Agenda

Conservation Advisory Council
Wednesday July 27, 2016 1:30 pm – 4:30 pm

Address:
421 SW Oak St., #300
Portland, OR 97204

1:30 Welcome, introductions

1:35 Announcements and Old Business *(discussion)*
June 2016 CAC minutes
Date changes for October and November RAC meetings
- October – change from Wednesday, Oct 19 to Friday, Oct 21
- November – change from Friday, Nov 18 to Wednesday, Nov 16

1:45 Updated AirGenerate Remediation Plan *(information)*
Julia Harper (NEEA) will summarize the end of NEEA's remediation effort to support customers with failed AirGenerate units; Residential program staff (Energy Trust) will outline a revised plan around how Energy Trust will support customers with unit failures.

2:05 Residential savings assessment *(information)*
Staff will update CAC members on an analysis of both gas and electric savings through 2020 across key measures, and will address what additional work is planned and how this current analysis will be utilized going forward.

2:45 Multifamily Structure Design Exercise *(discussion)*
We will engage CAC members, staff and members of the public in attendance in a small group breakout exercise and contest to gather ideas on ways to simplify the current multifamily program incentive structure.

3:45 Momentum Savings *(information)*
Guest speaker Carrie Cobb from BPA will provide an overview of BPA's work on Momentum Savings, an emerging approach to measuring and counting savings occurring outside of direct program interventions.

4:30 Public comment

4:45 Adjourn

The next scheduled meeting of the Conservation Advisory Council will be September 7, 2016.

Conservation Advisory Council Meeting Notes

June 22, 2016

Attending from the council:
Jim Abrahamson, Cascade Natural Gas
JP Batmale, Oregon Public Utility Commission
Warren Cook, Oregon Department of Energy
Wendy Gerlitz, Northwest Energy Coalition
Julia Harper, Northwest Energy Efficiency Alliance
Garrett Harris, Portland General Electric
Don Jones, Jr., Pacific Power
Don MacOdrum, Home Performance Guild of Oregon
Tyler Pepple, Industrial Customers of Northwest Utilities
Stan Price (by phone), Northwest Energy Efficiency Council
Gary Smith (for Brent Barclay), Bonneville Power Administration

Attending from Energy Trust:
Mike Bailey
Amber Cole
Kim Crossman
Phil Degens
Sue Fletcher
Fred Gordon
Steve Lacey
Ted Light
Spencer Moersfelder
Thad Roth
Julianne Thacher
Jay Ward
Peter West

Others attending:
Dave Backen, Evergreen Consulting
Mike Christianson, Energy 350
Bill Henry, EQL Energy
Bob Stull, CLEAResult
Adam Shultz, Oregon Department of Energy

1. Welcome and introductions

Kim Crossman convened the meeting at 1:30 p.m. and reviewed the agenda. The agenda, notes and presentation materials are available on Energy Trust's website at: www.energytrust.org/About/public-meetings/CACMeetings.aspx.

2. Announcements and old business

April and May meeting notes were approved with one correction to the May notes. Allison Spector, not Alison Gowdon, attended from Cascade Natural Gas in May.

Tyler Pepple: On page five, the May notes feature a potential cap of 20 megawatts. Is that average megawatts or megawatt hours.
Warren Cook: That cap didn't actually make it into the bill.

3. Senate Bill 838 large customer funding restrictions compliance study results

Ted Light, senior planning project manager, presented the results of Energy Trust's compliance study for large customer funding restrictions stipulated in SB 838, passed by the Oregon Legislature in 2007. SB 838 stated that customers using more than 1 average megawatt of electricity are exempt and should receive no direct benefit from additional funding for cost-effective energy efficiency above the portion Energy Trust receives of the 3 percent public purpose charge outlined in SB 1149.

To determine if Energy Trust is under the threshold for funding large customers, staff calculated a cumulative average incentives to large customers as a percentage of SB 1149 revenue in pre- and post-SB 838 periods. The cumulative average spending for large customers is well under the spending threshold in Pacific Power territory and slightly under the threshold in PGE territory.

Garrett Harris asked roughly what percentage of large customers are industrial and commercial. Ted responded that it's roughly 80 percent industrial and 20 percent commercial.

JP Batmale: Does Energy Trust expect to exceed the incentive cap at the end of 2016?
Kim: If Energy Trust exceeds goals, it is likely to exceed this threshold. A small number of very large projects can have a big impact on annual outcomes.

Wendy Gerlitz: What happens if Energy Trust exceeds the cap?
Ted: Energy Trust will have three years to bring the cumulative average below the cap.
Kim: Several years ago when we thought this was imminent, we laid out several options to reduce spending for large customers. We would probably lower the cap for self-direct customers and create a cap for large customers. These changes would not impact customers using less than 1 aMW. Any of these changes would lead to a reduction in Energy Trust's overall energy goals. We also need to consider different changes for Pacific Power and PGE territories because reduction in spending on large customers would only be needed in PGE territory. If we make these kinds of changes, the board and Conservation Advisory Council members will be involved.

Don MacOdrum: Are all of these projects cost effective?
Kim: Correct, these are very cost-effective projects.

Garrett Harris: The baseline was established years ago, correct?
Kim: Yes. The baseline is lower in PGE territory because it took longer for Energy Trust programs to develop there, so early savings were low. This means we have a lower cap in PGE territory.

Tyler: Is the report available?
Ted: Yes, the reports are available in the Conservation Advisory Council June packet online.

Tyler: It's good that we're not at the cap, but the corollary of that is we didn't get as much savings as we could have from those customers.

4. Commercial Pay for Performance pilot and offering

Sam Walker, commercial senior project manager, presented Energy Trust's Pay for Performance pilot results and expansion plans.

Historically, Energy Trust had limited operations and maintenance and behavioral offerings for commercial customers. In 2011, the state legislature directed the Oregon Public Utility Commission to submit a report on energy-efficient power purchase agreements by the end of 2012, which led to the OPUC docket UM 1573 and a subsequent report. The report stated that Energy Trust and the OPUC would continue to explore opportunities for pilots.

Based on OPUC feedback and input from the public, Energy Trust issued a request for proposals to develop a Pay for Performance pilot in 2014.

The objectives of Energy Trust's Pay for Performance pilot were to encourage broader customer participation, deeper retrofits and greater persistence of savings. In addition, Energy Trust sought to gain knowledge of whole-building analysis tools, implementation and verification costs, operations and maintenance and behavioral strategies that enhance commercial Strategic Energy Management, administrative management strategy and long-term potential for acquiring additional savings.

Sam described how the Pay for Performance pilot worked, including payment of performance-based incentives annually over three years. Participants were encouraged to implement a blend of operations and maintenance, behavioral and capital energy-efficiency investments. Energy Trust negotiated incentives based on the mix of measures implemented. Energy Trust required a whole-building modeling approach and a respondent-proposed modeling platform that was transparent to evaluators.

Energy Trust selected one pilot participant, the 1000 Broadway Building in Portland. The building was ENERGY STAR® certified. Energy 350 did the energy modeling through a contract with the customer.

Don MacOdrum: How many proposals were submitted?
Sam: Six.
Don MacOdrum: How many were you open to approving?
Sam: Three to five.
Oliver Kesting, commercial sector lead: Four of the applications were not cost effective. One application included one measure that was not cost effective. Energy Trust negotiated an exception with the OPUC for that measure, but the customer later decided not to participate.

Garrett: What does the market look like going forward? It seems like there are a lot of barriers to recruiting participants.
Sam: The measure mix for 1000 Broadway included operations and maintenance and capital improvements, but no behavioral improvements. Capital measures were primarily for variable speed drives on pumps. The customer requested an incentive of 5 cents per kWh of savings per year. Energy Trust added a cap on the total incentives.

Warren: What year was 1000 Broadway built?
Don Jones: The 1990s.

Sam: The year-one performance period ended in December 2015. The customer estimated 550,000 kWh in its proposal and achieved savings of 778,000 kWh. This is a 16 percent total reduction in the building’s energy use. In the first year, Energy Trust paid $29,000 in incentives, roughly 11 cents per kWh over three years. Project costs were less than expected.

Don MacOdrum: How would you have structured the incentives for a different measure mix, such as primarily capital upgrades?
Sam: We calculated the incentive rate based on the blended measure mix.

Don Jones: The rate is set upfront and can’t be renegotiated if the measure mix changes?
Oliver: We had a disclaimer that we could renegotiate if the mix changed dramatically.

Don MacOdrum: Does the length of payment period impact the incentive offering?
Oliver: Yes.
Sam: For operations and maintenance, we are still evaluating the measure life. We worked with Planning to extend the measure life to five years for operations and maintenance measures.

Gary Smith: Do the customers cost share?
Sam: Yes. Incentives were allowed to cover up to 100 percent of the implementation costs.
JP: Is the payment from the customer to Energy 350 part of the cost share?
Oliver: Yes, that was built into the proposal.

Don MacOdrum: If the customer pays nothing, then the participant cost is zero. How do you achieve cost-effectiveness?
Oliver: I think the customer paid some portion of the capital upgrade costs. We will follow up with more information.

Sam described the lessons learned from the pilot. The approach appears to work. The customer is happy and so is the service provider. The market is interested.

> However, negotiated incentives add complexity. Energy Trust has alleviated some of the complexity by going to a five-year measure life for operations and maintenance. Similar offerings, like operations and maintenance, should be aligned with Pay for Performance. Energy Trust also seeks to better understand the measure life after three years of visibility.
>
> Sam offered recommendations from Energy Trust's Evaluation team, which include expanding the potential building market by reducing savings targets and including other building types, reducing the reporting frequency from monthly to quarterly, making the request for proposals and contracting language more transparent and using lay terms where possible, and cross-marketing incentives for capital measures through Pay for Performance.
>
> Sam described Energy Trust's expansion plans for this offering. Staff aim to recruit up to five additional projects in late 2016. Staff will use a Program Management Contractor approach, prequalify service providers and specify simple regression analysis. Energy Trust will establish incentive rates rather than negotiate rates with the customers, and will align incentives with other measures. Finally, the measures will be limited to operations and maintenance and behavioral.

Wendy: These high-level results are encouraging. In talking to potential customers, it seems like having one simple approach for the building owner is important. I think capital upgrades should not be excluded, and I'd like to revisit that decision. I also think we should revisit the three-year timeframe constraint. Lengthening the payback period could alleviate customer concerns about cost differences between operations and maintenance and capital investments.

Kim: Is the constraint about extending our ability to pay customers over more than three years?
Oliver: Yes. I know a 10-year payback period would help alleviate cost differences between operations and maintenance and capital. However, we still have the same levelized cost targets. If we extend payment over 10 years, we would pay 1.5 cents per kWh. Is that enough to motivate customers? Also, we already have successful offerings to incent capital investments.

Wendy: Our construct for energy-efficiency programs is based on a single measure approach. The Northwest Energy Coalition is wondering if this new blended model could attract new customers who are not currently participating. I think you should add this as an additional offering rather than use it to replace existing offerings. There's value in the new approach, and it can't be compared to our current measure by measure approach. I think by divorcing the

operations and maintenance from the capital incentives, you make this a less appealing offering for customers.
Oliver: We're not reverting back. We're just delivering the offering differently. Since we know we probably won't be able to deliver incentives over 10 years, why not deliver capital incentives upfront and operations and maintenance and behavior incentives over time? Also, if Energy Trust pays incentives to the service provider, the service provider can distribute incentives over however many years the customer wants.

Stan Price: Congratulations on a successful pilot. First, I second the points Wendy made. They're consistent with the point of view of Northwest Energy Efficiency Council. Energy Trust should think about new delivery methods and not stick to how we've done things in the past. My second point is that while 10 years is too long and three years is too short, somewhere in between may be viable, maybe seven or eight years. Extending the payment period could alleviate Energy Trust's concerns about overpaying in early years based on savings estimates. Third, this pilot exceeded expectations and energy-savings estimates in a building that seems like it would not have had a lot of conservation potential left. It's bewildering to redesign the program given that the pilot worked so well. The open-endedness of the program was key to the success.
Oliver: Our design is meant to respond to some of the complications regarding the contract negotiation brought on by the blended measures. Removing capital simplifies the application process for customers and streamlines administrative work for Energy Trust.

Julia Harper: What kind of customers would be best suited to Pay for Performance rather than SEM?
Oliver: We have three types of operations and maintenance offerings. First is retrocommissioning, which is about specific measures or pieces of equipment. The second is SEM, which is a longer-term commitment for larger customers with multiple buildings. Pay for Performance fills the niche of single buildings that are too small or lack the organizational infrastructure to invest in SEM.

Don Jones: I was involved in the initial docket. I was expecting this to suit a building that needed more capital upgrades and could blend them with operations and maintenance. I would like to engage these customers to help them make a great leap forward.

Garrett: What does the market look like? How small can the buildings be to participate in this program? How many eligible and high-potential buildings are out there?
Oliver: For the pilot, eligible buildings were 50,000 square feet or larger. I don't think we would want to engage buildings less than 50,000 square feet.
Sam: The City of Portland's new energy reporting policy is also for buildings of 50,000 square feet and greater. There are roughly 450 of these buildings in Portland.

Tyler: How did you promote the request for proposals?
Oliver: Through our website and PMCs. We also asked service providers to recruit participants.

Don MacOdrum: I echo Stan and Wendy. It doesn't make sense to exclude capital projects. One of your objectives was to encourage deeper retrofits. What kind of savings persistence are you seeing?
Oliver: We'll know more in years two and three of the pilot.
Sam: For some operations and maintenance measures that only require a single human intervention like relocating a sensor, we know savings will persist for many years.
Oliver: For SEM, we do have evidence that operations and maintenance savings persist for longer than three years.

Tony Galluzzo, McKinstry: I'm thinking about differences between owner managed buildings and third-party managed buildings. For third-party managers, turnover negatively impacts savings persistence. Of the 450 Portland buildings, how many of them are third-party managed? In addition, having an experienced building engineering staff will also impact a building's savings.
Kim: Are you saying that buildings managed by a third party are the best candidates?
Tony: I'm saying the motivations are different for third-party building managers because they think shorter term, so a three-year payment period would be more attractive.

Don MacOdrum: What was the management arrangement at 1000 Broadway?
Sam: It is owner managed.

JP: Thank you to Energy Trust, Stan and Wendy for contributing to this. I also want to note that this is still a pilot, so we're still evaluating the results. I think there will be chances to revisit this with the OPUC through the docket process. The OPUC appreciates how this approach shifts the risk by spreading it out over three years and aligns performance with incentives. We also appreciate the increased administrative work for both the customer and Energy Trust. Finally, we like how this product aligns with the market. The OPUC is not sure about pulling out capital upgrades. We need to revisit this conversation in six or nine months when we have more results.

Stan: We are eager for this pilot to become a more robust offering in the future.

5. Public comment
There were no additional public comments.

6. Meeting adjournment
The next scheduled meeting of the Conservation Advisory Council will be on July 27, 2016, from 1:30 p.m. – 4:30 p.m.

MOMENTUM SAVINGS

Carrie Cobb, BPA

July 27 2016

WHAT ARE MOMENTUM SAVINGS?

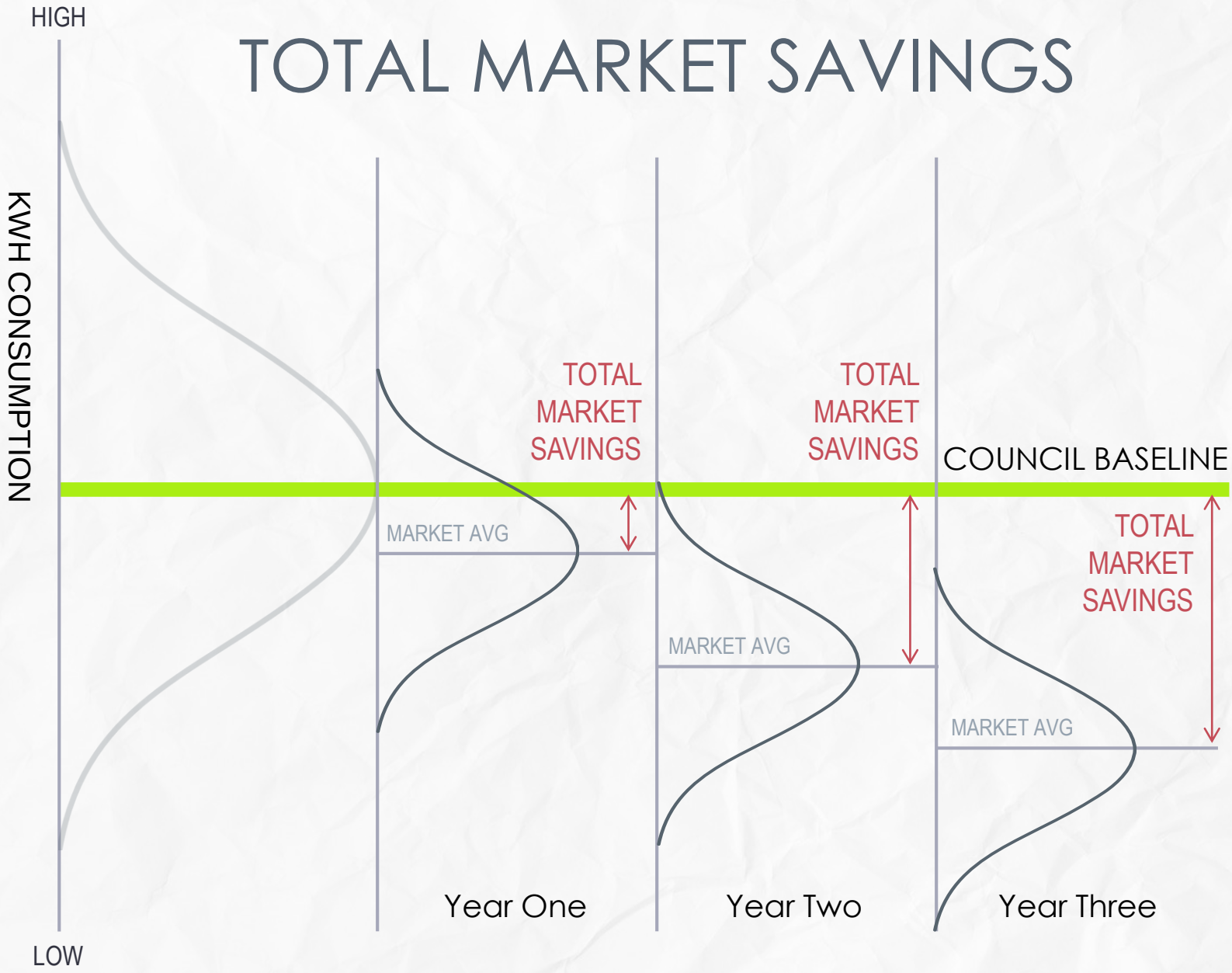
MOMENTUM SAVINGS CRITERIA

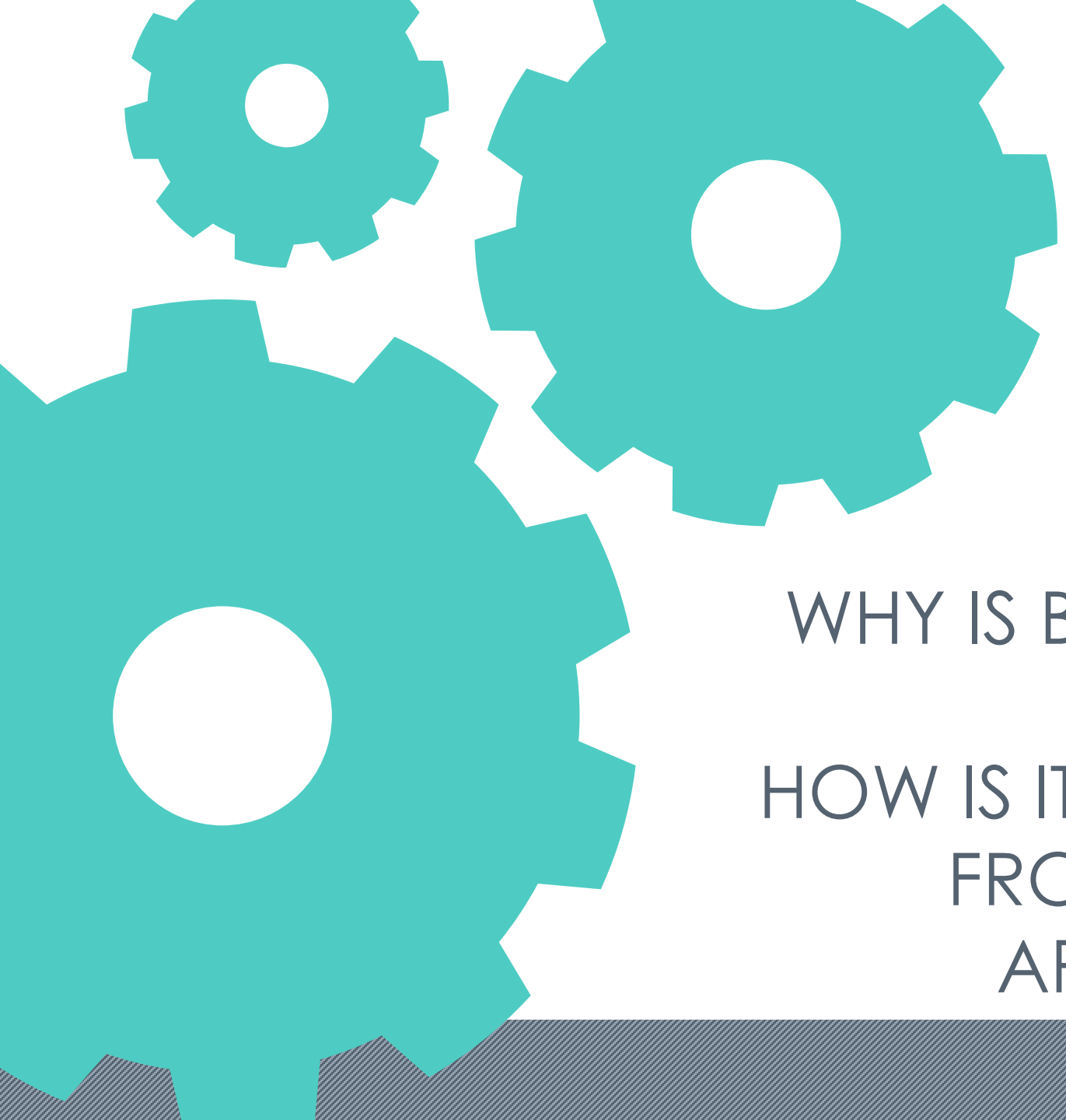
Not directly paid for by programs and not claimed in NEEA's net market effects

Cost effective

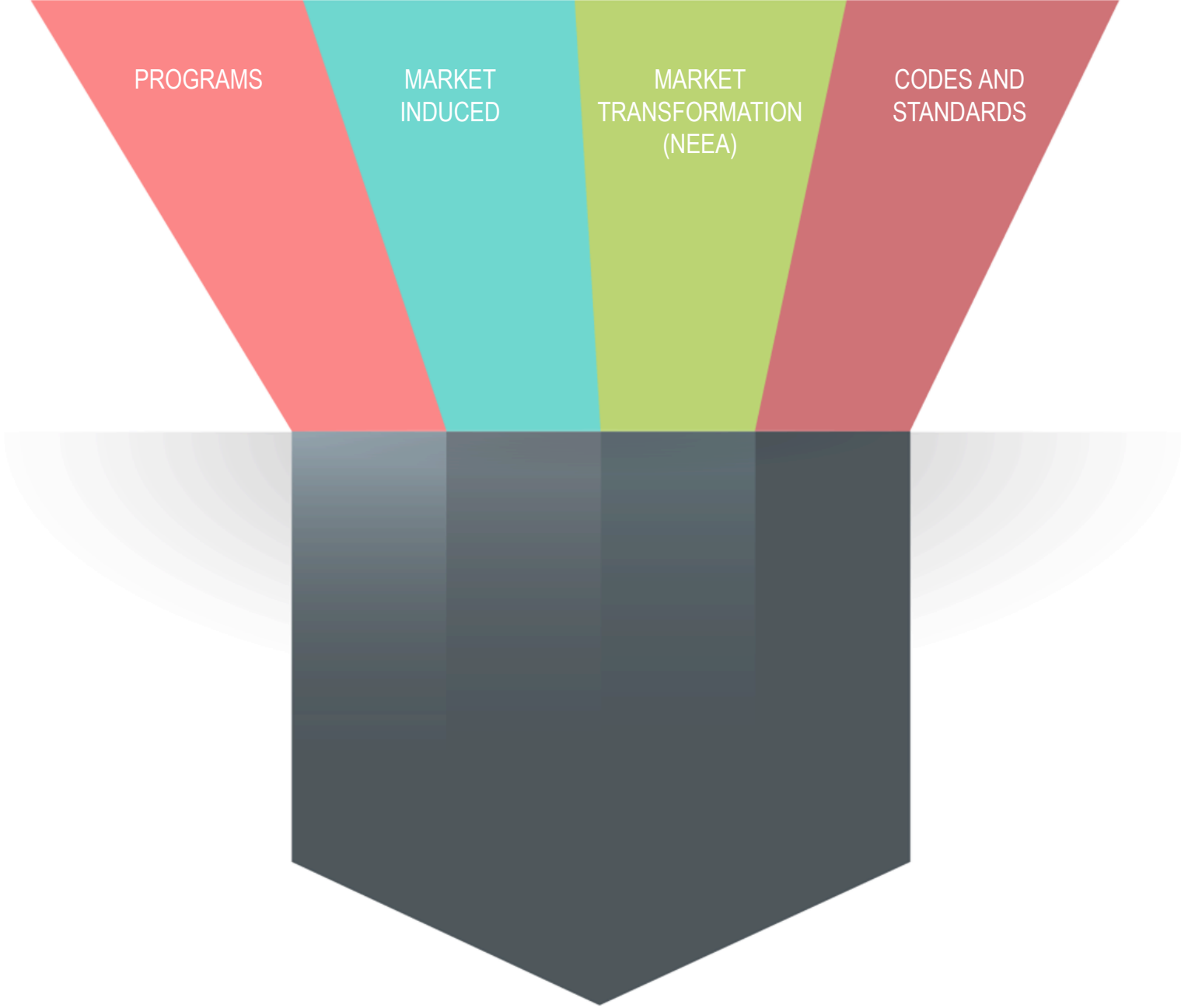
Measured relative to frozen baseline

TOTAL MARKET SAVINGS

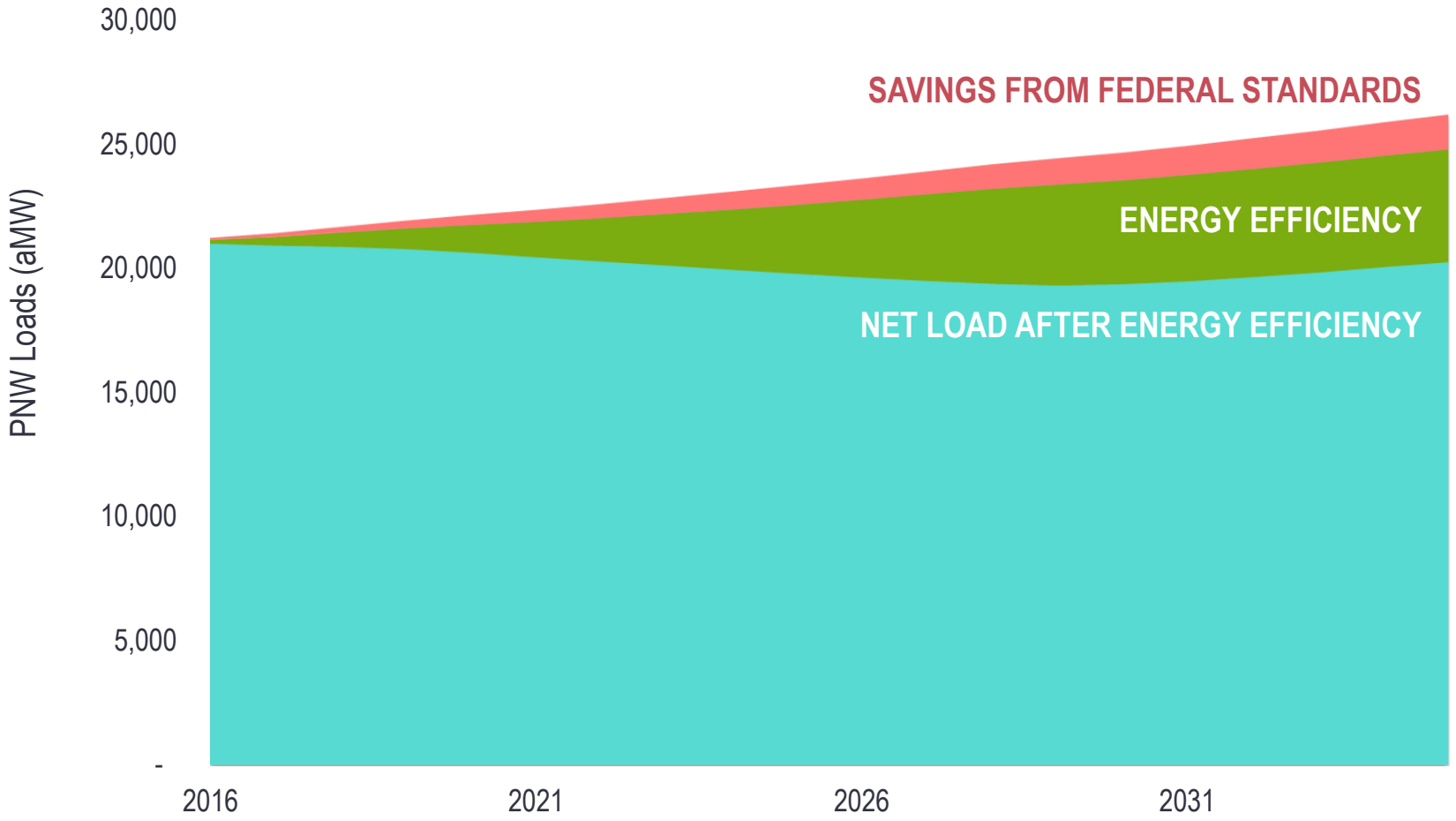




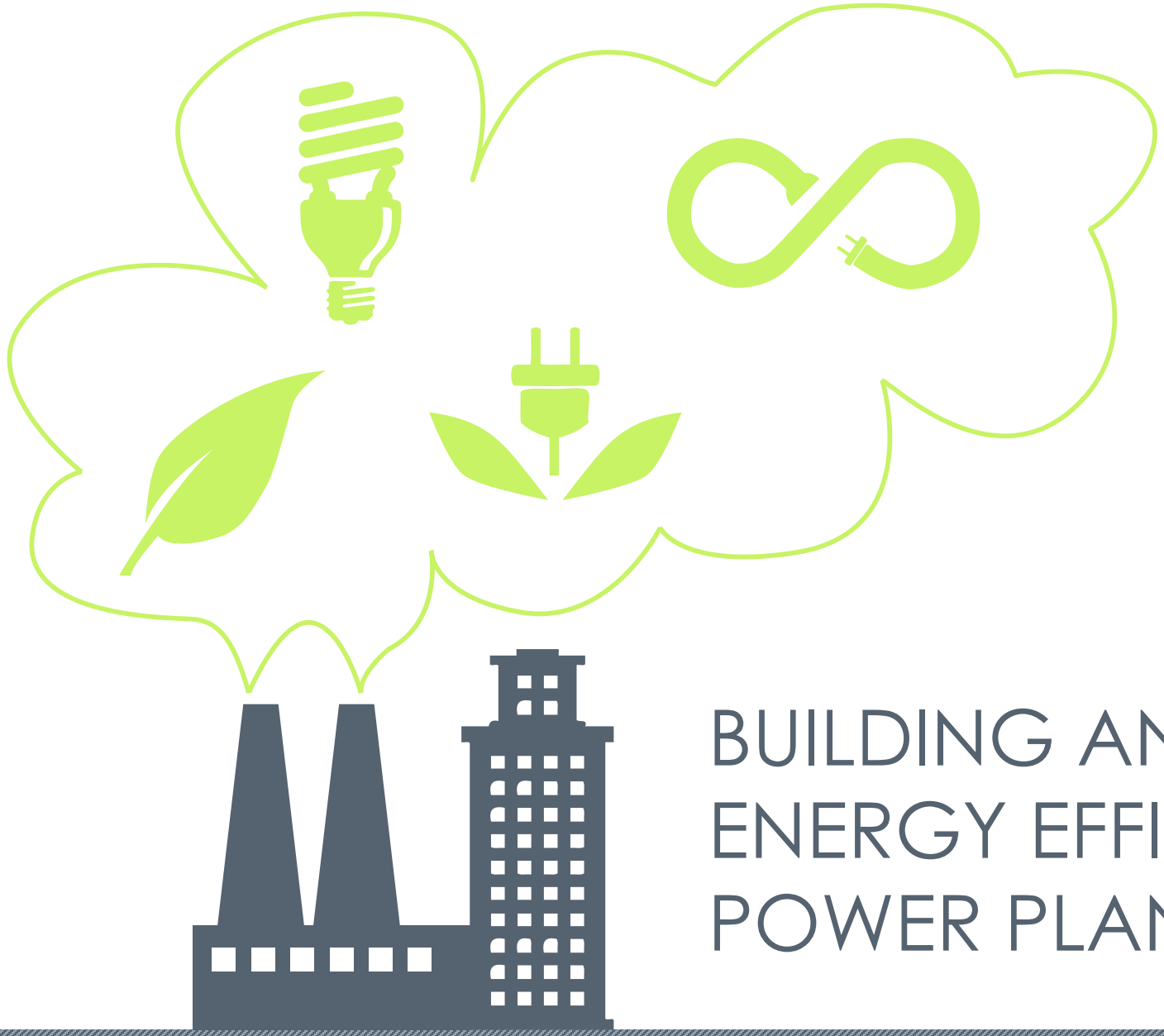
WHY IS BPA DOING THIS?
HOW IS IT DIFFERENT FROM THE ETO APPROACH?


PROGRAMS
MARKET INDUCED
MARKET TRANSFORMATION (NEEA)
CODES AND STANDARDS

EFFICIENCY CHANGES LOADS



Source: Draft Seventh Power Plan

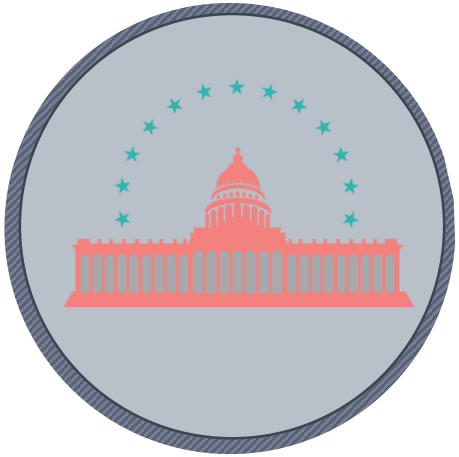


BUILDING AN ENERGY EFFICIENCY POWER PLANT

ANALYTICAL FOCUS

Lighting

HVAC



Appliance Standards

HEADING INTO THE

SEVENTH POWER PLAN

CONTACT

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Current BPA Market Research Projects

BPA Market Research projects support the development of current practice baselines, momentum savings and program design. Below is an overview of projects occurring within FY 2016 and which function they support.

Table 1: Project Goals for Market Research, FY 2016

	Momentum Savings	Baseline Research or Measure Support	Market Insights for Programs
Agriculture Market Research			X
Residential HVAC Market Research	X		X
Residential Lighting Market Research	X	X	X
Non-residential Market Research	X	X	X
Commercial Building Simulation Models		X	
Commercial HVAC Market Research			X
Comprehensive Portfolio Review	X		
Non-residential Lighting Controls Scoping Study	X	X	
SIS Baseline Field Study		X	

Agriculture Market Research

The Agriculture Market Research Project will gather market intelligence to identify the top areas of opportunity for irrigation efficiency in the BPA region. The team will begin by documenting the current agriculture program logic and desired program outcomes by developing a program logic model. We will also document current market practices for irrigation hardware in the Northwest. To do this, the team will perform interviews with BPA and utility program staff, attend a trade show and interview manufacturers, dealers, and installers, develop a field data collection protocol, and collect sales data from irrigation hardware manufacturers. The team will also develop a method and model for calculating Momentum Savings for irrigation hardware.

Residential HVAC Market Research

The Residential HVAC Market Research Project will result in market intelligence to inform future program strategy and an estimate of Momentum Savings from 2010-2014. The research team collected sales data from HVAC distributors and interviewed regional distributors and program staff. This primary research was

combined with secondary sources, including the Residential Building Stock Assessment and Regional Technical Forum (RTF) analysis, in order to estimate Momentum Savings from air source heat pumps from 2010-2014. This analysis identified key areas of uncertainty in the Momentum Savings estimates, and BPA will collect data on these areas of key uncertainty to finalize these estimates in a future project.

Residential Lighting Market Research

The Residential Lighting Market Research Project will estimate market savings from residential lamps from 2010-2014. To do this, the project is combining multiple data sources into a comprehensive market model that includes all residential application lamp types. Data sources include sales data, shelf data, the Residential Building Stock Assessment data, and information from interviews. Interviews in this project are across sector and distribution channel—one particular challenge in residential lighting is the overlap between the dominant retail channel and the distributor channel. Interviews include retailers, program staff, new construction market actors, lighting showrooms, manufacturer representatives, commercial builder owners and maintenance staff.

Non-residential Lighting Market Research

The Non-residential Lighting Market Research Project will estimate market savings for the commercial, industrial and outdoor lighting market. This project will develop a new, more robust model and incorporate in the 7th Plan assumptions; the current Excel-based platform in not flexible enough for more sophisticated analysis. In close partnership with NEEA and the regional lighting strategy, the project will collect primary data via interviews and sales data, and develop a gap assessment of data needs to characterize the market. Findings from this study will be incorporated into a market intelligence report to be released in April of 2016. This project will also characterize technology categories and develop current practice baseline estimates across the market.

Commercial Building Simulation Model Development

The Commercial Building Simulation Model Development project is developing building simulation models by building type. The project is also developing HVAC interaction factors for use in non-residential lighting savings estimation. These models will be used to develop population based commercial HVAC energy savings estimates. The building types being developed include multiple building types such as food service, grocery, lodging, office, retail and schools. The project has regularly scheduled phone calls with regional experts to provide input on the model development.

Commercial HVAC Market Research

The Commercial HVAC Market Research Project will gather market intelligence to inform future program strategy and estimate Momentum Savings. To inform market research findings, the team interviewed regional distributors, manufacturer representatives, facility solution firms, engineering firms, and commercial builder owners and maintenance staff, and BPA program staff. The team will develop a method and build a model to estimate Momentum Savings from commercial HVAC equipment from 2010-2014. The team anticipates this effort to be very challenging; commercial systems include many different types of equipment and dozens of possible different building applications. A good outcome may

be that this task results in a better understanding of the uncertainties and data gaps to further explore.

Comprehensive Portfolio Review

The Comprehensive Portfolio Review Project is reviewing BPAs portfolio of savings for overlap with Momentum Savings; reviewing the load forecast assumptions to determine impacts for Momentum Savings; and, developing a forecast of Momentum Savings for 2016-2018. This project provides a comprehensive look at all BPAs Momentum Savings in relation to the program savings and to the Council baseline.

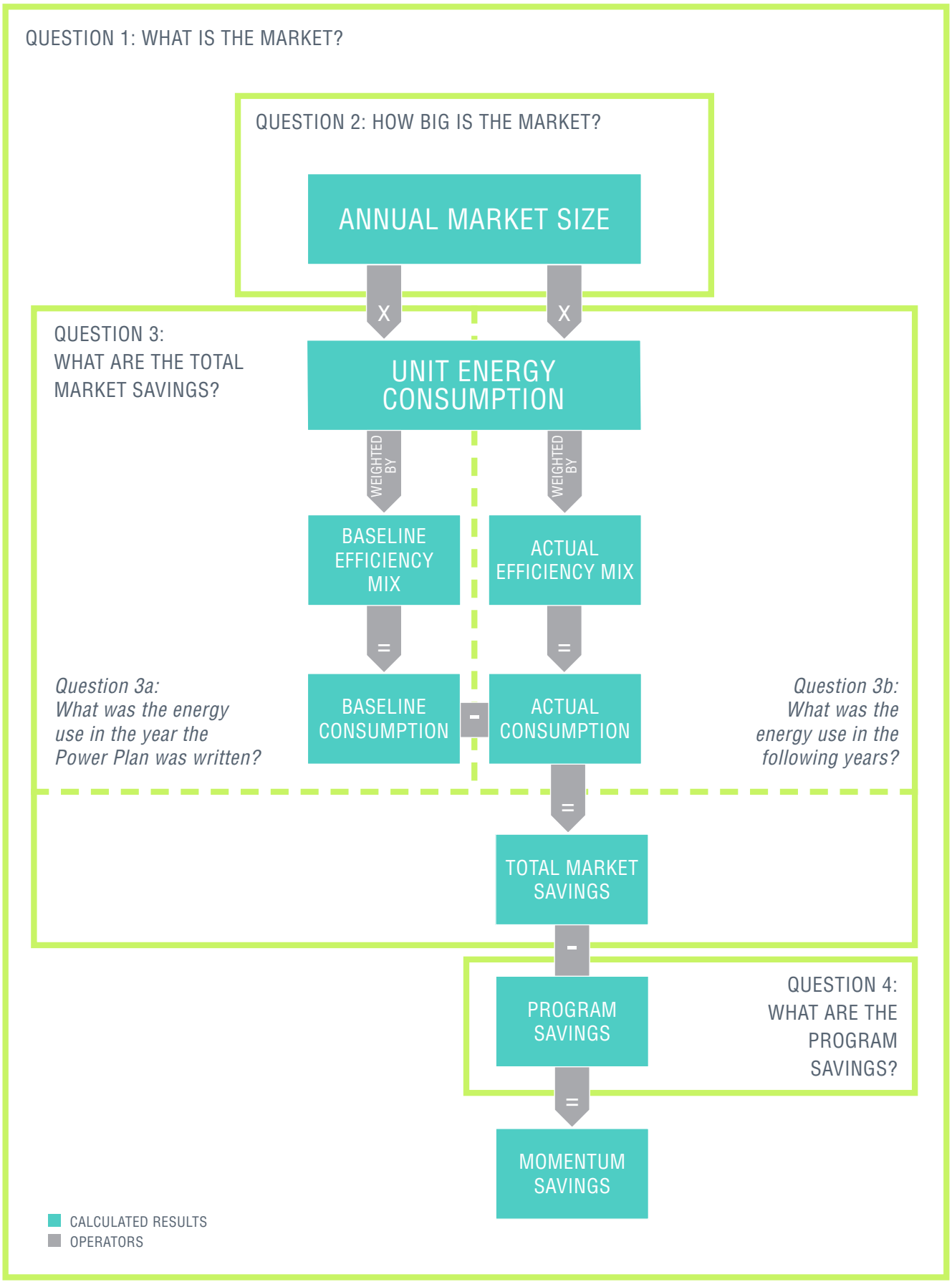
Non-residential Lighting Controls Scoping Study

The Non-residential Lighting Controls Scoping Study will review existing research on lighting controls and develop the framework for a study to estimate market changes from lighting controls and energy savings from lighting controls. The outcome for this project will be a clear plan on the data requirements to estimate momentum savings and energy savings from lighting controls, which will be consistent with the RTF and will leverage existing studies.

SIS Baseline Field Study

The SIS Baseline Field Study will visit hundreds of randomly selected fields in the region to determine the current practice for agriculture irrigation. The study will monitor water usage, weather and crop types for the growing season, and compare the population at large to the program participants' water usage. The study is large, with multiple interim deliverables and phases that are too extensive to outline in this study overview one-pager. Study updates and information are available on Conduit at: https://conduitnw.org/Pages/Group.aspx?rid=189

How to measure Momentum Savings



Team and Roles

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Overview of Momentum Savings

Bonneville
POWER ADMINISTRATION

OCTOBER 2015

Contributors

Developed by Jane Pater Salmon, Navigant Consulting, Inc.; Rob Carmichael, Cadeo Group.

Developed for the 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
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.	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.
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.	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.
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.	BPA subtracts NEEA's Net Market Effects after removing programmatic savings from Total Market Savings.
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.	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..

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

BPAs 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.

Equation 1. Calculating Momentum Savings

*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.

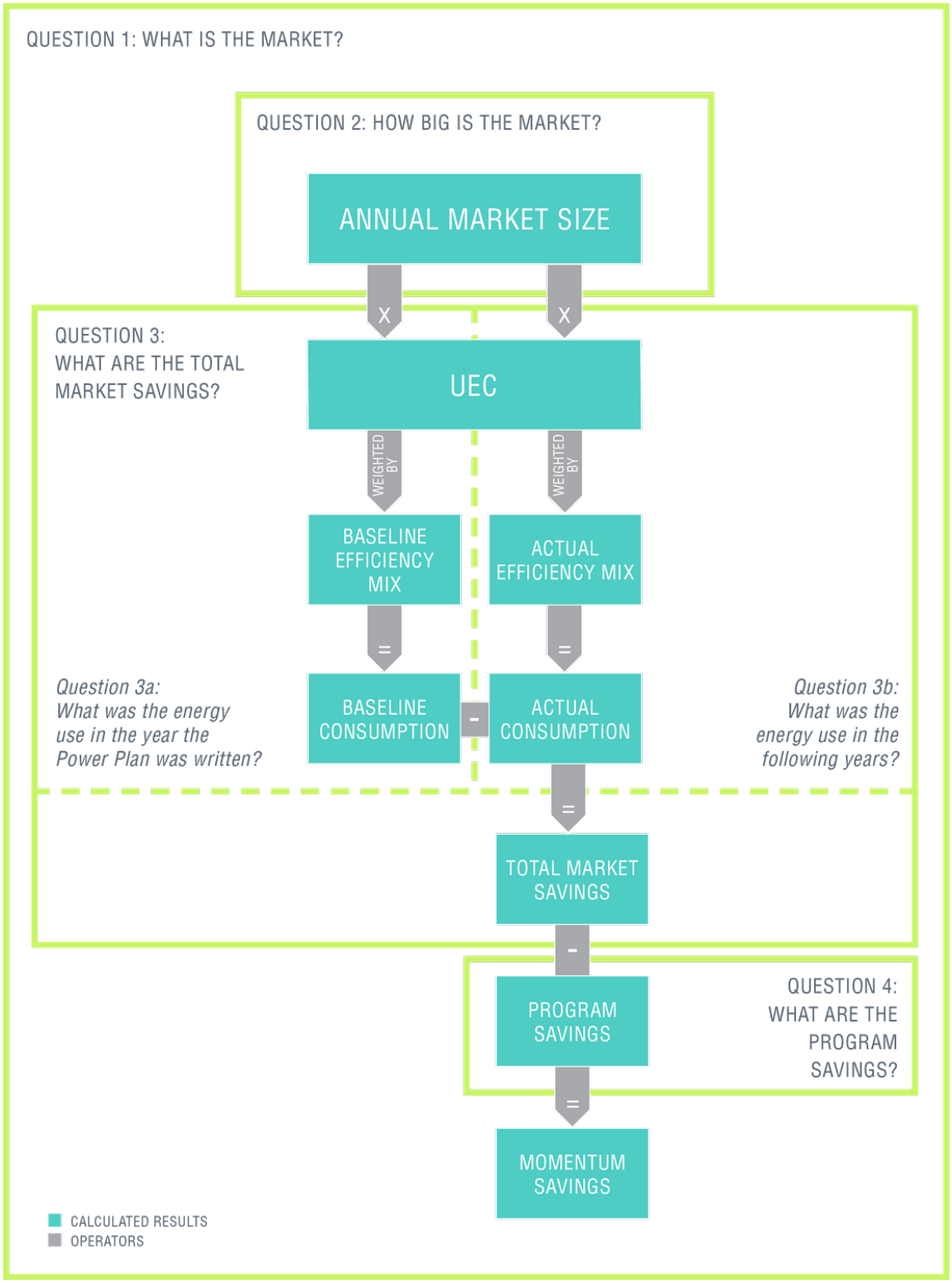
Question 4: What are the program savings?

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



Residential Savings Assessment Update

July 27, 2016

Energy Trust of Oregon

Drivers for the assessment

- The 2015-2019 Residential Strategic Plan highlighted challenges facing the sector

- 2015 Measure approval process highlighted accelerating impacts on savings

Measure Impacts

- The residential lighting market is anticipating higher federal standards and acceptance of efficient products is accelerating.
- Reduction of showerhead savings due to market saturation and rising baselines.
- Continuing pressure on measures related to cost-effectiveness

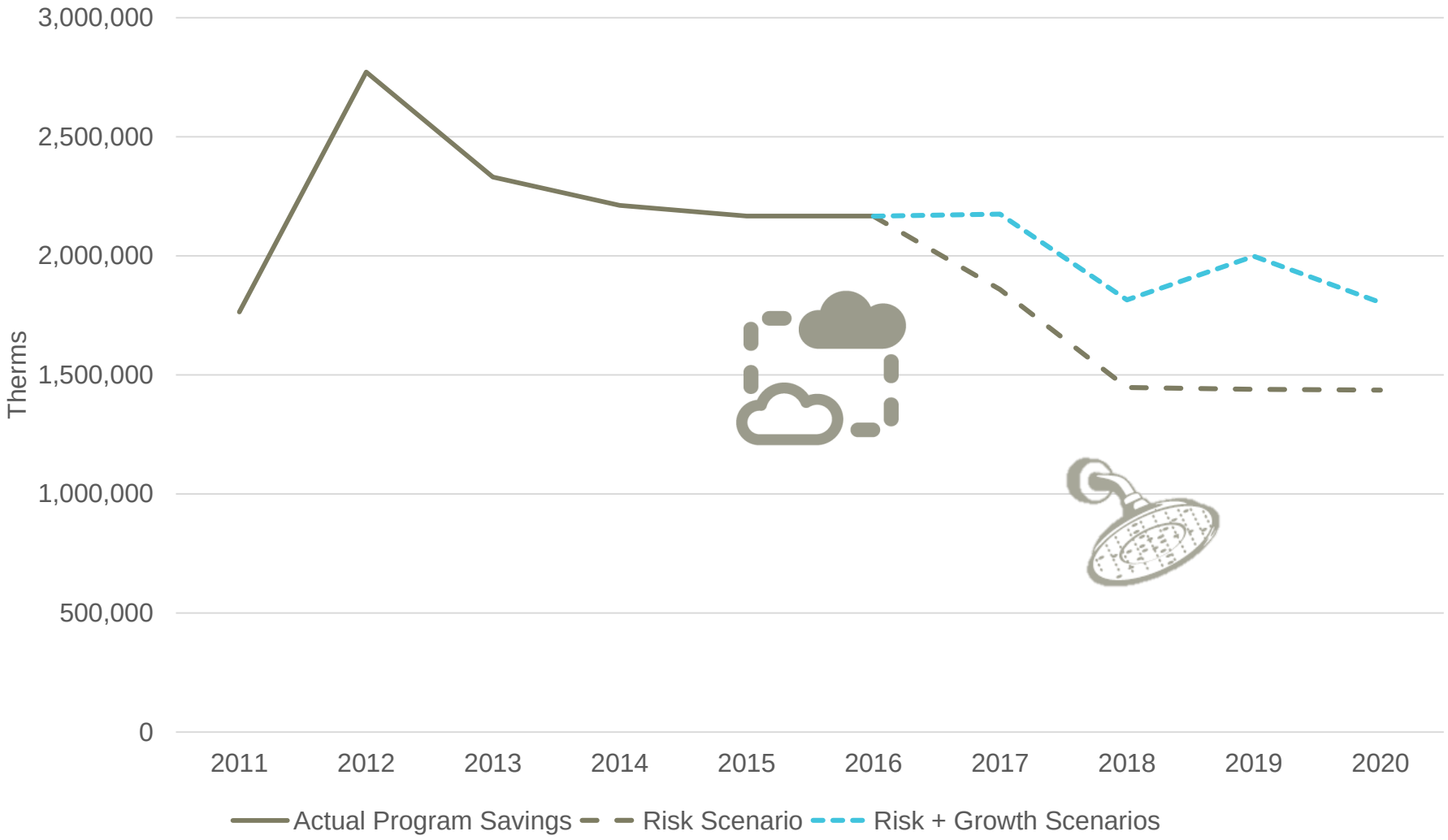
Comprehensive Savings Assessment

Developed an approach to evaluate savings opportunities over the next four years.

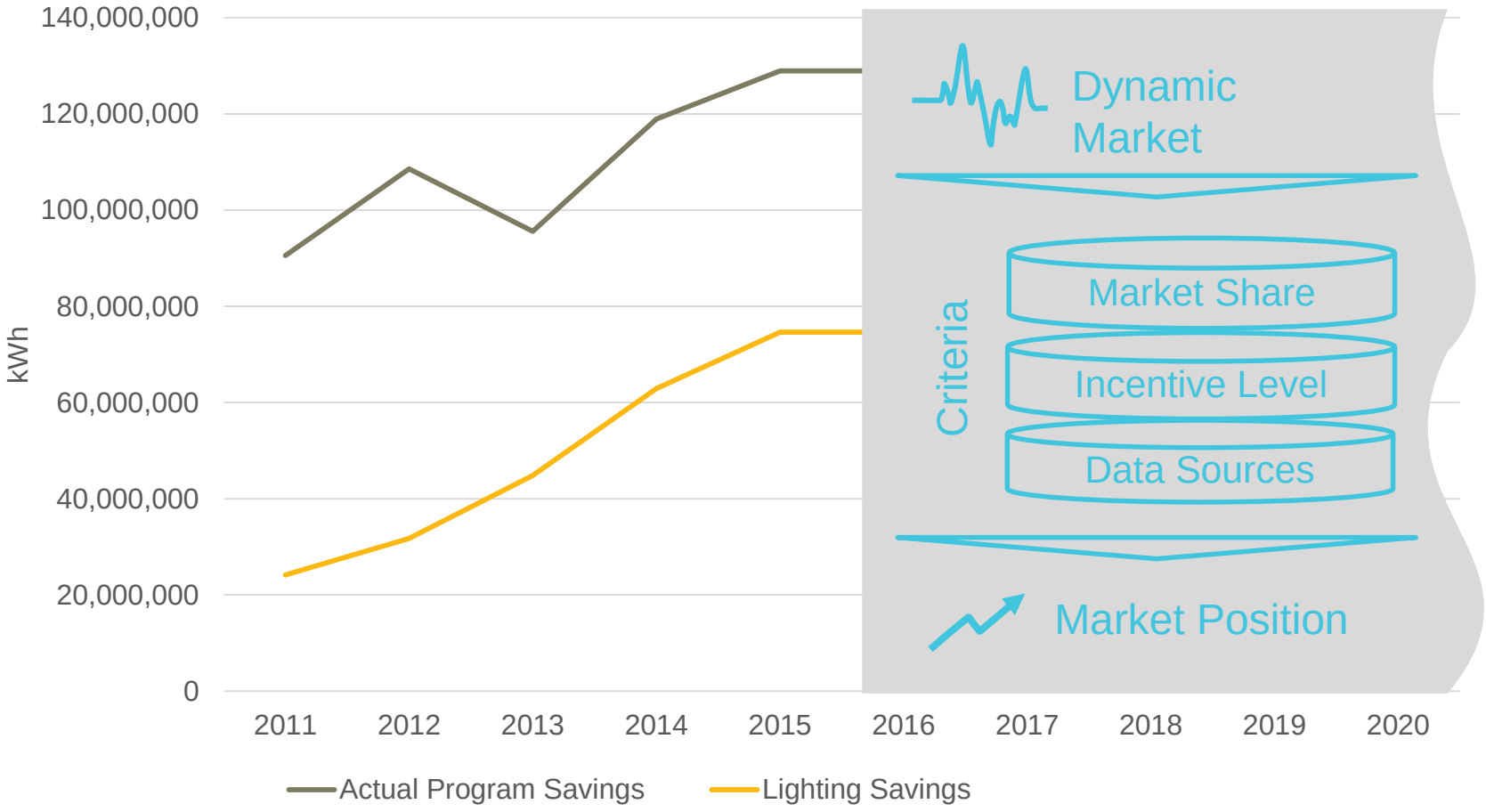
- Savings at Risk
- Current measures expected to expand
- New measures

Worked with Planning, PMCs, and other implementers.

Residential Gas Savings Scenarios



Residential Electric Savings Scenarios



Thank You

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