

Measure Cost Calculations

The installation of energy efficient measures incur two types of costs, incremental measure cost (IMC) and gross measure cost (GMC). These two costs are determined by either all or a subset of four values including base case equipment and labor cost as well as measure case equipment and labor cost. Depending on the installation/program type of the measure (ROB, NEW, RET, REA, REF), the four equipment and labor values will vary as being relevant to the gross and incremental equations.

In a special case, RET measures have two cost periods, a Remaining Useful Life (RUL) period or the first baseline period; and an Effective Useful Life minus Remaining Useful Life (EUL- RUL) period or the second baseline period. In RET situations; it is assumed that the old existing equipment would have had 1/3 of the new equipment's life remaining before failure¹. To properly calculate the cost effectiveness of the measure the cost is calculated differently for these two periods.

Note: For ROB, NEW, and REA the new equipment is either replacing equipment that has been assumed to have failed or completely new equipment with no pre-existing baseline. In these cases there is no RUL period for the existing equipment.

For REF (Retrofit first baseline only) the new equipment is replacing equipment that still has a remaining useful life of at least one year, this is also dubbed early retirement (ER). However in REF there are no codes and/or standards to calculate savings for the above code/standard period (2nd baseline). For REF there is only one baseline period for the entire EUL.

The following discussion and equations will demonstrate the proper use of the IMC and GMC equation. Even though the values will vary significantly, it is always the Gross measure cost used to populate the cost effectiveness calculations reported for a measure whether it is NEW, ROB, RET, REA, or REF.

Gross Measure Cost

Per the E3, the gross measure cost is the cost to install an energy efficient measure. This definition implies two different meanings depending on the install type. In the case of RET², REA, and REF, GMC means the full cost of the measure to purchase and install. In the case of ROB and NEW, GMC means the cost premium required to install the energy efficient measure over a less efficient piece of equipment.^{3,4} Being that RET, REA, REF, ROB, and NEW have different definitions, there is a clear distinction between the equations for the various install types.

¹ Summary of EUL-RUL Analysis for the April 2008 Update to DEER, www.deeresources.com

² This part of the discussion only pertains to the RUL period or first baseline period for RET measures. The discussion on the GMC for the second baseline cost is under the subsection titled "Special Notes on RET with concern to 1st and 2nd baseline periods."

³ E3 Calculator TechMemo 5d.doc, Program Inputs, Page 5, http://ethree.com/public_projects/cpuc4.php

⁴ Energy Efficiency Policy Manual Version 4, Page 8, Footnote 9

For **RET², REA, and REF**, GMC is represented by the equation below:

$$GMC = \text{Measure Equipment Cost} + \text{Measure Labor Cost}$$

For **NEW and ROB**, GMC is represented by the equation below:

$$GMC = (\text{Measure Equipment Cost} + \text{Measure Labor Cost}) - (\text{Base Case Equipment Cost} + \text{Base Case Labor Cost})$$

*Note: Unless stated otherwise the measure case labor and base case labor are assumed to be the same value reducing the equation to the following:

$$GMC = \text{Measure Equipment Cost} - \text{Base Case Equipment Cost}$$

In the case of RET, REA, and REF, the customer is making a conscience decision to replace existing, working equipment before the useful life of the equipment has expired. Since this is a discretionary choice by the consumer, the cost invoked is the full cost of the equipment and installation of the energy efficient equipment.

In the case of ROB and NEW, the equipment being replaced/installed is assumed to have failed in place or is past its useful life. In this scenario the customer is in the situation of having to purchase new equipment. The customer is faced with either purchasing standard efficiency or code baseline equipment versus energy efficient equipment. Because the customer will be spending money to replace their equipment anyway, the gross cost for the energy efficient measure is the premium paid above the non-efficient or code baseline equipment.

Special Notes on RET with concern to 1st and 2nd baseline periods

RET measures have two baseline periods for energy savings because the measure has an applicable code and/or standard baseline. The equation described above for RET is the equation used for the first baseline period. At the expiration of the RUL period and the start of the EUL-RUL period, the base case is assumed to jump from the customer baseline to the code baseline. At this point the GMC equation for RET would shift to an equation similar to NEW and ROB to simulate incremental measure cost.

For **RET EUL - RUL period (2nd baseline)**, GMC is represented by the equation below:

$$GMC = (\text{Measure Equipment Cost} + \text{Measure Labor Cost}) - (\text{Base Case Equipment Cost} + \text{Base Case Labor Cost})$$

*Note: Unless stated otherwise the measure case labor and base case labor are assumed to be the same value reducing the equation to the following:

$$GMC = \text{Measure Equipment Cost} - \text{Base Case Equipment Cost}$$

***Note:** Various complicated price fluctuations are not addressed in these equations, such as future costs due to inflation in labor, future costs due to deflation in material cost, and other variables that cannot be accurately described at this time.

Incremental Measure Cost

Incremental Measure Cost is the premium cost to install an energy efficient measure over a standard efficiency measure or code baseline measure.⁵ While IMC has a straight forward definition, depending on the install type the equation does vary. The incremental cost is only used to help determine program incentives. It is not affected by the first and second baseline periods and may differ from the cost used for cost effectiveness calculations.

For NEW, ROB, RET, and REF measures, there exists a theoretical base case that the measure can be compared to in cost. Because a base case exists for **NEW**, **ROB**, **RET**, and **REF** IMC is represented by the equation below:

$$\text{IMC} = (\text{Measure Equipment Cost} + \text{Measure Labor Cost}) - (\text{Base Case Equipment Cost} + \text{Base Case Labor Cost})$$

*Note: Unless stated otherwise the measure case labor and base case labor are assumed to be the same value reducing the equation to the following:

$$\text{IMC} = \text{Measure Equipment Cost} - \text{Base Case Equipment Cost}$$

In the case of NEW and ROB the IMC and GMC end up having the same equation and hence the same value. In the case of RET and REF, the IMC is different from the GMC and the IMC is only used for program assistance in determining incentive values.

For REA there exists no base case to compare the measure to, as in the case of an economizer added to a HVAC system. Adding the economizer is the energy efficient measure and the base case is the absence of an economizer therefore there truly is no base case cost. Because of this, for **REA**, IMC is represented by the equation below:

$$\text{IMC} = \text{Measure Equipment Cost} + \text{Measure Labor Cost}$$

See the last page for a summary table

⁵ Energy Efficiency Policy Manual Version 4, Glossary Page 7

Measure Cost Permutations

As illustrated in the measure cost calculations section of this workpaper, depending on the installation type of a measure, the cost calculations can vary. There are instances where the same measure can be delivered and incented (DIM) on in multiple channels. The different channels may dictate that the same measure have a different installation type, thus causing two calculation methods and values for the cost records.⁶ To address the different cost strategies for the same measure, the cost permutations were reduced to the three attributes that make a unique cost record for MMDB, program type (installation type), incentive method, and climate zone.

Program/Install Type

Program type is used as a permutation factor because of the discussion in the Gross Measure Cost Section of this document. For a single core measure that has more than one install type assigned to it based on the measure's DIM, rather than make a unique core measure, multiple costing records are generated.

Climate Zone

Climate zone is used as a permutation factor based on input from the Energy Division (ED). The ED has directed that all information be first sourced from DEER⁷, including cost, which provides material and labor multipliers based on climate zone.⁸ To accommodate the multiples, a cost record is generated per climate zone.

Incentive Method

Incentive method is used as a permutation factor to address reporting strategies used by the regulatory group. Unlike install type that uses different equations to come up with different cost numbers, based on the incentive method regulatory will take a different action when reporting to the CPUC⁹. A single core measure may have various incentive methods to the customer/vendor/manufacturer and based on the incentive method the MMDB cost records are utilized differently.

See the follow page for the list of incentive methods.

⁶ E3 Calculator TechMemo 5d.doc, Program Inputs, Page 5, http://ethree.com/public_projects/cpuc4.php

⁷

⁸ 2008 DEER Measure Cost Documentation Revision 3, Section 2.3, www.deeresources.com

⁹

The available deemed incentive methods along with how regulatory uses the MMDB information for the SCE portfolio are as follows:

Data extracted from MMDB (If actual costs are not known)

- Down-Stream Incentive - Deemed
- Mid-Stream Incentive
- Up-Stream Incentive
- On-bill Finance – loan

Data extracted from invoices/POs

- Direct Install
- Exchange – Replacement
- Giveaway
- Testing Services / Other
- Down-Stream Incentive - Calculated

Data extracted from MMDB and adjusted by invoices

- Up-Stream Buy Down

As the incentive method list above shows, there are three strategies for reporting cost information. To address the strategies while maintaining a smaller number of cost records, there are three default incentive methods in the MMDB, down-stream incentive, direct install, and up-stream buy down.

Note: The regulatory group is directed to use, if available, the actual measure cost and to only use an estimated deemed cost in the event that the actual cost is unknown¹⁰. Actual measure cost would override any case where the cost data is stored in the MMDB.

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Table 1. Measure Cost Summary

Install/Program Type	Gross Measure Cost (First Baseline Period)	Gross Measure Cost (Second Baseline Period)	Incremental Measure Cost
NEW	Measure Equipment Cost – Base Case Equipment Cost	N/A	Measure Equipment Cost – Base Case Equipment Cost
ROB	Measure Equipment Cost – Base Case Equipment Cost	N/A	Measure Equipment Cost – Base Case Equipment Cost
RET	Measure Equipment Cost + Measure Labor Cost	Measure Equipment Cost – Base Case Equipment Cost	Measure Equipment Cost – Base Case Equipment Cost
REF	Measure Equipment Cost + Measure Labor Cost	N/A	Measure Equipment Cost – Base Case Equipment Cost
REA	Measure Equipment Cost + Measure Labor Cost	N/A	Measure Equipment Cost + Measure Labor Cost

*Note: For a more thorough discussion on the install/program type, see the install type document.