

Clean Buildings Performance Standard

Energy Management Plan and Operations
and Maintenance 101

Presenters

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Washington State
Department of
Commerce

We strengthen communities



HOUSING AND HOMELESSNESS



INFRASTRUCTURE AND BROADBAND



SMALL BUSINESS ASSISTANCE



ENERGY



PLANNING AND TECH ASSISTANCE



COMMUNITY SERVICES AND FACILITIES



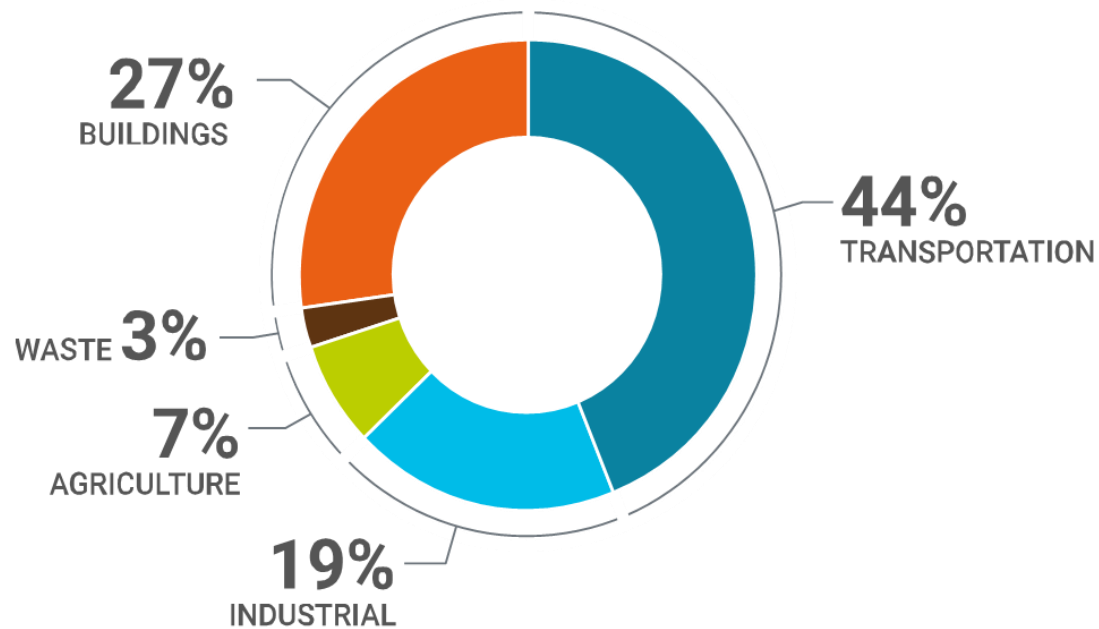
CRIME VICTIMS AND PUBLIC SAFETY



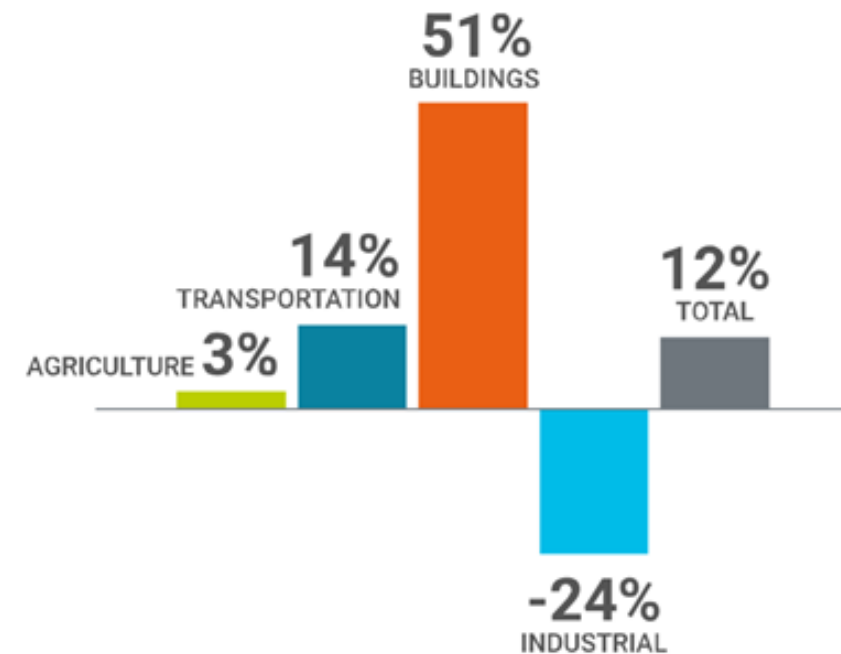
ECONOMIC DEVELOPMENT

Reducing emissions from existing buildings

Overall emissions in Washington



Emissions change by sector, 1990-2015



Agenda

- Clean Buildings Performance Standard requirements summary
- Overview and intent of the Clean Buildings Energy Management Plan (EMP) & Operations and Maintenance (O&M) program requirements
 - Responsible parties
 - What is an EMP and O&M
- What makes an effective EMP and O&M program
 - EMP and O&M objectives
 - Best practices
- Tools and resources
 - Existing and in development
- Reporting requirements
- Resources and support



Clean Buildings Performance Standard

- Based on ASHRAE Standard 100-2018
- WAC 194-50 – Rules for compliance and administrative requirements.
 - Amendment to Standard 100
- Applies to Tier 1 Buildings
 - Buildings over 50k sq ft excluding parking garages

Commerce charged with:

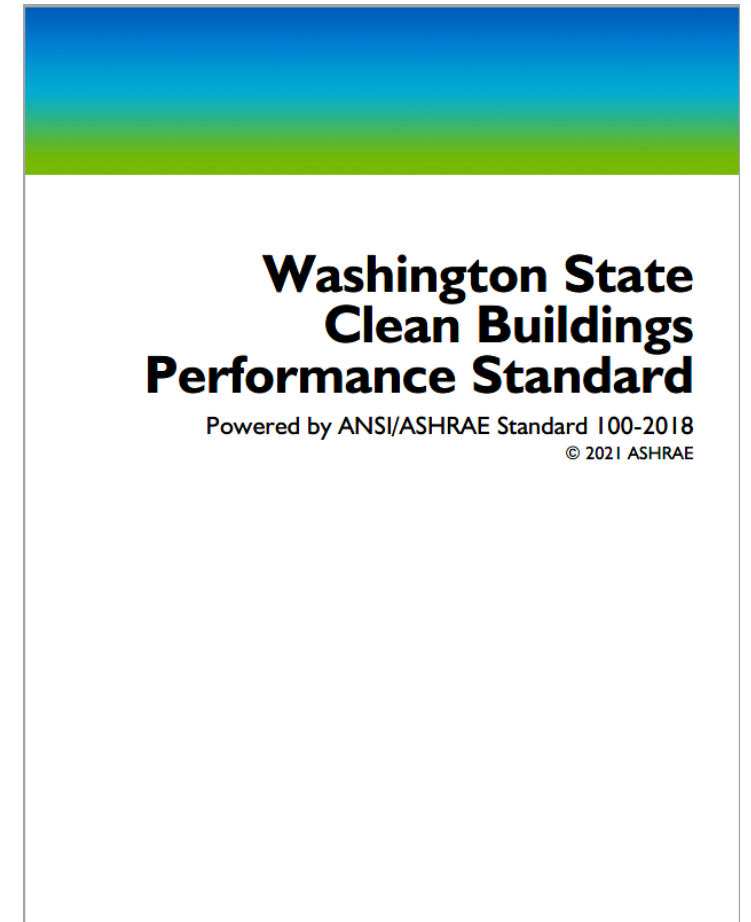
- Rulemaking
- Notifying building owners
- Administering incentives
- Supporting mandatory compliance

Visit the Clean Buildings webpages for more information and resources at www.commerce.wa.gov/buildings or email buildings@commerce.wa.gov

CBPS Breakdown

Structure:

- Sections 1, 2 and 3 – Purpose, Scope and Definitions
- Section 4 – Compliance Requirements
- Section 5 – Energy Management Plan
- Section 6 – Operations and Maintenance Requirements
- Section 7 – Building Energy Use Intensity Target (EUI_t) setting
- Section 8 – Energy Audit Requirements
- Section 9 – Implementation and Verification
- Normative Annex L: Operations and Maintenance Implementation
- Annex X – Investment Criteria
- Annex Y- Tier 2 Administrative Procedures
- Annex Z – Administrative Procedures



Tier 1 Requirements



Benchmarking



Operations & Maintenance Program

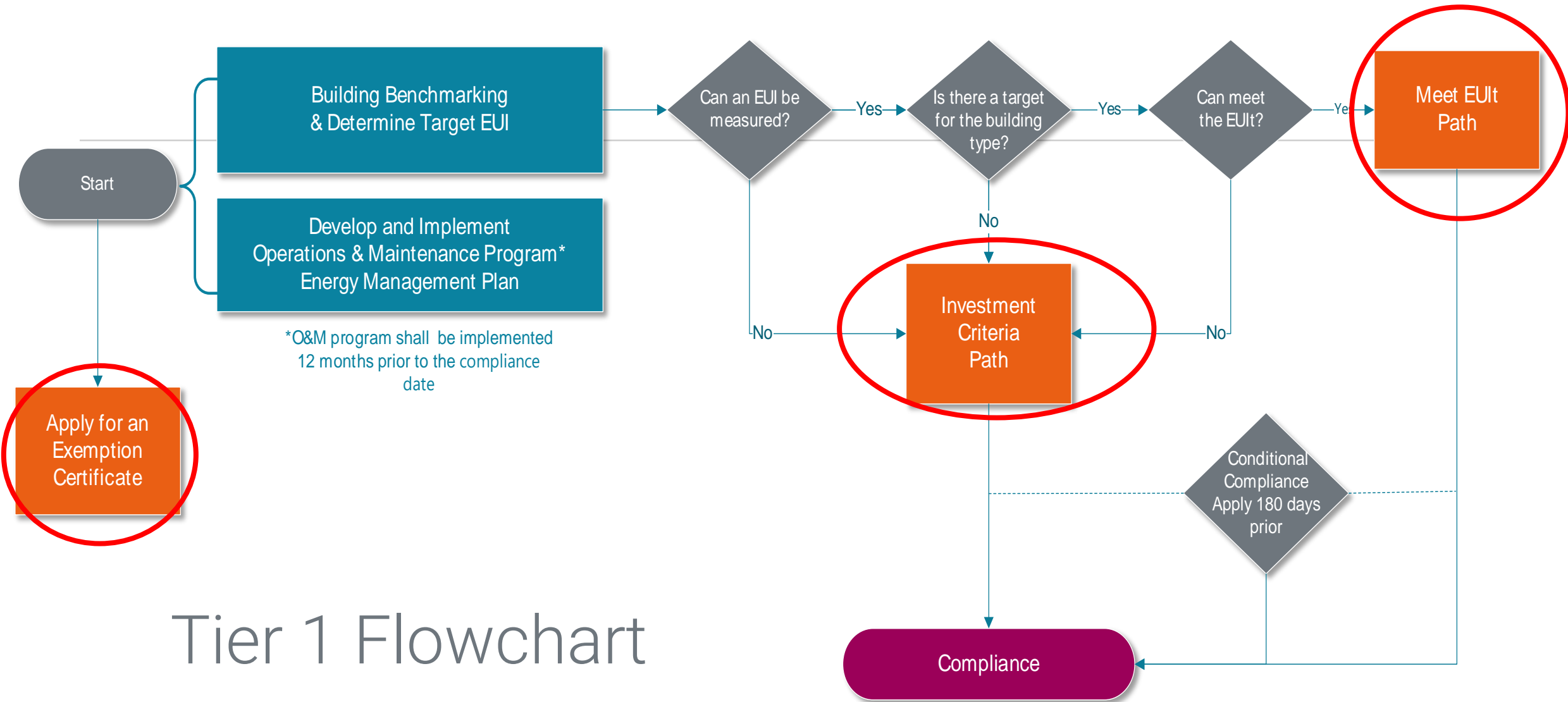


Energy Management Plan



Performance Metric

- Energy use intensity target met, **or**
- Energy Audit and implementation of cost effective energy efficiency measures



Tier 1 Flowchart

Tier 2 Requirements



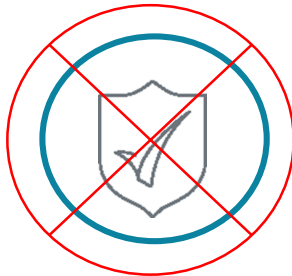
Benchmarking



Operations & Maintenance Program



Energy Management Plan



Performance Metric

- Energy use intensity target met, **or**
- Energy Audit and implementation of cost effective energy efficiency measures

Compliance and Reporting Schedule

A building owner of a tier 1 building must meet the following reporting schedule for complying with the standard and every five years thereafter:



Tier 1 - Buildings more than 220,000 gross sq. ft, June 1, 2026



Tier 2 - Buildings more than 20,000 – less than 50,000 gross sq. ft, July 1, 2027



Tier 1 - Buildings more than 90,000 – less than 220,001 gross sq. ft, June 1, 2027



Tier 1 - Buildings more than 50,000 – less than 90,001 gross sq. ft, June 1, 2028

Intent – Energy Management Plan (EMP)

- The EMP is a living document that describes the building's energy performance:
 1. Building energy metering and reporting
 2. Energy-Use Intensity (EUI) reporting
 3. Energy Efficiency Measure (EEM) implementation
 4. Operations and maintenance considerations for Energy Managers
 5. Communication responsibilities
- The EMP shall be updated annually, provided to occupants and stakeholders, and reviewed and signed by the building owner annually.

Shall be implemented a minimum of 12 months prior to compliance date

EMP Responsible Parties

Energy Management Plan Requirements

RELATED ROLES:

Energy manager role, responsible for developing and implementing the energy management plan.

Building manager role, responsible for complying with the energy management plan.

Energy Manager (EM): The individual, identified by the building owner who has responsibility for ensuring that the energy use in the building is minimized without compromising the indoor environmental quality (building indoor air quality, thermal comfort, visual acuity and comfort, sound quality). The EM may be the building owner, a tenant, an employee of the owner or tenant, or a contractor retained by the owner or tenant.

Building Manager: The person responsible for maintaining the building, its envelope, and its energy-using systems. The building manager may also be the person responsible for expending funds on capital improvements to the building.

Graphic source: ASHRAE Std 100 Users' Guide

EMP – Metering and Reporting (Benchmarking)

Establish and Energy Star Portfolio Manager Account

- Required energy accounting system of the standard
- Used to document energy meters and create EUI/WNEUI
 - Some buildings cannot create EUI/WNEUI

Establish Energy Use Intensity Target

- Regional average EUI target for your building
 - Some buildings will not have targets (Industrial)
- Document and compare to EUI/WNEUI annually

Document changes in building occupancy and operations

- Supports annual comparison of building energy performance

5.1 Establish the Energy Management Plan		N/A
5.1 An Energy Management Plan has been established and maintained in accordance with the standard.	<input type="checkbox"/>	
5.1.1 The <i>building owner</i> has designated an <i>energy manager (EM)</i> to develop and maintain an <i>energy management plan</i> for the <i>building</i> . Energy Manager's name: <input type="text"/> Energy Manager's association with the building: <input type="text"/>	<input type="checkbox"/>	
5.1.2.1 If applicable , energy accounting has been submitted in accordance with Section 5.2	<input type="checkbox"/>	<input type="checkbox"/>
5.1.2.2 WNEUI and EUI from initial compliance date for building: WNEUI from initial compliance year: <input type="text"/> EUI from initial compliance year: <input type="text"/>	<input type="checkbox"/>	<input type="checkbox"/>
5.1.2.3 Documented annual updates of net energy use, WNEUI and EUI.	<input type="checkbox"/>	<input type="checkbox"/>
5.1.2.4 Documentation of annual comparison of the net WNEUI and EUI to the energy target.	<input type="checkbox"/>	<input type="checkbox"/>
5.1.2.5 Documentation of original, current and changes in the number of occupants, weekly operating hours, or time of day schedule for occupancy, production rates and energy using equipment that would have caused a change in the measured WNEUI and EUI.	<input type="checkbox"/>	

Graphic: EMP Reporting Tool


EMP – Energy Audit Reporting

Energy Audits are required when pursuing compliance through the Investment Criteria or conditional compliance.

- Form D (Energy Audit Form) is required when documenting compliance through conditional compliance or the Investment Criteria

When audits are conducted, audit reports shall be included in the energy management plan and shall include any implemented EEMs

- Form D can be used to meet audit documentation requirements of the EMP



ENERGY SAVINGS OPPORTUNITIES

15

Building Name: **COM Test1**

Annual Energy & Cost Savings				
Package Name <small>Measure; Status (*); Modeling / Calculation Approach (**) *</small>	Measure Description	Total Cost Savings	Peak Demand Savings (kW)	Electricity Savings (kWh)
Potential Capital Recommendations				
Lighting <small>Retrofit with light emitting diode technologies; ^5; ^^1</small>	Replace all existing lighting with LED	2014.21	0.0	23421.0
HPWH <small>Install heat pump SHW system; ^5; ^^2</small>	Install HPWH	860.0	0.0	10000.0
HVAC <small>Install air source heat pump; ^5; ^^2 Install air source heat pump; ^5; ^^2</small>	Install 20 SEER ASHP Install 10 HSPF ASHP	5160.0	0.0	60000.0
Totals (recomm. measures)		8034.21	0.0	93421.0

Payback with Incentives							
Package Name <small>Measure; Status (*); Modeling / Calculation Approach (**) *</small>	Measure cost	Potential incentives	Measure life (years)	Net measure cost	Simple ROI (%)	Simple Payback (w/o incentives - years)	Simple Payback (w/ incentives - years)
Potential Capital Recommendations							
Lighting <small>Retrofit with light emitting diode technologies; ^5; ^^1</small>	45000.0	5000.0	25.0	40000	5%	22.3	19.9
HPWH				4500	19%	5.8	5.2

Graphic: Clean Building Form D (Audit Template)

EMP – Capital Management Plan

5.1 Establish the Energy Management Plan		N/A
5.1.2.10: Capital management plan identifies equipment for replacement with energy efficient and ENERGY STAR rated equipment in case of failure.	<input type="checkbox"/>	
5.1.2.11: A contact list of suppliers and manufacturer's local representatives of energy efficient equipment, <i>qualified energy auditor</i> , the <i>energy manager</i> , and the <i>building owner</i> .	<input type="checkbox"/>	

Shall include phased implementation when applicable

Graphic: EMP Reporting Tool

EMP – Lighting

5.1 Establish the Energy Management Plan		N/A
5.1.2.12: Current lighting schedule and the calculated lighting power density, along with the potential savings from any potential EEMs. A lighting schedule is not required for buildings that meet their EUI or have implemented a lighting upgrade through a utility program within the previous five years.	<input type="checkbox"/>	<input type="checkbox"/>
5.1.2.13: Current lighting satisfaction survey and lighting checklist as described in Appendix D of <i>Performance Measurement Protocols for Commercial Buildings</i> or as approved by the AHJ. A lighting satisfaction survey is not required for buildings that meet their EUI or have implemented a lighting upgrade through a utility program within the previous five years.	<input type="checkbox"/>	<input type="checkbox"/>

Fixture Details

- List all the different fixture types and their wattage installed in the spaces. This list will be available to choose from in the Lighting Schedule.
- List retrofit fixture types and their wattage you are considering for your spaces. This list will be available to choose from in the Lighting Schedule.
- Grey cells will be populated automatically.
- Additional rows can be added by right clicking anywhere within the table and selecting the "Insert->Tab Rows Above" menu option.

Existing Fixtures					Retrofit Fixtures	
ID	Description	Wattage	Total Count	Annual Energy Use	ID	Description
			0	0		
			0	0		
			0	0		
			0	0		
			0	0		
			0	0		
			0	0		
			0	0		
			0	0		
			0	0		

Lighting Schedule and Survey:

https://www.smartbuildingscenter.org/wp-content/uploads/2023/06/Lighting-Survey-Table_Published-V02-2.xlsb

EMP – Education

5.1 Establish the Energy Management Plan		N/A
5.1.2.8: Method developed to inform occupants about the benefits of efficient energy use and to instruct them in the use and adjustment of operable windows, HVAC system controls, and lighting system components and controls. This shall include materials (electronic or printed) as appropriate.	<input type="checkbox"/>	
5.1.2.9: Training plan developed for the O&M personnel to operate the building systems to achieve established indoor environmental targets with optimum energy efficiency.	<input type="checkbox"/>	

Graphic: EMP Reporting Tool

EMP – Operations and Maintenance Program

The Operations and Maintenance Program (O&M) is a requirement of the EMP

- **5.1.2.14:** Operations and maintenance (O&M) program developed in accordance with Section 6 and implemented as specified in Normative Annex L.

EMP – Communication & Execution

5.3 Energy Manager. The *EM* shall be responsible for the following.

5.3.1 Conducting technical, policy-related planning related to energy efficiency.

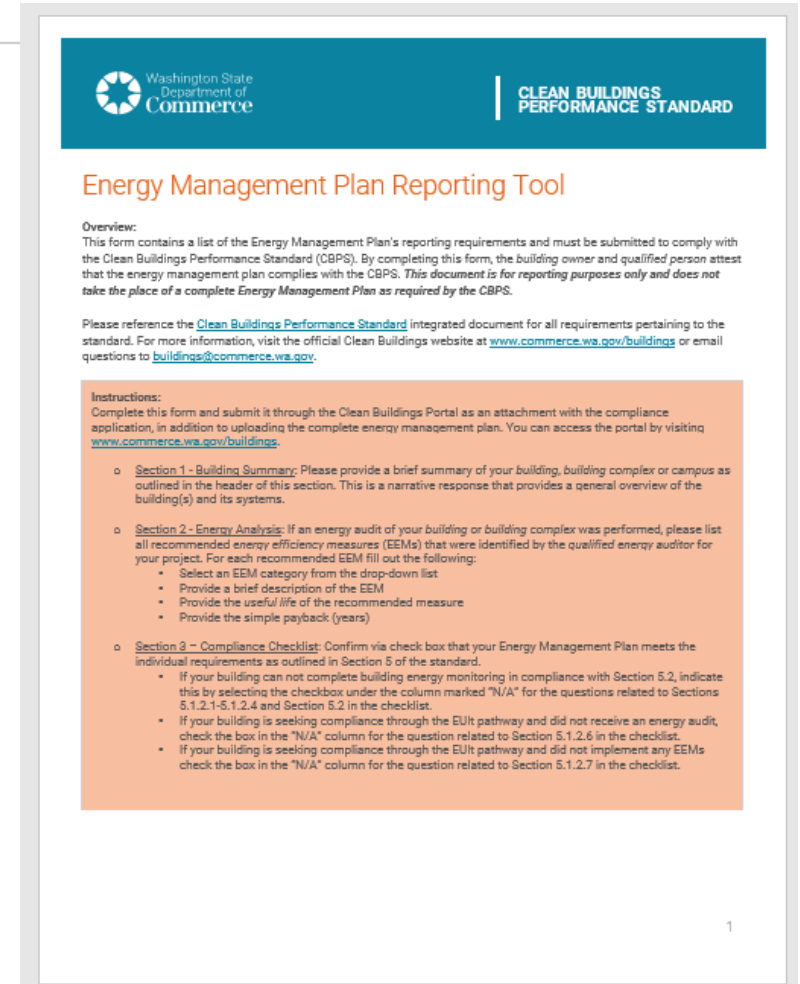
5.3.2 Purchasing energy for spaces under his or her control.

5.3.3 Public relations matters related to energy.

5.3.4 Implementing the results of energy audits and *EEMs* outlined in the energy management plan.

Reporting requirements

- Submit EMP Reporting Tool provided by Commerce to the Clean Buildings Portal
- Upload complete EMP to the Clean Buildings Portal



The screenshot shows the header of the reporting tool page. On the left is the Washington State Department of Commerce logo. On the right is the text 'CLEAN BUILDINGS PERFORMANCE STANDARD'. Below the header is the title 'Energy Management Plan Reporting Tool'. The page contains an overview section, a reference to the Clean Buildings Performance Standard, and a detailed instructions section with three main points: Section 1 - Building Summary, Section 2 - Energy Analysis, and Section 3 - Compliance Checklist. A page number '1' is visible in the bottom right corner of the screenshot.

Washington State
Department of
Commerce

CLEAN BUILDINGS
PERFORMANCE STANDARD

Energy Management Plan Reporting Tool

Overview:
This form contains a list of the Energy Management Plan's reporting requirements and must be submitted to comply with the Clean Buildings Performance Standard (CBPS). By completing this form, the building owner and qualified person attest that the energy management plan complies with the CBPS. *This document is for reporting purposes only and does not take the place of a complete Energy Management Plan as required by the CBPS.*

Please reference the [Clean Buildings Performance Standard](#) integrated document for all requirements pertaining to the standard. For more information, visit the official Clean Buildings website at www.commerce.wa.gov/buildings or email questions to buildings@commerce.wa.gov.

Instructions:
Complete this form and submit it through the Clean Buildings Portal as an attachment with the compliance application, in addition to uploading the complete energy management plan. You can access the portal by visiting www.commerce.wa.gov/buildings.

- o **Section 1 - Building Summary:** Please provide a brief summary of your building, building complex or campus as outlined in the header of this section. This is a narrative response that provides a general overview of the building(s) and its systems.
- o **Section 2 - Energy Analysis:** If an energy audit of your building or building complex was performed, please list all recommended energy efficiency measures (EEMs) that were identified by the qualified energy auditor for your project. For each recommended EEM fill out the following:
 - Select an EEM category from the drop-down list
 - Provide a brief description of the EEM
 - Provide the useful life of the recommended measure
 - Provide the simple payback (years)
- o **Section 3 - Compliance Checklist:** Confirm via check box that your Energy Management Plan meets the individual requirements as outlined in Section 5 of the standard.
 - If your building can not complete building energy monitoring in compliance with Section 5.2, indicate this by selecting the checkbox under the column marked "N/A" for the questions related to Sections 5.1.2.1-5.1.2.4 and Section 5.2 in the checklist.
 - If your building is seeking compliance through the EUI pathway and did not receive an energy audit, check the box in the "N/A" column for the question related to Section 5.1.2.6 in the checklist.
 - If your building is seeking compliance through the EUI pathway and did not implement any EEMs check the box in the "N/A" column for the question related to Section 5.1.2.7 in the checklist.

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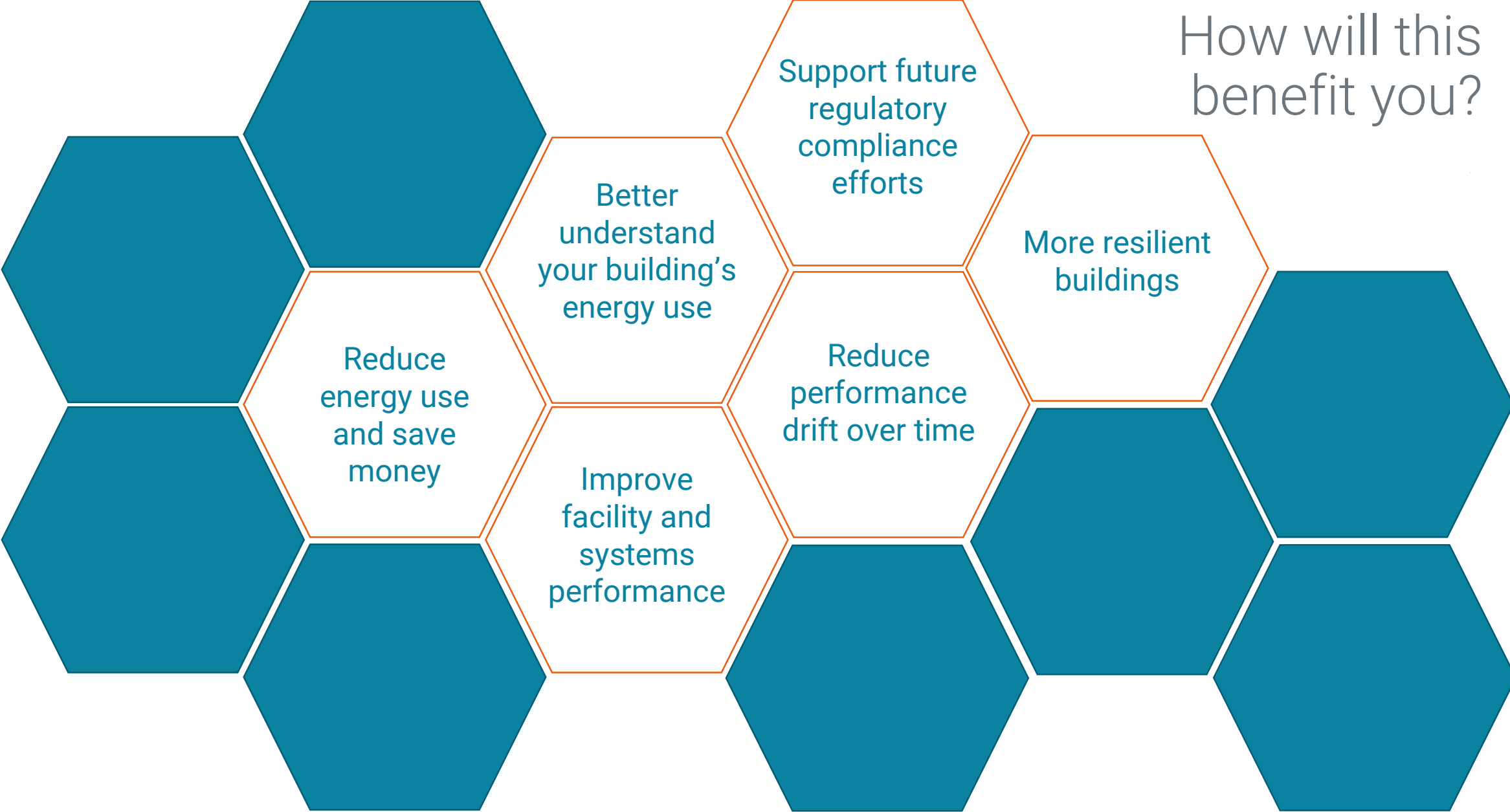
Intent – Operations and Maintenance Program (O&M)

Established and implemented in order that the building energy-using systems achieve their intended energy efficiency throughout their service life.

This program documents the O&M objectives, establishes the criteria for evaluation, and commits the building operator and maintenance personnel to basic goals of performance, such as:

- minimizing equipment failures
- ensuring ongoing efficient operation
- performing identified maintenance requirements

How will this benefit you?



O&M Responsible Parties

RELATED ROLES:

Energy manager role, responsible for developing and implementing the energy management plan, some of which overlaps with operations and maintenance requirements.

Building manager role, responsible for complying with the energy management plan and the operations and maintenance requirements.

Building owner role, responsible for ensuring operations and maintenance requirements are met.

Building operator role, required to execute the operations and maintenance plan and commit to its goals.

Building Operator: The person or persons who have responsibility to inspect, operate, and maintain the building systems and components that fall within the scope of the this standard. The building operator may be an employee of the building owner, the building manager, or a contractor.

Energy Manager (EM): The individual, identified by the building owner who has responsibility for ensuring that the energy use in the building is minimized without compromising the indoor environmental quality (building indoor air quality, thermal comfort, visual acuity and comfort, sound quality). The EM may be the building owner, a tenant, an employee of the owner or tenant, or a contractor retained by the owner or tenant.

Building Manager: The person responsible for maintaining the building, its envelope, and its energy-using systems. The building manager may also be the person responsible for expending funds on capital improvements to the building.

Graphic source: ASHRAE Std 100 Users' Guide

O&M Program Format

- Create in house
 - Utilize existing building management software
 - Model after existing resources
 - ASHRAE Std 180
 - Future templates provided by Commerce
- Participate in energy utilities Accelerator Programs
- Contract with local firms providing Clean Buildings compliance services

Table 5-3 Boilers

	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Recommended Corrective Action</i>
a	For systems using fuel oil, inspect fuel filter.	Clean, and verify proper operation.	Monthly	Repair or replace as needed to ensure proper operation.
b	Perform chemical testing of system water.	Verify water treatment target levels are being maintained.	Monthly	Repair <i>equipment</i> , and treat as needed to ensure proper water chemistry.
c	For systems using fuel oil, check fuel pump for proper operation.	Clean, and verify proper operation.	Quarterly	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.3.2.2 for procedure to modify frequency.

Graphic source: ASHRAE Std 180

O&M - Tasks

6.4 Operations and Maintenance Tasks:	
<p>6.4.1 Maintenance for all equipment, components and systems has been established in accordance with applicable manufacturers' requirements and also includes tasks that minimize failures and maintain energy consumption efficiency, such as those found in Informative Annex D for the following building systems where applicable:</p> <ul style="list-style-type: none">• Building envelope• Domestic hot water• Heating, ventilation, and air conditioning• Refrigeration• Lighting• Controls• Electric Power Distribution and on-site power generation	<input type="checkbox"/>
<p>6.4.2 Safe and reasonable access is provided to all equipment covered by the O&M program for inspection, maintenance, and repairs.</p>	<input type="checkbox"/>
<p>6.4.3 O&M requirements are reevaluated when <i>building</i> use changes or renovations/alterations are made that affect the facility's operations.</p>	<input type="checkbox"/>

Graphic: O&M Reporting Tool

O&M – Tenant Improvements

6.5 Tenant Improvements:	
The <i>energy manager (EM)</i> has implemented a formal process to ensure that any tenant improvements involving a change in space use or the relocation of partitions (including partial height partitions) do not change the annual <i>net energy use</i> except to the extent that the annual <i>net energy use</i> change (increase or decrease) is consistent with any change in the <i>building's energy target</i> .	<input type="checkbox"/>

Graphic: O&M Reporting Tool

O&M – Equipment Replacement

6.6 Equipment and Component Replacement:	
6.6.1 When HVAC, domestic water heating, refrigeration equipment and appliances are replaced, the replacement equipment meets the most stringent energy efficiency requirements in the federal equipment standards, <i>state equipment standards</i> , and the <i>applicable building code</i> .	<input type="checkbox"/>
6.6.2.1 When lighting equipment is replaced, the replacement equipment meets the most stringent energy efficiency requirements in the federal equipment standards, <i>state equipment standards</i> , and in the <i>applicable building code</i> . Implementation of more efficient equipment is evaluated and included as specified for the <i>capital management plan</i> , Section 5.1.2.10.	<input type="checkbox"/>
6.6.2.2 Replacement lighting equipment does not increase the existing installed lighting power demand unless it meets the exception to 6.6.2.2* . *Exception to 6.6.2.2: The existing installed lighting power may proportionally increase when the current light levels are below those recommended in the Illuminating Engineering Society (IES) <i>Lighting Handbook 4</i> or latest addition of the <i>Washington State Energy Code (WSEC)</i> .	<input type="checkbox"/>

Graphic: O&M Reporting Tool

O&M – Implementation

L2: Operations and Maintenance Program:

Each *building* system has an O&M program that, at a minimum, preserves the condition of the system and its elements in a manner that enables the system to provide the intended thermal and visual comfort, energy efficiency, and helps to achieve the intended indoor environmental quality required for the *building*.

At a minimum, the O&M program contains an inventory of equipment, systems, and controls to be inspected and *maintained* and a maintenance plan describing the goals, objectives, and execution of the systems maintenance program.

L2.1 Inventory of Items to be Inspected and *Maintained*: Components of *building* systems that impact the *building's* performance have been inventoried and used to establish unacceptable system condition indicators, inspection frequencies, and maintenance tasks.



Shall be implemented a minimum of 12 months prior to compliance date

Graphic: O&M Reporting Tool

O&M – Reference Material (Annex D)

(This annex is not part of this standard. It is merely informative and does not contain requirements necessary for conformance to the standard. It has not been processed according to the ANSI requirements for a standard and may contain material that has not been subject to public review or a consensus process. Unresolved objectors on informative material are not offered the right to appeal at ASHRAE or ANSI.)

INFORMATIVE ANNEX D OPERATIONS AND MAINTENANCE REQUIREMENTS FOR BUILDING SYSTEMS AND ELEMENTS

D1. BUILDING ENVELOPE

D1.1 Operations and maintenance (O&M) requirements for the *building* envelope should include all applicable items in Section 6 plus the following.

D1.2 The *energy manager (EM)* should verify a *building* envelope inspection is performed at least once every three years. Corrective action should be taken as needed, including addressing all items below.

D1.3 Seal all exterior joints in the *building* envelope, and all around penetrations of the *building* envelope by utility services.

D1.4 Replace broken or missing windows.

D1.5 Repair or replace exterior door weather stripping, threshold, and door sweeps as needed.

Exceptions to D2.2.3:

1. Systems dedicated to serving equipment requiring higher water temperatures,
2. Systems that use a water heater to meet both domestic hot-water needs and space heating load.

D3. HEATING, VENTILATING, AND AIR- CONDITIONING (HVAC) SYSTEMS

D3.1 Scope. The scope of Section D3 includes *HVAC systems* and components used to condition spaces within *buildings*. The O&M requirements for these systems and their components should minimize energy use over time, while providing heating, ventilation, and cooling as needed for *building* operations and occupant needs. The O&M requirements for these systems should be evaluated when *building* use or other changes are made that affect system operations.

D3.2 General Requirements

D3.2.1 O&M requirements for *HVAC systems* include all applicable items in Section 6 plus the following.

D3.2.2 Each O&M task should be performed in a safe and professional manner by *qualified* personnel. Tasks that require specialized expertise should be performed by personnel with the requisite expertise who are certified where required by code or regulation.

D3.2.3 O&M tasks should be performed twice per year, unless otherwise noted in this standard, or as recommended by the manufacturer.

D3.2.4 Securely and visibly display a list of operating

O&M – Ref. Material (ASHRAE 100 Users' Guide)

Operations and Maintenance Checklist		Date
#	Task	
.10	Maintain serviceable points of lubrication.	<input type="checkbox"/>
.11	Replace or clean filters in accordance with the manufacturer's recommended schedule or design pressure drop.	<input type="checkbox"/>
.12	Maintain HVAC system piping and duct systems against leakage.	<input type="checkbox"/>
.13	Maintain insulation on HVAC system piping and duct systems.	<input type="checkbox"/>
.14	Maintain the steam water heating, hot-water heating, and chilled-water cooling control valves against leakage a minimum of once every three years.	<input type="checkbox"/>
D3.2.8	Document periodic maintenance work and service work on service logs.	<input type="checkbox"/>
D3.3 Boiler Systems		
D3.3.1 (Sec 6)	O&M requirements for boiler systems include all applicable items in Section 6.	<input type="checkbox"/>
.1 Boiler Burners		
a.	Maintain proper combustion efficiency—carry out a combustion analysis and carbon monoxide testing at least annually and make necessary corrections to achieve rated efficiency and safety.	<input type="checkbox"/>

[ASHRAE 100 Users' Guide](#)

[Available for download on our website:](#)

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

O&M – Ref. Material (STD 180)

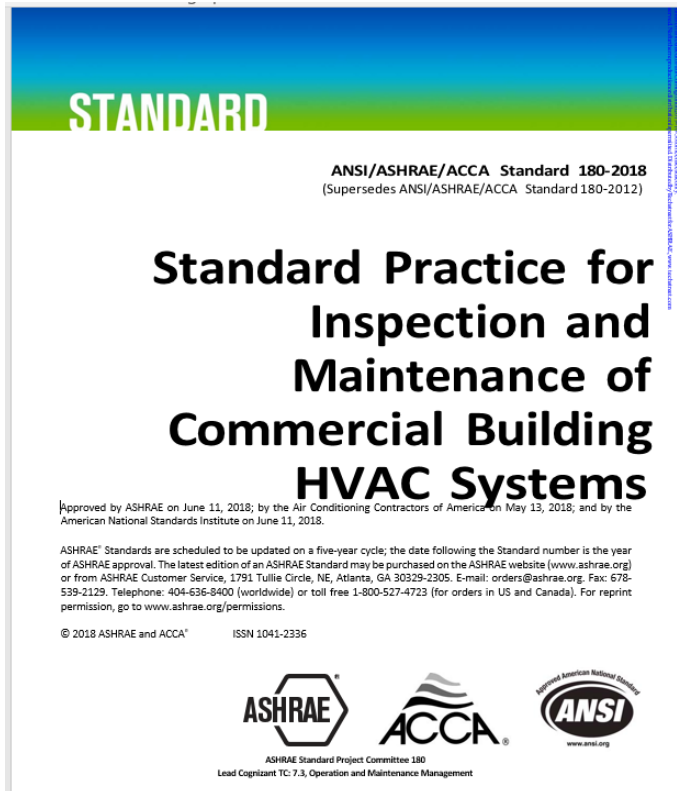
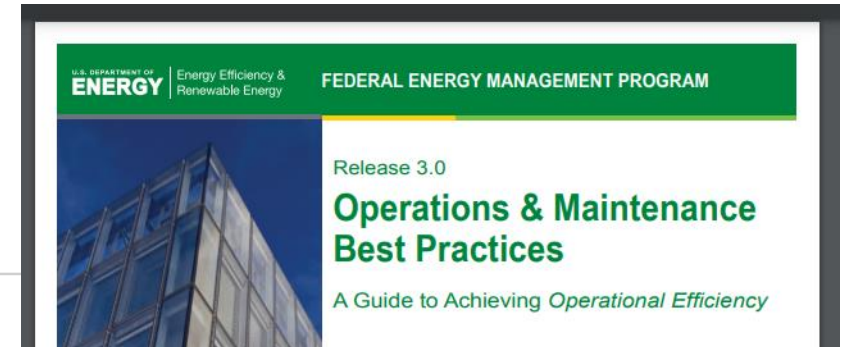


Table 5-3 Boilers (Continued)

	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Recommended Corrective Action</i>
d	Inspect blowdown or drain valve. Clear all debris to ensure proper operation.	Clean, and verify proper operation.	Quarterly	Repair or replace as needed to ensure proper operation.
e	Check for evidence of leakage of fuel supply, heat transfer fluid, and flue gas.	Record location of identified leaks.	Quarterly	Repair or replace as needed to ensure proper operation.
f	For systems using natural gas, check gas pressure, gas valve operation, and combustion fan operation.	Clean, and verify proper operation.	Quarterly	Repair or replace as needed to ensure proper operation.
g	Check control system and devices for evidence of improper operation.	Clean, lubricate, and verify proper operation.	Semiannually	Repair or replace as needed to ensure proper operation.
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections as needed.	Annually	Repair or replace as needed to ensure proper operation.

O&M – Ref. Material (FEMP)



	A	B	C	D	E
1	FEMP O&M Small Buildings Checklist Tool				
2	<i>Annual Checklist</i>				
3					
4	Description	Comments	Date 1	Condition Indicator	Notes
5	Lighting	LED Lights			
6	Clean lamps and fixtures	Clean lamps and fixtures. Reflective surfaces should be cleaned periodically for maximum efficient delivery of light to the space.			
7	Clean walls and ceilings	Clean walls and ceilings since clean surfaces allow maximum distribution of light within the space.			
8	Replace degraded lenses or louvers	Replace yellowed, stained, or broken lenses or louvers.			
9	Repaint walls and replace ceilings	Lighter colored surfaces will increase light distribution efficiency within the space.			
10	Replace burned out lamps	Replace burned out lamps. For larger facilities consider group relamping.			
11	Evaluate lamps and ballast for potential upgrade	Evaluate lamps and ballasts for potential upgrades. Rapid change in technology may result in significant savings through relamping or simple retrofit.			
	Survey lighting use/illumination	Measure light levels compared to tasks need in typical spaces. Identify			

<https://www.energy.gov/femp/articles/operations-and-maintenance-best-practices-guide-achieving-operational-efficiency>

O&M – Plan development

L2.2 Maintenance Plan Development: The maintenance plan was written and developed specifically to meet the size, design, scope, and complexity of the systems serving our facility. The plan describes required tasks, identifies the parties responsible for performing these tasks, specifies the authorizing party, documents completion of required tasks, and subsequently monitors the results. The plan includes all of the following information

O&M – Performance Objectives

L2.2.1 Performance Objectives. Performance objectives identified for this facility incorporate thermal and visual comfort, energy efficiency, and indoor environmental quality metrics. Performance objectives are based on design intent and operational criteria specific to particular systems. The source of the performance objectives has been documented.



O&M – Condition Indicators

L2.2.2 Condition Indicators: Indicators of unacceptable system and equipment conditions have been established. These indicators are measurements or observations of conditions that could lead to failure or performance degradation.



→ **Statement of condition indicators (ASHRAE Std. 100 Sec. L2.2.2).** The inventory of items identifies what needs to be inspected and maintained, while the condition indicators are what maintenance personnel are checking for. In other words, they set criteria to signal unsatisfactory or out-of-specification performance. Condition indicators may be measurements or observations. If they signal unsatisfactory performance at two successive inspections, the building owner and/or their designated representative are required to further investigate the problem.

Graphic source: ASHRAE Std 100 Users' Guide

O&M – Inspection and Maintenance Tasks

L2.2.3 Inspection and Maintenance Tasks: Inspection and maintenance tasks for inventoried equipment, systems, and controls have been established. Inspections include the physical assessment of system components and may include measurement of operating parameters and data provided by sensors or a *building* management system (BMS). Maintenance tasks include adjustment, service, or replacement of inventoried equipment and systems. Control systems settings, including but not limited to set points, schedules, and sequence of operations, are inspected and *maintained*.



*Refer to Section 4.3.2.2 for procedure to modify frequency.

Table 5-9 Control Systems (Continued)

	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Recommended Corrective Action</i>
h	Check control box for dirt, debris, and/or loose terminations.	Clean and tighten electrical connections as needed.	Semiannually	Repair, replace, or restore as needed to ensure proper operation.
i	Check motor contactor for pitting or other signs of damage.	Clean and tighten electrical connections as needed.	Annually	Repair, replace, or restore as needed to ensure proper operation.

Graphic source: ASHRAE Std 180

O&M – Task Frequencies

<p>L2.2.4 Inspection and Maintenance Task Frequencies: Frequency of inspection and maintenance tasks for inventoried equipment, systems, and controls have been established. If unacceptable condition indicators or unacceptable performance is found during two (2) consecutive inspections, the owner or owner’s designated representative investigates and analyzes possible causes.</p>	<input type="checkbox"/>
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- Based on manufacturer recommendations and other industry resources
- adjust as needed considering age and condition of equipment or system
- Refer to Informative Annex D

D3.3.1.1 Boiler Burners

- Maintain* proper combustion efficiency—carry out a combustion analysis and carbon monoxide testing at least annually, and make necessary corrections to achieve rated efficiency and safety.
- For boilers $\geq 400,000$ Btu/h (117,240 W), design input, perform combustion analysis, and make adjustments to optimize boiler efficiency at least once annually.
- For boilers $< 400,000$ Btu/h (117,240 w), design input, perform combustion analysis, and make adjustments to optimize boiler efficiency at least once every three years.

Graphic source: ASHRAE Std 100

O&M – Documentation

L2.2.5 Documentation: A minimum inspection and maintenance documentation package has been created and consists of the following items:

1. Listings of *building* systems and system components with associated performance criteria pertinent to the facility.
2. Inspection and maintenance tasks and the method of tracking (automated or manual).
3. Identification of *building* systems or components operating beyond their *useful life*.
4. Sufficient record detail and verification (written or electronic) to demonstrate implementation of the maintenance plan.
5. The inspection and maintenance document directory shall be readily accessible, organized and clearly identified. Emergency information shall be immediately available and include emergency staff and/or agency notification procedures.



Table 5-22 Rooftop Units (Continued)

	Normative	Normative	Normative	Informative
	<i>Inspection Task</i>	<i>Maintenance Task</i>	<i>Frequency*</i>	<i>Recommended Corrective Action</i>
n	Check fan blades and fan housing.	Clean as needed.	Annually	Repair or replace as needed to ensure proper operation.
o	Check refrigerant system temperatures.	When outside of recommended levels, find and record the cause.	Annually	Repair, and adjust refrigerant to achieve optimal operating levels.
P	Check fan drive for wear or problems due to poor alignment or poor bearing seating.	Adjust and lubricate as necessary.	Annually	Repair or replace as needed to ensure proper operation.

*Refer to Section 4.3.2.2 for procedure to modify frequency.

Graphic source: ASHRAE Std 180

O&M – Documentation of corrective action

L2.3 Maintenance Plan Authorization and Execution:

Inspection and maintenance tasks are performed on an established frequency or upon a documented observance of unacceptable condition. Whether authorized by written or verbal instructions, execution of the task is documented and archived for future reference.



	A	B	C	D	E
1	FEMP O&M Small Buildings Checklist Tool				
2	<i>Annual Checklist</i>				
3					
4	Description	Comments	Date 1	Condition Indicator	Notes
5	Lighting	LED Lights			
6	Clean lamps and fixtures	Clean lamps and fixtures. Reflective surfaces should be cleaned periodically for maximum efficient delivery of light to the space.			
7	Clean walls and ceilings	Clean walls and ceilings since clean surfaces allow maximum distribution of light within the space.			
8	Replace degraded lenses or louvers	Replace yellowed, stained, or broken lenses or louvers.			
9	Repaint walls and replace ceilings	Lighter colored surfaces will increase light distribution efficiency within the space.			
10	Replace burned out lamps	Replace burned out lamps. For larger facilities consider group relamping.			
11	Evaluate lamps and ballast for potential upgrade	Evaluate lamps and ballasts for potential upgrades. Rapid change in technology may result in significant savings through relamping or simple retrofit.			
	Survey lighting use/illumination	Measure light levels compared to tasks need in typical spaces. Identify			

Graphic source: FEMP

O&M – Review & Revisions

L2.4 Revision of the Maintenance Program:

The O&M program is reviewed, and revisions considered, in any of the following situations:


1. Modifications to the *building* that impact *building* system performance objectives have occurred.
2. The *building* function or its use has changed in a way that impacts *building* system performance objectives.
3. *Building* system component changes have occurred.
4. One or more systems are found to be incapable of achieving their performance objectives.
5. Upon documented recommendation from the maintenance provider.



Graphic: O&M Reporting Tool

Reporting requirements

- Submit O&M Reporting Tool to the Clean Buildings Portal
- Upload complete EMP & O&M program to the Clean Buildings Portal


CLEAN BUILDINGS PERFORMANCE STANDARD

Operations and Maintenance Reporting Tool

Overview:
The operations and maintenance (O&M) program is a component of the energy management plan. The O&M program shall be developed in accordance with Section 6 and Normative Annex L of the Clean Buildings Performance Standard (CBPS) and must be implemented 12 months prior to the mandatory compliance date.

This document is for reporting purposes only and does not take the place of a complete O&M program as required by the CBPS. The O&M Reporting Tool contains a checklist of program reporting requirements that must be submitted along with a completed O&M program to comply with the CBPS. By completing this form, the building owner and qualified person attest that the O&M program has been implemented in accordance with the CBPS.

Please reference the [Clean Buildings Performance Standard integrated](#) document for all requirements pertaining to the standard. For more information, visit the official Clean Buildings website at www.commerce.wa.gov/buildings or email questions to buildings@commerce.wa.gov.

Instructions:
Complete this form and submit it through the Clean Buildings Portal as an attachment with the compliance application, in addition to uploading the complete operations and maintenance program. You can access the portal by visiting www.commerce.wa.gov/buildings.

To complete the list below, indicate via the checkbox that your building's O&M program has been developed in accordance with the following sections of the Clean Buildings Performance Standard:

Commerce Building ID:

6.2 Operations and Maintenance Program	
<p>A formal operations and maintenance (O&M) program has been established and implemented in order that the building energy-using systems achieve their intended energy efficiency throughout their service life. This program documents the O&M objectives, establishes the criteria for evaluation, and commits the building operator and maintenance personnel to basic goals of performance (such as minimizing equipment failures, ensuring ongoing efficient operation, and performing identified maintenance requirements).</p>	<input type="checkbox"/>

Each Tier 1 and Tier 2 building on campus is conditioned with water source heat pumps coupled with DOAS systems. Heating to each heat pump is provided by high efficiency natural gas boilers and a variable primary pumping system. Cooling is provided via a cooling tower and uses the same variable pumping system.

Ari and Uzi building office spaces are conditioned via split system heat pumps, and shop areas are conditioned with electric space heat.

Interior lighting on campus is primarily LED fixtures but also includes some linear fluorescent and compact fluorescent light sources. Exterior building lighting includes a mixture of LED exterior wall packs, and high intensity discharge (HID) lamp sources used for pole mounted area lighting. Grounds and maintenance facilities include LED shop lights.

Tools and Resources

- Clean Buildings Performance Standard Informative Annex D
- Smart Building Center Clean Buildings [Lighting Schedule and Survey](#)
- ASHRAE Standard 180 – Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems
- [ASHRAE 100 Users' Guide](#)
- Federal Energy Management Program (FEMP)
 - [Best Practice Guidelines](#)
 - [Small Building O&M Checklist](#)
- [WSU RCM Webinar: Energy Management Plans for Clean Buildings](#)
- [WSU RCM Webinar: Operations and Maintenance for Clean Buildings](#)
- Future Templates from Commerce and the Clean Buildings Team

No-Cost Support

- ✓ **Clean Buildings Team**
 - Technical Assistance
- ✓ **Utility Providers**
 - Accelerator Programs
- ✓ **Smart Building Center/NEEC**
 - Help Desk
- ✓ **Energy Star Portfolio Manager**
 - Customer Support
 - Live and recorded training session



Clean Buildings Webpage

Clean Buildings

Clean buildings are essential to meeting our state energy goals. In 2019 the Clean Buildings bill was signed into law and later expanded in 2022. The objective is to lower costs and pollution from fossil fuel consumption in the state's existing covered buildings and multifamily buildings. The law also provides incentives to encourage building owners to make energy efficiency improvements earlier than required. Learn more about the [Clean Buildings Performance Standards](#).



Contact

Emily Salzberg
Buildings Unit Managing Director
Email: Buildings@Commerce.wa.gov
Phone: 360-725-3108

Need Help?

Submit any questions or support requests using the [Customer Support Form](#).

Subscribe

To sign up for updates or access your subscriber preferences, please enter your contact information below.

*Email Address

Submit



How to Comply

Building owners and their teams may not know where to start. Visit the [How to Comply](#) page to learn more about the steps to get started.



Frequently Asked Questions

Browse or search our [Frequently Asked Questions](#). If you can't find what you're looking for, send a question or comment to our staff by emailing Buildings@Commerce.wa.gov.



Clean Buildings Library

Get fact sheets, flowcharts, quick reference guides and other information about the [Clean Buildings Performance Standard](#).



Customer Support and Resources

Find resources from Commerce and other organizations that support compliance, including a directory of qualified persons and qualified energy auditors that may be able to assist you in compliance.



Clean Buildings Portal

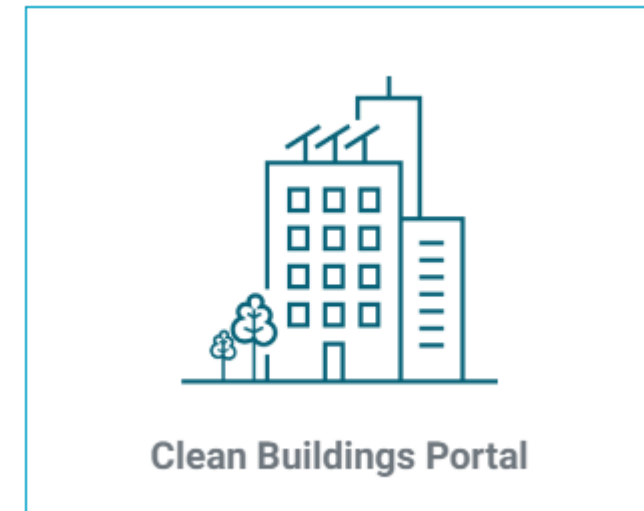
The [Clean Buildings Portal](#) is a database of all Tier 1 buildings and provides building owners a secure system to manage their building's compliance with the [Clean Buildings Performance Standard](#) and submit applications to the [Early Adopter Incentive Program](#).

- [How to Comply](#)
- [Frequently Asked Questions](#)
- [Guidance Document Library](#)
- [Customer Support and Resources](#)
- [Early Adopter Incentive Program](#)
- [Clean Buildings Portal](#)
- [Customer Support Form](#)

Website: <https://www.commerce.wa.gov/buildings/>

Clean Buildings Portal

- View and verify parcel/building information
- Manage roles and authorized users to work on parcel/building profile
- Submit applications
- Submit compliance forms
- Track compliance requirements
- Check on the status of applications
- Make changes to account information



Tier 2 Timeline – SB 5722, 2022

December 2023

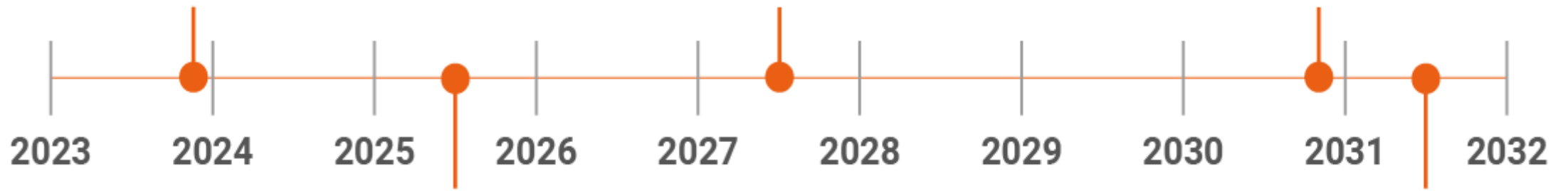
Rules for Tier 2 benchmarking energy management and operations and maintenance requirements

July 2027

Tier 2 reporting to Commerce

December 2030

Adopt rules for Tier 2 performance standards



July 2025

Tier 2 building owner notifications and incentive program launch

July 2031

Rules take effect after legislative session pending any action by the legislature

State supported programs

- Clean Energy Fund Building Electrification Program \$10 million
- Clean Buildings Incentive \$75 million Tier 1, \$150 million Tier 2
- Weatherization \$35 million
- Community Energy Efficiency Program \$5 million
- Energy Retrofits for Public Buildings
 - Energy Efficiency Grants \$4 million
 - Solar Grants \$1 million
 - State Project Improvement Grants \$4.5 million
- High Efficiency Electric Equipment \$80 million plus federal funds
- Energy Audits for Public Buildings \$20 million

Questions & Answers

Visit the Clean Buildings webpages for more information and resources at www.commerce.wa.gov/buildings or email buildings@commerce.wa.gov



Washington State
Department of
Commerce

www.commerce.wa.gov



Thank You!

www.commerce.wa.gov/buildings

buildings@commerce.wa.gov

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