Oregon Department of ENERGY

EUI Target DevelopmentRAC and Public meeting

SBW Team October 15, 2024



September Meeting Q&A



BEPS Rulemaking Portal



EUIt Methodology

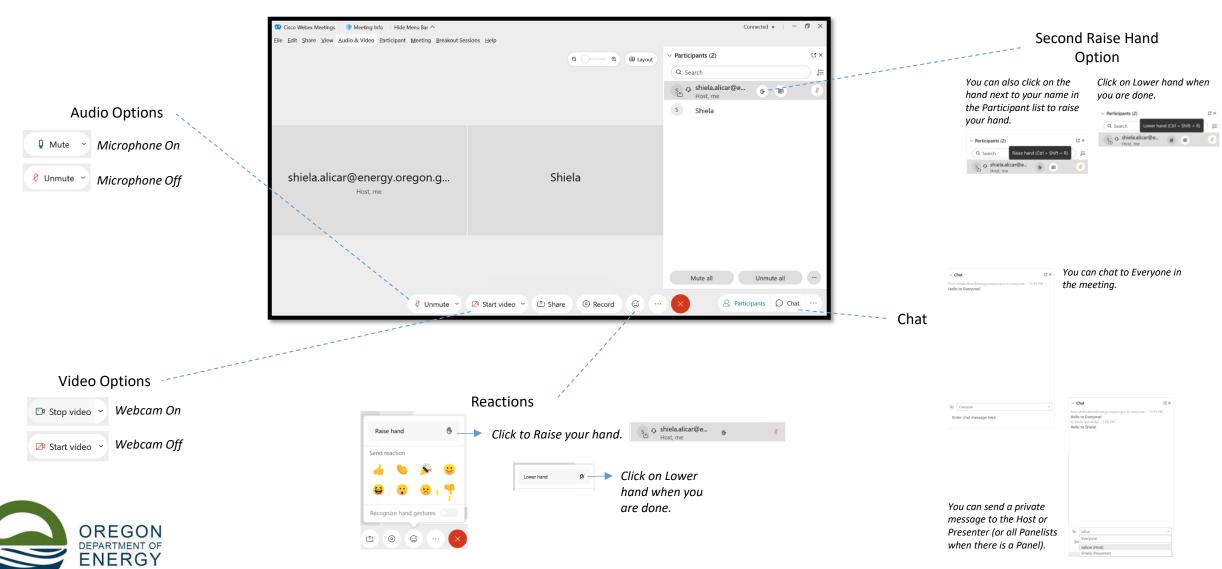








USING WEBEX



Time	Topic	Presenter
1-1:05pm	Average Energy Use Intensity (EUI)	Anna Kelly, Director, SBW Consulting
1:05- 1:20pm	Target EUIs overview	Poppy Storm, Senior Policy Advisor, 2050 Institute
1:20-1:45 p.m.	Q&A and Facilitated Discussion	Kirstin Pulles, Unrooz Solutions



SBW Team

Principal in Charge Faith DeBolt, SBW



Project Manager Anna Kelly, SBW



Technical Michael Baker, SBW



Technical Santiago Rodríguez-Anderson, SBW



Facilitation Sepideh Rezania, Unrooz



Facilitation
Kirstin Pulles, Unrooz



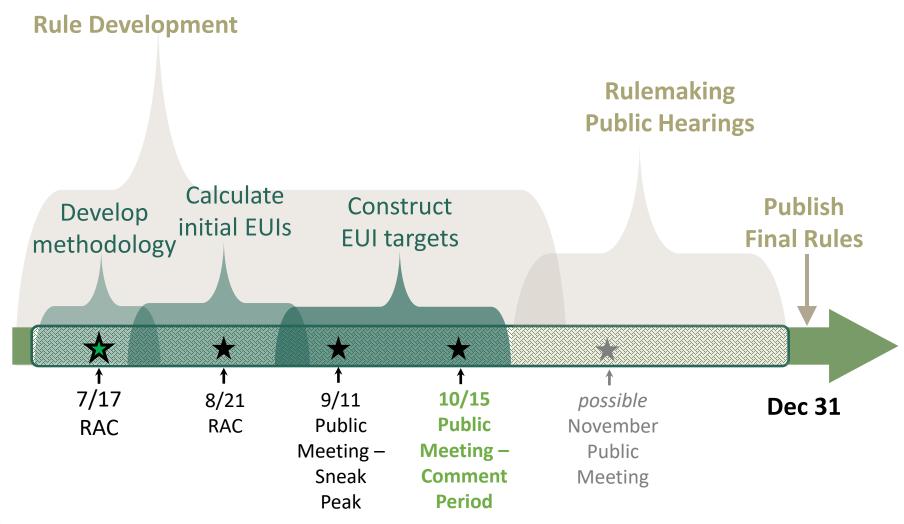
Policy Poppy Storm, 2050 Institute



Additional SBW Technical Staff: Jeremy Stapp, Gina Hicks, Erin Wenger, Nick Sitts

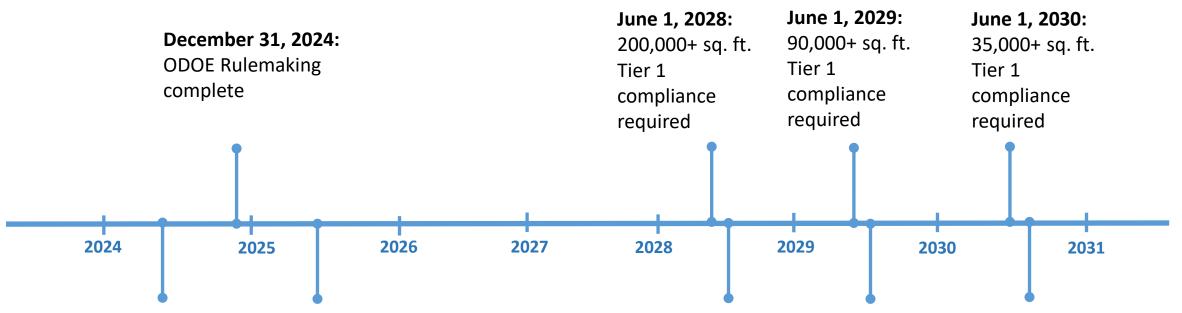


BPS Target Development Process





BPS PROGRAM TIMELINE – KEY DATES



2024: Multiple stakeholder and RAC meetings to support rulemaking

July 1, 2025: ODOE to notify Tier 1 and Tier 2 Building Owners July 1, 2028: Tier 2 building benchmarking

required

 ODOE evaluation of Tier 2 benchmarking data

July 1, 2029:

 ODOE update rulemaking and EUI targets (every 5 years after) October 1, 2030:

ODOE report to Governor and Legislature on recommendation for Tier 2 BPS



UNDERSTANDING HB 3409: BPS

Directive

Key Detail

Building Performance

Establish energy performance standards

Standards are for commercial buildings >35,000sqft

Average EUI

Set energy use intensity targets (EUIt) for specific building types

The **average** EUI serves as the **minimum allowable** EUIt for buildings.

Compliance Pathways

Buildings can comply using multiply pathways

Conditional compliance through energy audits, energy investments and energy management plans



PROCESS OVERVIEW



Step 1: Data Collection

Objective: Gather EUI data from various sources.

Sources Include: Regional, national, and local EUI data.



Step 2: 2019 Northwest Average EUIs

Objective: Determine the baseline EUI for the Northwest.

Approach: Combine regional and national data to establish the 2019 average.



Step 3: Oregon Average EUIs

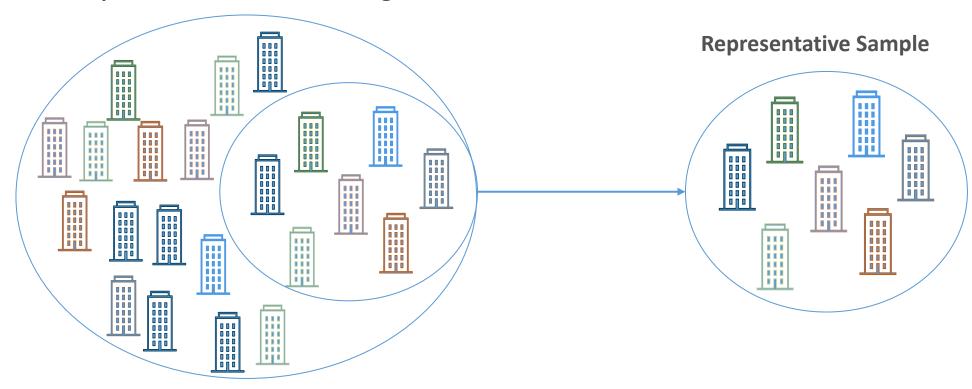
Objective: Tailor EUI benchmarks for Oregon.

Approach: Make Oregon adjustments to specific building types and use trends to adjust to Oregon average EUIs.



WAYS TO DEVELOP AVERAGE EUIS

Example: Census of Office Buildings





DATA AVAILABLE FOR AVERAGE EUIS





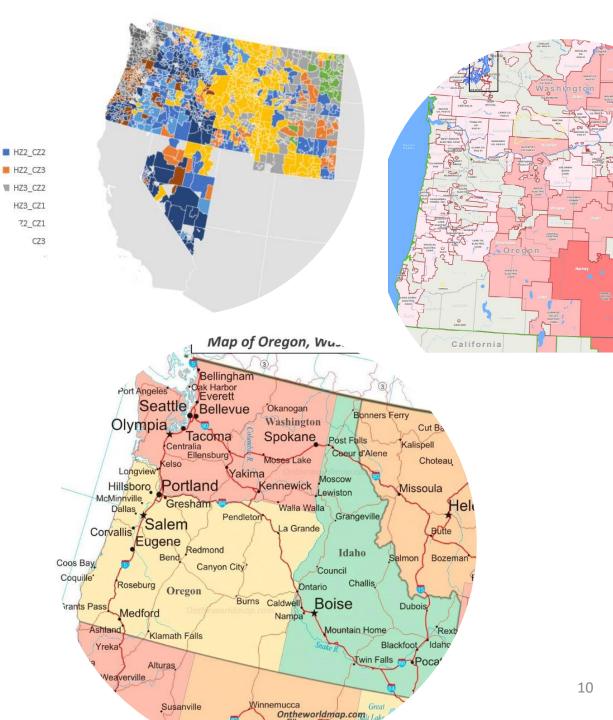
Northwest Regional Data

Climate Adjusted National Data



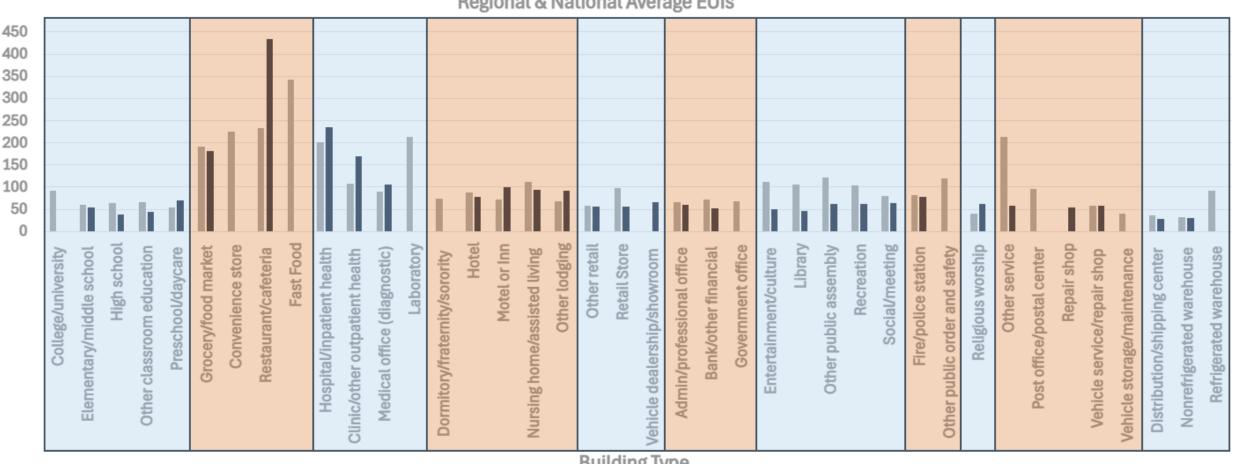
Oregon and Washington Data





DEVELOPING 2019 REGIONAL AVERAGE EUIS

Regional & National Average EUIs



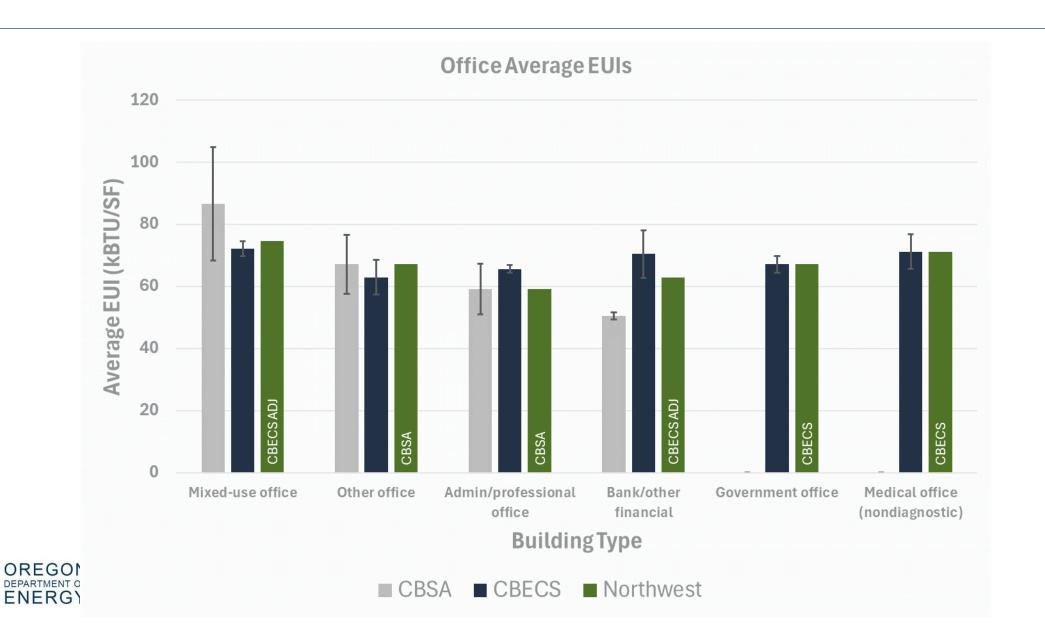
Building Type

■ CBECS ■ CBSA



Average EUI (KBTU/SF)

DEVELOPING 2019 NORTHWEST AVERAGE EUIS





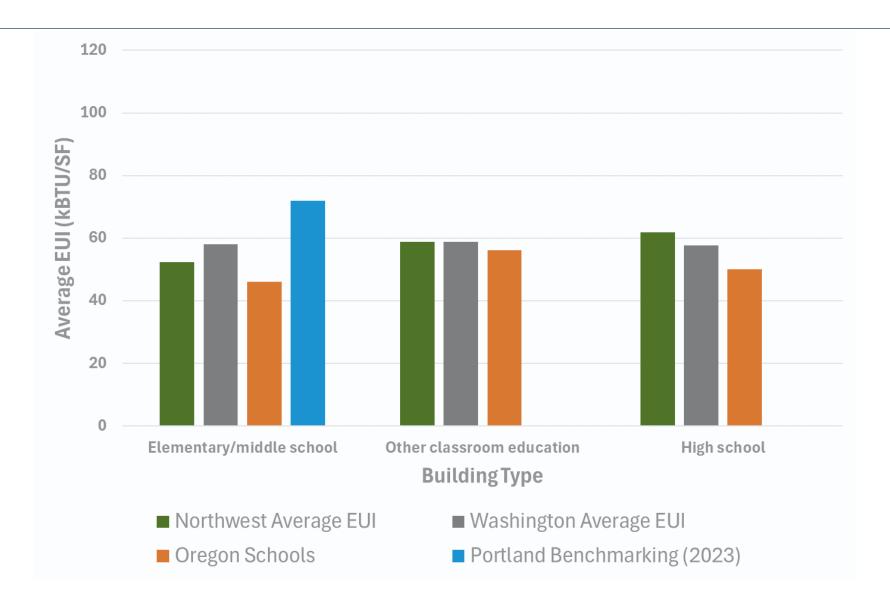
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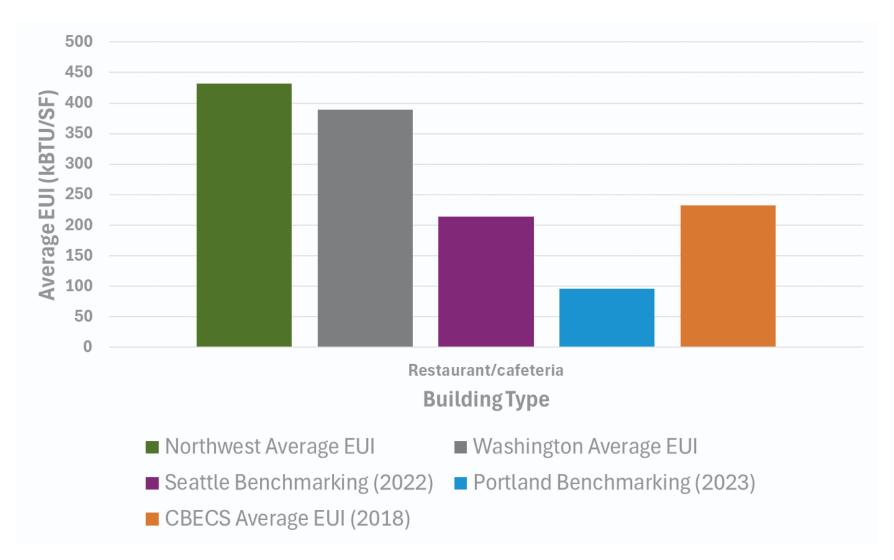
Establish "Oregon Average EUIs"

- Compare Oregon, Portland, and Seattle data against 2019 Northwest Average EUIs
- Recommend custom Oregon adjustments to specific building types
- Apply custom adjustments to specific building types in the 2019 Northwest Average EUIs
- Apply a 2027 adjustment factor to establish the Oregon Average EUIs



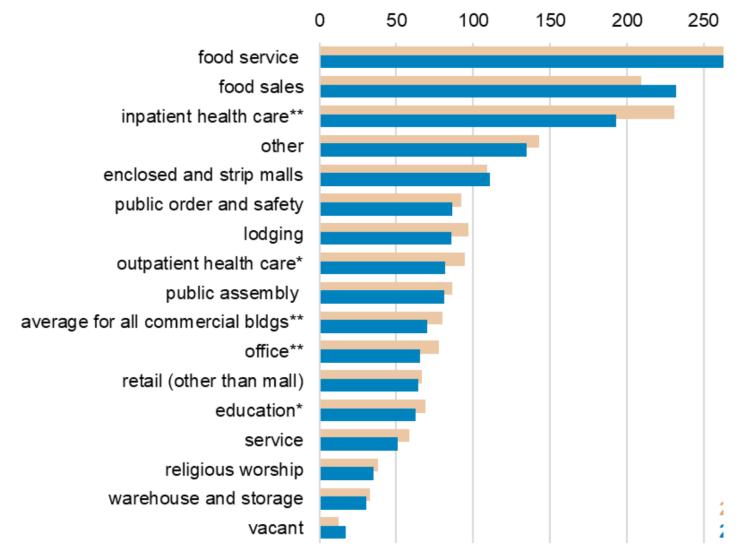








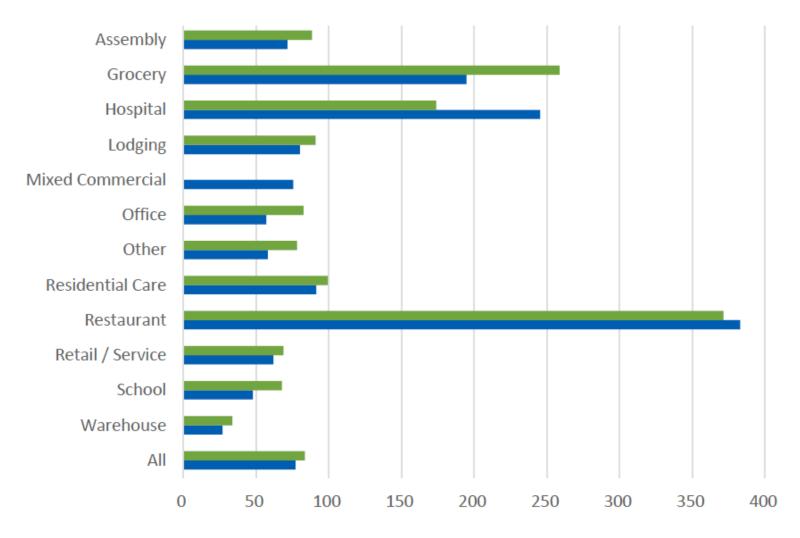
 National energy use intensity decreased from 2012 to 2018:





Data source: U.S. Energy Information Administration, Commercial Buildings Energy Consumption Survey

Northwest energy intensity decreased from 2014 to 2019:





2014 2019



Adjusting 2019 Average EUIs to Reflect Energy Use Trends

Consideration	CBECS (2012-2018)	CBSA (2014-2019)	OR State- Owned (2018-2023)	OR Schools (Various Ranges)	Portland Benchmarking (2018-2023)	Seattle Benchmarking (2018-2022)
Trending down overtime?	Yes	Yes	N/A	Yes	N/A	Yes
Use for 2027 adjustment factor?	Yes	No	N/A	No	N/A	No





Adjusting Oregon Average EUIs to 2027 benchmark

2027 aligns with first Oregon BEPS EUIt measurement year (with June 1, 2028 reporting deadline)



Calculate as -1.7%/year

-13.6% total trend factor for 2027 (eight years between 2019-2027)



Apply trend factor to 2019 Northwest Average EUIs

Reflects 2027 Oregon Average EUIs







Apply Four Custom Adjustments

Use Oregon schools' data to establish average EUIs for schools:

- Elementary/middle schools
- High schools
- Other classrooms

Reduce average restaurant EUI by 23% to align with CBECS, Portland, and Seattle data

Apply a Universal Adjustment Factor to Establish Oregon Average EUIs

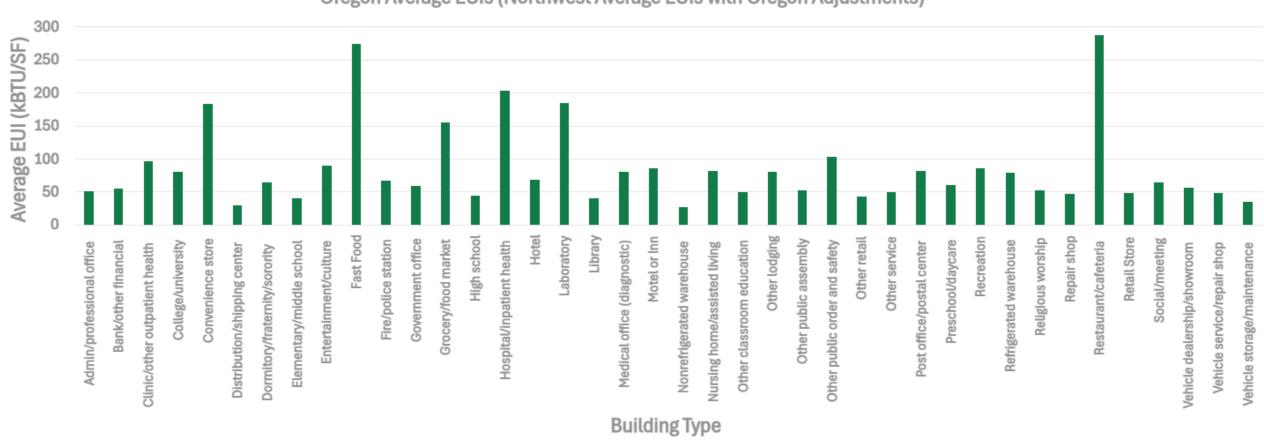
Use CBECS downward trend to align with first Oregon BEPS EUIt measurement year

- Averaged across all building types (10% reduction from 2012-2018, -1.7%/yr)
- Large population of buildings (>6,000)
- Representative sample, highly vetted data and analysis
- Conservative estimate calculated pre-COVID



OREGON AVERAGE EUIS

Oregon Average EUIs (Northwest Average EUIs with Oregon Adjustments)



2027 Draft Oregon EUIt



TARGET SETTING CRITERIA

EUI targets must:	Source:
Be weather normalized, net energy	HB 3409
Be equal to or greater than average EUIs	HB 3409
Include two or more climate zones	HB 3409
Adjust as necessary for unique energy using features	HB 3409
Consider regional and local building energy use	HB 3409
Exclude EV supply equipment	HB 3409
Maximize GHG reductions	HB 3409
Recognize flexible loads (EUIt adjacent)?	RAC

Assessed Average EUIs Against Target
Setting Criteria

Discussed Implications of Changes

Considered
Rationale for
Changes

Finalized Draft Targets



DRAFT EUI TARGETS

Principle Building Activity	ASHRAE Buillding Type	Compliance Cycle One EUIt	ASHRAE 100
Education	College/university	79	65
Education	Elementary/middle school	40	34
Education	High school	43	47
Education	Other classroom education	49	28
Education	Preschool/daycare	60	46
Food Sales	Grocery/food market	155	150
Food Sales	Convenience store	182	166
Food Service	Restaurant/cafeteria	287	217
Food Service	Fast Food	274	304
Health Care (Inpatient)	Hospital/inpatient health	203	160
Health Care (Outpatient)	Clinic/other outpatient health	96	43
Health Care (Outpatient)	Medical office (diagnostic)	80	38
Laboratory	Laboratory	184	111
Lodging	Dormitory/fraternity/sorority	64	46
Lodging	Hotel	67	49
Lodging	Motel or Inn	85	41
Lodging	Nursing home/assisted living	81	89
Lodging	Other lodging	79	49
Retail	Other retail	43	53
Retail	Retail Store	48	38
Retail	Vehicle dealership/showroom	55	46



DRAFT EUI TARGETS

Principle Building Activity	ASHRAE Buillding Type	Compliance Cycle One EUIt	ASHRAE 100
Office	Admin/professional office	51	36
Office	Bank/other financial	54	61
Office	Government office	58	40
Public Assembly	Entertainment/culture	90	32
Public Assembly	Library	39	50
Public Assembly	Other public assembly	52	40
Public Assembly	Recreation	85	37
Public Assembly	Social/meeting	64	34
Public Order and Safety	Fire/police station	66	41
Public Order and Safety	Other public order and safety	103	85
Religious Worship	Religious worship	52	20
Service	Other service	50	44
Service	Post office/postal center	81	51
Service	Repair shop	46	32
Service	Vehicle service/repair shop	47	41
Service	Vehicle storage/maintenance	34	31
Warehouse/Storage	Distribution/shipping center	29	26
Warehouse/Storage	Nonrefrigerated warehouse	26	16
Warehouse/Storage	Refrigerated warehouse	78	60



What questions can we answer about...



Data Sources

National Datasets

Regional Datasets

Local Datasets



Average EUIs

Climate Zone

Building Types

COVID-19



EUI Targets

Target Setting Criteria

Schools Adjustment

Trends Adjustment

Restaurant Adjustment

ODOE Comment Portal



Where to comment on Energy
Use Intensity Targets on
ODOE's BPS Rulemaking
Comment Portal



Oregon Department of ENERGY

EUI Target DevelopmentPublic meeting #1

SBW Team September 11, 2024

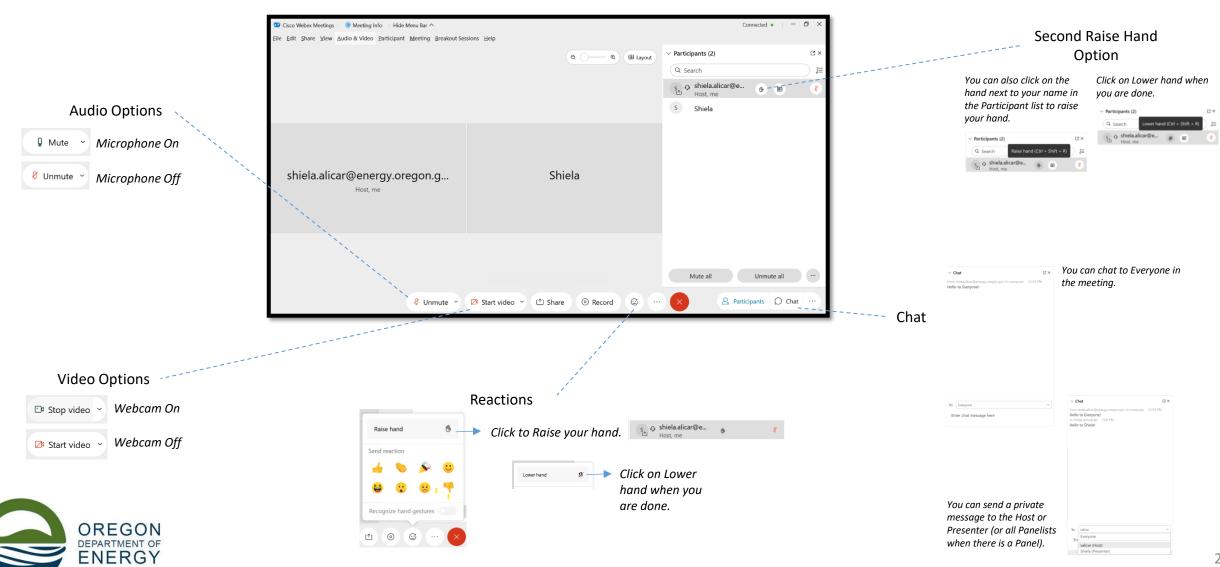








USING WEBEX



AGENDA

10:00 a.m.	Introductions	Sepideh/Kirstin, Facilitator
10:05 p.m.	Review EUI Target Development Process & Timeline	Anna Kelly, Director of Innovation and Strategy
10:10 p.m.	Background	Anna Kelly, Director of Innovation and Strategy
10:20 p.m.	Average EUIs	Santiago Rodriguez-Anderson, Sr Engineer
11:05 p.m.	Target EUIs	Poppy Storm, Senior Policy Advisor
11:25 p.m.	Wrap Up and Next Steps	Anna Kelly, Director of Innovation and Strategy



SBW Team





Project Manager Anna Kelly, SBW



Technical Michael Baker, SBW



Technical Santiago Rodríguez-Anderson, SBW



Facilitation Sepideh Rezania, Unrooz



Facilitation Kirstin Pulles, Unrooz



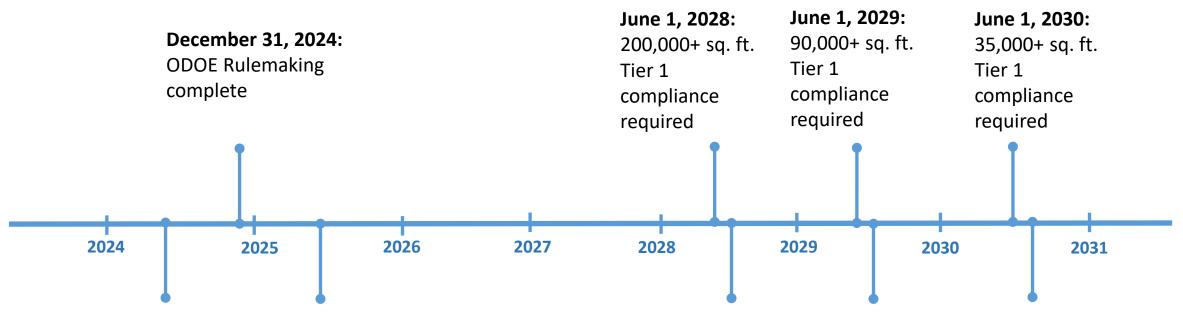
Policy Poppy Storm, 2050 Institute



Additional SBW Technical Staff: Jeremy Stapp, Gina Hicks, Erin Wenger, Nick Sitts



BPS PROGRAM TIMELINE – KEY DATES



2024: Multiple stakeholder and RAC meetings to support rulemaking (~ 4)

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July 1, 2029:

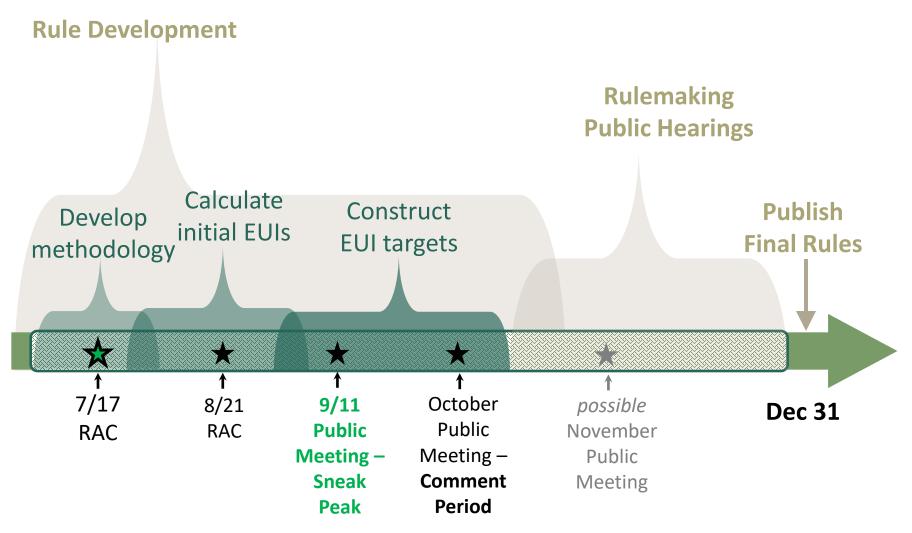
- ODOE evaluation of Tier 2 benchmarking data
- ODOE update rulemaking and EUI targets (every 5 years after)

October 1, 2030:

ODOE report to
Governor and
Legislature on
recommendation for
Tier 2 BPS



BPS Target Development Process





PURPOSE OF THIS MEETING





PROVIDE A SNEAK PEAK TO THE POTENTIAL TARGETS

INCREASE AWARENESS OF THE TARGET DEVELOPMENT PROCESS

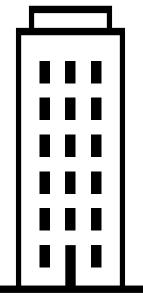
COMMENT PERIOD OPENS IN OCTOBER!







BPS KEY CONSIDERATIONS



Building Performance Standards require certain buildings and owners to meet certain performance targets by a specified date.



Align and Establish Goals

- Alignment with decarbonization goals
- Performance metrics



Determine Covered Properties

- Property Types
- Exemptions and Accommodations



Consider Compliance Approaches

- Compliance Approaches
- · Enforcement for Non-compliance



Provide Support to Building Owners

- Technical Support
- Funding Support



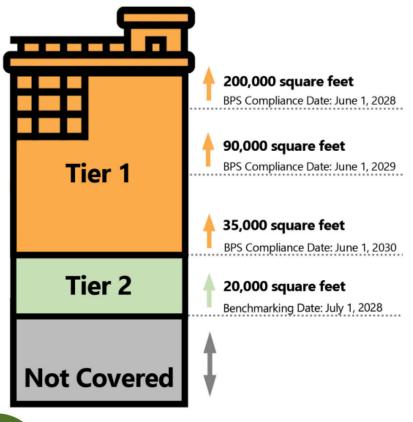
Establish Reporting Requirements

- Reporting Mechanism
- Access to Historical Data

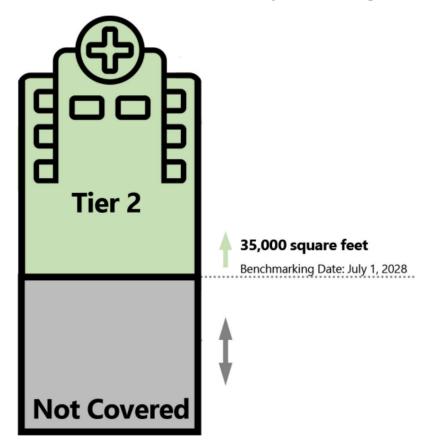


UNDERSTANDING HB 3409: BPS

Commercial (Non-Residential),
Hotels, and Motels



Multifamily Residential, Hospitals, Schools, Dormitories, and University Buildings



<u>Tier 1</u> = BPS Compliance

<u>Tier 2</u> = Energy Benchmarking / Reporting



UNDERSTANDING HB 3409: BPS

Directive

Key Detail

Building Performance

Establish energy performance standards

Standards are for commercial buildings >35,000sqft

Average EUI

Set energy use intensity targets (EUIt) for specific building types

The **average** EUI serves as the **minimum allowable** EUIt for buildings.

Compliance Pathways

Buildings can comply using multiply pathways

Conditional compliance through energy audits, energy investments and energy management plans



WHAT DETERMINES AN EUI FOR A BUILDING?

Drivers of Energy Use

Energy Consumption

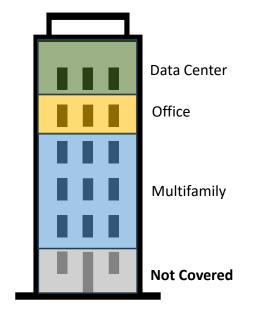
Electricity

Natural Gas

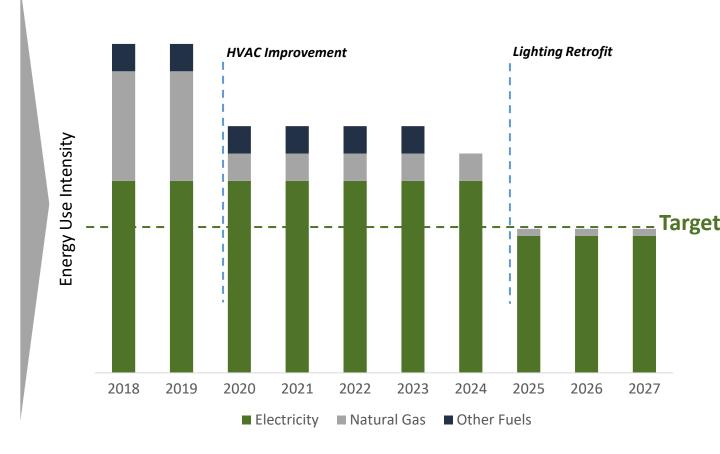
Other Fuels



Building Activity Types



Energy Use Intensity



HOW AN EUI TARGET IS DETERMINED

Each covered building type gets their own target

Outpatient Health Care

Lodging

How is energy used at a hospital compared to an office?

Office

Malls

...and 37 more building types!

Customizations
are made to
targets to
account for
use-case

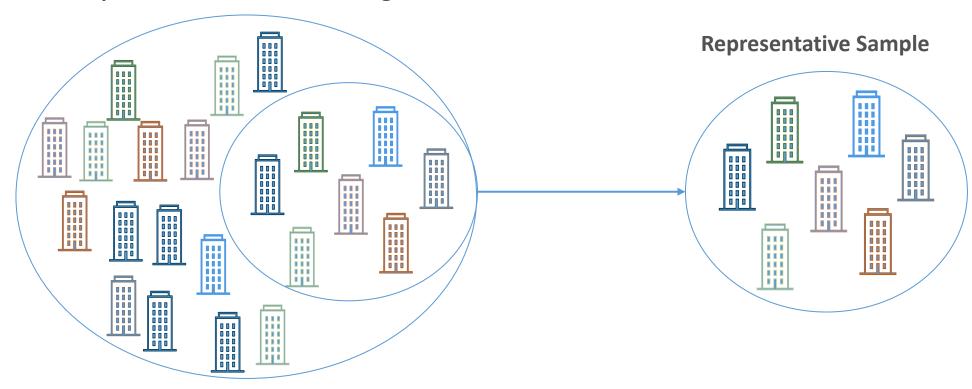
"Are you reviewing for changes in occupancy post COVID?"

YES



WAYS TO DEVELOP AVERAGE EUIS

Example: Census of Office Buildings





DATA AVAILABLE FOR AVERAGE EUIS





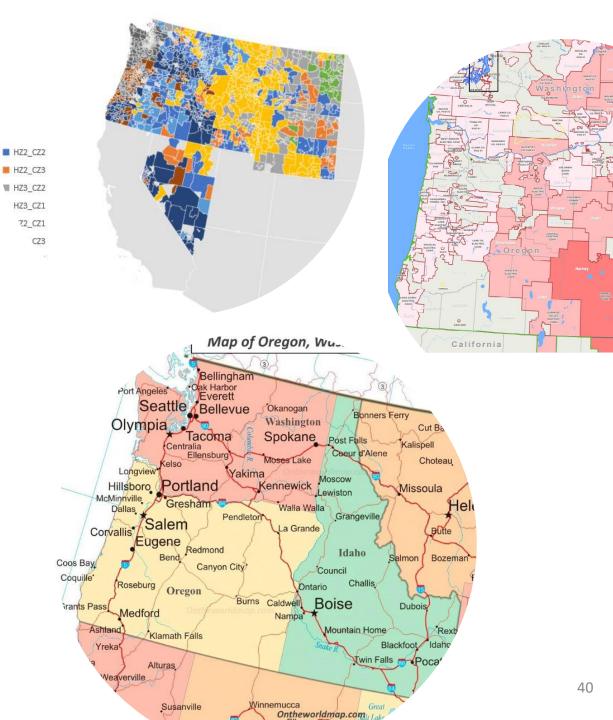
Northwest Regional Data

Climate Adjusted National Data



Oregon and Washington Data

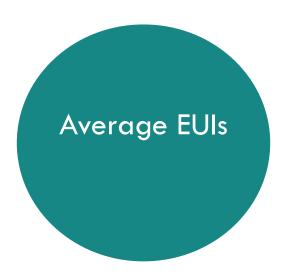




KEY CONSIDERATIONS & DISCUSSION

- Questions and/or comments on background information?
- Thoughts on data sources available?





- Process Overview
- Building Types
- Developing Northwest Average EUIs
- Draft Northwest Average EUIs



PROCESS OVERVIEW



Step 1: Data Collection

Objective: Gather EUI data from various sources.

Sources Include: Regional, national, and local EUI data.



Step 2: 2019 Northwest Average EUIs

Objective: Determine the baseline EUI for the Northwest.

Approach: Combine regional and national data to establish the 2019 average.



Step 3: Oregon Average EUIs

Objective: Tailor EUI benchmarks for Oregon.

Approach: Make Oregon adjustments to specific building types and use trends to adjust to Oregon average EUIs.



BUILDING TYPES

- Targets will be Energy Star Portfolio Manager types
- Using ASHRAE-100 2024 for analysis but will convert for final standard
- Propose dropping types in blue

Building Type	Subtype
Education	College/university
Education	Elementary/middle school
Education	High school
Education	Other classroom education
Education	Preschool/daycare
Food Sales	Grocery/food market
Food Sales	Convenience store
Food Service	Restaurant/cafeteria
Food Service	Fast Food
Health Care (Inpatient)	Hospital/inpatient health
Health Care (Outpatient)	Clinic/other outpatient health
Health Care (Outpatient)	Medical office (diagnostic)
Laboratory	Laboratory
Lodging	Dormitory/fraternity/sorority
Lodging	Hotel
Lodging	Motel or Inn
Lodging	Nursing home/assisted living
Lodging	Other lodging
Mercantile (Enclosed and Strip Malls)	Enclosed mall
Mercantile (Enclosed and Strip Malls)	Strip shopping mall
Mercantile (Retail Other Than Mall)	Other retail
Mercantile (Retail Other Than Mall)	Retail Store
Mercantile (Retail Other Than Mall)	Vehicle dealership/showroom

Building Type	Subtype	
Office	Admin/professional office	
Office	Bank/other financial	
Office	Government office	
Office	Medical office (nondiagnostic)	
Office	Mixed-use office	
Office	Other office	
Public Assembly	Entertainment/culture	
Public Assembly	Library	
Public Assembly	Other public assembly	
Public Assembly	Recreation	
Public Assembly	Social/meeting	
Public Order and Safety	Fire/police station	
Public Order and Safety	Other public order and safety	
Religious Worship	Religious worship	
Service	Other service	
Service	Post office/postal center	
Service	Repair shop	
Service	Vehicle service/repair shop	
Service	Vehicle storage/maintenance	
Warehouse/Storage	Distribution/shipping center	
Warehouse/Storage	Nonrefrigerated warehouse	
Warehouse/Storage	Refrigerated warehouse	



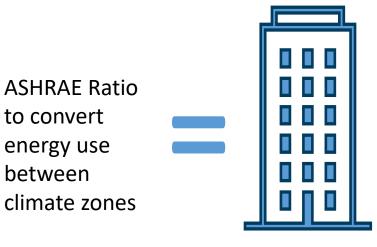
CLIMATE ZONE ADJUSTMENTS FOR NATIONAL DATA

San Antonio EUI



A building in San Antonio, Texas. Different climate, different energy use

NW Equivalent EUI

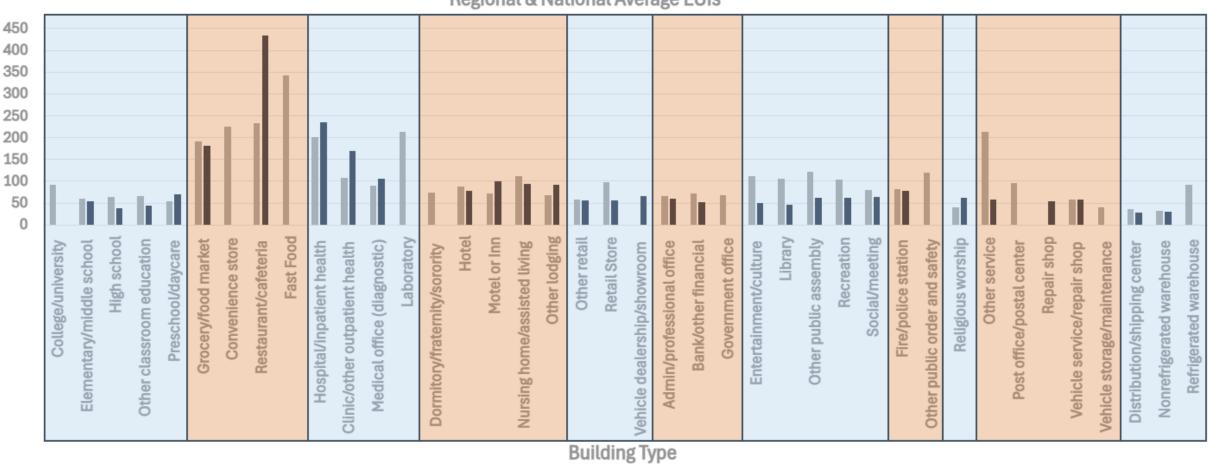


How much energy that building would use if operating in Oregon's climate



Ex. 115 (Lab Building EUI in San Antonio) x 1.13 (ASHRAE ratio to convert between Texas and Eastern Oregon climate zone) = 130 EUI in Oregon Climate Zone 5B

Regional & National Average EUIs

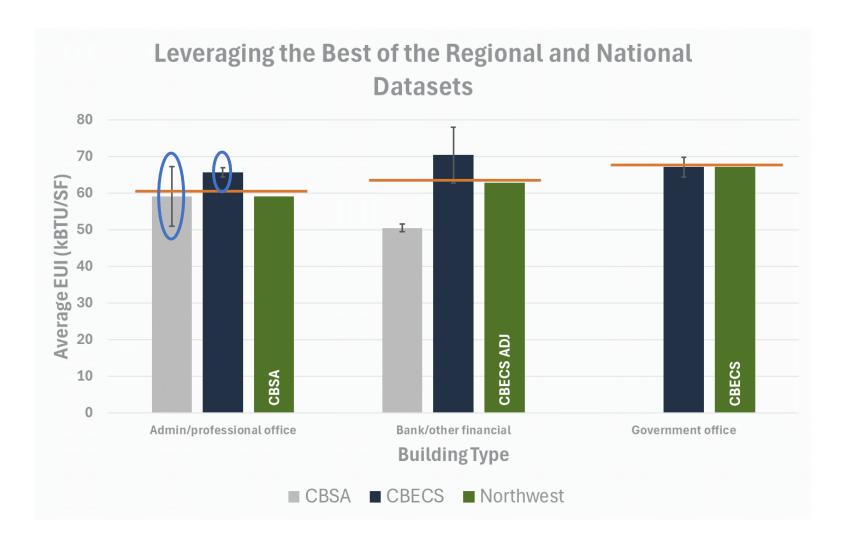


■ CBECS ■ CBSA



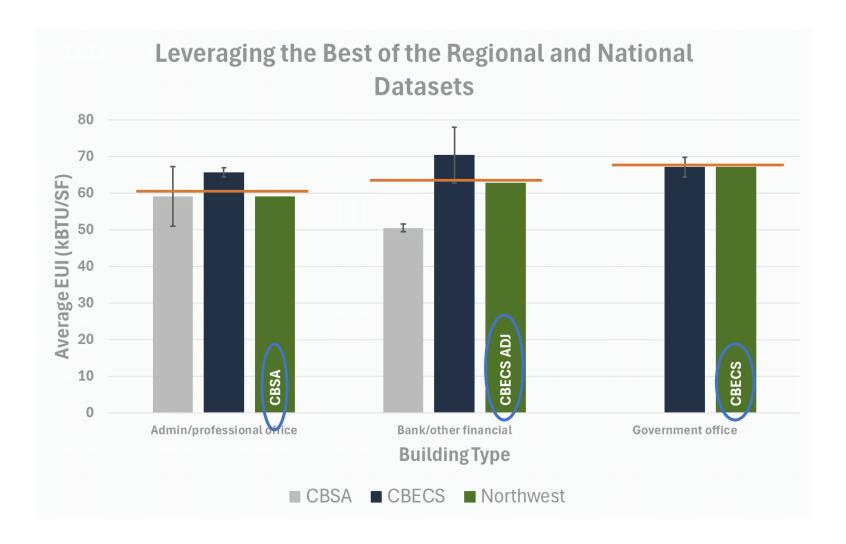
Average EUI (KBTU/SF)

Step 1. Determine the error range for both data sets.



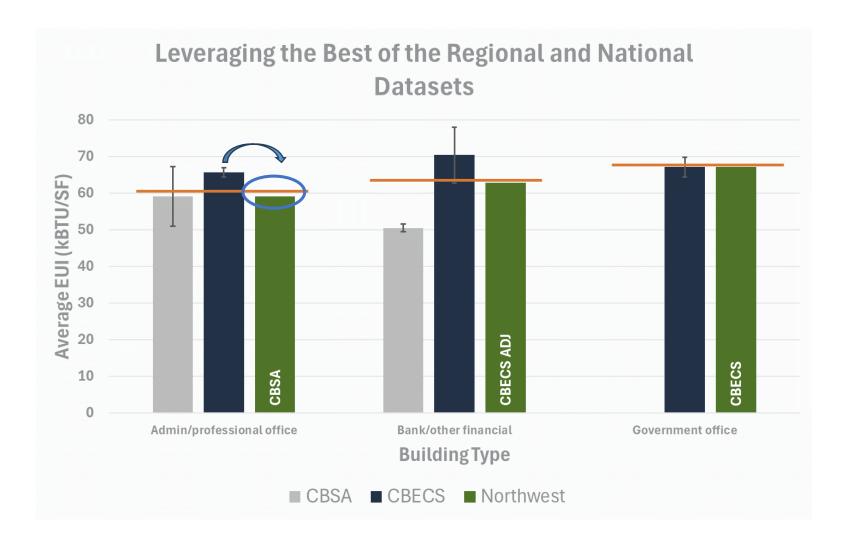


Step 2. Determine whether the base will be CBSA data or CBECS data.

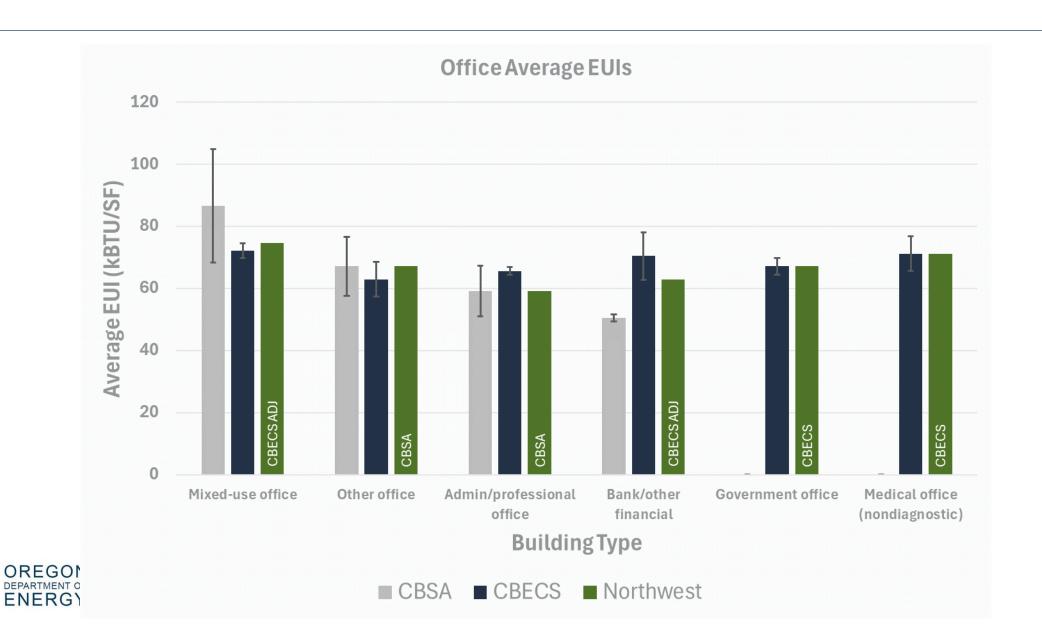


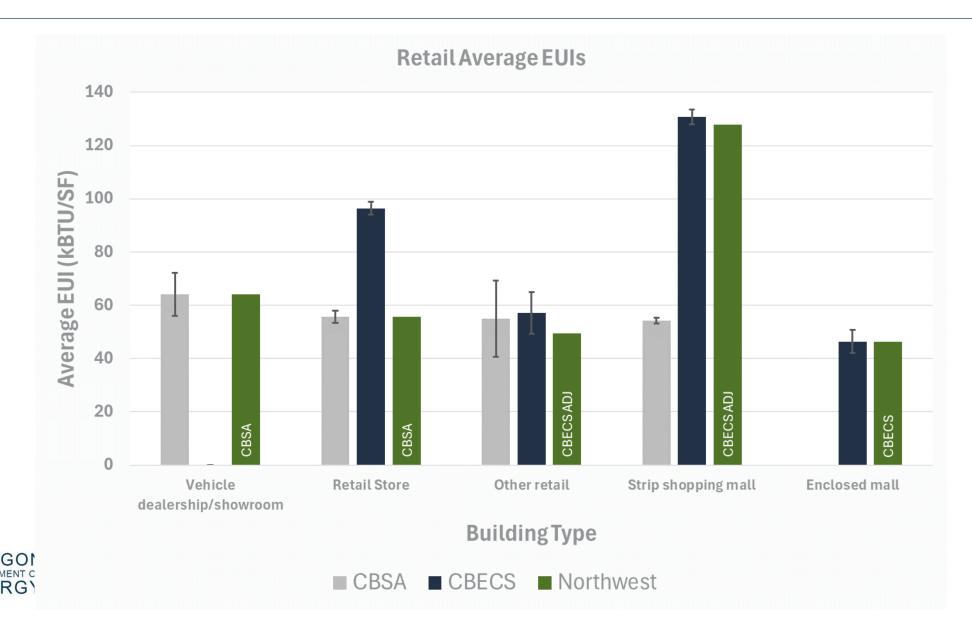


Step 3. Apply the smaller error range to the average in the chosen data set.

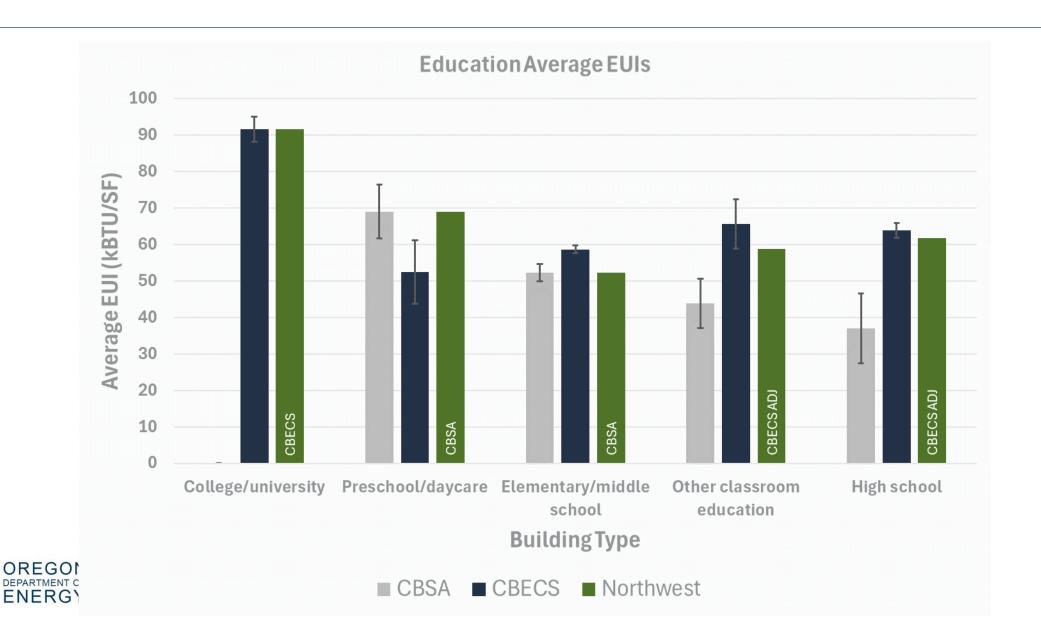




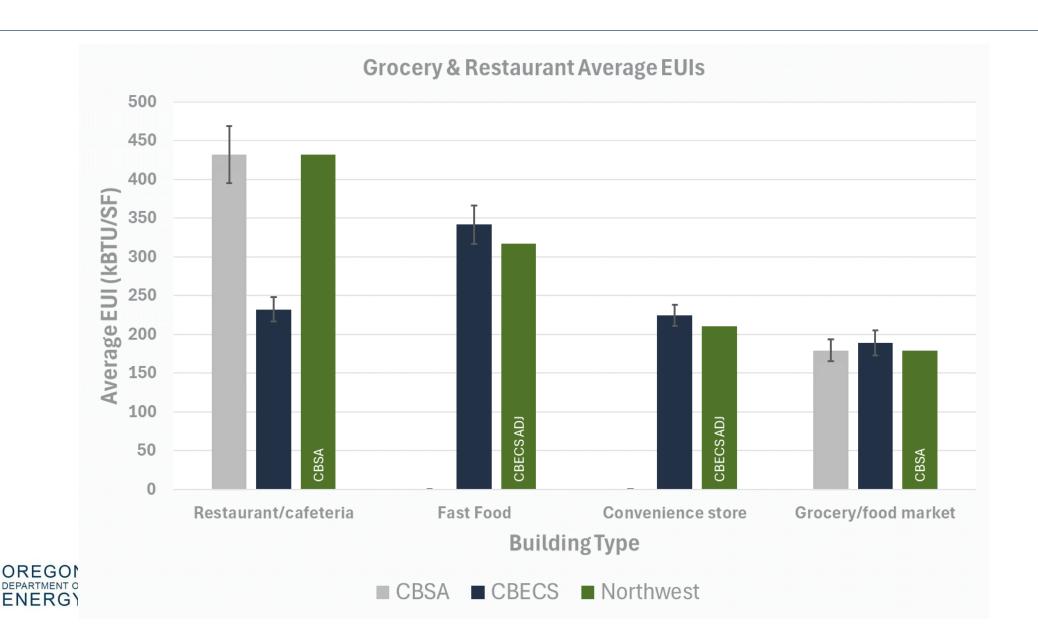


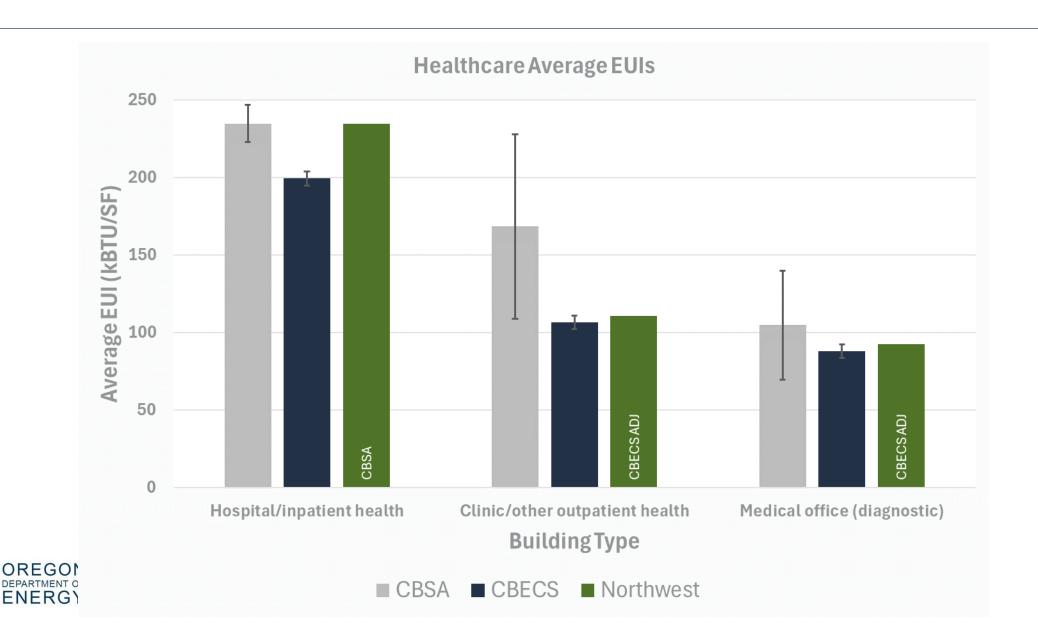


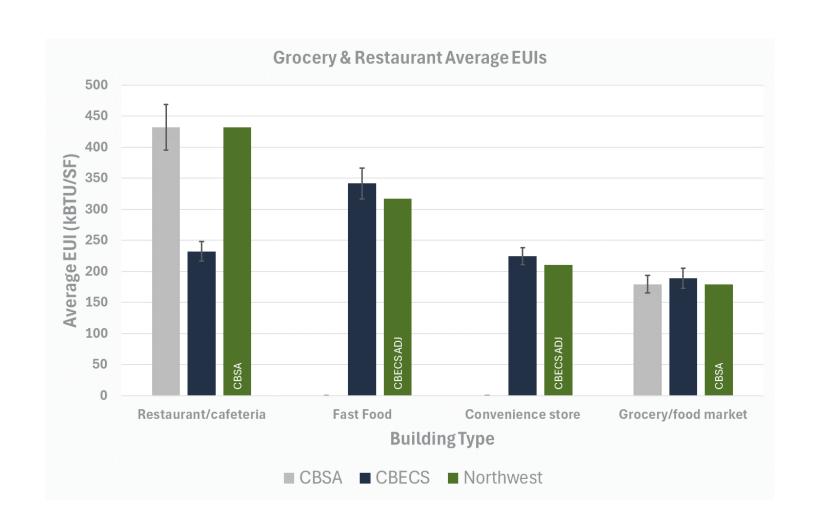




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- Oregon and other Northwest data sources
 - Portland benchmarking
 - Seattle benchmarking
 - Oregon state-owned buildings
 - Oregon schools
 - Washington State average EUIs





Step 3: Oregon Average EUIs

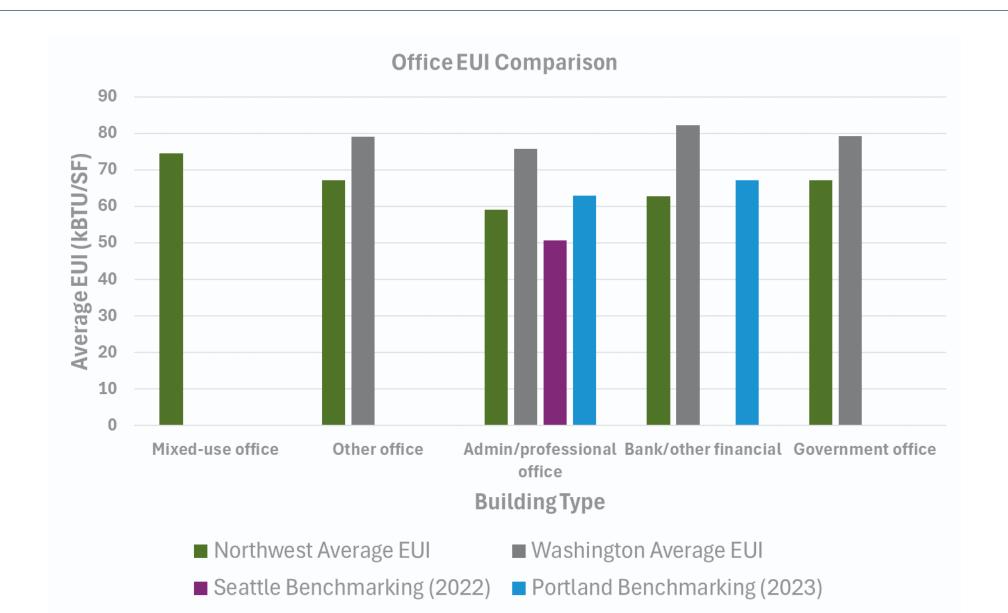
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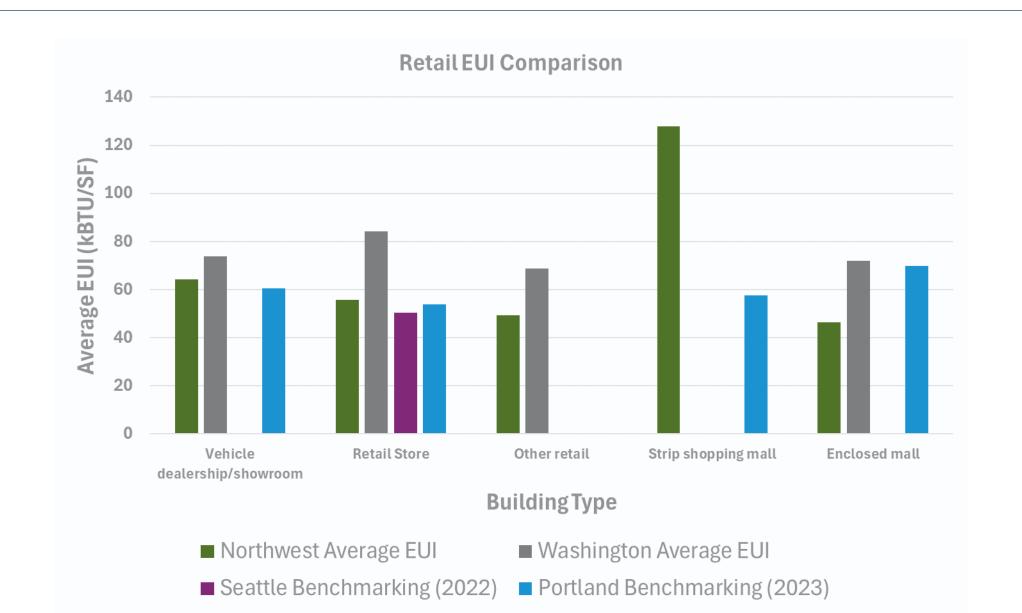
Establish "Oregon Average EUIs"

- Compare Oregon, Portland, and Seattle data against 2019 Northwest Average EUIs
- Recommend custom Oregon adjustments to specific building types
- Apply custom adjustments to specific building types in the 2019 Northwest Average EUIs
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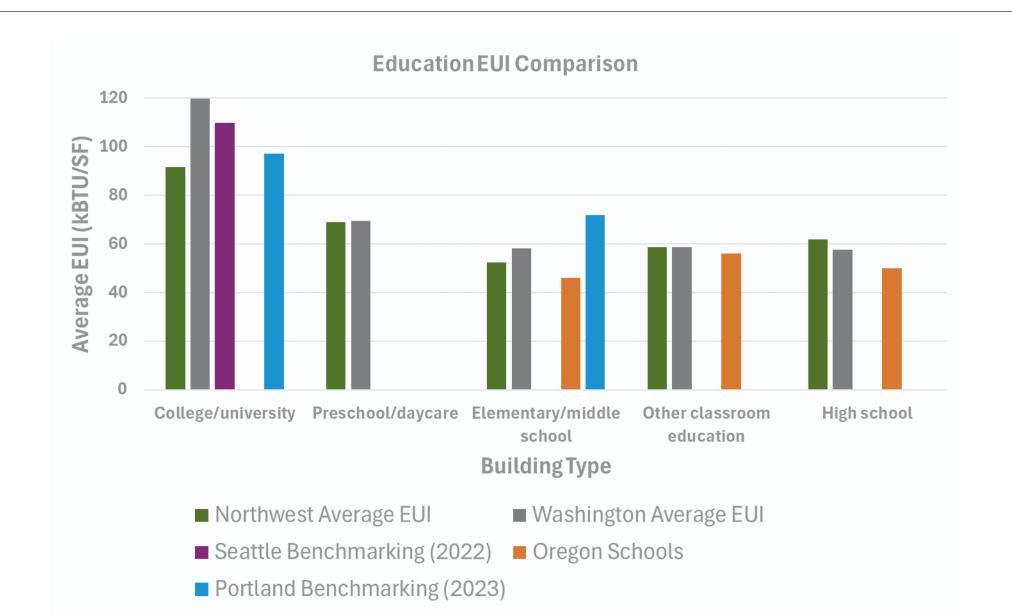




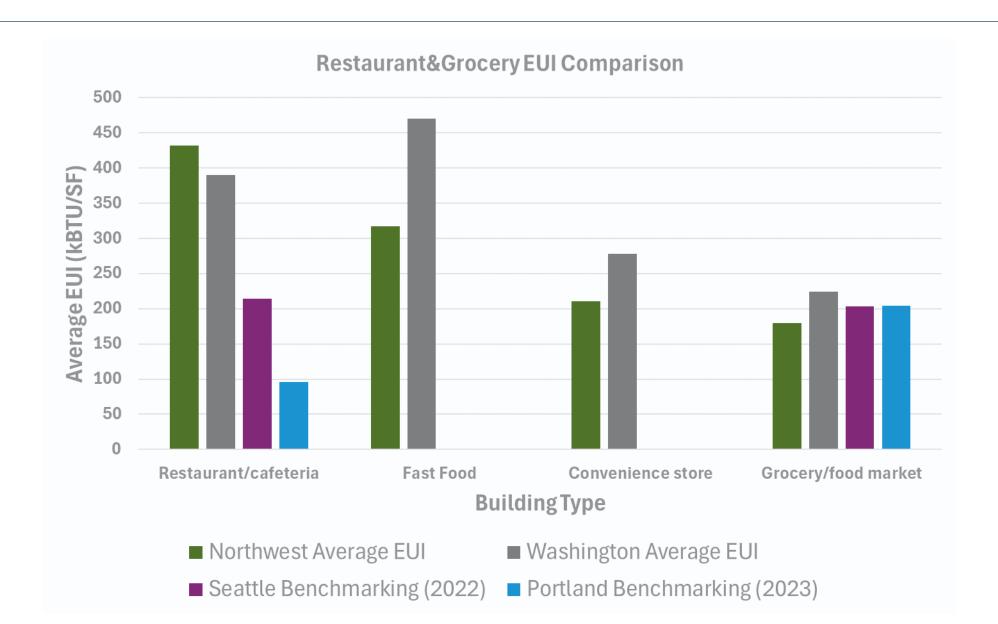




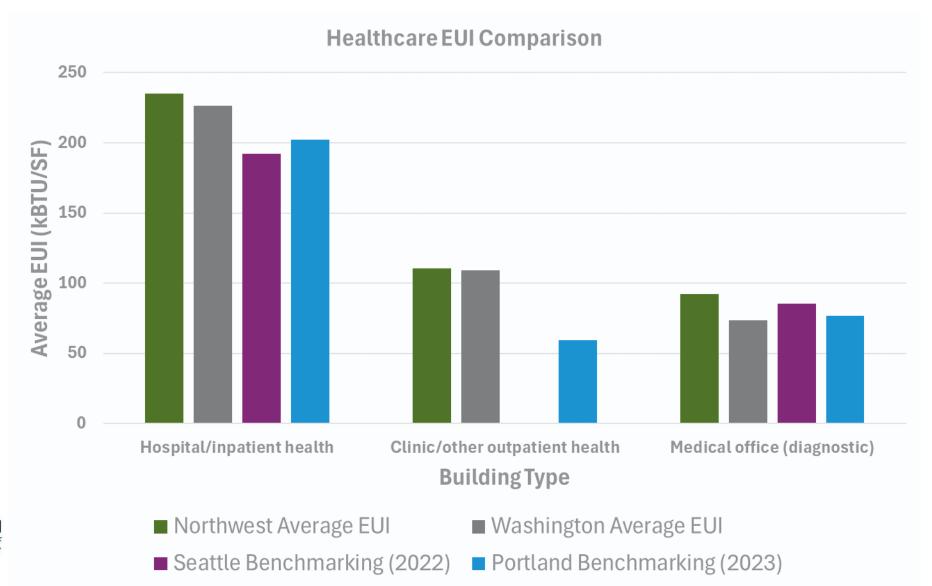














Tailoring 2019 Northwest Average EUIs for Oregon

Consideration	OR State-Owned	OR Schools	Portland Benchmarking	Seattle Benchmarking
Relevant building type differences?	No	Yes	No	No
Use for custom adjustments?	No	Yes	No	No

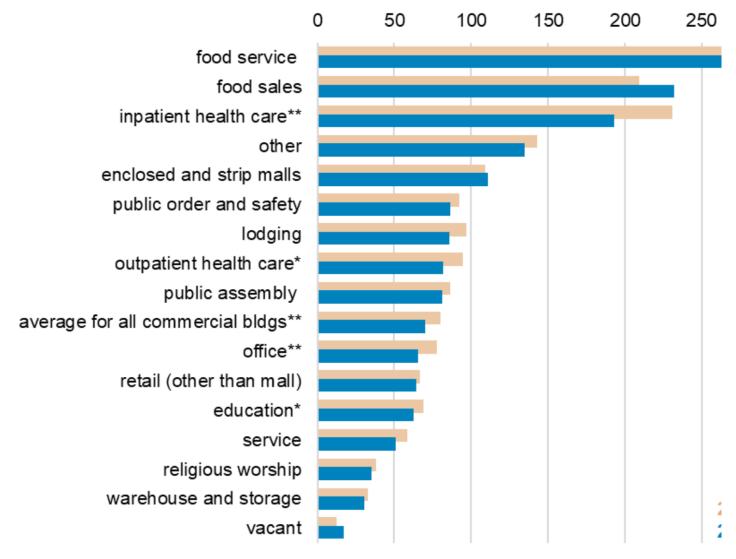


Adjusting 2019 Average EUIs to Reflect 2024 or 2027 Consumption

Consideration	CBECS (2012-2018)	CBSA (2014-2019)	OR State- Owned (2018-2023)	OR Schools (Various Ranges)	Portland Benchmarking (2018-2023)	Seattle Benchmarking (2018-2022)
Trending down overtime?	Yes	Yes	N/A	Yes	N/A	Yes
Use for 2027 adjustment factor?	Yes	No	N/A	No	N/A	No



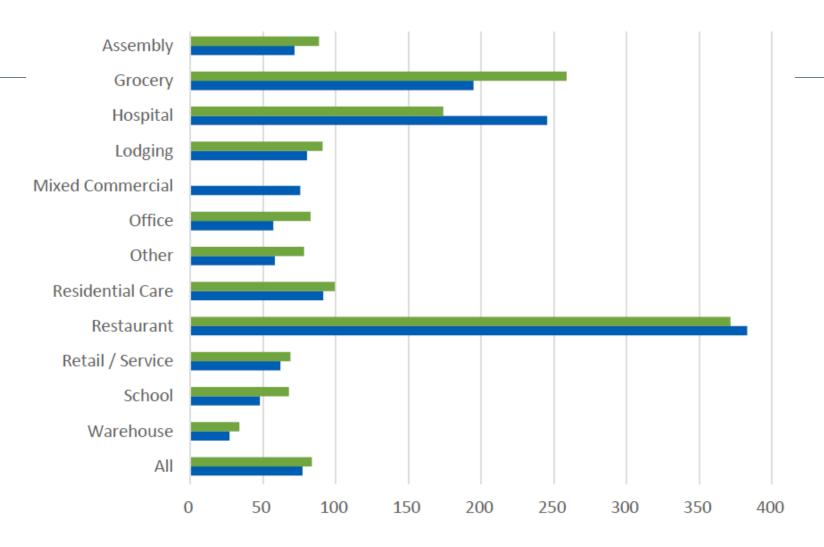
 National energy intensity decreased from 2012 to 2018:





Data source: U.S. Energy Information Administration, Commercial Buildings Energy Consumption Survey

Northwest energy intensity decreased from 2014 to 2019:



Annual Energy Use Intensity (kBtu per Square Foot)

2014 2019







Apply Four Custom Adjustments

Use Oregon schools' data to establish average EUIs for schools:

- Elementary/middle schools
- High schools
- Other classrooms

Reduce average restaurant EUI by 23% to align with CBECS, Portland, and Seattle data

Apply a Universal Adjustment Factor to Establish Oregon Average EUIs

Use CBECS downward trend averaged across all building types (10% reduction from 2012-2018, - 1.7%/yr)

- Large population of buildings (>6,000)
- Representative sample, highly vetted data and analysis
- Conservative estimate calculated pre-COVID



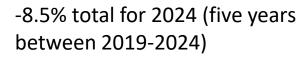


Adjusting Oregon Average EUIs to to 2024 versus 2027 benchmark?

2024 aligns with analysis year 2027 aligns with first Oregon BEPS EUIt measurement year (with June 1, 2028 reporting deadline)



Calculate as -1.7%/year



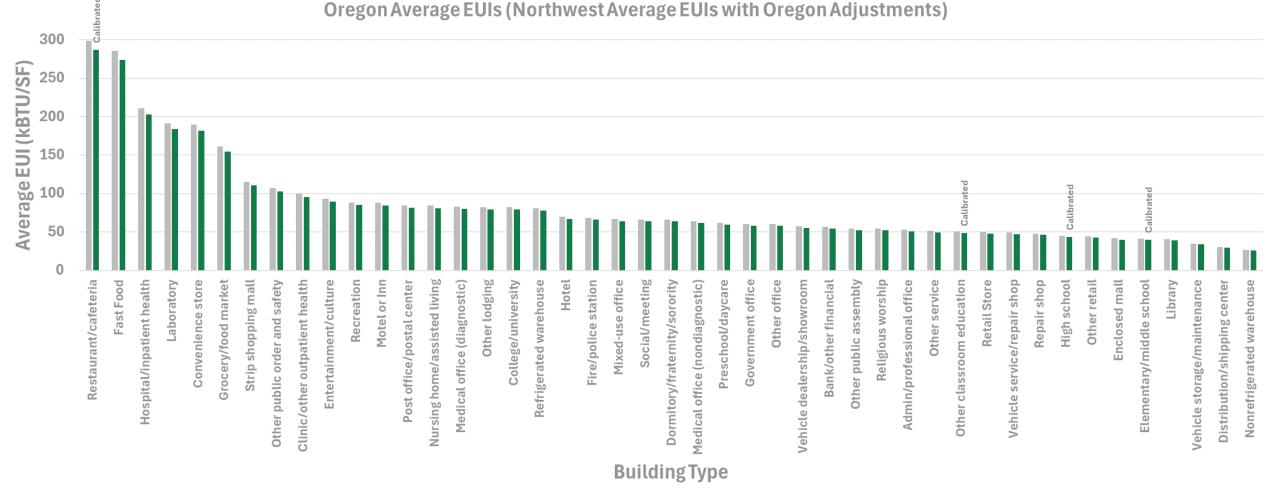
-13.6% total for 2027 (eight years between 2019-2027)



Apply factor to 2019
Northwest Average EUIs to reflect 2024 or 2027
Oregon Average EUIs



DRAFT OREGON AVERAGE EUIS



■ 2024 Draft Oregon EUIt
■ 2027 Draft Oregon EUIt



KEY CONSIDERATIONS & DISCUSSION

Questions and/or comments on average EUI approach?

Thoughts on data sources used?

Thoughts on proposed 2024 or 2027 Oregon Average EUIs?

How do these recommendations align with your policy expectations?





- Process Overview
- Target Setting Criteria
- EUI Target Comparisons
- Key Considerations & Discussion



PROCESS OVERVIEW

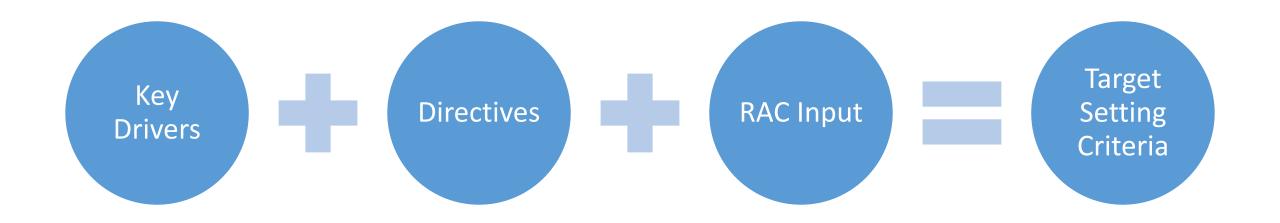
Assess Average
EUIs Against Target
Setting Criteria

Discuss Implications Consider
Rationale for
Changes

Finalize Targets



ESTABLISHING TARGET SETTING CRITERIA



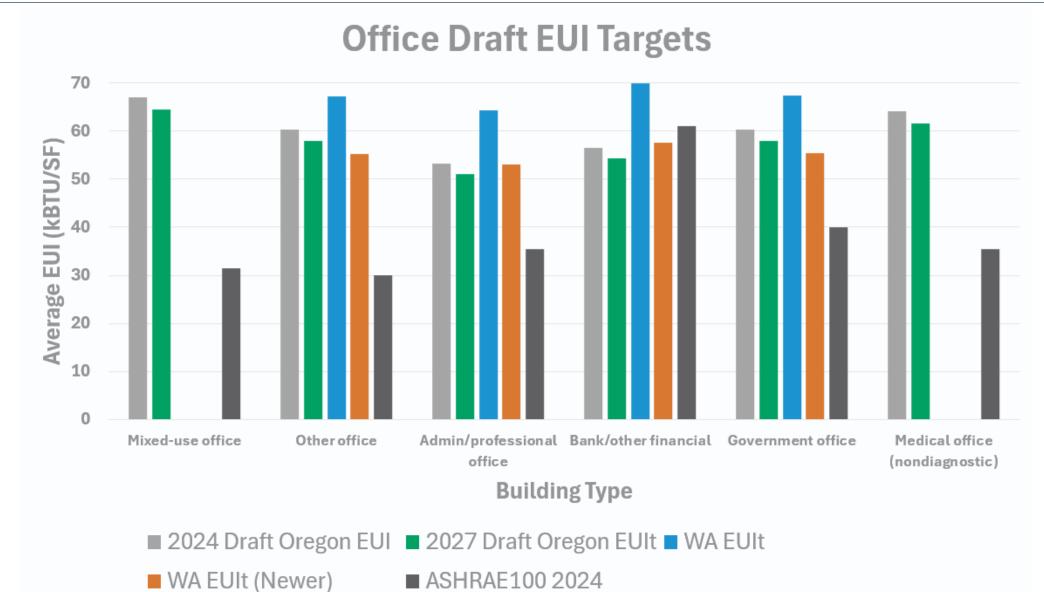


TARGET SETTING CRITERIA

EUI targets must:	Source:
Be weather normalized, net energy	HB 3409
Be equal to or greater than average EUIs	HB 3409
Include two or more climate zones	HB 3409
Adjust as necessary for unique energy using features	HB 3409
Consider regional and local building energy use	HB 3409
Exclude EV supply equipment	HB 3409
Maximize GHG reductions	HB 3409
Recognize flexible loads (EUIt adjacent)?	RAC



DRAFT EUI TARGETS: USE OREGON AVERAGE EUIS





KEY CONSIDERATIONS & DISCUSSION

Questions and/or comments on target setting approach?

Thoughts on proposed draft EUI targets?

How do these recommendations align with your policy expectations?

How do they align with the HB 3409 directives?





Robust process for developing average and target EUIs



EUIs are trending down



Northwest and Oregon average EUIs are often lower than national



Recommendations are to:

Make several custom building type adjustments

Apply a 2027 adjustment factor to update 2019 average EUIs to 2027



Next Steps



Adjust today's averages where needed



Present final averages to Oregon Department of Energy



File draft targets



ublic comment period



DRAFT EUI TARGETS

Principle Building Activity	ASHRAE Buillding Type	2027 Draft EUIt	ASHRAE 100
Education	College/university	79	65
Education	Elementary/middle school	40	34
Education	High school	43	47
Education	Other classroom education	49	28
Education	Preschool/daycare	60	46
Food Sales	Grocery/food market	155	150
Food Sales	Convenience store	182	166
Food Service	Restaurant/cafeteria	287	217
Food Service	Fast Food	274	304
Health Care (Inpatient)	Hospital/inpatient health	203	160
Health Care (Outpatient)	Clinic/other outpatient health	96	43
Health Care (Outpatient)	Medical office (diagnostic)	80	38
Laboratory	Laboratory	184	111
Lodging	Dormitory/fraternity/sorority	64	46
Lodging	Hotel	67	49
Lodging	Motel or Inn	85	41
Lodging	Nursing home/assisted living	81	89
Lodging	Other lodging	79	49
Retail	Enclosed mall	40	48
Retail	Strip shopping mall	111	80
Retail	Other retail	43	53
Retail	Retail Store	48	38
Retail	Vehicle dealership/showroom	55	46



^{*} A target projecting to 2024 would be 4.2% higher than the 2027 Target

DRAFT EUI TARGETS

Principle Building Activity	ASHRAE Buillding Type	2027 Draft EUIt	ASHRAE 100
Office	Admin/professional office	51	36
Office	Bank/other financial	54	61
Office	Government office	58	40
Office	Medical office (nondiagnostic)	62	36
Office	Mixed-use office	64	32
Office	Other office	58	30
Public Assembly	Entertainment/culture	90	32
Public Assembly	Library	39	50
Public Assembly	Other public assembly	52	40
Public Assembly	Recreation	85	37
Public Assembly	Social/meeting	64	34
Public Order and Safety	Fire/police station	66	41
Public Order and Safety	Other public order and safety	103	85
Religious Worship	Religious worship	52	20
Service	Other service	50	44
Service	Post office/postal center	81	51
Service	Repair shop	46	32
Service	Vehicle service/repair shop	47	41
Service	Vehicle storage/maintenance	34	31
Warehouse/Storage	Distribution/shipping center	29	26
Warehouse/Storage	Nonrefrigerated warehouse	26	16
Warehouse/Storage	Refrigerated warehouse	78	60



^{*} A target projecting to 2024 would be 4.2% higher than the 2027 Target