Measure Cost Analytical Methods

**Add/revise strengths**

**Add/revise weaknesses**

**Add other methods**

**Add comments on applicability – ideal use cases, when not applicable etc.**

| Method | Definition | Strengths | Weaknesses | Applicability |
| --- | --- | --- | --- | --- |
| Simple Average | A simple arithmetic average is the most common method to estimate costs if data is limited (small sample size) | Cost and time efficient | Does not represent prices paid | Limited data points  Data is from complete random sample of population |
| Weighted Average | Costs are calculated as a weighted average to reflect relative proportions (i.e., costs were weighted by program claims or market data) | Ensures mix of product types/sales is represented | Influenced by outliers, skewed distributions | Data not from random sample of population  Variability of products/prices within sample strata |
| Median | The median indicates the central tendency of a population. | Not influenced by outliers |  | When outliers exist in the sample  Complex, site-specific measures  Costs from experts, limited # of market actors |
| Regression Analysis | Regression analysis is used to evaluate the relationship between cost and one or more other variables. For example, regression models were constructed to examine the relationship between cost and the normalizing unit, which enabled the estimation of costs when data for a specific sample stratum is missing. |  |  | Used when need to understand relationship of cost and other product attributes.  Interpolation to fill missing data points. |
| Hedonic Price Model | A hedonic price model is a specific type of regression analysis used to estimate the relative influence of various product features on an observed price. In the case of energy efficiency measure cost analysis, hedonic price models are used to determine the portion of the measure cost associated with the energy performance of the equipment (e.g. SEER, EER, AFUE, R-value, etc.). | Enables isolation of price variation to energy performance  Represents sales volume | Data requirements and processing costs |  |
| Built-up Costs | The costs for some measures for which costs are too complex or too specialized are developed by subject matter technical experts. | Enables isolation of price variation to energy performance | Requires expertise | Complex measures/site-specific configurations.  It is not possible to isolate features between base and measure scenario |
| Lower Quartile | Lower quartile method is used to estimate costs as the lower quartile of a defined range. | Can account for contractor mark-ups | Limited applicability | Competitive pricing (contractor bids) when lower bids are more representative of actual prices paid |
| Add method |  |  |  |  |
| Add method |  |  |  |  |

References

Ting, M., M. Rufo, and J. Loper. 2013. “Measure costs – the forgotten child of energy efficiency analysis.” ECEEE Summer Study Proceedings. Pp. 2081 – 2091.

Ting, M. (Itron, Inc.) 2014. “Energy Efficiency Measure Cost Studies.” SEE Action Webinar – EM&V Working Group. September 24.

Itron, Inc. 2014. 2010-2012 WO017 Ex Ante Measure Cost Study Final Report. Prepared for the California Public Utilities Commission.

Cal TF Staff analysis of approved statewide measures.

Regional Technical Forum (RTF). 2015. Roadmap for the Assessment of Energy Efficiency Measures. December 8.