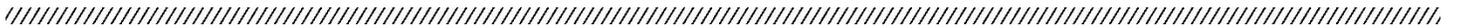


Quarter Two 2018 Report to the Oregon Public Utility Commission & Energy Trust Board of Directors



ENERGY TRUST OF OREGON
AUGUST 15, 2018

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A glossary of program descriptions and key terms is available online at www.energytrust.org/reports

I Results at a glance^{1,2}

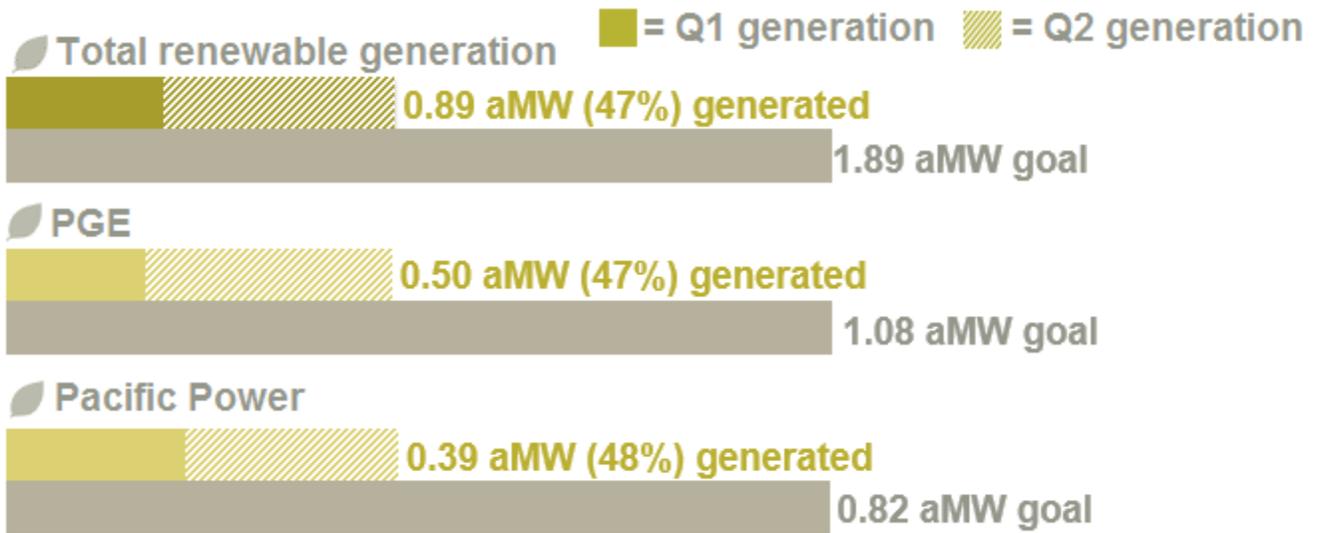
Savings



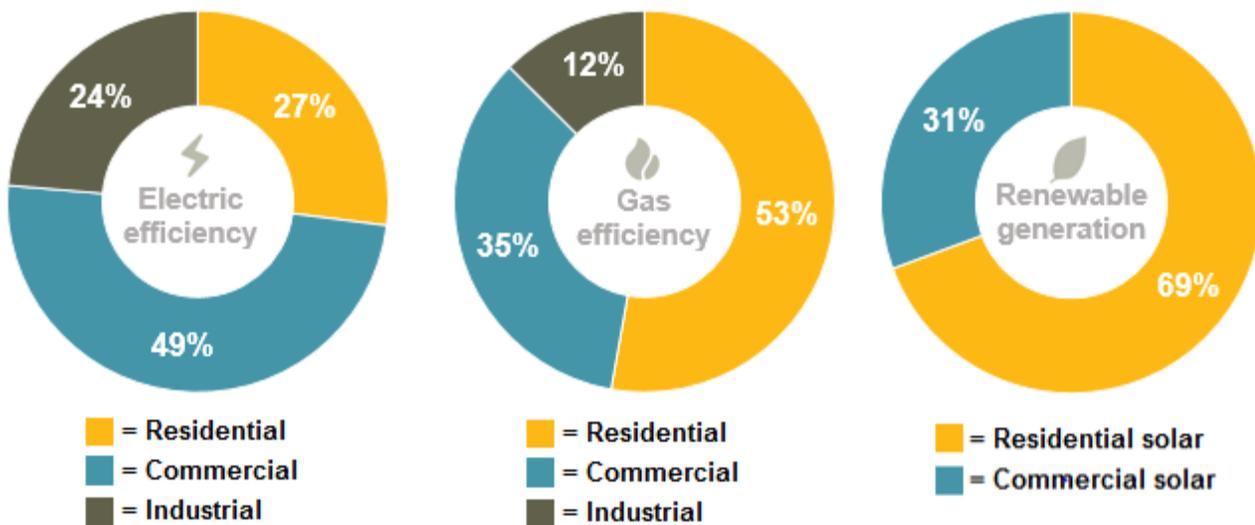
¹ This document reports net savings. Net savings are adjusted gross savings based on results of current and past evaluations.

² Note that aMW indicates average megawatts, MMTh indicates million annual therms and M is million.

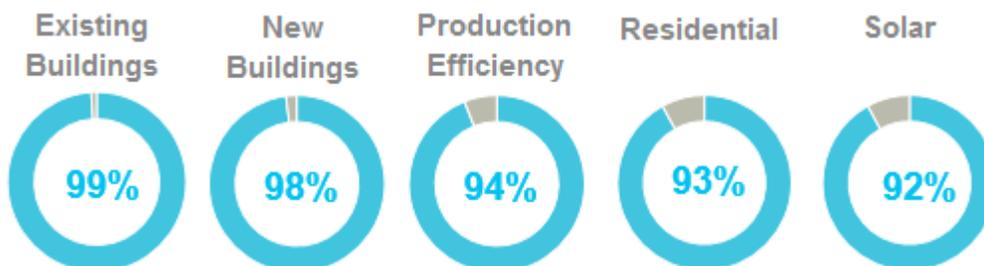
Generation



Percent of savings and generation by sector year-to-date

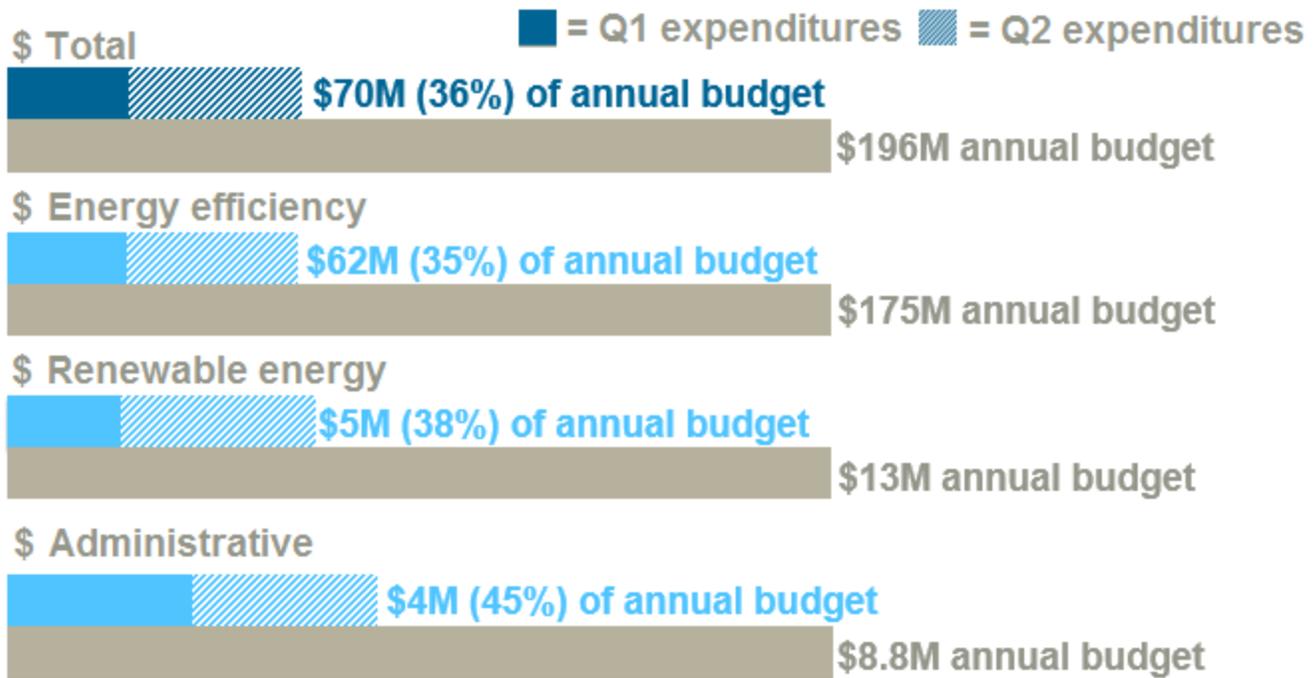


Customer satisfaction³

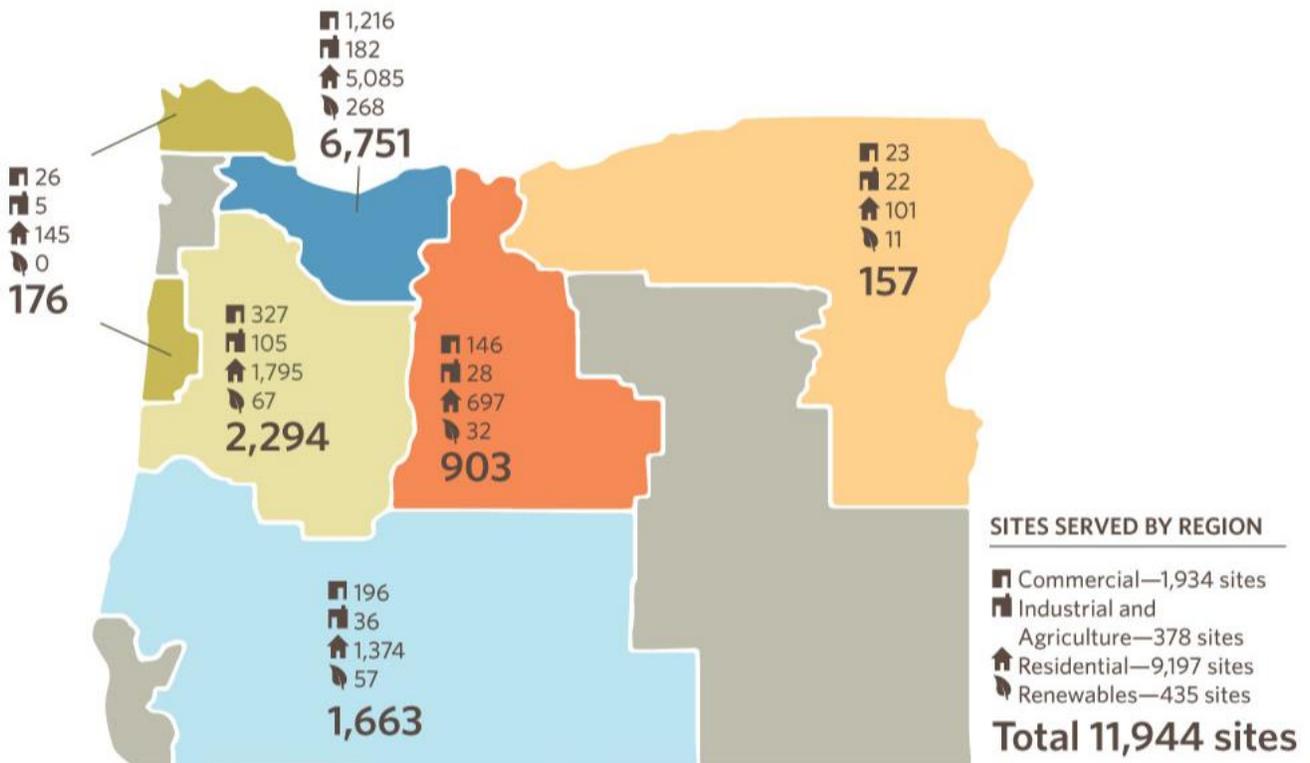


³ From March through June 2018, Energy Trust delivered a short telephone survey to 1,808 Oregon participants who completed projects between January and March 2018 and received an incentive or discount from Energy Trust. Results indicate satisfaction with overall program experience. New Buildings participants are surveyed annually, with the most recent survey in Q1 2018.

Expenditures



Sites served by region



This document reports on Energy Trust services to Oregon customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista. Areas in gray are not served by these utilities.

II Executive summary

A. Progress to energy efficiency and renewable energy goals^{4,5}

- At the close of quarter two, Energy Trust was on track to meet or exceed energy efficiency and renewable generation goals for 2018.
- Savings are typically lower in the first half of the year as more studies and assessments are completed compared to the second half of the year when more projects close. However, activity to date and the pipeline of committed projects provides an early indication that savings and generation are on target.
- Electric efficiency improvements completed in Q2 saved 10.4 average megawatts of electricity, about 18 percent of the 2018 goal of 56.6 aMW. Q2 2018 electric savings were approximately 24 percent less than savings in Q2 2017, resulting from increased lighting baselines that reduced the amount of claimed savings from residential lighting as this market transforms.
- Gas efficiency improvements completed during Q2 saved approximately 1.5 million annual therms of natural gas⁶, about 22 percent of the 2018 goal of 6.6 million annual therms. Q2 2018 gas savings were approximately 2 percent greater than the savings in Q2 2017.
- Renewable energy systems installed during Q2 will generate 0.53 aMW of electricity, 28 percent of the 2018 goal of 1.89 aMW.
- Savings and generation achieved in Q2 represent about 61,000 tons of carbon dioxide kept out of the atmosphere, the equivalent of removing 13,000 cars from Oregon roads.

10.4
AVERAGE
MEGAWATTS SAVED

1.5M
ANNUAL THERMS
SAVED

0.53
AMW GENERATED

61,000
TONS OF CARBON
DIOXIDE AVOIDED

B. Notable activities and trends

- Energy Trust completed Q2 with a strong foundation of completed and expected projects to help meet annual energy-efficiency and renewable generation goals, with continued high demand for LEDs across sectors, continued strong residential and commercial new construction markets, and the ongoing benefits of a strong economy.
- LEDs account for all the lighting savings in the residential sector and more than 95 percent of lighting savings in commercial and industrial sectors. In 2018, Energy Trust expects much fewer LED savings from residential customers than compared to 2017 and more LED savings from commercial and industrial customers than in 2017. In 2018, Energy Trust is eliminating incentives for some bulb types and is claiming fewer savings for

100%
OF RESIDENTIAL
LIGHTING SAVINGS
FROM LEDs

⁴ This document reports net savings, which are adjusted gross savings based on results of current and past eval

⁵ This report includes the best available energy savings data as of the date of submission. Energy savings reported here for periods prior to January 1, 2017, may be different than previously reported as a result of applying updated evaluation factors to Energy Trust savings and generation in Oregon through the annual true up process. The full True Up 2017 Report is available online at www.energytrust.org/reports.

⁶ The gas savings do not include results for NW Natural in Washington. These results are available at www.energytrust.org/reports.

standard, screw-in bulbs. This year, Energy Trust expects to incent 23 percent fewer residential LEDs bulbs and claim 76 percent fewer savings than in 2017. The decline in savings and incentives for LEDs is due to increasing baselines, declining costs and successful market transformation. Additional research is underway to assess LED lighting impacts on 2019 and 2020 savings and expenditures, and will be summarized in the Q3 2018 report.

- **Staff developed an exit plan for the residential LED market** as part of budget planning for 2018 and 2019, and identified four market indicators to track on the LED market. The Residential program plans to further reduce incentives and savings from LEDs by 30 percent in 2019, and then by another 80 percent in 2020 as a final step toward successful market transformation. Detailed information on lighting is provided in Appendix 1.
- **LEDs have grown significantly in commercial and industrial sectors, however to a much smaller extent** than in the residential market. Screw-in LEDs are a small share—roughly 5 percent—of the commercial and industrial lighting market. Multifamily buildings are the exception, as screw-in LEDs represent the majority of lighting savings for residential tenants and 30-34 percent of all electric savings for Energy Trust’s multifamily program. Commercial and industrial lighting changes lag those in residential because the embedded lighting equipment lasts longer, and replacements and upgrades require more effort and relative cost. Energy Trust is monitoring some applications, such as linear LEDs, where price drops and market penetration are starting to signal that less support and incentives will be needed in future years. See Appendix 1 for more information.
- **As lighting savings represent a smaller portion of electric savings in future years, Energy Trust expects to achieve significant savings from other technologies and offerings**, including energy-efficient residential and commercial construction, commercial and industrial building upgrades, and residential heat pumps, showerheads and smart thermostats.
- **New housing construction drove electric and gas savings**, both for highly efficient multifamily buildings and EPSTTM single-family homes that exceed Oregon’s energy code. Energy Trust launched a new 2018 incentive structure for EPS homes that reflects changes to Oregon’s residential building code made in 2017, and added a transition incentive to mitigate attrition as builders navigate the cost and challenges of building to the new code.
- **Large custom projects at schools drove commercial gas savings**, including large custom Existing Buildings projects in Southern Oregon, Central Oregon, the Willamette Valley and the Portland Metro area. The New Buildings program provided early design and technical assistance to additional schools applying for state bonds. In Q2, the state approved an additional \$854 million in bonds for new school construction projects in the Willamette Valley and the Oregon Coast, which are expected to result in 50 to 70 additional projects in future years.



**NEW HOUSING
CONSTRUCTION
DROVE ELECTRIC AND
GAS SAVINGS**



**SCHOOLS PROJECTS
DROVE COMMERCIAL
GAS SAVINGS**

- **To help reach, serve and deliver benefits to more participants**, Energy Trust finalized an operations plan for its diversity, equity and inclusion initiative, which includes **10 goals to achieve by the end of 2020**.
 - **In Q2, staff began to identify data sources and establish baselines for each goal.** Staff presented this analysis to and received input from four organizations with expertise conducting this type of data analysis.
 - **Several staff attended PGE's Diversity Summit**, learning from experts and implementers of diversity, equity and inclusion initiatives. In addition, the diversity, equity and inclusion committee hosted two diversity experts for presentations to staff, including Multnomah County chief diversity and equity officer and the research director of the Coalition of Communities of Color.
- **The board of directors approved a staff recommendation to award the New Buildings program management contract to CLEAResult**, following a competitive solicitation in Q1. The contract will run from 2019 through 2021, with two optional one-year extensions. In addition, staff reviewed proposals for delivery of the Production Efficiency custom track offering, following a request for proposals issued in Q1. Staff will present a recommendation to the board for approval in Q3.
- **To increase Energy Trust's capacity to innovate and adapt to change**, staff completed projects to improve organizational processes and readiness for the future:
 - **An organizational review project team delivered a final report of findings and recommendations** to the organization's internal management team and presented an executive summary to the board of directors. Recommendations include improvements to goal alignment across the organization, prioritization, decision-making, staffing planning, alternative staffing approaches, staff development, technology systems, adaptability, innovation, organizational structure and organizational culture. Staff will work through year-end to implement a handful of near-term recommendations while developing a plan for implementing the majority of the recommendations.
 - **A budget review project team provided final recommendations** to staff, the board of directors and stakeholders. The team recommended moving to a three-year action planning timeframe, with an annual budget and an annual review of the action plan. Staff will work through 2019 to develop a plan for implementing these recommendations.
 - **Energy Trust refined its forecasting methods to be used in development of the organization's 2019 Budget and 2019-2020 Action Plan** to meet stakeholder needs. Refinements included using earlier forecasts for budgeting, which were found to be reliable at an aggregate level with modest improvements, and adding forecast requirements to 2018-2019 program management and delivery contracts. As a result, Energy Trust will provide OPUC and utilities with an earlier draft budget to allow more time for review and input.

10

DIVERSITY, EQUITY
AND INCLUSION
GOALS SETPRESENTED BUDGET
PROCESS
RECOMMENDATIONS
TO BOARD AND
STAKEHOLDERS

- **Staff provided information to Energy Trust's board of directors at an annual strategic planning workshop**, including progress to 2015-2019 Strategic Plan goals and the final three of 11 learning topic papers on subjects of interest to the board. Learning topic papers address awareness and education as a long-term investment in program activity, community engagement, community resilience, cost-effectiveness, distribution systems and energy efficiency, long-term energy efficiency forecasting, electric and advanced mobility, expanded goals to support energy savings and generation, new opportunities from data, partnering to capitalize benefits and solar plus storage.
- **Several board transitions occurred in the first half of 2018.** Three members retired from Energy Trust's board of directors after many years of service to the organization: Ken Canon, Dan Enloe and founding board member John Reynolds. Energy Trust welcomed **new board member Ernesto Fonseca, CEO of Hacienda Community Development Corporation**, who brings expertise in sustainable communities, energy efficiency and affordable housing. The board is currently recruiting interested candidates to fill remaining vacancies.



III Program and operations activity

A. Commercial sector highlights

- **The commercial sector was on track with savings expectations in most utility territories**, driven by Existing Buildings lighting projects, large custom Existing Buildings projects in schools and a strong new construction market.
- **To help reach goals in Pacific Power and Cascade Natural Gas territories**, the sector will deepen commercial Strategic Energy Management engagement with participating customers in these territories.
- **Savings from NEEA activities comprised approximately 4 percent and 5 percent of the sector's results** in PGE and Pacific Power territories, respectively. Savings in 2018 are from building code and equipment standards improvements, working with distributors and manufacturers to encourage stocking of efficient commercial lighting, and efforts to promote and support commissioning of new and existing commercial buildings.

4%

OF COMMERCIAL
SECTOR SAVINGS IN
PGE TERRITORY FROM
NEEA ACTIVITIES

5%

OF COMMERCIAL
SECTOR SAVINGS IN
PACIFIC POWER
TERRITORY FROM
NEEA ACTIVITIES

Existing Buildings

The Existing Buildings program offers energy-efficient improvements for existing commercial buildings of all sizes. Incentives are available for custom projects, including capital upgrades and operations and maintenance improvements; standard upgrades; lighting upgrades; and energy management offerings such as commercial Strategic Energy Management, with incentives, tools, training and technical assistance to help customers reduce energy use through behavioral and operations improvements.

- **Electric savings were bolstered by large lighting projects** completed in Q2, with applications for lighting projects trending up.
- **Despite strong interest in lighting projects, savings are more difficult to achieve** as the market transforms, many large customers have already participated and fewer lighting offerings are cost-effective. Staff expect lighting controls and advanced lighting strategies to grow as a portion of lighting savings in future quarters.
- **Large custom projects at schools drove gas savings**, including at North Marion, Oregon Trail, Bend-LaPine, Three Rivers and Winston-Dillard school districts. Foodservice equipment, boilers and a large waste heat recovery project also contributed gas savings.
- **Applications for energy-efficiency studies rose in Q2**, adding to the pipeline of projects expected to complete in 2018. Existing Buildings helped customers complete 11 short studies through Q2 2018, compared to four in fall 2017 when the offering launched. Because they are less expensive and quicker than custom studies, short studies help eliminate barriers to participation for small customers.
- **To streamline and reduce delivery costs of commercial Strategic Energy Management**, staff outlined strategies to improve energy modeling



LARGE LIGHTING
PROJECTS DROVE
ELECTRIC SAVINGS



APPLICATIONS
INCREASED FOR
ENERGY-EFFICIENCY
STUDIES

for implementation later this year and into 2019.

- **Staff collaborated with NEEA to develop a new standard incentive for high-efficiency variable refrigerant flow systems** with dedicated outdoor air systems and heat recovery.
- **To encourage rural small business participation, staff delivered program information and applications to more than 500 restaurants and small businesses** in Eastern Oregon, Central Oregon and Southern Oregon.
- **To date, no customers have enrolled in Energy Trust's Pay for Performance pilot.** Staff commissioned an evaluation to find out why enrollment is lacking, and engaged stakeholders to review options for revising or ending the effort. Generally, Pay for Performance overlaps with Existing Buildings custom and Strategic Energy Management offerings, indicating there does not appear to be a significant gap in the market for Pay for Performance to fill.

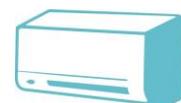
500

RESTAURANTS AND
SMALL BUSINESSES
RECEIVED
INFORMATION AND
APPLICATIONS

Existing Multifamily

The Existing Multifamily program serves existing multifamily structures with two or more dwelling units, including market-rate housing, affordable housing, assisted living facilities, campus housing facilities, homeowners associations and individual unit owners. Offerings include free in-unit installation of LEDs, showerheads and faucet aerators and distribution of energy-saving advanced power strips; incentives for common-area lighting upgrades; incentives for standard measures including HVAC equipment, water heaters, weatherization, appliances and foodservice equipment; midstream incentives provided to distributors for qualifying equipment and lighting measures; incentives for custom projects; and technical services including technical analysis studies and free walkthrough surveys.

- **Free installation of LEDs, showerheads and faucet aerators in tenant units, plus common-area lighting and standard HVAC upgrades, drove electric savings** in Q2. Common-area lighting projects increased from Q1 as a result of outreach efforts.
- **Gas savings were driven by upgrades to energy-efficient HVAC, foodservice and water heating equipment.**
- **The program saw strong savings from standard upgrades, driven by technical and educational services** such as free walkthrough surveys, lighting audits and presentations. Gas and electric savings from standard upgrades were nearly 25 percent higher through Q2 compared to the first half of 2017. The program plans to increase savings from the standard track in anticipation of fewer savings in future years from direct installation of LEDs as the LED market transforms.
- **Demand for ductless heat pumps remained strong despite the expiration of the state Residential Energy Tax Credit** at the end of 2017. To date, the program supported 143 ductless heat pump installations, up from 86 installations through Q2 2017. Demand for ductless heat pumps



STRONG DEMAND FOR
DUCTLESS HEAT
PUMPS

could still decline in the remainder of 2018 following the end of the application grace period for Residential Energy Tax Credits.

- **Targeted outreach to small multifamily properties bolstered participation** through Q2, with roughly 200 condominium and townhome owners and 100 two- to four-plex rental properties served. In addition, targeted marketing to regions outside of the Portland Metro area drove nearly 40 project leads in Central Oregon, Southern Oregon and Eastern Oregon.
- **Existing Multifamily concluded its water submetering pilot**, launched in 2017 with the Portland Water Bureau to explore energy savings opportunities from shifting participants from master-metered to individually metered water billing. The pilot fell short of a representative sample of participants, with only two sites enrolled. Staff identified high installation costs, existing plumbing configurations and limited availability of qualified plumbing contractors as barriers to participation. Staff are exploring additional ways to coordinate with the water bureau on energy- and water-saving offerings for multifamily and commercial buildings.
- **The program enrolled 60 properties in its free online benchmarking tool**, which compares a property's energy use against other similarly sized properties and against its own past energy usage. In Q2, staff expanded the tool's functionality to include notifications of unexpected increases in energy use, enabling customers and energy advisors to respond quickly to critical energy- or water-saving opportunities.
- **Existing Multifamily completed a program performance and market saturation analysis** to inform targeted outreach and strategy to increase engagement in market segments and regions with most opportunity and historically lower participation rates. The analysis found the program has already served many of the properties with 50 or more units; has had most success in reaching customers in the Portland Metro and Central Oregon regions, but lagged in remaining regions; and has had lowest participation rates with smaller properties, particularly buildings with 2-4 units.



TARGETED OUTREACH
TO SMALL
MULTIFAMILY
PROPERTIES

60

MULTIFAMILY
PROPERTIES
ENROLLED IN
BENCHMARKING TOOL

New Buildings

The New Buildings program supports design and construction of high-performance commercial buildings and major renovations of all sizes and building types. Staff engage with building owners, developers and design professionals to provide standard prescriptive incentives, market solutions incentive packages and custom incentives. Tailored market solutions incentive packages help businesses make quick decisions and achieve deeper energy savings when constructing small restaurant, grocery, multifamily, office, school or retail buildings less than 70,000 square feet.

- **Multifamily and warehouse projects each comprised about 30 percent of electric savings** in Q2, followed by grocery projects at 14 percent.
- **The majority of gas savings in Q2 were from multifamily projects**, at 43 percent, with lodging and grocery projects also contributing substantial savings.



MAJORITY OF NEW
BUILDINGS GAS
SAVINGS FROM
MULTIFAMILY
PROJECTS

- **Oregon's rising construction costs appear to influence some customers to opt for less aggressive and lower-cost energy-saving investments or to build to code.** If this trend continues, staff expect less savings per project or to raise incentives to retain prior penetration rates.
- **One Path to Net Zero project completed through Q2**, with an additional 16 projects expected to complete by year-end—on par with 2017. Path to Net Zero provides increased incentives and support to new commercial construction projects that aim to exceed energy code by 40 percent through a combination of energy-efficiency and renewable energy features.
- **New Buildings continued outreach to remote and smaller communities** through events, including high-performance design trainings in Bend and Portland, an energy-efficient schools panel in Coos Bay, and events with the Umpqua Small Business Development Center and the Partnership for Economic Development in Douglas County.
- **The program helped schools receiving 2017 state bonds with early design and technical assistance**, including through 25 early design assistance meetings around the state. In Q2, the state approved an additional \$854 million in bonds for new school construction projects in Salem, Corvallis, Harrisburg and Nestucca Valley, which are expected to result in 50 to 70 additional projects in future years.
- **New Buildings enrolled two small 1- to 3-MW data centers** so far this year, both in Hillsboro. Staff are cultivating relationships with existing design and engineering firms to increase awareness of Energy Trust support for small- and mid-size data centers.



COMPLETED ONE
PATH TO NET ZERO
PROJECT



PROVIDED EARLY
DESIGN AND
TECHNICAL
ASSISTANCE TO
SCHOOLS

B. Industry and agriculture sector highlights

- **The industry and agriculture sector performed in line with expectations for most utility territories**, with high demand for lighting driving electric savings and a large thermal oxidizer project boosting savings in NW Natural territory.
- **Despite strong lighting demand, the sector could fall short of its PGE savings goal due to a megaproject now expected to save only 50 percent of its originally forecasted savings in 2018**, with the remainder delayed to 2019. Megaprojects are large commercial and industrial projects receiving more than \$500,000 in Energy Trust incentives for energy-efficiency upgrades. These projects are reviewed and approved by the board of directors and provide savings at a very low cost.
- **Savings from NEEA activities comprised approximately 1 percent of the sector's results** in Pacific Power territory, with no savings in PGE territory. Savings in 2018 are from NEEA's reduced wattage lamp replacement initiative, certification of refrigeration operators in the industrial refrigeration market, as well as from a previously funded initiative to improve awareness of and establish standards for efficient motors.

1%

OF INDUSTRY AND
AGRICULTURE
SECTOR SAVINGS IN
PACIFIC POWER
TERRITORY FROM
NEEA ACTIVITIES

Production Efficiency

Production Efficiency provides energy-efficiency solutions for all sizes and types of eligible industrial, agricultural, municipal water and wastewater customers. The program provides services and incentives through three primary delivery tracks: standard, custom and energy performance management. Production Efficiency is designed and managed in-house by Energy Trust staff, and is delivered to market through the support of program delivery contractors and other market actors.

- **Lighting projects drove electric savings in Q2**, especially LEDs, LED high bays and custom LED indoor agriculture projects. Strong lighting savings are expected to continue through 2019. Standard track measures also contributed electric savings, including irrigation upgrades, compressed air leak reduction upgrades and fast acting doors.
- **The steam trap offering launched in Q4 2017 delivered 90 percent of gas savings in Q2**, followed by insulation upgrades and heat pump water heaters. A large custom regenerative thermal oxidizer project is expected to contribute roughly one-third of gas savings by year-end.
- **Production Efficiency completed 500 projects through Q2**, which is well ahead of expectations. Interest in studies is consistent with last year; however, resulting projects are smaller than in past years and save less energy.
- **The program developed new measures to launch by year-end**, including building insulation for indoor agriculture, natural gas boilers, municipal water leak detection and repair, and four irrigation sprinkler upgrades.
- **Responding to high demand for Performance Plus enhanced lighting incentives** for commercial and industrial customers, the program temporarily discontinued these incentives for new Production Efficiency projects for the remainder of 2018. Incentives will remain for Existing Buildings customers, and current Production Efficiency incentive reservations and commitments will be honored.
- **Energy Trust sponsored the 2018 NW Industrial Energy Efficiency Summit** and delivered sessions on energy-efficiency and Strategic Energy Management for the brewing industry supply chain, sharing energy-efficiency best practices and technologies with 200 customers.
- **The program collaborated with utilities and industry partners to reach more small- and medium-sized industrial customers**, including sponsoring the Oregon Manufacturing Extension Partnership and speaking at three Pacific Power Be Wattsmart community events for commercial and industrial customers.
- **Staff reached out to rural farmers, irrigators and their vendors through 57 phone calls and in-person visits**, including outreach to agencies and nonprofits such as the Oregon Association of Nurseries, Oregon Women for Agriculture and Oregon State University extension centers.
- **Staff improved scoping and calculator tools to facilitate comprehensive engineering services for small- to medium-sized industrial sites.** This



**LIGHTING DROVE
PRODUCTION
EFFICIENCY ELECTRIC
SAVINGS**

90%

**OF GAS SAVINGS
FROM STEAM TRAP
OFFERING**

500

**PRODUCTION
EFFICIENCY
PROJECTS
COMPLETED**



**REACHED OUT TO
FARMERS THROUGH
57 CALLS AND VISITS**

includes a scoping tool for walkthrough studies and calculators for lighting and irrigation upgrades.

C. Residential sector highlights

- **The residential sector performed in line with expectations for all utility territories**, with strong savings driven by construction of new EPS homes and in-store purchases of LEDs.
- **Savings from NEEA activities comprised approximately 23 percent and 20 percent of the sector's results** in PGE and Pacific Power territories, respectively. Savings in 2018 are primarily from previously funded efforts to improve battery charger standards, as well as from residential building code improvements. Ductless heat pump, heat pump water heater and super-efficient dryer initiatives also deliver savings.

Residential

Energy Trust's residential program provides energy-efficiency solutions for residential customers of single-family homes, manufactured homes and newly constructed homes. Cash-back incentives are available for energy-efficient HVAC systems, appliances and weatherization upgrades. Instant discounts are provided for water heating equipment, lighting and showerheads. The program delivers services through four program tracks: home retrofit, manufactured homes, retail promotions and new construction.

- **In-store purchases of LEDs and showerheads, ductless and ducted heat pump upgrades, and energy-efficient EPS new homes drove electric savings** in Q2.
- **The majority of gas savings were from market transformation and construction of new EPS homes, with a substantial remainder from energy-efficient showerheads, smart thermostats and upgrades to energy-efficient windows, furnaces and gas fireplaces.** Energy Trust claims market transformation savings for influence on 2011 and 2008 updates to energy code that increased the adoption of energy-efficient technologies and practices.
- **The program launched a new EPS incentive structure that reflects changes to Oregon's residential building code made in 2017.** To help EPS builders and verifiers transition to the new EPS incentive structure, the program added a builder transition incentive. Temporary additional incentives help motivate builders to continue to build higher performing homes and mitigate attrition as builders navigate the cost and challenges of building to the new code.
- **Heat pump replacements were 160 percent higher than in Q2 2017**, largely driven by the Q2 end of the grace period for receiving a Residential Energy Tax Credit following the 2017 sunset, revised requirements for Energy Trust incentives, and a complementary incentive from Energy Trust for also installing heat pump controls.

23%

OF RESIDENTIAL
SECTOR SAVINGS IN
PGE TERRITORY FROM
NEEA ACTIVITIES

20%

OF RESIDENTIAL
SECTOR SAVINGS IN
PACIFIC POWER
TERRITORY FROM
NEEA ACTIVITIES



LAUNCHED A NEW EPS
INCENTIVE
STRUCTURE

160%

MORE HEAT PUMP
REPLACEMENTS
COMPARED TO LAST
YEAR

- **Heat pump water heater sales lagged across both retail and distributor channels**, attributed to the sunset of NEEA's upstream incentives to manufacturers, the sunset of Residential Energy Tax Credit in 2017 with no grace period in 2018, sunset of federal tax credits, and higher costs from recent trade tariffs reducing production volumes.
- **Following lower than expected LED sales at Costco and The Home Depot, the program increased incentives and promotions** at these large big-box stores in urban areas. **The program began offering LED incentives at new small, local and independent stores**, including Salvation Army and Market of Choice stores.
- **Residential launched an online instant coupon that allows customers to redeem smart thermostat incentives** at time-of-purchase online or in select retail stores, simplifying their purchasing experience through instant incentive offerings. To date, 450 recipients who received an email promoting the coupon requested instant coupons, and additional campaigns are planned for 2018 and 2019. When possible, campaigns will align with manufacturer promotions to leverage manufacturer discounts.
- **Residential received its first 16 incentive applications to retire old, inefficient manufactured homes and replace them with energy-efficient new models** through the manufactured home replacement pilot. Staff completed all site assessments and participant interviews for the first of three participating manufactured home communities, Oak Leaf Manufactured Home Park in Portland, and received incentive applications for all units expected to participate.
- **The program contracted with Portland nonprofit Community Energy Project to reach underserved customers through installation of 25 heat pump water heaters in low-income homes at no cost to the participants**, do-it-yourself weatherization workshops, in-home energy-efficiency audits and promotion of Savings Within Reach enhanced incentives for moderate-income customers. This effort tests a new program design model that builds partnerships with community-based organizations to help customers they work with benefit from energy-efficiency services.
- **The program released a request for proposals to HVAC trade allies installing ducted and ductless heat pumps in manufactured homes.** A heat pump promotion for manufactured homes is expected to launch in Q3 and last through the end of Q1 2019. It will increase expand engagement with low- and moderate-income residents.



EXPANDED LED INCENTIVES TO NEW SMALL, LOCAL AND INDEPENDENT STORES

16

MANUFACTURED HOME REPLACEMENT INCENTIVE APPLICATIONS RECEIVED



CONTRACTED TO INSTALL 25 HEAT PUMP WATER HEATERS IN LOW-INCOME HOMES AT NO COST

D. Renewable energy sector highlights

- **The renewable energy sector performed in line with expectations in Q2**, with an expected reduction in demand for solar incentives following the sunset of the Residential Energy Tax Credit.
- **Energy Trust's Board of Directors approved a \$3-million incentive for a biopower cogeneration project at the City of Salem Willow Lake Water**

Pollution Control Plant, following project development assistance and early design support from Energy Trust.

Solar

The Solar program aims to create a vigorous and sustainable market for solar in Oregon that will ultimately thrive without incentives. The program offers incentives and support to increase consumer awareness through education and marketing; protect consumers by enforcing business and quality standards; aid the industry to drive down non-hardware soft costs; and ensure a robust, qualified trade ally network. The program offers standard incentives for smaller-scale distributed systems for residential, business, public sector and nonprofit customers. In 2018, the program is focusing on improving equitable access to solar for lower-income customers and supporting innovative applications of solar that provide greater value to communities or the grid.

- **With 310 residential customers applying for solar incentives in Q2**, this was the lowest quarter for residential applications in four years and represented a **40 percent reduction in demand compared to Q2 2017**. The reduction was expected following the expiration of the Residential Energy Tax Credit at the end of 2017, and in Q1 the program moderately increased residential incentives to help provide stability and continuity for customers and trade allies during this major market change.
- **The program collaborated with the Oregon Department of Energy to help customers meet the Q2 deadline to complete documentation to receive a state tax credit** for solar projects installed in 2017. Energy Trust allowed customers that did not meet the deadline for projects installed in 2017 to receive moderately higher 2018 solar incentives.
- **Solar launched a new solar development assistance offering to provide early support for public, nonprofit and other organizations facing high project barriers**. Customers can apply for and receive both utility grant funding and solar development assistance, which provides early assistance to develop a project design, financial plan and proposal. Utility grant funds cannot be spent on early costs, so Energy Trust's solar development assistance fills this gap. In Q2, 21 nonprofit and public customers applied for both Energy Trust incentives and PGE's Renewable Development Fund grant.
- **Energy Trust helped support customers impacted by a solar contractor that did not meet its contract obligations to them**, coordinating closely with the Oregon Solar Energy Industries Association and two solar trade allies who stepped in to complete the majority of the remaining active projects and assist customers. Energy Trust's involvement limited the negative impact on affected customers and allowed a majority of the project installations to complete within Oregon Department of Energy deadlines.
- **The program launched an upgrade to PowerClerk software used by solar trade allies to submit incentive applications on behalf of their customers**. The upgraded software is more flexible, produces more accurate

40%

REDUCTION IN
RESIDENTIAL SOLAR
INCENTIVE
APPLICATIONS
FOLLOWING TAX
CREDIT SUNSET



LAUNCHED NEW
SOLAR DEVELOPMENT
ASSISTANCE
OFFERING

estimates of energy generation, allows for electronic signature tracking and provides more data about battery storage.

- **Staff completed and submitted a report to the U.S. Department of Energy on strategies for increasing solar access for low- to moderate-income communities.** Strategies include building the capacity of nonprofit and housing agencies to develop solar projects, supporting the development of effective and replicable funding models for low- and moderate-income solar projects, and helping Oregon's nascent community solar program achieve its 10 percent low-income participation mandate. Implementation of these strategies will begin in Q3 2018.
- **Energy Trust hosted its third annual Solar Contractor Day attended by 112 business solar industry stakeholders,** including representatives of 24 solar trade allies. The event offered business development, professional development and technical education to support solar trade ally businesses and reduce their non-equipment soft costs.
- **The program provided OPUC staff with expertise, data and community solar financial modeling** to inform its "Interim Alternative Bill Credit Rate Proposals for Community Solar" report. The OPUC used Energy Trust's financial analysis to inform the initial bill-credit rate for the state's community solar program.



HOSTED THIRD
ANNUAL SOLAR
CONTRACTOR DAY

Other Renewables

The Other Renewables program supports renewable energy projects up to 20 megawatts in nameplate capacity that generate electricity using biopower, geothermal, hydropower and municipal-scale, community-owned wind technologies. Most projects are less than 2 megawatts in size. The goal of the program is to expand Energy Trust's renewable energy portfolio across a range of technologies and improve market conditions for renewable energy projects. The program provides project development assistance incentives and installation incentives. Project development assistance incentives can pay for a portion of the costs of feasibility studies, technical assistance or other non-capital cost assessments to help projects move from concept to construction. Qualified projects may access project development assistance incentives multiple times, up to the limits of funding caps, enabling applicants to move through consecutive development activities. The program also provides installation incentives calculated on a custom basis after a detailed technical and financial review of a project's application. All incentives are paid following successful project installation or activity completion.

- **Energy Trust's Board of Directors approved a \$3-million incentive for a biopower cogeneration project at the City of Salem Willow Lake Water Pollution Control Plant.** Expected to reach commercial operation in Q4 2019, the cogeneration system will convert wastewater to produce an expected annual average of 7,610 MWh of clean energy and heat to be used on-site. Energy Trust also provided project development assistance to support early design of this project.



INCENTIVE APPROVED
FOR CITY OF SALEM
WATER POLLUTION
CONTROL PLANT

- **A significant milestone for the irrigation modernization initiative, Farmers Conservation Alliance secured \$50 million in federal funding to begin modernizing irrigation piping in the Deschutes River Basin.** With installation beginning this fall, upgraded pipes will reduce energy use and conserve water while adding opportunities for small-scale hydropower systems. The irrigation modernization initiative is a collaborative effort by Energy Trust and Farmers Conservation Alliance to connect irrigation districts and farmers with tools to invest in modern irrigation infrastructure, saving energy, conserving water, improving habitat for fish and generating clean energy.
- **Demand for the irrigation modernization initiative continued to grow, with more than a dozen new irrigation districts expressing interest.** Energy Trust and Farmers Conservation Alliance staff are coordinating to determine how to support the high level of interest within staffing and budget constraints.
- **Staff received one biopower and one hydropower project application for installation incentives** following a competitive solicitation. Projects include a municipal water resource recovery facility biopower system and a small, on-farm irrigation hydropower system. Staff will review applications in Q3.
- **Staff presented at the Northwest Small Hydropower Conference and Northwest Environmental Business Council's Future of Energy Conference,** and provided information to the Oregon House of Representatives Committee on Energy and Environment. Presentations strengthen relationships with project developers and legislators, and educate them about the value of distributed renewable energy projects.

E. Internal operations highlights

Communications

- **Energy Trust received 100,000 website visits in Q2,** generating 284,000 page views.
- **More than 90 percent of all visitors to the website in Q2 were new visitors,** most of whom found the website through a search engine or paid online advertising. In addition to the home page, most new visitors viewed the residential incentives page, the residential heating solutions page and the smart thermostat incentive page.
- **In Q2, visitors who found the website through a search engine viewed 2.8 pages per visit and spent just over three minutes on the website.** This is higher than Energy Trust's 2017 average and a good indicator of engagement.
- **The majority of web visitors were located in the Portland Metro area (79 percent),** followed by the Willamette Valley (9 percent), Southern Oregon (7

100,000
WEBSITE VISITS

percent) and Central Oregon (4 percent). The remaining one percent of visits originated from Eastern Oregon, the Coast and outside of Oregon.

- **Energy Trust distributed eight press releases in Q2**, featuring a new board member and statewide and regional 2017 results.
- **Energy Trust garnered 42 news stories** about its programs, services and customer benefits in print and broadcast with a media value of \$7,900—what it would have cost to purchase the equivalent advertising space or air time—as a result of media outreach and responses to reporter inquiries.

Customer service

- **Energy Trust received 3,800 calls in Q2 2018, a 22 percent decrease** from 4,900 calls in Q2 2017. This reflects a trend of declining call volumes as more customers access online self-service web content and tools.
- **Staff responded to 350 email inquiries in Q2 2018**, a 20 percent decrease from 440 emails received in Q2 2017.
- **Energy Trust received one complaint in Q2 2018** that could not be easily resolved by a call center representative. The complaint was from a customer disqualified for an incentive due to their installed equipment not meeting Energy Trust's efficiency requirements.

Trade and program allies

- **Staff provided education and networking opportunities to 260 trade allies at Trade Ally Forums in Bend, Grants Pass, Klamath Falls, Pendleton and Portland.** Presentations covered gas and electric measure updates, heat pump water heaters and ductless heat pump sizing, and heat pumps in manufactured homes. Guest speakers included the City of Portland on Portland Home Energy Scoring, Community Energy Project and Craft3 on how to talk to customers about income, and regional economists discussing employment and housing trends.
- **Energy Trust provided ongoing support for trade allies through webinars, trainings, meetings and the Insider newsletter.** Support for trade allies is critical as Energy Trust relies on them to communicate about and deliver Energy Trust offerings to customers.
- **Energy Trust reduced the frequency of the monthly Insider newsletter to every other month.** This allows for improved content strategy and reduced workload while maintaining a valuable resource for trade allies.
- **Energy Trust launched an improved online Find a Contractor tool to make it easier for customers to find and connect with local trade allies.** The tool is easier to use and has new features, including an option for customers to type exactly what they're looking for instead of selecting from a drop-down list, an easier way to search for a specific contractor by name, and more options for filtering trade allies by characteristics that customers indicated are important in their selection process.

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NEWS STORIES ABOUT ENERGY TRUST

3,800

CUSTOMER CALLS RECEIVED



CONDUCTED TRADE ALLY FORUMS IN BEND, GRANTS PASS, PENDLETON AND PORTLAND



LAUNCHED IMPROVED FIND A CONTRACTOR TOOL

General outreach

- **Outreach staff expanded awareness about Energy Trust services through presentations and events**, including Multnomah County Pathways to 100 Percent Renewables forum; Community Energy Project's Spring Fling; Oregon Native American Chamber events; Coalition of Communities of Color's Annual Gala; AARP Housing Policy Solutions conference in the Rogue Valley; 2018 Ford Institute's Rural Leadership Workshop; the annual meeting of Umpqua Valley Home Builders Association; and Pacific Power events in Jacksonville, Mill City and Lebanon.
- **Outreach staff provided information about Energy Trust programs through meetings** with the City of Ashland and the City of Medford.
- **Staff oriented and trained new a AmeriCorps Resource Assistance for Rural Environments intern** supporting the Lake County Resources Initiative in Lakeview.

IT and business systems

- **Energy Trust processed 14,000 customer projects in Energy Trust systems**, including 10,000 submitted through web applications.
- **Energy Trust launched a new Stakeholder Relationship Management system** to track and manage relationships with stakeholders representing a range of organizations, including government, community-based, utility and business associations.
- **Began using DocuSign automated workflow to manage access requests for new staff using Energy Trust's systems**, reducing processing time and eliminating the need for manual routing and signature collection.
- **Staff began transition to a new online version of SharePoint**, improving usability of this intranet platform used by staff, program management contractors and program delivery contractors.
- **Staff were assigned as owners and stewards of data across Energy Trust's IT systems**. Data owners will be responsible for documenting and maintaining data business rules, developing standard calculations and metrics visible to the organization, monitoring data quality and researching data issues, planning and leading data clean-up and standardization efforts, and assisting users with questions or issues related to the data.

14,000
CUSTOMER PROJECTS
PROCESSED

Planning and evaluation

- **Staff designed 29 new energy-efficiency measures** and revised 14 measures.
- **Staff completed and posted five evaluations and market studies** on the Energy Trust website: Economic Impacts of Energy Trust of Oregon's 2017 Program Activities Report, 2017 Fast Feedback Annual Report, Air Conditioning Research Phase Two Final Report, Residential Grow Light

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NEW ENERGY-
EFFICIENCY
MEASURES DESIGNED

Research, and Comparison of Ductless and Ducted Heat Pump Retrofits in Manufactured Homes.

- **Staff drafted an energy-efficiency forecast for Pacific Power's integrated resource plan**, and presented content supporting NW Natural, Cascade Natural Gas and Avista IRPs at an OPUC workshop.

IV Revenues and expenditures tables^{7,8,9,10}

A. Revenues and expenditures summary

- Overall revenues totaled \$45.7 million for Q2 2018, 1 percent over what was budgeted.
- Q2 expenditures totaled \$41 million, of which \$21 million or 51 percent was for incentives.
- Q2 electric efficiency expenditures were 5 percent below budget.
- Q2 gas efficiency expenditures were 17 percent below budget.
- Q2 renewable energy expenditures were 6 percent below budget.

B. Revenues

Revenues include public purpose revenue plus incremental electric revenue from SB 838 and a small grant. Incremental revenues are those authorized under SB 838 to support capturing additional cost-effective electric efficiency savings above the amount supported by funding through SB 1149.

Source	Q2 actual revenues	Q2 budgeted revenues
Portland General Electric	\$ 9,089,814	\$ 8,911,545
PGE Incremental	\$ 15,440,596	\$ 15,842,346
Pacific Power	\$ 6,858,725	\$ 6,926,175
Pacific Power Incremental	\$ 7,817,322	\$ 7,586,082
NW Natural	\$ 5,594,873	\$ 5,200,245
NW Natural Industrial DSM	\$ -	\$ -
Cascade Natural Gas	\$ 503,423	\$ 424,639
Avista	\$ 385,623	\$ 289,217
Low- and moderate-income solar grant	\$ 17,206	\$ -
Total	\$ 45,707,583	\$ 45,180,249

C. Expenditures by utility

Source	Q2 actual expenditures	Q2 budgeted expenditures
Portland General Electric	\$ 21,660,604	\$ 23,659,197
Pacific Power	\$ 14,639,310	\$ 14,560,068
NW Natural	\$ 3,779,565	\$ 4,733,493
NW Natural Industrial DSM	\$ 608,636	\$ 630,302
Cascade Natural Gas	\$ 356,485	\$ 523,355
Avista	\$ 329,667	\$ 232,570
Business development	\$ 10,872	\$ -
Low- and moderate-income solar grant	\$ 17,206	\$ -
Total	\$ 41,402,345	\$ 44,338,986

⁷ Columns may not total due to rounding.

⁸ The gas savings do not include results for NW Natural in Washington. These results are available at www.energytrust.org/reports.

⁹ Energy Trust invested organization contingency pool funds to explore new business development opportunities. Organization contingency pool funds are unrestricted donations and consulting fees, and are independent from ratepayer funds.

¹⁰ Energy Trust received a grant from the U.S. Department of Energy to collaborate with the Oregon Department of Energy to increase access to solar energy for low- and moderate-income communities.

D. Expenditures by sector and program

		Q2 actual expenditures		Q2 budgeted expenditures	
Commercial	Existing Buildings	\$	10,031,432	\$	8,810,543
	Existing Multifamily	\$	2,248,942	\$	2,409,997
	New Buildings	\$	5,310,946	\$	5,912,687
	NEEA Commercial	\$	596,940	\$	571,055
Commercial total		\$	18,188,261	\$	17,704,282
Industrial	Production Efficiency	\$	7,167,892	\$	8,056,544
	NEEA Industrial	\$	39,277	\$	35,628
Industrial total		\$	7,207,170	\$	8,092,172
Residential	Residential	\$	9,774,687	\$	11,708,878
	NEEA Residential	\$	1,205,613	\$	1,288,737
Residential total		\$	10,980,300	\$	12,997,615
Energy efficiency total		\$	36,375,731	\$	38,794,069
Renewables	Solar	\$	2,089,649	\$	2,399,387
	Other Renewables	\$	926,304	\$	823,253
Renewable generation total		\$	3,015,952	\$	3,222,640
Administration	Administration	\$	1,983,597	\$	2,322,277
Administration total		\$	1,983,597	\$	2,322,277
Other	Business development	\$	10,872	\$	-
	Low and moderate income grant*	\$	16,193	\$	-
Total expenditures		\$	41,402,345	\$	44,338,986

*Low- and moderate-income solar grant expenditures do not match grant expenditures in table C. This is because a portion of the grant expenditures in table D are under administration expenditures.

E. Incentives paid

Quarter	PGE efficiency	Pacific Power efficiency	NW Natural efficiency	Cascade Natural Gas efficiency	Avista efficiency	PGE generation	Pacific Power generation	Total
Q1	\$3,807,004	\$2,180,736	\$1,311,985	\$94,172	\$124,349	\$487,488	\$399,020	\$8,404,755
Q2	\$9,993,474	\$6,049,279	\$2,455,087	\$191,421	\$175,663	\$1,074,497	\$1,139,920	\$21,079,341
Total	\$13,800,478	\$8,230,015	\$3,767,072	\$285,593	\$300,012	\$1,561,985	\$1,538,941	\$29,484,096

V Savings and generation tables^{11,12,13,14,15}

A. Savings and generation by fuel

	Q2 savings/generation	YTD savings/generation	Annual goal	Percent achieved YTD
Electric savings	10.4 aMW	14.3 aMW	56.6 aMW	25%
Natural gas savings	1.5 million therms	2.1 million therms	6.6 million therms	33%
Electric generation	0.53 aMW	0.89 aMW	1.89 aMW	47%

B. Progress toward annual efficiency goals by utility¹⁶

	Q2 savings	YTD savings	Annual goal	Percent achieved YTD	Annual IRP target	Percent achieved YTD
Portland General Electric	6.5 aMW	8.9 aMW	36.4 aMW	24%	36.12 aMW*	25%
Pacific Power	3.9 aMW	5.3 aMW	20.2 aMW	26%	19.8 aMW	27%
NW Natural	1.3 million therms	1.8 million therms	5.7 million therms	32%	5.7 million therms*	32%
Cascade Natural Gas	95,445 therms	148,580 therms	547,106 therms	27%	548,212 therms*	27%
Avista	85,647 therms	158,263 therms	349,520 therms	45%	349,520 therms*	45%

* Integrated resource plans for PGE, NW Natural, Cascade Natural Gas and Avista are pending acknowledgement by the OPUC.

¹¹ Columns may not total due to rounding.

¹² This document reports net savings. Net savings are adjusted gross savings based on results of current and past evaluations.

¹³ Electric savings also include transmission and distribution savings.

¹⁴ The gas savings do not include results for NW Natural in Washington. These results are available at www.energytrust.org/reports.

¹⁵ Energy Trust reports 100 percent of generation and capacity for renewable energy installations supported by Energy Trust's cash incentives. While some of these projects have additional sources of funding, Energy Trust enabled project completion.

¹⁶ Integrated resource plan targets are shown in net savings, and are based on the IRP targets Energy Trust submitted to utilities for inclusion in their current IRP filings based on 2018 net-to-gross ratios. Some IRP targets do not match Energy Trust goals because IRP timing precedes Energy Trust's budgeting process through which utility energy goals are set. Energy Trust uses the most up-to-date information to determine its budgeted goals.

C. Electric savings by sector and program

		Q2 savings aMW	YTD savings aMW	Annual goal aMW	Percent achieved YTD
Commercial	Existing Buildings	3.2	3.7	15.0	25%
	Existing Multifamily	0.5	0.8	1.8	46%
	New Buildings	1.8	2.1	6.3	33%
	NEEA Commercial	0.3	0.4	1.8	24%
Commercial total		5.8	7.0	24.8	28%
Industrial	Production Efficiency	2.5	3.4	19.2	17%
	NEEA Industrial	0.0	0.0	0.1	27%
Industrial total		2.5	3.4	19.3	17%
Residential	Residential	1.7	2.9	7.2	40%
	NEEA Residential	0.5	1.0	5.3	19%
Residential total		2.1	3.9	12.4	31%
Total electric savings		10.4	14.3	56.6	25%

D. Natural gas savings by sector and program

		Q2 savings thm	YTD savings thm	Annual goal thm	Percent achieved YTD
Commercial	Existing Buildings	386,224	439,657	1,481,693	30%
	Existing Multifamily	28,941	48,416	165,791	29%
	New Buildings	210,812	252,393	936,040	27%
Commercial total		625,976	740,466	2,583,524	29%
Industrial	Production Efficiency	248,941	268,176	1,064,753	25%
Industrial total		248,941	268,176	1,064,753	25%
Residential	Residential	598,776	1,129,069	2,903,694	39%
Residential total		598,776	1,129,069	2,903,694	39%
Total natural gas savings		1,473,693	2,137,711	6,551,970	33%

Energy Trust allocated budget to NEEA for gas market transformation activities. While there were no associated savings in 2018, savings are expected in subsequent years.

E. Renewable energy generation by utility

	Q2 generation aMW	YTD generation aMW	Annual goal aMW	Percent achieved YTD
Portland General Electric	0.32	0.50	1.08	47%
Pacific Power	0.21	0.39	0.82	48%
Total	0.53	0.89	1.89	47%

F. Renewable energy generation by program

	Q2 generation aMW	YTD generation aMW	Annual goal aMW	Percent achieved YTD
Other Renewables	0.00	0.00	0.00	n/a
Solar	0.53	0.89	1.89	47%
Total generation	0.53	0.89	1.89	47%

G. Incremental utility SB 838 expenditures¹⁷

Utility	2018 Q2 SB 838 Expenditures	YTD SB 838 Expenditures
Portland General Electric \$	166,591 \$	364,631
Pacific Power \$	250,090 \$	400,172
Total \$	416,681 \$	764,803

¹⁷ Reflects expenditures by Pacific Power and PGE in support of utility activities described in SB 838. Reports detailing these activities are submitted annually to the OPUC.

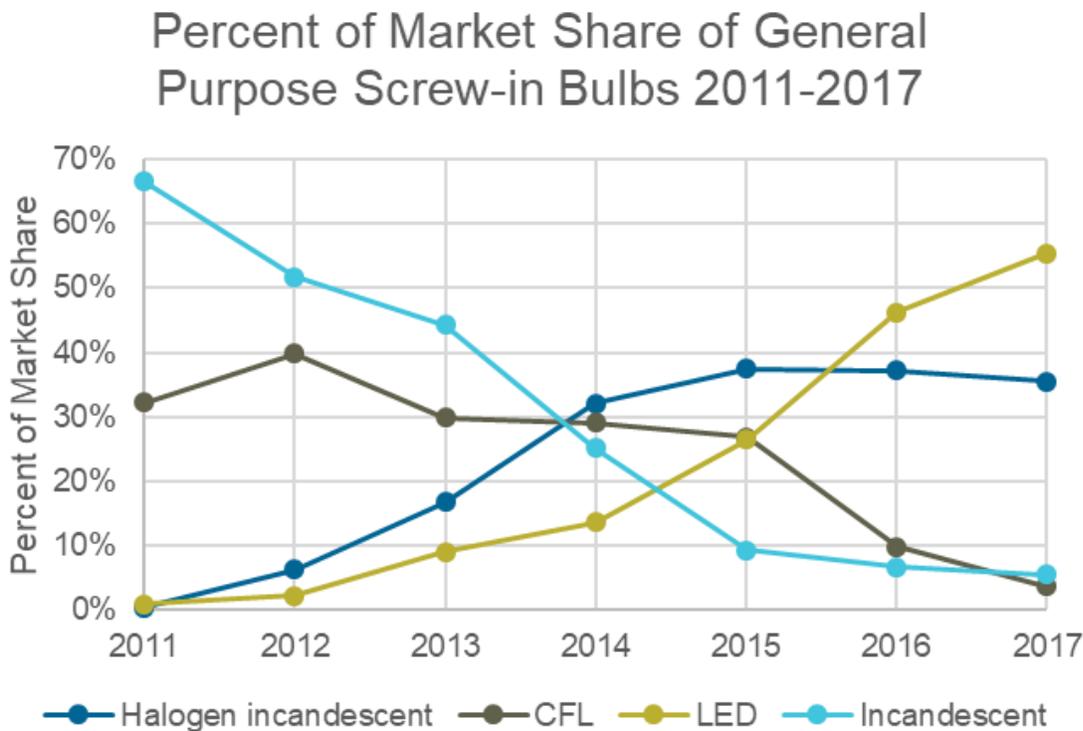
APPENDIX 1: Summary of LED market transformation and impact

A. Background on LED market transformation

Energy Trust, in coordination with Bonneville Power Administration (BPA) and other Pacific Northwest utilities, has supported the introduction and market adoption of LEDs since 2014. Manufacturers, retailers and consumers adopted LED technology much faster than expected, spurred by declining prices, high customer satisfaction with the product, and Energy Trust incentives and education. As a result, LEDs now represent 100 percent of residential lighting savings and more than 95 percent of lighting savings in the commercial and industrial sectors.

Figure 1 provides market share data for the Pacific Northwest for one of the most common sizes and types of general purpose screw-in bulbs, 250-1049 lumens A-lamp bulbs. LEDs have increased market share, while the share of standard incandescent bulbs (now unlawful to manufacture) and CFLs have dropped. The market share of halogen incandescent bulbs, currently the least efficient available technology for most applications, increased as the standard incandescent bulbs were outlawed, and is beginning to slightly decrease in favor of LEDs. This is consistent with national trends that show the halogen market share holding steady, as reported in Energy Trust’s 2018 budget.

Figure 1: Trends in Pacific Northwest market share for general purpose screw-in bulbs, by year



B. Background on the Energy Independence and Security Act of 2007

Energy Trust, BPA and other regional utilities have been acting ahead of the federal Energy Independence and Security Act of 2007 (EISA), which prohibits the manufacture or sale of most types of inefficient screw-in bulbs after January 1, 2020. This would effectively eliminate standard incandescent and halogen incandescent lamps from sale after that date. Only CFL or LED bulbs would qualify for sale under EISA, but few CFLs are currently in the market and manufacturers are no longer investing in this technology. LEDs are expected to dominate the market in 2020, in line with today.

Energy-efficiency programs have long acted ahead of federal and state standards and codes to help drive the market to earlier, smoother and more complete adoption of pending standards and codes. Such activities must still comply with relevant benefit cost tests, which are the total resource cost test and the utility cost test.

Because of the history of delays and changes to standards and general uncertainty about market response, Energy Trust has excluded EISA from its analyses of LED cost-effectiveness. Historically, standards such as these have been delayed. American Council for an Energy-Efficient Economy recently reported that the federal administration is proposing to delay or repeal part of the law, including all backstop provisions. Examples of past delayed or repealed federal standards include the congressionally legislated delay in enforcing a prior screw-in lighting standard, a component of the standard for fluorescent tube lighting that allowed inefficient high-color rendition index bulbs to remain on the market, and a furnace efficiency standard that was not expected to survive litigation as written.

C. Background on assumptions related to Energy Independence and Security Act and LED savings analysis

In 2018, Energy Trust re-evaluated the impact of EISA on LED incentives and savings in 2019. Staff determined that remaining in effect as written, the large majority of LED screw-in bulbs would no longer be cost-effective to incent in 2019 or after under the total resource benefit-cost test. Incenting LEDs would still be cost-effective under the utility benefit cost test. Staff presented this draft analysis to the Energy Trust Conservation Advisory Council at its August 1 meeting. If in planning for 2019 staff assume that EISA is continues as written, Energy Trust would need to make a sudden exit from the market at the start of 2019 or secure a cost-effectiveness exception from the Oregon Public Utility Commission.

The Northwest Power and Conservation Council's Regional Technical Forum has developed a different analysis. Using the Regional Technical Forum analysis, BPA and other regional utilities found that LEDs remain cost-effective to support even with EISA in effect. Some of Energy Trust's assumptions vary from the Regional Technical Forum's because Energy Trust employed more recent data and a different analytic approach.

Regardless, EISA implementation remains uncertain, and implementation across the region may not be uniform if it rolls out as written. Market analyses of LED sales, costs and shelving practices by retailers indicate that there is still a role for Energy Trust to support LEDs in 2019 and 2020. There is a risk that abrupt exits from the market will cause customers to choose less efficient bulbs, and doing so could undermine Energy Trust's successful coordination with BPA and other utilities working as a region to transform lighting adoption of LED technology.

D. Energy Trust conclusion on LED approach

Energy Trust staff believe that analyzing cost-effectiveness without taking into account EISA remains reasonable and appropriate. Codes and standards are more likely to be successful if Energy Trust and utilities support the technology or practices with programs and incentives, and the reasons for Energy Trust's initial analytic approach excluding EISA from its analyses of LED cost-effectiveness still hold.

Energy Trust is already on a path to substantially reduce market support for LEDs in 2019 and 2020, based on the market analyses staff have reviewed. A faster withdrawal than planned could drive an opposite result and create an opportunity for more sales of inefficient bulbs. Continued, reduced support for LEDs, plus coordination with BPA and utilities, helps ensure successful and permanent market transformation for screw-in LED bulbs.

The following background on residential, commercial, industrial and multifamily lighting markets provides additional information and context.

E. Background on the residential lighting market

LED market adoption has been the most pronounced for screw-in bulbs in the residential sector, with LEDs replacing sales of CFLs and reducing sales of standard incandescent and halogen incandescent bulbs. From relatively little savings from residential LEDs in 2014, savings from screw-in LEDs grew to 115 million kilowatt hours in 2017 from sales of more than 5.6 million bulbs supported by Energy Trust. In 2014, CFLs represented 68 percent of the lighting market and standard incandescents represented 32 percent. In 2017, LEDs represented 55 percent of regional lighting sales, followed by halogens at 35 percent, and CFLs and standard incandescent each representing 5 percent. While halogen incandescents are more efficient than the original incandescent bulbs, the share of the most efficient options (LED and CFL) has actually declined since 2011, one indication of the need to continue intervening in the market.

In 2017, Energy Trust supported about 500 lighting retailers of all sizes across Oregon, with lighting savings from LEDs growing to 79 percent of all residential electric savings. Reductions in bulb costs since 2014 enabled Energy Trust to reduce average LED incentives by 50 percent by the end of 2017. Energy Trust's residential LED incentives have dropped by another 5 percent through Q2 2018 based on cost and sales data.

F. Exit strategy for the residential LED market

Responding to the rapidly advancing market acceptance for LEDs, staff developed an exit path for the residential LED market during development of Energy Trust's 2018 annual budget. Energy Trust identified five market indicators to track on to inform the exit strategy, including LED market share, incentives paid per bulb, retail price of bulbs, incremental price of ENERGY STAR[®] LEDs, and energy savings and cost-effectiveness. Energy Trust works with regional partners to systematically collect and review additional market data.

In 2018, Energy Trust eliminated incentives for some LED bulb types, reduced others and is claiming fewer savings for standard, screw-in bulbs. As anticipated, the Residential program expects to incent 23 percent fewer residential LEDs bulbs and claim 76 percent fewer savings in 2018 as compared to 2017, reducing the impact of share of savings to 39 percent of total residential electric savings by the end of 2018.

For 2019, current market data indicates Energy Trust should still support LEDs to forestall use of replacement halogens. At the same time, Energy Trust should continue to reduce support for LEDs in anticipation of complete market transformation. In 2019, Energy Trust will reduce residential LED savings by 30 percent compared to 2018, and by another 80 percent in 2020. Incentive spending on residential retail lighting is expected to be about \$4.3 million in 2019, 59 percent less than in 2017.

In 2020, Energy Trust will no longer support general service screw-in LED bulbs, and will continue to support specialty LEDs. Staff expect to incent roughly 700,000 specialty LED bulbs at a cost of about \$850,000, down from a high of 5.6 million LEDs supported in 2017. The focus of the 2020 program offering will be developed when the situation is clearer. If EISA is in place, Energy Trust strategy will likely focus on areas with slow implementation of the standard, or on equipment not covered. If EISA is not in place, it will focus on lagging markets and equipment types. This will be a final step in supporting an extraordinarily successful LED lighting market transformation.

G. Background on commercial and industrial LED market

LEDs have grown significantly in commercial and industrial sectors, however, to a much smaller extent than in the residential market. Screw-in LEDs are a small share—roughly 5 percent—of the commercial and industrial lighting market. Multifamily buildings are the exception, as screw-in LEDs represent the majority of lighting savings for residential tenants and 30-34 percent of all electric savings for Energy Trust's Existing Multifamily program.

LEDs represent about 98 percent of all commercial and industrial lighting savings supported by Energy Trust, largely for linear applications, fixtures and specialty applications. The availability of LEDs drove a strong increase in participation in Energy Trust's lighting initiative, particularly because of their superior light quality and versatility in lighting controls applications. Lighting as a share of all commercial and industrial electric savings grew from 29 percent in 2015 to 34 percent in 2017. In 2018, LEDs are expected to represent 48 percent of all commercial and industrial lighting savings. This share is expected to drop to 42 percent in 2019 as customers complete many of the available large projects.

Commercial and industrial lighting changes lag those in residential because the embedded lighting equipment lasts longer, and replacements and upgrades require more effort and relative cost. There is no EISA equivalent for the types of lighting that dominate commercial and industrial applications. Nevertheless, Energy Trust is monitoring some applications, such as linear LEDs, where price reductions and market penetration are starting to signal that less support and incentives will be needed in future years.

H. Background on existing multifamily LED market

In multifamily buildings, screw-in LEDs are the dominant technology in apartments and have been subject to the same trends as in the residential program. In 2019, 30 percent of multifamily electric savings are expected to be from direct installation of efficient bulbs in apartments by contractors and landlords. An assumption that EISA implementation will proceed as written would have as dramatic an impact on apartment dwellers as indicated earlier for single-family homeowners, with overall multifamily electric savings decreasing by 30 percent in 2019.

For multifamily customers, gas savings would also be impacted as Energy Trust installs water-saving devices (energy-efficient faucet aerators and showerheads) in tandem with direct installation of efficient bulbs. Without the shared costs, Energy Trust will not likely be able to provide these water-saving measures under the current

delivery mechanism. Gas savings would be reduced by about 25,000 therms for a reduction of 15 percent in multifamily gas savings in 2019.

As in the Residential program, the Existing Multifamily program is reducing incentives and working toward a near market exit by the end of 2019. However, it remains unclear whether Energy Trust will exit the multifamily market at the same pace as the residential market. Energy Trust will conduct a full examination of the Existing Multifamily program in 2019, which will include evaluation and changes to multifamily lighting offerings.

If Energy Trust assumes that EISA will be repealed or delayed, as staff are doing in the Residential program, it will allow Energy Trust to still offer direct installations of LEDs and water-saving devices in 2019 for multifamily properties and planfully address changes in 2019 for 2020 and later.