



2021-2022 STATE ENERGY EFFICIENT DESIGN BIENNIAL REPORT

Submitted to the
OREGON LEGISLATURE

by the
**OREGON
DEPARTMENT OF
ENERGY**

January 2023



**OREGON
DEPARTMENT OF
ENERGY**

EXECUTIVE SUMMARY

In 1991, the Oregon Department of Energy established the State Energy Efficient Design (SEED) program as a result of ORS 276.900-915.

Adopted legislation states: “It is the policy of the State of Oregon that facilities to be constructed or purchased by authorized state agencies be designed, constructed, renovated and operated so as to minimize the use of energy resources and to serve as models of energy conservation.”

In January 2001, the Energy Conservation Initiative was added to the statute, requiring all state agency facilities that are newly constructed or substantially remodeled to perform better than the energy conservation provisions of the Oregon state building code by a minimum of 20 percent. The SEED program divides new construction and renovation projects into two classes depending on their size. Class 1 buildings are 10,000 or more square feet, and Class 2 buildings are less than 10,000 square feet. Regardless of building class, state agencies must incorporate cost-effective energy conservation measures into building projects.

Requirements for state agencies to reduce energy consumption in existing state-owned buildings was added to ORS 276.900-915 in 2001 and agencies were provided additional direction by Governor Brown’s Executive Order 17-20.¹ Agencies are required to report energy use to ODOE. ODOE collaborates with state agencies to support uploading and reporting facility energy use, establishing performance benchmarks for their buildings, tracking progress, and providing technical guidance to achieve those goals. The result of these efforts includes more detailed energy consumption reporting and the establishment of facility-specific energy performance targets based on national standards.

EO 17-20 also requires that, beginning for all projects permitted after January 1, 2022, any new state-owned buildings used primarily for office and other commercial workspace are designed to be able to operate as carbon-neutral buildings. DAS, ODOE, and DEQ collaborated to issue a Guidance Document² for state agencies to reference when undertaking projects subject to these requirements, and this requirement is being incorporated into the general SEED process for high-efficiency design. There are no projects that have completed design or construction under this requirement since it recently took effect in early 2022, but projects to which this will apply are beginning early planning stages and will be included in future SEED reports.

SEED PROGRAM RESULTS

Completed SEED Construction Projects:

- **195** state building projects completed over the course of the program
- **One** SEED new construction and **two** SEED renovation projects completed construction in 2021-2022

State of Oregon SEED Program Investment since 2003:

- **\$30.3 million** invested in SEED energy conservation improvements.
- **\$5.7 million** in estimated annual energy savings

¹ https://www.oregon.gov/gov/Documents/executive_orders/eo_17-20.pdf

² <https://www.oregon.gov/energy/energy-oregon/Documents/EO17-20-CNGuidance.pdf>

- **\$66 million** in program lifetime savings

2021- 2022 SEED Program completed construction projects:

- **\$54.5 million** is the total construction cost of the two completed projects in 2021- 2022
- **115,000** total square footage of facilities
- **\$28,900** estimated incremental cost of SEED energy conservation
- **\$19,725** annual estimated energy savings

Existing Building SEED Program Energy Use Tracking:

- **21** participating state agencies
- **279** state owned buildings participating in 2021
- **159** state owned buildings met performance targets in 2021
- **18.3** million square feet of state-owned facilities participating
- **1,275,336** million Btu of total energy used by participating facilities

Oregon State agencies focus on improving the performance and comfort of their buildings. Annually, agencies share with ODOE cost effective building improvements invested in during the previous year, demonstrating progress to performance goals. Energy use across Oregon’s state-owned facility portfolio has fluctuated year to year as the state adds and sells facilities or the use of facilities changes.

ABOUT THE REPORT

The first section of this report covers the two Class 1 buildings that completed renovation construction during calendar years 2021 and 2022.

The second part of the report describes state agency energy use benchmarking, the platform selected for reporting energy use data and collected results from 2016-2021. Tracking energy use by buildings helps agencies identify tangible opportunities for energy savings and set reasonable benchmarking goals for each facility based on the assets of the facility and how it is used. ODOE actively supports reduced agency energy consumption by analyzing facility energy use data and identifying opportunities for energy and cost savings. Tables and graphs included in the report show energy use intensity for each agency’s buildings over time and how they perform in comparison to performance target values.

This project is successful due to the diligent reporting of energy use and investment in efficiency by Oregon state agencies.

The complete 2022 State Energy Efficient Design (SEED) report is available online:

<https://www.oregon.gov/energy/Data-and-Reports/Pages/Reports-to-the-Legislature.aspx>

TABLE OF CONTENTS

EXECUTIVE SUMMARY2

SECTION 1: NEW CONSTRUCTION AND REMODELS5

 Process5

 Cost-Effective Investment5

 Participating Buildings.....5

 Program Savings to Date6

 Biennium Savings Summary6

 Post-Occupancy Metering Results6

 SEED Project Highlights7

SECTION 2: ENERGY CONSERVATION IN EXISTING STATE BUILDINGS12

 History12

 Process12

 Benchmarking12

 Energy Use Reporting.....13

SECTION 3: AGENCY STATUS REPORTS15

 Oregon Department of Administrative Services.....15

 Oregon Department of Agriculture21

 Oregon Department of Aviation22

 Oregon Department of Corrections.....23

 Department of Employment.....26

 Oregon Department of Fish and Wildlife.....27

 Department of Forestry30

 Oregon Health Authority36

 Department of Legislative Services36

 Oregon Liquor and Cannabis Commission.....37

 Oregon Lottery.....38

 Oregon Military Department39

 Oregon Parks and Recreation Department46

 Oregon Public Employee Retirement System.....47

 Oregon Department of Public Safety Standards and Training.....48

 Oregon School for the Deaf49

 Oregon Department of State Lands.....50

 Oregon State Police51

 Oregon Department of Transportation53

 Oregon Department of Veterans’ Affairs62

 Oregon Youth Authority64

SECTION 1: NEW CONSTRUCTION AND REMODELS

Process

The SEED process calls for state agencies to work with ODOE in the initial design of their building projects so cost-effective energy conservation measures are planned for and incorporated into building designs. If a state agency is planning a new construction or renovation project, they are responsible for ensuring compliance with SEED requirements. Here are the initial steps:

1. Determine if the project is subject to SEED requirements. New construction or renovation projects that add to, alter, or repair energy systems accounting for 50 percent or more of the facility's total energy use are subject to SEED requirements.
2. Determine if the project is a Class 1 or Class 2 building. In general, buildings 10,000 square feet or more are Class 1, and buildings smaller than 10,000 square feet are usually Class 2. See the full program guidelines for more information.
3. Notify the Oregon Department of Energy.

Once ODOE staff are notified, they guide the state agency through the initial project planning process, facilitating meetings, analyzing potential energy conservation measures, and working with the project management team. Once the project is complete, ODOE works with the project team to implement and evaluate their verification plan, confirming energy savings are achieved in the facility.

Cost-Effective Investment

There are a variety of energy conservation measures (ECMs) that may be implemented in buildings. ODOE supports state agencies in determining which measures make the most sense in how the building will be used and the return on the investment. Cost-effectiveness is determined by conducting an analysis of the “benefit-to-cost ratio” (BCR) and the “net present value” (NPV) over the life of a measure. If the BCR exceeds 1.0 and NPV is greater than 0, then a project is cost-effective. Depending upon the size and complexity of the project, SEED program staff provide technical consulting services to the state agency throughout the course of a project. SEED staff work closely with state agencies and their building design teams to develop a list of energy conservation measures for consideration for each project. ECMs can be either baseline measures or analyzed measures. Baseline ECMs are those that are already known to be generally cost-effective, due to past analysis and experience with the technologies. Baseline ECMs are incorporated into the proposed system design and do not receive a detailed cost-effectiveness analysis. Analyzed ECMs are evaluated for cost-effectiveness based on a life-cycle cost analysis. An ECM package is developed for each project, resulting in a building design that will perform better than energy code levels by 20 percent or more.

Participating Buildings

The SEED program divides buildings into two classes depending upon their size. Class 1 buildings are 10,000 or more square feet and Class 2 buildings are less than 10,000 square feet. Regardless of building class, state agencies must incorporate cost-effective ECMs into building projects.

For Class 1 buildings, ODOE staff collaborate with agency design teams to develop an ECM package for each building project, provide agencies with technical advice, and monitor the Class 1 buildings once it is occupied. Working together, SEED program staff and agency design teams ensure all cost-effective

STATE ENERGY EFFICIENT DESIGN PROGRAM – BIENNIAL REPORT

energy conservation measures are included in each building’s design and buildings perform better than the energy efficiency provisions of the Oregon state building code by 20 percent or more.

For Class 2 projects, or those less than 10,000 square feet, agencies are responsible for administering their own review and implementation of energy conservation measures. ODOE SEED staff is available to provide support as needed.

This report summarizes the three Class 1 buildings that completed construction during calendar years 2021-2022.

Program Savings to Date

Over the course of the SEED program, 195 state building projects have been completed. Three SEED projects completed construction in 2021-2022.

Since 2003, the total cost for completed state building construction projects exceeds \$2 billion, with nearly \$30.3 million invested in energy conservation improvements. Energy conservation investments are estimated to have saved more than \$5.7 million in annual energy costs and almost \$66 million in program lifetime savings.

Biennium Savings Summary

The following table summarizes SEED new construction and renovation projects completed in the 2021-2022 calendar years, including projected energy savings resulting from the SEED analysis and process. There are currently a variety of SEED projects in planning and development stages, and three state agency projects by the Oregon Department of Transportation, Oregon Judicial Department, and Oregon Military Department completed construction in the 2021-2022 biennium. The SEED program enabled annual savings of nearly \$20,000 per year from these two new buildings alone.

Project	Construction Budget	Project Square Feet	Project Type	Annual Savings		
				Total Million Btu	Annual \$ Savings	% Better Than Code
ODOT Meacham Maintenance Station	\$26,000,000	37,500	New Construction	520.1	\$7,393	24.6%
Supreme Court Building Interior Modernization	\$25,000,000	56,000	Renovation	573.5	\$7,493	24.8%
OMD Grants Pass Armory Renovation	\$3,500,000	21,667	Renovation	750.0	\$4,839	48.9%
Total	\$54,500,000	115,167	--	1,844	\$19,725	--

Post-Occupancy Metering Results

After a SEED project is completed, post-occupancy energy use is tracked through the existing buildings portion of the SEED program to help ensure the facility is meeting its energy use targets. Buildings are targeted to perform 20 percent or better than the code baseline. Performance targets for SEED new buildings and renovations are established through comprehensive energy modeling of the building at the design stage. Energy use is commonly expressed as “Energy Use Intensity” or EUI, which is calculated by dividing the total annual energy consumed (in units of thousand Btu, or kBtu) by the gross conditioned floor area (in units of square feet, or sf) of the building.

Post-occupancy energy data is provided in the following table for three Oregon Military Department renovation projects that completed construction in previous SEED cycles. These values represent

energy consumption as reported by the agency to ODOE. Most agency data is reported through either calendar years 2020 or 2021, although ODOE and state agencies recognize that energy data during these years may be atypical due to the coronavirus pandemic. ODOE will continue to work with state agencies to track and analyze energy data during transitioning occupancy conditions.

Project	Energy Use Intensity, EUI (kBtu/sq ft/yr)					Actual 2020	Actual 2021
	Modeled Code Baseline	Modeled SEED Building Baseline	Actual 2017	Actual 2018	Actual 2019		
OMD Maison Bldg	33.8	25.7	63	41.7	40	37.2	37.8
OMD RA Miller Readiness Center-Forest Grove	39.6	30.4	29.9	34.9	34	31.1	32.7
OMD Youth Challenge	68.0	55.1	66.7	52.4	54.9	44.4	--

The Oregon Military Department’s renovation of the Maison Readiness Center in Portland was completed in the 2017-2018 biennium. Post-renovation, the EUI of this facility has shown a steady decrease. The EUI remains greater than the predicted code and SEED building level targets as predicted in the SEED energy modeling analysis, although these performance levels can be difficult to calibrate for existing buildings and renovations that only affect portions of a facility. Most importantly, the energy consumption of this facility has decreased post-renovation, and ODOE will continue to work with OMD track energy consumption.

OMD’s renovation of the Forest Grove Armory (RA Miller Readiness Center) in Forest Grove was also completed in the 2017-2018 calendar year biennium. This facility’s energy performance has been in line with the predicted energy consumption from the SEED analysis and has performed consistently better than the modeled “code-level” building.

The Oregon Military Department’s renovation of the Youth Challenge Project in Bend was completed in 2018. This facility’s energy consumption has decreased post-renovation and EUI performance has been in-line or better than the SEED high-performance energy targets.

SEED Project Highlights

Three SEED projects completed construction in 2021-2022.

1. Supreme Court Building Interior Modernization

Oregon Judicial Department
Salem, Oregon

The Oregon Supreme Court building was constructed in 1914 and is the oldest continuously operating government building on the Capitol Mall. The Oregon Judicial Department began building renovations in November 2019 to preserve and protect the historic structure and improve safety, function, efficiency, and access for years to come. The project includes earthquake reinforcement with base isolation technology and upgrades to heating, cooling, electrical, technology, plumbing systems, and accessibility to meet modern standards.³



³<https://www.courts.oregon.gov/courts/appellate/supreme/Pages/building.aspx#:~:text=The%20interior%20modernization%20will%20not,cost%20is%20approximately%20%2455%20million>

Energy conservation features include:

- High-efficiency boilers
- High-efficiency lighting and lighting controls
- Energy recovery air handlers
- Demand-controlled ventilation
- Night-flush cooling

Air Handlers



Boilers



Lighting Controls



2. Grants Pass Armory Renovation

Oregon Military Department
Grants Pass, Oregon

The Grants Pass Armory and Readiness Center provides administrative, training, classroom, and office spaces for the National Guard. It was originally built in 1972, and this recent renovation project included updates to the envelope, mechanical, electrical, plumbing, and structural systems in the building.

Energy conservation features include:

- High-performance windows
- Increased roof insulation
- High-efficiency lighting and lighting controls
- High-efficiency heat pump chiller
- High-efficiency condensing hydronic boiler (for secondary heating)
- Condensing, high efficiency water heater
- Demand controlled ventilation and optimized ventilation
- Dedicated outside air system
- Solar photovoltaic panels

Solar PV Arrays



High Efficiency Water Heaters



Boilers



3. Meacham Maintenance Station

Oregon Department of Transportation
Meacham, Oregon

This is a new facility built for fleet storage and maintenance with a small administrative area. The building contains various space types, including offices, storage, training and crew rooms, showers, mechanical and electrical spaces, and several large bay areas for holding, maintaining, and dispatching road maintenance equipment and vehicles.

Energy conservation features include:

- Increased roof insulation
- High-efficiency interior and exterior lighting and lighting controls
- High-efficiency space and water heating equipment

SECTION 2: ENERGY CONSERVATION IN EXISTING STATE BUILDINGS

History

In the summer of 2000, wholesale electricity prices soared to unprecedented levels as a result of the restructuring of California’s electric industry. Oregon and other western states were equally affected due to the interconnected nature of electricity generation and distribution throughout the region. Governor Kitzhaber, by way of his Energy Conservation Initiative, directed all of Oregon’s state agencies to improve energy conservation efforts in their facilities. The goal was to reduce state agencies’ energy consumption by 10 percent below levels measured in 2000.

ORS 276.915 was amended in 2001 to make the 10 percent savings a requirement for all state-owned buildings effective June 30, 2003. The SEED statute was amended again in 2007 to reset the savings goal to 20 percent by June 30, 2015. Agencies collectively met the 20 percent energy use reduction requirement two years before the 2015 deadline.

Process

ORS 276.900-915 directs state agencies to report energy use in state owned facilities to Oregon Department of Energy (ODOE). Agencies report calendar year electricity and fossil fuel use for their facilities 5,000 square feet or greater and using 10 kBtu/sf/yr or more. ODOE supports agencies by:

- Tracking energy use.
- Collaborating with agencies to establish standard or calculated benchmarks.
- Delivering annual agency energy use reports of facility energy use over time.
- Providing auditing and technical support.

Benchmarking

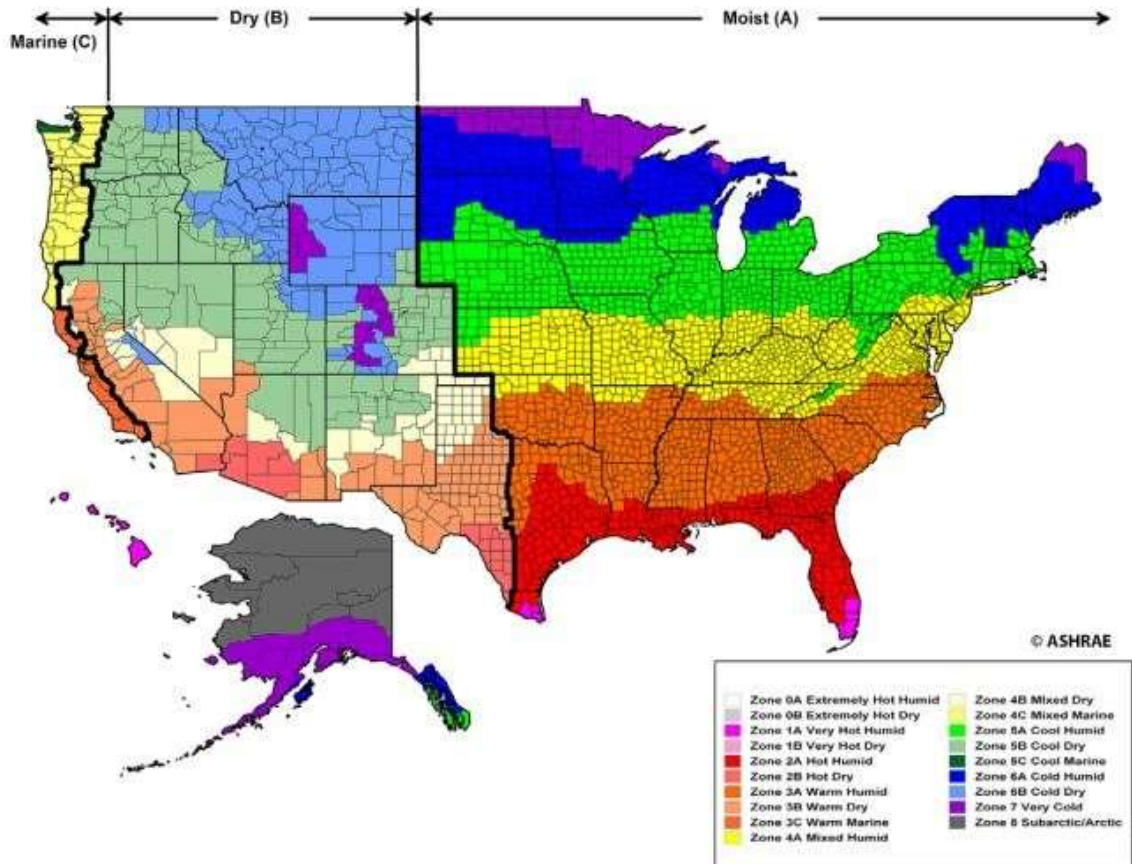
The initial existing state building energy reduction goal of a 20 percent decrease was met in 2013. No new energy use reduction requirements for state agencies have been established.

Executive Order 17-20, issued in November 2017, states that ODOE will work with all agencies to benchmark and track energy use in state-owned facilities. EO 17-20 reinforced SEED program objectives, supporting state agencies in adopting Energy Use Intensity (EUI) targets for their buildings and tracking progress to those targets. EUI is energy use per square foot per year, which is calculated by dividing the total annual energy consumed (in units of thousand Btu, or kBtu) by the gross floor area (in units of square feet) of the building. EUI for each facility can then be compared to average EUIs for similar building types (i.e., office, hospital, laboratory, etc.) where 2015, or the first full year of tracked energy use, is used to determine the baseline energy use intensity (EUI) for a facility, with subsequent years through 2019 now available. Agencies with buildings exceeding target EUIs are directed to evaluate potential retrofits to increase the efficiency of their buildings, and ODOE is directed to guide agencies to implement tactical and achievable energy use reductions.

The charts in the following section summarize energy use in the buildings belonging to each agency. The intent is to “benchmark” agency buildings, comparing their annual EUI to similar buildings, national targets, and usage over time. Performance target EUIs are based on the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 100-2015 for climate zones 4C (western Oregon) and 5B (Eastern Oregon). Please see the map below with the varying national climate

zones. ASHRAE is an international organization promoting sustainable technology for the built environment. ASHRAE Standard 100-2015 is a data-driven, internationally recognized standard for improving energy conservation in existing buildings, providing a comprehensive approach for addressing energy conservation in a quantitative, objective manner. This standard’s targets represent high performing buildings for each building category and region and is represented by the black horizontal lines in the building energy use graphs in this report.

**INFORMATIVE ANNEX G
CLIMATE ZONES**



Not all building types have ASHRAE targets, however, and Oregon Department of Energy staff worked with each agency to establish calculated high-performance targets for those buildings based on their benchmark year of 2015, or whenever they first reported annual energy use.

Energy Use Reporting

Oregon state agencies began reporting building-level energy use of state-owned facilities to the ENERGY STAR Portfolio Manager database on January 1, 2015 per SEED rules in OAR 330-130- 0080.

The data presented in this report represents five years of energy consumption data from 2016- 2021. Agency 2022 building energy use data is due to ODOE in 2023. Therefore, the energy use presented in this report does not reflect the effects of the COVID-19 pandemic, which dramatically changed the energy use of many of Oregon buildings.

With a dataset of five years available, ODOE may identify and evaluate specific building energy consumption trends and work with agencies to better understand them. The following building energy use charts demonstrate some individual facility energy EUIs are decreasing, while some have increased.

This can be due to changes in operational profiles (such as operating hours or occupancy), occupant behavior, equipment changes, or external factors such as weather. The data presented in the graphs below represent actual energy consumption and has not been normalized for variables such as weather.

Upon issuing annual energy use report cards to each agency, ODOE offers assistance in performing a more in-depth analysis to understand building energy performance. As more data is collected and trends are established, ODOE will perform more in-depth analysis on specific buildings as appropriate with agencies to help prioritize opportunities for energy and cost savings.

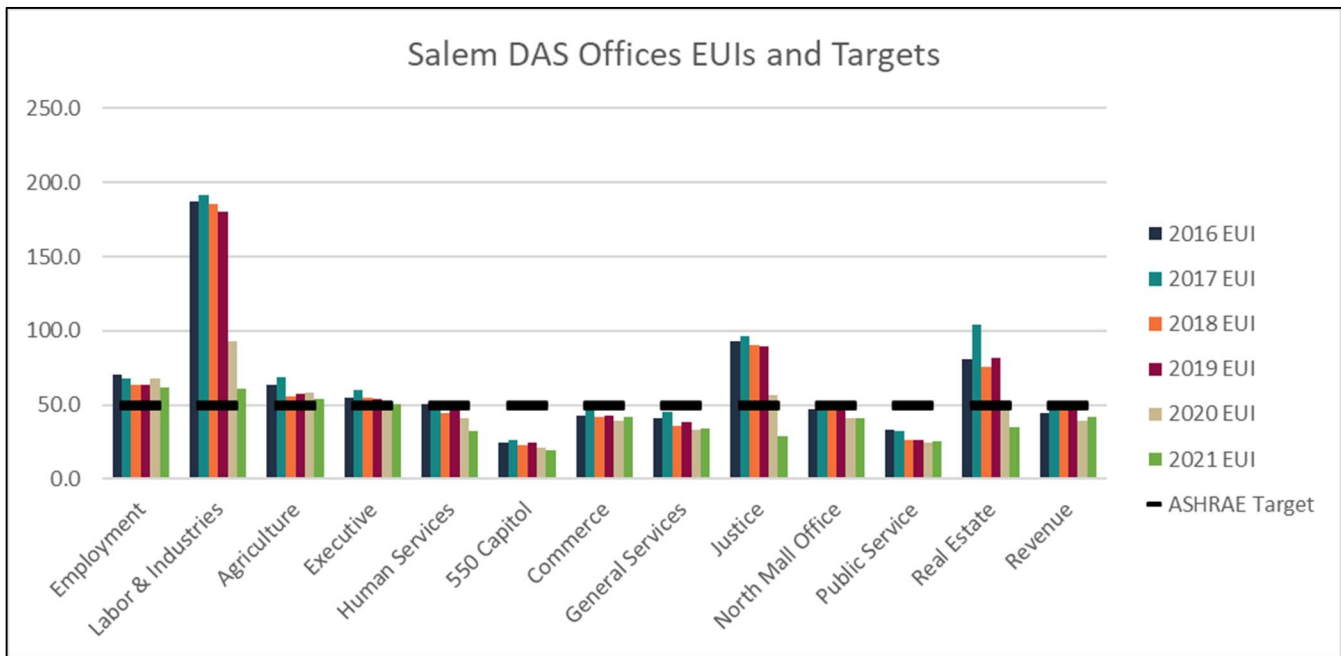
SECTION 3: AGENCY STATUS REPORTS

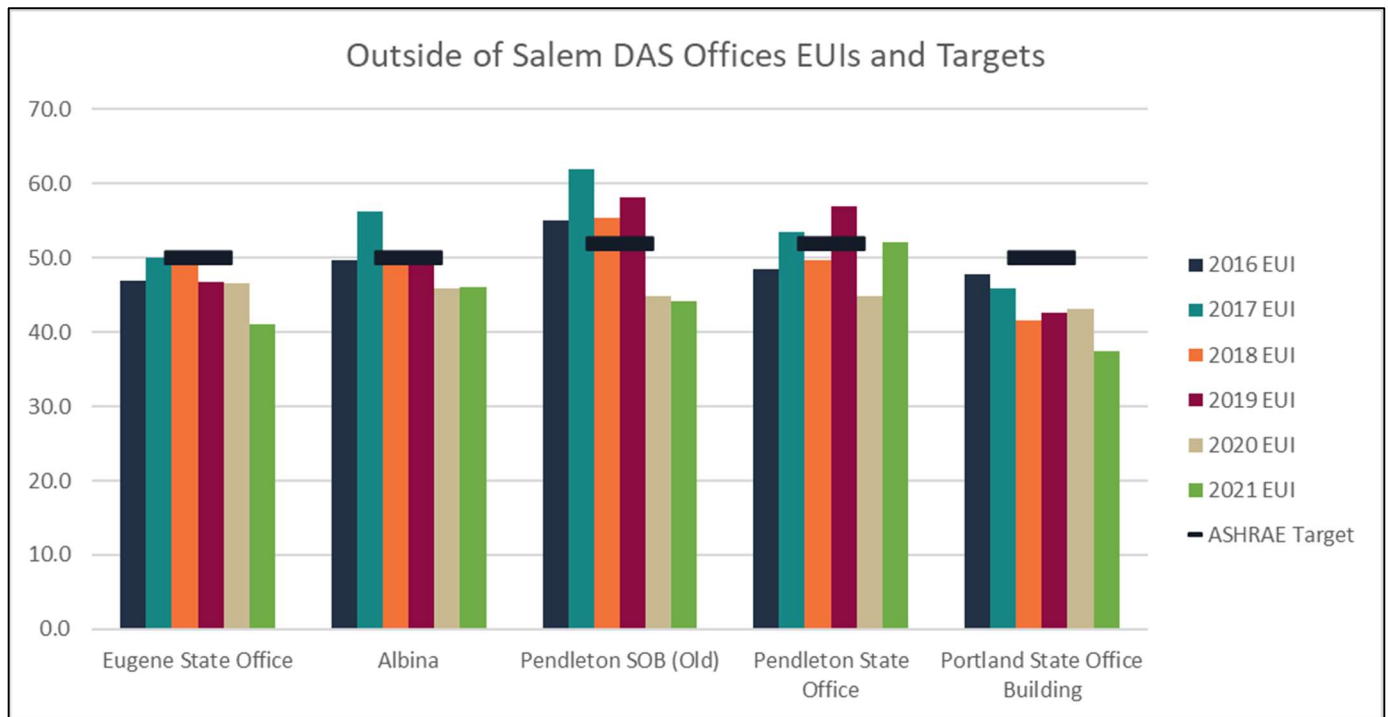
The information below is a summary of data recorded in the ENERGY STAR Portfolio Manager database by state agencies from 2016-2021. Annual building energy use for each facility is tracked and summarized in tables and graphs below. Graphs show the annual building EUI in comparison to previous years and to national targets for similar high-performance buildings. Additional information about the buildings, agency activities, and future plans is provided to ODOE by individual agencies.

Oregon Department of Administrative Services

- Most facility operating hours and comfort expectations remained the same for essential workers.
- DAS continued to participate in Energy Trust of Oregon’s Strategic Energy Management (SEM) Program with 15 buildings enrolled.
 - DAS Earned Energy Trust’s Tenacity Award for completing 42 energy saving actions and 5 capital projects saving energy across the agency’s enrolled SEM portfolio.
 - DAS staff continue to incorporate lessons learned from the SEM Program in energy savings upgrades.
- DAS has a designated Energy Analyst developing and guiding the Energy Management Action Plans.

DAS Office Buildings





Summary of 2021 Energy Use and EUIs

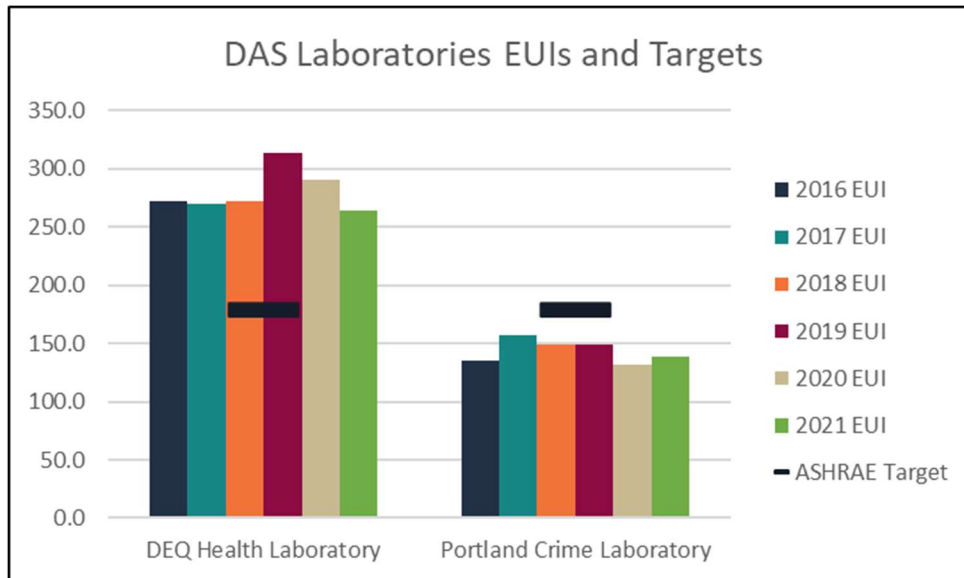
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBTu/sf/yr (black lines).
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 5B is 52 kBTu/sf/yr (black lines).
- In 2021, energy use in many DAS office buildings declined slightly as a result of occupancy changes due to the second year of the pandemic. Most of the buildings saw a decline in energy use as a result of pandemic-related behavior changes. The Real Estate and Labor & Industries buildings had the greatest declines in energy use.
- Employment Building, energy use was above target due to increased operating hours because of pandemic-driven issues.
- Agriculture Building, energy use was slightly above target due largely to increased hours because of pandemic-driven issues.
- 550 Capitol is the building that houses ODOE. The building's efficient design and ODOE's energy efficiency efforts have made this building stand out among DAS-owned properties for its efficiency.

Efforts to Address Future Energy Use

- In the Labor and Industries building DAS identified 14 energy actions or controls changes that will result in energy savings.
- Executive Building, DAS replaced the chiller with a Magnetic Bearing Water Cooled Chiller and a refurbished cooling tower from the Data Center remodel.
- Portland State Office Building, DAS identified three energy actions including a chiller tune-up that reduced energy consumption.
- Human Services Building, DAS installed a new LED lighting package.
- Human Services Building, DAS replaced vane axial fan hubs with fixed pitch fan blades and variable frequency drive controllers on four air handling units for improved air flow control and energy savings.

- Revenue, DAS installed a new more efficient LED lighting package.
- 550 Capital, DAS staff programmed time delays in electric heat fan powered boxes resulting in energy savings.
- Justice Building, a complete window renovation is scheduled for 2022. When completed, the window project should show an energy savings.

DAS Laboratories



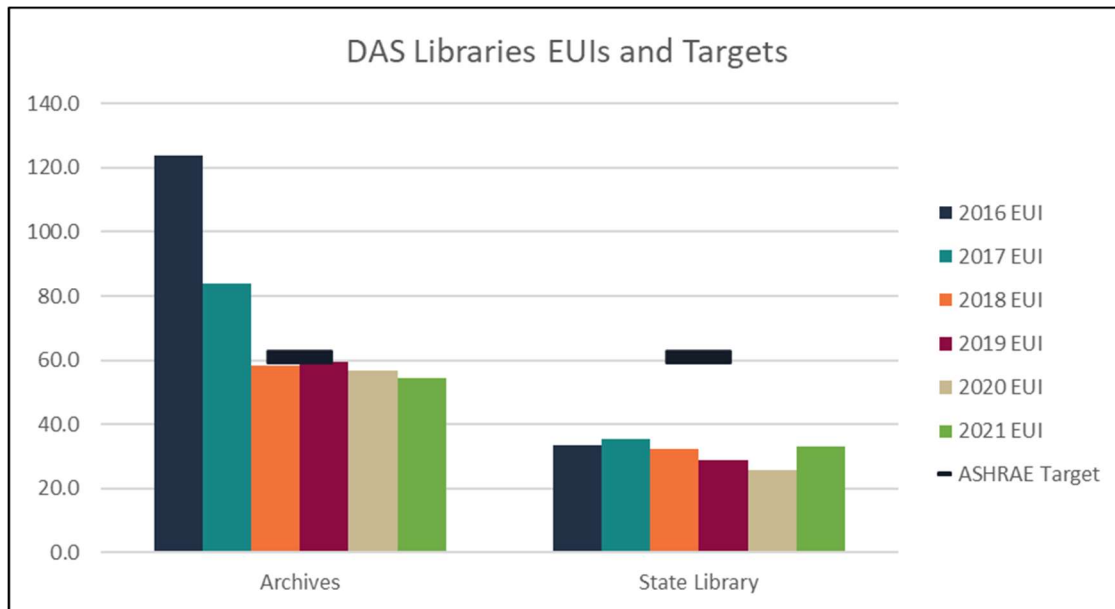
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for all laboratories in Zone 4C is 179 kBtu/sf/yr. ASHRAE does not distinguish the energy use of different types of laboratories.
- The DEQ Health Lab is over target, this facility was originally an office building that was converted to a lab, as a result there are system inefficiencies that would require a major retrofit of the building to address.
- DEQ Health Laboratory operated under increased staff and staff hours to meet increased lab use and testing needs responding to the Covid-19 pandemic.

Efforts to Address Future Energy Use

- No immediate actions identified. The agency will continue to monitor energy use and identify opportunities for efficiency.

DAS Libraries



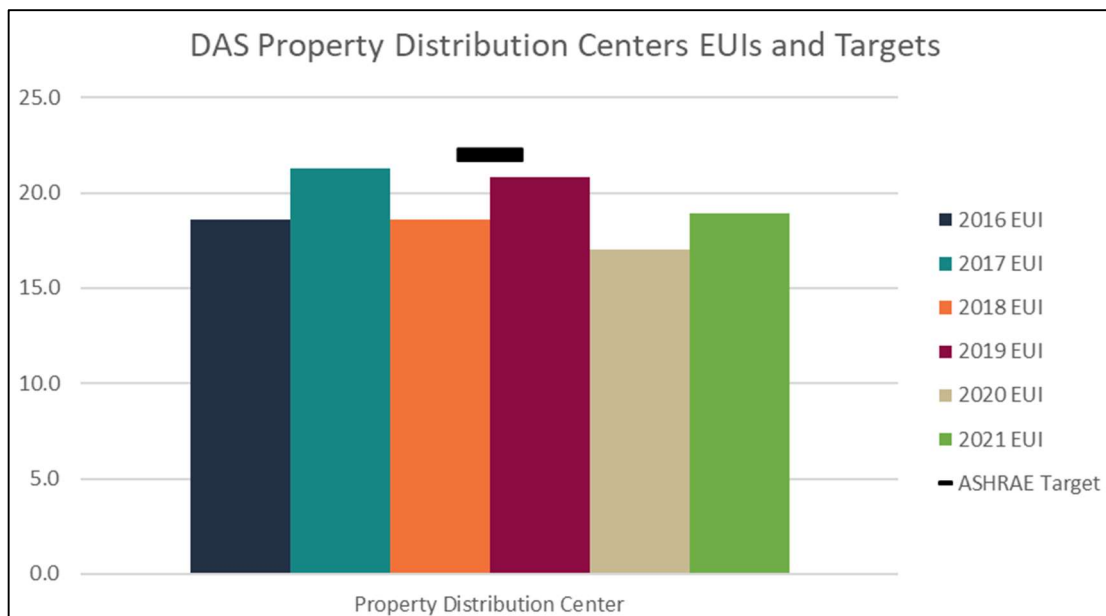
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Libraries in Climate Zone 4C is 61 kBtu/sf/yr.
- State Library received an LED lighting package.
- State Library received a new air-cooled magnetic bearing chiller.
- State Library received higher efficient boiler isolation valves to increase boiler efficiency.

Efforts to Address Future Energy Use

- No immediate actions identified. The agency will continue to monitor energy use and identify opportunities for efficiency.

DAS Property Distribution Center



Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Distribution Centers in climate zone 4C is 22 kBtu/sf/yr.

Efforts to Address Future Energy Use

- No immediate actions identified. The agency will continue to monitor energy use and identify opportunities for efficiency.

DAS Non-Refrigerated Warehouse**Summary of 2021 Energy Use and EUIs**

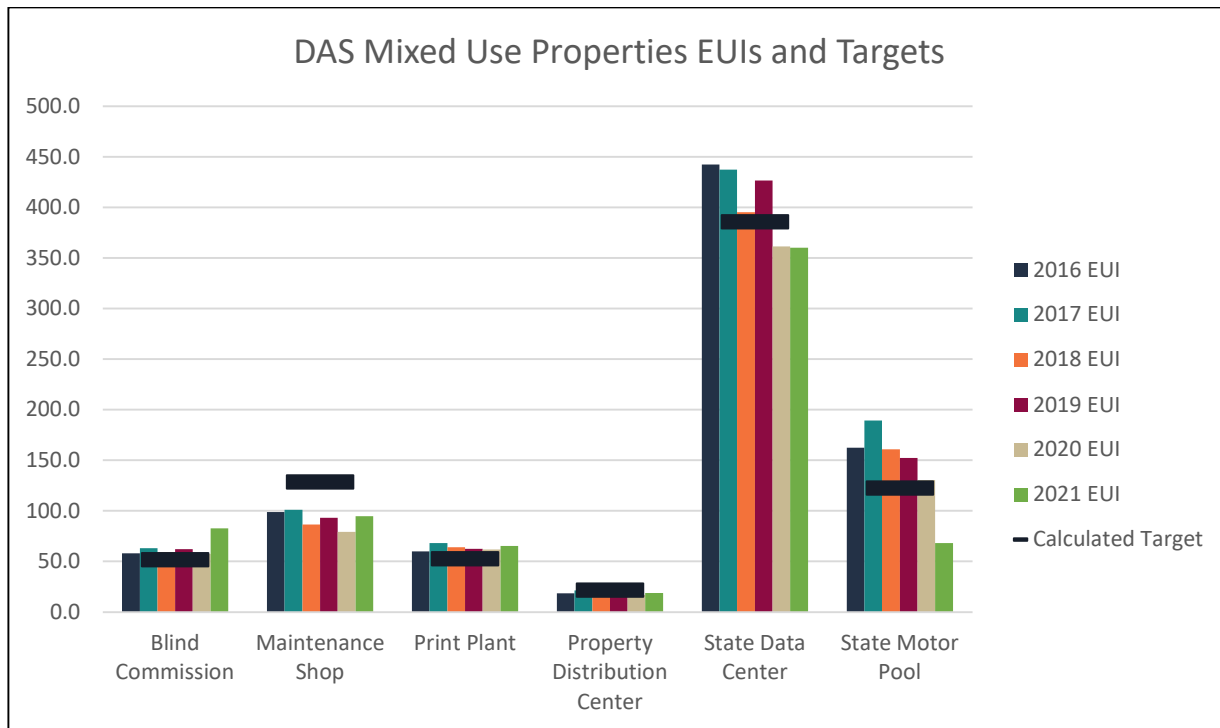
- North Valley Complex, DAS acquired the building in 2019.
- Department of Human Services utilized the building in 2020 and 2021 as a warehouse for COVID PPE storage.
- North Valley Complex is starting a major renovation in 2022.
- Major renovations make the previous EUI target inaccurate and thus it has been excluded from this report. A new target will be calculated upon completion of the renovations and included in future reports.

Efforts to Address Future Energy Use

The North Valley Complex building in Wilsonville, Oregon, will house offices and laboratories for a variety of Oregon governmental agencies. The building has been modeled in the IES 2019 Virtual Environment, with simulations to analyze the energy performance of the proposed design both with and without additional energy conservation measures, as well as a design following the guidelines of SEED Appendix L and meeting the applicable energy code, ASHRAE Standard 90.1-2016. The simulation summary full proposed SEED EUI is 68.

The remodel is focused on creating a high tech/sustainable building, which may include but is not limited to the following:

- Department of Agriculture Laboratories:
 - Animal Health Lab
 - Plant Health Lab
 - Insect Pest Prevention Management Lab
 - Regulatory Services Lab Sections
- Occupational Safety and Health Administration:
 - Hazardous Substance Analyses Lab, analytical field equipment maintenance & calibrations
- Oregon State Police:
 - Long Term Evidence Storage utilizing loading docks and high pile storage with racking systems.
- Department of Administrative Services:
 - Portland Operations and Maintenance Support Shop
 - Emergency Storage - Long Term Storage of State PPE utilizing loading docks and high pile storage with racking systems.
- The modeled EUI is 68.

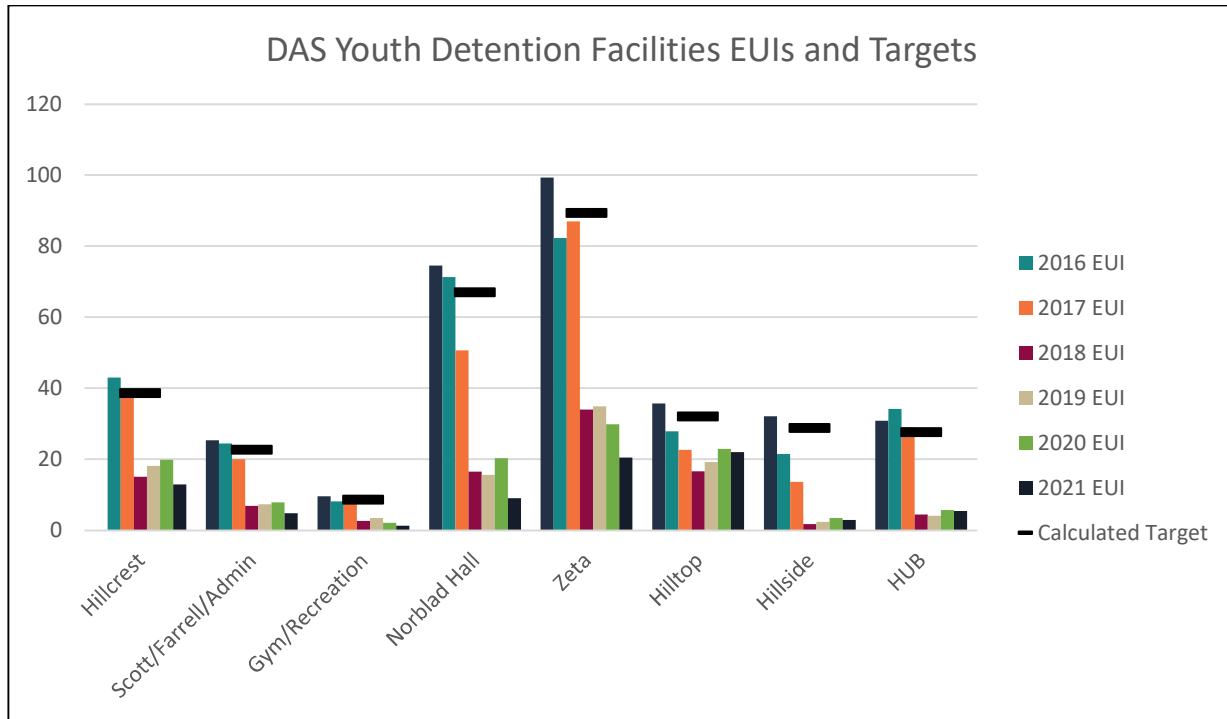
DAS Properties Without ASHRAE EUI Targets**Summary of 2021 Energy Use and EIUs**

- These DAS properties have calculated EUI targets established based on their baseline use. ASHRAE Standard 100 targets are not available.
- ODOE collaborated with DAS to create a Target EUI of a 10 percent reduction from the 2015 baseline year use by 2022 (black lines). All of these properties are meeting or close to meeting their performance targets.
- The DAS Maintenance Shop is 25% office space, 25% maintenance shops and 50% warehouse.
- The DAS Print Plant operates 24/7 and has both printing shop space and office space.

Efforts to Address Future Energy Use

- The State Data Center usage dropped (19% in 2020 and 1% in 2021).
 - The chillers were replaced with three MULTISTACK MagLev water-cooled Chillers.
 - One air cooled scroll chiller was added to the admin/office side.
 - Six new air handlers were added to the Data floor system and one for the UPS room.
 - The next years projection for energy use is the same or less than in past years.

DAS Youth Detention Facilities



Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 has not established EUI targets for a detention center campus of facilities.

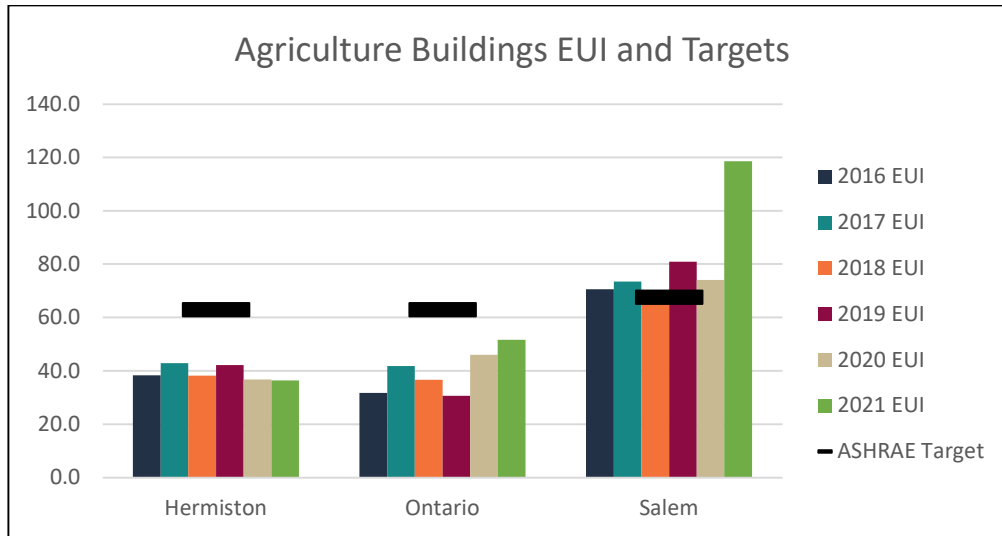
Efforts to Address Future Energy Use

- In 2018, ownership of the campus of buildings was transferred from the Oregon Youth Authority to DAS.
- In August of 2021 ownership of the Hillcrest campus was transferred from DAS to a new owner. 2021 will be the last year of tracking.

Oregon Department of Agriculture

- ODA is developing an agency sustainability plan which includes dedicated staff evaluating opportunities to reduce energy consumption. This work was paused due to the pandemic and reduced staffing in facilities.
- ODA evaluated potential behavior and equipment changes to improve the efficiency of their offices.
- Oregon Department of Agriculture’s building portfolio consists of multi-use facilities that include offices, warehouses and inspection facilities used by staff to evaluate agricultural goods.

Agriculture Buildings



Summary of 2021 Energy Use and EUIs

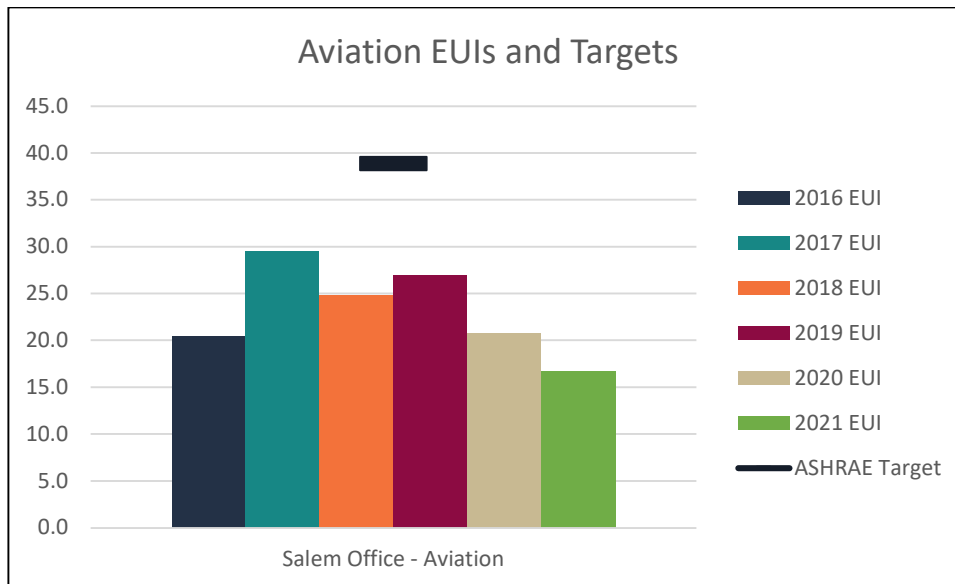
- The Oregon Department of Agriculture’s Salem location is a compound of buildings that serve the specific needs of the agency’s business functions. These buildings include office space, insect rearing laboratory, a heavy capacity laboratory, machine shop, warehouse for storage and insect trap maintenance, a hops laboratory and two greenhouses.
- Since the end of the pandemic, the ODA has increased its usage of these spaces, including additional insect incubators, refrigerators, freezers and washing machines. Aside from the additional equipment, more staff are using the space. This too increases energy usage with doors opening and closing, and lights and heaters may run longer.
- The harsh winter weather of 2021 increased energy usage, especially for the two green houses.

Efforts to Address Future Energy Use

- The Oregon Department of Agriculture will use the tools and resources available to consider how it may adjust its energy usage while continuing to meet its operational objectives.

Oregon Department of Aviation

- ODA’s building portfolio consists of their Salem Shop/Hangar Building and an attached office building.
- The facility was built in 1954 and needs major capital improvements.
- ODA is evaluating the potential to fund a replacement of the building rather than a retrofit.

Aviation Buildings**Summary of 2021 Energy Use and EUIs**

- ODA’s facility consists of an office and hanger/shop.
- ASHRAE Standard 100 EUI target for government office buildings in climate Zone 4C is 50 kBtu/sf/yr (black line).
- ASHRAE Standard 100 EUI target for vehicle storage/maintenance in climate Zone 4C is 14 kBtu/sf/yr (black line).
- ODOE created a calculated performance target of 38.9 EUI for ODA’s facility based on the square footage dedicated to these different uses.
- Aviation did not report fuel oil use in 2021. As a result, the calculated EUI only includes electricity used.
- ODOE will work with Aviation to determine if fuel oil is still used in its facilities and will report 2021 usage if available.

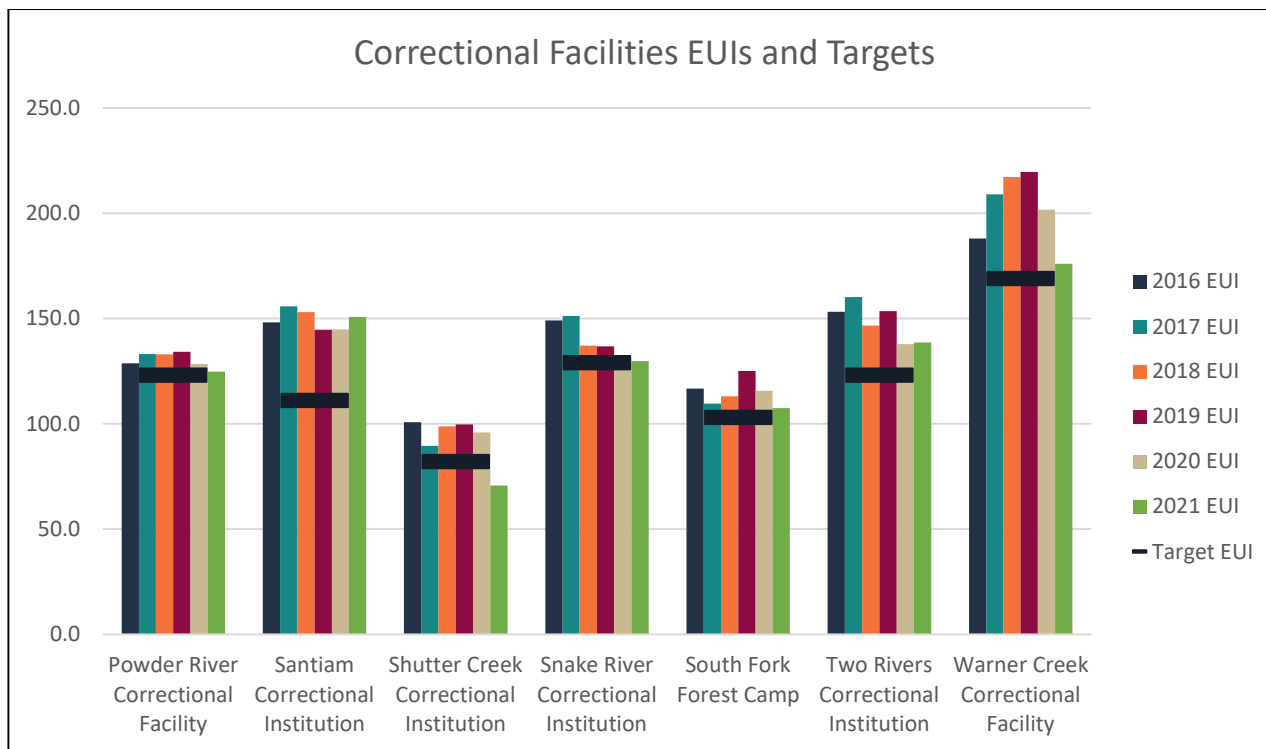
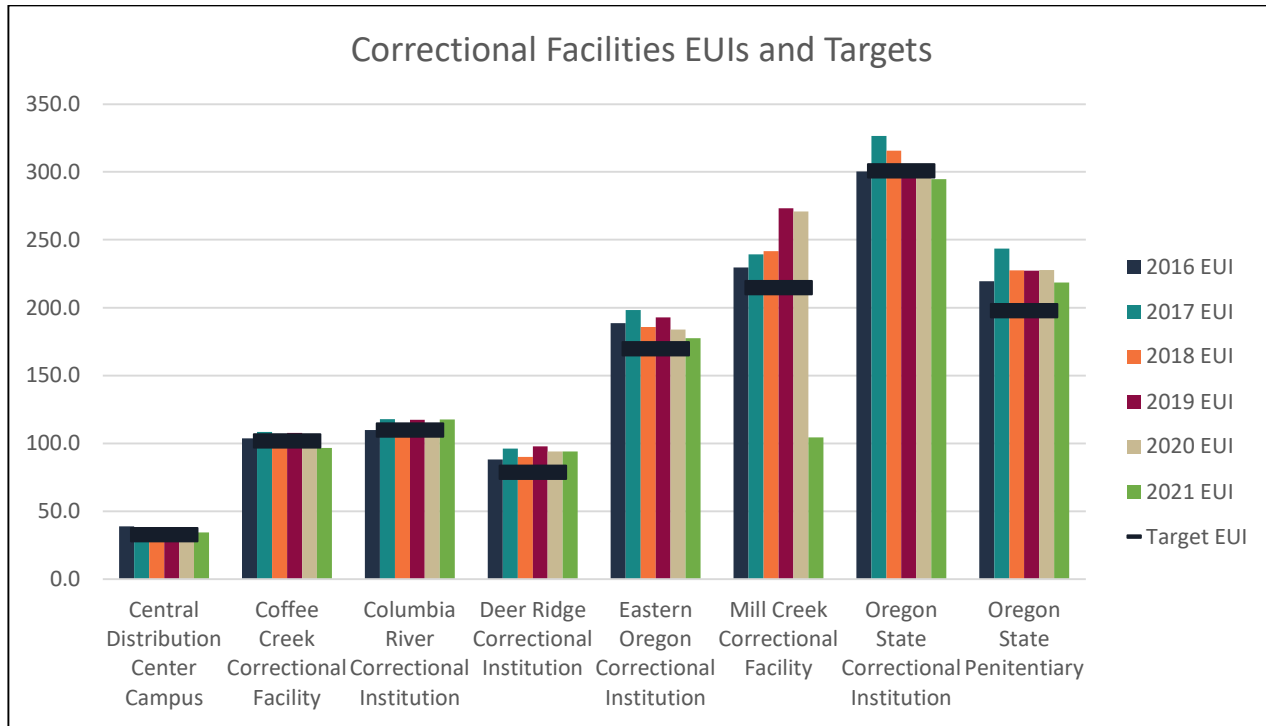
Efforts to Address Future Energy Use

- No immediate actions identified. The agency will continue to monitor energy use and identify opportunities for efficiency.

Oregon Department of Corrections

- ASHRAE Standard 100 does not have a directly applicable target for prison/incarceration facilities. ODOE and Corrections agreed to use a 20 percent reduction from the 2013 EUI as an appropriate efficiency target.

Correctional Facilities



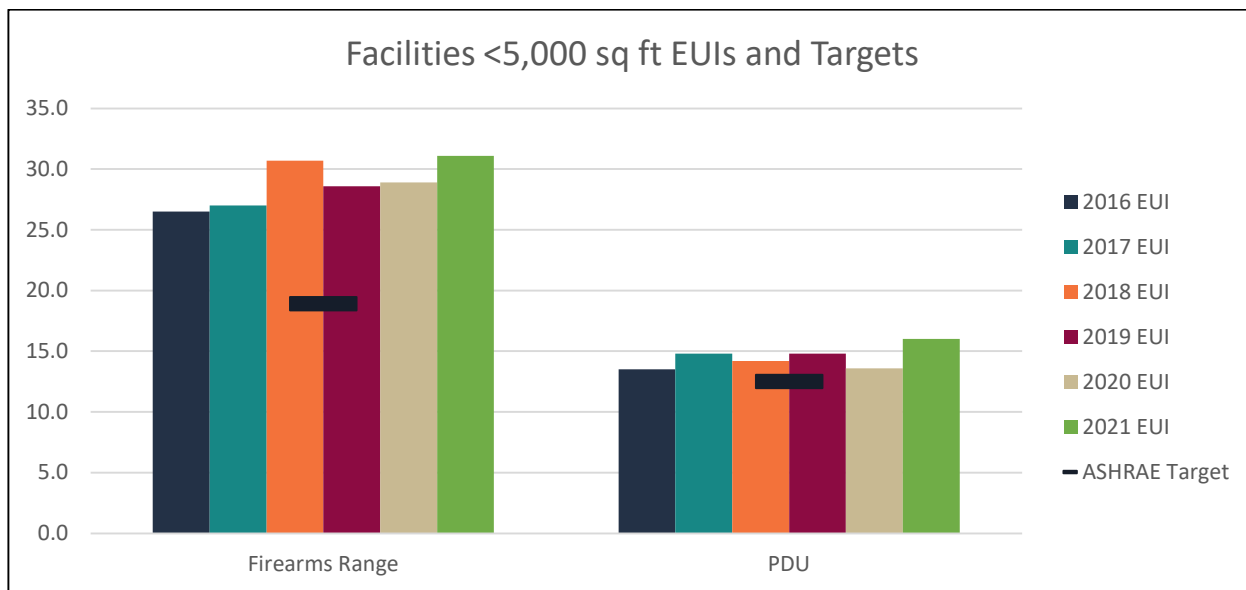
Summary of 2021 Energy Use and EUIs

- Corrections extended HVAC operation in general population areas and admin.
- Aged HVAC equipment beyond life.
- Central Distribution Center’s refrigeration was upgraded.
- Staffing shortages led to deferred maintenance.

Efforts to Address Future Energy Use

- Corrections will re-baseline each institution’s energy use based on data from 2020-2021.
- MCCF and SCCF are no longer in operation. They will be removed from the data collection process going forward.
- DOC will pursue equipment upgrades where appropriate to realize energy savings. This includes upgrading to energy efficient appliances and upgrading lighting.
- DOC will continue its “Battle of the Buildings” competition to incentive energy efficiency across buildings through friendly competition.
- Sustainability and facilities staff will conduct site visits to complete level 1 energy audits.
- DOC continues to work with an energy coach as part of Energy Trust’s SEM program.
- DOC will continue to host bi-monthly energy calls and bi-monthly meetings with physical plant managers.
- Sustainability staff will continue to send their sustainability newsletter.

Corrections Facilities <5,000 sq ft EUIs



Summary of 2021 Energy Use and EUIs

- There has been an influx of staff and training hours over the years. The range is being utilized more and for longer periods of time.
- The PDU building also had many new staff staying for later hours and on weekends. That building has now been sold and will be removed from the Portfolio Manager.

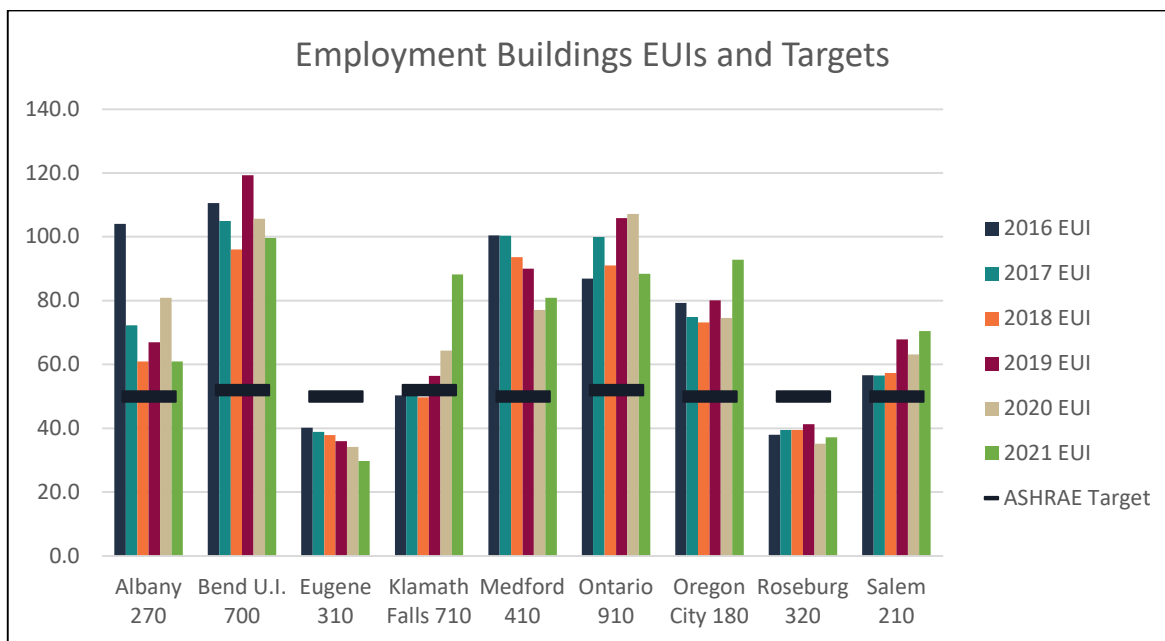
Efforts to Address Future Energy Use

- Corrections will re-baseline each institution’s energy use based on data from 2020-2021.
- Facilities will do a walkthrough and evaluate potential opportunities for efficiency.
- DOC will enlist an HVAC tech for HVAC fixes and upgrades.

Department of Employment

- OED’s building portfolio consists of government office buildings.
- OED leases space to partner organizations within their buildings and has increased occupancy within their buildings by adding new tenants.
- OED’s Facilities Management team was allocated \$14 million to invest in HVAC, controls, LED lighting, roofing, insulation, window, door and restroom upgrades, ADA compliance and installation of EV charging stations in this biennium, but the OED Executive Management Team made decisions to redistribute \$4.2 million as a reduction from the allocated budget leaving, \$9.8 million for facilities management. Currently, \$8.1 million has been spent for the architectural and engineering (A&E) and construction of Capital Improvement Projects with the remaining \$1.7 million projected to be spent by the end of the 21-23 biennium.

Employment Buildings



Summary of 2021 Energy Use and EUIs

- Bend UI is an Unemployment Insurance (UI) call center with a fully functioning server room and fitted with large UPS/server units. This requires additional electric loads and cooling and thus requires increased energy needs.
- Bend UI and Klamath Falls both have heated (electric) sidewalks which are activated when temps dip below freezing.
- During wildfire season, all OED offices were assisted with 2,000 CFM air scrubbers which needed to run 24/7 when air quality was at its worst.
- HVAC dampers were opened to increase fresh air intake in compliance with OSHA standards to reduce and manage infections.
- OED offices and UI call centers were running additional shifts and/or extended work hours as a result of critical workloads required to deliver UI benefits.
- Capital improvement projects have been completed which will result in future energy efficiencies in Ontario, Baker City, Oregon City and Salem with multiple upgrades such as

roofing, plumbing, HVAC, controls, LED lighting, windows, doors, insulation, and EV charging stations.

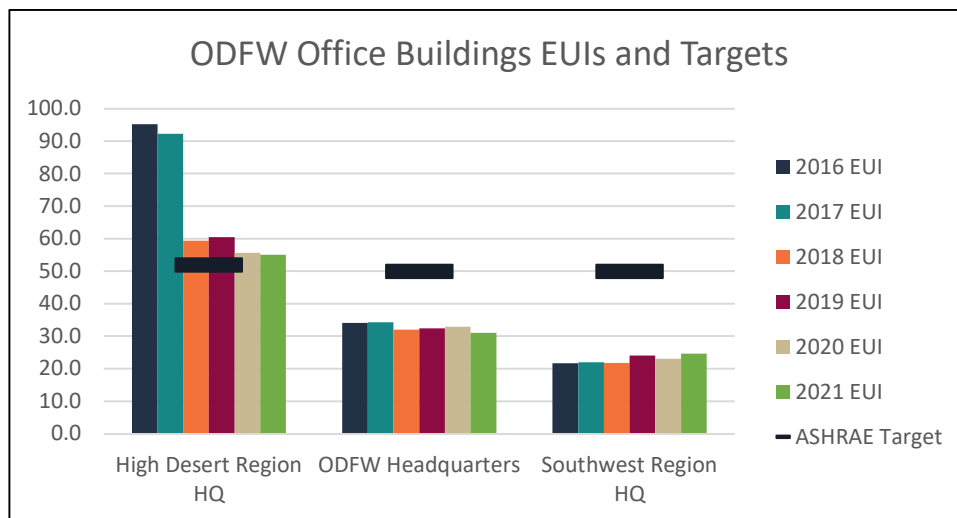
Efforts to Address Future Energy Use

- Capital improvement projects are planned for the 23-25 biennium at Salem, Albany, Roseburg, and Medford. This will provide future energy efficiencies with roofing, HVAC, LED lighting, insulation, windows, doors, plumbing and EV charging stations.
- The Employment Department offices are in the beginning stage of planning for space consolidation efforts.

Oregon Department of Fish and Wildlife

- ODFW has a decentralized model of building management and relies on local building project managers to monitor buildings and provide energy use data.
- Many ODFW facilities have mixed uses.

ODFW Office Buildings



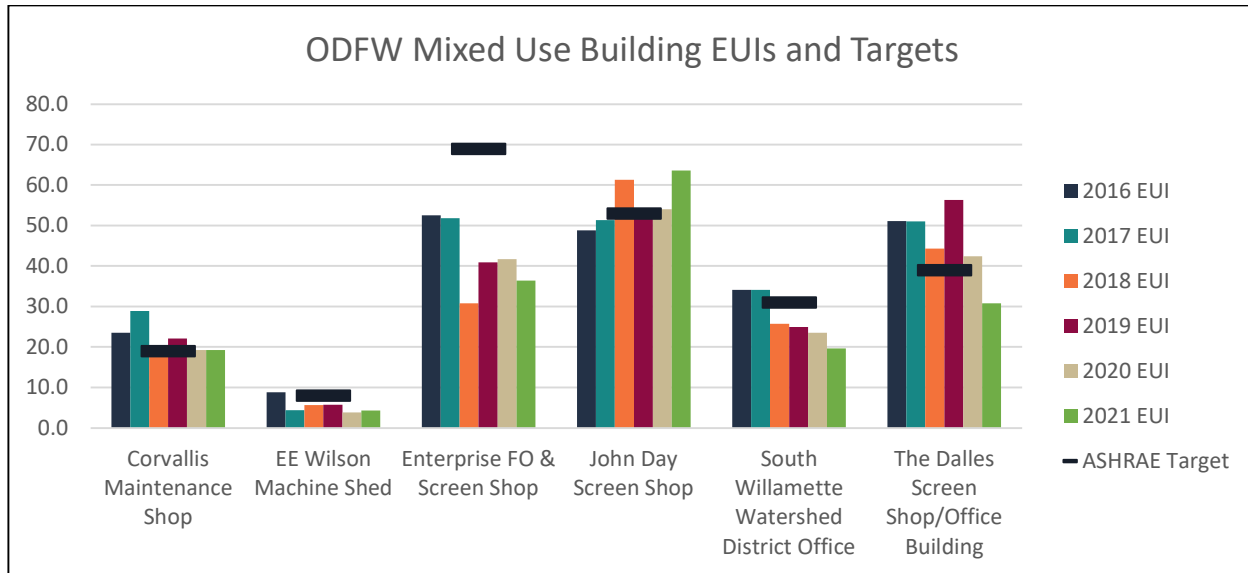
Summary of 2021 Energy Use

- ASHRAE Standard 100 EUI target for Government Offices in Climate Zone 4C 1s 50 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for Government Offices in climate Zone 5B is 52 kBtu/sf/yr.
- High Desert HQ presents the greatest opportunity for energy efficiency improvements. This building is a 6300 sq foot office building that includes equipment storage and a maintenance shop.
- ODFW’s Salem Headquarters has a solar PV system that offsets much of the buildings use.

Efforts to Address Future Energy Use

- ODOE will work with ODFW in 2023 to identify opportunities for greater efficiency in the High Desert Region HQ.

ODFW Mixed Use Buildings



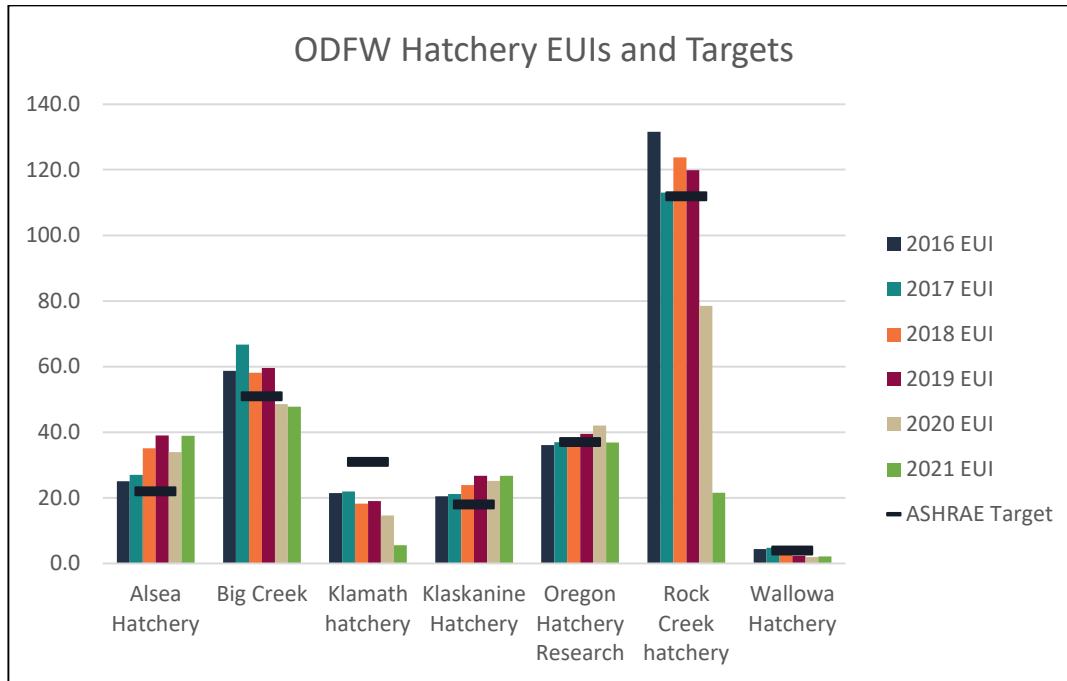
Summary of 2021 Energy Use and EUIs

- ODFW Mixed use buildings are combined spaces that are used for varying operations. There is not an appropriate ASHRAE Standard 100 EUI target. ODOE collaborated with ODFW to create a Target EUI of a 15 percent reduction from the 2015 baseline year.
- The Enterprise building consists of office space, metal fabrication and they lease a floor of the building to Oregon State Police.
- The Dalles Screen Shop/Office is split between a metal fabrication shop and a government office.
- The S Willamette Watershed Office added a Veterinary lab in 2017. The remaining square footage of the building is dedicated to office and warehouse space. In 2017/18, ODFW retrofitted the heating and cooling system.
- The Corvallis shop is a metal fabrication shop with no heat.
- The John Day building consists of office space, wood shop, storage and metal manufacturing. Energy use varies seasonally as it is used as a metal fabrication shop in the winter and an Office in the summer. Project demand dictates energy use.
- The EE Wilson Machine Shed is an open storage pole barn with three sides. Energy use is mostly lighting.

Efforts to Address Future Energy Use

- ODOE will work with ODFW to identify opportunities for improved efficiency in the John Day Screen Shop and Corvallis Maintenance Shop.

ODFW Hatchery Buildings



Summary of 2021 Energy Use and EUIs

- Hatcheries do not have ASHRAE Standard 100 EUI targets established based on their use. ODOE collaborated with ODFW to create a Target EUI of a 15 percent reduction from the 2015 baseline year.
- Hatchery campuses include warehouses with equipment, fabrication areas, hatch houses and offices.
- Majority of the electricity used by a hatchery can be attributed to water use. Hatcheries have gravity fed systems from a local waterway. When waterways are low, hatcheries pump in water to their facilities. Many of the pumps are old and expensive to operate.
- ODFW identified installing new VFDs on the pumps as a potential solution but has invested in the retrofits slowly due to the cost.
- During Fire season, fire crews utilize hatcheries to get water, increasing demands on their pumps and energy use of facilities.

Efforts to Address Future Energy Use

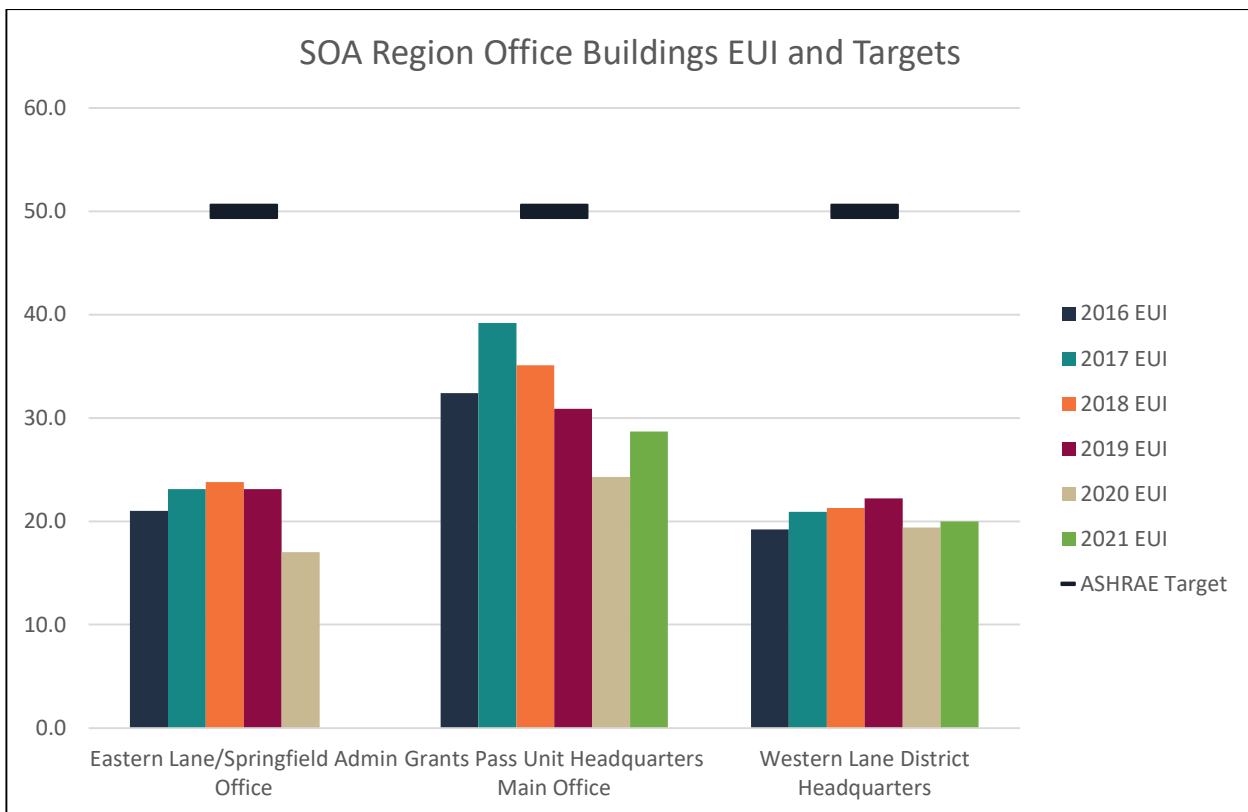
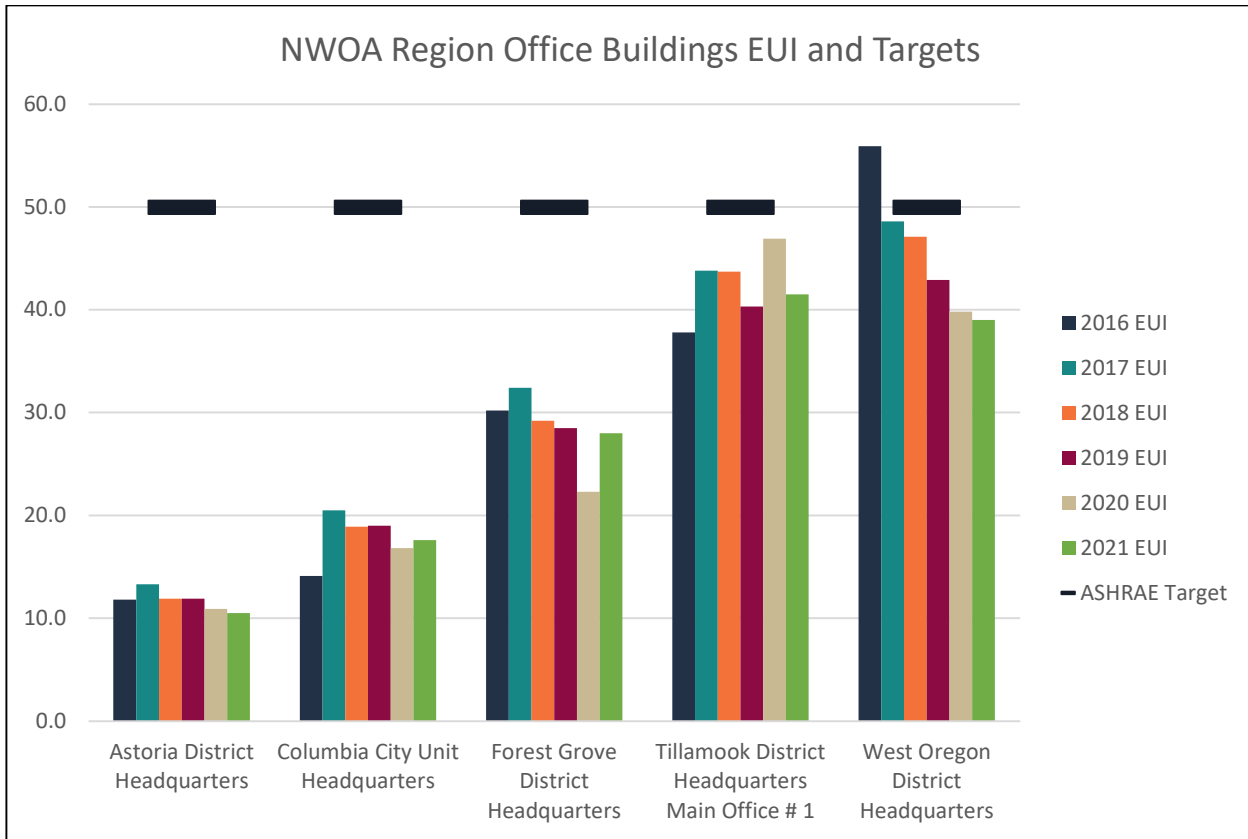
- ODOE plans to engage hatchery managers to develop best practices for energy management in state hatcheries.

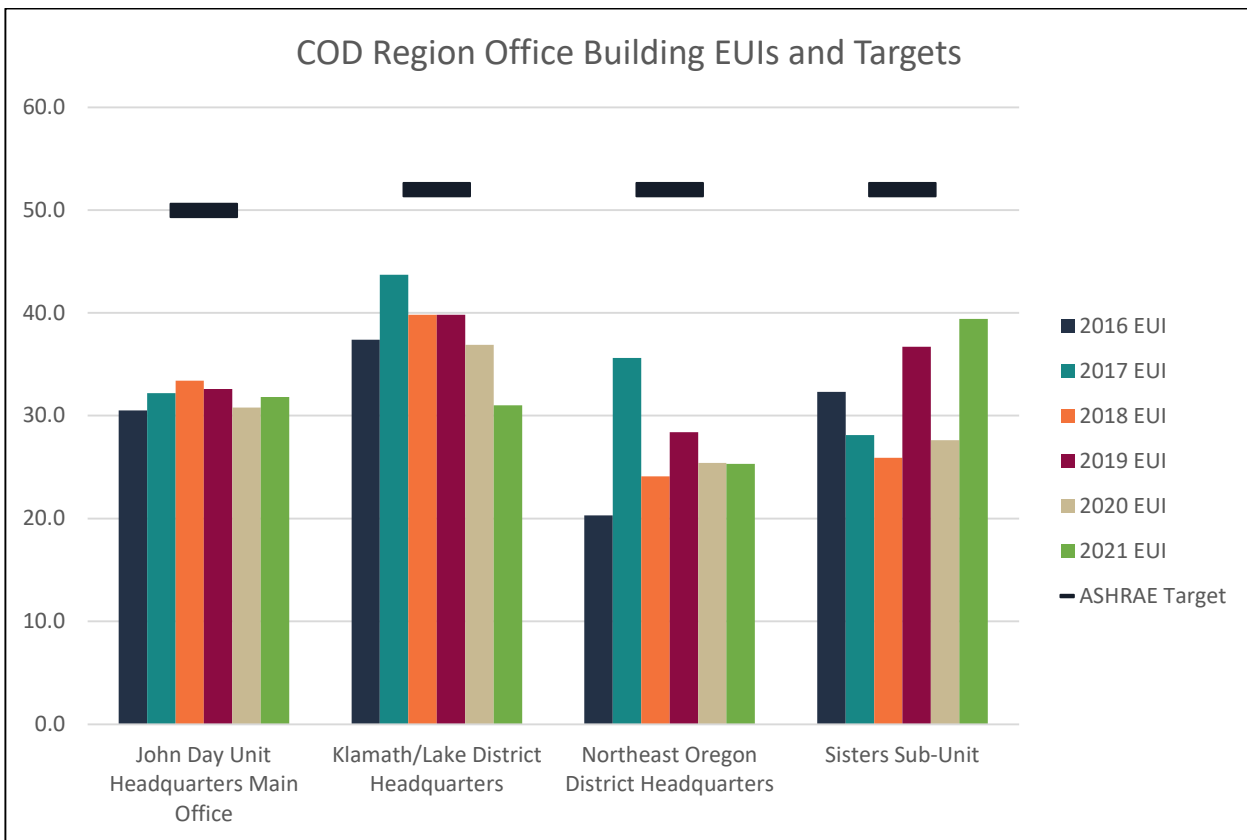
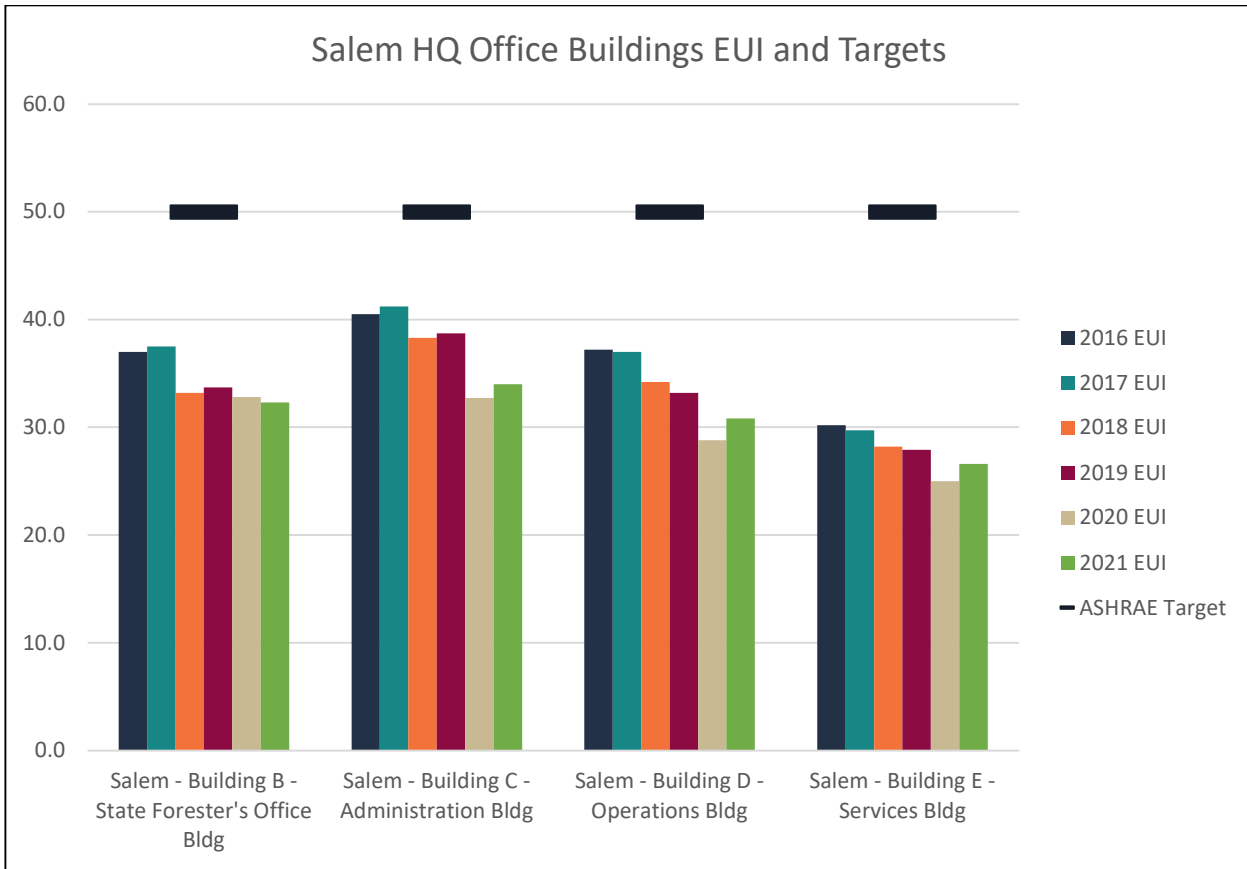
Department of Forestry

- ODF’s facilities management business model can be characterized as de-centralized. The Salem Campus Headquarters consists of 9 buildings. Regional field offices comprised of District Offices, Unit Offices, and Guard Stations manage their own building/structures portfolio, and are responsible for budgets, maintenance, and utility bills. Region Managers, aka District Foresters, typically replace or upgrade equipment upon failure and need to see a short payback to their operations budget before they invest in energy efficiency facility improvements. District Foresters are influenced by the success of other District Foresters and are interested in successful case studies that may apply to their facilities.
- ODF participates in Energy Trust of Oregon’s Strategic Energy Management (SEM) Program. ODF staff have incorporated lessons learned from the SEM program in agency communications and in implementation of energy efficiency upgrades in select facilities, most notably the Salem Campus Headquarters and Fire Cache and Equipment Pool Operations Compound.
- To increase occupancy engagement, ODF’s Agency Administration Branch has issued quarterly newsletters (“The Branch”) that incorporate energy conservation, sustainability tips, and ideas to help field offices understand the benefits of having a long-term energy conservation management strategy, and to encourage being good stewards of our resources.
- ODF has invested in numerous LED lighting and HVAC upgrades in many of its facilities statewide and are gradually upgrading all buildings. They are focusing on behavioral changes and have conducted night walks to identify opportunities to reduce energy consumption at its Salem Campus HQs and Fire Cache/Equipment Pool Operations Compound.
- ODF building occupancy fluctuates seasonally due to seasonal hiring and fire management demands.
- Increased wildfire activity has caused ODF building occupancy to increase.



Forestry Office Buildings





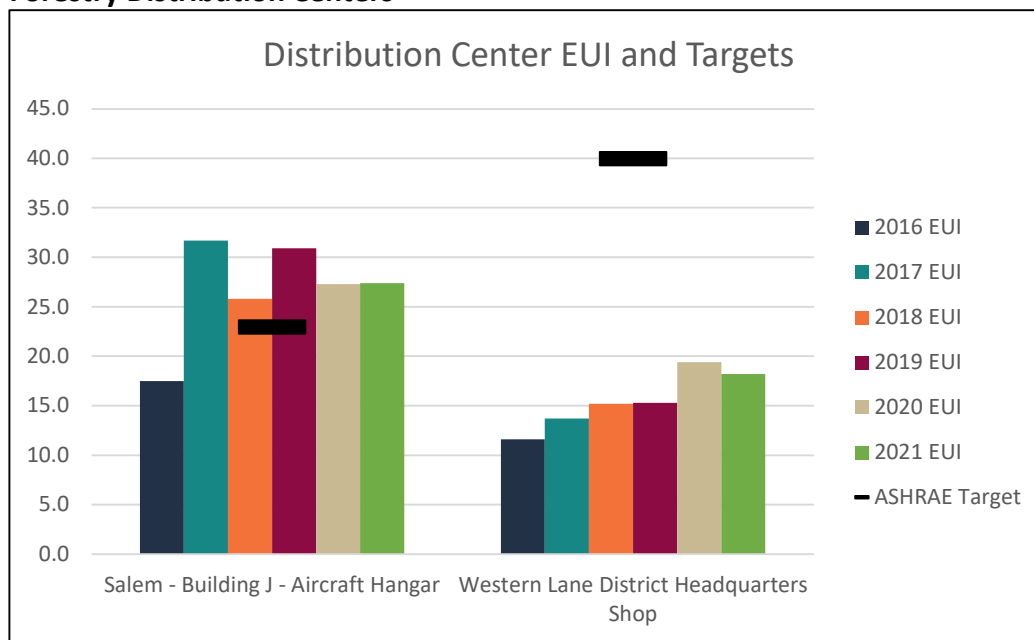
Summary of 2021 Energy Use and EUIs

- North Cascade District Headquarters (Santiam) was lost in the 2020 Labor Day fires and thus is excluded from this report. ODF is currently leasing a building in Stayton to take the place of this office, but utilities are included in the lease and the building is not sub-metered.
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 5B is 52 kBtu/sf/yr.
- Salem Forestry Buildings A, F and I are not reported within this document as they are under 5000 square feet.

Efforts to Address Future Energy Use

- ODOE will work with ODF facilities staff to identify energy efficiency opportunities in buildings that are above their energy use targets.

Forestry Distribution Centers



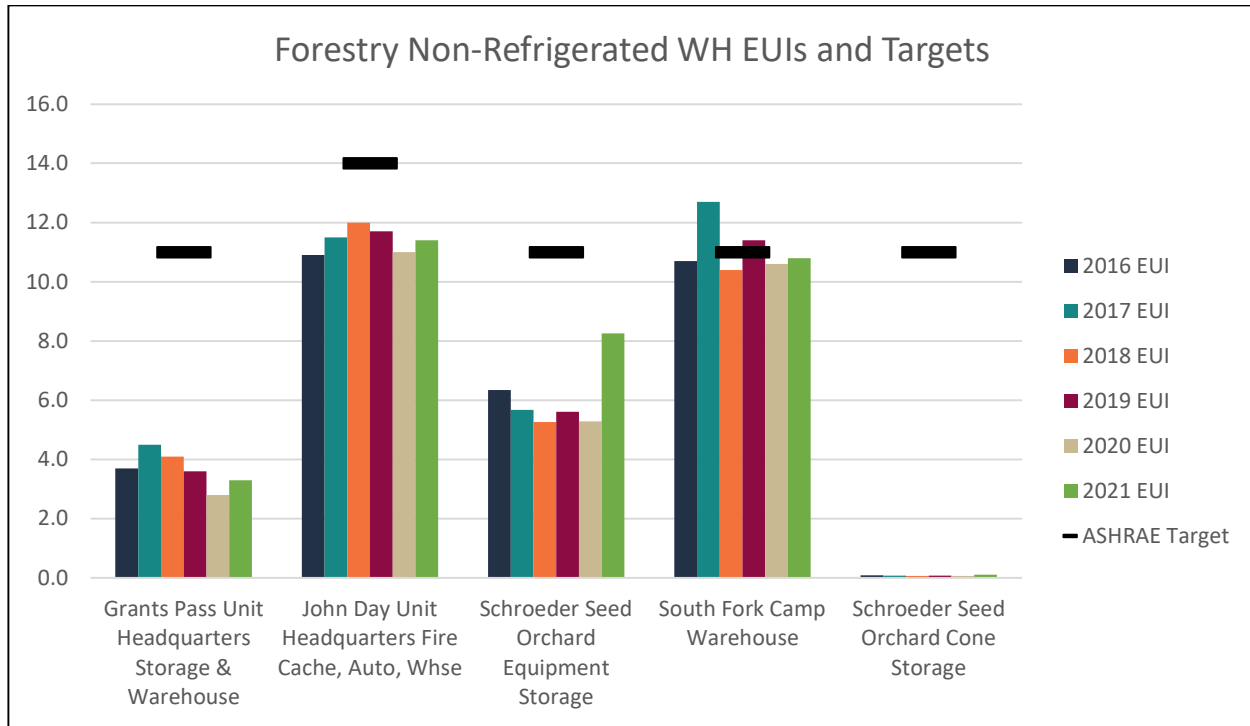
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for all Distribution Centers in Zone 4C is 22 kBtu/sf/yr.
- ASHRAE does not distinguish the energy use of different types of Distribution Centers. We elected to use calculated ASHRAE targets for both distribution centers based on the variety of uses of the buildings.

Efforts to Address Future Energy Use

- Salem Building J – Aircraft Hangar is a candidate for an energy efficiency audit given it consistently exceeds its energy use target.

Forestry Non-refrigerated Warehouse



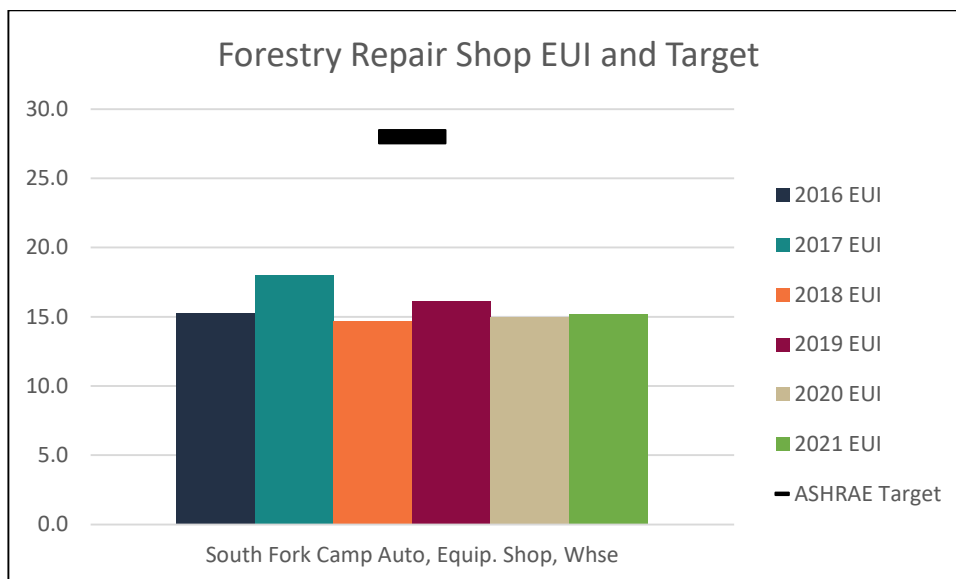
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Non-refrigerated warehouses in Climate Zone 4C is 11 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for Non-refrigerated warehouses in Climate Zone 5B is 14 kBtu/sf/yr.

Efforts to Address Future Energy Use

- All properties are currently operating below their targets.

Forestry Repair Shop



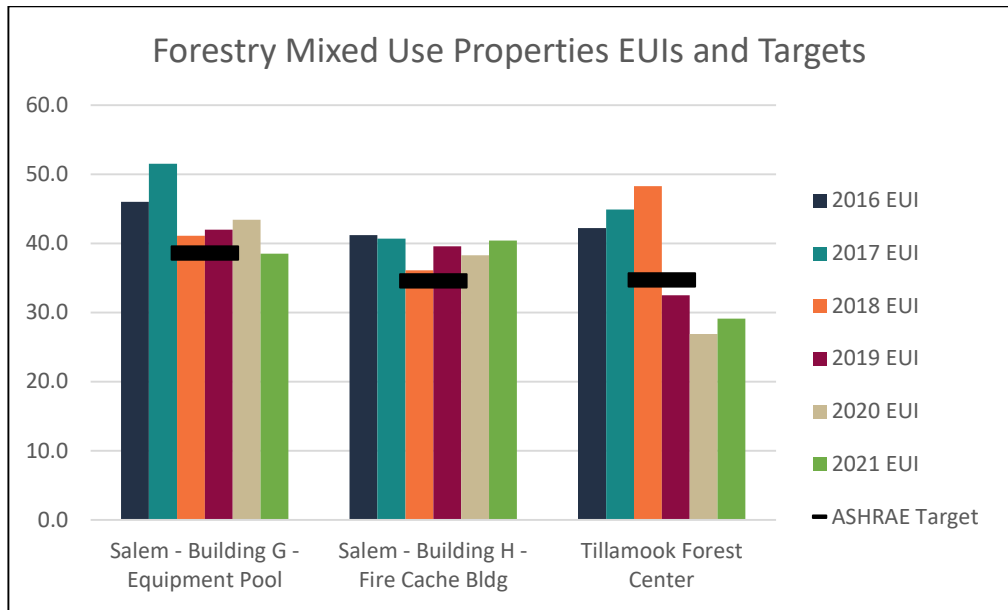
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Repair Shops in Climate Zone 4C is 28 kBtu/sf/yr.
- The South Fork Building is operating well below its EUI target.

Efforts to Address Future Energy Use

- No immediate actions identified.

Forestry Mixed Use Properties



Summary of 2021 Energy Use and EUIs

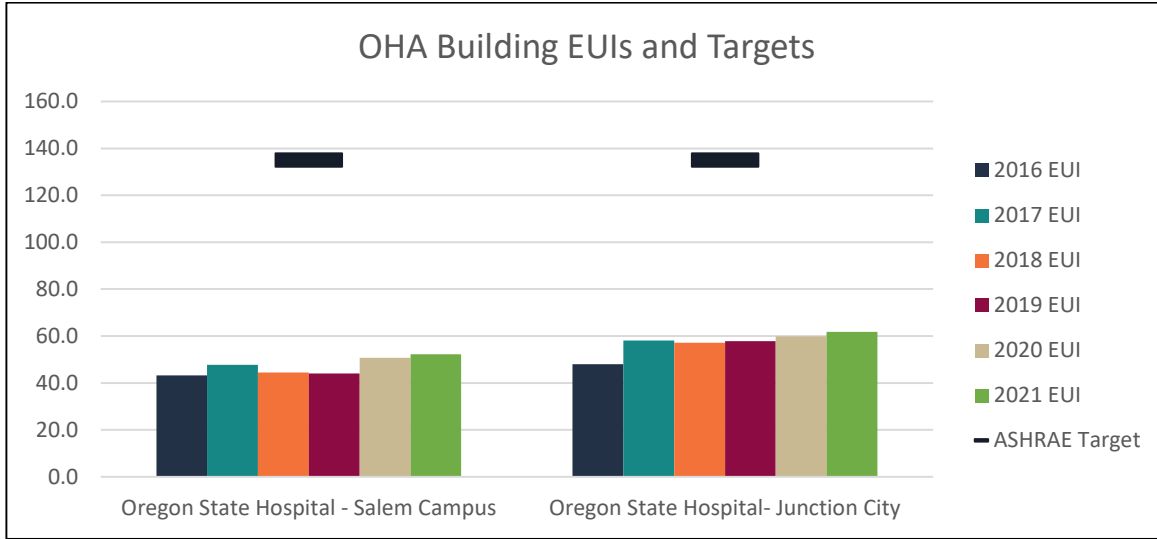
- ASHRAE Standard 100 does not have an EUI target for Mixed Use properties.
- ODOE calculated the targets of each building by comparing square footage of the buildings, use and comparable EUI targets.

Efforts to Address Future Energy Use

- ODOE will work with ODF to identify opportunities for improved efficiency in the Fire Cache Building.

Oregon Health Authority

- The ongoing COVID-19 pandemic has required increased ventilation and reduced air recycling in state hospitals. This has increased energy use.



Summary of 2021 Energy Use and EUIs

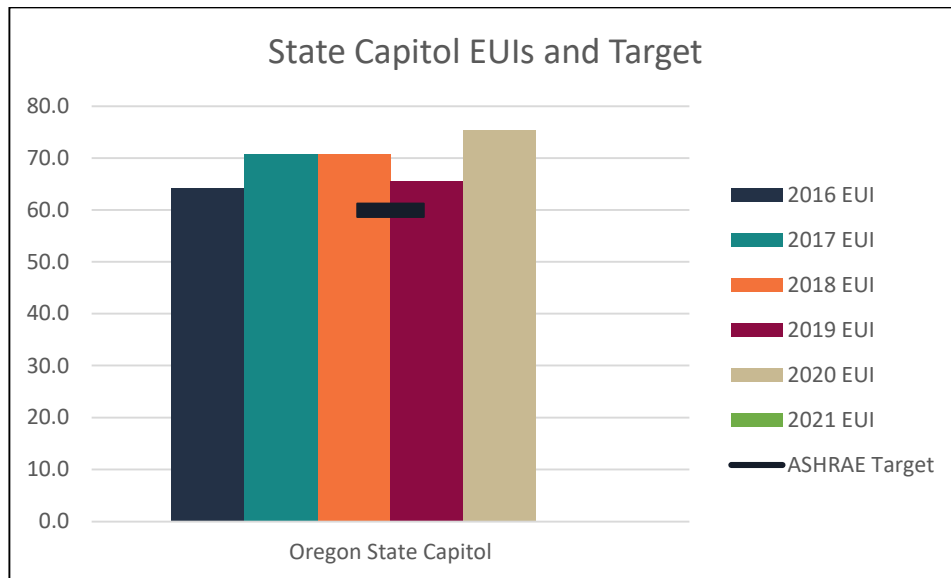
- Oregon State Hospital Salem and Junction City Campus converted all hospital HVAC systems to negative air to reduce Covid 19 infection in staff and patients resulting in increased energy usage.

Efforts to Address Future Energy Use

- The ongoing COVID-19 pandemic has required increased ventilation and reduced air recycling in state hospitals. This will continue for the foreseeable future.

Department of Legislative Services

- The Oregon State Capital was built in 1938, expanded in 1977 and is on the National Register of Historic Places.
- The Capital building contains historic features and lighting that are challenging to cost effectively retrofit.

Oregon State Capitol**Summary of 2021 Energy Use and EUIs**

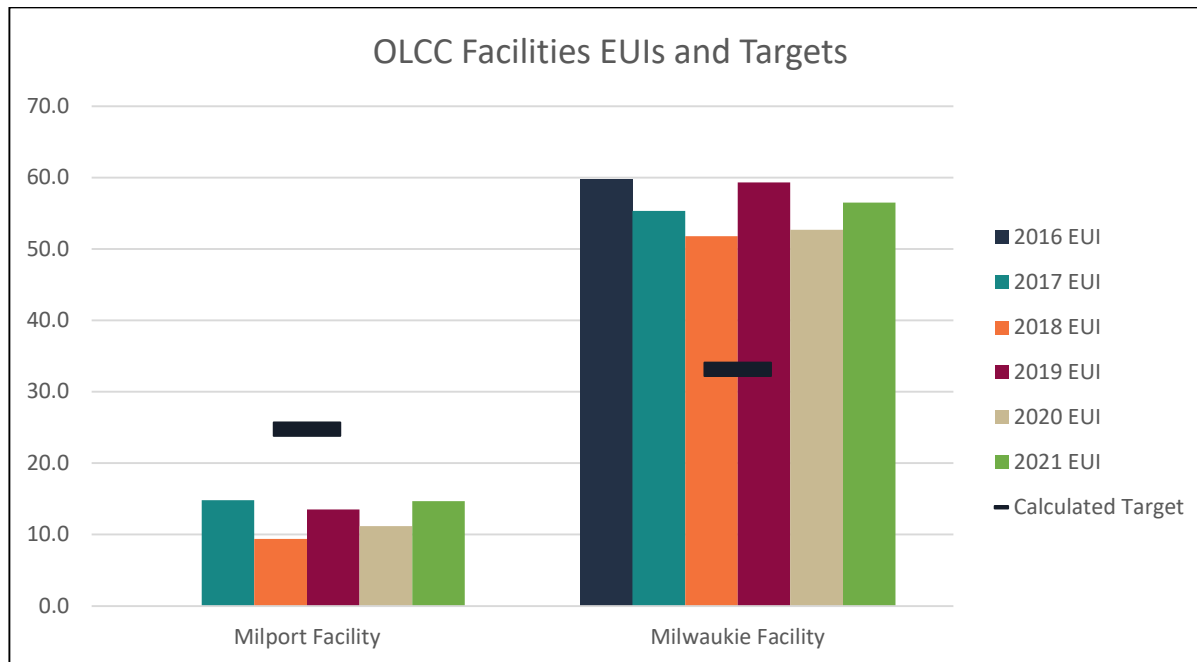
- The Oregon State Capitol is currently undergoing phase 3 of the CAMS construction project, focused on base isolation of the main portion of the building. This project has significantly altered occupancy and square footage, making energy use reporting inaccurate. ODOE and OLS have decided not to report energy use until the completion of the project due to this inaccuracy. The project will be completed in early 2025.

Efforts to Address Future Energy Use

- ODOE will work with OLS to resume energy usage reporting upon completion of the project. ODOE will support OLS in identifying opportunities for efficiency in the renovated facility.

Oregon Liquor and Cannabis Commission

- OLCC facilities function as both offices and distribution centers, there is not an ASHRAE building type that accurately matches how these buildings are used.
- ODOE created a calculated target for these buildings by estimating the percentage of the buildings that are office and distribution centers based on information provided by OLCC staff.
- Milport is estimated to be 10% Office and 90% Distribution Center.
- Milwaukie is estimated to be 40% Office and 60% Distribution Center.

OLCC Buildings**Summary of 2021 Energy Use and EUIs**

- OLCC facilities function as both offices and distribution centers, there is not an ASHRAE building type that accurately matches how these buildings are used.
- ODOE created a calculated target for these buildings by estimating the percentage of the buildings that are office and distribution centers based on information provided by OLCC staff.
- Milport is estimated to be 10% Office and 90% Distribution Center.
- Milwaukie is estimated to be 40% Office and 60% Distribution Center.
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for distribution centers in climate Zone 4C is 22 kBtu/sf/yr.
- OLCC did not provide comments on its 2021 energy use.

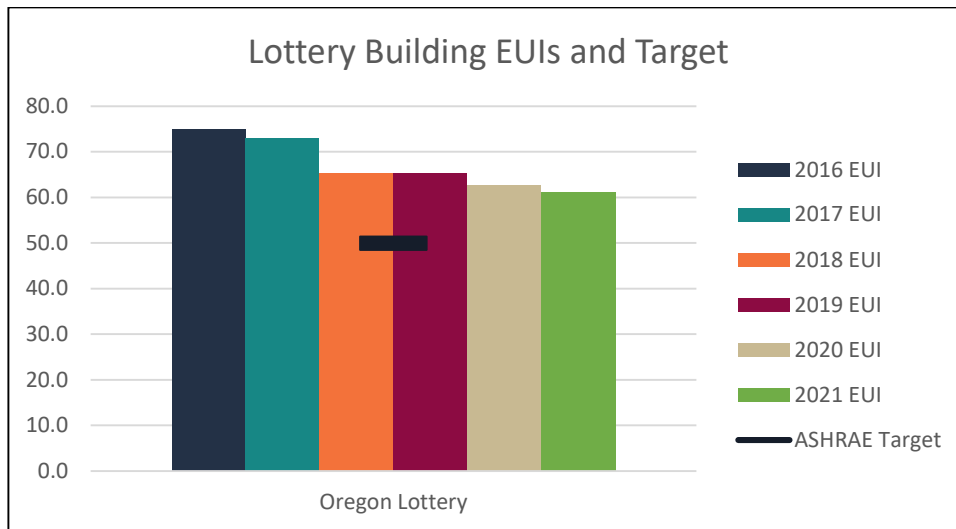
Efforts to Address Future Energy Use

- ODOE will work to identify an energy contact at OLCC and work with this contact to develop a strategy for energy management at the OLCC facilities.

Oregon Lottery

- Lottery participates in Energy Trust of Oregon's Commercial Building Program. From 2015 to 2017, Lottery invested in 13 energy efficiency improvement projects leading to 1,237,168 kWh and 22,823 therms in annual savings. Lottery received \$310,633 in incentives from Energy Trust.
- Lottery has designated Facility Management staff to develop its Energy Management Plan.
- Lottery is aware of the state of Oregon's plug load strategy to reduce energy use and has engaged in energy management best practices to minimize phantom loads.

Lottery Building



Summary of 2021 Energy Use and EUIs

- Oregon Lottery’s Salem Office was built in 1995; buildings make up 98,222 sq ft. with 108,000 sq ft. dedicated to parking use.
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBtu/sf/yr.
- Lottery’s office includes both warehouse space and a data center which requires high energy use. Energy intensive lottery machines are tested, used and evaluated in the building.
- The slight decrease in energy use is due to fewer employees working in the building.

Efforts to Address Future Energy Use

- Lottery has initiated a building use optimization project. Results from that project will dictate building usage changes and future plans.

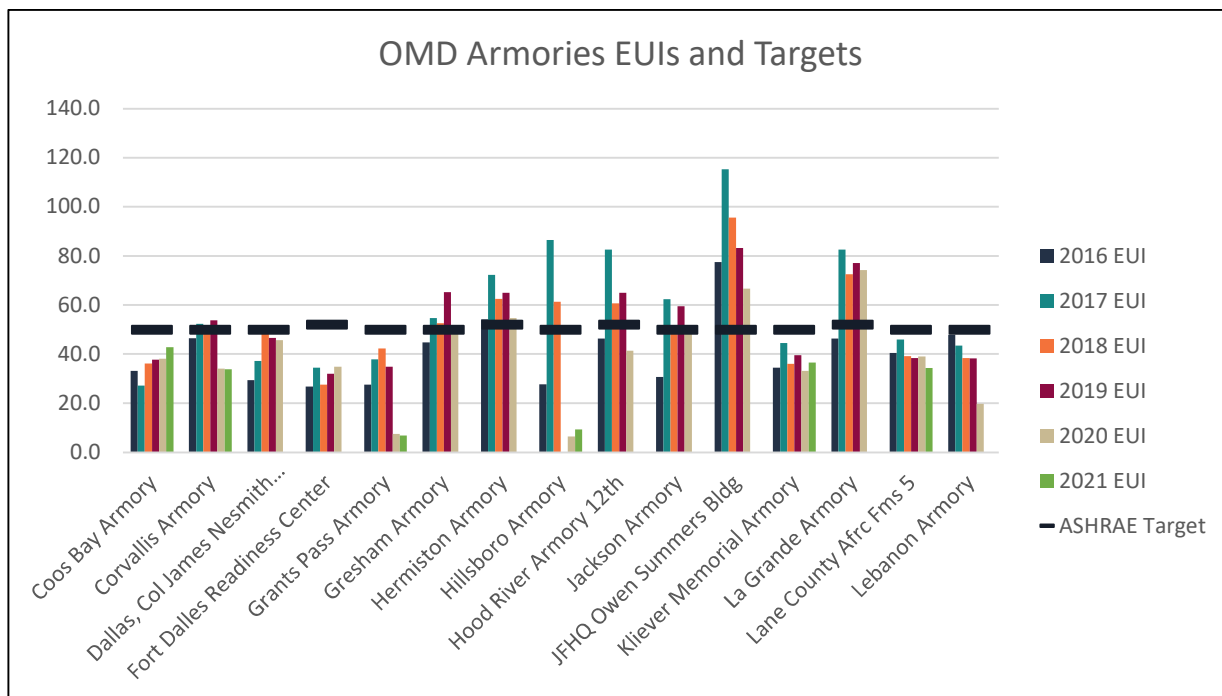
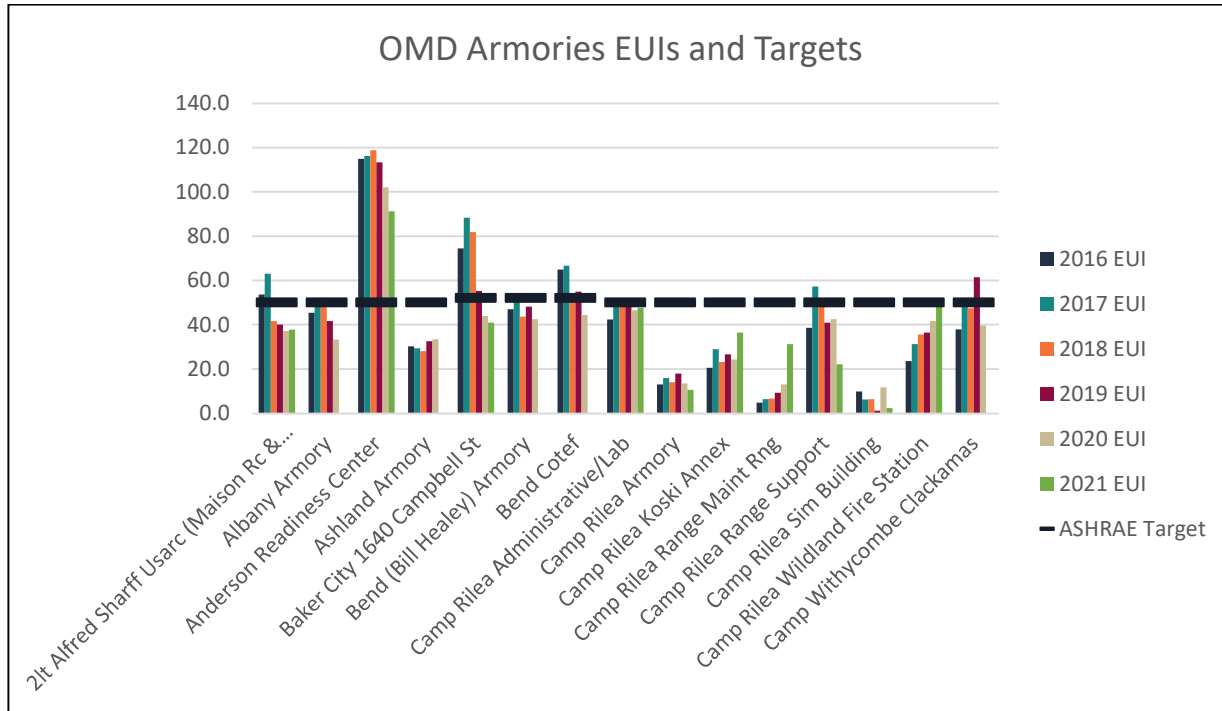
Oregon Military Department

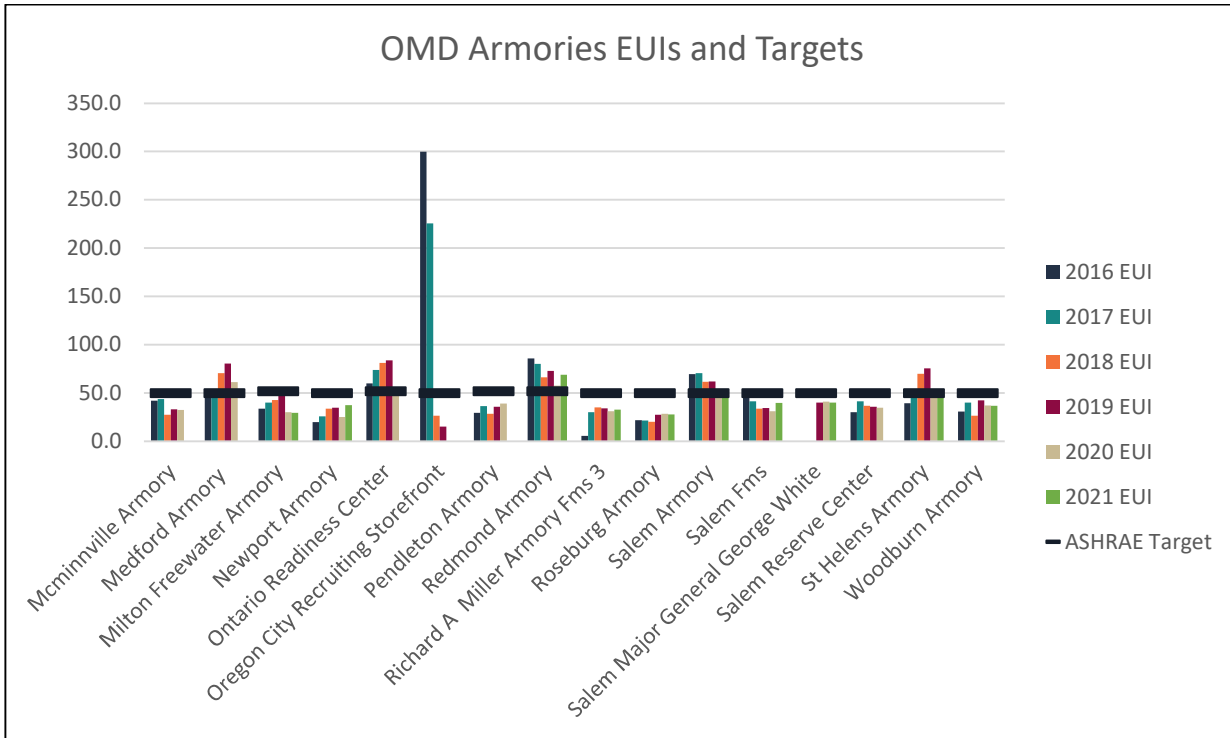
- OMD has a designated Energy Manager to develop and guide their Energy Management Plan within their Facilities and Operations division.
- OMD has increased focus on resilience; designated locations will have a goal of being independent of utilities for 14 days during an event.
- Recruiting has decreased within the National Guard resulting in low building occupancy at this time. Recruiting may increase numbers and energy use will increase as a result.
- OMD evaluates their portfolio as a whole and has a goal to reduce their facility portfolio energy use by 2.5% annually.
- OMD is funded by both the State of Oregon and the federal government which puts them in the unique position of following both state and federal energy guidelines.
- OMD is limited in what building information they can provide due to security concerns.
- OMD building occupancy and use fluctuates dramatically as facilities are used as rentals or for National Guard trainings over weekends but may be empty or only have maintenance staff

occupying the building the rest of the time. When soldiers occupy facilities, they train, eat and live in the buildings 24/7.

- OMD staff identified energy efficiency upgrade opportunities in improving building thermal envelopes, occupancy controls, and lighting. They are working to acquire funding for projects.
- Some OMD buildings did not report a full year of energy data for 2021 and thus an accurate EUI could not be calculated. These buildings have a 0.0 2021 EUI in the below tables. ODOE will work with military to ensure energy use for these facilities is reported for 2021 and in subsequent years.

OMD Armories





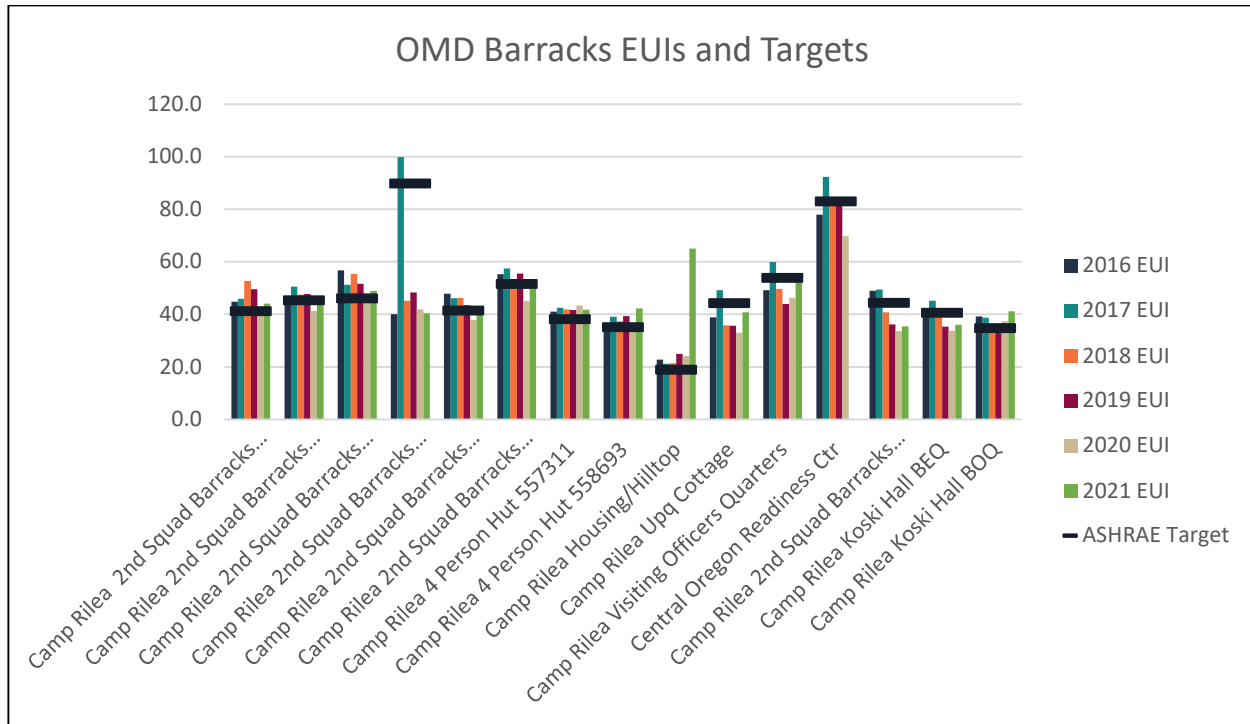
Summary of 2021 Energy Use and EIUs

- Oregon armories have a similar use pattern as a government office
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBtu/sf/yr
- ASHRAE Standard 100 EUI target for office buildings in climate Zone 5B is 52 kBtu/sf/yr
- Armories with a 0.0 EUI did not report 12 full months of energy data in 2021.

Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets.

OMD Barracks



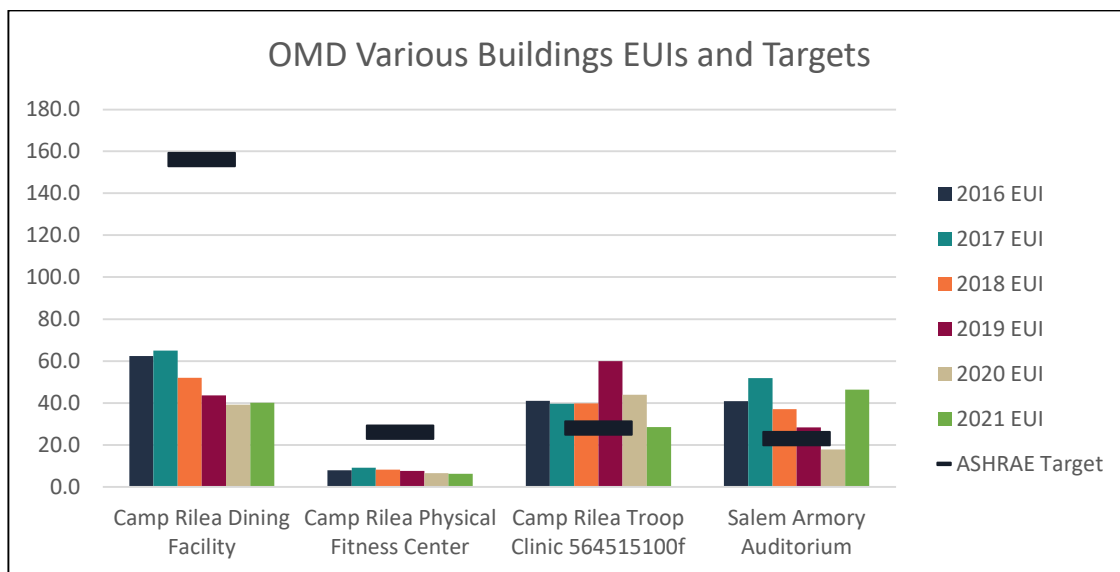
Summary of 2021 Energy Use and EIUs

- Barracks do not have ASHRAE Standard 100 EUI targets established based on their use.
- ODOE established a Target EUI of a 10 percent reduction from the 2017 baseline year.
- None of the barracks buildings use electricity or propane, with the exception of the Central Oregon Readiness Center which did not report 12 full months of electricity use in 2021.

Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets

OMD Various Buildings



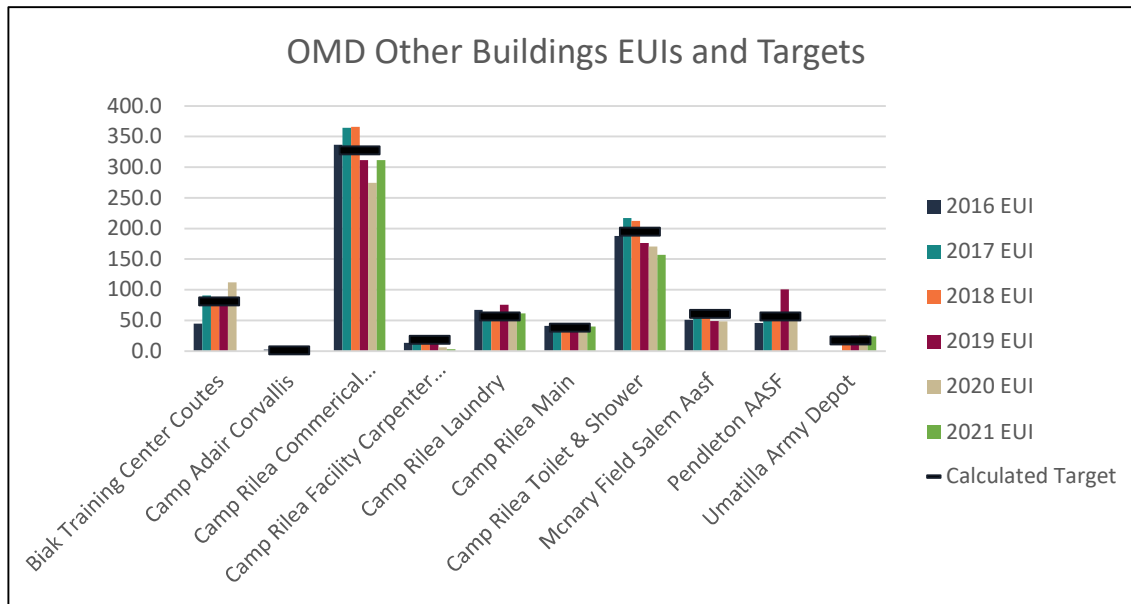
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for recreation facilities in Zone 4C is 26 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for cafeterias in Zone 4C is 156 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for entertainment/culture facilities in Zone 4C is 23 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for medical office in Zone 4C is 23 kBtu/sf/yr.

Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets.

OMD Other Buildings



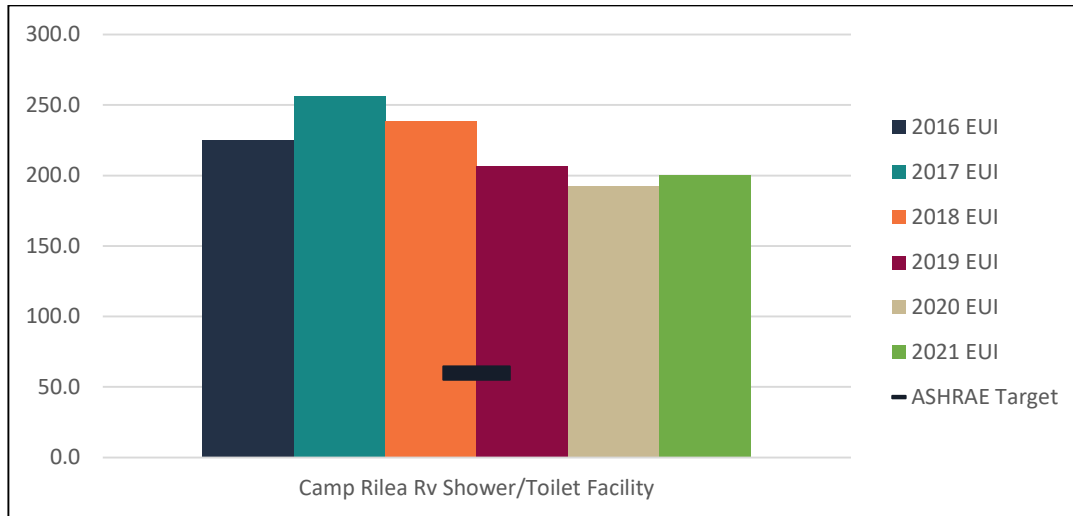
Summary of 2021 Energy Use and EUIs

- These Other Buildings do not have ASHRAE Standard 100 EUI targets established based on their use.
- ODOE established a Target EUI of a 10 percent reduction from the 2017 baseline year.

Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets.

OMD Other – Public Service Buildings



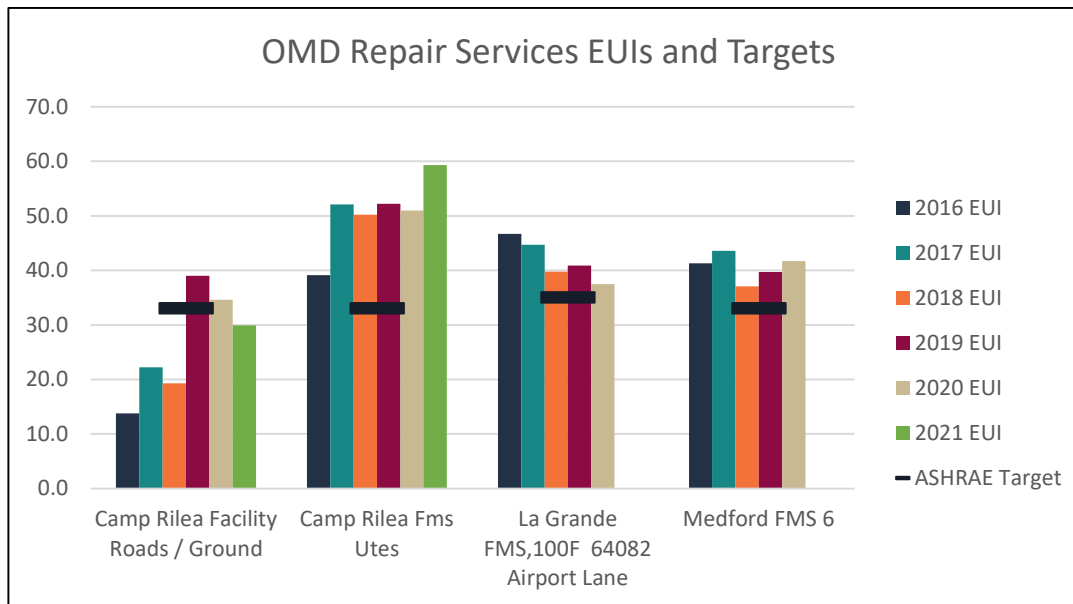
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Other- Public Service in climate zone 4C is 60 kBTU/sf/yr.

Efforts to Address Future Energy Use

- ODOE will work with OMD to determine if the ASHRAE target that is currently used for this facility is still appropriate.

OMD Repair Services



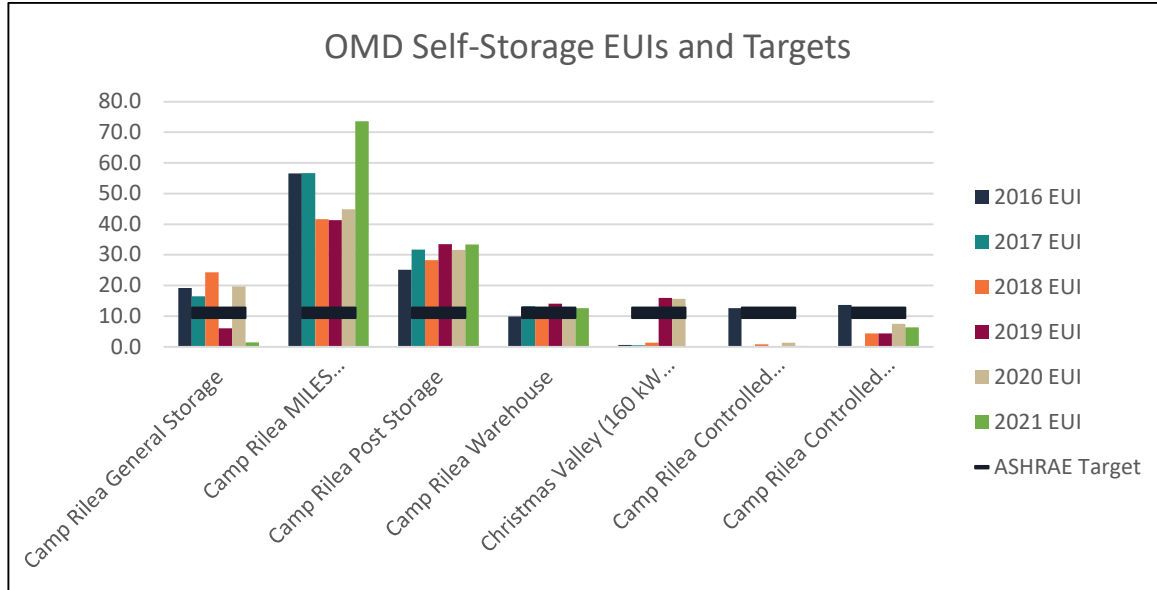
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Repair Services in climate zone 4C is 33 kBTU/sf/yr.
- ASHRAE Standard 100 EUI target for Repair Services in climate zone 5B is 35 kBTU/sf/yr.

Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets.

OMD Self-Storage Facility



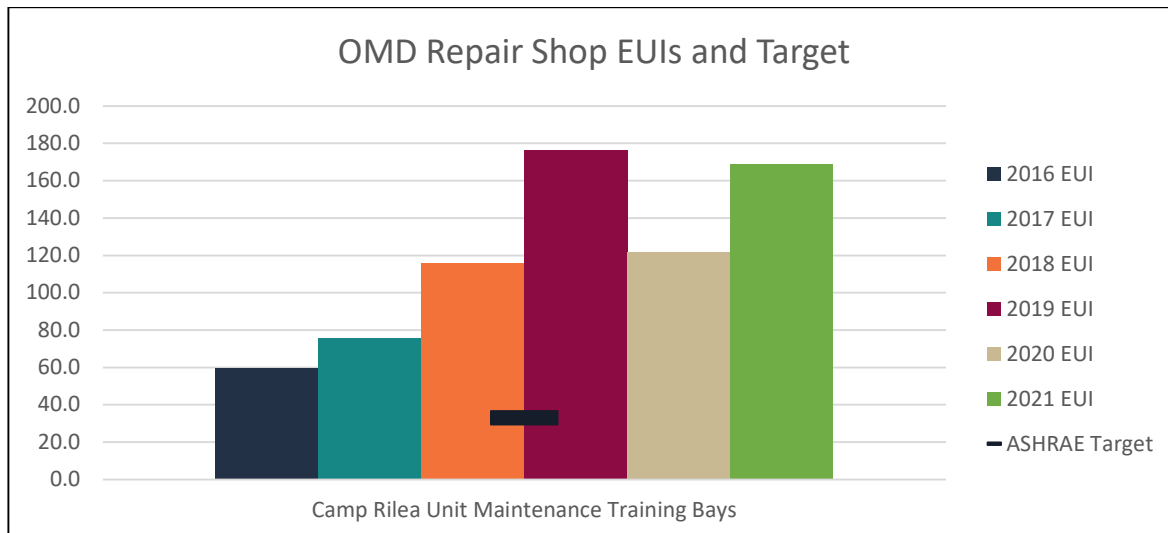
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Self-Storage Facility in climate zone 4C is 11 kBtu/sf/yr.
- Some facilities did not report energy use data for 2021.

Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets.

OMD Repair Shop



Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Vehicle Service/Repair Shops in climate zone 4C is 33 kBtu/sf/yr.

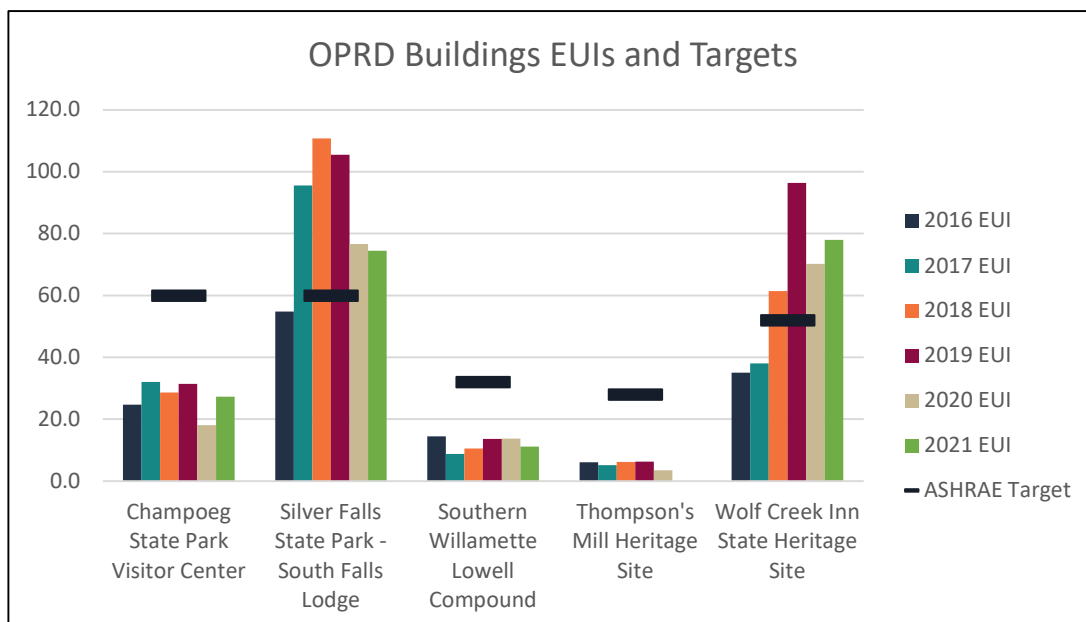
Efforts to Address Future Energy Use

- ODOE will work with OMD to identify efficiency opportunities and continue making progress toward OMD’s energy use targets.

Oregon Parks and Recreation Department

- Many of OPRD’s buildings have historic features limiting energy retrofit opportunities.
- OPRD has a sustainability plan including energy conservation goals and a dedicated Operations and Maintenance team to track progress to goals.
- OPRD had a system-wide increase of 618,455 visits (+1.15%) from 2017 to 2018, leading to increases in energy consumption.
- In 2020, OPRD had a system-wide decrease in park visits based on Covid-19 restrictions and park closures, which impacted overall energy consumption. In 2021 energy use has increased with the return of visitors to the parks.
- OPRD manages over 1100 facilities across the state with a large percentage of them being restroom facilities. Park restrooms use a modest amount of energy as they are only heated to keep from freezing and lighting is supplemented by natural light when available.
- Building occupancy and use fluctuates seasonally with the weather and tourist interest.
- OPRD has invested in LED lighting in many of their facilities and is invested in reducing energy use.
- Larger OPRD facilities are tracked by ODOE and represented in the following report.

OPRD Buildings



Summary of 2021 Energy Use and EUIs

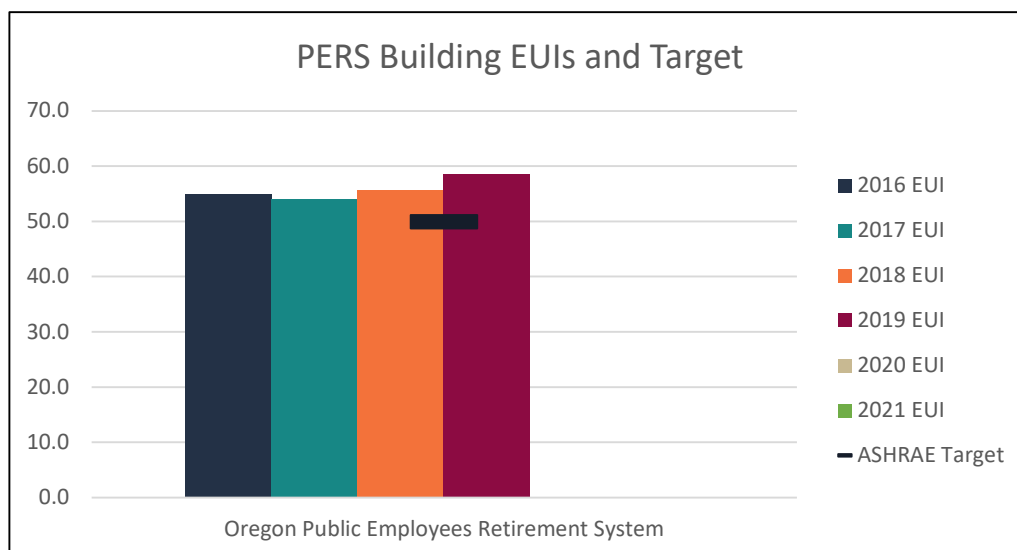
- Silver Falls Lodge and Champoeg Visitor Center are categorized as building type Other- Public Service. ASHRAE Standard 100 EUI target for Other-Public Service in climate Zone 4C is 60 kBtu/sf/yr.
- South Willamette Lowell Compound is categorized as 50% building type Office and 50% maintenance/vehicle storage. ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBtu/sf/yr. and maintenance/vehicle storage is 14 kBtu/sf/yr.
 - ODOE uses a calculated target of 32 kBtu/sf/yr. for South Willamette Lowell Compound based on the dual use of the facility
- Thompson’s Mill is categorized as building type Public Assembly. ASHRAE Standard 100 EUI target for Public Assembly in climate Zone 4C is 28 kBtu/sf/yr.
- Wolf Creek Inn is categorized as building type Hotel and is a state heritage site. ASHRAE Standard 100 EUI target for Hotels in climate Zone 4C is 52 kBtu/sf/yr.
- Many of the facilities have concession contractors providing food, drink and hospitality services. Concession contractors are sub metered and responsible for their own utility bills.

Efforts to Address Future Energy Use

- South Falls Lodge and Wolf Creek Inn provide opportunities for improved energy efficiency. ODOE will work with OPRD to learn more about the current operations of these facilities and identify potential energy efficiency measures.

Oregon Public Employee Retirement System

- The PERS building is categorized as building type government office
- ASHRAE Standard 100 EUI target for government office buildings in climate Zone 4C is 50 kBtu/sf/yr.
- The PERS building was built in 1996 and is due for equipment upgrades.
- PERS has not reported energy use in Energy Star Portfolio Manager for 2020 or 2021. ODOE is working to identify an energy management contact at PERS to restart the reporting process.



Summary of 2021 Energy Use

- PERS did not report 2021 energy use for its facility. ODOE is working to establish an energy management contact at PERS.

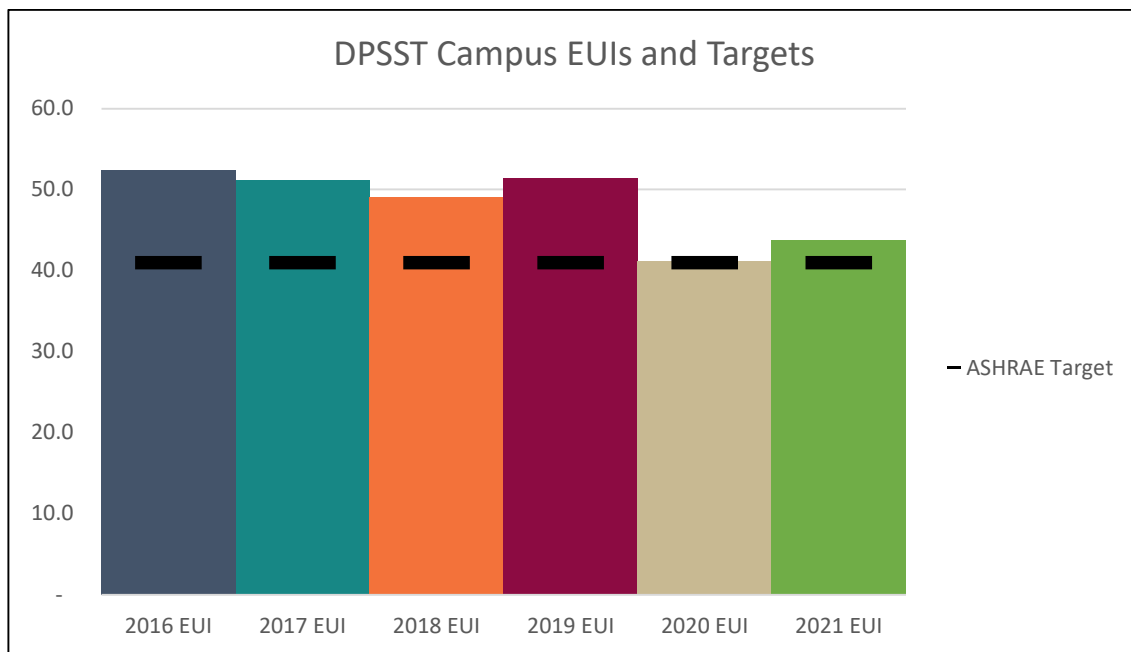
Efforts to Address Future Energy Use

- Once ODOE has established an energy management contact at PERS, ODOE will work with the contact to develop a strategy for monitoring energy use at the PERS facility.

Oregon Department of Public Safety Standards and Training

- DPSST is participating in Energy Trust of Oregon’s Strategic Energy Management (SEM) Program to identify no to low-cost energy savings opportunities and capital improvements. Energy Trust of Oregon has also conducted building audits on campus to identify opportunities.
- DPSST has designated an Energy Manager to develop and guide their Energy Management Plan.
- Building occupancy fluctuates throughout the year with training cycles. Recruit class sizes vary depending on police employment demand. 2021 saw a higher demand to get students into the academy to meet the demand to hire from the city and counties.
- DPSST has evaluated and incorporated the state of Oregon’s plug load strategy to reduce energy use.

DPSST Campus



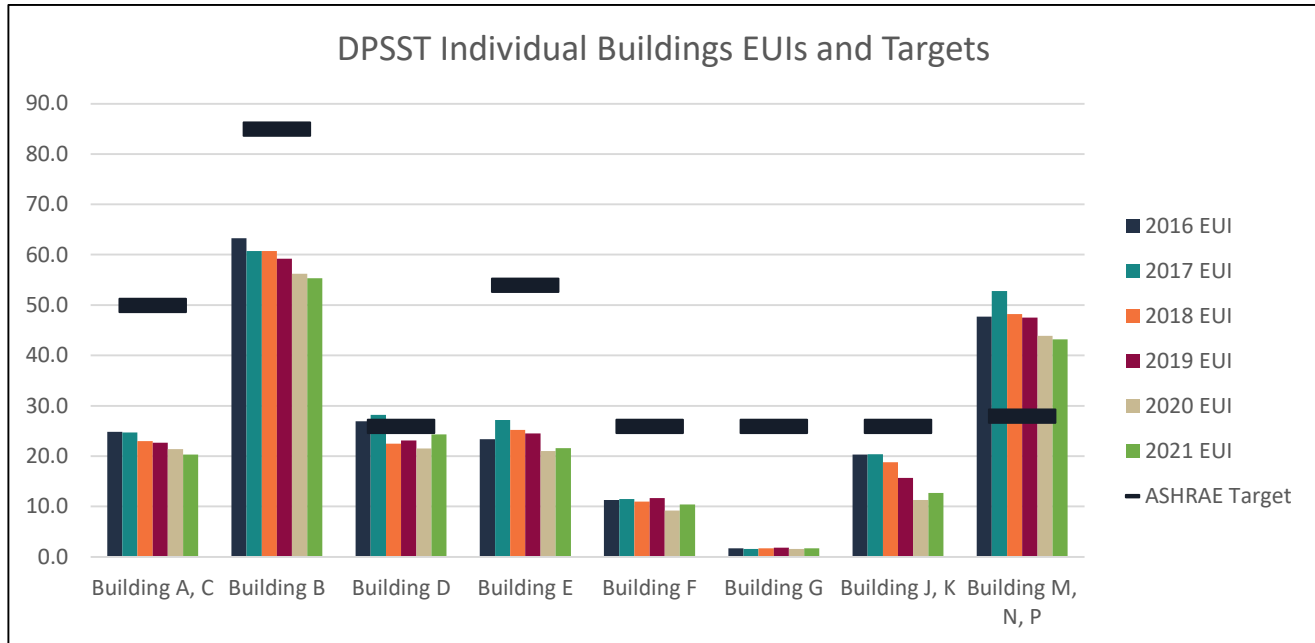
Summary of Energy Use and EUIs

- 2021 energy use was impacted by the increased numbers of public safety students required to come through the campus. DPSST’s energy use was still down from past years (16-19) but the impacts of classes canceled and buildings being less populated turned around to meet a new demand for the training of public safety professionals.

Efforts to Address Future Energy Use

- DPSST is still engaged in Strategic Energy Management (SEM) to identify areas they can address both by practice and by system improvements. In 2021 DPSST identified and completed several projects including LED lighting upgrades, replacement of kitchen equipment and HVAC controls to help in the reduction of energy on campus.

DPSST Individual Buildings



Summary of 2021 Energy Use and EUIs

- Overall DPSST still saw a downward trend in energy use over the building portfolio with an increase in D building, which is a training venue that saw the most traffic of students when the academy came back from Covid levels.

Efforts to Address Future Energy Use

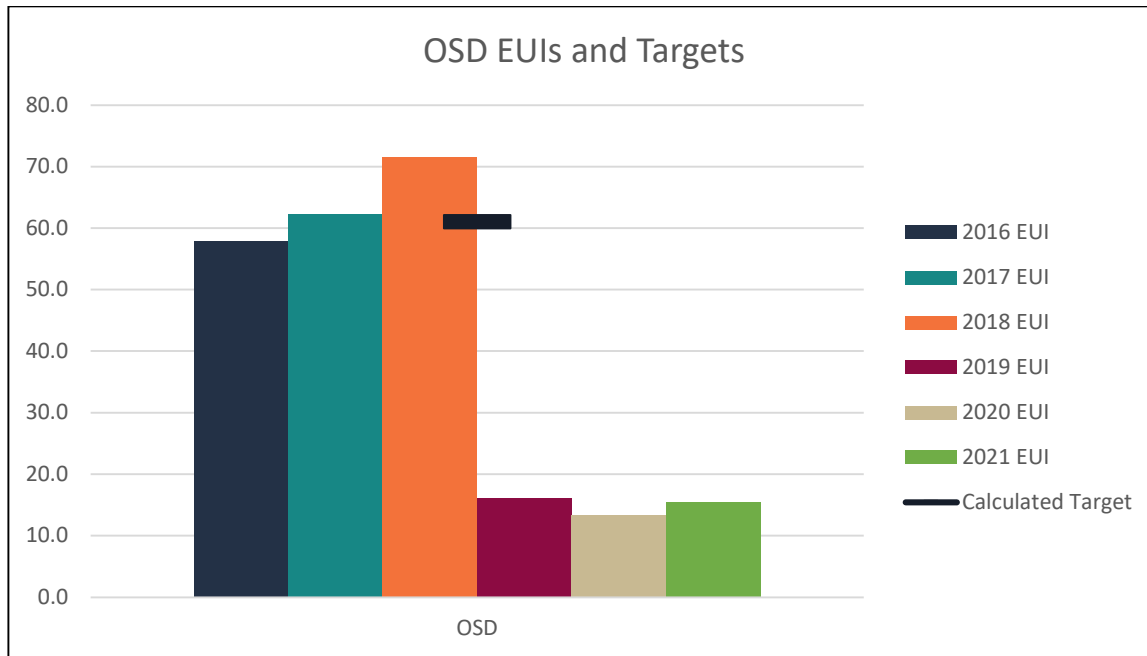
- Building M, N, and P are still over the ASHRAE target but are trending down. These buildings have only electric furnace heat, but the units are still in good condition. DPSST has recently installed Pelican thermostat controls on P building as a pilot and will be installing controls to M and N in the next few months.

Oregon School for the Deaf

- OSD’s campus has 20 buildings including
 - Campus Administration
 - Dormitories for students living on campus five days a week for the school year
 - Elementary and High Schools
 - Charter Schools leasing facilities
 - Cafeterias
 - Gyms, swimming pool and recreation facilities

- ASHRAE Standard 100 does not have an EUI target for school campuses.
- Natural Gas use was not reported in Portfolio Manager
- ODOE created a target EUI in collaboration with OSD and based on previous performance.

OSD Campus



Summary of 2021 Energy Use and EUIs

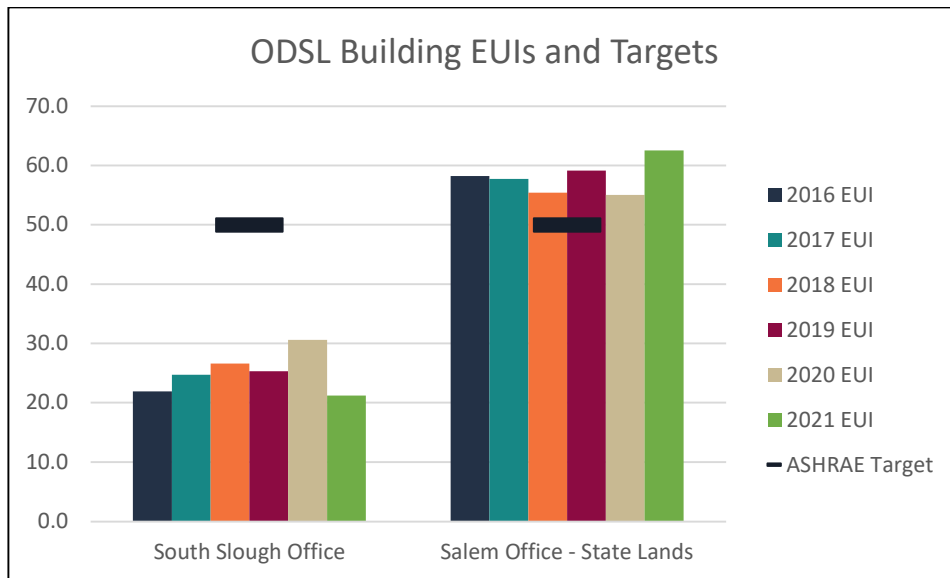
- Natural Gas use has not been reported in Energy Star Portfolio Manager since 2018 for the OSD campus. ODOE will work with OSD to determine if natural gas is still used at the facility and if to, report usage for 2018-2021.

Efforts to Address Future Energy Use

- No immediate actions identified. ODOE will work with OSD to determine if the calculated target is still accurate or if an updated target is needed.

Oregon Department of State Lands

- The Department of State Lands buildings are categorized as building type government office
- ASHRAE Standard 100 EUI target for government office buildings in climate Zone 4C is 50 kBtu/sf/yr.
- New cooling tower installed spring of 2020.

ODSL Office Buildings**Summary of 2021 Energy Use and EUIs**

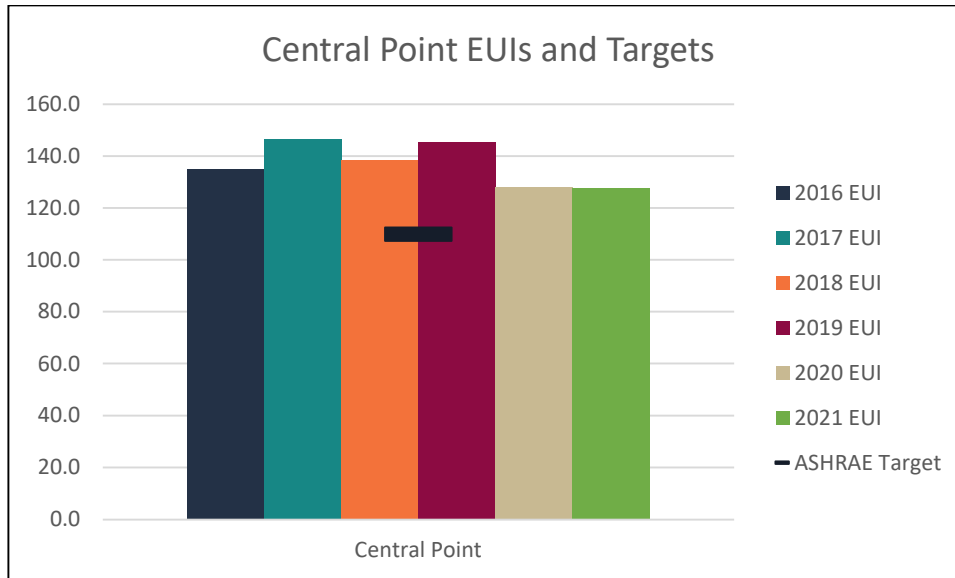
- ASHRAE standards for COVID protocols to increase maximum system allowable ventilation generated a significant increase in natural gas usage.

Efforts to Address Future Energy Use

- Current energy projects are replacement of 187 first floor T-8 fluorescent tube fixtures to type B LED tubes. This will reduce lighting energy use on this floor by 50%.
- Investigate possibility of custodial staff changing work hours to reduce heating and lighting load on building. Halted maximum ventilation protocols, May 2022.

Oregon State Police

- The Central Point building is categorized as a Mixed-Use building type
- The property includes two separate buildings with mixed uses including:
 - 24/7 Oregon State Police and Oregon Department of Transportation dispatch services
 - Southern Area Command Police Services
 - Forensic Laboratory with 2 high volume fume hoods & refrigerators
 - Medical Examiner including large body freezer
 - Evidence storage including multiple freezers
 - Fleet Services Bay
- ASHRAE Standard 100 EUI target for fire/police stations in climate Zone 4C is 66 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for Laboratories in climate Zone 4C is 179 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for Hospitals in climate Zone 4C is 135 kBtu/sf/yr.
- Oregon Department of Energy calculated the facility performance target of 110 EUI based on the various uses of the building.
- Electricity and Natural Gas energy used was reported in Energy Star Portfolio Manager for this building. The fuel used for the backup generators is not represented in this energy assessment.

OSP Central Point**Summary of 2021 Energy Use and EUIs**

- The buildings at this facility are over 23 years old with original lighting, boiler and HVAC equipment. OSP has identified the need for upgrades to lighting, HVAC equipment including a control system and a rebuild of the boiler.
- Some of OSP facilities have backup generators. Central Point has two generators to maintain emergency lighting, dispatch, and cooling in the medical examiner’s laboratory during an event.
- OSP facilities, including the Central Point location, remain fully operational during this pandemic. The Central Point facility operates with the main change being customers did not enter the facility and a minimal number of support staff teleworked.
- The assumption of any potential reductions due to reduced staff in the buildings is not applicable for the Central Point facility.
- At the requirement of the Oregon Occupational Safety and Health Administration (Oregon OSHA) and recommendations from ASHRAE, ventilation was increased and MERV 13 filters were installed. The MERV 13 filters affect the HVAC system by reducing the air flow and at the same time, OROSHA rule 437-001-0744 required optimizing the air flow and mix of outside air.
- These changes to the HVAC operations for a 24-hour facility resulted in increased energy consumption. These changes are still required, and OSP anticipates the increased energy consumption to continue.

Efforts to Address Future Energy Use

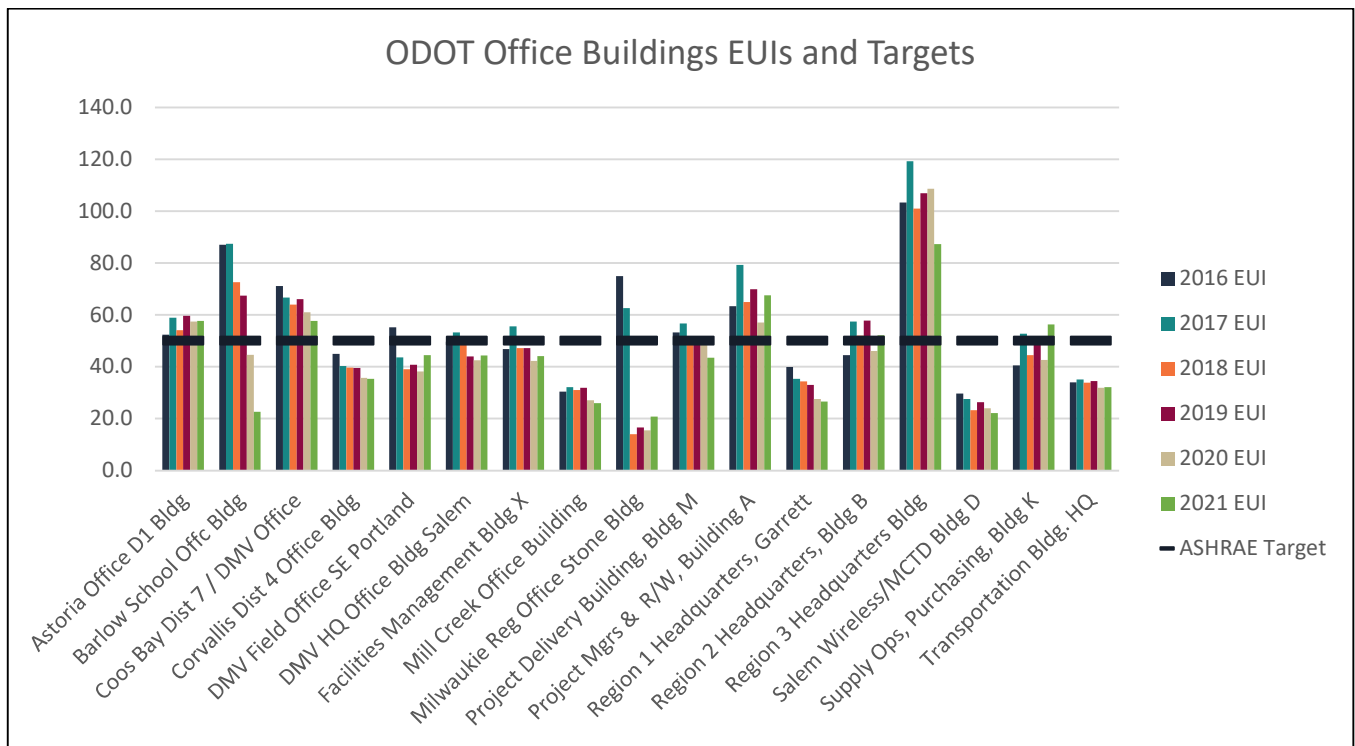
- Looking ahead, OSP was granted funding to make a significant investment in this property. The project includes major renovation and space increase for this location. This investment is expected to complete in 2023. OSP’s strategic masterplan is well-positioned to align with the state facility and agency goals outlined in Oregon Executive Orders 17-01, 17-20, and 20-04. These goals include energy and water efficiency targets, reducing greenhouse gas emissions, accomplishing cost savings by reducing energy footprint, and creating workplace environments that support employee health and well-being.

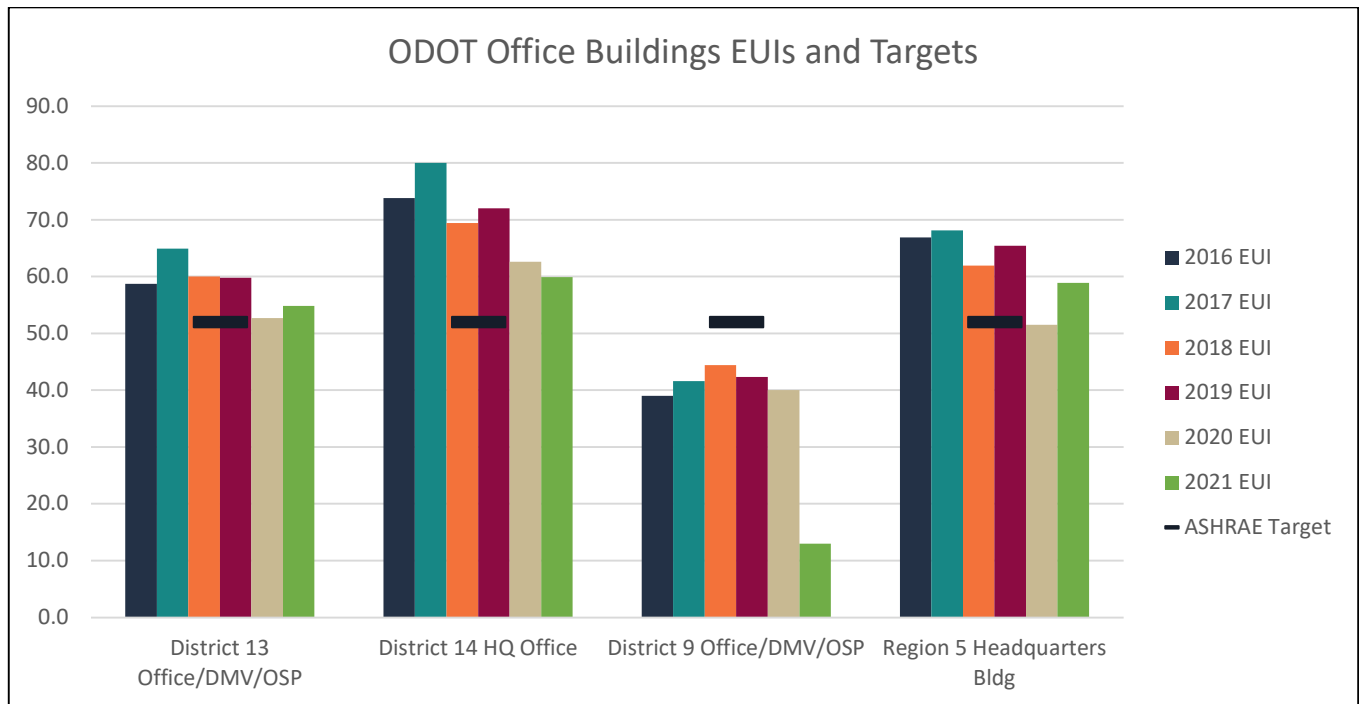
- Replacement of out-of-date lighting, HVAC, and roof will help facilitate the energy goals reduction.
- OSP has engaged ODOE’s SEED Energy Analyst to assist in the planning of the remodel and design.

Oregon Department of Transportation

- ODOT participates in Energy Trust of Oregon’s Strategic Energy Management (SEM) Program. ODOT staff have incorporated lessons learned from the SEM program in facilities throughout the state.
- ODOT invested in LED lighting upgrades in many of their facilities and are gradually upgrading all buildings.
- ODOT buildings increased their overall occupancy due to agency growth in the last few years.
- ODOT is decentralized; Region Managers pay bills and track their facility use and maintenance. Region Managers need to see payback in their operations budgets to invest in facility improvements.

ODOT Office Buildings





Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for office buildings in climate Zone 4C is 50 kBtu/sf/yr. ASHRAE Standard 100 EUI target for office buildings in climate Zone 5B is 52 kBtu/sf/yr.
- Barlow School Office Building energy use dramatically declined, as ODOT has relocated staff and reduced occupancy in the building. ODOT may replace the windows or invest in additional energy efficiency measures.
- Milwaukie Regional Office Stone Building energy use dramatically declined, as ODOT is no longer occupying the building. ODOT may sell the building
- DMV Field Office SE Portland steadily decreased energy use. The building received a major renovation including a high efficiency water source heat pump upgrade. Improvements of the Direct Digital Control System have led to continued energy use reductions.
- Programmable thermostats have been installed for the existing HVAC system.
- District 13 Office includes both a DMV and Oregon State Police. ODOT facilities staff have limited access and visibility to Oregon State Police leased buildings operation.
- Region 3 Headquarters was originally a warehouse that has been converted to offices. The building needs a new HVAC system as the existing system is oversized. Region 5 headquarters needs a significant upgrade in building infrastructure to realize energy savings.

Efforts to Address Future Energy Use

A 50001 Ready Energy Management Plan for facilities was developed and will help each facility with annual use goals and an energy reduction path to achieving and/or maintain target EUI. This plan will help ensure the implementation of projects that are identified in the Energy Trust of Oregon SEM program Annual Energy Plan for Operations and Maintenance.

ODOT is reducing leased spaces and consolidating staffing into owned buildings. Efforts to relocate staff in Region 2, Building B specifically, are presenting operational opportunities. An improved modern work environment should accommodate hybrid/remote employees and prove to reduce overall consumption.

ODOT facilities are aging and many of the energy and water-using systems need updating. Although ODOT has completed some upgrades as resources have allowed, there has not been sufficient capital budget to replace the HVAC, lighting, controls, plumbing fixtures, air distribution, and envelope upgrades in the Region 3 HQ, Region 4 HQ, Region 5 HQ and Bend DMV/Annex buildings. Capital Improvement opportunities present the largest impact for these buildings. ODOT is seeking bids and proposals to address a broad scope and to provide upgrades to the noted sites to increase comfort, better controllability of the heating, cooling and ventilation, reduced natural gas and electricity consumption, and contribute to the State’s energy efficiency and greenhouse gas emissions reduction goals outlined in Executive Orders [17-20](#) and [20-04](#).

Region 3 HQ building in Roseburg, OR is in need the following:

- Complete HVAC replacement, including new boiler
- Commissioning
- HVAC controls for main area and networked programmable thermostats for admin area
- Building envelope and insulation upgrade
- High-efficiency domestic hot water
- Exterior lighting upgrade to light emitting diode (LED)
- Interior lighting upgrade to LED (Current CFL lighting only)
- Low flow plumbing fixtures
- Other opportunities as identified by A/E

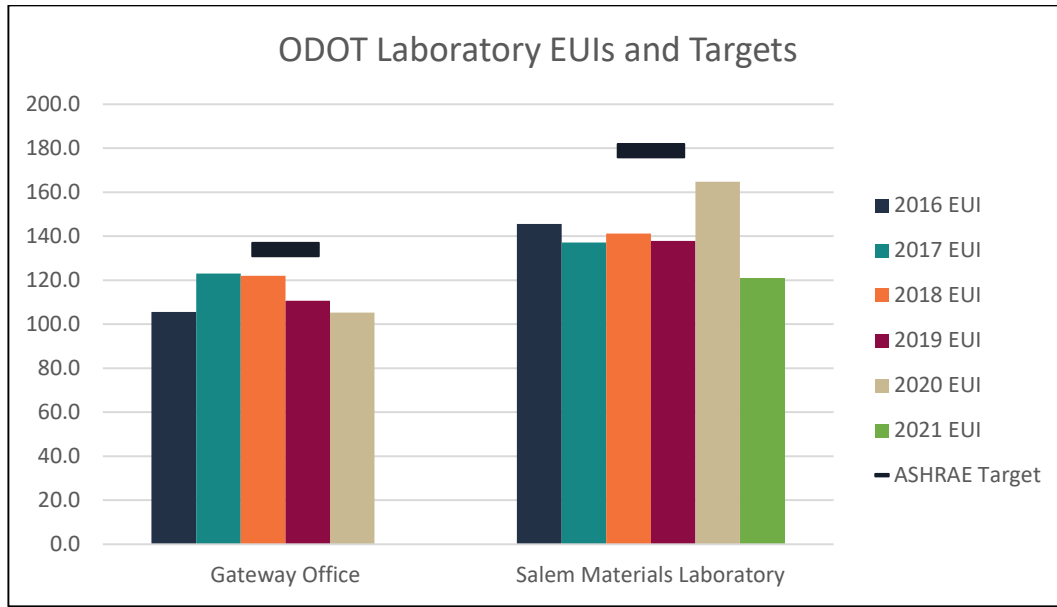
Region 4 HQ and DMV/Annex offices in Bend, OR are in need of the following:

- HVAC replacements in Region 4 HQ
- HVAC controls upgrades
- Interior LED lighting upgrades
- Building envelope sealing and insulation upgrades
- Air de-stratification in the DMV lobby
- Retro-commissioning
- Low flow plumbing fixtures
- Other opportunities as identified by A/E

Region 5 HQ building in La Grande, OR is in need of the following:

- DDC building automation system
- HVAC replacement, including air distribution
- Commissioning
- Interior LED lighting upgrade
- Building envelope sealing, remediation, and insulation upgrades
- Low-flow plumbing fixtures
- High efficiency domestic water heating
- Other opportunities as identified by A/E

ODOT Laboratories



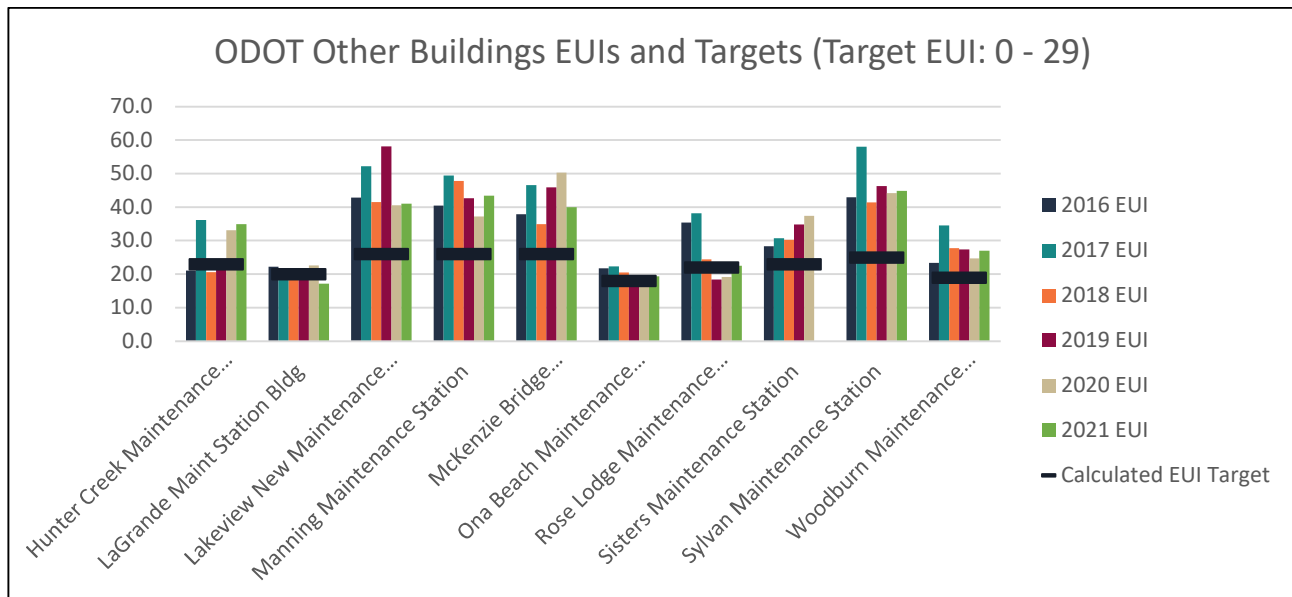
Summary of 2021 Energy Use and EUIs

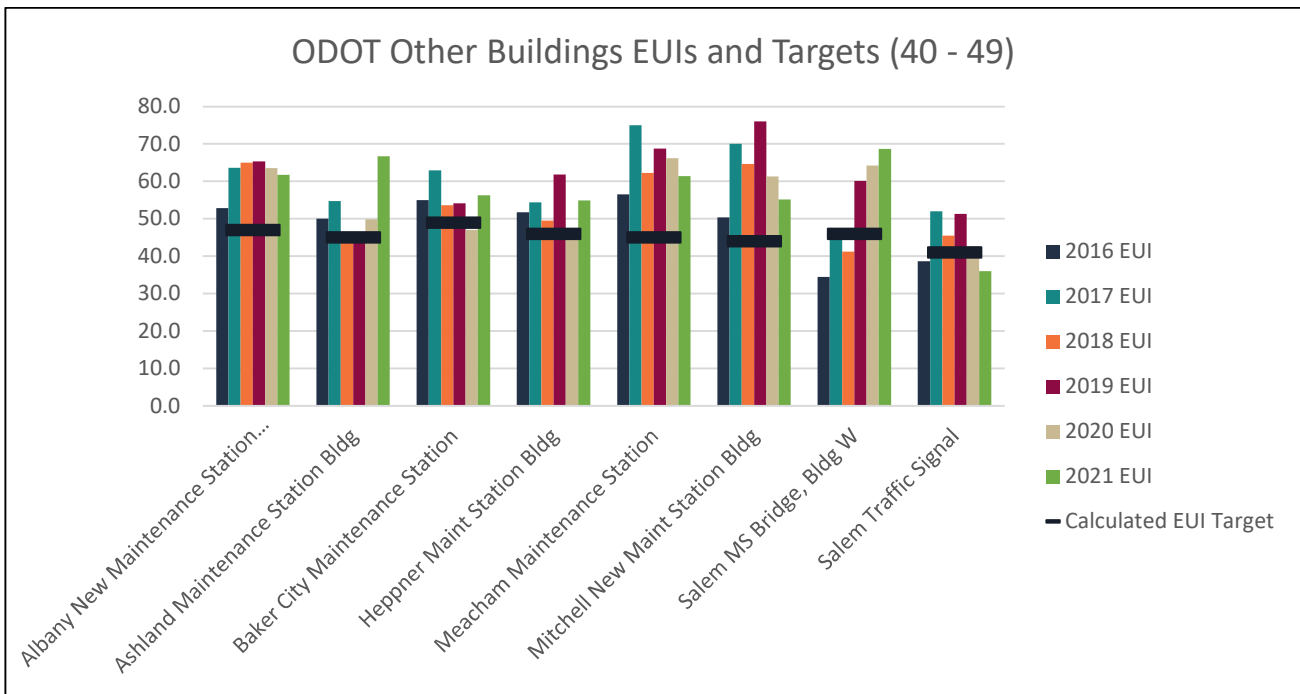
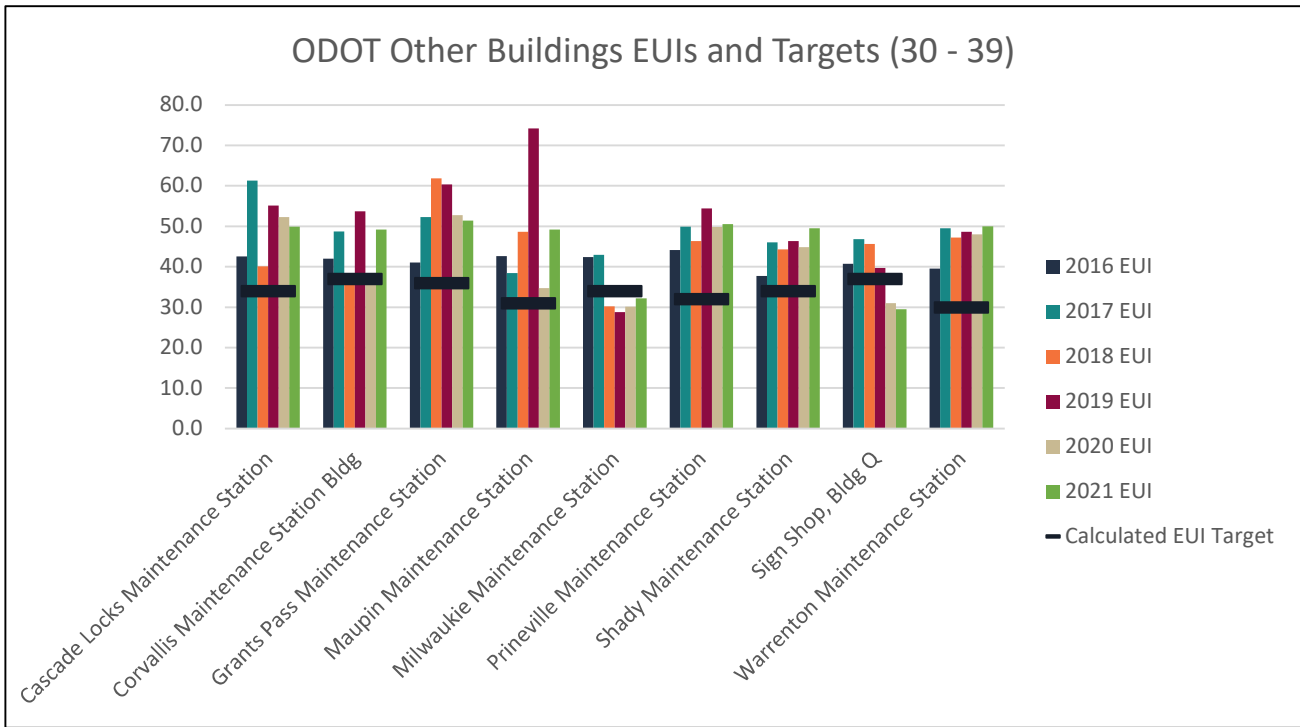
- ASHRAE Standard 100 EUI target for Laboratories in Climate Zone 4C is 179 kBtu/sf/yr.
- The Material Laboratory is participating in Energy Trust of Oregon’s SEM program.
- Gateway Office is 60% a forensic lab and 40% an Oregon State Police station.
- ASHRAE Standard 100 EUI target for Police Stations in Climate Zone 4C is 66 kBtu/sf/yr.
- Gateway has an ASHRAE calculated performance target of 134 EUI.

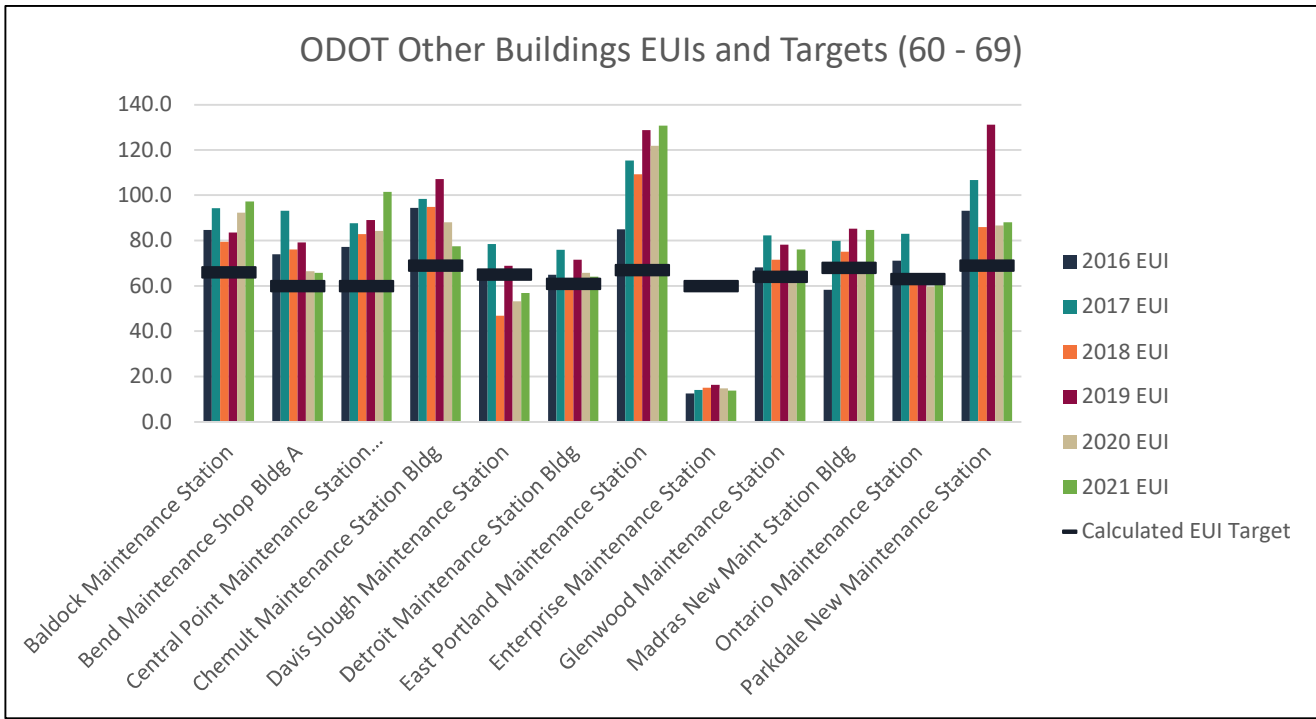
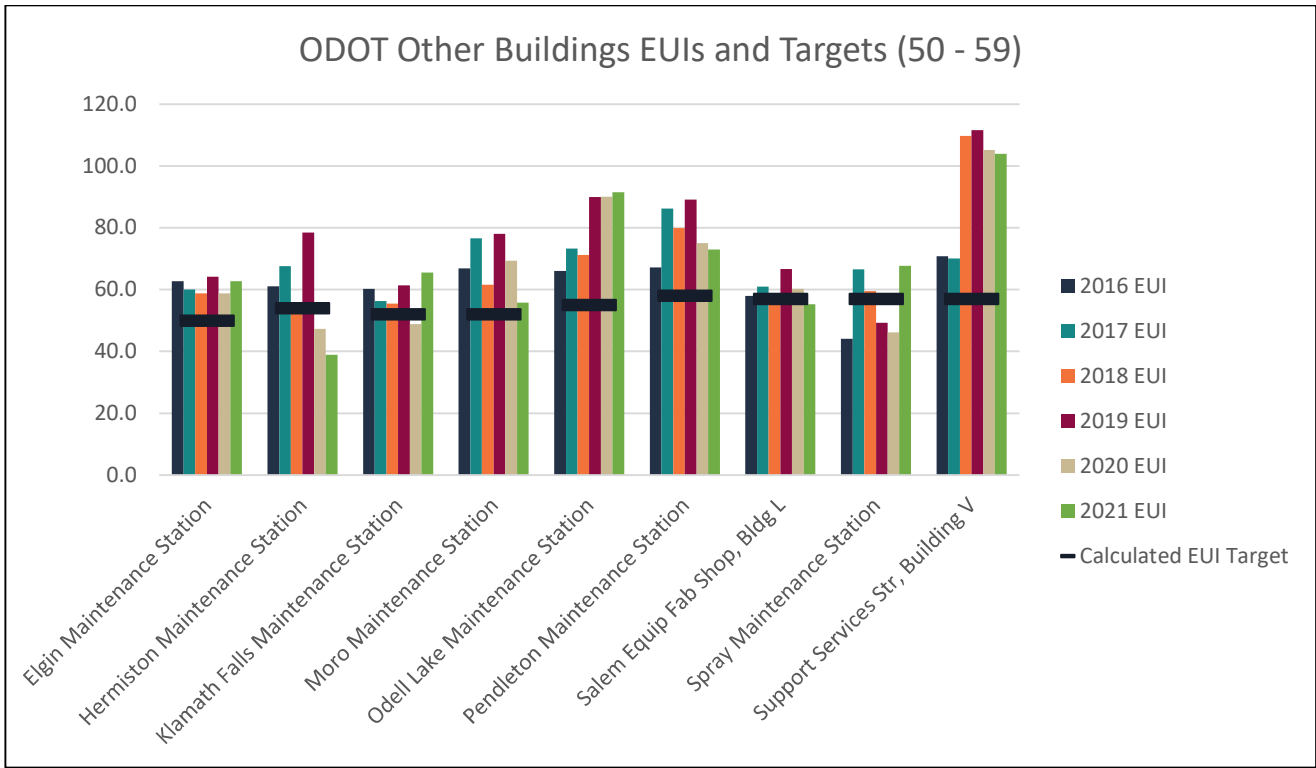
Efforts to Address Future Energy Use

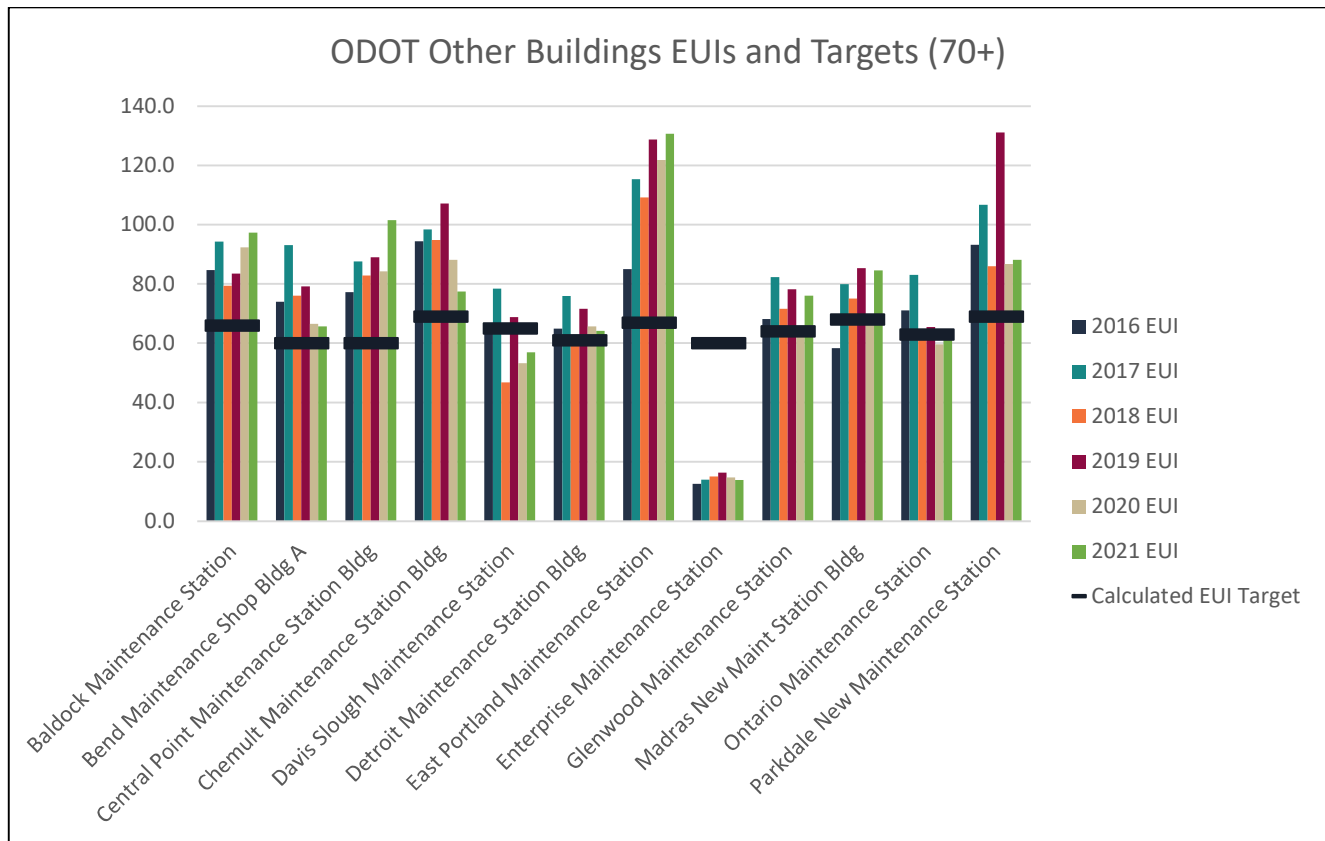
- No immediate actions identified. The agency will continue to monitor energy use and identify opportunities for efficiency.

ODOT Other Buildings (No ASHRAE Targets)









Summary of 2021 Energy Use and EUIs

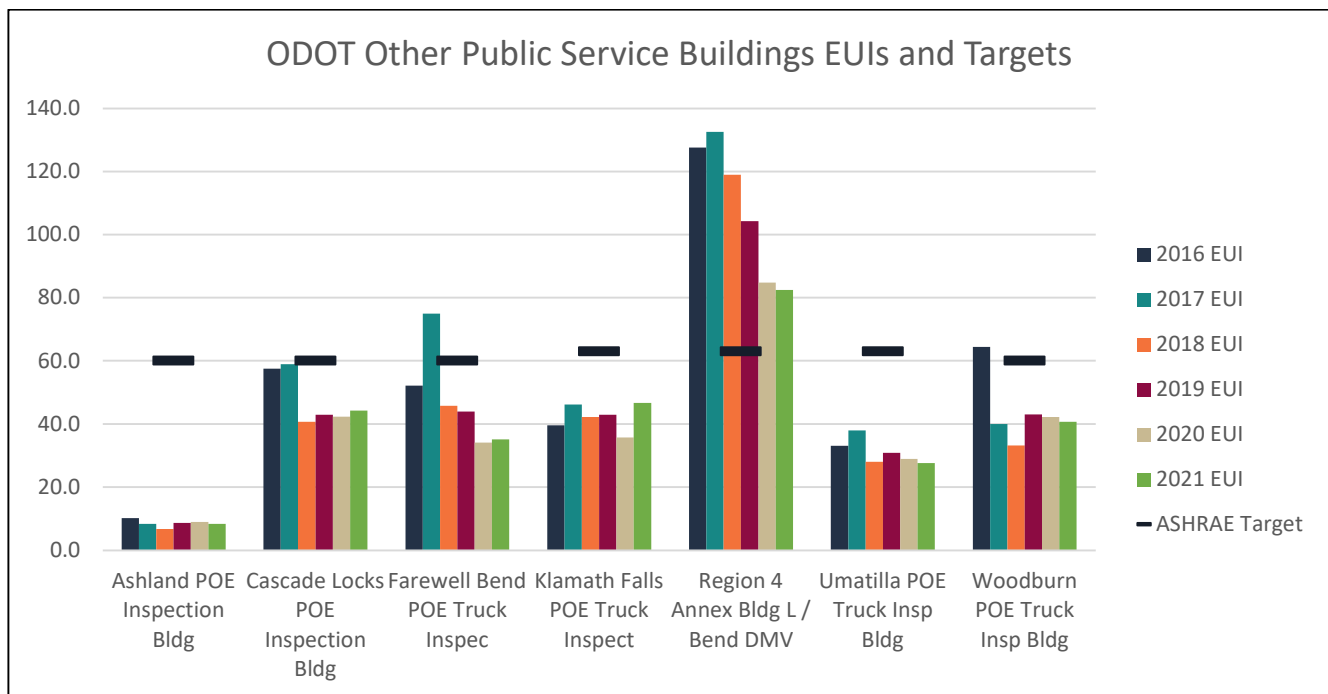
- These ODOT buildings do not have ASHRAE Standard 100 EUI targets established based on their use.
- ODOE collaborated with ODOT to create a Target EUI of a 10 percent reduction from the 2015 baseline year use.
- Many maintenance stations are a campus of buildings providing various services on a single meter. Many of the maintenance facilities are too small for the trucks they need to have so doors remain open as the trucks are being serviced or stored.
- Energy use in ODOT maintenance buildings is impacted by severe weather. In the winter, snow and ice lead to increased use by vehicles clearing roads and assisting motorists. Inclement and unseasonal weather in some areas saw increased consumption at maintenance stations.
- Annual energy use may be affected by various factors including weather variations, changes to operational hours, and occupancy changes, among other factors outside of ODOT's control. In summer, these stations are utilized by fire crews to get water, supplies and maintain vehicles.
- Most buildings are operating above the Target EUI and present significant opportunity for energy savings.
- Hermiston MS completed a solar array project in June of 2022 (total capacity of 25.92kW DC). Since Pendleton Maintenance Station invested in a solar photovoltaic system in 2019, the building has reduced EUI. ODOT anticipates seeing a similar reduction of EUI at the Hermiston MS in future reporting.

Efforts to Address Future Energy Use

- ODOT can meet its targets by focusing customer operations, portfolio management, property management, and business services on environmental stewardship.

- Identify and track energy consumption and building occupancy so that facilities can accommodate building comfort while prioritizing energy reduction efforts.
- Provide information to building tenants about the status of energy and sustainability projects and demonstrate to customers the results of projects and efforts.
- Ask tenants for feedback about the building environment to improve where necessary and to determine the effectiveness of our sustainable operating and custodial procedures.
- Two intersecting trends in building energy usage have made electricity consumption during periods of no occupancy an attractive opportunity for energy savings that should be examined further internally by ODOT.
 - The first trend is the steadily increasing electricity use of devices that operate even when few or no people are present. These devices include plug loads, network equipment, security systems, elevators, and certain, uncontrolled components in HVAC systems.
 - The second trend is the rising percentage of time when buildings are empty or intermittently occupied. Occupancy rates vary based on building functions, size, cleaning schedules, security procedures, culture, and other factors. Few measurements have been made on the frequency and duration of vacant hours. Most information is anecdotal and this should be examined further to gauge a clearer sense of occupancy informed operations.
- The combination of higher miscellaneous electrical loads used during vacant periods and more vacant hours suggests the existence of potential energy savings that could present enough opportunity to achieve building target EUI across ODOT’s portfolio of buildings.

ODOT Other Public Service Buildings



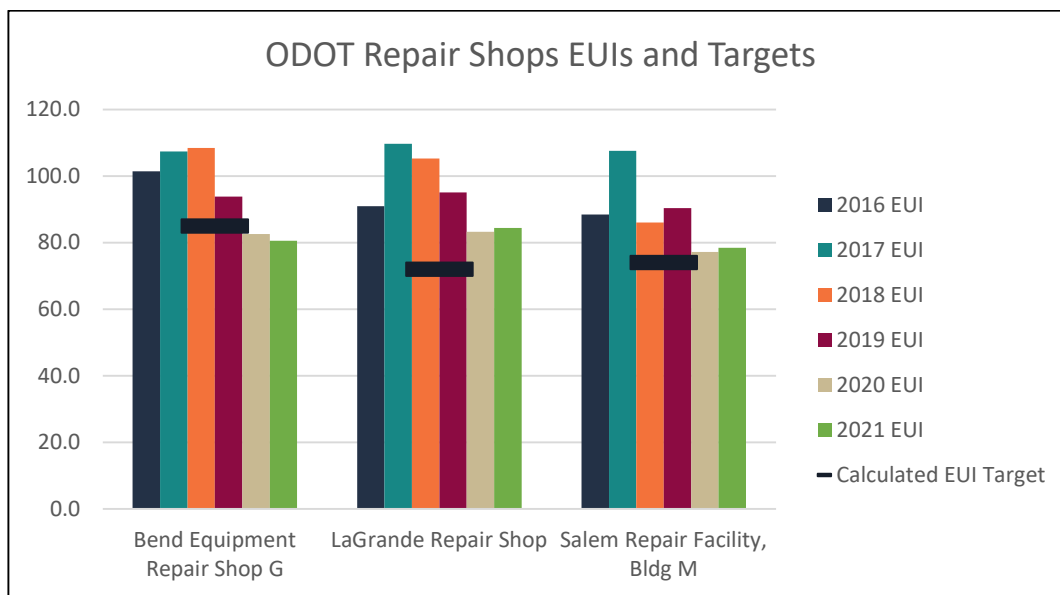
Summary of 2021 Energy Use and EUIs

- ASHRAE Standard 100 EUI target for Other – Public Service Buildings in Climate Zone 4C is 60 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for Other – Public Service Buildings in Climate Zone 5B is 63 kBtu/sf/yr.
- Region 4 Annex Building is the only building operating above its ASHRAE energy use target.

Efforts to Address Future Energy Use

- The Oregon Department of Transportation is committed to strategic management to inform agency operations and best practices at its facilities. Each building will have a written Energy Management Plan that addresses budget reduction goals for the facility. 50001 Ready EnMS for ODOT applicable buildings.
- Conducting annual building occupant surveys and developing an employee engagement plan that promotes and teaches employees to practice energy efficient behaviors in our facilities and solicits ideas from employees about how to improve energy performance within the organization.
- Planning is currently underway to address upgrading energy systems at the Region 4 Annex Building, which is needed to realize savings and a reduction in EUI.

ODOT Repair Shops



Summary of 2021 Energy Use and EUIs

- ODOT and ODOE negotiated calculated targets of a 10% reduction in energy use from the baseline year of 2015 for Repair Shops
 - Bend Eq Repair Shp (truck shp) G- 85 kBtu/sf/yr
 - Salem Repair Facility, Bldg M- 74 kBtu/sf/yr
 - LaGrande Repair Shop- 72 kBtu/sf/yr
- All buildings are operating over ASHRAE targets but are getting closer to calculated targets.

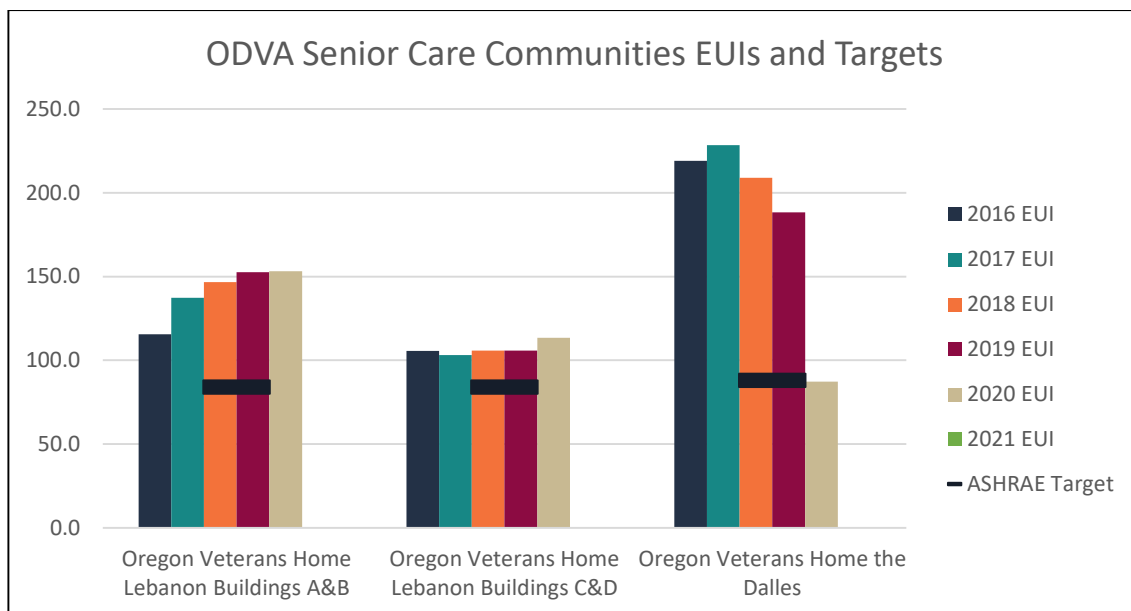
Efforts to Address Future Energy Use

- ODOT Repair Shops maintain road maintenance and fleet vehicles and are heavily used in fall/winter/spring. The buildings contain plows and other large equipment and have significant ventilation requirements. The buildings include manufacturing and are used 24/7 during extreme weather events. There is limited opportunity for savings beyond major, multi-million dollar retrofits of the mechanical systems and envelope.

Oregon Department of Veterans’ Affairs

- A technical issue prevented Veterans’ Affairs from reporting a full year of energy data in 2021, thus ODOE is not able to calculate an EUI for 2021. ODOE is working with ODVA to address the issue and report the final months of data.

ODVA Senior Care Communities



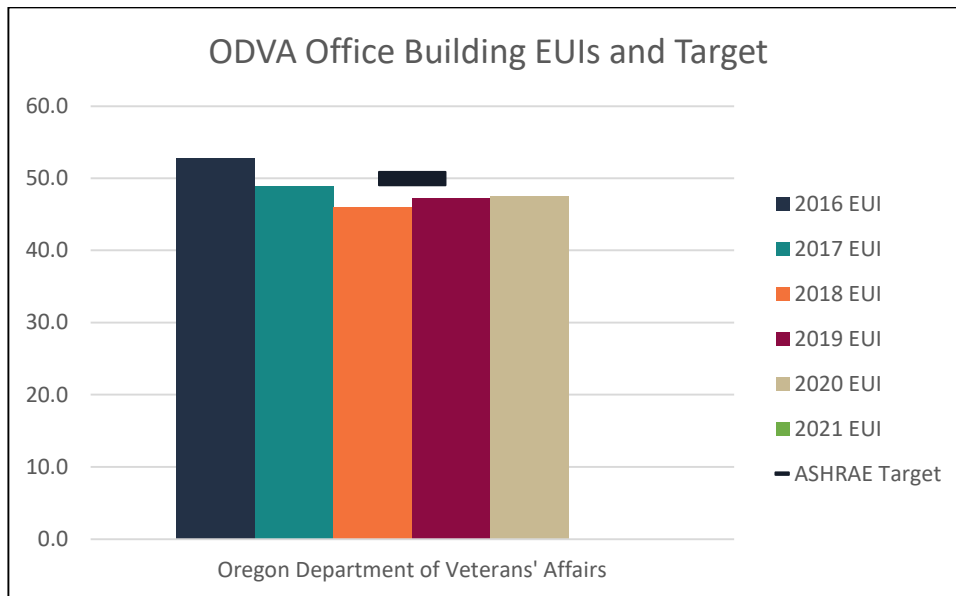
Summary of 2021 Energy Use

- ASHRAE Standard 100 EUI target for senior care communities in climate Zone 4C is 84 kBtu/sf/yr.
- ASHRAE Standard 100 EUI target for senior care communities in climate Zone 5B is 88 kBtu/sf/yr.
- ODOE will update this report with 2021 data from ODVA once it is available.

Efforts to Address Future Energy Use

- ODOE will work with ODVA to identify opportunities for reducing energy use in its Senior Care facilities where feasible.

ODVA Office Building



Summary of 2021 Energy Use

- ASHRAE Standard 100 EUI target for Government Office buildings in climate Zone 4C is 50 kBtu/sf/yr.
- ODOE will update this report with 2021 data from ODVA once it is available.

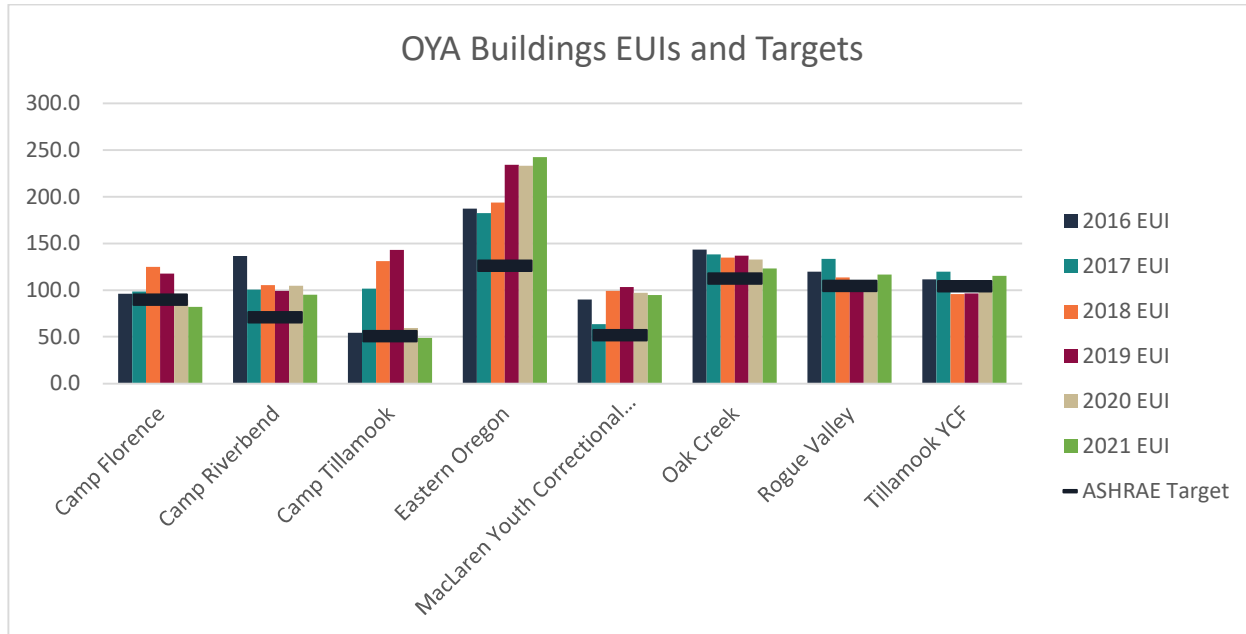
Efforts to Address Future Energy Use

- ODOE will work with ODVA to identify opportunities for reducing energy use in its office building where feasible.

Oregon Youth Authority

- ASHRAE Standard 100 does not have an EUI target for detention facilities.
- ODOE collaborated with OYA to create a calculated performance target of a 20% reduction from the baseline year of 2015 (black line).

OYA Buildings



Summary of 2021 Energy Use

- The agency operated the facilities in pandemic mode in all of 2021. Using higher efficiency MERV 13 filters, changing the filters more frequently. Increased ventilation and air scrubbers are still working to purify the air in the spaces. This resulted in higher-than-normal energy use.
- Occupancy levels were almost identical to pre-pandemic levels due to almost all personnel are essential and had to report to work during the pandemic.
- OYA is committed to meeting Executive Order 17-20 by reducing energy use by 20% compared to the baseline year.
- OYA’s facilities operate 24 hours a day, 7 days a week. This presents challenges because typical HVAC and lighting operational set-backs and similar energy saving opportunities cannot be utilized.
- The agency has an aggressive capital construction campaign to transform facilities from a boot camp-based atmosphere to a developmental living environment to aid in youth transformation.
- All renovation and new construction projects are designed to meet the requirements to exceed current energy saving building codes by 20%.
- OYA has made numerous energy improvements to lighting systems. Replacing antiquated lighting fixtures to LED both within facilities and in exterior locations.
- OYA has also been very successful at installing energy efficiency roofing systems and HVAC energy recovery units as well as high efficient boilers, variable frequency drives, automated building and lighting controls to further the goal of reducing energy use.

- Over the last five years OYA has constructed 9 new facilities and all of them were constructed to SEED standards and met the requirement to exceed the energy code by 20%. One of OYA new facilities, the New Bridge High School on the Rogue Valley campus, was recently awarded the LEED Platinum rating, the highest LEED standard available.
- More energy was used to heat and cool the spaces and additional appliances like air scrubbers were installed to purify the air. Negative pressure systems were also installed to help keep youth and staff safe.

Efforts to Address Future Energy Use

- The agency has an aggressive capital construction campaign to transform facilities from a boot camp-based atmosphere to a developmental living environment to aid in youth transformation.
- All renovation and new construction projects are designed to meet the requirements to exceed current energy saving building codes by 20%.
- The agency is continuing to operate the facilities in pandemic mode. Using higher efficiency MERV 13 filters, changing the filters more frequently. Increased ventilation and air scrubbers are still working to purify the air in the spaces. This will continue to result in higher-than-normal energy use.
- New rules and practices around wildfire smoke rules also results in higher energy use to ensure the air in the living and working spaces are at acceptable levels.
- Cleaning and sanitizing practices are also in place which also results in higher use of resources.
- OYA will continue to implement energy improvements to lighting systems. Replacing antiquated lighting fixtures to LED both within facilities and in exterior locations.

FOR MORE INFORMATION

The Oregon Department of
Energy 550 NE Capitol Street NE
Salem, OR 97301
503-378-4040 | 800-221-8035
askenergy@oregon.gov
www.oregon.gov/energy

