

Exhibit 2¹

2018 International Energy Conservation Code

R403.5.1 (IRC N1103.5.1) Water heating equipment. Service water heating equipment shall be one or more of the following types:

- ~~1. Storage gas water heater with a uniform energy factor (UEF) that meets the requirements of Table R403.5.1.~~
- ~~2. Storage electric water heater, utilizing and not less than 1.0 kW of on-site renewable energy.~~
3. Heat pump water heater.
4. Tankless water heater.
5. Grid-enabled water heater.
- ~~6. Solar water heating system having a solar fraction of not less than 0.5.~~

Exception: Installation of one or more of the following types:

1. Replacement water heating equipment
2. Storage gas water heater with a uniform energy factor (UEF) that meets the requirements of Table R403.5.1.
3. Storage electric water heater, utilizing and not less than 1.0 kW of on-site renewable energy.
4. Solar water heating system having a solar fraction of not less than 0.5.
5. Any other type of water heating system not explicitly listed in Section R403.5.1 (IRC N1103.5.1), and not less than 1.0 kW of on-site renewable energy.

TABLE R403.5.1 (IRC N1103.5.1)
MINIMUM UNIFORM ENERGY FACTOR (UEF) FOR STORAGE GAS WATER HEATERS

<u>FIRST HOUR RATING^a</u>	<u>MINIMUM UEF</u>
<u>Very Small</u>	<u>0.24</u>
<u>Low</u>	<u>0.50</u>
<u>Medium</u>	<u>0.64</u>
<u>High</u>	<u>0.68</u>

a. The first hour rating of a water heater is determined by the federal test procedure. It is listed on the Energy Guide label affixed to the water heater.

SECTION R202 (N1101.6) **GENERAL DEFINITIONS**

Add new definition as follows:

GRID-ENABLED WATER HEATER. An electric water heater that includes controls that enable activation for use as part of an electric thermal storage or demand response program.

¹ <https://cdn-web.iccsafe.org/wp-content/uploads/IECC-Residential-min-2019-upload-upload.pdf>; last accessed 4/30/2020.

SOLAR FRACTION. The fraction of total annual water heating energy met by a solar water heater.

Commenter's Reason:

This proposal should be approved as modified. It has been modified to provide additional clarity and flexibility, while maintaining the integrity of the original proposal.

The proposal requires builders to install either a tankless water heater, a grid-enabled water heater, or a heat pump water heater, with an exception for if a builder installs a water heating system from a list of additional options. The additional options include storage gas water heaters (some of which must be more efficient than the federal minimum standard), electric resistance water heaters (if the home also has at least 1.0 kW of on-site renewable energy generation) and solar water heating systems, among others. The proposal is structured in this way to respond to the Committee's comments about being clear which water heating efficiency levels are set at federal minimum standards, and which are more efficient or require installation of additional components.

Tankless water heaters, grid-enabled water heaters, and heat pump water heaters clearly do not exceed the federal requirements. But even if these options were not available for a home, or did not make economic sense, many of the options in the exception can utilize water heater heating equipment that meets the federal standard if combined with other options. For example, a builder may install any electric resistance water heater, provided the home also has at least 1 kW of on-site renewable energy. Similarly, any type of water heater may be paired with a solar water heating system.

Other states and jurisdictions are already incorporating water heaters into their building codes. Washington state recently passed legislation that would require all electric water heaters to have a modular demand response communications port compliant with certain standards that make it grid-enabled. The Washington requirement takes effect January 1, 2021, and applies to all electric storage water heaters offered for sale, for use in both new and existing buildings. California's Title 24 building code requires installation of either gas/propane instantaneous water heaters or gas/propane storage type water heaters in new residential dwellings. In the case of California, the prescriptive compliance path allows use of certain minimum efficiency water heaters, but does not allow use of every type of minimum efficiency water heater. As such, the proposal at hand is significantly more permissible and flexible than what is currently in place in California.

This proposal continues to be relevant only to the prescriptive path of the code. Builders may use any type of water heater they choose if they follow the performance or ERI path of the code.

Bibliography: State of Washington, House Bill Report 2SHB 1444, As Passed Legislature: <http://lawfilesexternal.wa.gov/biennium/201920/Pdf/Bill%20Reports/House/1444-S2%20HBR%20PL%2019.pdf>

California Energy Commission, Building Energy Efficiency Standards, Title 24, Section 150 (Mandatory Features and Devices):<http://lawfilesexternal.wa.gov/biennium/2019-20/Pdf/Bill%20Reports/House/1444-S2%20HBR%20PL%2019.pdf>

Cost Impact: The net effect of the public comment and code change proposal will increase the cost of construction. The requirements of the code change will increase the cost of construction, as tankless water heaters, grid-enabled, and heat pump water heaters tend to cost more than some "conventional" tank water heating models. However, if a builder chooses to comply via the options available in the exception, there may be little or no increased cost. As mentioned in the reason statement, many of these options allow for installation of minimum efficiency equipment when paired with other options like on site renewable energy production.