



Code Amendment Proposal Application Proposal 8

Department of Consumer & Business Services
Building Codes Division
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Read the entire code amendment proposal application before completing this form. Please complete all parts before submitting your proposal and refer to the provided checklist.

APPLICANT INFORMATION

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PROPOSAL INFORMATION

Specialty code: Oregon Reach Code
Code section(s): 3.2; 6.4.3.1.3; 7.3.4
Briefly explain the subject of your proposal: Grid Integrated Thermostats and Water Heaters

INSTRUCTIONS AND CHECKLIST


Fill in all the information above and submit this page, signed and dated, with the required supplementary information for Parts I, II, and III listed in the following checklist. This application may be submitted by mail to the mailing address above, or by email to BCD.PTSPtech@oregon.gov.

Checklist:

- Part I** Code amendment language is attached in the proper format.
- Part II** Amendment proposal requirements for amending the code have been reviewed.
- Part III** Amendment proposal criteria questions have been answered and are attached.

Note: One application is required for each code section you are proposing to amend. If this proposal requires changes in other sections of the code for alignment, include those changes as part of this application.

APPLICANT SIGNATURE

Signature:  Date: 2/24/2022

Copyright notice: By signing this Code Amendment Proposal Application, I understand and acknowledge that the work contained in this application is original, or if not original, I have the right to copy the work. By signing this work, I understand that any rights I may have in this work, including any form of derivative works and compilations, are assigned to the Department of Consumer and Business Services Building Codes Division. I also understand that I do not retain or acquire any rights once this work is used in a Department of Consumer and Business Services Building Codes Division publication.

Oregon Reach Code Proposal: Grid Integrated Thermostats and Water Heaters

Part I: Code Amendment Language

Modify Section 3.2: Definitions as follows:

DEMAND RESPONSE SIGNAL. A signal that indicates a price or a request to modify electricity consumption for a limited time period.

DEMAND RESPONSIVE CONTROL. A control capable of receiving and automatically responding to a demand response signal.

Add new text as follows:

6.4.3.1.3 Demand Response.

All thermostatic controls shall be capable of the following base on a command from a demand responsive control:

- a. The controls shall be programmed to automatically adjust upward the zone operating cooling set points by a minimum of 4°F (2.2°C)
- b. The controls shall be programmed to automatically adjust downward the zone operating heating set points by a minimum of 4°F (2.2°C)
- c. The controls shall be programmed to automatically adjust downward the zone operating cooling set points by a minimum of 2°F (1.1°C).
- d. The automated DR strategy shall include both ramp-up and ramp-down logic to prevent the building peak demand from exceeding that expected without the DR implementation.

Exception to 6.4.3.1.3

Special occupancy or special applications where wide temperature ranges are not acceptable (such as retirement homes, process applications, museums, some areas of hospitals) and are approved by the authority having jurisdiction.

Modify Section 7.3.4 as follows:

7.3.4 Automated Demand Response. ~~Where a demand response (DR) program is available to the building project, the building controls shall be designed with automated demand response (DR) infrastructure capable of receiving DR requests from the utility, electrical system operator, or third-party DR program provider and~~ demand responsive controls capable of automatically implementing load adjustments to the HVAC, and lighting, and water heating systems.

Add Section 7.3.4.4 as follows:

7.3.4.4 Demand Responsive Water Heating. Electric storage water heaters with a rated water storage volume between 40 and 120 gallons and a nameplate input rating equal to or less than 12kW shall be provided with controls that meet the requirements in Table 7.3.4 or an equivalent *approved* standard.

Exceptions:

1. Water heaters that provide a hot water delivery temperature of 180°F (82°C) or greater
2. Water heaters that comply with Section IV, Part HLW or Section X of the ASME Boiler and Pressure Vessel Code
3. Water heaters that use 3-phase electric power

Table 7.3.4

<u>Equipment Type</u>	<u>Rated Water Storage Volume</u>	<u>Controls</u>	
		<u>Before 7/1/2025</u>	<u>As of 7/1/2025</u>
<u>Electric Storage Water heaters</u>	<u>40-120 gallons</u>	<u>ANSI/CTA-2045-B Level 1 and also capable of initiating water heating to meet the temperature set point in response to a <i>demand response signal</i>.</u>	<ul style="list-style-type: none"> • <u>ANSI/CTA-2045-B Level 2, except “Price Stream Communication” functionality as defined in the standard.</u>

Add reference in Chapter 11 Normative References as follows:

Reference	Title	Section
American National Standards Institute (ANSI) 25 West 43 rd Street New York, NY 20036, United States 1-212-642-4900; www.ansi.org		
<u>ANSI/CTA-2045-B</u>	<u>Modular Communications Interface for Energy Management</u>	<u>7.3.4.4</u>

Part II –Code Amendment Proposal Requirements

To the best of our knowledge, this proposal aligns with all statutes and rules governing the Oregon state building code.

Part III -Code Amendment Proposal Criteria

Thermostats

This proposal requires that thermostats in commercial buildings have demand control functionality that can be used to adjust thermostat set-points. Since this requirement is part of the construction code, it will not require buildings to participate in any demand response programs. But it will ensure that buildings are capable of participating, so that Washington buildings will be able to help integrate building loads with available production.

Grid flexibility is one of the foundations of achieving meaningful decarbonization of building energy as it is an essential element of decarbonizing the electrical grid. Carbon free energy sources like solar and wind have varying production over the course of the day and the year. Demand responsive controls that can respond to demand response signals enable buildings to shape their loads to better align with available energy production. This could come in the form of curtailing energy use when demand is high or utilizing excess production for building tasks like pre-conditioning spaces or service hot water when demand is lower.

The ability to adjust by 4 degrees was chosen based on demand flexibility requirements in California's energy code Title 24 Part 6. This will align the requirements with the biggest American market – which is also a neighboring market – for demand responsive thermostats.

The proposal includes an exemption for thermostats serving health care and assisted living facilities as these are occupancies where climate control can be related to health care.

Demand responsive functionality will present a cost-saving opportunity for buildings in the future. More and more utilities are moving beyond voluntary programs and are expanding use of time-of-use rates for electricity as a tool for shaping demand. Installing demand-responsive thermostats now will allow building tenants and owners to better control their utility costs.

Demand responsive functionality has been required in Title24 since the 2013 edition and was found cost effective in CA. In the 8 years since, equipment prices have decreased (less than \$60 for a basic DR thermostat⁷ compared to just under \$30 for a basic 7-day programmable thermostat⁸) and WA peak prices have increased.

Water heaters

Water heaters can provide significant load shifting and energy storage capacity in many building types. ANSI/CTA-2045 standardizes the socket, and communications protocol, for heat pump water heaters so they can communicate with the electricity grid other demand response signal providers. In addition, 2045 adds control and communications requirements for mixing valves in HPWH to enable them to provide greater storage capacity to support increased load shifting. The addendum also creates a definition of demand responsive control to ensure its consistent use throughout the code. ANSI/CTA-2045 is the industry standard for demand responsive controls for water heaters, but the requirement allows for other protocols to be approved by the building official.

This proposal requires that water heaters with integrated storage tanks have this demand control functionality. The requirement is limited to electric water heaters with integrated storage tanks. It only applies to water heaters over 20 gallons in order to exclude small, point-of-use water heaters; these water heaters also only have very small capacity for demand response. Water heaters in health care

facilities are also exempted since the hot water provided can be considered a part of health care. The requirement would also not apply to large water heating systems, as they generally have separate storage tanks. These water heaters subject to this requirement generally serve lavatories and kitchenettes in commercial buildings and some water heating approaches in mid-rise residential.

Grid flexibility is one of the foundations of achieving meaningful decarbonization of building energy as it is an essential element of decarbonizing the electrical grid. Carbon free energy sources like solar and wind have varying production over the course of the day and the year. Demand responsive controls that can respond to demand response signals enable buildings to shape their loads to better align with available energy production. This could come in the form of curtailing energy use when demand is high or utilizing excess production for building tasks like pre-conditioning spaces or service hot water when demand is lower.

Demand control functionality will also present a cost-saving opportunity for buildings in the future. More and more utilities are moving beyond voluntary programs and are expanding use of time-of-use rates for electricity as a tool for shaping demand. Installing demand-responsive lighting controls now will allow building tenants and owners to better control their utility costs. Since this requirement is part of the construction code, it will not require buildings to participate in any demand response programs. But it will ensure that buildings are capable of participating, so that WA buildings will be able to help integrate building loads with available production.