

Energy Benefits and NEI Estimation Tools for Program Evaluators and Policy-Makers

Tuesday, November 1 | 1:00pm – 5:00pm | \$185

Instructors: Angela Vitulli, Brian Morrison, Maura Flight, Catherine Foley, Karen Noiva, and Christine Lee, IEC

IEC developed a large portfolio of highly user-friendly, Excel-based tools that evaluators and policy-makers can use to readily estimate energy benefits and non-energy impacts (NEIs) with limited data collection, and little or no prior experience estimating these types of benefits. These include tools to estimate and monetize benefits from DSM, fuel switching (e.g., heat pump), DER, storage, and DR programs from multiple perspectives (customer, utility, society). The tools can be used to examine single projects as well as large portfolios, and to estimate both prospective and retrospective benefits.

Benefits and NEIs covered in the tools include:

- On-bill savings from DSM, fuel switching, DER, and/or storage programs (regardless of access to bills)
- Emissions reductions
- Human health benefits
- Social costs of carbon avoided
- Avoided economic impacts from reduced outage time
- Reduced public health threats from reduced outage time
- Electricity system savings from peak load reduction, renewables, and/or storage investments
- Electricity system savings from enhanced DR programs
- Levelized Cost of Energy
- Levelized Cost of Storage

The workshop will provide instruction to attendees on how to use the tools, how the tools work, tool limitations, and updating.

Participants will leave the workshop with an understanding of how to use each tool, its purposes, and an understanding of its limitations. Participants will also have copies of tools of interest, documentation for each tool, and examples of publicly available analyses that IEC has already conducted with the tools.

The tools were originally developed for the California Energy Commission (CEC). The tools are free, open source, and available to all interested parties. Some of the tools require adaptation or data updates to apply outside of CA; for these tools, the workshop will cover level of effort for adaptation. Updates generally involve copying and pasting new data sets and are recommended every 1-3 years depending on the tool.

Workshop approach and format: Participants will be contacted prior to the workshop to identify the tools of interest to each participant, and we will structure the workshop accordingly. We will only cover tools that attendees are interested in.

We encourage participants to download tools and documentation onto their laptops prior to the workshop, and to make sure that they can open the tools on their laptops. However, we will also make these materials available to participants on the day of the workshop. We encourage participants to explore tools of interest prior to the workshop.

At the workshop, instructors will first provide 5-minute overviews of each tool of interest to be covered, describing the tool's purpose, logic, data requirements, and limitations. For the remaining time, instructors will split up into breakout groups and work with participants to construct and run scenarios of interest to them. IEC will schedule and organize the breakout groups so that participants can attend as many as possible that are of interest.

About the instructors:



Moderator/Session Coordinator: Angela Vitulli is a Principal at IEc specializing in evaluation of R&D, technology demonstration, and market facilitation programs. She has worked with DOE EERE, NYSERDA, CARB, and NRCAN to evaluate the implementation and impacts of these programs, as well as to design and plan the next generation of them. Ms. Vitulli served as the project manager for the IEc Team's project with CEC to develop and deploy reduced form benefits tools, to better understand and forecast the benefits of CEC EPIC investments.

Instructors:



Brian Morrison, IEc. - On behalf of the New York State Energy Research and Development Authority, Mr. Morrison has led assessments of the costs and benefits of more than 80 proposals to develop microgrids in New York State. He was also a leading contributor to a report to the New York State Legislature on the development of microgrids to support the delivery of critical health and safety services during prolonged power outages. He will provide instruction on the use of the Grid Reliability Benefits Tool, the Public Safety Benefits Calculator, and the On-bill Savings Calculator for DER + Storage Projects.



Maura Flight, IEc. Maura Flight is a Principal and Environmental Economist with IEc. She provides economic analysis support to inform sound environmental and natural resource management from project-level studies to national-level regulations. Her current work focuses on ecosystem service valuation, benefit-cost analysis, and regional economic impact analysis in the context of climate change mitigation. She oversaw development of the emissions, health benefits, and social cost of carbon tools for CEC.



Catherine (Cat) Foley, IEc. Cat Foley (she/her) specializes in program evaluation, performance measurement, and energy and environmental analysis. She draws on a multi-disciplinary background with experience and expertise in a diverse set of evaluative tools and methods, statistical analyses, GIS-analysis and mapmaking, and facilitation and consensus building. Cat is also proficient in data visualization, data management, quality assurance and quality control processes, and analysis of qualitative information. She provides support to programs at the federal, state and local levels; recent clients include Environmental Protection Agency, Bureau of Ocean Energy Management, Small Business Administration, and California Energy Commission.



Karen Noiva, IEc. Karen is interested in enhancing sustainability and resilience of urban water infrastructure and other complex systems through modeling, data analysis, and visualization. Her previous experience includes working with geospatial data, statistical data-mining and clustering, and system dynamics.



Christine Lee, IEc. With over 15 years of consulting experience, Ms. Lee specializes in assisting public sector decision makers to develop and implement evaluation and decision support frameworks designed to increase transparency and improve stewardship of public resources. Her current work focuses on examining the economic impacts and evaluating the effectiveness of clean energy and climate change regulations, policies, and programs. Ms. Lee will provide instruction on the use of the System-Level Savings Calculator.

OVERVIEW OF BENEFITS AND NEI TOOLS

Tool	Estimates Benefits To	Description	Requires Adaptation to use Outside of CA?
On-Bill Energy Savings Calculator	Ratepayers	Estimates on-bill savings from projects or programs that reduce ratepayers' electricity and/or fuel use, change the timing of electricity use, and/or increase on-site electricity generation with net metering	No adaptation for non-solar projects if user enters actual billing information (rates, schedule, etc.). Some adaptation if user wants to replace CA-based model billing information programmed into the tool. Some adaptation for states without net metering and/or for solar projects.
On-Bill Energy Savings Calculator for DER + Storage Projects	Ratepayers	Estimates on-bill savings from projects that combine distributed energy generation with advanced energy storage and control, thereby enhancing ratepayers' load management capabilities	Significant adaptation required, as this tool is based on a CA-specific underlying model.
Emissions Calculator	Society	Estimates changes in emissions due to projects or programs that increase renewable electricity generation in California, reduce or shift demand for electricity, and reduce consumption of gas and oil through electrification	Significant adaptation required. However, good alternatives exist for estimating emissions. One can use national average emissions factors (e.g., EPA AVERT model), which is a user-friendly approach, but lacks customization to the region or state. On the other end of the spectrum, evaluators and policy-makers can use a geographically customized dispatch model, if one exists. These models are precise but require expertise to use. IEC's emissions calculator is in between these two approaches in terms of rigor.
Social Cost of Carbon Calculator	Society	Estimates the social welfare benefits of projects or programs that reduce or mitigate greenhouse gas (GHG) emissions. Requires emissions estimates as inputs (see above).	No adaptation required
Health Benefits Calculator	Society	Estimates the human health benefits resulting from projects or programs that reduce emissions of primary fine particulate matter (PM2.5), nitrogen oxides (NOx), and sulfur dioxide (SO2) emissions. Requires emissions estimates as inputs (see above).	No adaptation required
Grid Reliability Benefits Tool	Society	Estimates the benefits of interventions that lead to improvements in grid reliability, in conjunction with the U.S. Department of Energy's Interruption Cost Estimate (ICE) Calculator, an electric reliability planning tool	No adaptation required
Public Safety Benefits Calculator	Society	Estimates the benefits of interventions that reduce public safety risks by improving the level of critical public services that can be maintained during a power outage	No adaptation required
System-Level Savings Calculator	Utilities	Estimates the avoided costs to utilities, including avoided energy procurement and avoided capital costs for new generation capacity due to projects that lead to load reduction	Significant adaptation required, as this tool is based on a CA-specific underlying model.
Demand Response Impact Tool	Utilities	Estimates the value to utilities of increasing penetration of automated demand response, or improved responsiveness or operational efficiency of demand response	No adaptation required
Levelized Cost of Energy Calculator	Utilities, Project Developers	Estimates the difference in levelized cost between and among renewable generation and energy storage projects based on variations in capital and operating expenses, efficiency and other variables	No adaptation required

Tool	Estimates Benefits To	Description	Requires Adaptation to use Outside of CA?
Levelized Cost of Storage Calculator	Utilities, Project Developers	Estimates levelized cost of battery technologies. Provides a cost benchmark that can be used to evaluate the economic feasibility of a storage project, whether feasibility is based solely on wholesale market revenues (energy, capacity, ancillary services) or on avoided costs such as network transmission	No adaptation required

Below, is more information on when an evaluator (or policy-maker) may want to apply each tool.

Situation: Evaluator would like to estimate prospective on-bill savings from a program that promotes peak load reduction, fuel switching (e.g., heat pumps), DER installation, and/or storage; or evaluator is conducting a retrospective evaluation of such a program. Thorough billing analysis is not feasible.

- Applicable Tool: On-bill savings calculator and/or on-bill savings from storage

Situation: Evaluator has estimated load reduction, peak load reduction, and fuel switching from a program, and wants to estimate associated non-energy benefits such as emissions reductions (criteria emissions and/or GHGs); value of avoided carbon emissions; and/or air quality health benefits.

- Applicable Tool: Emissions calculator, social cost of carbon calculator, health benefits calculator

Situation: Evaluator has estimated peak load reduction or increased renewable generation from a program and wants to estimate benefits to the utility system.

- Applicable Tool: System level savings calculator

Situation: Evaluator is analyzing the impacts of a program that promotes microgrids or otherwise avoids outages, and wants to monetize the value of avoided outages.

- Applicable Tool: Public safety benefits calculator, reliability calculator

Situation: Evaluator is analyzing the prospective financial performance of a program that deploys renewables or storage projects, or a program that is designed to improve the operational efficiency of renewables or storage technologies.

- Applicable Tool: Levelized cost of energy calculator, levelized cost of storage calculator

Situation: Evaluator is analyzing the retrospective or prospective benefits of expanding DR and ADR enrollment.

- Applicable Tool: Demand Response Impact Tool