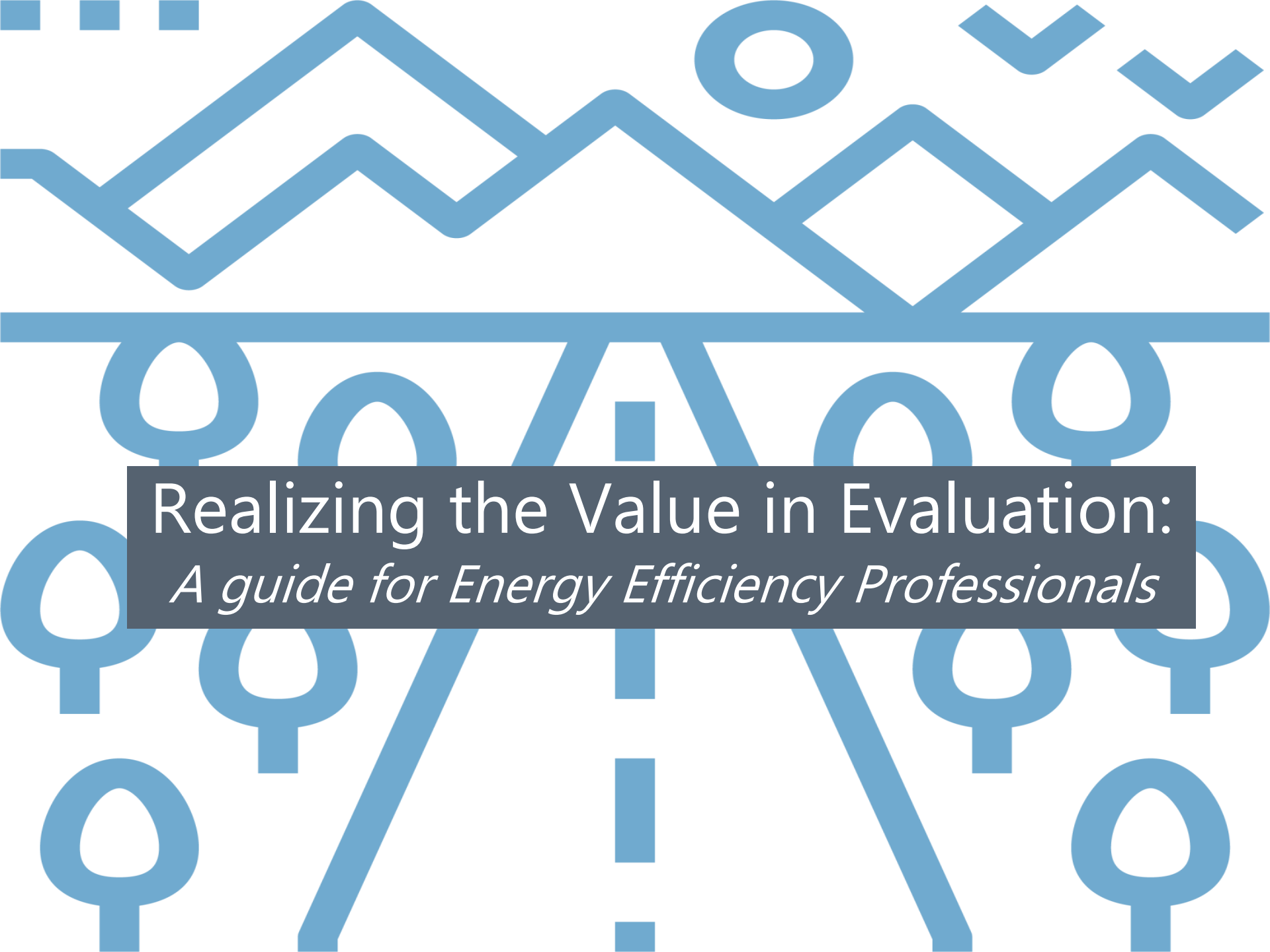

Realizing the Value in Evaluation:

A guide for Energy Efficiency Professionals

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Introduction

Getting the lay of the land

Introduction

Ask not what evaluation is doing TO your programs; ask what evaluation can do FOR your programs.

Gone are the days when hundreds of pages worth of evaluation reports sit unread on forgotten server locations!

Rapid feedback, infographics, and continuous performance monitoring are here and now!

In addition, there are plenty of opportunities to combine forces with similar functions to save time, frustration, and effort for everyone – all while maximizing the usefulness of results.

This playbook outlines how to plan for energy efficiency evaluation efforts that strive toward maximizing the value for program design and implementation by leveraging innovative data collection techniques, advanced data analytics, and user-friendly graphical presentations.

How to Use This Playbook

This guide serves as an information resource for the program and evaluation teams working to develop a framework for energy efficiency evaluation planning. It is organized in three sections.

Evaluation Basics

Terminology and fundamental concepts

Evaluation Prioritization

Considerations for engaging stakeholders to choose the right path for evaluation in your organization

User-Friendly Reporting

Guiding principles for getting evaluation results that refuse to sit on the shelf

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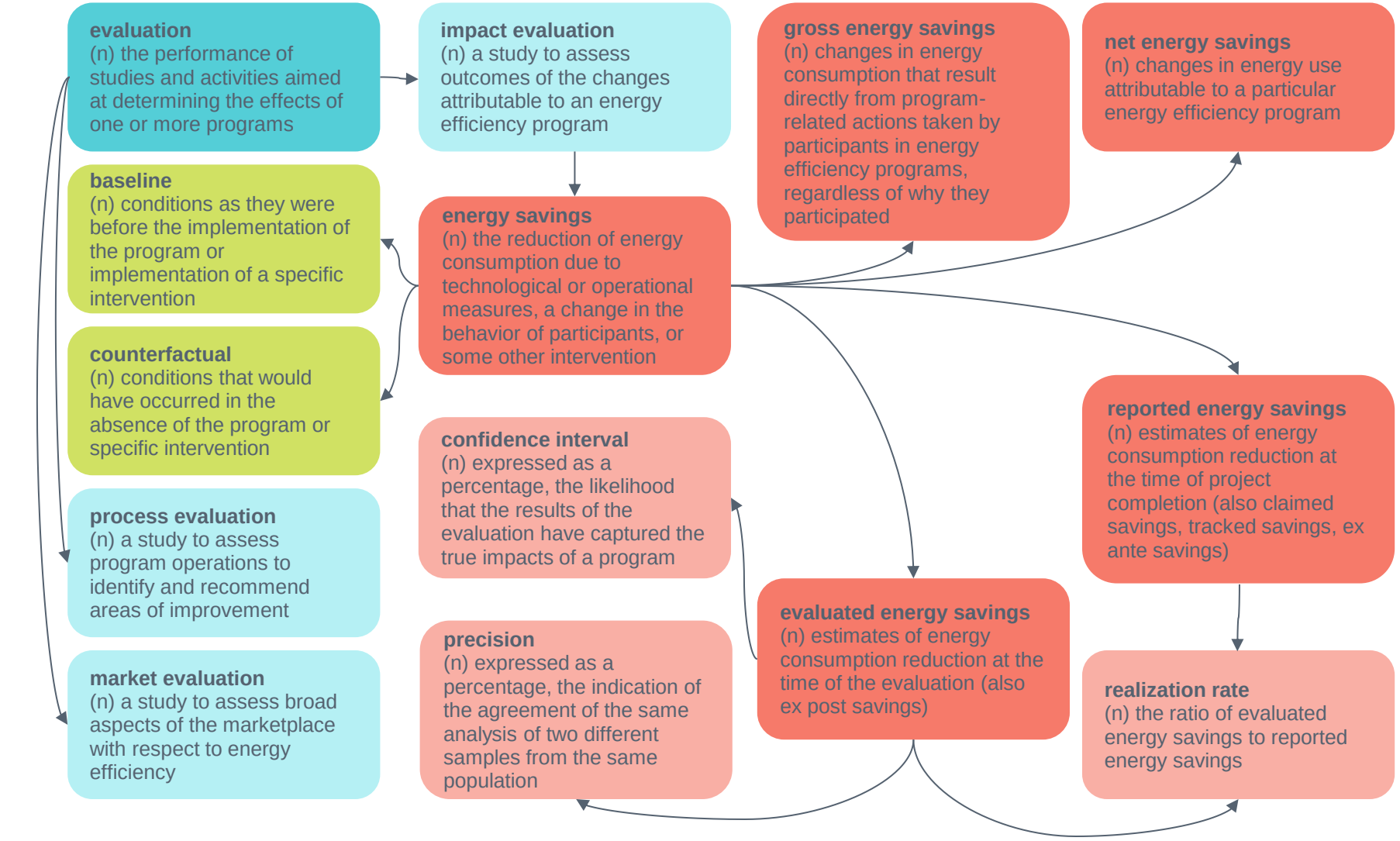
Evaluation Basics

Fundamental Evaluation Concepts

Key Terms

Summative Analysis	• Used to determine if the program objectives were met (e.g., savings impact, cost-effectiveness) • Generally answers "What happened?"
Formative Analysis	• Used to identify areas of success of and areas for improvement to program processes • Generally answers "*Why did what happened happen?*" and "*What should I do differently?*"
Prospective Analysis	• Use to address forward-looking questions about program delivery • Generally answers "*What should I do next?*"

Key Terms


evaluation
(n) the performance of studies and activities aimed at determining the effects of one or more programs
impact evaluation
(n) a study to assess outcomes of the changes attributable to an energy efficiency program
gross energy savings
(n) changes in energy consumption that result directly from program-related actions taken by participants in energy efficiency programs, regardless of why they participated
net energy savings
(n) changes in energy use attributable to a particular energy efficiency program
baseline
(n) conditions as they were before the implementation of the program or implementation of a specific intervention
energy savings
(n) the reduction of energy consumption due to technological or operational measures, a change in the behavior of participants, or some other intervention
counterfactual
(n) conditions that would have occurred in the absence of the program or specific intervention
confidence interval
(n) expressed as a percentage, the likelihood that the results of the evaluation have captured the true impacts of a program
reported energy savings
(n) estimates of energy consumption reduction at the time of project completion (also claimed savings, tracked savings, ex ante savings)
process evaluation
(n) a study to assess program operations to identify and recommend areas of improvement
evaluated energy savings
(n) estimates of energy consumption reduction at the time of the evaluation (also ex post savings)
market evaluation
(n) a study to assess broad aspects of the marketplace with respect to energy efficiency
precision
(n) expressed as a percentage, the indication of the agreement of the same analysis of two different samples from the same population
realization rate
(n) the ratio of evaluated energy savings to reported energy savings
Evaluation Category
Condition Type
Calculated Evaluation Metric
Savings Value

Getting There

How to gather useful intelligence for prioritizing evaluations

Check the Road Conditions:

Key questions to ask before you start

Before you start any journey, you probably ask yourself, "Where am I going?" and "How do I get there?"

Often in energy efficiency evaluations, the question "Why are we going there?" is not addressed directly.

You should be able to answer:

- ❑ "What am I trying to accomplish in this evaluation?"
- ❑ "How can I get the most value out of this evaluation?"

The following pages provide examples of questions to ask prior to starting an evaluation.

Program Attributes

What is the relative contribution to the portfolio-level energy savings and budget?

How many customers does the program touch?

Is the program mature, undergoing significant delivery changes, or in a pilot-like stage?

Program Implementation Input

What are the objectives of the program?

How comfortable are you with the energy savings estimates?

Are customers and market actors generally satisfied with the program?

Where along the market saturation curve are the technologies?

What does the future of the program look like?

Evaluation Intelligence

Has this program been evaluated previously?

What were the results of previous evaluations?

Did the evaluation propose any areas of additional research?

Did the evaluation recommend any actions for continuous improvement?

Other Considerations

Are there any regulatory compliance constraints or priorities? (e.g., 7th Power Plan's "hard to reach" focus)

Can the evaluation align with any enterprise initiatives? (e.g., understanding carbon reduction)

What other research is ongoing or available that could support the evaluation?

Calculating Your Route:

Prioritizing the evaluation effort

The GPS in your car analyzes all of the available data (e.g., traffic patterns, road speeds, construction zones) to determine the best route.

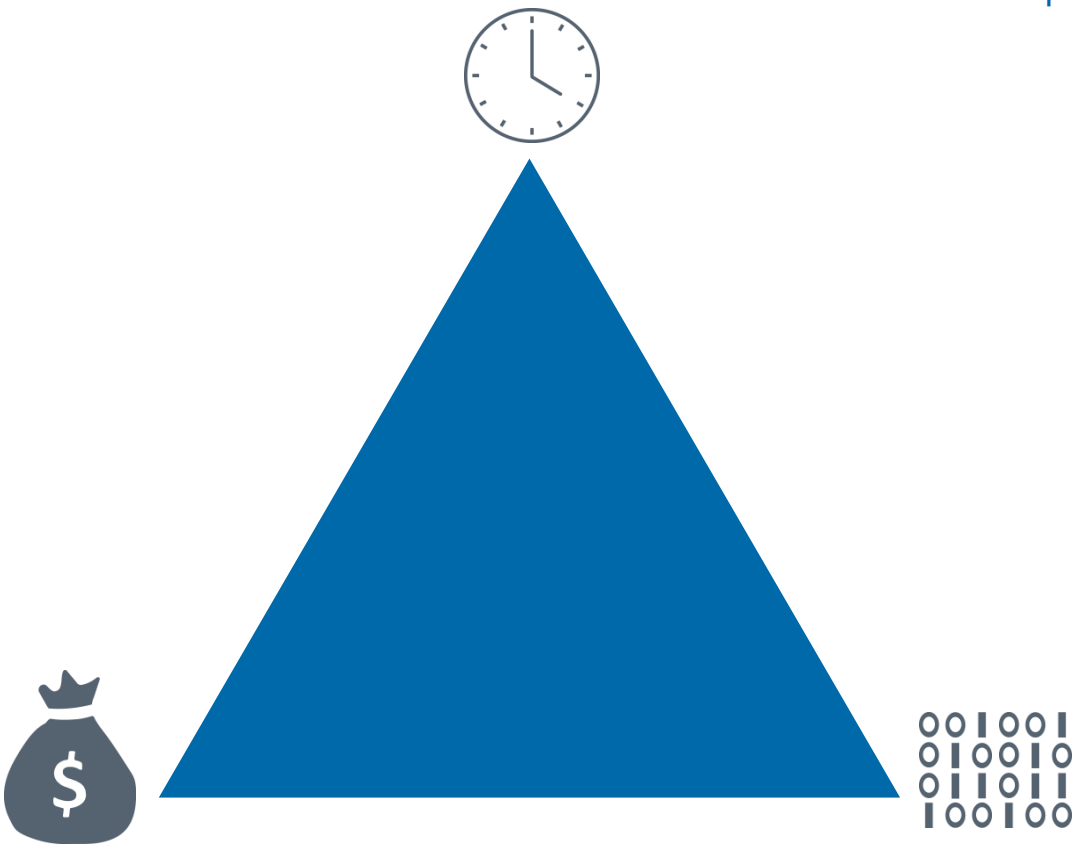
Evaluation planning can apply a similar theory to prioritizing the evaluation activities. On one hand, you might want to address all of the research objectives; on the other hand, and more realistically, you have constraints (e.g., **time, money, data**).

So there are trade-offs. Framing the key questions in the context of "value added" will help.

Calculating Your Route:

Prioritizing the evaluation effort

When faced with the task of deciding how to allocate limited resources to get what your organization needs from evaluation, realize that there is no one right approach. Approaches that will result in the most granular data to quantify savings may take more time and money than is realistic. On the other hand, approaches that use document review to verify delivery may be efficient ways to meet the needs of evaluation in some cases, but will likely fall short when there are more uncertainties at play.



Hit the Road:

Implementing the strategy with real-time adjustments

Have you ever used the app Waze? An extension of GPS navigation, Waze continuously collects information about the route you are on and makes real-time updates to get you from Point A to Point B in the quickest way possible.

Going into an evaluation, you might not know all of the answers to the key planning questions. That's okay! You might set up a performance indicator monitoring system, which can help you strategize along the way.

For example, you might monitor the level of customer satisfaction with a program over time, and you might explore any significant changes to find out what caused the changes.

Traditional Evaluation

Evaluation conducted **after** implementation

- ❑ What happened?
- ❑ Why did it happen?

Forward-Looking Evaluation

Evaluation **alongside** implementation

- ❑ What is working?
- ❑ What should we change?

Where is your evaluation going?

Drive Program Success

Deliver user-friendly evaluation results

Radical simplification:

Lead the way to key findings

Evaluation results can be complex, but reading reports about them should be as straightforward as possible.

Distilling findings into a concise 1-pager of highlights can help refine the story of even the most complex study. Consider creating an accompanying summary document to go along with the detailed report and data tables.

Radical simplification:

Lead the way to key findings

EVALUATION SUMMARY

LOW INCOME WEATHERIZATION ENERGY EFFICIENCY PROGRAM (LIW)

The program is achieving its overall objectives of reducing low-income customers' energy cost burden.

KEY FINDINGS

- The program resulted in participants consuming 18% less electricity and 24% less gas, on average.
- Average per household electric energy savings were lower than reported (79% realization rate) but were strong relative to benchmarked LI programs.
- Average per household gas energy savings exceeded reported savings (118% realization rate).
- The LIW program resulted in quantifiable non-energy benefits (NEBs).
- PSE's savings estimation methods and input data are reasonably accurate; however, several measures have outdated planning assumptions.
- Agencies and stakeholders praise PSE's communication and characterize PSE as forward-thinking, service-oriented, collaborative.

RECOMMENDATIONS

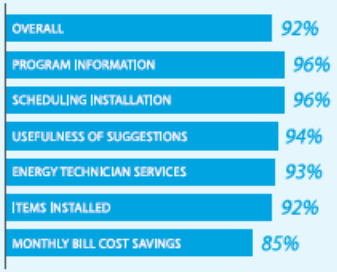
- Update unit energy savings (UES) values for shell and duct measures to reflect most recent RTF estimates.
- Include non-energy impacts in program cost-effectiveness scenarios.

CADMUS PUGET SOUND ENERGY

64% of customers knew PSE helped pay for services

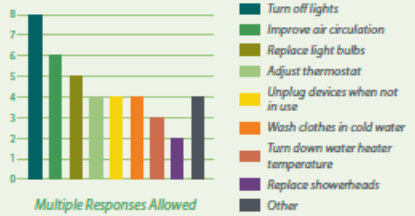
Customers discovered the program through…

Program Satisfaction



Customer Actions

83% of customers remember energy auditor recommendations → *70% have implemented energy auditor recommendations*

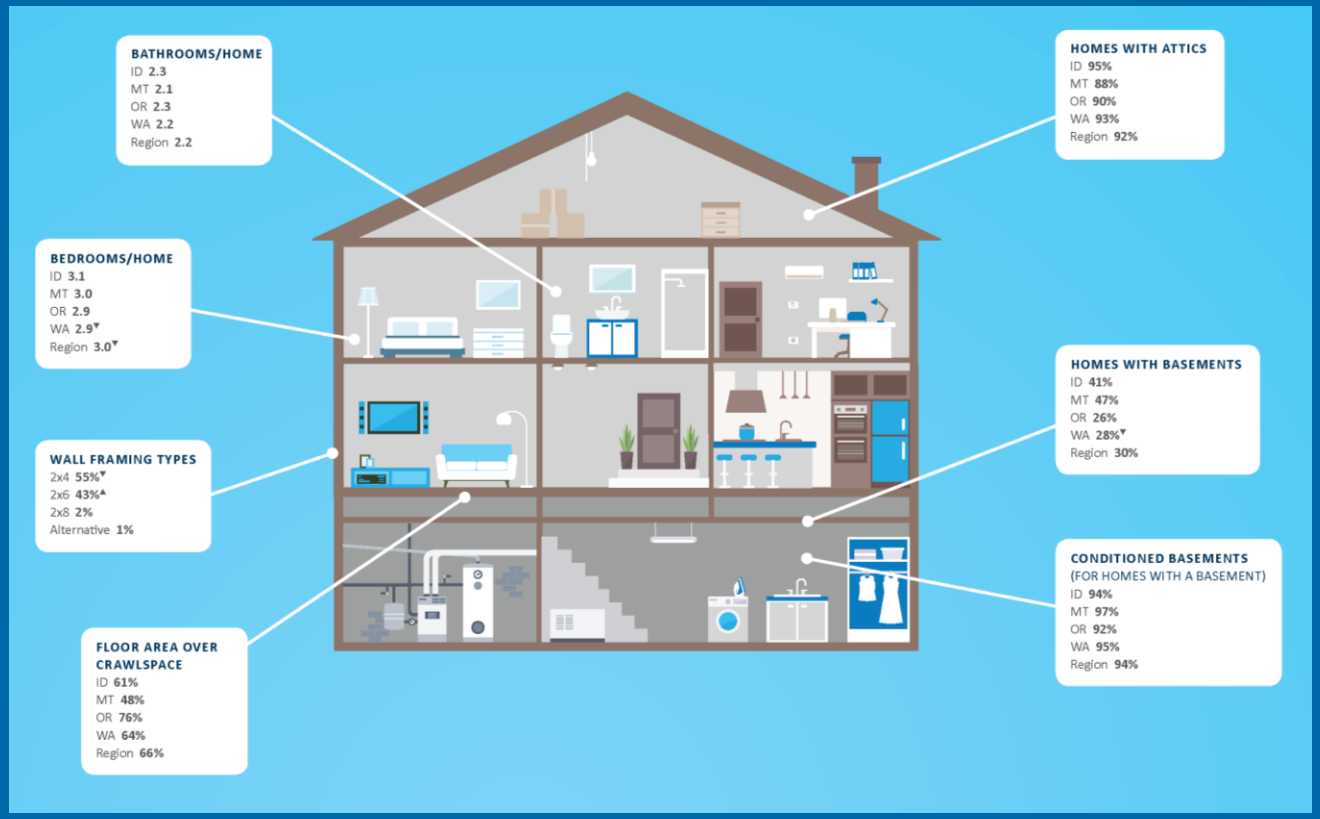


Source: PSE Low Income Weatherization EE Program (LIW) Evaluation

Make it easy to map results to programs

It's worth rethinking how to share findings to maximize their applicability across stakeholder categories.

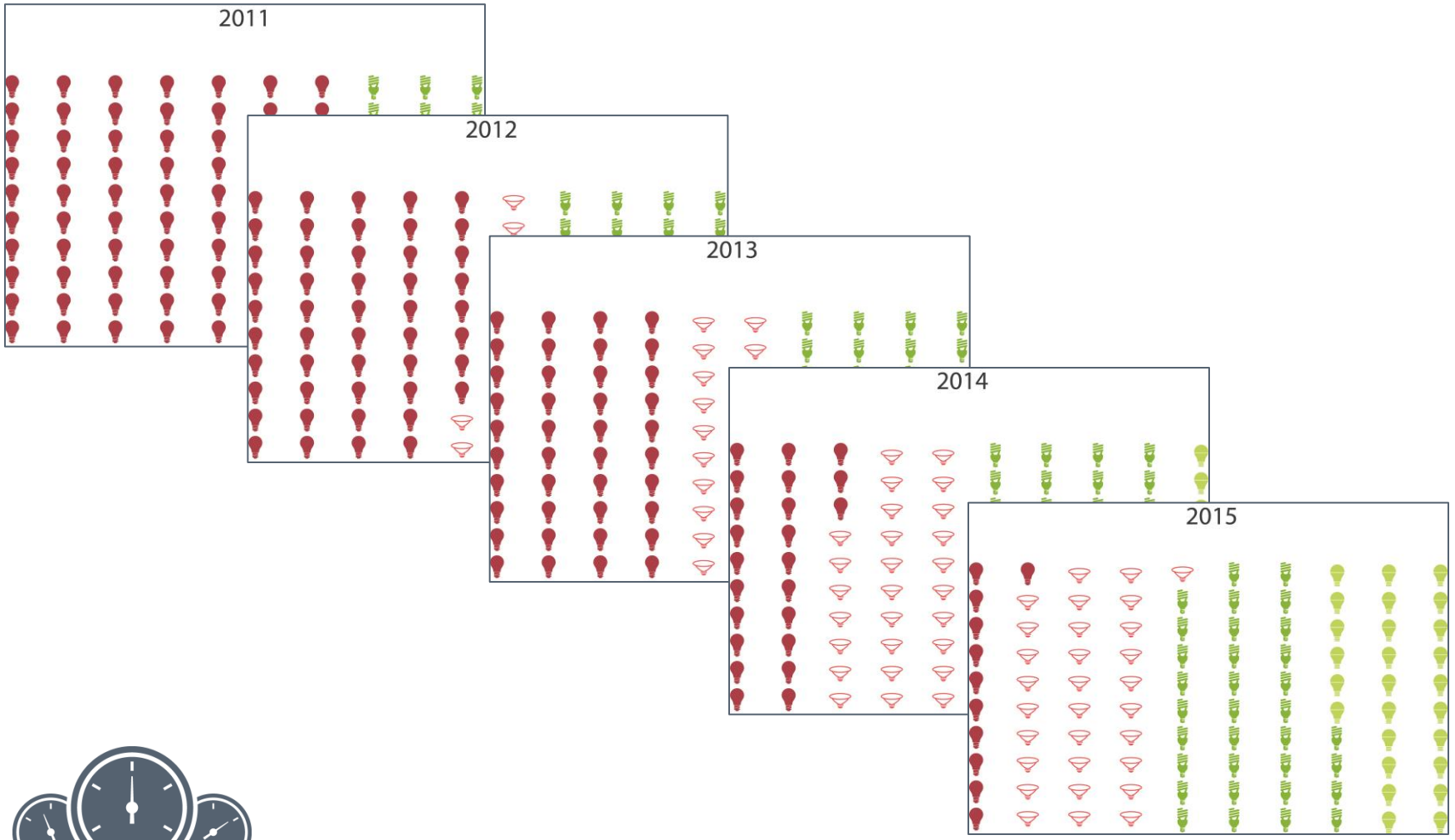
In this example, the Residential Building Stock Assessment findings are mapped onto a visual representation of a single-family home, making it easy for program managers to zero in on the results that matter to them.



Source: RBSA 2016-2017, https://neea.org/resources/residential-building-stock-assessment-ii-single-family-homes-report-2016-2017

Say it with (intuitive) graphs

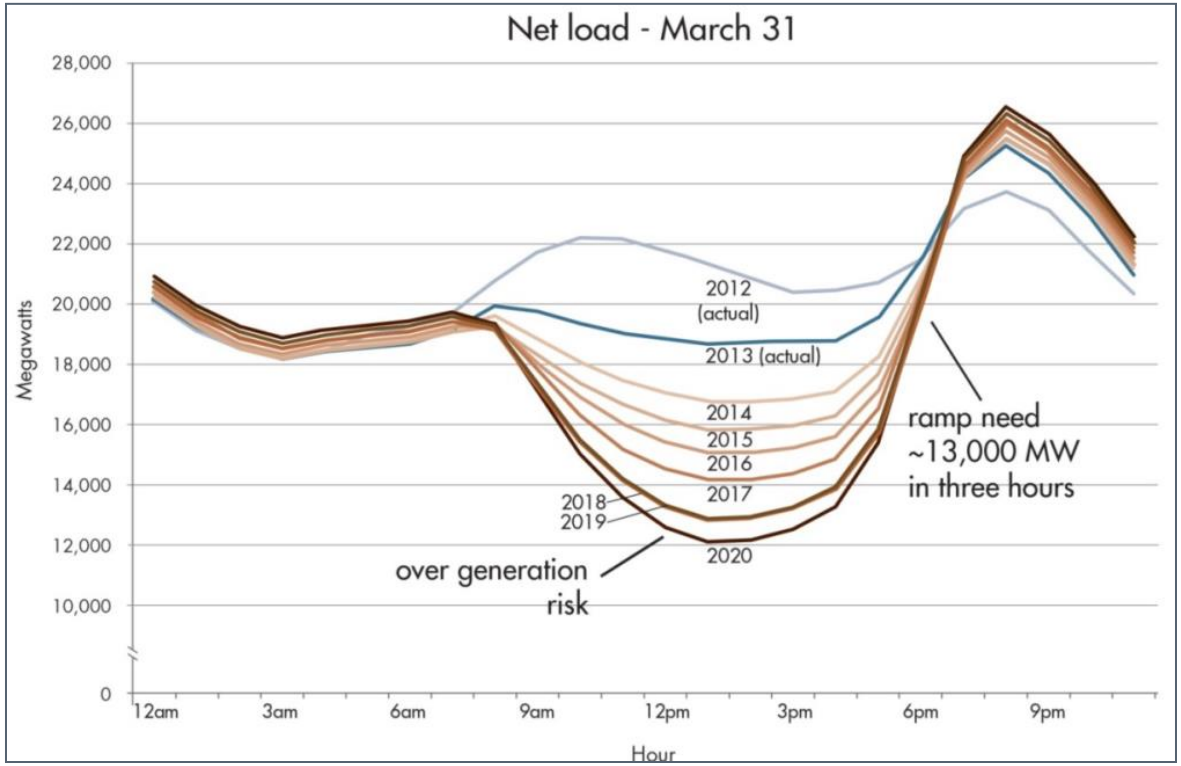
In this example, the graphs speak volumes about how the lighting market is changing in a short span of years. The audience doesn't have to work to find the message.



Source: BPA Residential Lighting Market Update, https://www.bpa.gov/EE/Utility/research-archive/Documents/Momentum-Savings-Resources/Residential_Lighting_Market_Update.pdf

Say it with (intuitive) graphs

Beyond Energy Efficiency, there are numerous examples in the energy sector of graphs that deftly illustrate complex issues. Below is the "Duck Curve" (so named for its eponymous shape) illustrating how mid-day rooftop solar generation is changing the shape of net load in California. This graph has been used extensively across the WECC to talk about the challenges to integrating renewables. Related graphics displayed on CAISO's dashboard (facing) show related metrics to track how "duck-like" the day's demand is in real-time.



From CAISO, http://www.caiso.com/TodaysOutlook/Pages/default.aspx

Today's Outlook | Demand | Supply | Prices | Emissions — AS OF 16:00 05/04/2018

Grid status: Normal — Learn more about active alerts, warnings and emergencies

Current and forecasted demand AS OF 16:00

View official data in OASIS

Capacity status

40,596 MW Available capacity*

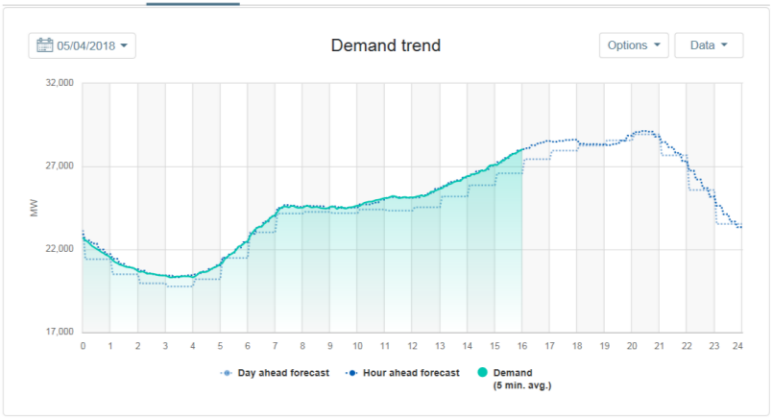
28,333 MW Current demand

29,134 MW Forecasted peak

*Available capacity varies due to outages, congestion and emergencies. View all outage reports.

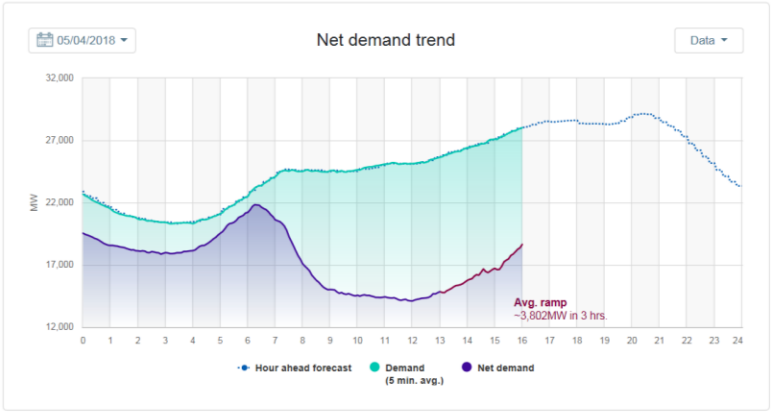
40,596 MW Available capacity*	28,333 MW Current demand	29,134 MW Forecasted peak
50,270 MW Historical peak (Jul 24, 2006)	28,405 MW Today's peak (15:57)	28,320 MW Tomorrow's forecasted peak

Today's Outlook | Demand | Supply | Prices | Emissions — AS OF 16:00 05/04/2018



Net demand (demand minus solar and wind) AS OF 16:00

This graph illustrates how the ISO meets demand while managing the quickly changing ramp rates of variable energy resources, such as solar and wind. Learn how the ISO maintains reliability while maximizing clean energy sources.

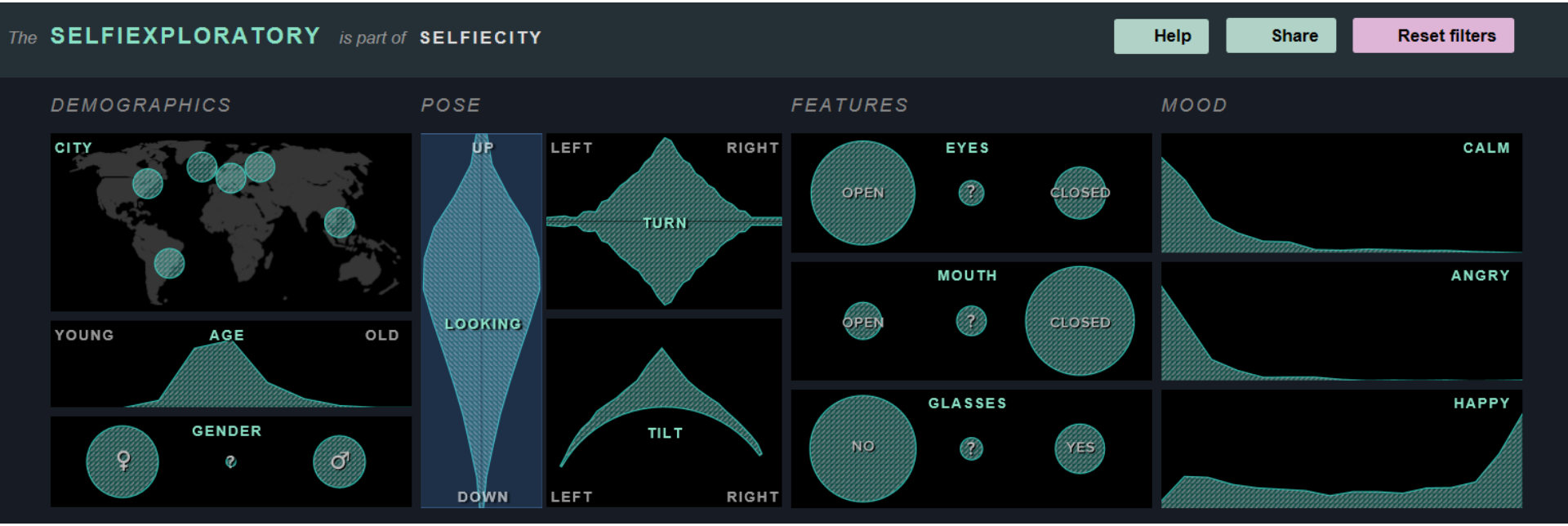


From CAISO, http://www.caiso.com/TodaysOutlook/Pages/default.aspx

Say it with (intuitive) graphs

Graphs should help tell the story of data – and they should never feel like a test of the audience's fluency with evaluation metrics.

In this example (outside the realm of Energy Efficiency), the frequencies of over a dozen separate features of selfie composition are elegantly displayed in an intuitive set of (interactive!) graphs. When choosing whether to display evaluation data in graphical form, make sure audiences of all sorts can readily discern the takeaway.



From http://selfiecity.net

Where is your evaluation going?

Where is your evaluation going?

Where is your evaluation going?