Agenda

Conservation Advisory Council
Wednesday, August 2, 2017
1:30 p.m. – 4:45 p.m.

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

1:30 Welcome, Old Business and Short Takes *(discussion)*
Updates include introductions, agenda review, June 2017 CAC minutes, remaining 2017 meeting dates and the 2018 budget development schedule.

1:35 Residential Sector RFP Results (*information)*
Staff will review the results of and next steps from the Residential Sector request for proposals for a program management contractor and program delivery contractors. The board of directors approved the staff recommendation for a Residential Program Management Contractor, Retail Midstream Promotions Program Delivery Contractor and EPS Whole-Home New Construction Program Delivery Contractor.

1:50 Quarter 2 Highlights *(discussion)*
Staff will present highlights from Quarter 2, including reviewing sector dashboards showing early year-end forecasts.

2:05 Factors Impacting 2018 Measure Development and Budget *(discussion)*
In preparation for developing the 2018 annual budget, staff will review with CAC members factors that influence cost-effectiveness screening for some measures. Factors include updated electric and natural gas avoided costs, expiration of the state Residential Energy Tax Credit and standard measure review findings (e.g., savings level changes, improving baselines, market saturation). These factors may impact the cost-effectiveness of certain measures. A preliminary list of such measures will be shared; the list can and will most likely change as final information is received and program action plans drafted. Staff will continue the discussion at the September and October meetings.

2:50 Break

3:05 Sector Trends Analysis *(discussion)*
In preparation for developing the 2018 annual budget, staff completed trends analyses for the residential, commercial and industrial sectors. Staff will present their findings and seek CAC feedback and input. *Note, each sector analysis is approximately 24 pages long with multiple charts and descriptive text.*

4:20 Public Comment

4:45 Adjourn

The next scheduled meeting of the Conservation Advisory Council is Wednesday, September 13, 2017

Conservation Advisory Council Meeting Notes

June 21, 2017

Attending from the council:
JP Batmale, Oregon Public Utility Commission
Warren Cook, Oregon Department of Energy
Tony Galuzzo, Building Owners and Manager Association
Wendy Gerlitz, NW Energy Coalition
Charlie Grist, NW Power and Conservation Council
Rick Hodges, NW Natural (for Holly Braun)
Julia Harper, Northwest Energy Efficiency Alliance
Don Jones, Jr., Pacific Power
John Karasaki, Portland General Electric (for Garrett Harris)
Don MacOdrum, Home Performance Guild of Oregon
Lisa McGarrity, Avista
Tyler Pepple, Industrial Customers of Northwest Utilities
Allison Spector, Cascade Natural Gas
Susan Jowaiszas
Corey Kehoe
Oliver Kesting
Steve Lacey
Andrew Lunding
Alex Novie
Jay Olsen
Thad Roth
Kenji Spielman
Cameron Starr
Mariet Steenkamp
Rob Strange
Scott Swearingen
John Volkman
Sam Walker
Katie Wallace
Jay Ward

Attending from Energy Trust:
Mike Bailey
Gwen Barrow
Quinn Cherf
Amber Cole
Tara Crookshank
Hannah Cruz
Sue Fletcher
Fred Gordon
Jackie Goss
Marshall Johnson

Others attending:
Heather Beusse Eberhardt, Energy Trust board
Scott Davidson, Enhabit
Kari Greer, Pacific Power
Mitt Jones, Cadmus
Roger Kainu, Oregon Department of Energy
Lonny Peet, Nexant
Alan Meyer, Energy Trust board
Chris Smith, Energy 350
Bob Stull, Ecova

1. Welcome and Introductions

Hannah Cruz convened the meeting at 1:33 p.m. The agenda, notes and presentation materials are available on Energy Trust's website at www.energytrust.org/about/public-meetings/conservation-advisory-council-meetings/. Hannah introduced herself as the new facilitator for Conservation Advisory Council meetings.

2. Old Business and Announcements

Hannah noted that there is a slight edit and correction to the May minutes based on comments received. The notes were reposted online at the link listed above.

She reminded the Conservation Advisory Council that the Energy Trust budget review survey closes on June 22 and encouraged participation. Energy Trust will use survey feedback to assist in reviewing and identifying improvements to the annual budget objectives, process and stakeholder engagement approach.

The September council meeting has been moved from September 6 to September 13 to allow staff time to develop draft 2018 action plans as part of the overall budget process.

The Energy Trust Board of Directors met on May 18-19, 2017, for the annual Strategic Planning Workshop and received a mid-plan update from staff. The workshop information is on the Energy Trust website. At its July 26, 2017 board meeting, the board will approve the notes from the workshop and review topic areas staff can research over the next year to assist them in initiating development of the next 2020-2024 Strategic Plan.

Thad Roth provided an update on the Residential Sector Request for Proposals (RFP). The results of the competitive RFP will determine the contract or contracts the residential sector needs to manage and deliver sector services starting January 1, 2018. The review team is currently in the decision process after interviewing candidates over the past month. The RFP received a robust response. Staff will present their recommendation for board consideration at the July 26 board meeting.

Hannah reported that the Oregon Secretary of State has opened a performance audit of Energy Trust and some Conservation Advisory Council members have been contacted by the auditors for interviews. Mariet Steenkamp is the lead for Energy Trust and is collaborating with the Oregon Public Utilities Commission (OPUC) to be responsive to the auditors and their information requests. JP Batmale noted the performance audit is likely focused on Energy Trust's efficacy and OPUC oversight. JP invited any Conservation Advisory Council questions to be sent his way.

Alan Meyer: Is this the first time Energy Trust has been audited?
JP Batmale: Energy Trust was previously examined during an audit of the Oregon Department of Energy (ODOE).

3. 2017 Legislative Update

Jay Ward provided an update on the current state legislative session. Energy Trust tracks and monitors legislative activity for potential impacts with Energy Trust's work, and does not take positions in support or opposition to any legislation. The two main areas the legislature is currently focused on are balancing the state budget and passing a transportation infrastructure package. The draft transportation package bill (HB 2017) previously included provisions to alter the purposes of the public purpose charge; committee co-chairs have said those provisions will be pulled from the next iteration of the bill. The state Residential Energy Tax Credit (RETC) is scheduled to expire at the end of 2017. There are bills still active that would extend the tax credit in some way. Session constitutional sine die is July 10.

4. Large Customer Funding Analysis

Steve Lacey provided an update on large customer funding analysis and noted that Director of Energy Programs Peter West is lead on the project. Energy Trust electric efficiency funding is set legislatively through SB 1149 and SB 838. The former legislation applies to all customers of PGE and Pacific Power while the latter exempted commercial and industrial customers (collectively "large customers") using more than 1 average megawatt of electricity annually. SB 838 directs that the investment of those funds shall not benefit customers that do not pay into the fund. To ensure alignment with this directive, Energy Trust and the OPUC set up a process where incentives serve as a proxy for program spending in the area of large customers in commercial and industrial sectors. Energy Trust contracts with a third party to conduct an annual analysis on incentive spending and to determine if incentive spending stayed within the proxy threshold. In spring 2017, Energy Trust contracted with CLEAResult for analysis of 2016 incentive spending.

Energy Trust provides an annual update to the Conservation Advisory Council. In addition, Energy Trust provided a stakeholder review of guidelines in 2014; no changes were made at that time. The board reviewed the analytic methodology in 2013 in preparation for the 2015-2019 Strategic Plan,

and anticipated that at some point, the threshold would be exceeded at least for Portland General Electric (PGE).

Staff recently received the 2016 analysis and is now providing an initial update to Conservation Advisory Council. Staff will provide additional information later in the year as the threshold for one utility was exceeded in 2016.

Steve presented the results of the 2016 analysis. Energy Trust's incentive spending threshold for Pacific Power large customers is set at 27.3 percent. As of 2016, the incentive spending at 20.1 percent remained below the threshold. Energy Trust remains in compliance with Pacific Power.

JP Batmale: What is the average over multiple years?
Steve Lacey: The threshold was set to a four-year average.
Scott Swearingen: The threshold was set at the cumulative average for the years 2005-2007. The number shown for each year post-SB 838 is the cumulative average from 2008 forward.

Steve continued that Energy Trust's incentive spending threshold for PGE large customers is set at 18.4 percent. As of 2016, the incentive spending at 18.7 percent exceeded the threshold. Energy Trust has been very close to the PGE threshold since 2013, and this is the first year that the threshold was exceeded. This has set some actions in motion. Achieving the threshold is attributed to a healthy economy, new construction, an increase in industrial activity and success with the Program Delivery Contractor's engagement with PGE large customers.

Staff will conduct additional analysis to forecast the year-end incentive spending and to determine whether the threshold will be exceeded in 2018. That information will be available later this summer and staff is looking at some form of corrective action to start later this year and in 2018. Based on the early information we have, we expect consistent or increased activity for large customers of PGE over the next three years. An update will be provided to the Conservation Advisory Council in late summer or early fall after analysis of the pipeline and creation of a correction plan.

Steve noted that Energy Trust has a three-year grace period to come back into compliance. Given that Energy Trust has a robust PGE pipeline, staff needs to understand what the horizon is going forward.

Warren Cook: It would be interesting to see pre- and post-energy savings of SB 838.

Tyler Pepple: What will happen over the next three years?
Steve Lacey: It looks as though we'll be in the same position for at least the next couple of years. This is not just occurring in the industrial area, but also with large customers in the new construction and commercial markets.
Charlie Grist: It's best to quantify the data to help lead the discussion.

Tony Galuzzo: How are large commercial customers defined?
Steve Lacey: Any customer that consumes over 1 average MW. This data is tracked by the utilities and provided to us on an annual basis.

Allison Spector: Does this specifically pertain to electric customers?
Steve: Yes.

Lisa McGarrity: As part of this analysis, will you look at free ridership to determine if there is a category where incentives aren't needed?
Steve Lacey: I think so. Some of the strategies include potentially lifting our incentives for self-direct customers. Another strategy is to reduce our PDC outreach efforts and soliciting of projects, thereby taking a more reactive stance by allowing the work to come to the PDCs rather than Energy Trust going after the business.

Tyler Pepple: Can you email the study?
Hannah Cruz: Yes. It is important to come back into compliance with the customer incentive funding levels.

Tony Galuzzo: Do you expect changes within the program to occur in the next year?
Steve Lacey: We expect so. We have three years' worth of funding analyses and have a small threshold that has been exceeded, so we don't want any corrective actions to have an outsized impact on savings.

Tyler Pepple: Because these are cumulative savings, do you know how much in terms of annual reduction you would need to achieve?
Scott Swearingen: If we were to take action in 2017 to be compliant within the year, it would be a $2 million reduction in incentives if revenues remain similar to 2016.

Hannah Cruz: We will follow up with pertinent documents this week and more updates will be provided at an upcoming Conservation Advisory Council meeting.

5. New Buildings Program Update
Jessica Iplikci gave an update on the New Buildings program market engagement activities. The program review focused on market strategies and activities that Energy Trust employs in the marketplace to transform new commercial construction with the goal of market transformation. To create savings opportunities in the market and drive future project activity in energy efficiency, Energy Trust works to increase the market's capacity to deliver high-performance and net-zero energy buildings. The objective is to work with a wide range of projects and allies to engage and enroll projects. Strategic market engagement activities that include outreach and support, community building, marketing, training and education. Energy modeling has evolved and was built out to engage the larger market and focus on influencers, including design professionals and building developers and owners.

Don Jones Jr. joined the meeting at 2:33 p.m.

Jessica asked the Conservation Advisory Council for feedback. She will capture thoughts shared today and bring back to the council for further training and education analysis.

Warren Cook: What is Energy Trust's current market share in new buildings?
Jessica Iplikci: The overall program numbers are significant and are measured by square footage. The number currently stands at 70 percent efficacy.

Julia Harper: What percentage of the sector do we think we're reaching through training and education per profession?
Jessica Iplikci: We don't currently have that information, but it would be beneficial to consider developing methodology to understand that.

Lisa McGarrity: Are continuing education credits given to those who attend?
Jessica Iplikci: Yes. This is a recent development and we'd like to expand that going forward.

Rick Hodges: Who attends the events? Are they new attendees or returning?
Jessica Iplikci: There are approximately 100 attendees per event. Many attendees return because the content changes. We continue to build on concepts and address different design strategies.

Don Jones, Jr.: Are any of the larger firms missing from the meetings and education opportunities?
Jessica Iplikci: I don't think so. There are some new names and businesses participating due to the construction boom.

Hannah Cruz: How many new employees within companies attend?

Jessica Iplikci: We don't expect all staff from various firms to attend, and we want self-selection for those driving energy decisions to attend.

Lisa: Are design builders on the contractor participant side attending?
Jessica Iplikci: They are, but this information is not captured well in Energy Trust records of attendees by category, profession or role.

Warren Cook: Are the audiences split pretty close to where the area of influence is?
Jessica Iplikci: Yes. We've focused on key influencers and built this forum with the goal of reaching building owners and influencing that audience.

Charlie Grist: Is this education all focused on new buildings? Seems that you would want to look at where the need is. Is there work to be done in training and project requirements?
Jessica Iplikci: It is a big part of how we are attempting to build demand for high-performance buildings and informing how they can set requirements for energy to be a project goal. Our strategy is to use marketing as the tool for creating awareness among owners. We're currently doing that through marketing channels and bringing a strong owner voice by highlighting their projects.

JP Batmale: For completed projects, has a subset come out that we know as new projects?
Jessica Iplikci: When we started to be intentional in bringing project highlights, we focused on a great project in Central Oregon. We used that to highlight what's happening in local new construction. As a result, firms that developed successful projects are participating and leading or presenting through Allies for Efficiency and are enrolling in the program.

John Karasaki: Does Energy Trust conduct exit interviews with builders and developers?
Jessica Iplikci: We evaluate and continuously build from what we learn through projects with owners and developers. As we gain more high-performance projects, we will start gleaning common aspects that are successful and transferable. Then we will develop content that can support the learnings introduced in Allies for Efficiency. This will be backed up by technical guides and content they can continue to reference after the training. I see an opportunity for the program to build best practices as a parallel strategy. As we see net-zero projects approach, we want to develop marketing materials and technical briefs.

Tyler left at 2:55 p.m.

Lisa McGarrity: One thing I don't see addressed is the financial piece.
Jessica Iplikci: How we might be able to address the financial area is the net-zero energy fellowship. We will start to get the results in 2018 and will be able to incorporate the financial focus, which might be where we connect content to training and education.

Charlie Grist: Have you surveyed attendees about desired enhancements?
Jessica Iplikci: We do have surveys geared toward satisfaction, but we would want to use that survey in new ways to understand how influential it was.

Heather Beusse Eberhardt: In the Board Evaluation Committee we talk about the performance after measures have been adopted. This education seems low in terms of people maintaining systems. Is there separate training for building operators or an opportunity to better retain the information?
Jessica Iplikci: Operations are a big piece in high-performance and zero-energy buildings, and are addressed through early design phases and program design. We inform the assumptions designers use to develop buildings and apply commissioning, which is important for new construction.
Oliver Kesting: Operations switches over into an existing buildings function and we can address this through Strategic Energy Management (SEM) or Building Operator Certification training.

6. Residential Lighting Update

Ryan Crews gave an update on the Energy Trust residential retail lighting strategy. The lighting market continues to evolve and staff is monitoring progress. He provided an overview of regional

statistics. There has been a 39 percent decrease in lighting consumption over the last six years, attributed to more affordable LEDs and to the federal Energy Independence and Security Act coming into effect. According to a 2016 Northwest Energy Efficiency Alliance report, LED prices continue to decline annually and last year constituted the largest share of the market at 43 percent.

Energy Trust's residential lighting market landscape is changing quickly. It is a complex landscape with varied retailers. To understand and navigate the complex lighting market, Energy Trust created a decision-making framework composed of five components: 1) Track LED market share; 2) Characterize the maximum market-share indication point; 3) Track incremental cost; 4) Adaptive measure approval and budget management; and 5) Improve industry stakeholder engagement. This framework will support Energy Trust in achieving available cost-effective savings, providing appropriate incentives and reducing free ridership, avoiding prematurely exiting the market, allowing for flexible and innovative program design, and growing relationships with retailers and manufacturers.

Julia Harper: How do you determine the correct context of incentives?
Thad Roth: Current projections show $10 million to $12 million in incentives representing just under 60 percent of total residential lighting savings. Energy Trust is also looking at how to go into certain stores to make changes while recognizing that those retailers have aggressive sales tactics. We are using that criteria to inform when and what parts of the market we will exit.
Marshall Johnson: The 80/20 rule applies here as in the trade ally sector. Eighty percent of savings come from Costco, Walmart and Home Depot; the remaining retailers make up the other 20 percent.

Charlie Grist: What is the cost of halogen lighting in the big box stores?
Ryan Crews: Halogen typically makes up about half of the product on the shelf. Price wars have driven ENERGY STAR® products cost down. We will follow-up with the cost of halogen bulbs.
Thad Roth: We'll use data to work on next year's budget. We'll have a better sense in the fall about our findings from this year's savings.

7. Cannabis Market Update

Sam Walker reported on the current cannabis market for production grow facilities. As of today, there were more than 1,500 cannabis Oregon Liquor Control Commission (OLCC) producer applications for outdoor, indoor and mixed-use facilities, with 20-30 percent for indoor grow operations. Most energy-efficiency opportunities are indoor. The OLCC limits indoor growing space to flowering plant canopy not to exceed 10,000 square feet.

Energy Trust began serving legal cannabis medical services in 2013 and adult-use recreational in 2016. Energy Trust provided incentives to 15 cannabis sites for 1 million kWh in total savings. Energy Trust projects savings in excess of 4 million kWh in 2017. Most opportunities are in lighting, representing 70 percent of load. Evergreen Consulting is handling customer interactions and coordinating with the custom PDCs.

JP Batmale: Is OLCC establishing a baseline on production?
Sam Walker: The governor's task force delivered a report in fall 2016 on best practices, but there were no standards set.
Warren Cook: Real data will come annually from growers and inform analysis and statistics.

Indoor growers have concerns about airborne contaminants, and tend to operate with elevated CO2 levels. This limits outside air exchange, requiring additional mechanical cooling. Most projects completed to date are lighting, though additional opportunities exist in HVAC, dehumidification and air filtration systems. Staff is seeing LEDs and other efficient lighting in all phases of production, from vegetative to flowering. Plasma ionization air filtration can be employed to reduce odor. Total feasible savings of 25-50 percent are possible in indoor facilities. One challenge in implementing projects is that growers know best what works for particular strains based on their experience with high-intensity discharge lamps. There are also a number of competing priorities as customers establish their businesses, from evaluating efficient technology to staffing and getting their product

out the door. Energy Trust is building awareness of programs, learning with the market and conducting qualitative market research that will be available in August 2017.

Charlie Grist: Energy Trust should work with cannabis producers on lighting. There will be a lot of discovery of what works with lighting and what doesn't.

Rick Hodges left the meeting at 3:21 p.m.

Alan Meyer: Are we able to get adequate financial information before we provide incentives?
Sam Walker: We don't specifically evaluate the financial characteristics of customers. Customers are required to have a legal license before they can qualify for an Energy Trust incentive.

Julia Harper: Was it a conscious decision not to vet financial data?
Sam Walker: We treat the cannabis industry as we do every other business. They need to be legally operating customers of our partner utilities paying into the public purpose charge and installing qualifying measures.
Fred Gordon: At one point, we went to industrial projects to gauge and collect data and then changed our estimated life on the industrial process to 15-20 years for capital assets.
Hannah Cruz: These customers pay into the public purpose charge and are eligible for Energy Trust incentives when installing qualifying energy-saving projects.

Allison Spector: Is there any requirement that cannabis producers need to stay with the program for a certain amount of time?
Steve Lacey: Incentives greater than $500,000 are presented to the board for approval.

Lisa McGarrity: What kind of payback are we experiencing?
Sam Walker: In the two to four year range.

Warren Cook: This is a unique industry where there is an increase in lighting and a decrease in production. It would be good to change the discussion to production instead of lighting.

Heather Beusse Eberhardt: There are rules that cannabis producers can't take advantage of some incentives.
Sam Walker: As long as they pay into the public purpose fund, they are eligible as legal producers.

8. Business Customer Reports Overview

Scott Swearingen provided background on Energy Trust's business customer reports, a customer engagement tool that provides a comprehensive overview of all projects completed at the customer's site.

Heather Beusse Eberhardt left at 3:33 p.m.

Outreach managers and program staff use the reports, which include three major features: a project summary, a raw data file and a project recognition handout. The project recognition document is helpful for SEM, new engagements and large projects. The business customer reports have been provided more than 70 customer surveys since May. Initial feedback has been positive.

Alan Meyer: Who typically initiates the report?
Scott Swearingen: Customers can contact the program.

Allison Spector: This a fantastic value-added report. Would there be a way to encourage additional project savings results from this tool?
Scott Swearingen: Yes, the first goal is to leverage this report to encourage additional customer participation. Staff will investigate these findings and report back.

Charlie Grist: Who may request the report?

Scott Swearingen: Anyone who is authorized as a representative of the site or Energy Trust outreach staff who is sharing information with the current customer.

Charlie Grist: Can reports be shared with current customers?
Scott Swearingen: Yes, but they cannot include information about prior customers that occupied the site.

Bob Stull: What kind of requests do we receive and what information is available on them?
Scott Swearingen: Any eligible Energy Trust customer can request a report, but we need to match their information with the current customer. You can't include project information from multiple entities if they have a different tax identification. The site has to match the accounts associated with that site.
Bob Stull: Would you provide information about a site to a new owner?
Scott: Project information can only be shared that is relevant to the new account, as identified by the tax identification number. We cannot share project information related to any former accounts. There are too many caveats with missing information and the report would need to be cleaned up before releasing to the customer. It was decided not to include utility information in the initial rollout.
Lisa McGarrity: I would be cautious when including utility information if that is the direction you decide to take.

Kari Greer: Can a utility manager request this report?
Scott Swearingen: We will follow up with you on how this tool could be shared with utilities.

Lonny Peet: Does the report use utility information?
Scott Swearingen: When we were first putting together the requirements for this project, we anticipated to ride coattails on the Utility Customer Information project that was wrapping up. We decided against this idea, as there were so many issues with cleaning utility information. The reports would require more manual quality control prior to release if we included this information.

9. Public Comment
There were no public comments.

10. Meeting Adjournment
The meeting adjourned at 4:25 p.m. The next scheduled meeting of the Conservation Advisory Council is August 2, 2017.

Decision for Residential Program Contracts

August 2, 2017

Energy Trust of Oregon

2017 Residential Structure

Existing Homes

Serves:	Homeowners + renters
Through:	Contractors | targeted engagement | kits
Incentives:	Midstream + downstream
Contract:	1st PMC

New Homes

Serves:	Homebuyers
Through:	Builders | influence on building codes
Incentives:	Downstream to builders
Contract:	2nd PMC

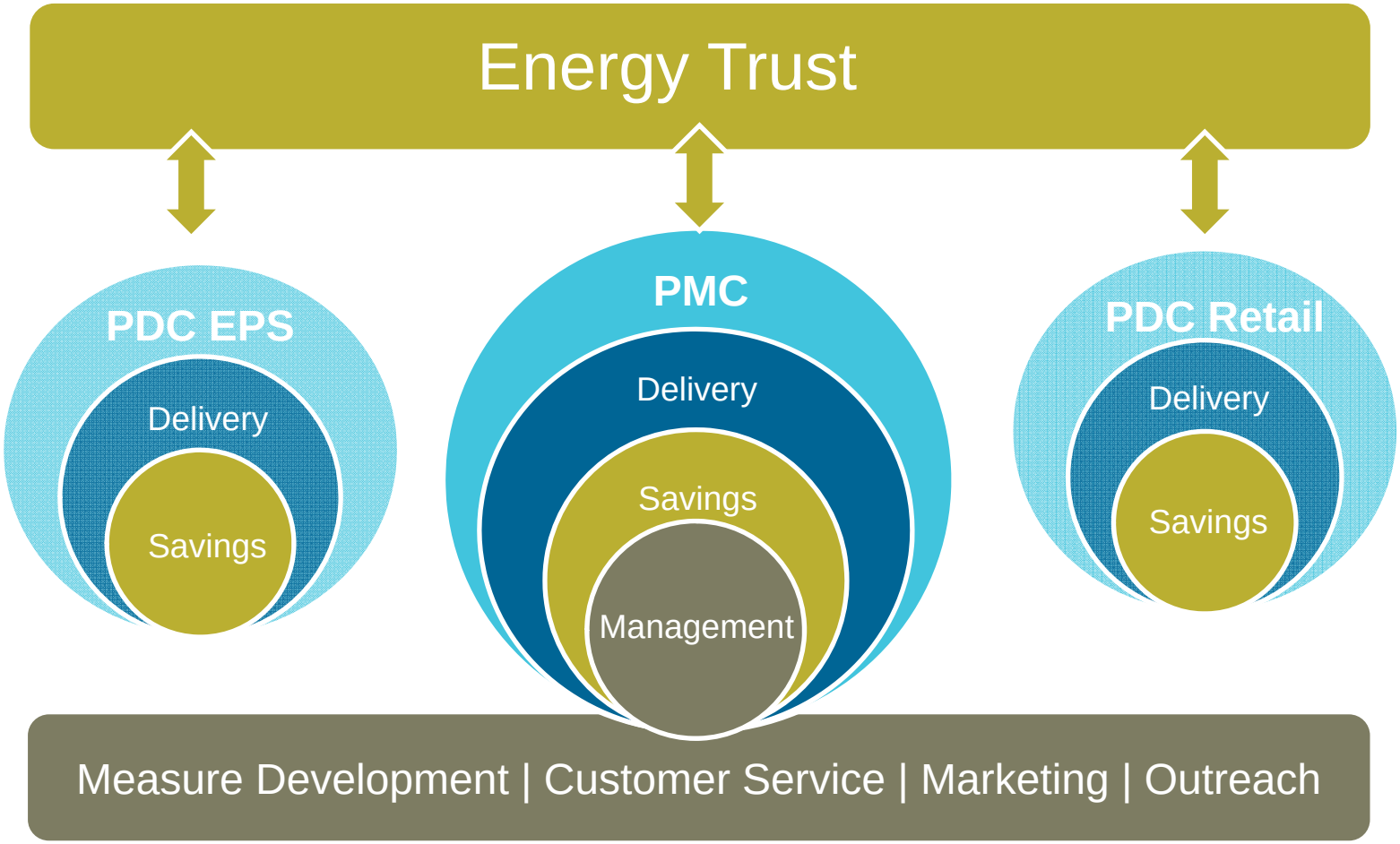
Products

Serves:	Homeowners + renters
Through:	Retailers
Incentives:	Midstream + downstream
Contract:	3rd PMC

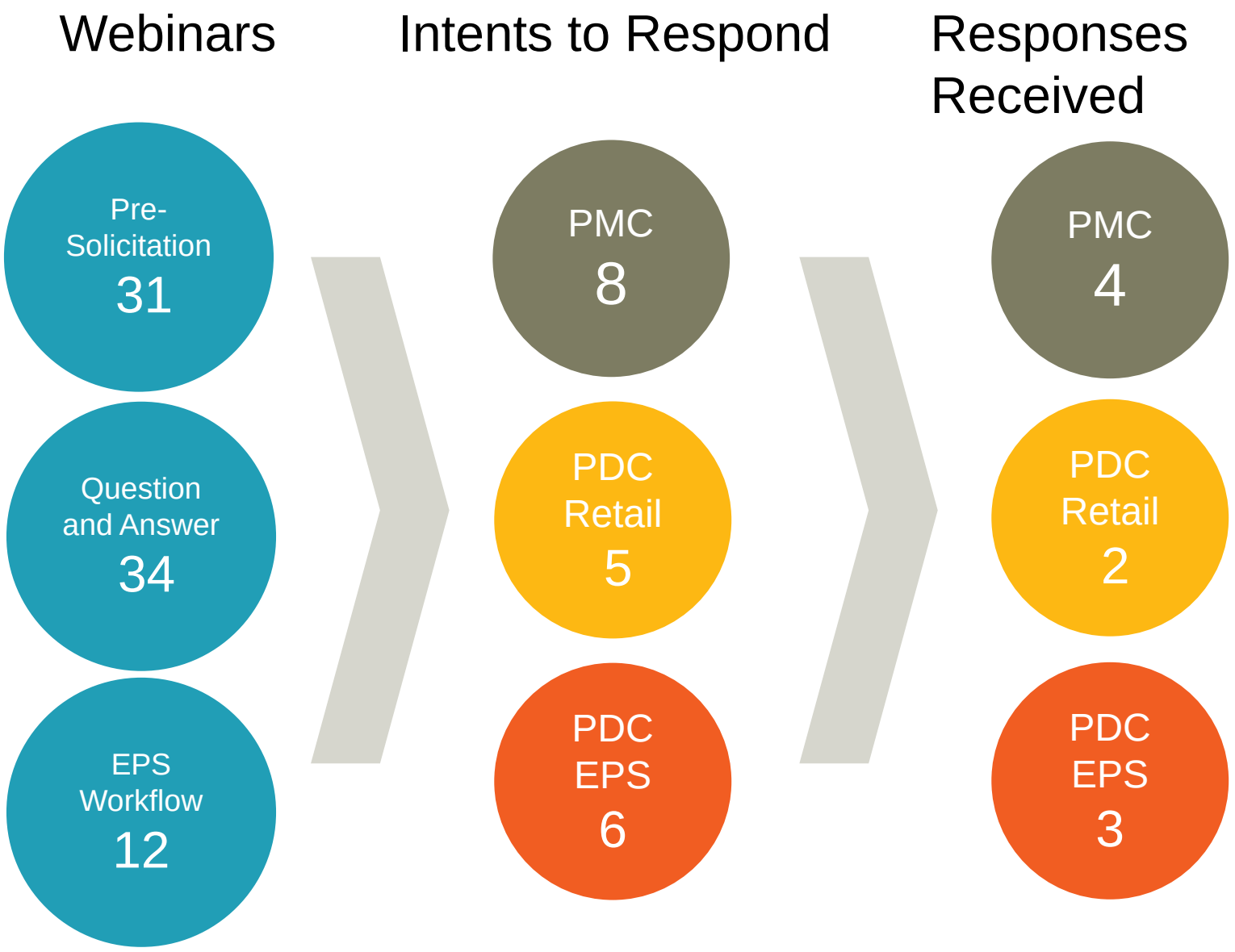
RFP Objectives

1) Align cost with value
2) Anticipate potential savings declines
3) Increase management and flexibility
4) Streamline offerings and develop consistent market strategies
5) Provide flexibility to adjust strategy mid-year

2018 Residential Program



Response Overview



Scoring Criteria

	Weight
Cost and Energy Savings	**40%**
Strength of Proposal	**30%**
Strength and Cohesion of Team	**15%**
Collaboration	**10%**
Diversity, Equity and Inclusion	**5%**

Recommendations

- PMC Contract: CLEAResult
- PDC Retail Midstream Promotions: Ecova
- PDC EPS Whole-Home New Construction: TRC

Next Steps

- Transition contracts signed—Sept 1
- Key transition onboarding and trainings complete—Nov 15
- Stakeholder introductions and key relationships transferred —Dec 15
- 2018 and 2019 contracts signed—Dec 22

Questions and Answers

Thank You

Residential Sector Team

EnergyTrust of Oregon

Board Decision

Authorize a Program Management Contract and two Program Delivery Contracts for the Residential Program

July 26, 2017

Summary

Approve negotiation and execution of the following contracts:

- Program Management Contract: CLEAResult
- Program Delivery Contract—Retail Midstream Promotions: Ecova
- Program Delivery Contract—EPS Whole-Home New Construction: TRC

Each contract term would be for two years with three optional one-year extensions. The total term for any individual contract would not exceed five years.

Background—Residential Program Structure Evolution

- Historically, the residential sector has been comprised of three programs (Existing Homes, New Homes and Products) serving residential customers through three separate Program Management Contracts organized around how customers install, purchase or access measures, e.g., trade allies, home builders or retailers.
- In response to anticipated reductions in savings levels, staff completed an assessment of the residential savings potential and delivery model in 2016. The analysis led to a forecast that indicated an approximate 60 percent reduction in electric savings and 10 percent reduction in natural gas savings over the following five-year period.
- Staff concluded that maintaining the current structure would inhibit delivery of future savings, and decided to combine the three programs (Existing Homes, New Homes and Products) into one program with one cohesive program delivery model, including:
    - A Program Management Contract (PMC) to support management of measure development, budget and forecasting, reporting, incentive payments, marketing and customer call center activities across all residential market channels
    - One or multiple Program Delivery Contracts (PDCs) to engage subject matter experts to deliver offers with targeted expertise for specific efforts, such as new home construction or lighting
- The consolidated structure is expected to streamline program management work, increase process efficiencies, allow greater flexibility to adapt to future savings opportunities, establish a more robust and diversified portfolio, and maintain cost-effective offerings for customers.

Background—2017 Residential Program RFP

- In March 2017, staff issued a request for proposals (RFP) for one PMC, one Retail Midstream Promotions PDC and one EPS Whole-Home New Construction PDC to deliver services for the residential program.
    - Respondents could bid on a single contract, all contracts or a combination of the three contracts.
- The RFP resulted in eight intents to respond for the PMC option, five intents to respond for the Retail Midstream Promotions option and six intents to respond for the EPS Whole-Home New Construction option.
- Energy Trust received four proposals for PMC services, two proposals for retail services and three proposals for whole-home new construction services. Interviews were conducted with three PMC respondents, two retail service respondents and two whole-home new construction respondents.

- The following RFP review process was followed:
    - Staff completed a pre-qualification evaluation of all proposals for completeness and adherence to financial, legal and minimum requirements. All proposals passed this stage.
    - A review team comprised of 14 Energy Trust staff and two external reviewers, a representative from the NW Power and Conservation Council providing regional and technology expertise and a Diversity, Inclusion and Equity expert, reviewed the proposals and:
        - Provided a preliminary score based on written proposals
        - Posed questions to finalists selected for interviews
        - Interviewed respondents
        - Had follow-up discussions and updated scoring
        - Made a final internal recommendation
- Budgeting and savings:
    - For the purpose of managing a competitive RFP solicitation, staff provided respondents with 2018 residential savings forecasts, based on the best available information at the time of RFP release, of 80,000,000 kWh and 2,936,000 therms for Oregon and Washington.
    - The proposed Residential PMC and PDC delivery budgets for the selected bidders are expected to total approximately $10.7 million for contracted management and delivery services in Oregon and Washington for 2018 which is subject to board approval during the 2018 annual budget process.
    - Staff estimate a 2017 transition budget impact of under $600,000 across the PMC and PDC contracts, with no individual contract exceeding $500,000.

Discussion

Reviewers identified strengths of the three proposals.

Strengths of CLEAResult proposal included:

- Experience delivering PMC services to the residential sector, including PMC delivery of the combined New Homes and Products program from 2004 through 2014, New Homes since 2015 and Existing Homes since 2013.
- Understanding of the challenges and opportunities facing the residential sector, awareness of regional programs and governance objectives, and broad understanding of market and program dynamics.
- A cost-competitive proposal that best aligns delivery investments with future savings, and best positions Energy Trust to adapt to shifts in future savings opportunities.
- Engineering analysis and measure development strengths, strategies to improve benefit-cost-ratio challenges and new approaches to working with trade allies to address underserved markets.
- Demonstrated ability to support business systems, communications protocols and the organizational culture needed to foster effective collaboration between Energy Trust and PDCs.

Strengths of the Ecova proposal included:

- Services and capabilities that best position Energy Trust to navigate a rapidly changing residential lighting market.
- A strategy to build from existing business relationships to support new retail-driven measures and integrate key diversity, equity and inclusion objectives.
- Experience engaging with a range of retailers, extending the reach of Energy Trust's retail footprint into rural and smaller population towns throughout the service territory.

Strengths of the TRC proposal included:

- Program delivery innovations aimed at increasing the efficiency of newly built homes and streamlining program operations.
- Expert staff and clear knowledge of the new homes construction market with a strong understanding of the evolving building climate in the Northwest.
- Innovative strategy and process to gain deeper savings in the new homes market.
- Forecasting expertise and integration for strategic planning, which positions Energy Trust to advance the market as building codes increase baseline efficiency

Recommendations

Authorize staff to negotiate and sign a new **Residential Program Management Contract with CLEAResult Consulting, Inc.** for a two-year term with potential for three one-year performance-based extensions and a total contract term not to exceed five years. If the board follows this recommendation, then staff will provide notice to the OPUC that Energy Trust is entering into this agreement.

Authorize staff to negotiate and sign a new residential **Retail Midstream Promotions Program Delivery Contract with Ecova, Inc.** for a two-year term with potential for three one-year performance-based extensions and a total contract term not to exceed five years. If the board follows this recommendation, then staff will provide notice to the OPUC that Energy Trust is entering into this agreement.

Authorize staff to negotiate and sign a new residential **EPS Whole-Home New Construction Program Delivery Contract with TRC Companies, Inc., or a subsidiary,** for a two-year term with potential for three one-year performance-based extensions and a total contract term not to exceed five years. If the board follows this recommendation, then staff will provide notice to the OPUC that Energy Trust is entering into this agreement.

RESOLUTION 811
AUTHORIZE A NEW PROGRAM MANAGEMENT CONTRACT WITH CLEARESULT FOR THE RESIDENTIAL PROGRAM

WHEREAS:

1. **Energy Trust staff has determined that, as compared to the current Residential program structure, a sole Residential program management contractor, combined with Residential program delivery contractors for (a) retail midstream promotions and (b) energy performance score whole-home new construction, would (i) streamline Residential program management work, (ii) increase process efficiencies, (iii) allow greater flexibility to adapt to future savings opportunities, (iv) establish a more robust and diversified portfolio, and (v) maintain cost-effective offerings for Energy Trust customers;**
2. **With the assistance of outside expertise, Energy Trust staff has conducted a fair and open procurement process to select a sole program management contractor and two program delivery contractors to manage and deliver Residential program services for the next 2-5 years;**
3. **Staff selected CLEAResult Consulting Inc. as providing the Residential program management contract proposal that would best meet the needs of Energy Trust and Energy Trust customers;**
4. **Staff has estimated a total first-year Residential program management and program delivery budget to be delivered as a PMC contract for 2018 at $7,978,915 for Oregon and Washington based on identified savings levels from the RFP. Final details for the exact cost will be approved by this Board as part of the 2018 annual budget approval process; and**
5. **The Energy Trust board will review actual savings and costs each year as part of the annual budget and action plan process.**

IT IS THEREFORE RESOLVED:

1. **Subject to determination of a contract cost amount based on the board-approved 2018 annual budget, the executive director or his designee is authorized to negotiate and to enter into a contract with CLEAResult Consulting Inc. to manage the Residential program for an initial term from January 1, 2018, through December 31, 2019.**
2. **First-year contract costs and savings goals included in the contract shall be consistent with the board-approved 2018 annual budget and two-year action plan. Thereafter, staff may amend the contract consistent with the board's annual budget and action plan decisions and the executive director or his designee is authorized to sign any such contract amendments.**
3. **The contract may include a provision allowing staff to offer one-year extensions beyond the initial term if the program management contractor meets certain established performance criteria. In no event would the total term of the contract plus extensions exceed five years.**
4. **Before extending this contract beyond the initial term, staff will report to the board on the program management contractor's progress and staff's recommendation for any additional extension time periods. If the board does not object to extension, contract terms would remain as approved in the most recent action plans, budgets and contract at the time of extension, and the executive director or his designee is authorized to sign any such contract extensions.**

Moved by:		Seconded by:
Vote:	In favor:	Abstained:
	Opposed:	

RESOLUTION 812
AUTHORIZE A NEW PROGRAM DELIVERY CONTRACT WITH ECOVA FOR THE RETAIL MIDSTREAM PROMOTIONS PORTION OF THE RESIDENTIAL PROGRAM

WHEREAS:

1. **Energy Trust staff has determined that, as compared to the current Residential program structure, a retail midstream promotions delivery contractor, combined with a sole Residential program management contractor and a delivery contractor for energy performance score whole-home new construction, would (i) streamline Residential program management contract work, (ii) increase process efficiencies, (iii) allow greater flexibility to adapt to future savings opportunities, (iv) establish a more robust and diversified portfolio, and (v) maintain cost-effective offerings for Energy Trust customers;**
2. **With the assistance of outside expertise, Energy Trust staff has conducted a fair and open procurement process to select a program management contractor and two program delivery contractors, including a retail midstream promotions delivery contractor, to manage and deliver Residential program services for the next 2-5 years;**
3. **Staff selected Ecova, Inc. as providing the retail midstream promotions proposal that would best meet the needs of Energy Trust and Energy Trust customers;**
4. **Staff has estimated a total first-year Residential program delivery budget to be delivered as a PDC contract for 2018 at $922,474 for Oregon and Washington based on identified savings levels from the RFP. Final details for the exact cost will be approved by this Board as part of the 2018 annual budget approval process; and**
5. **The Energy Trust board will review actual savings and costs each year as part of the annual budget and action plan process.**

IT IS THEREFORE RESOLVED:

1. **Subject to determination of a contract cost amount based on the board-approved 2018 annual budget, the executive director or his designee is authorized to negotiate and to enter into a contract with Ecova, Inc. to deliver the retail midstream promotions portion of the Residential program for an initial term from January 1, 2018, through December 31, 2019.**
2. **First-year contract costs and savings goals included in the contract shall be consistent with the board-approved 2018 annual budget and two-year action plan. Thereafter, staff may amend the contract consistent with the board's annual budget and action plan decisions and the executive director or his designee is authorized to sign any such contract amendments.**
3. **The contract may include a provision allowing staff to offer one-year extensions beyond the initial term if the program delivery contractor meets certain established performance criteria. In no event would the total term of the contract plus extensions exceed five years.**
4. **Before extending this contract beyond the initial term, staff will report to the board on the program delivery contractor's progress and staff's recommendation for any additional extension time periods. If the board does not object to extension, contract terms would remain as approved in the most recent action plans, budgets and contract at the time of extension, and the executive director or his designee is authorized to sign any such contract extensions.**

Moved by:		Seconded by:
Vote:	In favor:	Abstained:
	Opposed:	

RESOLUTION 813
AUTHORIZE A NEW PROGRAM DELIVERY CONTRACT WITH TRC FOR THE ENERGY PERFORMANCE SCORE WHOLE-HOME NEW CONSTRUCTION PORTION OF THE RESIDENTIAL PROGRAM

WHEREAS:

1. **Energy Trust staff has determined that, as compared to the current Residential program structure, an energy performance score ("EPS") whole-home new construction delivery contractor, combined with a sole Residential program management contractor and a delivery contractor for retail midstream promotions, would (i) streamline Residential program management contract work, (ii) increase process efficiencies, (iii) allow greater flexibility to adapt to future savings opportunities, (iv) establish a more robust and diversified portfolio, and (v) maintain cost-effective offerings for Energy Trust customers;**
2. **With the assistance of outside expertise, Energy Trust staff has conducted a fair and open procurement process to select a program management contractor and two program delivery contractors, including an EPS whole-home new construction delivery contractor, to manage and deliver Residential program services for the next 2-5 years;**
3. **Staff selected TRC Companies, Inc. as providing the EPS whole-home new construction proposal that would best meet the needs of Energy Trust and Energy Trust customers;**
4. **Staff has estimated a total first-year Residential program delivery budget to be delivered as a PDC contract for 2018 at $1,818,244 for Oregon and Washington based on identified savings levels from the RFP. Final details for the exact cost will be approved by this Board as part of the 2018 annual budget approval process; and**
5. **The Energy Trust board will review actual savings and costs each year as part of the annual budget and action plan process.**

IT IS THEREFORE RESOLVED:

1. **Subject to determination of a contract cost amount based on the board-approved 2018 annual budget, the executive director or his designee is authorized to negotiate and to enter into a contract with TRC Companies, Inc., or its subsidiary, for the EPS whole-home new construction portion of the Residential program for an initial term from January 1, 2018, through December 31, 2019.**
2. **First-year contract costs and savings goals included in the contract shall be consistent with the board-approved 2018 annual budget and two-year action plan. Thereafter, staff may amend the contract consistent with the board's annual budget and action plan decisions and the executive director or his designee is authorized to sign any such contract amendments.**
3. **The contract may include a provision allowing staff to offer one-year extensions beyond the initial term if the program delivery contractor meets certain established performance criteria. In no event would the total term of the contract plus extensions exceed five years.**
4. **Before extending this contract beyond the initial term, staff will report to the board on the program delivery contractor's progress and staff's recommendation for any additional extension time periods. If the board does not object to extension, contract terms would remain as approved in the most recent action plans, budgets and contract at the time of extension, and the executive director or his designee is authorized to sign any such contract extensions.**

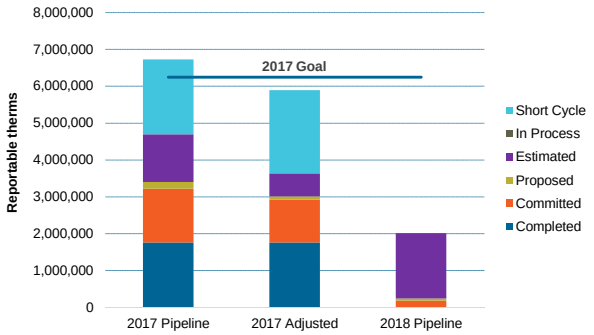
Moved by:		Seconded by:
Vote:	In favor:	Abstained:
	Opposed:	

Energy Efficiency Summary*
All Programs; not including NEEA

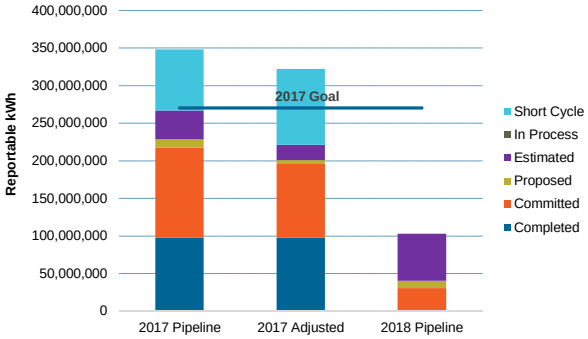
July 1, 2017

Combined Efficiency		PGE	PAC	NWN	CNG	AVI
Achieved	2017 Achieved to Date (kWh or therm)	97,794,043	59,417,338	1,751,787	178,081	134,249
	To date % of goal	36%	37%	28%	32%	43%
Context	Historical % of actual accomplishment	32%	28%	27%	28%	NA
Budget	To Date % of Incentive Budget Spent	34%	33%	29%	25%	37%

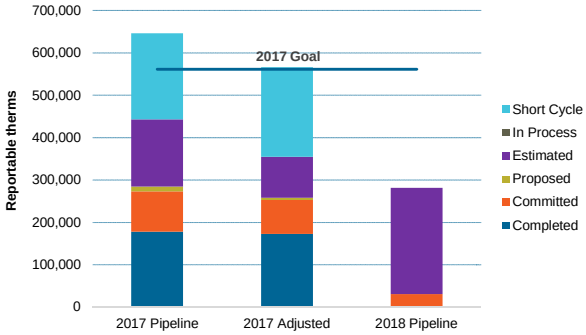
NWN Savings Pipeline 2017-2018



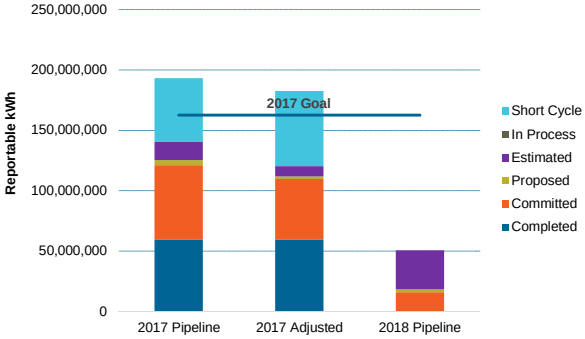
PGE Savings Pipeline 2017-2018



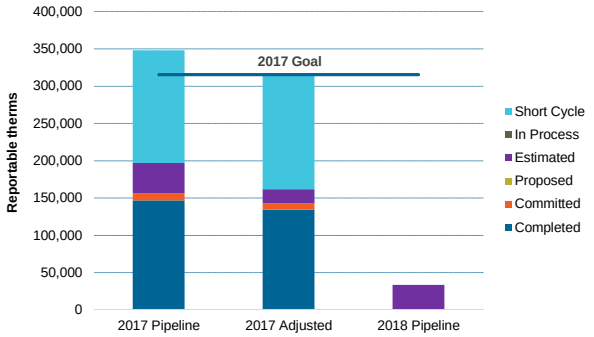
CNG Savings Pipeline 2017-2018



PAC Savings Pipeline 2017-2018



AVI Savings Pipeline 2017-2018



2017 Adjusted Pipeline percent of Goal	
PGE: 119%	**PAC:** 112%
NWN: 94%	**CNG:** 101%
AVI: 100%	

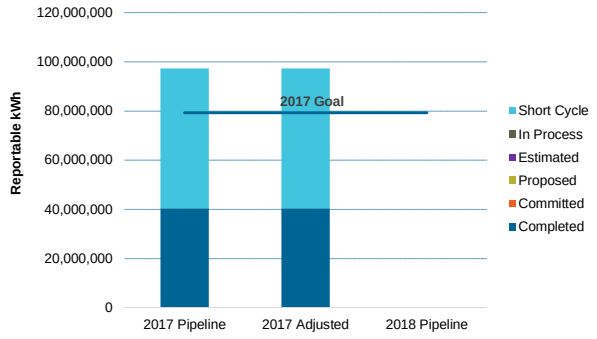
* Dashboards are a program management tool used by Energy Trust staff on a quarterly basis and represent best available data as of the date of distribution. Savings, progress to goal, pipelines and incentive spending are preliminary and may not reflect official Energy Trust data as reported in quarterly and annual reports to the Oregon Public Utility Commission. All reports to the OPUC are published online at www.energytrust.org/reports.

Residential Programs Summary*
Existing Homes, and New Homes and Products; not including NEEA

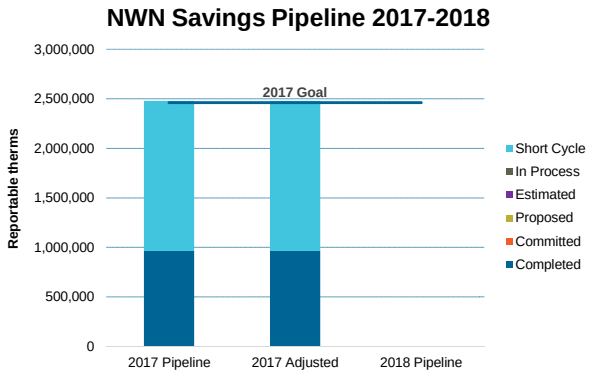
July 1, 2017

Residential Sector		PGE	PAC	NWN	CNG	AVI
Achieved	2017 Achieved to Date (kWh or therm)	40,399,804	26,550,158	961,038	86,435	100,205
	To date % of goal	51%	53%	39%	45%	40%
Context	Historical % of actual accomplishment	40%	40%	40%	38%	#N/A
Budget	To Date % of Incentive Budget Spent	38%	40%	38%	34%	35%

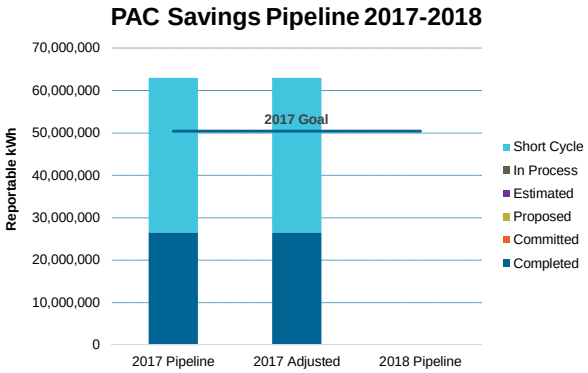
PGE Savings Pipeline 2017-2018



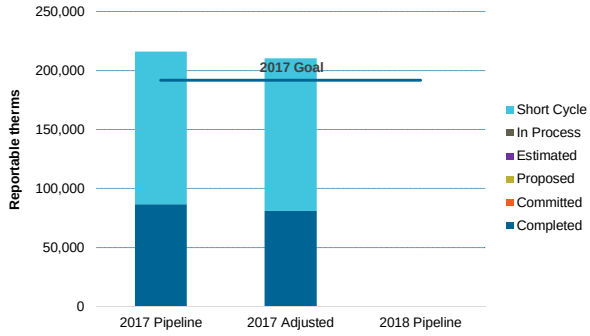
NWN Savings Pipeline 2017-2018



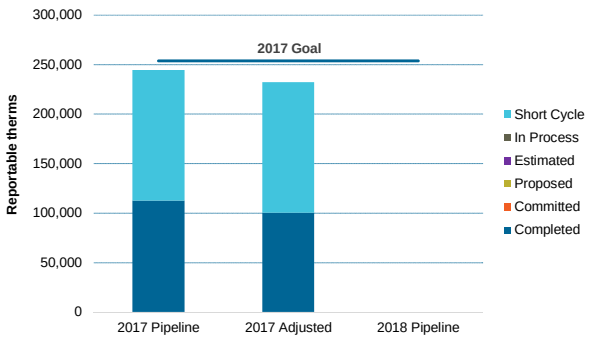
PAC Savings Pipeline 2017-2018



CNG Savings Pipeline 2017-2018



AVI Savings Pipeline 2017-2018



2017 Adjusted Pipeline percent of Goal	
PGE: 123%	**PAC:** 125%
NWN: 101%	**CNG:** 110%
AVI: 91%	

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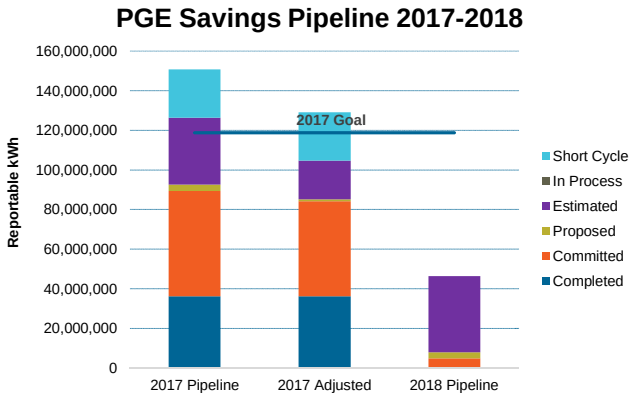
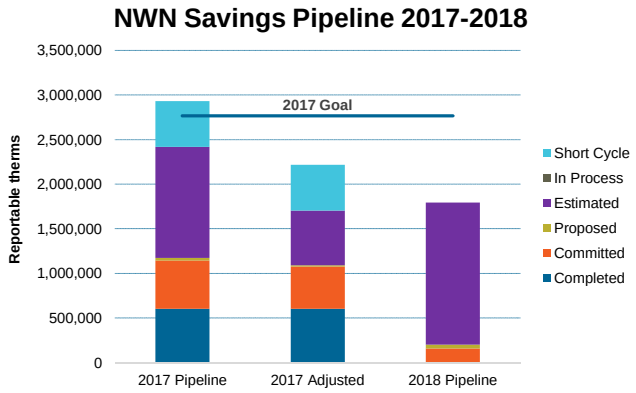
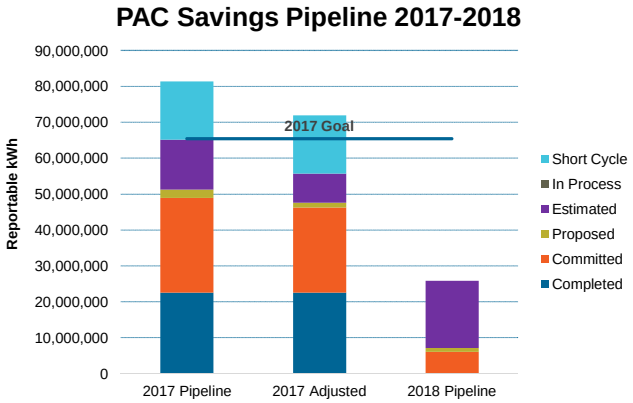
Commercial Programs Summary* **July 1, 2017**

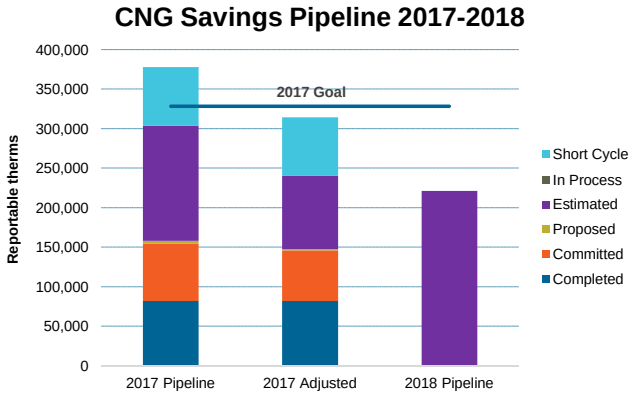
New Buildings, Existing Buildings and Existing Multifamily; not including NEEA

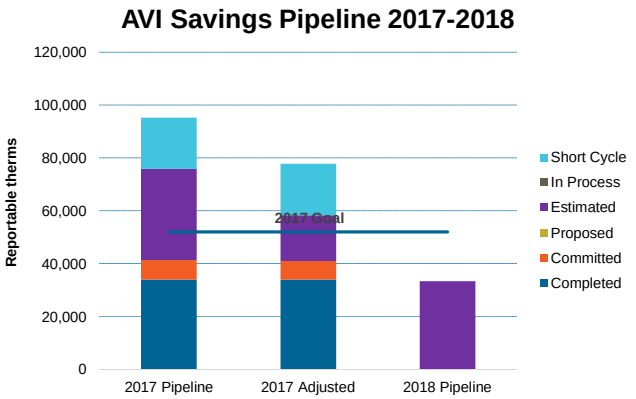
Commercial Sector		PGE	PAC	NWN	CNG	AVI
Achieved	2017 Achieved to Date (kWh or therm)	36,281,548	22,645,496	605,873	81,989	34,043
	To date % of goal	31%	35%	22%	25%	65%
Context	Historical % of actual accomplishment	28%	27%	22%	23%	#N/A
Budget	To Date % of Incentive Budget Spent	32%	30%	21%	20%	47%











2017 Adjusted Pipeline percent of Goal	
PGE: 109%	**PAC:** 110%
NWN: 80%	**CNG:** 96%
AVI: 150%	

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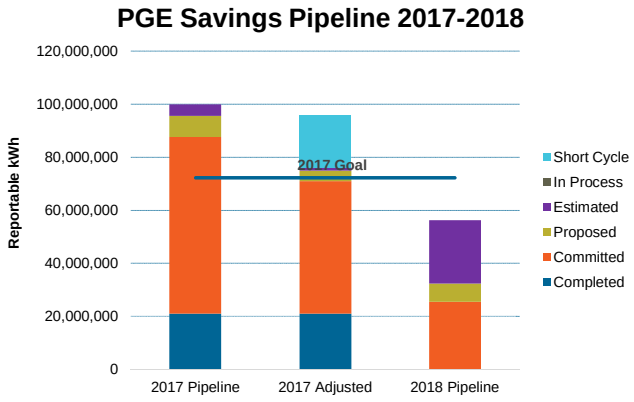
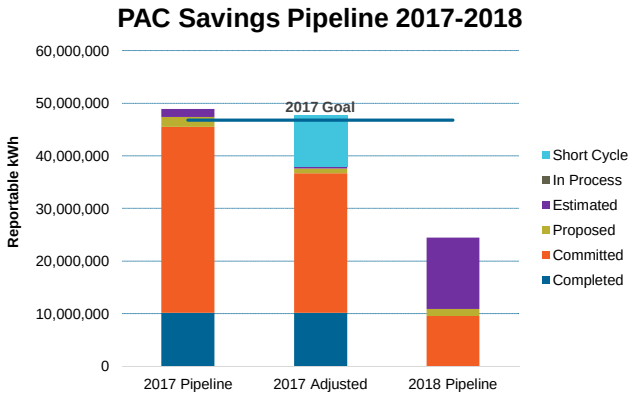
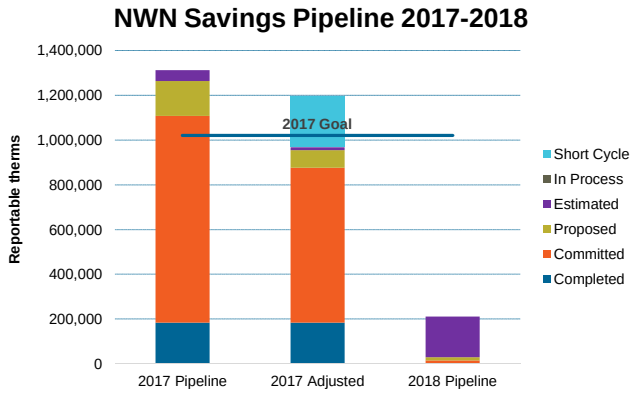
Industrial Sector Summary*
Production Efficiency; not including NEEA

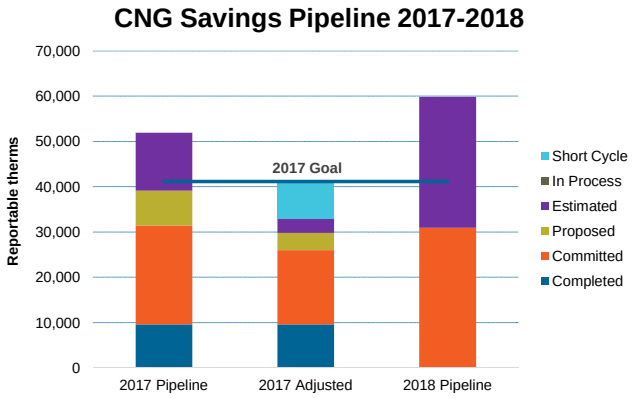
July 1, 2017

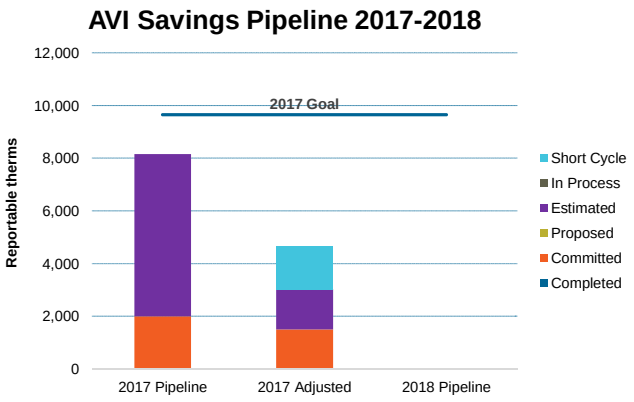
Program: Industrial		PGE	PAC	NWN	CNG	AVI
Achieved	2017 Achieved to Date (kWh or therm)	21,112,691	10,221,684	184,876	9,657	9,657
	To date % of goal	29%	22%	18%	23%	23%
Context	Historical % of actual accomplishment	31%	17%	14%	17%	#N/A
Budget	To Date % of Incentive Budget Spent	36%	28%	28%	29%	0%











2017 Adjusted Pipeline percent of Goal			
PGE:	133%	**PAC:**	102%
NWN:	117%	**CNG:**	101%
		AVI:	48%

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Factors That Impact 2018 Measure Development and Budgeting

Conservation Advisory Council

August 2, 2017

Energy Trust of Oregon

Introduction

- Energy Trust and PMCs are currently updating and developing measures for use in 2018 planning
- Most measures are expected to be cost-effective
- Some measures will be impacted by the following factors…

Influencing Factors

- Updated avoided costs
- RETC expiration
- New codes and standards
- Expiring exceptions
- Changing market conditions (e.g., LEDs)

Avoided Costs

Avoided Cost Updates

- Energy Trust updates avoided costs every two years (gas and electric)
- Utilities provide forecasts of value of efficiency
- Last avoided cost update implemented 1/1/2016
- Updated electric and gas avoided costs for 2018 measure and program planning take effect 1/1/2018

Key Components of Electric Avoided Costs

1. Energy price forecasts
2. Avoided T&D capacity deferral value
3. Avoided generation capacity deferral value
4. Regional 10% conservation credit
5. Risk reduction value

Electric Avoided Cost =

Energy price forecast x (1+10% Power Act Credit) x (1 + marginal line losses)
+ T&D deferral value x (1+10% Power Act Credit) x (1 + marginal line losses)
+ Generation deferral value x (1+10% Power Act Credit) x (1 + marginal line losses)
+ Risk Reduction Value

Key Factors for Electric Avoided Cost Updates

- **Electric price** forecasts have decreased
- The value of **generation capacity deferral** has increased (peak savings have more value)
- The current method used to value peak reduction needs to be improved
  - Undervalues savings highly coincident with peak
  - Overvalues savings for measures with low peak coincidence (e.g., flat load profiles)

Key Outcomes for **Electric** Updates

- Overall, electric avoided costs have decreased for all load profiles and all measure lives
- Measures with shorter lives are more affected
- Will not know full extent of impact until after measure development and budget are complete

Key Components of Gas Avoided Costs

1. Gas price forecasts
2. Supply and distribution capacity costs
3. Oregon carbon policy adder
4. Risk reduction value
5. 10% Power Act credit

Gas Avoided Cost =

Gas Price Forecast x (1+10% Power Act Credit)
+ Supply and Distribution Capacity Value x (1+10% Power Act Credit)
+ State Carbon Policy Adder x (1+10% Power Act Credit)
+ Risk Reduction Value

Key Factors for Gas Avoided Cost Updates

- Updated **gas price forecasts** have decreased
- NW Natural provided separate avoided cost values for **distribution and supply capacity** savings

Key Outcomes for **Gas** Updates

- Gas avoided costs have decreased for measures with useful life <~20 years
- Gas avoided costs have increased for measures with useful life >~20 years
- Will not know full extent of impact until after measure development and budget are complete

For Measures that Don’t Pass TRC

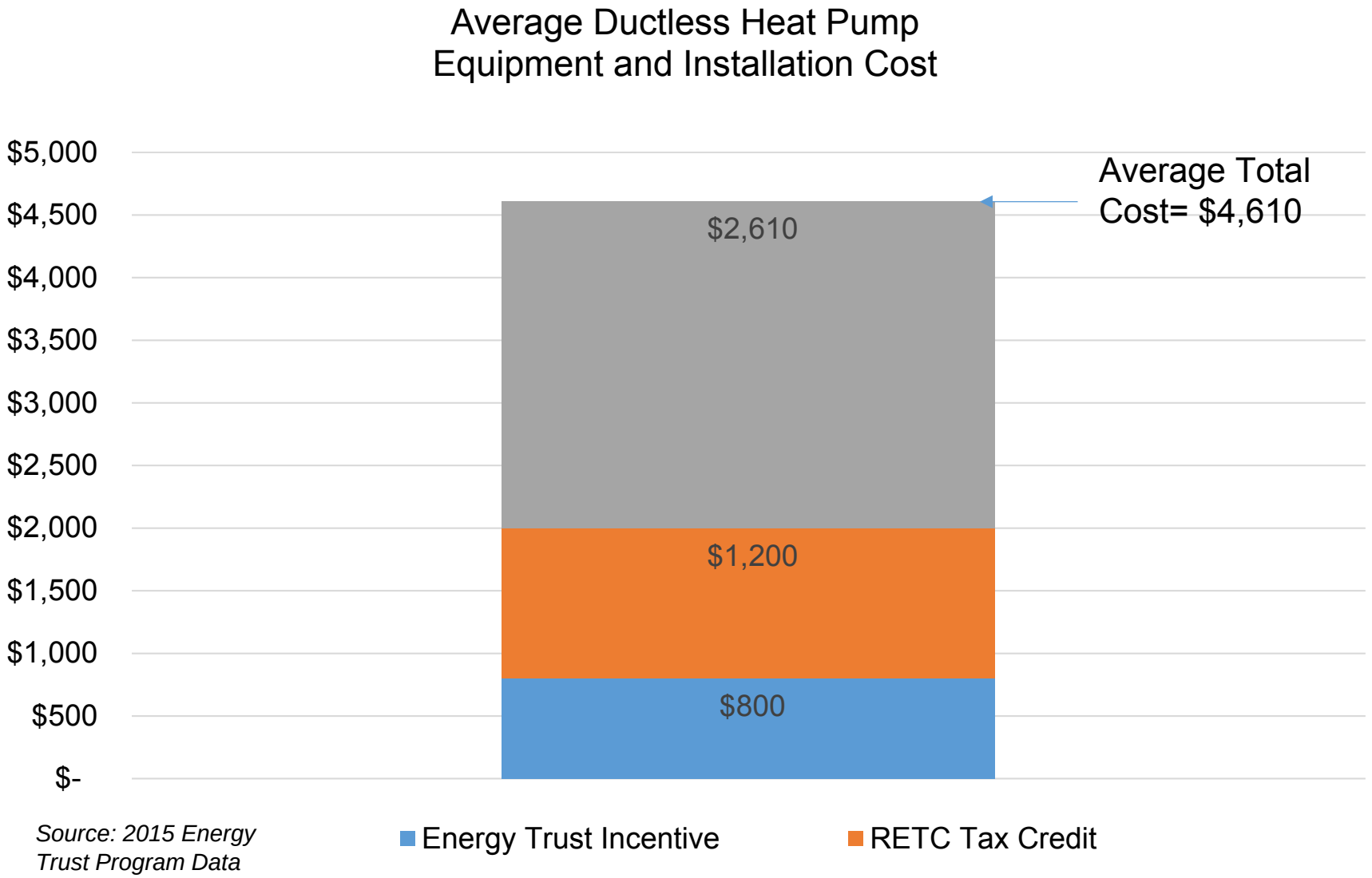
- Can narrow or re-structure measure
- Can consider exceptions per OPUC exception criteria
- Can consider whether a pilot is warranted
- Could stop offering an incentive for the measure

Residential Energy Tax Credits

RETC and Energy Trust

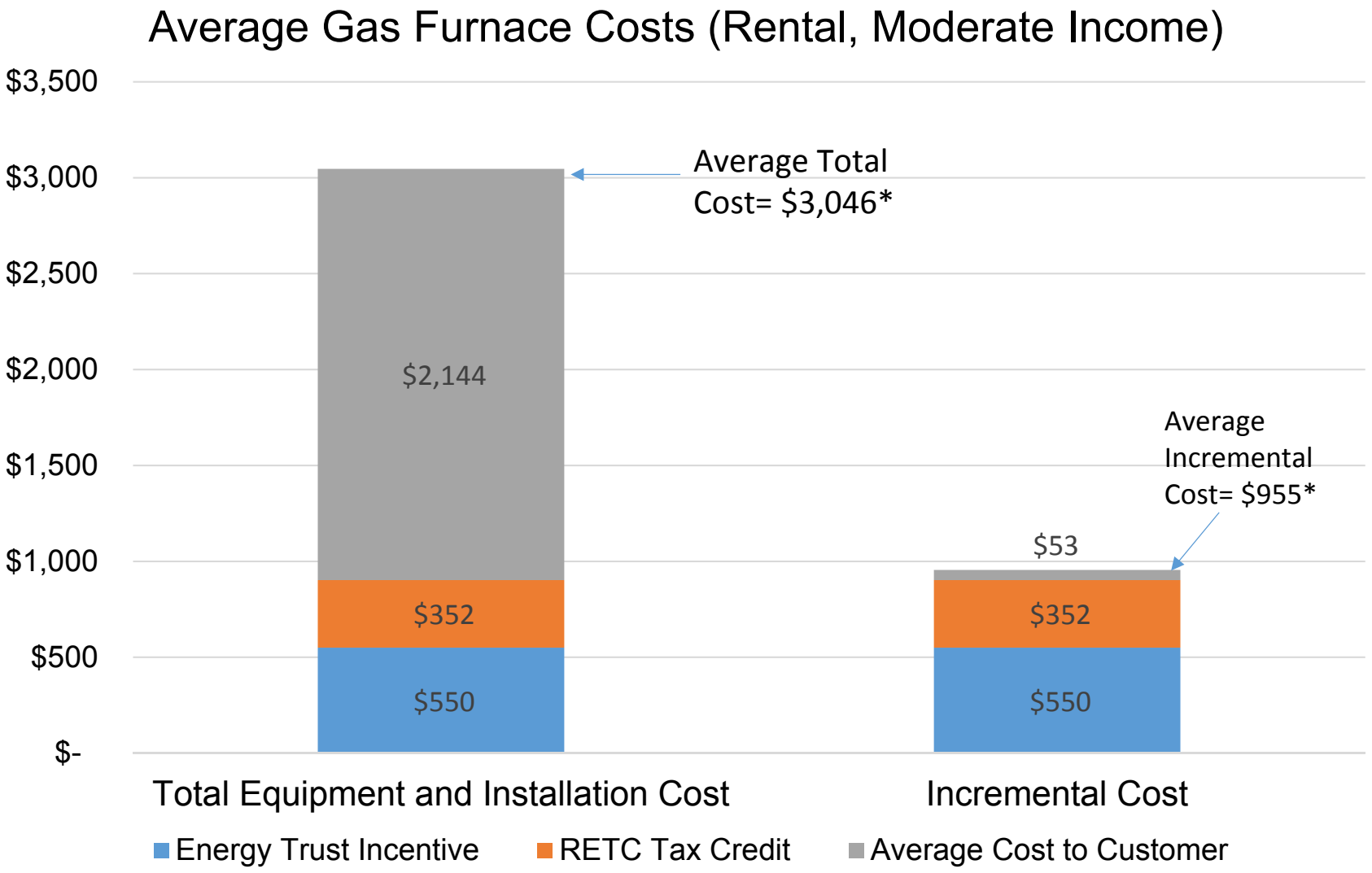
ODOE RETC Category	Energy Trust Incented?
Heat Pump Water Heater	Yes
Tankless Gas Water Heater	Yes (new homes only)
Storage Gas Water Heater	yes
Gas Furnace	Yes (rental, small MF, moderate income)
Direct Vent Gas Fireplace	Yes
Air-Source Ducted Heat Pump	Yes
Ductless Heat Pump	Yes
Residential Solar Electric	Yes

Electric Example of RETC Impact



Source: 2015 Energy Trust Program Data

Gas Example of RETC Impact



*Non-premium products

Other Factors Impacting Measures

Codes and Standards

- Oregon residential code update
- Water heater EF to UEF rating change
- Possible commercial code update – timing TBD

Measures With Expiring Exceptions

- Residential gas tank water heaters
- Multifamily windows
- Residential new construction (EPS path 4)

Measures That Could be Impacted

- Measures that are presently planned for 2018 updates or developments are subject to changes
- Other measures will be reviewed in 2018 for 2019 program planning

Measures That May Be At Risk

- Packaged terminal heat pumps
- Whole home heat pumps
- Ductless heat pumps (multifamily, new homes, existing homes)
- Gas tank water heaters
- Multifamily windows
- New homes
- Residential furnaces (lagging markets)

Next Steps

- Aug-Sept: 2018 measure developments/updates
- Sept. and Oct. CAC meetings: Update on measure developments/changes

Thank You

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Fred Gordon, Director of Planning and Evaluation
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EnergyTrust of Oregon

Commercial Sector

2009 – 2016 Trends Analysis

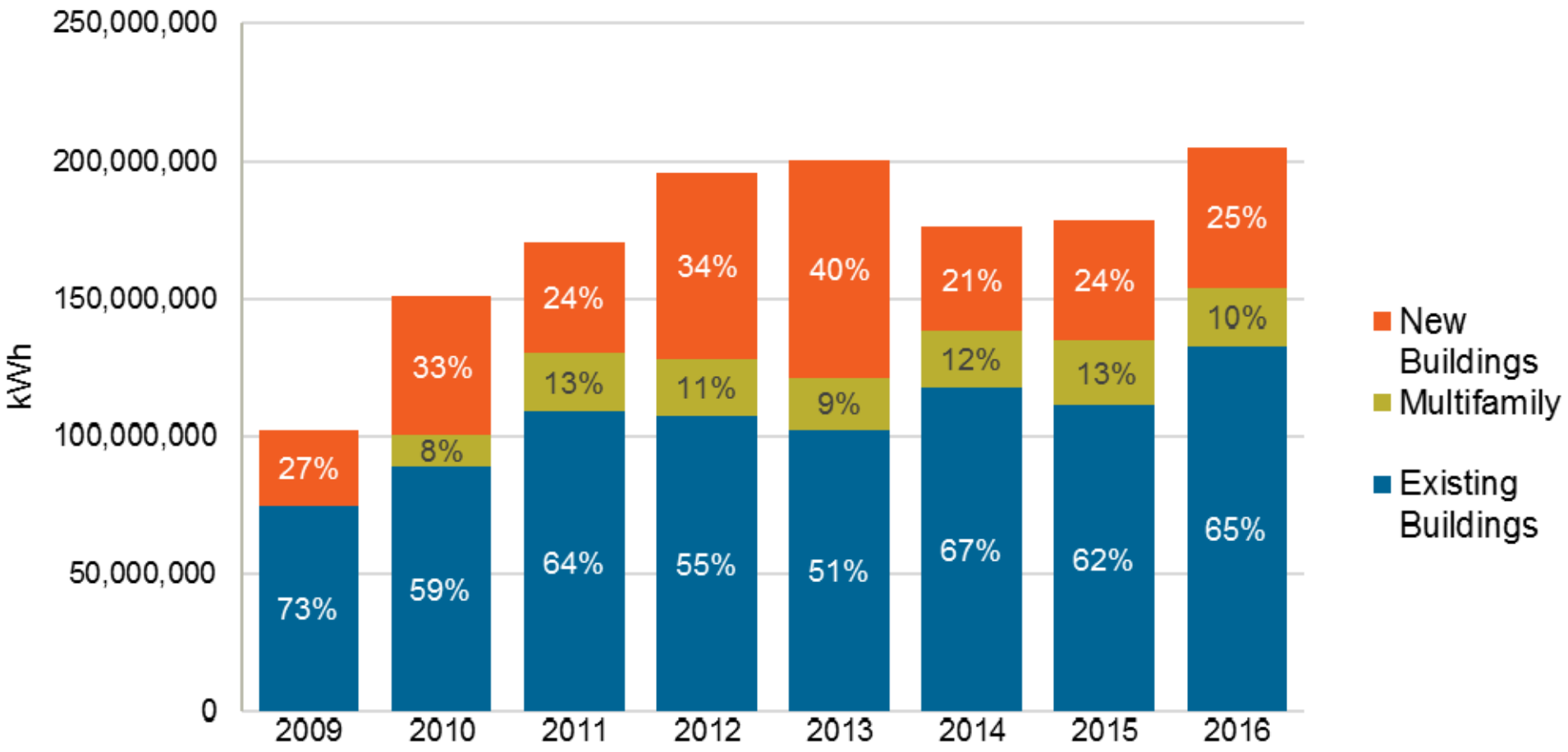
August 2, 2017

EnergyTrust of Oregon

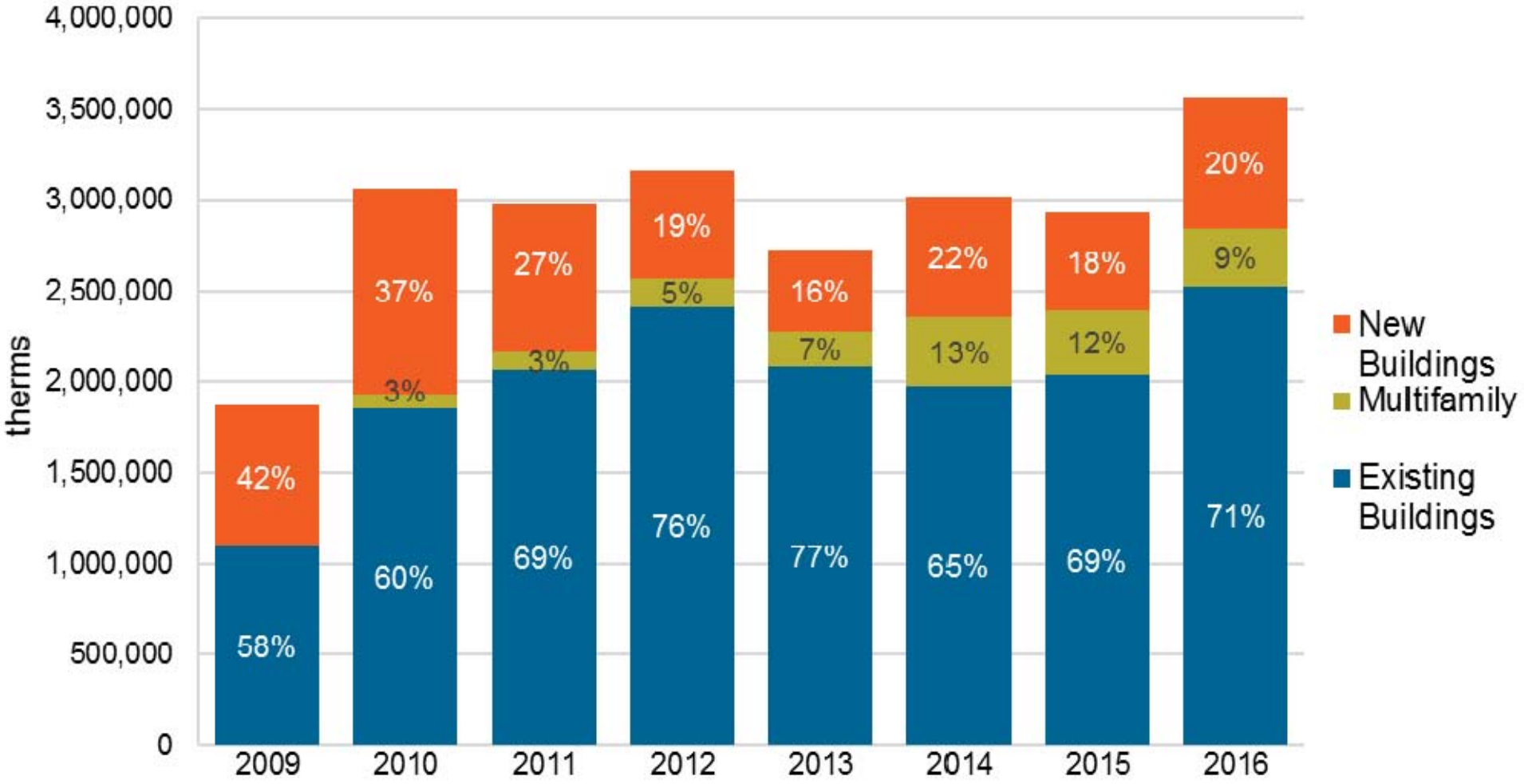
Sector Highlights

- Record commercial gas and electric savings in 2016
- Record commercial project completions (8,327) in 2016
- Steady growth and new offerings for Existing Buildings
- Strong performance in Multifamily—peaks in gas savings in 2014 and in electric savings in 2015
- Building cycles drive New Buildings

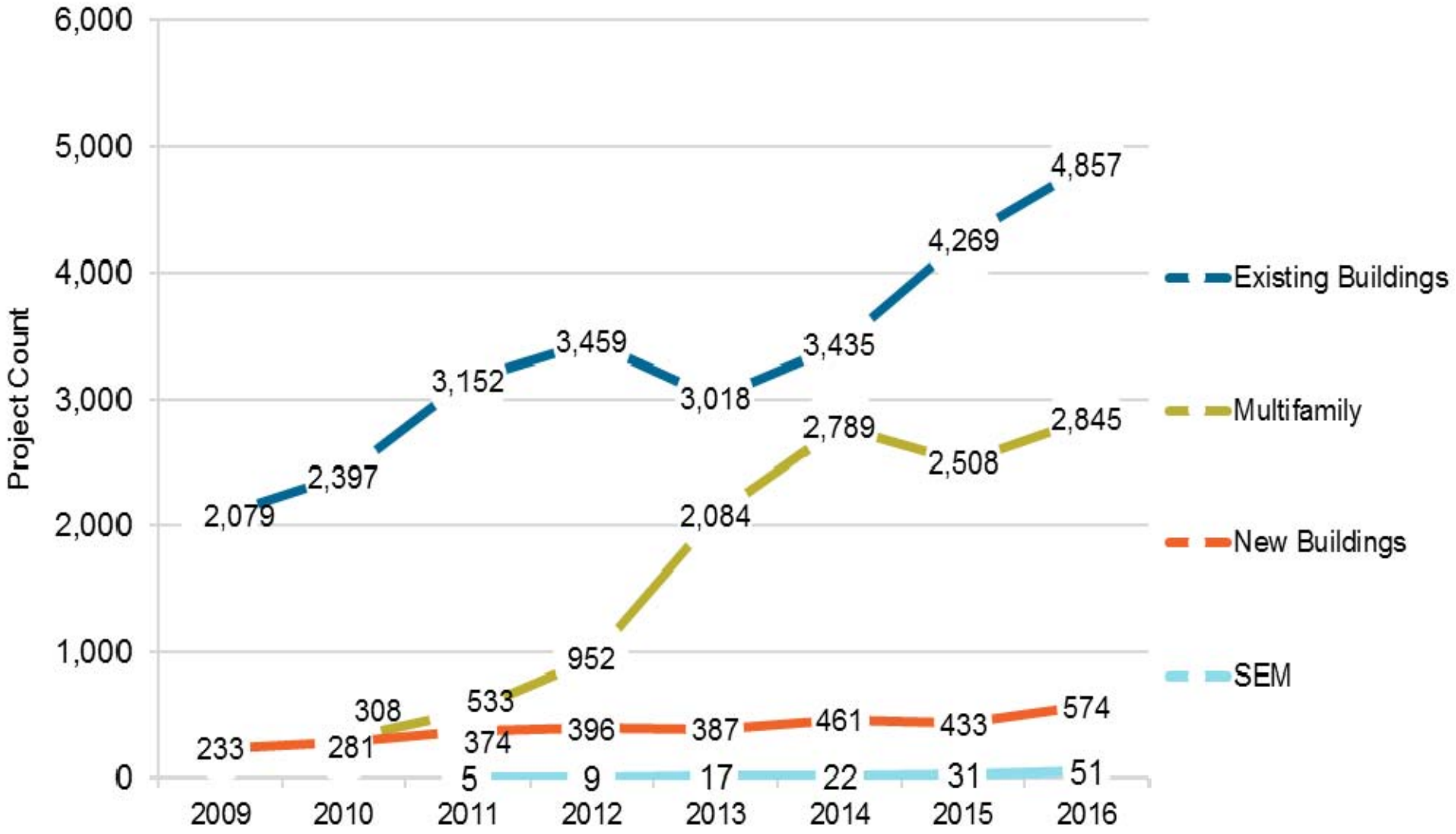
Commercial Sector Electric Savings



Commercial Sector Gas Savings



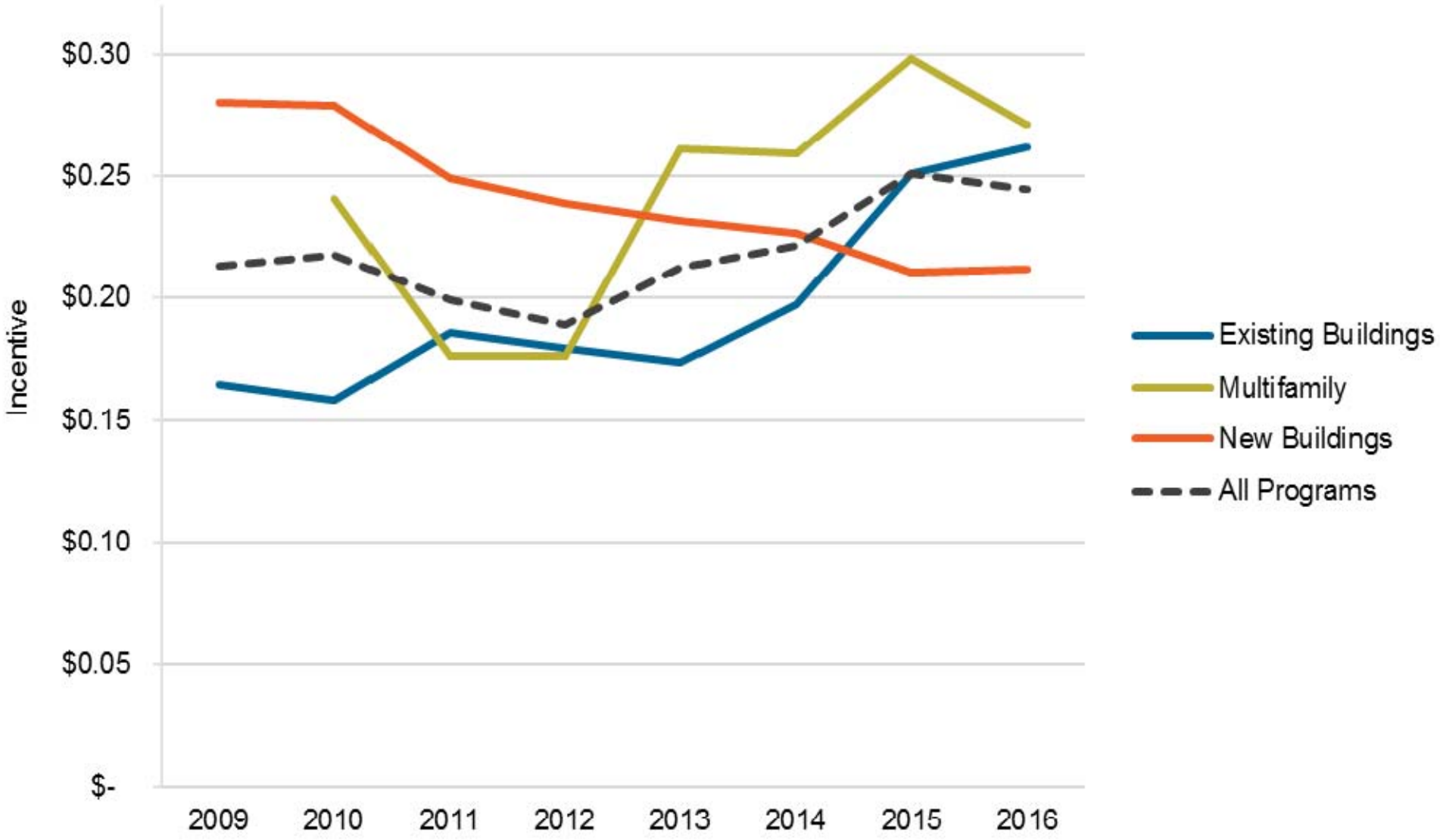
Commercial Project Count



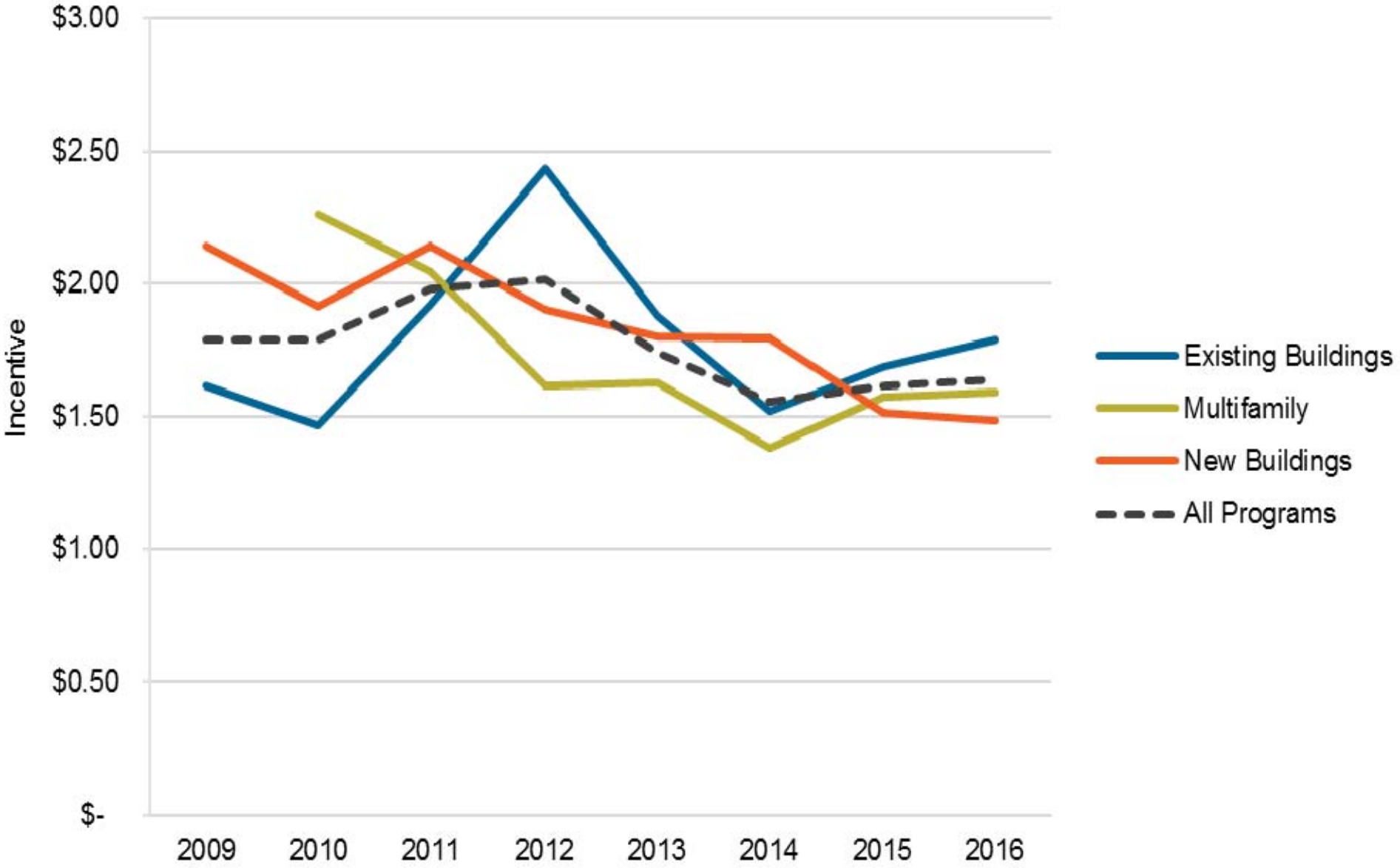
Incentives

- Incentive cost per kilowatt hour (kWh) increased for Multifamily and Existing Buildings
- Incentive cost per therm declined since 2012 for all programs
- Existing Buildings incentive cost per therm increased since 2014
- Incentive cost per kWh and therm declined for New Buildings

Commercial Sector Electric Incentives



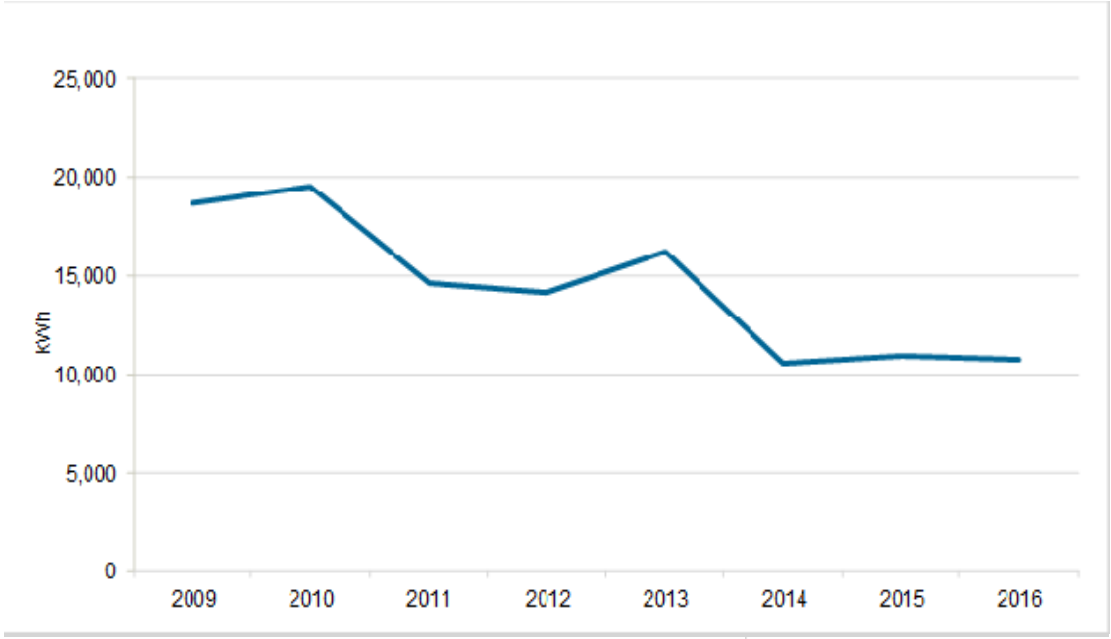
Commercial Sector Gas Incentives

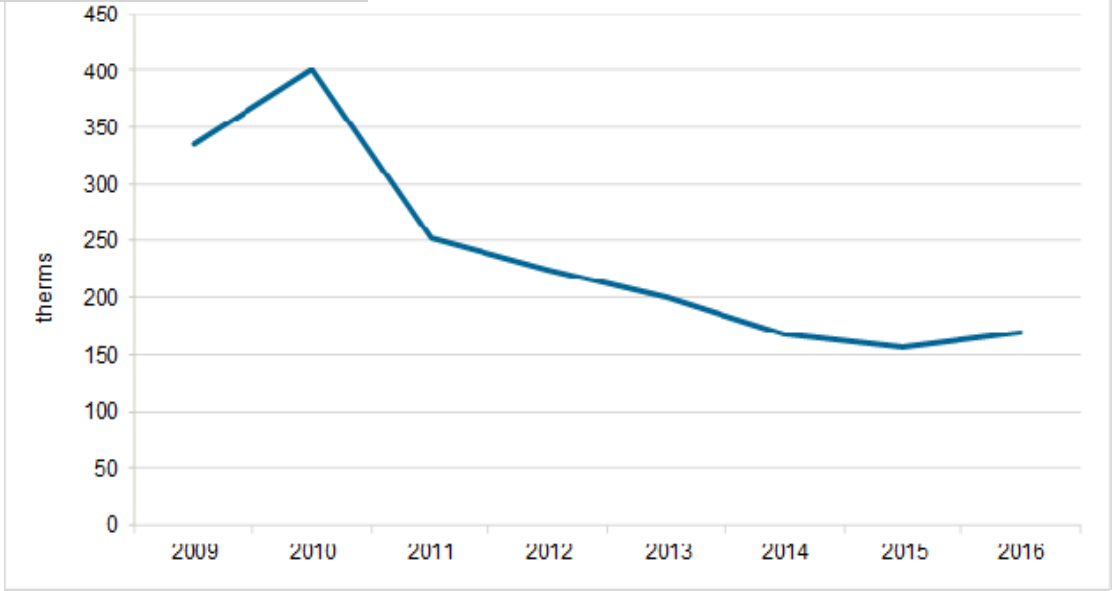


Market Trends

- Higher codes and standards, program participation is raising the bar
- Smaller project savings opportunities
- Lighting continues to drive new participation and savings
- Lumpiness of results, by year, from large projects

Commercial Sector Average Savings/Project





Existing Buildings Highlights

- SEM expanding to non-metro and smaller customer sites
- LED is a game changer and driving big savings
- Custom projects continue to be strong
- Standard incentives, especially foodservice, continue to grow
- Streetlight opportunities declining
- Trade ally recruitment focus on diversification

New Buildings Highlights

- More standard measures driving down incentive costs
- Market Solutions resulting in more measures installed at smaller sites
- Path to Net Zero—more than 70 project enrolled
- Sophistication of custom building designs and rising baselines are increasing costs
- Training opportunities and interest continues
- Increased regional outreach

Existing Multifamily Highlights

- Continued low vacancy rates
- Shift to smaller properties
- Standard track savings are up
- Strong interest in LEDs
- Direct install continues to be significant but facing challenges

Thank You

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EnergyTrust of Oregon

Commercial Sector

Trends: Measures, Markets and Sources of Savings from 2009-2016

July 2017

EnergyTrust of Oregon

About Energy Trust of Oregon

Energy Trust is an independent nonprofit organization, overseen by the Oregon Public Utility Commission, to lead utility customers in benefiting from saving energy and generating renewable power. Our services, cash incentives and solutions have helped participating customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista save more than $2.7 billion on their energy bills since 2002. The cumulative impact of our leadership since 2002 has been a contributing factor in our region's low energy costs and in building a sustainable energy future. More information about Energy Trust's background, funding sources, strategic and action plans, policies and programs are available on our website at www.energytrust.org.

Executive Summary

Energy Trust conducts periodic trends analysis to understand historic accomplishments and market conditions, and inform our planning for future program offerings. This analysis, performed for the Commercial Sector, reflects program activity in Existing Buildings, New Buildings and Multifamily from 2009 through 2016.

Overall the Sector has been successful, with record gas and electric savings achieved in 2016. The number of completed projects has increased consistently for all programs peaking at 8,327 projects in 2016, an increase of over 260% since 2009.

Existing Buildings results have consistently increased for both gas and electric, and the addition of Strategic Energy Management in 2012 helps offset lower savings opportunities available through Standard and Custom Measures.

Multifamily achieved peaks in gas savings in 2014 and in electric savings in 2015 due to high savings from direct install measures. Although savings have dropped somewhat, Multifamily continues to achieve strong electric and gas savings.

New Buildings achieved record gas savings in 2010 and record electric savings in 2013, primarily due to large custom projects.

Sector incentive cost per kilowatt-hour (kWh) has increased since 2012 due to lower savings from custom and standard measures and higher incentives necessary to drive market adoption in Multifamly and Existing Buildings.

Gas incentives per therm have dropped since 2012 across all programs.

Incentive cost per kWh and therm for New Buildings declined due to increased uptake and lower costs for standard projects. This reduction is due to higher savings per project from more sophisticated designs and new technologies.

Markets with significant growth in recent years include multifamily new construction, grocery, restaurant, lodging, and office sectors. In multifamily, larger market rate properties have had particularly strong participation, as well as assisted living and campus living facilities.

I. About the Analysis of Trends

Source of Data

Data contained in this report comes from Energy Trust's internal systems of record for Oregon Programs.

Trend Analysis: Working and Reportable Savings Numbers

These analyses are primarily based on working savings numbers, which are savings before evaluation factors and transmission and distribution losses or credits are applied. Working savings will not match reportable savings, which are included in Energy Trust's public reports to the Oregon Public Utility Commission and board of directors.

We analyze trends using working savings for a couple of reasons:

- Consistency: Evaluation factors change. Working savings provide a year-over-year comparison of market response to program offerings.

- Incentive designs and budgets are built on working savings, as verified first-year working savings are the basis for incentive payments to customers. Trends based on working savings are the basis of bottom-up goal setting and incentive budget development.

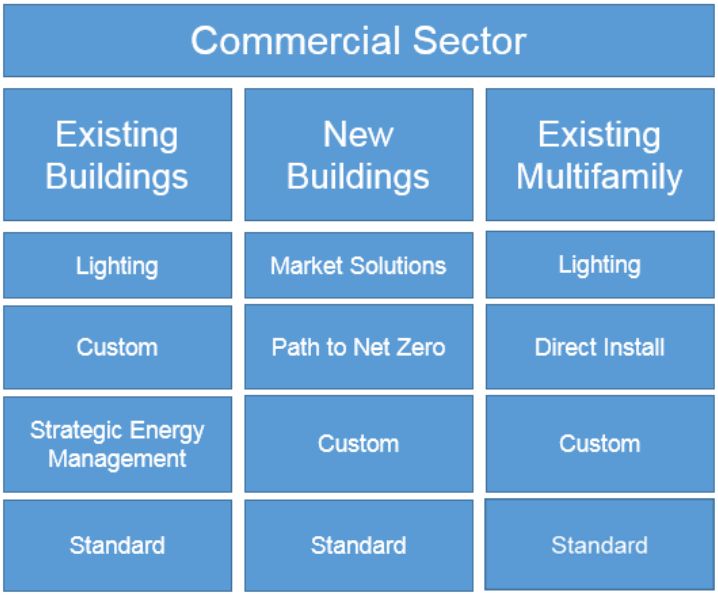
- Market drivers: While tracking and addressing changes in free ridership and technical realization is important to program outcomes, the primary driver of program outcomes is how the market responds to program offers. The secondary driver of outcomes appears to be customer perception of the current economy. This trend analysis focuses on the primary driver influenced by basic program design and delivery.

II. Sources of Savings

Through the commercial sector, Energy Trust provides energy efficiency services and incentives to commercial customers, institutional customers and multifamily properties. Energy Trust's commercial sector is composed of three programs, each delivered by a Program Management Contractor (PMC): Existing Buildings, New Buildings and Existing Multifamily (Multifamily). Prior to 2010, Existing Multifamily savings and incentives were allocated within the Residential sector.

Energy Trust helps customers save energy by providing technical services and cash incentives for lighting upgrades, standard and custom equipment retrofits and design upgrades, direct installation of free energy-saving light bulbs, and operations and maintenance improvements.

Figure 1: Commercial Sector Programs



A. Commercial Sector Overview

Since 2009, Oregon's commercial business growth has been driven by an increasing population, a new and expanding services economy and historically low unemployment. In urban areas, these factors are driving density, infill and small business development. Figures 2 and 3 show savings in the commercial sector from 2009 to 2016 by key program tracks.

Energy Trust has seen dramatic growth in new business activity, particularly in the technology, multifamily, grocery, retail and restaurant segments. New office construction has rebounded, especially in the Portland metro area. However, economic recovery has not been spread equally around the state. Smaller rural markets are slower to recover or may even have lost business activity since 2009. Energy Trust's commercial programs are focusing on reaching new customers in smaller markets that haven't worked with Energy Trust in the past.

In this dynamic market, Energy Trust's commercial sector has maintained both electric and natural gas savings since 2011. A decline in savings for Existing Buildings between 2013 and 2015 has largely been filled by a commercial Strategic Energy Management offering introduced in 2012.

Several trends affect commercial program activity:

- While a great deal of savings is still available, the project profile has shifted over time. Many of the cheapest retrofit savings at larger customer sites has been captured, and all programs are operating in a market characterized by more small to medium-sized customers and incremental efforts with large customers. Since 2009, average savings per commercial project has declined by half.
- The bar for energy efficiency is continually rising, in part the result of Energy Trust programs. In addition, changing energy codes, standards and market practices are driving a need for Energy Trust to innovate for more advanced program offerings.
- Lighting, specifically LED technology, is generating high savings in all of Energy Trust's commercial programs. This trend is due to a rebounding economy, desirable LED technology and declining equipment costs, all supported by Energy Trust's strong delivery network of lighting trade allies and a comprehensive array of lighting incentives. LEDs are becoming more of a common choice for efficient lighting. In coming years, market transformation of this technology will likely lower for level of Energy Trust's need to provide incentives for LEDs at current levels
- Data centers have created some peaks in savings trends. In Figure 2, higher New Buildings savings in 2012-13 came from a few large data center projects sites. Existing Buildings experienced higher gas savings in 2012 as a result of an increase in boiler installations – some of them large.

Figures 2 through 10 on the following pages summarize historical savings results and incentive costs by Energy Trust commercial programs and delivery tracks. Delivery tracks are represented as:

- Standard: prescriptive incentives for specific measures
- Custom: projects that received more detailed engineering support, design analysis and calculated incentives
- Lighting: custom, standard and direct installation
- Strategic Energy Management: comprehensive operations and maintenance services

Charts also show trends since 2009 for project volume, average savings per project and incentive costs by program.

- Across the commercial sector, the number of completed projects more than doubled since 2011. Overall sector incentive costs per therm have been level since 2009, while incentives per kWh increased slightly since 2012. This was driven by higher Standard and Custom incentives for Existing Buildings, and more savings from direct installation offers for Existing Buildings and Existing Multifamily.

- Savings per project increased for New Buildings when the Market Solutions offer for small commercial projects spurred investment in more measures per project. In Multifamily, the addition and ramp-up of appliance incentives and direct-install services significantly decreased the savings per project between 2011-2013, Since that time savings per project have been relatively steady, with slight declines on the gas side. For Existing Buildings, gas savings per project remained level while electric savings per project has declined. The program had an increase in larger Custom and SEM projects as well as smaller projects such as Standard and Small Business Energy Savings.

See program-specific sections for Existing Buildings (including SEM), Existing Multifamily and New Buildings for more detailed information, including by measures, technologies and market segments.

Figure 2: Commercial Electric Savings by Program

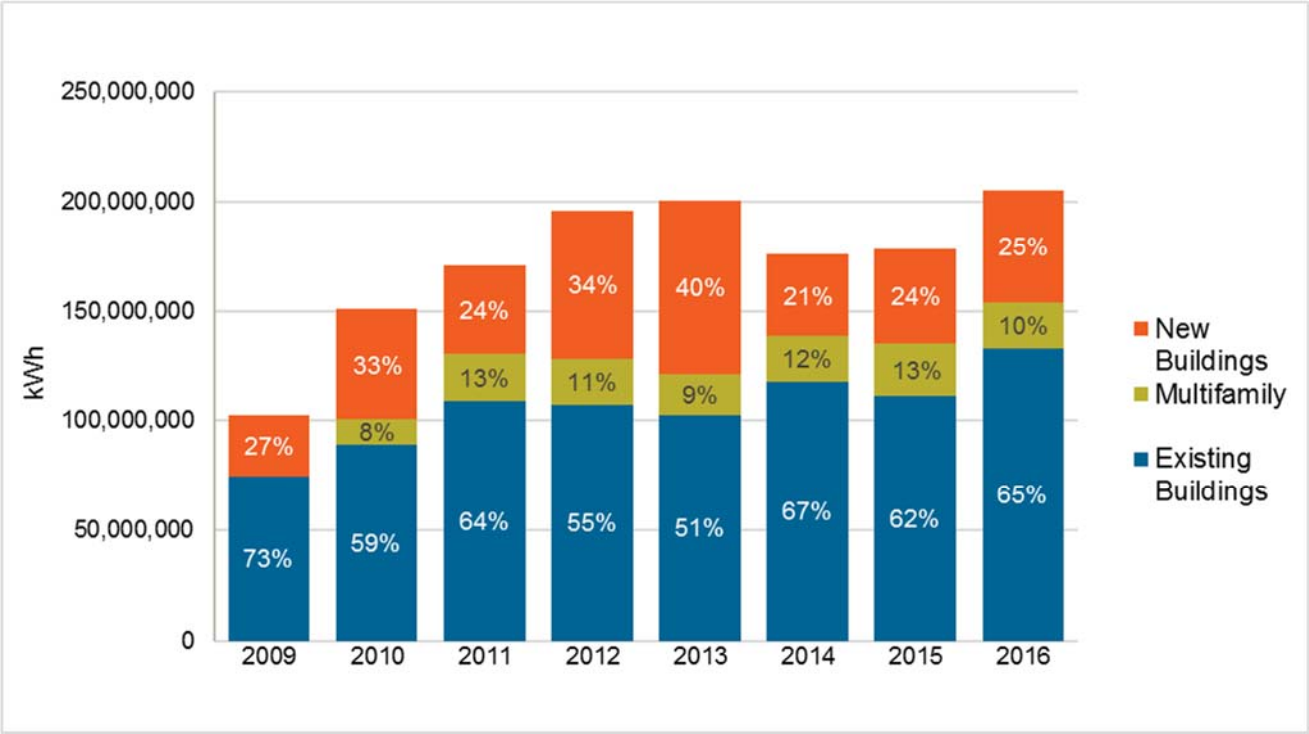


Figure 3: Commercial Gas Savings by Program

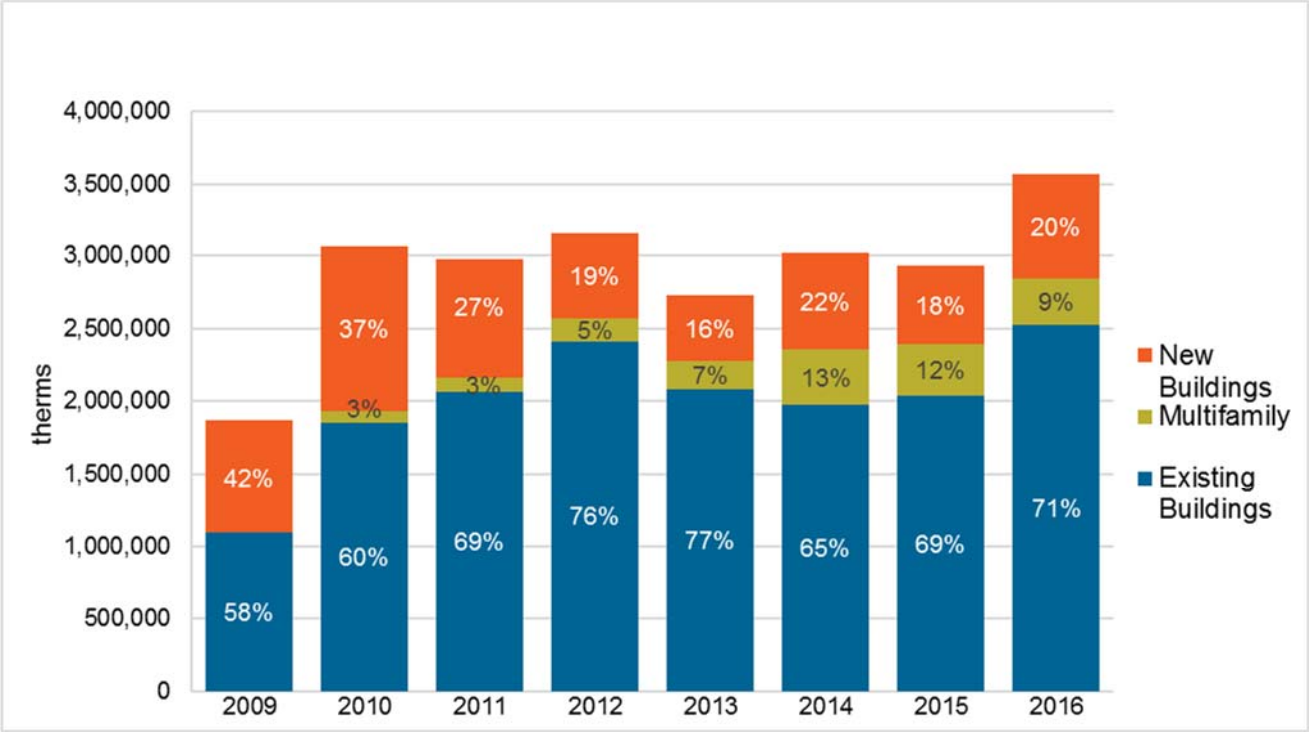


Figure 4: Commercial Electric Savings by Track*

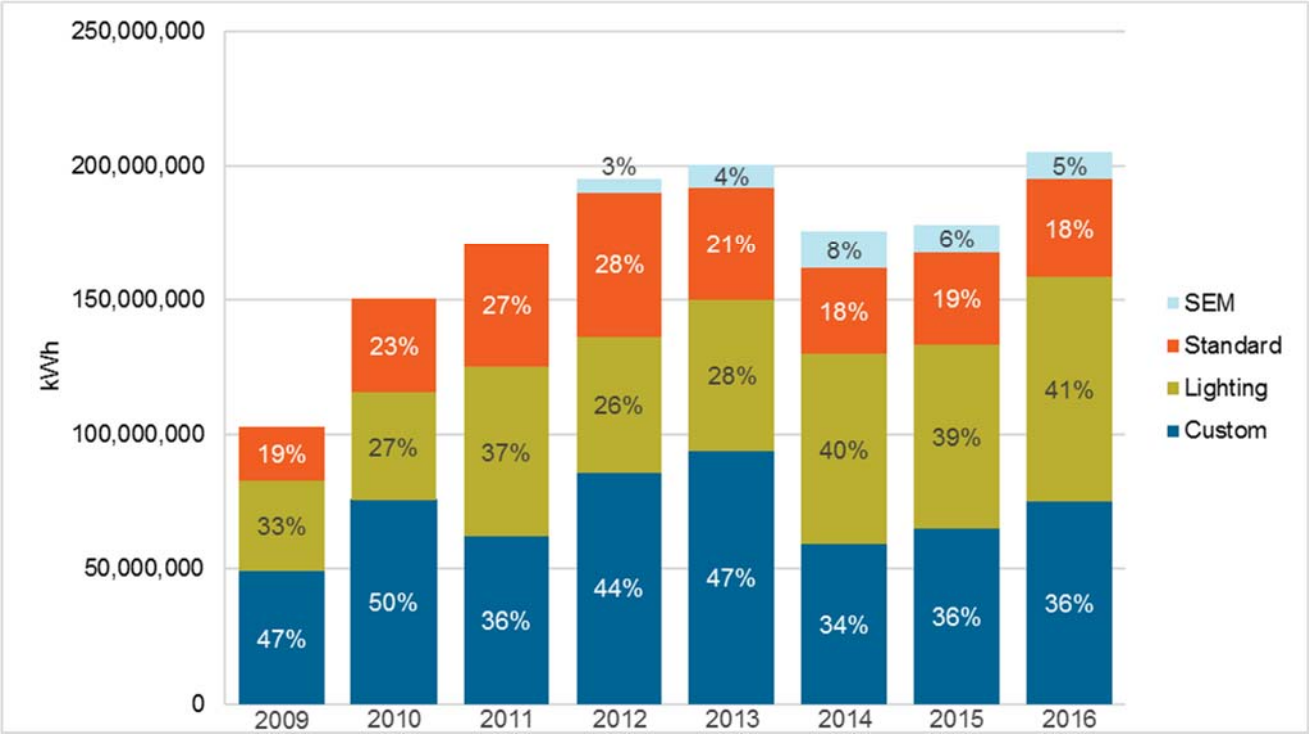
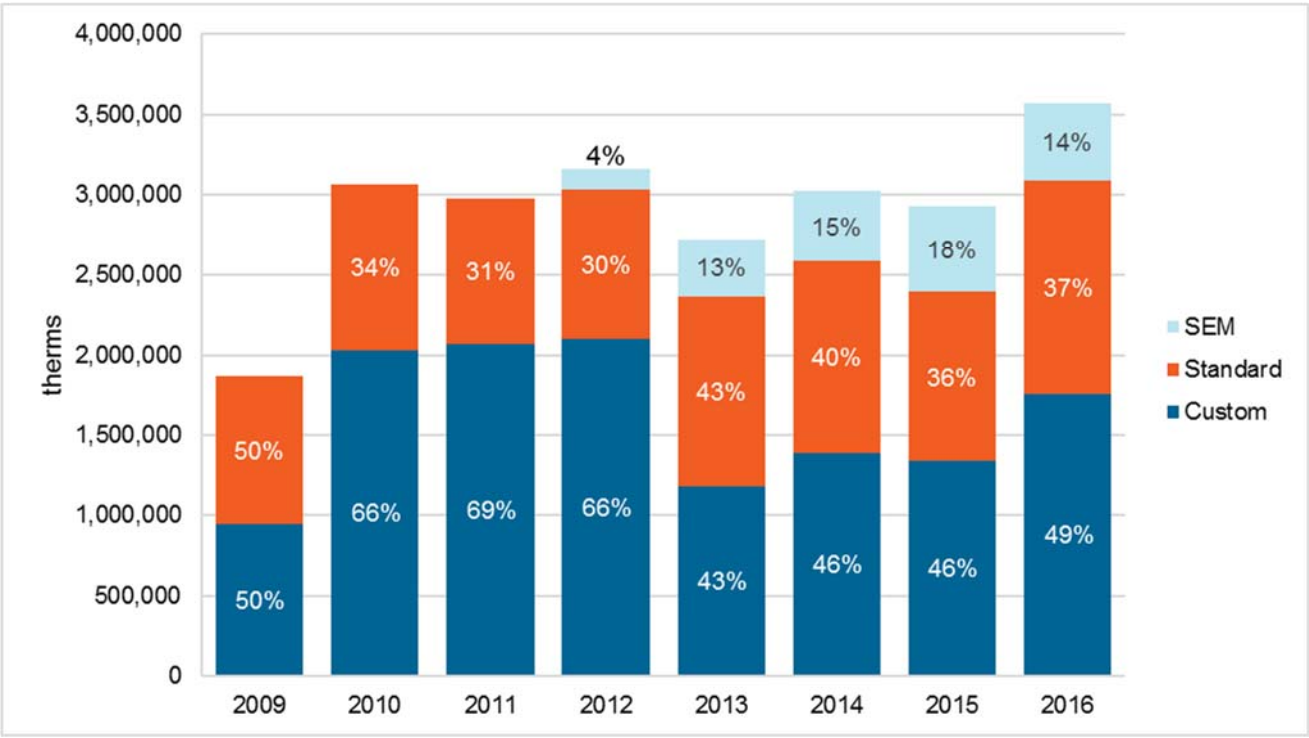
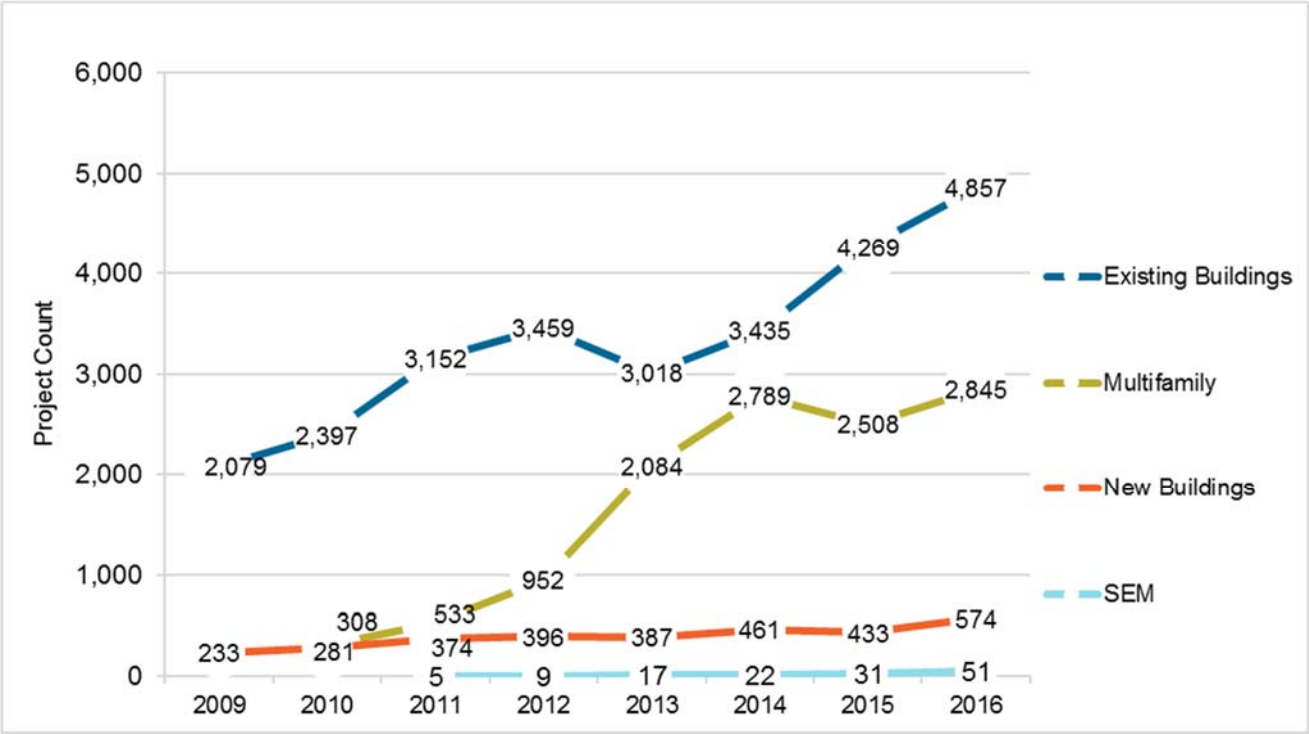


Figure 5: Commercial Gas Savings by Track*



* Standard Track includes standard equipment, Market Solutions for New Buildings, Direct Install for Existing Multifamily and Small Business Energy Savings for Existing Buildings

Figure 6: Commercial Projects Completed



Figures 7 and 8 show the trends for incentive costs by program across the sector. The numbers represent the average cost per kilowatt-hour and therm.

Figure 7: Commercial Incentive Cost per kWh

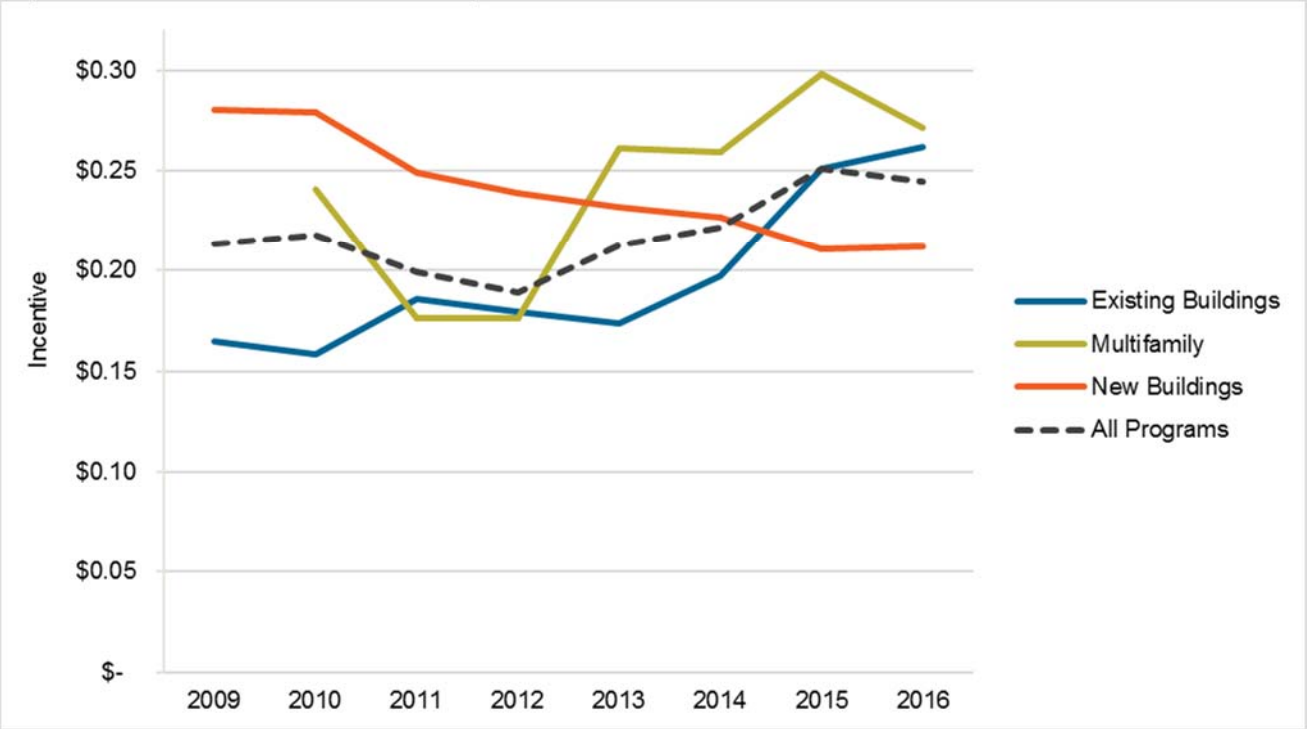
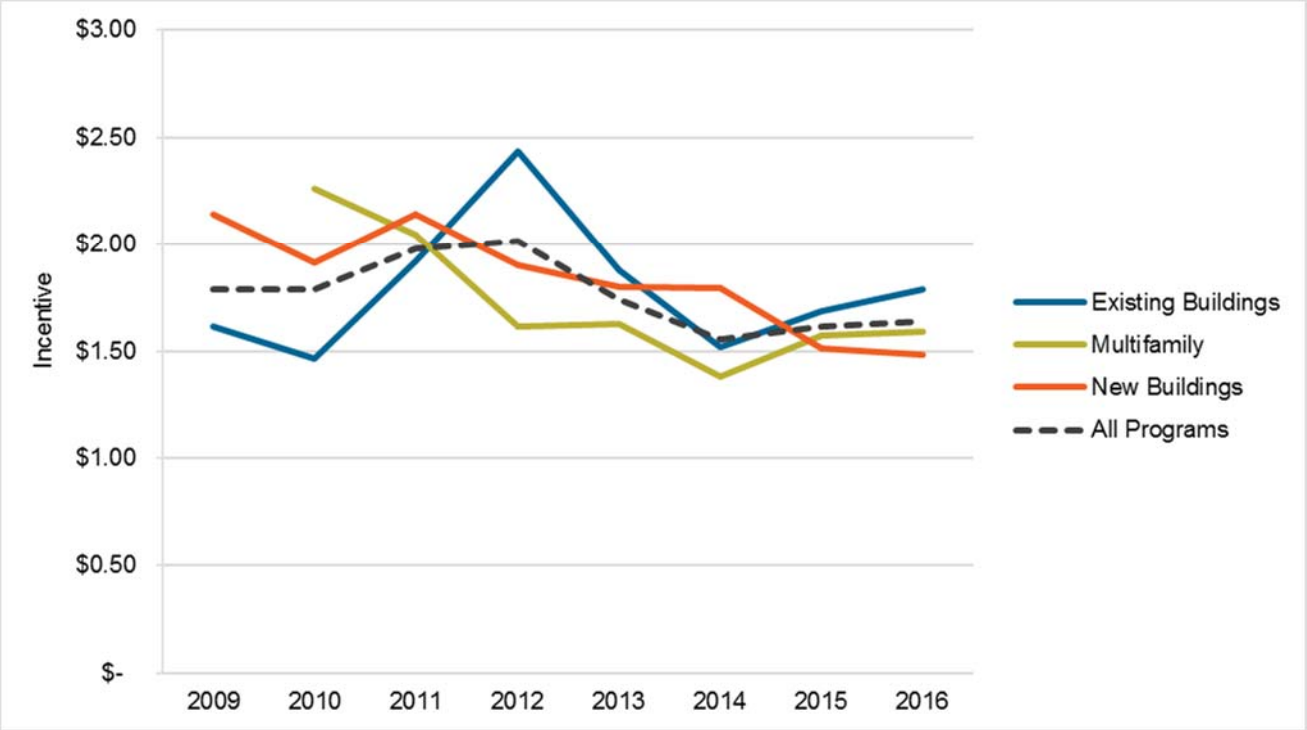
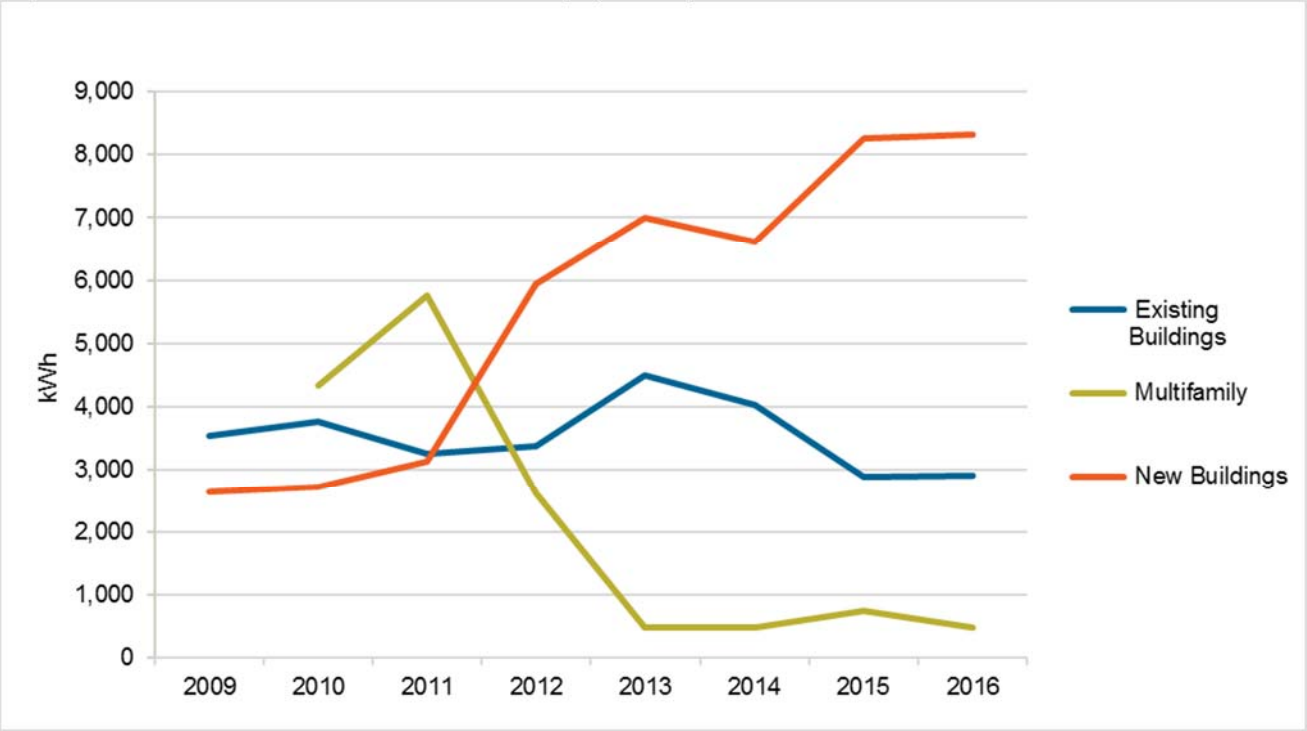


Figure 8: Commercial Incentive Cost per therm



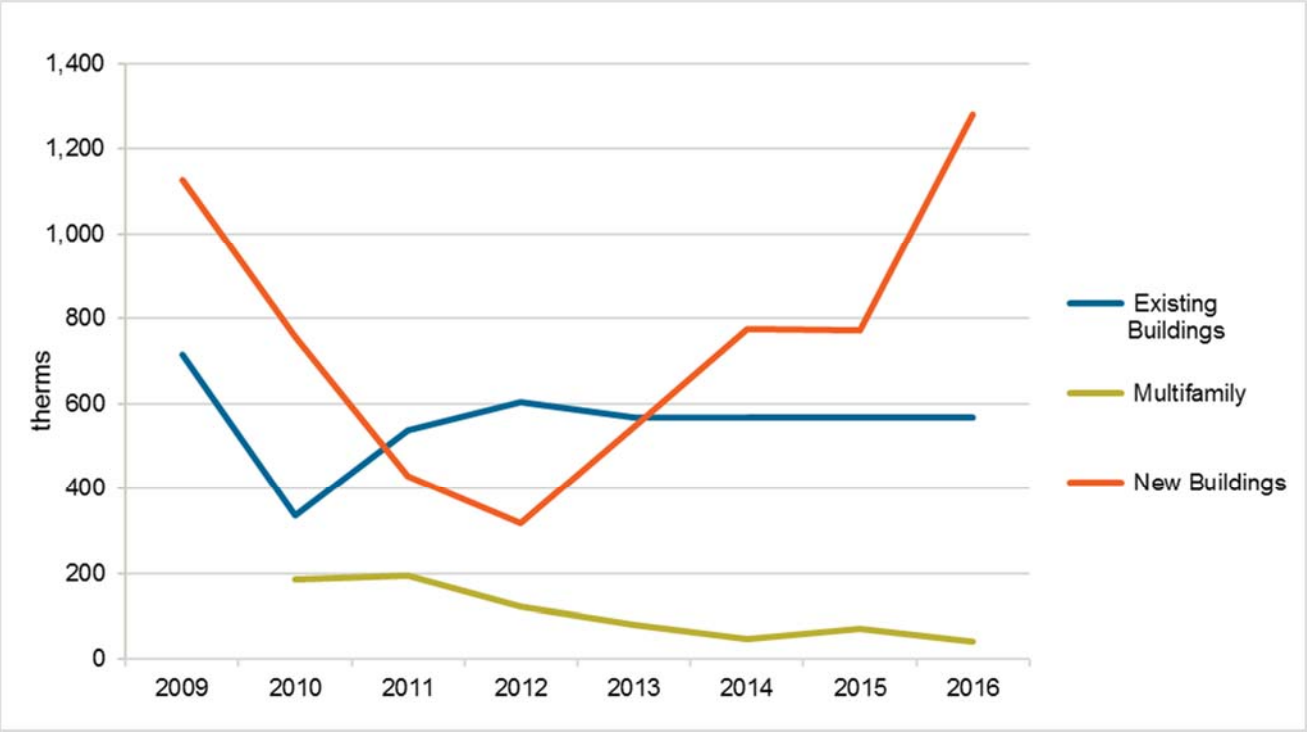
Figures 9 and 10 below represent the median savings per project for the Existing Buildings, New Buildings, and Multifamily programs. Median savings is used because averages can vary greatly due to the influence of larger projects.

Figure 9: Commercial Median Electric Savings per Project*



* Not including SEM

Figure 10: Commercial Median Gas Savings per Project*



*Not including SEM

B. Existing Buildings

Existing Buildings is organized around custom projects, standard incentives, lighting and Strategic Energy Management. Figures 11 and 12 show program savings and incentive costs for the period 2009-2016.

Existing Buildings, which is the largest program in the sector, saw electric savings rise by 56% and gas savings rise by 43% during this time. Declines in custom project savings have been offset by gains in lighting and SEM for electric, while gas savings, which are typically less consistent than electric, rose in 2012 due to an increase in boiler installation and then declined back to a more traditional level.

Large project savings

The program works with large customers through an account management approach and these customers have historically produced the largest share of savings. However, many low-cost and quick-payback projects that made these savings possible have been completed. While these larger customers may be implementing fewer large projects, many are achieving strong savings through Strategic Energy Management. Existing Buildings is refocusing efforts on small and medium-sized customers to achieve annual savings goals, while continuing to leverage opportunities with large customers. Existing Buildings has raised some incentives and increased investments in outreach and operational capacity to support the effort to serve more sites.

Natural gas savings

The program acquires most gas savings from dual-fuel projects, those with both gas and electric savings. This is the result of increased gas incentives and caps for custom gas-only and dual-fuel projects in a two-stage process in 2015 and 2016. While this raised costs, or run rates, customers responded positively to the better return on investment, which resulted in higher savings per project. In 2016 the program raised boiler incentives and the number of boiler projects increased from 12 in 2015 to 31 in 2016, with more than a three-fold increase in therm savings. Boiler projects have the largest savings-per-project of all other Standard measures.

Lighting

Lighting, which delivers 60 to 65 percent of Existing Buildings electric savings, and foodservice equipment projects represent the largest volume of applications—both are supported by Energy Trust's strong trade ally contractor network.

Lighting trade allies selling LED lighting retrofits have delivered large savings for the program and quick paybacks and lower maintenance costs for customers. An increase in the number of LED manufacturers and vendors promoting LED products in Oregon has buoyed this market.

Street lighting, mostly from the City of Portland, was a significant part of the overall lighting total for Existing Buildings in 2016. The last installations for the City of Portland will complete in 2017 at a much lower level of savings. Many larger cities have taken full advantage of LED streetlight retrofit offers, but opportunities still remain in smaller communities. Lighting continues to perform well, with a strong pipeline for both exterior and interior projects.

In 2016 lighting projects far exceeded goal and budget, and it's expected this trend will continue into 2018. To address this high demand on the lighting incentives budget, Energy Trust reduced lighting incentives for 2017 and will consider further reductions for 2018.

Foodservice

Foodservice equipment trade allies are equipment wholesalers that promote Energy Trust incentives through their outside sales staff and showrooms. PMC trade ally coordinators meet regularly with vendors to educate them on products and equipment qualifications. These vendors are customer-oriented. Many provide Energy Trust applications, pre-stamped return envelopes for customers and

help complete the forms. Incentive bonuses and a foodservice equipment contest in 2015 and 2016 helped cultivate vendor relationships and resulted in strong customer response.

Strategic Energy Management

SEM participation has grown steadily since launching in 2012, and increased 65 percent from 2015 to 2016. As of 2016, SEM represented 7 percent of electric and 19 percent of gas savings for Existing Buildings.

Program account managers are increasingly effective at identifying and recruiting customers for SEM. In 2016, staff made two changes to SEM:

- Changed the delivery model from Program Delivery Contracts managed by Energy Trust to an offer managed by the Existing Buildings Program Management Contractor.
- Increased incentive levels to build momentum and persistence of savings.

While more expensive in the short term, we expect that these changes will result in operational efficiencies and, ultimately, more savings and greater customer engagement.

SEM has enabled Energy Trust to build more productive interactions, especially large customers with a declining number of custom projects. SEM is also cultivating relationships with smaller customers and believes this is increasing awareness and participation in other Energy Trust offerings overall.

Pay-for-Performance

At the request of the OPUC, Existing Buildings developed a Pay-for-Performance offer in 2014. To date, there is one project enrolled in the original Pay-for-Performance pilot, with electric savings claimed and incentives paid in 2015 and 2016. The final incentive will be paid in 2017. The lessons learned and preliminary results of that pilot project informed the development of an expanded pilot offer, scheduled to launch with six participants in 2017, with savings to be claimed beginning in 2019.

Increasing participation

Existing Buildings program design changes have contributed to increased participation by a wider range of customers:

- Increased account management outreach throughout Energy Trust's territory including small rural areas, as well as increased trade ally recruitment and training;
- Introduction and expansion of two offerings through delivery channels that specifically target small and rural customers:
    - LED buy-downs are midstream incentives that allow lighting and electrical distributors to apply an "instant incentive" when they sell LED lamps to eligible customers.
    - Small Business Energy Savings is a turnkey lighting offering limited to small commercial customers in non-metro markets. It features a limited selection of lamps and fixtures, attractive incentives and zero-percent financing and is designed to meet the needs of harder-to-reach smaller businesses that have not participated in Energy Trust programs and may not be targeted by trade allies.

Trade ally recruitment

While continuing to support lighting and foodservice trade allies, the program is also seeking to diversify the mix of program savings by recruiting trade allies that service other equipment types. Staff targeted insulation contractors starting in 2014, which led to a substantial increase in savings in this historically low-participation market. In total, 52 new non-lighting trade allies in 12 different categories joined the Energy Trust Trade Ally Network in 2016.

The distribution of projects across the Existing Buildings portfolio has been constant over the past several years, especially for electric savings. Gas savings show more variability—a few large projects can have a big impact. For example, in 2016 there were 16 custom gas projects with more than 10,000 therms each, including one project with more than 250,000 therms. 2012 experienced a sizeable increase in therms savings as noted in Figure 14 due to a jump in large boiler projects.

Figure 11: Existing Buildings Electric Savings

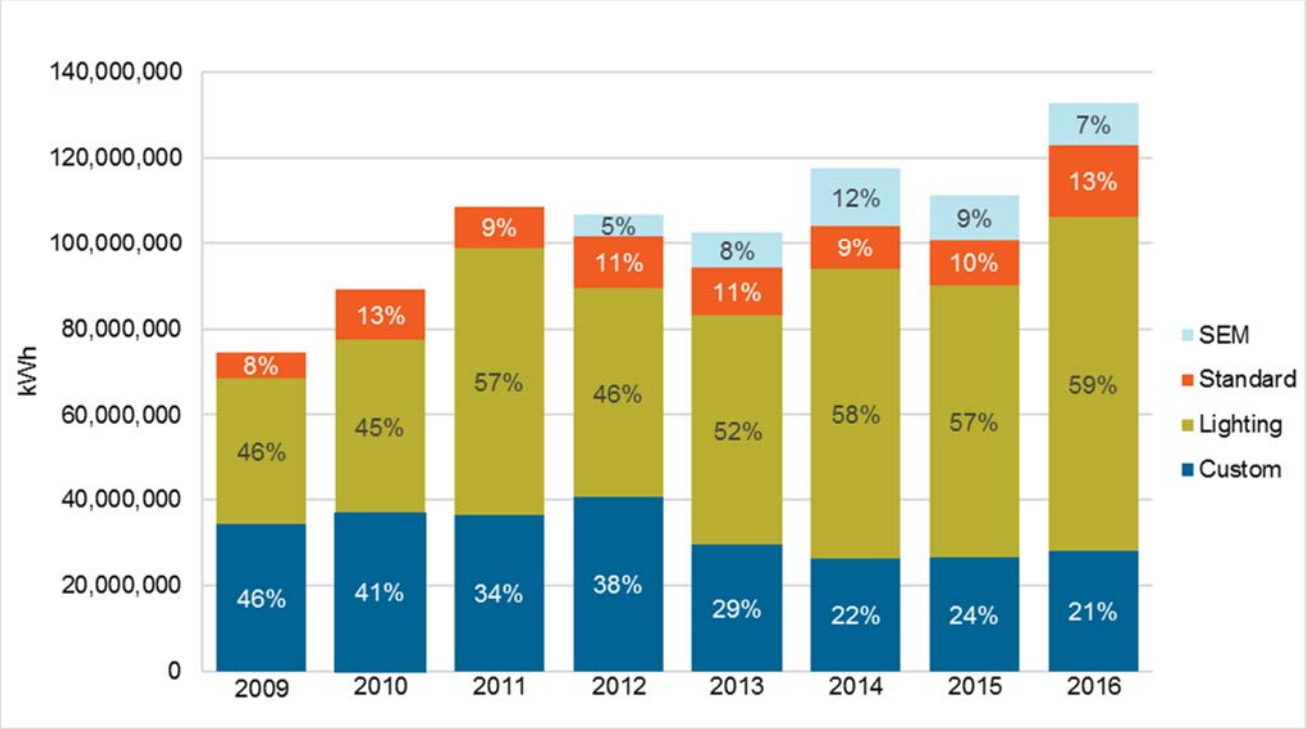
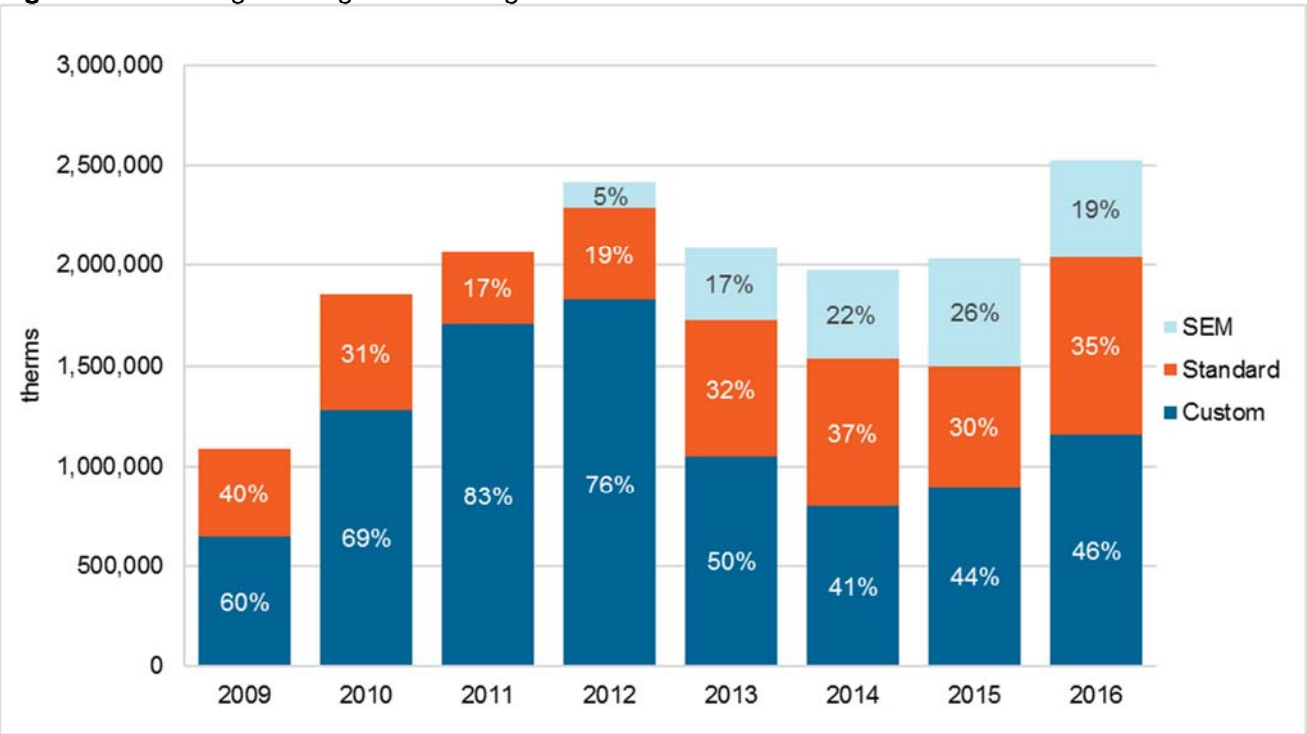


Figure 12: Existing Buildings Gas Savings



Figures 13 and 14 below indicate the program incentive cost per working kWh and working therm over time. These costs represent total incentive costs by track divided by the working savings for that year. These charts do not include SEM.

Incentive costs for custom projects began increasing in 2014 for both electric and gas. Declining costs of gas over the past several years have increased payback times and reduced customer incentive to invest in gas energy efficiency projects. To address this market impact, the program increased gas incentives. Also, customers implemented fewer large-scale projects paid at the maximum percentage of project cost, which typically decreases the run rate. In 2014, the program gained more gas savings from smaller projects that received the full per-therm or per kilowatt-hour incentive.
Also in 2016, Existing Buildings increased the custom gas incentive. While this increased the cost per therm for gas projects, it also presented a better business case for customers, which brought in more gas projects.

Figure 13: Existing Buildings Incentive Cost per kWh

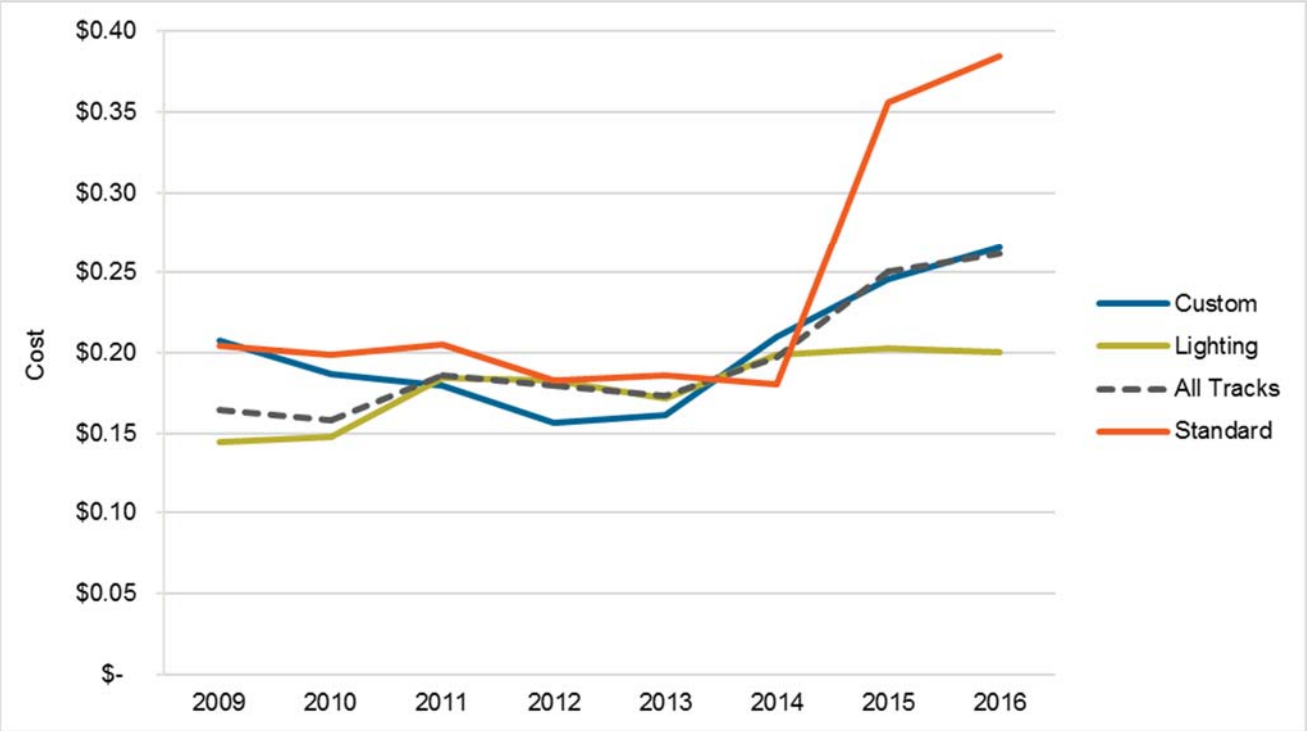
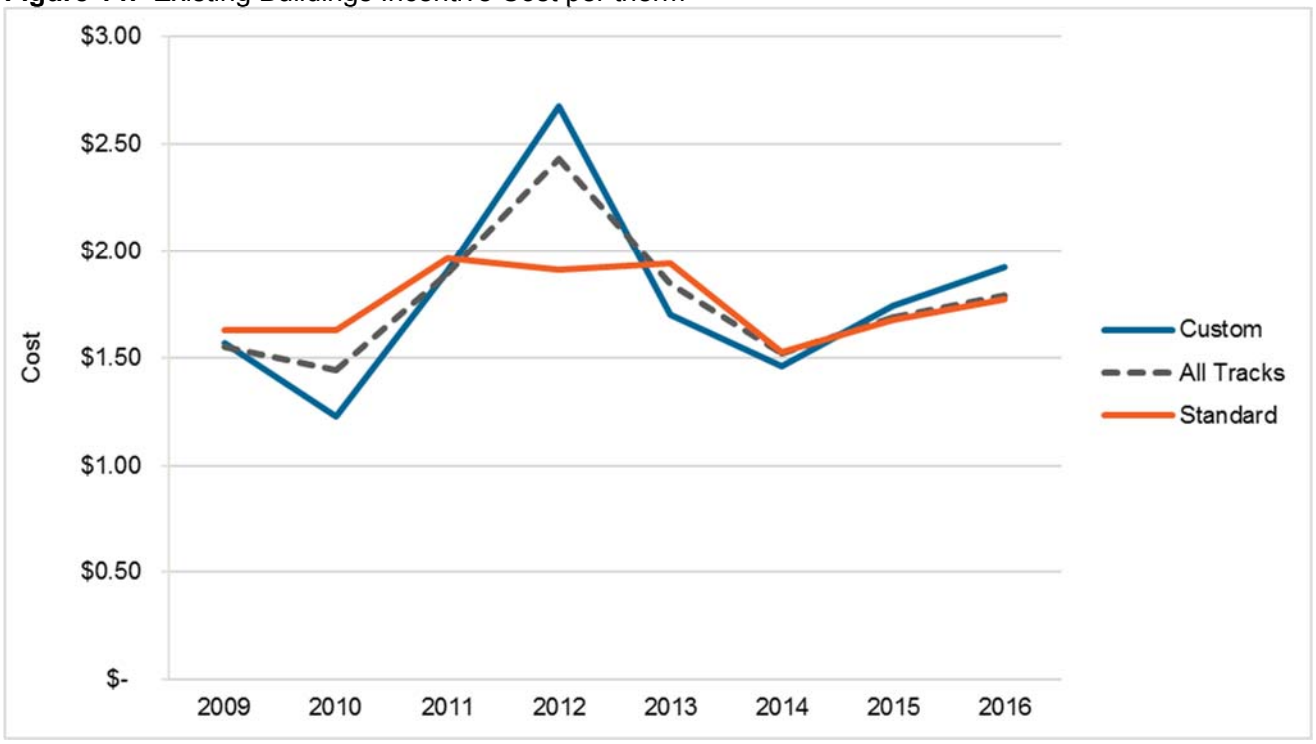


Figure 14: Existing Buildings Incentive Cost per therm



C. Existing Multifamily

Since moving from the residential sector to the commercial sector in 2010, Existing Multifamily (Multifamily) has evolved to serve all multifamily building types with two or more attached residences, across several market segments: market rate, affordable housing, campus living, assisted living facilities, homeowner associations (HOA) and individually owned units. These segments have the common bond of housing residents in attached dwellings, yet each faces its own challenges and opportunities. This variety of needs is addressed through program design and delivery.

Existing Multifamily operates with an account management approach, organized around custom projects, standard equipment incentives, lighting, distributor buy-down equipment incentives, and free in-unit direct installation of LED lightbulbs, low-flow showerheads or wands, low-flow faucet aerators and advanced power strips. The direct-install offer continues to be Existing Multifamily's largest and lowest-cost source of electric and gas savings, and the first point of contact for many customers.

The multifamily market is currently characterized by low vacancy rates and high rents, particularly in the Portland metro area. With this consistent cash flow, more owners are making investments to be competitive with a growing number of new properties. As a result, the program has seen an increase in standard projects; however, it can still be a tough sell since property managers are also dealing with competing investment priorities for building maintenance needs and cosmetic upgrades.

The Existing Multifamily program is maturing. Many of the largest multifamily structures in the state have participated in our offerings, and over time, the program has increased outreach to smaller property types with historically, lower participation rates. As a result there has been a shift in a higher portion of projects coming from smaller properties. The program is also re-engaging with larger properties who have only taken advantage of limited offerings, encouraging repeat participation.

As the majority of existing multifamily building stock in the Northwest is electrically heated, the primary savings opportunities are through electric efficiency upgrades. As with other programs, gas savings for Existing Multifamily can vary widely year to year. Due to the relatively small number of gas projects compared to electric, a few projects delaying completion can have a big impact on achievement to annual therm goals.

Figures 15 and 16 show variations in savings by track. Electric savings from direct-install have steadily declined since 2011, while savings from standard and lighting tracks have consistently increased. On the gas side, direct-install savings peaked in 2014 with declines in more recent years, while standard savings have grown substantially since 2011.

Figures 17 and 18 demonstrate the consistency of incentive costs for electric savings. While costs for standard track savings increased dramatically in 2011 as the program matured into a more commercial model, this was balanced out with the addition of low cost savings from the direct install track. Incentive costs for direct install have risen since 2013 as the service switched from CFLs to LEDs and introduced advanced power strips.

Figure 15: Existing Multifamily Electric Savings

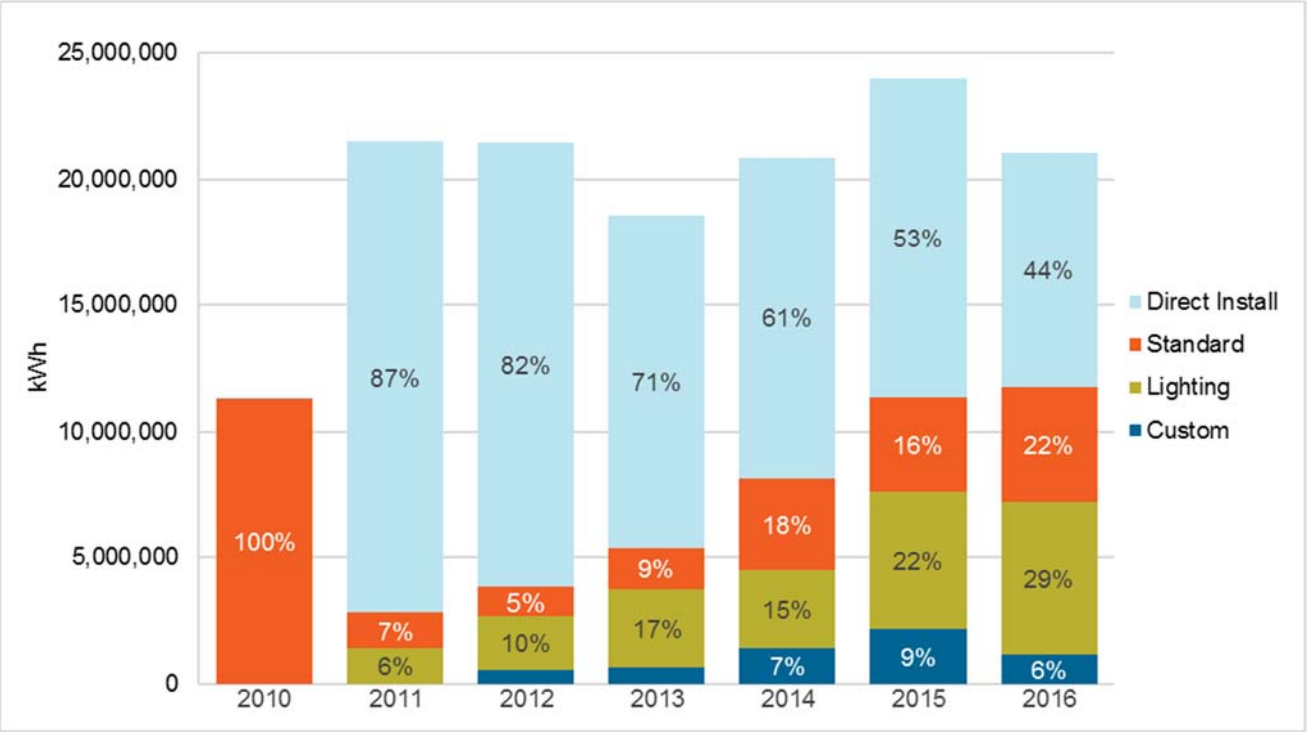


Figure 16: Existing Multifamily Gas Savings

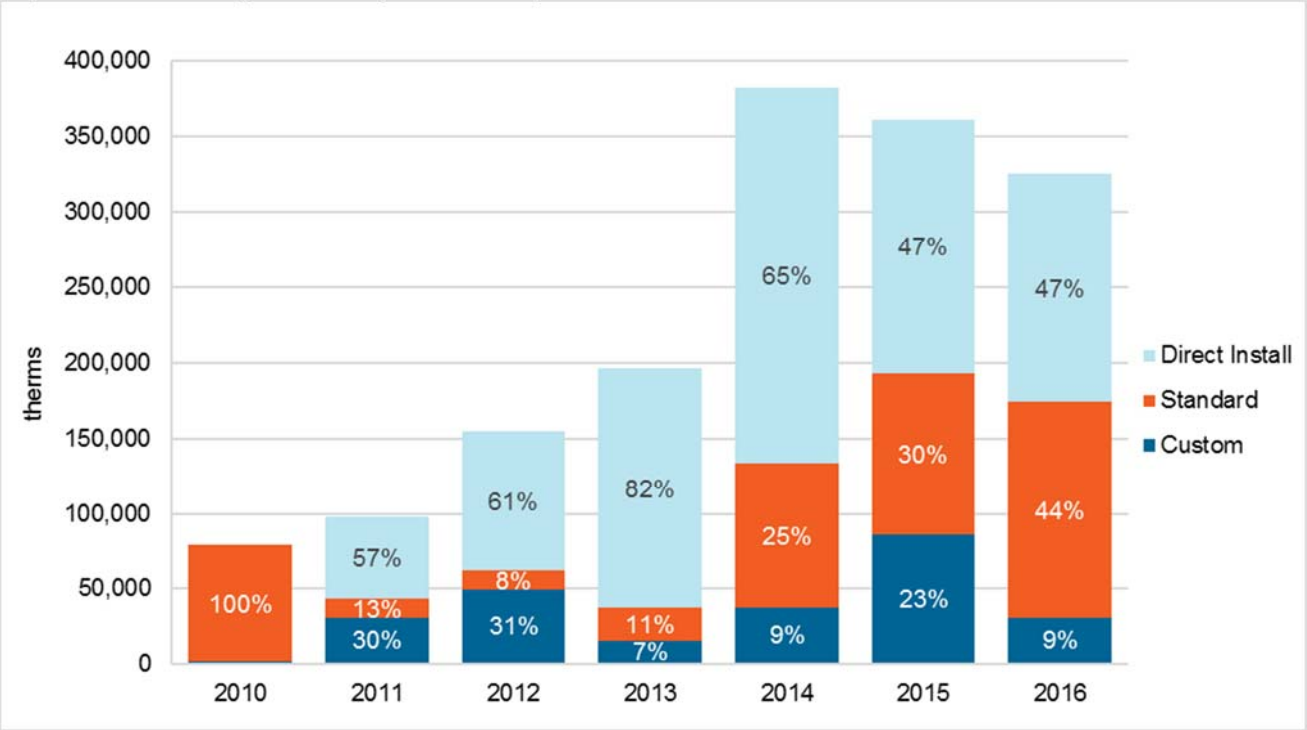


Figure 17: Existing Multifamily Incentive Cost per kWh

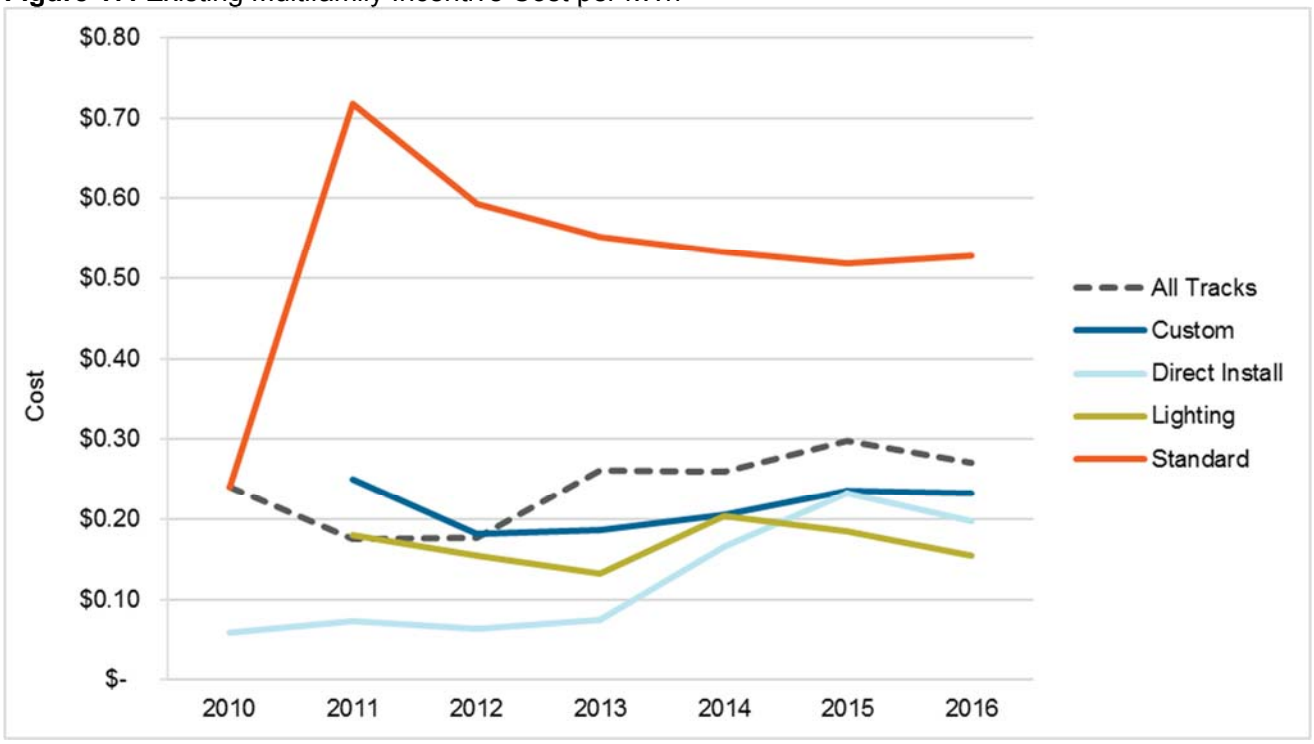
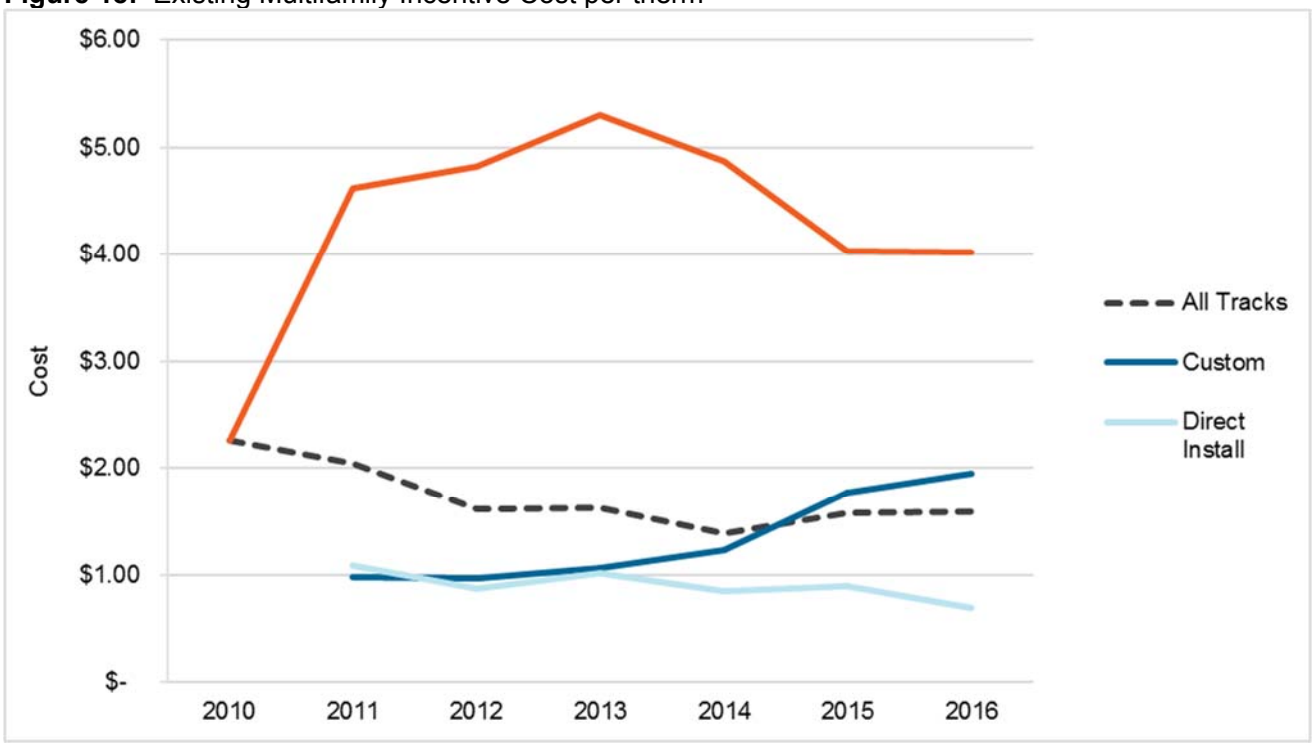


Figure 18: Existing Multifamily Incentive Cost per therm



D. New Buildings

New Buildings provides incentives for energy-efficient design and equipment to support construction of high-performance commercial new buildings and major renovations of all sizes and types. The program's high levels of project counts, square footage and energy savings are due in large part to a strategic alignment to the market. The program has grown steadily over the past several years with a market approach that focuses on influencing building owners across a range of building and business types and working closely with the architecture, engineering and construction industry. Program design is in alignment with how buildings are designed, built and occupied and is organized by Standard, which include Market Solutions and Custom, which includes projects involving an energy model, as well as Path to Net Zero, the program's newest offer that provides support for buildings seeking to exceed Oregon energy code by 40 percent or more.

Figures 19 and 20 shows the results, by year and fuel for New Buildings. New construction is highly sensitive to the local economic cycle and is typically "lumpier" than retrofit program results. In 2012 and 2013, New Buildings had exceptionally high savings years due to several large enterprise data centers, hospitals and schools which drove electric savings. Gas savings saw a significant drop in 2011 after a large number of LEED® certified buildings were completed in 2010.

In the cyclical market of commercial new construction, staff work with participant design teams to present solutions designed to capture savings from each project. Construction activity in Oregon is currently at a historic high across many market segments, and many project owners, including many in the public sector, are interested in pursuing innovative approaches for high-performance buildings, up to and including Path to Net Zero.

Energy Trust's practice of testing program design innovations through pilots has proved to be an effective way to increase program participation in a dynamic marketplace. Market Solutions, launched in 2012 after a pilot period, is speeding adoption of more standard measures per project through a delivery method that allows customer to easily make energy-efficient choices that lower operating expenses. Path to Net Zero is creating a community of designers, engineers and owners who are interested in the highest level of efficiency and the integration of renewable resources into office, schools and other building types.

New Buildings continually targets and achieves savings across common categories, including lighting, HVAC, prescriptive gas and electric options and appliances. How these savings categories are achieved varies based on the size and complexity of the project. Smaller projects, including small offices, schools and restaurants, typically take advantage of Market Solutions and standard measures that don't require an energy model. More complex and/or larger buildings typically require a sophisticated energy model to determine cost-effectiveness. While ensuring savings, this custom approach may result in uncertainty for building owners that need to make quick, early decisions about energy efficiency.

Energy Trust has acquired savings from a surge in multifamily construction. This prescriptive path through Market Solutions proved successful in scaling new gas and electric energy-saving strategies and solutions for this market.

Figures 21 and 22 show the incentive costs trends for the period. Incentive costs vary due to the changing measure mix to smaller standard measures and more expensive custom measures.

Figure 19: New Buildings Electric Savings

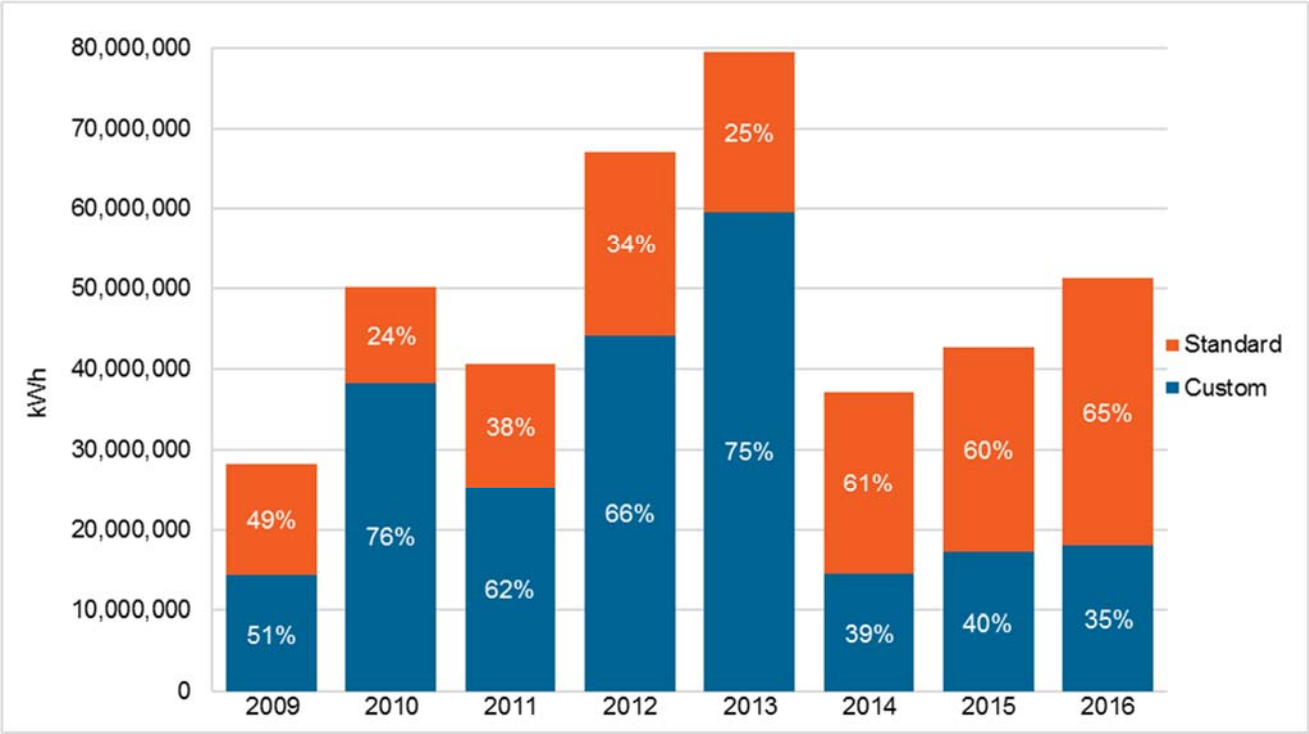


Figure 20: New Buildings Gas Savings

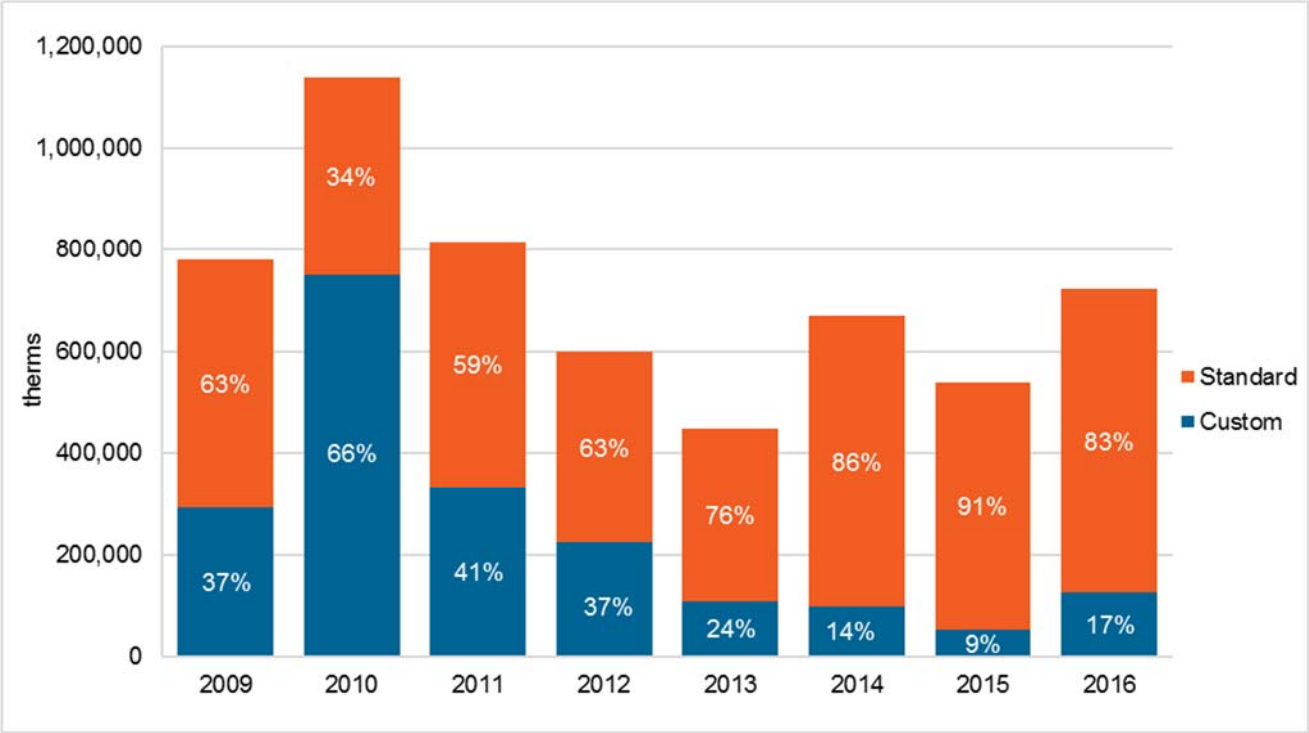


Figure 21: New Buildings Incentive Cost per kWh

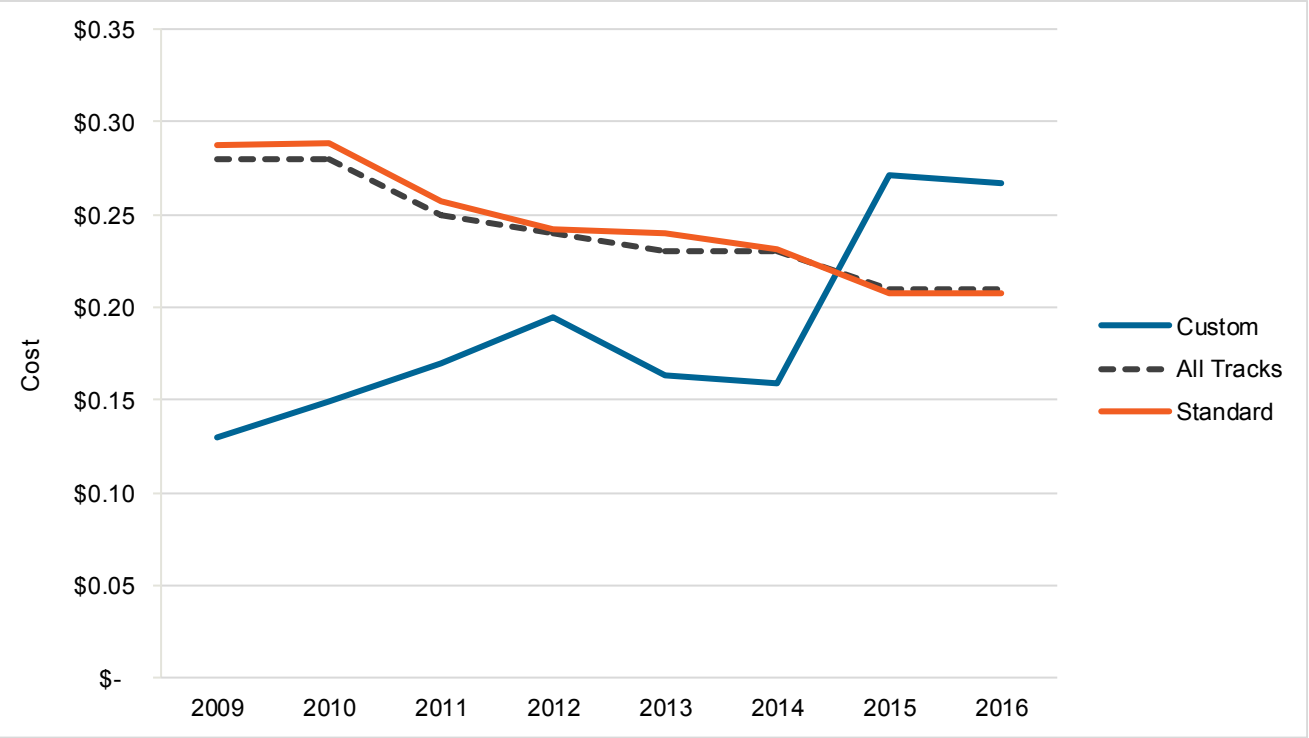
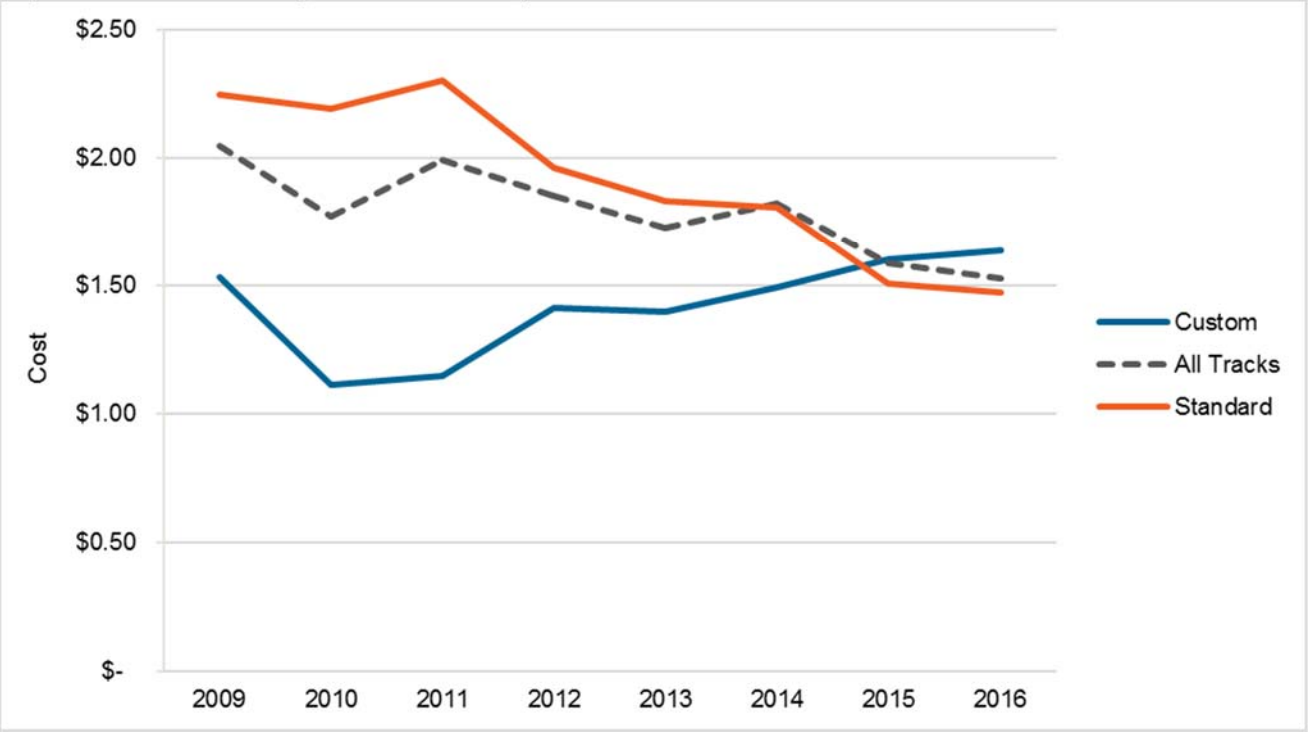


Figure 22: New Buildings Incentive Cost per therm



III. Measures and Technologies

A. Existing Buildings

Existing Buildings' sources of savings have grown since 2009, but the general distribution of those savings has remained fairly consistent year to year. Lighting and lighting controls continues to be the single largest contributor to electric savings at 60-65 percent, boosted by the Small Business Energy Savings initiative launched in late 2014.

In 2016, grocery equipment installations took the lead in Standard track for non-lighting savings, especially new cooler doors on open cases, anti-sweat controls and EMC motors for refrigerated cases. This measure resulted in both electric and gas savings in 2016.

Foodservice equipment continues to lead the way in the Standard track in both the number of applications and total gas savings, roughly one-third of all Standard therm savings. Gas-fired condensing boilers, combined with modulating boiler burners introduced in 2015, accounted for approximately 20 percent of the Standard therm savings.

Custom projects continue to deliver a significant portion of overall savings. A key influence on Custom savings is the number of Technical Analysis Studies (TAS) conducted by Allied Technical Assistance Contractors (ATACs). Most Custom projects require these studies to calculate project savings and cost-effectiveness.

Custom projects represent more than one-third of overall electric savings, and nearly half of all gas savings. Looking at the top 10 Custom projects for each electric utility, there were 17 Custom projects with incentives greater than $100,000. The top 10 projects for each gas utility (30 projects total) includes 4 Custom projects with incentives greater than $100,000 or 13 percent. Three of the four were from NW Natural demand-side management (DSM) customers.

HVAC systems, controls, chillers, VFDs, boilers and heat recovery are the most frequent projects for Custom savings. Custom heat recovery, which includes the largest gas savings project in 2016, was introduced in 2016.

SEM has been a strong source of both electric and gas program savings since launching the offer in 2012. SEM focuses on operations and maintenance and behavioral activities. While there are more SEM participants each year, the annual savings per customer have been lower for a couple of reasons. One reason is that starting in 2016 customers were paid on verified savings rather than projected savings. This shifts savings into future program years. The benefit is higher confidence in savings claims. Additional reasons for lower savings are due to long-term participants see declining new savings over time as their SEM practices become standard, and an increase of smaller customers adopting SEM.

Figure 23 shows the savings gained from the most frequently implemented measures for 2009-2016. Lighting and HVAC have seen the largest increases which has been responsible for much of the program's savings growth.

Figure 23: Key Measures for Existing Buildings, 2009-2016

Electric Savings (kWh)								
	2009	2010	2011	2012	2013	2014	2015	2016
Lighting	45,210,850	43,461,325	66,400,346	51,396,815	55,629,757	69,919,561	69,335,005	85,263,411
HVAC	8,611,420	16,091,556	28,665,779	34,951,676	23,474,584	22,599,503	17,100,699	21,968,064
Appliance	247,375	100,106	243,456	191,569	40,927	508,203	922,302	5,332,832
Motors	3,596,536	6,318,851	1,970,797	2,839,635	5,958,988	3,290,583	3,592,126	3,256,023
Custom/Other	10,737,488	13,006,501	3,953,141	4,809,476	5,089,443	2,917,247	2,992,260	2,369,273
Gas Savings (therms)								
	2009	2010	2011	2012	2013	2014	2015	2016
HVAC	613,067	808,104	1,646,848	1,664,032	1,080,582	792,014	734,593	876,604
Heating	116,965	211,140	117,422	252,315	150,560	67,111	96,132	486,068
Food Service	67,692	35,677	23,545	117,349	308,085	379,755	372,174	432,950
Appliance	0	14,035	1,625	2,283	8,804	12,378	24,275	81,580
Custom/Other	122,535	499,738	69,707	43,232	41,614	53,667	124,249	61,541

B. Existing Multifamily

Figure 24 details the electric and gas savings since 2010 from key measures implemented at Existing Multifamily sites. HVAC and custom projects have increased most dramatically over the period.

As Energy Trust re-evaluates measures, some key measures are facing challenges in cost-effectiveness due to reduced gas and electric avoided costs. Staff is focused on identifying new savings opportunities and program designs to maintain a robust program that meets customer needs, should some current incentives be discontinued in the future.

Since 2011, the direct-install offer for free energy-saving devices has provided the bulk of Existing Multifamily savings. There are challenges around cost-effectiveness of devices within direct-install. For example, evaluation factors resulted in a reduction of savings for two key measures, shower devices and advanced power strips, which increased the overall program's cost per kWh and therm. In recent years, staff has focused on promoting other program tracks to build a more diverse portfolio and reduce reliance on direct-install for program savings. It's a complex calculus: staff have been able to maintain and even grow direct-install savings by expanding outreach to smaller properties. Per-site savings have declined by overall project sites have increased.

The lighting track has seen strong growth in recent years, with the multifamily market transitioning at a fast pace to adopt LEDs.

Figure 24: Key Measures for Existing Multifamily, 2010-2016

Electric Savings (kWh)							
	2010	2011	2012	2013	2014	2015	2016
Direct Install	9,049	18,661,821	17,605,210	13,156,223	12,687,509	12,654,512	9,275,783
Lighting	5,805,875	1,394,476	2,116,373	3,111,119	3,454,134	5,569,356	6,080,031
HVAC	234,112	384,020	195,698	383,043	1,391,526	1,941,967	2,732,138
Weatherization	947,662	855,362	785,412	931,158	1,483,331	1,236,716	1,405,303
Custom	0	7,423	561,741	668,244	1,442,707	2,316,262	1,178,834
Gas Savings (therms)							
	2010	2011	2012	2013	2014	2015	2016
Direct Install	0	54,936	92,658	158,759	248,393	167,917	151,385
HVAC	5,921	2,130	1,627	12,940	62,356	76,335	91,221
Water Heating	41,730	1,846	4,983	1,570	8,090	23,305	32,811
Custom	13,196	28,448	47,207	14,118	36,504	78,924	28,650
Food Service			1,173	1,707	2,331	2,802	13,590

C. New Buildings

Figure 25 shows the gas and electric savings from key measures or program tracks. Lighting, HVAC and Custom deliver the largest share of savings.

The New Buildings program offers early design assistance, installation incentives and commissioning incentives to support integrated design. The integrated design path results in more projects implementing more specific energy-efficiency features. The standard track (Market Solutions), which has a good/better/best structure, leads customers along a prescriptive path to increase efficiency through a progression of equipment options—starting with lighting, then HVAC and on to options like foodservice equipment and others. One of the goals for Market Solutions is to increase the number of measures installed at smaller sites, especially among business types that had typically received incentives only for lighting. This approach has been successful and the average number of measures installed through Market Solutions is three.

Lighting is the most commonly implemented measure across many market segments, especially for warehouse, office and grocery. Heating measures are also important but are more common in heating-dominant buildings like schools.

Path to Net Zero (PTNZ) is a market transformation initiative that helps project owners strive for even higher energy performance—exceeding Oregon code by 40 percent of more. Savings through PTNZ projects are just beginning to show up in annual program results due to long design and construction timelines. Market interest for PTNZ is high. More than 70 projects have enrolled in PTNZ across the state since the initiative became a standard offer in 2015, after a successful pilot that began in 2009.

Figure 25: Key Measures for New Buildings, 2009-2016

Electric Savings (kWh)								
	2009	2010	2011	2012	2013	2014	2015	2016
Lighting	9,241,983	8,217,540	6,154,914	14,571,779	12,061,243	12,629,853	15,690,946	20,213,031
Custom/Other	501,061	25,842,229	20,997,375	33,026,772	34,979,372	7,783,801	12,433,543	14,677,417
Market Solutions				6,135	558,264	2,142,112	4,465,047	5,646,998
HVAC	4,845,310	2,755,921	5,133,071	5,820,178	23,535,497	7,937,728	7,840,891	5,614,549
Appliance	29,913	107,705	60,869	384,248	439,093	526,604	122,938	1,647,800
Gas Savings (therms)								
	2009	2010	2011	2012	2013	2014	2015	2016
Water Heating	129,790	124,926	29,553	65,350	89,734	152,410	100,012	208,001
Other	281,991	642,070	541,470	142,146	40,302	33,823	106,170	181,503
Market Solutions				0	21,134	69,906	136,571	138,965
HVAC	271,117	331,823	168,129	290,687	250,006	336,549	129,307	89,142
Appliance	0	2,987	938	3,088	5,555	5,420	1,037	56,127

IV. Market Segments

Figure 26 and 27 is a visual representation of the top market segments where electric savings were achieved in 2016 as compared to the period of 2009 - 2016. Offices, Multifamily and College/University have consistently been top contributors to electric savings. Top markets for savings can vary due to timing of larger projects and targeted efforts for specific markets; for some segments, such as schools, colleges/universities and public sector (including street lighting) funding availability through bond measures is the driver for program participation and savings.

Figure 26: Commercial Top Electric Market Segments 2009-2016, by kWh

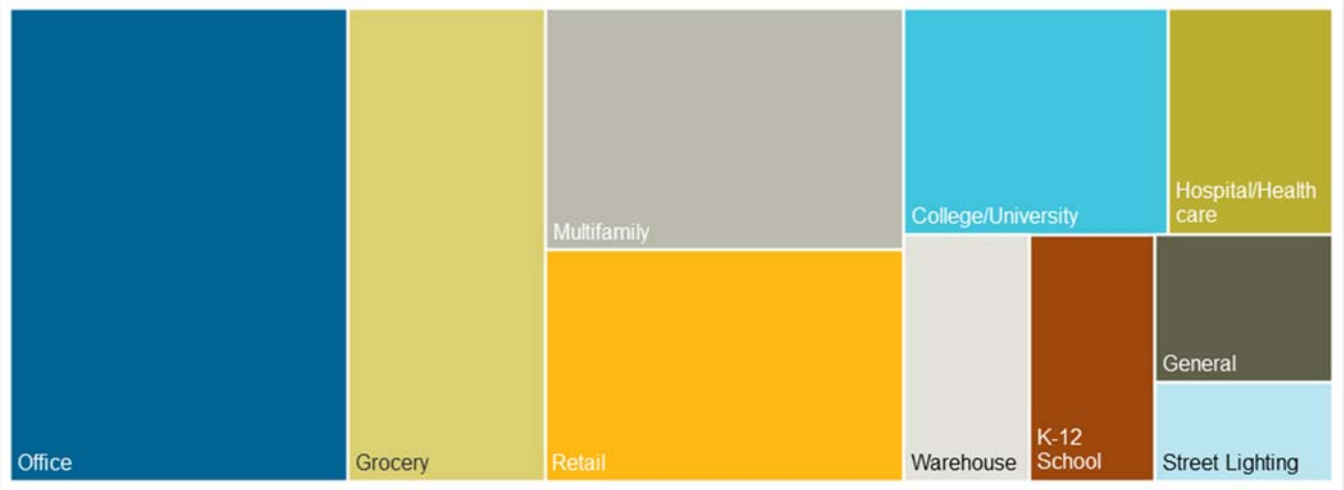


Figure 27: Commercial Top Electric Market Segments 2016, by kWh

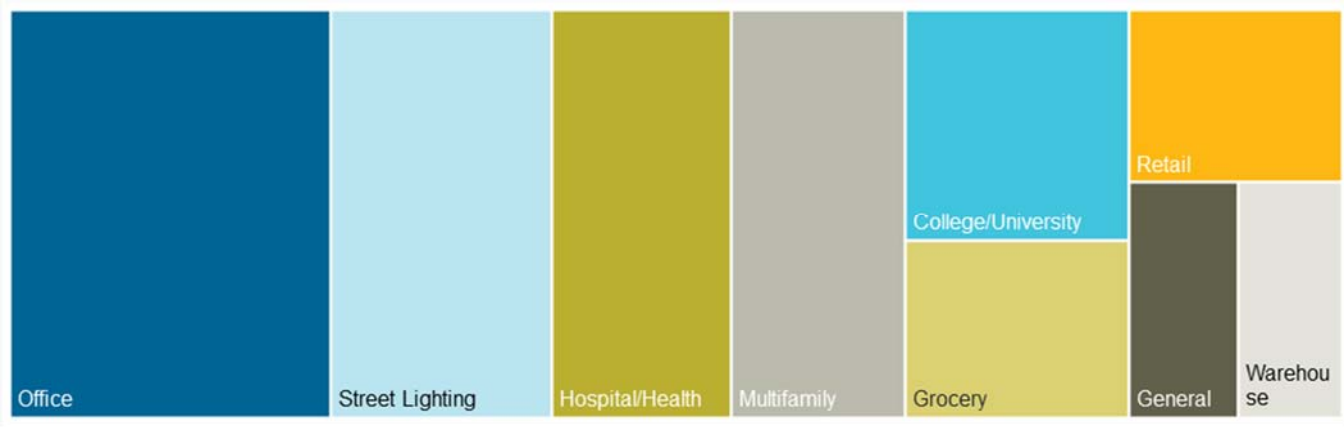


Figure 28 and 29 is a similar visual view into the top market segments where gas savings were achieved in 2016 as compared to the period of 2009 through 2016. College/University, Hospital/Healthcare. Offices, and Restaurants have consistently been top contributors to gas savings. Top markets for savings can vary due to timing of larger projects and targeted efforts for specific markets; for some segments, such as schools, colleges/universities and public sector, funding availability through bond measures is the driver for program participation and savings.

Figure 28: Commercial Top Gas Market Segments 2009-2016, by therm

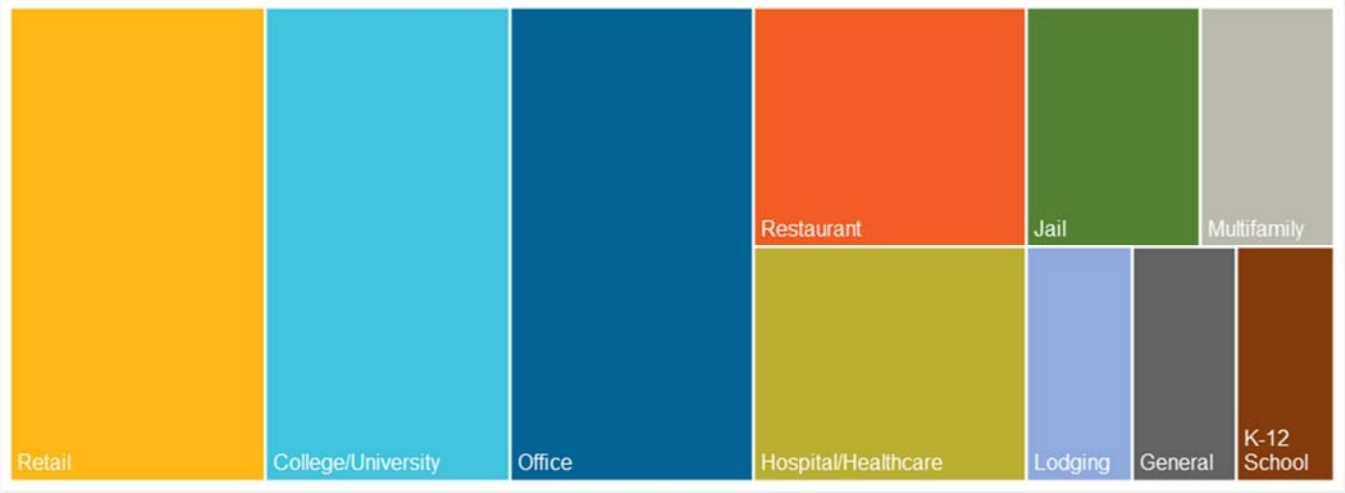
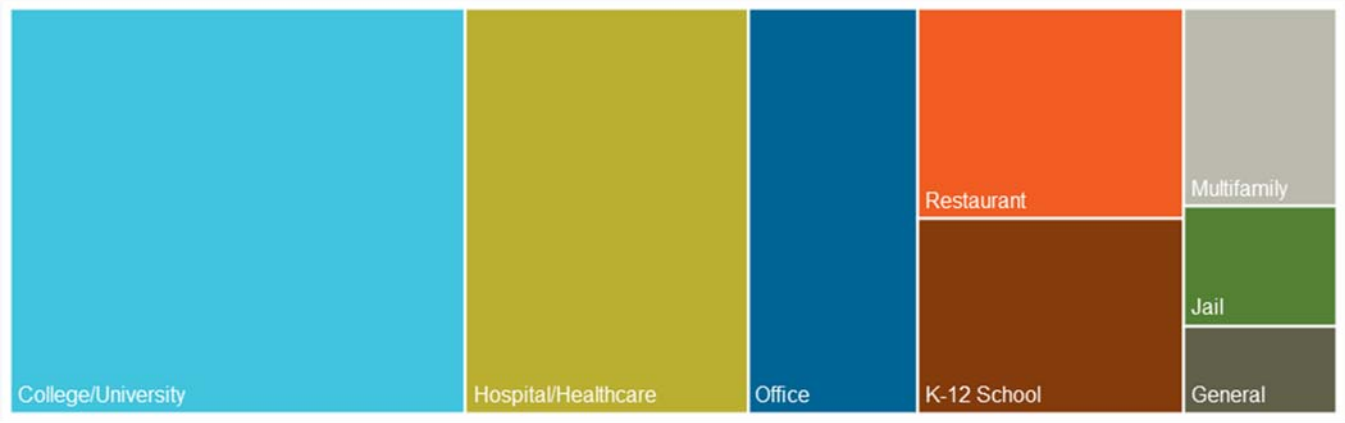


Figure 29: Commercial Top Gas Market Segments 2016, by therm



A. Existing Buildings

Existing Buildings serves commercial businesses of all types and sizes. The program has expanded its reach by encouraging larger customers to do more in their buildings and reaching smaller customers and customers in rural areas of the state. Reaching small and rural customers has been accomplished through marketing campaigns (emails and direct mail) targeting specific business types, project types and geographic areas, as well as adding account managers and trade ally coordinators focused on those business types and locations. Trade ally coordinators focus on recruiting and training trade allies to promote the various offerings to their customers in their local communities. The program continues to use a direct outreach and customer relationship approach to serve large customers.

Key Markets by Savings for Existing Buildings

As shown in Figures 30 and 31, the savings by market vary by year, and between electric and gas savings. Offices typically represent the largest market opportunity in square footage in Energy Trust service territory, but as shown in the table below, savings are quite diversified and can come from a variety of business types, depending on local economic activity.

Staff expects the K-12 schools segment to grow, as schools have a high potential for savings. Many school districts in Energy Trust territory have recently passed bond measures for new construction and building upgrades. These typically result in a large influx of projects for schools.

Street lighting, while very strong in 2015 and 2016 savings, was primarily from the City of Portland. The City of Portland project is winding down in 2017 and the street lighting savings trend will not continue in 2017 or 2018.

Figure 30: Top Market Segments by Savings for Existing Buildings, 2016

Electric Savings (kWh)	
Street Lighting	21,207,070
Office	15,789,847
Grocery	9,712,442
Retail	9,400,480
Warehousing and Storage	6,468,265

Gas Savings (therms)	
Hospital	420,312
Restaurant	394,095
Office	205,306
College/University	170,541
High School	134,087

In Strategic Energy Management, office, healthcare and higher education have been the biggest participants to date. Over the last five years, office, retail/banking and property management have grown significantly. Energy Trust began working with K-12 in 2015 and multifamily (assisted living) in 2016. Staff have found that a customer's level of energy use, organizational structure and staff motivation tend to be better indicators of readiness for Strategic Energy Management than market sector.

Figure 31: Top Market Segments by Savings for Strategic Energy Management, 2016

Electric Savings (kWh)	
Office	3,688,583
Hospital/Health Care	2,136,061
College/University	1,525,174
K-12 School	1,146,943
Retail	404,376

Gas Savings (therms)	
Hospital/Health Care	133,457
Office	109,954
Jail/Reformatory/Penitentiary	96,549
K-12 School	68,211
College/University	51,772

B. Existing Multifamily

As shown in Figure 32, Market rate multifamily housing properties consistently provide the largest source of electric and Existing Multifamily savings, primarily from larger buildings. As market penetration increases, program managers expect savings to shift toward smaller properties, as well as those located in non-metro areas. There are still savings opportunities in larger buildings since the vast majority of them have only participated in one or two program savings tracks. The program's account managers work with these customers to re-engage them for other program offerings.

Affordable housing is an important market segment, with the majority of these properties heated with inefficient electric resistance heat. Assisted living properties which are typically master-metered with central boilers, have also had high participation and been a large source of savings, particularly on the gas side. The program has served more than 40 percent of the eligible assisted living facilities with at least one offering. This market segment still have good potential for additional savings, especially with the addition of Avista to Energy Trust territory.

HOAs and individually-owned units have been challenging segments to serve. HOAs face complex ownership structures and decision-making requirements, and individual unit owners are hard to reach through traditional channels and may self-identify as residential. The program is refining outreach strategies and targeting to these customers.

Figure 32: Top Market Segments by Savings for Existing Multifamily 2016

Electric Savings (kWh)	
Market Rate	11,174,831
Affordable	4,110,030
Assisted Living	3,044,569
Homeowners Association	1,640,181
Individual Unit Owner	872,643
Campus Living Property	174,351

Gas Savings (therms)	
Market Rate	114,923
Assisted Living	109,925
Campus Living	40,433
Affordable	25,151
Homeowners Association	22,487
Individual Unit Owner	10,456

C. New Buildings

Growth in Oregon's population is driving new construction, bringing many new opportunities to advance energy savings. As shown in Figure 33, grocery, schools, assisted living, office, retail, warehouse, distribution and fulfillment centers are particularly active market segments. Small commercial buildings continue to represent a large portion of projects under construction statewide.

A number of bond measures have been approved by Oregon voters and this is driving increased market activity for schools and other public projects, many of which are expected to pursue Path to Net Zero. PTNZ has been particularly attractive in the public sector to reduce energy needs over the lifetime of the structure. This influx of projects has spurred the program to target program support to design professionals working on these public projects.

Multifamily now represents much of the gas and electric energy saved through Market Solutions. Healthcare facilities had been a top market segment in the past; however, hospitals statewide went through a building boom that ended in 2014-2015.

Figure 33: Top Market Segments by Savings for New Buildings, 2016

Electric Savings (kWh)	
Large Projects	13,913,260
Multifamily	12,087,545
Warehousing and Storage	5,148,071
Office	3,795,357
Grocery	3,498,281

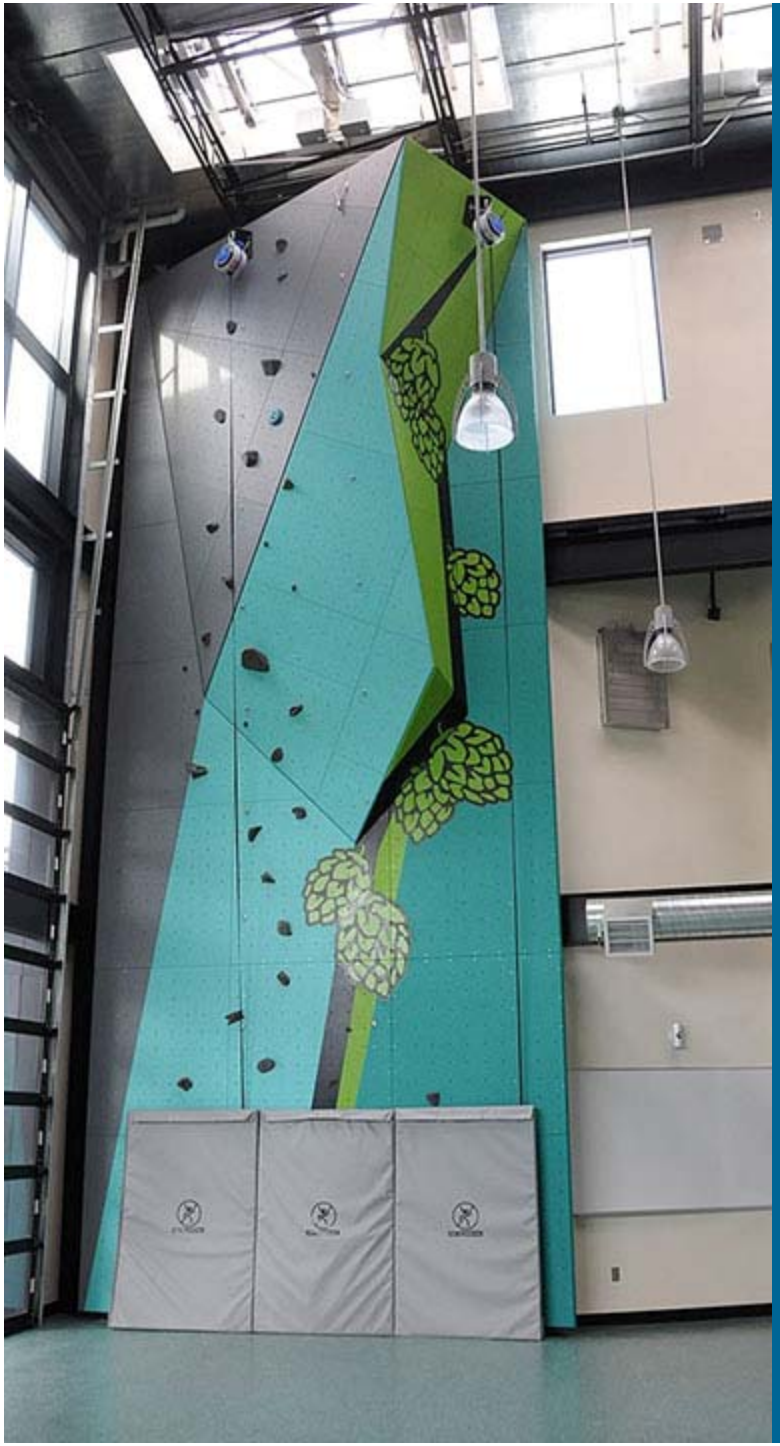
Gas Savings (therms)	
Multifamily	357,064
Lodging/Hotel/Motel	58,976
Grocery	42,374
Gym/Athletic Club	41,309
K-12 School	32,650

Industry and Agriculture Sector

2009 – 2016 Trends Analysis

August 2, 2017

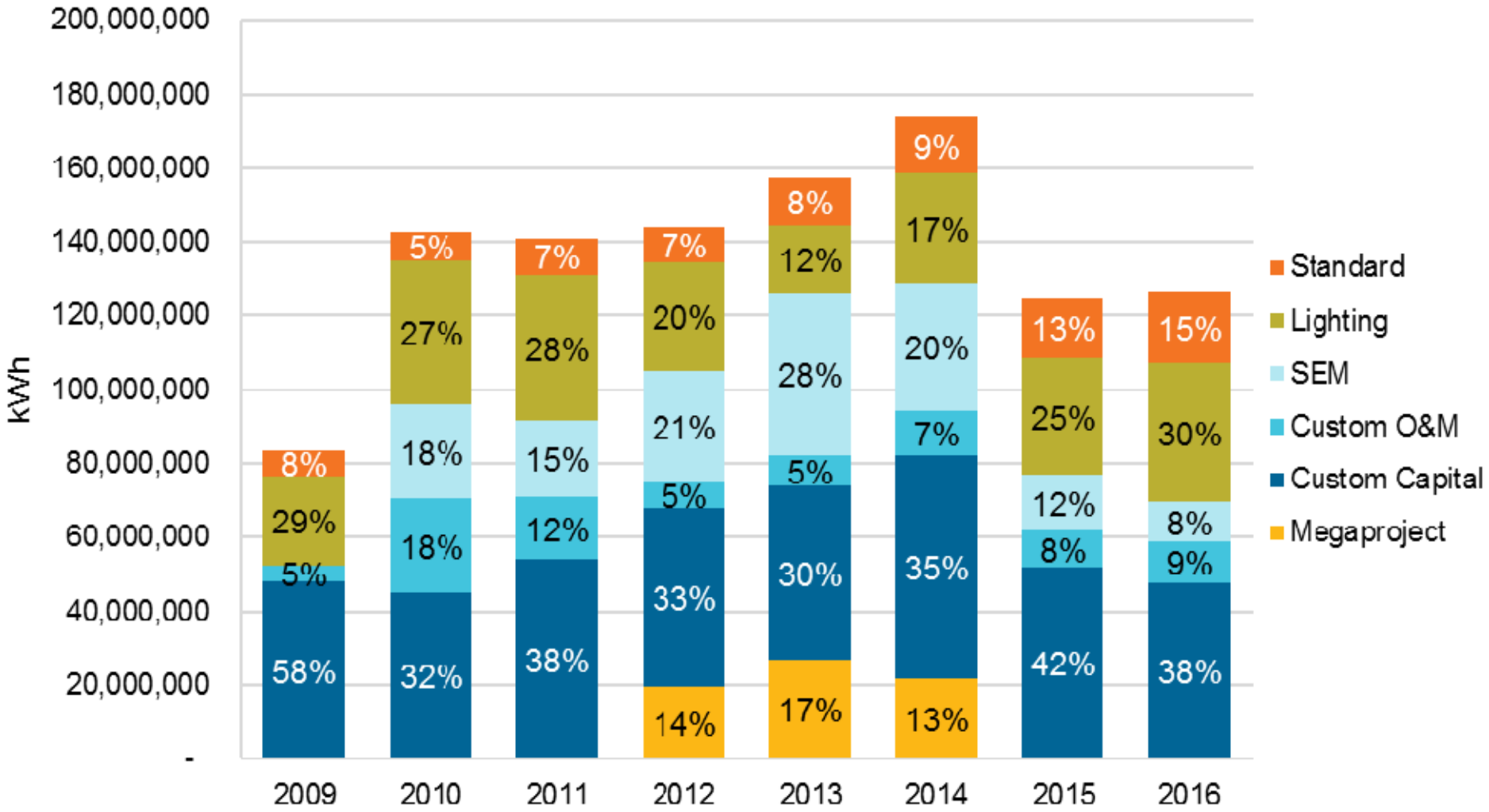
EnergyTrust of Oregon



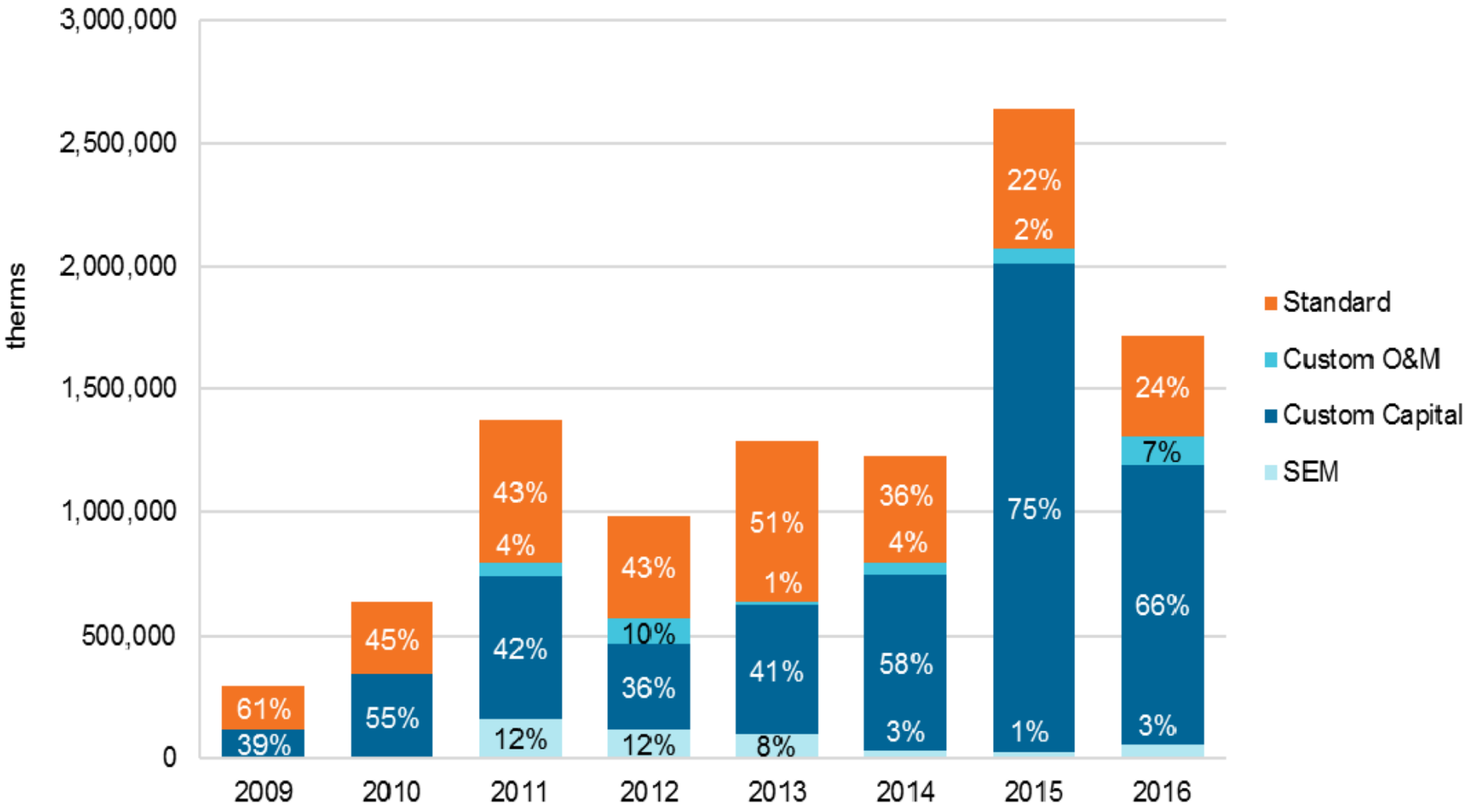
Sector Highlights

- Launch of new offering Continuous SEM in 2016
- New market development with indoor agriculture
- Strong lighting growth and increased LED conversions
- Growth of small-to-medium business participation

Industry and Agriculture Electric Savings



Industry and Agriculture Gas Savings



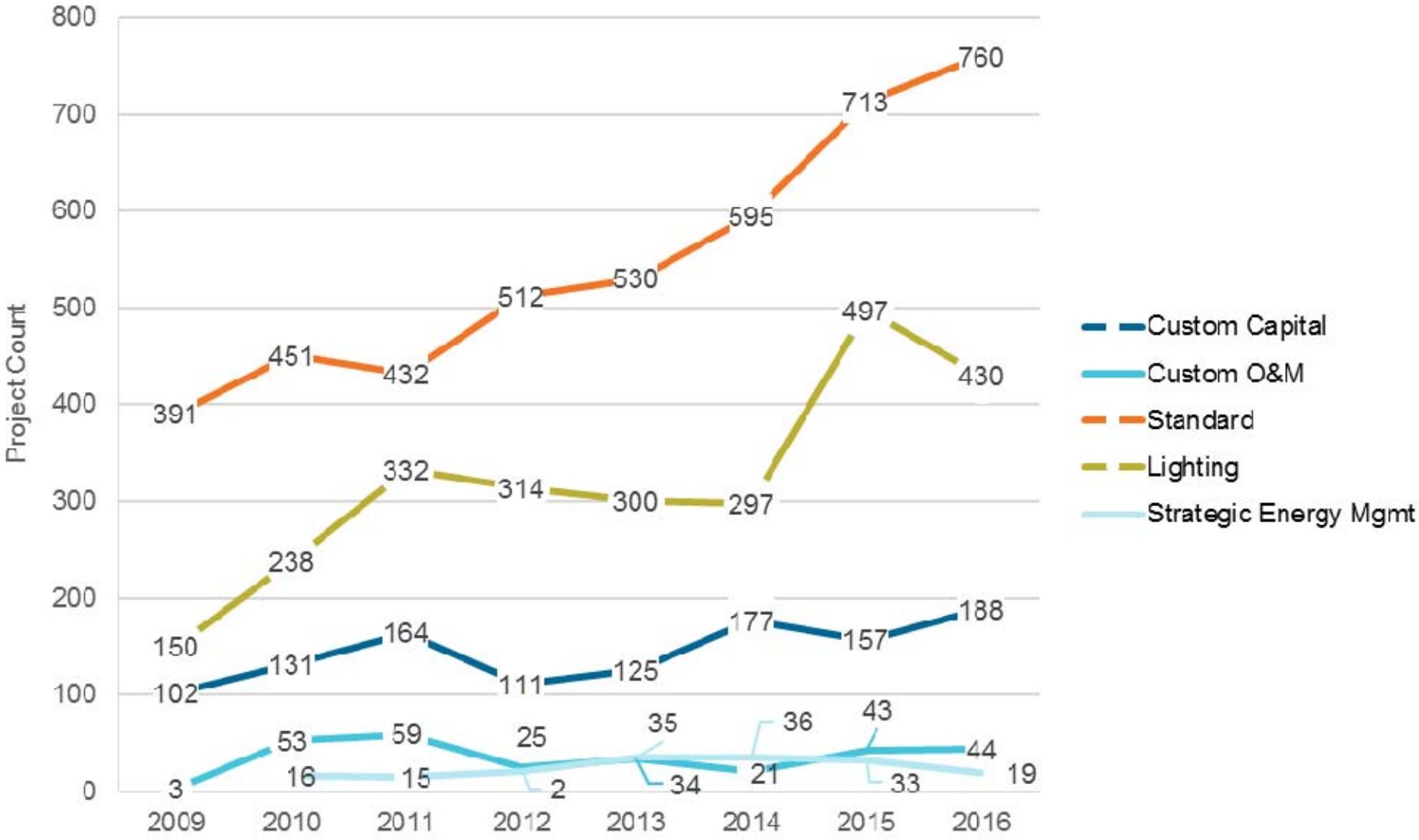
Overview

As we reach small to medium customers:

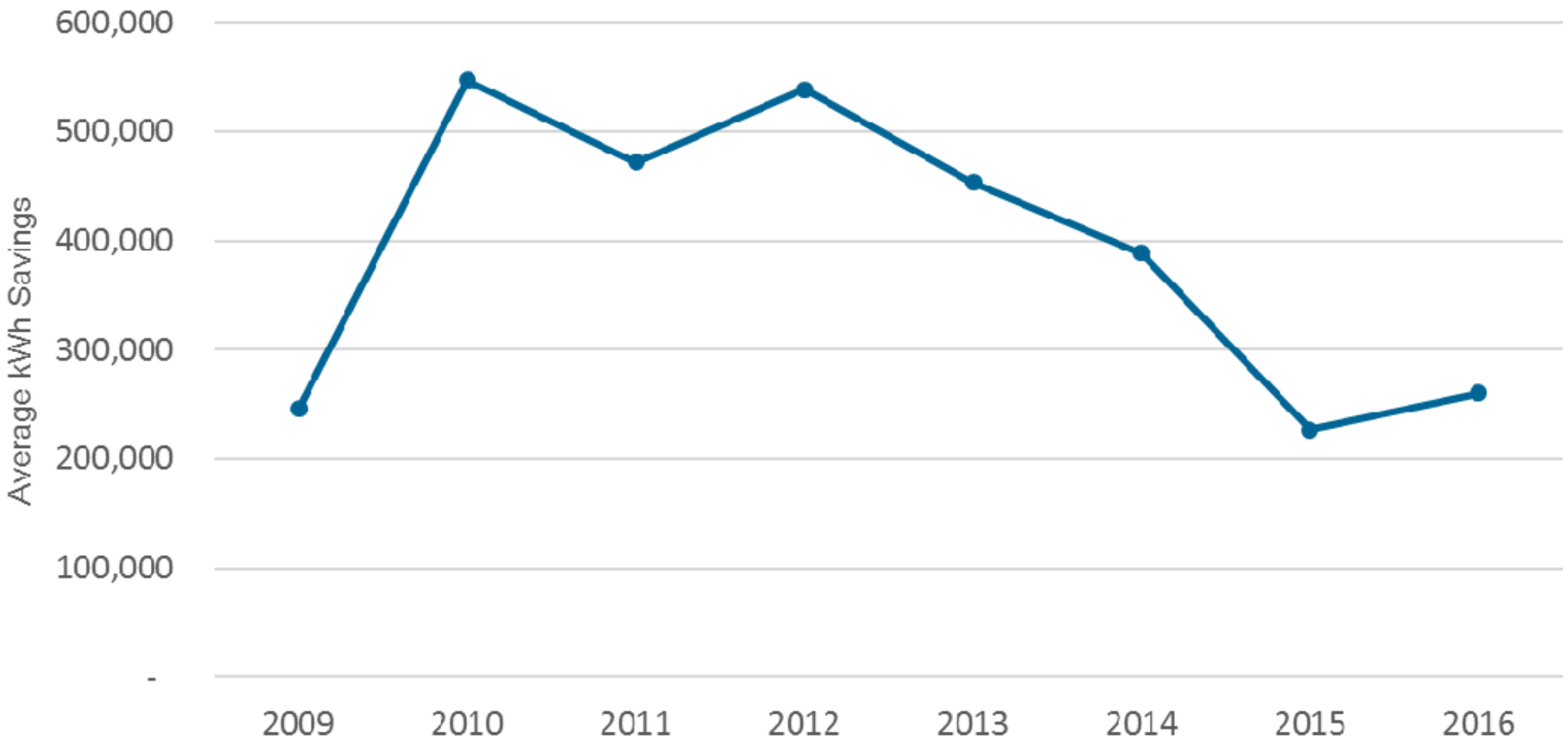
- Project count has increased
- Average project size for electric savings has decreased
- Increase in electric incentive run rate

Gas continues to be lumpy, with low project volume and large cost-effective projects

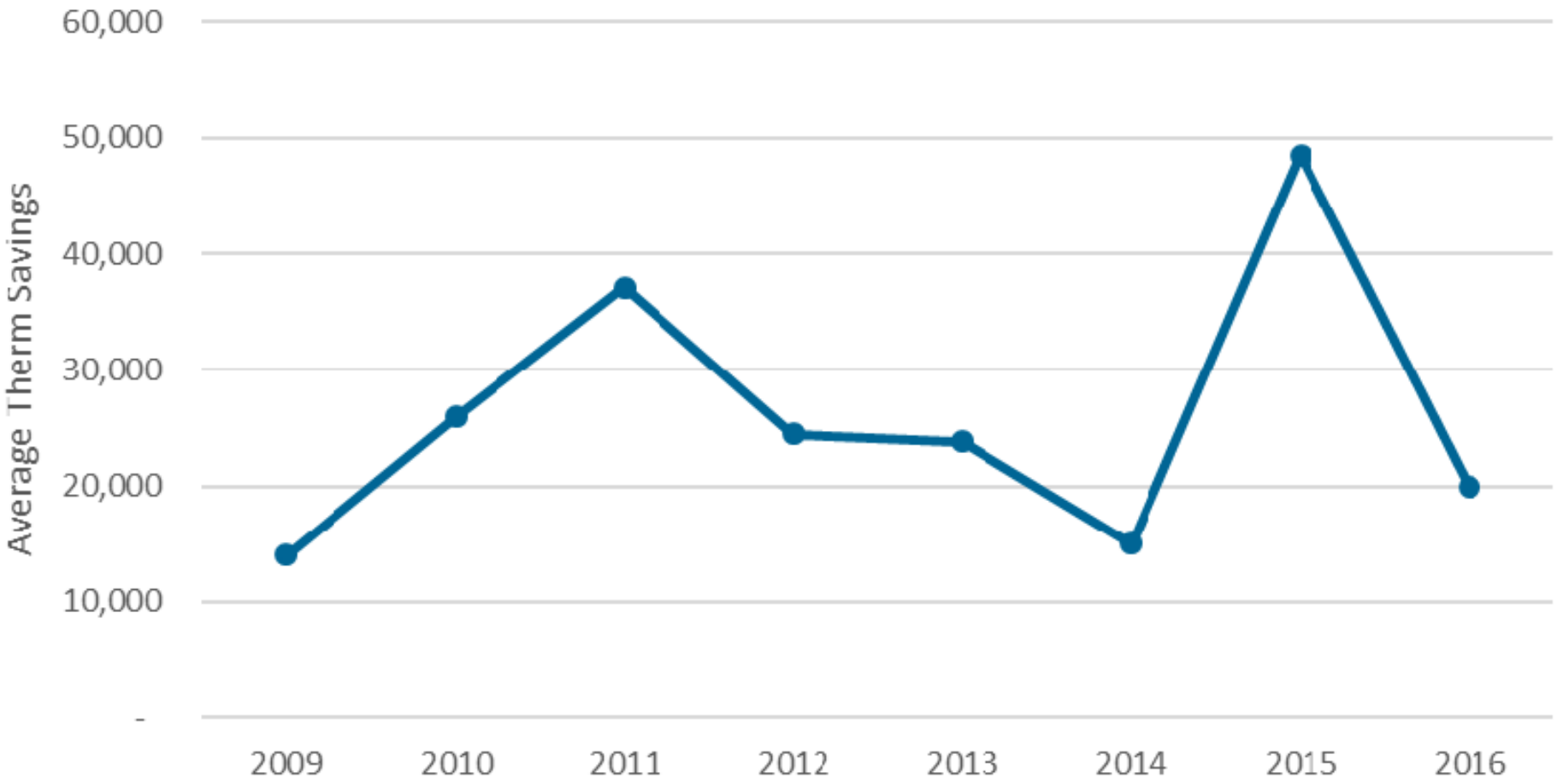
Industry and Agriculture: Project Count



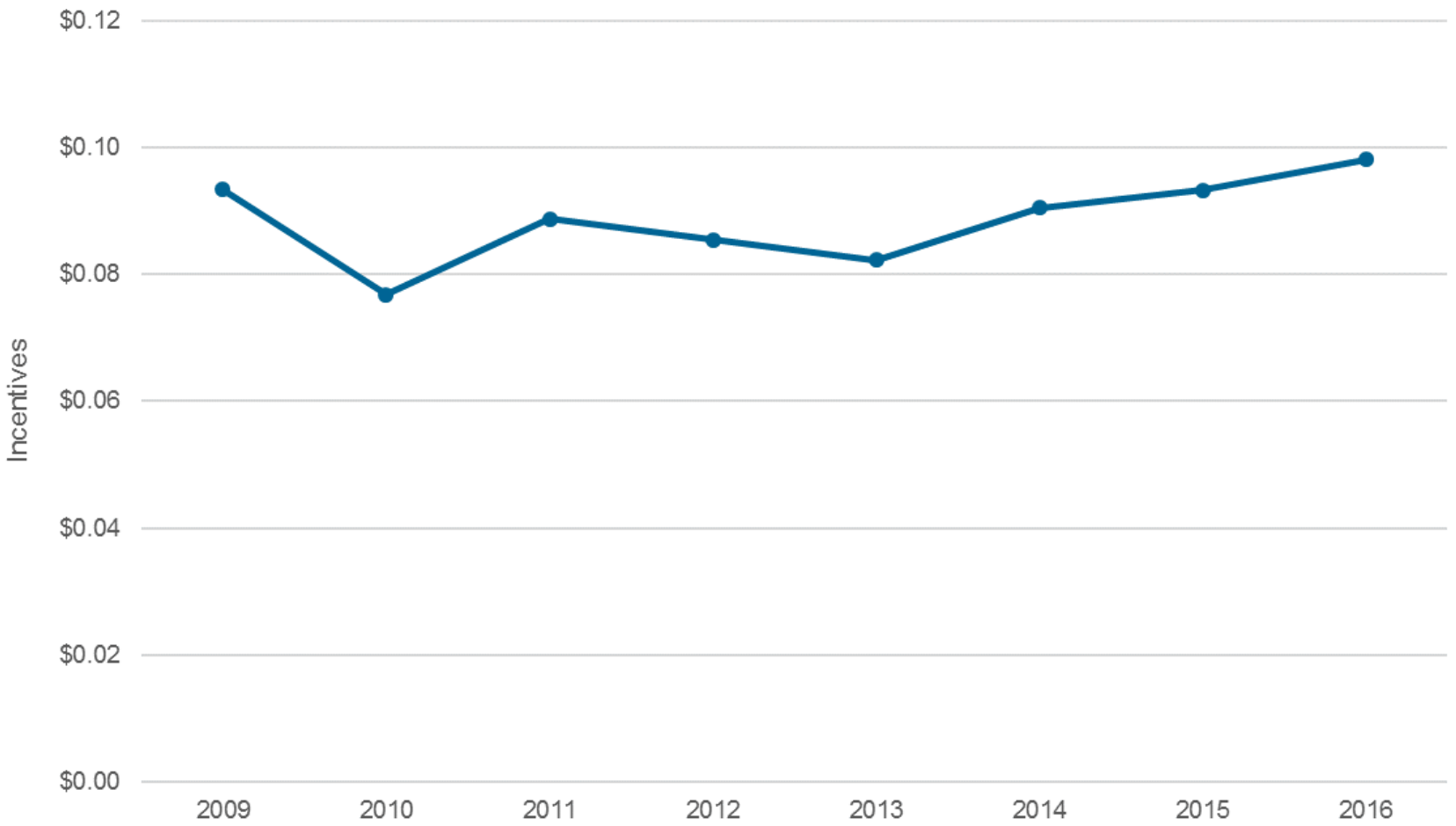
Industry and Agriculture: Average Electric Project Size



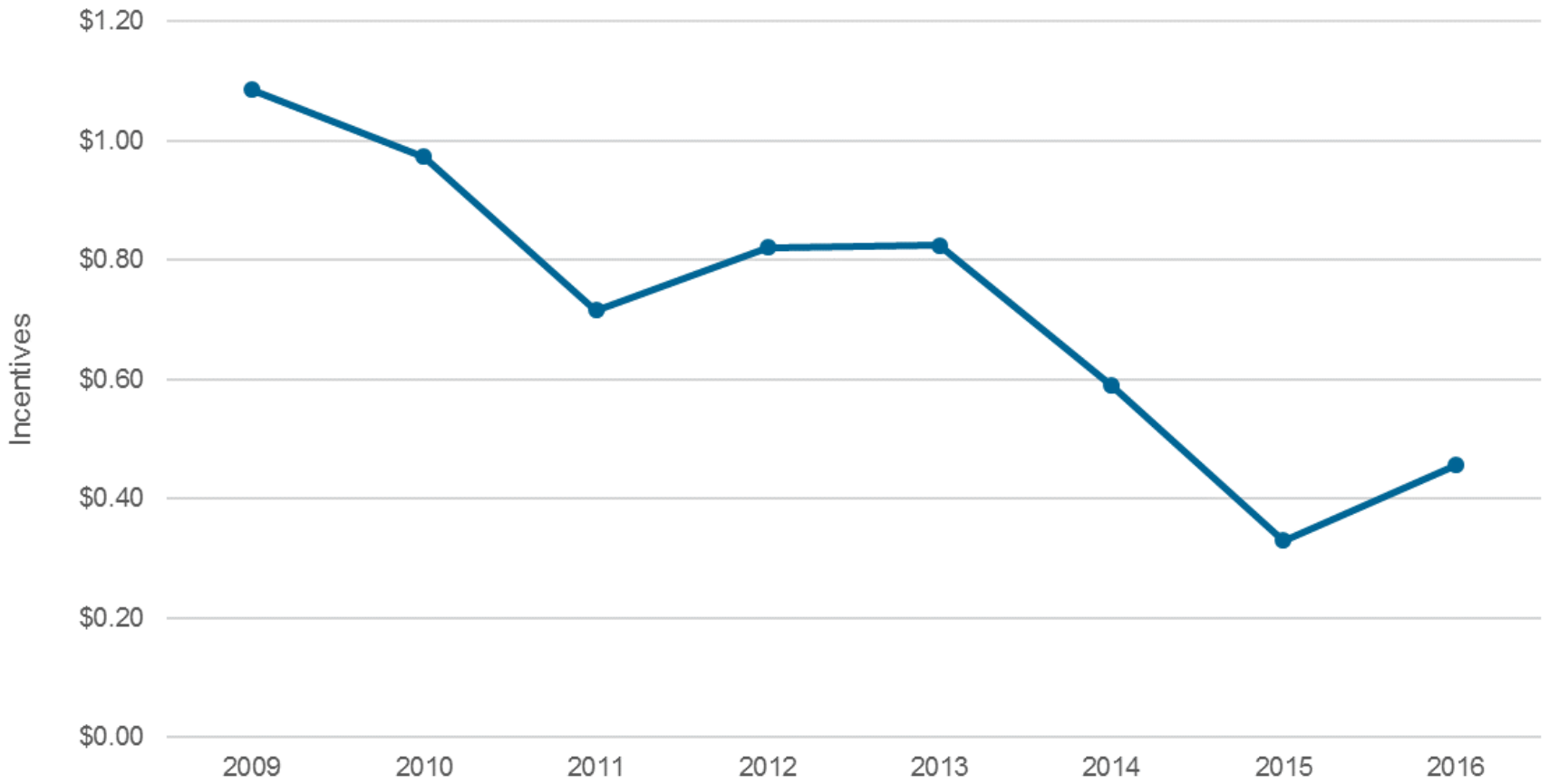
Industry and Agriculture: Average Gas Project Size



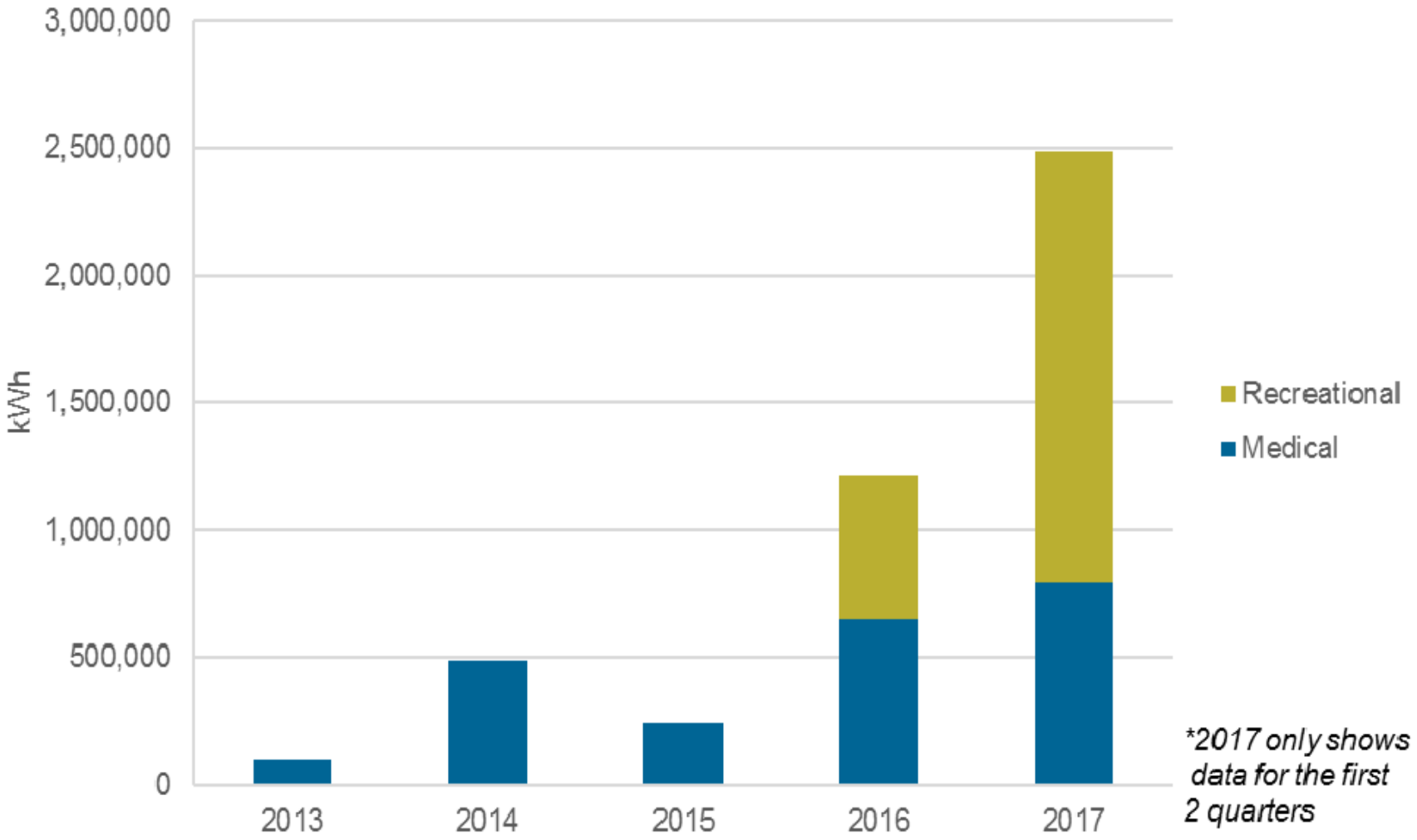
Industry and Agriculture: Electric Incentives



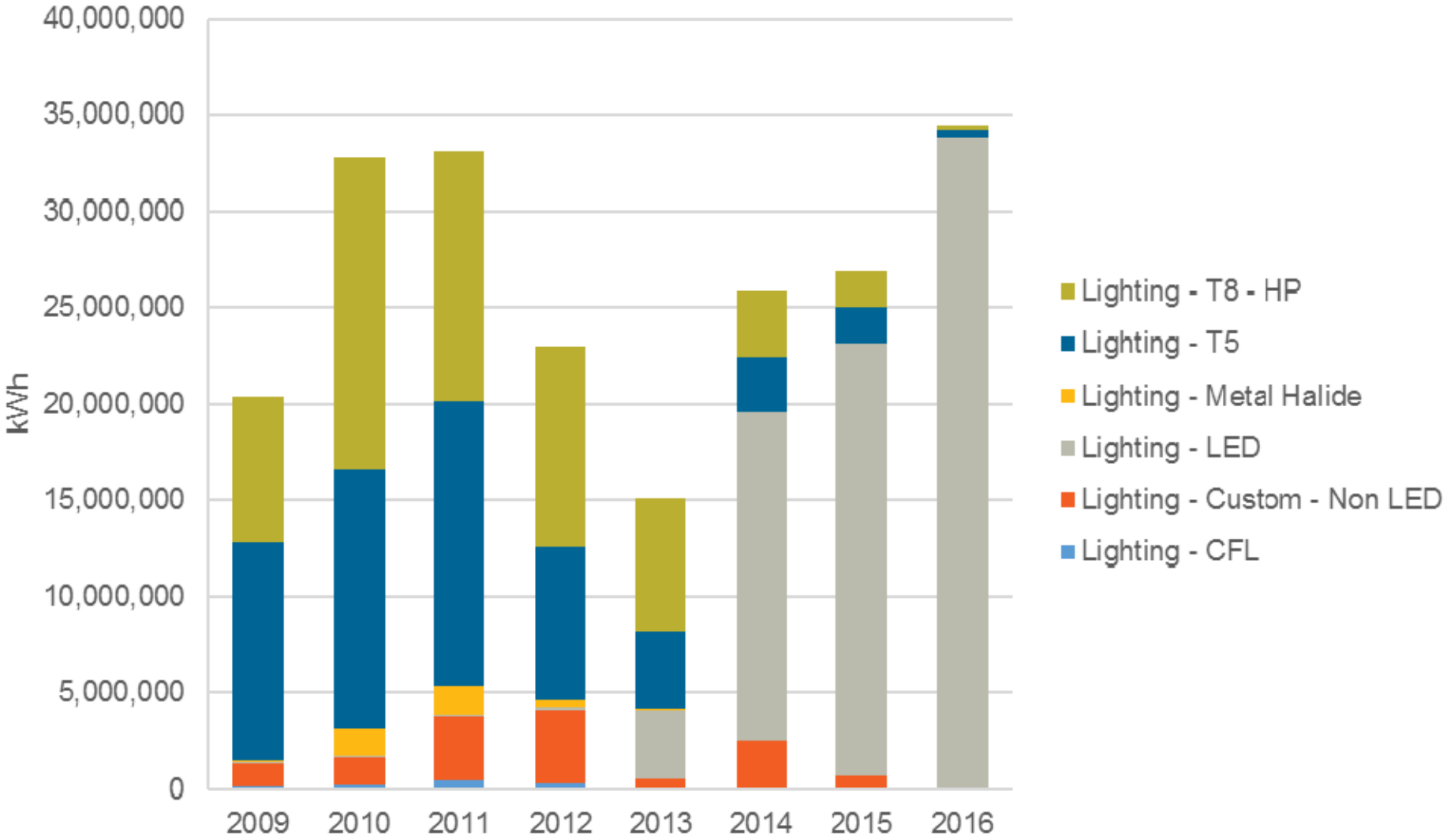
Industry and Agriculture: Gas Incentives



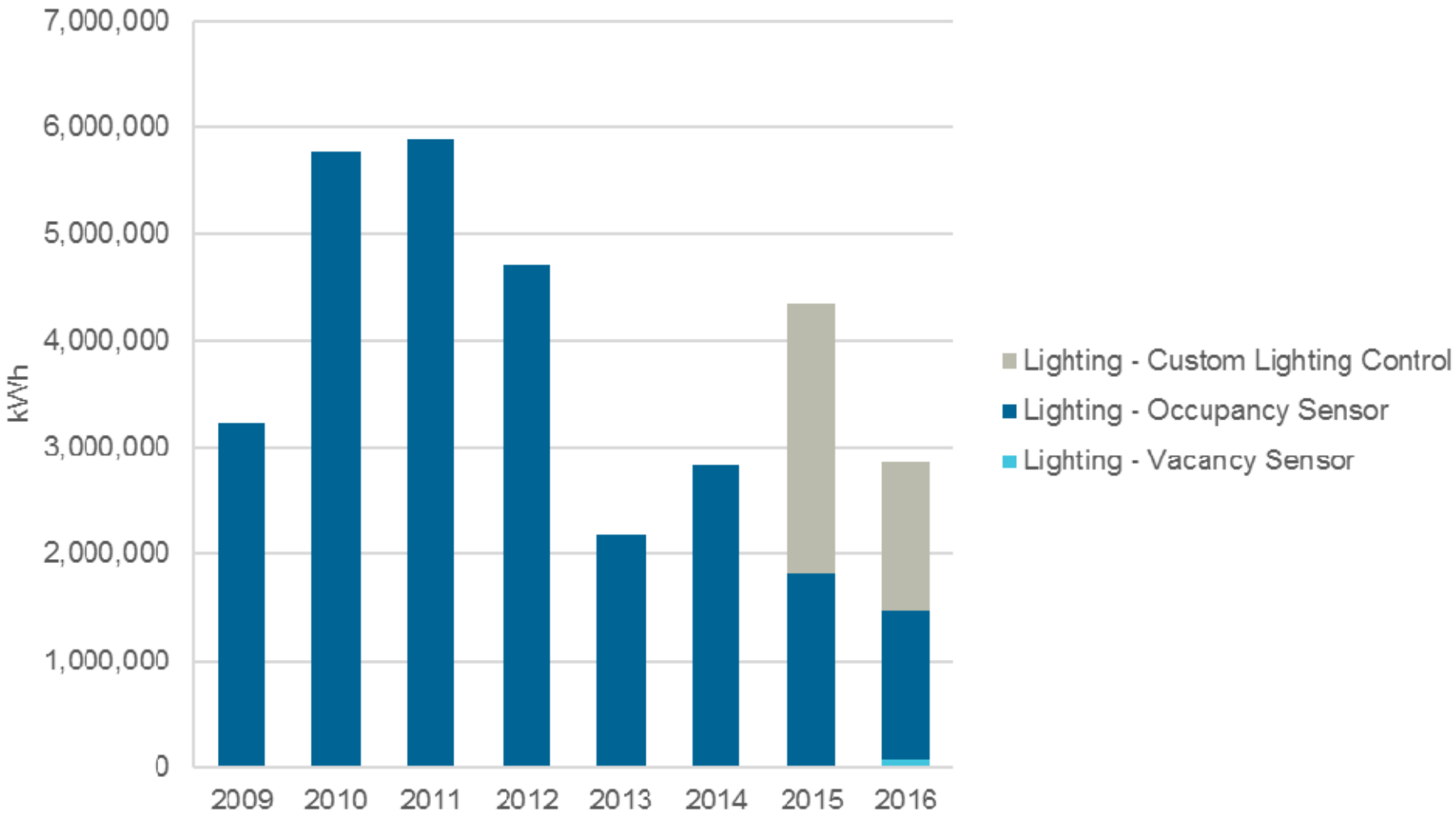
New Market Growth: Indoor Cannabis Production



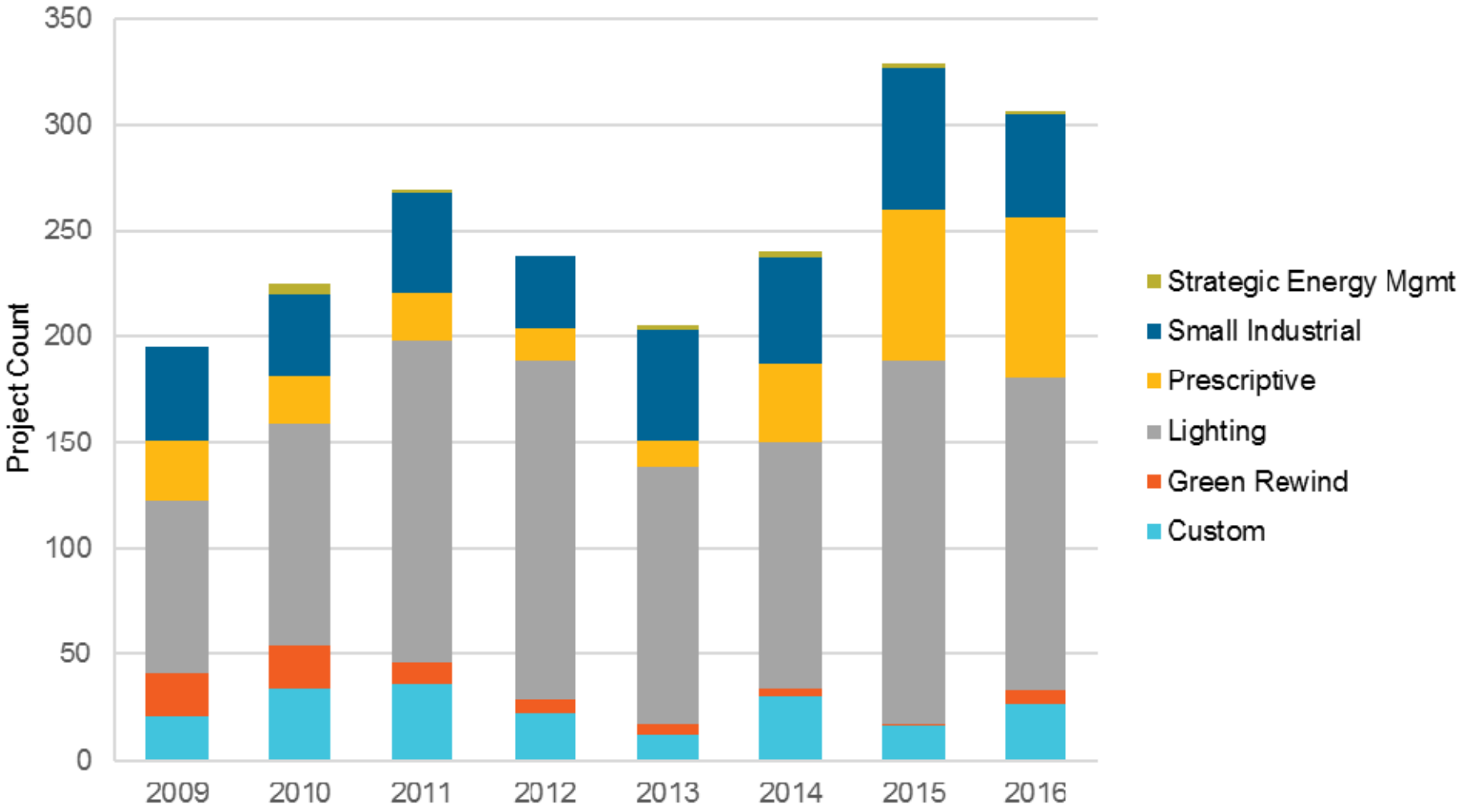
Industry and Agriculture: LED Adoption



Industry and Agriculture: Lighting Controls



Industry and Agriculture: First Engagement



Thank You

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EnergyTrust of Oregon

Industry and Agriculture Sector

Production Efficiency Trends: Systems, Markets and Sources of Savings from 2009-2016

July 2017

Energy Trust of Oregon

About Energy Trust of Oregon

Energy Trust is an independent nonprofit organization, overseen by the Oregon Public Utility Commission, to lead utility customers in benefiting from saving energy and generating renewable power. Our services, cash incentives and solutions have helped participating customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista save more than $2.7 billion on their energy bills since 2002. The cumulative impact of our leadership since 2002 has been a contributing factor in our region's low energy costs and in building a sustainable energy future. More information about Energy Trust's background, funding sources, strategic and action plans, policies and programs are available on our website at www.energytrust.org.

I. Analysis of trends in the Industry and Agriculture Sector

Source of Data

Data contained in this report comes from Energy Trust's internal systems of record. It is for programs delivered in Oregon.

Trend Analysis: Working and Reportable Savings Numbers

These analyses are primarily based on working savings numbers, which are savings before evaluation factors and transmission and distribution losses or credits are applied. Working savings will not match reportable savings, which are included in Energy Trust's public reports to the Oregon Public Utility Commission and board of directors.

We analyze trends using working savings for a few of reasons:

- Consistency: Evaluation factors change. Working savings provide a year-over-year comparison of market response to program offerings.

- Incentive designs and budgets are built on working savings, as verified first-year working savings are the basis for incentive payments to customers. Trends based on working savings are the basis of bottom-up goal setting and incentive budget development.

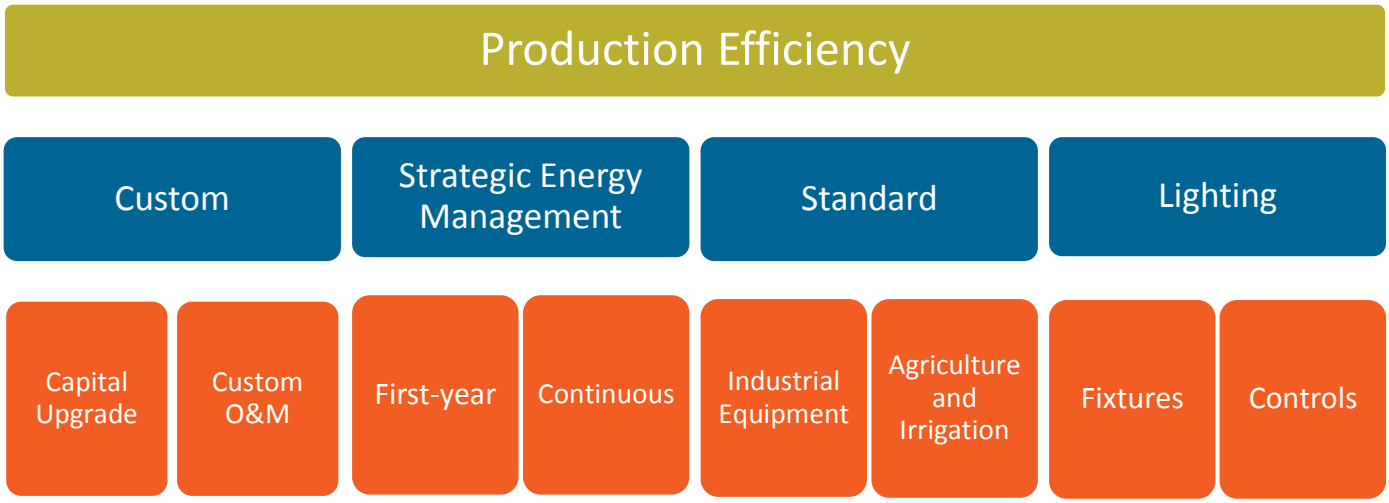
- Market drivers: While tracking and addressing changes in free ridership and technical realization is important to program outcomes, the primary driver of program outcomes is how the market responds to program offers. The secondary driver of outcomes appears to be customer perception of the current economy. This trend analysis focuses on the primary driver influenced by basic program design and delivery.

Megaprojects are projects that achieve very high savings and receive incentives above $500,000. They require board approval before they begin work. Megaprojects are not included in this analysis since they create spikes of activity that skews general program trends.

II. Sources of Savings

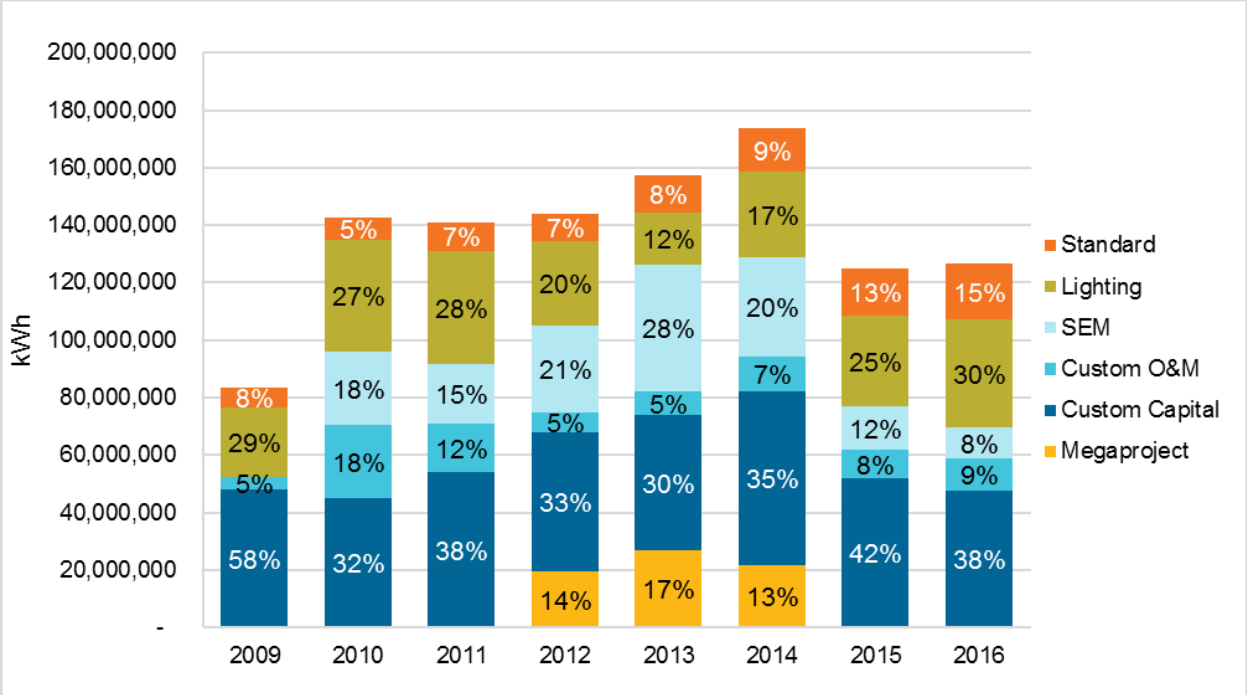
The Industry and Agriculture sector has one program, Production Efficiency. Production Efficiency is organized around and achieves savings through four primary pathways: custom, Strategic Energy Management (SEM), standard and lighting. Custom includes capital and operations and maintenance (O&M) projects. Each pathway is targeted to specific industry needs and/or market segments with differing technical complexity, delivery channels and development timelines.

Figure 1: Program pathways for savings



The program's historical electric and gas savings are detailed and analyzed showing the sources of savings in Figure 2 and Figure 7. This report also details project characteristics, types of savings and costs.

Figure 2: Electric sources of savings from 2009 – 2016 (working kWh)



** Megaproject savings are included only in this graph to provide the complete view of savings for the program.

Oregon manufacturers have weathered many changes since 2009—recession, economic recovery, and the ups and downs of the overall business climate. The contributions of the Industry and Agriculture Sector to the Energy Trust savings portfolio have remained relatively steady through it all, as staff adapted existing program offerings or created new ones to help customers maximize their energy efficiency opportunities. Staff effectively designed incentive bonus offers, particularly in 2011 and 2012, that proved successful in minimizing the impact of the recession on savings. Bonuses deployed in 2014 also helped level out savings as manufacturers maintained a cautious view of the market.

Some trends within the Industry and Agriculture Sector are fairly predictable. Custom capital energy projects tend to rise with the economy, while custom O&M projects increase when times are leaner. Other trends reflect the evolution of a mature program. The program, Production Efficiency has worked with many customers for multiple years, particularly those with larger sites. As a result, most of the large projects have been completed. A significant amount of savings can still be captured at these sites; however, these savings will be claimed through increasingly incremental efforts.

Smaller customers

The program expanded focus in 2014 to develop services and incentives to capture smaller projects at large customer sites, and to provide offerings for smaller customers. This strategy has worked to diversify the participant mix and to maintain overall savings. Since 2012, the number of small-to-medium participants has doubled as a percentage of all customers served. However, savings have lagged participation, and historical levels of total savings could not be sustained. As noted in the charts, a very high level of savings still remains to be achieved even as the era of numerous, very large projects has passed.

Standard

Standard projects, which include agricultural equipment for irrigation and greenhouses, are a growing contributor to program savings. Once in the single-digit percentages, in 2016 these projects represented 15 percent of the total. As the program engaged smaller industrial businesses, staff developed new standard track measures that complemented custom analysis and focused on delivering more cost-effective offerings to these new customers. For instance, a vendor-driven compressed air leak reduction approach was created in 2014. This offer helps small-to-medium companies that do not have the staff resources to fix and repair leaks. This offer also builds capacity in Energy Trust trade allies, while providing a vendor-driven service to the market.

Strategic Energy Management

Energy Trust introduced SEM to large industrial customers in 2009. Because SEM engagements are typically 12-15 months long and savings are claimed at the end of the engagement, the savings trends for SEM show up in the following year. The focus on identifying and addressing energy-efficiency opportunities with no- and low-cost O&M was a good fit for companies during the recession. In 2013, SEM was refined to include smaller sites. The program served a few large sites with very high SEM savings.

These exceptionally large engagements may mask a couple of factors that are impacting SEM savings: the general decline in overall SEM savings that occurred as a result of serving smaller sites with lower savings potentials, and the saturation of SEM at large sites. Over the next couple of years, Energy Trust continued to improve and expand the delivery of SEM, resulting in a smoother, more predictable flow of SEM savings from all customers. The results of these changes are beginning to be clear in 2016.

The Refrigeration Operator Coaching offering, a cold storage-focused version of SEM, was introduced in 2011 and offered through 2014 when staff determined this specific version of SEM had saturated the market. Cold storage facilities are now integrated into the regular SEM offerings. In 2014, the SEM offering was scaled for small and medium sites, several outside of the metro area and Willamette Valley. SEM savings in 2015 reflect the expansion of this offering. After the initial recruitment of non-metro sites in 2014, staff assessed the market potential for SEM in these areas and determined that regional cohorts are most effective for customers when implemented every 2-3 years.

Lighting

LED high-bay lamps and fixtures, which can operate for years without a loss of light quality, are a good fit for facilities where maintenance to change lamps can shut down a production line. As manufacturers recover from the recession, add shifts and see profits rise, LEDs provide multiple business benefits. From 2013-2016, lighting projects increased steadily by almost 20 million kilowatts-hours, a 106 percent growth, with the vast majority of the savings being LED upgrades.

In fall of 2011, Energy Trust's business programs together offered a bonus incentive for lighting to maintain savings from 2009 to 2010. The program posted high savings for 2011, but the lure of the bonus also had a result of depleting the project pipeline for 2012, resulting in a 35 percent drop in 2012 savings. Staff stepped back from year-end bonuses after this experience, particularly for those at year-end which exacerbated operational bottlenecks at the end of the year.

Figure 3: Top lighting measures from 2009 – 2016 (working kWh)

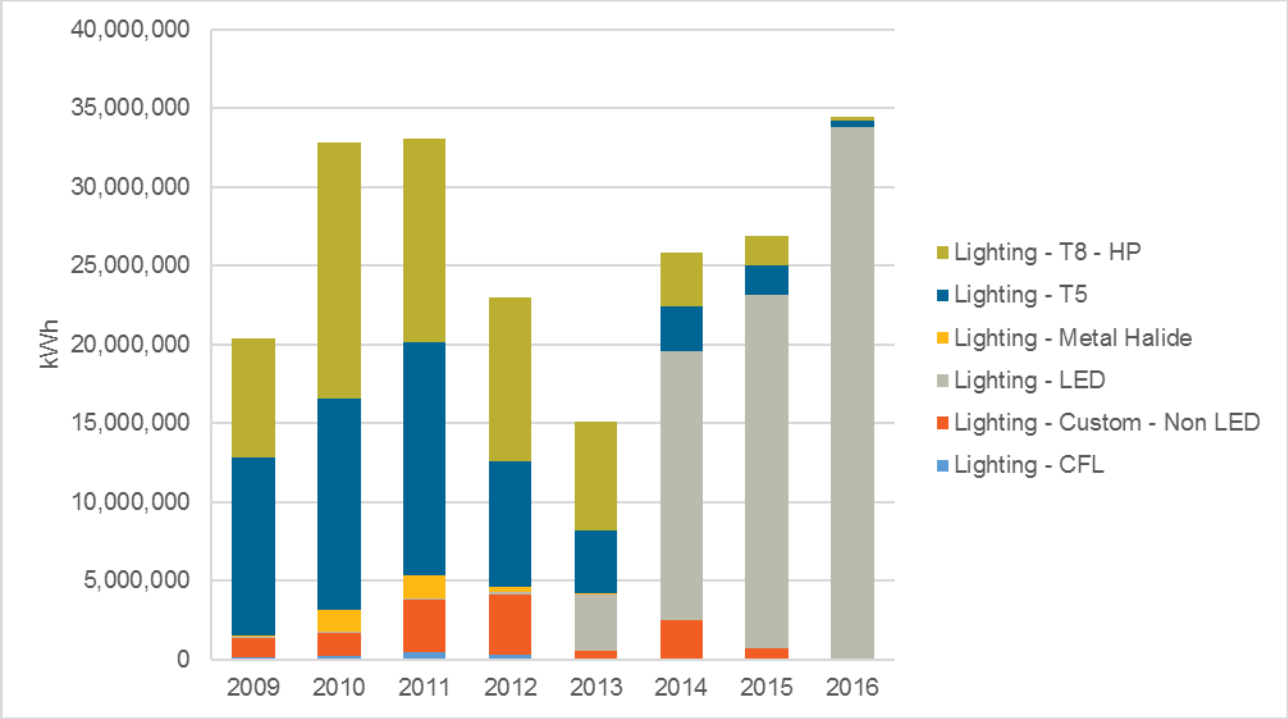
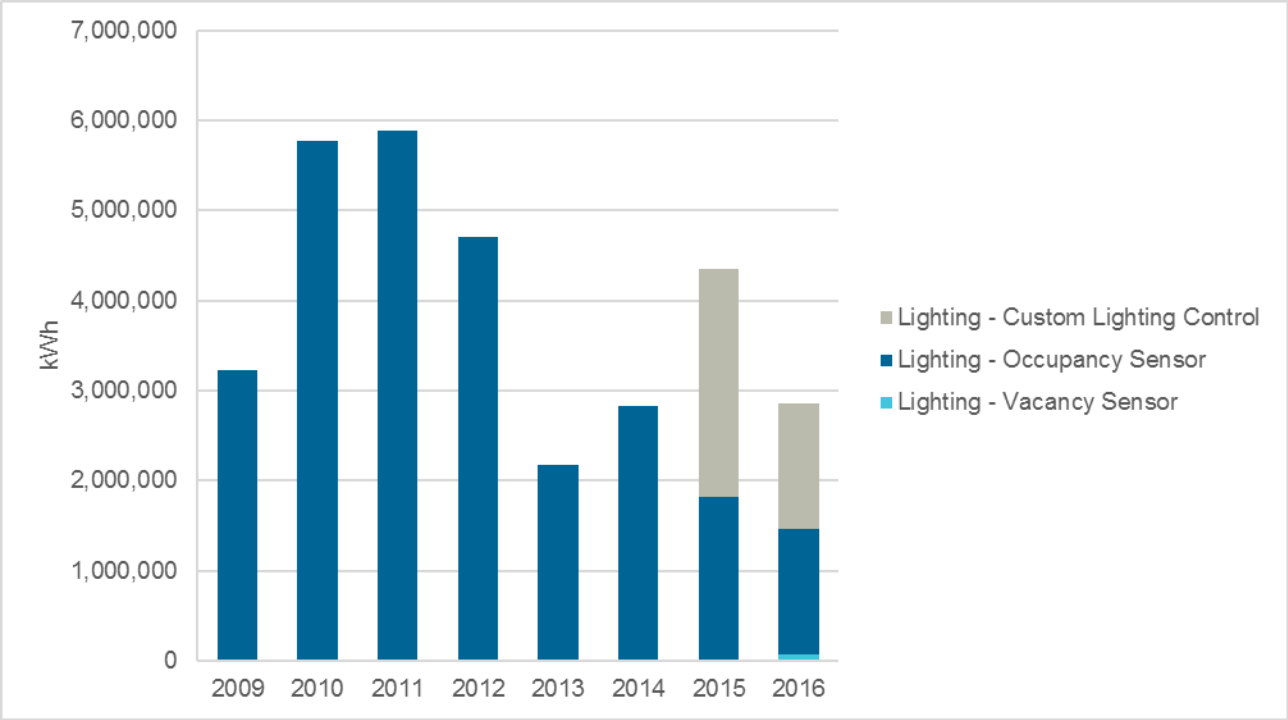


Figure 3 charts the level and composition of lighting savings since 2009. The transformative impact of LED lighting adoption is easy to see in the Industry and Agriculture sector.

The emergence of LED lighting at declining price points is transforming the lighting retrofit market for industry. This trend is due to a rebounding economy, desirable LED technology and declining equipment costs, all supported by Energy Trust's strong delivery network of lighting trade allies and a comprehensive set of lighting incentives. Other factors such as long lamp-life for reduced maintenance and better performance for improved lighting quality and safety attracted manufacturers of all sizes to LED lighting upgrades. LED technology effectively replaced fluorescent high-bay and exterior lighting products to become a nearly unanimous choice in 2016.

The appeal of LEDs may also have surfaced new--and frequently smaller--customers. These customers engaging with Energy Trust for the first time in 2016 overwhelmingly started with lighting, followed by standard incentives. New participants were predominantly small- to medium-sized customers. Staff are planning further analysis to map the customer path of these new participants.

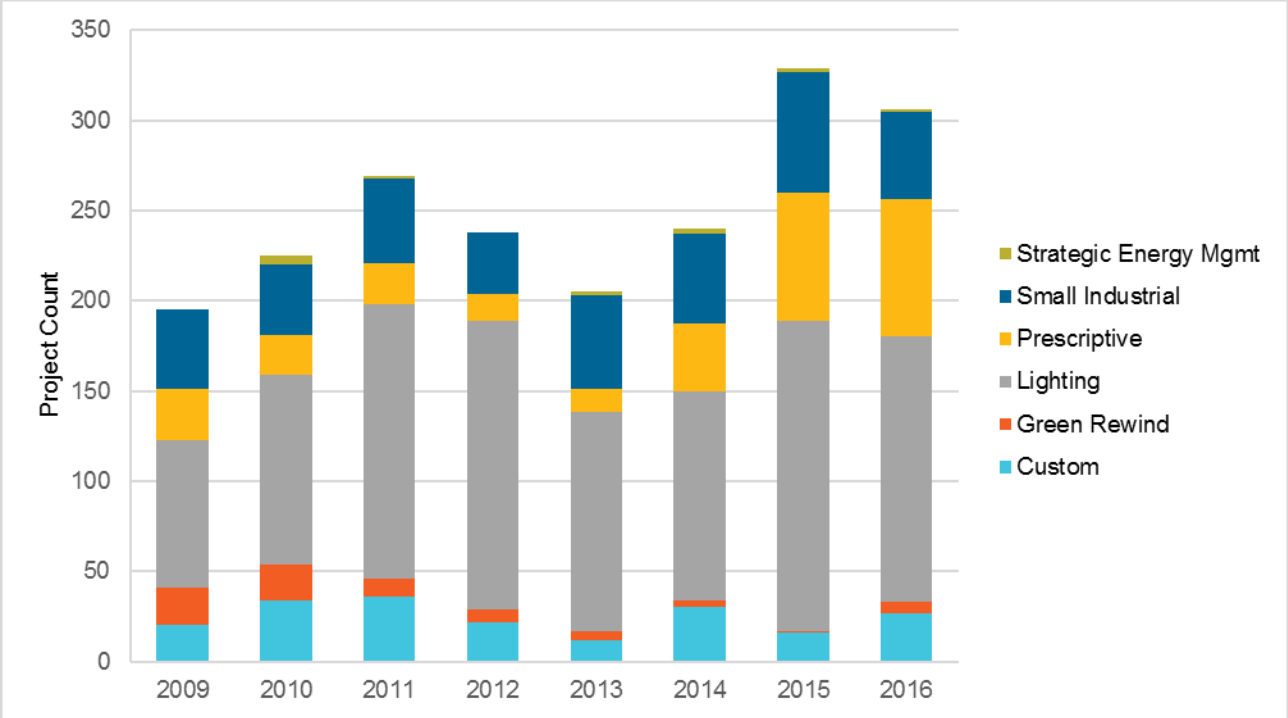
Figure 4: Lighting control measures from 2009 – 2016 (working kWh)



Another aspect of lighting savings is controls. Figure 4 examines the level and mix of savings from different lighting controls technologies. As LED technology increased in adoption, the program was predicting installations of custom controls, which can include controls embedded into fixtures, would increase proportionally. Although the program surfaced more custom controls savings, custom controls have not increased in proportion to LEDs. In the absence of deeper research, staff believe that this may occur when the incremental energy and dollar savings gained from adding controls is less financially compelling.

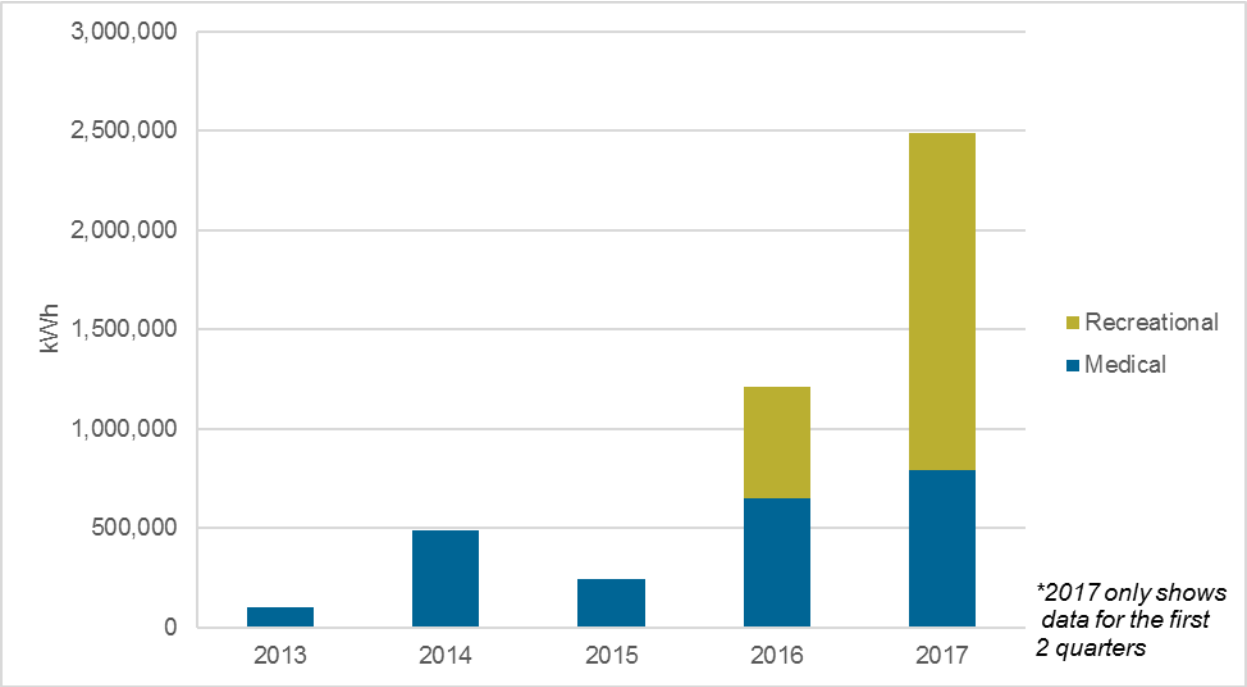
Program engagement

Figure 5: Customer's first project engagement



With the strategic goal of expanding participation to new, smaller customers, the program examined how new participants first entered in the program. The design was setup to engage new customers with account managers, custom PDCs. However, after analyzing past participation data, a customer is most likely to first engage in the standard track, specifically in lighting. This finding will be part of a larger analysis and will support future program design strategies to expand participation in the most cost-effective manner.

Figure 6: Cannabis/Indoor Agriculture savings from 2013 – 2016 (working kWh)



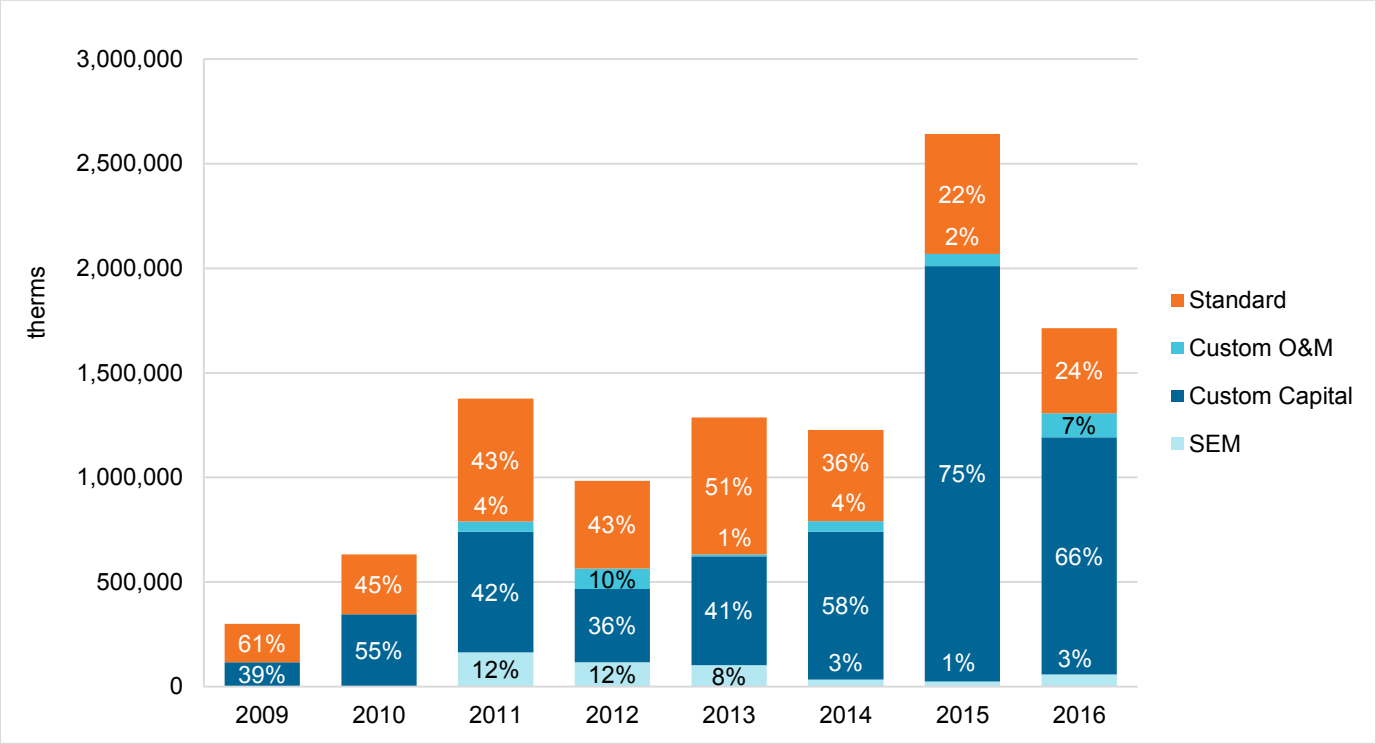
The single biggest change for Production Efficiency has been the addition of the legalized cannabis industry to the program portfolio. Figure 6 shows the growth in savings from the cannabis market.

Energy Trust began serving medical facilities in May 2013 with three completed projects. Larger savings opportunity arrived with the legalization of recreational/adult-use cannabis in November 2015. Energy Trust completed 17 projects in 2016 when the number of licensed facilities was small. To illustrate the rapid growth of this market segment, Figure 6 includes data through the second quarter of 2017 for 19 completed projects. An additional 28 projects and 10 million kilowatt-hours of savings are forecast to complete in 2017, for customers of both electric utilities.

The majority of project savings are for process lighting, primarily LEDs. Projects are often implemented in phases as growers test lighting designs and strategies in the various stages of plant cultivation, and across plant strains. Through a close collaboration with growers, Energy Trust is developing more expertise around lighting design and growing strategies for cannabis. There are also non-lighting opportunities – HVAC, dehumidification and odor control – to expand savings further.

Oregon's cannabis industry is in start-up mode and the program anticipates that dynamic market will experience consolidation over the next few years. Energy Trust is tracking the rate of new grower licenses as one way to refine forecasts.

Figure 7: Gas sources of savings from 2009 – 2016 (working therms)



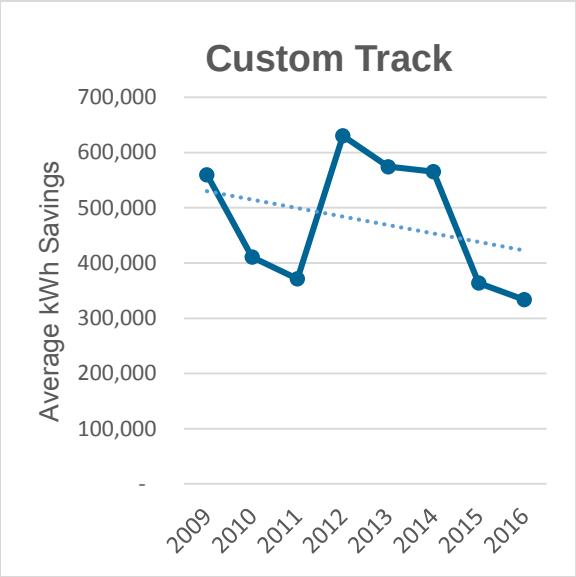
Gas savings in the program vary widely year to year as shown in Figure 7[1]. Compared to electric projects, the number of gas projects is low—under 100. And because projects are often large and complex, one project may represent the majority of the Production Efficiency annual gas savings goal. The program achieves more predictable but smaller gas savings through standard industrial equipment and greenhouses.

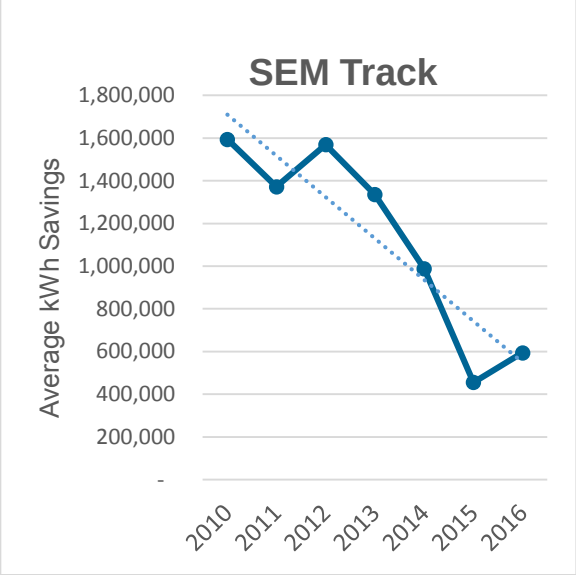
[1] Note, Energy Trust does not serve customers who receive their natural gas through transportation rates.

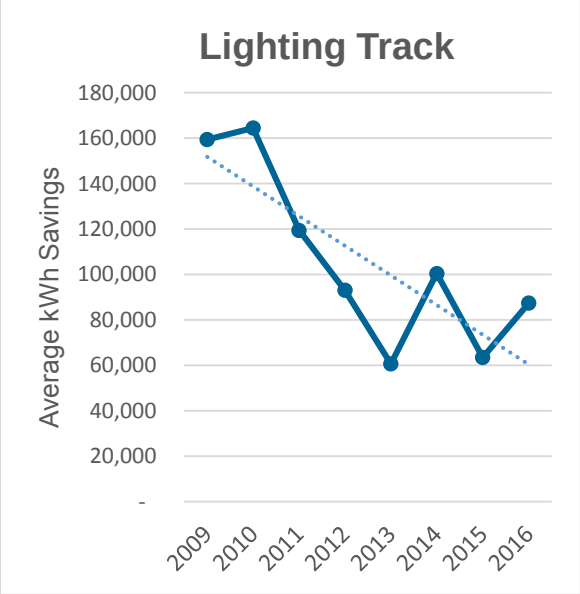
The next sets of charts outline the average savings per project from the various market pathways in the program. Overall the number of completed projects has grown significantly as shown in Figures 10 and 11, while the savings per project has been variable, as shown on Figures 8 and 9.

Figure 8 illustrates that electric savings per project have declined in three of four key program tracks. The exception is the standard track, where savings per project grew from 2009 to 2016 due to targeting more small to medium sized customers. However, because the portion of standard track saving is smaller than the other tracks (Figure 2), this growth in saving per project cannot make up for the decrease in savings across the other tracks.

Figure 8: Electric average project size by track from 2009 – 2016 (working kWh)







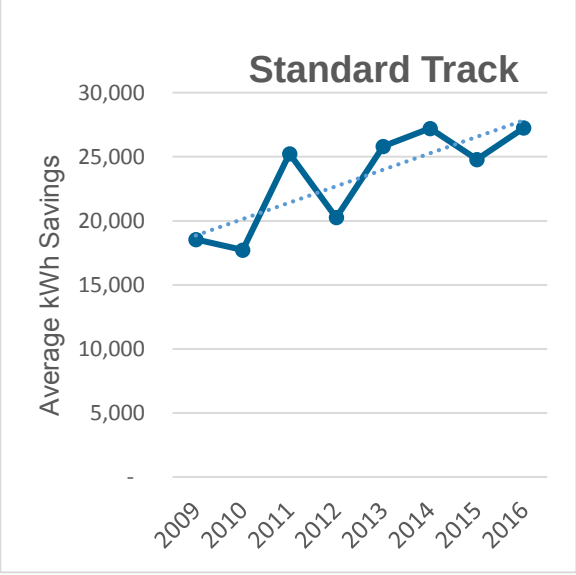


Figure 9 illustrates the changes in average project size over time for gas. The gas trends are not as conclusive as the electric. Average custom track gas savings are impacted by large projects, because of the relatively small number of gas projects completed in a given year compared to electric projects. This was the case in 2015 when one exceptionally large gas project accounted for 62% of total program gas savings, resulting in a large spike in average custom track gas savings for that year.

The high average SEM gas savings in 2011 and 2012 were due to the completion of exceptionally large O&M projects. Similarly, in the standard track, there were abnormally high savings in greenhouse high efficiency condensing boilers that shifted the average project size for 2013.

Figure 9: Gas average project size by track from 2009 – 2016 (working therms)

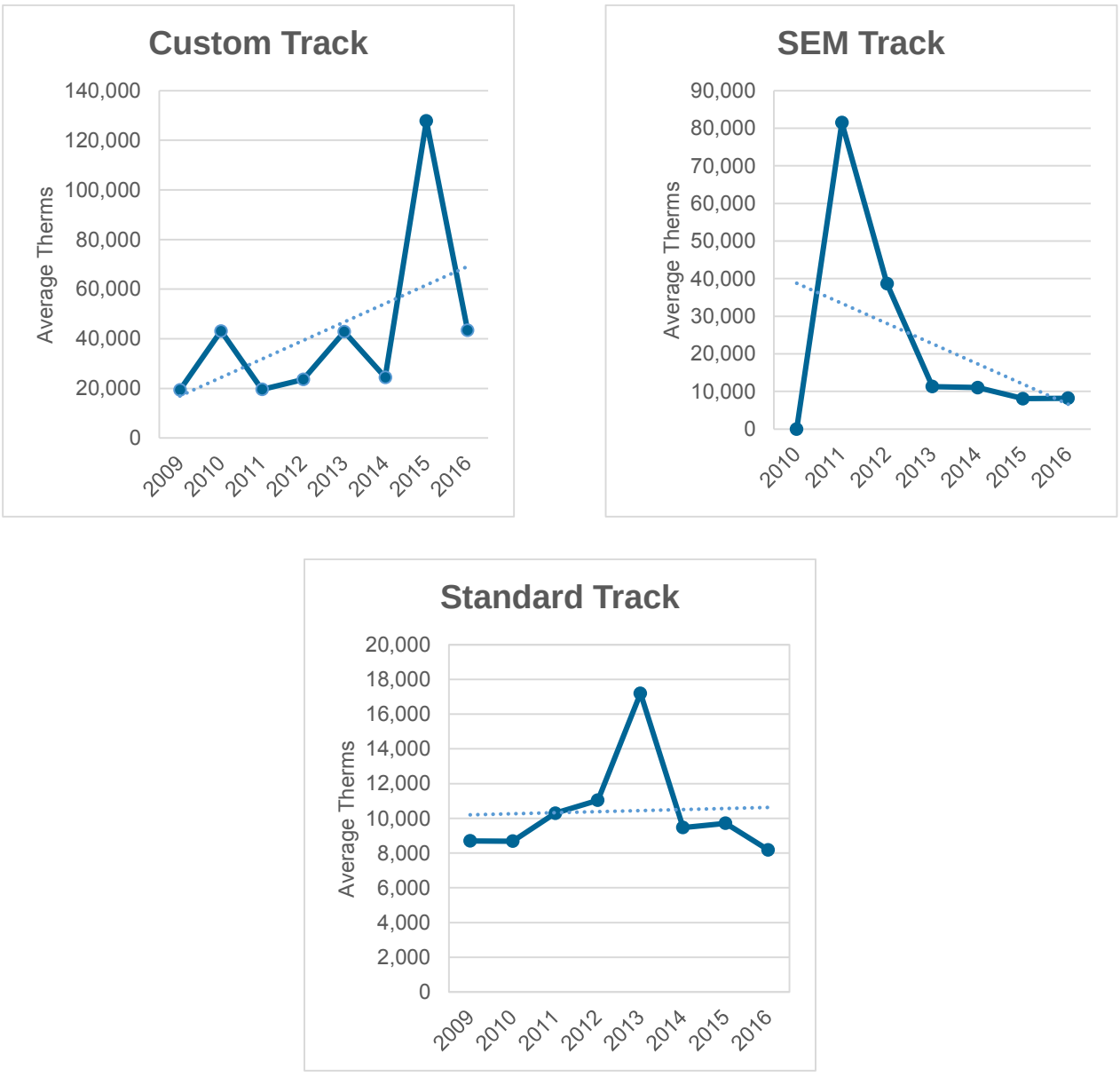


Figure 10 shows total Production Efficiency project volumes since 2009. Between 2014 and 2015, the program had the largest project volume increase of 27 percent.

Figure 11 shows the overall trend of more projects in all key areas of the program. Lighting and standard upgrades have seen the most significant growth. The number of standard projects has increased steadily every year, with the exception of a small dip in 2011. The number of lighting projects more than doubled between 2009 and 2011, remained relatively level between 2011 and 2014, then increased by 67 percent in 2015.

An impact of higher project volume is the correlating increase in the number of technical studies required to reach program savings goals. This shows up as increases in delivery and incentive costs (Figures 16 and 19).

In 2016, SEM engagements returned to a more typical level after three years of significantly higher enrollment which would show up in 2017. Staff believe that the program has largely saturated the market for new, first-year SEM enrollments. Continuous SEM, introduced in 2016, will establish a path for customers of all sizes to engage in SEM over a longer period.

Figure 10: Count of completed Production Efficiency projects from 2009 - 2016

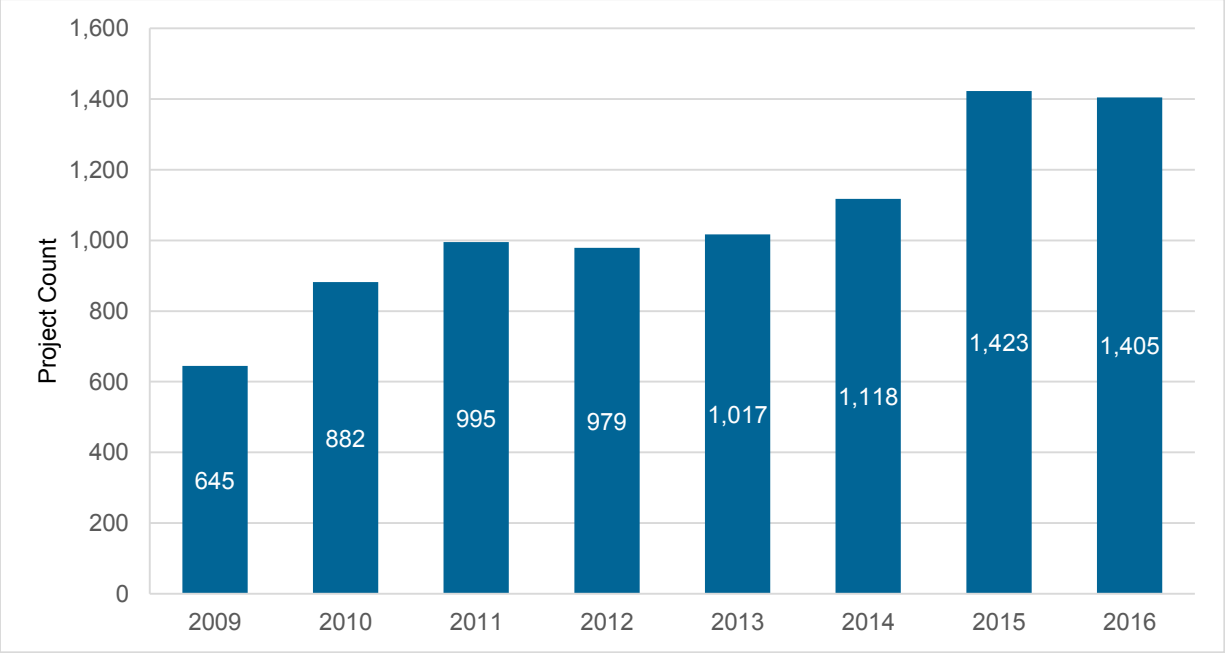
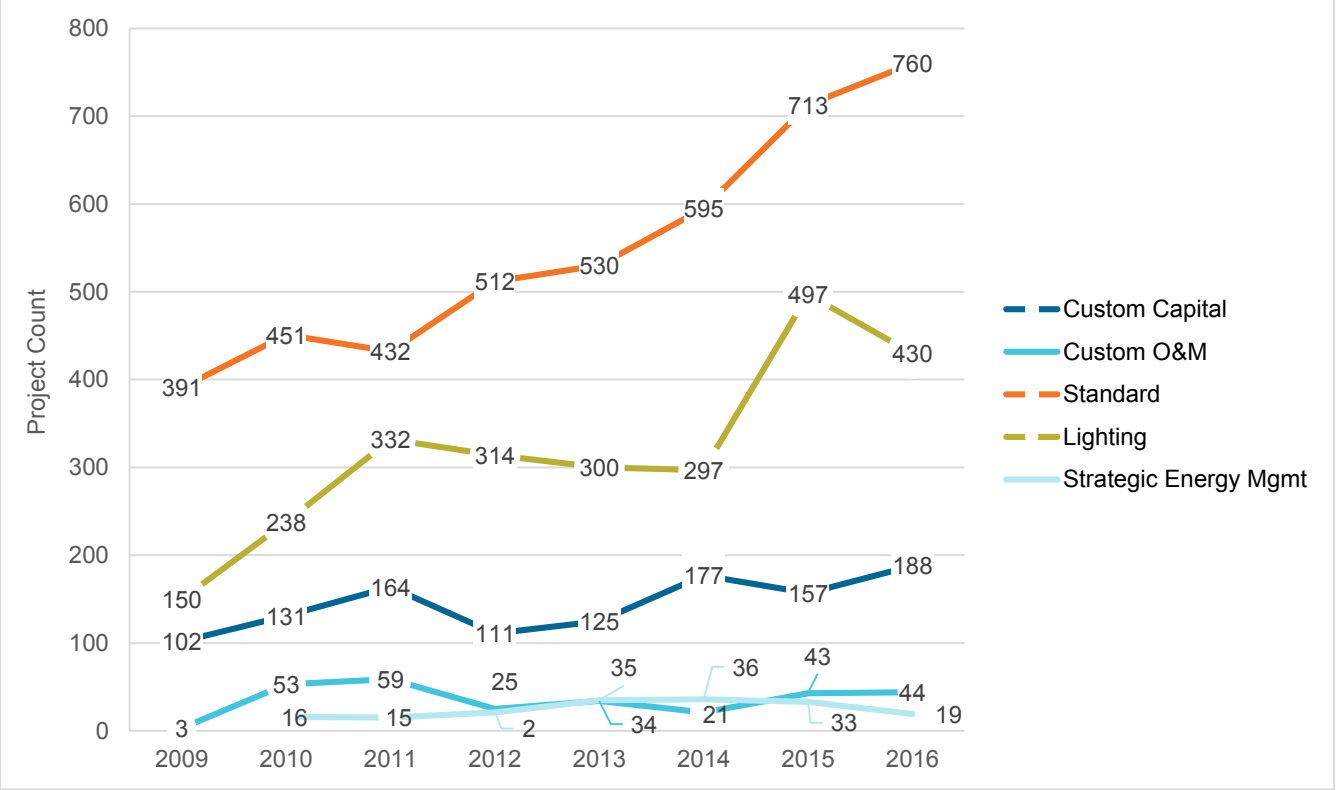


Figure 11: Project counts by sources of savings from 2009 – 2016



III. Systems

As the program began serving more small and medium customers, staff has seen an increase in savings in the standard track and has created new measures such as the cooling tower fan VFD, welders, and refrigeration measures, controls and high speed doors to reach more customers in specific markets. Lighting is integrated into all industrial and agriculture sites; therefore, it is a well-represented system type. As shown in Figure 2, Lighting represented 30 percent of savings in 2016. As the indoor agriculture/cannabis market grows (shown in Figure 6), lighting will continue to be one of the largest system savings in the program portfolio. The following charts (Figures 12 and 13) show the industrial systems that produced the most savings in 2016.

Figure 12: Electric savings from measures associated with top 10 industrial systems in 2016 (working kWh)

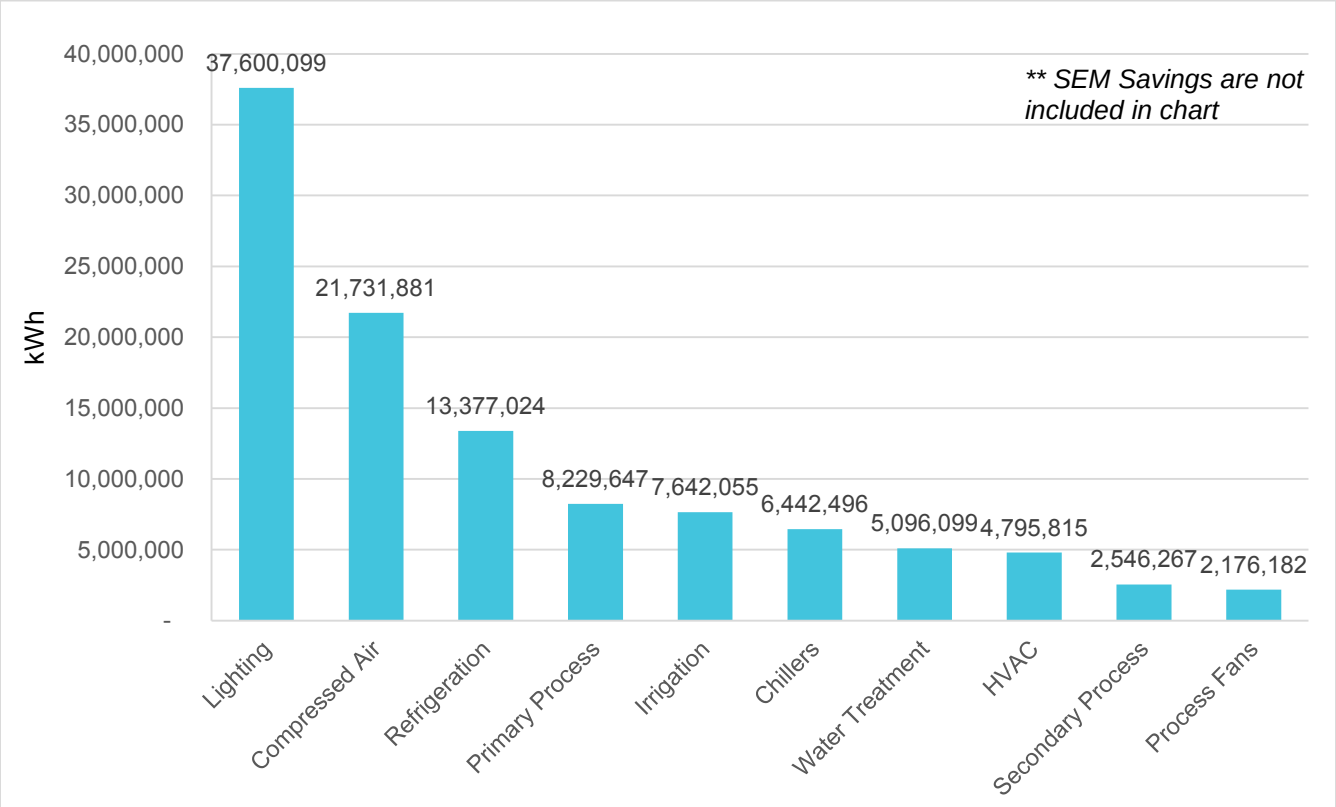
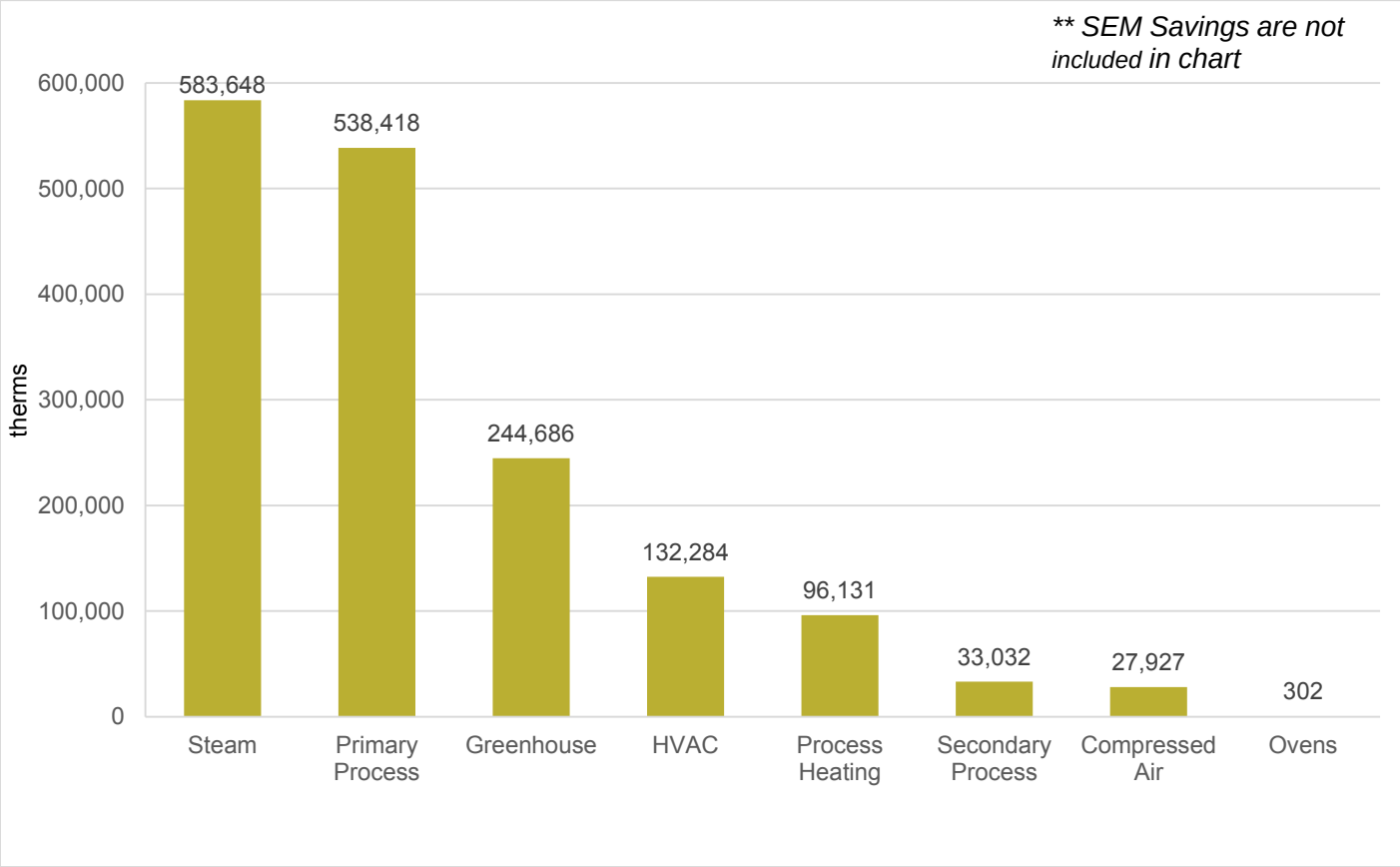


Figure 13: Gas savings from measures associated with top 8 industrial systems in 2016 (working therms)



Steam, primary process and greenhouse contributed to over 75 percent of the program savings. The program continues to work with large custom processes, specifically upgrades on steam boilers, but also have increased outreach and savings in the standard track with insulation for steam pipes systems.

Greenhouse continues to be a strong system in gas savings and the program is continually adding new measures, such as greenhouse condensing unit heaters at the end of 2015, to continually drive deeper savings in the system.

IV. Program Costs

The following charts show historic cash incentives, delivery and service incentives per kilowatt-hour or therm.

Figure 14: Electric cash incentives 2009 - 2016 ($/working kWh)

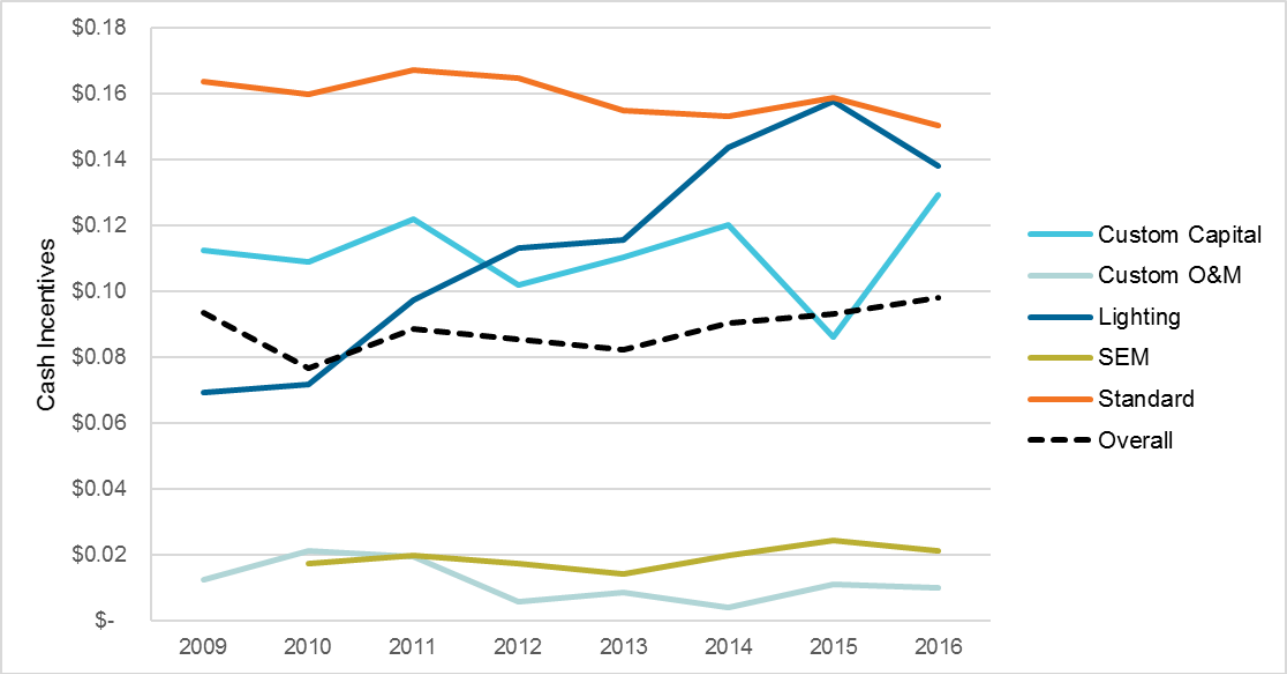


Figure 14 shows the average incentive costs per kilowatt-hour from 2009 to 2016 for all program tracks. The standard industrial and agriculture has stayed relatively stable with a few new measures entering the track.

Lighting had increased somewhat as LEDs have become dominant in the market, but seems to be declining again as product costs begin to drop. This is being offset somewhat by lighting upgrades at cannabis cultivation sites where their high lighting demand is resulting in highly cost-effective projects.

Custom Capital and Custom O&M costs have remained relatively stable over the years. There is a dip in Custom Capital in 2015 due to a number of relatively large, very cost-effective projects completing that year. Custom capital electric incentives are calculated at a dollar per kilowatt-hour rate up to a percent of project cost cap. Large cost effective projects can reduce the overall electric custom capital incentive rate in a given year. Alternatively, if large projects complete at, or close to the incentive cap, the impact can be an increase in the average incentive rate for a given year. This was the case in 2016 when several large custom capital projects completed at close to the $0.25 per kilowatt-hour incentive rate.

SEM costs rose after 2013, corresponding to the introduction of the first-year SEM offering to small/medium sites. Costs peaked in 2015 when Energy Trust launched regional cohorts.

Figure 15: Gas cash incentives from 2009 - 2016 ($/working therms)

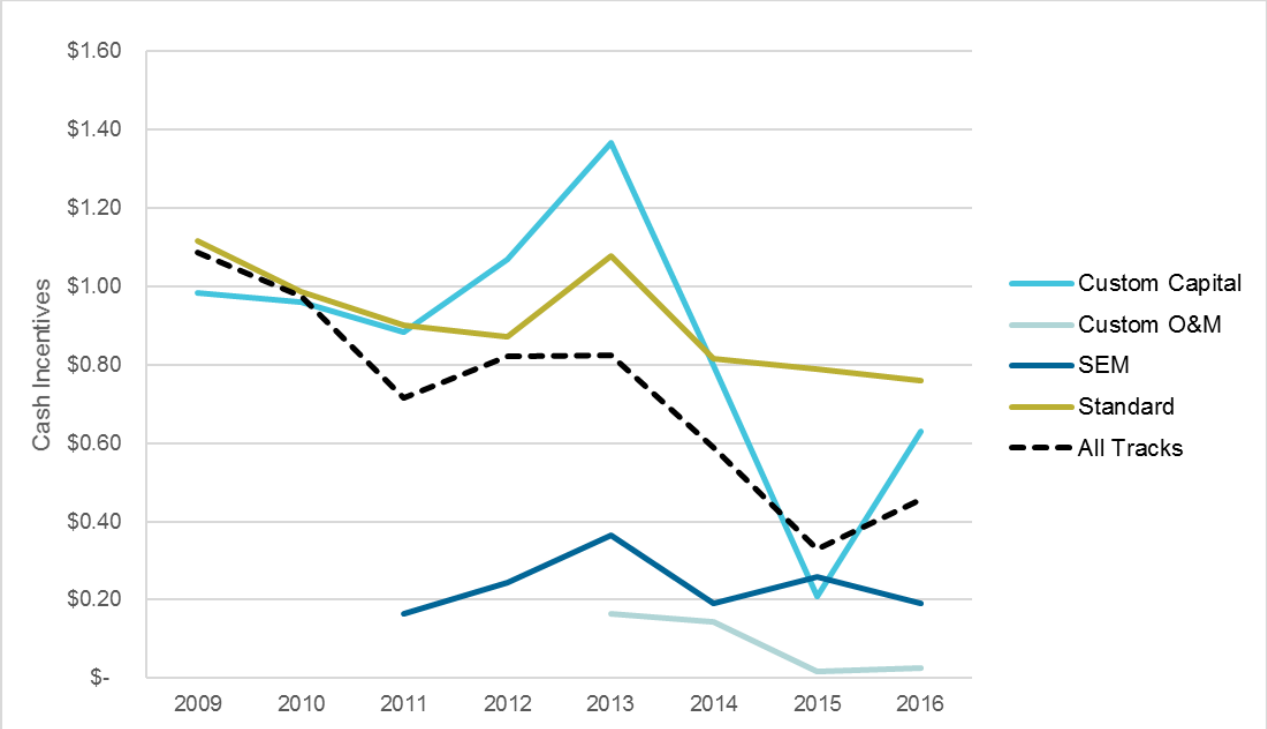
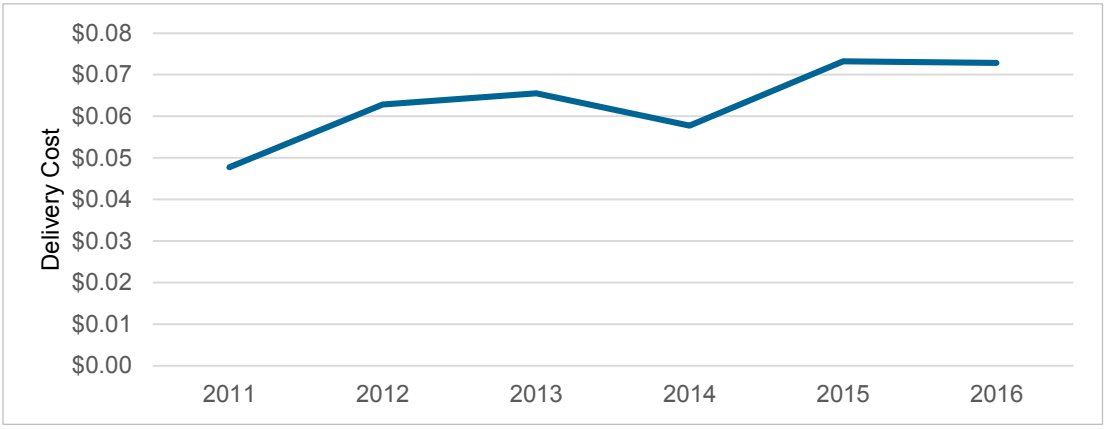


Figure 15 shows that standard track incentives have remained relatively stable due to the majority of the savings coming from standard measures with set prescriptive incentive levels. Custom capital gas incentives are calculated at a dollar per therm rate up to a percent of project cost cap. Large cost-effective projects can reduce the overall custom capital gas incentive rate in a given year, which was the case in 2015, with the completion of one very large gas project which accounted for approximately 60 percent gas savings. Alternatively, if large projects complete at, or close to the incentive cap, the impact can be an increase in the average incentive rate for a given year. This was the case in 2013 when two large custom gas projects completed at greater than $1.00 per therm.

Figure 16: Electric delivery run-rates per electricity savings ($/working kWh)



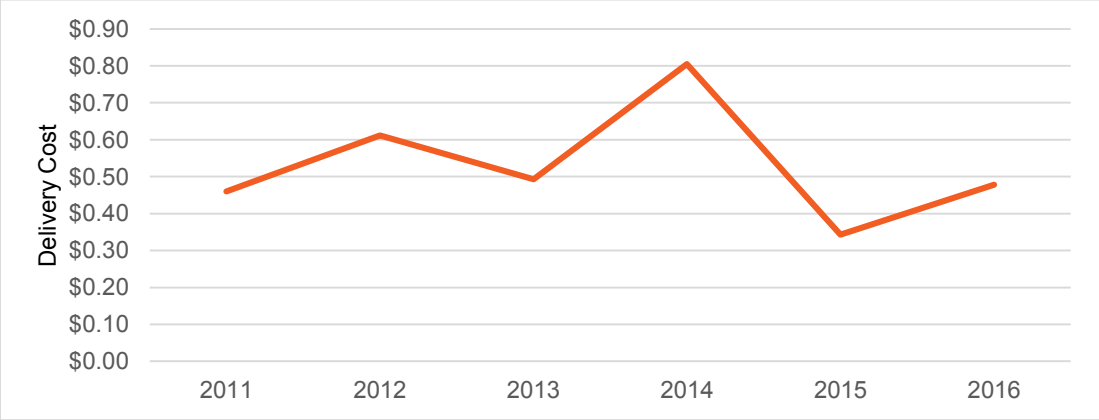
Figures 16 and 17 show average delivery run-rates, costs per kilowatt-hour and therm.

Since the program began working with small to medium customers in 2015, staff have seen an increase in program delivery costs. The program also had a strategic goal of serving businesses that we had not reached before, many of which were in areas outside the Portland metro area. The program was successful in expanding participation in central and eastern Oregon in 2015 and 2016, but this resulted in an increase in delivery costs.

Several factors contribute to higher delivery costs to serve small to medium sites in the non-metro area:

- Travel costs for contractors to reach new customers
- Lower savings per site
- Rising costs for contracted services, overall
- Lower project conversion rates from outreach to participation among small and medium customers

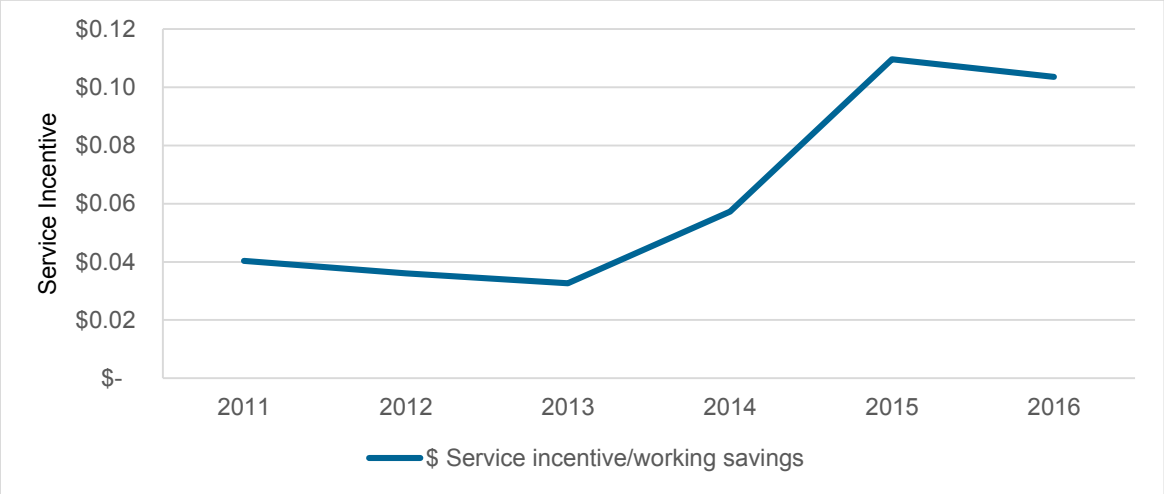
Figure 17: Gas delivery run-rates per gas savings ($/working therm)



As shown throughout the gas trends – gas savings are variable, and the delivery rate is less connected to program design than the electric delivery analysis.

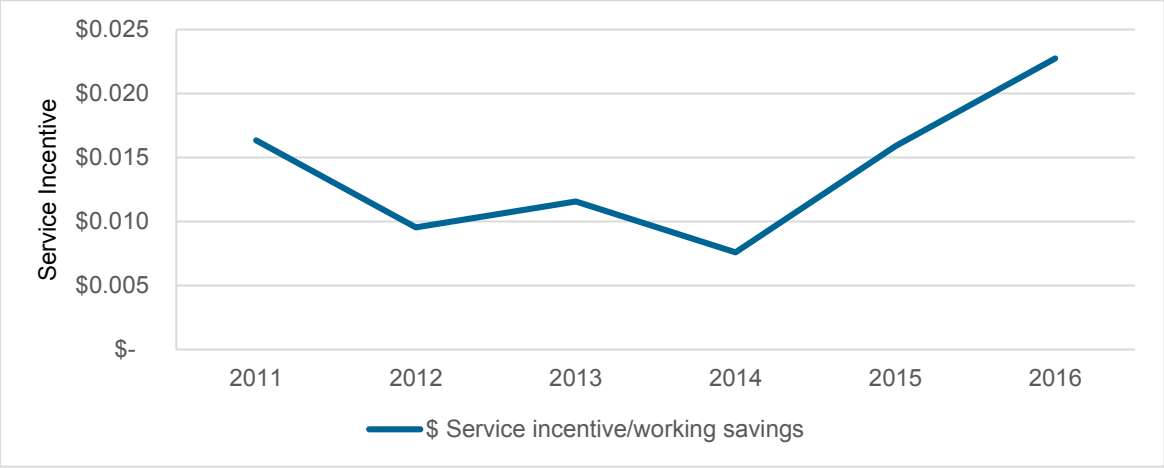
Figures 18 through 20 show the cost of service incentives. Service incentives for the custom and SEM tracks are incentives paid directly to either the Allied Technical Assistance Contractors (ATAC) for completing a technical analysis study (TAS) for a custom study, or to SEM Coaches delivering SEM services to customers.

Figure 18: SEM coach service incentive run rates per electricity savings ($/working kWh)



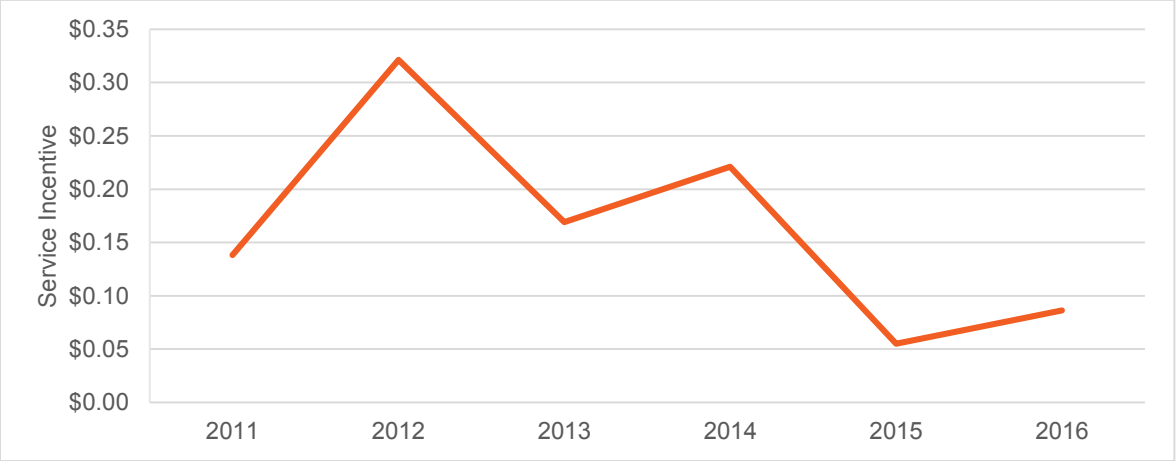
For electric savings shown in Figures 18 and 19, there is an increase in service incentives in 2015 and 2016. The cost to deliver electric savings through SEM has increased as the program targeted small to medium size customers with cohorts in multiple regions across Oregon.

Figure 19: Custom studies service incentive run-rates per electricity savings ($/working kWh)



For custom, the volume of projects has grown to deliver the same amount of savings since the average project size has reduced. Additionally, as more and more studies are completed for small to medium size customers with smaller projects, staff are seeing more instances where the conversion rate for studies to committed projects is lower, and there has been a higher probability that the project studied will not be cost-effective since the baseload of savings is smaller than for larger customers.

Figure 20: All program service incentive run-rates per therm savings ($/working therm)



The program continues to see large cost-effective projects in the gas custom studies, and has focused on increasing project volume to reduce the lumpiness of the program.

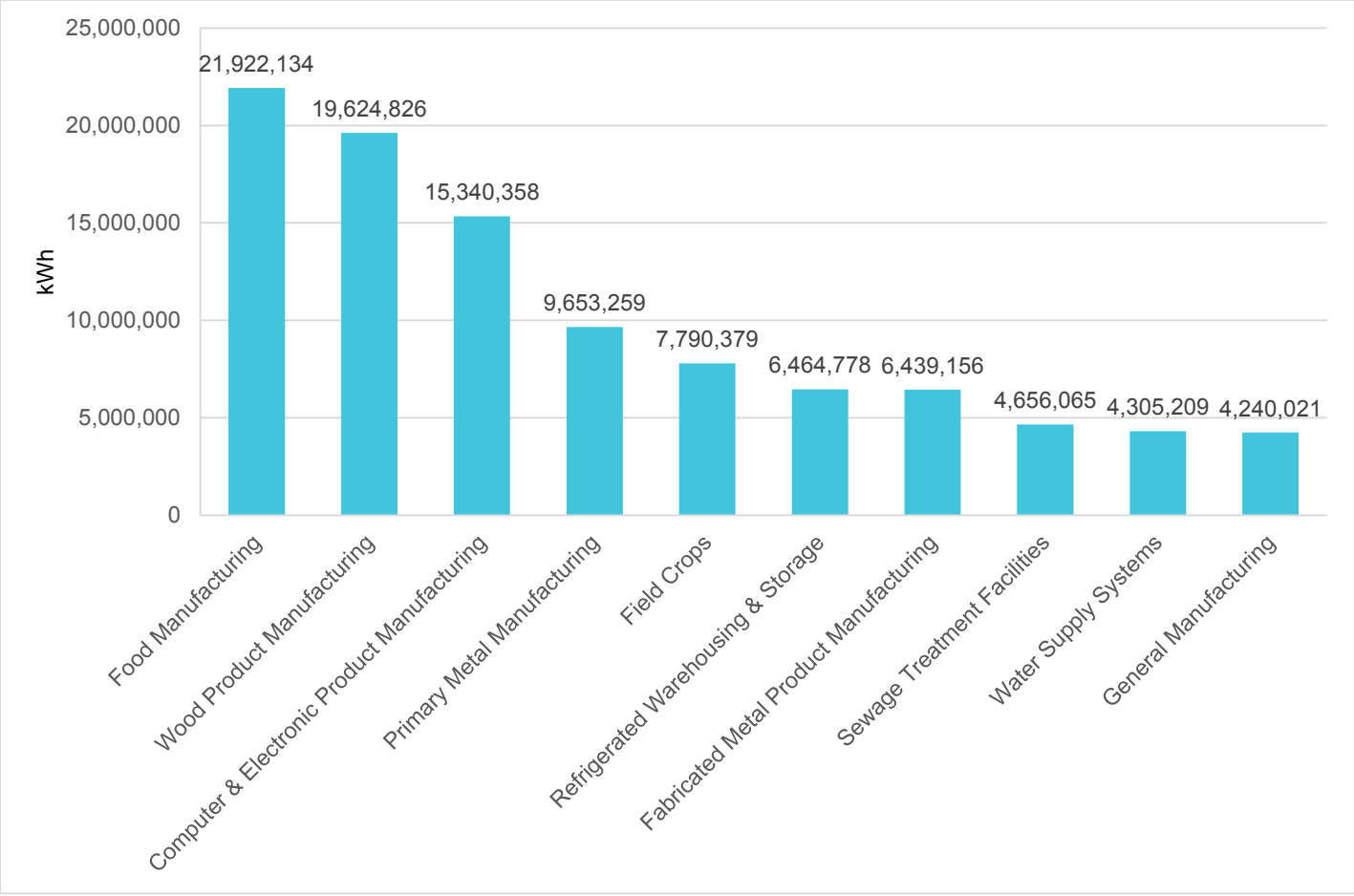
V. Market Segments

Oregon's manufacturing base is increasingly diverse, and the program has been successful in broadening customer participation in legacy industries such as wood products and food processing and developing markets such as high technology and cannabis across the state.

Market segments are not always a reliable indicator for program participation. Other factors such as corporate culture, competitive climate and executive priorities often have more influence on whether or to what extent a company values investment in energy efficiency as a strategic tool for its business. However, examining the amount of savings provided through top market segments provides insights into the market, and can help staff identify customer groups that may be receptive for greater outreach effort from Energy Trust.

The following charts show the sectors that had the most savings in 2016.

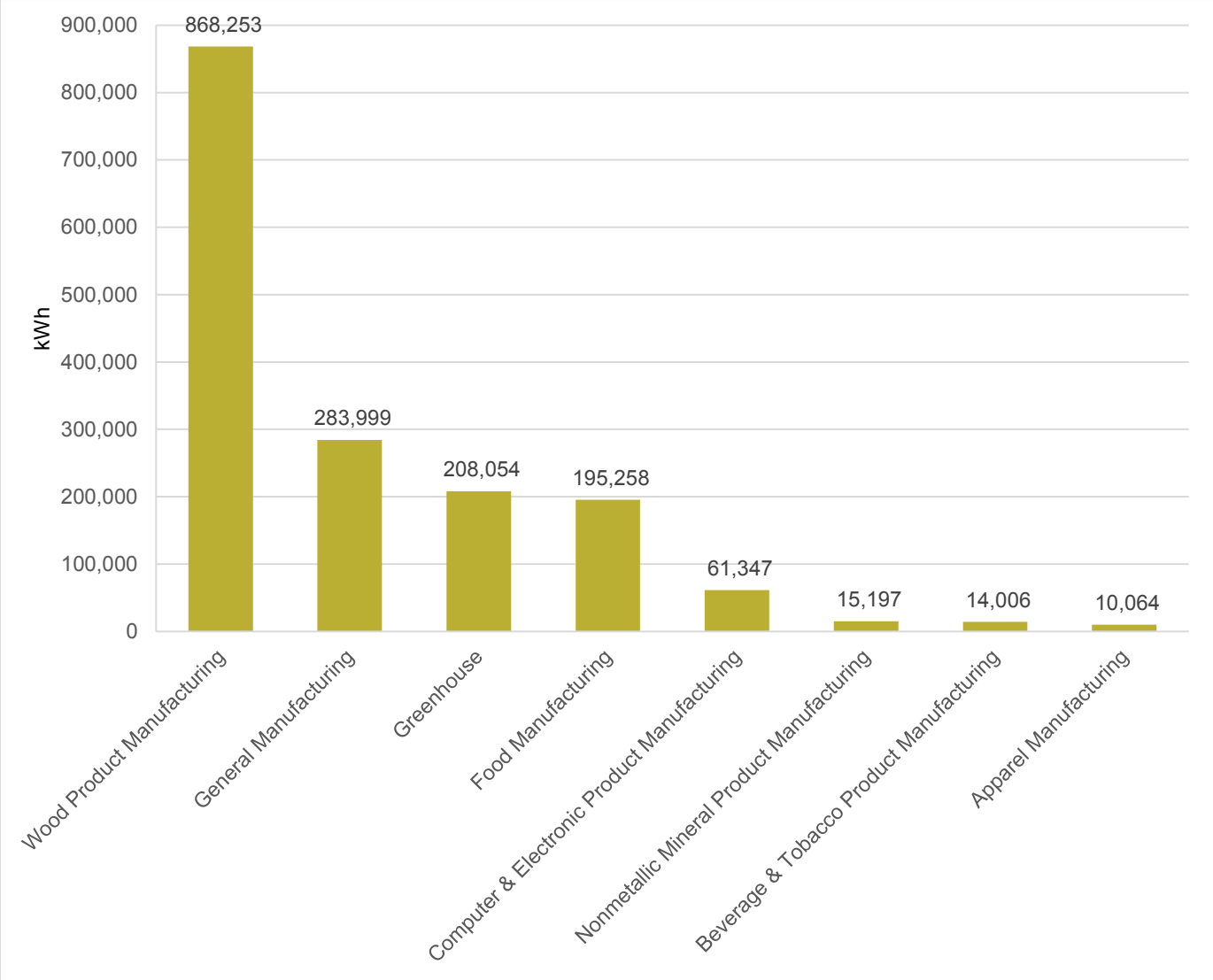
Figure 21: Electric savings from top 10 industry types that participated in 2016 (working kWh)



In 2016, the top three producer-types represented approximately 45 percent of all savings. Food processing and wood products continue to be strong Oregon industries. Many of Oregon's leading companies in these two segments have realized the value of investments in energy efficiency, deeply.

The high tech industry has long been recognized as the industry with the greatest electric savings potential, yet the program had difficulty realizing this segment's potential in the early years of the program. More recently, staff have found effective ways to engage these customers and participation from high-tech sites and the segment continues to be one of the largest contributors in 2016.

Figure 22: Gas savings from top 8 industry types that participated in 2016 (working therms)



In 2016, the top three producer-types represented almost 80 percent of all gas savings, and Wood Products was 50 percent of all savings. Among standard incentives, greenhouse projects continue to be a strong market for the program.

As the program has matured from 2009 to 2016, our largest markets continue to participate and provide large portions of savings to the program. As we engage more and more with these markets, we see the contributions shift and diversification of the market segments.

Figures 23 and 24 provide a visual perspective on the top markets for Production Efficiency and how they have change from 2009 to 2016. Paper manufacturing, which as a large market segment in 2016, is no longer toward the top, and high tech markets have continued to be in the largest electric markets for the program. Municipal water and wastewater have also become top markets. These charts demonstrate the changing landscape of Oregon manufacturing, as well as the staff's progress in diversifying the program portfolio.

Figure 23: 2016 Top Electric Markets

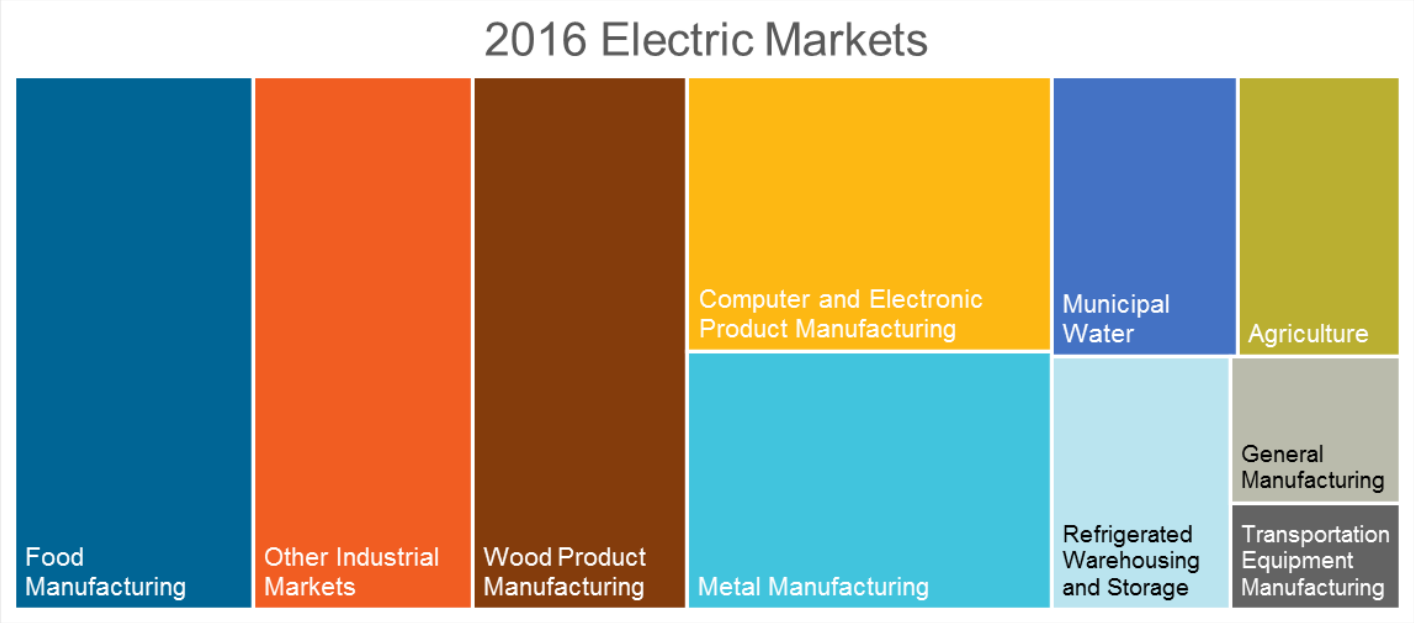
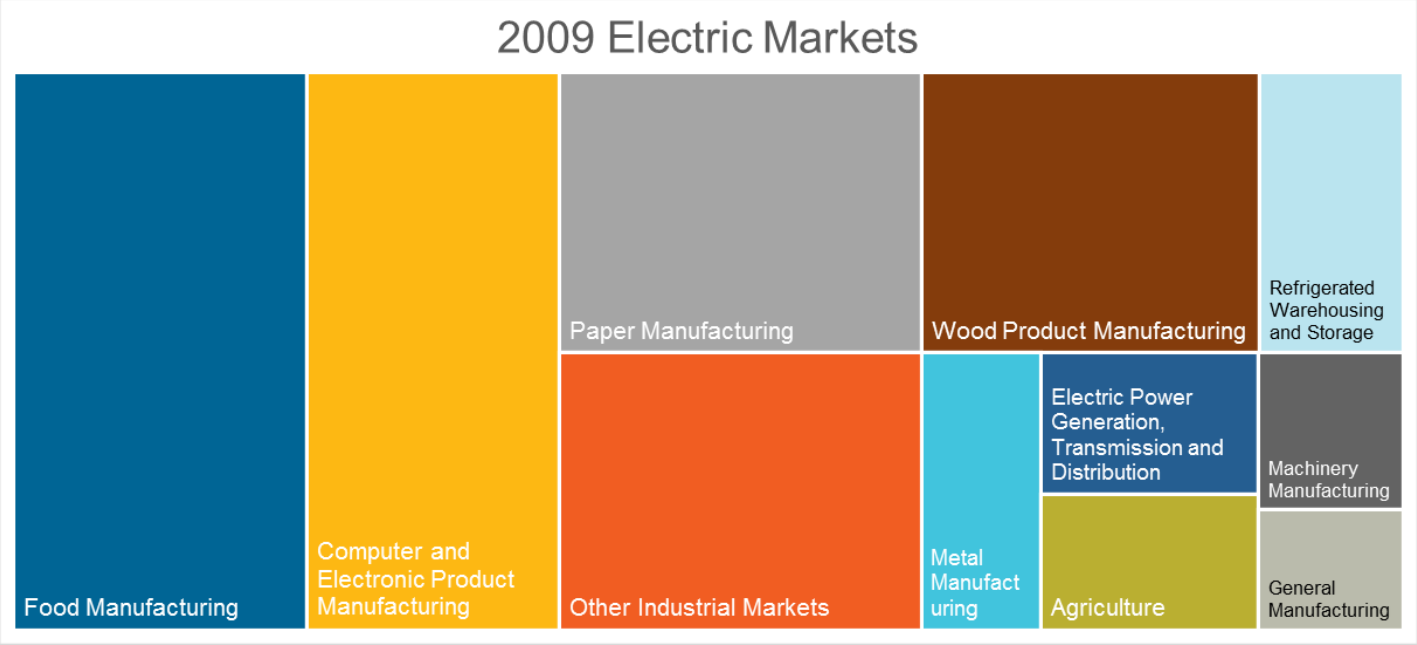


Figure 24: 2009 Top Electric Markets



Figures 25 and 26 show the same visual representation of top markets for gas where we see less diversification of market segments. Between 2009 and 2016, wood products and greenhouse are the largest markets for gas savings.

Figure 25: 2016 Top Gas Markets

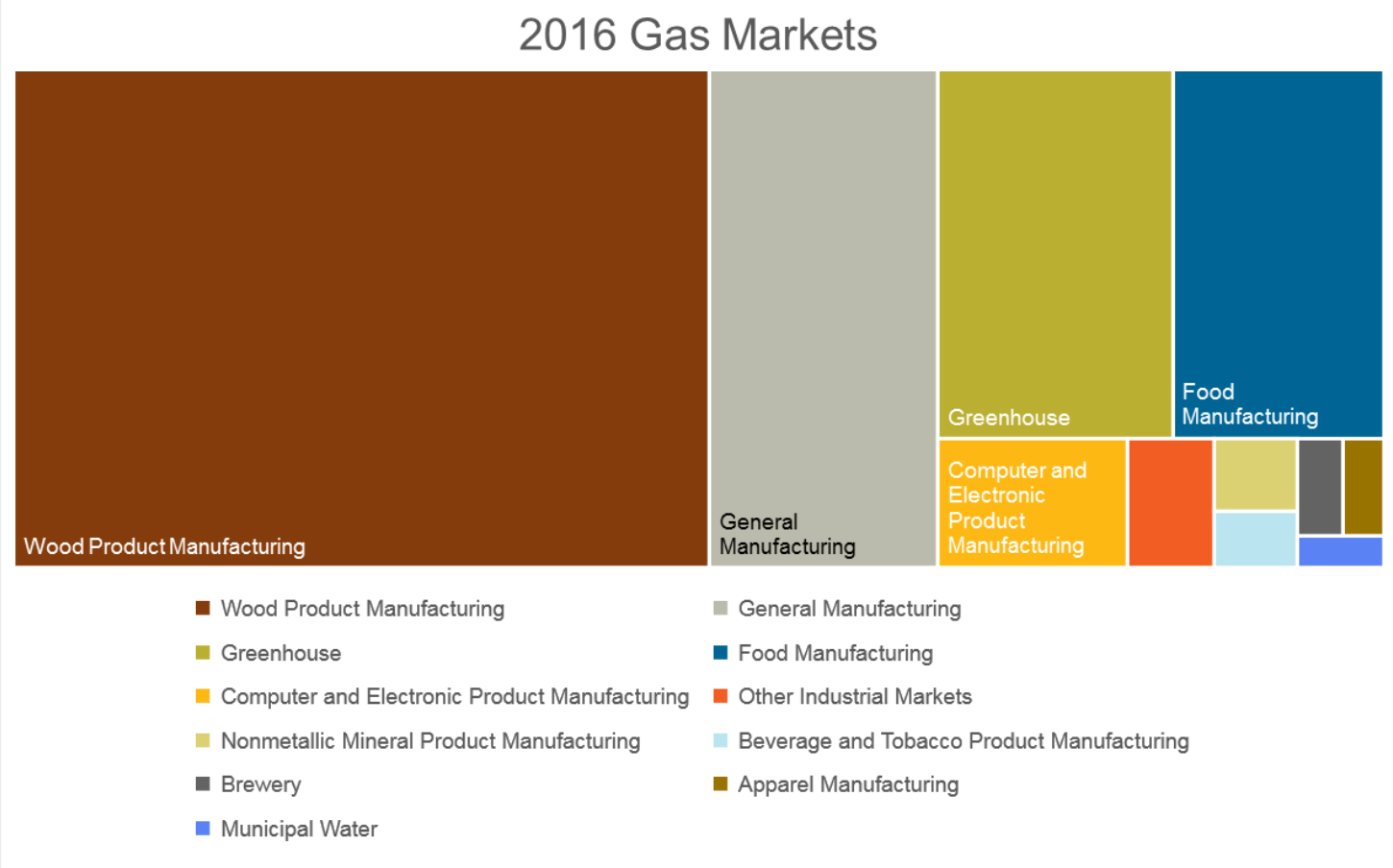
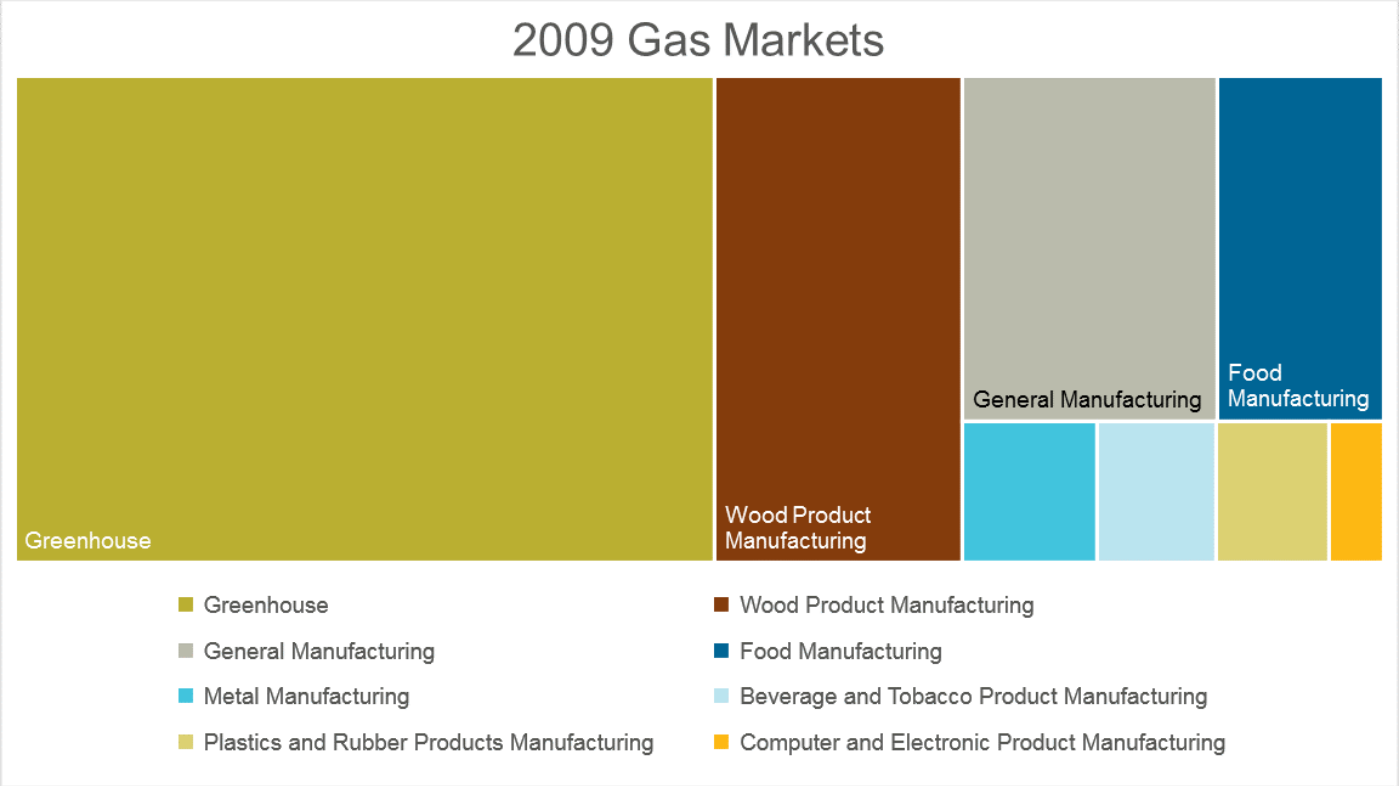
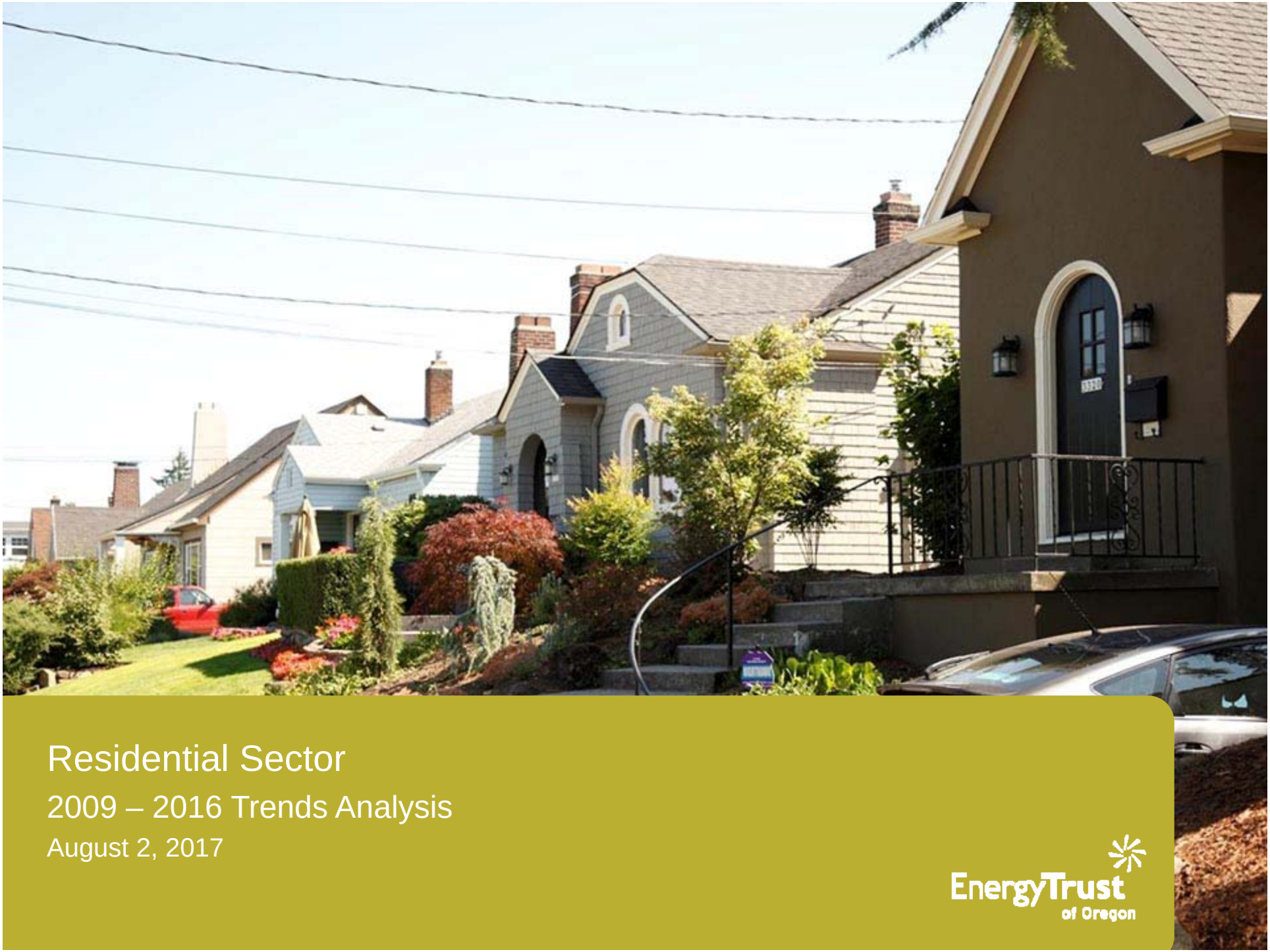


Figure 26: 2009 Top Gas Markets





Residential Sector

2009 – 2016 Trends Analysis

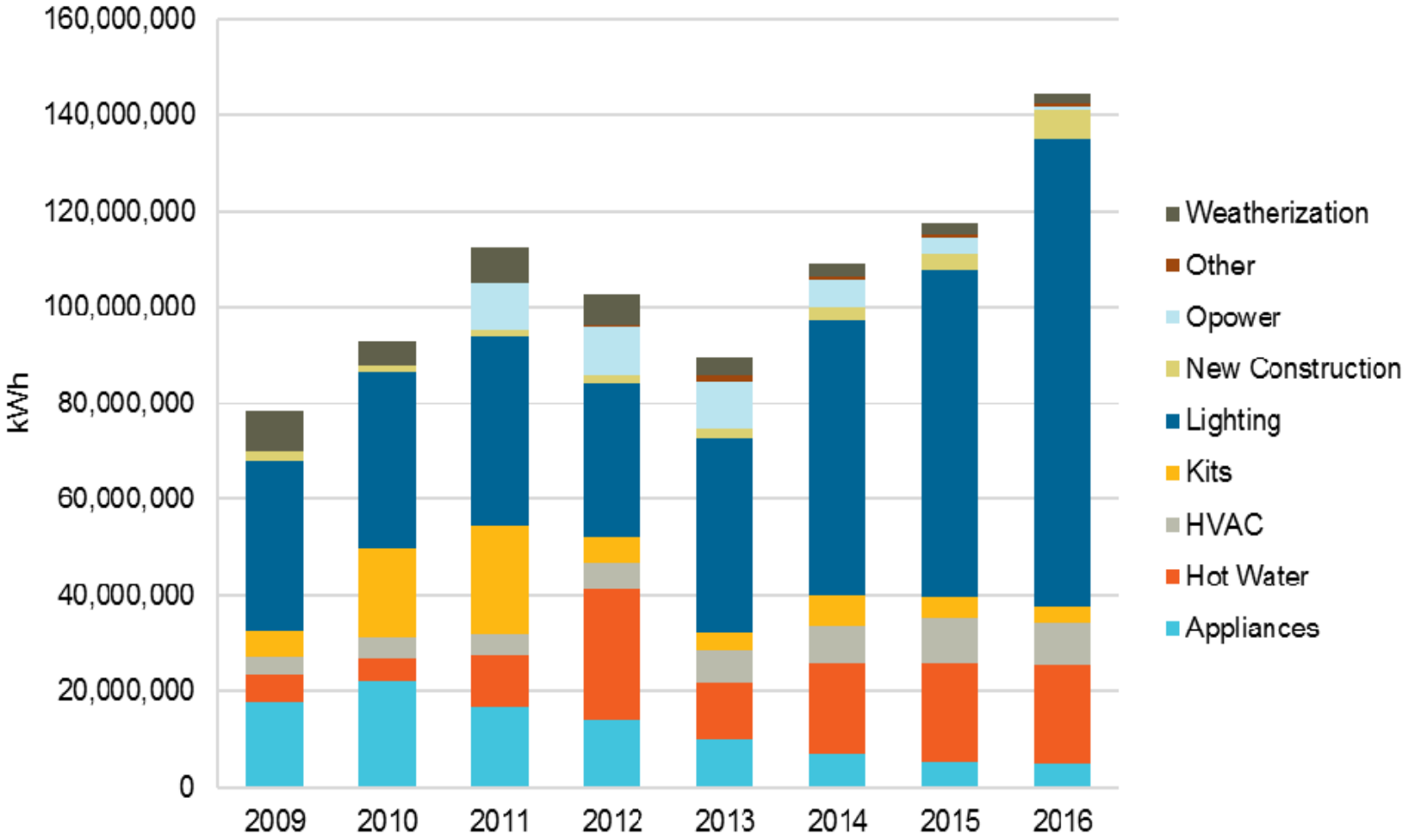
August 2, 2017

Energy Trust of Oregon

Residential Sector Trends 2009-2016

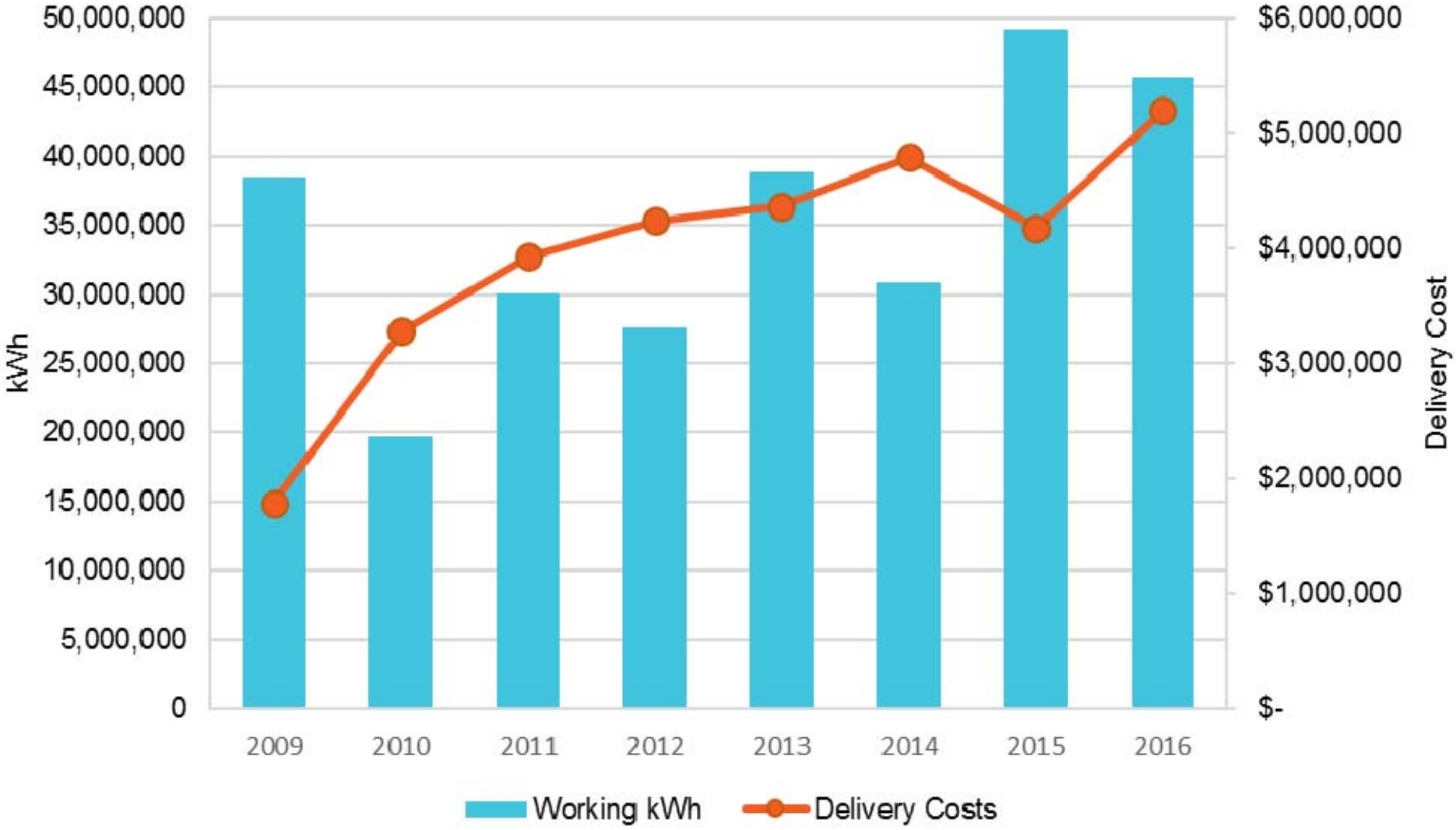
- Board approved restructuring sector, moving from 3 programs to one program for the sector
- Focus on technologies instead of current program structure to align with new structure
- Provide insight into trends for technologies, market fundamentals and future savings contributions

Total Electric Savings (Working kWh)

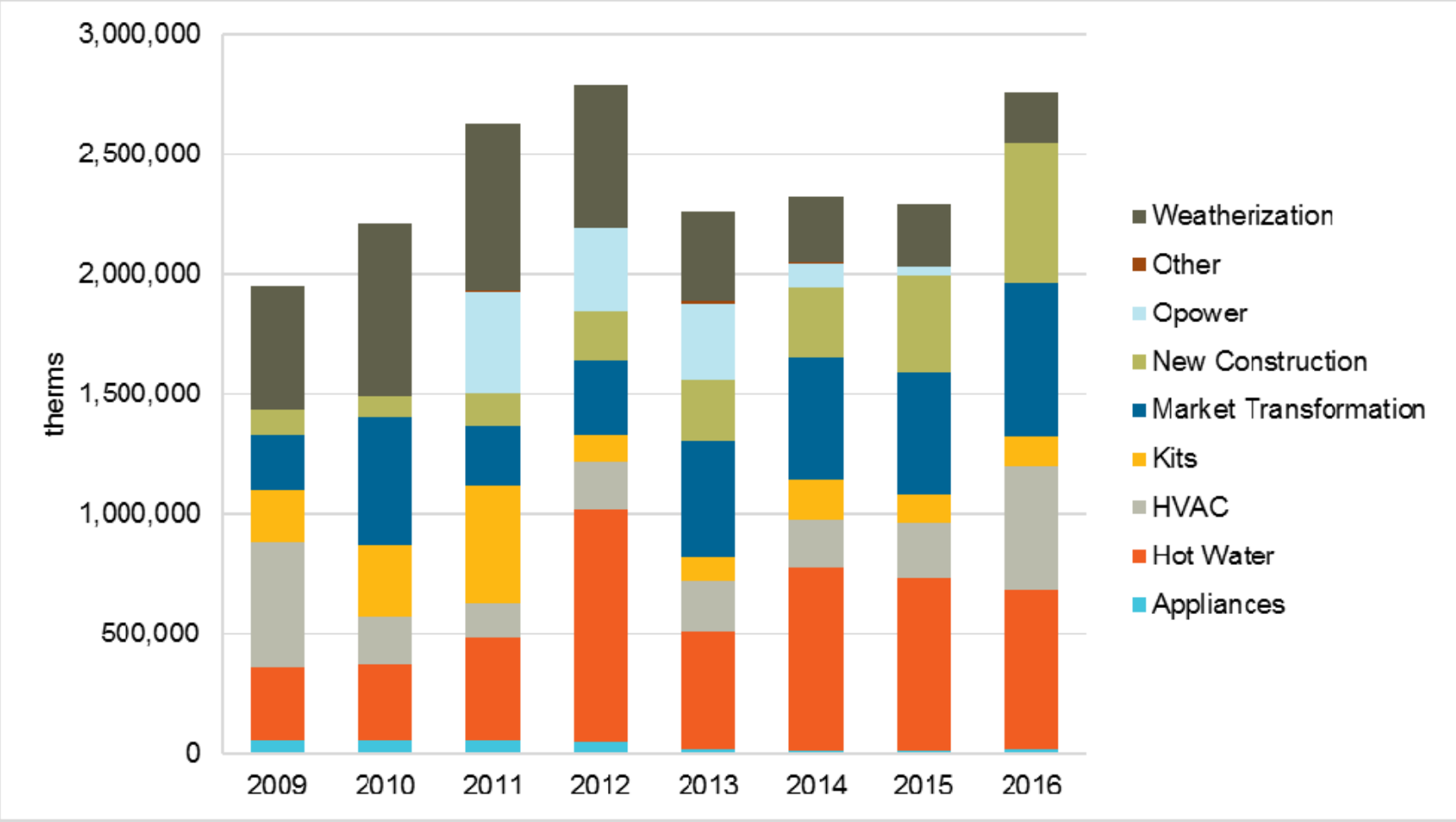


- Not including NEEA
- Kits 2009-2011: represents savings from Energy Saver, LivingWise and Carry Home Savings Kits
- Kits 2012-2016: represents LivingWise and Carry Home Savings Kit savings, Energy Saver Kit savings are reported in the measure technologies, lighting and hot water

NEAA Savings and Expenditures



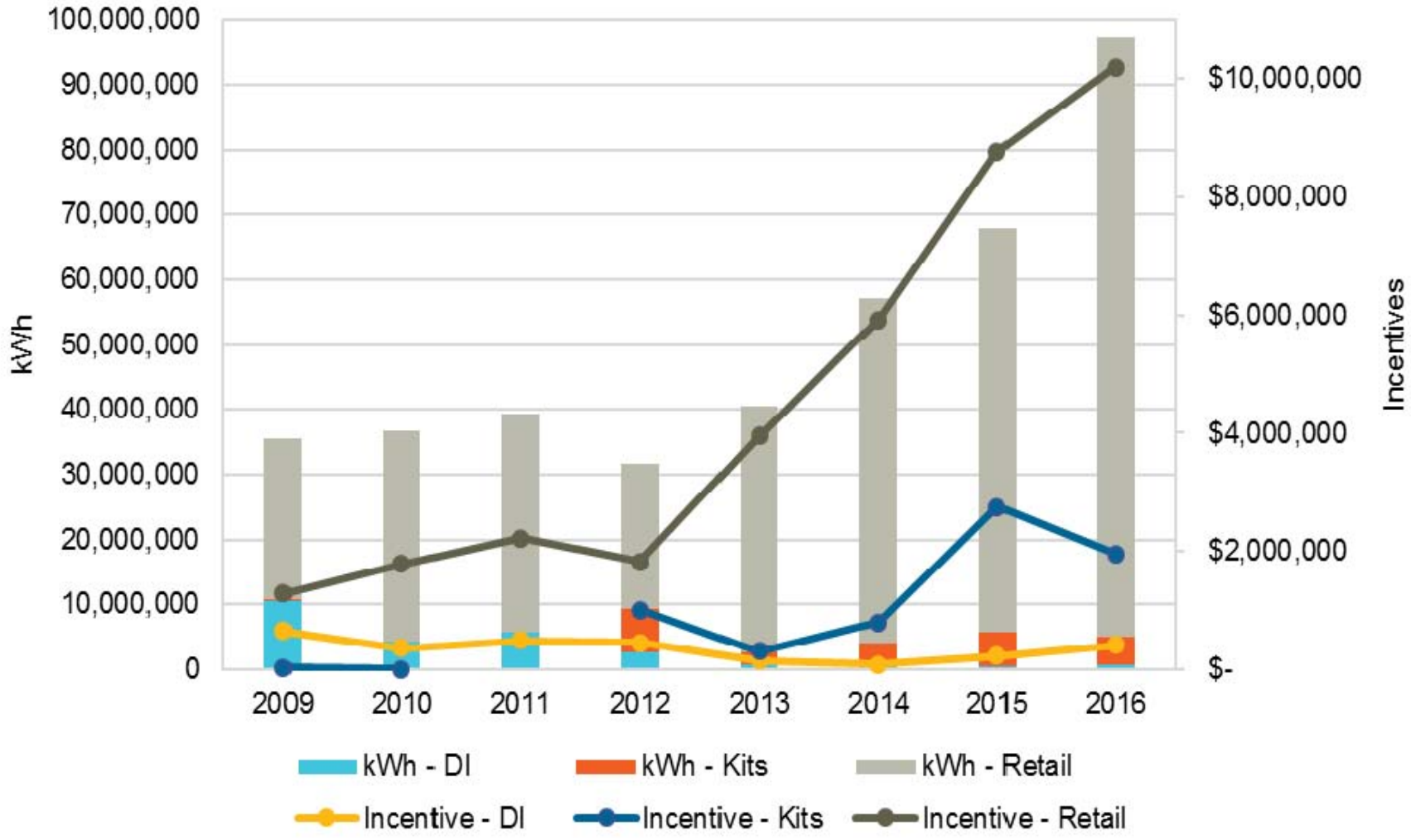
Total Natural Gas Savings (Working Therms)



- Including Washington gas savings for NW Natural
- Market transformation includes 2008 and 2011 Oregon building code changes and Oregon furnaces
- Kits 2009-2011: Energy Saver, LivingWise and Carry Home Savings Kits
- Kits 2012-2016: LivingWise and Carry Home Savings Kits. Energy Saver Kits reported in the measure technology

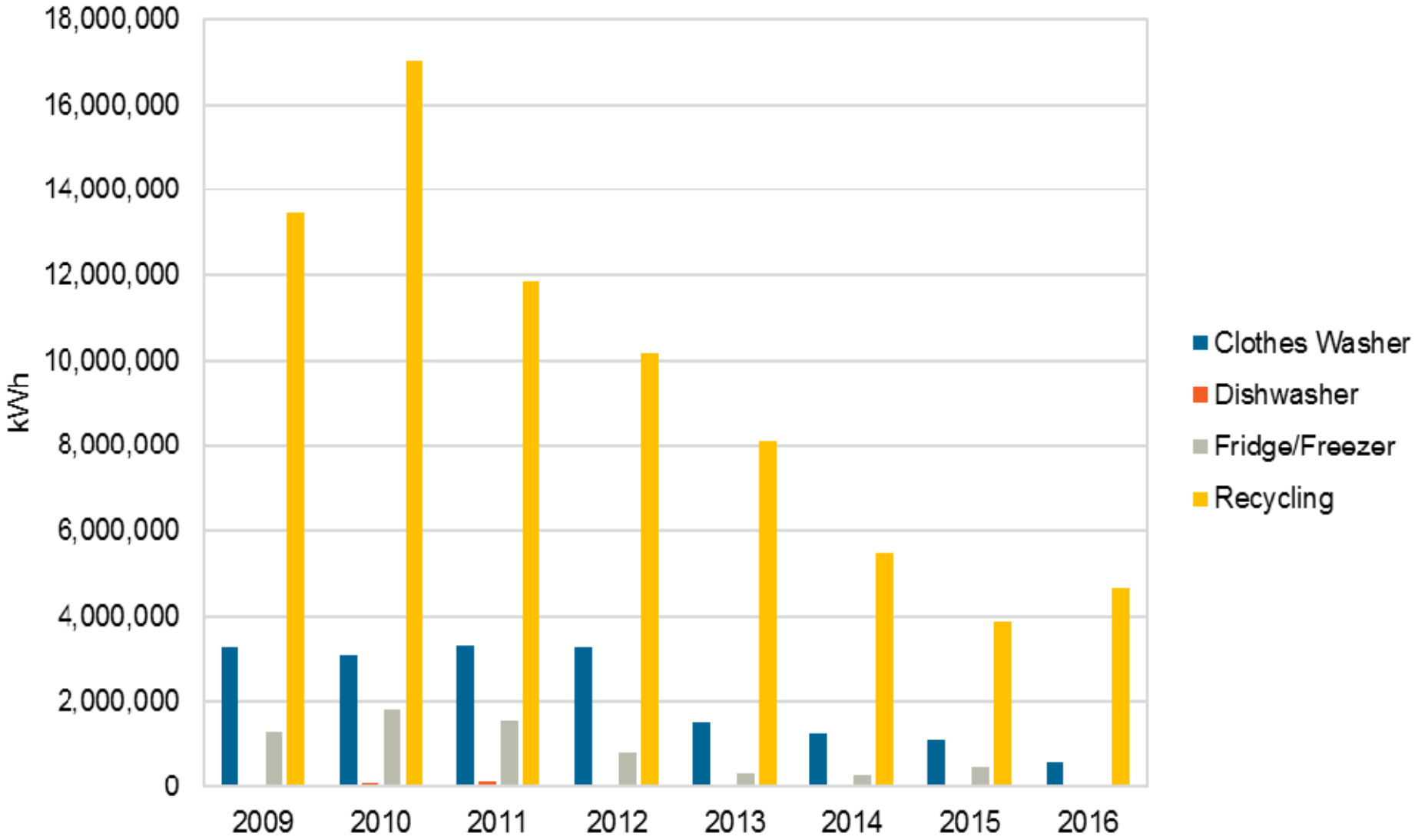
Measure Categories

Lighting Savings by Incentives and Channel

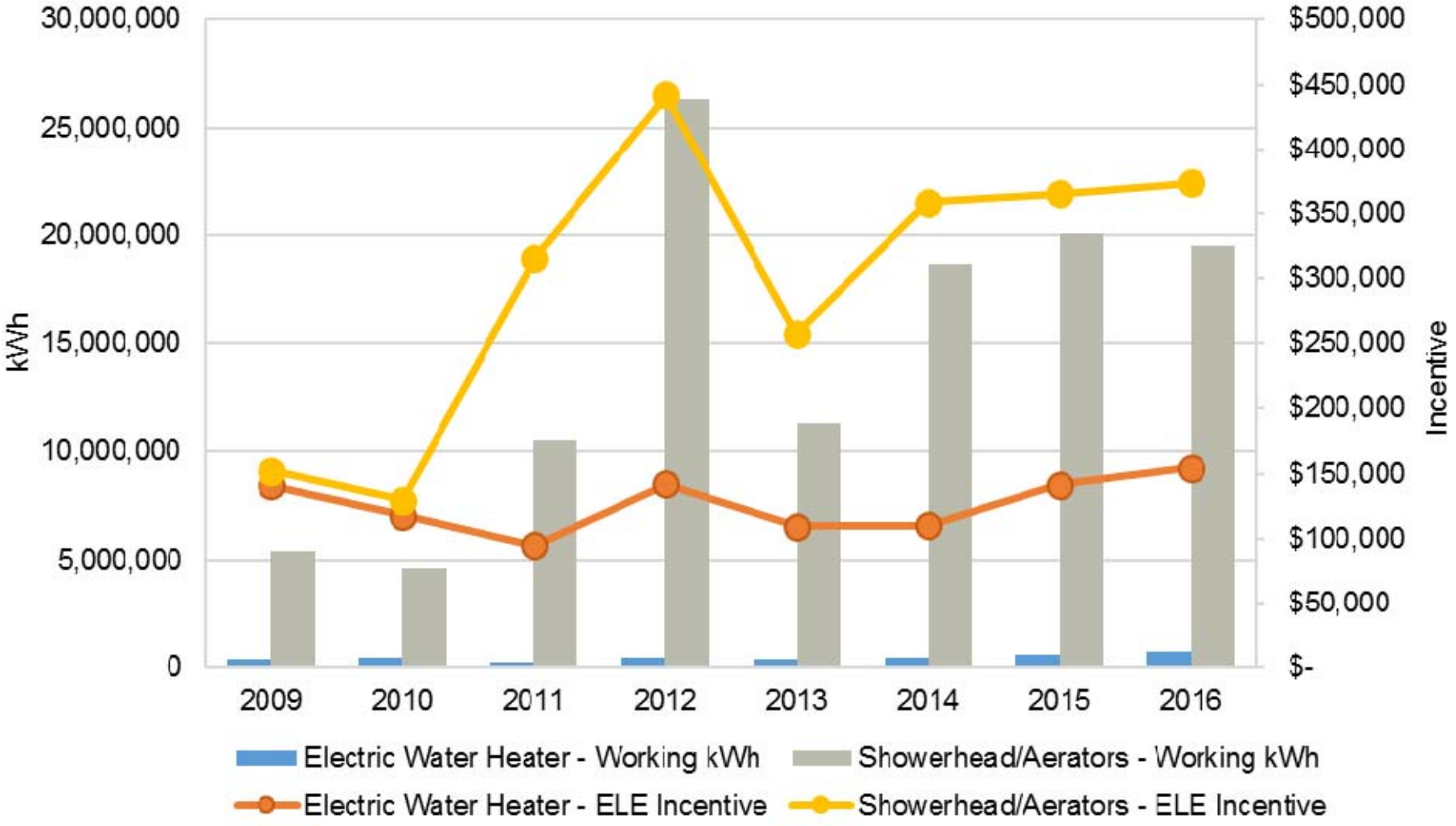


*DI means direct installation of lighting

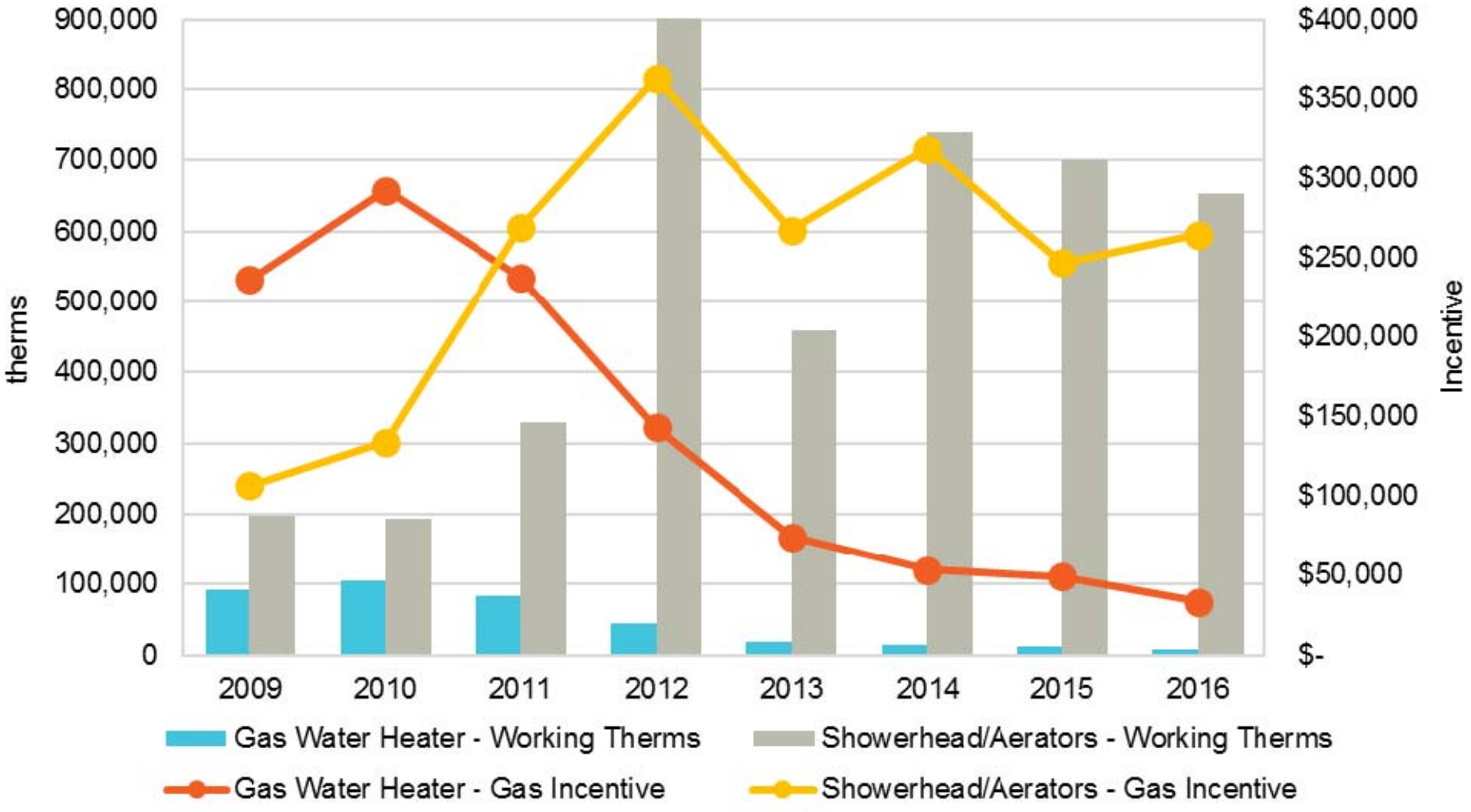
Appliance Electric Savings (Working kWh)



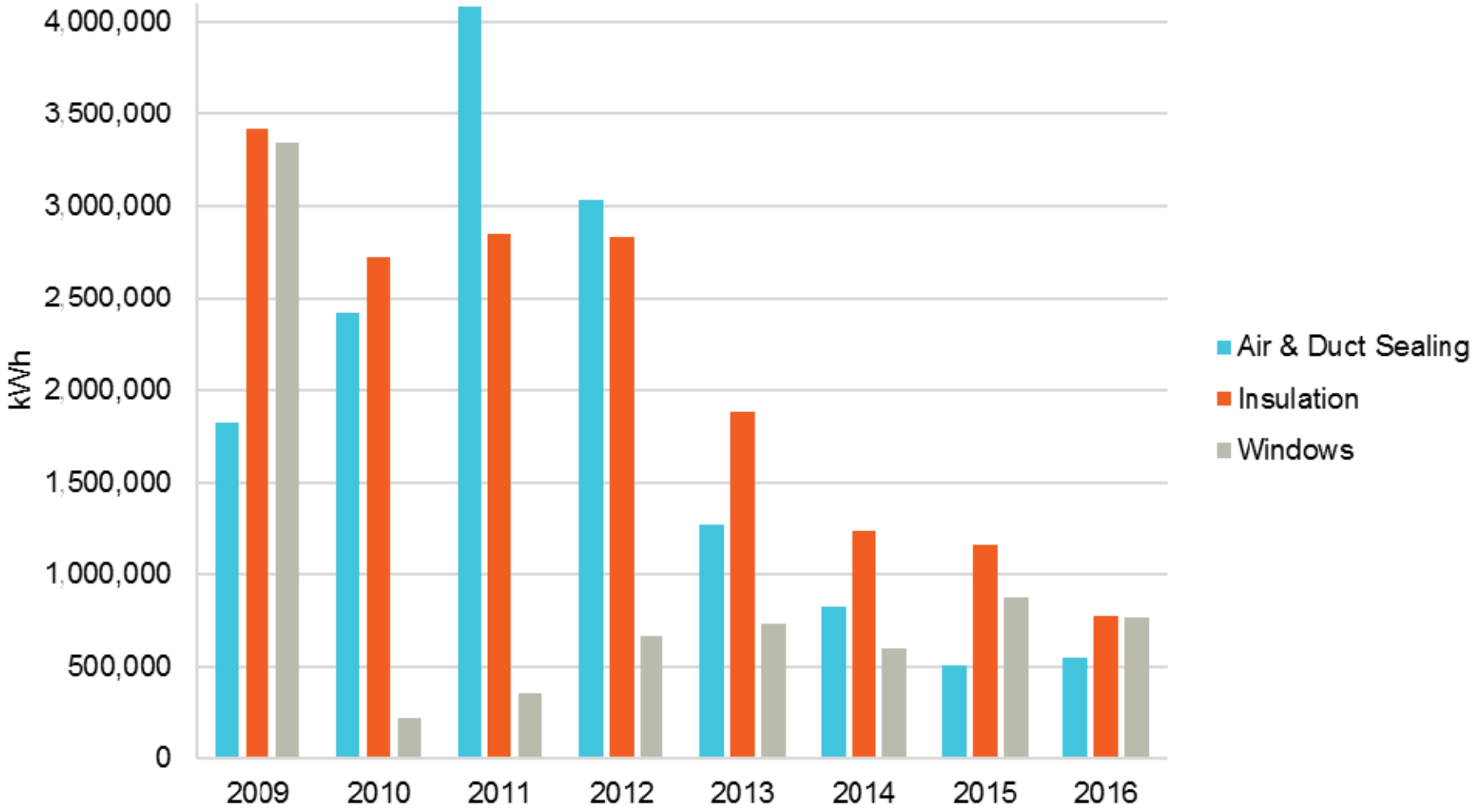
Hot Water Electric Savings (Working kWh)



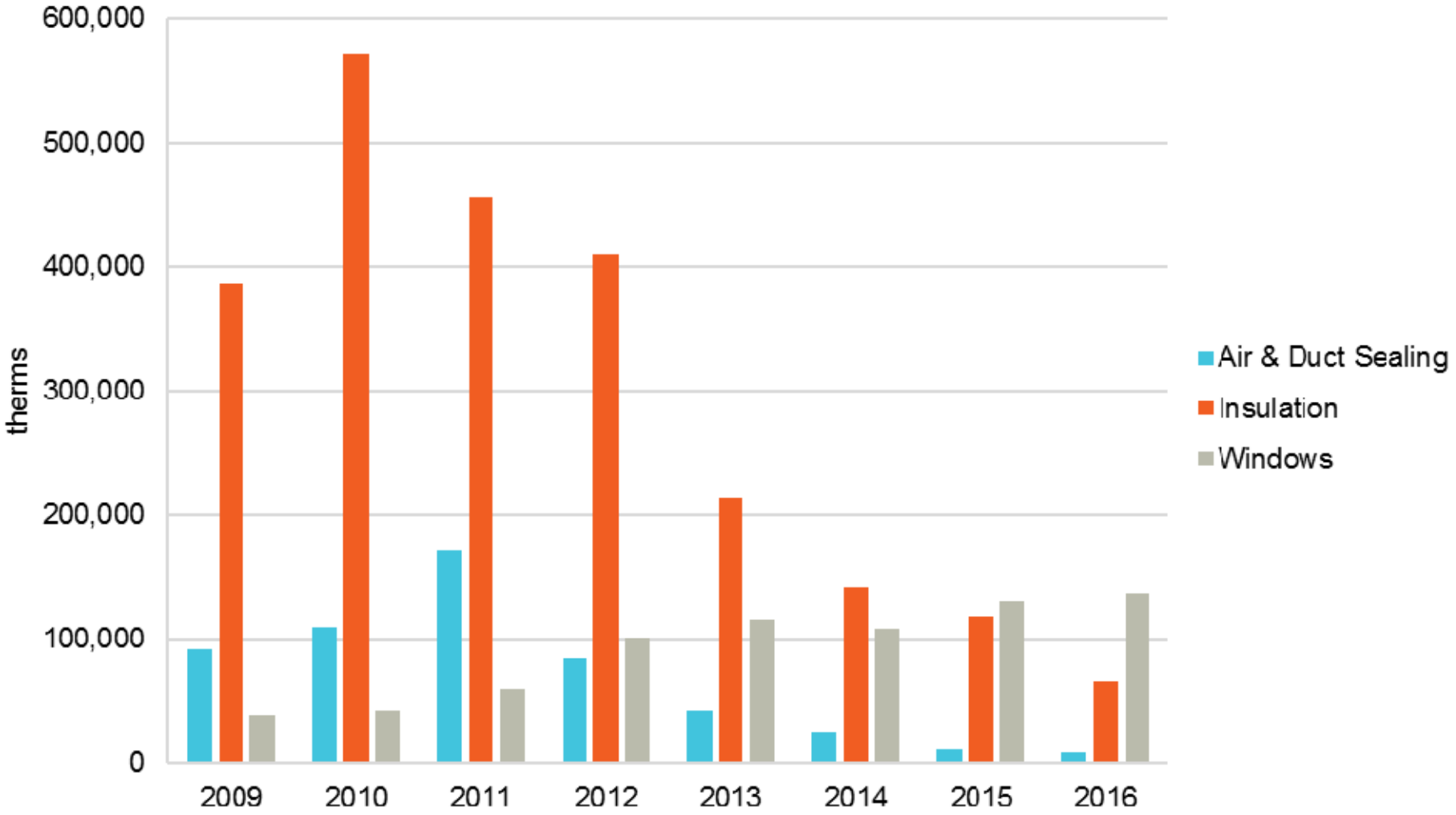
Hot Water Gas Savings (Working Therms)



Weatherization Electric Savings (Working kWh)

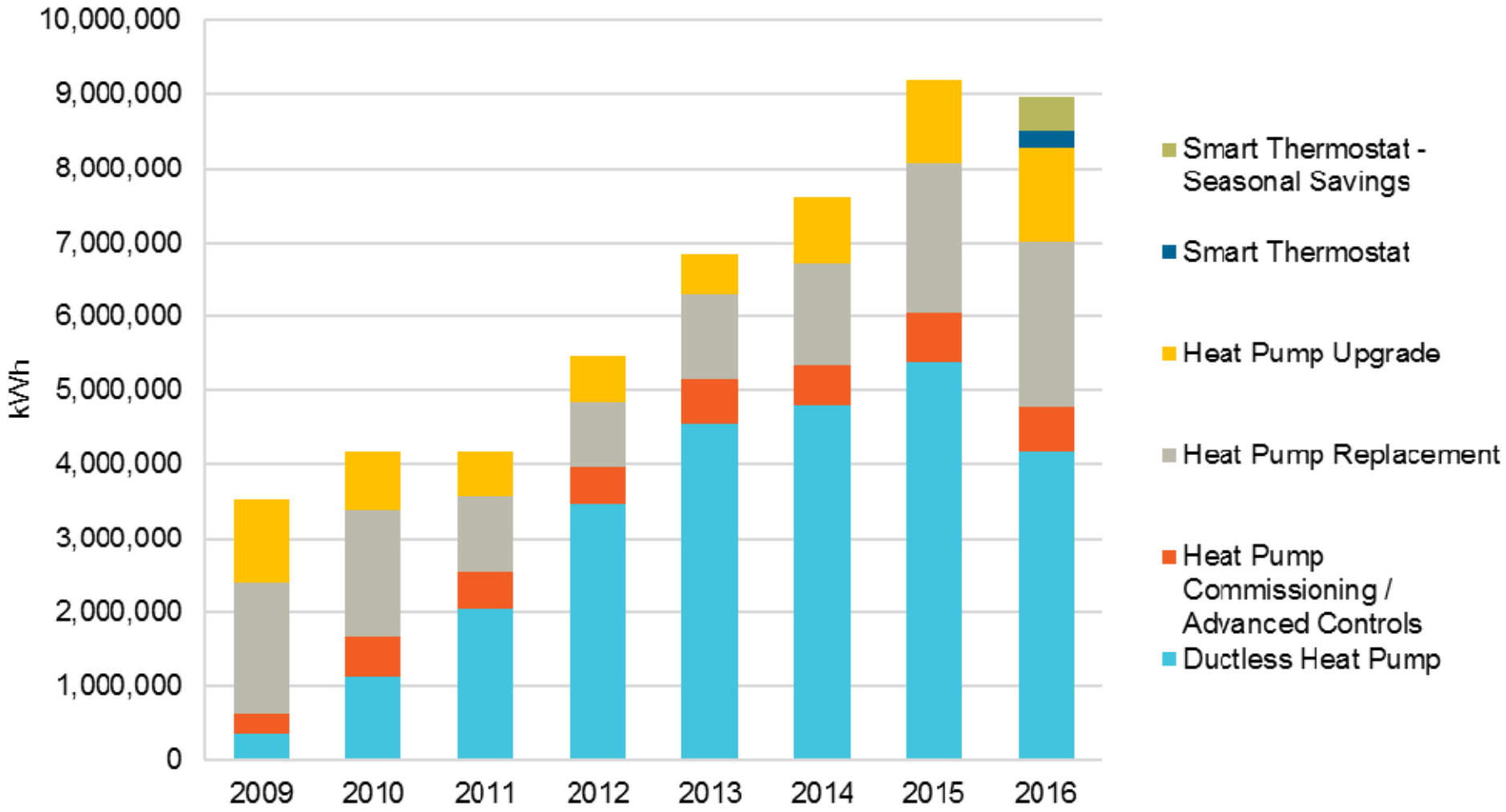


Weatherization Gas Savings (Working Therms)

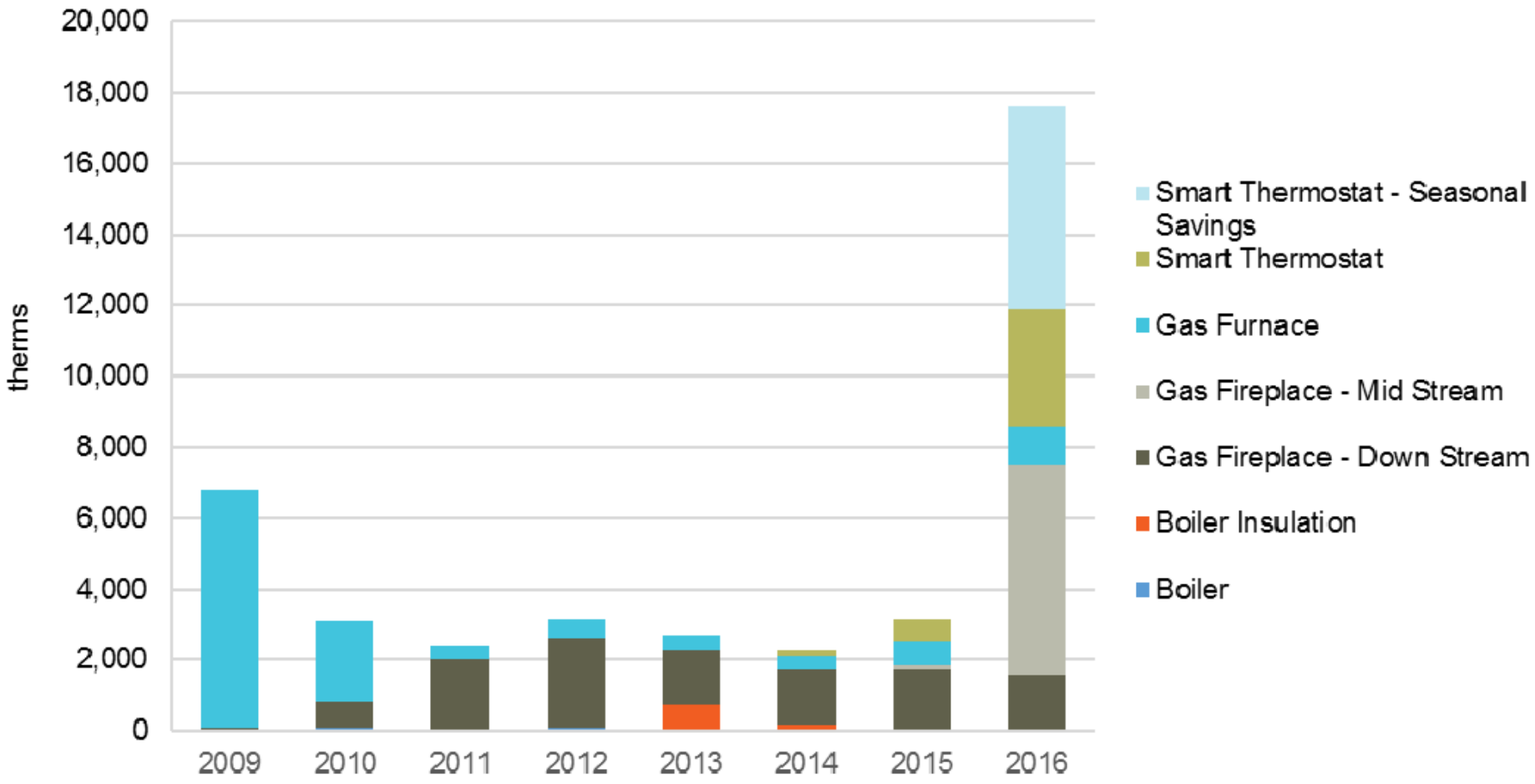


* Including NW Natural in Washington

HVAC Electric Savings (Working kWh)

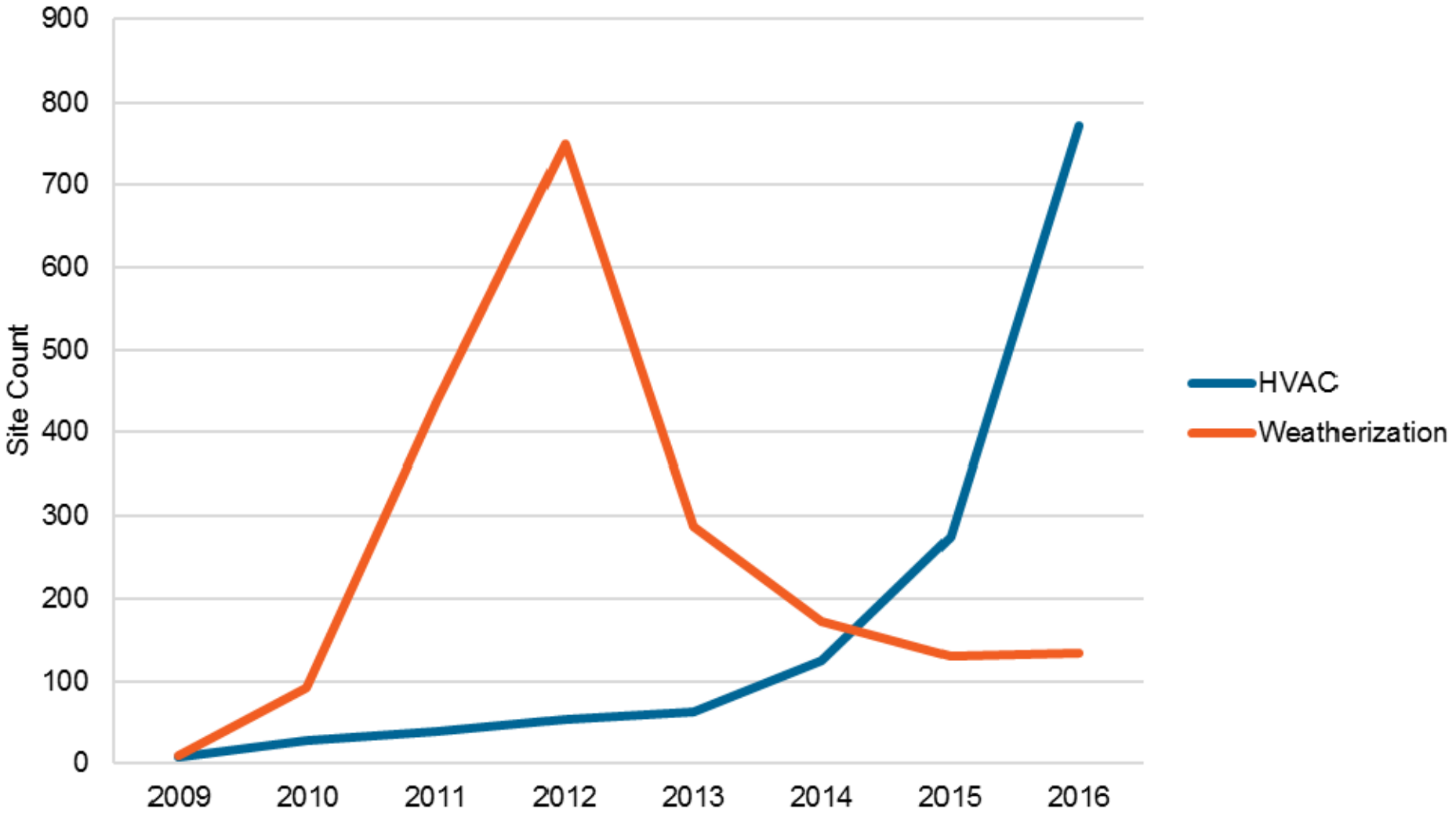


HVAC Gas Savings (Working Therms)

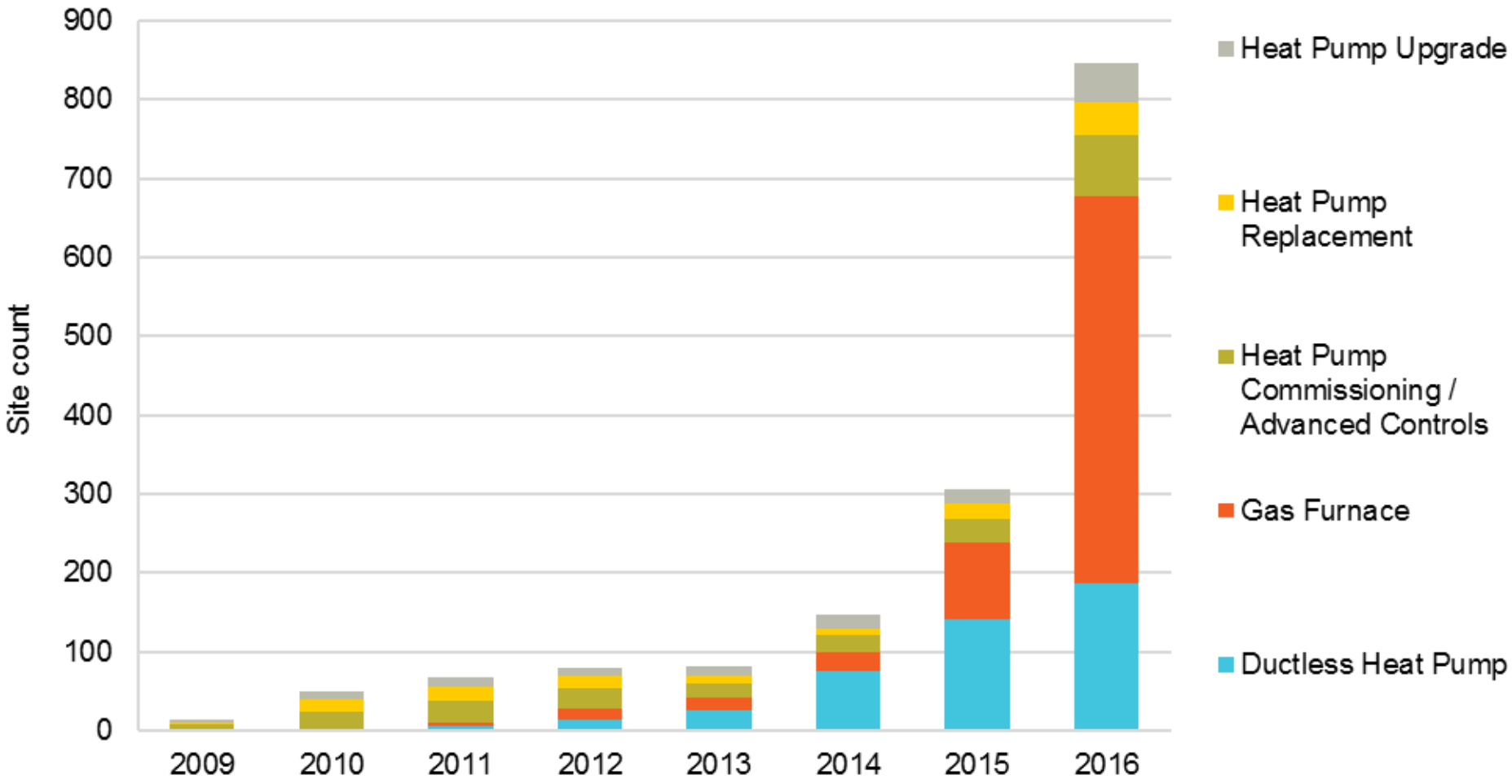


* Including NW Natural in Washington

Savings Within Reach Sites Served

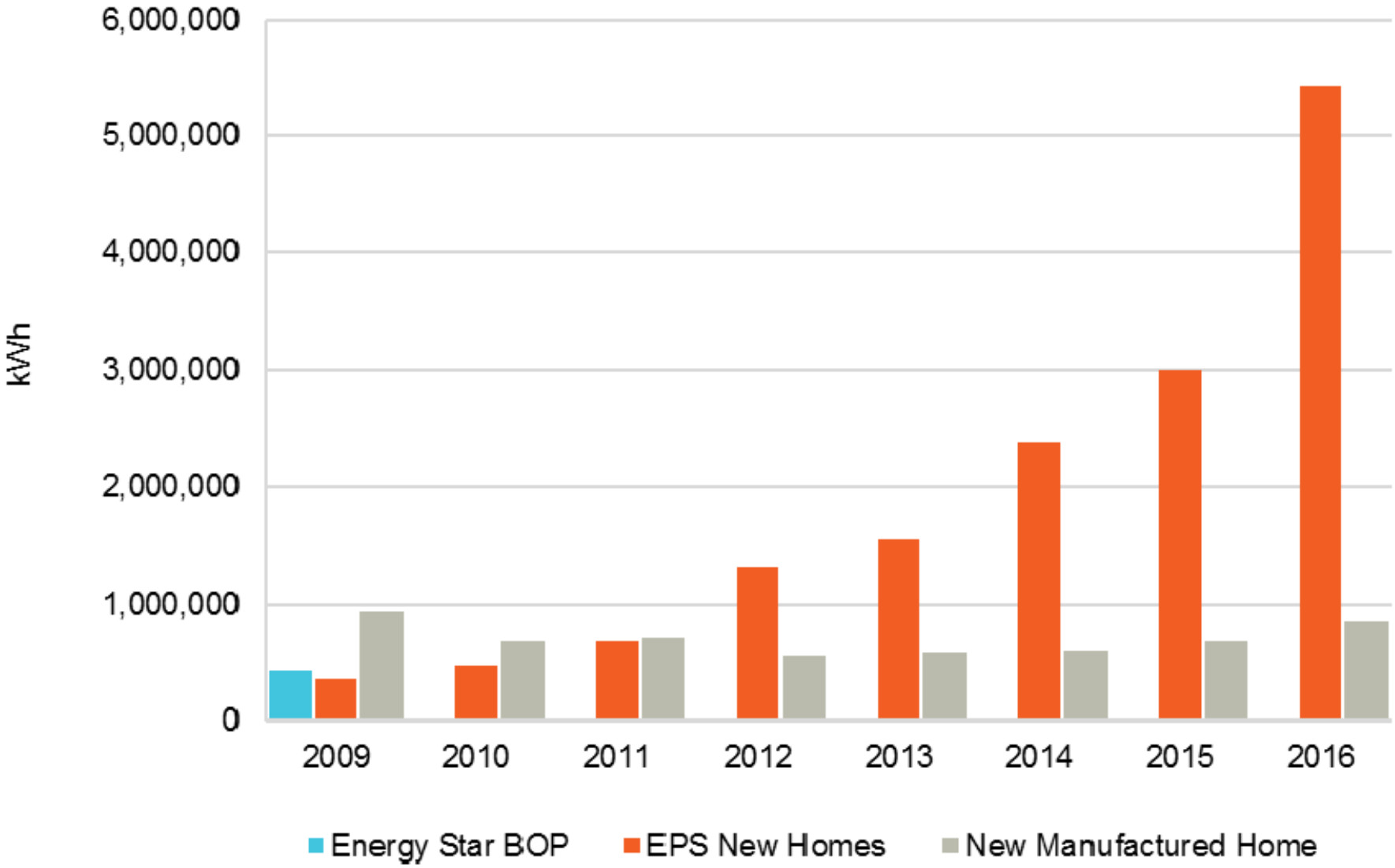


Savings Within Reach Sites Served



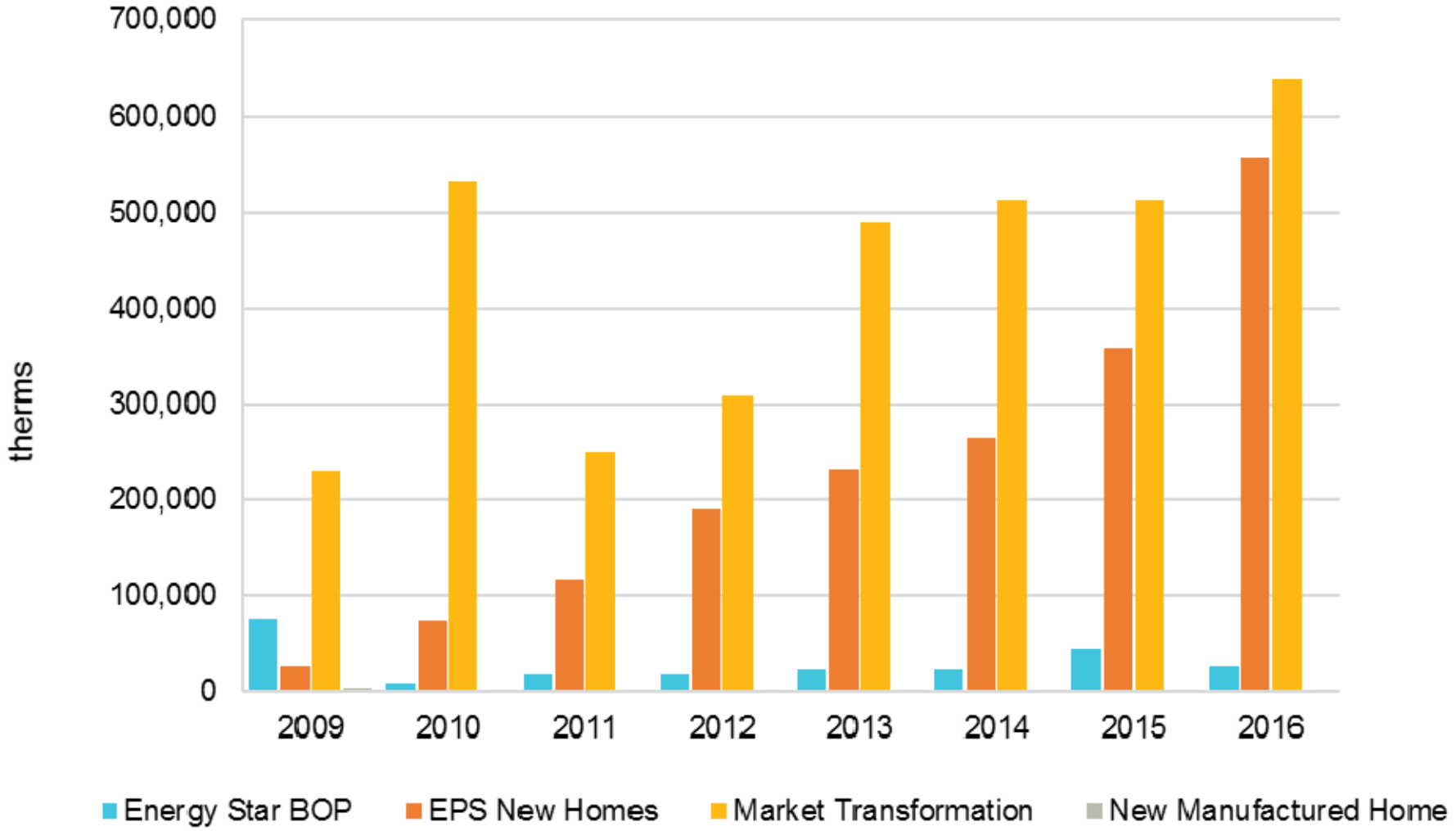
New Construction

New Construction Electric Savings (Working kWh)



* Not including stand-alone measures

New Construction Gas Savings (Working Therms)



- Including NW Natural in Washington
- Not including stand-alone measures
- Market Transformation represents Oregon savings

Thank You

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EnergyTrust of Oregon

Residential Sector

Trends: Measures, Markets and Sources of Savings from 2009-2016

July 2017

About Energy Trust of Oregon

Energy Trust is an independent nonprofit organization, overseen by the Oregon Public Utility Commission, to lead utility customers in benefiting from saving energy and generating renewable power. Our services, cash incentives and solutions have helped participating customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista save more than $2.7 billion on their energy bills since 2002. The cumulative impact of our leadership since 2002 has been a contributing factor in our region's low energy costs and in building a sustainable energy future. More information about Energy Trust's background, funding sources, strategic and action plans, policies and programs are available on our website at www.energytrust.org.

I. About the Analysis of Trends

Source of Data

Data contained in this report comes from Energy Trust's internal systems of record for both Oregon and Washington.

Trend Analysis: Working vs. Reportable Savings Numbers

These analyses are primarily based on working savings numbers, which are savings before evaluation factors and transmission and distribution losses or credits are applied. Working savings will not match reportable savings, which are included in Energy Trust's public reports to the Oregon Public Utility Commission and board of directors.

We analyze trends using working savings for a couple of reasons:

- Consistency: Evaluation factors change. Working savings provide a year-over-year comparison of market response to program offerings.
- Incentive designs and budgets are built on working savings, as verified first-year working savings are the basis for incentive payments to customers. Trends based on working savings are the basis of bottom-up goal setting and incentive budget development.
- Market drivers: While tracking and addressing changes in free ridership and technical realization is important to program outcomes, the primary driver of program outcomes is how the market responds to program offers. The secondary driver of outcomes appears to be customer perception of the current economy. This trend analysis focuses on the primary driver influenced by basic program design and delivery.

Residential Program Structure

From 2009-2016 Energy Trust served residential customers through its residential sector comprising three programs: Existing Homes, New Homes and Products. These three residential programs are currently brought to market through three separate PMC contracts: CLEAResult for Existing Homes, CLEAResult for New Homes and Ecova for Products. PMCs are companies contracted with to manage and deliver Energy Trust programs. Contracted functions include

management of program operations, program development, forecasting, marketing, program implementation, outreach and customer service. PMC contracts are competitively rebid on a regular basis, reviewed by a committee with internal staff and external representatives, and approved by the board of directors.

Each program engages discrete market channels and delivers a core set of technologies and offerings that have provided stable and substantial sources of energy savings.

- The **Existing Homes program** offers energy-efficient lighting and water conservation devices delivered by mail through Energy Saver Kits, and achieves weatherization, HVAC and water heater upgrade savings through trade ally contractors.
- The **New Homes program** offers incentives for energy-efficient new home construction to builders through EPS™, a home energy performance score, and drives new home market transformation based on influence to building codes.
- The **Products program** promotes efficient lighting, showerheads and appliances sold in retail stores, and engages manufactured home dealerships to promote efficient new manufactured homes.
- Energy Trust invests in **Northwest Energy Efficiency Alliance (NEEA)** to deliver market transformation savings on behalf of the residential sector. NEEA savings are included in residential sector savings for reporting purposes, and are in addition to savings from Existing Homes, New Homes and Products programs.

Changes to current structure
In response to anticipated reductions in savings levels, staff completed an assessment of the residential savings potential and delivery model in 2016. The findings of that assessment identified market changes, declining savings, and challenges of the current multiple program delivery structure. Staff concluded that maintaining the 3 program structure would inhibit delivery of future savings and identified a new program structure for the sector to achieve future savings. In 2017 the residential sector conducted an RFP to consolidate three programs into one residential program, the single program will have more latitude and flexibility to pursue savings across market channels. This means that any campaign oriented by technology is positioned to drive adoption across all market channels, and any effort organized by market channel can be leveraged to include all technologies delivered through that channel. This supports Energy Trust's plans to broaden engagement across market channels, such as by engaging water heater distributors and retailers.

In addition to one PMC, staff are adding delivery flexibility by adding two contracts with Program Delivery Contractors (PDCs), a Retail Midstream PDC and an EPS Whole Home Construction PDC. PDCs are companies contracted with to implement a specific program offering. PDCs have smaller contracts focused on program implementation, not program management. The benefit of working with PDCs is that Energy Trust can work directly with market actors who may not be traditional implementers and who may offer a high level of technical, supply chain or business model expertise.

Staff are planning the transition from three programs to a single program by January 1, 2018, including a transition to a single PMC and two PDCs.

II. Sources of Savings

The current sources of savings for the residential sector comes from three program portfolios, Existing Homes, New Homes and Products. Savings from NW Natural customers in southwest Washington are also included of the total portfolio of savings, and in the charts and explanations below.

In preparation for the residential sector transition to the new structure in 2018 this Trends report will present sources of savings focused on technologies as opposed to the existing three program structure. Staff focus on technologies in this report is intended to better align with the new sector structure. This technology, or measure category, focus provides better insight in understanding the historical performance of key technologies, the current market fundamentals supporting these technologies and the future savings contributions of these technologies.

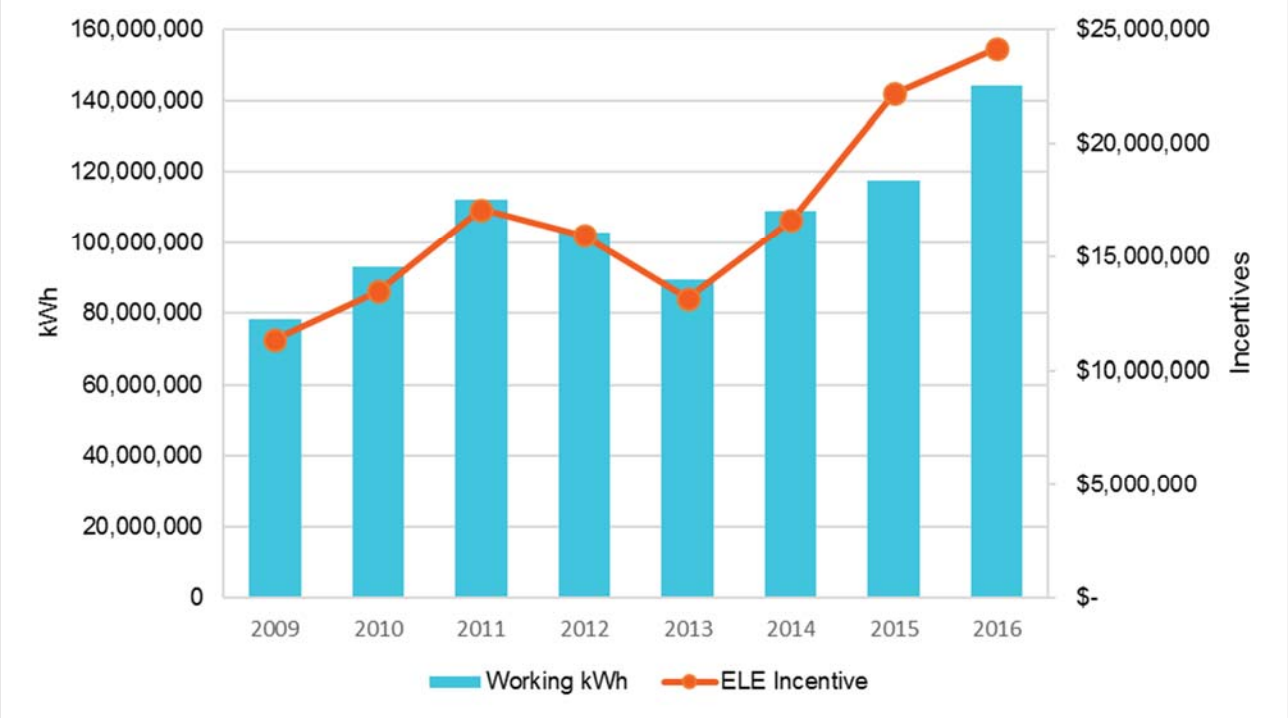
Measure categories are defined through the end use in a residential setting. Measure categories include water heating, HVAC, lighting, appliances, weatherization (building shell and windows), and new construction, which reflects measure categories as a package of measures built into a newly constructed home.

In addition to a review of technology performance since 2009 this report will also present two market channels of significant importance to the residential sector, Savings Within Reach, an income-qualifying initiative focused on providing increased incentives and services to qualifying customers, and Energy Saver Kits, a tool to expand participation.

Sector Trends

The following graphs (Figures 1-4) show overall sector trends, including total electric and natural gas savings and incentives for the sector to provide context for performance since 2009. Also shown are savings and costs for NEEA, which Energy Trust is a funder, and for NW Natural in Washington, which savings and incentives are presented as part of Figure 2 and separately in Figure 4.

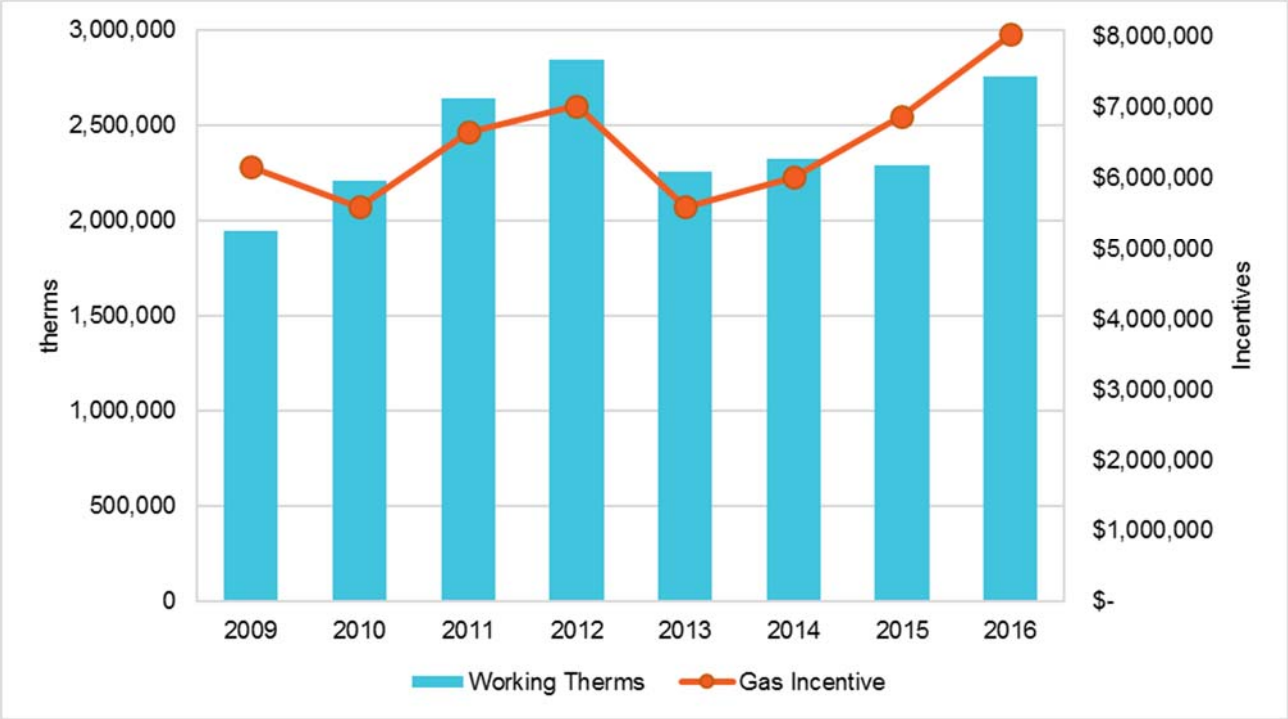
Figure 1: Total Electric Incentive and Savings (Working kWh) 2009-2016



** Not including NEEA*

Electric savings have shown an upward trend since 2009, resulting in the largest savings for the sector in 2016. Incentive costs have closely tracked changes in savings over time. As will be detailed later in the report retail lighting savings has been the largest driver of increased savings for the sector followed by savings from showerheads and aerators through the distribution of Energy Saver Kits. The decline in savings from 2011 to 2013 represents a combination of issues including a decline in reliance on savings from Energy Saver Kits as well as declines in appliance and weatherization savings.

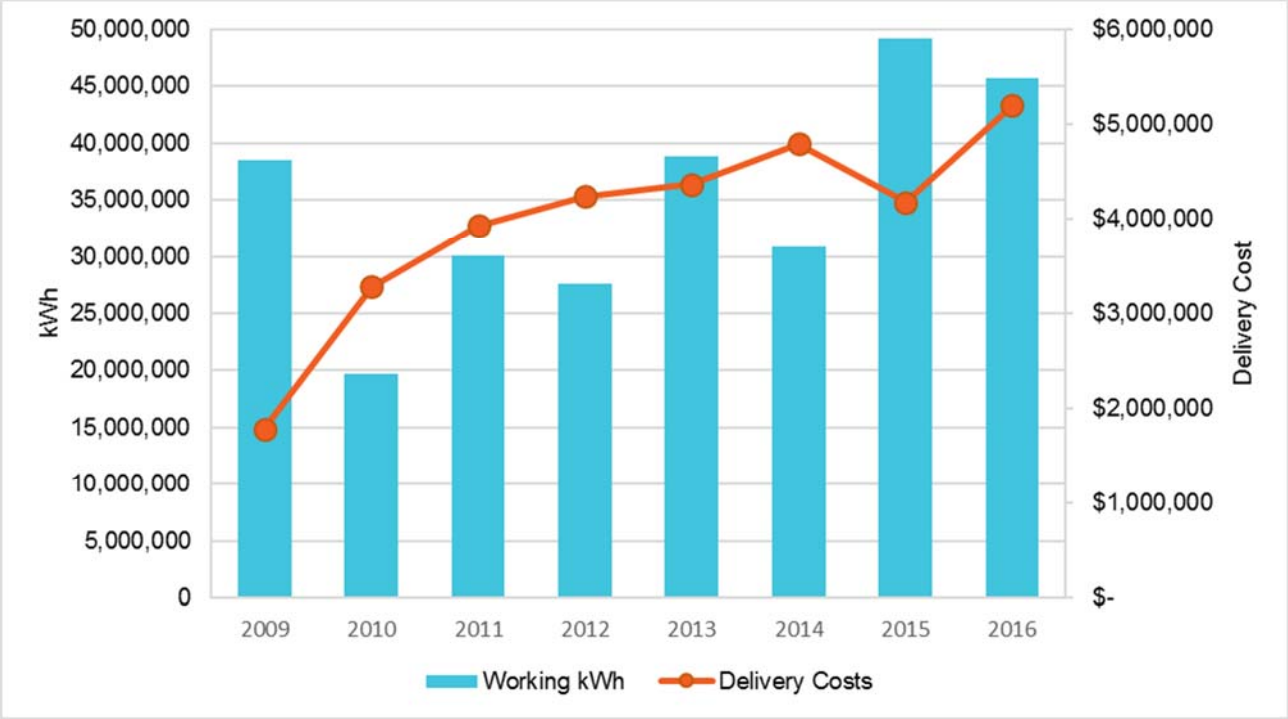
Figure 2: Total Natural Gas Incentives and Savings (Working Therms) 2009-2016



** Including NW Natural in Washington*

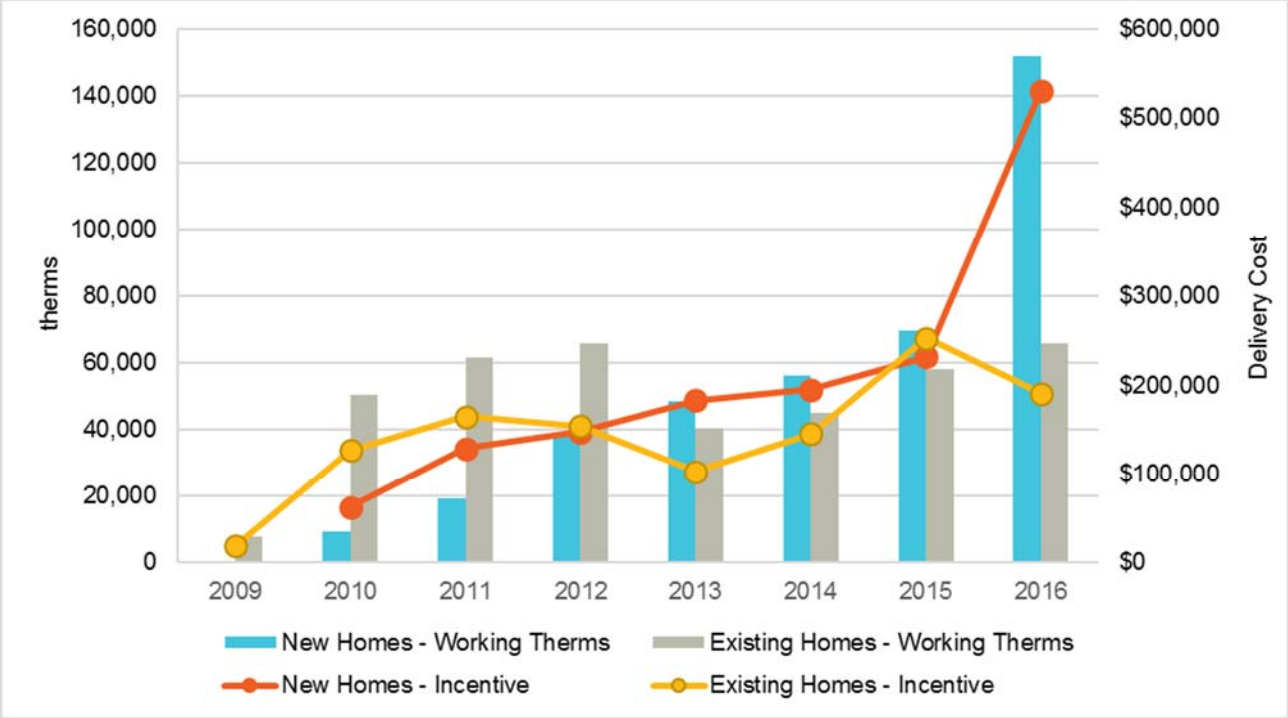
Since 2009 natural gas savings have shown more variability. In 2016 savings achieved similar savings levels from 2012. The key natural gas savings driver in the last three years is EPS for new homes, from both individual savings as well as market transformation related to enabling advancement of the new residential building code. Savings in 2012 were driven by direct install initiatives and strong weatherization activities. Declines in savings from 2012 reflect a reduced reliance on savings from Energy Saver Kits and weatherization due to cost effectiveness constraints.

Figure 3: NEAA Savings (Working kWh) and Expenditures 2009-2016



Electric savings and costs for NEEA are considered differently than Energy Trust-delivered initiatives. NEEA makes long-term investments in various initiatives so annual savings are not directly driven by annual costs. Savings over the last two years have been quite strong and are represented by higher federal standards for appliances and televisions, and market transformation for new construction of electric homes.

Figure 4: Washington Gas Savings (Working Therms) 2009-2016



Residential gas programs were introduced in 2009 for NW Natural customers in Washington (Figure 4). In total, savings have remained consistent through 2015 with growth coming from the New Homes program. In 2016 the New Homes offer in Washington was aligned with the Oregon offer, expanding participation by new builders and significantly increasing savings.

III. Run Rates

The tables below show electric and natural gas costs per unit of savings (run rates) for incentives and delivery costs on a first-year savings basis. In general incentive costs show upward pressure while delivery costs decline or moderate from 2009-2016.

Electric Run Rates, excluding NEEA—$/kWh					
Year	Working kWh	Electric Incentive	**Incentive Run Rate**	Electric delivery	**Delivery Run Rate**
2009	78,317,781	$11,347,181	$0.14	$8,812,074	$0.11
2010	93,064,154	$13,451,187	$0.14	$9,751,439	$0.10
2011	112,336,966	$17,102,371	$0.15	$11,807,973	$0.11
2012	102,693,064	$15,950,078	$0.16	$9,464,182	$0.09
2013	89,618,043	$13,155,642	$0.15	$8,985,869	$0.10
2014	109,048,751	$16,616,006	$0.15	$11,553,228	$0.11
2015	117,476,744	$22,205,828	$0.19	$9,929,615	$0.08
2016	144,448,630	$24,190,940	$0.17	$9,582,497	$0.07
Total	847,004,133	$134,019,236	$0.16	$79,886,881	$0.09

The electric incentive run rates show a slight increase over time while the delivery run rates show a slight decline. The increases in incentives run rates can be attributed to growing sales of retail LEDs (as lower cost CFLs declined) and the growth in savings from EPS in New Homes. The decline in delivery costs is likely due to an increased focus on delivery cost reduction beginning in 2014.

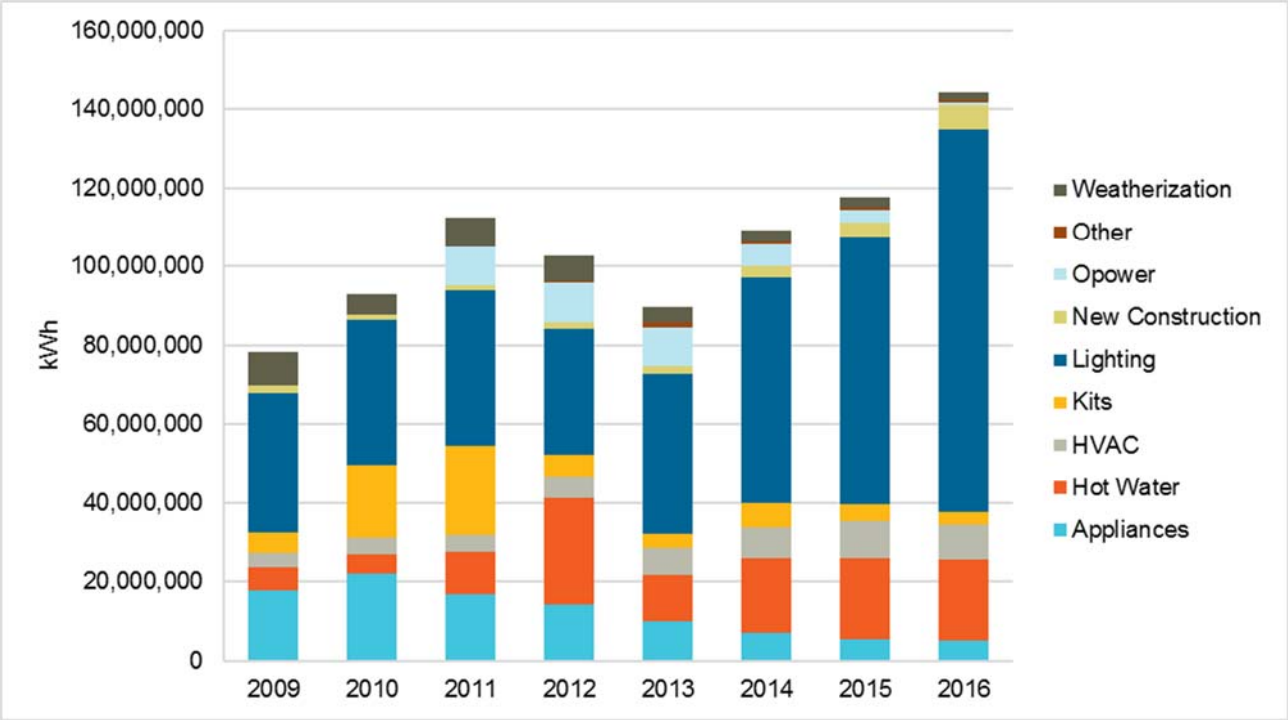
Natural Gas Run Rates—$/Therm					
Year	Working Therm	Gas Incentive	**Incentive Run Rate**	Gas Delivery	**Delivery Run Rate**
2009	1,951,147	$6,166,450	$3.16	$3,765,416	$1.93
2010	2,213,568	$5,602,662	$2.53	$3,317,399	$1.50
2011	2,639,410	$6,659,522	$2.52	$4,253,273	$1.61
2012	2,844,518	$7,027,385	$2.47	$5,406,697	$1.90
2013	2,260,996	$5,601,356	$2.48	$4,814,794	$2.13
2014	2,323,108	$6,022,882	$2.59	$4,394,169	$1.89
2015	2,290,237	$6,883,929	$3.01	$3,644,686	$1.59
2016	2,756,596	$8,036,966	$2.92	$3,316,655	$1.20
Total	19,279,584	$52,001,155	$2.70	$32,913,091	$1.71

The gas run rate for incentives shows a constant pattern from 2010 through 2014 with increases in 2015 and 2016. Delivery costs since 2014 have declined. This is due to an increased focus on delivery cost reduction beginning in 2014 in order to manage the Existing Home program to meet cost-effectiveness requirements after drops in avoided costs and increased baselines.

IV. Trends by Measure Category

Figures 5 and 6 below show savings by measure category for both gas and electric measures.

Figure 5: Total Electric Savings (Working kWh) by Measure Category 2009-2016



** Not including NEEA*
** 2009-2011 Energy Saver Kit lighting and hot water savings were represented in Kit's savings. In 2012, Energy Saver Kit savings are reported in the measure technology, lighting and hot water, rather than combined in the Kit category. From 2012 through 2016 kit savings only represent LivingWise Kits for classrooms and Carry Home Savings kits for food pantry clients.*

Since 2009 lighting has been the largest contributor to residential electric savings on a percent basis each year providing a stable base of electric savings. With the relatively significant and quick growth of LED technology starting in 2014 the lighting category savings in 2016 represented the largest savings for the sector. In 2016 lighting was 67% of the total electric savings achieved.

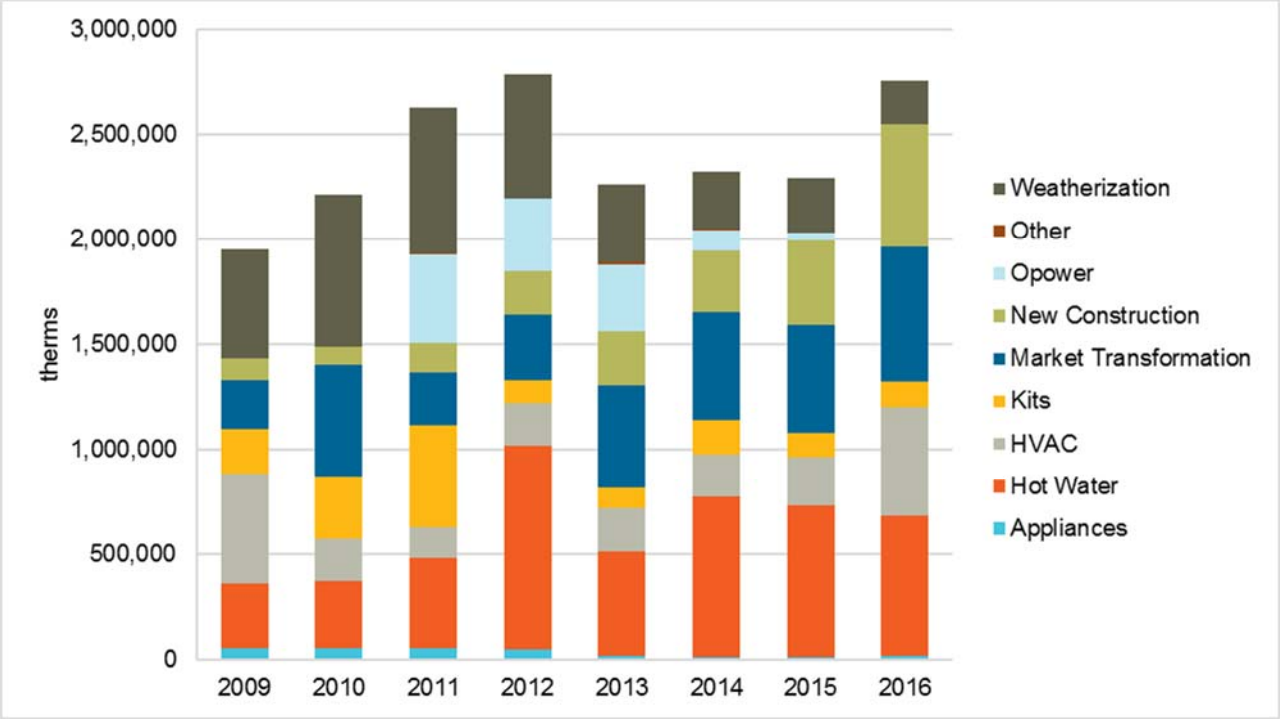
Lighting will face savings challenges over the next few years due to increases in the market baseline and declining incremental costs. The future likely brings smaller savings opportunities for lighting, which will come through increasing focus on lagging product categories and geographic territories.

Hot water contributes the second largest amount of electric savings. The measures included in the hot water category are showerheads and aerators distributed in Energy Saver Kits, showerheads retail sales and efficient water heaters. In 2016 hot water savings were 14% of the total electric savings achieved.

Other measure categories contributing to growth in electric savings since 2009 include new construction and HVAC measures.

Declining measures since 2009 include weatherization and appliances. Appliance savings reductions were driven by federal codes while weatherization savings reductions are related to cost effectiveness requirements.

Figure 6: Total Natural Gas Savings (Working Therms) 2009-2016



** Including Washington Gas savings for NW Natural*
** Market Transformation includes 2008 and 2011 Oregon building code changes and Oregon furnaces*
** 2009-2011 Energy Saver Kit hot water savings were represented in Kits savings. In 2012, Energy Saver Kit savings are reported under hot water, rather than the Kit category. From 2012 through 2016 kit savings only represent LivingWise Kits for classrooms and Carry Home Savings kits for food pantry clients.*

Key contributors to gas savings increases since 2009 include new construction and the related market transformation savings realized from increased state building codes. In 2016 these accounted for 44% of the total gas savings achieved.

Additional savings growth has been realized through the hot water measure category (showerheads, aerators and water heaters), and HVAC savings resulting primarily from the growth in gas hearths and the Savings Within Reach, income qualified, gas furnace measure. In 2016 these accounted for 43% of the total gas savings achieved.

Declines in gas savings have come from weatherization savings reductions related to cost effectiveness requirements.

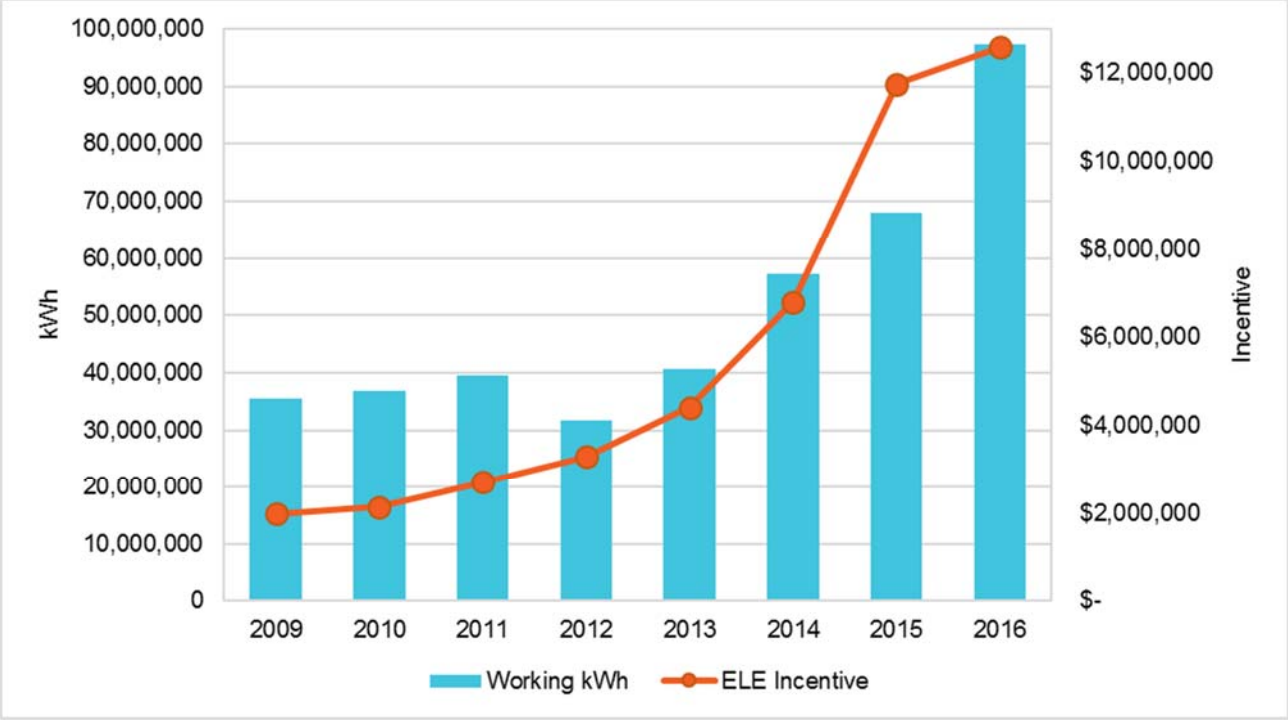
V. Individual Measures

Lighting

CFL and LED bulbs and fixtures sold at retail locations have provided strong and consistent electric savings growth. Dramatic savings increases, beginning in 2014, reflect the introduction and very fast market and consumer acceptance of LEDs. With the growing acceptance of LEDs the market has seen a significant decline in CFL sales. This decline in CFL market demand, and expected increases in federal standards, has resulted in an exit by manufacturers. As a result the sector no longer offered incentives for CFLs beginning in 2017. The transition to LEDs increased the run rate for lighting savings, reflecting the initial need for higher incentives on LED products.

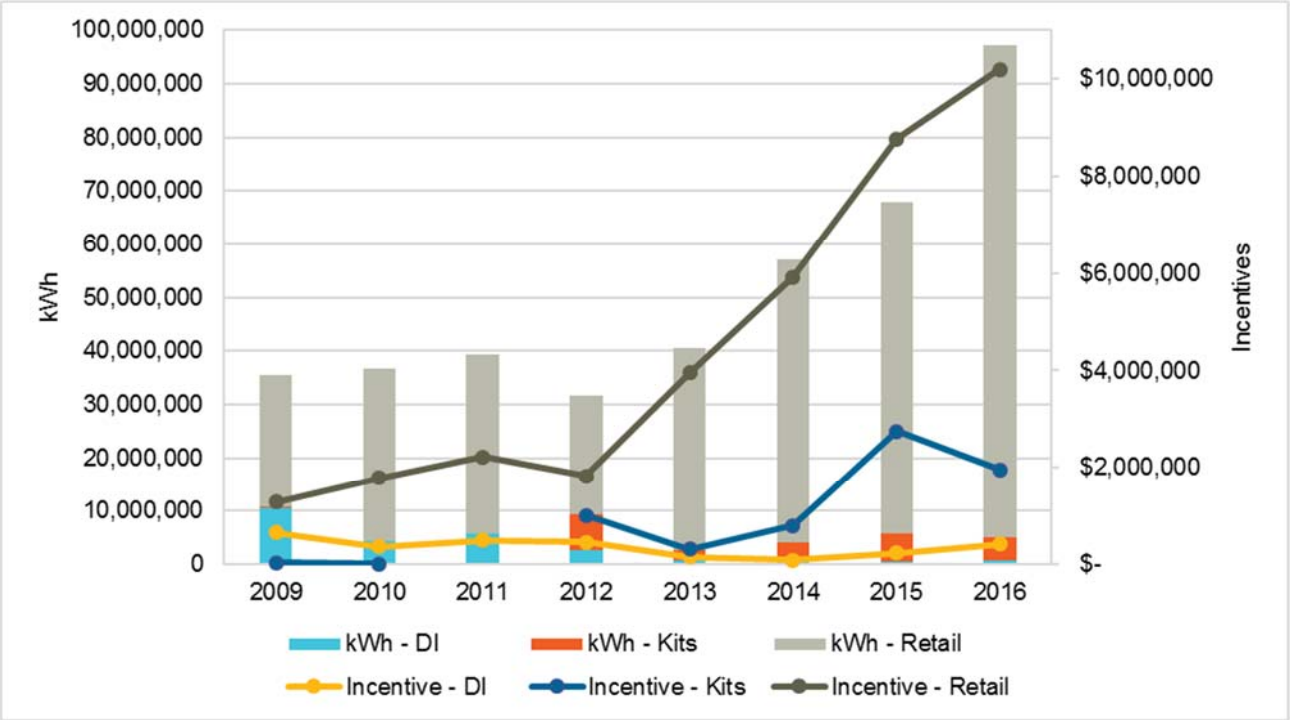
In 2016 and 2017 LED costs are declining significantly and in turn, staff, began the reduction in incentives and run rates for LED products. As we look ahead, savings opportunities for lighting will decrease as will the need for our incentives, reducing the remaining savings opportunity to lagging product categories and geographic territories.

Figure 7: Total Lighting Savings (Working kWh) 2009-2016



** Not including NEEA*

Figure 8: Lighting Savings (Working kWh) and Incentives by Delivery Channel 2009-2016

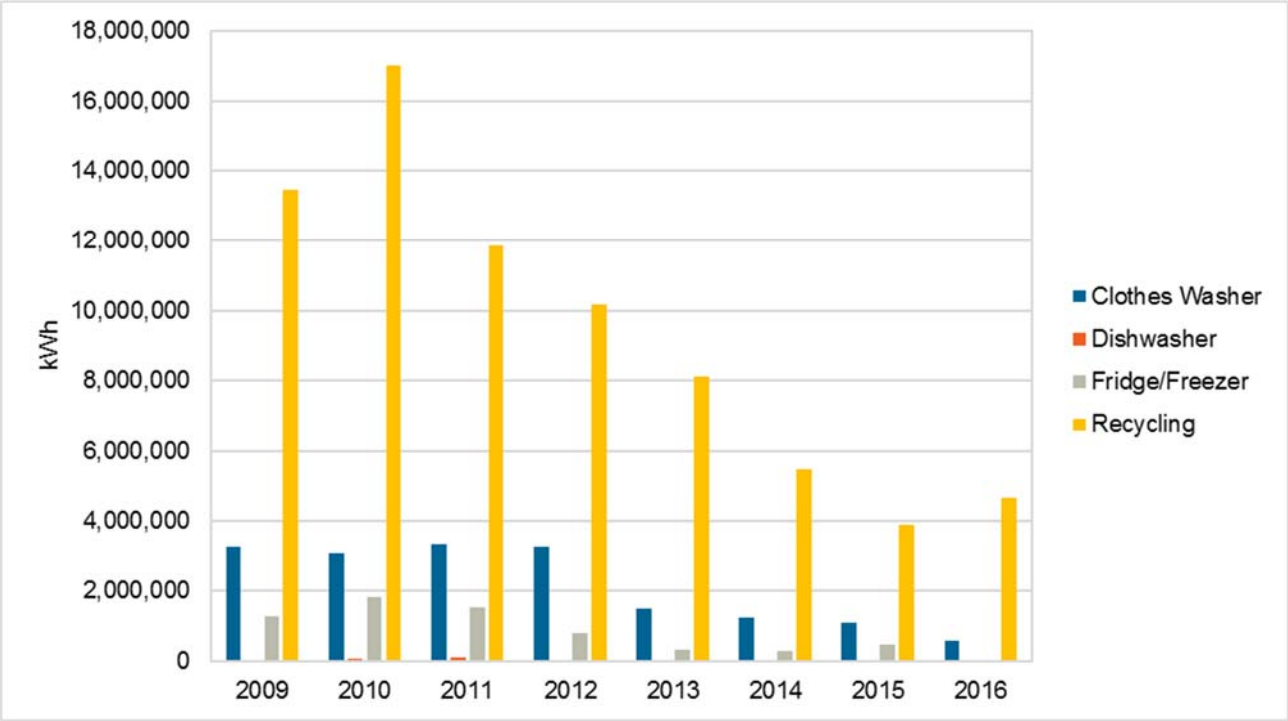


Note: DI refers to direct install lighting

Appliances

Appliance savings have declined since 2010 due to increasing federal standards on new appliances and a decline in appliance recycling as refrigerators and freezers manufactured prior to the 1993 federal standards change were collected and removed from households. Beginning in 2017 the sector provides incentives only for high-efficiency clothes washer purchases.

Figure 9: Appliance Electric Savings (Working kWh) 2009-2016



Hot Water

For both gas and electric savings, flow restricting showerheads and faucet aerators sold at retail and delivered through Energy Saver Kits have come to represent the majority of savings from this measure category. Energy Trust will continue to capture available savings from flow restricted devices but at a slower rate than past years.

We are currently implementing strategies to accelerate the savings opportunities from storage tank water heaters. Our current customer facing offer has shown poor results in capturing emergency water heater replacement opportunities. Through a midstream program design and incentive delivery structure directed at retailers and distributors to improve stocking practices, and leveraging manufacturer training for contractors, we expect to make energy-efficient units more broadly available and at a lower incentive cost, expanding the installation of units and increasing savings.

Figure 10: Hot Water Electric Savings (Working kWh) 2009-2016

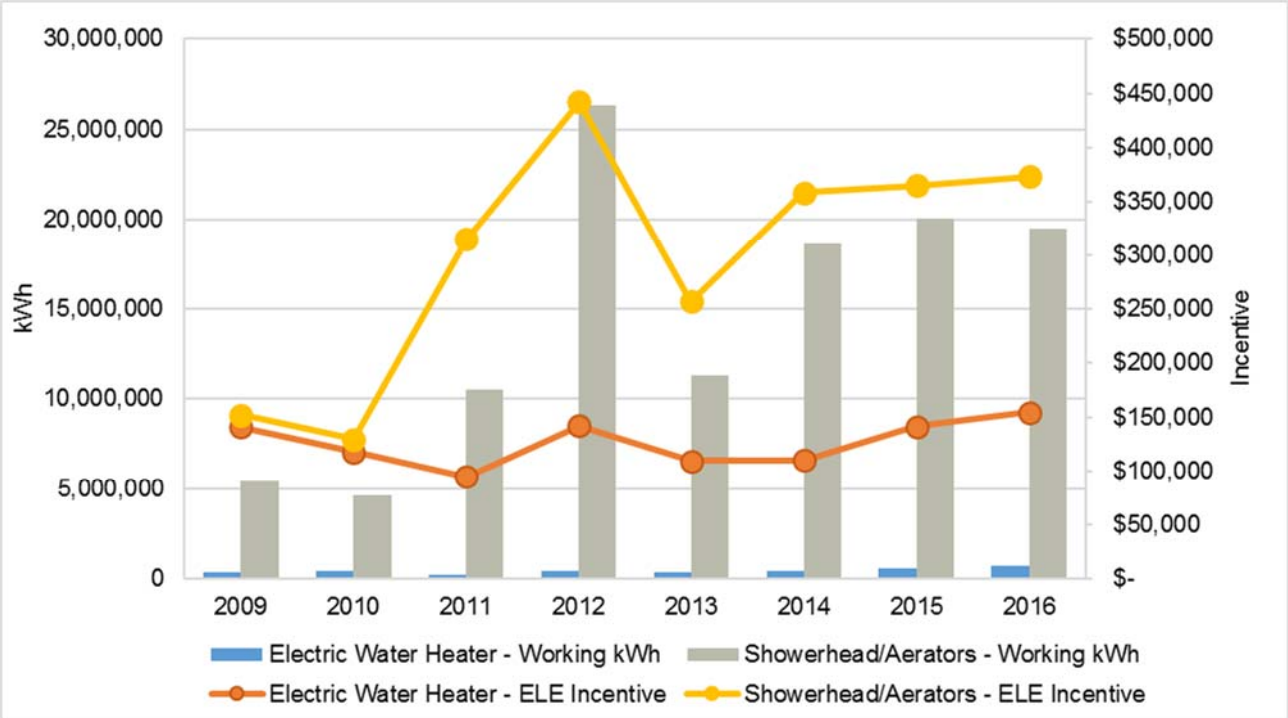
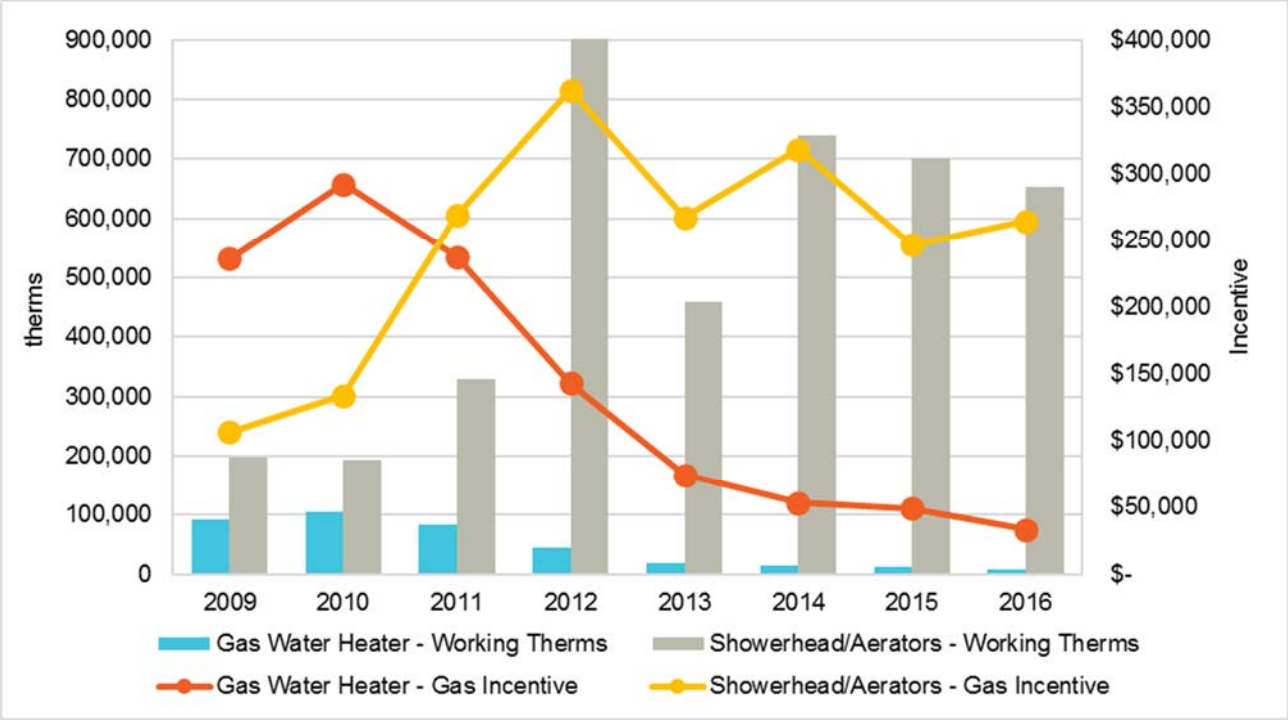


Figure 11: Hot Water Gas Savings (Working Therms) 2009-2016



HVAC

Growth in the HVAC measure category has come from improvements in technology, growing customer acceptance supported by regional (NEEA) efforts, and a focus on income qualified offers to reach lagging markets.

Savings growth for electric HVAC measures has been primarily driven by ductless heat pumps and ducted heat pump replacements. As we look forward, we anticipate reduced electric savings for ductless heat pumps related to cost-effectiveness considerations and the sunset date of the Residential Energy Tax Credit.

Growth in gas HVAC savings has come from efficient gas fireplaces incentive delivery providing both mid-stream and down-stream incentives. The electronic ignition is incented mid-stream (noted in the chart below for midstream) while the fire place unit is incented downstream with customer-facing incentives. Gas furnaces, through income qualified offers (Savings Within Reach) and rental properties, have contributed to increased savings over the last two years and are expected to continue to be a key offering through Savings Within Reach.

Smart thermostats represent new gas and electric savings sources through improved control of HVAC equipment and behaviorally based control approaches like NEST Seasonal Savings. Smart thermostats offer a range of benefits beyond just improved control to improve efficiency including implementing demand savings and other behavioral design options. Additional future savings opportunities could come through utility collaboration efforts.

Figure 12: HVAC Electric Savings (Working kWh) 2009-2016

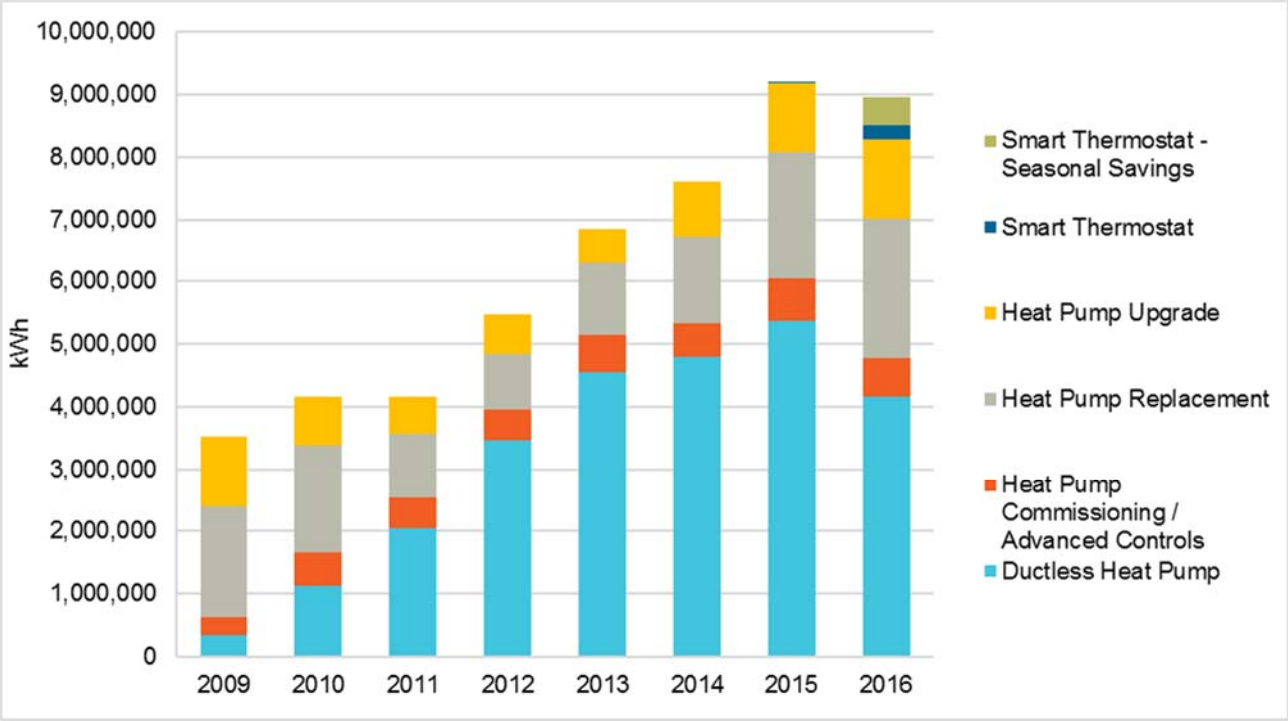
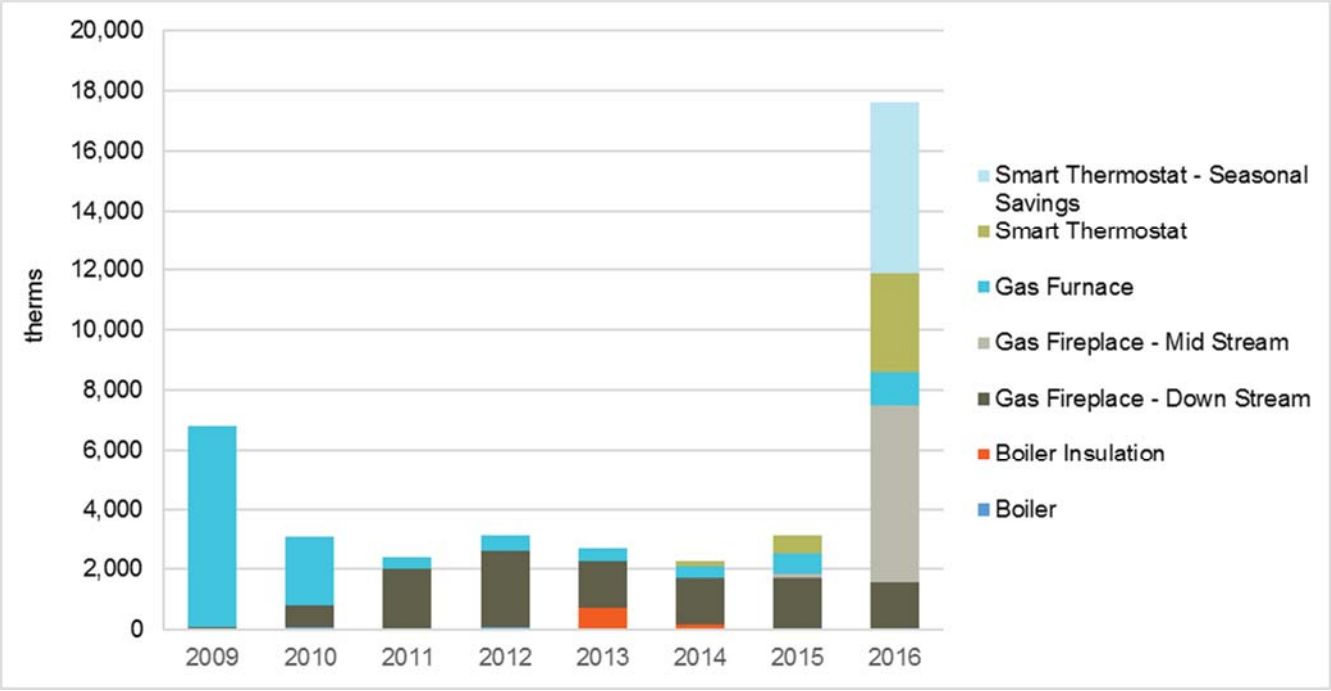


Figure 13: HVAC Gas Savings (Working Therms) 2009-2016



** Including NW Natural in Washington*

Weatherization

Both natural gas and electric savings have declined as measure saturation and cost-effectiveness requirements have narrowed the market opportunities for these home energy improvements. Measure evaluation supports continuing savings opportunities for weatherization measures through targeting high energy use customers. In the past four years windows have provided smaller savings results but have continued to deliver reliable savings while insulation and air sealing have been the constrained measures and are currently offered under a cost-effectiveness exception from the OPUC.

Figure 14: Weatherization Electric Savings (Working kWh) 2009-2016

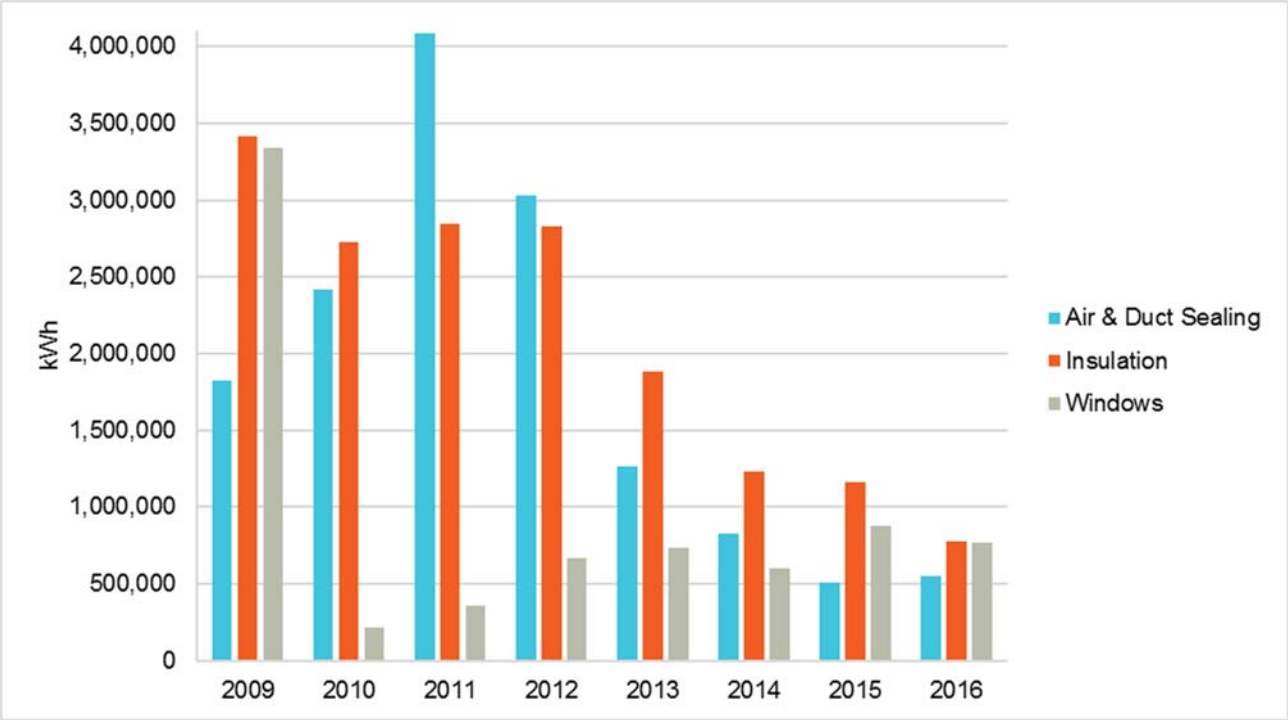
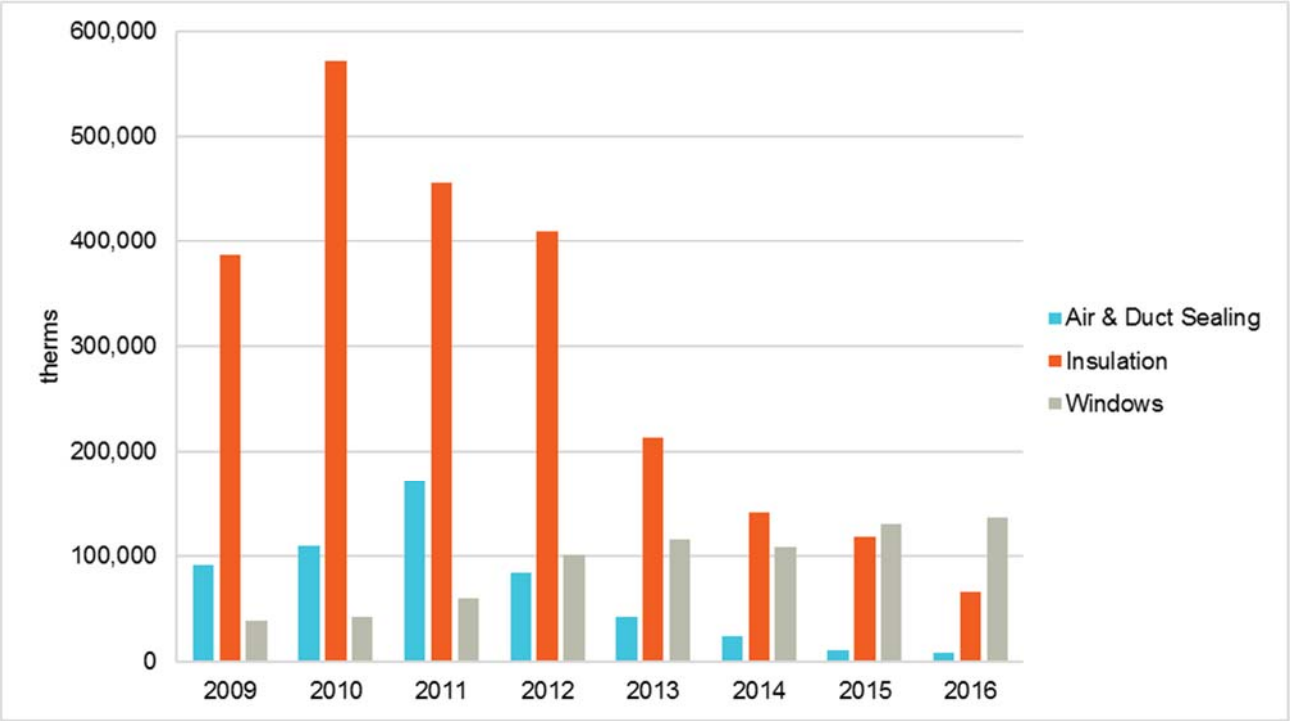


Figure 15: Weatherization Gas Savings (Working Therms) 2009-2016



**Including NW Natural in Washington*

Existing Manufactured Homes

Free air and duct sealing services increased during the economic downturn. In the last few years program activity and savings have declined due to saturation of homes receiving the free services. As we look forward savings opportunities in existing manufactured homes are likely to come from HVAC equipment and control measures.

Figure 16: Existing Manufactured Homes Electric Savings (Working kWh) and Incentives 2009-2016

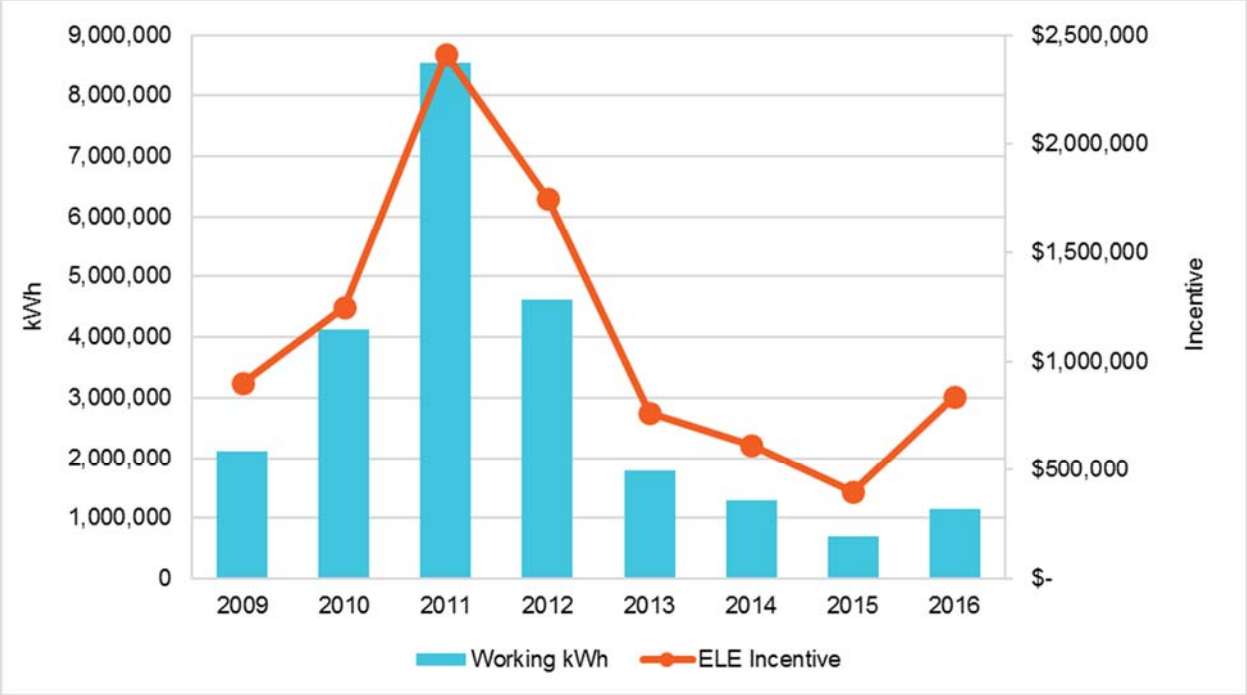


Figure 17: Existing Manufactured Homes Gas Savings (Working Therms) and Incentives 2009-2016

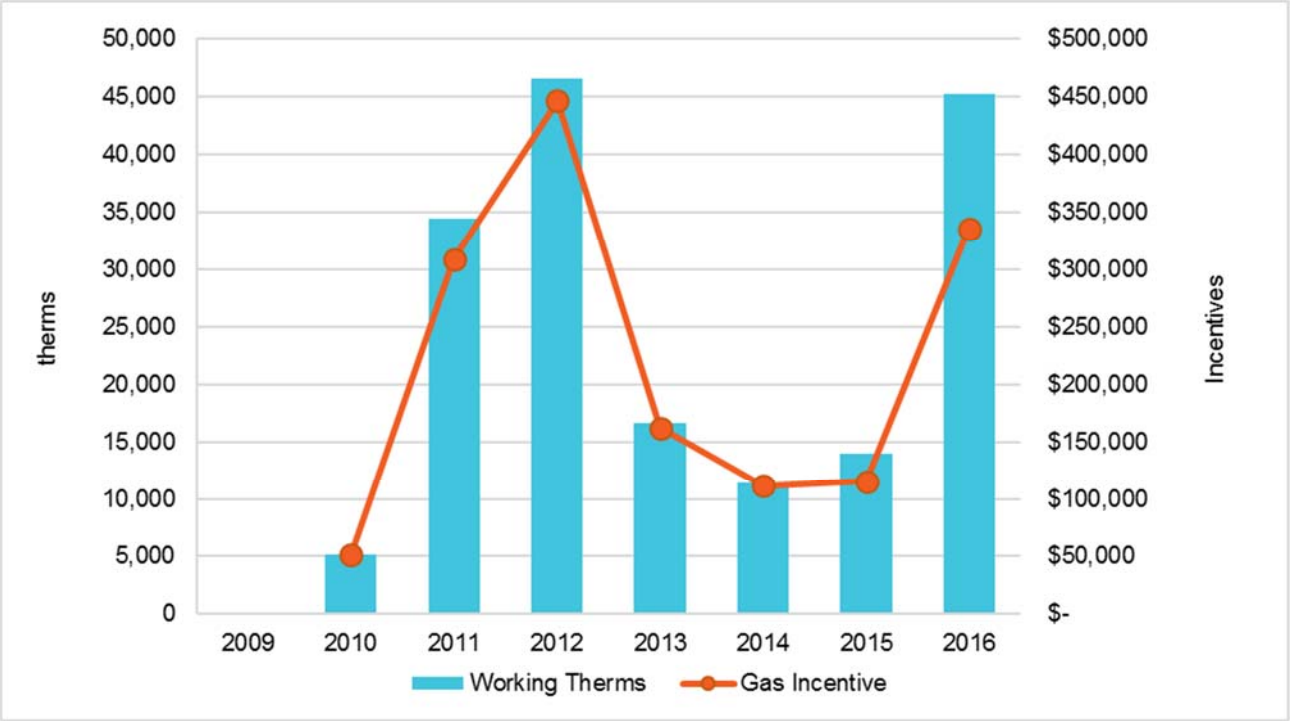
Savings Within Reach

The Savings Within Reach offer makes it more affordable for income qualified Oregon homeowners to invest in home energy upgrades. Leading up to 2012, Savings Within Reach primarily recorded savings from weatherization measures. In 2012 Clackamas County Office of Sustainability utilized federal American Recovery and Reinvestment Act funding which increased weatherization measure activity and participation. Savings reductions in 2013 for both gas and electric align with weatherization qualification changes for insulation and air sealing projects, reducing the number of eligible projects.

In September 2015 income qualification guidelines were broadened to include household incomes that are 80-120 percent of state median income aligning with income levels guidelines the Community Action Partnership (CAP) weatherization programs use. Both electric and gas savings have increased from 2014 - 2016, with increases related to the income guideline increase as well as growth in HVAC measures through the installation of high-efficiency gas furnaces and ductless heat pumps in qualifying homes. We anticipate that HVAC savings opportunities will continue to increase.

Figure 18: Savings Within Reach Electric Savings (Working kWh) and Incentives 2009-2016

Figure 19: Savings Within Reach Gas Savings (Working Therms) and Incentives 2009-2016



** No gas projects were completed in 2009*

Figure 20: Savings Within Reach Sites Served by Measure Category 2009-2016

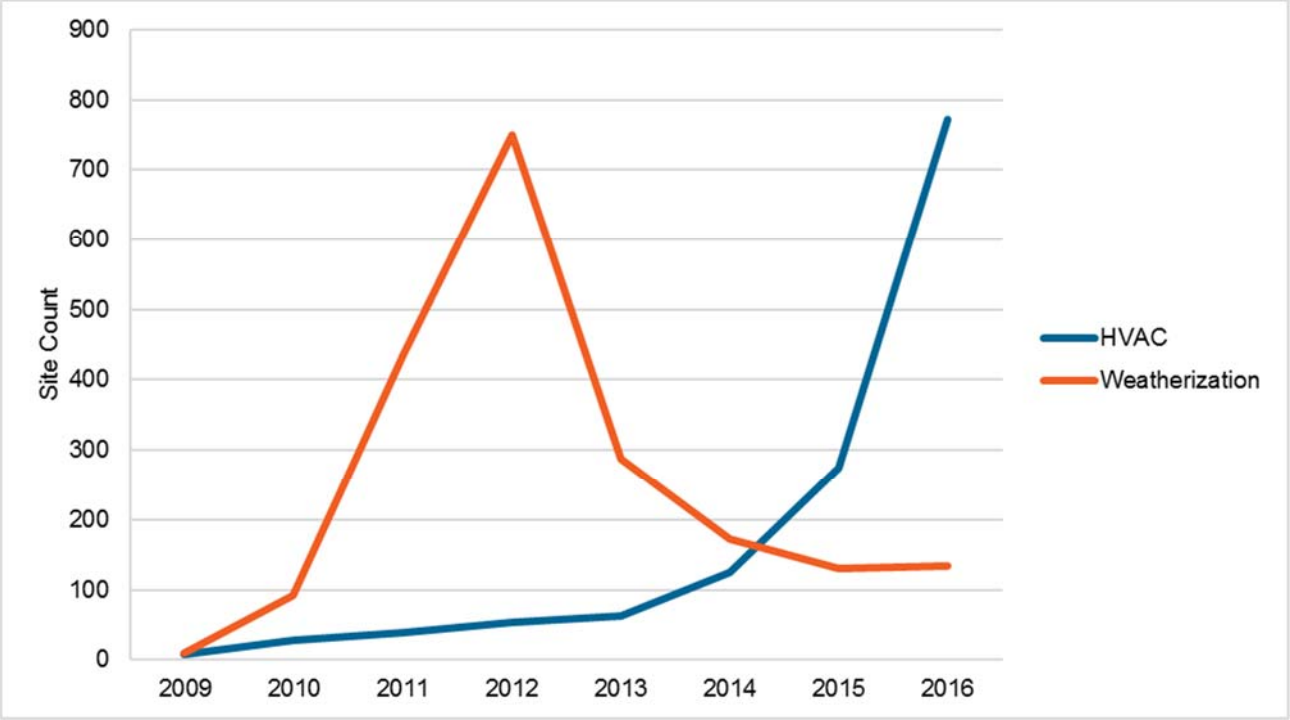
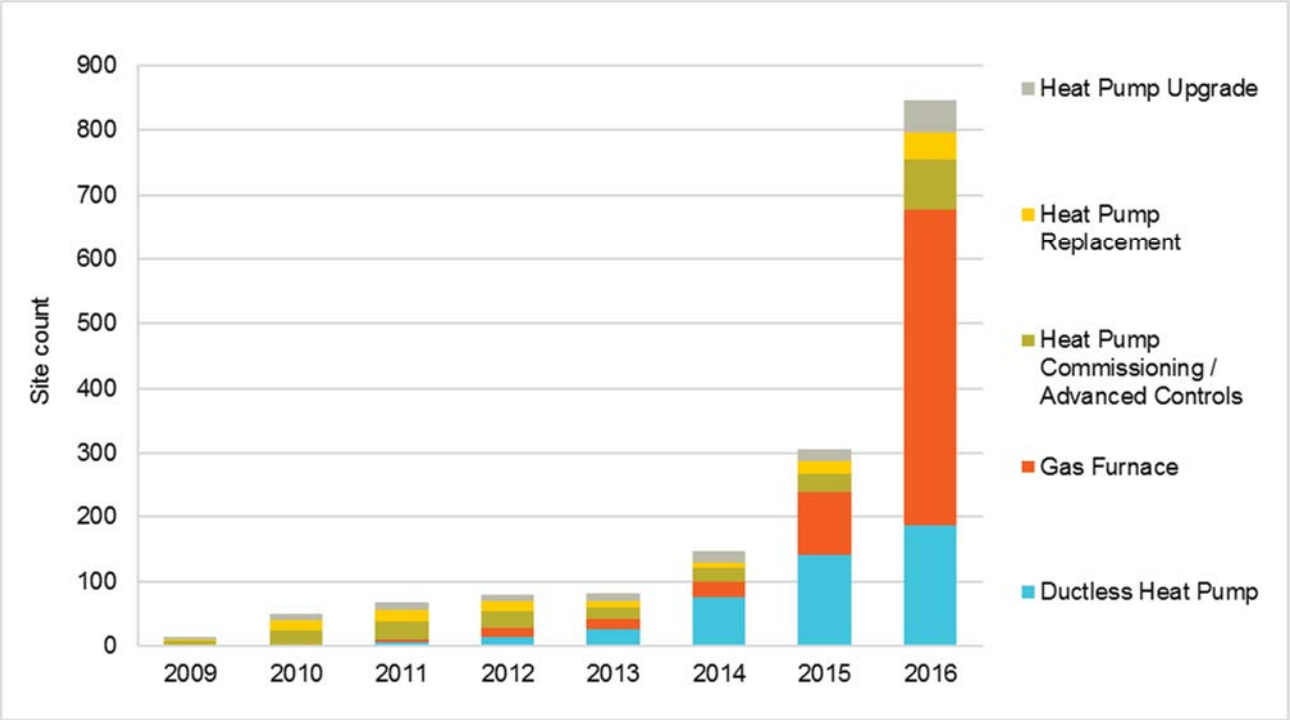


Figure 21: Savings Within Reach Sites Served by HVAC type 2009-2016



Run Rates

In comparing the run rates for standard incentives to Savings Within Reach incentives, the latter is more expensive due to enhanced incentive levels. Most standard residential incentives are established based upon incremental costs of the qualifying measure, whereas Savings Within Reach incentive amounts are typically set to the maximum allowable amount of the cost-effectiveness threshold of the utility cost test, appealing to the income qualifying homeowner.

Savings Within Reach Electric Run Rates			
Year	Working kWh	Electric Incentive	Run Rates $/kWh
2009	22,235	$9,235	$0.42
2010	161,883	$70,759	$0.44
2011	535,669	$230,550	$0.43
2012	762,265	$309,498	$0.41
2013	304,930	$119,261	$0.39
2014	376,895	$146,411	$0.39
2015	593,017	$250,644	$0.42
2016	787,036	$314,579	$0.40
Total	3,543,930	$1,450,940	$0.41

Savings Within Reach Natural Gas Run Rates			
Row Labels	Working Therms	Gas Incentive	Run Rates $/Therm
2009	-		$ -
2010	5,143.19	$51,965	$10.10
2011	34,390.61	$308,878	$8.98
2012	46,626.10	$446,306	$9.57
2013	16,642.54	$162,028	$9.74
2014	11,422.00	$111,403	$9.75
2015	14,007.13	$115,286	$8.23
2016	45,257.24	$335,718	$7.42
Total	173,488.81	$1,531,587	$8.83

New Construction

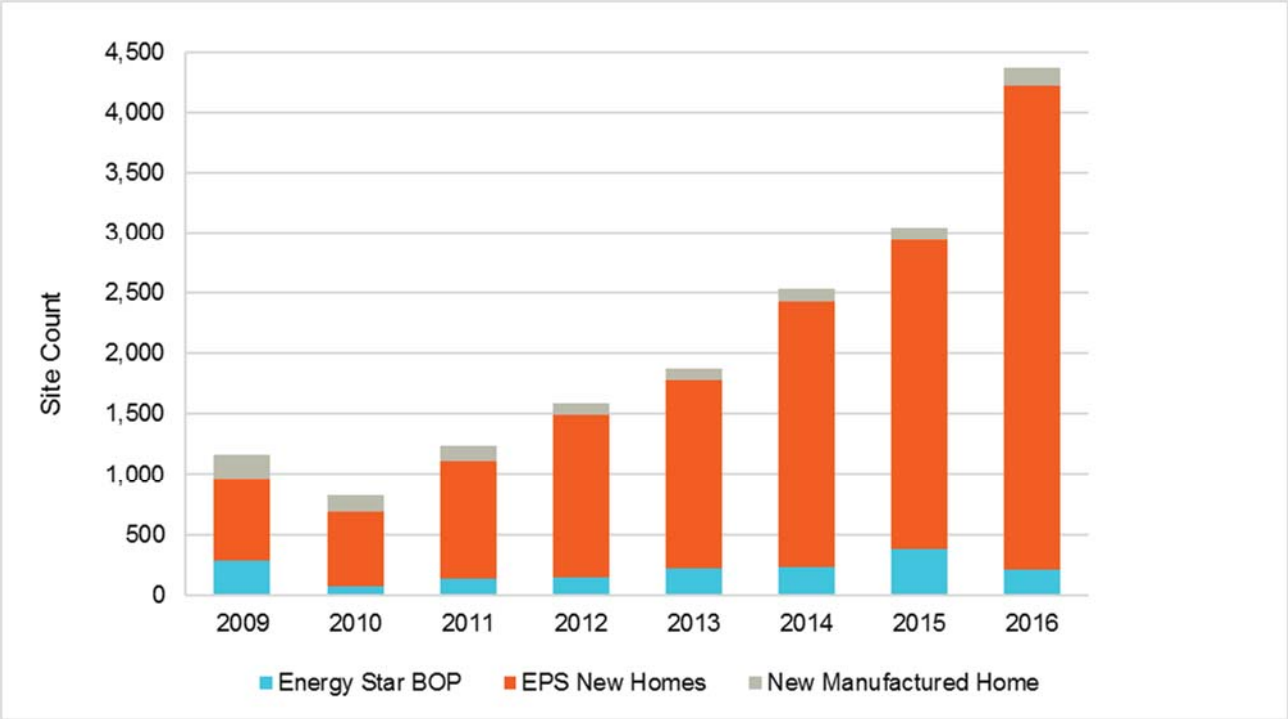
The New Construction savings source is primarily newly constructed single-family homes built with EPS, Energy Trust's energy performance scoring tool. Newly constructed homes growth comes from strong construction activity as well as a program design delivering services for production builders as well as smaller builders in urban and rural areas. EPS homes provide significant gas savings through both new home construction (21%) and ongoing market transformation savings (23%) reflecting our ability to support the development of new codes.

The introduction and adoption of EPS provided deeper savings opportunities over the prior Builder Option Packages.

The growth in savings in new construction is highly reliant on economic conditions. Significant construction activity in the Portland metro area (including NW Natural's service territory in Washington), Central Oregon, the Willamette Valley and Southern Oregon will continue to drive savings. Currently 1 in 3 newly constructed homes receive an EPS, with new approaches to the market, such as coordinating with planning agencies, to drive program implementation at the development level are also expected to continue provide growth and success in new construction.

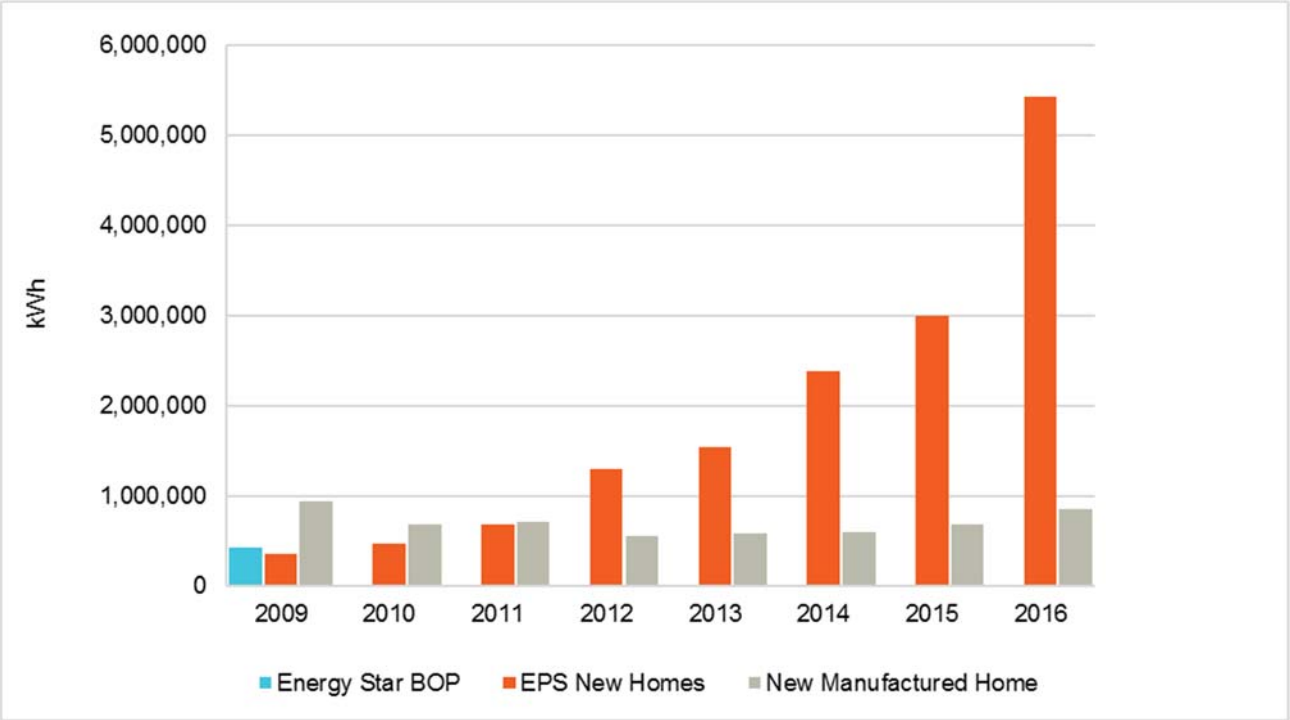
New manufactured homes and Builder Option Packages reflect smaller and consistent savings opportunities. New manufactured homes provides electric savings through the sale of ENERGY STAR homes. We expect savings to continue at past levels with savings growth opportunity through upgrading the HVAC system in new manufactured homes. Builder Option Packages (BOP in the table below) is the ENERGY STAR new construction offer, it was replaced in the market with EPS in Oregon (2011) and in Washington (2016). For all of the measures, population growth, housing starts and continued economic recovery will drive savings growth opportunities for the new construction measure category.

Figure 22: New Construction Sites Served 2009-2016



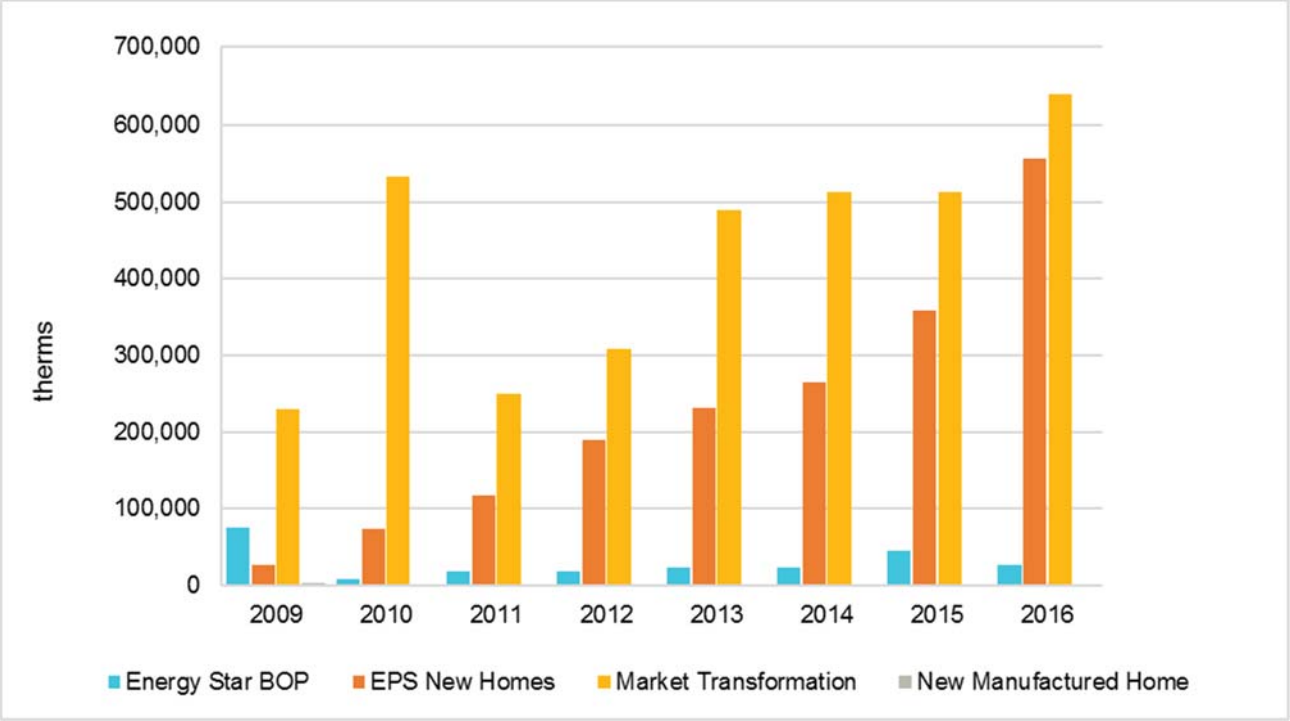
** Not including stand-alone measures*

Figure 23: New Construction Electric Savings (Working kWh) 2009-2016



** Not including stand-alone measures*

Figure 24: New Construction Gas Savings (Working Therms) 2009-2016



** Including NW Natural in Washington*
** Not including stand-alone measures*
** Market Transformation represents Oregon savings*