Agency Mission:

The Oregon Department of Energy helps Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.
OREGON DEPARTMENT OF ENERGY
Annual Performance Progress Report (APPR) for 2021

INTRODUCTION

The Oregon Department of Energy’s mission is to help Oregonians make informed decisions and maintain a resilient and affordable energy system. We advance solutions to shape an equitable clean energy transition, protect the environment and public health, and responsibly balance energy needs and impacts for current and future generations.

To achieve our mission, the agency oversees diverse programs to meet the state’s energy goals and policies – including programs that are not necessarily included in the scope of this report. The areas covered by this biennium’s key performance measures are important for meeting Oregon’s energy goals. Areas not included in the KPMs are also critical, such as ODOE’s Nuclear Safety and Emergency Preparedness division, which oversees Oregon’s interests in the Hanford Nuclear Site cleanup and ensures that the state is prepared to respond to nuclear- and energy-related emergencies. Further, the KPMs do not wholly capture ODOE’s work to support energy policy development and innovation – efforts such as promoting energy resilience, providing technical expertise on issues like home energy performance and residential energy codes, and tracking emerging issues like electric vehicles, energy storage, renewable natural gas, and more.

The agency is reporting on seven key performance measures:

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<td>Customer Service</td>
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<td>19</td>
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ODOE updated our KPMs for the 2021-23 biennium to more accurately reflect our work. The new KPMs were developed, in part, from an analysis of the agency’s programs that was presented to the Joint Ways and Means Committee during the 2020 Regular Session following a Budget Note request. Some of the changes reflect the fact that many of the previous measures were evaluating programs that have sunset, moved to other state agencies, or, in the case the Small-scale Energy Loan Program, no longer actively adding any new activity.

THE OREGON CONTEXT

ODOE oversees statewide energy policy and development, and the agency’s work intersects with numerous stakeholders and partners. These include large-scale investor-owned utilities and smaller consumer-owned utilities, many of which provide incentives and other resources to their customers; non-governmental organizations that advocate on energy and climate issues and provide incentives and rebates; federal entities such as the Bonneville Power Administration; regional entities like the Northwest Power and Conservation Council; and many others. ODOE also reports to the Oregon Legislature through various annual reports. Many of the department’s measures link to Oregon Benchmark #77: Carbon Dioxide Emissions.

MEASURING OUR PERFORMANCE

The Oregon Department of Energy believes in continuous improvement across all program areas. Whether KPMs hold steady, improve, or decline, the agency seeks ways to improve processes and deliverables. Following a 2019-21 Budget Note, ODOE reported to the Joint Committee on Ways and Means during the 2020 session with an analysis of existing programs, KPMs, agency administration, the indirect cost rate, and the usage of the Energy Supplier Assessment.
Due to new programs and additional funding allocated to ODOE during the 2021 Legislative Session, ODOE’s 2021-23 legislatively approved budget increased by just under $95 million and added 12 positions.

<table>
<thead>
<tr>
<th>ODOE’s Legislatively Approved Budget:</th>
<th>2017-19</th>
<th>2019-21</th>
<th>2021-2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Fund</td>
<td>$0</td>
<td>$2,000,000</td>
<td>$70,911,388</td>
</tr>
<tr>
<td>General Fund Debt Service</td>
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<td>$4,334,048</td>
<td>$3,500,000</td>
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<tr>
<td>Lottery Fund Debt Service Ltd</td>
<td>$3,023,630</td>
<td>$3,023,365</td>
<td>$3,022,570</td>
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<tr>
<td>Other Funds Non-limited</td>
<td>$55,905,959</td>
<td>$1,040,647</td>
<td>$1,128,074</td>
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<tr>
<td>Other Funds Debt Service Non-limited</td>
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<td>$39,988,071</td>
<td>$30,531,300</td>
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<tr>
<td>Other Funds Limited</td>
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<td>$32,812,879</td>
<td>$67,950,612</td>
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<tr>
<td>Federal Funds Non-limited Debt Service</td>
<td>$104,000</td>
<td>$104,000</td>
<td>$0</td>
</tr>
<tr>
<td>Federal Funds Limited</td>
<td>$2,455,398</td>
<td>$2,196,096</td>
<td>$3,123,175</td>
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<tr>
<td>Total All Funds Budget</td>
<td>$160,475,168</td>
<td>$85,499,106</td>
<td>$180,167,119</td>
</tr>
</tbody>
</table>

AUTHORIZED POSITIONS
97
81
93

AUTHORIZED FTE
93.87
79.25
91.00
KPM # 1  | CUSTOMER SERVICE: Percent of customers rating their satisfaction with the agency’s customer service as “good” or “excellent”: overall, timeliness, accuracy, helpfulness, expertise, availability of information.  | Measured since: 1997
---|---|---
Goal | Provide customers with a high degree of satisfaction with ODOE programs and services. | |
Data source | Survey conducted by the department. | |
Owner | Mary Knight, KPM Coordinator, Phone: 503-373-7562 | |

1. **HOW WE ARE DOING**

   **Results.** ODOE conducted an online customer service survey in August 2021. Results represent the sum of all customer feedback, with no weighting by category. All categories showed a decline over the last biennium, and the agency is below the target goal of 90 percent.

   **About the Target.** The Legislative Fiscal Office updated the target to 90 percent for all service categories in 2021. In preceding years, the target was 95 percent. In the Oregon Department of Energy’s 2021-2024 Strategic Plan, the agency also set a target to reach at least 95 percent good or excellent ratings. Customer service is an integral part of ODOE’s work and an essential component of meeting the agency’s mission. For day-to-day operations, the agency defines “customer” broadly – from community stakeholders to industry representatives to fellow State agencies. For the sake of this KPM, ODOE has historically surveyed external customers once each biennium using the standard customer service questions and process guidelines. ODOE issues targeted surveys for specific programs, adds additional questions to help us improve services, and in 2021 also added demographic questions (racial/ethnic background, geographic area, and household income) to better understand who we are serving.

2. **FACTORS AFFECTING RESULTS**

   **Background.** The 2021 customer survey results show a measured drop in satisfaction over the last biennium. Several factors have likely influenced the drop, including changes to survey methodology, changes in ODOE programs resulting in fewer survey respondents who
benefit directly from ODOE programs, and controversial energy facilities proposed by developers that are currently under review in our facility siting division.

**Survey Methodology:** ODOE adjusted the methodology for conducting the survey in 2021 to reach more targeted customers and achieve more relevant results. Past surveys were sent by ODOE’s four divisions, and respondents frequently commented that they didn’t know why they were receiving the survey or would provide feedback on programs not housed at ODOE. For 2021, ODOE sent targeted surveys by customer service area, such as to members of the public who have engaged in energy facility siting processes over the last two years; contractors participating in ODOE’s Solar + Storage Rebate Program; members and attendees of ODOE stakeholder and advisory bodies; school districts participating in schools-related programs; and others. In the survey emails, ODOE reminded the recipients why they engaged with us over the past two years. This approach was successful in receiving relevant results for our programs, though overall participation was low compared to prior years (in part because of a smaller customer base, as noted below).

In ODOE’s 2021-2024 Strategic Plan (more information below), we included the objective to achieve an at least 95 percent positive customer service rating. An initiative to support that goal is to create more targeted, timely surveys. ODOE will work to improve our customer service methodology to issue surveys to customers soon after we have interacted with them or provided a service, in an effort to increase participation and receive more constructive results.

**Incentive Program Customers:** The 2019-2021 biennium covered by the customer service survey saw many changes at ODOE, most notably the absence of long-time incentives that directly served Oregonians, including residential, conservation, and transportation tax credit programs; a tax credit program for producers and collectors of biomass; and a rebate program for energy-efficient heating or weatherization projects for homes heated with oil. These incentive programs, which met their legislatively established sunsets in 2017, created a significant customer base for surveying, with historically high ratings for those direct services ODOE provided. The current 2019-2021 biennium survey is the first customer service survey conducted without that large customer base.

ODOE will continue to focus on providing outstanding customer service, and we hope results in our 2023 Annual Performance Report will improve as the agency develops and launches new incentive programs created by the Oregon Legislature, including funding to continue the Oregon Solar + Storage Rebate Program; funding to support energy-efficient rebuilding efforts following the 2020 wildfires; and a $50 million community renewables grant program.

**Controversial Energy Projects:** ODOE’s energy facility siting team provides support to the Energy Facility Siting Council, which reviews proposed and amended energy facilities in Oregon and conducts robust public involvement processes. ODOE sent a customer service survey to Oregonians who engaged with the siting process over the last two years, including engagement with highly controversial energy facilities that are currently under review. These controversial projects proposed by developers do not always have public support, which likely leads to lower
ratings in our survey, as people’s responses may reflect their dissatisfaction with the outcome of the siting process or their opposition to the project rather than ODOE’s customer service. For example, for the energy facility siting survey, many of the recipients were members of the public who have engaged with the proposed Boardman to Hemingway 300-mile Transmission Line project in Eastern Oregon, which is a highly controversial project currently in the “contested case” phase of the review process. About 70 percent of the siting survey respondents reported that they reside in Eastern Oregon – and about 70 percent of the respondents rated ODOE’s overall quality of services as fair or poor.

ODOE staff will continue to focus on providing excellent customer service to all areas of the state, and the agency will continue tracking customer service ratings for the siting process to confirm if results are affected by controversial projects, or if there are other improvements the division can make to improve overall service.

**Strategic Plan:** The Oregon Department of Energy published its 2021-2024 Strategic Plan in early 2021, which includes imperatives (focus areas to guide our work) that will help ODOE improve our customer service and how we engage with and serve Oregonians. Specific imperatives that speak to customer service include Expanding and Improving Stakeholder Engagement; Building Practices and Processes to Achieve More Equitable Outcomes; and Assessing and Modernizing Agency Programs and Activities. Other imperatives around data capabilities and optimizing or organizational efficiency and impact should also help ODOE improve its overall service to Oregonians.

**How We Compare.** Comparing ODOE’s methodology to other non-governmental organizations reveals some differences. ODOE surveys once per biennium, whereas other entities survey customers soon after they complete projects. ODOE will work to improve survey methodology and time surveys to occur soon after customers interact with ODOE staff.

**About the Data.** The survey is comprised of results from 10 targeted surveys for ODOE program areas and activities. Survey results are being carefully reviewed, including customer feedback in the additional open-ended questions the agency included in the surveys.
Oregon Department of Energy

2021 KEY MEASURE ANALYSIS

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<table>
<thead>
<tr>
<th>KPM #2</th>
<th>ZERO EMISSION VEHICLE ADOPTION IN OREGON: ZEV registrations in the light-duty vehicle sector statewide.</th>
<th>Measure since: 2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Meet the targets established in SB 1044 for statewide ZEV adoption, including that State agencies procure 25 percent of eligible fleet vehicles as zero emission vehicles by 2025.</td>
<td></td>
</tr>
<tr>
<td>Data source</td>
<td>Oregon Department of Transportation, Department of Motor Vehicle registration Data; Department of Administrative Services data.</td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>Mary Knight, KPM Coordinator, Phone: 503-373-7562</td>
<td></td>
</tr>
</tbody>
</table>

1. HOW WE ARE DOING

Results. As of June 2021, there are 38,482 light-duty zero-emission vehicles registered in Oregon, comprising just over 1 percent of passenger vehicles. Of these, 13,410 are plug-in hybrids and 25,072 are battery electric vehicles. While the state did not achieve its 50,000 registered ZEVs by 2020 goal – and it is not yet on track to achieve the 2025 or 2030 goals – Oregon is well positioned to support increased ZEV adoption with policies and programs that support ZEV sales in Oregon, including incentives to help reduce up-front vehicle costs.

The Department of Administrative Services’ Biennial Examination Required Under ORS 283.343 on the Use of State-Owned Vehicles reports that state agencies owned 41 electric vehicles out of a total 7,218 light duty fleet vehicles, or 0.6 percent.

Our Strategy. ODOE is a member of the Zero Emission Vehicle Interagency Working Group that is working to implement the goals of SB 1044 (2019) and of Executive Order 17-21. ODOE is also a member of the Every Mile Counts initiative led by the Oregon Department of Transportation, focusing on the interagency actions necessary to implement the Statewide Transportation Strategy to reduce greenhouse gas emissions in the state’s transportation sector. Some of the projects ODOE has led for these activities include:

- The development and maintenance of the Go Electric Oregon website, an online resource to provide information about electric vehicles and electric vehicle charging infrastructure. The website was initially created in 2018 to provide information on EVs, EV charging, the benefits of driving

<table>
<thead>
<tr>
<th>Year</th>
<th>Light-duty Vehicles in Oregon</th>
<th>ZEVs in Oregon</th>
<th>ZEVs as Percent of Light-duty</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>3,331,516</td>
<td>1,183</td>
<td>0.04%</td>
</tr>
<tr>
<td>2012</td>
<td>3,347,029</td>
<td>2,226</td>
<td>0.07%</td>
</tr>
<tr>
<td>2013</td>
<td>3,390,057</td>
<td>4,341</td>
<td>0.13%</td>
</tr>
<tr>
<td>2014</td>
<td>3,447,778</td>
<td>6,517</td>
<td>0.19%</td>
</tr>
<tr>
<td>2015</td>
<td>3,543,719</td>
<td>9,014</td>
<td>0.25%</td>
</tr>
<tr>
<td>2016</td>
<td>3,654,972</td>
<td>12,617</td>
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<tr>
<td>2017</td>
<td>3,743,750</td>
<td>16,670</td>
<td>0.45%</td>
</tr>
<tr>
<td>2018</td>
<td>3,760,000</td>
<td>22,056</td>
<td>0.59%</td>
</tr>
<tr>
<td>2019</td>
<td>3,672,549</td>
<td>27,998</td>
<td>0.76%</td>
</tr>
<tr>
<td>2020</td>
<td>3,443,282</td>
<td>33,579</td>
<td>0.98%</td>
</tr>
</tbody>
</table>
Oregon Department of Energy

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electric, and progress on the state’s 50,000 registered ZEVs by 2020 goal. ODOE will be updating the site in 2021-22 to reflect the new targets established by SB 1044.

- In September 2020, the Oregon Department of Energy published an interactive EV Dashboard that provides information on EV adoption and charging infrastructure in Oregon. The dashboard supports a larger effort to promote vehicle electrification, meet Oregon’s zero-emission vehicle adoption goals, and create a centrally located resource for Oregon EV data. The dashboard will be updated in Fall 2021 to include additional functionalities, including reporting EV registration data by zip code and establishing trend data on ZEV adoption in Oregon.

- As part of EO 17-21, the Oregon Department of Energy designed and established EV Leadership Awards on behalf of the Governor for businesses or organizations that demonstrate leadership in promoting Electric Vehicles and EV adoption.

- In 2020 and 2021, ODOE developed the Zero-Emission Vehicle Interagency Action Plan in collaboration with the member agencies of the Zero Emission Vehicle Interagency Working Group. The ZAP is a list of near-term actions state agencies can take to support ZEV adoption.

In 2019, the Oregon State Legislature passed Senate Bill 1044, directing ODOE to produce a biennial report about the general state of ZEV adoption in Oregon and the progress on achieving the state’s greenhouse gas emissions goals in the transportation sector through ZEV adoption. SB 1044 established ZEV adoption targets and required state agencies to lead by example by procuring 100 percent ZEVs for light-duty fleets by 2025. On September 15, 2021, ODOE released the inaugural Biennial Zero Emission Vehicle Report. The report shows that the state is not yet on track to achieve our ZEV targets. However, with state and federal incentives, many ZEVs have a lower lifetime cost-of-ownership than their gasoline-powered counterparts – especially when access to low-cost electricity form at-home charging is available. ODOE anticipates a significant increase in the availability of ZEV models in the next few years, and experts believe the up-front cost of a ZEV will equal the cost of a gasoline vehicle in just two to three years.

Fourteen states, including Oregon, have adopted California’s Low-Emission Vehicle program, and 12 of those have adopted ZEV program rules. Governor Kate Brown joined governors of 11 other states to urge President Biden to support policies that would end sales of gasoline-powered vehicles by 2035.

In June 2021, the Oregon Department of Transportation released the state’s Transportation Electrification Infrastructure Needs Analysis study. The TEINA study assessed transportation electrification charging infrastructure needs and gaps throughout Oregon, recognizing that convenient, accessible charging infrastructure is a critical driver to accelerating zero emission vehicle adoption and lowering greenhouse gas emissions. The study concluded that to achieve its ZEV adoption targets, Oregon will need a five-fold increase in ZEV charging by 2025, twenty times more charging infrastructure by 2030, and nearly 45 times more by 2035. The study concluded that there are significant gaps in access to charging for rural and multi-unit dwelling Oregonians.
About the Target. Oregon’s overall greenhouse gas goal is to significantly and rapidly reduce total GHG emissions – and by 2020, achieve levels that are 10 percent below 1990 levels. This would result in emissions of 52 million metric tons of carbon dioxide equivalent (MMTCO2e). Light-duty vehicles account for about 19 percent of the state’s GHG emissions at about 12.4 MMTCO2e, which is nearly 20 percent higher than the proportionate share for light-duty vehicles to meet GHG reduction goals by 2020. Despite their so far modest uptake in Oregon, the use of ZEVs has avoided an estimated 338,000 metric tons of in-state CO2e emissions between 2010 and 2019.

Specific electric vehicle adoption targets for Oregon began with Governor Brown’s Executive Order 17-21 and were further formalized with the passage of SB 1044 (2019). Those goals, which are the targets for this KPM, are:

- By 2020, 50,000 registered motor vehicles will be zero-emission vehicles;
- By 2025, at least 250,000 registered motor vehicles will be zero-emission vehicles;
- By 2030, at least 25 percent of registered motor vehicles, and at least 50 percent of new motor vehicles sold annually, will be zero-emission vehicles; and
- By 2035, at least 90 percent of new motor vehicles sold annually will be zero-emission vehicles.
SB 1044 also requires state agencies to procure 25 percent of eligible new light-duty vehicles as ZEVs by 2025 based on availability. The Department of Administrative Services’ Biennial Examination Required Under ORS 283.343 on the Use of State-Owned Vehicles reports that state agencies owned 41 electric vehicles out of a total 7,218 light duty fleet vehicles, or 0.6 percent. In the report, DAS notes charging infrastructure and first costs as limiting factors:

“To increase ZEV adoption in state fleets, a concerted effort to manage the cost and people resources to electrify the fleet should be considered. A recent DAS fleet electrification study showed that the total cost of ownership is favorable in many use cases for ZEV versions of vehicles out now and soon emerging on the market. However, the largest hurdles to fleet electrification is the cost and effort to install charging infrastructure and the incremental cost of the vehicles. Add to that the substantial cost of the people resources needed to manage the implementation of projects, and the cost is even higher.”

The DAS Fleet and Parking Services Manager reports that eight of the 510 light-duty vehicles purchased in 2020 were ZEVs. This represents 1.6 percent and shows an increase in the rate of ZEV acquisitions over the current fleet. Note that this occurred even in a year of reduced purchases due to the COVID-19 pandemic. With manufacturer pledges to provide increasing numbers of ZEV models in the next few years, achieving the 25 percent goal may be achievable.

2. FACTORS AFFECTING RESULTS

**Background.** Overall vehicle sales were lower in 2020 compared to 2019 due to economy-wide effects from the COVID-19 pandemic. Auto manufacturing plants and many dealerships shut down in April and May of 2020 to assist in mitigating the spread of COVID-19, which, in conjunction with reduced consumer activity, lowered vehicle sales. It is also likely that the reported number of registrations is lower than the actual number of ZEVs operating because of extensions on vehicle registrations enacted to help reduce the spread of the COVID-19 virus. COVID-19’s economic downturn depressed overall vehicle sales, including ZEV sales.

With the passage of HB 2165 in the 2021 Legislative Session, the Charge Ahead Rebate maximum amount was increased from $2,500 to $5,000, effective January 1, 2022. The Charge Ahead Rebate and the Oregon Clean Vehicle Rebate offer effective means for addressing the barrier of cost because they can reduce it at or near to the time of purchase. The availability of more affordable used ZEVs is also critical to transitioning the market toward ZEVs. Since the number of used vehicle purchases is four times higher than new vehicles in Oregon, a robust used ZEV market is critical if the state is to meet its adoption targets.

In 2021, ODOT partnered with EV Charging Solutions to upgrade all 44 of the West Coast Electric Highway’s charging stations and to add three new ones to the network. The upgrades will add more charger types and upgrade existing ones to serve a wider range of electric vehicles. ODOT sourced $4.1 million in funding for the upgrades from a mix of federal and state funds, plus a 20 percent match from EVCS. Upgrades to
the West Coast Electric Highway are part of the agency’s commitment to electrify Oregon’s transportation system and reduce greenhouse gas emissions from transportation.

The up-front cost of ZEVs remains a barrier, although the price differential between internal combustion vehicles and ZEVs is getting smaller and is expected to reach parity in the next few years. Depending on the vehicle model and annual income, the federal and state incentives can reduce the up-front and yearly costs to own and operate a ZEV to less than an equivalent gasoline vehicle. While most Oregonians can take full advantage, some lower-income and higher-income Oregonians may not be able to take full advantage of all incentives due to eligibility rules or tax liability. Like the TEINA study, the Biennial Zero Emission Vehicle report found that access to charging infrastructure is limited for rural and multi-unit dwelling Oregonians. State support is needed to ensure all Oregonians have equitable access to electric fuel.

About the Data. The data used in this section comes from the Oregon Department of Transportation Department of Motorized Vehicles registration data, which includes the fuel type of all light-duty vehicles and the number of vehicles registered in the state (including vehicles owned in Oregon but purchased in other states). The registration data was evaluated to assess how the state is progressing in the adoption of ZEVs. The data includes, by month, the total number of light-duty fleet vehicles compared to the number of Battery Electric Vehicles and Plug-in Hybrid Electric Vehicles.

The Department of Administrative Services’ Biennial Examination Required Under ORS 283.343 on the Use of State-Owned Vehicles provided the data to measure the State-owned ZEV target.

Electric motors are much more efficient than internal combustion engine vehicles, meaning electric motors use less energy to accomplish the same amount of work. In most cases when comparing fuels such as biodiesel to diesel, there is no impact to the data as the engine is the same in both cases and the amount of work accomplished is similar. A conventional vehicle varies between zero percent when idling, to somewhere in the low- to mid-30 percent efficiency when driving. By comparison, electric motors are in the mid-80 to mid-90 percent efficiency range. As a result, it requires less overall energy to drive the same distance in an electric vehicle than a non-electric vehicle. This higher efficiency is not accounted for in this KPM and would generally indicate a significantly lower energy consumption, and thus greenhouse gas emissions, for electric vehicles.

How We Compare. As of the end of 2018, Oregon ranked fourth in ZEV adoption per capita according to a U.S. Department of Energy Office of Energy Efficiency & Renewable Energy report. The report has not been updated in several years.

In addition, there is a new transportation scorecard from the American Council for an Energy-Efficient Economy (ACEEE) which published its inaugural report in February 2021. ACEEE is a nonprofit research organization that develops transformative policies to reduce energy waste and
combat climate change. Oregon has scored among the top 10 in ACEEE’s ranking of states for energy efficiency for several years now and looks forward to the organization’s new efforts focusing on the transportation sector.

“ACEEE’s State Transportation Electrification Scorecard evaluates the progress that state legislatures and agencies (e.g., public utility commissions, departments of transportation) are making to implement policies to scale up deployment of light-duty electric vehicles (passenger cars, SUVs, and trucks) and heavy-duty electric vehicles (large commercial vehicles, such as freight trucks and buses) and the necessary charging infrastructure for personal, commercial, fleet, and public transit use.”

ACEEE’s report covered transportation electrification more broadly than ODOE’s KPM, but its ranking still provides useful information. Oregon ranked no. 9 overall, scoring 14.5 (of 17 possible points) under Planning and Goals, 11.5 (of 30 possible points) under Incentives for EV Deployment, 5 (of 12 possible points) under Transportation System Efficiency, 4.5 (of 10 possible points) under Electricity Grid Optimization, 1 (of 10 possible points) under Equity, and 7 (of 21 possible points) under Outcomes.
1. HOW WE ARE DOING

Results. The Energy Facility Siting Division met this target again at 100 percent.

About the Target. Part of the agency’s commitment to stakeholders is providing reliable resources and services. To measure this, ODOE monitors the timeliness for processing application completeness reviews for energy facility siting, reflected by the percent of new energy facility applicants notified by ODOE whether an application is complete within 60 days of ODOE receiving it.

2. FACTORS AFFECTING RESULTS

About the Data. The reporting cycle for this measure is by calendar year. The data for the energy facility siting measures represents actual completeness review processing time data for all applications received during the reporting period.
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<table>
<thead>
<tr>
<th>KPM # 4</th>
<th>ENERGY USE BY STATE BUILDINGS: Electrical and fossil fuel energy use in state-owned buildings by use, type and building area.</th>
<th>Measure since: 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Goal</td>
<td>Establish a robust data set of building level energy use for state-owned buildings more than 5,000 square feet to facilitate energy reduction.</td>
<td></td>
</tr>
<tr>
<td>Data source</td>
<td>Agencies reporting</td>
<td></td>
</tr>
<tr>
<td>Owner</td>
<td>Mary Knight, KPM Coordinator, Phone: 503-373-7562</td>
<td></td>
</tr>
</tbody>
</table>

1. **HOW WE ARE DOING**

**Results.** In 2020, the average Energy Use Index for State-owned buildings was 44.9 kBTU per square foot, below the EUI target. Because the target is a metric of energy use, achieving an EUI below the identified target is the goal – a lower EUI means less energy use.

Energy use in state-owned office buildings in 2020 decreased from 2019. While improved data collection and evaluation have increased visibility into agency building energy use, the COVID-19 pandemic significantly changed building use behavior in 2020 for most agencies, making it challenging to compare to previous years. The improved data collection also affects the historical data, which has been updated and is reflected in this year’s KPM reporting.

In 2020, many state employees worked from home for most of the year – so the changes in building energy use in 2020 may be attributed to this change. Other pandemic-related changes also affected energy use:

- Building operators increased ventilation to reduce potential infections in buildings, therefore increasing energy use.
- With reduced staff in buildings, plug loads decreased.

![Average Energy Use Index for State Owned Offices Compared to ASHRAE Target](image-url)
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- For workers who still used state facilities, operating hours and heating/cooling expectations remained the same. Fully occupied commercial buildings tend to use more energy for cooling and ventilation to maintain a comfortable temperature. But with fewer workers in buildings, heating demand increased instead to keep buildings comfortable.
- Energy use did not decline as much as anticipated, as building temperatures still need to be maintained for the limited staff in attendance. Many buildings are not zoned or do not have the ability to condition based on low attendance.
- Water use was a better indicator of the behavior change, as it declined dramatically in 2020.
- Night audits were suspended during the pandemic, eliminating a tool facility staffs use to identify potential behavior changes.
- IT took over computers and put them in sleep mode to retain updates from software companies, potentially increasing plug loads.

To make informed energy efficiency investment decisions, state agencies need data about energy use in their buildings and a method for comparing use to similar buildings. ODOE developed a comprehensive dataset for baseline energy use in state-owned facilities with the goal of continuous improvement of data quality and communication over time. In 2015, 20 state agencies reported building- or meter-level energy use into the ENERGY STAR® Portfolio Manager platform, establishing facility baseline energy use. Twenty agencies provided 2020 energy use data for 324 state-owned buildings. Energy use in 2020 was compared against the baseline and an established energy use index (EUI) performance target for each building type. ODOE will deliver to each agency a report outlining the energy use of their buildings, and how they compare to previous years and to the performance targets. In 2020, 170 state-owned buildings met the performance targets, while 154 did not. With this information and technical support from ODOE, agencies can identify opportunities for increased energy efficiency in their buildings and realize long-term savings in their operating budgets.

About the Target. Because the target is a metric of energy use, achieving an EUI below the identified target is the goal – a lower EUI means less energy use. ODOE established a target for office buildings, shown in the chart, based on the American Society of Heating, Refrigerating, and Air-Conditioning Engineers (ASHRAE) Standard 100 high-performance EUI. The target EUIs for each building type are based on ASHRAE Standard 100-2018 targets for climate zones 4C (Western Oregon) and 5B (Eastern Oregon). EUI is a common industry metric for evaluating building energy use and is calculated by determining the annual kBtu of energy used, divided by the square footage of the building. EUI targets enable agencies to compare energy used by an individual building to similar type buildings in the state or region. These macro level indicators support agencies in identifying which buildings need to be evaluated to determine if the higher level of energy use is warranted by a building’s characteristics and use profile, or if a comprehensive energy audit should be considered. ODOE delivers technical assistance, if requested, to help agencies identify solutions to lower energy use over time and reach target EUI levels. Each agency determines the cost-effective energy efficiency methods to pursue. ODOE supports agency decision-making by providing reliable building energy use information and energy efficiency consultation.
ORS 276.915 requires state agencies to track annual energy use at the agency level. Agencies report more detailed facility-level data to identify additional opportunities for energy savings. Beginning in 2015, participating agencies have entered annual energy use for state-owned buildings that are more than 5,000 square feet into the EPA ENERGY STAR® Portfolio Manager platform. For 2020, agencies reported a total of 1.4 million Btu, representing over 18 million square feet of facilities.

Oregon’s agency reporting portfolio grew from 312 buildings in 2018 to 324 in 2020, an increase of almost 4 percent. Not all building types in agency portfolios have established high-performance target EUIs. Of the 324 buildings/campuses that report energy use, 47 percent do not have prescribed ASHRAE targets due to their unique use. ODOE works with each agency to calculate appropriate performance targets for buildings without established targets. State-owned buildings without an ASHRAE EUI target make up 53 percent of the total square footage and use 70 percent of the total energy. Of the state-owned facilities with target EUIs, offices represent 59 percent of that total energy use. Other-services buildings comprise 2 percent and laboratories make up 11 percent of that total energy use. Libraries, distribution centers, repair shops, senior care facilities, and hospitals combine to represent the remaining 28 percent of the energy use in buildings with target EUIs. For all state buildings, 52 percent are at or below established high-performance targets, and 48 percent exceed target EUIs.

2. FACTORS AFFECTING RESULTS

**Background.** Not all state-owned buildings have building-level utility meters. Some facilities share a meter between two or more buildings, as in a campus or complex. Those situations complicate the ability to track energy use at the building level. In such situations, utility use needs to be pro-rated by building square footage and may not give an accurate picture of building performance. Additionally, utility data is manually reported by agencies, which increases the need for data verification. Although some agencies have facility level personnel with energy management skills, many agencies assign the reporting duties as an add-on to clerical duties. Agency staff unfamiliar with energy use may not be able to identify errors in the data when uploading it. ODOE collaborates with all agencies to review data and identify and correct inconsistencies while maintaining the integrity of the data.

Regarding energy consumption and performance, there are many factors that can affect EUI results. Energy efficiency projects and conservation measures can improve energy performance. Facility characteristics such as occupancy, operating hours, functions, and equipment affect energy use. Other external factors, such as weather, also affect energy use. ODOE provides technical assistance, when requested, to help agencies better understand the factors that have the greatest effect on a facility’s energy consumption.

ODOE provides progress reports to agencies with information about how each of their facilities compare to similar buildings. Agencies with buildings exceeding their targets may investigate further to determine if the higher energy use is justified. For those buildings where a satisfactory explanation is not found, ODOE supports the agency, if requested, to identify opportunities for energy reduction, such as
continuous commissioning in which building managers routinely track building equipment operating conditions, setpoints, and energy use to maintain peak performance. ODOE provides expert technical assistance to help agencies identify valuable energy improvements.

**How We Compare.** Other states in the region also require state-owned facilities to report building energy use into EPA ENERGY STAR® Portfolio Manager. Minimum square footage that triggers reporting varies between states, as do disclosure requirements.

California Executive Order (EO) B-18-12 mandated that state energy and water use be benchmarked and reported as of 2013. The goal was to reduce energy use by 20 percent by 2018. Thirty-five departments report under EO B-18-12. Washington, through EO 12-06, has required state agencies, colleges, and universities to track and report energy use in buildings over 10,000 square feet since 2012. Energy use is reported using EPA ENERGY STAR® Portfolio Manager. The Department of Enterprise Services posts the energy use for public viewing. In April 2014, the governor of Montana directed state agencies to begin monitoring energy use in state buildings and to begin publicly disclosing the energy numbers online. The listings will eventually encompass state buildings and facilities of 5,000 square-feet or larger. Idaho does not have benchmarking requirements for state buildings.

**About the Data.** In January 2015, state agencies began reporting energy use at the building level into EPA ENERGY STAR® Portfolio Manager. Prior to that, agencies reported aggregated annual agency energy use into an ODOE database. As agencies become more familiar with reporting energy use data into the database, they are refining their data input and building category designations. By tracking annual energy use, agencies see how their buildings are performing over time and can make informed decisions to determine if operational adjustments or capital investments are needed. Building performance is typically measured in EUI (kBtu/square foot/year). Electrical and fossil fuel annual energy use data is converted into common units (British thermal units or Btu) and combined with building square footage to calculate EUI. The ASHRAE target is a EUI value that represents high performance by building type.
1. HOW WE ARE DOING

**Results.** Overall, the carbon intensity of Oregon’s electricity consumption has decreased from 0.427 metric tons of CO2e/MWh in 2010 to 0.363 metric tons of CO2/MWh in 2019. The carbon intensity remains higher than the 2035 interim non-binding target established by the Oregon Global Warming Commission (represented by the red line in the figure), as well as the new 2030 and 2035 electricity emissions targets for Oregon’s investor-owned utilities mandated in 2021 by HB 2021 (represented by the dashed lines). The carbon intensity of Oregon’s consumption is likely to continue to improve as utilities:

- Phase out imports of electricity generated by coal-fired power plants from Oregon utility rates by 2030\(^1\)
- Continue to make progress toward meeting the 50 percent Renewable Portfolio Standard targets for 2040\(^2\)
- Take action to meet new electricity emissions targets for Oregon’s investor-owned utilities established by HB 2021

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\(^1\) With one exception that would enable rate-basing costs for up to five years after the plant has fully depreciated. This would apply exclusively to Colstrip plant in Montana.

\(^2\) Utilities in Oregon are currently meeting the annual RPS targets and are on track to meet the 2025 RPS targets.
The carbon intensity of Oregon’s electricity generation has decreased from 0.183 metric tons/MWh in 2010 to 0.177 metric tons CO2e/MWh in 2019 and has been lower than the 2035 interim target for six of the past 10 years. This is because of Oregon’s significant in-state hydropower, wind, and other low- and zero-carbon resources. The carbon intensity of in-state generation is likely to continue to decrease further now that the state’s sole coal-fired power plant retired in October 2020. Despite the overall downward trends in the carbon intensity of Oregon’s electricity generation and its electricity consumption, year-to-year variations in these values occur and are mainly driven by fluctuating water resources available for hydropower generation due to natural variation in annual precipitation. This was the primary driver of the increase in carbon intensity from 2018 to 2019, with substantially lower-than-average precipitation in 2019, which reduced hydropower generation that was then replaced by carbon-emitting generation like natural gas.

Thanks to highly effective energy efficiency programs, Oregon’s total electricity consumption has grown by only about 2 percent over the last decade despite population growth of about 10 percent. In its Seventh Power Plan, adopted in February 2016, the Northwest Power and Conservation Council forecasted that cost-effective energy efficiency could meet all the region’s future load growth over the next 20 years. The Draft 2021 plan, released in September 2021, has a different outlook. While the Draft 2021 plan forecasts that energy efficiency acquisition will continue to play a critical role in meeting the region’s future demand for electricity, two factors have led the Council to recommend a strategy that includes both energy efficiency acquisition and renewable energy resource acquisition. The first factor is that the success of Oregon’s energy efficiency programs means much of the low-cost energy efficiency opportunities have been captured. The second factor is that the falling cost of renewables means that renewables become the least-cost resource instead of energy efficiency.

**About the Targets.** Until 2021, Oregon did not have a formal sector-specific target for the carbon intensity of electricity. ODOE derived an interim target for the purposes of this report from the greenhouse gas reduction goals in ORS 468A.205, the Oregon Global Warming
Commission’s Interim 2035 GHG reduction goal, and utility projections for future electricity loads. This target represents the carbon intensity that Oregon’s electricity resource mix would need to reach in 2035 for the sector to achieve its proportional share of the state’s overall emissions reduction goal. In 2015, the Oregon Global Warming Commission developed an interim greenhouse gas reduction goal for 2035, which is interpolated between the goals for 2020 and 2050 set in ORS 468A.205. Meeting this goal would require a 42.5 percent decrease in total greenhouse gas emissions from 1990 levels. If the electricity sector achieved an equivalent reduction from 1990 levels, emissions in 2035 would be 9.5 million metric tons CO2. Dividing this by forecasted utility loads in 2035 yields an interim carbon intensity target of 0.151 tons of CO2/MWh.

In 2021, the Oregon legislature passed HB 2021, mandating that Oregon’s investor-owned utilities reduce greenhouse gas emissions compared to the average of their 2010, 2011, and 2012 emissions by 80% in 2030, 90 percent in 2035, and completely eliminate greenhouse gas emissions from retail electricity supply by 2040. To determine the carbon intensity requirements of these targets, ODOE calculated the average emissions for 2010, 2011, and 2012 using DEQ emissions data, and divided this by forecasted utility loads in 2035 yielding an interim carbon intensity target of 0.06 tons of CO2/MWh in 2030 and 0.03 tons of CO2/MWh in 2035. In 2040, the carbon intensity target will be zero. ODOE will submit for approval the 2030 target of 0.06 tons of CO2/MWh during the next LFO review.

The electricity sector includes all in-state and out-of-state generation that serves Oregon’s total annual electricity load. This includes electricity provided by investor-owned utilities, consumer-owned utilities, electricity service suppliers, and Independent Power Producers. In 2019, this sector accounted for approximately 29 percent of all greenhouse gas emissions in Oregon.

Carbon dioxide emissions released from the combustion of fossil fuels to generate electricity make up most of the greenhouse gas emissions from the electricity sector. CO2 emissions in the electricity sector can primarily be reduced in three ways:

- Implementing energy efficiency and conservation measures and demand response programs to reduce the amount of electricity required to be generated
- Replacing electric generating resources that have CO2 emissions with resources that have lower or zero-carbon emissions
- Adding storage that can be charged with electricity from a generating resource, or mix of generating resources, with low or zero-carbon emissions and discharging that stored electricity to replace electricity generated from resources with higher carbon emissions

Energy efficiency, conservation, and demand response programs mainly help reduce the magnitude of CO2 emissions by reducing the total amount of electricity generated. These can reduce the carbon intensity (emissions per unit of energy) of electricity consumption if they reduce use of the highest-emitting resources like coal and natural gas peaker plants. Replacing generating resources that emit carbon with resources that emit lower or zero-carbon, either directly or with batteries charged by lower emission generating resources, helps reduce both the

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3 ORS 468A.205 established a policy goal to achieve greenhouse gas levels that are at least 75 percent below 1990 levels by 2050.
magnitude of carbon emissions and the carbon intensity of the electricity resource mix. Both approaches are used in Oregon to reduce greenhouse gas emissions and achieve other energy and environmental benefits in the electricity sector.

The carbon intensity of the electricity resource mix is expressed as metric tons of carbon dioxide equivalent per Megawatt Hour (MWh). Oregon has two different electricity resource mixes, the resource mix of the electricity it generates within the state, and the resource mix of the electricity it consumes (a combination of electricity generated both in-state and out-of-state). The two mixes are different because Oregon neither consumes all the electricity it generates, nor generates all the electricity it consumes. This is because competitive energy markets encourage Oregon to both import and export electricity across its borders. While much of the electricity consumed in Oregon is generated by Oregon’s vast amount of zero-carbon hydropower resources, a significant portion of the electricity consumed in Oregon is also generated by out-of-state fossil-fuel resources. Oregon’s consumption of out-of-state fossil fuel resources is one factor that leads to the carbon intensity of the electricity consumed in Oregon to be higher than the carbon intensity of the electricity generated in Oregon.

2. FACTORS AFFECTING RESULTS

Background. There are several policy drivers helping to reduce the carbon intensity of electricity consumed in Oregon, including:

- The Oregon Coal to Clean Act (SB 1547) passed in 2016 requires utilities to eliminate imports of electricity generated by coal-fired power plants from Oregon utility rates by 2030.5
- The Oregon Renewable Portfolio Standard (RPS) established in 2007 sets renewable energy requirements for the state’s electric utilities. Updated in 2016, the Oregon RPS requires large utilities to have 50 percent of their electricity sales come from qualifying renewable energy sources by 2040; smaller utilities have lesser requirements.
- In 2020 Governor Kate Brown issued Executive Order 20-04, which will have implications for the carbon intensity of electricity consumption. The Executive Order directed:
  - state agencies to exercise any and all authorities and discretion to help Oregon achieve its GHG reduction goals
  - the Oregon Department of Energy to establish and update appliance efficiency standards to the most stringent among West Coast jurisdictions
  - the Oregon Department of Environmental Quality to establish a sector-specific cap-and-reduce program for large stationary sources of GHGs
  - the Oregon Public Utility Commission to advance decarbonization in the utility sector
  - the Oregon Department of Consumer and Business Service’s Building Codes Division to work with ODOE in adopting energy efficiency goals for new residential and commercial buildings

4 The data used in this report reflect only carbon dioxide emissions and do not include emissions of other greenhouse gases at this time.

5 With one exception that would enable rate-basing costs for up to five years after the plant has fully depreciated. This would apply exclusively to Colstrip plant in Montana.
• The Oregon “Clean Energy for All” Act (HB 2021) passed in 2021 establishes clean energy targets for Oregon’s large investor-owned utilities. HB 2021 requires Oregon’s IOUs to meet the following goals:
  o 2030: 80% reduction of GHG emissions from average of 2010, 2011, 2012 emissions
  o 2035: 90% reduction of GHG emissions from average of 2010, 2011, 2012 emissions
  o 2040: 100% reduction of GHG emissions from average of 2010, 2011, 2012 emissions (i.e.: zero emissions)

In addition, the Federal Public Utility Regulatory Policies Act (PURPA), which requires utilities to purchase the power offered to them from independent (non-utility) renewable generators with capacities of 80 MW or less, has led to increased renewable and carbon-free electricity. Green power and other voluntary programs increase the mix of renewable resources used to meet Oregon’s electric load. In effect, these laws, policies, and programs help lower the carbon emissions of the average megawatt hour generated and consumed. ODOE supports this work by providing technical assistance for renewable energy projects, certifying eligible resources for the RPS, reporting the electricity resource mix annually, and participating in statewide energy policy development work.

The carbon intensity of electricity generated in the state is much lower than the carbon intensity of electricity consumed in the state because hydropower and other low and zero-carbon resources comprise a substantially larger percentage of the resource mix of the electricity generated in Oregon relative to the resource mix of the electricity consumed in Oregon – and because Oregon had only one coal-fired power plant, located in Boardman. This sole coal plant ceased operations on October 15, 2020 and is planned to be decommissioned and demolished by the end of 2023. Additional in-state generation comes from natural gas-fired power plants, which have about half the carbon intensity of coal-fired generation. Additionally, new fossil fuel-fired power plants sited in Oregon with the capacity to generate 25 megawatts or more are required to meet the Oregon Energy Facility Siting Council’s carbon dioxide standard. This regulation encourages large in-state fossil-fueled generating resources of this size to be the most efficient and least carbon intensive as possible by requiring developers to procure greenhouse gas offsets (typically in the form of a monetary payment to The Climate Trust) for any carbon emissions above the EFSC standard.

Oregon’s total forecasted electricity load used to generate the interim 2035 target depends on: Oregon’s population growth; the growth of industry in Oregon; the growth of electric vehicles and other electrically powered devices and machines in Oregon; and the effectiveness of energy efficiency and conservation programs implemented by utilities, the Bonneville Power Administration, the Oregon Department of Energy, Energy Trust of Oregon, and others. In addition, climate change could result in increased summer load for air conditioning and irrigation needs for agriculture, while at the same time resulting in decreased snowpack and shifting periods of runoff. If this were to occur, the ability of Oregon’s zero-carbon hydropower resources to continue to supply the same, large portion of the state’s annual electricity loads (especially in summer months) could be negatively affected.

Over the next decade, the state will need research and policy development that will help safely and reliably incorporate increasing levels of renewable generating resources into the electricity system in a cost-effective manner. This could include creative and collaborative efforts on:
carbon pricing, power asset depreciation, participating in regional energy and transmission markets, energy storage, demand response, customer incentives and financing for distributed resources such as solar and storage, emerging renewable resources (e.g., offshore wind, marine energy, and geothermal energy), and electricity system resiliency.

Energy efficiency and conservation programs will continue to be needed to achieve the Northwest Power and Conservation Council’s energy efficiency acquisition projections to meet the region’s future load growth over the next 20 years. In addition, continued efforts are needed to meet the Council’s projection that demand response (including storage) can help offset the need for new fossil-fueled power plants to meet peak loads.

**How We Compare.** Due to the Federal Columbia River Power System and other private and publicly owned hydropower facilities in the state, Oregon generally has an electricity resource mix with a lower carbon intensity than states in other regions. The carbon intensity of the state of Washington’s electricity sector, however, benefits from an even higher percentage of zero-carbon hydropower than Oregon. For example, in 2018, 53.2 percent of Oregon’s electricity consumption was generated from zero-carbon resources. In that same year, 68.8 percent of Washington’s electricity consumption was generated from zero-carbon resources.

Washington state passed SB 5116 in 2019, which established new goals for reducing carbon emissions in its electricity sector. The bill requires utilities to remove coal from the electricity resource mix consumed in Washington by 2025 and requires 100 percent of electricity consumed in Washington to be carbon neutral by 2030.

**About the Data.** Until 2019, ODOE KPM reports used the carbon intensity of electricity consumption in Oregon based on ODOE’s calculations of the state’s Electricity Resource Mix (ERM). In 2019, ODOE reviewed its methodology for calculating the state’s ERM and determined that basing the ERM on Oregon Department of Environmental Quality greenhouse gas emissions data was sufficient and appropriate. DEQ is the authority on greenhouse gas emissions reporting, and ODOE ERM data on the ODOE website and in this report are both now based on DEQ emissions data. For reports after 2019, ODOE will use the DEQ emissions data for this KPM. There are minor differences in these GHG emissions calculation methodologies, which means the carbon intensity data for the electricity consumed in Oregon reported in previous KPM reports will not match the carbon intensity data for consumption in this KPM report and reports going forward.

ODOE utilized information from the Oregon Global Warming Commission’s legislative report, data from the U.S. Department of Energy’s Energy Information Administration (EIA), and utility load projections to derive the 2035 interim target. The agency also utilized the Oregon Department of Environmental Quality’s GHG Emissions Inventory Reporting program to derive the HB 2021 targets and determine the carbon intensity of electricity that is consumed in Oregon. The GHG Inventory is updated by DEQ annually and is based on utility generation and electricity purchases. ODOE used EIA data to determine the carbon intensity of electricity generated in Oregon; because EIA publishes annual data for the total MWh of electricity generated in each state and the carbon dioxide emissions associated with each states’ generation in December of the
following year, the carbon intensity data of electricity generated in Oregon for 2020 is not yet available. The chart above depicting carbon intensity of electricity generated in Oregon uses data through 2019, which is the most current available data set.

*This 2021 KPM report includes the carbon intensity values for electricity consumed and generated in Oregon across years 2010 through 2019.*
Vision: A safe, equitable, clean, and sustainable future.

<table>
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<tr>
<th>KPM #5c</th>
<th>GREENHOUSE GAS CONTENT OF OREGON'S STATIONARY FUEL: Greenhouse gas emissions per unit of the mix of other stationary fuels used in Oregon.</th>
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<td>Mary Knight, KPM Coordinator, Phone: 503-373-7562</td>
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1. **HOW WE ARE DOING**

**Results.** The stationary fuels sector includes all fuels used in Oregon other than fuel used for electricity generation and transportation. This includes fuel used for residential and commercial buildings and fuel used for manufacturing. Stationary fuel use typically includes heating of spaces and liquids, cooking, and industrial process heat. In 2019, this sector accounted for approximately 15.7 percent of all GHG emissions in Oregon.\(^6\) From 1990 to 2019, the carbon intensity of stationary fuel used in Oregon declined slightly but is well above the interim target for 2035. Most of the reduction came from a shift from petroleum to natural gas in the industrial sector, which resulted in fewer greenhouse gases (GHG) emitted per British thermal unit (Btu) due to natural gas’ lower carbon density. When coupled with energy efficiency measures, the result is a slight decrease in total emissions from industrial fuel use. This was partly offset by a slight increase in emissions for the residential and commercial sectors, driven primarily by population and economic growth.

\(^6\) Oregon Department of Environmental Quality. Oregon Greenhouse Gas Sector-Based Inventory Data. [https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx](https://www.oregon.gov/deq/aq/programs/Pages/GHG-Inventory.aspx)
Looking to the future, the U.S. Department of Energy’s Energy Information Administration\(^7\) forecasts energy usage out to the year 2050 at the national scale, which indicates 0.66 percent increase per year in energy consumption for stationary fuels. The EIA predicts that total CO2 emissions are expected to decline by an average of 0.3 percent per year in the residential sector but increase by 0.4 percent per year in the commercial sector and increase by 1.04 percent per year in the industrial sector.

**About the Target.** Emissions from stationary fuel use can be reduced in two ways: implementing energy efficiency and conservation measures to reduce the amount of fuel used and shifting to lower carbon renewable fuels to reduce the carbon intensity (carbon emissions per unit of fuel) of the stationary fuel mix. Currently, energy efficiency and conservation are the primary tools used to reduce fuel consumption and related emissions in this sector. This includes ODOE’s statewide technical assistance programs for building and industrial energy efficiency, as well as utility energy efficiency programs, building energy codes, and industrial combined heat and power initiatives.

The GHG intensity of the stationary fuel mix is expressed as kilograms of carbon dioxide equivalent (CO2e) per Btu.\(^8\) To reduce the GHG intensity of the fuel mix, ODOE and others implement a variety of technical assistance programs to increase the mix of low- and no-carbon renewable fuels such as biomass, solar thermal energy, and renewable natural gas.

GHG emissions from the production, transport, and storage of stationary fuels in Oregon primarily come from methane leaks associated with natural gas production. Oregon is a relatively small producer of natural gas, totaling about 399 million cubic feet in 2019 from the Mist natural gas field in northwest Oregon.\(^9\) Industry and alternative fuels companies are developing programs to help reduce methane releases from oil and gas production and distribution. Oregon does not currently mine coal or refine petroleum.

While a sector-specific target has not been formally set for stationary fuels, ODOE has derived an interim target for purposes of this report from the GHG reduction goals in ORS 468A.205 and the stationary fuel use forecast developed by the U.S. Department of Energy’s EIA. This target represents the carbon intensity that Oregon’s fuel mix would need to reach in 2035 for the sector to achieve its proportional share of the state’s overall emissions reduction goal. Depending on the reductions that can be achieved in other sectors, the stationary fuel sector may need to achieve more or less than this target to meet the state’s overall goals in the future.

In 2015, the Oregon Global Warming Commission developed an interim greenhouse gas reduction goal for 2035, which is interpolated between the goals for 2020 and 2050 set in ORS 468A.205. Meeting this goal would require a 42.5 percent decrease in total greenhouse gas emissions.

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\(^7\) Annual Energy Outlook 2021 with Projections to 2050. Retrieved from [https://www.eia.gov/outlooks/aeo/](https://www.eia.gov/outlooks/aeo/)

\(^8\) Carbon dioxide equivalent is a measure of all greenhouse gas emissions adjusted to the equivalent amount of carbon dioxide based on the global warming potential of each greenhouse gas.

from 1990 levels. If the stationary fuel sector achieved an equivalent reduction from 1990 levels, emissions in 2035 would be 5.3 million metric tons CO2e. Dividing this by the EIA forecast of stationary fuel use in 2035 yields an interim target of 35.68 kilograms/MMBtu. This target could change if forecasted fuel use changes due to fuel prices, energy efficiency measures, changes in technology, and other factors. Again, there is no requirement for the stationary fuel sector to meet this target, and technological barriers may limit the stationary fuel sector’s ability to achieve this level of carbon intensity. Nevertheless, the interim target provides a point of reference for comparison to the trend in carbon intensity from this sector.

2. **FACTORS AFFECTING RESULTS**

**Background.** Stationary fuel use over time is largely driven by population growth, the economy, technology, and climate change policy. As an example, the recent increase in residential and commercial greenhouse gas emissions from fuel use is being driven by Oregon’s population growth of a little more than 1.3 percent a year (faster than most other states).\(^\text{10}\) Yearly fluctuations in weather, introduction or commercialization of technology, new policy, and energy prices will all affect the type of fuel and use patterns for stationary energy. EIA long-term modeling indicates that residential GHG emissions from fuel use will decline at a rate of about 0.2 percent per year, primarily due to improvements in building and appliance energy efficiency, while the commercial and industrial sector GHG emissions from fuel use will increase because of increased economic growth, low fossil fuel prices, and increased manufacturing.

Significantly reducing the carbon intensity of stationary fuel used in Oregon would require a shift from fossil fuels to low- or no-carbon renewable fuels (e.g., renewable natural gas, renewable hydrogen, and biomass). New policies may be needed to support such a shift, including policies to support the production, distribution, and use of renewable fuels.

Policies to move toward zero net energy buildings could significantly reduce stationary fuel emissions in the residential and commercial sectors. Industrial energy efficiency measures and highly efficient on-site combined heat and power systems using renewable fuel can also reduce emissions from this sector. Governor Brown’s executive order 17-20\(^\text{11}\) requires Oregon to develop a timeline to achieve net zero energy ready buildings across the state. Furthermore, it directs improvements to the state energy building code for energy efficiency, electric vehicle readiness, and solar installation readiness. EO 17-20 also includes a focus on retrofitting older, less-efficient buildings, and demonstrating energy efficiency leadership in state-owned and state-leased buildings.

Renewable Natural Gas is a lower carbon alternative to fossil-based natural gas. RNG is derived from the anaerobic digestion of waste that can occur in wastewater treatment plants, dairy digesters, and landfills. RNG can also be produced via the thermal gasification process of cellulosic material. In July 2017 the Oregon Legislature passed SB 334, which required ODOE to conduct a renewable natural gas resource inventory and to report the preliminary findings to the relevant legislative group by mid-September 2018. This inventory provided an overview of current and

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potential RNG resources across the state and supports the continued development of this less carbon-intense resource. RNG resources have carbon intensities that are significantly lower than fossil-based natural gas, and in some instances have negative carbon intensities (not only reduces emissions but also utilizes waste streams that would otherwise have emitted GHGs). In 2019, Governor Brown signed SB 98 into law, which set voluntary RNG goals for the state’s natural gas utilities, creating a path for RNG to become an increasing part of Oregon’s energy supply. In 2020, NW Natural issued its first Request for Proposals seeking to secure RNG resources for its customers over the long term, and subsequently signed contracts with Element Markets to receive RNG from two facilities. NW Natural also issued an RFP for RNG in 2021 and is currently conducting due diligence on a short list of the proposals received.

Research is needed to better understand the net GHG emissions from the growth and use of biomass as a stationary fuel. Production of biomass as a fuel source initially results in a decline in atmospheric carbon as plants take up and sequester CO2 during the growth phase. This sequestered CO2 is released when the biomass is combusted. The net emissions can also be affected by changes in land use and a variety of other factors. Steady increases in measured atmospheric carbon may indicate that plant uptake of carbon from the atmosphere is not keeping up with anthropogenic-driven rates of atmospheric carbon emissions. Blending hydrogen or renewable hydrogen into the natural gas supply or using hydrogen as a drop-in fuel for other stationary purposes will also affect net emissions. In 2021, the Oregon Legislature passed SB 333, which requires ODOE to report on the benefits of and the barriers to producing and consuming renewable hydrogen in the state to support renewable energy and greenhouse gas reduction policies and goals.

**How We Compare.** Oregon’s GHG emissions from stationary fuels were slightly lower than Washington and California, and significantly lower than many eastern and mid-western states. This is due to differences in the level of fuel use, the mix of fuels, climate, and types of industry. Stationary fuel use in Oregon is a lower percentage of total in-state GHG emissions than in each of our neighboring states.12

**About the Data.** Formal tracking of the GHG emissions from stationary energy use is based on the data provided by the Oregon Department of Environmental Quality Greenhouse Gas Reporting Program and the U.S. Energy Information Administration. For stationary fuel use, the report uses a combination of reported emissions from parts of the industrial sector and fuel suppliers (fossil fuels, but not biomass) as well as modeling of emissions from residential / commercial buildings and small manufacturing. The data include GHGs directly emitted in Oregon and do not account for the out-of-state emissions of stationary fuels used in the production, transport, and disposal of goods consumed by Oregonians. The EIA fuel consumption forecast used to calculate the interim target for Oregon may underestimate or overestimate Oregon’s fuel consumption due to the use of national scale energy-use growth data.

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1. HOW WE ARE DOING

Results. Overall, alternative fuel consumption and diversity have trended upward as a percentage of fuels consumed. In 2005, petroleum products, such as gasoline and diesel, accounted for 98.3 percent of the fuel consumed in the on-road transportation fuel mix, while just 1.2 percent came from alternative fuels. In 2020, alternative fuels increased to 9.45 percent. While alternative fuel use is trending upward, Oregon is well below the target of at least 45 percent coming from alternative resources.

Most of the increase is due to the Oregon Renewable Fuels Standard program that blends biofuels into petroleum-based gasoline and diesel. Biofuels are also eligible to generate credits in the Oregon Department of Environmental Quality’s Clean Fuels Program.

Mixing alternative fuels with traditional petroleum-based fuels continues to be the most widely used source of alternative fuels in the state.

Alternative fuel diversity has increased since 2005. The 2020 fuel mix includes renewable diesel, bio-compressed natural gas, and bio-liquid natural gas, which were not available in 2005. Additional
increases in alternative fuel use follow growth in the availability of alternative fuel vehicles and the alternative fuels themselves. Electricity is experiencing rapid growth as a transportation fuel. As of June 2021, there are 38,482 electric vehicles registered in Oregon. In 2019, SB 1044 established new targets for zero-emission vehicle adoption in Oregon to reduce GHG emissions in the light-duty transportation sector. In 2021, the Oregon Legislature passed HB 2165, which modifies income qualifications and doubles DEQ’s Charge Ahead Rebate incentive from $2,500 to $5,000 for the purchase of a zero-emission vehicle, effective January 1, 2022.

**Strategy.** The 2020 Oregon Global Warming Commission’s report to the legislature indicates all emitting sectors will need to reduce their overall emissions for the state to achieve its greenhouse gas emission reduction goals. Adoption of lower carbon intensity transportation fuels is a key reduction strategy because this sector bears the largest proportional share of GHG emissions in Oregon. In addition to reducing GHGs, diversification of transportation fuels is key in developing a more robust and resilient transportation fuel supply for the state. These data help provide an indication of the effectiveness of the strategy to expand the use of alternative fuels in Oregon’s on-road transportation fuel mix.

The intent of this KPM is to assess the adoption rate of alternative fuels into the transportation fuel mix in Oregon. The adoption of alternative fuels, such as compressed natural gas, propane, and electricity has beneficial social, economic, and environmental effects on individuals and businesses in Oregon. ORS 468A.205 established a goal to reduce GHG emissions to 75 percent below 1990 emission levels by 2050. The transportation sector is responsible for 39 percent of Oregon’s GHG emissions, and traffic-related air pollution is linked to respiratory conditions like decreased lung function, wheezing, cardiovascular disease, and childhood asthma.

Because electricity and certain biofuels can be produced in state, these transportation fuels help retain more dollars in Oregon. Electricity and other alternative fuels do not use the same transportation system as traditional petroleum fuels, and therefore can increase the resilience of Oregon’s fuel infrastructure in case of a catastrophic event.

**About the Targets.** The Oregon Department of Energy has set a Key Performance Measure target of at least 45 percent of on-road transportation fuels coming from alternative resources by 2035. In addition, several state programs and goals include the adoption of alternative fuels:

- The Oregon Department of Environmental Quality Clean Fuels Program has a goal to reduce GHG emissions from the transportation fuel sector by 10 percent over 10 years by creating a market for the sale of credits for lower carbon intensity fuels.
- In 2020, Governor Kate Brown directed DEQ and the Environmental Quality Commission to expand the Clean Fuels Program to achieve reductions in average carbon intensity of transportation fuels of at least 20 percent (relative to 2015) and 25 percent by 2035.
- The Oregon Renewable Fuels Standard requires most gasoline to blend 10 percent ethanol per gallon and 5 percent biodiesel to standard diesel per gallon.
• The Oregon DEQ Low-Emission Vehicle/Zero-Emission Vehicle (ZEV) Program currently requires battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs) be approximately six percent (9.5 with transfers) of light-duty vehicle deliveries to Oregon auto dealers, with an increase to sixteen percent (22 with transfers) in 2025.

• SB 1044 (2019) established aspirational goals on ZEV adoption in Oregon through 2035 and requires state agencies to procure 25 percent of eligible vehicles as ZEVs. In 2021, SB 2027 increased state procurement goals from 25 percent to 100 percent.

• In June 2021, the Oregon Department of Transportation has completed a Transportation Electrification Infrastructure Needs Analysis, which assesses current EV infrastructure and identifies gaps for additional infrastructure to meet the state targets.

• The *Every Mile Counts* initiative is led by ODOT, with collaborating agencies ODOE, DEQ, and the Department of Conservation and Land Development. The initiative seeks to identify and implement interagency work to help reduce GHG emissions in the transportation sector. Among other activities, the four agencies will look at opportunities to increase EV adoption in the light-duty as well as medium- and heavy-duty sectors, identify optimal vehicle use cases for different forms of alternative fuel vehicles in the medium- and heavy-duty sector, and identify opportunities reduce emissions in the freight sector. The four agencies are currently collaborating on developing key performance measures for this initiative.

• As a member of the International ZEV Alliance, Oregon has established a goal that 100 percent of new passenger vehicles in Oregon will be ZEVs by 2050.

• The Oregon Department of Administrative Services signed onto the West Coast Electric Fleets Pledge, which currently asks for 10 percent of eligible new vehicle procurements be EVs by 2020.

• As a member of the multi-state ZEV Task Force, Oregon has agreed to a collective 10-state goal of 3.3 million EVs operating on state participant roadways.

• Oregon signed an MOU with 14 other states and the District of Columbia to develop a multi-state action plan to identify barriers and propose solutions to support electric medium- and heavy-duty vehicles.

2. FACTORS AFFECTING RESULTS

**Background.** Overall, consumption of alternative fuels continues to rise. Biofuels, which are frequently blended with traditional petroleum-based fuels to meet federal and state standards, are widely available in the market. State and federal governments have deployed several programs to increase the use of alternative fuels and alternative fuel vehicles such as the federal and Oregon Renewable Fuel Standards, Clean Fuels Program, Oregon DEQ’s Clean Vehicle and Charge Ahead rebates, and other federal, state, and local incentives for alternative fuels and vehicles. The Oregon Department of Energy and Clean Cities Coalition work with fleets to provide technical assistance and outreach to fleets interested in adopting alternative fuel vehicles. Oregon state agencies, in collaboration with local governments and neighboring states, enable the development of EV charging infrastructure through projects like the West Coast Electric Highway, the EV Project, Electrify America, and utility transportation electrification projects.
Relatively low petroleum fuel prices have affected alternative fuel use over the last three years by spurring sales of less fuel-efficient vehicles and increasing overall vehicle miles travelled. Additionally, the availability of some alternative fuels is inconsistent. For example, Compressed Natural Gas is a fuel resource that can be used in medium- and heavy-duty trucks; however, there are only five public fueling stations located in Oregon, and there are no stations located in the Portland metropolitan areas. In 2020, DEQ’s Clean Fuels Program reported 2,592,564 diesel gas equivalents (dge) for bio-CNG. Additional fueling infrastructure would help to increase these numbers. In 2020, the Clean Fuels Program also reported 289,506 dge of bio-LNG, which represents the third straight year of decline for this fuel.

**How We Compare.** It is not possible to compare information on alternative fuel use in other states because there is no known published data of this kind. However, data are available to compare access to alternative fuel infrastructure. In 2020, Oregon ranked 15th in the nation, down from 14th in 2019, in the total number of alternative fueling stations reported in the U.S. Department of Energy’s Alternative Fuel Data Center locator. California ranks number one and the state of Washington ranks sixth. In 2015 Oregon was ranked seventh in this category, and Washington was ranked third. Oregon was an early adopter of EV charging infrastructure; however, more populous states are beginning to ramp up the installation of charging infrastructure. Oregon is ranked 27th in population and 29th in transportation sector energy consumption out of the 50 states.

**About the Data.** The data provide a snapshot of total alternative fuels measured in gasoline gallon equivalents consumed in the on-road transportation sector. The data are compiled from several sources. Gasoline data is gathered from the Oregon Department of Environmental Quality; diesel data is obtained from the US DOE’s Energy Information Administration and the Oregon Department of Transportation Fuel Group. Biodiesel information is collected from several sources, including the ODOT Fuels Group, fleet surveys, and US DOE EIA data. LPG, CNG, and LNG data is acquired through surveys of fuel suppliers and fleets. Electricity use is sourced from Tri-Met for MAX and Portland Streetcar, DEQ analyzed DMV data, public charging providers, and fleet surveys. Some fleet data are based on a calculation that uses an equation derived by US DOE that is applied to the number and types of vehicles in large fleets. This calculation has become an industry standard approach because many fleets consider fuel use proprietary.

Prior to the implementation of the Oregon Clean Fuels program, ODOE assessed liquid biofuels using the data resources described above. Since 2016, ODOE has incorporated the Clean Fuels program data for liquid biofuels. Because the sources of data have differences in how they are collected, the resulting trend line had an artificial jump between 2015 and 2016. ODOE continues to collect all data points but for clarity displays only data points since 2016.

This KPM identifies the percentage of alternative fuel types of the total fuel used in the on-highway transportation sector on a gasoline gallon equivalent basis. This makes it possible to compare one fuel to another in quantity. Electric motors are much more efficient than internal combustion engine vehicles, meaning electric motors use less energy to accomplish the same amount of work. In most cases when comparing fuels such as biodiesel to diesel, there is no impact to the data as the engine is the same in both cases and the amount of work accomplished is
similar. A conventional vehicle varies between zero percent, when idling, to somewhere in the low- to mid-30 percent efficiency when driving. By comparison, electric motors are in the mid-80 to mid-90 percent efficiency range. As a result, it requires less overall energy to drive the same distance in an electric vehicle than a non-electric vehicle. This higher efficiency is not accounted for in this KPM and would generally indicate a significantly lower energy consumption for electric vehicles.
Oregon Department of Energy

Vision: A safe, equitable, clean, and sustainable future.

<table>
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<th>KPM #7</th>
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1. HOW WE ARE DOING

   **Results.** Data is reported by calendar year – in 2020, there were 6,103 total home energy scores performed in Oregon. This is based on data from the U.S. Department of Energy Home Energy Score System.

   The COVID-19 pandemic slowed home energy scoring activity in Oregon. State-certified assessors were unable to enter homes safely for much of the year. Many assessor businesses, however, identified ways to conduct scores virtually. The state’s largest scoring program, in Portland, temporarily lifted score requirements because of the pandemic, causing many homes to be listed for sale without a score. In October 2020, Milwaukie (population 21,000) adopted a mandatory scoring policy for homes put on the market. Once the city’s program is established and begins full implementation, Milwaukie will contribute to the state’s overall total scores. ODOE expects to see activity from Milwaukie beginning January 2021. Hillsboro is the latest city in Oregon to adopt a mandatory scoring policy, which will begin September 1, 2021; ODOE expects Hillsboro to drive scoring activity further in 2022.

   **About the Target.** The agreed-upon target with the Legislative Fiscal Office is 7,500 scores per year. This may be adjusted over time as the program continues to develop.

2. FACTORS AFFECTING RESULTS

   **Background.** The State of Oregon, through the Oregon Department of Energy, has built a statewide framework for residential home energy scoring activity. This framework provides regulations that prescribe necessary credentials for a professional assessor, outlines what must be included
in a scoring report, and provides the calculating engine to determine a score. This framework has been essential for each Oregon city – it builds assurances that scoring activity is well supported, accurate, and consistent across the state. To ensure successful interest and uptake, the framework was also developed with the underlying premise that scores and scorecards would be produced at low cost ($125-$250), would include useful consumer information, and would be easy to understand. Comparable programs across the country have a higher cost of $500-$800 per score and include more detailed information than consumers may need.

**Outreach and Awareness:** ODOE began working directly with cities to assist in the advancement of home scoring policies in 2016. In 2018, Oregon’s largest city, Portland, began the nation’s first large-city policy that requires all homes listed for sale include a home energy score produced by the state-approved scoring system. In the two years following, more than 15,000 scores were conducted. Those families now have valuable information about their homes’ energy use and can understand how even small improvements can make a big difference in energy savings.

Eugene Water and Electric Board was the state’s first fully approved scoring program. The program is voluntary to EWEB customers and focused on rental property. To date, EWEB has scored an estimated 200 rental units, with the majority occupied by students attending the University of Oregon.

While mandatory scoring programs drive most of the scores in Oregon, there is potential for additional scores to be conducted by voluntary consumer request. However, data indicate that:

- Consumers may be unaware or unmotivated to determine the efficiency of their home.
- Consumers may be unaware of the potential value and future cost savings in making energy efficiency improvements.
- Mandatory policies can drive energy scoring uptake and increase consumer understanding of the value of energy efficiency benefits.

To drive the expansion and activity of home scoring, ODOE has focused attention on assisting city decision-makers, and shares information about the benefits of energy scoring to improve their energy and climate planning effectiveness. By engaging with cities and providing technical and support resources, ODOE works to overcome significant barriers to widespread adoption of home energy scoring policies. Barriers include:

- City decision-makers may be unaware of energy scoring as an effective option to reduce energy use and consumer utility costs as part of their energy and climate action planning.
- Limited city staff and resources available to develop an energy scoring policy.
- Limited city staff and resources to support on-going home energy scoring program implementation activities.
- Continued concerns related to the COVID-19 pandemic may affect the ability to conduct on-site inspections for scoring purposes.

Stakeholders may raise concerns about the value of the home energy scores compared to the potential costs of implementing a program, so ODOE staff are available to provide expertise and guidance about the benefits of scoring – from energy cost savings to potential greenhouse gas emissions.
reductions. The response to ODOE’s engagement in home energy scoring has been significant and has led to on-going discussions and technical assistance with 10 cities. These cities range in population from 5,000 (Talent) to 657,100 (Portland). ODOE has responded to multiple city requests for assistance in developing home scoring policies as part of their energy and climate action planning.

**How We Compare.** Oregon leads the nation in residential scoring activity, as reported by the USDOE Home Energy Score Program. Within the USDOE HES program, there have been 150,000 scores conducted since 2016. Oregon has contributed 26,000 scores, or 17 percent of the total between 2016 and the time of this report publication. Many states have scoring systems other than the USDOE HES, which are voluntary and often coordinated and funded by local utility programs. Identifying these voluntary programs is difficult as they are not reported into a national database.

While ODOE continues to seek out Oregon jurisdictions with interest in home scoring policies, some cities in other states are also contacting ODOE for lessons learned in rolling out policies and implementation steps. For many city staff and councils, resistance to mandatory policies continues to be seen as the number one barrier to forward progress.

Oregon’s home energy scoring program has been successful thanks to efforts around messaging the benefits of home energy scoring. At its foundation, home energy scoring is a consumer protection effort, helping people understand energy characteristics that affect home operational costs. Some cities only see the benefits of scoring homes to reduce energy consumption and greenhouse gas emissions. However, what seems to resonate with city decision-makers most is the ability to provide clear energy information to constituents to help them in their homebuying decisions. With a home score in hand, a homebuyer is better equipped to make an informed decision and plan steps to improve the performance of the home they select.

**Recognition:** ODOE received an Innovation Award in 2019 from the USDOE “for launching a replicable, statewide Home Energy Score program that coordinates local and regional programs, minimizes program management burdens, and streamlines Home Energy Score implementation throughout the state.”

**About the Data.** Data is reported by calendar year, so ODOE is reporting for calendar year 2020. Data is produced through the U.S. Department of Energy Home Energy Score System.