Department of Energy & Climate Change

Appendix E – Selecting your M&V approach: Key decision questions

Electricity Demand Reduction pilot

M&V manual

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Selecting Your M&V Approach: Key Decision Questions

Your choice of M&V Approach will be dependent on key considerations as follows:

Is your equipment on the deemed savings list?

If your equipment is on the deemed list (see M&V Manual section 2.5) you should then refer to the Measure Overview REF to confirm that your equipment is suitable for deeming.

Can the equipment be directly measured with metering?

A lot of equipment can be measured directly where they affect a single type of electrical equipment, such as lighting, IT, or motors. This is not the case for all equipment, for practical reasons relating to the electrical layout of the building or because they affect more than one type of electrical equipment. Equipment suppliers, installers as well as metering providers will be able to provide advice on what can and can't be measured using temporary or permanent submetering.

If equipment can be directly measured, then **Partial Measurement** or **Full Measurement: Submetering** approaches can be used.

Is the demand reduction of the equipment fixed or variable?

A fixed change in demand means that the original load was running at a constant level and will be replaced by one that will run at a lower, but still constant level. Examples would include a lighting retrofit, or replacement of direct on-line motors with more efficient models. A Partial Measurement approach would be suitable for this type of project.

A variable change in demand means that either replacement or original technology (or both) vary in the amount of electricity they consume, which could be in response to changes such as the people in the building (e.g. lighting controls), changes in production volumes (e.g. variable speed drives), or external temperature (e.g. refrigeration or space heating equipment). A Full Measurement approach would be suitable for this type of project.

Are the expected savings greater than 10% of total electricity use?

The total electricity use means all of the electricity used by the building, including loads that are not affected by the equipment. This is includes electricity taken from the grid, as charged by your electrical utility provider, but also any electricity generated on-site, such as through photo-voltaics or Combined Heat and Power. Whilst on-site generation is not eligible it is important that the total electricity supply captures all sources used by the building.

The figure of 10% refers to the expected saving from the equipment compared to the total building electricity consumption. For example, a replacement lighting project may reduce the total lighting demand by 50%. If the original lighting load made up more than approximately 20% of the total building load, then it could be possible to measure the reduction from the total

electricity supply. This could apply to any type of electrical equipment, but also where the total saving expected from a project made up of several different equipment types is greater than 10%.

Where savings are greater than 10%, a **Full Measurement: Total Building Electricity** approach is likely to be suitable - 10% is a guideline figure for savings above which it is usually possible to meet the accuracy requirement of a given baseline. The actual figure will be specific for each baseline and should be calculated accorded to the guidance in section 8 Accuracy.

What if there is more than one suitable approach?

It is often possible that more than one approach could be used to measure the savings of a project.

The points below state the considerations for choosing between approaches when more than one is suitable.

Deemed Savings vs Measurement

Technologies on the Deemed Savings list can be measured via one of the Measurement approaches. A measurement approach may be preferred if you want more certainty in the measurement of the saving or feel that the deemed savings calculation will under-estimate the demand value of the project.

Partial Measurement vs. Full Measurement: Submetering

Where the demand reduction is fixed, a Partial Measurement is suitable, however, this does not rule out a Full Measurement: Submetering approach. The latter is preferable if there is an existing submetering system in place because this would avoid the need to provide an estimate of and evidence for peak applicable hours. It may also be useful to install submetering for ongoing energy monitoring purposes, rather than use a temporary meter for a one-off measurement.

Full Measurement: Total Building Electricity vs. Partial or Full Measurement: Submetering Approaches

A common scenario, particularly for multi-technology projects, is that it is possible to directly measure the technologies, and the total project savings are greater than 10%. The table below sets out the advantages and disadvantages of each approach.

Approach	Advantages	Disadvantages
Full Measurement: Total Building Electricity	You can use existing half hourly utility meter data, providing you with historic data to calculate your baseline. No need to install additional metering. You only need to develop one baseline to capture the impact of the whole project.	No breakdown of the savings achieved by each measure Measurement will include changes to the building other than the EDR project – if there are lots of changes over the baseline and/or reporting period, it may be more difficult to establish the demand reduction achieved by the project.

Partial or Full Measurement: Submetering	Greatest accuracy for measurement of individual equipment types. You will capture only the impact of the equipment – other changes to the building will not affect the measurement.	You may need to install additional metering. Separate baselines for each meter point will be required.

In practice, a Total Building Electricity approach is usually less onerous compared to undertaking direct measurement of each equipment type in an individual site. The latter approach is usually only used where the size of savings justifies a more costly approach to their measurement.

However, where there are several buildings comprising a project, direct measurement of individual equipment types may provide a basis for sampling where technology deployments are the same. This may provide a less onerous approach compared to measuring each site at the whole building level.

What if no approach is suitable?

It is possible that you answer “no” to all of the questions in the decision tree where you identify that the equipment saves less than 10% and cannot be measured directly with metering. In this case it is possible that the equipment is not a suitable project as a standalone technology because it cannot be measured. However, it should be noted that the 10% value is guideline figure from which it is usually possible to disaggregate demand savings from other changes in electricity consumption. It is possible, especially if building electricity usage is very consistent, that savings of less than this can be measured, although may require analytical expertise to establish this. Further advice on improving the accuracy of a measurement is included in the FAQs.

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