Consultation Paper: PIAM&V requirements

WHAT

The NSW Government has proposed changes to clause 7A of the Energy Savings Scheme Rule of 2009 (**ESS Rule**). They include a proposed provision for the Scheme Administrator to publish requirements for the Project Impact Assessment with Measurement and Verification (**PIAM&V**) method.

We have drafted a set of requirements that must be met by accredited certificate providers (**ACP**s) who want to create ESCs using the PIAM&V method.

WHY

This draft has been developed in response to feedback received from ACPs requesting additional guidance on the application of the PIAM&V method. The draft PIAM&V Method Requirements are consistent with and complement the provisions of, the ESS Rule. The draft has been developed to facilitate consultation with stakeholders, and to increase clarity and certainty, and reduce potential regulatory risk regarding the application of the PIAM&V method.

WHO

We are inviting views on the draft requirements from stakeholders including:

- ACPs
- Measurement and Verification Professionals (**M&V Professionals**)
- PIAM&V auditors, and
- other interested parties.

HOW

Stakeholders should send their submissions to ess@ipart.nsw.gov.au with the subject line "Draft PIAM&V Method Requirements".

The draft PIAM&V Method Requirements contains text boxes, which provide context and include questions that stakeholders are encouraged to address in their submissions.

Stakeholders are also invited to attend a workshop in which we will seek views on the draft PIAM&V Requirements.

WHEN

The workshop will be held on **Monday, 11 November 2019,** and submissions will close on **Friday, 22 November 2019.**

WHERE

The draft PIAM&V Method Requirements are attached to this consultation paper.

The Stakeholder workshop will be held at:

Corinthian Room
SMC Conference and Function Centre
66 Goulburn Street, Sydney, NSW

WHAT NEXT

We will consider the submissions and the feedback received at the workshop in finalising the PIAM&V Requirements.

We expect to publish the final Requirements in December 2019.

Consultation Paper on PIAM&V Method Requirements

Consultation Guidance:

This document contains the draft Project Impact Assessment with Measurement and Verification (**PIAM&V**) Method Requirements (**PIAM&V Method Requirements**) along with consultation guidance and questions.

The draft PIAM&V Method Requirements have been developed in response to feedback received from Accredited Certificate Providers (**ACP**s) requesting additional guidance on the application of the PIAM&V method (clause 7A of the *Energy Savings Scheme Rule of 2009* (**ESS Rule**)). This consultation draft has been developed to facilitate consultation with stakeholders, and to increase clarity and certainty, and reduce potential regulatory risk regarding the application of the PIAM&V method.

The draft contains text boxes, such as this, to provide explanations and includes questions that stakeholders are encouraged to address in their submissions. The text boxes will be removed from the final PIAM&V Method Requirements.

The draft PIAM&V Method Requirements are consistent with the ESS Rule in its current form, aim to provide clarity and complement the provisions of the ESS Rule. The two exceptions to this are Sections 1 and 4. These contain draft requirements related to changes to clause 7A of the ESS Rule proposed by the Department of Planning, Industry and Environment (**DPIE**)[1]. DPIE has also proposed transitional arrangements regarding these draft changes.

Current operation of clause 7A.16 of the ESS Rule

Currently, clause 7A.16 of the ESS Rule provides for the Scheme Administrator to publish Guides (**PIAM&V Method Guides**) that detail acceptable and unacceptable approaches to meet the requirements of clause 7A of the ESS Rule.

Proposed changes to clause 7A.16 of the ESS Rule

The NSW Government has proposed changes to clause 7A.16 of the ESS Rule to emphasise that ACPs must comply with PIAM&V method requirements published from time to time by the Scheme Administrator. The proposed changes provide that the PIAM&V Method Requirements must complement and/or supplement the requirements of clause 7A of the ESS Rule and must be consistent with the ESS Rule.

If this change to the ESS Rule is made, the draft PIAM&V Method Requirements should be read in conjunction with the PIAM&V Method Guide.

Nature of changes to the PIAM&V Method Guide

Whether the change to the ESS Rule occurs or not, we propose to publish an update to the PIAM&V Method Guide. This will follow our assessment of the outcomes of the consultation process.

If this change to the ESS Rule is made, we may need to remove certain parts of, and make other consequential changes to the PIAM&V Method Guide as a result of the publication of any final PIAM&V Method Requirements. If this change to the ESS Rule is not made, we may add to our existing Method Guide to provide the needed clarity on the application of the PIAM&V method.

Any future changes to the PIAM&V Method Requirements will be subject to IPART's established consultation process which is available at:
https://www.ipart.nsw.gov.au/Home/Contact-Us/Make-a-Submission/Submissions-Policy

1. https://energy.nsw.gov.au/media/1786/download

Note: In the final version of the PIAM&V Method Requirements, we would include a clause 1 covering the legislative background to the PIAM&V Method Requirements and other legal matters.

1. Required records

Consultation Guidance:

Record keeping requirements for all methods are outlined in the Record Keeping Guide. The PIAM&V Method Guide sets out additional evidence requirements relevant to the PIAM&V method. Proposed changes to clause 7A of the ESS Rule would require additional records to be commissioned by ACPs. This section sets out both the existing evidence requirements and the proposed evidence required to demonstrate compliance with the proposed change to clause 7A.5(h) of the ESS Rule.

The proposed additional requirement is for a Preliminary Measurement and Verification Professional Report (**Preliminary M&V Professional Report**). While this is a separate report, it is expected to be based on the existing Measurement and Verification Professional Report template, and would be limited to an assessment of the suitability of the Measurement Procedures for the baseline period only (see draft Section 4 below). If any changes need to be made to the baseline Measurement Procedure parameters after the Preliminary M&V Professional report is completed, this may be reflected in the final M&V Professional report with appropriate explanatory reasoning.

In relation to the PIAM&V Method, an Accredited Certificate Provider must prepare and/or commission the following documents for each Implementation:

(a) Measurement and Verification Plan (**M&V Plan**) with a sampling plan (if applicable);

(b) Measurement and Verification Report (**M&V Report**);

(c) Preliminary Measurement and Verification Professional Report (**Preliminary M&V Professional Report**);

(d) Measurement and Verification Professional Report (**M&V P Report**); and

(e) Spreadsheets or tools that develop energy models and calculate Energy Savings.

Note: An example M&V Plan is provided in the PIAM&V Method Guide which sets out the typical information requirements.

Question 1

What types of supporting evidence and explanatory reasoning should be included in the Preliminary M&V Professional Report?

2. Measurement Period where energy consumption is subject to seasonal variation

Consultation Guidance:

The Measurement Period is defined in clause 7A.5(f1) of the ESS Rule. The following requirements are consistent with this clause and have been developed to provide ACPs with clarity on how to set the Measurement Period to ensure that it meets the requirements of the ESS Rule.

Note: Clause 7A.5(f1) of the Rule states that when measuring energy consumption, Independent Variables, Site Constants or any other relevant parameter, the Accredited Certificate Provider must:

ensure that the Measurement Period includes any time periods during which Independent Variables may reasonably be expected to lead to the Implementation increasing electricity consumption or Gas consumption or both.

2.1 An Accredited Certificate Provider must demonstrate that the:

(a) Baseline Energy Model; and

(b) Operating Energy Model,

both include at least one full operating cycle of the End-User Equipment (**EUE**).

2.2 An operating cycle means the time period for EUE within the measurement boundary required to witness one complete cycle of energy usage patterns due to the effects of key Independent Variables,[2] which covers all values of energy consumption throughout the operating cycle, from minimum to maximum.

2.3 Evidence provided in support of an operating cycle must demonstrate energy usage patterns over at least one complete operating cycle and how the relevant variables are captured in the Measurement Period.

2.4 Where the energy consumption of the EUE is affected by weather, a full operating cycle is typically described by 12 months of data. Where an Accredited Certificate Provider elects to use less than 12 months of data for the Measurement Periods for the Baseline Energy Model and the Operating Energy Model, the Accredited Certificate Provider must demonstrate that the shorter Measurement Period represents the full operating cycle for the EUE.

2.5 Changes to EUE within the measurement boundary following the Implementation of the Recognised Energy Saving Activity (**RESA**) is not justification for the use of a shorter Measurement Period. If changes within the measurement boundary have occurred (for example the addition of new EUE), a non-routine event may be used to adjust the energy consumption to account for the effect of the change in EUE, provided the percentage of time excluded is less than 20% of the Measurement Period.

2.6 When developing the Measurement Periods for the Baseline Energy Model and the Operating Energy Model, Accredited Certificated Providers must take steps to reduce statistical bias, including by selecting Measurements Periods which:

2. Measurement and Verification Operational Guide Office of Environment and Heritage (pg 29)

(a) are the same length (for example 12 months); and

(b) are integer multiples of the operating cycle, not fractions of the operating cycle.

Note: The OEH Measurement and Verification Operational Guide (**OEH M&V Guide**) has information on operating cycles for different EUE.

Question 2

What types of evidence and justification can be provided to demonstrate that a proposed Measurement Period covers the full operating cycle for implementations where energy consumption is affected by weather?

3. Normal operating conditions

Consultation Guidance:

Independent Variables and Site Constants for the Baseline and Operating Energy Models must be measured under normal operating conditions in accordance with Clauses 7A.3(a) and 7A.4(a) of the ESS Rule. These requirements are consistent with the ESS Rule and have been developed to clarify the factors that should be considered when defining normal operating conditions including the treatment of non-routine events.

Note: Clauses 7A.3(a) and 7A.4(a) of the Rule state that a Baseline Energy Model and an Operating Energy Model must estimate either electricity consumption or Gas consumption (in the absence or after an Implementation, as relevant) and must:
be dependent on Independent Variables and Site Constants, where relevant, that are established by measurements taken under normal operating conditions in accordance with clause 7A.5 of this Rule. [emphasis added]

3.1 Measurements of the Independent Variables and Site Constants must:

(a) take into account the context of the EUE within the Site, e.g. refrigeration located within an air-conditioned building is less likely to be affected by ambient conditions than refrigeration in an unconditioned space;

(b) be made under normal operating conditions; and

(c) exclude any non-routine events.

3.2 Non-routine events:

(a) must be recorded in the M&V Plan; and

(b) cannot represent more than 20% of the duration of the Measurement Period.

3.3 An Accredited Certificate Provider must define the normal operating conditions in the M&V Plan for the measurements taken. The definition of normal operating conditions must include:

(a) that the EUE is properly installed, maintained and used in accordance with the original equipment manufacturer's instructions;

(b) the normal hours of operation of the EUE;

(c) weather conditions (if applicable); and

(d) normal production levels.

Question 3
What other factors should be considered when defining normal operating conditions?

4. Engaging an M&V Professional

Consultation Guidance:

The NSW Government has proposed changes to clause 7A.5(h) of the ESS Rule requiring that an ACP engages an M&V Professional early in a project to ensure that the modelling approach meets the requirements of clause 7A of the ESS Rule. It has also proposed transitional arrangements regarding these draft changes. The following sets out the proposed change and the proposed requirements to facilitate this change.

Note: DPIE has proposed changes to clause 7A.5(h) of the Rule to ensure that an ACP engages an M&V Professional early in the project to ensure that the modelling approach meets the requirements of clause 7A of the Rule. This section sets out the proposed PIAM&V Requirements which would complement these changes to the Rule.

4.1 An Accredited Certificate Provider must provide the written explanatory reasoning required under clause 7A.5(h) of the Rule in the form of a Preliminary M&V Professional Report which is consistent with any template Preliminary M&V Professional Report Published by the Scheme Administrator.

4.2 The Preliminary M&V Professional Report must:

(a) be signed and dated by an M&V Professional[1] and the Energy Saver; and

(b) be based on a review of the M&V Plan and include written explanatory reasoning of the appropriateness of the following for the Measurement Period for the Baseline Energy Model:

(i) Define the Measurement Period so that it consists of a start date and an end date and, if appropriate, a time of day for each of those dates;

(ii) Define the Measurement Period so that it will have, in relation to the Baseline Energy Model, an end date that occurs before the Implementation Date;

(iii) Define the frequency of measurements of the Measurement Period;

(iv) Define which items of EUE will have their electricity consumption, Gas consumption or both, measured (the measurement boundary) – noting that the measurement boundary would be the same for the operating Measurement Period;

(v) Specify the measurement equipment (meters), or other sources of measurement;

[1] The Preliminary M&V Professional Report and M&V P Report do not need to be signed by the same M&V Professional.

(vi) Define the calibration procedures, accuracy and precision of such measurement methods;

(vii) the Independent Variables and Site Constants;

(viii) the baseline Measurement Period, that is, that the selected Measurement Period represents a full operating cycle and includes periods for which Independent Variables may reasonably be expected to lead to the Implementation increasing electricity consumption or Gas consumption or both;

(ix) the measures in place to record and exclude non-routine events from the baseline Measurement Period. These measures must include options to ensure that non-routine events represent less than 20% of the duration of the Measurement Period.

4.3 The M&V P Report must be signed by an M&V Professional and refer to and consider both the Preliminary M&V Professional Report and M&V Report.

Question 4

What should be addressed by the explanatory reasoning in the Preliminary M&V Professional Report to demonstrate the appropriateness of factors related to the baseline Measurement Period?

5. Measurement boundary

Consultation Guidance:

The requirements for setting the measurement boundary are set out in clause 7A.5(d) of the ESS Rule and are described in the PIAM&V Method Guide. The following section provides clarification on documenting the EUE within the measurement boundary and the use of utility meter data.

Note: Clause 7A.5(d) of the Rule states that when measuring energy consumption, Independent Variables, Site Constants or any other relevant parameter the Accredited Certificate Provider must:

define which items of End-User Equipment will have their electricity consumption, Gas consumption, or both, measured (the measurement boundary).

5.1 The M&V Plan must document all items of EUE that are included in the Implementation within the measurement boundary.

5.2 An Accredited Certificate Provider must ensure that any Energy Savings measured by the utility meter have occurred as a result of the Implementation.

Note: Common examples of Implementations to which this requirement relates, include:

(a) where an Accredited Certificate Provider is using a whole-of-site approach; and

(b) if there are multiple EUEs measured by the utility meter that are not subject to the Implementation.

5.3 If Energy Savings cannot be isolated as occurring as a result of the Implementation, an Accredited Certificate Provider must:

(a) use sub-metering; or

(b) change the RESA definition to include all activities at the Site (which may in turn require an alternative modelling approach and additional time for the collection of data).

Question 5

What options (other than sub-metering), that can be supported by acceptable evidence, are available to ACPs to define the measurement boundary?

6. Independent Variables

Selecting Independent Variables

Consultation Guidance:

Requirements for the selection and relevance of Independent Variables are set out in the ESS Rule. The following section is consistent with, and complements, the ESS Rule and provides clarification on the selection of Independent Variables to ensure that the modelling meets the requirements of the ESS Rule. Key statistical tests for the relevance of the Independent Variables, which are currently set out in Appendix D of the PIAM&V Method Guide, are proposed to be included in the PIAM&V Method Requirements.

Note: Clause 10.1 of the Rule defines an Independent Variable as:
a parameter that varies over time, can be measured, and affects the EUE's energy consumption for the purposes of clause 7A of this Rule.

6.1 An Accredited Certificate Provider must ensure that the selected Independent Variables affect the energy consumption of the EUE that is upgraded.

Note: For example, the electricity consumption of lighting is not affected by temperature, therefore temperature would not be an appropriate Independent Variable for a lighting project, but daylight hours, for example, could be used to support the modelling.
Examples of common Independent Variables for different EUE and applications are provided in the OEH M&V Guide.

Relevance of Independent Variables

Note: Clauses 7A.3(a) and 7A.4(a) of the Rule require that a Baseline Energy Model or an Operating Energy Model must be dependent on Independent Variables and Site Constants, where relevant, that are established by measurements taken under normal operating conditions in accordance with clause 7A.5 of the Rule.

6.2 Each Independent Variable must meet the thresholds of statistical good fit in Table 1.

6.3 An Accredited Certificate Provider must keep documentary records demonstrating that the threshold is met using Regression Analysis.

Table 1	
Modelling criteria	**Threshold**
t-statistic of Independent Variable	Absolute value > 2
Adjusted R^2 (coefficient of determination)	>0.75

Question 6
What other modelling criteria and corresponding thresholds should be considered?

Question 7
Is there supporting evidence that can justify different thresholds than those provided in Table 1 and, if yes, what is that evidence?

7. Accuracy Factor

Consultation Guidance:

The ESS Rule requires that ACPs calculate the relative precision of the energy savings to determine an Accuracy Factor to be applied to the calculation of energy savings. Errors may occur from insufficient data, either in terms of quantity or time, which are not adequately accounted for in the modelling. The following section is consistent with the ESS Rule and provides clarification on the types of error that must be taken into account when determining the relative precision of energy savings.

Note: Clause 7A.10 of the Rule states that the Accuracy Factor in relation to Equations 7A.1 and 7A.3 is between 1 and 0, and

a) is either
   i. the value corresponding to the energy model type and relative precision of the Electricity Savings or Gas Savings estimate at 90% confidence level as listed in Table 23 of Schedule A; or
   ii. determined by another process as Published by the Scheme Administrator

7.1 In applying clause 7A.10 of the Rule, an Accredited Certificate Provider must take into account all material sources of error associated with the development of the model when calculating the relative precision of the Electricity Savings or Gas Savings estimate including, but not limited to:

(a) Data uncertainty, that is the uncertainty generated from insufficient data either in terms of quantity or time period;

(b) Measurement uncertainty; and

(c) Modelling uncertainty.

Question 8
What additional guidance or tools may provide support for the calculation of data uncertainty?

8. Estimate of the Mean model

Consultation Guidance:

The ESS Rule defines data and modelling requirements for both an Estimate of the Mean and the Regression Analysis energy model types. The following section is consistent with the ESS Rule and clarifies the data requirements for energy models set out in clause 7A.6(b) of the ESS Rule. It also clarifies the need to identify all of the relevant Independent Variables and Site Constants when using an Estimate of the Mean model.

Data requirements

Note: Clause 7A.6(b) of the Rule provides that an Accredited Certificate Provider must:

assign values for electricity consumption, Gas consumption, Independent Variables and Site Constants for each time period in each Measurement Period, where relevant.

8.1 An Accredited Certificate Provider must assign a value for each time period in each Measurement Period for both:

(a) Site Constant(s) and the Independent Variable(s); and

(b) Regression Analysis and an Estimate of the Mean energy model.

Note: For example, if energy consumption is recorded for 12 time periods, a value for the Site Constant(s) and the Independent Variable(s) must be provided for each of the 12 time periods recorded even if the Site Constant(s) does not change. Consistent with Equation 7A.2 of the Rule, the values referred to in section 9.1 are required so that predicted baseline or operating energy consumption data may be excluded from the calculation of normal year energy savings where Site Constants are not their standard value.

Relevant Independent Variables and Site Constants

Note: Clause 7A.2(a)(i) of the Rule states that Baseline Energy Models and Operating Energy Models must be established in accordance with the following criteria:

An Estimate of the Mean that is based on measurements of energy consumption, Independent Variables and Site Constants, where relevant, specifies a Measurement Period, and where the Coefficient of Variation of the energy consumption over the Measurement Period is less than 15%.

8.2 An Accredited Certificate Provider must consider whether the use of an Estimate of the Mean model is appropriate. This may include:

(a) assessing if there are other Independent Variables that significantly affect electricity consumption; and

(b) measuring likely Independent Variables to determine that they do not have a significant effect on the energy consumption as described in the OEH M&V Guide.

Note: In establishing an energy model Site Constants will always be relevant but there may or may not be Independent Variables that significantly affect energy consumption.

8.3 When using an Estimate of the Mean model, an Accredited Certificate Provider must establish an energy model based on any and all Independent Variables and Site Constants which affect energy consumption of the EUE.

8.4 The M&V Plan must document:

(a) the process used to determine that an Estimate of the Mean energy model is appropriate; and

(b) all potential Independent Variables that were tested and why the variables were excluded from the model.

8.5 It is not sufficient to state that an Estimate of the Mean model was used and therefore there are no relevant Independent Variables.

Question 9

What other evidence can be provided to support the identification and selection of relevant Independent Variables?