



NABERS Energy and Water for hospitals

Support Document

**Rules for collecting
and using data**

VERSION 1.0 January 2017

Formatting conventions used in this document

Note: Text appearing with a grey tint in the background is explanatory text only.
It is not part of the Rules.

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1 Interpretation

1.1 Objective

The Support Document must be read in conjunction with the NABERS Energy and Water for Hospitals, Rules for collecting and using data.

This document provides additional information for the Assessor to ensure ratings are conducted in a consistent and robust manner. Consistency is important to ensure ratings are comparable and accurately reflect the performance parameters.

While the Rules cover all the important components of the rating, the Assessor is urged to refer to this Support document to ensure compliance with the Rules.

2 Site Inspection

Assessors may be required to inspect the premises to be rated during their assessment, in order to:

- confirm that documentation provided for the assessment is accurate,
- check for inclusions and exclusions from the energy and water coverage (as appropriate)
- visit plant rooms to ensure that all relevant equipment is covered under the meters included in the rating
- resolve any other issues that arise

The site inspection is only required if the Assessor deems it necessary to undertake the above mentioned tasks or if directed by the National Administrator.

The site inspection must take place either within the Rating Period or within a reasonable period of time at the end of the Rating Period. This is to ensure the inspection is relevant to the rating.

If the Assessor cannot physically conduct the site inspection, they may delegate this task to another Assessor. The Assessor submitting the rating is responsible for the accuracy of the data and must make sure that the inspection is conducted in agreement with this section. The Assessor must obtain and retain all the evidence required to prove their assumptions for auditing purposes.

3 Rating Timeline

3.1 Allowance for lodgement

It takes time for the Assessor to complete a rating, so 120 days is given to lodge the rating after the end of the rating period. Ratings lodged after the 120 days will have a reduced validity period to ensure all ratings are based on current data.

The following scenarios illustrate this principle.

3.1.1 Scenario 1

A NABERS Rating is lodged with the National Administrator within 120 days of the end of the rating period. It will be valid for 365 days from the date of certification.

For example:

- The rating period is 1 January 2016 to 31 December 2016.
- The Assessor lodges the rating on 1 February 2017, and the Administrator certifies it on 5 February 2017.
- The rating will be valid for 365 days from the date of certification (5 February 2017).
- It will expire on 5 February 2018.

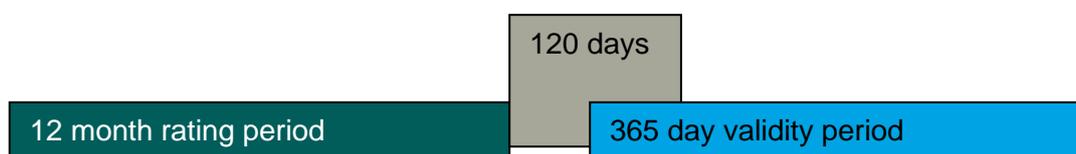


Figure 1: A rating that is lodged within 120 days of the end of rating period.

3.1.2 Scenario 2

A NABERS Rating is lodged with the National Administrator more than 120 days after the end of the rating period. It will be valid for 365 days from the end of the rating period.

For example:

- The rating period is 1 January 2016 to 31 December 2016.
- The Assessor lodges the rating on 1 June 2017, and the Administrator certifies it on 6 June 2017.
- The rating will be valid for 365 days from the end of the rating period (31 December 2016).
- It will expire on 31 December 2017.

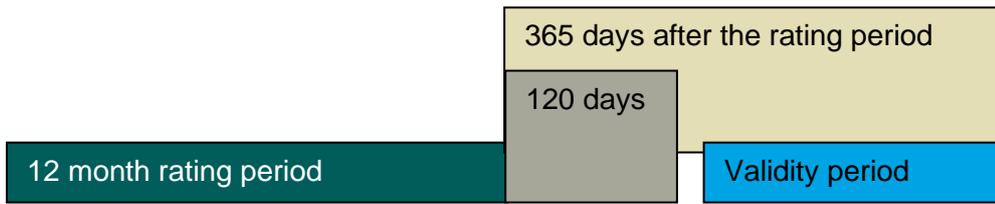


Figure 2: A rating that is lodged after 120 days from the end of rating period.

4 Utility Bill Units and Formats

4.1 Utility units

The units of consumption that Assessors should seek on utility bills are:

Utility	Units
<i>NABERS Energy for hospital ratings:</i>	
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	L (litres) or m ³ (cubic metres).
<i>NABERS Water for hospital ratings:</i>	
Water, all sources	kL (kilolitres)

4.2 Natural gas bill formats

Some natural gas utility bills do not have units listed on them. Assessors must check the units on utility bills to ensure the correct values are used in the rating. The Assessor must check with the utility what the units are and the conversion factors used.

4.3 Energy bill formats

Some electrical energy bills are presented in the following format:

$$\text{Total Energy} = \text{Energy (kWh)} + \text{Losses (\%)}$$

The premises is rated on the energy use of the building. Network distribution losses are removed from the total energy used if it has been included in the total energy use.

5 Non-Utility Meter Records

5.1 Measurements and formats required

The following non-utility meter data should be recorded and retained for audit:

Data required	Acceptable record or format	Examples of unacceptable records
All meters		
Date of reading	Day/month/year	Month/year; day/month; month
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	Meter reading, either direct from the meter or from the metering interface	No meter reading; 'units used' without the actual meter reading
Electricity meters		
Calculated electricity reading	Calculated consumption figure in kWh, based on meter readings and k-factor	Any figure that cannot be derived from the meter reading and k-factor; any figure without units
Gas meters		
Meter pressure	Meter pressure, with units	No meter pressure; no units
Meter pressure correction factor	Meter pressure correction factor	No meter pressure correction factor
Monthly energy density	Energy density of gas (MJ/m ³) from utility bill	No energy density data; no units on energy density data; energy density data not supported by evidence from utility
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		

Data required	Acceptable record or format	Examples of unacceptable records
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

5.2 Non-utility metering system validation

This section deals with non-utility meter reliability, especially electricity meters with current transformers (CTs), and the correctness of Remote Meter Reading Systems (RMRS).

Non-utility electricity meters can vary significantly in their ability to correctly measure energy consumption, especially due to incorrect wiring of the meter and incorrect meter multipliers (CT ratios). RMRS, such as a Building Management System (BMS), can vary significantly in how they interpret the measured consumption of a non-utility meter.

5.2.1 Metering systems requiring validation

All non-utility metering systems should be validated if they include:

- a meter with a current transformer (CT), or
- a gas meter, or
- a Remote Meter Reading System (including an interface to a Building Management System (BMS) used to transmit meter data).

Direct connect meters with no RMRS, and pulse meters with an on-board counting device and no RMRS, are exempt from these requirements.

1 Non-utility electricity meters

All non-utility meters with CTs require validation, and adjustment if necessary, by a licensed electrician or electrical engineer to ensure that the CT ratio (meter multiplication factor) and wiring are correctly configured.

The number of meters to be validated for a rating is as required by the non-utility meter management plan.

2 Non-utility 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 meter to the same pressure conditions used by the utility meter.

The number of meters to be validated for a rating is as required by the non-utility meter management plan.

Validation of the gas meter includes measuring the 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.

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

3 Remote Meter Reading Systems

All Remote Meter Reading Systems (RMRS) connected to non-utility meters selected for validation must also be validated to ensure the final consumption amount used 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:

- Confirm the units of consumption are consistent at the RMRS and the meter face
- Record at least two readings from the meter and corresponding RMRS over the same time period.

4 Pulse meters

Consumption measurements from a pulse meter can only be used in a NABERS rating assessment if the pulse meter has an on-board counting mechanism which provides an absolute count (rather than a pulse to an external device).

The Remote Meter Reading System (RMRS) must be validated in accordance with the non-utility meter validation requirements to ensure it is recording the measured consumption correctly if used to record the pulse meter reading.

Where the pulse meter is manually read, validation is not required.

5.2.2 Utility and Non-utility meters

Utility meters are to be used in preference to non-utility meters. Non-utility meters are used in the absence of utility data or where the data from non-utility meters provides more reliable data, such as when utility reads are too infrequent and require adjustment.

Non-utility meters may also be used where they are the primary source of data rather than using a utility meter and a significant number of exclusions. Where a non-utility meter is used as primary data, it is entered into the rating form as if it were a utility meter. Normal validation requirements for the non-utility meter still apply.

1 Minimum frequency of readings

All non-utility meters used to provide data for energy or water consumption inclusions or exclusions must have a record of readings that is both:

- at least as frequent as the utility meter under which the non-utility meter lies

- at least quarterly (i.e. four readings with an average gap between readings of at least 10 weeks)
- The Assessor must retain this record of readings in case of audit.

6 Consumption Data

6.1 Quality Assurance

6.1.1 Process overviews

Prior to determining the energy and water consumptions, Assessors should comply with the following process, where feasible:

1 Confirm all sources

1. Ask the facility manager to identify all the energy/water supplies for the site, including batch-delivered supplies.
2. Review service drawings, where available, to identify all supply points. For example, single line diagrams, electrical schedules and hydraulic diagrams.
3. Review the site to check for equipment requiring different types of energy/water.
4. Review metering arrangements to ensure that all relevant utility and non-utility meters have been included in the assessment.

2 Assess the accuracy of the assumptions for each source

1. Check if any of the bills for that source were estimated.

Consumption from utility-estimated bills is not considered acceptable data and may not be used for NABERS Energy or Water for hospitals ratings. If a utility bill is estimated, the Assessor must use *Section 6.2.5 Using valid meter readings before and after missing data*.

2. Check the data for anomalies.

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 to investigate any significant anomaly.

This must be completed for utility and non-utility data. The Assessor must contact the National Administrator before proceeding if the anomaly cannot be explained as the rating may not be able to proceed.

3. Check whether the source includes any non-utility meters for inclusion or exclusion of energy or water.

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

4. Check if any other assumptions were made about consumption.

If they were, the Assessor must calculate the total amount of consumption affected by each assumption, and add it to the relevant Potential Error.

For the rating to be permitted, the total Potential Error must not exceed the limits given in the *Rules Document, Section 2.4 Acceptable data and estimates*

6.2 Periods covered by Utility Data

6.2.1 Standard for acceptable data

Utility consumption figures must cover one complete and continuous year, allowing for missing data as specified in the following sections.

1 Stand-alone NABERS Energy or Water for hospitals ratings

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

- Consumption data that account for at least 80% of the rating result (in kWh or kL/m²) must be adjusted to exactly match the Rating Period.
- For a NABERS Energy rating, consumption data must cover a continuous 12-month period that is displaced from the Rating Period by no more than two months.
- For NABERS Water rating each, consumption data must cover a continuous 12-month period that is displaced from the Rating Period by no more than:
 - two months for monthly or quarterly billing periods
 - four months for every six month billing period
- Additional consumption data outside what is required to cover the continuous 12-month period must not be included in the rating (ie including more data points than necessary in a non-utility inclusion/exclusion as this may bias the data).

2 Combined NABERS Energy and Water for hospitals 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 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 following provisions apply:

- The energy consumption data must meet the same criteria as given above for a stand-alone 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 for monthly or quarterly
 - four months for every six month billing period
- Additional consumption data outside what is required to cover the continuous 12-month period must not be included in the rating (ie including more data points than necessary in a non-utility inclusion/exclusion as this may bias the data).

6.2.2 Matching the rating period

Where utility bills or meter recording periods for an energy or water source do not precisely match the start and end of the Rating Period, the Assessor must use the following method:

1. Gather all data for the rating that forms part of the Rating Period.
2. The closest data point that begins before the Rating Period is the first data point used to calculate the continuous 12 month consumption.
3. The relevant energy/water to be included in the rating period is calculated by proportionally including energy by the number of days that the data point is in the Rating Period.
4. All other data points are used until there are 365 days (366 in a leap year) of data. Once there is a continuous 12 months of consumption, no more data may be used. The last data point may be proportionally included based on the number of days in the Rating Period.

Refer to Appendix, *Section 10.1.1 Adjusting consumption data to match the Rating Period* for details of the calculations performed.

6.2.3 Estimating unrecorded consumption

Where there is an unresolvable gap in the primary billing data, (for example, caused by a change of supplier or meter) the Assessor may estimate the unrecorded consumption by interpolating between adjacent bills under the following conditions:

- If the consumption of the relevant source is climate-independent, the interpolation must be based on the average daily consumption figures of the adjacent bills.
- If the utility consumption is climate-dependent, then the interpolation must use a climate-based correlation.
- If a climate-based correlation is used, the Assessor must provide details of the correlation method, the climate data used and explain why the correlation method was chosen.

Regardless of the interpolation method used, the Assessor must add the entire estimate of unrecorded consumption to the relevant Potential Error.

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

6.2.4 Adjusting for gaps at the start or end of the Rating Period

If an energy or water source is missing a valid meter reading at the start or end of the Rating Period (for example, because the bill is missing or the reading was estimated), the consumption for the full Rating Period cannot be calculated using that data alone.

If accurate readings are available from before or after the Rating Period, the Assessor may use the cumulative meter readings to calculate the consumption using the procedure outlined in *Section 6.2.5 Using valid meter readings before and after missing data*.

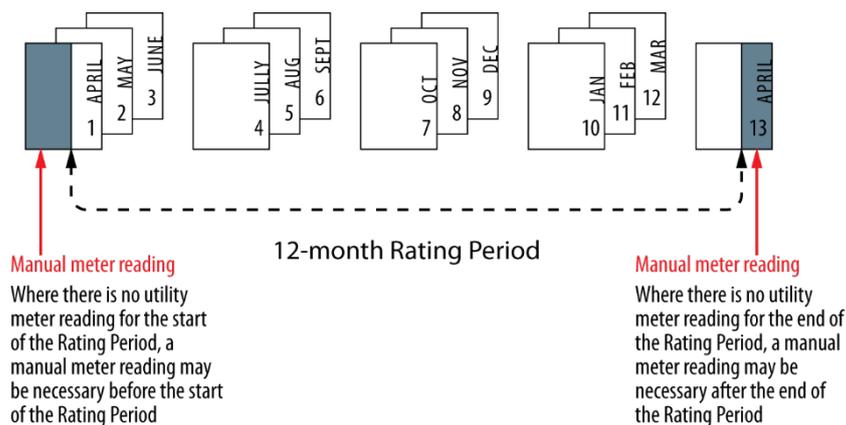
Cumulative reads available before and after must be treated as if it was taken on the first or last day (as appropriate) of the Rating Period if the reading is more than 2 billing periods from the Rating Period. This will minimise the impact of seasonality when the data is apportioned.

Otherwise, the Assessor may use a manual meter reading from before or after the Rating Period to calculate consumption if all of the following conditions apply:

- The Assessor is able to reconcile the manual meter reading with a history of meter readings that measure the consumption to a date after the end of the Rating Period, either as meter readings from utility bills or as manual readings meeting the frequency and data recording requirements of *Section 5 Non-Utility Meter Records*.
- The reading must be treated as if it was taken on the first or last day (as appropriate) of the Rating Period, regardless of the actual period of time between the day of the reading and the start or end (as appropriate) of the Rating Period.
- The reading must clearly align with the consumption history for the meter.

The manual meter reading is acceptable data if these requirements are met.

Figure 1: Adjusting for gaps at the start or end of the Rating Period



6.2.5 Using valid meter readings before and after missing data

Special consideration must be taken if an energy or water source is missing a utility bill, a utility bill has been estimated, or valid meter readings are not available.

The total consumption for the period can be accurately determined using the method described in this section when valid meter readings are available for the period immediately before and immediately after missing or estimated 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.

1 Energy sources other than natural gas

1. Calculate the total metered consumption in the period by using the meter readings before and after the missing or estimated reading(s), and

2. Obtain any relevant factor required to convert the metered consumption to actual consumption and use the actual consumption as the total consumption for the period.

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.

2 Interval data

Some utilities will bill a meter based on a remote meter reading system 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. This method outlines the procedure for using the estimated data.

This method is only usable for utility data and cannot be used for non-utility meters.

The automated system will detect when it does not receive a certain amount of data from the meter and the bill will be listed as an 'Estimate'. Where this is the case, the Assessor may use the following method:

1. 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.
1. Obtain the complete data set of interval readings from the Utility for the estimated month. Identify all the days where there is missing data (this will usually be a '0' read).
2. Remove the entire 24 hour period of any day that has a missing data point. The energy use for these days are to be interpolated using the nearest complete weekdays bounding the missing days. This means that weekend days with missing data will be treated like weekdays.
3. The data is to be entered into the Rating Assessment Form as individual line items for the actual and interpolated values. 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).
4. The interpolated data is added to the Potential Error in the same way as *Section 6.2.3 Estimating unrecorded consumption*.

3 Natural gas

Missing gas consumption can also be determined using meter readings, however additional consideration is required due to the complexities of converting gas meter readings to energy consumption.

Where a bill is missing or estimated but valid meter readings are available before and after the missing period, the gas consumption can be determined by using the following methodology:

1. Calculate the total metered gas flow in the period by using the readings before and after the missing or estimated reading(s).

2. Obtain the correction factor (CF) for the gas meter from:
 - the estimated bill for the period (if available), or
 - the utility bills before or after the missing period, or
 - written documentation provided by the utility.

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.

3. 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:
 - a) written documentation provided by the utility for the period between the two readings, or, if not available
 - b) the average heating value for the period between the two readings, in the case there are utility bills (estimated or actual) fully covering such period, or, if not available
 - c) the following default values must be used for the period between the two readings, depending on the state where the premises are located:

State/Territory	Heating value (MJ/m ³)
ACT	38.3
NSW	38.3
NT	40.5
QLD	39.5
SA	38.3
VIC	38.8
WA	41.5

4. Calculate the gas consumption by using the following formula:

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

where:

R_B and **R_E** = the meter reading at the beginning and end of the period, respectively

CF = the correction factor, and

HV = the heating value (MJ/m³).

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' and the reading for 31 May was '12,150'.

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 (this includes the two estimated bills) was 39 MJ/m³.

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

$$(12,150 - 10,000) \times 1.1 \times 39 = 92,235 \text{ MJ}$$

6.3 Including or excluding consumption

The energy or water use measured for an assessment must include the minimum end uses identified in the Rules Document, *Sections 5.2.1 Required minimum energy coverage and 6.2.2 Required minimum water coverage*.

The following methods of measurement for inclusion and exclusion are permitted in any combination up to the allowable potential error:

- use of a utility meter
- use of a non-utility meter
- batch delivery supply bills in which the supplier states the quantity supplied
- exclusions as described in *Section 6.4 Exclusions based on financially reconciled utility costs*
- estimates as described in *Section 6.5 Estimating small un-metered energy use*
- data and estimates as described in *Section 6.6 Batch-delivered supplies*
- data and estimates as described in *Section 6.7 Thermal energy measurements*.
- data and estimates as described in *Section 6.8 Car Park Energy*

6.4 Exclusions based on financially reconciled utility costs

The Assessor may estimate the consumption for the end uses outside the coverage by applying a fixed proportion to the metered consumption where:

- a utility meter 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
- there is no non-utility meter which only measures those end uses inside or those outside the scope of coverage, and
- the utility costs associated with the meter are allocated to the various end uses according to a fixed proportion of the meter readings.

The estimated consumption may be excluded from the assessment if it is added to the relevant Potential Error.

6.4.1 Determining the fixed proportion

If lease documentation allocates a proportion of the relevant energy 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 tenants affected by the end uses in question, that identifies the end uses and the allocated proportion.

No exclusion is allowed if the fixed proportion cannot be determined from acceptable documentation. In this case, the entire consumption measured by the meter must be included in the assessment.

6.5 Estimating small un-metered energy use

A small amount of un-metered energy from equipment can be estimated for inclusion to meet the minimum energy coverage and enable a rating to proceed.

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

The estimated energy use must be added to the Potential Error. Large equipment or a high number of small pieces of equipment may not fit within the error and if this occurs, the rating cannot proceed until appropriate metering is installed and acceptable energy use data is available to cover the Rating Period.

Energy use is estimated using the following steps:

- 1) Identify all un-metered equipment or plant to be estimated.
- 2) Determine the power consumption in kW at maximum capacity from nameplate data or equipment specifications.
- 3) Determine an appropriate duty cycle for the equipment from suitable specifications or records. For example, the BMS shows the fan in a fan coil unit ran at a maximum of 25% capacity throughout the year. The duty cycle of 25% may be used. The duty cycle must be 100% if there are no suitable specifications or records.
- 4) Calculate the annual hours. The Rated Hours of the building multiplied by 52 weeks (e.g. 50 hours a week x 52 weeks = 2,600 hours a year) may be used if the small end use cannot operate when there are no occupants in the building. Otherwise, assume 8,760 hours a year (24/7 operation).
- 5) Estimate the annual energy use as:

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

Some equipment may modify the annual hours as they are either on timers or demand based equipment. Assessors may use either the Rated Hours as specified in the method above or calculate the annual hours as per the methods below. The nameplate power and duty cycle remain unmodified.

Lighting or other equipment on a fixed timer calculates the annual hours by multiplying the fixed timer amount by the days of occupation. Lighting on a 12 hour per day fixed timer would use 12 hours x days of occupation. Lighting on a sensor with a 10 minute timer would use the Rated Hours as this is not a fixed timer.

6.5.1 Documentation required

The documentation retained for audit must include:

- The calculations, including a clear explanation of method and all assumptions
- Photos/records of name plate capacities
- Documentation used to determine duty capacity if it is not 100%
- Documentation used to determine annual hours

6.6 Batch-delivered supplies

Energy or water supplies delivered in batches, such as diesel fuel, bottled gas, coal, or tank-delivered water, must be included within an assessment if they are within the scope defined in the Rules document, *Section 5 Energy Coverage* or *Section 6 Water Coverage*.

6.6.1 Measurement and estimation

In general, 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:

- a written statement of what deliveries were received during the Rating Period
- copies of the bills from suppliers showing the details of the deliveries
- descriptions of the measurement or estimation methods used.

1 Estimating from a sample of bills

It is acceptable to estimate delivered quantities from a sample of bills when not all bills are available. A written response from a suitable person confirming deliveries with bills for each batch-supplied source is required.

If insufficient bills from the Rating Period are available, then:

- the Assessor may also gather all billing data for the 12 months preceding the Rating Period and if there are then sufficient bills, an estimate can be made
- otherwise, an estimate from capacity measurements must be made as specified below.

The delivery quantities shown on the bills must be converted to an annual consumption estimate: either by averaging for non-seasonal uses, or by use of a climate-based correlation of deliveries against relevant climate data for the Rating Period.

If a climate-based correlation is used, the Assessor must provide details of the correlation method and the climate data used, and explain why the correlation method was chosen.

2 Estimating from capacity measurements

It is acceptable to estimate the quantity of a batch-delivered supply from capacity measurements of on-site storage tanks if:

- there have been no recorded deliveries, and
- the batch-delivered supply represents less than 5% of the total greenhouse gas emissions or water consumption for the premises to be rated.

Acceptable methods are, in order of preference:

1. regular capacity readings to determine consumption
2. one reading taken by dip-stick, sight gauges or other method and the difference between full tank and current level to determine consumption.
3. the total capacity of the tanks.

The Assessor must ensure that all tanks used are included in the capacity measurements, including reserve tanks.

Any deliveries during the year must be added to the estimate.

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

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

6.7 Thermal energy measurements

Some buildings export or import thermal energy using water as a medium. An example is chilled water being pumped from one building to another.

These systems are complex and it is difficult to measure the thermal energy in the water, relate it back to energy input to the thermal plant and calculate the greenhouse gas emissions.

Due to this complexity and because such systems are uncommon, they are treated in a separate document to these Rules entitled *Validation Protocol for Thermal Energy Exclusions*.

6.8 Car Park Energy

6.8.1 Total exclusion

The energy use of lighting and ventilation in car parks used by the hospital may be totally excluded from the rating where:

- the car park is not located on the site of the hospital, or
- both:
 - the ownership and management of the car park are independent of the ownership and management of the hospital to be rated, and
 - there is a separate meter (or group of meters) that covers the entire energy use associated with the car park, but does not cover any other aspect of the building's central services energy use that must be included in the assessment.

Note: There is no total exclusion simply on the grounds that the car park is leased to, or otherwise operated by, a manager separate from the hospital owner or operator.

6.8.2 Proportional exclusion of energy use

Where the hospital does not have use of all of the building's car park, then a proportion of the energy use associated with the non-hospital car spaces may be excluded from the rating in accordance with the following rules:

- 1) Proportional exclusion of car park energy use is only permitted where there is a separate meter (or group of meters) that covers the entire energy use associated with the car park, but does not cover any other aspect of the hospital's energy use that must be included in the assessment.

For example, it is not uncommon for car park metering to include other basement services such as hydraulic pumping. In such cases proportioning is not permitted.

- 2) Where a commercial agreement with one or more third party assigns a proportion of the measured car park energy use, then the share(s) specified in the documentation must be used in the assessment.
- 3) If no specific allocation of the energy use is given in third party commercial agreements, the relevant proportion is calculated by dividing the number of parking spaces allocated to the hospital by the total number of parking spaces.

Where pass cards or keys have been issued to the hospital, the number of parking spaces allocated to the hospital is the greater of:

- the number of physically dedicated parking spaces, and
- the number of pass cards or keys issued (to a limit of the total number of parking spaces).

Dedicated parking space, pass or key allocation data must be sourced from third party commercial agreements.

- 4) If there are no third party commercial agreements available, then it is acceptable to determine the proportions by obtaining documentation signed by third parties that identifies the proportion of allocation.
- 5) If there is no documentation and no third parties are able or willing to identify proportions, then all of the energy use associated with the car park must be included in the assessment.
- 6) Regardless of the method used to proportion the energy use, the maximum that can be excluded is 100% of the measured car park energy usage.

The Assessor must fully document both the method and all data used to proportion car park energy usage.

7 On-site electricity generation

7.1 Cogeneration and trigeneration systems

The Assessor will be required to complete the cogeneration spreadsheet calculator and include the corresponding results in the rating spreadsheet. This will only be required if the cogeneration system exports the electrical and thermal loads. If the entire electrical and thermal generation is consumed by the facility, the Assessor need not undertake any additional analysis.

Where the cogeneration spreadsheet needs to be completed, the Assessor is required to obtain the following information

- Generator fuel consumption by the co/trigen system [MJ]
- Auxiliary electricity used by the co/trigen system [kWh]
- Electricity generation [kWh]
- Heating hot water [kWht]
- Chilled water generation [kWht]
- Electricity from co/trigen plant to Rated Premises [kWh]
- Heating hot water from co/trigen plant to Rated Premises [kWht]
- Chilled water from co/trigen plant to Rated Premises [kWht]

7.2 Renewable on-site generation systems

Where energy is generated for use in the rated premises and is either:

- connected on the user side of the consumption meter which records the relevant external energy supply to the premises, or
- used on site independently of utility-supplied systems

then it will reduce the amount of utility-supplied energy required. This is permitted and is no adjustment to the utility billing data is thus required. On-site renewable energy generation is an efficient mechanism to reduce grid electricity consumption which is why the corresponding usage is not included in the rating assessment.

Externally supplied energy sources (such as gas, fuel oil, or electricity used by heat pumps) used to generate on-site energy must be included within the energy assessment.

Electricity generated inside the rated premises but exported to an external user (such as a nearby building or the electricity grid) does not improve the energy performance of the rated premises. The exported energy cannot be subtracted from the utility-supplied consumption as it has no impact on the energy consumption of the premises being rated.

8 GreenPower™

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, accredited under the National GreenPower Accreditation Program, is considered to be the purchase of a zero greenhouse emission energy source.

8.1 Confirmation of separate purchases

The Assessor must verify that the GreenPower was used in the space to be rated. For assessments where a separate GreenPower purchase was made, the building owner must provide written confirmation that the GreenPower purchase was used for the hospital only.

8.2 Bulk purchases

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

This information must also be replicated on each Rating Assessment Form to allow for cross-checking. Proof of the GreenPower purchase must be supplied with each rating application.

9 On-site water capture and recycling

Where water is collected or recycled at the premises to be rated (for example, by rainwater harvesting, treatment of on-site waste water or recycled reject reverse osmosis water) and is either:

- connected on the user side of the meter which records the relevant external water supply to the premises, or
- used on site independently of utility-supplied systems

then it will reduce the amount of externally supplied water needed. On-site water capture and recycling are efficient mechanisms to reduce external water consumption which is why the corresponding usage is not included in the rating assessment. No adjustment is thus required which means that supplier billing data must be used without modification.

No discount of on-site water use is allowed against water exported from the site, under any circumstances.

10 Appendices

Summary

Appendix A - Calculations

10.1 Appendix A - Calculations

10.1.1 Adjusting consumption data to match the Rating Period

Where utility bills or meter recording periods for an energy or water source do not precisely match the start and end of the Rating Period, an adjustment uses the following procedure:

1. Order the relevant meter records chronologically and number them from 1 to N, discarding any records that fall completely outside the Rating Period.
2. For the **first** and **last** records (numbered 1 and N), only the consumption data that falls within the Rating Period is required. If such a record covers n days for which a total consumption of E_x is measured, but only m days covered by the record fall inside the Rating Period, then the adjusted consumption figure E_x^* for that record is:

$$E_x^* = E_x \frac{m}{n}$$

3. The total consumption **E** for this energy or water source for the full Rating Period is:

$$E = E_1^* + \sum_{i=2}^{N-1} E_i + E_N^*$$

This is the sum of the two adjusted meter records (the first and last) with all the records in between.

In the diagram below, the bills between May and March are included completely. The bills for April at the start and end of the Rating Period are adjusted so that exactly 12 months of data are included in the assessment.

Figure 5: Adjusting consumption data to match the Rating Period

