

Overview of Momentum Savings

Bonneville
POWER ADMINISTRATION



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Introduction

This white paper discusses the methods and processes that Bonneville Power Administration (BPA) uses to calculate and report Momentum Savings. The paper is intended to help BPA's utility customers, regulators, and any other interested stakeholders understand how BPA measures and reports Momentum Savings to its customers and the region.

The paper is structured as follows:

- First, it introduces the concept of Momentum Savings and how it relates to regional efficiency program activities.
- Second, it describes the process of a typical Momentum Savings research project, including an overview of the analytical framework that guides the calculation of Momentum Savings.
- Third, it describes the steps that BPA takes to ensure Momentum Savings estimates are reliable.
- Finally, the paper illustrates how BPA plans to allocate Momentum Savings to BPA customer utilities.

What are Momentum Savings?

Momentum Savings result when an end-user chooses an efficient option without receiving a financial incentive directly from a utility. Many factors may drive such choices, including the “momentum” generated by past efficiency programs, new codes and standards, corporate sustainability policies, and technology trends. Momentum Savings are energy savings that are:

- Cost-effective
- Not directly paid for by utilities
- Not part of the Northwest Energy Efficiency Alliance's (NEEA) Net Market Effects
- Above the Northwest Power and Conservation Council's Power Plan baseline (Council baseline)

Momentum Savings are integral to the region's power planning activities. Every five years, the Northwest Power and Conservation Council (the Council) prepare a regional power supply plan. The Council's assessment of conservation potential includes all achievable and cost-effective energy efficiency available *now* to reduce future demand. By definition, this cost-effective efficiency resource is a better value for the Northwest than new power generation. This resource forms the regional conservation target for each five-year planning period.

The Council is indifferent to how the region achieves this conservation resource. The reason a kilowatt-hour is saved—and who saved it—is secondary to the fact that it was indeed saved. Therefore, the Council's five-year conservation targets comprise two types of savings:

- Programmatic Savings: energy savings that utilities pay for directly through programs
- Momentum Savings: representing all other energy savings, whether the indirect legacy of past programs or those that occur entirely independent of utility efforts

How are Momentum Savings Estimated?

Momentum savings require a fundamentally different quantification approach than programmatic savings, because there is no centralized record of them. A rich body of work exists documenting the approaches to, limitations of, and results of quantifying programmatic savings. Evaluators have sought to refine these approaches and results over 30 years, and continue to seek to advance the methodologies. The methodologies for calculating Momentum Savings build upon these approaches. This section describes how Momentum Savings research projects lead to regional estimates of Momentum Savings projects.

A BPA Momentum Savings project typically targets a specific market, usually defined by an end use, measure category, and/or sector. Recent and ongoing projects include residential lighting, weatherization, agriculture, residential and commercial HVAC, non-residential lighting, and others.¹ For each project, BPA first develops a research plan, which includes four basic steps:

- Characterize the market
- Draft the Momentum Savings methodology
- Collect data
- Calculate Momentum Savings

Characterize the Market

Understanding how and through whom a given product arrives at its eventual end use helps the analyst collect and analyze sales data, which drives estimates of Momentum Savings. A better understanding of the channels in the market enables the analyst to identify the most effective point from which to collect sales data. A better understanding of the different market actors types and their roles in the market enables the analyst to apply that sales data in Momentum Savings analysis. Momentum Savings projects typically include the following market characterization activities:

- The identification of the key market actors in the sector, including manufacturers, distributors, retailers, contractors, and end-users.
- An assessment of the distribution chain and relationships among the market actors.
- An assessment of how utility program activity and other potential drivers have impacted the market and how they may impact the market in the future.
- An assessment of existing data sources and data gaps in the market.

Draft Momentum Savings Methodology

In each project, BPA drafts a written methodology for quantifying Momentum Savings before embarking on the actual analysis. This step builds on the intelligence gained during the market characterization. It provides stakeholders with an opportunity to contribute to the methodology before the research team invests in data collection or analysis.

¹ A list of projects and associated reports can be found here: www.bpa.gov/goto/Momentumsavings.

The draft methodology explains how the research team will address four key questions. The four questions remain consistent across all markets so that stakeholders remain grounded in a consistent approach. The discussion in Appendix A outlines the four-question Momentum Savings Analysis Framework that underpins all Momentum Savings analysis.

Stakeholder Review: BPA engages internal and external stakeholders to review and assess the draft methodology. External stakeholders may include the Council and subject matter experts at NEEA or other organizations. BPA may hold in-person working groups and webinars with reviewers to share key assumptions, data sets, and uncertainties. This approach elicits better feedback and increases overall transparency.

The final methodology incorporates feedback from this stakeholder review.

Collect Data

Actual sales data is the engine that drives any Momentum Savings analysis. While program savings often have receipts, rebate forms, or pre- and post- engineering measurements, Momentum Savings—those efficient products and practices that occur outside utility program purview—do not, by definition, have program documentation. Therefore, to estimate Momentum Savings in any given market, BPA must depend on accurate data that details the sale of all energy efficiency equipment in the region.

Interviews with the market actors identified in the market characterization guide BPA's approach to data collection. BPA usually makes detailed sales data requests of the key market actors most likely to have the necessary data at the regional level. In most markets, wholesale distributors and retailers best fit this criteria. In many cases, manufacturer data, if available, covers too broad a geographic territory to be useful, while contractors/installers are too fragmented for practical data collection purposes.

Calculate Momentum Savings: The Momentum Savings Analysis Framework

The quantification of Momentum Savings in the market at issue is the fourth component of a Momentum Savings project. This step relies heavily on the market characterization and data collection activities that precede it. Appendix A describes the core analytical framework BPA uses to quantify Momentum Savings.

External Review: A second round of detailed review begins when the draft analysis is complete. BPA makes the draft results, analysis workbooks, and methodology available to stakeholders for their review. BPA seeks to actively engage stakeholders in the review process and will hold in-person working sessions and webinars as necessary to communicate the methodology, assumptions, and uncertainties. Key stakeholders include Northwest Power and Conservation Council Staff, utility planning and evaluation staff and NEEA technical staff. BPA also posts the draft analysis on its Web site for review.

Why Are Momentum Savings Reliable?

Conservation achievements, whether Momentum Savings or programmatic savings, should be accurately and reliably measured. Approaches to counting Momentum Savings are relatively new when compared to

the industry's measurement, verification, and evaluation of program savings. For this reason, BPA is considering several aspects of quality assurance and control in the process for calculating Momentum Savings. This section discusses BPA's processes for initiating third-party review, avoiding double-counting problems, updating research, and considering cost-effectiveness.

Third-Party Review

As discussed previously, external stakeholder review is a critical component of the Momentum Savings estimation process. BPA views the Council's active engagement as particularly important given its collective industry experience and role in developing the regional conservation targets. BPA makes draft methodology memos, collected sales data, and analytical spreadsheets available to Council staff throughout the analysis process. BPA also engages subject matter experts internally and at NEEA to vet each Momentum Savings methodology's assumptions. BPA is seeking to expand third-party review over the course of the next few years to build upon the current review process.

Review for Double Counting

Double-counting of savings could occur at several analytical points when calculating Momentum Savings, just as it could with programmatic savings. BPA takes care to avoid these accounting pitfalls in its analyses. The act of categorizing these areas of potential double-counting is one component of an effective prevention strategy because it raises awareness among BPA analysts and reviewers.

In addition to assessing overlap on reporting during the initial analysis, BPA is conducting a total program portfolio review during the summer of 2015 to identify any possible areas of overlap in savings. The findings from this portfolio review will be available by October 1, 2015.

Table 1 identifies several areas in which double-counting could occur and BPA's approach to addressing those risks.

Table 1. Strategies for Addressing Potential Double Counting

Potential Issue	Approach to Addressing
<p>Measure interaction. Measure interaction occurs when the installation of one measure changes the potential savings impact of another. Common examples include the combination of weatherization and HVAC measures, lamps and lighting controls, or clothes washers and clothes dryers. The efficiency of one impacts the savings potential of the other. As such, the savings cannot be assumed to be independent.</p>	<ol style="list-style-type: none"> 1. Most measures analyzed in the Momentum Savings analyses are based on the Council’s supply curves, which already take into account the impact of measure interaction. 2. Measures in the Council Plans are based on measures approved by the Regional Technical Forum (RTF). The RTF’s technical experts scrutinize the reliability of measure savings estimates, including instances of measure interaction and potential double counting, before approving savings estimates. 3. BPA’s engineers review the technical specifications and assumptions that drive measure savings estimates.
<p>Inconsistent baselines. Utility CPA and program baselines may not be consistent with each other or the Council Plan and may change over the Plan period. This can cause double counting because each term in Equation 1 (in Appendix A) must be measured against the same baseline.</p>	<p>BPA recognizes that program savings may be measured against a baseline other than the Council’s Plan baseline. BPA checks to determine if the program savings have been accrued against the baseline (i.e., the Council’s). If a different baseline was used in programs, BPA adjusts the savings to account for the difference in these baselines. Conservation Potential Assessment (CPA) savings will be a subset of Momentum Savings in cases where CPAs assume that the baseline is more efficient than the Council baseline. An adjustment to Momentum Savings will need to be made so that the Momentum Savings baselines align with CPA baselines when these utilities report savings.</p>
<p>NEEA’s Net Market Effects. NEEA reports its regional conservation achievements as Net Market Effects. NEEA’s Net Market Effects are not directly paid for by utilities, though they are a component of Total Market Savings. NEEA does not report these savings as program savings.</p>	<p>BPA subtracts NEEA’s Net Market Effects after removing programmatic savings from Total Market Savings.</p>
<p>Behavior savings. Behavior program savings affect multiple markets, most often including lighting, HVAC, and appliances. This could cause double counting because the behavior program savings are not contained within a single market.</p>	<p>Momentum Savings analysis doesn’t include any savings for behavior change. However, while much research has been done to see if there are overlap with behavior savings and new measures, the RTF has a new subcommittee that is discussing possible ways to address overlap with upstream savings, including Momentum Savings..</p>

Update Process

BPA conducts regular market research updates based on the level of savings and ability to improve upon past analyses. For example, BPA has begun the third project researching the non-residential lighting market. Each project attempts to collect more sales data that builds on the knowledge gained in the previous round. This approach enables the research team to improve the representativeness of the market and to address sources of uncertainty that stakeholders prioritized during the previous projects.

Cost-Effectiveness

The question of cost-effectiveness for Momentum Savings is not different than for programmatic savings. Like program savings, Momentum Savings assess cost-effectiveness in line with the Council's, which uses a Total Resource Cost (TRC) test for screening measures for the regional power plan. The Momentum Savings analysis relies on the TRC analysis performed by the Council and the RTF. Momentum Savings analysis includes measures that are cost-effective under the Council plan or that are determined to be cost-effective by the Department of Energy for standards rulemakings. Momentum Savings analysis excludes measures that are not cost-effective at the measure level. For example, if the Council or the RTF determines that a measure is not cost-effective, BPA would not include that measure in total market estimates and would exclude the measure from the analysis.

Reporting Savings to Utilities: Overview

BPA's customer utilities CPAs follow the methodology of the Council. Because of this, their potential includes Momentum Savings. Utilities currently receive Momentum Savings in the markets that NEEA tracks, as NEEA reports those markets to utilities based off of the 6th Plan baseline, which includes Momentum Savings and Net Market Effects. However, BPA has not yet begun reporting Momentum Savings to utilities from BPA research. Before reporting begins, BPA needs to conduct more stakeholder engagement and determine a solution for inconsistent baselines, which create a risk of double-counting.

Reporting Savings to Utilities: Allocation

BPA relies on publicly available data to allocate Momentum Savings to its customer utilities. The draft approach uses a combination of U.S. Energy Information Administration, customer count, and climate zone data to derive sector- and climate zone-specific allocations of Momentum Savings. These data are objective and easily verifiable; BPA's customer utilities cannot control these numbers or the savings that BPA allocates based on them.

The current allocation method is in draft format, and will be finalized by the end of 2015. The draft approach uses slightly different methods for the non-residential sector and the residential sector:

- **Non-Residential.** BPA allocates Momentum Savings using each preference public utility's percent of total electric sales across a given heating or cooling zone. This approach uses retail sales data reported to EIA weighted by the relative size of the utility's heating or cooling zone. For example, if a public utility sold three percent of the total electric sales (including all forms of generation) in their heating zone, and their heating zone represented 40 percent of the total regional electric

sales, then BPA would allocate 3% x 40%, or 1.2%, of the total non-residential heating Momentum Savings to that utility.

- **Residential.** BPA uses the same method as described for the non-residential sector, but replaces total electric sales with residential customer count. In other words, the total residential heating Momentum Savings for a utility would be that utility's percent of total residential customers across a given heating zone, weighted by the relative size of the utility's heating zone.

Reporting savings to utilities: Accounting for baseline differences

The most significant risk for double-counting energy savings is due to differences in baselines between utility Conservation Potential Assessments (CPA) and the Council Power Plan baselines. Utilities update the baselines for their CPAs more frequently than the Council updates the Power Plan baseline, which allows utilities to use more current data to inform their baselines.

The two baselines are appropriate for different purposes; one is not "more correct" than the other. Programs update their measure eligibility to follow these changing baselines because it ensures cost-effectiveness. The Council freezes its baseline to enable tracking toward the regional targets. The total conservation achievement toward the regional targets (including momentum savings) is measured relative to the Council baseline. Momentum Savings will report savings relative to the Council baseline.

The relationship between savings relative to CPA baselines and Momentum Savings reported relative to the Council baseline will take one of two forms:

1. CPA savings will include all Momentum Savings in cases where CPAs assume that the baseline is less efficient than the Council baseline. This will most likely arise as an issue to consider when a two-year CPA period covers one year prior to the inception of a new Power Plan and one year following the inception of the new Power Plan.
2. CPA savings will be a subset of Momentum Savings in cases where CPAs assume that the baseline is more efficient than the Council baseline.

In the second case, an adjustment to Momentum Savings will need to be made so that the baselines align with CPA baselines. BPA will report all Momentum Savings with detailed baseline assumptions to facilitate this adjustment. This level of detail will assist utilities and stakeholders in determining which savings are above the utility CPA assumptions.

Appendix A: The Momentum Savings Analysis Framework

In a given market, Momentum Savings are the sum of all cost-effective energy efficiency that occurs above the most recent Council Plan baseline that are *not* paid for by utilities.

$$\text{Equation 1. Calculating Momentum Savings} \\ \text{Total **Market Savings** - Total **Program Savings** = **Momentum Savings**}$$

BPA uses a consistent methodological framework to solve this equation. The framework requires the analyst to answer four core questions to quantify Momentum Savings.

Question 1: What is the market?

The analyst's market definition establishes the boundaries of the analysis. The analyst explicitly describes the scope of the analysis along many dimensions (e.g., sectors, product types, geography). These foundational decisions provide clarity of purpose for the subsequent data collection and analysis.

Question 2: How big is the market?

The analyst uses sales data to define the size of the market, which includes units of all efficiency levels—not merely the high efficiency options. The market size is typically defined by the number of units sold in the market in a given year. This is used as an input to determine (a) the baseline energy consumption (using the average unit energy consumption defined in Question 3) and (b) the actual market energy consumption (using the average unit energy consumption defined in Question 4).

Question 3: What are the total market savings?

Question 3a: What was the energy use in the year the Power Plan was written?

Question 3b: What was the energy use in the following years?

Total market savings is the difference between baseline energy consumption and actual energy consumption. If the actual consumption is lower than the baseline consumption (due to a change in efficiency mix), then there are savings in the market, relative to the baseline assumptions. The estimation of total market savings requires a measure of the annual market size (as estimated in Question 2) in addition to the difference between the average unit energy consumption in the baseline year (Question 3a) and each subsequent year of the analysis period (Question 3b).

The analyst must determine the energy consumed by a baseline unit in the Council's relevant Power Plan. The Council's Power Plans define a unit in each market that has a baseline energy consumption. The energy consumption for all other units is compared to this baseline unit to determine energy savings. The baseline unit reflects the average energy consumption of all units sold in the market in the year prior to Plan period; this is a "current practice" baseline. For example, the Sixth Plan baseline used 2009 as the reference year for the baseline unit; the Sixth Plan period began on January 1, 2010.

Question 4: What are the program savings?

The analyst must remove from total market savings (Question 3) the savings claimed elsewhere in the region. This includes program-incentivized units and NEEA's Net Market Effects Savings. The analyst measures savings from all sources against the Council baseline defined in Question 3a.

Outcome: Momentum Savings

The preceding four questions of the Momentum Savings Analysis Framework provide the analyst with all the data necessary to estimate Momentum Savings—the cost-effective savings that occur above the frozen baseline and that are not directly incented by programs or claimed as part of NEEA's net market effects. Figure 1 summarizes how the four questions fit together to enable the estimation of Momentum Savings.

Figure 1: Overview of the Momentum Savings Analysis Framework



