

Toward a Common Lexicon for Customer-Funded Energy Efficiency: Putting a National Program Taxonomy and Terminology into Practical Use

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ABSTRACT

From region to region and even within states, the energy-efficiency program industry uses different terminology. Definitions of such key terms as lifecycle savings, net savings, and incentives vary depending on the jurisdiction. This diversity in semantics is a natural product of the different values and approaches that each state’s policymakers have adopted for energy efficiency but makes “apples-to-apples” aggregation of program inputs and outputs difficult and less meaningful. Inconsistency in efficiency program data poses a barrier to quantifying the energy efficiency resource on a regional and national basis and therefore undermines the notion that this resource is a material contributor to energy needs.

Lawrence Berkeley National Laboratory (LBNL) has assembled a national taxonomy of energy efficiency (EE) programs and a common terminology for data on energy savings, program spending and other metrics for characterizing customer-funded efficiency programs. This common lexicon was founded on the work of the EM&V Working Group of the State and Local Energy-Efficiency Action Network (SEE Action), augmented with extensive reviews of programs in a majority of states by LBNL, the Consortium for Energy Efficiency and other national and regional organizations. CEE worked with LBNL to adapt this taxonomy for its *State of the Efficiency Program Industry* survey, fielded annually to efficiency program administrators across the US and Canada. LBNL and CEE will describe the practical usefulness of the program taxonomy and data glossary in analyses of the energy efficiency industry. LBNL staff will discuss the value of its adoption by a variety of energy sector stakeholders.

Introduction

In 2012, program administrators that manage electric and gas efficiency programs funded by utility customers spent about \$8 billion (CEE 2013¹), with spending projected to possibly more than double by 2025 (Barbose et al. 2013). These programs are administered by well over a hundred administrators (utilities, state energy agencies, non-profit and for-profit companies). In addition, hundreds if not thousands of organizations implement the programs under the direction of the administrators; many of which have their own savings and cost reporting requirements.

Most program administrators report information annually (e.g., portfolio and program-level energy savings and costs). In some states, program administrators also provide information on other metrics (e.g., number of program participants, project-participant costs, and program marketing and evaluation costs). However, the state-by-state evolution of utility customer-funded energy efficiency programs has fostered diversity in their regulation, design and administration—and likewise, with respect to reporting, diversity in the basic terminology for

¹ Key findings as well as the full report and data appendices from CEE’s 2013 publication can be accessed using this URL: <http://library.cee1.org/content/2013-state-efficiency-program-industry-report>

naming programs and describing their characteristics. The absence of a standardized lexicon has made it difficult to categorize programs and their savings in a consistent way that enables formal analysis and the drawing of conclusions about energy efficiency as a resource from regional or national perspectives.

A number of organizations have collected data from efficiency program and portfolio annual reports and used them to report, track, compare or analyze program impacts on a regional or national basis:

- The Northeast Energy Efficiency Partnerships' (NEEP) Regional Evaluation, Measurement and Verification Forum (EM&V Forum) supports the development and use of common and/or consistent protocols to evaluate, measure, verify, and report the savings, costs, and emission impacts of energy efficiency. The EM&V Forum has developed the Regional Energy Efficiency Database (REED), launched in early 2013, which includes data from eight states, soon to be nine states and the District of Columbia. REED was informed by the Forum's "Common Statewide Energy Efficiency Reporting Guidelines," which were adopted by the Forum's Steering Committee in 2010.
- The American Council for an Energy-Efficient Economy (ACEEE) has conducted industry surveys for many years, including a national review of the cost of energy saved through efficiency programs (Friederich et al. 2009, Molina 2014).
- U.S. Energy Information Agency (EIA) has surveyed utilities for data on their energy efficiency programs for many years through the EIA 861 Form. EIA (2013) has also released a "State Energy Efficiency Program Evaluation Inventory" that supported the National Energy Modeling System (NEMS) and is based upon efficiency program evaluations.

With funding from the U.S. Department of Energy, LBNL initiated its Cost of Saved Energy (CSE) project to collect and analyze the cost of saved electricity and natural gas from utility-customer funded energy efficiency programs across the United States. As part of this effort, LBNL researchers collected data from 31 states' energy efficiency programs, primarily for the years 2009, 2010 and 2011. As a result, cost and savings data on almost 1,900 unique programs, covering one or more program years (for a total of ~4,000 program-years of data), have been collected for reporting and analyses.

Since 2006, CEE has conducted an annual data collection and published a report called the *State of the Efficiency Program Industry Report*. In 2007, the data collection expanded to include program administrators in Canada, as well as in the United States. The annual report contains historical and current trends on electric and gas² portfolio and program level budgets, expenditures, and savings reported at the state, regional, and national level.

These two data collection efforts, by virtue of their size, depth and program-level detail, encountered and made efforts to ameliorate the limitations to meaningful aggregation of national DSM industry data caused by incongruous reporting practices among states and provinces. A consistent means of identifying and describing programs has the potential to bolster confidence in energy efficiency as a resource.

² Gas program data are collected in collaboration with the American Gas Association (AGA), which surveys the majority of natural gas program administrators.

Given the number of program administrators and implementers that report program data and the lack of a consistently adopted classification and description of program offerings, there are three key concerns for those who want to compile, track, compare, or analyze data for both utility and non-utility customer funded energy efficiency programs on a state, regional, or national basis:³

1. Energy savings and program costs are not defined consistently: The way that reported metrics are defined varies from state to state. The most common discrepancies can be found in the definitions of net energy savings. However, there are many other metrics for which differences are found, for example:
 - The term “annual energy savings” typically is understood as shorthand for annualized incremental energy savings, but some entities—including resource planners—apply a different meaning that includes savings resulting from prior years’ activities.
 - Most program administrators do not count their own performance incentives among program costs, yet a few do. The definitions of other cost categories (e.g., marketing costs) also vary from state to state.
 - The definition of measure lives (e.g., how the term effective useful life is defined), how measure lives are determined, and the estimated measure life values for the same measures or program types often varies among states.
2. The data that are reported are not consistent: For example, some states report just gross or net energy savings whereas others report both. Similarly, many efficiency annual reports only indicate first-year savings and not lifetime savings.⁴ With respect to cost data, program administrators often report a different combination of administrator costs, incentive costs, implementation contractor costs, participant costs, evaluation costs, and marketing costs, depending on state reporting guidelines or administrator practices.
3. Programs and sectors are not characterized in a universal or standardized fashion: Programs targeting specific building types or consumers can be included under different sectors from state to state (e.g., multi-family residential structures are sometimes included in the commercial sector and sometimes in the residential sector portfolio; low-income programs sometimes are included as residential offerings but often not). The types of activities and/or measures that are included under the same program title (e.g., custom vs. combination custom/prescriptive programs) also vary.

Usually, these inconsistencies do not cause much confusion within any single organization or state with respect to program-related definitions. However, when data are compiled from multiple states or program administrators, the inconsistencies can produce an apples-and-oranges mix of data, which can distort any multi-state or multi-administrator observations about a particular program metric, type or sector. In summary, a common

³ Note that the three listed concerns do not address a potential fourth issue of the reliability (accuracy) of the reported data.

⁴ LBNL found that only about a quarter of the program reports that we reviewed included information on measure lifetimes or lifetime savings, although this information is required to assess program cost effectiveness.

terminology and program typology is important for organizing program data into appropriate and consistent categories so that programmatic energy efficiency, as a regional and national resource, can be more reliably assessed.

Program Categories and Metric Definitions

LBNL worked with CEE to agree upon a final set of program categories and metric definitions to use for the LBNL CSE project (see Appendices A and B for a list of program categories and metrics definitions) and for CEE’s 2013 Annual Industry Data Collection effort used to publish the 2013 *State of the Efficiency Program Industry Report*. Energy efficiency programs were grouped and classified by sector (6), then by simplified efficiency program category (27) and then detailed program category (66) as illustrated in Figure 1.⁵

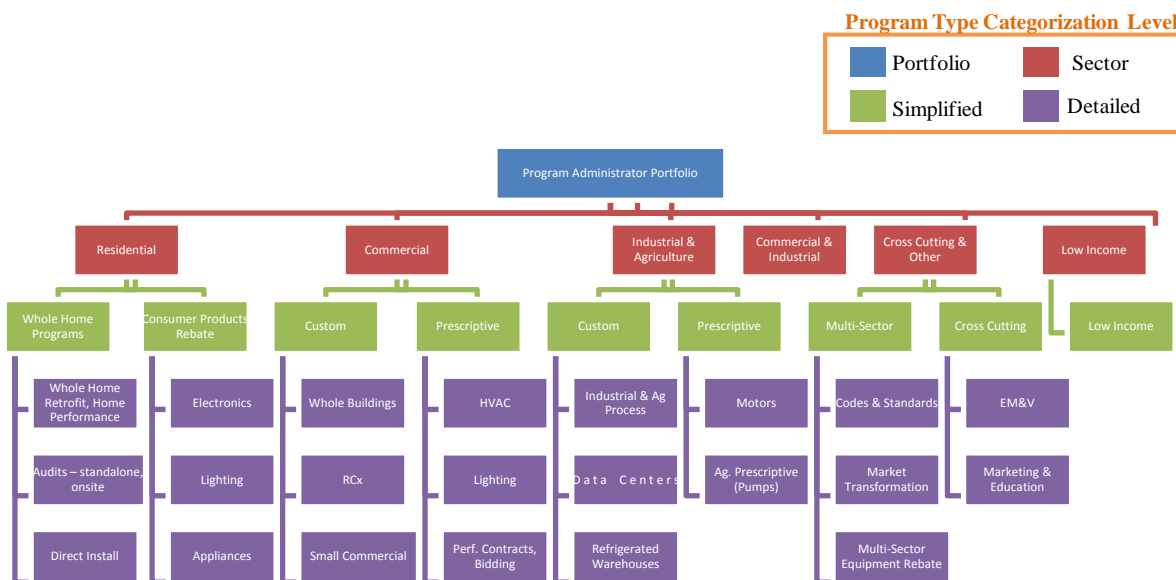


Figure 1. Selected program types in LBNL program taxonomy (Note that not all simplified and detailed program categories are shown. RCx is shorthand for retro-commissioning.).

Program Categories and Typology

The primary source used for characterizing and defining the simplified and detailed program categories was the thousands of programs reviewed as part of the CSE project. In addition, the CEE State of the Efficiency Program Industry data collection and other valuable sources - including the previously cited ACEEE and NEEP/REED efforts - were reviewed and utilized. For the demand-response program categories, we used the program categories defined by the Federal Energy Regulatory Commission for its national surveys (FERC 2012). CEE is

⁵ Including demand response as a seventh “sector,” there are 31 simplified program categories and 66 detailed program categories.

using those categories in its collections of demand-response program data. LBNL is not collecting demand-response program data at this time.

For the CSE project, LBNL researchers used these categories and definitions to characterize program data compiled from the source reports (i.e., program administrator annual reports and impact evaluation reports) into sectors and then into detailed program categories. LBNL decided that a three-tiered hierarchy of (1) sector level categories, (2) simple program categories, and (3) detailed program categories was appropriate because it provided options for different levels of analysis, given two data availability issues. First, some cost data are only available at the sectoral or simplified program level. Second, even at a national level, the number of programs for which data are available can be small for certain detailed program categories. Nonetheless, LBNL included certain program types in the detailed typology because they have regional significance (e.g., pool pump programs in the Southwest, data center programs in New York, Washington and California) or the program types appear to be emergent (e.g., financing and residential behavior).

Having the three tiers for different levels of collection and analyses, including a first tier of fairly detailed program categories, also allows flexibility in grouping programs for comparison and analysis (e.g., single-measure versus comprehensive programs, resource versus non-resource programs, or by technology such as lighting versus HVAC programs). In addition, in some cases, having the more detailed program category tier narrowed the range of installed measures for each program type and therefore reduced the uncertainty in derivation of program average measure costs, lifetimes and lifetime savings. For example, LBNL defined three detailed program categories for the simplified program category of “Whole Home Upgrades”: Whole Home Audit Programs; Whole Home Direct-Install Programs; and Whole Home Retrofit Programs.

The detailed program categories also enable some visibility into program design, e.g., differentiating among single-measure rebate programs, direct-install programs and multi-measure prescriptive programs. Thus, detailed program categories make it easier to focus attention or queries on the design and implementation of those programs of interest. However, characterizing programs by design or implementation strategy is limited to some degree by the fact that the programs often combine multiple strategies or operate as critical enablers or gateways to several other programs. When the reported name of the program was ambiguous (e.g., EnergySaver) or otherwise not intuitive, LBNL looked to the program description and, if available, measure-level savings as touchstones for program categorization.

Other energy-sector stakeholders can choose which level of detail best suits their analytical or reporting needs: the specificity of up to 66 efficiency and demand response program categories, which enables more in-depth comparative analyses of different types of efficiency programs; the very high level organization of seven sectors; or the middle ground of the 31 simplified program categories. It should also be noted that having multiple levels to the program typology also can enable data sharing, by allowing comparison or perhaps merging of data among different resolution data sets.

In 2013, CEE collaborated with LBNL to review, refine, and vet (using CEE members) the initial set of program categories developed by LBNL for their Cost of Saved Energy (CSE) Project. Once the program categories were finalized, CEE adapted them to the 2013 annual industry data collection effort to test the industry’s ability to report program level information

using these program classifications.⁶ Nearly 60% of electric respondents in the US and Canada reported energy efficiency data using this program taxonomy, indicating an overall understanding and ability to group program level data according to this classification scheme. For the demand-response program categories, LBNL and CEE used DR program categories defined by the Federal Energy Regulatory Commission for its national surveys (FERC 2012)⁷.

Metric Definitions

In preparing the metric definitions, LBNL relied overwhelmingly on the consensus definitions laid out in the State and Local Energy Efficiency Action Network's (SEE Action Network) Energy Efficiency Program Impact Evaluation Guide (State and Local Energy Efficiency Action Network 2012) which describes common terminology, structures, and approaches used for determining savings from energy efficiency programs. The guide was particularly important for defining energy metrics such as net and gross energy savings and lifetime energy savings. The SEE Action Network's committees included program administrators, regulators and others from multiple states and regions, and the definitions in the guide were the result of much discussion and negotiation that incorporated input from a wide range of energy efficiency experts and existing glossaries. The guide's terms and definitions thus represent a consensus among many stakeholders in different parts of the country.

The Promise of a Common Language and Taxonomy

By applying the typology and data glossary, LBNL and CEE have been able to assemble databases that provide a uniquely sweeping and detailed portrait of energy efficiency programs funded by utility customers. Sorting programs into well-defined categories, with costs and savings characterized in a standardized fashion, has enabled:

- National inventories of program types that are useful for sharing experiences in program design and savings estimates
- Insights into the composition of core portfolios and variations linked to regions, climates, fuel mixes and other factors
- Collection of extensive data that are useful for quantifying and to some degree forecasting the resource
- Analyses of cost data that are useful for comparing demand and supply side resources
- Analyses of savings data that reinforce claims that the efficiency resource is substantive and growing

Collaboration and Updating

LBNL and CEE's intention for supporting the use of these program categories is to improve the efficacy of efforts to compile, report, and analyze energy efficiency program information from multiple program administrators operating similar programs with different names and under different state regulatory paradigms. CEE and LBNL also hope that as more

⁶ Key findings as well as the full report and data appendices from CEE's 2013 publication can be accessed using this URL: <http://www.cee1.org/content/growth-trends-energy-efficiency-industry>

⁷ Although LBNL is not compiling demand-response program data at this time for use in the CSE project, CEE's annual industry data collection effort and report does track demand response program and program category level data.

industry stakeholders incorporate and cite these program categories, they may eventually be integrated into standardized industry terminology. As a result, this program taxonomy will provide a tool for industry stakeholders to more easily and consistently identify commonalities and trends among programs throughout the US and Canada. Stakeholders may then choose to adopt the categories for their own internal tracking and evaluation activities.

To this end, LBNL, with the support of CEE, has shared these program categories and definitions with NEEP and ACEEE staff engaged in collecting and analyzing data for their own efforts. LBNL has also discussed the categories with EIA analysts for their consideration in future efficiency program studies that they may undertake. CEE has adapted this program taxonomy and incorporated it into its 2013 annual industry survey and data collection efforts and will continue to make every effort to use a taxonomy that complements this national standardization effort as it develops its future reports on industry trends.

Our goal is to continue collecting annual data on efficiency programs implemented throughout the United States and Canada and to use the program categories and metric definitions for organizing, reporting and analyzing the information. We recognize that program category names and definitions may change and evolve as new programs are developed and new information becomes available to help refine the program categorization.

To that end, CEE and LBNL conducted a webinar on the efficiency lexicon, and CEE queried its members this spring to collect stakeholder feedback on the typology and definitions. Both are being revised in response to that input as well as our own observations of shifts in program offerings. We anticipate that this input solicitation and update process will likely be repeated every other year.

Discussion

Having a common lexicon for energy efficiency enables the standardization of data that is key to quantifying the energy efficiency program resource on extra-territorial scales – and conducting “apples-to-apples” comparisons among energy resources. Creating a lexicon for an industry more than 30 years old is not without its challenges, however. The inherent inconsistencies in program reporting that make standardization necessary also can make it difficult. Some program administrators report data for each class of end-uses and each type of design and implementation approach. Other program administrators aggregate their reporting at a high level, e.g., “residential new homes and products.” LBNL found that creating a multi-level hierarchy for classifying programs helped manage the challenges posed by different levels of detail in program descriptions and reporting. As a practical matter, however, some level of overlap at the most detailed level of categorization was unavoidable. The multi-level hierarchy still allows for a clean delineation among general families of programs, e.g., C&I prescriptive. These challenges and compromises are outweighed by the value of a common lexicon that is grounded in the real-world offerings of program administrators nationwide.

Without a common terminology and schema for characterizing programs, it is not possible to aggregate data from customer-funded efficiency programs above the level of states, and often even the level of program administrators, with any confidence. Absent some form of standardization, it is, and would remain, difficult to analyze and quantify the accomplishments and potential of programmatic energy efficiency on a regional and national basis. Supply-side resources do not have informational challenges of the same sort or magnitude. The costs and performance of gas turbines are expected to fall within a reasonably narrow range; any uncertainties are perceived as known and quantifiable. In this regard, energy efficiency is – or at

least is perceived to be – at a disadvantage: Cost and savings ranges are less understood. Uncertainties are not well identified, understood or quantified, at least among those less knowledgeable about energy efficiency. Estimating what energy efficiency programs cost and what amount of savings may be expected now and in the future, in a consistent fashion, is critical to leveling the playing field among demand and supply resources in the energy sector. Although there is much more work to be done, this lexicon is an important step in narrowing the uncertainty bands around energy efficiency cost and savings at the national level. It is also a key to making the demand-side resource more palpable for investors, grid operators and planners, policymakers and others who will help determine the resource mix of the future.

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