

Impact Report Checklist

Project-Based Activities – Measurement and Verification

Version 2.1 – 12 September 2019

An accredited person (AP) must have a project impact report approved by the Essential Services Commission to be eligible to create Victorian energy efficiency certificates (VEECs) under the measurement and verification (M&V) method of the Victorian Energy Upgrade (VEU) program's project-based activities (PBA). Applications for project impact report approval must include the relevant impact report documentation and the corresponding approved measurement and verification professional's (AM&VP's) verification report. If this is the first impact report for the project, you must also include a completed VEEC Assignment Form for Project-Based Activities. Note that the AM&VP's report can be either a 'basic verification report' or a 'detailed verification report'. For information about PBA M&V please refer to **Measurement and Verification Method Activity Guide** and **Measurement and Verification Method Compliance Requirements** which can be found at www.esc.vic.gov.au/m-and-v

This document provides a comprehensive overview of the information that should be included in a project impact report. A project impact report is a written document submitted as part of an application for project impact report approval to explain the impact of the project on energy savings. To write a project impact report in the scheme you should be aware of the concepts and issues contained within this document, even if you are an experienced certified measurement and verification professional (CMVP), as some differences exist between the international performance measurement and verification protocol (IPMVP) and PBA M&V.

Table 1 lists the key information and attached documents that should be included as part of a project impact report. This list is not exhaustive and there may be other information that we require depending on each specific project. Please also note that there are differing requirements depending on which options you select, such as whether you are using forward creation, annual creation or annual creation with top-up, and whether you are modelling energy consumption using regression analysis or estimate of the mean.

Table 1: Project impact report checklist

Item	Requirements
Methods	• Have you provided a justification for IPMVP method chosen? • Have you provided a justification for VEEC creation method chosen?
General project information	• If the project involves lighting equipment, have you provided details of all lighting products replaced or installed? This includes number, brand, model, wattage and sensors. • If the project involved HVAC upgrades, have you provided details of whether electricity or gas is used for heating? • If option B is used, have you provided details of the sub-metering used? Including whether it is a temporary installation, calibration details and meter specifications.
Key dates	• Did the baseline period end within 24 months prior to the activity start date? • If forward creation is used, did the operating period occur within 24 months following the activity end date? • Do the measurement period start and end dates match the M&V plan? • If annual creation or top-up is used, does the reporting period start and end at the correct time for this impact report version? E.g. if this is the first report, does it start immediately following the activity end date and end exactly one year later?
Evidence of completion date(s)	• Has evidence been provided to verify the activity start date? • Has evidence been provided to verify the activity end date? • Has evidence been provided to verify the implementation start time i.e. the last activity end date (if the project has multiple premises)?
As-built engineering drawings	• If applicable, have as-built engineering drawings of the upgraded equipment and site lay-out been attached?
M&V plan compliance document	• Has a section been included in the report, or a separate document attached which discusses M&V plan compliance? • Has a person been identified who ensured that the M&V plan was followed, and has it been explained how they achieved this? • Are the implemented energy saving measures the same as those described in the M&V plan? If not, have you explained why? • Is the inventory of affected equipment, metering (including procedures, specifications and metering points) and energy sources the same as those identified in the M&V plan? If not, have you explained why? • Are the modelling types (i.e. regression or estimate of the mean) the same as those identified in the M&V plan? If not, have you explained why? • Has it been explained whether the approaches taken to establish the gas and/or electricity baseline(s) and (if applicable) operating models were the same as those identified in the M&V plan? If not, have you explained why?

Item	Requirements
	• Have you included a description of the calculation approach; was the proposed type and frequency of reporting adequate for the actual project? • Have you explained the data collection and storage methods, including who was responsible for this and how missing data was dealt with? • Has a section been included that compares the savings estimate provided in the M&V plan with the actual savings determined at impact report stage? This should include an explanation and justification for any significant difference(s).
Measurement boundary	• Have details of the measurement boundary(ies) been discussed? • If relevant, are the drawings/diagrams/mapping co-ordinates used to provide evidence of the measurement boundary(ies) sufficient for someone who has never been to the site to understand? • Is all equipment affected by project activities contained within the boundary? • If any virtual meters are used in the measurement boundary, have you provided details of these? • Is the measurement boundary for the operating or reporting period (as applicable) consistent with the baseline period? • Have you identified and discussed which energy source(s) have been measured? • For multi-site projects, have you described how the measurement boundary was determined in a consistent manner across all premises with the project?
Interactive savings	• Have you discussed any interactive savings (i.e. energy savings or negative energy savings which occur outside of the measurement boundary as a result of the project)?
Measurement periods	• Have you included a section in the report for each measurement period (baseline period and either the operating or reporting period, as applicable) • Have you provided details of the baseline and (if applicable) operating measurement periods? This includes the date ranges selected and the reason for these selections. • Have you identified whether a full operating cycle for the affected equipment has been covered by the relevant measurement period (baseline and/or operating period, as applicable)? If you have chosen not to measure a full cycle, what reason has been given for this? Note – you may elect to measure less than a full cycle, noting that it may affect the number of VEECs which can be claimed based on the effective range of any independent variables used in modelling.

Item	Requirements
	• If you have chosen to use a full operating cycle for the affected equipment and the relevant measurement period (baseline and/or operating period, as applicable) is less than 12 months, has evidence been provided to show it covers a full cycle? • Have you identified and discussed which site constants have been measured? • Are site constants at their normal values during the operating or reporting period, as applicable (i.e. equal to the value measured during the baseline period)? • Has the measurement procedure for site constants and each source of energy consumption been explained? • Have measurement frequency and time intervals been discussed? • Is the measurement frequency for the baseline period the same as the measurement frequency for the corresponding operating or reporting period? • Have values been provided for each of the independent variables, site constants and measured energy consumption for each time interval, for all measurement periods used? • If sampling was used, has a full description and details of any sampling methods used been included?
Independent variable requirements (for models that use regression analysis)	• Have you identified and discussed which independent variables have been measured, including an explanation of how they relate to energy consumption? • Has the measurement procedure for each independent variable been explained? • Has any uncertainty related to the independent variables been discussed? • Has the effective range of each independent variable been stated, including calculations? For forward creation, this is based on the values used to create the baseline and operating energy models. For annual creation or top-up, this is based on the values used to create the baseline energy model. • For multi-site projects, has the same independent variable(s) been used for similar models?
Normal year (for forward creation using regression analysis)	• Have normal year values been provided for each time interval in the measurement period, for each independent variable? • Does the normal year represent the expected mean, range and variance for the independent variables for a typical year of operation? • Are all normal year values within the eligible range for that independent variable?
Measurement period evidence	• Have raw data files (in Microsoft Excel format) for measurement period data been provided, including measurements of all site constants, measured energy consumption and independent variables (if applicable)?

Item	Requirements
Uncertainty	Have you discussed all sources of uncertainty for measurements, modelling and sampling undertaken?
Renewable energy	- Has renewable energy generation been introduced within the measurement boundary? - If renewable energy generation has been introduced, has any energy been exported beyond the measurement boundary at any point during the operating or reporting period (as applicable)? If so, this generation equipment must have been separately metered and excluded from the measurement boundary. - If renewable energy generation has been introduced, are you also claiming benefits under another prescribed greenhouse gas scheme? If so, this must have been metered and excluded from the measurement boundary.
Modelling – general requirements	- Does the report include a section on each applicable energy model? - Have you identified which energy source(s) are described by the energy model(s)? - Are all energy models based on measured energy consumption? Note – energy models must be based on measured and not calculated energy consumption - Have the equations for all energy models been stated in the report? - Does the report state and justify which modelling type has been used for each energy model (i.e. regression analysis or estimate of the mean)? - Has a description of the modelling undertaken been provided? - Have you explained how each model has been derived? - Are energy models based on 80% of the time intervals in the relevant measurement period and have you provided justification and evidence of this? - For multi-site projects, have you shown that the same reasoning and decisions were made during the development of each model?

Item	Requirements
Requirements for any models that use regression analysis	• Have you included the appropriate statistical tests to show compliance with IPMVP best practice? These should at least include R^2 model fit, bias error, CV_{RMSE}, sensitivity t-stat and residual test(s) to ensure that the model is appropriate and a good fit. • Are there any other statistical tests which should be conducted to validate the approach taken? Examples of these may include a predicted R^2 test, testing the independence of independent variables, testing for autocorrelation of time series data – if applicable. Have details of these tests been included? Note – these are not mandatory but may be useful for some models. • Are there at least six times as many time intervals as the number of independent variables used to build the model? • Have you shown that the independent variables are truly independent? • For multi-site projects, have you shown that the equation structure is the same for the model of each similar measurement boundary?
Requirements for any models that use estimate of the mean	• Is the Coefficient of Variation for the dataset used to create the model below 15% and have you provided calculations to show this?
Modelling evidence	• Have corresponding data files in Microsoft Excel format been included, showing how each model was derived? • Have you provided evidence that all mathematical methods and modelling are compliant with the IPMVP? Note – this should include worked solutions for any statistical tests.
Ineligible data	• Have you identified and discarded any time intervals where site constants are not at their standard values? • If forward creation is used, have you identified and discarded any time intervals where the values of any independent variables in the normal year fall outside +/- 5% of their effective range? • If annual creation or top up is used, have you identified and discarded any time intervals where the values of any independent variables in the reporting period fall outside +/- 5% of their effective range? • Have you identified where any other data has been discarded (e.g. data points which have been identified as outliers)? Have you justified the approach and has it been and consistently applied?

Item	Requirements
Abatement calculations	• Has a description on how calculations have been undertaken been provided (including written justification on steps and decisions taken)? • Overall, have you ensured the basis for routine-adjustment is eligible with respect to the Regulations and IPMVP? • Have any non-routine adjustments been included in the calculations? Note – non-routine adjustments are not permitted in PBA M&V. • Have you provided detailed information (including any calculations) to determine interactive savings? • If forward creation is used, have detailed calculations using Equations 1, 2 and 4 of Measurement and Verification in Victorian Energy Upgrade (VEU) Program: - Specifications (M&V specifications) been provided? • If annual creation or top-up is used, have detailed calculations using Equations 1, 3 and 5 of M&V specifications been provided? • If forward creation is used, has the decay factor been specified and used in the calculations (including all inputs for the persistence model, if applicable)? • Has the accuracy factor been specified and used in the calculations? • Has the emissions factor been specified and used in the calculations? • Has the regional factor been specified and used in the calculations? • Has a calculation of the relative precision (based on the uncertainty of all measurements, sampling and modelling) and accuracy factor, compliant with IPMVP and M&V specifications, been provided? • Has justification and evidence for the precision been provided (e.g. calibration certificates for metering equipment other than fiscal utility meters such as NMI or MIRN)? • Has a description of the approach taken with significant digits been provided? • Has a description and calculation of counted savings been provided? • If there have been other VEU activities or any other energy saving projects within the measurement boundary during this period, have they been accounted for in the calculations as counted savings? • If forward creation is used, has selection and justification of the nominated persistence model been discussed, including the criteria used to select it? • If annual creation or top-up is used, have you included details of savings from previous reporting periods, including negative energy savings?