken by the NSW Government.</p>

Term	Definition
Net Lettable Area (NLA)	The floor area, determined in accordance with the measurement standard for rated area, of spaces that can be used as offices within the rated premises .
	<p>Note: This is essentially the space within the permanent walls of the building, but excluding spaces for:</p> <ul style="list-style-type: none"> a) Public access and use (including stairs, escalators, lift lobbies and passageways); b) Building mechanical, air conditioning, electrical and other utility services; c) Staff and cleaning facilities (including toilets, tea rooms, and cleaners' cupboards). <p>The Assessor should refer to the relevant measurement standard for rated area documents for a definitive list of inclusions and exclusions.</p>
non-utility metering system	An energy or water metering system that is owned or operated by a third party other than a utility .
potential error	The total of all estimates (including assumptions, approximations, and unverified data) included in the rating assessment. The NABERS rating input form automatically calculates the potential error based on the data provided.
rating period	The 12-month base period for the rating, requiring at least 12-months of acceptable data upon which the rating is based.
rated premises	The tenancy or building to be rated.
rating scope	The scope of the rating – either Base Building, Whole Building or Tenancy.
Remote Meter Reading System (RMRS)	System whereby meter readings and other crucial meter data are sent to a data collection system. Such a system provides virtual meter access when physical access is not possible.
Rules	Authoritative document produced by the National Administrator that specifies what must be covered by an Assessor in order to produce a rating.
Ruling	An authoritative decision by the National Administrator which acts as an addition or amendment to this document.

Term	Definition
utility	An organisation or company that holds a licence to retail electricity, gas or water, and that sells energy or water as its primary business. This definition excludes: <ul style="list-style-type: none">a) Landlords which on-sell electricity or water where they neither hold a licence nor have an exemption deemed valid by the National Administrator for needing a licence.b) Third party contractors, such as meter reading providers.
utility metering system	An energy or water metering system that is owned and operated by a utility .
validation	The process of checking the configuration of a metering system for a NABERS rating, and if necessary, adjusting and re-checking, to ensure the configuration is correct.

3 Supply points and minimum coverage

3.1 Summary

This chapter focuses on **Steps 1, 2 and 3** of **Table 1.1**:

Step 1: *Identify all the sources and supply points of energy and/or water (e.g. meters and batch delivery) and confirm supply points used in the rating are permitted by NABERS.*

Step 2: *Check the sources and supply points to confirm the required minimum energy and water coverage can be met.*

Step 3: *Confirm the types of supply points and meters that are present, and adhere to validation requirements as applicable.*

For documentation requirements, see Section 9.2.

3.2 Energy and water sources and supply points

3.2.1 Conducting a site visit

The **Assessor** must identify all energy and/or water sources and supply points to the premises. A thorough site inspection must be conducted in order to ensure that all instances of energy and/or water have been considered in the **Assessor's** analysis for the rating.

The **Assessor** must identify the following (as relevant to the **rating type**):

- a) All sources of supplied external energy, including, but not limited to—
 - 1) electrical including renewable,
 - 2) gas,
 - 3) diesel,
 - 4) geothermal,
 - 5) thermal (chilled, heating or condenser water).
- b) All sources of supplied external water, including but not limited to—
 - 1) ground water,
 - 2) fire services water,
 - 3) bore water,
 - 4) external surface water, such as untreated dam water, and
 - 5) externally supplied recycled water sources – whether potable or not.

- c) For office ratings, all sources of energy and/or water to shared facilities used by the occupants, including—
 - 1) car parks, and
 - 2) end of trip facilities.

Note: An ‘end of trip facility’ is a designated space containing facilities such as secure bicycle storage, showers, changing facilities, lockers and drying space for clothes, for use by staff and visitors of the building.

- d) For residential aged care and retirement living ratings, all sources of energy and/or water to shared facilities used by the occupants, including—
 - 1) onsite kitchens used commercially,
 - 2) communal laundries,
 - 3) onsite laundries used commercially,
 - 4) onsite indoor and outdoor pools and spas for residents’ use, and
 - 5) gyms for resident use.
- e) Energy or water exported from the premises for other uses.

Notes and photos must be kept as evidence of the inspection. All of the following steps must be taken to ensure that no instances of energy and/or water have been missed:

- i) Ask the building managers/facilities managers to identify all the energy and/or water sources and associated accounts for the premises, including batch-delivered supplies, GreenPower™ and recycled water.

Note: The **Assessor** should not assume that all energy purchased from a GreenPower™ Accredited Generator is GreenPower™ Certified. For further details, see Section 4.5.1.

- ii) Review service drawings, where available, to identify all supply points (e.g. single line diagrams, electrical circuit schedules and other electrical diagrams, gas and diesel pipe schematics, and water reticulation diagrams).
- iii) Review the premises (including plant rooms and switchboards) to check all equipment requiring different types of energy and/or water supply is covered by the identified supply points (e.g. electricity, gas, diesel, potable water, recycled water).
- iv) Review the premises to check for any unmetered sources of water and/or energy to the premises.
- v) Ask building managers/facilities managers to identify all the services on site that may be shared with other premises, and the energy and/or water supplies and associated accounts for those services.
- vi) Collect all details of **end uses**, sources and meters relevant to the inspection (e.g. details of an electrical meter recording consumption of a tenancy **end use**).

For documentation requirements, see Section 9.2.1.

3.2.2 Unmetered sources

Water or energy from unmetered sources can only be used for ratings if 12 months of **acceptable data** can be obtained. For example, water supplied from a river, bore or well for **end uses** must be able to be measured or estimated accurately according to these **Rules** for a full 12-month period.

This requirement does not apply to the following sources, which can be reused without penalty:

- a) Water used for fire systems;
- b) Heat exchange systems where the water is returned to the source;
- c) Natural groundwater seepage into basements that would normally be discharged;
- d) Rainwater collected onsite;
- e) Condensate collection.

For documentation requirements, see Section 9.2.2.

3.2.3 Supply points permitted by NABERS

Supply points are used to determine consumption. The following supply points are permitted by NABERS:

- a) **Utility metering systems.** These are to be used in preference to **non-utility metering systems** and do not need to be cumulative meters.
- b) **Non-utility metering systems.** These must meet the requirements of Section 3.4 and Chapter 5;
- c) Batch delivery supply bills where the supplier has stated the quantity supplied; and
- d) Thermal meters (see *NABERS The Rules – Apportioning Shared Thermal Energy Systems*)

In some cases, an **Assessor** may not be able to determine consumption from a supply point. If this occurs, other methods, such as estimation, are allowed in specific situations in accordance with these **Rules**. These are described further in Chapter 7.

3.3 Minimum energy and water coverage

3.3.1 General

Once the sources and their supply points have been determined, **Assessors** must ensure that all the required energy and water **end uses** for each rating are covered. These are listed in the **Rules** documents for each rating and are not repeated here.

If an **end use** is required to be included in the rating but is not covered by one of the supply points identified, then the **Assessor** must use one of the alternative allowable methods listed in Chapter 7 to ensure the minimum energy or water coverage requirements can be met.

The energy associated with electric vehicle charge points does not form part of the minimum energy coverage and is not required to be included. Emissions associated with moving vehicles are not included in the scope of ratings.

For documentation requirements, see Section 9.2.3.

3.3.2 Checks of sources and supply points – Excluded sources

Sources that supply energy and/or water exclusively to **end uses** that are outside the required minimum energy coverage for the **rating scope** can only be excluded from the rating if permitted by these **Rules**.

For documentation requirements, see Section 9.2.4.

3.3.3 Checks of sources and supply points – Additional checks for Office Ratings

For Office Ratings, **Assessors** must also undertake the following checks, where relevant, of all sources and supply points.

Office Base Building Ratings:

- a) All tenant meters must initially be considered as sources to the Base Building. They must only be excluded in accordance with these **Rules**. Tenant distribution boards must be reviewed to ensure that none of the Base Building **end uses** have been connected. Instances of connected Base Building power and lighting might include cleaner's power points, lifts or lobby lighting on whole floor tenancies.
- b) **Assessors** must check all **end uses** to be included for the rating. This includes **end uses** that are located in spaces not included in the rated area calculation.

Office Tenancy Ratings:

- a) Base Building distribution boards must be identified and reviewed to ensure none of the Tenancy **end uses** have been connected.
- b) **Assessors** must check if a Tenancy has been supplied with any energy from the following:
 - 1) Tenant meters on other floors;
 - 2) Meters in the main switchroom;
 - 3) Uninterruptable Power Supply (UPS) or essential power systems on other floors;
 - 4) Diesel backup power systems elsewhere in the premises;
 - 5) Renewable power from an on-site renewable energy system.If there is any energy from sources listed in 1) to 5) above, then this energy must be included in the rating.
- c) **Assessors** must check all **end uses** to be included for the rating. This includes **end uses** that are located in spaces not included in the rated area calculation.

3.3.4 Checks of sources and supply points – Additional checks for Shopping Centre Ratings

For Shopping Centre Ratings, **Assessors** must also undertake the following checks, where relevant, of all sources and supply points.

- a) All tenant meters must initially be considered as sources to the Base Building. They must only be excluded in accordance with these **Rules**. Tenant distribution boards

must be reviewed to ensure that none of the Base Building **end uses** have been connected.

- b) **Assessors** must check all **end uses** to be included for the rating. This includes **end uses** that are located in spaces not included in the **GLAR** calculation.

3.3.5 Checks of sources and supply points – Additional checks for Residential Aged Care and Retirement Living Ratings

For Residential Aged Care and Retirement Living Ratings, **Assessors** must also undertake the following checks, where relevant, of all sources and supply points:

- a) **Assessors** must check all **end uses** to be included for the rating. This includes **end uses** that are located in spaces not included in the rated area calculation.
- b) Distribution boards to be included in the rating must be checked to ensure **end uses** associated with townhouses, villas or non-centrally serviced independent apartment dwellings are not connected.
- c) Energy and water **end uses** for retail facilities that are located in the **rated premises** and open to the general public may be excluded provided sufficient submetering is in place.

3.4 Confirmation of metering systems

3.4.1 General

Data from **utility metering systems** is to be used in preference to data from **non-utility metering systems**.

Utility metering systems do not need to be validated for a NABERS rating.

Data from **utility metering systems** can be used for inclusions or exclusions, regardless of whether they are non-cumulative or cumulative.

For documentation requirements, see Section 9.2.5.

3.4.2 Use of non-utility metering systems

Non-utility metering systems can be used in the following circumstances:

- a) In the absence of a complete set of **utility** data; or
- b) Where the data from **non-utility metering systems** provides more reliable data, such as when **utility** reads are too infrequent and require adjustment or the **utility metering systems** are on the high-voltage side of the transformers (see Section 3.4.5); or
- c) Where a **non-utility metering system** is a more direct source of consumption data, for example where the alternative would be a **utility meter** and a significant number of exclusions.

Where a **non-utility metering system** is used as primary data source, it is entered into the **NABERS rating input form** as if it were a **utility metering system**. Normal **validation** requirements for the **non-utility metering system** still apply.

Where **non-utility metering systems** are used, the **Assessor** must record and retain documentation that identifies all **non-utility metering systems**. This includes written reports and diagrams.

Note 1: Where a rating is carried out based on inputs from only **non-utility metering systems**, **Assessors** should, where possible, reconcile all meters against a **utility** meter.

Note 2: Advice from **utility** companies about which meters service the building always needs to be cross-checked on site to ensure errors that have not been made. It is recommended that the meter reading on each meter is recorded at the time of the site inspection.

3.4.3 Meter accuracy for non-utility metering systems

NABERS does not provide specific requirements on the accuracy class for meters. However, it does require that **metering systems** are validated in accordance with Chapter 6.

Assessors must ensure that meters installed will accurately read data at the levels expected. For example, if low or variable gas flows are expected, the gas meters installed must be able to measure at these low flows. Particular care should be taken with turbine gas meters and electricity meters rated for much higher currents than are actually being recorded.

The following section (3.4.4) provides further information on different metering types permitted in NABERS ratings.

3.4.4 Types of non-utility meters

3.4.4.1 General

The following sections outline the different types of non-utility meters and how data from these meters can be treated for the purpose of a NABERS rating.

Note: Definitions of metering systems within Section 3.4.4 are based on the AER's *Discussion Paper: Classification of Metering Services in NSW*, December 2012.

3.4.4.2 Cumulative meters

Cumulative **metering systems**, for the purposes of NABERS, have a permanent on-board counting mechanism which accumulates consumption data.

Note: The above definition of a cumulative metering system is based on a "Type 6" meter as defined in Table A.1 of the AER's *Discussion Paper: Classification of Metering Services in NSW*, December 2012.

Data from these meters, when used as non-utility meters, can be used for allowable inclusions or exclusions in a NABERS rating.

Non-utility metering systems relying solely on records created from pulse readings are considered cumulative if the pulse meter has an on-board counting mechanism to permanently store accumulated consumption data (otherwise known as an absolute count).

3.4.4.3 Non-cumulative meters

Non-cumulative **non-utility metering systems** are meters which do not meet the definition of a cumulative meter.

Note: These meters may include interval meters and “Type 5” meters as defined in Table A.1 of the AER’s *Discussion Paper: Classification of Metering Services in NSW*, December 2012.

Data from non-cumulative meters must not be adjusted to fill in missing data.

When using data from these meters for an inclusion, the following rules apply:

- a) The data must be reconciled against an energy or water balance from a parent **utility metering system**; and
- b) Virtual meters must not be used in this reconciliation.

If the data from these meters cannot be confirmed to be 100 % complete using the above rules (e.g. full interval data is not available), then the data must only be used for exclusions.

It is the expectation of the **National Administrator** that this data reconciliation is undertaken by metering providers and not by NABERS **Assessors**.

3.4.4.4 “Soft” meters or equipment sensors

“Soft” meters or equipment sensors provide indirect measurement of energy consumption using known information about the equipment (such as sensors, fan speeds or data output from variable speed drives). Data from these devices must only be used for exclusions in a NABERS rating.

Readings from these meters must convert detected current, phase and voltage into an energy reading (measured in kWh) in order to be considered **acceptable data**.

Readings calculated from current and voltage only (apparent power), sensor data (such as fan speeds) or energy readings that are based on intermittent instantaneous power measurements rather than integrated power are not considered **acceptable data**. This is because “soft” meters or equipment sensors are less accurate than physical meters.

Note: For a list of **acceptable data** records and formats, see Table 5.2.

3.4.4.5 Virtual meters

Virtual meters are effectively not physical meters. Virtual meters refer to calculating consumption data, typically by subtracting the data of one meter from another to obtain the difference. They may also include a sum of smaller meters downstream to create a virtual meter.

Note: The above definition of a virtual meter is based on a “Type 7” meter as defined in Table A.1 of the AER’s *Discussion Paper: Classification of Metering Services in NSW*, December 2012.

Virtual meters cannot be used where an energy and/or water balance against a parent **utility metering system** is required. This includes:

- a) Non-cumulative **non-utility metering systems**, where the data is used for inclusions (see Section 3.4.4.3);

- b) High-voltage meters (see Section 3.4.5).

All **non-utility metering systems** used for virtual meter calculations must be validated in accordance with these **Rules**.

Virtual meter calculations must be conducted by the **NABERS rating input form**. This means that all non-virtual meter data must be entered, without manipulation, into the **NABERS rating input form**.

Note: For premises with a very large number of virtual meters, there are certain situations where entry of individual virtual meters into the **NABERS rating input form** may not be necessary. Advice should be sought from the **National Administrator** to confirm if these situations apply to your premises.

3.4.5 High-voltage electricity metering

NABERS Energy ratings are based on low-voltage metering. It is acceptable to use **non-utility metering systems** on the low-voltage (LV) side for the energy use measurements if—

- a) a premises' main electricity **utility metering systems** are situated on the high-voltage (HV) side of the transformers, and
- b) there are no connections to energy uses within or outside the premises that bypass the LV meters. The LV meters must cover 100 % of the electricity **end uses**.

The **Assessor** must reconcile the LV meters against the HV meters to ensure that no meters are missing or reading incorrectly. Virtual meters (Section 3.4.4.5) cannot be used in this reconciliation.

As a guideline, transformer losses are expected to be less than 10 %. Losses above this figure must be re-investigated to find the source of the discrepancy and ensure the losses are not caused by unaccounted power used from the premises.

The **Assessor** may use values above 10 % losses if they have obtained evidence that the losses are not from electricity used by the premises. The HV metering is to be used in absence of this evidence.

The high-voltage **utility metering system** must be used in the absence of non-utility low-voltage meters which comply with these **Rules**. No allowance is made for losses in this situation.

For documentation requirements, see Section 9.2.6.

4 Utility metering consumption data

4.1 Summary

This chapter focuses on **Step 4** of **Table 1.1**:

Step 4: Calculate the consumption from each of the **utility metering systems** to be included in the rating, including corrections for any estimates or missing data.

Assessors must comply with the following process to calculate consumption from **utility metering systems** as defined in **Table 4.1**.

Table 4.1: Process to calculate consumption from utility metering systems

Sub-step		Reference
1	Check the utility metering system data format and units, converting where necessary	Section 4.2
2	For each utility metering system , ensure that acceptable data is available for the 12-month rating period	Section 4.3
3	Where required, correct utility metering system data in accordance with these Rules	Section 4.4
4	Account for GreenPower™ and recycled water in the rating data	Section 4.5

For documentation requirements, see Section 9.3.

4.2 Data unit and format checks

4.2.1 General

Assessors must check the data units and formats for each **utility metering system** and convert them where necessary.

Billed quantities may be provided by utilities as either hard copy utility bills or an electronic consumption record. **Assessors** should refer to Section 9.3.1 for specific requirements on acceptable billing formats.

Some utilities provide a “headline” consumption figure separately from the billed quantities. In the event of conflicting information, the billed quantities always take precedence.

For documentation requirements, see Section 9.3.1.

4.2.2 Natural gas bill formats

Some natural gas **utility** bills do not have units listed on them. The **Assessor** must check with the **utility** what the units are, and the conversion factors used.

Note: In general, Western Australian gas **utility** bills do not have units. They are often shown in kWh as the **utility** has divided the MJ value. The **Assessor** should multiply the kWh value by 3.6 MJ/kWh to obtain the energy in MJ.

4.2.3 Units

The units of consumption that **Assessors** should seek on **utility** bills are outlined in **Table 4.2**.

Table 4.2: Units of consumption for utility bills

Utility	Units
NABERS Energy ratings:	
Electricity	kWh (kilowatt hours) or MWh (megawatt hours); GJ (Gigajoules)
Natural Gas	m ³ (cubic metres) at standard temperature and pressure; MJ (Megajoules) or GJ
LPG	LPG must be entered into the NABERS rating input form as Gas and the units are in MJ, not in L (litres) or m ³ (cubic metres). Note: Where LPG bills list consumption in litres, the following formula can be used to convert litres (L) to megajoules (MJ): $Consumption_L \times 25.7 = Consumption_{MJ}$
Fuel oil (diesel, heating oil, etc.)	L (litres); GJ
NABERS Water ratings:	
Water, all sources	kL (kilolitres) (=m ³)

Note: If the **rated premises** is part of a strata scheme, **utility** bills may include a total building consumption figure but bill on a figure that removes **utility** measured downstream consumption. Care is required to ensure that the correct figure is used, relevant to the rating coverage.

4.2.4 Energy bill formats

Some electrical energy bills are presented in the following format:

$$Total\ Energy = Metered\ energy\ (kWh) + Losses\ (\%)$$

For a NABERS Energy Rating, the metered energy without inclusion of network losses is used.

4.3 12-months of acceptable data for each utility metering system

4.3.1 General

Consumption data from each **utility metering system** must be reviewed by the **Assessor**. The **Assessor** must ensure that **acceptable data** covers one complete and continuous year, allowing for estimated and missing data as specified in Section 4.3.2 and Section 4.3.3 below.

For documentation requirements, see Section 9.3.1.

4.3.2 Check if any of the bills have been estimated

Consumption from estimated **utility** bills is not considered **acceptable data** and must be corrected before use in NABERS ratings.

It is also considered good practice to ensure the preceding bill also does not contain estimated data. If the preceding bill contains estimated data or is non-existent, guidance should be sought from the **National Administrator**.

For requirements on correcting estimated data, refer to Section 4.4.

4.3.3 New utility metering system installations

Where a **utility metering system** is a new installation at the **rated premises**, it is taken to have a start reading of zero from the date of installation unless a meter reading is taken at the time of installation.

Example: A new **utility metering system** might have been installed as a result of a metering system replacement by the **utility**.

4.3.4 Check the data for anomalies

The **Assessor** must review the monthly or periodic data from each **utility metering system** over the **rating period** and scan the data for anomalies such as—

- a) meter rollovers – where the readings return to 0,
- b) meter changes,
- c) meter faults,
- d) **Remote Meter Reading System (RMRS)** faults,
- e) irregular readings, or
- f) disproportionate consumption values.

In some cases, consumption may not be an estimate but may still be inaccurate. The **Assessor** must use their experience and judgement to identify any anomalies in the data (accounting for seasonal variation) and investigate any significant anomaly. Any investigation must be documented for audit (*see documentation requirements in Section 9.3.1*).

The **Assessor** must contact the **National Administrator** before proceeding if the anomaly cannot be explained as the rating may not be able to proceed.

For requirements on correcting missing data, refer to Section 4.4.

4.3.5 Billing periods

Assessors are required to enter the **billing period** for each **utility metering system** into the **NABERS rating input form**.

For each **utility metering system**, the **billing period** must align with one of the following:

- a) The start date of the **billing period** with the start date of the first bill or reading; or
- b) The end date of the **billing period** with the end date of the last bill or reading.

Assessors must also align the **billing period** as closely as possible with the **rating period**. In doing so, the **billing period** must also comply with Sections 4.3.6, 4.3.7 or 4.3.8, as may be applicable.

Note 1: This is to avoid apportioning of the consumption data at the beginning and end of the **rating period**.

Each separate bill provided by the **utility** must be recorded as a separate line item into the **NABERS rating input form** to show the pattern of consumption throughout the **billing period**, along with the exact dates and consumption values for the respective bill.

Note 2: When entering data into NABERS Perform, a submeter used for electricity exclusions will default to the **rating period** instead of the **billing period** of the respective parent meter. If the parent meter is known, it is recommended to align the submeter to the parent meter's **billing period**.

4.3.6 Stand-alone NABERS Energy or Water ratings – where a building is targeting a single rating

The following provisions apply where data cannot be gathered for exactly the same period for different **metering system** accounts:

- a) The **rating period** must align exactly with the **billing period** for the primary **utility** account, or the meter reading dates of the primary non-utility account where there is no **utility** account; and
- b) The **billing period** for each **utility** account must match the dates on the bills.

If the billing dates of the other accounts do not align with the **rating period** then **Assessors** must ensure:

- 1) Consumption data that accounts for at least 80 % of the total rating result (in kg-CO₂ for energy or in kL/m² for water) falls within the **rating period**; and
- 2) Consumption data is as close to the **rating period** as possible, with a maximum of two months displacement of data from the **rating period** allowed.

4.3.7 Combined NABERS Energy and Water ratings – where a building is targeting both ratings

When a combined NABERS Energy and Water rating is being conducted, the same **rating period** must apply to both ratings. If it is not possible to gather data for exactly the same period for both ratings, the **rating period** is based on the data gathered for the NABERS Energy rating.

The consumption data for each water source must cover a continuous 12-month period that is displaced from the **rating period** by no more than two months.

4.3.8 NABERS Energy for Offices – Co-assess ratings

For office buildings, when a **co-assess** rating is being undertaken, the same **rating period** must apply to all ratings. Where—

- a) a Base Building rating is conducted, the Base Building **rating period** is used for all ratings,
- b) no Base Building rating is conducted, the Whole Building **rating period** is used for all ratings,
- c) only Tenancy ratings are conducted, the **rating period** for the largest tenancy is used.

If it is not possible to gather data for exactly the same period for all ratings, the consumption data for each source in each rating must cover a continuous 12-month period that is displaced from the **rating period** by no more than two months.

4.4 Adjusting for missing or estimated utility metering system data

4.4.1 General

The **Assessor** must check that the data from **utility metering system** readings do not rely on estimates by the **utility**. If it does, then the method outlined in this Section 4.4 must be followed.

The frequency of meter readings should be both—

- a) at least as frequent as the **utility** meter's billing frequency, and
- b) at least quarterly (i.e. four readings spaced evenly throughout the year).

For documentation requirements, see Section 9.3.1.

4.4.2 Adjusting for gaps at the start or end of the billing period

A **utility metering system** may be missing a valid meter reading at the start and/or end of the **billing period** because the bills are missing, or the reading was estimated by the **utility**. To resolve this, **Assessors** can use manual meter readings where no bills are available.

When using manual meter readings, the data must be adjusted as follows:

- a) Readings taken before the start of the **billing period** must be treated as if they were taken on the first day of the **billing period**.
- b) Readings taken after the end of the **billing period** must be treated as if they were taken on the last day of the **billing period**.

Note: This is to prevent unrealistic apportioning of data where regular reads are not available.

All manual meter readings used must comply with the data requirements of Section 4.2.

Where they are available, the **Assessor** should check these readings against **utility** readings.

4.4.3 Adjusting for gaps during the billing period – where cumulative meter readings are not available

Where there is an unresolvable gap in the billing data, (e.g. due to a change of supplier or meter), the **Assessor** may calculate an **acceptable estimate** of the unrecorded consumption by interpolating between adjacent bills. The interpolation must be based on the average daily consumption figures of the adjacent bills.

The **Assessor** must add the entire **acceptable estimate** of unrecorded consumption to the relevant **potential error**.

Under no circumstances is it permissible to extrapolate outside the available data. The premises cannot be rated if the data does not cover a full continuous 12-month period.

4.4.4 Adjusting for gaps during the billing period – where cumulative meter readings are available

4.4.4.1 General

In some cases, an energy or water source can be missing a valid **utility metering system** reading during the **billing period** (e.g. if the bill was not available or if the reading was estimated by the **utility**).

The total consumption for the missing period can be accurately determined using the method(s) below (Sections 4.4.4.2 and 4.4.4.3) when valid **metering system** readings are available for the period immediately before and immediately after the missing readings.

The calculated consumption is considered to be **acceptable data** and may be used in the assessment without being added to the relevant **potential error**.

4.4.4.2 Energy sources other than natural gas

For energy **sources** other than natural gas, the **Assessor** must:

- a) Calculate the total metered consumption in the period by using the meter readings before and after the missing or estimated reading(s); and
- b) Obtain any relevant factor required to convert the metered consumption to actual consumption; and
- c) Use the actual consumption, as calculated using the relevant factor, as the total consumption for the period.

Note: **Assessors** are to exercise care when performing these calculations and obtain written documentation to confirm the use of any conversion factors if not documented on the relevant **utility** bills.

4.4.4.3 Natural gas

Missing gas consumption can also be determined using **metering system** readings. However, additional consideration is required due to the complexities of converting gas **metering system** readings to energy consumption.

Where a bill is missing or estimated but valid **metering system** readings are available before and after the missing period, the gas consumption can be determined using the following method:

- a) Calculate the total metered gas flow in the period by using the readings before and after the missing or estimated reading(s).
- b) Obtain the correction factor (CF) for the gas meter from the following, in order of preference:
 - 1) The estimated bill for the period (if available); or
 - 2) The **utility** bills before or after the missing period; or
 - 3) Written documentation provided by the **utility**.

Note: The correction factor is used to convert the metered consumption from the meter pressure to standard atmospheric pressure. It is sometimes in **utility** bills under an alternative name, such as “pressure correction factor” or “conversion factor”.

- c) Obtain the gas Heating Value (HV) at atmospheric pressure during the period between the valid readings. This value must be obtained from one of the following sources listed, in order of preference:
 - 1) Written documentation provided by the **utility** for the period between the two readings or, if not available;
 - 2) The average heating value for the period between the two readings, in the case there are **utility** bills (estimated or actual) fully covering such a period or, if not available;
 - 3) The default Heating Values in **Table 4.3** must be used for the period between the two readings, depending on the state where the premises is located.

Table 4.3: Default Heating Values based on State/Territory

State/Territory	Default Heating Value (HV) (MJ/m ³)
ACT	37.5
NSW	37.5
NT	40.0
QLD	37.5
SA	37.5
TAS	38.0
VIC	38.0
WA	40.0

- d) Gas consumption can be calculated using the following formula:

$$\text{Gas Consumption} = (R_E - R_B) \times CF \times HV$$

where:

R_B = the cumulative meter reading at the beginning of the missing bill period, in m^3 ;

R_E = the cumulative meter reading at the end of the missing bill period, in m^3 ;

CF = the correction factor; and

HV = the heating value (MJ/m^3).

Example:

Two consecutive monthly bills have been estimated by the **utility**. Estimated readings were taken on 31 March and 30 April. Valid meter readings for the period immediately before and immediately after the estimated readings were available in adjacent **utility** bills. The reading for 1 March was $10,000 m^3$ and the reading for 31 May was $12,150 m^3$.

The pressure correction factor was obtained from the **utility** bills and was equal to 1.1. The average heating value for all the bills between the two accurate readings (including the two estimated bills) was $39 MJ/m^3$.

The total gas consumption between 1 March and 31 May can be calculated as:

$$(12,150 m^3 - 10,000 m^3) \times 1.1 \times 39 MJ/m^3 = 92,235 MJ$$

4.4.5 Use of interval meter data from a utility

Some utilities will bill a **metering system** based on a **Remote Meter Reading System (RMRS)** that transmits the consumption data but not the cumulative readings. This makes it impossible to reconcile an estimated bill as meter readings before and after are not available. The method below outlines the procedure for using this data.

The **RMRS** will detect when it does not receive a certain amount of data from the **metering system** and the bill will be listed as an 'estimate'. Where this is the case, the **Assessor** must use the following method:

- a) Obtain written confirmation from the **utility** that the reason the bill was 'estimated' was because of missing data. If it is any other reason, contact the **National Administrator** to obtain approval to use this method.
- b) Obtain the complete data set of interval meter readings from the **utility** for the estimated month. Identify all the days where there is missing data (typically a '0' read).

Note 1: Actual consumption on weekend days may be '0' and therefore care must be taken to ensure data identified as missing is actually missing.

- c) For day(s) with missing data which occur on:
 - 1) A weekday:
 - i) Remove the entire 24-hour period of the day(s) that have a missing data point.
 - ii) The consumption data for removed days are to be interpolated using adjacent weekdays that have complete data.

- 2) A weekend and the consumption data is to be used for an inclusion:
 - i) Remove the entire 24-hour period of the day(s) that have a missing data point.
 - ii) The consumption data for removed days are to be interpolated using adjacent weekdays that have complete data.
- 3) A weekend and the consumption data is to be used for an exclusion, no alteration to the consumption data is to be made.
- d) All consumption data is to be entered into the **NABERS rating input form** as individual line items for the actual and interpolated values.

Note 2: This means that for an estimated bill, there will be a minimum of three entries for that bill – the actuals on either side of the interpolated value and the interpolated value.

- e) The interpolated data is an **acceptable estimate** and must be added to the **potential error**.

Note 3: This method is only usable for **utility** bills received from **utility metering systems**. For **non-utility metering systems**, see Section 6.5.4.

4.4.6 Meter readings for new meter installations

See Section 4.3.3.

4.5 Accounting for GreenPower™

4.5.1 General

Note 1: The GreenPower™ program aims to decrease greenhouse gas emissions associated with electricity generation and to facilitate the installation of new renewable energy generators across Australia. As such, the purchase of GreenPower™ from energy providers accredited under the National GreenPower™ Accreditation Program (known as a 'GreenPower™ Accredited Generator'), is considered to be the purchase of a zero greenhouse emission energy source. Visit www.greenpower.gov.au for further information.

GreenPower™ can be used to improve a premises' NABERS energy rating.

Each NABERS energy rating is broken down into 2 components:

- a) A star rating that is calculated with GreenPower™; and
- b) A star rating that is calculated without GreenPower™.

The first recognises the use of GreenPower™ as zero emission electricity and the second counts GreenPower™ as standard grid electricity to reflect the actual energy efficiency of the premises.

GreenPower™ may be purchased at the time of consumption, or retrospectively as a separate purchase from the energy consumed.

Note 2: This process ensures that an equivalent amount of accredited GreenPower™ is purchased and added to the electricity grid on behalf of the premises.

For documentation requirements, see Section 9.3.2.

4.5.2 Separate purchases

Separate purchases of GreenPower™ are those that are not included within the **utility** bill.

The purchase of any GreenPower™ bought separately to offset actual energy consumption must have occurred before the date the rating application was submitted.

The **Assessor** must verify that the GreenPower™ was used within the premises. For assessments where a separate GreenPower™ purchase was made, the premises must provide written confirmation that the GreenPower™ purchase was used for the premises in question only.

4.5.3 Bulk purchases

Where a bulk GreenPower™ purchase must be divided between a number of properties, the **Assessor** must provide documentation from the premises to the **National Administrator** with a spreadsheet indicating the exact amount of GreenPower™ (in kWh) allocated to each property.

Energy to be included in a NABERS Rating under GreenPower™ must be clearly GreenPower™ Certified. As it is possible that a GreenPower™ Accredited Generator may also sell non-GreenPower™ Certified energy, **Assessors** must not assume that all the energy from a GreenPower™ Accredited Generator is GreenPower™ Certified.

Assessors must retain documentation that confirms all energy claimed as GreenPower™ is GreenPower™ Accredited. This can include invoices that clearly document GreenPower™ Accredited energy or other documentation from the GreenPower™ Provider confirming that any energy included under GreenPower™ in the rating is retired through the GreenPower™ program.

In all cases, the actual percentage or amount of GreenPower™ energy supplied must be explicitly assessed from the bills or as advised in writing by the GreenPower™ Provider. This information must also be replicated for each rating to allow for cross-checking. Proof of the GreenPower™ purchase must be supplied with each rating application.

4.5.4 On-sold GreenPower™

In premises where the **utility** supply is distributed to tenants through **non-utility metering systems**, it is possible to on-sell the GreenPower™ to tenants.

On-sold GreenPower™ cannot be included in the calculations for the NABERS energy rating. In this situation, the **Assessor** must assume that no GreenPower™ was used within the energy coverage of the NABERS energy rating unless written evidence demonstrates otherwise.

4.5.5 Exclusions

Assessors must use the following method to allocate GreenPower™ energy use exclusions:

- a) Where an exclusion is due to use by another entity excluded in the rating (e.g. a premises on-selling electricity to tenants through a **non-utility metering system**), documentation must be obtained to determine the amount of GreenPower™ used within the premises. No GreenPower™ can be included in the rating where it is ambiguous or where no documentation exists.
- b) Where an exclusion is due to being outside the energy coverage but is still owned or operated by the premises (e.g. the partial exclusion of a car park), the GreenPower™ must be allocated to the excluded meter in the same proportion as it was bought for the **utility metering system**.

4.5.6 Standard for acceptable data

Note: The “headline” GreenPower™ percentage may not exactly match the actual percentage for each bill, with adjustments made by the **utility** to balance this over time. Therefore, care should be taken to confirm the actual GreenPower™ amounts applied.

Assessors must check whether a GreenPower™ purchase was capped to a specific amount, and if so, must ensure the correct figure has been used.

4.6 Accounting for recycled water

Each NABERS Water rating is broken down into two components:

- a) A star rating that is calculated with supplied recycled water; and
- b) A star rating that is calculated without supplied recycled water.

The first component (a) recognises the use of the externally supplied recycled water and does not include the associated water consumption in the rating (improving the rating). The second component treats externally supplied recycled water as mains water use to reflect the actual water efficiency of the premises.

Assessors must ensure that any unknown portions of recycled water are treated as mains supply. Recycled water should be applied to the rating using the correct inputs into the **NABERS rating input form**.

For documentation requirements, see Section 9.3.3.

5 Non-utility metering consumption data

5.1 Summary

This chapter focuses on **Step 5** of **Table 1.1**:

Step 5: Calculate the consumption from each of the **non-utility metering systems** to be included in the rating, including correction for any estimates or missing data.

Assessors must comply with the following process to calculate consumption from **non-utility metering systems** for the rating as defined in **Table 5.1**.

Table 5.1: Process to calculate consumption from non-utility metering systems

Sub-step		Reference
1	Check the non-utility metering system data format and units, converting where necessary	Section 5.2
2	For each non-utility metering system , ensure that acceptable data is available for the 12-month rating period	Section 5.3
3	Where required, adjust non-utility metering system data in accordance with these Rules	Sections 5.4 and 5.5

For documentation requirements, see Section 9.4.

5.2 Data unit and format checks

Assessors must check the data units and formats for each **non-utility metering system** and convert them where necessary.

If data from **non-utility metering systems** is included in a NABERS rating, data defined in **Table 5.2** must be recorded and retained for audit.

For documentation requirements, see Section 9.4.1.

Table 5.2: Data required for non-utility metering systems

Data required	Acceptable record or format	Unacceptable record or format
All meters		
Date and time of reading or interval	Day/month/year (Optional) Time in 24-hour format (HH:MM)	Month/year; day/month; month Hour only
Meter identification	Meter number or label that can be directly cross-referenced to the single-line diagram	No identification; label not clearly identifiable on single-line diagram
Meter reading from cumulative meters	Cumulative meter reading, either direct from the meter or from the metering interface	No meter reading
Consumption data from non-cumulative meters	Consumption data with clear units and time period. Refer to Section 3.4.4.3 for more information.	No consumption data or consumption data without clear units.
Electricity meters		
k-factor (CT multiplier)	Meter k-factor	No k-factor
Calculated electricity reading	Calculated consumption figure in kWh, based on meter readings and k-factor	Any consumption figure that cannot be derived from the meter reading and k-factor; any consumption figure without units
Gas meters		
Meter pressure	Meter pressure, with units	No meter pressure; no units
Meter pressure correction factor for inclusions	The utility pressure correction factor	No meter pressure correction factor
Meter pressure correction factor for exclusions	Pressure correction factor of ¹ / ₂	No meter pressure correction factor
Monthly energy density	Energy density or heating value of gas (MJ/m ³) from utility bill (see Section 4.4.4.3)	No energy density data; no units on energy density data; energy density data not supported by evidence from utility

² To ensure accuracy of calculations, it is recommended that a measured meter pressure correction factor be used where available.

Data required	Acceptable record or format	Unacceptable record or format
Calculated gas reading	Calculated gas consumption figure in MJ	Any figure that cannot be derived from the gas meter reading, pressure correction factor and monthly energy density; any figure without units
Water meters		
Meter multiplier	Meter multiplier to convert readings to kL or m ³	No meter multiplier
Calculated water reading	Calculated water consumption figure in kL or m ³	Any figure that cannot be derived from a meter reading or meter multiplier; any figure without units

Note: Where current transformer ratios (CT ratios) are taken into account in the consumption data, it is acceptable to enter a CT ratio of 1 into the **NABERS rating input form**.

Where non-cumulative data is used from a validated non-cumulative meter, the initial meter reading can be set to “0” in the **NABERS rating input form**.

5.3 12-months of acceptable data for each non-utility metering system

5.3.1 General

Consumption data from each **non-utility metering system** must be reviewed by the **Assessor**. The **Assessor** must ensure that **acceptable data** covers one complete and continuous year, allowing for estimated and missing data as specified in Section 5.3.2 and Section 5.3.3 below.

For documentation requirements, see Section 9.4.1.

5.3.2 Check if any of the data has been estimated

Consumption from estimated **non-utility metering system** data is not considered **acceptable data** and may not be used for NABERS ratings.

Where there is estimated data, refer to Sections 5.4 and 6.4.

5.3.3 Check the data for anomalies

The **Assessor** must review the monthly or periodic data from each **non-utility metering system** over the **rating period** and scan the data for anomalies such as:

- a) Meter rollovers – where the readings return to 0;
- b) Meter changes;
- c) Meter faults;
- d) **Remote Meter Reading System (RMRS)** faults;

- e) Irregular readings; or
- f) Disproportionate consumption values.

In some cases, consumption may not be an estimate but may still be inaccurate. The **Assessor** must use their experience and judgement to identify any anomalies in the data (accounting for seasonal variation) and investigate any significant anomaly. Any investigation must be documented for audit (*see documentation requirements in Section 9.4.1*).

The **Assessor** must contact the **National Administrator** before proceeding if the anomaly cannot be explained as the rating may not be able to proceed.

For requirements on correcting missing data, refer to Section 5.4.

5.3.4 Meter reading dates for cumulative meters

Assessors are required to enter the meter reading dates for each **non-utility metering system** into the **NABERS rating input form**.

Assessors must have a record of readings that is both—

- a) at least as frequent as the **utility meter** under which the **non-utility meter** lies, and
- b) at least quarterly (i.e. four readings spaced evenly throughout the year).

Where a cumulative meter is not connected to an **RMRS** that has been validated in accordance with Section 6.3.3, it must be read on-site, and a record of these readings must be kept in case of audit.

Note: Cumulative meter readings can be recorded by personnel other than the **Assessor**.

5.3.5 Consumption data for non-cumulative meters

Assessors are required to enter the consumption data for each **non-utility metering system** into the **NABERS rating input form**. This can be entered as a '0' for the first "meter reading" and the total consumption amount for the last "meter reading".

Data from non-cumulative meters must comply with Section 3.4.4.3.

5.3.6 Entry of electricity exclusion submeters into NABERS Perform

When entering data into NABERS Perform, a submeter used for electricity exclusions will default to the **rating period** instead of the **billing period** of the respective parent meter. If the parent meter is known, it is recommended to align the submeter to the parent meter's **billing period**.

5.3.7 Stand-alone NABERS Energy or Water ratings – where a building is targeting a single rating

A rating may have multiple **metering system** accounts. Where the **billing periods** for different **metering system** accounts do not align, the **billing period** of the largest utility account must align with the **rating period**.

If the **billing period** of the other accounts do not align with the **rating period** then **Assessors** must ensure the **billing period** is as close to the **rating period** as possible, with a maximum of two months displacement allowed.

5.3.8 Combined NABERS Energy and Water ratings – where a building is targeting both ratings

When a combined NABERS Energy and Water rating is being conducted, the same **rating period** must apply to both ratings. If it is not possible to gather non-utility data for exactly the same period for both ratings, the **rating period** is based on the data gathered for the NABERS Energy rating.

The consumption data for each water source must cover a continuous 12-month period that is displaced from the **rating period** by no more than two months.

5.3.9 NABERS Energy co-assess

When a **co-assess** rating is being undertaken, the same **rating period** must apply to all ratings. Where—

- a) a Base Building rating is conducted, the Base Building **rating period** is used for all ratings;
- b) no Base Building rating is conducted, the Whole Building **rating period** is used for all ratings;
- c) only Tenancy ratings are conducted, the **rating period** for the largest tenancy is used.

If it is not possible to gather data for exactly the same period of all ratings, then the consumption data for each source in each rating must cover a continuous 12-month period that is displaced from the **rating period** by no more than two months.

5.3.10 Ensure all non-utility meters are validated

If **non-utility meters** are used in the assessment, the **Assessor** must check that all necessary **validation** (and correction of data) is complete (see Chapter 6).

Note: If the **non-utility metering system** is part of an **embedded network**, **validation** might be required. Refer to Section 6.2.3.

5.4 Adjusting for gaps in non-utility cumulative metering system data

5.4.1 General

This section only applies to consumption data from cumulative metering systems.

The **Assessor** must check that the data from **non-utility metering system** readings does not rely on estimates. If it does, then the method outlined in this Section 5.4 must be followed.

For documentation requirements, see Section 9.4.1.

5.4.2 Gaps at the start or end of the rating period

If the meter data is used for an exclusion and there are gaps at the start and/or end of the **billing period** then the data must be entered without adjustment.

If the meter data is used as for an inclusion then the data must be adjusted as described below:

- a) If cumulative **Remote Meter Reading System (RMRS)** or manual readings, which comply with the data recording requirements of Section 5.3.4 are available, the **Assessor** may use the cumulative meter readings to calculate the consumption.
- b) If the meter readings match the frequency of data recording requirements in Section 5.3.4, the readings can be entered into the **NABERS rating input form** on the day they were taken.
- c) If the readings were taken less frequently, cumulative reads available before and after must be treated as if they were taken on the first and/or last day (as appropriate) of the **billing period**. This is to prevent unrealistic apportioning of data where regular reads are not available.

5.4.3 Gaps during the billing period

5.4.3.1 Energy sources other than natural gas

Where missing consumption can be calculated from meter readings, **Assessors** can include this data and must follow the process listed in Section 4.4.4.2.

5.4.3.2 Natural gas

Where missing consumption can be calculated from meter readings, **Assessors** can include this data and must follow the process listed in Section 4.4.4.3, except for part (b) which refers to the correction factor to be used.

When calculating gas consumption for **non-utility metering systems**, the **Assessor** must use the measured meter pressure correction factor where it is known.

Note 1: It is preferable to obtain the pressure correction factor through measurement as this will result in more accurate gas consumption at the **rated premises**, although the **National Administrator** recognises this may be a costly endeavour.

For new installations, the pressure correction factor would be provided as part of gas meter commissioning documentation.

If the measured meter pressure correction factor is not known and cannot be easily obtained, then the **Assessor** can:

- a) Use the default pressure correction factor of '1' where data is used for an exclusion; or,
- b) Use the utility meter pressure correction factor in conjunction with a heating value where data is used for an inclusion.

Note 2: A list of default heating values based on state or territory can be found in Table 4.3.

5.5 Adjusting for gaps in non-utility non-cumulative metering system data

Consumption data from non-cumulative metering systems must not be adjusted (see Section 3.4.4.3).

6 Non-utility metering system validation

6.1 Summary

This chapter focuses on Step 6 of **Table 1.1**:

Step 6: Where **non-utility metering systems** have been used to calculate consumption, validate these meters in accordance with these **Rules**.

Note: Validation is required for **non-utility metering systems** due to the potential for issues with software and/or hardware configuration which can directly influence the measurement of energy consumption. Common problems include incorrect wiring of the meter and incorrect meter multipliers (CT ratios). **Remote Meter Reading Systems (RMRS)**, such as Building Management Systems (BMS), can vary significantly in how they interpret the measured consumption of a **non-utility metering system**.

Assessors must comply with the following process to validate **non-utility metering systems** for the rating as defined in **Table 6.1**.

Table 6.1: Process to calculate validation in non-utility metering systems

	Sub-step	Reference
1	If data from non-utility metering systems is included in a NABERS rating, then the Assessor must check if these meters need to be validated	Section 6.2
2	If the meters need to be validated, then the Assessor must ensure that all metering systems are properly recorded and validated according to these Rules	Section 6.3
3	If adjustment is required for non-utility metering systems as a result of validation checks, the Assessor must investigate whether the correct values can be calculated (not estimated)	Section 6.4

For documentation requirements see Section 9.5.

6.2 Metering systems requiring validation

6.2.1 General

Assessors must check that all necessary **validation** (and correction of data where required) is complete.

Non-utility metering systems require **validation** if they include the following:

- a) A meter with a Current Transformer (CT) (even where the CT ratios are applied internally to the meter face readings); or
- b) A gas meter; or
- c) A **Remote Meter Reading System (RMRS)**, including an interface to a Building Management System (BMS) used to transmit meter data.

Note 1: While not required for a rating, NABERS recommends **validation** of—

- a) direct connect meters with no **RMRS**, and
- b) pulse meters with no **RMRS**.

The following meter types do not need to be validated:

- 1) Water meters; and
- 2) Manually read direct connect meters.

Note 2: If these systems are connected to an **RMRS**, the **RMRS** will still need to be validated as per Section 6.3.3.

Note 3: Certain electrical meters may be either direct connect meters or CT meters. **Assessors** should ensure that an electrical meter is properly categorised as either direct connect or CT.

It cannot be assumed that newly installed **non-utility metering systems** have been validated. Evidence of **validation** must be obtained by the **Assessor**.

6.2.2 Treatment of non-utility metering systems with CTs

All **non-utility metering systems** (inclusions or exclusions) with CTs require **validation** (and adjustment, if necessary) by a licensed electrician or electrical engineer. This is to ensure that the CT ratio (meter multiplication factor) and wiring are correctly configured and, where applicable, programmed into the meter.

For validation requirements relating to **non-utility metering systems** with CTs, see Section 6.3.

6.2.3 Meters in embedded networks

An owner of a premises may install, own and manage the meters in an **embedded network**. Where the owner of the premises is able to provide evidence that they are licensed as an electricity retailer, they are deemed to be a **utility** for NABERS purposes. In such cases, meter **validation** is not required.

In some cases, the owner may hold an exemption from the requirement to be a registered network service provider by the Australian Energy Regulator (AER). In such cases the **Assessors** must contact the **National Administrator** for approval for the use of this exemption.

Note 1: An example of an exemption which will not be approved by the **National Administrator** is a site with less than 10 metering systems. This note will be updated by the **National Administrator** as cases are approved.

Where the owner does not hold a license or exemption approved by the **National Administrator**, the owner is not considered a **utility** and NABERS requires the **Assessor** to check these meters against the NABERS meter **validation** requirements.

The **National Administrator** must be contacted if other arrangements are encountered or there is any uncertainty regarding assessment.

Note 2: The requirements to gain exemptions for **embedded networks** by AER may differ between Australian states and territories. For example, Western Australia and the Northern Territory are not part of the National Energy Market (NEM) and as such work under different regulatory frameworks.

This means that most meters in **embedded networks** in Western Australia and the Northern Territory will need to be validated for NABERS purposes. NABERS also understands that most **embedded networks** in Queensland, South Australia and Tasmania will not be licensed nor hold an exemption and will need to be validated for NABERS purposes.

Where the **Assessor** is unsure, meters should be validated.

For documentation requirements see Section 9.5.1.

6.3 Requirements for validating meters

6.3.1 Current Transformer (CT) Meters

6.3.1.1 General

CT meters must be validated to ensure that the recorded consumption data accurately matches the adjusted readings taken from the meter.

The validation of CT meters aims to confirm the absence of the following common issues:

- a) Meter multipliers are incorrectly matched to CT ratios;
- b) One or more CTs are not connected and therefore not recording consumption;
- c) One or more CTs are connected in reverse, offsetting consumption of other phases;
- d) Cross-phase CT connection errors, where CTs are not matched to the correct voltage phase;
- e) Faulty or missing potential fuses, which can lead to under-recorded consumption or even meter failure.

Note 1: The CT ratio is expressed as a ratio of the primary current to the secondary current. As the secondary current is normally standardised at 5 amps, the CT ratio is expressed as '[x]:5' where [x] is the maximum current for the circuit that is metered. For example, a ratio of '300:5' means that when 300 amps flows through the CT, then 5 amps flows through the meter.

Where the CT meter does not automatically adjust the meter's reading with the CT ratio, the meter reading requires a meter multiplier to arrive at the actual consumption recorded by the meter.

This meter multiplier (also known as the 'meter factor' or 'k-factor') is calculated from the CT ratio. Using the example above, where the CT ratio is 300:5, the meter multiplier would be 60.

Note 2: All activities conducted on or with a live electrical system must be done by a qualified and licenced electrician. As specific requirements vary based on jurisdiction, advice should be sought prior to undertaking any work on or with live electrical systems. **Assessors** are not expected to undertake live electrical work themselves.

Note 3: For more information on these different types of meters, refer to the *Energy Saver Electricity Metering and Monitoring Guide* or the **National Administrator**.

6.3.1.2 Validation requirements

When validating a CT meter, the following steps must be undertaken:

- a) Check the metering wiring to ensure correct configuration (refer to Section 6.3.1.1 for a list of common issues).
- b) Record the CT ratio that is applied to meter readings:
 - 1) Where the CT ratio is unknown or cannot be reviewed, the CT ratio must be verified by a qualified electrician (see Section 6.3.1.3).
 - 2) Where the CT ratio is known and has been programmed into the meter, the meter programming must be reviewed to ensure that the CT ratio is been applied correctly to the meter readings (see Section 6.3.1.3).
 - 3) Where the CT ratio is known and not programmed into the meter, the CT ratio must be verified to ensure that it is being applied correctly to meter readings.
- c) Record any multipliers that are applied to a meter reading.
- d) Using the recorded CT ratio and any applicable multipliers, verify that the CT meter is correctly converting meter readings to actual consumption.

Where the reading from the meter face does need to be multiplied by the CT ratio to calculate the true consumption, the CT ratio or multiplier that is required to convert the meter reading to kWh should be recorded.

The process for validating an electrical CT meter can be seen in [Figure 6.1](#).

Assessors must record and retain the results of validation checks for the purpose of L2 auditing. An example of a validation record for electrical **non-utility metering systems** can be seen in [Appendix A](#). Where the multiplier used within the meter can be reviewed, the figure should be photographed on the meter face and attached to the meter **validation** form as evidence.

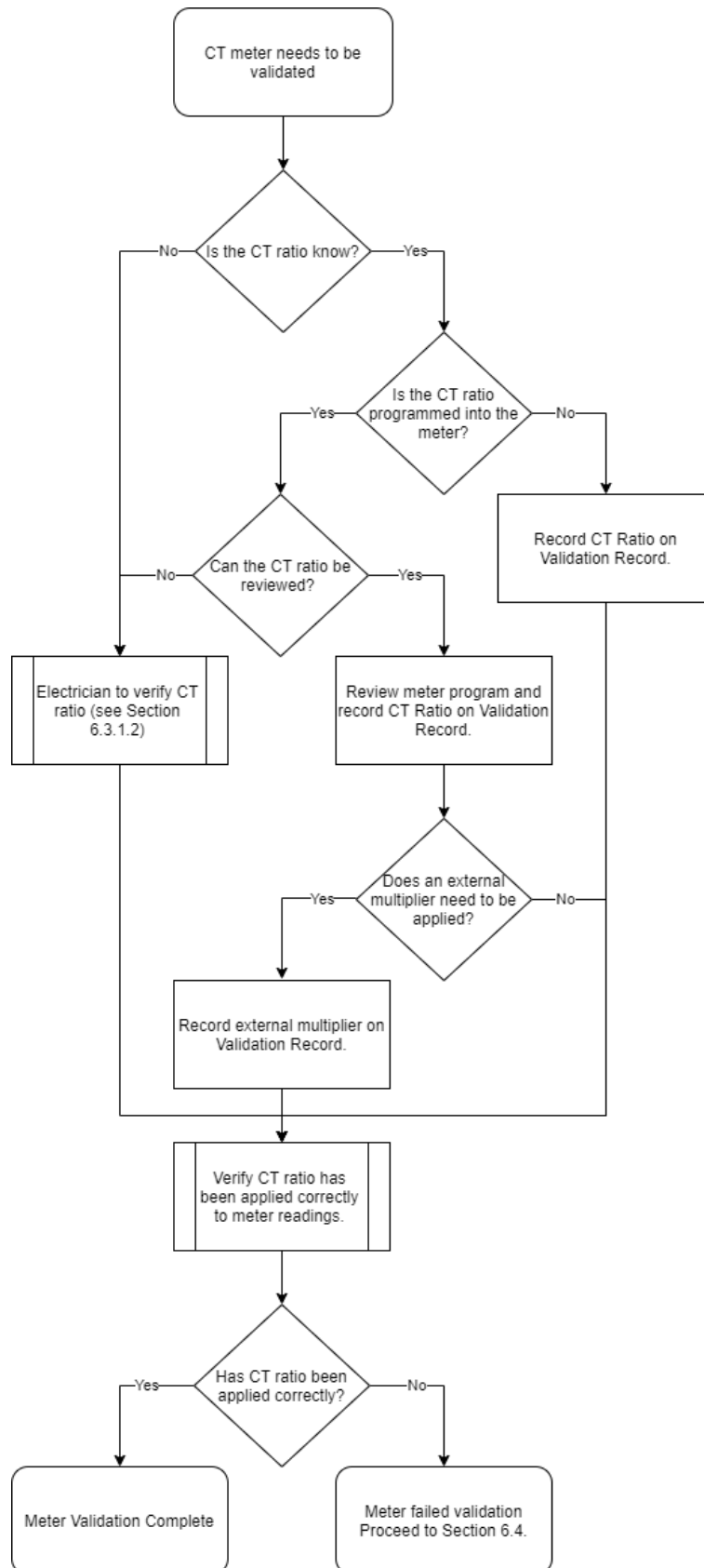


Figure 6.1: Process for validation of an electrical CT meter

6.3.1.3 Reviewing the Current Transformer (CT) ratio

This section describes how testing with a manual power meter or tong-testing can be used to verify a CT meter where either—

- a) the CT ratio is unknown, or
- b) the meter multiplier cannot be verified directly from the meter.

Where the CT ratio is known, the CT ratio programming must be checked to ensure it is being correctly applied. A qualified and licenced electrician must record the load current on each phase and the corresponding meter current. This can be done utilising a variety of methods, including (but not limited to) taking measurement using a handheld power meter or by tong-testing.

If the difference between the readings on respective phases is less than 10 %, the CT ratio programming is considered correct.

If the difference is greater than 10 %, this indicates that the internal ratio has not been programmed correctly and thus must be treated as an installation error.

Where the CT ratio is unknown or cannot be reviewed, a qualified and licenced electrician must verify the CT ratio.

Note: A power meter can be used to confirm the CT ratio and multiplier by measuring the actual current flow through the circuit being metered and the corresponding phase to the meter. The following calculation can then be used to determine the CT ratio and the multiplier to be applied to the meter face reading:

$$\begin{aligned} \text{The CT ratio ('value':5)} &= \frac{\text{measured circuit amps (e.g. 120 amps)}}{\text{measured meter amps (e.g. 2 amps)}} \times 5:5 \\ &= 300:5 \\ &\Rightarrow \text{A meter multiplier of 60 is required to} \\ &\quad \text{convert the meter face reading to actual} \\ &\quad \text{kWh consumption} \end{aligned}$$

6.3.1.4 Validating cloud metering

If the **metering system** does not have self-identifying CTs then the CT ratio and wiring need to be confirmed as per a normal CT meter (see Section 6.3.1).

If the system has self-identifying CTs (i.e. where the CTs have high level communications with the **cloud metering system** rather than a wire) then CT ratio **validation** is not required, and the **Assessor** should enter this into the **NABERS rating input form** as having no CT ratio.

For wireless CTs, a check must be performed to confirm that the CTs—

- a) have been correctly identified with the **end use**, and
- b) the voltage and current measurement correspond to the **end use**.

It must be confirmed that the system has both voltage and current measurement within the same distribution board as the CTs, separately for each phase.

6.3.1.5 Checking meters in place to avoid shutdown

Where electrical wiring and Current Transformers (CTs) cannot be accessed without partial or complete shutdown of the electrical network, a qualified and licenced electrician must be engaged to perform the validation as per Section 6.3.1.2.

The engaged electrician must verify that each **non-utility metering system** has been properly installed, is functioning correctly and is being interpreted correctly. They must also fill out the NABERS **validation** record for electrical **non-utility metering systems** (see Appendix A).

Acceptable methods for verification can include (but are not limited to):

- a) Use of a portable power meter to record consumption of the metered circuit over a period of time; and,
- b) Use of a clamp-on ammeter or similar device to identify the average current in the circuit being metered.

The CT ratio and meter multiplier programmed in the **non-utility metering system** must also be recorded in the NABERS **validation** record.

Note 1: If a qualified and licenced electrician is unable to undertake this check, guidance should be sought from the **National Administrator**.

Note 2: Where electrical wiring and Current Transformers (CTs) cannot be accessed without partial or complete shutdown of the electrical network and a checking live meters is not possible, then guidance should be sought from the **National Administrator**.

6.3.2 Gas Meters

All non-utility gas meters require **validation** (and adjustment, if necessary) by a competent person with an understanding of gas meters. This ensures that the pressure correction factor corrects the measured volume of the **non-utility metering system** to the same pressure conditions used by the **utility metering system**.

Where the pressure factor cannot be physically tested or there is no data available for the meter pressure and the correction factor cannot be determined, the following values can be used:

- a) Inclusion meters: **utility metering system** pressure correction factor;
- b) Exclusion meters: 1.

Record the meter pressure and the correction factor required to adjust the reading to m³ under standard pressure. This data can be collected from the **non-utility metering system** and compared with the **utility metering system** or obtained from the gas supplier.

Note: Validation of the gas meter includes measuring the gas pressure at the meter to calculate the pressure correction factor. The pressure correction factor is used to adjust the volume of gas by the amount it has been compressed to accurately calculate the energy content.

$$\text{Pressure Correction Factor} = \frac{\text{Measured pressure (absolute)}}{\text{Atmospheric pressure}}$$

The meter pressure and pressure correction factor must be recorded for non-utility gas meter inclusions.

All readings and any adjustments must be documented using the meter **validation** template in Appendix A.

6.3.3 Remote Meter Reading Systems

Note 1: Remote Meter Reading Systems (RMRS) are used to read the meters from a remote location. They are used to simplify the reading process, or because of accessibility issues with manually reading a meter. **RMRSs** are common for both electricity, gas and water metering.

The **RMRS** can record the consumption of the meter by counting a pulse output or through a protocol that directly reads the meter register. The connection to the meter can be through a hard-wired, wireless or radio frequency connection.

Most remote gas and water reading systems use pulse output type meters, either hard-wired or via radio frequency transmitters. Electricity meters use either pulse output or direct reading of metering consumption.

The **RMRS** can be part of an existing Building Management System (BMS) or a dedicated system.

All **Remote Meter Reading Systems (RMRS)** connected to **non-utility metering systems** require **validation** to ensure the final consumption amount is correct. This must be conducted by a competent person with an understanding of the meters and the **RMRS** to ensure the meter data is correctly interpreted. At minimum, the person must:

- a) Confirm that consumption on the **RMRS** corresponds to meter readings as measured at the meter; and
- b) Take a minimum of two readings at different time periods and document the results. For each time period, a reading from both the **non-utility metering system** and the corresponding **RMRS** is to be taken simultaneously.
- c) Undertake the following for an **RMRS** used for counting pulses from a meter:
 - 1) If an on-board counting device is present, the **RMRS** and the on-board counting device must be read during the site inspection. The consumption on the meter face must be shown to correlate to the accumulated pulse counting on the **RMRS** over the same period.
 - 2) If an on-board counting device is not present, the **RMRS** and the metering system must be read during the site inspection. Interval data taken from the **metering system** must be shown to correlate to the pulse counting on the **RMRS**.

Note 2: For **RMRS** used for counting pulses from a meter without an onboard counting mechanism, it is considered good practice to undertake a validation check multiple times over the course of a **rating period** to ensure the system is operating correctly.

All readings and any adjustments must be documented using the meter **validation** templates in Appendix A.

If there is little or no consumption during the testing period, the time for taking the second reading should be extended until reasonable consumption is recorded.

Where the results identify a discrepancy between the **non-utility metering system** and the **RMRS**, the **RMRS** must be adjusted and at least two more readings taken to confirm the consumption measurement is the same.

Note 3: It is considered good practice to validate a **metering system** at the start of a **rating period** to ensure the data generated in the **rating period** is valid.

6.3.4 Validation frequency for all metering

6.3.4.1 Rating application submitted through NABERS Perform platform

This section applies where a rating is submitted through NABERS Perform as the **NABERS rating input form**.

Note 1: NABERS Perform is the new online platform developed by the **National Administrator** that will consolidate the functions of NABERS Members and NABERS Rate. This new platform also allows **Assessors** to check the previous validation status of **non-utility metering systems** within a premises. It is the intent of the **National Administrator's** that future rating applications will be submitted through this new online platform.

Note 2: **Assessors** are responsible for ensuring the veracity of all **validation** information included in the rating application. This includes obtaining and retaining required evidence, including for those which are pre-filled by the NABERS Perform platform. Previous validation information pre-filled by the platform should not be relied upon as the sole evidence that validation has been undertaken on a meter.

Assessor must ensure that all **non-utility metering systems** are validated in accordance with the following frequencies:

- a) Premises' first rating on NABERS Perform: 10 % of each type of meter listed in Section 6.2.1 must have been validated within the last 10 years;
- b) Premises' second rating on NABERS Perform: 50 % of each type of meter listed in Section 6.2.1 must have been validated within the last 10 years; and
- c) Premises' third rating on NABERS Perform and subsequent ratings onwards: 100 % of each type of meter listed in Section 6.2.1 must have been validated within the last 10 years.

Example 1:

A previously unrated premises submits a rating application in June 2021 through NABERS Perform.

As this is the first rating to be submitted on NABERS Perform, 10 % of each type of meter listed in Section 6.2.1 must have been validated within the last 10 years.

Example 2:

A premises, which was rated once before on NABERS Perform, submits a rating application in March 2022 through NABERS Perform.

As this is the second rating to be submitted on NABERS Perform, 50 % of each type of meter listed in Section 6.2.1 must have been validated within the last 10 years.

Example 3:

A premises, which has been rated five times on NABER Rate, submits a rating application in June 2021 through NABERS Perform for the first time.

As this is the first rating to be submitted on NABERS Perform, 10 % of each type of meter listed in Section 6.2.1 must have been validated within the last 10 years.

Where a **non-utility metering system** requires adjustment, see Section 6.4.

6.3.4.2 Rating application submitted through NABERS Rate

This section applies where a rating is submitted through NABERS Rate as the **NABERS rating input form**.

If **validation** of **non-utility metering systems** is required, the **Assessor** must randomly select at least 10 % of each of the following types to be validated each year:

- a) Meters with a Current Transformer (CT);
- b) Gas meters; and
- c) Meters connected to a **Remote Meter Reading System (RMRS)**.

Assessors must not select a non-utility meter that has previously been validated within the last 10 years if—

- 1) the **Assessor** has conducted a rating on the premises previously, or
- 2) information on previous meter validation is available.

Where a **non-utility metering system** requires adjustment, see Section 6.4.

For documentation requirements, see Section 9.5.2.

6.3.4.3 Co-assess rating applications

For **co-assess** applications, the requirements in Section 6.3.4.2 apply across the whole application, and not to each individual rating.

6.3.5 Standard for acceptable data

The **Assessor** may only accept evidence of **validation** of a **non-utility metering system** in the form of a certificate of currency or other written evidence that demonstrates the following:

- a) Confirms that a **metering system** requiring **validation** has been checked in accordance with this Chapter, and found to be correctly recording consumption; and
- b) Confirms that the check the date of validation took place within the last 10 years; and
- c) Applies to the present condition and configuration of the **metering system** without any alteration; and
- d) Provides details of the **validation** performed.

6.4 Adjustments resulting from validation checks

Where a **non-utility metering system** has been found to require adjustment as a result of **validation** checks, the **Assessor** must investigate the type of fault and the consumption data. This investigation will determine whether it is possible to accurately calculate (not estimate) the correct values for the consumption data from the **non-utility metering system**. If adjustment is found to be needed, the following requirements apply:

- a) All **metering systems** that have never been validated, or have no proof of being validated, must be validated so as to ensure that correct data is collected in the 12-month period before the next NABERS Energy or Water rating. In this case, the **Assessor** cannot follow the schedule in Section 6.3.4.

- b) The **Assessor** must determine any correction to be applied to the data collected from the **metering systems** which are found to be incorrect; otherwise the data from the meter cannot be used and the rating cannot proceed.

Note: Meters validated within the last 10 years and under previous versions of the **Rules** do not have to be re-validated under this version of the **Rules**.

All adjustments to **metering systems** must be done by appropriately qualified and licensed persons according to the applicable standards and procedures that apply within that jurisdiction for the equipment.

The rating can proceed where the **Assessor** can calculate the correct values for the consumption data. The **Assessor** must retain full documentation of the error found, the incorrect records from the **metering system**, and the calculations used to correct the data for audit.

In the absence of any other evidence, a correction must be based on the assumption that the error in the **metering system** is applied to all data collected for the current rating assessment.

Example: If the CT ratio for an electricity meter was out by a factor of +20 %, the overall electricity consumption data for that meter must be corrected by -20 %. Similarly, if the CT wiring of an electricity meter was incorrect but the consumption for each phase was recorded by the meter, this can be used to reconstruct the actual consumption and the reconstructed data can be used as **acceptable data**.

However, consumption data cannot be reconstructed if the CT wiring of an electricity meter was incorrect and the meter also did not record the energy consumption for each phase.

Where it is not possible to calculate the correct values from incorrect **metering system data**, then—

- 1) for data relating to exclusions, the rating can proceed if the consumption is not excluded from the rating, or
- 2) for data relating to inclusions, the rating can proceed if the consumption is an **acceptable estimate**, created using the method in [Chapter 7](#).

If neither of these options are possible, the rating cannot proceed, and the premises cannot be rated until a full **rating period** of accurate data has been obtained.

For documentation requirements, see [Section 9.5.3](#).

7 Small end use estimation and batch supplies

7.1 Summary

This chapter focuses on **Step 7** of **Table 1.1**:

*Calculate the consumption from any small **end use** estimations and batch supplies.*

For documentation requirements, see Section 9.6.

7.2 Methods for estimating small amounts of data

7.2.1 Including small un-metered electricity uses

A small amount of un-metered electricity from equipment can be included in the **acceptable estimates**, and therefore can be added to the **potential error**. This may be necessary where an un-metered item is required for inclusion under the energy coverage requirements.

This method applies to inclusions only. It must not be used for exclusions or where acceptable metered data is available for the equipment.

Large equipment or a high number of small pieces of equipment may not fit within the **potential error**. If this occurs, the rating cannot proceed until appropriate metering is installed and acceptable energy use data is available to cover the **rating period**.

Electricity use is estimated using the following procedure:

- a) Identify all un-metered equipment or plant to be estimated.
- b) Determine the power consumption in kW at maximum capacity from nameplate data or equipment specifications.
- c) Calculate the annual hours – typically 24 hours a day. Some equipment may modify the annual hours as they are either on timers or demand-based equipment. **Assessors** must provide full justification for any reduction in hours.
- d) Determine an appropriate duty cycle based on the annual hours as determined in c) for the equipment from suitable specifications or records.
- e) Estimate the annual energy use as:

$$\text{Energy use (kWh)} = \text{nameplate power (kW)} \times \text{Duty cycle (\%)} \times \text{annual hours (h)}$$

For documentation requirements, see Section 9.6.1.

7.2.2 Office ratings – Water and energy exclusions based on financially reconciled utility costs

7.2.2.1 General

The **Assessor** may estimate the consumption for the **end uses** outside the coverage by applying the fixed proportion to the metered consumption if the following applies:

- a) A **utility metering system** measures the aggregate consumption for a variety of water or energy **end uses**, some inside the coverage of a rating but others outside it; and
- b) **Non-utility metering systems** which only measure those **end uses** inside or those outside the scope of coverage are not present; and
- c) The **utility** costs associated with the meter are allocated to the various **end uses** according to a fixed proportion of the meter readings, as specified in Section 7.2.2.2 below.

The estimated consumption may be excluded from the assessment if it is added to the relevant **potential error**. The estimated consumption may be reduced to meet the **potential error** requirements; however, an estimate must not be increased under any circumstances.

7.2.2.2 Determining the fixed proportion

If Owner/Tenant Agreement (OTA) documentation allocates a proportion of the relevant energy and/or water use, then this proportion must be used in calculating the exclusion. Otherwise, it is acceptable to determine the proportion from documentation, signed by the parties affected by the **end uses** in question. Such documentation must identify the **end use**, the meter to which this it applies, and the proportion of allocation.

If the fixed proportion cannot be determined from acceptable documentation, then no exclusion is allowed, and the entire consumption measured by the meter(s) covering the **end uses** in question must be included in the assessment.

For documentation requirements, see Section 9.6.1.

7.2.3 Office ratings – energy exclusions based on area weighting

The following **Ruling** can only be used for office energy ratings. It cannot be used for office water ratings.

If an energy **end use** within a space could be excluded but is not adequately sub-metered, the **Assessor** may estimate the consumption within that space by undertaking the following:

- a) Taking the ratio of the floor area of the excludable space to the total floor served by the relevant meter(s) (ignoring all spaces not included in office **NLA**); and
- b) Applying the ratio to the total consumption measured by the meter(s).

Note: When calculating the total floor area, **Assessors** are to ignore spaces not included in office **NLA**. This is to prevent unnecessary measurement for an estimate which must already fit within the **potential error**.

The **Assessor** may then exclude the **estimated** consumption, provided that—

- 1) the **Assessor** clearly explains the calculation method used and assumptions made in the submitted documentation, and

2) the **Assessor** adds the estimated consumption to the relevant **potential error**.

If these requirements are not met, then the energy **end use** within the space cannot be excluded.

This method can be used for small retail spaces on the ground floor and for small educational or medical spaces.

For documentation requirements, see Section 9.6.1.

7.3 Batch-delivered supplies

7.3.1 Real consumption measurement

Energy or water supplies delivered in batches, such as diesel fuel, bottled gas, or tank-delivered water, must be included within an assessment if they are within the scope defined for the rating.

Quantity data for batch deliveries must be taken from supplier invoices or similar documentation or from measurement systems (such as meters, scales or unit counting) at the point of delivery.

To ensure that all applicable deliveries during the **rating period** are included in the assessment for a rating, the **Assessor** must identify the supervisors or managers responsible for each batch-delivered source and obtain the following:

- a) A written statement of which deliveries were received during the **rating period** or, if applicable, a statement that there were no deliveries; and
- b) Copies of the bill(s) from suppliers showing the details of the deliveries; and
- c) Descriptions of the measurements and/or methods used.

If all the bills are available, then the total consumption from the bills can be used in the rating.

Note: A single bill is adequate to establish the energy or water supplied by batch to a premises.

For document requirements, see Section 9.6.2.

7.3.2 Calculating an alternative estimate

Where real consumption measurements cannot be determined as per Section 7.3.1, an alternative estimate must be calculated for the quantity of a batch-delivered supply from capacity measurements of storage.

Alternative estimates can be determined through the use of a dip-stick, sight gauges or other methods.

The **Assessor** must ensure that all commissioned tanks servicing the **rated premises** are included in the following measurements, including reserve tanks.

For the purposes of a rating, the order of preference is:

- a) One reading taken at the beginning of the **billing period** and one reading taken at the end of the **billing period**, covering a continuous 365-day period and displaced by

no more than two months from the **rating period**. The difference is then calculated between the two readings in order to determine the alternative estimate.

- b) One reading taken at the end of the **rating period**. The difference is then calculated between the total tank capacity and the reading in order to determine the alternative estimate.
- c) The total capacity of the tanks.

7.3.3 Batch-delivered recycled water (NABERS Water ratings only)

Where recycled water is delivered to storage tanks, the quantity of water must be measured at the delivery to the tank.

Note: Water measured from the discharge will potentially misallocate top-up water as recycled instead of potable.

7.3.4 Batch-delivered water for direct uses (NABERS Water ratings only)

No estimates are allowed where delivered water is used without being stored in a storage tank (e.g. applied directly to landscaping, or used for testing, or direct filling of sprinkler systems, cooling systems etc.).

For document requirements, see Section 9.6.2.

8 Generated energy and captured water

8.1 Cogeneration and trigeneration systems

Separate **Rulings** are available on the NABERS website www.nabers.gov.au for cogeneration and trigeneration systems. For further information please contact the **National Administrator**.

8.2 On-site renewable energy generation systems

A separate **Ruling** is available on the NABERS website www.nabers.gov.au for On-site Renewable Energy Generation (OREG) systems. For further information please contact the **National Administrator**.

8.3 Rainwater capture and recycling

Where water is collected or recycled at a premises (e.g. by rainwater harvesting or by the treatment of waste water), it can be considered a water efficiency measure.

When such capturing/recycling of water is either—

- a) connected on the user side of the meter which records the relevant external water supply, or
- b) used within the premises independently of utility-supplied systems,

a better rating can be expected. No modification of external water source data is required in this situation.

Water exported from the premises cannot be discounted against water used within the premises under any circumstances.

Note: Water pumped onto the premises from an external water source(s) and stored in an on-premises dam or reservoir is not considered a water efficiency measure. In such situations, the water pumped into the premises and associated energy must be appropriately metered and the consumption included in a rating.

For documentation requirements, see Section 9.7.1.

9 Documentation required for accredited ratings

9.1 Summary

9.1.1 Information and documentation requirements

The information in the tables below is required for a rating. Information may be contained in many different formats. The purpose of the documentation is to provide an acceptable, credible source of the required information. In some instances, specific document types may be unnecessary for an individual rating. Or, under different rating circumstances, the specific document types may carry multiple items of information required for the rating. The qualifying factor is not the type of document but that the documentation contains the required information in an acceptable format.

The tables in Section 9.2 onwards are organised based on the divisions of previous chapters (Chapter 3 through to Chapter 8). All the required information should be obtained from the premises owner/manager before a site visit, and then confirmed during the site visit and subsequent assessment. A site inspection helps to verify that the information provided is accurate, current and complete.

Individual ratings may require additional information or documentation depending on the individual circumstances of the **rated premises**.

9.1.2 Documentation retention

Assessors must keep copies of the documentation that contains information on which an assessment is based. Data retained for audit must be in a form which facilitates reviews and makes anomalies easily apparent.

Access to original documents is highly desirable if they are available. Copies of original documents may be used as evidence as long as the **Assessor** is satisfied that they are, or can be verified to be, true and complete records of the original documents or files.

9.2 Documentation required for Chapter 3: Supply points and minimum coverage

Topic	Requirements	Documentation
<p>9.2.1 Conducting a site visit</p>	<p>Section 3.2.1</p>	<p><u>Required Information</u></p> <p>The Assessor must retain evidence that identifies all energy and/or water sources supplied to the premises, shared services or facilities. Notes and photos must be kept as evidence of their site visit, and all information available relating to end uses, sources and meters relevant to the inspection must be collected.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as supporting evidence can include:</p> <ul style="list-style-type: none"> a) Single line diagrams and/or metering schematics; b) Site Photos; c) Video recordings; d) Assessor site notes and other relevant documents.
<p>9.2.2 Unmetered sources</p>	<p>Section 3.2.2</p>	<p><u>Required Information</u></p> <p>The presence of any unmetered energy or water sources must be checked during the site inspection and recorded by the Assessor in their site notes. The Assessor must explain how any unmetered sources are treated within the rating and how they relate to the minimum energy or water coverage.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as supporting evidence can include:</p> <ul style="list-style-type: none"> a) Single line diagrams and/or metering schematics; b) Photos; c) Video recordings; d) Assessor site notes and other relevant documents.

<p>9.2.3 Minimum energy and water coverage required</p>	<p>Section 3.3.1</p>	<p><u>Required Information</u></p> <p>The Assessor must retain evidence that—</p> <ul style="list-style-type: none">a) Confirms the minimum coverage requirements have been met;b) Identifies all supply points and confirms how each of the required end uses are covered by the supply points; andc) Maps the distribution of energy and/or water through the premises, including at the main switchboards and distribution boards throughout the premises. <p><u>Documentation Examples</u></p> <p>Documents that can be used as supporting evidence can include:</p> <ul style="list-style-type: none">a) Single line diagrams and/or metering schematics;b) Photos;c) Assessor site notes and other relevant documents. <p>Note: Existing diagrams and schematics that have been marked up by hand are acceptable.</p>
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<p>9.2.4 Checks of sources and supply points</p>	<p>Section 3.3.2 Section 3.3.3</p>	<p><u>Required Information</u></p> <p>The Assessor must retain evidence that confirms any source or end use to be excluded from the rating and substantiate the grounds for the exclusion.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as evidence that confirms sources and supply points:</p> <ul style="list-style-type: none">a) A single document that list of sources/supply points to the building with notes to confirm whether they are included or excluded. This document may be a marked up—<ul style="list-style-type: none">1) single line diagram,2) metering schematic, or3) reticulation diagram. <p>Documents that can be used as evidence supporting the grounds for exclusion of supply points can include:</p> <ul style="list-style-type: none">b) Site photos;c) Assessor site notes; andd) Other relevant reticulation documentation. <p>Note: It is acknowledged that access to and labelling of distribution boards may not always be sufficient to fully substantiate the grounds for exclusion of a supply point. In these cases, the Assessor may need to make educated assumptions regarding coverage of individual distribution boards. The basis of these assumptions should be fully documented. If an Assessor is uncertain, they should contact the National Administrator.</p>
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<p>9.2.5 Confirmation of metering systems</p>	<p>Section 3.4.1</p>	<p><u>Required Information</u></p> <p>The Assessor must retain evidence of the location and type of all utility and non-utility metering systems used in the rating.</p> <p>Note: This information is required to satisfy the requirements of the Rules. If the Assessor is unable to document it based on their site observations then it is expected that a third party would be engaged by the building owner to draft a single line diagram, metering schematic or reticulation diagram.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as supporting evidence can include:</p> <ul style="list-style-type: none">a) Site photos;b) Assessor site notes; andc) Reticulation documentation, including single line diagrams and metering schematics. <p>Information on meter location should be mark-up (by hand or otherwise) of the meter identification used when entering the metering system into the NABERS rating input form.</p> <p>Information on meter types, as listed in those listed in Section 3.4 (e.g. cumulative, non-cumulative, soft, virtual or high voltage), should be recorded in the site notes.</p> <p>Note 1: It is sufficient for the Assessor to confirm “all non-utility metering systems used in the rating are cumulative meters” in their site visit notes.</p> <p>Note 2: Where no documentation is available for a metering system, the Assessor must document this information (by hand or otherwise), to the best of their knowledge.</p>
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<p>9.2.6 High-voltage electricity metering</p>	<p>Section 3.4.5</p>	<p><u>Required Information</u></p> <p>The Assessor must retain evidence of any LV meters used in place of utility HV meters and justification of replacement.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as evidence of the locations where LV meters are used can include:</p> <ul style="list-style-type: none">a) Single line diagrams;b) Metering schematics; andc) Reticulated diagrams. <p>Note: Where these are unavailable, the Assessor may use documented professional assessment of the metering system configuration based on available documentation and site inspection.</p> <p>For justification of the use of LV meters, an energy balance should be performed and documented.</p>
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9.3 Documentation required for Chapter 4: Utility metering consumption data

Topic	Requirements	Documentation
<p>9.3.1 Data for each utility metering system</p>	<p>Section 4.2 Section 4.3 Section 4.4</p>	<p><u>Required Information</u></p> <p>Billed quantities provided by the utility must be retained by the Assessor as well as evidence of estimated bills (where applicable). The Assessor must document how these estimates were resolved, if this is not evident in the NABERS rating input form.</p> <p>Assessors must also retain evidence of estimated bills (where applicable) and document how these estimates were resolved.</p> <p>Documentation of any related investigation and resolution of anomalies or estimations in the data should be retained by the Assessor if it is not evident from the data entered into the NABERS rating input form.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as evidence of billed quantities can include:</p> <ol style="list-style-type: none"> a) Utility bills for a minimum of 12 months showing consumption records for the billing periods; b) A spreadsheet or other electronic record from the utility showing consumption for the billing periods, with a clear indication of the meter identification and reading, and at least one utility bill that can be shown to reconcile against the electronic data. Where the utility provides an online portal with billing information, actual bills for reconciliation are not required. However, the billing information from the portal must still be retained as documentation.

<p>9.3.2 Accounting for GreenPower™</p>	<p>Section 4.5</p>	<p><u>Required Information</u></p> <p>For the documentation requirements for GreenPower™ Assessors must refer to Section 4.5 of these Rules.</p> <p>Due to the level of detail, this has not been replicated here.</p>
<p>9.3.3 Accounting for recycled water</p>	<p>Section 4.6</p>	<p><u>Required Information</u></p> <p>For externally supplied recycled water, the following information must be retained as evidence:</p> <ul style="list-style-type: none"> a) The source of the water; b) The quantities of the water; and c) Any non-recycled components of the water.

9.4 Documentation required for Chapter 5: Non-utility metering consumption data

Topic	Requirements	Documentation
<p>9.4.1 Data for non-utility metering systems</p>	<p>Section 5.2 Section 5.3 Section 5.4</p>	<p><u>Required Information</u></p> <p>All relevant data from non-utility metering systems as listed in Table 5.2 must be retained for a minimum period of 12 months.</p> <p>Note: Documentation of any related investigation and resolution of anomalies or estimations in the data should be retained by the Assessor if it is not evident from the data entered into the NABERS rating input form.</p>

9.5 Documentation required for Chapter 6: Non-utility metering system validation

Topic	Requirements	Documentation
<p>9.5.1 Meters in embedded networks</p>	<p>Section 6.2</p>	<p><u>Required Information</u></p> <p>Where embedded networks are identified within the rated premises and meters within these are to be treated as a utility metering system, the Assessor must document and retain evidence of licencing of the embedded network operator to sell energy. If the embedded network has a valid exemption and this is pre-approved by the National Administrator, this must also be retained.</p> <p><u>Documentation Examples</u></p> <p>Documents that can be used as evidence proving that the specific embedded network is licensed as an electricity retailer or is exempt from the requirement to be a registered network service provider can include:</p> <ul style="list-style-type: none"> a) Current printout from the Australian Energy Regulator (or similar body) website listing the licenses that clearly specifies the embedded network; b) Written confirmation from the Australian Energy Regulator (AER) or similar body.
<p>9.5.2 Validation of metering systems</p>	<p>Section 6.3</p>	<p><u>Required Information</u></p> <p>The Assessor must retain evidence of validation for each non-utility metering system that is required to be validated.</p> <p>The Assessor must review the evidence of validation provided by the building owner or their contractor and check them for completeness. If the document is completed correctly, and does not contain any obvious errors, then the Assessor can accept the evidence and use it in the rating.</p>

		<p>Note 1: Metering systems which were validated under v3.2 of the NABERS Rules – Energy and Water for Offices can also be considered validated under these Rules.</p> <p>Note 2: See Appendix A for examples of validation records for non-utility metering systems.</p>
9.5.3 Adjustment resulting from validation checks	Section 6.4	<p><u>Required Information</u></p> <p>The Assessor must retain evidence of adjustments made to non-utility metering systems as a result of validation checks.</p> <p>The documentation must outline the following information:</p> <ul style="list-style-type: none"> a) Type of fault found and the consumption data; b) Full documentation of the error found, the incorrect records from the metering system, and the calculations used to correct the data for audit; c) A record of the validation of any altered non-utility metering systems.

9.6 Documentation required for Chapter 7: Small end use estimation and batch supplies

Topic	Requirements	Documentation
9.6.1 Methods for estimating small amounts of data	Section 7.2	<p><u>Required Information</u></p> <p>The documentation the Assessor must retain for instances of end use estimation includes the following:</p> <ul style="list-style-type: none"> a) Small end use electricity inclusions: <ul style="list-style-type: none"> 1) The calculations, including a clear explanation of method and all assumptions; and 2) Photos/records of name plate capacities; and

		<ol style="list-style-type: none"> 3) Documentation used to determine duty capacity if it is not 100 %; and 4) Documentation used to determine annual hours, including full justification for any reduction in hours. <p>b) Exclusions based on financially reconciled utility costs:</p> <ol style="list-style-type: none"> 1) Documentation of any estimated consumption outside the coverage; and 2) Any associated documentation or agreements that outlines mutual agreement signed by the parties affected by the end uses that identifies the proportion of allocation. <p>c) Energy exclusions based on area weighting (Offices):</p> <ol style="list-style-type: none"> 1) Marked up NLA plans and calculations showing the proportion of NLA excluded to arrive at the area weighted excluded energy and metering arrangements associated with the excluded energy.
<p>9.6.2 Batch-delivered supplies</p>	<p>Section 7.3</p>	<p><u>Required Information</u></p> <p>The documentation the Assessor must retain for batch-delivered supplies includes the following:</p> <p>a) Batch deliveries:</p> <ol style="list-style-type: none"> 1) Record of the measurement method or estimation for each source entered into the NABERS rating input form; 2) Supplier invoices or similar documentation which states the quantity data delivered; 3) The written statements of what deliveries occurred during the rating period, including contact details for the responsible person who supplied the information; 4) A description of the measurement or estimation method(s) used; 5) All data used to calculate the measurements or acceptable estimates; and 6) Details of all calculations, including those for alternative estimates.

		<p>b) Batch-delivered recycled water (NABERS Water ratings only):</p> <ol style="list-style-type: none"> 1) Written confirmation from the supplier that states that the water supplied is recycled or reused, whether potable or not, including the percentage of recycled or reclaimed water within the supply; and 2) The source of the water (such as the location of the supplier).
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9.7 Documentation required for Chapter 8: Generated energy and captured water

Topic	Requirements	Documentation
9.7.1 Recycled water	Section 8.3	<p><u>Required Information</u></p> <p>The documentation required for any water collected and/or recycled at a rated premises must include a statement by the Assessor affirming that recycled water has not been deducted from the consumption data.</p>

Appendix A – Non-utility metering system validation records

The following templates are examples of **validation** records for electrical, gas and **RMRS non-utility metering systems**.

Example of a validation record for electrical non-utility metering systems

Validation record for electrical non-utility metering systems

See Section 6.3.1 on requirements for validating electrical non-utility metering systems

Name of premises:		Name of person undertaking validation:	
Address of premises:		Qualification and/or certified licence number:	
		Date of validation:	

ID (meter no. or tenancy / unit no.)	Description (meter brand and type)	Wiring check*	CT Ratio [^] (of the installed CTs)	Where multipliers are applied to a meter reading after output:		Where multipliers are applied to a meter reading prior to output:					
				Does the meter face reading need to be multiplied to calculate the true consumption?	If so, confirm the multiplication factor to be applied to account for the CT Ratio:	Can the meter multiplier be interrogated on the meter face?	If so, record the meter multiplier and attach photographic evidence	If not, use tong-testing or a hand-held meter to compare measured current and meter face current per phase			
								Sub-meter current per phase	Comparison meter current per phase		
				Yes / No		Yes / No		/	/	/	/
				Yes / No		Yes / No		/	/	/	/
				Yes / No		Yes / No		/	/	/	/

* Wiring check including reverse CT connection errors, cross phase CT connection errors, phase sequence connection errors and faulty or missing potential fuses.

[^] The CT ratio is considered to be programmed correctly when the difference between the measured current and the current shown on the meter is no more than 10 %.

Signed to record that the above **non-utility metering systems** are correctly configured and have been validated:

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Example of a validation record for gas non-utility metering systems

Validation record for gas non-utility metering systems

See Section 6.3.2 on requirements for validating gas non-utility metering systems

Name of premises:		Name of person undertaking validation:	
Address of premises:		Qualification and/or certified licence number:	
		Date of validation:	
Non-utility meter ID (meter no. or tenancy / unit no.)	Non-utility meter description (meter brand and type)	Meter pressure (kPa)	Correction factor

Signed to record that the above **non-utility metering systems** are correctly configured and have been validated:

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Example of a validation record for Remote Meter Reading Systems (RMRS)

Validation record for Remote Meter Reading Systems (RMRS)

See Section 6.3.3 on requirements for validating Remote Meter Reading Systems (RMRS)

Name of premises:		Name of person undertaking validation:	
Address of premises:		Qualification and/or certified licence number:	
		Date of validation:	
ID of meter connected to RMRS (Meter no. or tenancy / unit no.)			
Description of meter connected to RMRS (Meter brand and type)			

Remote Meter Reading System readings

Confirmation of the accurate interpretation of system reading the non-utility meter at the same two time periods (where applicable)

Time A		Time B	
Remote Metering Reading System readings	Corresponding manual non-utility meter readings from meter face	Remote Metering Reading System readings	Corresponding manual non-utility meter readings from meter face
Time A:		Time B:	
Time A:		Time B:	
Time A:		Time B:	
Time A:		Time B:	

Signed to record that the above **non-utility metering systems** are correctly configured and have been validated:

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Appendix B – List of changes

The following table records the changes made to v1.2 of *NABERS Rules – Metering and Consumption* in order to produce this minor update (v1.3).

Table B.1: Details of minor update version 1.3

Location	Changes made
1.1	Point c), <i>NABERS The Rules – Energy and Water for Residential Aged Care and Retirement Living</i> , added to list of NABERS Rules texts to be read in conjunction with these Rules.
1.6	First reference updated to new publication of <i>NABERS The Rules – Apportioning Shared Thermal Energy Systems</i> , version 1.0, 2021.
Chapter 2	Gross Lettable Area Retail (GLAR) added.
3.2.1	Clarification at the beginning of a) and b) added: 'but not limited to'. Point d) for residential aged care and retirement living rating added.
3.2.3	Title of text in d) updated to refer to the new Rules concerning thermal metering.
3.3.5	Section on additional checks required for Residential Aged Care and Retirement Living Ratings added.
4.2.3	Information on units for LPG in Table 4.2 simplified and text regarding strata scheme and downstream consumption replaced with a note to assist in the conversion of litres to megajoules.
4.3.5	Cross reference in third paragraph amended.
4.3.8	Application of this section for offices clarified.
6.3.1.4	Cross reference in first paragraph amended.

8.2	Title slightly updated and OREG system specified.
8.3	Note rewritten for clarity.

Contact us

**NABERS is administered by the NSW
Department of Planning, Industry and
Environment**

4 Parramatta Square
12 Darcy Street
Parramatta NSW 2150

T (02) 9995 5000

E nabers@environment.nsw.gov.au

nabers.gov.au