

# **MODERN HYDRONICS**

## **SUMMIT 2022**

### **REGULATORY LANDSCAPE**

**Brace Yourselves...!**

# Topics for today

- Regulatory outlook
  - Household & commercial boilers
  - Commercial water heaters
  - Household water heater metric changes
- A few other jurisdictional efficiency updates

# Note About Terminology / Units

MBH = thousands of BTU/hr

*M* is Roman Numeral for 1,000

Not SI Mega which is  $10^6$

And kBTU, please...



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## **Regulations Amending the Energy Efficiency Regulations, 2016 (Amendment 15): SOR/2019-164**

Canada Gazette, Part II, Volume 153, Number 12

# MEPS

# Minimum Energy Performance Standards

# Household Gas Boilers

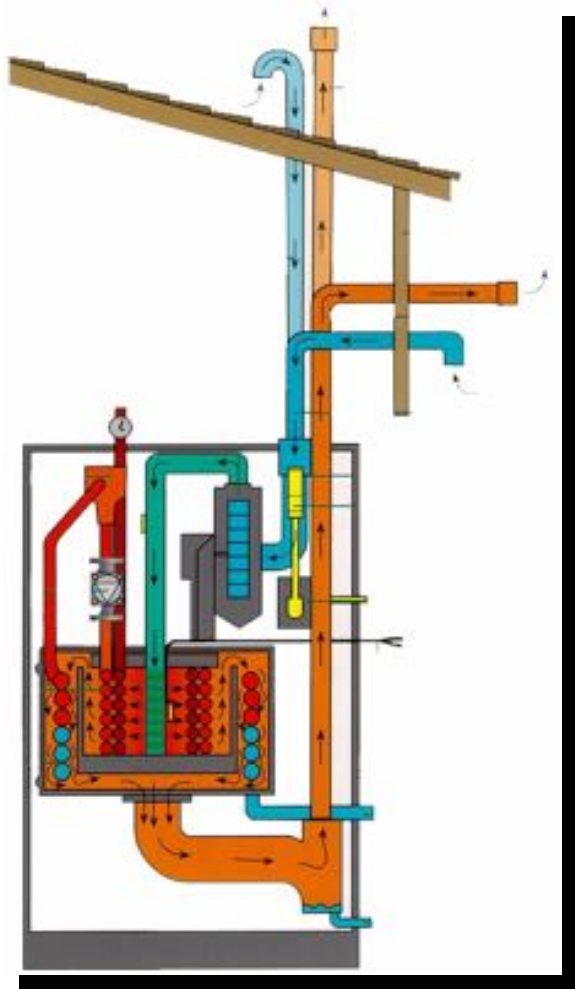


# NRCan MEPS – Household Boilers

TABLE 1

Item	Column 1	Column 2	Column 3	Column 4
	Energy-using Product	Standard	Energy Efficiency Standard	Period of Manufacture
5	Household gas boilers that are intended for hot water systems and have tankless domestic water heating coils	CSA P.2 for annual fuel utilization efficiency	Annual fuel utilization efficiency $\geq$ 82% No continuously burning pilot light	On or after September 1, 2012 and before July 1, 2023
5.1	Household gas boilers that are intended for hot water systems and have tankless domestic water heating coils	CSA P.2 for annual fuel utilization efficiency, standby power and off-mode power	Annual fuel utilization efficiency $\geq$ 90% No continuously burning pilot light Standby power $\leq$ 9 W Off-mode power $\leq$ 9 W	<u>On or after July 1, 2023</u>
6	Household gas boilers that are intended for hot water systems and do not have tankless domestic water heating coils	CSA P.2 for annual fuel utilization efficiency	Annual fuel utilization efficiency $\geq$ 82% No continuously burning pilot light Equipped with automatic water temperature adjustment device and not operable without the device	On or after September 1, 2012 and before July 1, 2023
7	Household gas boilers that are intended for hot water systems and do not have tankless domestic water heating coils	CSA P.2 for annual fuel utilization efficiency, standby power and off-mode power	Annual fuel utilization efficiency $\geq$ 90% No continuously burning pilot light Equipped with automatic water temperature adjustment device and not operable without the device Standby power $\leq$ 9 W Off-mode power $\leq$ 9 W	<u>On or after July 1, 2023</u>

# Consider venting...





# Commercial Boilers





# NRCAN MEPS Commercial Boilers

## Energy efficiency standards — commercial

(3) The energy efficiency standards set out in column 2 of Table 2 to this section apply to commercial gas boilers described in column 1 that are manufactured on or after **January 1, 2025**.

TABLE 2

Item	Column 1	Column 2
	Energy-using Product	Energy Efficiency Standard
1	Commercial gas boilers that have an input rate of $\geq 87.92$ kW (300,000 Btu/h) but $\leq 732.68$ kW (2,500,000 Btu/h) and are intended for hot water systems	Thermal efficiency <u><math>\geq 90\%</math></u>
2	Commercial gas boilers that have an input rate of $> 732.68$ kW (2,500,000 Btu/h) but $\leq 2\,930.71$ kW (10,000,000 Btu/h) and are intended for hot water systems	Combustion efficiency <u><math>\geq 90\%</math></u>
3	Commercial gas boilers that have an input rate of $\geq 87.92$ kW (300,000 Btu/h) but $\leq 732.68$ kW (2,500,000 Btu/h) and are intended for low pressure steam systems	Thermal efficiency $\geq 81\%$
4	Commercial gas boilers that have an input rate of $> 732.68$ kW (2,500,000 Btu/h) but $\leq 2\,930.71$ kW (10,000,000 Btu/h) and are intended for low pressure steam systems	Thermal efficiency $\geq 82\%$





# Commercial Storage Water Heaters



# NRCan MEPS Commercial Water Heaters

**Energy efficiency standards — commercial**

(3) The energy efficiency standards set out in column 2 of Table 2 to this section apply to commercial gas-fired storage water heaters described in column 1 that are manufactured on or after **July 1, 2023**.

**TABLE 2**

Item	Column 1	Column 2
	Energy-using Product	Energy Efficiency Standard
1	Commercial gas-fired storage water heaters, other than replacement units, that have an input rate of > 21.97 kW (75,000 Btu/h) but ≤ 30.5 kW (105,000 Btu/h), have a V, of ≤ 454 L (120 US gallons), use single-phase power and limit water temperatures to < 82°C (180°F)	Uniform energy factor ≥ 0.6107-0.00021 V <sub>s</sub>
2	Commercial gas-fired storage water heaters that are replacement units, that have an input rate of > 21.97 kW (75,000 Btu/h) but ≤ 30.5 kW (105,000 Btu/h), have a V, of ≤ 454 L (120 US gallons), use single-phase power and limit water temperatures to < 82°C (180°F)	Uniform energy factor ≥ 0.6597-0.00024 V <sub>s</sub>
3	Commercial gas-fired storage water heaters, other than those described in items 1 and 2, <u>that are not replacement units</u>	<u>Thermal efficiency ≥ 90%</u> Standby loss ≤ 0.84(Q/0.234 + 16.57√V <sub>s</sub> )
4	Commercial gas-fired storage water heaters, other than those described in items 1 and 2, <u>that are replacement units</u>	<u>Thermal efficiency ≥ 80%</u> Standby loss ≤ Q/0.234 + 16.57√V <sub>s</sub>

# NRCan MEPS Household Instantaneous WH

### Testing standards

(2) A gas-fired instantaneous water heater complies with the energy efficiency standard if it meets that standard when tested in accordance with testing procedures established by the standard set out in column 2 that are applicable to a *gas-fired instantaneous water heater* as defined in section 382.

TABLE

Item	Column 1	Column 2	Column 3	Column 4
	Energy-using Product	Standard	Energy Efficiency Standard	Manufacturing Period
1	Household gas-fired instantaneous water heaters that have a maximum flow rate of < 6.4 L/min	CSA P.3-15	<u>Uniform energy factor <math>\geq 0.86</math></u>	<u>On or after January 1, 2020</u>
2	Household gas-fired instantaneous water heaters that have a maximum flow rate of $\geq 6.4$ L/min	CSA P.3-15	<u>Uniform energy factor <math>\geq 0.87</math></u>	<u>On or after January 1, 2020</u>

# MEPS Are Not The Same

- Atmospheric household and commercial boilers still available in US
- Non-condensing storage water heaters still available at least for the near future
  - Flurry of DOE TSDs, NOPRs, SNOPRs, Determinations and the odd SCOTUS rulings...
- Non-condensing instantaneous still available





# Market transformation strategies for energy-using equipment in the building sector

Supporting the transition to a low-carbon economy



**Energy and Mines Ministers' Conference**

St. Andrews by-the-Sea, New Brunswick

August 2017

**Figure 5. Aspirational goals to 2035 for space heating in Canada**

**Short term:** By 2025,

- All fuel-burning technologies for primary space heating for sale in Canada meet an energy performance of at least 90% (condensing technology).
- All air-source heat pumps for sale in Canada meet a SCOP greater than 2.5,<sup>10</sup> at least 30% better performance than today.

**Medium term:** By 2030,

- A residential natural gas heat pump with a SCOP greater than 1.2 can be manufactured and installed cost-effectively.<sup>11</sup>
- A residential cold climate air-source heat pump with a SCOP greater than 2.75 can be manufactured and installed cost-effectively.<sup>12</sup>
- The deployment of heating systems using renewable technologies and renewable resources is supported.

**Long term:** By 2035, all space heating technologies for sale in Canada meet an energy performance of more than 100%.



## Figure 8. Aspirational goals to 2035 for water heating in Canada

**Short term:** By 2025, all fuel-burning water heating technologies for sale in Canada meet an energy performance of at least 90% (condensing technology).

**Medium term:** By 2030,

- All electric water heaters for sale in Canada meet an energy performance of more than 100% (EF greater than 1).
- A residential gas heat pump with an EF greater than 1.4 can be manufactured and installed cost-effectively.<sup>19</sup>

**Long term:** By 2035, all water heating technologies for sale in Canada meet an energy performance greater than 100% (EF greater than 1).

# City of Vancouver

## Recently passed amendments to VBBL

- *Climate Emergency Requirements for New Housing 3-Storeys and Under*
  - *Zero site emissions for space and DHW*
  - *Effective Jan 1, 2022*

## Proposed Updates for Part 6 buildings (for mid-2023)

- *GHGI reductions*
  - *Include refrigerant life cycle emissions*

## Under consideration

- **ZEBR (zero energy building retrofit)**
  - High level plan to reduce existing building emissions by 50% by 2030 and 100% renewable energy by 2050.
  - Particulars TBD
  - Big Move 4 (2025 date for zero emission space and DHW) removed from consideration

- **City does not intend to prescribe fuel, but can enact GHG emission limits**



**Zero Emissions  
Space and  
Water Heating in  
New Homes**



To continue the goal of reducing carbon pollution throughout the City of Vancouver, we are requiring zero emissions space and hot water heating in all new low rise residential construction beginning January 1st 2022.

This requirement can be met with electric heat pumps or electric resistance options.

# Province of British Columbia

## Provincial Sales Tax for fossil fuel combustion systems (FFCS)

- *Effective April 1, 2022*
- *PST increasing from 7% to 12% for FFCS*
- *Heat pumps exempt from PST*
  - *Both electric and fossil fuel-fired heat pumps*

## Energy Efficiency Regulation Amendment 7, Residential Boilers

- Effective January 1, 2022
- Residential gas boilers in scope of AFUE MEPS is condensing (90% or above)
  - Applicable for new construction and retrofit

## Energy Efficiency Regulation Amendment 7, Commercial Boilers

- Effective January 1, 2023
- Commercial gas boilers MEPS is condensing (90% or above)
  - Applicable for new construction and retrofit

# Toronto Green Standard Version 4

Applying the TGS sets your development apart: high performance, high quality, low emissions and future-proofed. TGS v4 developments will contribute to savings of over 1MT CO2e cumulative greenhouse gas emissions by 2050, or taking more than 300,000 cars off the road each year.

Applications submitted on or after May 1, 2022 are required to meet Version 4 of the Toronto Green Standard. Tier 1 performance measures must be met and compliance is reviewed through the planning approval process. Applications pursuing the voluntary Toronto Green Standard **Development Charge Refund Program** must meet the program requirements in addition to Tier 1. Select the Standard that best applies to the development that is the subject of your application below.

**Low-Rise Residential Version 4**  
Residential development less than 4 storeys with a minimum of 5 dwelling units.

**Mid to High-Rise Residential & Non-Residential Version 4**  
Residential apartment development 4 storeys and higher and all Industrial, Commercial and Institutional (ICI) developments.

**City Agency, Corporation & Division-Owned Facilities Version 4**  
Non-residential development for all City Agencies, Corporations & Divisions.

**Energy Modelling Guidelines Version 4**  
Guidelines on meeting the energy efficiency requirements.

## Operational Emissions and Energy

### TIER 1, 2 & 3

#### GHG 1.1 Greenhouse Gas Emissions Limits

(Refer to Specifications & Resources 1 to 7)

- Using whole-building energy modelling, demonstrate an annual greenhouse gas intensity (GHGI) that meets the performance limits provided in the table below:
- Projects pursuing net zero emissions follow the CaGBC Zero Carbon Buildings (ZCB) Design or Performance Standard or Passive House Standards acceptable pathways. Projects must demonstrate a GHGI target of 0.

Building Type: GHGI(kg CO2e/m <sup>2</sup> /yr)	Tier 1 Mandatory	Tier 2 Voluntary High performance	Tier 3 Voluntary Near Zero Emissions	Net Zero Emissions Mandatory for City- Owned Facilities
All Residential	15	10	5	0
Commercial Office	15	8	4	0
Commercial Retail	10	5	3	0
Mixed use (calculated using a weighted average of the above)				

*City of Toronto Zero Emissions Buildings Framework, 2017*



**RESIDENTIAL DEVELOPMENT CHARGE RATES  
EFFECTIVE - August 15, 2022**

Service	Residential Charge By Unit Type						Percentage of Charge
	Singles & Semis	Multiples 2+ Bedrooms	Multiples 1 Bed and Bach.	Apartments 2+ Bedrooms	Apartments 1 Bed and Bach.	Dwelling Room	
Spadina Subway extension	\$2,993	\$2,474	\$1,241	\$1,752	\$1,144	\$811	3.2%
Transit (balance)	\$33,651	\$27,814	\$13,954	\$19,698	\$12,857	\$9,119	35.8%
Parks and Recreation	\$12,437	\$10,280	\$5,157	\$7,280	\$4,752	\$3,371	13.2%
Library	\$2,135	\$1,765	\$885	\$1,250	\$816	\$579	2.3%
Housing Services - Shelter	\$1,098	\$908	\$455	\$643	\$420	\$298	1.2%
Housing Services - Affordable Housing	\$7,505	\$6,203	\$3,112	\$4,393	\$2,868	\$2,034	8.0%
Police	\$639	\$528	\$265	\$374	\$244	\$173	0.7%
Fire	\$239	\$198	\$99	\$140	\$91	\$65	0.3%
Ambulance Services	\$606	\$501	\$251	\$355	\$232	\$164	0.6%
Development-related studies	\$169	\$140	\$70	\$99	\$65	\$46	0.2%
Long Term Care	\$150	\$124	\$62	\$88	\$57	\$41	0.2%
Child Care	\$900	\$744	\$373	\$527	\$344	\$244	1.0%
Waste Diversion	\$60	\$49	\$25	\$35	\$23	\$16	0.1%
<b>Subtotal General Services</b>	<b>\$62,582</b>	<b>\$51,728</b>	<b>\$25,949</b>	<b>\$36,634</b>	<b>\$23,913</b>	<b>\$16,961</b>	<b>66.6%</b>
Roads and Related	\$15,711	\$12,985	\$6,515	\$9,196	\$6,003	\$4,258	16.7%
Water	\$3,763	\$3,111	\$1,561	\$2,203	\$1,438	\$1,020	4.0%
Sanitary Sewer	\$9,107	\$7,528	\$3,776	\$5,331	\$3,480	\$2,468	9.7%
Storm Water Management	\$2,815	\$2,327	\$1,167	\$1,648	\$1,076	\$763	3.0%
<b>Subtotal Engineered Services</b>	<b>\$31,396</b>	<b>\$25,951</b>	<b>\$13,019</b>	<b>\$18,378</b>	<b>\$11,997</b>	<b>\$8,509</b>	<b>33.4%</b>
<b>TOTAL CHARGE PER UNIT</b>	<b>\$93,978</b>	<b>\$77,679</b>	<b>\$38,968</b>	<b>\$55,012</b>	<b>\$35,910</b>	<b>\$25,470</b>	<b>100.0%</b>

<https://www.toronto.ca/legdocs/bylaws/2022/law1137.pdf>

**CITY OF TORONTO  
TORONTO GREEN STANDARD PROGRAM  
TIER 2, 3, & 4 CAP**

**EFFECTIVE AUGUST 15, 2022**

**TIER 2 CAP - VERSION 2.0**

Column 1	Column 2
<b>Residential (Per dwelling unit or dwelling room)</b>	
Single detached and semi-detached	\$5,520.81
Apartment- two bedroom and larger	\$3,522.40
Apartment- one bedroom and bachelor	\$2,402.54
Multiple (all multiples)	\$4,477.09
Dwelling room	\$1,491.19
<b>Non-Residential Use (per square metre)</b>	<b>\$40.73</b>

**TIER 2, 3 & 4 CAP - VERSION 3.0 OR LATER**

COLUMN 1	COLUMN 2	COLUMN 3
	TGS Tier 2	TGS Tier 3 or 4
<b>Residential (Per dwelling unit or dwelling room)</b>		
Single detached and semi-detached	\$6,901.01	\$8,281.22
Apartment- two bedroom and larger	\$4,403.00	\$5,283.60
Apartment- one bedroom and bachelor	\$3,003.18	\$3,603.81
Multiple (all multiples)	\$5,596.36	\$6,715.64
Dwelling room	\$1,863.99	\$2,236.79
<b>Non-Residential Use (per square metre)</b>	<b>\$50.91</b>	<b>\$61.10</b>

<https://www.toronto.ca/wp-content/uploads/2022/08/967a-Tier-2-Caps-Effective-August-15-2022.pdf>

## O. Reg. 404/12: ENERGY EFFICIENCY - APPLIANCES AND PRODUCTS

under *Green Energy Act, 2009, S.O. 2009, c. 12, Sched. A*

Versions

current

December 2, 2016 – (e-Laws currency date)

### SCHEDULE 3 FURNACES AND OTHER SPACE HEATING EQUIPMENT

6.1 Boil

#### EFFICIENCY STANDARDS AND REQUIREMENTS

Btu/h):

- i. Date of manufacture: January 1, 2017 or later.
- ii. Testing standard: HI BTS 2000, Rev.06.07 Method to Determine Efficiency of Commercial Space Heating Boilers, Second Edition.
- iii. Scope of application: the same scope as the testing standard, but limited to gas-fired boilers with an input rate of at least 88 kW (300,000 Btu/h) but less than 732 kW (2,500,000 Btu/h) that are used for space heating. However, units that are designed for combination space and water heating are excluded.
- iv. Prescribed efficiency standard or requirement:
  - A. hot water:
    1. for new building applications: no standing pilot, and thermal efficiency  $\geq$  90 per cent,
    2. for all other applications: no standing pilot, and thermal efficiency  $\geq$  83 per cent,

Regulation moved early 2019 to *The Electricity Act*:  
O. Reg. 509/18: ENERGY AND WATER EFFICIENCY - APPLIANCES AND PRODUCTS

Electricity Act, 1998, S.O. 1998, c. 15, Sched. A

Versions

[Regulations under this Act](#)

Revoked/spent regulations under this Act

O. Reg. 633/21

ENERGY DATA

O. Reg. 735/20

AMOUNTS UNDER SECTION 25.34 OF THE ACT

O. Reg. 509/18

ENERGY AND WATER EFFICIENCY - APPLIANCES AND PRODUCTS

# Energy & Water Reporting and Benchmarking – Large Buildings

The Energy & Water Reporting and Benchmarking link is now available for 2022. To report your energy and water data, please go to the 2022 EWRB Portfolio Manager portal.

[Report Your Energy & Water Data](#)

The Province of Ontario's Energy & Water Reporting and Benchmarking (EWRB) regulation ([O. Reg. 506/18](#)) is designed to help building owners and managers improve their building's performance. Through this regulation, large buildings are required to report annual energy and water consumption and performance data. [Ontario's Guide to Energy and Water Reporting](#) provides a detailed overview of the regulation and reporting requirements.

With buildings generating more than half of Toronto's greenhouse gas emissions, improving the energy efficiency of Toronto's building stock will be key to addressing the climate emergency. The City's [Net Zero Existing Buildings Strategy](#) will require the owners of all existing buildings in Toronto to decarbonize their buildings by 2040 and encourages to extend the provincial benchmarking and reporting requirements to buildings of all sizes. Full details on the provincial regulation can be found in [Ontario's Guide to Energy and Water Reporting](#).

## Reporting Requirements by Building Size

Building Size (Gross Floor Area*)	Annual Reporting Requirement	Regulatory Body
100,000 square feet and larger	<i>Mandatory</i>	Province of Ontario ( <a href="#">O. Reg. 506/18</a> )
50,000 square feet and larger	<i>Voluntary in 2022, Mandatory as of 2023</i>	Province of Ontario ( <a href="#">O. Reg. 506/18</a> )

<https://www.toronto.ca/business-economy/business-operation-growth/green-your-business/energy-and-water-reporting-and-benchmarking/>

# Be cognizant of the narrative...

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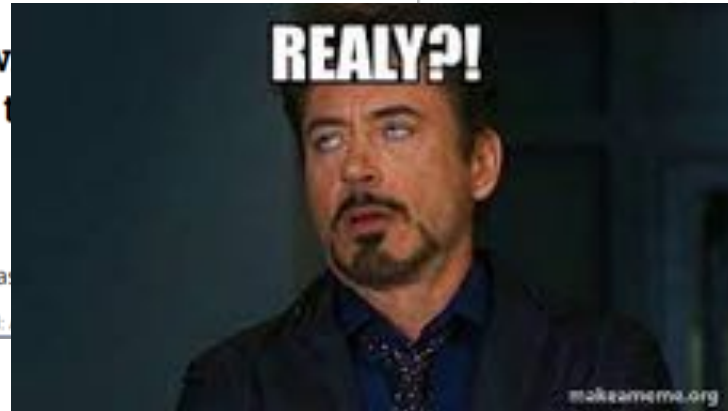
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British Columbia

## Cruise ships return to B.C., with environmental concerns in the foreground

Research shows the province's coastline is a war zone for cruise ships.

CBC News - Posted: Apr 08, 2022 6:53 PM PT | Last Updated:



She's not alone: according to the Tourism Industry Association of B.C., cruise ships contribute about \$2.7 billion annually to the provincial economy, supporting tourism-oriented businesses in Victoria, Vancouver and Prince Rupert.

said Bruce Williams, CEO of the Greater Victoria Chamber of Commerce in the Esplanade Bay neighbourhood, where docked tourists stock up on gifts and

According to the Greater Victoria Harbour Authority, the ships account for 96.3 per cent of all greenhouse gas emissions at the city's cruise terminal.

- ['Heading towards a climate reckoning': Victoria wants cruise ship-related emissions cut quickly](#)



# And coming soon...

## Montreal aims to lower greenhouse gas emissions by 2025

May 10, 2022

Montreal has set to mandate a zero-emission standard for all new construction beginning in 2025.

According to a report by *Le Devoir*, "In 2024, construction permits for small buildings (below 2000 m<sup>2</sup> [21,527 sf]) will only be granted to buildings whose operations will produce no greenhouse gas emissions."

This requirement will be extended to larger buildings in 2025.

According to [theenergymix.com](https://www.theenergymix.com), *Le Devoir* reported Mayor Valerie Plante's municipal administration would back up its deadline to run the city's entire building stock on renewable energy from 2050 to 2040.

The plan will treat renewable natural gas as a carbon-neutral fuel. The city will not regulate the choice of heating systems but will instead focus on carbon dioxide released into the atmosphere.

<https://www.constructioncanada.net/montreal-aims-to-lower-greenhouse-gas-emissions-by-2025/>

## Subsequent amendment (s)

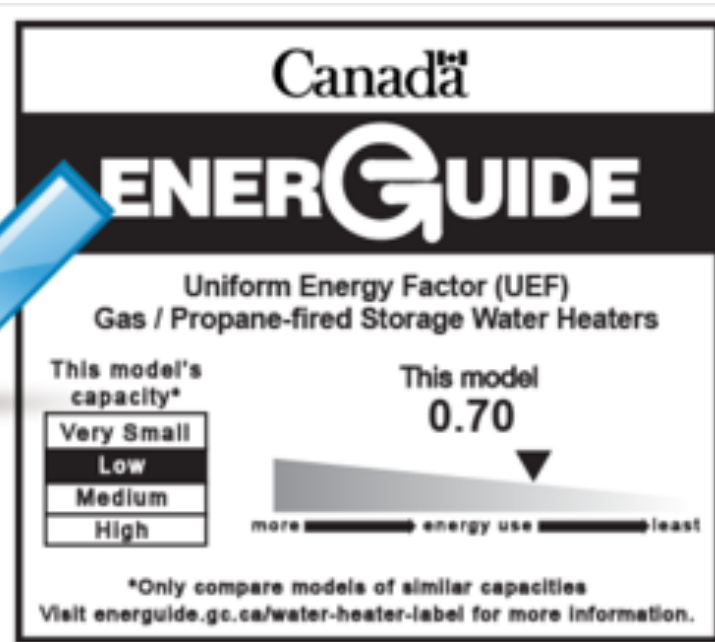
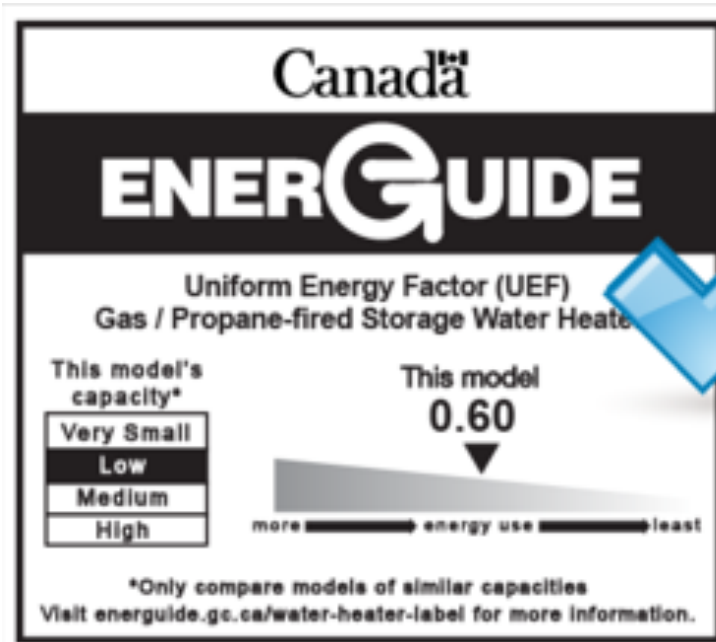
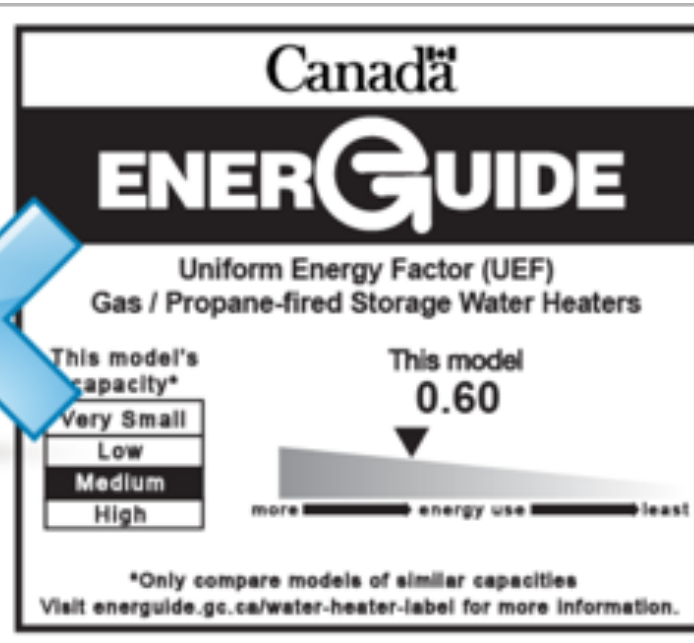
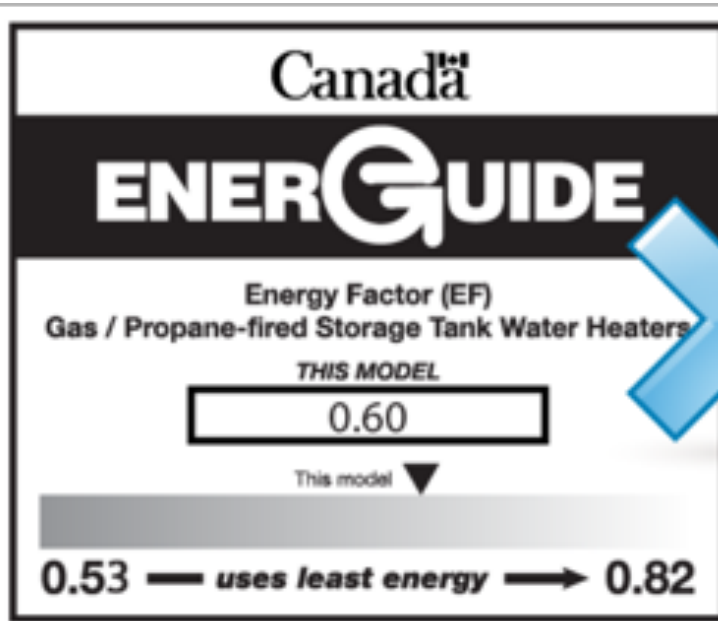
Natural Resources Canada intends to launch amendments 18 and 19 to the Energy Efficiency Regulations to update testing procedures and/or energy efficiency standards for previously regulated and new products. The specific contents of these amendments have not yet been determined. Consideration will be given to 19 products that are already regulated, and to the introduction of requirements for 7 new products (listed below).

Updating Already Regulated Products	Adding a New Product Category
1) Refrigerators	1) Clothes dryers (vented gas)
2) Combination refrigerator-freezers	2) Uninterruptible power supplies
3) Freezers	3) Pool pumps
4) Clothes washers	4) Showerheads
5) Integrated clothes washer-dryers	5) Faucets
6) Clothes dryers	6) Air compressors
7) Dishwashers	7) Line-voltage thermostats
8) Portable air conditioners	
9) Electric water heaters	
10) Room air conditioners	
11) Battery chargers	
12) External power supplies	
13) Gas-fired water heaters	
14) Oil-fired water heaters	
15) Ice makers (automatic commercial)	
16) Large air conditioners and heat pumps	
17) General service lighting	
18) General service fluorescent lamps	

## Date First included in Forward Regulatory Plan

Amendment 17 added December 2020, updated April 2021, updated April 2022

Amendment 18 and 19 added April 2022





THANK YOU FOR YOUR  
PARTICIPATION!

Questions?

