



Clean Buildings—Getting to Efficiency Webinar 1

Efficiency through the Clean Buildings Performance Standard

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WSU Energy Program

March 30, 2021



Efficiency through the Clean Buildings Performance Standard

Your Participation

Join audio:

- Choose “Telephone” and dial using the information provided

OR

- Choose “Mic & Speakers” to use VoIP

Questions/comments:

- Submit questions and comments via the Questions Panel throughout the webinar
- Q&A will be held after the presentation

Recording

- This webinar is being recorded and will appear within a few days at



Thank You

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Thank you to Neil Bavins for developing the webinar series!



Clean Buildings – Getting to Efficiency Webinar Series

- Efficiency Through the Clean Buildings Performance Standard (CBPS)
 - today
- Tune-ups for Clean Buildings
 - 4/21/21, 11:30 am
- Energy Management Plans for Clean Buildings
 - 5/19/21, 11:30 am
- Operations & Maintenance for Clean Buildings
 - 6/9/21, 11:30 am

registration information:

<http://www.energy.wsu.edu/PublicFacilitiesSupport/ResourceConservation.aspx>



Poll question

What is your building role?



Terms Used in the Webinar Series

- Washington State Clean Buildings Performance Standard
 - The Standard or CBPS
- ASHRAE 100-2018 Standard
 - ASHRAE Standard
 - ASHRAE - American Society of Heating, Refrigeration and Air-Conditioning Engineers
- Energy Management Plan
 - EMP
- Operations and Maintenance
 - O&M
- Energy Use Intensity and Energy Use Intensity Target
 - EUI and EUI_t
- Washington State Department of Commerce
 - Commerce



What is **NOT** Covered in this Webinar Series

- Benchmark Calculation Details
 - EUI, EUI_t, Portfolio Manager use, WNEUI, etc
- Compliance Path Details
- Early Adopter Incentive Program



What **IS** Covered in this Webinar Series

- Connection Between the Clean Building Performance Standard and ASHRAE 100-2018 Standard (Webinar 1)
- Overview of a Building Tune-up (Webinar 1)
- Building Tune-ups as a Way to Begin Fulfilling the EMP and O&M Requirements of the Standard. (Webinar 2)
- How to Comply with the Energy Management Plan Requirement for the Standard (Webinar 3)
- How to Comply with the O&M Program Requirements for the Standard (Webinar 4)



Requirements of the Clean Buildings Performance Standard

- Energy Management Plan (EMP)
- Operations & Maintenance (O&M) Program
- Compliance through one of these performance metrics:
 - Meet Energy Use Intensity Target (EUI_t)
 - Implement All Cost-effective Energy Efficiency Measures

**The O&M program must be implemented at least one year
prior to compliance date!**



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Compliance Schedule



Buildings over 220,000 GFA, June 1, 2026



Buildings between 90,001 - 220,000 GFA, June 1, 2027



Buildings between 50,000 - 90,000 GFA, June 1, 2028

*GFA- Gross Floor Area

START NOW!

- **At Least 1 Year's Data Needed to Determine Energy Use Intensity**
- **Operations & Maintenance Requirements Must Be Implemented at Least 12 Months Prior to Mandatory Compliance Date**
- **Might Need Conditional Compliance or Exemption? Must Apply at Least 180 Days Prior to Mandatory Compliance Date**



Washington State
Department of
Commerce

Serving Communities

Building Infrastructure

Growing the Economy

Promoting Washington

Clean Buildings

On May 7, 2019, the Clean Buildings bill (HB 1257, 2019) was signed into law. The objective is to lower costs and pollution from fossil fuel consumption in the state's existing buildings, especially large commercial buildings. The law requires the Washington State Department of Commerce to develop and implement an energy performance standard for these buildings and provide incentives to encourage efficiency improvements.



Clean Buildings Standards

Does this apply to my building?

How to Comply

Customer Support and Resources

Clean Buildings Portal

Early Adopter Incentive Program



WA Dept. Commerce Clean Buildings Page

<https://www.commerce.wa.gov/growing-the-economy/energy/buildings/>

- Links to Legislation and Reference Standards
- Early Adopter Incentive Program
- Determining if your Building Must Comply
- Steps to Comply
- Personnel Roles
- Resource and Support Links
- Links to Trainings, ENERGY STAR Portfolio Manager Trainings
- Building Owner Portal (to come)
- **Clean Buildings Live Q&A Session:**
 - **April 13 at noon**
 - **Go to Commerce webpage for link**

Contact your utility – they may have resources and incentives to help comply with the Standard



Steps to Comply from the Commerce Clean Buildings Website

- Washington State existing commercial buildings with minimum 50,000 gross square feet and larger, with limited exceptions
- How to Comply:
 1. **START NOW**
 2. Read and learn
 3. Watch videos and presentations and learn
 4. Determine if the building is exempt
 5. Understand the different roles needed for compliance
 6. Establish the building performance metric
 7. **Develop and implement the EMP and O&M programs**
 8. Wait for expected July 2021 building owner notification
 9. Document compliance by or before compliance date



<https://www.commerce.wa.gov/growing-the-economy/energy/buildings/how-to-comply/>



Poll Questions

Have you worked with the ASHRAE 100-2018 Standard previously?

1. Yes, I own a copy
2. Yes, but I don't own a copy
3. I'm familiar with it through the Clean Buildings Performance Standard
4. No, not really

ASHRAE Standards

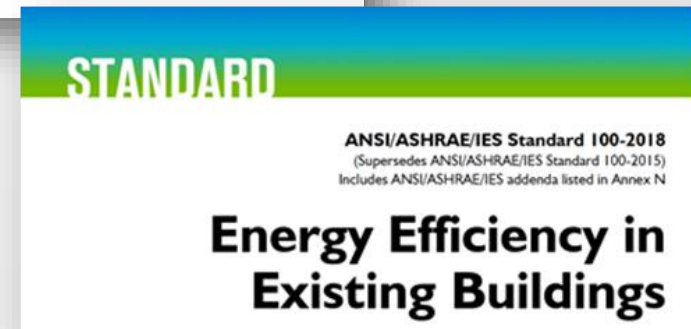
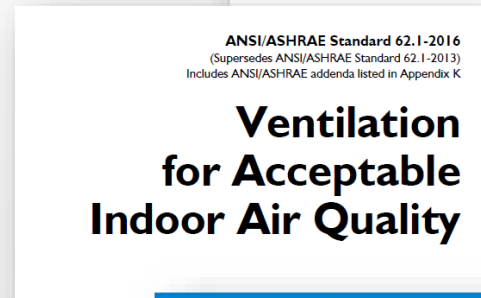
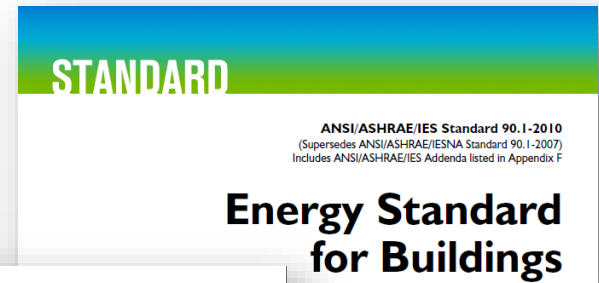
195 standards on ASHRAE website

- Variety of Engineering Standards
- Developed by Committee's

Common standards in daily use

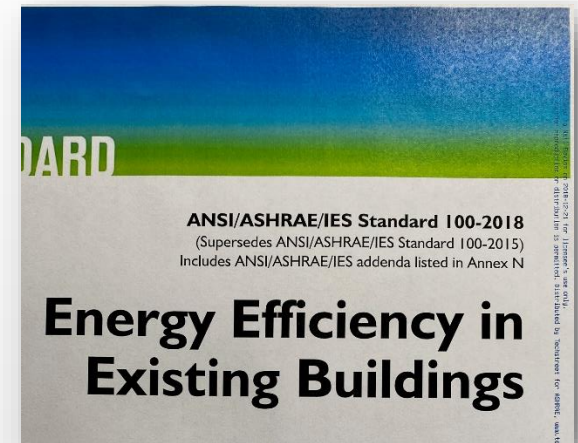
- 90.1-2019 Energy
- 62.1-2019 Ventilation
- 180-2018 HVAC Maintenance

ASHRAE 100-2018 Adopted for CBPS



ASHRAE 100 Standard

- Copyrighted Material-Pages are Marked
- Standards Update Periodically
- Continuous Maintenance
 - 3 yr. cycle for 100-2018
- ASHRAE 100-2018 available online
 - Read only-FREE
 - PDF \$75 members/\$100 nonmembers
 - Printed & PDF \$109/\$128 nonmembers



<https://www.ashrae.org/technical-resources/standards-and-guidelines>

Also Accessible from Commerce Clean Buildings Website



CBPS (WAC 194–50) and ASHRAE 100–2018

Complying with this rule requires the user to comply with *ANSI/ASHRAE/IES Standard 100-2018* as amended by this rule.

When this rule amends a section of *Standard 100*, the entire section is published in the rule. The user will need to have both documents in hand, but detailed comparison within any one section is not necessary.

Simply apply the entire section as published in the rule. All other sections in *Standard 100* apply.



Using WAC 194-50 and ASHRAE 100-2018

PDF

WAC 194-50-050

ASHRAE Standard 100, 2018—Section 5—Energy management plan.

Exception to 5.1.1 - Not adopted.

5.1.2.1 Energy accounting in accordance with Section 5.2.

5.1.2.2 In the initial year of compliance, the building's weather normalized energy use intensity (WNEUI) and energy-use intensity (EUI).

5.1.2.3 Annual updates of the net energy use, WNEUI and EUI.

5.1.2.4 Annual comparison of the net WNEUI and EUI to the energy target.

5.1.2.5 Documentation of original, current, and changes in number of occupants, weekly operating hours, or time of day scheduled for occupancy, production rates, and energy using equipment that would have caused change in the measured WNEUI and EUI.

5.1.2.14 Operations and Maintenance Plan including:

1. An operations and maintenance (O&M) program as defined in Section 6.

ASHRAE 100-2018

5. ENERGY MANAGEMENT PLAN

5.1 Establish the Energy Management Plan

5.1.1 The *building owner* shall designate an *energy manager (EM)* to develop and *maintain* an energy management plan for the *building*.

Exception to 5.1.1: *Buildings* smaller than 5000 ft² (465 m²) are not required to have an *EM* or an energy management plan.

5.1.2 The energy management plan shall incorporate the following.

5.1.2.1 An *energy accounting system* to record the energy use in accordance with Section 5.2.

5.1.2.2 In the initial year of compliance, the *building's energy-use intensity (EUI)*.

5.1.2.3 Annual updates of the *net energy use* and *EUI*.

5.1.2.4 Annual comparison of the net *EUI* to the *energy target*.

5.1.2.5 Documentation of original, current, and changes in number of occupants, weekly operating hours, or time of day scheduled for occupancy, production rates, and energy-using equipment that would have caused change in the measured *EUI*.

5.1.2.6 Energy audit reports and recommended *energy efficiency measures (EEMs)*. (Refer to Section 8.)

5.1.2.7 A list of *EEMs* that have been implemented and dates of implementation, including the following:

(These are incomplete snippets from
WAC 194-50 and ASHRAE 100-2018)



CBPS and ASHRAE 100–2018 Sections

Section 1. **Purpose:**

“This standard is directed toward providing procedures and programs essential to energy efficient operation...” (ASHRAE)

“This standard provides criteria that will result in reduced energy consumption through improved energy efficiency and performance in existing buildings. In adopting this standard by rule, Washington state department of commerce shall seek to maximize reductions of greenhouse gas emissions from the building sector .” (CBPS)



CBPS and ASHRAE 100–2018 Sections

- Section 2. Scope
 - Applies to Existing Buildings (Not New Construction)
- Section 3. Definitions
 - Important Reference – Recommend Reading
 - Roles:
 - Designation (no qualification):
 - Building Owner
 - Energy Manager
 - AHJ – Authority Having Jurisdiction = Commerce
 - Qualifications (different than ASHRAE):
 - Qualified Energy Auditor, Qualified Person
 - Certified Commissioning Professional
 - Same Person Can Have Multiple Roles



CBPS and ASHRAE 100–2018 Sections

- Section 4. Compliance Requirements
 - Residential Not Adopted
 - Specifies Annex Z for Forms
 - Requirements for Buildings Without EUI
 - Exceptions for Recently Built Buildings
- Section 5. Energy Management Plan
 - Specifies ENERGY STAR Portfolio Manager as the Energy Accounting System
 - Specifies the Energy Management Plan Contents and Updates
 - **Webinar 3 Will Cover in More Detail**



CBPS and ASHRAE 100–2018 Sections

- Section 6. Operations and Maintenance Requirements
 - References Normative Annex L: O&M Implementation (required)
 - Requirements for Efficiency of Replacement Equipment
 - **Webinar 4 Will Cover in More Detail**
- Section 7. Energy-Use Analysis and Target Requirements
 - Requires Qualified Person Do EUI Calculations
 - Not on this Webinar Series



CBPS and ASHRAE 100–2018 Sections

- Section 8. Energy Audit Requirements
 - Requires Qualified Energy Auditor for Audit
 - Allowances for Audits Completed in Last 3 Years
 - Specifies Audit Details
- Section 9. Implementation and Verification Requirements
 - Section 9.1: Developing and Implementing an EMP
 - Will be addressed in Webinar 3



CBPS and ASHRAE 100–2018 Sections

- Section 10. Residential Buildings and Dwellings
 - Not adopted by CBPS
- Annex Sections
 - Informative:
 - Annex D: O&M Requirements for Buildings Systems & Elements
 - Annex E: Energy Efficiency Measures
 - Normative:
 - Annex L: Specifies O&M Program
 - Annex X: Specifies Investment Criteria (for Audit)
 - Annex Z: Specifies Reporting Criteria, Forms and EUI Targets



Adoption of ASHRAE 100 into the CBPS – WAC 194–50

The screenshot shows the Washington State Legislature website. The header includes the Washington State Legislature logo and the text "WASHINGTON STATE DEPARTMENT OF COMMERCE ADOPTION AND AMENDMENT OF ASHRAE STANDARD 100, 2018". The main content area is titled "Chapter 194-50 WAC" and lists the "WAC Sections". Each section has a link to the HTML version and a link to the PDF version. The sections are:

HTML	PDF	Section	Description
		194-50-001	Foreword.
		194-50-010	ASHRAE Standard 100, 2018—Section 1—Purpose.
		194-50-020	ASHRAE Standard 100, 2018—Section 2—Scope.
		194-50-030	ASHRAE Standard 100, 2018—Section 3—Definitions.
		194-50-040	ASHRAE Standard 100, 2018—Section 4—Compliance.
		194-50-050	ASHRAE Standard 100, 2018—Section 5—Energy management plan.
		194-50-060	ASHRAE Standard 100, 2018—Section 6—Maintenance and operation.
		194-50-070	ASHRAE Standard 100, 2018—Section 7—Energy-use analysis and target requirements.
		194-50-080	ASHRAE Standard 100, 2018—Section 8—Audits.
		194-50-090	ASHRAE Standard 100, 2018—Section 9—Requirements.
		194-50-110	ASHRAE Standard 100, 2018—Section 11—References.
		194-50-120	Normative Annex C Forms.

Or Google:
WAC 194-50

<https://apps.leg.wa.gov/wac/default.aspx?cite=194-50>



Adoption of ASHRAE 100 into the CBPS

- HB-1257 Requires the Buildings Meet Energy Efficiency Target (EUI_t)
 - Commerce Adopted Regional Market Average Minus 15%
 - For Each Building Use
- Average EUI Will Decrease as Buildings Improve
 - Process is Repeated Every 5 Years
 - Result is Continuous Efficiency Improvement

Energy Use Intensity (EUI)

- ENERGY STAR Portfolio Manager is Adopted by CBPS to Determine EUI and Weather Normalized EUI (WNEUI)
- Portfolio Manager Generates the WNEUI Automatically.

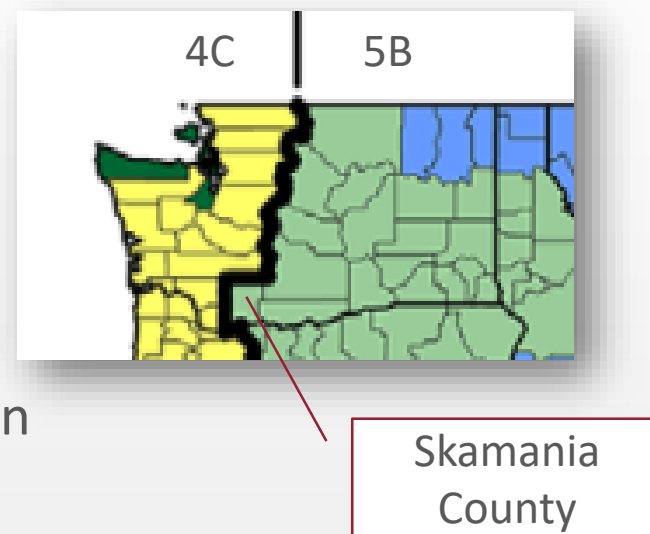
DO THIS NOW



- Annual Energy Use per Square Foot (gross)
 - All Site Energy Used: Gas, Electric, District Heat, Oil etc.

Energy Use Intensity Targets (EUI_t)

- Targets are based on:
 - Building Activity Type
 - Operating Hours
 - Climate Zone
 - Energy Code at Time of Construction
- Targets must be determined by Qualified Person ...





Qualified Person Requirements

- Training, Expertise and 3 Years Professional Experience in Building Energy-use Analysis
- At least one of the following:
 - Licensed Professional Architect or Engineer
 - BOC Level II
 - Certified Commissioning Professional
 - Qualified Energy Auditor
 - Certified Energy Manager



Start with a Tune-Up



- 3%-20% Savings from O&M Efficiency Measures
 - Fast Start, Immediate Implementation of Measures
 - Buildings <20% of Target O&M Measures May Get Compliance
- Energy Management Plan and O&M Program Still Required
 - Tune Up Informs Energy Management Plan
 - Tune Up Informs the O&M Program
- Tune Up Informs a Level 2 Audit, if Required
 - Building Energy Asset Score

<https://www.energy.gov/eere/buildings/building-energy-asset-score>

Building Tune Up Scope

- Energy Star Portfolio Manager (ESPM) Review
 - Update and Confirm Accuracy
 - Confirm Automated Utility Download
 - ESPM is Energy Accounting System in CBPS
- Utility analysis of electric, gas and water
 - Provides Clues to Energy Use
 - Potential Savings Opportunities
- On Site Assessment:
 - HVAC
 - Lighting
 - Domestic Hot Water
 - Water Use
 - Building Envelope - Air Leakage and Roof Insulation





An Ongoing Process

- O&M Measures Require Trial and Error
 - May Require Several Rounds
 - Meet Occupant Requirements
 - Gain Persistent Savings
- CBPS Requires 1 Year of Data to Comply
- Leave Time in Case a Level 2 Audit is Necessary





Energy Use and Target EUI overview as
it relates to the CBPS

Start As Soon As Possible!



Review:

- ASHRAE 100-2018 is Adopted By Reference by CBPS
- Start by Getting Your EUI – Use Energy Star Portfolio Manager
- Target Efficiency (EUI_t) Must Be Met or Audit May Be Required
- All Buildings Must Develop Energy Management Plan and O&M Program
- Building Tune Up is a Good Strategy to Start the Process



30 minute Q&A starting now

Please submit your questions to the
question box

Next webinar:

Tune-ups for Clean Buildings
4/21/21, 11:30am



Energy Program
WASHINGTON STATE UNIVERSITY



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