

**Building Upgrade Finance Cost Savings Methodology**  
**Sub-method P5 - Project Impact Assessment with Measurement and Verification**  
**(predicted savings)**

**1. Purpose**

This document sets out the sub-method for calculating the predicted utility savings from upgrade works under a building upgrade agreement that improve the efficiency of energy or water services. This analysis must be conducted by a Measurement and Verification Professional.

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## 2. Definitions

**Baseline Utility Model** has the same meaning as Baseline Energy Model as defined in clause 7A.3 of the ESS Rule.

**Effective Range** has the same meaning as in Clause 7A of the ESS Rule.

**Energy services** means the individual or combined services provided to a building, which consume energy and include, but are not limited to, heating cooling and ventilation, lighting, water handling, water heating, lifts, fire and security systems, energy management systems, computing, printing and publishing, refrigeration, cooking, communications and entertainment.

**ESS Rule** means the NSW Energy Savings Scheme Rule made under Part 9 of the *Electricity Supply Act (NSW) 1995*.

**Independent variable** has the same meaning as in Clause 7A of the ESS Rule.

**Measurement and Verification Professional** is a person who is a Certified Measurement and Verification Professional (CMVP), having demonstrated their proficiency in best practice measurement & verification techniques to the satisfaction of the Efficiency Valuation Organization.

**Normal Year** represents a typical year for operation of the building after the upgrade works are completed and within the time period for which lessees are expected to make contributions towards the building upgrade charge.

**Operating Utility Model** has the same meaning as Operating Energy Model as defined in clause 7A.4 of the ESS Rule.

**Production levels** means the amount of output delivered by the building and its occupants, which could be measured by operating hours, occupancy and/or an amount of goods or services produced.

**Services levels** means the amount of services or production provided by a utility to a building, its occupants and its equipment, being either energy services or water services.

**Site constant** has the same meaning as in Clause 7A of the ESS Rule.

**Utility Consumption** has the same meaning as Energy Consumption in Clause 7A of the ESS Rule.

**Utility Model** has the same meaning as Energy Model in Clause 7A of the ESS Rule.

**Utility Savings** means the reduction of the amount or equivalent amount of electricity consumption (in MWh), gas consumption (in MWh) or water consumption (in ML) arising from the upgrade as calculated by this sub-method. Utility Savings may be negative for electricity or gas for fuel switching activities

**Water services** means the individual or combined services provided to a building, which consume water and include, but are not limited to, the provision of water for drinking, bathrooms, cooling or cleaning.

### **3. Applicability of this sub-method**

This sub-method may be applied to any upgrade works that improve the electricity, gas or water efficiency of the building. This method requires measured utility consumption from before and after the building upgrade. It takes utility information measured both before the upgrade and over a period after the building upgrade to predict future utility savings.

Utility savings cannot be due to reduced service levels or production levels. For example, reducing the tenancy space in a building is not considered to improve the efficiency of the building.

To address this issue, production, occupancy or service levels must be considered for inclusion as independent variables or site constants and accounted for in the utility models. Their inclusion must be done in a way that allows direct comparison of performance before and after the upgrade works.

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#### 4. Utility Savings

##### Step 1 – Measure building performance before and after the upgrade

Take measurements of building performance, including Utility Consumption, Independent Variables and Site Constants, for a measurement period before the building upgrade commences.

The measurements taken will determine the Effective Range of the Utility Models for the upgrade, and so should represent as much as possible of the full range of expected values for the Independent Variables.

##### Step 2 – Establish the Baseline Utility Model, Operating Utility Model and Normal Year

Use those measurements to establish:

1. A Baseline Utility Model in accordance with Clause 7A.3 of the ESS Rule
2. An Operating Utility Model in accordance with Clause 7A.4 of the ESS Rule
3. A Normal Year in accordance with Clause 7A.7 of the ESS Rule.

Where:

- all references to “electricity consumption or gas consumption” are to be replaced with “electricity consumption or gas consumption or water consumption”;
- clause 7A.7 b) is replaced with the following requirement:

b) ensure the Normal Year represents a typical year for operation of the upgraded building within the maximum time period over which lessees will make contributions towards the building upgrade charge.

##### Step 3 – Calculate the predicted utility savings for each year

The predicted utility savings for the building upgrade is equal to:

For electricity savings:

Utility Savings (MWh) = Normal Year Electricity Savings, as calculated in accordance with Equation 7A.2 of Clause 7A of the NSW Energy Savings Scheme Rule;

For gas savings:

Utility Savings (MWh) = Normal Year Gas Savings, as calculated in accordance with Equation 7A.2 of Clause 7A of the ESS Rule;

For water savings:

Utility Savings (ML) = Normal Year Water Savings, as calculated in accordance with Equation 7A.2 of Clause 7A of the ESS Rule, substituting the term ‘Water’ substituted for the term ‘Electricity’ or ‘Energy’ and ‘ML’ (megalitres) for ‘MWh’.

## 5. Supporting evidence

For verification purposes, the building owner should retain the following records in relation to this method:

- A completed version of the ESS PIAM&V Tool (designed for calculating electricity savings), or equivalent analysis for the project, available at <http://www.environment.nsw.gov.au/business/piamv-tool.htm>, produced using the version of the PIAM&V Tool current at the time the Activity is undertaken (noting the substitution of gas or water measurements and measurement units if necessary)
- A report by a Measurement and Verification Professional, deeming the M&V design, data, calculations and use of the PIAM&V method to be appropriate, written explanatory reasoning, in accordance with the requirements of Clause 7A of the ESS Rule.

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