

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



**ENERGY TRUST OF OREGON
APRIL 15, 2019**

UPDATED DECEMBER 20, 2019

TABLE OF CONTENTS

	From the executive director	
I	Results at a glance	5
II	Executive summary	9
III	Program and operations activity	14
IV	2018 progress to OPUC performance measures	30
V	Revenues and expenditures tables	33
VI	Savings and generation tables	36
VII	Northwest Energy Efficiency Alliance progress	39
APPENDIX 1:	Customer satisfaction results	43
APPENDIX 2:	Progress to 2015-2019 Strategic Plan goals; cumulative and total annual results	44
APPENDIX 3:	Renewable resource development targets	46
APPENDIX 4:	2018 gross savings	52
APPENDIX 5:	NW Natural industrial demand-side management activities	53
APPENDIX 6:	Background, mission and goals	54
APPENDIX 7:	2018 board of directors; board development guidelines; 2018 advisory council members and meetings	56
APPENDIX 8:	Impacts on utility peak demand	63
APPENDIX 9:	Higher-value solar applications	69
APPENDIX 10:	Quarter four results tables	73
APPENDIX 11:	2018 results for SB 1149 and SB 838 funds	80
Energy Trust 2018 audited financial statement		Attachment

From the executive director

I am pleased to submit this report highlighting Energy Trust of Oregon's 2018 accomplishments and related benefits for utility customers. This past year, Energy Trust continued to deliver strong electricity savings and record-breaking natural gas savings, while maintaining very low costs and achieving high customer satisfaction. These results position the organization to exceed our 2015-2019 Strategic Plan goals, having now achieved 97 percent of the electric savings goal, 114 percent of the natural gas savings goal and 138 percent of the renewable generation goal. This success lays the foundation for another successful year in 2019, and an exciting and dynamic future as we look out to 2024 in our next strategic plan.

For the 16th year in a row, we have demonstrated that energy efficiency is the cheapest resource to meet customer needs. We have now saved our customers a collective 724 average megawatts of electricity and 65.4 million annual therms of natural gas. We've also helped them install 129.3 aMW of clean, renewable energy. These energy savings and generation will result in customers saving nearly \$7.7 billion on energy bills over time. For every \$1 we invest in a project, our customers will save \$3—whether we provide an incentive to encourage a homeowner to buy a more efficient heating system or pay for technical support to increase the energy efficiency of a large industrial facility.

The benefits of those investments don't accrue to just the customers installing the projects. The energy savings and generation we have supported have avoided the emission of 29.2 million tons of carbon dioxide. When we save energy, the utilities do not need to generate, purchase or distribute it. This helps keep costs lower for all utility customers. By helping to delay or avoid capital investments like building power plants or upgrading transformers to meet demand, energy efficiency and renewable generation enable utilities to reduce costs that might otherwise have been incurred and borne by their customers.

Energy efficiency remains and will continue to remain the lowest-cost resource for utility customers, which helps lower the energy burden for everyone. Yet not everyone has been able to participate equitably in our programs. People who participate directly in our programs receive additional and important benefits by lowering energy bills at their home or business.

To help ensure everyone can benefit from direct participation, we established 10 diversity, equity and inclusion goals for 2019 and beyond. These goals will challenge us to identify customers who might not be participating in our programs, explore new program designs to reach those customers, establish relationships with organizations who work with and represent those customers, and better reflect the communities we serve. These goals are already driving us in the right direction. In 2018, we completed and published analysis of our residential and business customer participation around the state to determine where gaps exist and guide strategies to reach those underserved customers.

Some of our new diversity, equity and inclusion strategies involve new offerings and innovative delivery approaches to ensure all customers directly benefit from clean energy investments. Just a few of the many new efforts advanced in 2018 include:

- Contracting with nonprofit Community Energy Project to install heat pump water heaters in homes of low-income customers at no cost to participants.

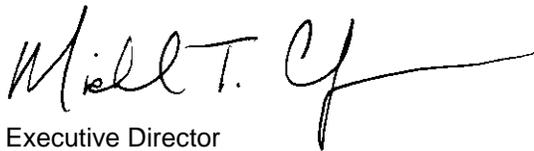
- Advancing a two-year pilot that aims to retire old, inefficient manufactured homes with new energy-efficient models at mobile home parks in Portland, Eugene and Roseburg.
- Developing grants to help community-based organizations design innovative program models for deploying solar to benefit low- or moderate-income customers.
- Launching a new Spanish language website to support Spanish-speaking customers with information to help make home improvements and receive cash incentives.

In 2019, we are continuing to explore and test new offerings, delivery strategies, outreach efforts and program designs. We are assessing the structure of our Existing Multifamily program to optimize delivery of offerings to multifamily building owners, managers and residents. We are continuing our transition out of the residential and multifamily lighting market following successful market adoption of screw-in LED bulbs. We are convening a new Diversity Advisory Council to inform and guide our diversity, equity and inclusion efforts. We are engaging a more diverse talent pool when we have board vacancies or staff positions to fill.

2019 promises to be an even more successful and groundbreaking year. We will finalize our 2020-2024 strategic planning process and lay out the direction and goals that will move us forward for the next five years. We'll focus internally to ensure we have the culture, processes and systems in place to support effective decision-making and prioritization of resources. We'll continue to hone the resources and tools we need to build on our innovative history and improve the way we engage with our partners to help us develop our short-term goals. Our industry is changing rapidly, and we need to be prepared to address the challenges and opportunities in service to our customers and to the State of Oregon.

Thank you to all who contributed to Energy Trust's achievements in 2018, including the Oregon Public Utility Commission, Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas, Avista, Northwest Energy Efficiency Alliance, Oregon Department of Energy, our 2,300 trade ally contractors and the many customers and communities pursuing energy efficiency and renewable energy across the state. We look forward to continuing our work with you to ensure everyone benefits from the low-cost energy and renewable power that is the cornerstone of our future.

Michael Colgrove

A handwritten signature in black ink, appearing to read "Michael T. Colgrove", with a long horizontal flourish extending to the right.

Executive Director

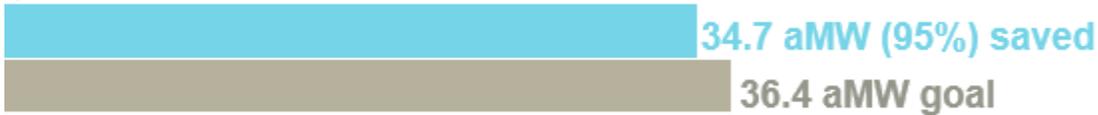
I Results at a glance^{1,2}

Savings

⚡ Total electric savings



⚡ PGE



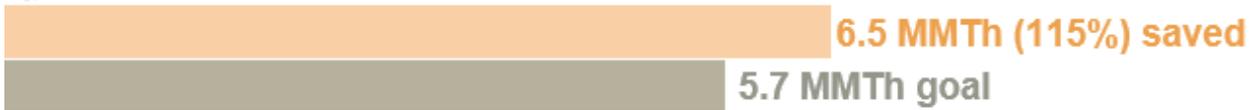
⚡ Pacific Power



🔥 Total natural gas savings



🔥 NW Natural



🔥 Cascade Natural Gas



🔥 Avista

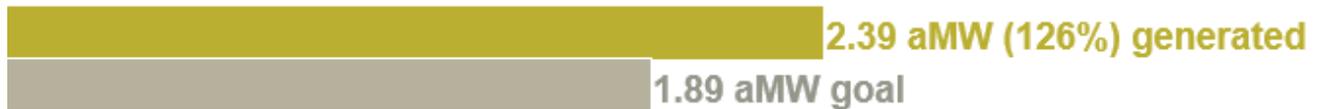


¹ This document reports net savings. Net savings are adjusted gross savings based on results of current and past evaluations.

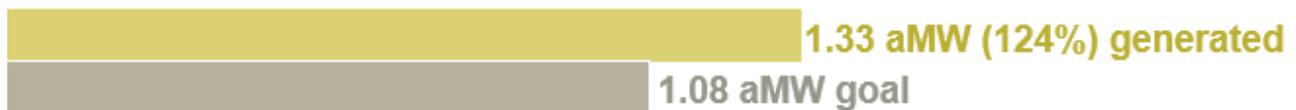
² Note that aMW indicates average megawatts, MMTh indicates million annual therms and M is million.

Generation

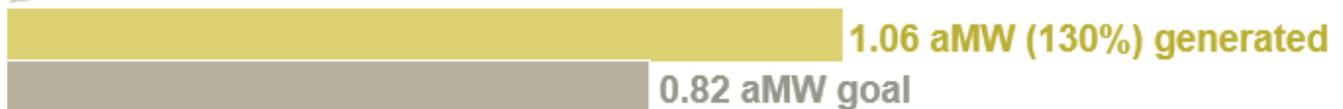
Total renewable generation



PGE



Pacific Power



Expenditures

\$ Total



\$ Energy efficiency



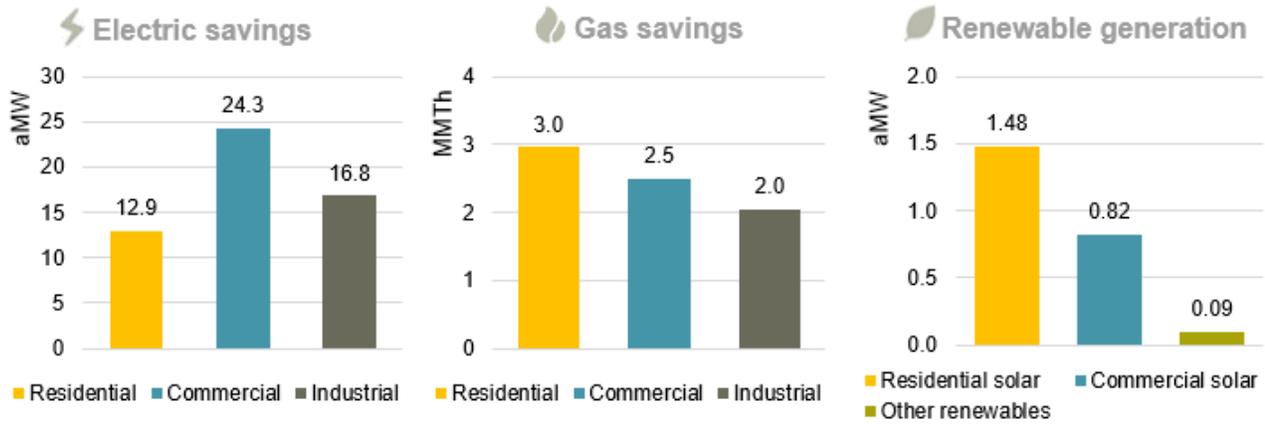
\$ Renewable energy



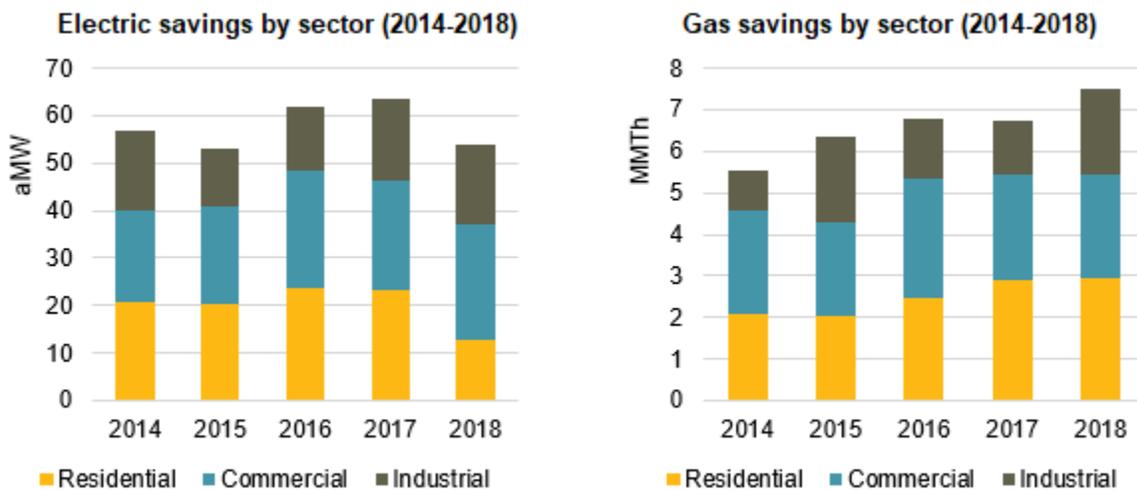
\$ Administrative



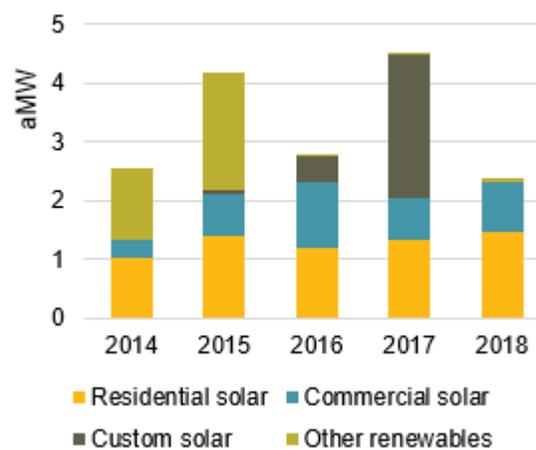
Percent of 2018 savings and generation by sector



Savings by sector over time



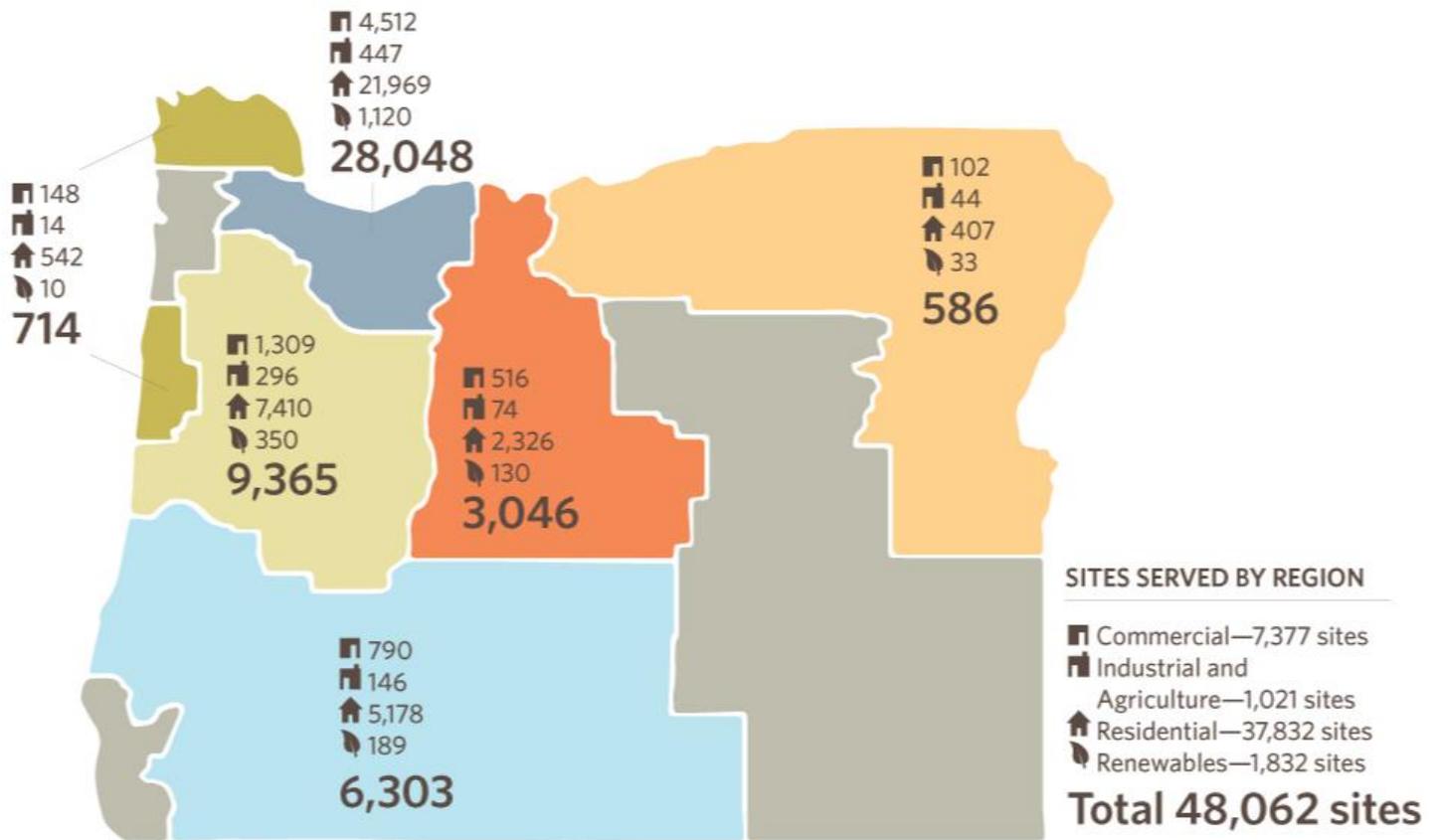
Renewable generation by program (2014-2018)



Customer satisfaction³



Sites served by region⁴



³ Energy Trust surveyed 4,147 residential customers and 761 non-residential customers in Oregon who received an incentive or discount from Energy Trust in 2018. New Buildings participants are surveyed annually, and these results are from the most recent survey in Q1 2018.

⁴ 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. Annual results^{5,6}

- **Energy Trust nearly achieved its annual electric savings goal and exceeded its natural gas savings goal, while sustaining low costs.**
 - Electric efficiency improvements completed in 2018 **saved 54.0 average megawatts** of electricity, about 5 percent short of the 2018 goal of 56.6 aMW, at a levelized cost⁷ of 2.8 cents per kilowatt hour, a slight increase over 2017. This shortfall was largely driven by expected savings from a multi-year custom megaproject in PGE territory being delayed to 2019; when complete, the project is expected to save 70 million kilowatt hours as originally forecasted. Without this megaproject shortfall, electric savings would have met the annual goal. It is typical for large custom industrial projects to have variations in savings year over year.
 - Natural gas efficiency improvements completed during 2019 **saved a record-breaking 7.5 million annual therms** of natural gas⁸, about 14 percent over the 2018 goal of 6.6 million annual therms, at a levelized cost of 26.4 cents per therm, a slight decrease over 2018. Gas savings were bolstered by a large regenerative thermal oxidizer project that enables an industrial customer to integrate energy efficiency into its environmental remediation efforts.
 - Energy Trust came close to goals in Portland General Electric and Pacific Power, achieving 95 and 96 percent respectively, and exceeded goals in NW Natural, Cascade Natural Gas and Avista territories.
 - Market transformation through Northwest Energy Efficiency Alliance resulted in 11 percent of Energy Trust's electric savings, having achieved 104 percent of the 2018 NEEA goal.
- **The renewable energy sector exceeded its annual renewable energy generation goal** for both PGE and Pacific Power territories.
 - Total renewable energy systems installed in 2018 will **generate 2.39 aMW** of electricity, 26 percent more than the 2018 goal.
- Savings and generation achieved in 2018 represent about **314,000 tons of carbon dioxide** kept out of the atmosphere, the equivalent of removing 66,600 cars from Oregon roads for a year.
- **Energy Trust exceeded every OPUC performance measure**, including:
 - **Maintained low administrative and program support costs at 5.7 percent of revenue (\$10.8 million)**, below both the 2018 budget of 6.6 percent and the OPUC performance measure of 8 percent.

54.0
AVERAGE
MEGAWATTS SAVED

7.5
MILLION ANNUAL
THERMS SAVED

2.39
AMW GENERATED

314,000
TONS OF CO₂
AVOIDED

⁵ This document reports net savings, which are adjusted gross savings based on results of current and past evaluations.

⁶ 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, 2018, 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 True Up 2018 Report will be available online at www.energytrust.org/reports.

⁷ Levelized cost is Energy Trust's total cost to save or generate each unit of energy over the life of the measure (which ranges from one to 20 years or more).

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

- **Kept staffing costs at 6.8 percent on a three-year rolling average**, below both the 2018 budget of 7 percent and the OPUC performance measure of 7.75 percent, three-year rolling average threshold.
- **Received consistently high customer satisfaction ratings** of 95 percent overall and 97 percent for interaction with program representatives.
- **Energy Trust completed the fourth year of the five-year Strategic Plan.** As of 2018, Energy Trust exceeded the five-year goals for natural gas savings and renewable generation and achieved 97 percent of the electric savings goal. For more detail, see Appendix 2.
- **Staff provided information on progress to the 2015-2019 Strategic Plan goals to Energy Trust's board of directors at an annual strategic planning workshop.** After the workshop, staff and the board's Strategic Planning Committee began to develop the 2020-2024 Strategic Plan, which will be drafted, provided for public comment and submitted to the board for approval in 2019.

95%
CUSTOMERS
SATISFIED OVERALL

B. Notable activities and trends

- **In 2018, Energy Trust helped residential single-family and multifamily customers install 4.9 million standard LEDs, the majority of which are screw-in LEDs, approximately one million fewer than 2017.** Because of increasing baselines, declining costs and Energy Trust's successful market transformation efforts, the organization claimed fewer savings per screw-in bulb. This trend is expected to continue in 2019, when the organization expects to incent 13 percent fewer residential LED bulbs and claim 31 percent fewer savings than in 2018. In anticipation of exiting from the market in 2020, Energy Trust is focused on expanding and diversifying its portfolio of energy-saving offerings like heating, water heating and controls equipment.
- **Commercial and industrial customers installed more than 675,000 LEDs in 2018,** on par with 2018. Significant opportunities beyond screw-in LEDs remain for the commercial and industrial sectors because screw-in LEDs are a small share—roughly 5 percent—of the commercial and industrial lighting market. There are many more types of lighting applications in these sectors that will continue to save energy in future years, such as linear LEDs, high output lamps and advanced controls that will continue to offer savings. 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.
- **In 2018, limited contractor availability impacted the ability of customers to complete projects in the Existing Buildings and New Buildings programs.** The labor shortage was driven by a strong economy.
- **The New Buildings and Existing Buildings programs conducted outreach in 10 school districts,** most of which were outside of the Portland Metro area. Outreach in advance of the May bond cycle resulted in an upwards of **50 enrollments in these school districts** once bonds passed.
- **Energy Trust explored two new sources of savings for the Residential sector, including** contracting with Community Energy Project to facilitate the installation of heat pump water heaters in low-income homes at no cost to the participants. The sector also launched a pilot with Whisker Labs to test optimization of smart thermostats to drive heating and cooling savings.
- **New residential solar applications were down 50 percent compared to the previous year following the expiration of the Oregon Residential Energy Tax Credit (RETC) at the end of 2017. The RETC expiration was the largest policy change impacting the residential solar market in the program's 15-year history,** and the Solar program increased residential incentives to partially offset the loss of the tax credit. Despite this effort, the program experienced fewer applications compared to 2017, which also saw an unusually high number of projects as customers worked to complete their projects before the sunset of RETC. The program anticipates a continued decrease in solar project volume in 2019.
- **The Other Renewables irrigation modernization initiative reached several significant milestones in partnership with the Farmers**



4.9 MILLION LEDs
INSTALLED



675,000 LEDs
INSTALLED FOR
COMMERCIAL AND
INDUSTRIAL
CUSTOMERS



50 PROJECT
ENROLLMENTS FROM
SCHOOL DISTRICTS



REDUCTION IN SOLAR
APPLICATIONS
FOLLOWING RETC
EXPIRATION

Conservation Alliance, including enrolling a total of 21 irrigation districts into the program. Deschutes River Basin irrigation districts leveraged their work with Energy Trust and the Farmers Conservation Alliance to secure federal grants totaling \$50 million to pipe open irrigation canals. Participating irrigation districts represent one-quarter of the state's agricultural water use.

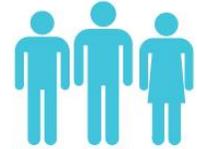
- **Energy Trust completed a transition to consolidate its three residential programs into one comprehensive Residential program delivered by a single Program Management Contractor and two Program Delivery Contractors.** This increased Energy Trust's flexibility to reach more customers and successfully reduced program delivery costs by 7 percent in the residential sector.
- **Energy Trust awarded 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. Several program enhancements were prioritized for 2019 and beyond, including a renewed focus on solar integration for new construction and focus on small- to medium-sized office tenant improvements.
- **Following a competitive solicitation, Energy Trust awarded three program delivery contracts for the Production Efficiency program's custom track** to Cascade Energy, Energy 350 and RHT Energy. The new contracts began January 1, 2019, and for the first time include coordinated delivery of the custom track and Strategic Energy Management services. The consolidated contract structure is expected to streamline delivery, provide greater flexibility for evolving offerings and enhance the customer experience.
- **Energy Trust worked with Pacific Power in the Medford area and NW Natural in Silverton to design pilots that will explore ways that specific energy-efficiency and renewable energy offerings, when intentionally focused on certain communities, might provide added benefits to customers by helping the utility save energy during peak hours.** These pilots will include targeting delivery and marketing of current energy efficiency and renewable energy services and incentives where the added benefit of peak value is expected to be the greatest in 2019. For more information, see Appendix 8.
- **Energy Trust coordinated with PGE in the development of its Smart Grid Test Bed proposal,** providing guidance on technical feasibility and highlighting opportunities to collaborate on the integration of demand response, energy efficiency and solar and battery storage offerings. For more information, see Appendix 8.
- **Energy Trust advanced its diversity, equity and inclusion initiative to reach, serve and deliver benefits to more participants,** including:
 - **Energy Trust finalized 10 goals to achieve by the end of 2020,** including determining participation baselines and setting goals to increase participation rates by underserved customers across programs. Some other goals include increasing work with minority- and women-owned



FINALIZED 10 DIVERSITY, EQUITY AND INCLUSION GOALS

trade allies, developing and deepening relationships with culturally specific or culturally responsive organizations, and increasing the diversity and intercultural effectiveness of staff and the board of directors.

- **Staff completed a 2018 Diversity, Equity and Inclusion Data and Baseline Analysis report** to understand participation data by race and ethnicity, income and geographic diversity. The report was used to establish baselines for program participation goals and shared with the board, stakeholders and the public through presentations and on Energy Trust's website.
- **Staff hosted an open house with more than 30 community-based organizations** to share information about Energy Trust's baseline analysis and goals and invite feedback.
- **In 2018, staff advanced projects to improve organizational processes and readiness for the future, and to increase Energy Trust's capacity to innovate and adapt to change, including:**
 - **An organizational review project team delivered findings and recommendations**, and staff planned for implementation of the highest-priority recommendations in 2019 and 2020.
 - **A budget review project team submitted its recommendation** to move to a three-year action planning timeframe, with an annual budget. Staff developed a plan for implementing this recommendation in 2019 and 2020 to be ready to create the 20201 Annual Budget and 2021-2023 Business Plan.
 - **Early improvements were implemented in 2018**, including optimizing some staff roles and team structures to increase the organization's ability to allocate staff resources, and refining the development of the organization's 2019 Budget and 2019-2020 Action Plan to provide the OPUC and utilities with an earlier draft budget with more time for review and input.
- **In the second quarter of 2018, the Oregon Audits Division of the Secretary of State's office issued findings for its performance audit of the OPUC's oversight of Energy Trust.** Following a year-long review process, auditors determined that the cost controls governing Energy Trust's administrative costs are reasonable, and that Energy Trust has consistently spent below the established annual cap set by the OPUC for such costs.

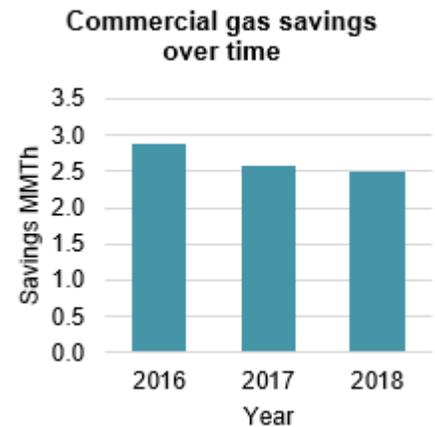
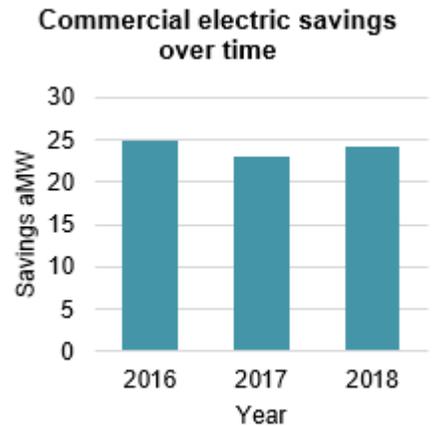


OPEN HOUSE FOR
MORE THAN 30
COMMUNITY-BASED
ORGANIZATIONS

III Program and operations activity

A. Commercial sector highlights

- The commercial sector exceeded goals in PGE, Cascade Natural Gas and Avista territories, and fell short in Pacific Power and NW Natural territories.
- The shortfalls in Pacific Power and NW Natural are due in part to shifting construction timelines causing several projects to delay to 2019. A key factor in these delays has been limited contractor availability in some areas of the state.
- In 2018, the Existing Buildings and New Buildings programs helped more schools save energy and cut costs. The Existing Buildings program influenced 358 projects across the state, an increase from 181 completed in 2017. The New Building program enrolled 130 schools in 2018, an increase from 86 in 2017. Schools have become an important market, especially in rural areas. Staff anticipate increased participation from schools in 2019, as a result of increased bond funding and outreach efforts in 2018 to directly contact every eligible school district in Oregon.
- Savings from NEEA activities comprised approximately 9 percent and 13 percent of the sector’s results in PGE and Pacific Power territories, respectively. Savings in 2018 were from building code and equipment standards improvements, working with distributors and manufacturers to encourage stocking of efficient commercial lighting, and from efforts to promote and support commissioning of new and existing commercial buildings.



Existing Buildings

The Existing Buildings program offers incentives for energy-efficient improvements in 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 Strategic Energy Management, with incentives, tools, training and technical assistance to help customers reduce energy use through behavioral and operations improvements.

- In 2018, lighting represented 59 percent of electric savings for the Existing Buildings program. An additional 10 percent of total savings came from technology upgrades in grocery stores, including the installation of anti-sweat heater controls, refrigerated case doors and electronically commutated motors.
- Gas savings were led by foodservice equipment upgrades and boilers, which together represented 24 percent of all gas savings.
- The Existing Buildings program created a small business team to expand outreach to small business customers in rural areas. This group focuses on helping small businesses install energy-efficient lighting and other

standard upgrades, with a focus on reaching more business owners who speak English as a second language. The small business team visited more than 800 customers in person in 2018, gaining valuable information on how to best support these customers in 2019.

- **The Existing Buildings program helped 358 schools save energy and cut costs**, an increase from 181 completed in 2017. As noted above, the program anticipates increased participation from schools in 2019, as a result of increased bond funding and outreach efforts in 2018 to directly contact every eligible school district in Oregon.
- **Energy Trust worked with 140 lighting trade allies to complete 2,300 lighting projects with commercial customers in 2018.**
- **Existing Buildings launched two commercial Strategic Energy Management cohorts in Eastern Oregon and the Portland Metro area**, enrolling a total of 65 organizations—the largest participation to date. Energy Trust now offers SEM through cohorts across all utility service territories.
- **The program launched new high-efficiency ductless HVAC and heat recovery offerings** developed in coordination with Northwest Energy Efficiency Alliance.
- **In 2018, the program began preparing two new offerings for 2019:**
 - **A midstream offering for emergency generator block heaters.** Midstream offerings will be an important new market channel for 2019 and beyond in order to streamline implementation costs and increase participation across all commercial programs. Emergency generator block heaters are an efficiency measure that support customers with critical operations such as hospitals.
 - **A networked lighting controls pilot.** Networked lighting controls can save 35 percent or more of lighting energy use in commercial buildings while providing additional non-energy benefits. A networked lighting control system is an intelligent system allowing for facilities staff to deploy multiple control strategies from programming, building- or enterprise-level controls, measuring and monitoring energy use.
- **Through the program's direct installation lighting offering for small businesses, the program audited nearly 650 businesses and completed approximately 400 projects.** This offering serves customers that have not been previously supported or reached through other offerings.

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

358

HELPED 358 K-12
SCHOOLS SAVE
ENERGY



140 TRADE ALLIES
COMPLETED 2,300
LIGHTING PROJECTS



HELPED SMALL
BUSINESSES WITH
NEARLY 400
PROJECTS

distributors for qualifying equipment and lighting measures; incentives for custom projects; and technical services including technical analysis studies and free walkthrough surveys.

- **Common-area lighting contributed over 40 percent of electric savings in 2018.** An additional 40 percent of electric savings came from ductless heat pumps, packaged terminal heat pumps and free installation of LEDs, shower devices, faucet aerators and advanced power strips in tenant units.
- **Lighting project volume at small and medium multifamily properties increased 50 percent** compared to 2017, as a result of targeted outreach through a dedicated lighting energy advisor and increased uptake of distributor buy-down offerings.
- **Gas savings were led by standard measures such as water heating, windows, boilers and furnaces** which accounted for nearly 50 percent of savings. Installation of water-saving devices in tenant units was responsible for an additional 30 percent of savings.
- **The program helped 1,800 new multifamily customers save energy and increased participation from returning customers by 15 percent compared to last year.** Energy Trust analyzed program and market data to inform targeted outreach and marketing strategies to drive these results, including identifying opportunities across market segments, regions and property types.
- **The program continued to see a decline in savings per project**, due to past success with larger properties driving the shift to properties with fewer units, along with declining per-measure savings as baselines increase.
- **The Existing Multifamily program collaborated with the Residential program to align offerings applicable to both residential and multifamily customers** including those in smaller properties and individual unit owners. Examples include launching on-bill repayment loans for multifamily unit owners where the cost of improvements are repaid through the utility bill, adapting multifamily heat pump offerings to align with residential incentives and requirements, and jointly offering the online smart thermostat instant discount coupon.
- **Smart thermostats continued to drive participation in 2018**, particularly among condominium and townhome owners. The Existing Multifamily program plans to focus on this offering in 2019, targeting to reach more customers in small multifamily and individual unit owners.
- **The program expanded incentives and eligibility for ducted heat pumps and launched new incentives for heat pump advanced controls for small multifamily properties.** As a result, the program provided incentives on 30 heat pumps, compared to fewer than 10 in 2017, and installed nearly 40 heat pump advanced controls projects.
- **The program increased the number of multifamily trade allies by 12 percent**, enrolling 20 new trade allies in 2018.



**LIGHTING PROJECTS
INCREASED 50
PERCENT**



**HELPED 1,800 NEW
MULTIFAMILY
CUSTOMERS**



**EXPANDED
INCENTIVES AND
ELIGIBILITY FOR HEAT
PUMPS**

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.

- **Warehouse projects comprised about 30 percent of electric savings in 2018**, followed by multifamily at 22 percent and less than 10 percent each from office, school and grocery projects. Participation from warehouses increased to 62 in 2018, compared to 34 in 2017.
- **Hospital projects comprised 32 percent of gas savings**, followed by multifamily at 29 percent and less than 10 percent each from lodging, school and restaurant projects.
- **The New Buildings program enrolled a record 711 new projects in 2018**, a slight increase from 2017. While the pipeline is strong, the construction market began to flatten in 2018, as a result of tight labor markets and high labor costs.
- **The number of Market Solutions projects increased by 12 percent compared to last year**, with 73 projects completed in 2018 and the majority of savings from multifamily customers. Of the 73 completed projects, a record 16 projects achieved the “very best” level of energy savings available through the offer. Market Solutions are pre-designed packages to help small, medium or fast-track projects reach quick decisions to achieve deep energy savings. Packages have been designed for small restaurants, grocery stores, multifamily buildings, offices, schools and retail buildings less than 70,000 square feet.
- **School enrollments continued to increase** with 130 enrollments in 2018, up 44 projects from the previous year. Enrollment was driven by local bonds and grants for capital upgrades at schools.
- **In 2018, the New Buildings program supported 12 affordable housing construction projects across the state.** Construction is expected to grow for this market in 2019 with a total of 23 completions anticipated, especially in the Portland Metro area due to measures approving bond funding for affordable housing.
- **Since starting the Path to Net Zero offering in 2009, Energy Trust has supported the completion of 19 projects and currently has 70 projects enrolled in the program.** The Path to Net Zero offering provides increased incentives and support to new commercial construction projects that aim to exceed energy code by at least 40 percent through a combination of energy-efficiency and renewable energy features. These stretch projects provide innovation and learnings to help further transform the market.

711
NEW BUILDINGS
PROJECTS ENROLLED

70
PATH TO NET ZERO
PROJECTS ENROLLED

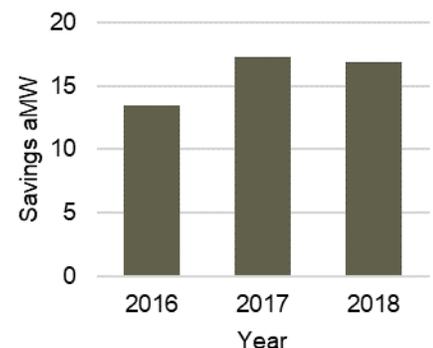
- **In 2018, New Buildings completed the first Path to Net Zero tribal community project in the state.** The Yellowhawk Tribal Health Center is a primary healthcare center for the Confederated Tribes of the Umatilla Indian Reservation outside of Pendleton. The facility will generate as much energy as it uses in a year through a variety of features, including solar panels, LED lighting, high-performance insulation and windows, and an efficient heating and cooling system that recovers heat and energy from the air.
- **Energy Trust launched its first Net Zero Emerging Leaders internships.** Starting in January 2019, student interns from local architecture firms will be employed to prioritize energy performance in their practice. Energy Trust is supporting students on a path to becoming influential leaders in their field with the potential to shape future building design and help the industry achieve the Architecture 2030 Challenge to construct all buildings as net zero by 2030.
- **New Buildings presented at 31 training events, including 20 hosted and partnered trainings,** eight of which were located in Salem, Bend, Eugene, Coos Bay and Roseburg.



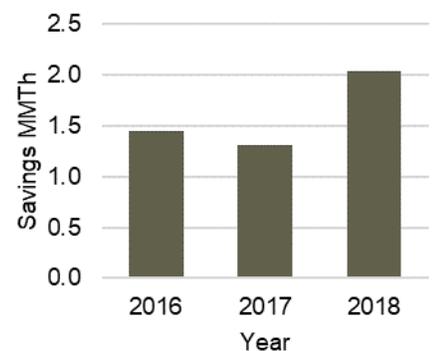
B. Industry and agriculture sector highlights

- **The industry and agriculture sector exceeded its goals for Pacific Power and NW Natural territories** and fell short of goals in PGE, Cascade Natural Gas and Avista territories. Energy Trust nearly doubled savings in NW Natural territory due to one large regenerative thermal oxidizer project, enabling the customer to integrate energy efficiency into its environmental remediation efforts.
- **In PGE territory, the significant shortfall is due in part to some savings from a large custom megaproject delayed to 2019,** saving 18 million kilowatt hours or only 43 percent of the forecasted savings for 2018. The megaproject is still on track to deliver significant savings in 2019. It is typical for large custom industrial projects to have variations year over year and this project is on-track to exceed its three-year savings goal of 70 million kilowatt hours by the end of 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 very low cost.
- **In Cascade Natural Gas and Avista territories, there are relatively few eligible industrial customers in these rural areas;** therefore, delays in only a few projects can have significant impacts on annual results. Outreach in both territories will continue in 2019.
- **Savings from NEEA activities comprised approximately 1 percent of the sector's results** in both PGE and Pacific Power territories. Savings in 2018 came from NEEA's reduced wattage lamp replacement initiative, certification of refrigeration operators in the industrial refrigeration market as

Industry/ag electric savings over time



Industry/ag gas savings over time



well as from a previously funded initiative to improve awareness of and establish standards for efficient motors.

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 customers through the support of Program Delivery Contractors and other market actors.

- **Lighting projects drove 36 percent of electric savings in 2018**, especially LED high bays and custom LED indoor agriculture projects. An additional 30 percent of savings came from custom projects, 12 percent from a megaproject, 11 percent from standard upgrades—including irrigation upgrades, compressed-air leak reduction upgrades and fast-acting doors—and 10 percent from industrial Strategic Energy Management participants.
- **Custom projects provided 56 percent of gas savings, including a large regenerative thermal oxidizer**, which helps customers meet requirements for air pollution reduction. The standard track provided 37 percent of the savings with greenhouse measures (i.e. condensing unit heaters, under bench heating and intelligent greenhouse controllers), insulation and steam trap projects representing the top measures. The remaining 7 percent of savings came from SEM, which achieved its highest annual gas savings to date due to a participant with a large gas load.
- **In 2018, approximately one-half of lighting projects were with small- to medium-sized customers.** Production Efficiency streamlined delivery to these customers to automate and expedite incentive payments.
- **Despite strong lighting demand in 2018, savings from lighting are expected to decrease over time** due to measure baseline changes, lower incremental costs leading to decreased incentives and a dynamic cannabis market.
- **Energy Trust supported the efficiency of Oregon’s energy-intensive cannabis production industry through 48 efficient lighting upgrades**, four more than in 2017. Due to a change in Oregon Liquor Control Commission licensing in 2018, fewer new grow operations enrolled and this trend is expected to continue in 2019.
- **Participation in industrial SEM increased**, with more engagement in First-year SEM. Enhancements to the Continuous SEM offering increased participation and received positive customer feedback. The multi-year Continuous SEM offering provides ongoing engagement, support and performance-based incentives to help graduates of First-year SEM further reduce energy waste.



**LIGHTING DROVE
PRODUCTION
EFFICIENCY ELECTRIC
SAVINGS**



**ENGAGED SMALL- TO
MEDIUM-SIZED
CUSTOMERS**

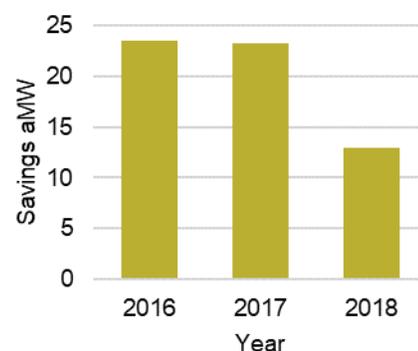
- **Energy Trust worked with nearly 100 lighting trade allies to complete 450 lighting projects with industrial customers** in 2018. The Production Efficiency program ran a trade ally lighting training in the first quarter of 2018, resulting in record attendance in Medford, Bend and Portland.
- **In the third quarter, Energy Trust provided a new, expedited path for completing technical analysis studies for smaller custom projects.** This streamlined process reduces costs for Energy Trust and speeds project timelines. This has been well received by program delivery contractors and customers thus far and will continue into 2019.

450
LIGHTING PROJECTS
WITH INDUSTRIAL
CUSTOMERS

C. Residential sector highlights

- **The Residential sector exceeded goals in all utility territories,** driven by Energy Trust influencing construction of new EPST[™] homes and purchases of LEDs, thermostats, efficient heating systems and heat pump water heaters.
- **Savings from NEEA activities comprised approximately 38 percent of the sector’s results** in both 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 delivered savings.

Residential electric savings over time

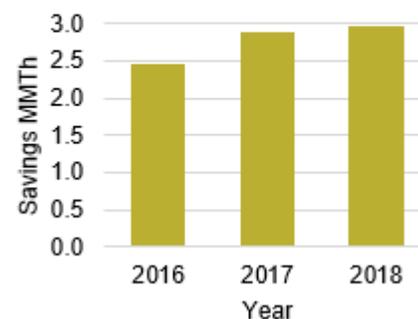


Residential

Energy Trust’s residential sector provides electric and gas energy-efficiency solutions for residential customers of single-family homes, manufactured homes and newly constructed homes. The program is delivered through Program Management Contractor CLEAResult and through two Program Delivery Contractors supporting retail promotions and EPS new construction offerings. Incentives are available for smart thermostats, energy-efficient HVAC and water heating equipment, lighting, appliances, weatherization upgrades and whole home improvements in new construction. The program delivers these efficiency services through a number of key market channels.

- **In 2018, the Residential program helped drive electric savings by influencing the purchase of LEDs and showerheads,** which accounted for 50 percent of the program savings. Another 23 percent of savings came from ductless and ducted heat pump upgrades and energy-efficient EPS new homes.
- **The majority of gas savings were from market transformation, construction of new EPS homes and smart thermostats,** with additional savings from upgrades to energy-efficient windows, furnaces and gas fireplaces. Energy Trust claims market transformation savings for influence on 2008, 2011 and 2017 updates to energy code that increased the adoption of energy-efficient technologies and practices.

Residential gas savings over time



- **The program influenced consumers to purchase 4.6 million ENERGY STAR screw-in LEDs in stores**, a nearly 17 percent decrease over 2017, through incentives and education, promotions and expanding relationships with retailers and manufacturers. Despite strong engagement, a decline in savings claimed per LED illustrates that the residential lighting market is transforming faster than expected, with full transformation expected in the next few years.
- **The Residential program contracted with Community Energy Project to reach underserved customers in Portland through installation of 27 heat pump water heaters in low-income homes at no cost to the participants.** This effort tested a new model of program design that builds partnerships with community-based organizations to help their clients more directly benefit from energy-efficiency services.
- **The program launched and advanced a two-year manufactured home replacement pilot to retire old, inefficient manufactured homes and replace them with energy-efficient new models** and began work with three manufactured home parks around the state. The Residential program completed all site assessments at St. Vincent DePaul's Oak Leaf Manufactured Home Park in Portland, receiving incentive applications for all 20 units and paying incentives for 16 new units. Throughout 2018, the Residential program worked with CASA of Oregon, Craft3, United Community Action Network and NeighborWorks Umpqua to prepare for additional manufactured home replacements at Newton Creek Manufactured Home Park in Roseburg and Umpqua Ranch Park in Glide.
- **The program implemented a new incentive structure for EPS new home construction, which reflects changes in Oregon's residential energy code in 2017.** Improvements in Oregon's residential energy code increased the baseline against which Energy Trust's incentives are measured, lowering the amount of savings that can be claimed per home constructed. To help EPS builders and verifiers transition to the new EPS incentive structure, the program added a builder transition incentive. Temporary additional incentives helped motivate builders to continue to build higher performing homes and mitigate attrition as builders navigated the cost and challenges of building to a new code.
- **In 2018, the Residential program offered an increased incentive for central heat pump and ductless heat pump systems in manufactured homes, resulting in installations in 114 manufactured homes.** This incentive was offered through 10 trade ally contractors across the state selected through a competitive solicitation. The effort will continue in 2019.
- **The program expanded delivery pathways influencing the purchase of approximately 6,500 smart thermostats**, an increase over the previous year. The program launched an instant coupon for smart thermostats, engaging nearly 2,000 customers that redeemed incentives easily and immediately at time-of-purchase online or in select retail stores. The program also worked with PGE to support smart thermostat installations in nearly 600



**4.6 MILLION LEDs
PURCHASED IN
STORES**



**LAUNCHED
MANUFACTURED
HOME REPLACEMENT
PILOT**



**EXPANDED DELIVERY
PATHWAYS FOR 6,500
SMART THERMOSTATS**

homes as part of PGE’s direct install offering that leverages demand response and energy efficiency benefits resulting in no cost to the customer. Smart thermostats deliver cost-effective savings for both gas- and electric-heated homes.

- **Toward the end of 2018, Energy Trust launched a pilot with Whisker Labs to test optimization on smart thermostats** manufactured by Honeywell, Ecobee and Emerson. Thermostat optimization reduces energy use by making small, gradual temperature adjustments based on occupant habits and preferences. The pilot will continue through the end 2019 and the results will be evaluated to determine the savings for thermostat optimization.
- **The Residential program onboarded 58 EPS new construction trade allies in 2018 and offered incentives for 19 early design assistance meetings across the state.** Energy Trust supported builders and verifiers to identify opportunities to continue building above code, resulting in higher savings per home. By identifying non-participating builders and engaging with builders early in the design stage, the program expanded reach to new builders and strengthened relationships with existing builders.

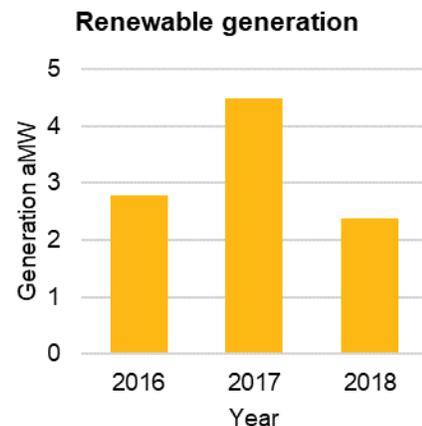
D. Renewable energy sector highlights

- **The renewable energy sector far exceeded its generation goals** largely due to a high volume of solar projects receiving an Energy Trust incentive in the first half of 2018 that had applied for RETC before the 2017 deadline. Additionally, the sector completed the 0.09-aMW Three Sisters Irrigation District hydropower project ahead of schedule in the final quarter of 2018.

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 focused 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.

- **The Solar program exceeded its goal as a result of residential solar projects driven by the expiration of Oregon’s Residential Energy Tax Credit (RETC) at the end of 2017.** These applications were submitted in 2017 and projects completed in 2018.
- **The Solar program raised residential incentives following the expiration of the RETC in 2017, in order to offset some of the loss of the tax credit to provide stability and continuity for customers during this market transition.** Energy Trust also collaborated with trade allies, the Oregon



Department of Energy and local jurisdictions to ensure projects were successfully completed in time to qualify for the RETC benefit. The RETC expiration is the largest policy change impacting the residential solar market in the program's 15-year history.

- **New residential solar applications were down 50 percent compared to 2017 as a result of the RETC expiration.** Energy Trust anticipates this trend to continue in 2019.
- **The program saw continued customer interest in solar plus storage in 2018 with 31 new applications submitted and 60 projects completed.** The majority of the projects are residential and pair solar with advanced lithium ion battery energy storage systems. The advanced battery storage projects completed in 2018 represent at least 0.29 MW of power and 0.70 MWh of capacity. For more detail, see Appendix 9.
- **Energy Trust provided guidance for several innovative solar plus storage projects in 2018.** This included technical consultation for the City of Portland's Fire Station 1 project to improve the resilience of this critical emergency facility by storing excess solar energy generated onsite for use during an extended outage.
- **The Solar program has been coordinating with residential and commercial energy efficiency programs to construct new solar-ready homes since 2006 and new solar-ready commercial buildings since 2013.** In 2018, there was a **57 percent increase in solar-ready new homes, with 149 projects built**, compared to the 95 solar-ready homes certified in 2017. Additionally, multiple builders who work outside of Energy Trust's electric service territory are using Energy Trust solar-ready requirements to add value for their customers.
- **In collaboration with the Oregon Department of Energy, Energy Trust convened the low- and moderate-income solar work group for the second year with more than a dozen new community-based organizations from around Oregon.** This work is supported by a U.S. Department of Energy grant and is in coordination with Clean Energy States Alliance.
- **The program conducted a competitive solicitation for applications for low- and moderate-income solar innovation grants to help** community-based organizations and affordable housing developers design innovative program models for deploying solar to benefit low- or moderate-income customers. Grants will be awarded in the first quarter of 2019.
- **The program deployed a new solar development assistance offering and received 32 applications for projects also receiving PGE and Pacific Power grants.** The new solar development assistance offering provides 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. Energy Trust collaborated closely with utilities to ensure funds are complementary.

60

SOLAR PLUS STORAGE PROJECTS COMPLETED



149 SOLAR-READY NEW HOMES BUILT



DEPLOYED A NEW SOLAR DEVELOPMENT ASSISTANCE OFFERING

- **Energy Trust launched an upgraded version of PowerClerk, the program’s online solar incentive application software.** The upgraded software is more flexible, produces more accurate estimates of energy generation, and provides more data about battery storage. This upgrade is foundational to supporting new offerings the program will pursue in 2019.

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 community-scale, municipally-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. 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 and investigations 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.

- **The Other Renewables program exceeded goal due to the completion of a small hydropower project** that was not expected to complete until 2019. As part of its effort to pipe open irrigation canals, the Three Sisters Irrigation District completed its second hydropower project. The 200-kW Watson hydropower facility includes four turbines that generate clean power and double as a “showroom” so landowners interested in hydropower generation can see the technology first-hand.
- **In 2018, the program dedicated incentives to four projects:**
 - **A 1.2-MW biogas cogeneration project at the City of Salem’s Willow Lake Water Pollution Control Facility.** The facility is expected to reach commercial operation in 2020 and to generate 7.6 million kilowatt hours of renewable electricity annually.
 - **A 600-kW biogas cogeneration project at the Water Environment Services Tri-Cities water resource recovery facility.** The project is expected to reach commercial operation in 2021 and generate 4.3 million kilowatt hours of renewable electricity each year.
 - **A 22-kW micro-hydropower project in the municipal water system near Wallowa Lake State Park.** The project is expected to reach commercial operation in 2019 and generate 134,000 kilowatt hours annually.
 - **An additional 300-kW irrigation modernization hydropower facility developed by the Three Sisters Irrigation District.** An increased



**200-KW HYDROPOWER
PROJECT COMPLETED
AHEAD OF SCHEDULE**

incentive was required for this project due to declines in avoided cost rates while interconnection with the utility was pending. The project is expected to reach commercial operation in 2019 and generate 922,000 kilowatt hours annually.

- **Staff supported a pipeline of 31 hydropower, biopower and geothermal projects receiving project development assistance.** Project development assistance consists of early stage support to help potential renewable energy projects overcome development barriers. Many of these projects will be installed by municipalities and irrigation districts to achieve energy sustainability and resilience goals and provide additional benefits, such as controlling costs, improving facility operations and managing waste. For more information about Energy Trust's project development assistance activities, see Appendix 3.
- **In 2018, the program's irrigation modernization initiative reached several significant milestones.** The initiative is a collaborative effort by Energy Trust and Farmers Conservation Alliance to help irrigation districts and farmers invest in modern irrigation infrastructure. Replacing open irrigation ditches with pipes saves energy, conserves water, enables habitat improvements for fish and wildlife and can generate clean energy through small hydropower systems. These milestones include:
 - **Enrolled five new districts, for a total of 21 irrigation districts participating, making up nearly one-quarter of the state's agricultural water use.** Energy Trust anticipates more districts to enroll in 2019.
 - **Nine enrolled districts completed initial planning phases.** Combined, the districts have identified 38 megawatts of in-conduit hydropower potential, 60 million kWh of energy savings and over 500 cubic feet per second of saved water, helping restore Oregon rivers and increase water available for agricultural customers.
 - **Deschutes River Basin irrigation districts leveraged work with Energy Trust and Farmers Conservation Alliance to secure federal grants totaling \$50 million to pipe open irrigation canals.** With assistance from the Oregon Department of Environmental Quality's Clean Water State Revolving Fund, the Oregon Water Resources Department's Water Project Grants and Loans program, and the Oregon Watershed Enhancement Board's Restoration Grant program, the Tumalo Irrigation District began replacing 8,500 feet of open canal with 7-foot diameter pipe. Construction began in the fourth quarter and will complete in early 2019. The federal funding will lead to further energy savings and hydropower generation potential as the district intends to pipe an additional 16 miles of canal through the end of 2019.
- **Despite growing interest in irrigation modernization and renewable energy projects, market conditions continue to challenge the economic viability of non-net-metered projects.** These market conditions include decreasing avoided costs, which result in increased above-market costs for

31

PROJECTS
RECEIVED
DEVELOPMENT
ASSISTANCE



ENROLLED 5 NEW
DISTRICTS IN
IRRIGATION
MODERNIZATION
INITIATIVE

facilities Energy Trust can support. As avoided costs fall, there is a decline in the rate paid by the utility to projects that sell their power directly to the grid. That makes it harder for future project revenue to cover initial costs, which increases the above-market costs calculated by Energy Trust. For more information, see Appendix 3.

E. Internal operations highlights

Communications

- **Energy Trust received 448,000 website visits in 2018**, generating 1.3 million page views, as a result of more targeted digital marketing strategies to drive new participants to the website.
- **More than 80 percent of all visitors to the website in 2018 were new visitors**, most of whom were driven to the site by Energy Trust's online advertising.
- **Visitors to the Energy Trust website viewed three pages per visit and spent about three minutes** on the website on average in 2018, an increase over 2017 and a good indicator of engagement.
- **The majority of web visitors were located in the Portland Metro area** (79 percent), followed by Willamette Valley (9 percent), Southern Oregon (7 percent) and Central Oregon (3 percent). The remaining 2 percent of visits originated from Eastern Oregon, the Coast and outside of Oregon.
- **Mobile traffic to the website declined slightly in 2018**, with just over 41 percent of users accessing Energy Trust's mobile-optimized website on their phone or tablet.
- **Staff continued work to bring Energy Trust's website into compliance with top tier Web Content Accessibility Guidelines, optimizing the browsing experience both for individuals with and without disabilities** by making the user interface simpler and easier to read and navigate on a variety of devices.
- **Energy Trust ran advertising campaigns for residential and business programs, as well as solar and irrigation programs.** A new campaign was completed and ran twice during 2018, designed to inspire and educate Oregonians about managing their energy use.
- **Energy Trust distributed 17 press releases in 2018**, featuring program promotions, requests for proposals and information, board officer elections, completed energy-efficiency and renewable energy projects around the state, results and customer benefits.
- **The organization garnered 182 news stories** about Energy Trust programs, services and customer benefits in print and broadcast with a media value of \$230,000—what it would have cost to purchase the equivalent advertising space and air time—as a result of media outreach and responses to reporter inquiries.

448,000
WEBSITE VISITS



**MORE ACCESSIBLE
WEBSITE FOR ALL
USERS**

182
NEWS STORIES ABOUT
ENERGY TRUST

Customer service

- **Energy Trust received 17,000 calls to Energy Trust's main hotline** in 2018, a 14 percent decrease from 2017 as a result of the elimination of appliance recycling, moving water heating incentives midstream and overall fewer residential incentives.
- **Staff received and responded to 1,400 email inquiries** from info@energytrust.org, a 19 percent decrease from 2017 driven from improved email tracking removing unrelated emails from the counts in 2018. Online activity has also shifted toward social media, although emails are still a frequent venue for complex technical and stakeholder questions, or complaints.
- **Energy Trust's Residential program re-design** led to a consolidation of call center services. This led to a decrease in internal resources needed to manage the call centers and the number of resources needed to deliver these services.
- **Energy Trust received and addressed 13 complaints in 2018, with one** that could not be easily resolved by a call center representative and required follow up from Energy Trust staff.
- **Energy Trust began tracking call volumes across all Program Management Contractor call centers.** Until 2018, Energy Trust was only able to track calls to its main toll-free phone number. Over time, this additional data will allow Energy Trust to view trends and shifts in call volumes related to promotions, incentive changes or online applications.

17,000
CUSTOMER CALLS
RECEIVED

Trade and program allies

- **Energy Trust provided education and networking opportunities for more than 400 trade allies** through forums and events in Bend, Medford, Grants Pass, Klamath Falls, La Grande, Pendleton and Portland. Presentations included program updates, insights from regional economists on employment and building trends, information from the Portland Home Energy Score program, American Heart Association, Community Energy Project, Craft3 and WorkSystems, and technical breakout sessions.
- **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. Trade allies will still receive frequent updates during the year-end incentive change cycle.
- **In the third quarter of 2018, Energy Trust surveyed more than 180 trade allies across the state who completed projects with Energy Trust in 2017 or 2018.** The results demonstrated that more than **one-quarter of responding trade allies have staff who speak at least one language other than English and support non-English speaking customers.** These results will inform programs on how best to engage and support this broader customer base.

400
TRADE ALLIES
ATTENDED TRADE
ALLY FORUMS AND
EVENTS


SURVEY TO REACH
NON-ENGLISH
CUSTOMERS

- **In 2018, 115 trade allies took advantage of Energy Trust’s business development fund opportunities**, totaling \$270,000 in reimbursement, to support trade ally marketing, advertising and training costs.

General outreach

- **Staff expanded awareness about Energy Trust programs and services through presentations** and events, including Pacific Power’s WattSmart events in Jacksonville and Mill City, Deschutes Basin Water Summit, Association of Oregon Counties/Community Renewable Energy Association, League of Oregon Cities conferences, the Oregon Leadership Summit, Salem Capitol Multicultural Day, Umpqua Valley Home Builders Association Home Tour, the Latinx Health Fair in Medford, the State of Oregon Regional Solutions event, a Native American Chamber of Commerce event, Community Energy Project’s Spring Fling, Coalition of Communities of Color’s Annual Gala, AARP Housing Policy Solutions conference in the Rogue Valley, 2018 Ford Institute’s Rural Leadership Workshop, Resource Senior Fair in Josephine County and a Eugene Climate Action Plan meeting.
- **Staff partnered with Sustainable Northwest and others to develop and implement the Making Energy Work field tour workshop in Coos County**, focused on community resilience and the Fall Energy Symposium in Bend, with statewide participation, including by Senator Merkley.
- **In 2018, Energy Trust trained new AmeriCorps Resource Assistance for Rural Environments (RARE) interns** to support local renewable energy projects, direct installation of LEDs in low-income households and continued outreach to small businesses in Lake County, Hood River and Pendleton. Energy Trust sponsors AmeriCorps RARE interns to build capacity in rural communities and connect those communities to Energy Trust programs and services.
- **Staff provided information and expertise to elected officials and policymakers** on Energy Trust programs and benefits delivered to Oregon utility customers. For example, Energy Trust supported the Residential Manufactured Housing Replacement Program communications with local and national stakeholders and policymakers. Staff also participated in the state’s Low-Income Utility Program working group, facilitated by the OPUC at the request of Governor Kate Brown. The purpose of the group was to inventory existing low-income programs, assess gaps and recommend ways to address energy burden needs.
- **Staff assisted Douglas County Smart Energy, an all-volunteer community advocacy group, in solar planning and development efforts** in conjunction with their U.S. Department of Energy SunShot grant, energy efficiency community offerings, strategic planning and general community education efforts.



ONGOING OUTREACH
THROUGHOUT THE
STATE



PROVIDED EXPERTISE
TO ELECTED
OFFICIALS AND
POLICYMAKERS

IT and business systems

- **Energy Trust processed 22,000 customer projects in Energy Trust systems**, including 19,000 submitted through web applications.
- **Staff transitioned to a new online version of Microsoft SharePoint**, improving usability of this intranet platform used by staff, Program Management Contractors and Program Delivery Contractors.
- **Staff moved data into a business intelligence reporting tool called Microsoft Power BI**. The tool improves data visualization and allows staff to more easily query and analyze information.
- **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.
- **Staff integrated Energy Trust's data with third-party datasets**, including Census data and weather data, to streamline analysis of external datasets with program data.
- **Energy Trust upgraded to Microsoft Office 365, adding functionality for staff**, including better capabilities for simultaneous editing of documents.

22,000
CUSTOMER
PROJECTS
PROCESSED

Planning and evaluation

- **Staff designed 457 new energy-efficiency measures**, a decrease from 554 new measures in 2017. Staff also revised 616 measures, three times more than the previous year. Reviews of existing measures fluctuate in any given year and are driven by how quickly market conditions are changing.
- **Staff completed and posted 15 evaluations and market studies** on the Energy Trust website.
- **Staff provided 20-year energy efficiency forecasts** for NW Natural and Avista to incorporate into Integrated Resource Plans. Staff also supported development of Pacific Power's next IRP by providing technical resource potential and presenting at several working group sessions. Staff continued to support PGE and Cascade Natural Gas in IRP development.
- **Staff provided support for an affordable housing working group that convened to address components of Governor Brown's Executive Order 17-20**. Staff attended meetings and coordinated development of a Resource Assessment modeling process that will quantify energy savings potential for low-income customers throughout Oregon.

457
NEW ENERGY-
EFFICIENCY
MEASURES

IV 2018 progress to OPUC performance measures

Each year, the Oregon Public Utility Commission establishes minimum performance measures for Energy Trust in a variety of categories. Minimum savings and generation figures for energy-efficiency programs and renewable energy programs are set at an aggregated level rather than at an individual program or sector level. This allows Energy Trust to pursue different program strategies in the residential, commercial and industrial sectors as market forces and technologies change. Electric and gas efficiency performance targets are set at 85 percent of Energy Trust goals as defined in annual budgets. The following OPUC minimum performance measures apply to Energy Trust 2018 results.

Category	Measure	Result
Electric efficiency	<p>PGE:</p> <ul style="list-style-type: none"> Save at least 30.9 aMW Levelized cost not to exceed 3.3 cents/kWh <p>Pacific Power:</p> <ul style="list-style-type: none"> Save at least 17.2 aMW Levelized cost not to exceed 3.6 cents/kWh 	<p>PGE:</p> <ul style="list-style-type: none"> ✓ Exceeded, with 34.7 aMW saved ✓ Within requirement, levelized cost at 2.7 cents/kWh <p>Pacific Power</p> <ul style="list-style-type: none"> ✓ Exceeded, with 19.3 aMW saved ✓ Within requirement, levelized cost at 2.9 cents/kWh
Natural gas efficiency	<p>NW Natural:</p> <ul style="list-style-type: none"> Save at least 4.8 million annual therms Levelized cost not to exceed 37 cents/therm <p>Cascade Natural Gas:</p> <ul style="list-style-type: none"> Save at least 0.47 million annual therms Levelized cost not to exceed 43 cents/therm <p>Avista:</p> <ul style="list-style-type: none"> Save at least 0.30 million annual therms Levelized cost not to exceed 25 cents/therm 	<p>NW Natural:</p> <ul style="list-style-type: none"> ✓ Exceeded, with 6.5 million annual therms saved ✓ Within requirement, levelized cost at 26.4 cents/therm <p>Cascade Natural Gas:</p> <ul style="list-style-type: none"> ✓ Exceeded, with 0.59 million annual therms saved ✓ Within requirement, levelized cost at 27.9 cents/therm <p>Avista:</p> <ul style="list-style-type: none"> ✓ Exceeded, with 0.41 million annual therms saved ✓ Within requirement, levelized cost at 24.7 cents/therm
Renewable energy	<ul style="list-style-type: none"> For project and development assistance (part 1), deploy at least \$1.72 million in non-solar project development assistance incentives. Maintain a non-solar project development assistance pipeline in excess of 25 projects. Report number of projects served, total dollars spent, and summarize project progress through development stages. For project and market development assistance (part 2), report annual results, including number of projects supported, milestones met and 	<ul style="list-style-type: none"> ✓ In compliance, paid \$2,524,938 and committed \$1,749,327 in project development assistance to 31 projects. Additional detail is in Appendix 3. ✓ In compliance, see Appendix 3.

	<p>documentation of results from market and technology perspective.</p> <ul style="list-style-type: none"> Obtain at least 1.6 aMW of installed generation of standard net-metered Solar program projects. For solar projects funded outside of the Solar program's standard, net-metered incentive offer, report sources of funding for projects and the criteria for selection. 	<p>✓ Exceeded, with 2.3 aMW of installed generation from standard solar projects</p> <p>✓ In compliance, program did not dedicate funds for custom solar projects in 2018</p>
Financial integrity	Receive an unmodified financial opinion from an independent auditor on annual financial statements	✓ In compliance , with an unmodified financial audit opinion for 2018
Administrative/program support costs	Keep administrative/program support costs below 8 percent of annual revenues	✓ Within requirement , with 2018 administrative and program support costs at 5.7 percent of annual revenues
Staffing expenditures	Total staffing expenditures not to exceed 7.75 percent of total organization expenditures calculated on a three-year rolling average for public purpose funded activities in Oregon	✓ In compliance , with a three-year rolling average staffing cost of 6.8 percent of total organization expenditures for 2015-2018 ⁹ .
Customer satisfaction	Demonstrate greater than 85 percent satisfaction rates for interaction with program representatives and overall satisfaction	✓ Achieved , with a 97 percent satisfaction rate for interaction with program representatives and a 95 percent overall satisfaction rate. Results for major programs are averaged to determine satisfaction rates. See Appendix 1.
Benefit/cost ratios	Report utility system and total resource perspective annually. Report significant mid-year changes as warranted in quarterly reports.	✓ Achieved , with no mid-year changes, see table below.
NEEA and market transformation	Report annually: <ul style="list-style-type: none"> Savings and costs Savings strategies Show Energy Trust direction to NEEA through committee membership Summary of Energy Trust direction to NEEA Summary of NEEA initiatives Energy Trust opts out of and why 	✓ In compliance , see section seven below.

⁹ In 2018, the staffing metric of 7.75 percent includes agency contractor costs. In 2019, the staffing metric of 7.25 percent will exclude agency contractors. In all years, Energy Trust has reported total staffing for both Oregon and Washington, and in the rolling average, total expenditures include Oregon and Washington.

Benefit/cost ratios

- Report benefit/cost ratios for larger conservation acquisition programs for both utility system and total resource perspective

2018 Utility Cost and Total Resource Cost by program

Program	Combined Utility Cost Test benefit cost ratio	Combined Total Resource Cost Test benefit cost ratio
Residential	2.03	2.61
Existing Buildings, including Multifamily	1.98	1.39
New Buildings	2.52	1.60
Production Efficiency	2.85	2.14

V Revenues and expenditures tables^{10,11}

A. Revenues and expenditures results

- Overall public purpose revenue plus incremental electric revenue from SB 838 totaled \$188.1 million in 2018, 2 percent over what was budgeted, and \$6.2 million less than in 2017.
- 2018 expenditures totaled \$174.8 million; of which, \$94.3 million or 54 percent was for incentives, compared to \$102.5 million or 57 percent in 2017.
- In 2018, Energy Trust spent a total of \$10.8 million, or 5.7 percent of total budgeted revenue, on administration and program support costs.¹²
- 2018 electric efficiency expenditures were 11 percent below budget.
- 2018 gas efficiency expenditures were 13 percent below budget.
- 2018 renewable energy expenditures were 6 percent below budget.

B. Revenues¹³

Revenues include public purpose revenue plus incremental electric revenue from SB 838. 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	Annual actual revenues		Annual budgeted revenues	
Portland General Electric	\$	38,451,343	\$	37,484,629
PGE Incremental	\$	65,652,983	\$	64,656,625
Pacific Power	\$	28,375,373	\$	28,525,981
Pacific Power Incremental	\$	32,632,784	\$	31,515,755
NW Natural	\$	18,453,201	\$	18,279,834
NW Natural Industrial DSM	\$	848,774	\$	520,024
Cascade Natural Gas	\$	2,335,838	\$	2,167,052
Avista	\$	1,325,133	\$	1,156,870
Low and moderate income grant	\$	88,944	\$	0
Total	\$	188,164,372	\$	184,306,770

¹⁰ Columns may not total due to rounding.

¹¹ The gas savings do not include results for NW Natural in Washington. These results are available at www.energytrust.org/reports.

¹² The calculation of \$10.8 million in support costs aligns with Energy Trust's calculation of the OPUC administrative and program support costs performance measure, and includes administrative and program support costs for services in Southwest Washington. The number does not align with administration costs in table D below, because program support costs are not included under administrative costs.

¹³ Energy Trust provides energy efficiency services and incentives to large NW Natural Industrial DSM customers under a separate rate charge. In 2017, Energy Trust reduced expenditures for these customers at NW Natural's direction and accumulated surplus revenue. As a result, Energy Trust budgeted much less revenue in 2018 and planned to use the surplus carryover to cover expenditures.

C. Expenditures by utility^{14,15,16}

Source	Annual actual expenditures	Annual budgeted expenditures
Portland General Electric	\$ 91,984,107	\$ 103,481,456
Pacific Power	\$ 57,918,425	\$ 64,374,165
NW Natural	\$ 18,449,891	\$ 20,867,571
NW Natural Industrial DSM	\$ 2,751,968	\$ 3,917,455
Cascade Natural Gas	\$ 2,229,716	\$ 2,717,423
Avista	\$ 1,446,922	\$ 1,135,609
Business development	\$ 14,354	-
Low and moderate income grant	\$ 88,944	-
Total	\$ 174,884,329	\$ 196,493,680

¹⁴ In 2018, Energy Trust invested organization contingency pool funds to explore new business opportunities. Organization contingency pool funds are unrestricted donations and consulting fees, and are independent from ratepayer funds.

¹⁵ 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.

¹⁶ Energy Trust provides energy efficiency services and incentives to large NW Natural Industrial DSM customers under a separate rate charge. In 2017, Energy Trust reduced expenditures for these customers at NW Natural's direction and accumulated surplus revenue. As a result, Energy Trust budgeted much less revenue in 2018 and planned to use the surplus carryover to cover expenditures.

D. Expenditures by sector and program^{17,18,19}

		Annual actual expenditures	Annual budgeted expenditures	Budget variance
Commercial	Existing Buildings	\$ 41,553,989	\$ 52,572,050	21%
	Existing Multifamily	\$ 8,583,620	\$ 9,500,328	10%
	New Buildings	\$ 18,176,527	\$ 21,116,898	14%
	NEEA Commercial	\$ 2,945,465	\$ 2,562,174	-15%
	Commercial total	\$ 71,259,601	\$ 85,751,449	17%
Industrial	Production Efficiency	\$ 36,659,921	\$ 36,305,033	-1%
	NEEA Industrial	\$ 94,746	\$ 367,140	74%
	Industrial total	\$ 36,754,666	\$ 36,672,172	0%
Residential	Residential	\$ 42,501,842	\$ 47,311,523	10%
	NEEA Residential	\$ 4,629,126	\$ 5,179,664	11%
	Residential total	\$ 47,130,968	\$ 52,491,187	10%
	Energy efficiency total	\$ 155,145,236	\$ 174,914,808	11%
Renewables	Solar	\$ 8,103,859	\$ 9,181,933	12%
	Other Renewables	\$ 3,845,912	\$ 3,549,694	-8%
	Renewable generation total	\$ 11,949,771	\$ 12,731,627	6%
Administration	Administration	\$ 7,690,424	\$ 8,847,245	13%
	Administration total	\$ 7,690,424	\$ 8,847,245	13%
Other	Business development	\$ 14,354	\$ -	N/A
	Low and moderate income grant*	\$ 84,544	\$ -	N/A
	Total expenditures	\$ 174,884,329	\$ 196,493,680	11%

*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
Q3	\$9,396,777	\$4,605,762	\$2,376,173	\$216,118	\$126,110	\$1,657,620	\$1,221,801	\$19,600,362
Q4	\$22,057,408	\$14,064,096	\$5,065,937	\$890,764	\$334,716	\$1,144,310	\$1,689,353	\$45,246,585
Total	\$45,254,664	\$26,899,872	\$11,209,183	\$1,392,476	\$760,838	\$4,363,915	\$4,450,095	\$94,331,042

¹⁷ In 2018, Energy Trust invested organization contingency pool funds to explore new business opportunities. Organization contingency pool funds are unrestricted donations and consulting fees, and are independent from ratepayer funds.

¹⁸ 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.

¹⁹ Energy Trust spent less than expected on NEEA industrial and more on NEEA commercial because NEEA's Extended Motor Products Initiative, which focuses on motor/drive/control packages, is targeted to more commercial facilities, and less on industrial facilities, than initially planned.

VI Savings and generation tables^{20,21,22,23,24}

A. Savings and generation by fuel

	Annual savings/generation	Annual goal	Percent achieved	Levelized cost
Electric savings	54.0 aMW	56.6 aMW	95%	2.76 ¢ per kWh
Natural gas savings	7,480,487 therms	6,551,970 therms	114%	26.41 ¢ per therm
Electric generation	2.39 aMW	1.89 aMW	126%	4.51 ¢ per kWh

B. Progress toward annual efficiency goals by utility

	Annual savings	Levelized cost	Annual goal	Percent achieved	Annual IRP target	Percent achieved
Portland General Electric	34.68 aMW	2.69 ¢ per kWh	36.4 aMW	95%	36.12 aMW	96%
Pacific Power	19.3 aMW	2.88 ¢ per kWh	20.2 aMW	96%	19.8 aMW	98%
NW Natural	6.5 million therms	26.43 ¢ per therm	5.7 million therms	115%	5.7 million therms*	115%
Cascade Natural Gas	592,940 therms	27.85 ¢ per therm	547,106 therms	108%	548,212 therms*	108%
Avista	409,128 therms	24.66 ¢ per therm	349,520 therms	117%	349,520 therms*	117%

Integrated Resource Plan targets are shown in net savings.

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

²⁰ Columns may not total due to rounding.

²¹ This document reports net savings. Net savings are adjusted gross savings based on results of current and past evaluations.

²² Electric savings also include transmission and distribution savings.

²³ The gas savings do not include results for NW Natural in Washington. These results are available at www.energytrust.org/reports.

²⁴ 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.

C. Electric savings by sector and program

		Annual savings aMW	Annual goal aMW	Percent achieved	Levelized cost per kWh
Commercial	Existing Buildings	13.8	15.0	92%	3.05 ¢
	Existing Multifamily	1.8	1.8	100%	4.51 ¢
	New Buildings	6.2	6.3	99%	2.71 ¢
	NEEA Commercial	2.4	1.8	135%	2.19 ¢
Commercial total		24.3	24.8	98%	3.00 ¢
Industrial	Production Efficiency	16.7	19.2	87%	2.29 ¢
	NEEA Industrial	0.11	0.08	131%	1.60 ¢
Industrial total		16.8	19.3	87%	2.29 ¢
Residential	Residential	8.0	7.2	112%	3.97 ¢
	NEEA Residential	4.9	5.3	94%	0.97 ¢
Residential total		12.9	12.4	104%	2.92 ¢
Total electric savings		54.0	56.6	95%	2.76 ¢

D. Natural gas savings by sector and program

		Annual savings thm	Annual goal thm	Percent achieved	Levelized cost per therm
Commercial	Existing Buildings	1,424,802	1,481,693	96%	32.92 ¢
	Existing Multifamily	118,955	165,791	72%	55.70 ¢
	New Buildings	941,346	936,040	101%	19.53 ¢
Commercial total		2,485,103	2,583,524	96%	30.04 ¢
Industrial	Production Efficiency	2,036,307	1,064,753	191%	13.80 ¢
Industrial total		2,036,307	1,064,753	191%	13.80 ¢
Residential	Residential	2,959,078	2,903,694	102%	28.97 ¢
Residential total		2,959,078	2,903,694	102%	30.60 ¢
Total natural gas savings		7,480,487	6,551,970	114%	26.41 ¢

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

		Annual generation aMW	Annual goal aMW	Percent achieved
Portland General Electric		1.33	1.08	124%
Pacific Power		1.06	0.82	130%
Total		2.39	1.89	126%

F. Renewable energy generation by program

	Annual generation aMW	Annual goal aMW	Percent achieved
Other Renewables	0.09	0.00	n/a
Solar	2.30	1.89	121%
Total generation	2.39	1.89	126%

G. Incremental utility SB 838 expenditures²⁵

Utility	2018 Q4 SB 838 Expenditures	YTD SB 838 Expenditures
Portland General Electric \$	243,635	\$ 807,345
Pacific Power \$	278,660	\$ 969,744
Total \$	522,295	\$ 1,777,089

²⁵ 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.

VII Northwest Energy Efficiency Alliance progress

To deliver low-cost energy for customers, Energy Trust has been working with the Northwest Energy Efficiency Alliance (NEEA) since 2002 to increase the availability and adoption of energy-efficient electric products, equipment and practices. In 2015, natural gas equipment was added.

By pooling resources at a regional level to work with manufacturers, distributors and retailers, NEEA accelerates the development, testing and distribution of new energy-saving equipment and approaches. NEEA identifies and refines new high-efficiency products, services and practices and helps bring them to market. Once products are ready and available, Energy Trust creates and implements programs to support broad market adoption in Oregon.

Utility customers benefit by seeing a greater choice of higher-efficiency products available through contractors and at stores, through improved pricing and quality for efficient products, and through improvements to building codes and equipment standards that will save energy.

In 2018, staff participated in NEEA project governance and regional coordination by engaging with working groups that oversee NEEA's overall portfolio. Energy Trust approved a new initiative for commercial building construction, developing an approach to gas cost-effectiveness, and implementing a regional program for buildings and homes.

NEEA savings noted here are forecasted. Updated savings results will be available in late Q2 2019 through NEEA's annual report. Any changes to NEEA savings reported here will be captured in Energy Trust's annual True Up 2019 Report, available Q4 2019.

A. NEEA savings

	Annual savings	Annual energy target	Percent achieved	Levelized cost per kWh
Commercial	2.4 aMW	1.8 aMW	135%	2.19 ¢
Industrial	0.1 aMW	0.1 aMW	131%	1.60 ¢
Residential	4.9 aMW	5.3 aMW	94%	0.97 ¢
Total	7.5 aMW	7.2 aMW	104%	1.24 ¢

B. NEEA expenditures²⁶

	Annual actual expenditures	Annual budgeted expenditures	Budget variance
Commercial	\$3,080,959	\$2,682,977	-15%
Industrial	\$99,104	\$384,450	74%
Residential	\$4,842,070	\$5,423,877	11%
Total	\$8,022,134	\$8,491,303	6%

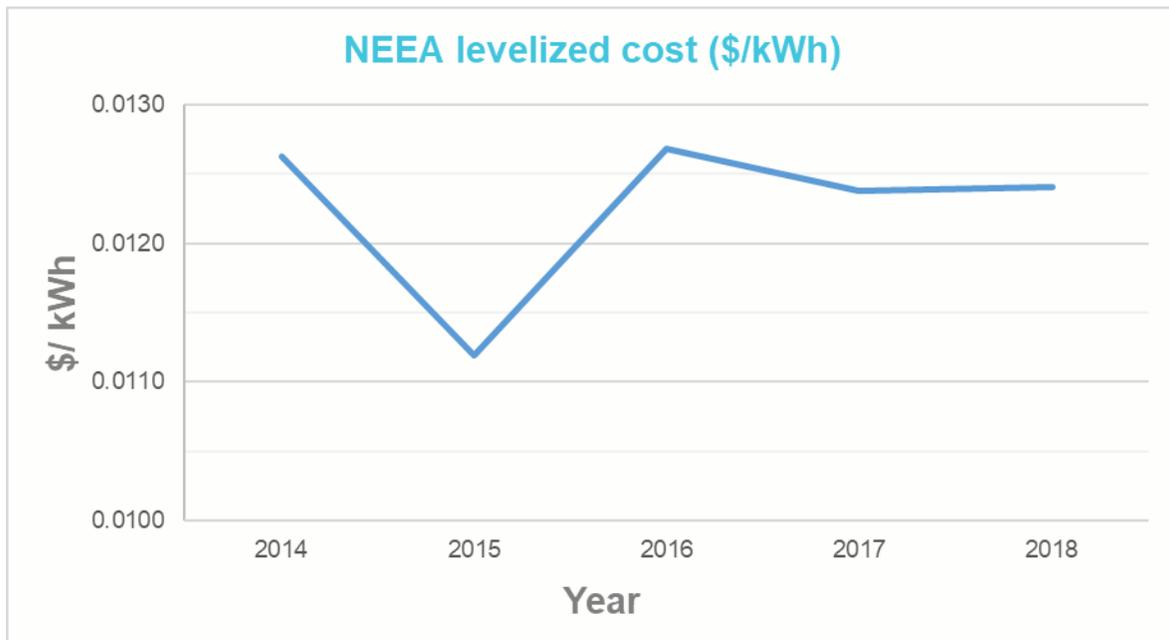
²⁶ Energy Trust spent less than expected on NEEA industrial and more on NEEA commercial because NEEA's Extended Motor Products Initiative, which focuses on motor/drive/control packages, is targeted to more commercial facilities, and less on industrial facilities, than initially planned.

C. Status of NEEA goals in Energy Trust’s 2015-2019 Strategic Plan

EMERGING EFFICIENCY RESOURCES	Status
NEEA identification of electric market transformation savings of 35 aMW	On track
Energy Trust identification of electric market transformation savings beyond NEEA’s	On track
NEEA gas market transformation progress	In progress

NEEA levelized cost

NEEA costs and savings are not realized in the same year. Savings in 2018 reflect costs from prior years, and costs from 2018 will lead to savings in subsequent years. For this reason, levelized costs are included for the past five years.



D. NEEA electric market transformation long-term goals, strategies and performance metrics

Below are NEEA's long-term goals and strategies, outlined in NEEA's 2015-2019 Business Plan²⁷.

NEEA facilitates market transformation with the following goals, strategies and performance metrics:

Goal 1: Fill the energy efficiency pipeline with new products, services, practices and approaches.

- Key strategies:
 - a. Identify new energy-efficiency opportunities.
 - b. Assess the potential for newly identified emerging technologies.
 - c. Prove the viability of emerging technology concepts.
- Five-year success metric: Fill the 20-year energy efficiency pipeline with 1,000 aMW of regional potential savings in process and 175 aMW of savings readied for market adoption.

²⁷ NEEA's 2015-2019 Business Plan is available online at <https://neea.org>.

Goal 2: Create market conditions that accelerate and sustain the market adoption of emerging energy-efficiency products, services and practices.

- Key strategies:
 - a. Influence market actors to increase availability of energy-efficient products and services.
 - b. Improve and ensure product quality.
 - c. Build market knowledge and capability.
 - d. Identify and develop market resources that capitalize on the compelling value proposition and business case (i.e., “non-energy benefits”) for an energy-efficient product, service or practice.
 - e. Increase product awareness.
 - f. Develop strategies to address price and first-cost issues.
 - g. Influence and support the successful implementation of more stringent building codes and appliance standards.
- Five-year success metric: In all of the markets in which NEEA works, including Oregon, NEEA programs are to result in substantive and measurable change in market conditions, resulting in energy savings.

More information on NEEA's market transformation strategies, processes and performance metrics is available in NEEA's 2015-2019 Business Plan and recent annual or quarterly reports²⁸.

E. NEEA gas market transformation progress indicators

Progress indicator	Status
2015: Complete scanning research and concept opportunity assessment for two technologies	Achieved
2016: Complete concept opportunity assessment for three technologies	Achieved
2017: Complete market and product assessment for one technology; five additional technologies in “Scanning”	Achieved
2018: Complete strategy testing and finalization for one technology	Delayed ²⁹
2019: At least two technologies ready for scale-up	N/A

F. Energy Trust membership on NEEA committees and direction to NEEA

Energy Trust provides regular guidance to NEEA through Executive Director Michael Colgrove’s service on the NEEA board of directors and its strategic planning committee and through Energy Trust staff participation on all nine of NEEA’s advisory committees.

Committee	Energy Trust staff member
Regional Portfolio Advisory Committee	Fred Gordon, director of planning and evaluation
Cost-effectiveness and Evaluation Advisory Committee	Andy Eiden, planning project manager Phil Degens, evaluation manager
Emerging Technology Advisory Committee	Fred Gordon, director of planning and evaluation
Natural Gas Advisory Committee	Phil Degens, evaluation manager
Northwest Research Group	Phil Degens, evaluation manager

²⁸ NEEA's recent annual and quarterly reports are available online at <https://neea.org>.

²⁹ Market development of gas combined space-water heating systems were slower than had been anticipated.

Residential Sector Advisory Committee	Thad Roth, residential sector lead
Commercial Sector Advisory Committee	Oliver Kesting, commercial sector lead
Industrial Sector Advisory Committee	Amanda Potter, industrial sector lead
End Use Load Research Steering Committee	Michael Colgrove, executive director

Energy Trust staff provided the following direction to NEEA through committees:

- Provided general oversight on the organization’s annual performance, expenditures and savings.
- Provided guidance on the strategic direction and goals of NEEA as it developed its 2020-2024 Strategic Plan and Business Plan.
- Helped establish initial guidelines and recommendations to the NEEA board and Gas Advisory Committee concerning evaluation and tracking of economic performance of the NEEA gas portfolio.
- Helped provide oversight for the scope, cost and schedule of the End Use Load Research project.
- Provided feedback to the NEEA Industrial, Commercial and Residential Advisory Committees on NEEA initiatives, and facilitated cross-organizational collaboration on topics including Strategic Energy Management infrastructure, commercial code enhancement, commercial real estate tools and training, new measures based on extended motor products and emerging technology such as next generation compressed air nozzles.
- Provided leadership in the NEEA-convened Northwest SEM Collaborative, a peer-to-peer network for program administrators, implementers and evaluators that speeds innovation and advances SEM program progress in the region.
- Engaged on numerous NEEA program work groups to provide tactical guidance on program implementation efforts to ensure program effectiveness while preventing overlap and confusion in the market. Activities at the work-group level are shared as appropriate with the sector advisory committees, regional portfolio committee, and in some cases, the NEEA board.

G. Energy Trust opts out of select NEEA efforts

Energy Trust opts out of industrial technical training, one of NEEA’s infrastructure offerings for member utilities. It was found to be duplicative with other training resources that Energy Trust delivers and sponsors for industrial and agricultural businesses and had lower participation. Energy Trust provides extensive training in comprehensive SEM through the Production Efficiency program, sponsors the annual Northwest Industrial Efficiency Summit, and sponsors more than 20 system-focused industrial technical training classes per year, which are provided to PGE and Pacific Power customers by PGE’s customer technical training group. Opting out of NEEA’s industrial technical training means that Energy Trust does not fund that effort and does not work with NEEA to plan and coordinate these efforts in Energy Trust territory.

APPENDIX 1: Customer satisfaction results

Energy Trust calculated customer satisfaction from short telephone surveys conducted with randomly selected participants soon after they completed projects. The survey asked residential and non-residential participants about satisfaction with their overall experience with Energy Trust. Participants in the Existing Buildings (including Existing Multifamily), Production Efficiency and Commercial Solar programs were also asked about satisfaction with program representatives. Surveys were conducted with 4,147 residential customers and 761 non-residential customers in Oregon who received an incentive or discount from Energy Trust in 2018.

In 2018, the average proportion of program participants satisfied with their overall experience with Energy Trust was 95 percent, and satisfaction with interactions with Energy Trust program representatives was 97 percent.

New Buildings projects often involve numerous market actors (architects, engineers, developers and owners) at different project stages, so it is difficult to reach a project representative who is able to respond to questions about satisfaction. Satisfaction with the New Buildings program is obtained from interviews with program participants as part of a separate evaluation survey. The most recent survey took place in Q1 2018. Ninety New Buildings project owners or representatives that participated in 2017 were surveyed about their overall program satisfaction and satisfaction with interactions with program representatives. Of participants surveyed, 98 percent were satisfied with their overall program experience. Satisfaction with program representatives was 96 percent.

Table 1: 2018 overall satisfaction

Program	Satisfaction with overall experience
Existing Buildings, including Multifamily	95%
New Buildings*	98%
Production Efficiency	97%
Residential	94%
Solar	91%
Unweighted average	95%

* New Buildings satisfaction based on survey results of 2017 program participants.

Table 2: 2018 satisfaction with program representatives

Program	Satisfaction with program representative
Existing Buildings, including Multifamily	96%
New Buildings*	96%
Production Efficiency	97%
Commercial Solar	100%
Unweighted average	97%

* New Buildings satisfaction based on survey results of 2017 program participants.

Note: Energy Trust’s customer feedback survey does not ask residential participants about satisfaction with program representatives. Residential participants interact with Energy Trust representatives to a varying degree—many do not interact with a program representative. In general, commercial and industrial participants have more interaction with Energy Trust representatives.

APPENDIX 2: Progress to 2015-2019 Strategic Plan goals; cumulative and total annual results

Progress to 2015-2019 Strategic Plan goals

- Energy Trust achieved 97 percent of the Strategic Plan electric savings goal of 240 aMW through 2018.
- Energy Trust achieved 114 percent of the Strategic Plan gas savings goal of 24 million annual therms through 2018.
- Energy Trust achieved 138 percent of the Strategic Plan renewable generation goal of 10 aMW through 2018.

⚡ Electric



🔥 Natural gas



🌿 Renewable generation



Cumulative and total annual results

- **Total annual savings of 724 aMW** have been realized since electric efficiency programs began in 2002, equivalent to powering approximately 617,000 Oregon homes. This total includes 23 aMW of savings from self-direct customers.
- **Total annual savings of 65.4 million annual therms** have been realized since gas efficiency programs began in 2003, equivalent to providing gas heat to approximately 129,000 Oregon homes.
- **Total annual renewable energy generation of 129.3 aMW** has been installed since 2002, equivalent to powering approximately 110,200 Oregon homes.
- **The net economic benefits of Energy Trust 2002-2018 expenditures, energy savings and renewable energy generation added \$7.3 billion to the local economy**, including \$2.2 billion in wages, \$390 million in small business income and employment equivalent to 5,800 full-time jobs lasting a decade.
- **Through 2018, air quality improvements stemming from Energy Trust investments have kept more than 29.2 million tons of carbon dioxide out of the atmosphere**, the equivalent of removing roughly 6 million cars from Oregon roads for one year.
- **Since 2003, Energy Trust has invested more than \$20 million in energy-efficiency projects at over 1,200 public K-12 Oregon schools**, and provided more than \$4 million in funding for solar electric and wind energy systems at nearly 69 public schools.

- **Energy Trust investments in energy efficiency and solar generation will save utility customers nearly \$7.7 billion** on their utility bills over the lifetime of those investments. Participating customers have already saved more than \$4.3 billion on their energy bills since 2002.

APPENDIX 3: Renewable resource development targets

A. Purpose of project development assistance

Energy Trust provides project development assistance and installation incentives for projects that will generate renewable electricity from hydropower, biopower, municipally-owned community wind and geothermal resources.

The primary goal of project development assistance is to increase the number of distributed renewable energy generation projects in Oregon by lowering early stage development barriers and financial risk. Through project development assistance, Energy Trust builds a pipeline of projects that have achieved critical pre-construction activities, including technical and financial assessments. Development assistance also prepares proposed project owners to apply for Energy Trust installation incentives and other sources of financial support. The early-stage analyses delivered through development assistance, such as feasibility studies, build and reinforce Energy Trust's awareness of market factors and other considerations important for supporting distributed renewable energy resources, while helping individual projects leverage other incentives, construction services and long-term financing.

Applications for project development assistance must be received and approved by Energy Trust prior to the start of the proposed development activity. Project development assistance incentive funds are provided as a reimbursement following completion of the activity and proof of full payment to all contractors. Incentive funding typically equates to 50% of the project activity cost, up to a maximum of \$200,000. Project proponents have a significant financial stake in development activities, helping ensure that activities are necessary and fiscally prudent. Common examples of project development activities include feasibility and design studies, feedstock studies, irrigation district modernization assessments, and transmission and interconnection studies.

While project proponents using any eligible technology can apply for project development assistance incentives, staff focus their efforts in two key areas:

- 1) Electricity generation from the combustion of biogas, which is created by the anaerobic digestion of organic wastes at water resource recovery facilities (also known as wastewater treatment plants) and businesses that manage organic materials (such as food processors).
- 2) Hydroelectric projects made possible from the modernization of irrigation water delivery infrastructure (canals) by irrigation districts.

B. Barriers to project development

Energy Trust's project development assistance is designed to address the main barriers to renewable energy project development. Barriers in 2018 remained similar to those in previous years, and in some instances increased (e.g., the sunset of Oregon's renewable energy development grant, combined heat and power tax credit, and the federal investment tax credit). Helping projects overcome these barriers builds a pipeline of projects that can apply for incentives, complete construction and generate renewable energy.

- **It is difficult to find capital to support early stage work.** Particular renewable energy projects with above-market costs are often regarded as high-risk when investing money at the beginning of the project. Investors

are reluctant to put funds into projects with unclear potential, especially when a project may have a lengthy return on investment. Without early stage funding, a project cannot advance to the point where the risk is reduced. By providing early stage funding, Energy Trust builds a pipeline and helps move projects forward, enabling them to attract additional financing and eventually construct a project. On the other hand, early stage assessments may also help inform the market if a project is determined to be not technically or financially viable. Energy Trust helps project owners reach that point with less financial exposure.

- **Project proponents whose primary business is not energy often encounter difficulties navigating the stages of project development.** Energy Trust works with many project proponents that are not professional developers. Advancing a project through the steps of resource characterization, feasibility, permitting and interconnection can be lengthy and difficult. Project development assistance—both financial and technical—helps developers navigate these steps efficiently in less time and for less cost.
- **Market conditions for distributed renewable generation in Oregon continue to be challenging.** At all stages of the development process, project owners face poor market fundamentals, including low avoided cost rates and greatly diminished state and federal incentives. Utility interconnection appears to be growing harder based on anecdotal reports from project proponents. Costs for materials, equipment and labor have also significantly increased since the 2008 – 2010 recession. Project development assistance is an essential tool to continue to attract investment in projects in Oregon and to maintain development capacity in the state.

C. Project development assistance activity in 2018

This report details the specific uses of project development assistance in these areas in 2018. Since 2014, Energy Trust has focused on increasing the deployment of project development assistance incentives to build a pipeline of projects that can apply for installation incentive funds.

Summary of project development assistance activity in 2018:

Focus areas	Projects supported	Total funds committed*	Total funds spent**
Focus area 1: Biogas	5	\$55,418	\$394,097
Focus area 2: Irrigation hydropower	18	\$1,579,289	\$1,718,760
Outside focus areas	8	\$114,620	\$412,081
Total	31	\$1,749,327	\$2,524,938

* Total funds committed only includes dollars committed in 2018.

** Total funds spent includes funds committed in 2018 and in previous years.

The 2018 OPUC Performance Measures for Energy Trust include metrics related to renewable energy and the focus areas in the above table. The first performance measure states:

Deploy \$1.72 million in project and market development assistance with a project pipeline of non-solar projects in excess of 25 projects. Energy Trust will report the number of projects served, total funds spent and summarize progress.

In 2018, the Other Renewables program deployed \$2.52 million in non-solar project development assistance incentives to 31 different projects, exceeding the minimum performance measure. The program committed most of these funds to irrigation hydropower projects, an investment nearly equivalent to that expended in 2017. Also, the program experienced a 2.5-fold increase in the level of biogas project development assistance over 2017, largely a result of two municipal water resource recovery facility cogeneration system designs and brewery biopower feasibility assessments. The two municipal water resource recovery facility biopower projects are currently under construction. Finally, development assistance outside of the focus areas increased by a factor of 2.5, where funds were expended to advance eight renewable electricity projects, specifically agricultural hydropower, municipal water-supply hydropower, woody biomass combined heat and power, and geothermal.

Not reflected in the above table are a significant number of irrigation hydropower projects supported previously. These hydropower projects are in various stages of development, as irrigation districts advance through modernization processes, including system improvement planning, permitting, fundraising and design, and installation of pressurized irrigation pipe. As a result, while the total number of projects supported financially in 2018 is less than 2017, staff expect a number of projects to re-enter the pipeline in future years.

D. Focus area: Electricity generation from the combustion of biogas

Biogas projects supported: 5

Milestones met

- Food waste micro-digester feasibility assessment
- Brewery waste-to-energy feasibility assessment
- Anaerobic membrane bioreactor pilot study for brewery waste treatment
- Municipal water resource recovery facility co-generation designs

Oregon's businesses and municipalities manage, process and are ultimately obliged to dispose of significant volumes of organic material. As Oregon's population grows, the volume of organic material requiring processing and disposal increases as well. These organic materials, managed daily by food processors and municipal water resource recovery facilities, are often decaying, costly to transport and pose human health risks. Traditional methods of safely managing these materials include land application and landfilling, and in the case of food waste, conveyance to livestock operations.

With recent technological advancements, these materials can serve as a valuable biogas feedstock. Under controlled conditions (e.g., absence of oxygen, controlled temperature) organic materials can produce biomethane, or biogas, through a process known as anaerobic digestion. Biogas, about 60 percent methane by volume, may be used as a renewable fuel. This biogas may be combusted to serve on-site thermal energy needs, used as a fuel for combined heat and power systems, or conditioned further and compressed for vehicle fuel or injected into existing natural gas pipelines as renewable natural gas.

Oregon's water resource recovery facilities treat wastewater to standards that protect human health and the environment. Treating wastewater is an energy intensive process, often the most significant use of energy for a municipality. The sophistication and scale of the treatment facilities range from simple aerobic treatment ponds to technologically advanced anaerobic treatment systems with nutrient recovery.

These publicly funded water resource recovery facilities are ideal locations for investments in energy efficiency and renewable energy generation (primarily biopower and solar). There are 11 cogeneration projects at water resource recovery facilities in Oregon, generating nearly 60,000 megawatt hours of net-metered renewable electricity per year. Energy Trust provided installation incentives at seven of these facilities. Key advantages include their public ownership, permanency, highly skilled staff and that they typically serve a stable or growing base of ratepayers. In addition, they provide an essential public service, have access to low-cost capital, and have significant onsite heat and electricity demand. To help guide financially and technically sound renewable energy investments, municipalities can greatly benefit from third-party expertise and incentives to lessen financial barriers. Energy Trust deploys project development assistance to help municipalities learn about the opportunities for adding or expanding generation and to advance efficiently through pre-construction development processes. Yet, market forces are making these cogeneration projects less attractive, including flat or declining marginal retail energy costs as well as renewable natural gas incentives that make cogeneration from biogas comparatively far less economically attractive.

Project development assistance for municipal biopower projects is typically used for feasibility studies, regional organic material feedstock studies, pre-design and design studies. Additionally, Energy Trust uses operations, maintenance and technical information gleaned from operating municipal biopower projects to inform future projects.

Food processors, including breweries, are investigating anaerobic digestion of their waste streams to produce biogas as a cogeneration system fuel. Oregon is home to a significant number of food processors and a burgeoning craft-brewing and distilling sector. Traditionally, these businesses have either disposed of their liquid wastes in municipal sewer collection systems, land-applied waste products or made wastes available as livestock feed. These businesses are often located in urban and suburban areas and face significant extra strength sewage charges for disposing of their organic wastes. Municipal waste water disposal costs provide financial motivation to investigate onsite waste treatment options such as anaerobic digestion and biopower. Energy Trust helps businesses evaluate if onsite waste treatment and biopower are a financially sound investment.

E. Focus area: Irrigation hydropower

Energy Trust supports several types of irrigation hydropower projects, which are categorized by customer type and process used. Staff see technically and financially viable hydropower opportunities among irrigation districts, other agricultural water suppliers such as ditch companies, and farms where irrigation water is delivered to an individual user. Energy Trust's irrigation modernization initiative provides a comprehensive structure for irrigation districts and other agricultural water suppliers to assess hydropower potential and identify additional water delivery system improvements and benefits.

Irrigation modernization projects supported: 18

Milestones met

- Feasibility studies
- Compilation and evaluation of information on existing water use and infrastructure
- Evaluation of stakeholder needs
- Evaluation of water and energy conservation potential
- Evaluation of environmental benefits and water quality impacts
- Evaluation of hydroelectric potential

- Evaluation of economic impacts
- Development of system optimization plans

Much of Oregon's agricultural water is delivered to farms by irrigation districts or other water providers using aging, open canal systems, many dug more than 100 years ago, which lose significant quantities of water to seepage and evaporation. These municipal systems are ripe for modernization, which would derive lasting energy and water conservation benefits, and create additional opportunities for agricultural security, rural prosperity, drought resiliency and environmental improvements.

Hydropower projects using irrigation water have been a focus for Energy Trust since 2010. Despite challenging renewable energy market conditions, these types of projects remain viable due to the wide range of non-energy benefits that modernized irrigation systems can provide, substantial grants from state and federal agencies to offset the cost of piping, and the concerted efforts by irrigation district managers and agricultural producers.

Modernizing an irrigation district is complex. A significant modernization milestone is the replacement of open canals with pipes, which saves water by eliminating seepage and evaporation. Irrigation canals use gravity to keep water flowing. Once the open system of canals and laterals are piped, the water in the pipe is pressurized by gravity, allowing irrigators to remove the pumps they formerly needed to lift and convey water from the open conveyances, thereby reducing energy use and maintenance costs. Pressurized water may also enable additional upgrades to more water-efficient on-farm irrigation systems (e.g. high-efficiency center pivot irrigators). Surplus water pressure can be used to generate hydropower, with revenues from the sale of renewable electricity helping to finance project implementation.

The irrigation modernization offering provides irrigation districts and the farmers they serve a one-stop shop to navigate complex agricultural priorities, regulatory requirements, funding needs and environmental concerns. Within each district, the irrigation modernization program identifies short- and long-term irrigation goals, assesses opportunities and risks, identifies potential stakeholder partnerships, evaluates and communicates the associated energy, economic, ecological and social benefits of modernization, secures project financing and facilitates project implementation.

This nationally recognized effort reduces the cost and time required for project planning and implementation, addresses key regulatory and institutional barriers, leverages federal, state and private funding, and reduces costs for agency, environmental and agricultural program deployment. This initiative builds awareness that modern agricultural water management can help mitigate the impacts of long-term drought on agricultural production and regional watersheds and ecosystems. Irrigation modernization is replicable and scalable, and designed to achieve significant energy, agricultural and ecosystem benefits in Oregon and in other western states.

In 2018, irrigation modernization assessments were underway at 21 Oregon irrigation districts. These assessments identify the renewable energy, energy efficiency, agricultural, water conservation, environmental and economic benefits associated with modernization. They also characterize various potential project implementation approaches. Each irrigation district will choose the implementation approach that is right for their patrons and unique situation. After a district's board selects a preferred approach, then design, permitting and financing will begin, followed by contracting and construction.

Early results indicate that modernization has the potential to yield significant energy and non-energy benefits. In the Deschutes basin, eight irrigation districts participating in the program have a combined 37 megawatts of hydropower potential and the opportunity to conserve 60,000 megawatt-hours of energy from pump elimination.

Since 2015, the irrigation modernization initiative has been delivered by Farmers Conservation Alliance, a nonprofit that develops resource solutions for rural communities. Farmers Conservation Alliance has worked with individual farmers, irrigation districts, agencies, tribes, nonprofits and foundations to form collaborative relationships that support modern irrigation systems.

F. Project development assistance outside of focus areas

Energy Trust supported eight projects outside of the two main focus areas in 2018. These projects represent a wide variety of distributed renewable energy generation opportunities. While all are viable, staff do not focus on these particular opportunities because past research has indicated that the market for these types of projects is smaller than for irrigation hydropower and biogas projects, permitting is challenging and upfront development costs can be high. Energy Trust remains open to these opportunities and provides staff support, but does not engage in targeted outreach to these types of projects.

Agriculture water supply hydro: 4

Municipal water supply hydro: 1

Geothermal electric: 2

Woody biomass combined heat and power: 1

Milestones met:

- Feasibility studies
- Interconnection studies
- Fish passage study

APPENDIX 4: 2018 gross savings

This appendix provides Energy Trust’s 2018 energy savings in gross savings. Gross savings are energy savings that result from Energy Trust programs, regardless of why customers participated.

In the body of Energy Trust’s annual and quarterly reports to the OPUC, Energy Trust reports results in net savings. Net savings refer to the portion of gross savings that is directly attributable to Energy Trust programs. Net savings do not include savings from participants who would have completed an energy-saving action even in the absence of the program (free riders), and do include estimates of savings from participants who completed an energy-saving action because of awareness of the program but didn’t receive a program incentive (participant spillover effect).

Energy Trust’s gross energy generation is equal to net renewable energy generation. Because of Energy Trust’s mandate to support only renewable projects with above-market costs, these projects are unlikely to move forward without Energy Trust incentives and therefore are not free riders. Based on these factors, Energy Trust claims 100 percent of generation for all renewable energy projects that receive incentives.

Progress toward gross annual efficiency and generation goals

	Annual savings/ generation (gross)	Annual goal (gross)	Percent Achieved
Electric savings	59.9 aMW	62.9 aMW	95%
Natural gas savings	8.2 million therms	7.2 million therms	115%
Electric generation	2.4 aMW	1.9 aMW	126%

Gross savings

⚡ Total electric savings



🌿 Total natural gas savings



APPENDIX 5: NW Natural industrial demand-side management activities

Since 2009, Energy Trust has provided service to NW Natural's Schedule 31 and 32 non-transport customers, funded through a special rate adjustment mechanism rather than through the public purpose charge. Program costs and therm savings for these customers in 2018 are included in the body of this annual report as a portion of NW Natural savings and reported separately below.

		Annual savings (therms)	Annual actual expenditures	Levelized cost/therm
Commercial	Existing Buildings	469,754	\$ 990,048	18.4 ¢
	Existing Multifamily	8,024	\$ 32,245	35.8 ¢
	New Buildings	239,133	\$ 243,966	7.8 ¢
Commercial total		716,910	\$ 1,266,258	14.7 ¢
Industrial	Production Efficiency	1,025,403	\$ 1,485,710	21.2 ¢
	Industrial total	1,025,403	\$ 1,485,710	21.2 ¢
Total		1,742,313	\$ 2,751,968	17.2 ¢

APPENDIX 6: Background, mission and goals

A. Background

Energy Trust is an independent 501(c)(3) nonprofit organization funded by and serving Oregon customers of Portland General Electric, Pacific Power, NW Natural, Cascade Natural Gas and Avista, and NW Natural customers in Washington. We offer energy efficiency and renewable energy programs and services to every type of customer, including those who own, rent or lease a home or building, product manufacturers, small and large businesses and industries, nonprofit and public organizations, farmers and ranchers.

Our mission is to help customers and utilities meet their energy needs with the cheapest and cleanest energy available. Since March 2002, we have been entrusted to invest public purpose funds from utility customers and deliver benefits from energy-efficiency improvements and renewable energy generation. We serve customers in coordination with utilities, community and industry organizations, government agencies and two other electric public purpose fund administrators—Oregon Housing and Community Services and the Oregon Department of Energy. Our work helps ensure a more affordable and sustainable energy future for utility customers, and contributes to our local and state economy in positive ways.

We provide information, technical expertise and financial assistance to help people modify their energy usage habits, choose high-efficiency products, invest in energy-efficient construction and install renewable energy projects. Our programs and approaches, range of offers tailored to customers, and collaboration with public agencies and community organizations enable us to provide relevant clean energy solutions as technologies and customer needs evolve. With our assistance, participating customers derive a range of benefits—lower energy bills, greater comfort, better indoor air quality, improved productivity and lower carbon emissions.

We believe it is our responsibility to ensure that all customers can directly benefit from our services, including people with low and moderate incomes, communities of color and rural communities. In 2018, we developed a Diversity, Equity and Inclusion Operations Plan to better understand where gaps exist so that we can improve and enhance offerings for underserved customers.

As a steward of utility customer dollars, we consistently maintain low administrative and program support costs to ensure the majority of public purpose funds flow back to customers as incentives, services and education. We competitively bid our program management and delivery contracts, ensuring the best prices for the services provided. For most programs, Energy Trust leverages specialized local trade and program ally businesses—many of whom employ 20 or fewer staff—that already serve customers in the marketplace. We support and leverage a statewide network of trade ally contractors, allied professionals and participating retailers that are familiar with Energy Trust incentives. By connecting customers directly to this network, Energy Trust helps keep costs low, supports our region's energy services sector and sustains opportunities in the areas we serve.

We are led by an independent board of directors whose members volunteer their time and expertise. Our work is also shaped by advice from two advisory councils comprised of stakeholders. We strive to be inclusive and transparent by holding open meetings and publishing online meeting agendas, notes, independent third-party program evaluations, draft and final budgets and action plans, reports and annual audited financial statements.

We comply with legal requirements and minimum performance measures set forth in our contract with the Oregon Public Utility Commission. Annual goals for electric and natural gas energy savings are developed in consultation with PGE, Pacific Power, NW Natural, Cascade Natural Gas and Avista, and built from each utility's Integrated Resource Plan. This collaboration enables Energy Trust to focus on and be accountable for delivering the lowest-cost energy available to meet the needs of every utility customer. In addition, annual renewable energy generation goals are developed using market knowledge obtained through renewable resource assessments.

B. Purpose statement

Energy Trust provides comprehensive, sustainable energy efficiency and renewable energy solutions to those we serve.

C. Vision statement

Energy Trust envisions a high quality of life, a vibrant economy and a healthy environment and climate for generations to come, built with renewable energy, efficient energy use and conservation.

D. 2015-2019 Strategic Plan goals and strategies

- Save 240 aMW of electricity
- Save 24 million annual therms of natural gas
- Install 10 aMW of renewable energy
- Expand participation
- Make energy efficiency more affordable
- Identify new technologies with energy-saving potential
- Continuously improve programs and services
- Provide project development support and incentives for renewable energy projects
- Work more efficiently
- Remain flexible and open to new opportunities

APPENDIX 7: 2018 board of directors; board development guidelines; 2018 advisory council members and meetings

PRESIDENT—Roger Hamilton, Eugene, is a former consultant with Western Grid Group, an organization that promotes transmission access for renewable energy projects across the West. He also consults with The Resource Innovation Group on climate change adaptation and mitigation. He has spent many years in public service as a Klamath County commissioner, an advisor on energy and watersheds to Governor John Kitzhaber and an Oregon Public Utility Commissioner. He has also served on the Oregon State Parks Commission, the National Association of Public Utility Commissioners and the board of directors of the Regulatory Assistance Project. *Roger has served as President since February 2018.*

VICE PRESIDENT—Alan Meyer, Salem, is a retired director of energy management for Weyerhaeuser Company, a diversified forest products manufacturing company. In that role, he was responsible for coordinating energy management activities at numerous manufacturing facilities throughout North America. Prior to joining Weyerhaeuser, he was director of energy for Willamette Industries, holding similar responsibilities. He also worked for PacifiCorp as the Oregon large industrial accounts manager. He previously served on the board of directors of Industrial Customers of Northwest Utilities, a nonprofit advocacy organization focused on energy policies. He has also served for more than 20 years on the City of Salem Morningside Neighborhood Association board. *Alan has served as Vice President since February 2018.*

SECRETARY—Mark Kendall, Salem, has more than 34 years of experience in energy management and renewable resource development in Oregon. Prior to founding his own consultancy, Kendall Energy, in 2009, he spent 19 years with the Oregon Department of Energy working in commercial and industrial energy management policy, including serving as the governor's appointee to the Northwest Energy Efficiency Alliance board from 2001-2006. Before working for the state, he spent 11 years with the Eugene Water and Electric Board. He also served on the Oregon Low Carbon Fuel Standard Advisory Committee, and facilitated the 2009 Industrial Greenhouse Gas Reduction subcommittee of the Oregon Global Warming Commission. He received his bachelor's degree from Linfield College with an emphasis in communications and energy management, and his master's degree in organizational development from the Leadership Institute of Seattle City University. *Mark has served as Secretary since February 2018.*

TREASURER—Susan Brodahl, Portland, is a vice president in the Portland office of Heffernan Insurance Brokers as well as an owner of Heffernan Group. Heffernan Group has more than 400 employees, and is ranked in the top tier of all privately held brokerages in the country. Susan believes in a creative approach to insurance using a risk funding model. Her philosophy is "clients for life." Susan is a frequent featured speaker at regional and national conventions as well as published in various trade and mainstream journals. She has been awarded the Lifetime Achievement Award from the Painting and Decorating Contractors of America, and has an economics degree from Willamette University. *Susan has served as Treasurer since February 2018.*

Anne Haworth Root, Medford, is co-owner and general manager of EdenVale Winery and Eden Valley Orchards, a destination winery, historic pear orchard and events center in southeast Medford. A second tasting room called Enoteca is located in Ashland. An award-winning entrepreneur, she developed the concept and helped found the

Oregon Wine and Farm Tour, an agritourism coalition of Southern Oregon wineries, historic farms and specialty food and cheese companies. She is a graduate of Southern Oregon University, where she was student body president and chair of the Oregon Student Lobby. She pursued postgraduate studies in the Master of Commerce program at Wollongong University in Australia.

Dan Enloe, Portland, is a retired supply chain manager at Intel Corporation in Hillsboro, where he worked in varying capacities since 1984. Prior to 1984, he was on active duty in the U.S. Navy and served as a nuclear submarine officer. Since leaving active duty, he served with the Naval Reserve, completed six reserve command tours and retired as a captain in 2009. He is a member of the Naval Reserve Association, the American Legion and the Navy League. A graduate of the U.S. Naval Academy with a degree in electrical engineering, he holds two patents. *Dan served on the board from April 2008 to May 2018.*

Debbie Kitchin, Portland, is the co-owner of InterWorks LLC, a construction company engaged in commercial tenant improvement and renovation and residential remodeling services. InterWorks is an award-winning contractor specializing in sustainable building practices. Prior to joining the family business in 1996, she served as senior economist for the Northwest Power and Conservation Council for 15 years and was a regional economist for the Bonneville Power Administration for three years. Debbie is vice chair for government relations of the Portland Business Alliance and is a board member for Greater Portland Inc. She is past president of the Central Eastside Industrial Council, a past board member of the Portland Building Owners and Managers Association and a past president of the Portland Commercial Real Estate Women.

Edmund Patrick Sherman, Portland, is a principal with Hilltop Public Solutions and Against the Current Consulting Group and works with clients interested in improving the quality of life in Native American communities. Eddie is a member of the Navajo and Omaha Nations and grew up on the Navajo Nation Reservation. In Navajo tradition, it is customary to identify someone's clan upon introduction: *Ya'at'eeh, Shi ei Eddie Sherman. Nat'oh Dine'e Tachii'nii nishlii doo [Tapa] Omaha Deer Clan ei bashishchiin. Bit'ahnii'nii ei dashicheii, nana [Tapa] Omaha Deer Clan ei dashinali. Todineeshzhee'dee ei naasha.* This translates to: Hello, my name is Eddie Sherman. I am Tobacco People, born for the [Tapa] Omaha Deer Clan. My maternal Grandfather's clan is Folded Arms people and my paternal Grandfather's clan is [Tapa] Omaha Deer Clan. I am from Kayenta, Arizona. *Eddie served on the board from November 2014 to August 2018.*

Elee Jenn, Newberg, is principal marketing and business development manager at Energy Performance Engineering LLC in Newberg. She helps building owners construct and maintain high-performance energy-efficient facilities through system commissioning and building control services. Many of Energy Performance Engineering's clients are schools, colleges and governments, including Portland Community College in Newberg. An accredited Leadership in Energy and Environmental Design professional, Elee holds a Master of Science in analytical chemistry and a Bachelor of Science in chemistry. *Elee joined the board in October 2018.*

Eric Hayes, Beaverton, is the state organizing coordinator for the International Brotherhood of Electrical Workers. He engages and organizes electrical workers to achieve better wages, pension, insurance and training. With 23 years at IBEW, Eric's multiple roles included recording secretary, vice president and president of Local 48. During this time, Eric served as a trustee of the Edison Pension Trust, Harrison Health Trust and the Apprenticeship Trust. He was also president of the Electrical Minority Workers Caucus Portland Chapter, which promotes minorities and women in IBEW. *Eric joined the board in October 2018.*

Ernesto Fonseca, Portland, is the Chief Executive Officer of Hacienda, an Oregon Community Development Corporation and Social Enterprise that advances the livability, health and economic progress of underserved communities in the Pacific Northwest. Ernesto has dedicated the last 17 years of his career to the development of high-quality, affordable housing and social services in Mexico and the United States. Ernesto brings ample experience in community development, housing and energy access from his time working with the Housing Authority of Maricopa County and the City of Avondale, and Arizona State University. Ernesto holds a Master of Science in Energy Performance and Climate Responsive Architecture, and a doctorate in Environmental Design and Planning from Arizona State University. *Ernesto joined the board in May 2018.*

Henry Lorenzen, Pendleton, has a resume that spans from working as a partner at Corey, Byler, Rew, Lorenzen and Hojem law firm to running his family's 4,000-acre wheat farm. From 2002 to 2018, he served as member on the Northwest Power and Conservation Council, which develops a regional power plan and fish and wildlife program. He has also served on the Oregon State Board of Higher Education, Oregon Fish and Wildlife Commission and Oregon Environmental Quality Commission, and on the boards of Oregon Public Broadcasting and the Oregon Historical Society. Henry's education includes a Juris Doctor from Lewis and Clark Law School, a Master of Business Administration from Harvard University and a Bachelor of Science in electrical engineering from Oregon State University. He is certified as a Professional Electrical Engineer. *Henry joined the board in October 2018.*

John Reynolds, Eugene, is a retired professor of architecture emeritus from the University of Oregon and is fellow of the American Institute of Architects. He has been involved in energy issues in Oregon since 1972, when he was elected to the Eugene Water and Electric Board. Since then, he has served as chair of the American Solar Energy Society, president of Solar Energy Association of Oregon and member of the board of the International Solar Energy Society. He has served on the Oregon Alternate Energy Commission and the Energy Committee of the Building Codes Structures Board. *John served on the board from March 2001 to May 2018.*

Ken Canon, Myrtle Creek, founded in 1981 the Industrial Customers of Northwest Utilities, a regional trade association focused on electric energy issues. Since retiring from that role in 2005, he chaired a committee that examined the performance of NEEA and also managed the Northwest Energy Efficiency Task Force. Earlier in his career, while working for Associated Oregon Industries, he drafted and helped enact Oregon's Business Energy Tax Credit. Later, he helped implement a comprehensive energy-efficiency program at International Paper Mill. He has a long history of organizing, managing and advising nonprofit organizations. Applying his expertise to his residence, Ken built the first ENERGY STAR home in Douglas County. Ken, a life-long Oregonian, was born and raised in Medford and graduated from Southern Oregon University and Willamette University College of Law. *Ken served on the board from November 2010 to February 2018.*

Lindsey Hardy, Bend, is the program director of the Bend Energy Challenge, a program of The Environmental Center. Most recently Lindsey was the outreach director at Sunlight Solar Energy. She sat on the Steering Committee of the High Desert Branch of the Cascadia Green Building Council for three years and planned Central Oregon's Green and Solar Tour. Previously as an AmeriCorps volunteer with the University of Oregon's Resource Assistance for Rural Environments, she oversaw the Solarize Pendleton campaign, helping neighborhoods benefit from efficiency of scale in residential solar installations. Lindsey graduated from Ithaca College with a Bachelor of Arts in Environmental Studies.

Melissa Cribbins, Coos Bay, is a Coos County Commissioner and an attorney. Prior to her election in 2012, she worked for the Coquille Indian Tribe as in-house counsel for six years. Before Melissa became an attorney, she

worked for the City of Spokane and Eugene Water and Electric Board in the field of water quality. She is a member of the Oregon State Bar and the Washington State Bar, and is active in many organizations both in Coos County and statewide. Melissa is a graduate of Portland State University and Gonzaga University.

Roland Risser, Washington County, has extensive knowledge of residential, commercial and industrial energy efficiency program design, development and implementation, including low-income energy efficiency programs. He recently retired from the U.S. Department of Energy, where he was the director of the Building Technologies Office and then deputy assistant secretary of Renewable Power. His decades of energy experience include multiple leadership positions at Pacific Gas and Electric and serving on national boards for the American Council for an Energy-Efficient Economy and the Consortium for Energy Efficiency. Roland earned a Master of Science in biology from California Polytechnic State University, a Bachelor of Science in biology from the University of California at Irvine, and graduated from the University of California at Berkeley, Haas School of Business. *Roland joined the board in October 2018.*

Ex-officio: Oregon Public Utility Commission

Steve Bloom, Salem, is one of three Oregon Public Utility Commissioners. He was a water rights lawyer in Pendleton and part-time U.S. magistrate judge. In 2005, he joined the Peace Corps and went to Armenia. He worked on amending that country's constitution; a national election was held and it was amended. He was then asked to head a judicial reform program. Upon returning to Oregon, he was counsel to an international wind energy company for four years. He was appointed to the OPUC in 2011. He attended Dartmouth and Stanford and has a B.A. in English. He also has a J.D. from Willamette College of Law. *Steve joined the board as ex-officio in January 2016.*

Special board advisor: Oregon Department of Energy

Janine Benner, Salem, joined ODOE in 2017 as assistant director for planning and innovation. In this role, she leads the department's work on clean energy policy development and implementation of energy efficiency programs and services. Janine came to ODOE from the U.S. Department of Energy (DOE), where she served as associate assistant secretary in the Office of Energy Efficiency and Renewable Energy, the largest government funder of clean energy research and development. Before that, she served as deputy assistant secretary in DOE's Office of Congressional and Intergovernmental Affairs. Janine also spent 12 years working for Congressman Earl Blumenauer, first as an energy and environmental policy advisor and then as deputy chief of staff. She grew up in Portland, Oregon and has a degree in history from Princeton University. *Janine joined the board as special board advisor in April 2017.*

Board development guidelines

Energy Trust's board of directors is a non-stakeholder, volunteer board. The board oversees Energy Trust management, provides strategic and policy direction and approves the organization's budget and major expenditures. The board carries out its oversight role collectively and through several committees. The board's bylaws ensure that Energy Trust board meetings and other processes are clear, open and accessible to the public.

The Oregon Public Utility Commission grant agreement with Energy Trust calls for the Energy Trust board to include the skills, broad representation and diversity necessary to achieve the nonprofit's mission.

As board openings arise, the board has traditionally consulted advisory councils, individuals and collaborating organizations to identify candidates with appropriate experience from throughout the state. In 2018, the board nominating committee documented and refined its process for new board member recruitment. In an effort to increase diversity on the board, it added process steps to identify and reach out to community-based organizations with knowledge of underserved customers when the board is recruiting for an open position. In October 2018, the board filled all vacant voting member seats using this new nominating process.

The 2018 board included 13 voting members with background in business (agriculture, industry/manufacturing, construction/remodeling, insurance, energy engineering), private consulting, government, utilities, trades, nonprofit and higher education. Members come from Bend, Coos Bay, Eugene, Medford, Myrtle Creek, Pendleton, Salem and the Portland metropolitan area. The board's OPUC ex-officio member is Commissioner Steve Bloom. Janine Benner, Oregon Department of Energy director, has been a special board advisor since April 2017.

All voting board members complete and sign disclosure of economic interest forms each year. The OPUC ex-officio board member and the special advisor from the Oregon Department of Energy do not receive confidential information. Once each year, board and staff members participate in a planning session to review progress and discuss Energy Trust's strategic direction. Board members are supported to undertake ongoing development activities. In addition, board governance and fiduciary responsibility training is provided to new board members in orientation and to all board members in conjunction with the board's annual meetings.

2018 advisory council members and meetings

The following lists of advisory council members reflect every member who served during all or part of 2018. Foundational work began in 2018 to establish a new Diversity Advisory Council, which is expected to be formed in 2019.

Conservation Advisory Council

Al Spector, Cascade Natural Gas
Anna Kim, Oregon Public Utility Commission
Charlie Grist, Northwest Power and Conservation Council
Danny Grady, City of Portland Bureau of Planning and Sustainability
Dave Moody, Bonneville Power Administration
Holly Braun, NW Natural
Jason Klotz, Portland General Electric
Julia Harper, NEEA
Kari Greer, Pacific Power
Kerry Meade, Northwest Energy Efficiency Council
Lisa McGarity, Avista
Tim Hendricks, Building Owners and Managers Association
Warren Cook, Oregon Department of Energy
Wendy Gerlitz, NW Energy Coalition
Will Gehrke, Citizens' Utility Board of Oregon
JP Batmale, Oregon Public Utility Commission
Tony Galluzzo, Building Owners and Managers Association

Andria Jacob, City of Portland Bureau of Planning and Sustainability
 Liz Jones, Citizens' Utility Board of Oregon
 Brent Barclay, Bonneville Power Administration
 Garrett Harris, Portland General Electric

2018 meeting dates	Major discussion topics
February 7	Preliminary 2017 annual results; update on 2018 rebids for New Buildings PMC and Production Efficiency Custom Track PDCs; update on 2018 action plans for Planning & Evaluation group and NEEA; review of business sector lighting strategy; New Buildings penetration rate analysis findings
March 20	2018 state legislative session update; planning for 2018 council meetings
May 9	RAC/CAC joint budget review findings; planning for 2018 council meetings, continued; revised 2018 budget development schedule; air conditioning measure analysis; residential measure decision-making approaches
June 20	CAC operating principles; New Buildings PMC contract rebid results; lighting tool market research results; savings attribution discussion; board workshop findings; 2020-2024 strategic plan development
August 1	Measure reviews and implications for 2019 budgeting; Production Efficiency Custom Track PDC contract rebid results; RAC/CAC joint 2020-2024 strategic plan development: strengths and capabilities; Existing Multifamily program market analysis; commercial Pay for Performance process evaluation results
September 14	Quarter 2 report and year-end forecast; draft 2019 action plans; large electric customer funding analysis (via email); research on underserved customers
October 12	Draft 2019 action plans, continued; targeted load management pilots; 2020-2024 strategic plan development: key drivers
November 30	RAC/CAC joint 2020-2024 strategic plan development: scenarios and opportunities; changes to draft 2019 budget and revisions from public comments; trade ally survey findings; PGE Smart Grid Test Bed guest presentation

Renewable Energy Advisory Council

Adam Schultz, Oregon Department of Energy
 Alexia Kelly, Electric Capital Management
 Andria Jacob, City of Portland Bureau of Planning and Sustainability
 Anna Kim, Oregon Public Utility Commission
 April Snell, Oregon Water Resources Congress
 Bruce Barney, Portland General Electric
 Dick Wanderscheid, Bonneville Environmental Foundation
 Erik Anderson, Pacific Power
 Frank Vignola, Solar Monitoring, University of Oregon
 Jaimes Valdez, Spark Northwest
 Jason Busch, Oregon Wave Energy Trust
 Kendra Hubbard, Oregon Solar Energy Industries Association
 Les Perkins, Farmers Irrigation District
 Michael O'Brien, Renewable Northwest
 Oriana Magnera, NW Energy Coalition

Suzanne Leta, SunPower
 JP Batmale, Oregon Public Utility Commission
 Matt Mylet, Beneficial State Bank
 Peter Weisberg, The Climate Trust

2018 meeting dates	Major discussion topics
February 7	Preliminary year-end results; state legislative session update on energy-related activity; organizational strategies for diversity, equity and inclusion
March 20	Solar program update; Wallowa Lake County Service District hydropower project
May 9	RAC/CAC joint budget review findings; City of Salem biogas project; solar peak reduction
June 20	Solar update; update on strategic planning process; what we can learn from Japan about resilient power systems; Energy Imbalance Market overview
August 1	PGE distributed resources update; RAC/CAC joint 2020-2024 strategic plan development: strengths and capabilities
September 14	Draft 2019 action plans; Water Environment Services of Clackamas County biogas project; Renewable Energy Certificate policy review
October 12	Low- and moderate-income solar update; 2020-2024 strategic plan development: key drivers
November 30	Draft 2019 budget; Oregon Department of Energy Biennial Energy Report; Three Sisters Irrigation District McKenzie hydropower project update; RAC/CAC joint 2020-2024 strategic plan development: scenarios and opportunities

APPENDIX 8: Impacts on utility peak demand

This appendix provides an annual update on Energy Trust's impacts on utility demand. It describes ongoing and future approaches to work with utilities and other stakeholders to employ distributed energy resources to mitigate system-wide peak demand, alleviate local distribution system constraints and lower utility costs for the benefit of ratepayers. Additionally, this appendix discusses energy efficiency's ongoing impacts on peak demand and the progress being made on the further development of methods to quantify and value the impacts peak demand reductions have on utility transmission, supply and distribution systems. Specifically, this appendix addresses the following purposes:

1. Report the value of current program impacts on peak demand more broadly, connecting to large grid efficiency contributions.
 - Expected winter and summer coincident peak capacity contribution estimates from energy goals for energy efficiency and solar generation.
2. Assess data and tools needed to link utility grid objectives to specific Energy Trust actions. These might include:
 - Actionable information about opportunities to avoid specific grid investments.
 - Tools for linking the areas where investments are needed in demographic and load data for program targeting.
 - Possible enhancements to cost-effectiveness analyses considering capacity and other values to the grid.
3. Identify and report on complementary pilots that achieve energy efficiency and meet grid optimization objectives, developed in coordination with utilities.
 - Work with utilities to identify where and how Energy Trust programs reduce demand on critical elements of the power delivery system.

A. Report the value of current program impacts on peak demand

Energy Trust helps customers install energy efficiency and renewable generation measures that not only save energy and offset electricity, but also provide additional benefits to the utility system and to ratepayers. Energy Trust will continue to improve its understanding of how energy efficiency savings and renewable generation can provide these additional benefits to utilities. Energy Trust is incorporating this evolving knowledge into avoided cost benefit calculations to estimate the value of impacts of energy efficiency activities on utilities' peak demand.

Peak demand reduction estimates from energy efficiency

For 2018, Energy Trust estimated peak demand reductions from electric and gas energy-efficiency projects by calculating the percent of annual energy savings that occur during the system's peak time periods identified by utilities and used in Oregon Public Utility Commission docket UM 1893. To estimate the portion of electric energy savings in those periods, Energy Trust relied on load profiles taken from the Northwest Power and Conservation Council's Seventh Power Plan³⁰. For natural gas, Energy Trust calculated both peak-day demand reductions and peak-hour demand reductions by relying on peak factors from two sources: peak-day factors were based on electric analogs taken from the Northwest Power and Conservation Council's Seventh Power Plan for several

³⁰ <https://nwcouncil.app.box.com/s/ph0by9u53vygowx42rms5oytojhdmg5x>

end-uses, and peak day factors for space heat end-use savings were developed by NW Natural. Energy Trust relied on peak-hour factors developed by NW Natural for all end-uses. These factors are used to calculate gas peak reductions by end-use at the measure level.

Energy Trust’s electric efficiency programs resulted in the following peak demand reduction estimates for 2018.

Table 1. 2018 net electric system efficiency peak demand reduction estimates (MW) at generator

Utility	Summer MW	Winter MW	Total aMW Saved
PGE	35.7	44.4	30.4
Pacific Power	18.7	23.5	16.2
Total	54.4	67.9	46.6

For gas measures, Energy Trust calculated peak-day and peak-hour natural gas savings.

Table 2. 2018 net natural gas system efficiency peak demand reduction estimates (therms)

Utility	Peak-day therms	Peak-hour therms
Cascade Natural Gas	8,168	565
Avista	5,804	375
NW Natural	72,336	4,698
Total	86,308	5,638

The above 2018 tables do not include Northwest Energy Efficiency Alliance activities. Energy Trust does not disaggregate market transformation savings into end-use profiles that would allow us to quantify peak demand savings.

Peak demand reduction estimates from solar electric generation

Energy Trust estimated 2018 average peak contribution from residential and non-residential solar electric projects. Energy Trust estimated average generation from installed solar projects for multiple locations throughout Energy Trust territory during peak hours by using monthly generation profiles for representative project types based on variation caused by shading, tilt, orientation and geographic location. Actual peak contributions for each project varies based on time of day and weather. Table 3 shows the average solar generation over the peak period identified by each utility for each season. The figures that follow show the average daily solar generation profile shape by season and utility.

Table 3. 2018 solar electric generation peak demand reduction estimates (MW)

Utility	Summer MW	Winter MW
PGE	2.88	0.82
Pacific Power	2.61	0.38
Total	5.49	1.20

Figure 1: Hourly summer solar generation profile from all 2018 solar installations in Portland General Electric territory

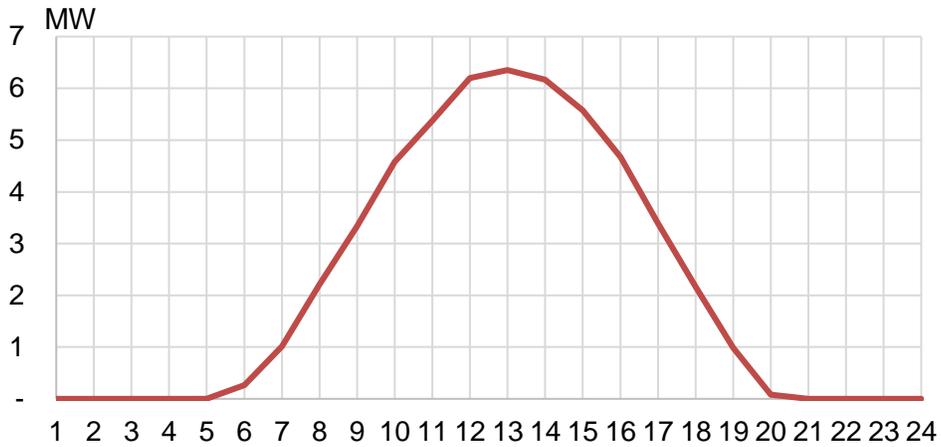


Figure 2: Hourly winter solar generation profile from all 2018 solar installations in Portland General Electric territory

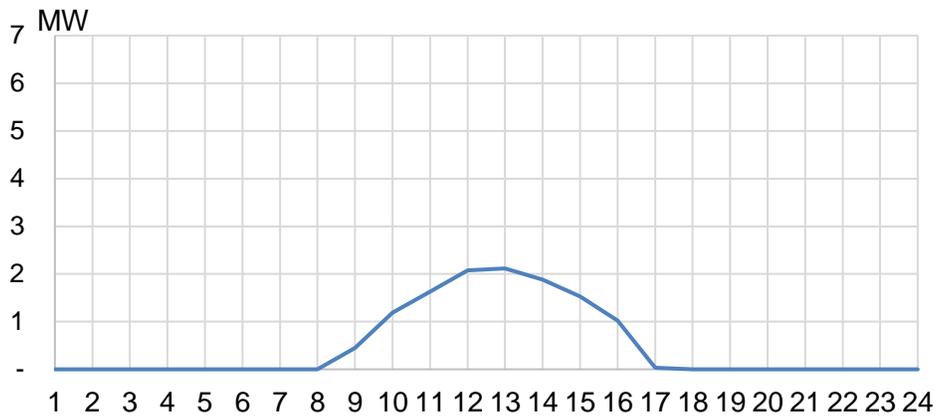


Figure 3: Hourly summer solar generation profile from all 2018 solar installations in Pacific Power territory

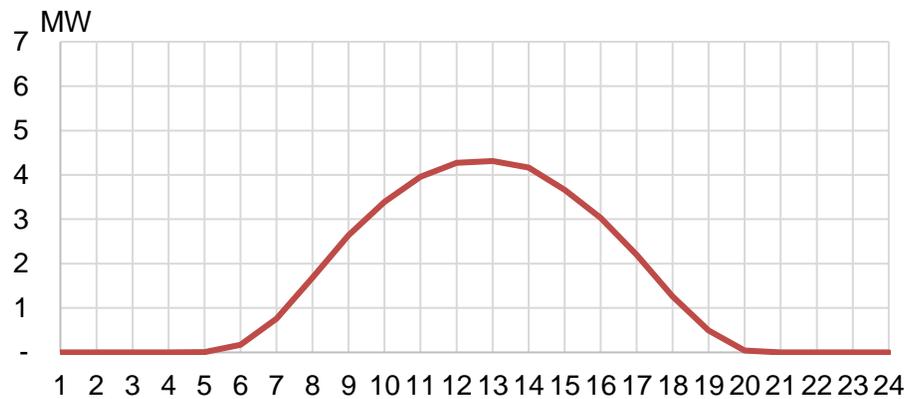
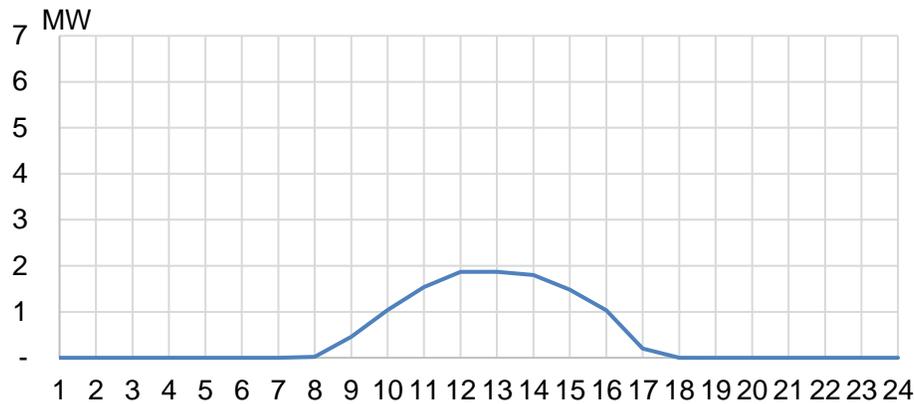


Figure 4: Hourly winter solar generation profile from all 2018 solar installations in Pacific Power territory



The above 2018 tables and figures **exclude** demand reduction estimates from:

- Renewable energy generation projects other than solar electric projects. Energy Trust has not incorporated these impacts into reporting because there are a relatively small number of projects with high degrees of production variability. More work is required to estimate the demand contributions of these projects and Energy Trust will consider doing so in future reporting.

B. Assess data and tools needed to link utility grid objectives to specific Energy Trust actions

Energy Trust is continuing to work with Kevala Analytics as part of a U.S. Department of Energy grant to share past renewable energy and energy efficiency project information to facilitate planning for the interconnection and integration of distributed energy resources such as energy efficiency, solar and solar plus storage. This data sharing will provide visibility and allow Energy Trust to assess the value of a tool that can provide transparency into localized grid constraints, areas of increased interconnection cost and the impacts on the distribution grid of delivering distributed energy resources. Energy Trust has discussed this opportunity with the OPUC, PGE and Pacific Power. There was agreement that outcomes of a study focused in Energy Trust territory could be beneficial for identifying the potential value of Kevala or a similar tool and expanding the collective knowledge base regarding the distribution system and distributed energy resources delivered in Oregon. PGE is in discussions with Kevala, and in 2019 Energy Trust expects to be able to share data related to a specific substation through the platform to increase the opportunities for lessons learned in PGE territory. In 2019, Energy Trust will be identifying use cases and all results will be shared with the OPUC, PGE and Pacific Power.

In 2018, Energy Trust hired The Cadmus Group Inc. to complete an examination of a subset of high-impact peak demand measures and load profiles. The objective of this work was to determine if the selected load profiles were the best representations of the end-use loads impacted by Energy Trust's efficiency measures. This project relied on a standardized set of guidelines developed by Cadmus for the Regional Technical Forum. The guidelines helped Energy Trust prioritize and identify where improvements can be made in selecting and applying load profiles to Energy Trust's efficiency measures. Operationalizing this project, Energy Trust has begun providing guidelines for profile selection for commercial and industrial custom projects to help standardize profile selections for a subset of impactful custom measure types. For example, Energy Trust has developed decision-making tools to determine which profile to select when a project incorporates energy savings from multiple end-uses.

C. Report on and identify complementary pilots that achieve energy efficiency and meet grid optimization objectives, developed in coordination with utilities

Energy-efficiency programs have the potential to help electric and natural gas utilities address demand-related challenges. Energy Trust can provide further benefit to utility systems by increasing the saturation of energy-efficient, demand response-capable equipment (such as internet connected thermostats and heat pump water heaters with built in Wi-Fi), providing additional options for utilities when considering potential demand response programs. Utility demand response programs can use this equipment as a resource in reacting to peak demand events. Through targeted load management pilot designs, Energy Trust is exploring offering additional incentives for measures and services that contribute to coincident peak demand reduction. Additionally, Energy Trust's well-established program marketing and outreach efforts, sales channels, contractor connections and customer relationships may prove valuable to utilities in marketing combined efficiency and demand management equipment and service packages.

Energy Trust is working on the following grid optimization related efforts:

Coordination with Portland General Electric

Energy Trust acts as a representative on PGE's advisory committee for its proposed Demand Response Test Bed pilot. In this role, Energy Trust provided advice on the design of the test bed and feedback on the written pilot proposal PGE submitted to the OPUC. While awaiting the OPUC's decision on the proposal, Energy Trust is helping PGE further prepare for the test bed through the development of coordinated marketing arrangements and joint measures as described below.

In 2018, Energy Trust worked with PGE to help expand the customer base of smart thermostats that could be enrolled in PGE's demand response program. One of the primary points of coordination with PGE is the residential thermostat direct-install program where Energy Trust and PGE co-fund the installation of qualified smart thermostats in targeted locations with the intention of reaching respective energy efficiency and demand response objectives.

Energy Trust also collaborated with PGE on another pilot program that delivers both demand response and energy efficiency benefits. Energy Trust ran a pilot using products from a company called Whisker Labs to optimize smart thermostat controls and expand qualifying products. The pilot leveraged the PGE demand response work with Whisker Labs to recruit a study sample of customers and select a subset of those customers to have operating schedules optimized to maximize demand response and efficiency benefits.

In 2019, Energy Trust plans to work with PGE to install smart thermostats in small- to medium-sized businesses and evaluate the energy and demand curtailment impacts of smart thermostats in these businesses.

Targeted load management pilots with utilities

In 2017, Energy Trust collaborated with Pacific Power to implement a targeted load management pilot in the North Santiam Canyon. The goal of that pilot was to test the quick deployment of energy efficiency in a targeted area. The targeted area had 174 projects completed during the pilot compared to 159 projects within the baseline period, representing a 9 percent increase in participation in the targeted area. In addition, the projects implemented saved 3,503,944 kWh representing 428 kW of summer peak demand reduction, and 478 kW of

gross winter peak demand reduction. In 2018, Energy Trust collaborated with Pacific Power to begin designing a second targeted load management pilot in the Medford area. This pilot will build off the learnings of the North Santiam Canyon pilot and test new initiatives such as the need to align measures to resource peak and tracking marketing efforts. Specifically, the pilot aims to increase the flexibility of Energy Trust's energy efficiency and solar program offerings and delivery strategies and test the efficacy of additional tactics to achieve demand reduction objectives. One example is integrating and promoting pilot measures that have the potential to achieve greater peak savings and provide increased incentives up to the maximum incentive allowed under current avoided costs to achieve pilot goals. The implementation phase of the pilot begins June 1, 2019, and will continue through December 2020.

In 2018, Energy Trust and NW Natural continued work on a collaborative effort to develop a pilot proposal for a targeted load management pilot in Silverton. The proposal includes pilot design, a research hypothesis, key research questions and the overall objectives of the pilot. NW Natural will file the pilot proposal with the OPUC as an amendment to their 2018 Integrated Resource Plan (IRP) in the spring of 2019 to gain approval to move forward with pilot implementation and planning.

Quantifying peak natural gas savings with NW Natural

Energy Trust worked with NW Natural to quantify the amount of natural gas saved on a peak-day and peak-hour from past and future Energy Trust activity, as part of the resource potential study it conducted for NW Natural's 2018 IRP. Energy Trust has also continued working with NW Natural to improve its avoided cost methodology as part of UM 1893 to incorporate the supply and distribution capacity value associated with peak savings by incorporating that value into the avoided costs Energy Trust uses to quantify the benefits of energy efficiency savings. This allows Energy Trust to better account for costs avoided by reducing gas loads during peak use times and thus more effectively assess supply and demand side resources in relative terms. Work is also underway with NW Natural to determine whether peak savings from energy efficiency can cost-effectively help defer or avoid capital projects to address capacity constraints in NW Natural's distribution system.

APPENDIX 9: Higher-value Applications of Solar

In its 2018 budget action plan, as an addition to standard program offerings, the Solar program focused on activities to improve equitable access to solar for lower-income customers and to support innovative applications of solar that provide greater value to communities or the grid. OPUC staff requested, through public budget comments, that Energy Trust track certain metrics to provide greater visibility to progress on this work:

Track and report in the 2018 annual report the number of solar systems that received Energy Trust incentives and also had a battery storage system, advanced interconnection and communication devices, or would be considered moderate-income.

This appendix addresses this request and provides additional context on potential benefits of higher-value applications of solar, along with market barriers and recent trends.

A. Advanced solar systems

Solar systems with battery storage and advanced interconnection and communication devices are advanced solar systems that can provide greater benefits to both customers and to the grid compared to conventional solar. Energy Trust defines advanced solar systems as systems that integrate photovoltaics with advanced inverters, advanced storage and/or complimentary flexible loads.

There are some tradeoffs that need to be considered in how advanced solar systems prioritize customer and grid benefits, because accessing certain benefits can have a negative impact on the systems' ability to deliver other benefits. For example, customers may experience less solar production when allowing their system to provide other grid services. Additional benefits of advanced solar systems can be captured through a simple or passive approach, such as market-based price signals or pre-programming the equipment with specific ride-through windows, or a more complex or active approach, including the system actively monitoring site load to mitigate peak or responding to utility signals to provide demand response.

One customer benefit that has been a driver for adoption of solar plus advanced battery energy storage systems—or solar plus storage—is resilience. For example, residential, municipal and public safety customers are interested in installing solar plus storage systems for resilient power that would be independent of fuel supply following a major disaster like a Cascadia Subduction Zone earthquake.

In 2019, Energy Trust will complete market research to better understand customer drivers, market barriers and potential benefits for solar plus storage. Advanced solar systems face numerous market barriers, including relatively high upfront costs, a lack of clarity on how interconnection and net metering standards apply to these systems and uncertainty around the potential value propositions for customers. Energy Trust is currently working with utilities, trade allies and customers to help address some of these barriers in Oregon.

Advanced inverter adoption

California and Hawaii were driven to adopt advanced inverter requirements prior to the Institute of Electrical and Electronics Engineers (IEEE) officially updating their Standard 1547 in 2018 due to the volume of solar installations being interconnected to their utility grids. As a result of these two high volume and influential markets requiring advanced inverter capabilities, most solar inverters being installed today have advanced capabilities that

include grid-support functions, such as voltage or frequency ride-through³¹. Currently the Oregon Administrative Rules limit the definition of IEEE 1547³² to the 2003 version of the standard in both the state’s Net Metering Rules³³ and Small Generator Interconnection Rules³⁴. The updated IEEE 1547-2018³⁵ standard for Interconnection and Interoperability of Distributed Energy Resources with Associated Electric Power Systems Interfaces identifies how to take advantage of advanced inverter functionality.

The Solar program collects inverter manufacturer and model data for each system installed and has identified models that are capable of advanced functions and can be remotely enabled and programmed via an internet connection to take advantage of those capabilities. Table 1 summarizes adoption of these inverter models as compared to full program volume. Other models may also have latent advanced functions, so this is likely a conservative estimate.

Table 1. Energy Trust advanced inverter adoption

Year installed	Installations with advanced inverters ³⁶	Total installations	% of annual total
2008	0	253	0%
2009	14	475	3%
2010	81	1198	7%
2011	181	1329	14%
2012	348	1,242	28%
2013	173	881	20%
2014	247	1,291	19%
2015	448	1,801	25%
2016	508	1,749	34%
2017	758	1,795	42%
2018	1,129	1,785	63%
Total	3,887	13,799	28%

Solar plus advanced battery storage adoption

The Solar program has seen growing customer interest for pairing battery storage along with a solar system³⁷. Table 2 summarizes solar plus storage installations in the program through the end of 2018. Since 2016, an increasing number of solar plus battery storage applications have specified equipment that could be categorized as “advanced battery energy storage systems”, capable of providing additional benefits to both the customer and the utility grid beyond just backup power during an outage. Between 2016 and the end of 2018, there have been

³¹ An overview of advanced inverter functionality from the National Renewable Energy Lab: <https://www.nrel.gov/docs/fy15osti/62612.pdf>

³² New changes in IEEE 1547 standards allow for smart inverter functionalities: <https://irecusa.org/2018/07/smart-inverter-update-new-ieee-1547-standards-and-state-implementation-efforts/>

³³ Oregon Net Metering Rules: <https://secure.sos.state.or.us/oard/displayDivisionRules.action?selectedDivision=4053>

³⁴ Oregon Small Generator Interconnection rules: <https://secure.sos.state.or.us/oard/viewSingleRule.action?ruleVrsnRsn=223929>

³⁵ Making the Grid Smarter - Primer on Adopting the New IEEE Standard 1547-2018 for Distributed Energy Resources: <https://irecusa.org/publications/making-the-grid-smarter-state-primer-on-adopting-the-new-ieee-standard-1547-2018-for-distributed-energy-resources/>

³⁶ Table 1 counts only installations that have advanced inverters that are capable of being remotely updated and programmed to provide grid services. Other installations may have inverters that can be updated manually.

³⁷ Energy Trust does not have a storage incentive offering. However, customers who choose to install an integrated solar plus storage system are eligible for a standard solar incentive as well as the federal Investment Tax Credit (ITC).

76 solar plus advanced storage installations completed, totaling 1.09 MWh and 0.472 MW based on the documentation provided.

Table 2. Energy Trust solar plus storage adoption

Year installed	Installations with battery storage ³⁸	Total installations	% of total
2008	4	253	1.6%
2009	2	475	0.4%
2010	6	1198	0.5%
2011	4	1329	0.3%
2012	8	1,242	0.6%
2013	2	881	0.2%
2014	6	1,291	0.2%
2015	2	1,801	0.1%
2016	10	1,749	0.5%
2017	42	1,795	2%
2018	65	1,785	4%
Total	151	13,799	1.1%

B. Solar for low- and moderate-income customers

Despite cost declines and increased availability, solar power remains out of reach for many households, particularly those with low and moderate incomes. Energy Trust has joined with aligned organizations and community-based groups to develop strategies to address market barriers and help ensure that more customers have access to solar.

In 2017, the Solar program convened a low- and moderate- income working group with a diverse set of stakeholders, including housing agencies and nonprofit organizations that serve lower-income Oregonians. The working group provides an avenue to vet proposed solutions and build the capacity and knowledge base of participants with training on solar technology, including costs and benefits. Staff convened a new cohort of community organizations to take part in the working group in 2018.

In 2018, Energy Trust introduced a Solar Innovation Grant for organizations that serve lower-income customers. Nine grant recipients were selected to receive up to \$10,000 each to develop a unique program to bring direct solar benefits to low- and moderate-income customers of Portland General Electric or Pacific Power. The grant recipients include organizations from across Oregon and will support capacity building and development work on a variety of models that will serve low- and moderate-income customers, including onsite multifamily and single-family solar and community solar solutions.

The Solar program has begun development of an income-qualified incentive designed for net-metered systems purchased by moderate-income homeowners. This proposed Solar Within Reach offering will share some elements with the Savings Within Reach offering available for Energy Trust’s residential moderate-income customers installing energy efficiency measures. The program anticipates that this incentive will support several

³⁸ This represents a count of all solar plus battery storage system applications and is not limited to advanced storage.

of the single-family project models developed through the Solar Innovation Grants. The program anticipates reporting on the results of the Solar Within Reach effort in future years.

Lower-income communities have less solar adoption

Without direct collection of demographic data as part of incentive qualification, the program has relied on the geographic data analysis to gauge adoption by income. Energy Trust’s *2018 Diversity, Equity and Inclusion Data and Baseline Analysis* report indicates that Solar program participation is unevenly distributed among the electric customers served by the organization. In 2017, the most affluent census tracts (Income Diversity Scores³⁹ of 1 and 2) completed more projects relative to their share of sites, while less affluent areas (scores of 4 and 5) had a lower proportion of sites with solar installations. Table 3 below is reproduced from the baseline analysis report⁴⁰. Energy Trust will continue to track these data over time as indicators of program access.

Table 3. Solar participation and share of total electric sites by census tract (Income Diversity Score)

Census tract income score	% of 2017 solar projects	% of all sites in category	Participant sites	Total electric sites
1	13%	9%	223	110,607
2	29%	20%	516	251,142
3	28%	26%	496	325,467
4	18%	24%	316	304,588
5	12%	22%	211	272,473

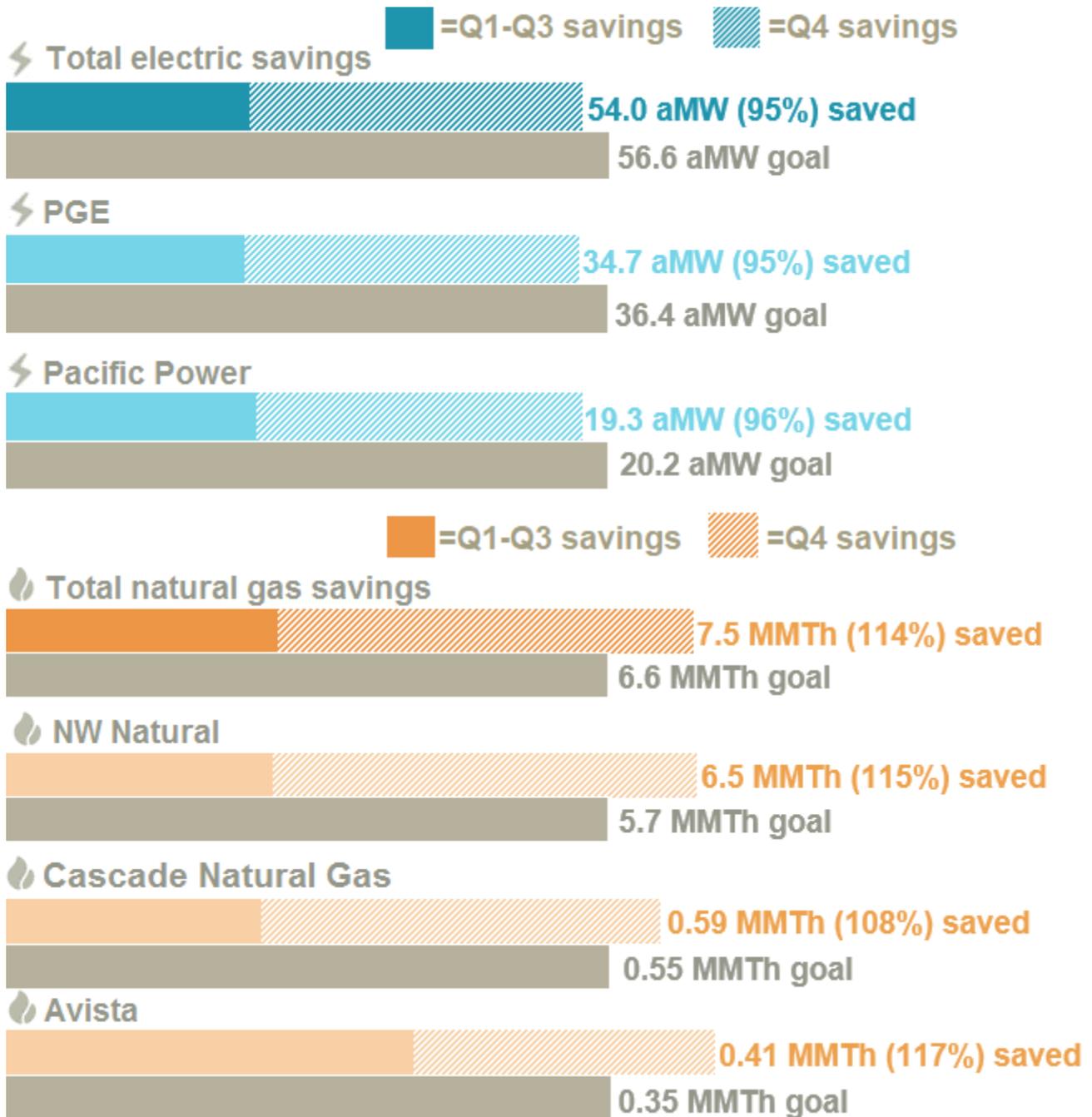
³⁹ Income Diversity Scores are based on household median income and average housing burden by census tract. For more information, please refer to the *2018 Diversity, Equity and Inclusion Data and Baseline Analysis*, page 14, <https://www.energytrust.org/documents/energy-trust-of-oregon-2018-diversity-equity-and-inclusion-data-and-baseline-analysis/>

⁴⁰ Table 54 on page 80 of the same report

APPENDIX 10: Quarter four results tables

I Q4 2018 activity at a glance⁴¹

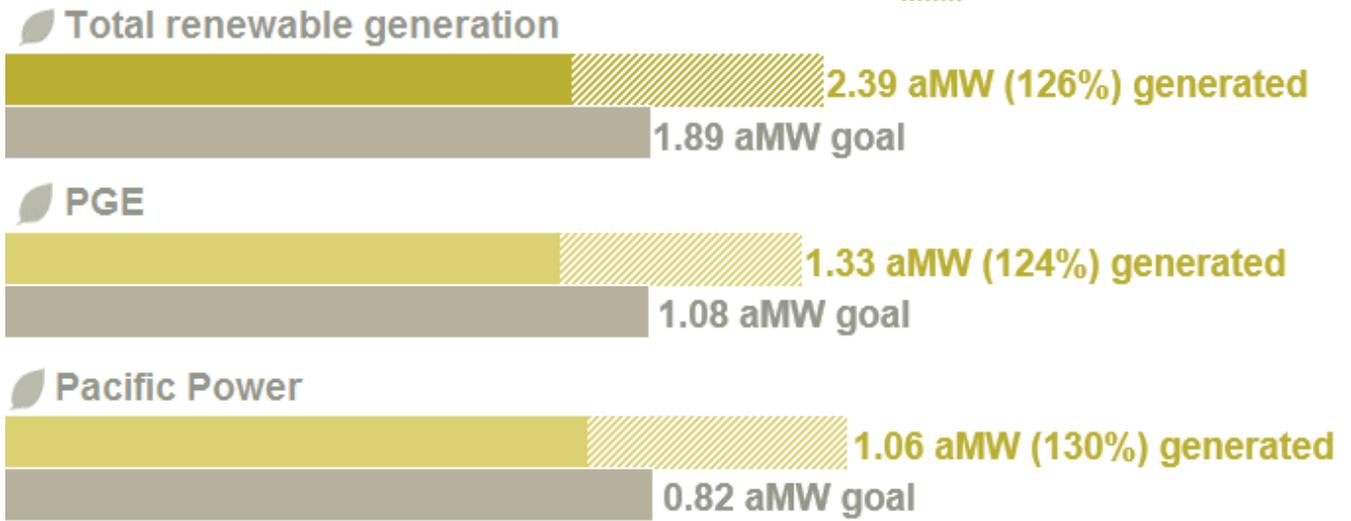
Savings



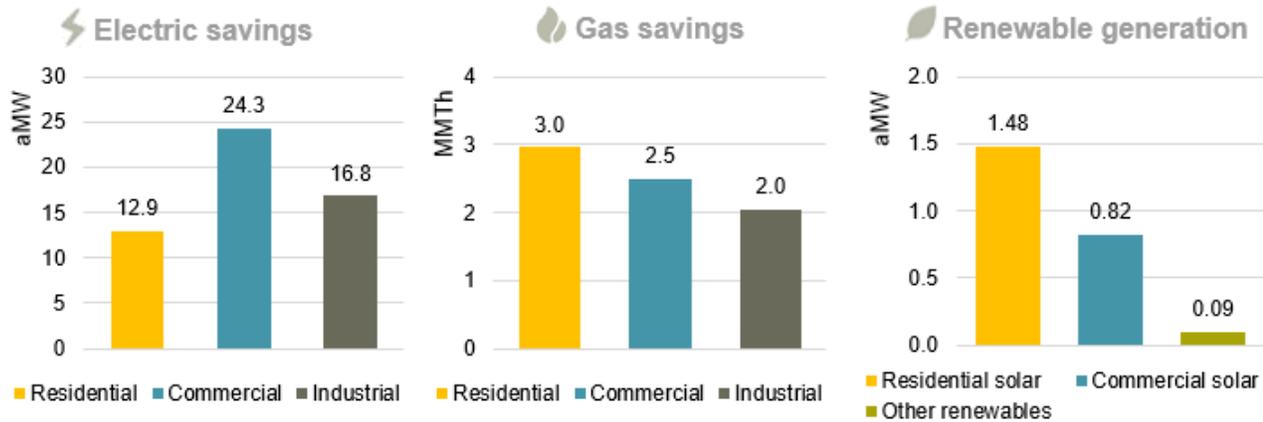
⁴¹ This document reports net savings, which are adjusted gross savings based on results of current and past evaluations.
NOTE: aMW indicates average megawatts, MMTh indicates million annual therms and M is million.

Generation

■ = Q1-Q3 generation ▨ = Q4 generation



Percent of 2018 savings and generation by sector (year-to-date)

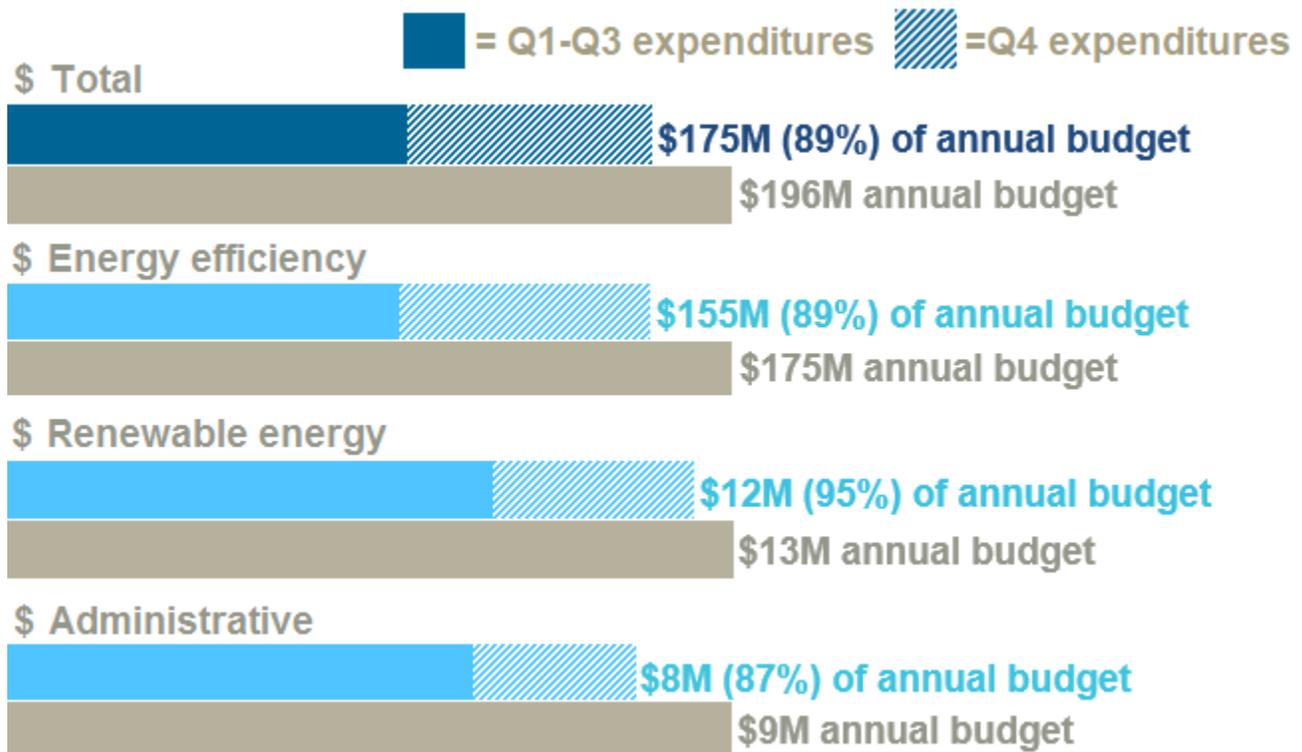


Customer satisfaction⁴²

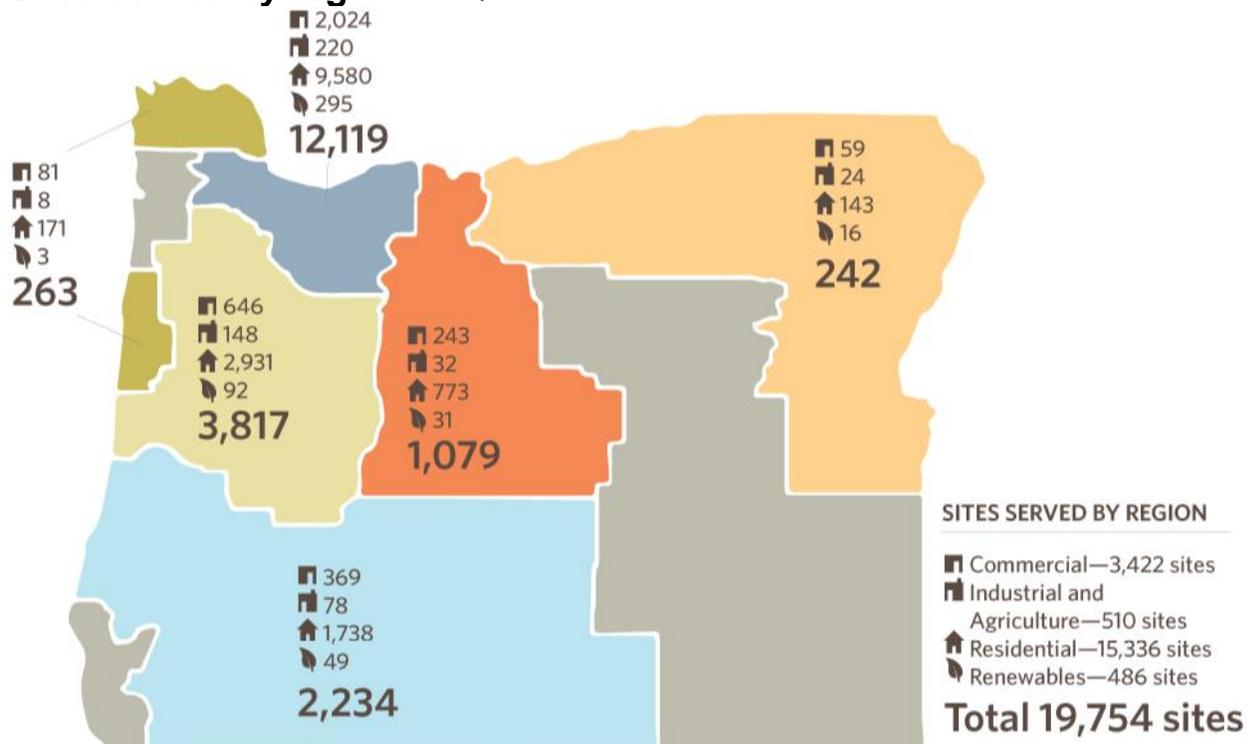


⁴² From December 2018 to March 2019, Energy Trust delivered a short telephone survey to 1,011 randomly selected participants in five Oregon programs who completed projects between October and December 2018 and received an incentive or discount from Energy Trust.

Expenditures



Sites served by region in Q4⁴³



⁴³ 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 Revenues and expenditures tables⁴⁴

A. Revenues

Revenues includes public purpose revenue plus incremental electric revenue from SB 838. 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	Q4 actual revenues	Q4 budgeted revenues
Portland General Electric	\$ 9,146,001	\$ 8,615,629
PGE Incremental	\$ 14,766,192	\$ 16,852,605
Pacific Power	\$ 6,582,621	\$ 6,775,923
Pacific Power Incremental	\$ 7,270,900	\$ 7,315,311
NW Natural	\$ 2,941,321	\$ 3,139,869
NW Natural Industrial DSM	\$ 848,774	\$ 520,024
Cascade Natural Gas	\$ 538,845	\$ 744,570
Avista	\$ 343,110	\$ 289,217
Low and moderate income grant	\$ 20,173	\$ -
Total	\$ 42,457,938	\$ 44,253,148

B. Expenditures by utility^{45,46}

Source	Q4 actual expenditures	Q4 budgeted expenditures
Portland General Electric	\$ 33,532,239	\$ 41,503,250
Pacific Power	\$ 22,751,766	\$ 24,842,636
NW Natural	\$ 5,942,730	\$ 7,981,709
NW Natural Industrial DSM	\$ 1,339,665	\$ 2,068,960
Cascade Natural Gas	\$ 1,153,181	\$ 1,244,147
Avista	\$ 484,481	\$ 498,747
Business development	\$ 2,505	\$ -
Low and moderate income grant	\$ 20,173	\$ -
Total	\$ 65,226,740	\$ 78,139,448

⁴⁴ Columns may not total due to rounding.

⁴⁵ In Q4 2018, Energy Trust invested organizational contingency pool funds to explore new business opportunities. Organization contingency pool funds are unrestricted donations and consulting fees, and are independent of ratepayer funds.

⁴⁶ 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.

C. Expenditures by sector and program^{47,48}

		Q4 actual expenditures		Q4 budgeted expenditures	
Commercial	Existing Buildings	\$	17,489,549	\$	25,745,488
	Existing Multifamily	\$	2,474,674	\$	3,012,469
	New Buildings	\$	5,227,286	\$	7,931,361
	NEEA Commercial	\$	726,891	\$	767,033
Commercial total		\$	25,918,399	\$	37,456,352
Industrial	Production Efficiency	\$	17,757,984	\$	16,581,783
	NEEA Industrial	\$	31,439	\$	39,202
Industrial total		\$	17,789,423	\$	16,620,986
Residential	Residential	\$	15,081,285	\$	16,431,108
	NEEA Residential	\$	944,023	\$	1,428,772
Residential total		\$	16,025,308	\$	17,859,880
Energy efficiency total		\$	59,733,131	\$	71,937,217
Renewables	Solar	\$	2,060,528	\$	2,841,485
	Other Renewables	\$	1,432,761	\$	1,174,628
Renewable generation total		\$	3,493,288	\$	4,016,112
Administration	Administration	\$	1,978,129	\$	2,186,118
Administration total		\$	1,978,129	\$	2,186,118
Other	Business development	\$	2,505	\$	-
	Low and moderate income grant*	\$	19,687	\$	-
Total expenditures		\$	65,226,740	\$	78,139,448

D. 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
Q3	\$9,396,777	\$4,605,762	\$2,376,173	\$216,118	\$126,110	\$1,657,620	\$1,221,801	\$19,600,362
Q4	\$22,057,408	\$14,064,096	\$5,065,937	\$890,764	\$334,716	\$1,144,310	\$1,689,353	\$45,246,585
Total	\$45,254,664	\$26,899,872	\$11,209,183	\$1,392,476	\$760,838	\$4,363,915	\$4,450,095	\$94,331,042

⁴⁷ In Q4 2018, Energy Trust invested organizational contingency pool funds to explore new business opportunities. Organization contingency pool funds are unrestricted donations and consulting fees, and are independent of ratepayer funds.

⁴⁸ 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.

III Savings and generation tables^{49, 50, 51}

A. Savings and generation by fuel

	Q4 savings/generation	YTD savings/generation	Annual goal	Percent achieved YTD
Electric savings	30.8 aMW	54.0 aMW	56.6 aMW	95%
Natural gas savings	4.5 million therms	7.5 million therms	6.6 million therms	114%
Electric generation	0.73 aMW	2.39 aMW	1.89 aMW	126%

B. Progress toward annual efficiency goals by utility

	Q4 savings	YTD savings	Annual goal	Percent achieved YTD	Annual IRP target	Percent achieved YTD
Portland General Electric	20.0 aMW	34.7 aMW	36.4 aMW	95%	36.12 aMW	96%
Pacific Power	10.8 aMW	19.3 aMW	20.2 aMW	96%	19.8 aMW	98%
NW Natural	3.9 million therms	6.5 million therms	5.7 million therms	115%	5.7 million therms*	115%
Cascade Natural Gas	359,122 therms	592,940 therms	547,106 therms	108%	548,212 therms*	108%
Avista	172,896 therms	409,128 therms	349,520 therms	117%	349,520 therms*	117%

Integrated Resource Plan targets are shown in net savings.

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

C. Electric savings by sector and program

		Q4 savings aMW	YTD savings aMW	Annual goal aMW	Percent achieved YTD
Commercial	Existing Buildings	8.6	13.8	15.0	92%
	Existing Multifamily	0.6	1.8	1.8	100%
	New Buildings	2.3	6.2	6.3	99%
	NEEA Commercial	1.5	2.4	1.8	135%
	Commercial total	13.1	24.3	24.8	98%
Industrial	Production Efficiency	11.3	16.7	19.2	87%
	NEEA Industrial	0.06	0.11	0.08	131%
	Industrial total	11.3	16.8	19.3	87%
Residential	Residential	3.4	8.0	7.2	112%
	NEEA Residential	3.0	4.9	5.3	94%
	Residential total	6.4	12.9	12.4	104%
	Total electric savings	30.8	54.0	56.6	95%

⁴⁹ Columns may not total due to rounding.

⁵⁰ Electric savings also include transmission and distribution savings.

⁵¹ The gas savings do not include results for NW Natural in Washington. These results are available in a separate report on activities for NW Natural in Washington at www.energytrust.org/reports.

D. Natural gas savings by sector and program

		Q4 savings thm	YTD savings thm	Annual goal thm	Percent achieved YTD
Commercial	Existing Buildings	909,484	1,424,802	1,481,693	96%
	Existing Multifamily	52,409	118,955	165,791	72%
	New Buildings	603,764	941,346	936,040	101%
Commercial total		1,565,656	2,485,103	2,583,524	96%
Industrial	Production Efficiency	1,710,415	2,036,307	1,064,753	191%
	Industrial total	1,710,415	2,036,307	1,064,753	191%
Residential	Residential	1,187,462	2,959,078	2,903,694	102%
	Residential total	1,187,462	2,959,078	2,903,694	102%
Total natural gas savings		4,463,534	7,480,487	6,551,970	114%

E. Renewable energy generation by utility

	Q4 generation aMW	YTD generation aMW	Annual goal aMW	Percent achieved YTD
Portland General Electric	0.40	1.33	1.08	124%
Pacific Power	0.33	1.06	0.82	130%
Total	0.73	2.39	1.89	126%

F. Renewable energy generation by program

	Q4 generation aMW	YTD generation aMW	Annual goal aMW	Percent achieved YTD
Other Renewables	0.09	0.09	0.00	n/a
Solar program	0.64	2.30	1.89	121%
Total generation	0.73	2.39	1.89	126%

G. Incremental utility SB 838 expenditures⁵²

Utility	2018 Q4 SB 838 Expenditures	YTD SB 838 Expenditures
Portland General Electric	\$ 243,635	\$ 807,345
Pacific Power	\$ 278,660	\$ 969,744
Total	\$ 522,295	\$ 1,777,089

⁵² 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 11: 2018 results for SB 1149 and SB 838 funds

A. Energy efficiency results for SB 1149 funds

2018 SB 1149 electric efficiency results	PGE savings aMW	Pacific Power savings aMW	Total savings aMW	Expenses	Mil\$ /aMW
Commercial	4.74	2.84	7.58	\$19,178,340	\$2.53
Industrial	6.42	3.43	9.85	\$19,632,953	\$1.99
Residential	2.44	2.14	4.58	\$10,094,935	\$2.20
Total electric efficiency programs	13.60	8.42	22.02	\$48,906,229	\$2.22

B. Energy efficiency results for SB 838 funds

2018 SB 838 electric efficiency results	PGE savings aMW	Pacific Power savings aMW	Total savings aMW	Expenses	Mil\$ /aMW
Commercial	11.53	5.15	16.68	\$46,777,572	\$2.81
Industrial	4.62	2.36	6.98	\$16,251,936	\$2.33
Residential	4.94	3.43	8.36	\$25,467,834	\$3.05
Total electric efficiency programs	21.08	10.93	32.01	\$88,497,341	\$2.76

C. Incremental utility SB 838 expenditures⁵³

2018 SB 838 utility expenditures	Q1	Q2	Q3	Q4	Total
Portland General Electric	\$198,040	\$166,591	\$199,079	\$243,635	\$807,345
Pacific Power	\$150,082	\$250,090	\$290,912	\$278,660	\$969,744
Total energy efficiency programs	\$348,122	\$416,681	\$489,991	\$522,295	\$1,777,089

⁵³ 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.