Appendix B: Glossary

This glossary is based primarily on three evaluation-related reference documents:

1. 2007 IPMVP
2. 2004 California Evaluation Framework
3. 2006 DOE EERE Guide for Managing General Program Evaluation Studies

In some cases, the definitions presented here differ slightly from the reference documents. This is due to discrepancies across documents and author interpretations.

Additionality: A criterion that says avoided emissions should only be recognized for project activities or programs that would not have "happened anyway." While there is general agreement that additionality is important, its meaning and application remain open to interpretation.

Adjustments: For M&V analyses, factors that modify baseline energy or demand values to account for independent variable values (conditions) in the reporting period.

Allowances: Allowances represent the amount of a pollutant that a source is permitted to emit during a specified time in the future under a cap and trade program.. Allowances are often confused with credits earned in the context of project-based or offset programs, in which sources trade with other facilities to attain compliance with a conventional regulatory requirement. Cap and trade program basics are discussed at the following EPA Web site: <http://www.epa.gov/airmarkets/cap-trade/index.html>.

Analysis of covariance (ANCOVA) model. A type of regression model also referred to as a "fixed effects" model.

Assessment boundary: The boundary within which all the primary effects and significant secondary effects associated with a project are evaluated.

Baseline: Conditions, including energy consumption and related emissions, that would have occurred without implementation of the subject project or program. Baseline conditions are sometimes referred to as "business-as-usual" conditions. Baselines are defined as either project-specific baselines or performance standard baselines.

Baseline period: The period of time selected as representative of facility operations before the energy efficiency activity takes place.

Bias: The extent to which a measurement or a sampling or analytic method systematically underestimates or overestimates a value.

California Measurement Advisory Council (CALMAC): An informal committee made up of representatives of the California utilities, state agencies, and other interested parties. CALMAC provides a forum for the development, implementation, presentation, discussion, and review of regional and statewide market assessment and evaluation studies for California energy efficiency programs conducted by member organizations.

Co-benefits: The impacts of an energy efficiency program other than energy and demand savings.

Coincident demand: The metered demand of a device, circuit, or building that occurs at the same time as the peak demand of a utility's system load or at the same time as some other peak of interest, such as building or facility peak demand. This should be expressed so as to indicate the peak of interest (e.g., "demand coincident with the utility system peak") Diversity factor is defined as the ratio of the sum of the demands of a group of

users to their coincident maximum demand. Therefore, diversity factors are always equal to one or greater.

Comparison group: A group of consumers who did not participate in the evaluated program during the program year and who share as many characteristics as possible with the participant group.

Conditional Savings Analysis (CSA): A type of analysis in which change in consumption modeled using regression analysis against presence or absence of energy efficiency measures.

Confidence: An indication of how close a value is to the true value of the quantity in question. Confidence is the likelihood that the evaluation has captured the true impacts of the program within a certain range of values (i.e., precision).

Cost-effectiveness: An indicator of the relative performance or economic attractiveness of any energy efficiency investment or practice. In the energy efficiency field, the present value of the estimated benefits produced by an energy efficiency program is compared to the estimated total costs to determine if the proposed investment or measure is desirable from a variety of perspectives (e.g., whether the estimated benefits exceed the estimated costs from a societal perspective).

Database for Energy-Efficient Resources (DEER): A California database designed to provide well-documented estimates of energy and peak demand savings values, measure costs, and effective useful life.

Deemed savings: An estimate of an energy savings or energy-demand savings outcome (gross savings) for a single unit of an installed energy efficiency measure that (a) has been developed from data sources and analytical methods that are widely considered acceptable for the measure and purpose and (b) is applicable to the situation being evaluated.

Demand: The time rate of energy flow. Demand usually refers to electric power measured in kW (equals kWh/h) but can also refer to natural gas, usually as Btu/hr, kBtu/hr, therms/day, etc.

Direct emissions: Direct emissions are changes in emissions at the site (controlled by the project sponsor or owner) where the project takes place. Direct emissions are the source of avoided emissions for thermal energy efficiency measures (e.g., avoided emissions from burning natural gas in a water heater).

Effective useful life: An estimate of the median number of years that the efficiency measures installed under a program are still in place and operable.

Energy efficiency: The use of less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way; or using less energy to perform the same function. "Energy conservation" is a term that has also been used, but it has the connotation of doing without a service in order to save energy rather than using less energy to perform the same function.

Energy efficiency measure: Installation of equipment, subsystems or systems, or modification of equipment, subsystems, systems, or operations on the customer side of the meter, for the purpose of reducing energy and/or demand (and, hence, energy and/or demand costs) at a comparable level of service.

Engineering model: Engineering equations used to calculate energy usage and savings. These models are usually based on a quantitative description of physical processes that transform delivered energy into useful work such as heat, lighting, or motor drive. In practice, these models may be reduced to simple equations in spreadsheets that calculate energy usage or savings as a function of measurable attributes of customers, facilities, or equipment (e.g., lighting use = watts × hours of use).

Error: Deviation of measurements from the true value.

Evaluation: The performance of studies and activities aimed at determining the effects of a program; any of a wide range of assessment activities associated with understanding or documenting program performance, assessing program or program-related markets and market operations; any of a wide range of evaluative efforts including assessing program-induced changes in energy efficiency markets, levels of demand or energy savings, and program cost-effectiveness.

Ex ante savings estimate: Forecasted savings used for program and portfolio planning purposes. (From the Latin for "beforehand.")

Ex post evaluation estimated savings: Savings estimates reported by an evaluator after the energy impact evaluation has been completed. (From the Latin for "from something done afterward.")

Free driver: A non-participant who has adopted a particular efficiency measure or practice as a result of the evaluated program.

Free rider: A program participant who would have implemented the program measure or practice in the absence of the program. Free riders can be total, partial, or deferred.

Gross savings: The change in energy consumption and/or demand that results directly from program-related actions taken by participants in an efficiency program, regardless of why they participated.

Impact evaluation: An evaluation of the program-specific, directly induced changes (e.g., energy and/or demand usage) attributable to an energy efficiency program.

Independent variables: The factors that affect energy use and demand, but cannot be controlled (e.g., weather or occupancy).

Indirect emissions: Changes in emissions that occur at the emissions source (e.g., the power plant). Indirect emissions are the source of avoided emissions for electric energy efficiency measures.

Interactive factors: Applicable to IPMVP Options A and B; changes in energy use or demand occurring beyond the measurement boundary of the M&V analysis.

Leakage: In the context of avoided emissions, emissions changes resulting from a project or program not captured by the primary effect (typically the small, unintended emissions consequences). Sometimes used interchangeably with "secondary effects," although leakage is a more "global" issue whereas secondary, interactive effects tend to be considered within the facility where a project takes place.

Load shapes: Representations such as graphs, tables, and databases that describe energy consumption rates as a function of another variable such as time or outdoor air temperature.

Market effect evaluation: An evaluation of the change in the structure or functioning of a market, or the behavior of participants in a market, that results from one or more program efforts. Typically the resultant market or behavior change leads to an increase in the adoption of energy-efficient products, services, or practices.

Market transformation: A reduction in market barriers resulting from a market intervention, as evidenced by a set of market effects, that lasts after the intervention has been withdrawn, reduced, or changed.

Measurement: A procedure for assigning a number to an observed object or event.

Measurement and verification (M&V): Data collection, monitoring, and analysis associated with the calculation of gross energy and demand savings from individual sites or projects. M&V can be a subset of program impact evaluation.

Measurement boundary: The boundary of the analysis for determining direct energy and/or demand savings.

Metering: The collection of energy consumption data over time through the use of meters. These meters may collect information with respect to an end-use, a circuit, a piece of equipment, or a whole building (or facility). Short-term metering generally refers to data collection for no more than a few weeks. End-use metering refers specifically to separate data collection for one or more end-uses in a facility, such as lighting, air conditioning or refrigeration. Spot metering is an instantaneous measurement (rather than over time) to determine an energy consumption rate.

Monitoring: Gathering of relevant measurement data, including but not limited to energy consumption data, over time to evaluate equipment or system performance, e.g., chiller electric demand, inlet evaporator temperature

and flow, outlet evaporator temperature, condenser inlet temperature, and ambient dry-bulb temperature and relative humidity or wet-bulb temperature, for use in developing a chiller performance map (e.g., kW/ton vs. cooling load and vs. condenser inlet temperature).

Net savings: The total change in load that is attributable to an energy efficiency program. This change in load may include, implicitly or explicitly, the effects of free drivers, free riders, energy efficiency standards, changes in the level of energy service, and other causes of changes in energy consumption or demand.

Net-to-gross ratio (NTGR): A factor representing net program savings divided by gross program savings that is applied to gross program impacts to convert them into net program load impacts.

Non-participant: Any consumer who was eligible but did not participate in the subject efficiency program, in a given program year. Each evaluation plan should provide a definition of a non-participant as it applies to a specific evaluation.

Normalized annual consumption (NAC) analysis: A regression-based method that analyzes monthly energy consumption data.

Participant: A consumer that received a service offered through the subject efficiency program, in a given program year. The term "service" is used in this definition to suggest that the service can be a wide variety of services, including financial rebates, technical assistance, product installations, training, energy efficiency information or other services, items, or conditions. Each evaluation plan should define "participant" as it applies to the specific evaluation.

Peak demand: The maximum level of metered demand during a specified period, such as a billing month or a peak demand period.

Persistence study: A study to assess changes in program impacts over time (including retention and degradation).

Portfolio: Either (a) a collection of similar programs addressing the same market (e.g., a portfolio of residential programs), technology (e.g., motor efficiency programs), or mechanisms (e.g., loan programs) or (b) the set of all programs conducted by one organization, such as a utility (and which could include programs that cover multiple markets, technologies, etc.).

Potential studies: Studies conducted to assess market baselines and savings potentials for different technologies and customer markets. Potential is typically defined in terms of technical potential, market potential, and economic potential.

Precision: The indication of the closeness of agreement among repeated measurements of the same physical quantity.

Primary effects: Effects that the project or program are intended to achieve. For efficiency programs, this is primarily a reduction in energy use per unit of output.

Process evaluation: A systematic assessment of an energy efficiency program for the purposes of documenting program operations at the time of the examination, and identifying and recommending improvements to increase the program's efficiency or effectiveness for acquiring energy resources while maintaining high levels of participant satisfaction.

Program: A group of projects, with similar characteristics and installed in similar applications. Examples could include a utility program to install energy-efficient lighting in commercial buildings, a developer's program to build a subdivision of homes that have photovoltaic systems, or a state residential energy efficiency code program.

Project: An activity or course of action involving one or multiple energy efficiency measures, at a single facility or site.

Rebound effect: A change in energy-using behavior that yields an increased level of service and occurs as a result of taking an energy efficiency action.

Regression analysis: Analysis of the relationship between a dependent variable (response variable) to specified independent variables (explanatory variables). The mathematical model of their relationship is the regression equation.

Reliability: Refers to the likelihood that the observations can be replicated.

Reporting period: The time following implementation of an energy efficiency activity during which savings are to be determined.

Resource acquisition program: Programs designed to directly achieve energy and or demand savings, and possibly avoided emissions

Retrofit isolation: The savings measurement approach defined in IPMVP Options A and B, and ASHRAE Guideline 14, that determines energy or demand savings through the use of meters to isolate the energy flows for the system(s) under consideration.

Rigor: The level of expected confidence and precision. The higher the level of rigor, the more confident one is that the results of the evaluation are both accurate and precise.

Secondary effects: Unintended impacts of the project or program such as rebound effect (e.g., increasing energy use as it becomes more efficient and less costly to use), activity shifting (e.g., when generation resources move to another location), and market leakage (e.g., emission changes due to changes in supply or demand of commercial markets). These secondary effects can be positive or negative.

Spillover: Reductions in energy consumption and/or demand caused by the presence of the energy efficiency program, beyond the program-related gross savings of the participants. There can be participant and/or non-participant spillover.

Statistically adjusted engineering (SAE) models: A category of statistical analysis models that incorporate the engineering estimate of savings as a dependent variable.

Stipulated values: See "deemed savings."

Takeback effect: See "rebound effect."

Uncertainty: The range or interval of doubt surrounding a measured or calculated value within which the true value is expected to fall within some degree of confidence.