

Advancing Canadian Appliance and Equipment Standards

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A Comparison of Canadian, American and International Efficiency Standards in Anticipation of Amendment 18 to Canada's Energy Efficiency Regulations

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Introduction

The energy use from the appliances and equipment in your home such as stoves, clothes washers, and furnaces, as well as those in commercial buildings and industrial operations all add up to a significant share of energy use and emissions (almost 40 per cent of energy-related CO₂ emissions globally according to CLASP).^a

Canada's federal government regulates appliances and equipment through the *Energy Efficiency Act*, eliminating the least efficient models from the Canadian market. Delays in strengthening these standards lock in higher energy consumption, and therefore higher utility costs and greenhouse gases. The appliances and equipment covered by Canada's *Energy Efficiency Regulations* are responsible for the majority of residential^b and commercial buildings' operational emissions.^c Therefore, small improvements in appliance and equipment efficiency can result in significant energy and greenhouse gas (GHG) savings when aggregated over the more than 16.4 million homes¹ and over half a million commercial (and institutional) buildings in Canada.^d Yet, small improvements are no longer enough. The often-long timeframes between, and incremental progress of, appliance and equipment standards updates do not capture how urgently efficiency must be ramped up to realize our climate goals. Given the long life expectancies of major appliances and equipment,² delays in strengthening efficiency standards lock in additional carbon emissions and higher consumer utility spending, as less efficient appliances cost more to run. Accordingly, governments must heavily weigh the implications of delaying amending existing

¹ (dwelling units): Statistics Canada. "Housing Economic Account, 1961 to 2021." Government of Canada, January 16, 2023. <https://www150.statcan.gc.ca/n1/daily-quotidien/230116/dq230116d-eng.htm#>

² 11 years for dishwashers and clothes washers up to 15-20 years for furnaces and heat pumps: Natural Resources Canada. "Choosing and Using Appliances with EnerGuide." Government of Canada, 2013. <https://natural-resources.canada.ca/sites/www.nrcan.gc.ca/files/energy/pdf/energystar/EnerGuideappliances.pdf>; "When Should I Replace My Furnace." Hydro One. Accessed January 5, 2024. <https://www.hydroone.com/saving-money-and-energy/residential/furnace-repair-or-replace>

standards or introducing new ones and the relative importance of other priorities, such as harmonization with major trading partners.

As more of the economy is electrified towards a net-zero pathway, more efficient appliances and equipment can free up much of the electricity required and at a much lower cost than building out new generation and transmission infrastructure.^e

Additionally, electricity using appliances and equipment must become smarter to enable cleaner energy. For example, storage water heaters³ can act as thermal batteries with the right controls.^f They can flexibly use excess renewable energy to heat and store hot water and avoid drawing electricity from the grid during peak demand, to help balance the grid and lower emissions. Canada should set regulations requiring every water heater to be manufactured with the controls and insulation that would enable this demand flexibility.

In Canada, appliance and equipment standards are typically amended on a two-year cycle (see Figure 1), however, Natural Resources Canada (NRCan) has been deploying new tools that enable quicker regulatory action,⁴ particularly in terms of harmonization with another jurisdiction, such as the United States.

NRCan's Forward Regulatory Plan for 2023-2025 is a list of planned or anticipated changes to the Energy Efficiency Regulations over that period.^g Amendments 18 and 19 to the regulations were added in April 2022.^h NRCan held pre-consultation webinars for Amendment 18 in June 2022 and technical bulletins for each

³ Air-to-water heat pumps can also act as thermal batteries: "Thermal Battery™ Storage-Source Heat Pump Systems." Trane, March 16, 2023.

https://www.trane.com/content/dam/Trane/Commercial/north-america/products-systems/systems/SYS-SLB035-EN_03162023.pdf; And batteries are slowly being added to other appliances, like induction stoves: Peters, A. "These New Induction Stoves Want to Convince You to Ditch Gas." Fast Company, November 22, 2022. <https://www.fastcompany.com/90814918/these-new-induction-stoves-want-to-convince-you-to-ditch-gas>.

⁴ Such as Ministerial Regulations, Technical Standards Documents, and Ambulatory Incorporation by Reference: Natural Resources Canada. "Canada's Energy Efficiency Regulations." Government of Canada, October 10, 2023. <https://natural-resources.canada.ca/energy/regulations-codes-standards/7043>.

category were released soon after in July.ⁱ Pre-publication in the *Canada Gazette, Part I* is anticipated imminently. With the amendment process spanning two years (see Figure 1), Amendment 18 is unlikely to come into force until mid-2025. Therefore, as standards for some of the product categories have not been updated in more than a decade, each amendment needs to drive significant efficiency progress.

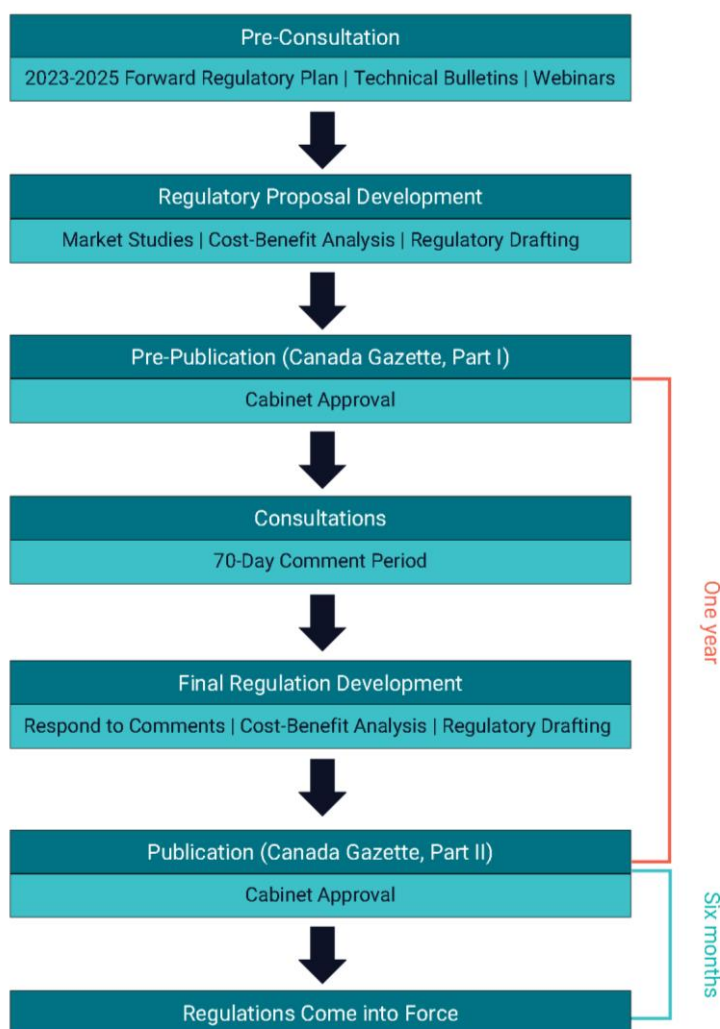


Figure 1 – NRCan’s typical regulatory timeline for amendments^j

The United States Department of Energy (U.S. DOE) proposed or finalized more than 20 new efficiency standards in 2023.^k In anticipation of these regulations, NRCan’s Amendment 18 pre-consultation webinars and technical bulletins for

many product categories⁵ list the intent to align with those new testing and energy efficiency standards when they are finalized. While aligning with these U.S. standards represents significant efficiency progress compared to Canada's current appliance and equipment efficiency standards, given their extended enforcement dates, ranging from 2027 to 2030,⁶ political change in either the U.S. or Canada could jeopardize these proposed standards. However, as these dates extend far beyond Canada's regulatory timeline for the amendments in the *2023-2025 Forward Regulatory Plan*, there is an opportunity for stepwise intermediate progress that should be seized upon.

This policy brief provides a background on appliance and equipment standards in Canada, discusses proposed Canadian and U.S. standards, and international best practices for efficiency standards of several product categories in the forthcoming Amendment 18, and some that NRCan could implement via future amendments (or with one of the mechanisms for faster regulatory changes mentioned above). The brief highlights opportunities for Canada to demonstrate leadership by adopting standards that go beyond U.S. regulations, in reflection of our colder climate and energy policy priorities.

Key points

- Across several product categories, Canada's energy performance standards lag international best practices, and our standards for some of these products were last updated more than a decade ago.
- A minimum efficiency of 90 lumens/watt would show leadership in lighting efficiency while complementing Canada's participation in the Minamata Convention, as just banning fluorescents to eliminate mercury without

⁵ Refrigerators, freezers, clothes washers, clothes dryers, dishwashers

⁶ 2027 for dishwashers: U.S. Department of Energy. "DOE Announces Efficiency Rules to Save Americans More Than \$650 Million in Annual Energy and Water Bills." Energy.gov, May 5, 2023. <https://www.energy.gov/articles/doe-announces-efficiency-rules-save-americans-more-650-million-annual-energy-and-water>; and 2030 for some refrigerator-freezers: Department of Energy. [6450-01-P] 10 CFR Part 430 [EERE-2017-BT-STD-0003] RIN 1904-AF56 Energy Conservation Program: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers: Direct Final Rule (2023). https://www.energy.gov/sites/default/files/2023-12/rf-ecs-dfr.pdf?utm_medium=email&utm_source=govdelivery



- increasing efficiency standards beyond 45 lumens/watt can lead to backsliding to light bulbs that are less efficient than fluorescents.
- Canada should follow through on its 2019 commitment of making ENERGY STAR®-level efficiency mandatory for all new major home appliances (dishwashers, refrigerator-freezers, clothes washers and dryers) as an interim standard before harmonizing with the U.S. DOE's more stringent standards that are in development. ENERGY STAR appliances already capture a large market share and ENERGY STAR-level efficiency standards could achieve significant energy and consumer savings, while acting as a stepping-stone to U.S. standards harmonization between 2027-2030.
 - Canada should align with the U.S. in increasing minimum energy performance standards (MEPS) for cooking appliances (ranges, stoves, ovens, and microwaves).
 - Canada should amend energy efficiency regulations to contribute to solving other pressing energy-system challenges in a net-zero transition. This includes:
 - Requiring all electric hot water heaters to be manufactured with the necessary controls for demand flexibility.
 - Requiring all air conditioners to be heat pumps, which provide both highly efficient heating and cooling.
 - The federal government should establish a clear regulatory pathway to phasing out fossil fuel space and water heating technologies in accordance with Canada's net-zero by 2050 commitments.

Background

Canada's *Energy Efficiency Act* came into force in 1992, setting requirements and enforcement provisions for energy efficiency regulations, in terms of the compliance and labelling of energy-using products imported into Canada and/or shipped from one province to another.^l The *Energy Efficiency Regulations* (1995, 2016), enabled by *the Act*, establish minimum energy efficiency standards for energy-using products to eliminate the least energy-efficient products from the market.^m The regulations currently apply to a wide range of products under the following categories: household appliances, heating and air-conditioning



equipment, water heaters, commercial refrigeration equipment, electronic products, industrial/commercial equipment, and lighting products.ⁿ

While federal standards apply to products imported to or shipped between provinces, the provinces themselves have authority over products manufactured and sold within their own borders. Some provinces have developed their own standards for federally regulated products, or products not federally regulated. In 2019, the Regulatory Reconciliation and Cooperation Table endorsed an agreement among provinces to work towards harmonizing appliance and equipment standards.^o Efficiency Canada's 2022 Scorecard report provided a list of products regulated under provincial standards at the time.

In 2021, NRCan and the U.S. DOE signed a *Memorandum of Understanding [...] Concerning Cooperation on Energy*, including item v.: “collaborating on new and updated energy efficiency standards and test methods for energy-utilizing consumer products and equipment where legally permissible and promoting industrial and commercial energy efficiency.^p Harmonizing efficiency standards and test procedures with the U.S. is intended to “minimize unintended burden” on Canadian appliance and equipment manufacturers and importers, and for most categories would improve Canada’s minimum efficiency standards. However, given Canada’s colder climate and ambitious emissions reduction targets, there are times when the benefits of more stringent MEPS in Canada outweigh the costs of not harmonizing with the U.S. For example, with furnaces, Canada adopted the ENERGY STAR minimum of 95 per cent annual fuel utilization efficiency (AFUE) as part of Amendment 15 in 2019,^q almost a decade ahead of the U.S. compliance date of December 18, 2028.^r

In December 2019, a Mandate Letter to the Minister of Natural Resources from the Prime Minister listed, “mak[ing] ENERGY STAR® certification mandatory for all new home appliances starting in 2022,” as a top priority.^s This resulted in the pre-consultation for Amendment 17 (April 2021), proposing MEPS for dishwashers, refrigerator-freezers, clothes washers, and clothes dryers, align with December 2019 ENERGY STAR performance levels.^t Those regulations were intended to come into force on July 1, 2023. In response to push-back from the Association of Home Appliance Manufacturers (AHAM) Canada^u (Efficiency Canada’s Director of

Policy Research Brendan Haley wrote a letter to the editor^v and a blog post^w in response) and developments in the U.S. indicating "major revisions" to appliance efficiency standards^x with which NRCan intends to align, major home appliances were removed from Amendment 17. The revised Amendment 17 was published in December 2022, updating standards and test procedures for central air conditioners, heat pumps, commercial and residential oil and gas hot water heaters, and walk-in refrigerators and freezers.^y

Major home appliances were included in the products under consideration for Amendment 18, as part of the pre-consultation webinars and technical bulletins, released in June and July 2022, respectively.^z However, in August 2023, NRCan announced Canada would be delaying updating refrigerators and refrigerator-freezers, freezers, dishwashers, clothes washers and clothes dryers, to align with the MEPS, test standards and timelines of the U.S. DOE,^{aa} which at the time were all slated for 2027 enforcement.^{bb}

In September 2023, U.S. AHAM and efficiency advocates (led by the Appliance Standards Awareness Project (ASAP)) collaborated to produce a consensus set of recommended standards to the DOE for major home appliances and cooking products.⁷ The recommendations generally align with the U.S. DOE's proposed MEPS,⁸ but with spread out compliance dates for many product categories, (the last being January 1, 2030 for some styles of refrigerator-freezer).^{cc} As of writing, the U.S. DOE has issued final rules for refrigerators and freezers and cooking products mirroring the consensus recommendations,^{dd} and final rulings for other major appliances are expected in the first half of 2024.

Under consideration now is Amendment 18, for which the pre-consultation included many of the same product categories that the U.S. DOE is in the process

⁷ Stoves, ranges and ovens, but not microwaves, toaster ovens, etc.: Appliance Standards Awareness Project & Association of Home Appliance Manufacturers. Agreement on Home Appliance Efficiency Standards Will Preserve Consumer Features and Deliver Remarkable Energy Savings, September 13, 2023.
https://www.aham.org/AHAM/News/Latest_News/Agreement_on_Home_Appliance_Efficiency_Standards.aspx.

⁸ Joint recommendation level exceeds DOE for one category of freezer and is slightly less stringent for a few categories of refrigerators, standard-size washers, and gas stoves.

of updating. If Canada delays taking action, we risk losing the opportunity to make near-term, tangible, and critically needed improvements to appliance and equipment standards that in some cases haven't been revised in over a decade. This risk is heightened by the uncertainty of the proposed U.S. amendments or their Canadian alignment under a potentially different administration in either country.

Below is a review of some of the product categories included in Amendment 18, others that would benefit from more stringent efficiency standards, and how Canada stacks up against the U.S. and international leaders on MEPS. Given Canada's commitment to achieving net-zero emissions, associated goals such as net-zero emission electricity and the enhanced value of energy savings in a cold climate, the federal government should be prepared to take leadership on appliance and equipment standards. This could mean strategically moving ahead of the U.S. for some categories and aligning with nations with more advanced efficiency standards.

Current and proposed standards

Lighting

Lighting efficiency is measured in lumens/watt. A lumen is the amount of light given off, while a watt is the amount of power consumed, so the higher the lumens/watt, the more efficient. In Canada, there are different lighting wattage (W) requirements for different bins (ranges) of lumens (lm). Across the lumen ranges, the minimum efficiencies for a general service lamp (GSL) range from 10.7 to 25.8 lm/W.^{ee}



	Current	As of date	Proposed	As of date
Canada	10.7-25.8	2014	45	Mid-2025
U.S.	45	August 1 st , 2023	124	2029
U.K.	91	October 1st, 2021	120 140	Late 2023 ⁹ September 2027
CLASP- recommended ¹⁰	90	2025	120	N/A

Table 1 - Lighting MEPS for General Service Lamps (lm/W)

According to the July 2022 Technical Bulletin for Amendment 18, NRCan intends to consolidate existing regulatory categories of general service incandescent, modified spectrum incandescent, compact fluorescent (CFL), and general service incandescent reflector lamps into the broader GSL category.^{ff} Additionally, they are considering increasing the MEPS to 45 lm/W, which would align with the U.S. standard that came into effect on August 1, 2023.^{gg} A MEPS of 45 lm/W effectively bans halogen incandescent light bulbs, the least efficient, from the market.^{hh} Quebecⁱⁱ and British Columbia^{jj} have led the way in Canada with 45 lm/W minimums since 2019 and 2020, respectively.¹¹

⁹ Draft regulation had November 15, 2023, enforcement: U.K. Parliamentary Under Secretary of State. "Draft Statutory Instruments - 2023 No. XXX Energy Conservation - The Ecodesign for Energy-Related Products and Energy Information (Lighting Products) (Amendment) Regulations 2023." <https://www.legislation.gov.uk>, 2023.

Adoption date has been delayed – Policy proposal is expected to be put forward for Ministerial approval early 2024 for late 2024/early 2025 enforcement.

¹⁰ Recommendation provided by CLASP, the international appliance efficiency nonprofit in: Mavandad, S. and Malinowski, M., World's Best MEPS: Assessing Top Energy Efficiency Standards for Priority Appliances, CLASP, 2022.

¹¹ Ontario was slated to have a similar standard starting in 2020, but it was repealed: Natural Resources Canada. "It's Lights out for Halogens in Europe..." Government of Canada, April 11, 2019. <https://natural-resources.canada.ca/energy-efficiency/spotlight-energy-efficiency/2019/04/04/its-lights-out-for-halogens-europe/21863>; "Energy Efficiency - Appliances and Products, O Reg 404/12."

Canada is a signatory to the Minamata Convention on Mercury^{kk} requiring a ban on compact fluorescent lamps (CFLs) by 2025.^{ll} The federal government proposed a ban on the import and manufacture of mercury-containing general lighting starting January 1, 2024, and high-pressure sodium vapour lamps for general lighting starting January 1, 2029.^{mm} However, according to the lighting industry publication, *Inside Lighting*, the final regulation banning mercury-containing general lighting has been delayed and is expected to be published in the *Canada Gazette, Part II* before the end of June 2024.ⁿⁿ According to CLASP's *Getting Appliances Back on Track* report, "enforcing technology-neutral MEPS at 90 lm/W [by 2025] is the easiest way for nations to simultaneously comply with Minamata and ensure there is no backsliding to incandescent or inefficient, low-quality LEDs in their market".^{oo} For countries already meeting the 90 lm/W efficiency standard, the report recommends a more ambitious 120 lm/W target.

Although, most traditional incandescent light bulbs have been banned in Canada since 2015,¹² as part of Amendment 12B,^{pp} the approximate year-and-a-half gap between the mercury regulations in 2024 and the proposed updated MEPS coming into force in 2025, creates a risk of backsliding from mercury containing fluorescent to halogen incandescent lighting or lower quality LEDs¹³ in the provinces where 45 lm/W is not already the regulated minimum.

Looking ahead, the U.S. is proposing a MEPS of 124 lm/W for GSLs from 2029,^{qq} however in the U.S., GSLs have several exemptions, including linear fluorescent

CanLII, November 28, 2018. <https://www.canlii.org/en/on/laws/regu/o-reg-406-23/latest/o-reg-406-23.html>.

¹² With a few exceptions including holiday lights and appliance bulbs: Natural Resources Canada. "Frequently Asked Questions: Canada's Standard for Efficient Light Bulbs." Government of Canada, December 2, 2015. <https://natural-resources.canada.ca/energy/regulations-codes-standards/7281#i>.

¹³ "low-quality LED lighting products that are not designed properly may be no more efficient than incandescent bulbs" compared to the 35-60 lm/W of compact fluorescent lamps (CFLs): ecoENERGY. "Learning about LEDs." Natural Resources Canada, 2010. https://publications.gc.ca/collections/collection_2011/rncan-nrcan/M144-219-2010-eng.pdf.

lamps, therefore not banning mercury in lighting.¹⁴ The United Kingdom's current minimum standard is 91 lm/W, and it was announced that it would be increasing to 120 lumens/watt in late 2023 and 140 lm/W on September 1, 2027.¹⁵ The increase to 120 lm/W has been delayed to 2024, but will be one of, if not, the highest lighting efficiency standard in the world when enacted.

What could Canada do for lighting efficiency?

Canada should require a MEPS of 90 lm/W for GSLs to meet obligations to the Minamata Convention to ban mercury-containing lighting while also encouraging energy efficiency. This would create a path to 124 lm/W by 2029, to harmonize with the U.S. To show leadership, NRCAN could go even further by requiring 140 lm/W in 2027, aligning with the U.K.

Major home appliances

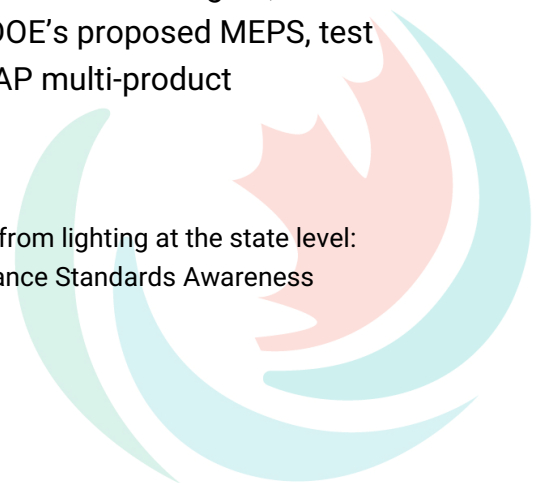
As of 2019, household appliances account for 14.1 per cent of residential energy use in Canada.^{ss} Broadly speaking, Canada should revisit its earlier proposal to make ENERGY STAR certification mandatory for many of the appliances covered below.

The following is a closer look at major home appliances, with the addition of microwaves.

Dishwashers

Canada's current MEPS for dishwashers (see Table 2) have been in place since 2013.^{tt} In May 2023, the U.S. DOE proposed standards for dishwashers were released^{uu} (See Table 2) with proposed enforcement from 2027.^{vv} In August, NRCAN announced they are considering also adopting the U.S. DOE's proposed MEPS, test standards, and 2027 timeline.^{ww} September's AHAM/ASAP multi-product

¹⁴ ASAP's *Clean Lighting* Model Bill is working to eliminate mercury from lighting at the state level: "Clean Lighting - Flipping the Switch to Clean Lighting." ASAP Appliance Standards Awareness Project, 2023. <https://appliance-standards.org/clean-lighting>.



agreement recommended the same levels and timeline as the DOE for dishwashers.^{xx}

Authority	Standard dishwashers		Compact dishwashers		Compliance date
	Maximum energy consumption (kWh/year)	Maximum water consumption (litres/cycle)	Maximum energy consumption (kWh/year)	Maximum water consumption (litres/cycle)	
Canada - current	307	18.93	222	13.25	May 30, 2013
ENERGY STAR (version 6)	270	13.25 (3.5 gallons)	203	11.73 (3.1 gallons)	January 29, 2016 – July 18, 2023
ENERGY STAR – current (version 7.0)^{yy}	240	12.1 (3.2 gallons)	155	7.56 (2.0 gallons)	July 19, 2023
U.S. DOE & AHAM/ASAP joint recommendation	223	12.5 (3.3 gallons)	174	11.73 (3.1 gallons)	2027 (3 years after regulation)

Table 2 - Dishwasher MEPS (assuming 215 cycles/year,¹⁵ except for the U.S. DOE's that is based on 184 cycles/year)^{zz}

What could Canada do for dishwasher efficiency?

As Canada last updated dishwasher efficiency standards more than a decade ago, NRCAN should adopt an interim MEPS at ENERGY STAR Version 6.0 levels, before harmonizing with the U.S. in 2027. Although ENERGY STAR published a new Version 7.0 specification in 2023, when normalized for the difference in cycles per year used in the test standard, it requires higher efficiency than the U.S. DOE proposed regulation,¹⁶ making it less appropriate as an interim regulation.

¹⁵ CAN/CSA-C373-14: Natural Resources Canada. "Dishwashers - Energy Efficiency Regulations." Government of Canada, June 14, 2019. <https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-regulations/guide-canadas-energy-efficiency-regulations/dishwashers/6955>.

¹⁶ For example: Standard dishwasher: US.DOE's 223 kwh/year standardized to 215 cycles/year from 184 equals ~261 kWh/year, which is higher than ENERGY STAR V7.0's 240 kWh/year.

There are currently 358 ENERGY STAR Version 7.0 dishwasher models on the Canadian market,¹⁷ so even more would comply with the less stringent Version 6.0 efficiency levels, making this very feasible.

Domestic refrigeration

There are 42 different domestic refrigeration product type categories in Canada and the U.S., each with their own MEPS.^{aaa} Within each category, the maximum energy consumption limit depends on the product's adjusted volume.¹⁸

The IEA's 2021 *PEET Efficiency Trends Analysis* report compared the average energy consumption of refrigerator-freezers in the Canadian, Australian, and Korean markets in 2019. Canadian refrigerator-freezers were the least efficient in every size category.

As there are so many product categories and a wide array of refrigerator-freezer sizes, comparing current and proposed Canadian and US MEPS can be complicated. To allow comparison across standards, Table 3 compares 400 L refrigerator-freezers with automatic defrost and top-mounted freezers without through-the-door ice service.

In February 2023, the U.S. DOE proposed a new MEPS for refrigerator-freezers for enforcement from 2027. Like dishwashers, refrigerators and freezers were part of the pre-consultation for Amendment 18, but were delayed in August, to adopt the U.S. standards and timeframe. However, a month after NRCan's announcement, the U.S. AHAM/ASAP agreement proposed pushing the compliance dates for refrigeration products to January 31, 2029, or January 31, 2030, depending on the

¹⁷ As of November 24, 2023, "Product Finder: ENERGY STAR Certified Residential Dishwasher." ENERGY STAR. Accessed November 24, 2023.

<https://www.energystar.gov/productfinder/product/certified-residential-dishwashers/results>.

¹⁸ Adjusted volume is defined in "CSA C300:18 (R2023) Energy performance and capacity of household refrigerators, refrigerator-freezers, freezers, and miscellaneous refrigeration products." Canadian Standards Association, 2023. <https://www.csagroup.org/store/product/CAN-CSA-C300-18>.

category. On December 29, 2023, the U.S. DOE published the direct final rule for refrigerators and freezers, with the compliance dates proposed in the joint recommendation.^{bbb}

Authority	Maximum energy use (kWh/year)	Effective date
Canada - current^{ccc}	348	Manufactured on or after September 15, 2014
ENERGY STAR^{ddd}	313	September 15, 2014
U.S. DOE – proposed (February 2023)	295	2027 (3 years after regulation)
AHAM/ASAP – joint recommendation (Final direct rule)	295	January 31, 2030
United for Efficiency (U4E) model regulations¹⁹	279 / Next target: 223	N/A

Table 3 - Current and proposed refrigerator-freezer MEPS for 400 L with automatic defrost and top-mounted freezer without through-the-door ice service.

What could Canada do for domestic refrigeration efficiency?

Given that refrigerator and freezer MEPS were last updated almost a decade ago and the poor energy performance of the average Canadian refrigerator-freezer, Canada should adopt an interim MEPS equivalent to current ENERGY STAR levels before aligning with the U.S. proposed standards in 2027 and setting dates for compliance with U4E's current and future targets, the current international best practice.

Clothes washers

Similarly to dishwashers and refrigerators, clothes washers were in the pre-consultation to Amendment 18^{eee} and as of the August 2023 NRCan

¹⁹ For the same size and test conditions as above: Malinowski, M., and S. Mavandad. "Getting Appliances Back on Track: Assessing Progress towards Global Energy Efficiency Commitments." CLASP, October 5, 2023, <https://www.clasp.ngo/research/all/getting-appliances-back-on-track>.

announcement, are being delayed in order to align with the U.S. timeline when finalized.^{fff}

The U.S. DOE proposed new MEPS for residential clothes washers in March 2023 for 2027 enforcement^{ggg} (see Table 4). As clothes washers were also included in the September U.S. AHAM/ASAP multi-product agreement and the U.S. DOE has not yet issued the final rule, it is uncertain which MEPS and timeline will be adopted.

Clothes washer MEPS are measured by the integrated modified energy factor (IMEF) (litres of capacity/kWh/cycle) and maximum integrated water factor (IWF) (litres of water/cycle/litres of capacity). To simplify the comparison between standards, the MEPS for a household standard top-load and compact front-load clothes washers are shown in the below table. The higher the IMEF, the more efficient, whereas a lower IWF is more efficient.



Authority	Standard top-load		Compact front-load		Effective date
	Max. IMEF (L/kWh/cycle)	Max. IWF (L/cycle/L)	Max. IMEF (L/kWh/cycle)	Max. IWF (L/cycle/L)	
Canada – current^{hhh}	44.46	0.87	32.00	1.11	January 1 st , 2018
ENERGY STARⁱⁱⁱ	58.33 (2.06 ft ³ /kWh/cycle)	0.57 (4.3 gal/cycle/ft ³)	58.62 (2.07 ft ³ /kWh/cycle)	0.56 (4.2 gal/cycle/ft ³)	Feb. 5, 2018
U.S. DOE – proposed^{jjj}	67.39 (2.38 ft ³ /kWh/cycle)	0.49 (3.7 gal/cycle/ft ³)	62.3 (2.2 ft ³ /kWh/cycle)	0.49 (3.7 gal/cycle/ft ³)	Three years after final regulation (2027)
U.S. AHAM/ASAP – joint recommendation	58.33 (2.06 ft ³ /kWh/cycle)	0.57 (4.3 gal/cycle/ft ³)	62.3 (2.2 ft ³ /kWh/cycle)	0.49 (3.7 gal/cycle/ft ³)	March 1, 2028

Table 4 - Current and proposed MEPS for clothes washers

What could Canada do for clothes washer efficiency?

As there are 293 ENERGY STAR-certified models of clothes washers currently available on the Canadian market,²⁰ and waiting to align with the U.S. in 2028 could mean a decade without progress on efficiency in Canada, NRCan should adopt an interim MEPS equivalent to current ENERGY STAR levels, with the intention to align with future U.S. efficiency standards for clothes washers if their stringency in the final rule exceeds those of ENERGY STAR.

Clothes dryers

Table 5, below, shows the minimum combined efficiency factors (CEFs) (lbs of clothing/kWh) for the categories of clothes dryers. The higher the CEF, the better.

²⁰ As of December 6, 2023: "Product Finder - ENERGY STAR Certified Residential Clothes Washers." EPA ENERGY STAR. Accessed December 6, 2023.
<https://www.energystar.gov/productfinder/product/certified-clothes-washers/results>.

There is currently no MEPS for gas clothes dryers in Canada.²¹ The July 2022 technical bulletin for clothes dryers proposed adding gas dryers to the list of products covered by the *Energy Regulations*, as part of Amendment 18. However, it has been delayed to the final U.S. DOE timeline.^{kkk}

Authority	Electric dryers					Gas dryers		Compliance date
	Standard	Compact				Standard	Compact	
		120V		240 V				
		Vented	Ventless	Vented	Ventless			
Canada - current	3.73	3.61	N/A	3.27	2.55	N/A		January 1, 2015
ENERGY STAR ^{lll}	3.93	3.80		3.45	2.68	3.48	N/A	May 5, 2017
U.S DOE – proposed ^{mmm}	3.93	4.33		3.57	2.68	3.48	2.02	2027 (3 years after final rule)
US - AHAM/ASAP - joint recommendation	3.93	4.33		3.57	2.68	3.48	2.02	March 1, 2028

Table 5 - Clothes dryer minimum combined efficiency factors

In August 2022, the U.S. DOE proposed new standards for both electric and gas standard-size clothes dryers that would be equivalent to the ENERGY STAR efficiency levels at the time (See *Table 5*).ⁿⁿⁿ However, clothes dryers, like clothes washers, were included in the AHAM/ASAP multi-product agreement with a March 1, 2028 compliance date,^{ooo} thus the compliance date Canada would adopt is uncertain until the U.S. DOE's final rule which is expected in the first half of 2024.

What could Canada do for clothes dryer efficiency?

To prevent further delays, Canada should move ahead with ENERGY STAR performance levels as previously proposed in 2019, before aligning with the U.S. (for the few categories where the U.S. efficiency standard differs from ENERGY

²¹ Natural Resources Canada. "Clothes Dryers - Energy Efficiency Regulations." Government of Canada, June 23, 2021. <https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-regulations/guide-canadas-energy-efficiency-regulations/clothes-dryers/6933>.

STAR) in 2027 or 2028 depending on the U.S. DOE final ruling. According to the May 2021 Amendment 17 technical bulletin for clothes dryers, NRCAN calculated that adopting the above ENERGY STAR-level efficiency standards “would reduce the energy use of household clothes dryers sold in Canada by approximately 25 per cent.”^{ppp}

Heat pump clothes dryers, which can reduce energy consumption by 20-60 per cent^{qqq} are now available from many major brands.^{rrr} Canadian governments and utility demand-side management programs should consider how to incentivize their adoption (similar to those for water heaters, see below “Water Heating”).

Given the greater efficiency of electric dryers, particularly those with heat pump technology, and the indoor NO_x pollution from gas appliances, ENERGY STAR has announced they will propose sunseting ENERGY STAR certification for gas dryers.^{sss} For these reasons, Canada should set a date for the phase-out of gas dryers.

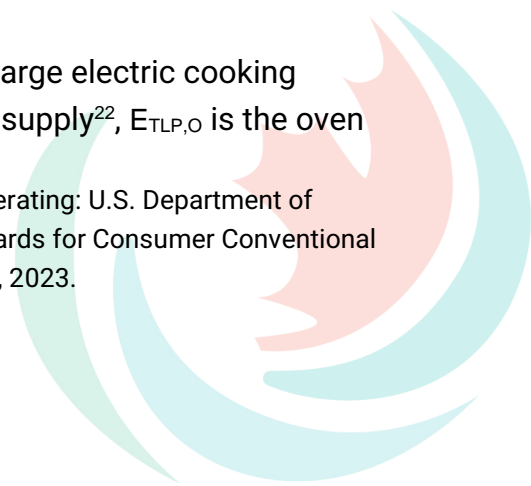
Cooking appliances

Cooking appliances were not included in the pre-consultation for Amendment 18,^{ttt} however current MEPS for cooking products in Canada are generally quite old (over twenty years for electric ranges) or essentially non-existent (gas cooking appliances). In the U.S., the DOE and AHAM/ASAP have proposed significant improvements to their MEPS that Canada would generally benefit from aligning with. On February 14, 2024, the U.S. DOE published a direct final rule for cooking appliances consistent with the AHAM/ASAP recommended levels and timelines.^{uuu}

Electric cooktops, ovens, and ranges

The below table shows current and proposed MEPS for large electric cooking appliances, where SMPS stands for switch-mode power supply²², E_{TLP,O} is the oven

²² a feature that prevents standby losses when equipment is not operating: U.S. Department of Energy. “Energy Conservation Program: Energy Conservation Standards for Consumer Conventional Cooking Products.” Federal Register - National Archives, February 1, 2023.



component's annual energy consumption in low-power mode (i.e. if the oven was never turned on), and V is oven volume in litres.

	Ranges (kWh/yr)	Cooktops (kWh/yr)		Oven (kWh/yr)	Compliance date
		Smooth element	Open elements (coil)		
Canada – current^{vv}	$2.0 \times V + 458$	258		$2.0 \times V + 200$	August 1, 2003
ENERGY STAR²³	$E_{TLP,0} \leq 7$ for oven portion and 195 for cooktop portion	195		N/A	September 25, 2023
U.S DOE - proposed^{www}	SMPS required for oven portion and 207/199 for cooktop	207	199	SMPS required	Three years after regulation (2027)
U.S. AHAM/ASAP – joint recommendation^{xxx} / U.S. DOE direct final rule	SMPS required for oven portion and 207 for cooktop	207	N/A	SMPS required	January 31, 2028

Table 6 - Maximum allowable energy consumption - large electric cooking appliances

The first ENERGY STAR Residential Electric Cooking Products specification took effect on September 25, 2023.^{yy} According to their letter to stakeholders, ENERGY STAR-certified residential cooking products will consume an average of 18 per cent less electricity than their non-ENERGY STAR equivalents.

<https://www.federalregister.gov/documents/2023/02/01/2023-00610/energy-conservation-program-energy-conservation-standards-for-consumer-conventional-cooking-products>.

²³ see pg. 3 for more details: “ENERGY STAR® Program Requirements Product Specification for Residential Electric Cooking Products Eligibility Criteria Version 1.0.” ENERGY STAR, October 2023.
<https://www.energystar.gov/sites/default/files/ENERGY%20STAR%20Residential%20Dishwasher%20Version%206.0%20Final%20Program%20Requirements.pdf>.

Gas cooktops, ovens, and ranges

For gas ranges, currently, the only energy efficiency standard in Canada is that it “must not have a continuously burning pilot light”.^{zzz}

	Ranges (kBTu/year)	Cooktops (kBTu/year)	Ovens (kBTu/year)	Compliance date
Canada - current	No continuously burning pilot light			February 3, 1995
ENERGY STAR^{aaaa}	N/A			
U.S. DOE - proposed^{bbbb}	SMPS required + 1,204 for cooktop component	1,204	SMPS required	Three years after regulation (2027)
U.S. AHAM/ASAP – joint recommendation^{cccc}	SMPS required + 1,770 for cooktop component	1,770	SMPS required	January 31, 2028

Table 7 - Gas range, cooktop, and oven maximum allowable energy consumption, kBTu/year

Microwaves

The current Canadian standard for microwave-only and countertop convection microwave ovens is ≤ 1.0 watts (W) for standby power and ≤ 2.2 W for built-in and over-the-range convection microwave ovens^{dddd}, which is aligned with current U.S. standards.^{eeee}

In June, the U.S. DOE issued a final rule on microwave ovens that will come into effect in 2026, which will lower the maximum allowable average standby power to 0.6 W for microwave-only ovens and countertop convection microwave ovens and 1.0 W for built-in and over-the-range convection microwave ovens.^{ffff}

What could Canada do for cooking product efficiency?

Aligning with the U.S. DOE’s MEPS and timelines for cooking products would improve energy performance for all categories, except electric coil cooktops and

ranges. As electric coil cooktops have the lowest purchase price, they are very popular, particularly in rental housing. Omitting them from efficiency standards could worsen occupants' energy cost burdens. Canada should therefore require electric coil cooktops to have, at minimum, the same MEPS as smooth element models, 207 kWh/year.

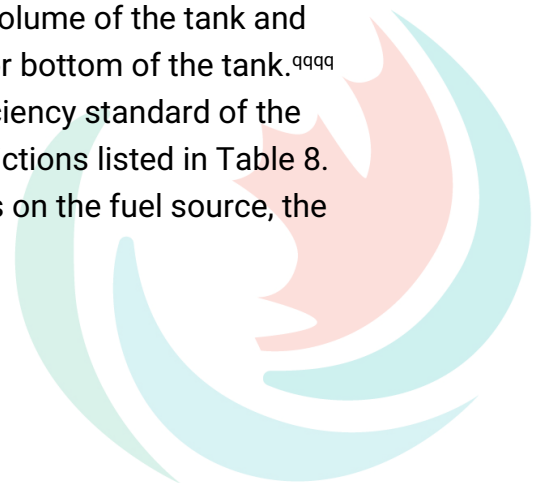
Additionally, given their higher greenhouse gas emissions (particularly methane^{ggg}), contribution to indoor air pollution,^{hhh,iii} and that gas cooking appliances can be in use for upwards of 20 years,^{jjj,kkk} NRCan should set a 2030 deadline when new gas ranges, stoves and ovens can no longer be sold in Canada, to align with net-zero by 2050 commitments.

Water heating

Water heating accounts for about 18 per cent of the energy used in Canadian homes.^{lll} There have been significant advancements in water heaters with the introduction of heat pump^{mmm} and smart control technologies for substantial efficiency improvements and demand-shifting capabilities,ⁿⁿⁿ respectively, that can save considerable costs for both the consumer and the utility.

Instantaneous (tankless) gas water heaters have gained popularity as they use on average 30 per cent less energy than storage gas water heaters^{ooo} since they do not have to maintain stored water temperatures and they take up less space. However, they emit significantly more unburnt methane, a potent greenhouse gas, as their burners turn on and off every time hot water is used.^{ppp}

Currently in Canada, electric water heater efficiency standards are defined by the maximum standby loss in watts (W), depending on the volume of the tank and whether the cold-water inlet is configured from the top or bottom of the tank.^{qqq} Gas and oil water heaters in Canada use the energy efficiency standard of the Uniform Energy Factor (UEF), as do the rest of the jurisdictions listed in Table 8. The prescribed minimum UEF for water heaters depends on the fuel source, the



first-hour rating^{rrrr} and the volume of the water heater's storage tank (if applicable).²⁴ A higher UEF is more energy efficient.

For ease of comparison, as a typical residential hot water tank volume is forty to sixty gallons (151- 227 litres),^{ssss} a fifty-gallon household water heater with a low draw pattern²⁵ (medium for ENERGY STAR as low is omitted)^{tttt} or a fifty-gallon first-hour rating, is assumed.

²⁴ Tankless/instantaneous hot water heaters.

²⁵ "Represents the number, flow rate, length and timing of hot water removal from a water heater during testing". The four categories of draw patterns are Very Small, Low, Medium, or High Usage: Natural Resources Canada. "Electric Water Heaters - Technical Bulletin on Amending the Standards." Government of Canada, July 27, 2022. <https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-regulations/electric-water-heaters/24405>.

	Electric		Gas		Oil
	Instantaneous	Storage (UEF)	Instantaneous	Storage	Storage
Canada - current	N/A	Maximum standby loss (W): Bottom inlet – 77.85; Top inlet – 72.85 ^{uuuu}	Max flow less than 6.4 L/min: ≥ 0.86 ; more than 6.4 L/min: ≥ 0.87 ^{vvvv}	0.50 ^{www}	.45 ^{xxxx}
ENERGY STAR	N/A	2.2-3.3 ²⁶	0.95	0.81	N/A
Canada – proposed ²⁷	N/A	0.92	Not included in Amendment 18	0.50	0.45
U.S. current ^{yyyy}	0.91	0.91	0.81 (assuming <2 gal and 50,000-200,000 Btu/h)	0.50	0.45
U.S. DOE - proposed	0.91	2.30	0.91 (assuming <2 gal and 50,000-200,000 Btu/h)	0.55	0.49

Table 8 – Current and proposed water heater efficiency standards

In July, the U.S. DOE proposed changes to water heater MEPS from 2029, if finalized.^{zzzz} The new standards would require electric storage water heaters with 12 kW or less of power input, and volumes between 20 and 120 gallons, to use heat pump technology, by setting uniform energy factors greater than 1 (except ≤ 35 gallons with very small or low draw patterns). Currently in the U.S., heat pump technology is only required for electric water heaters greater than 55 gallons. Under the proposed standards, gas-fired instantaneous (tankless) water heaters would be required to use condensing technology for greater efficiency.^{aaaaa}

In the U.S., the ACEEE has proposed all-electric storage water heaters be manufactured with the necessary controls to allow demand flexibility, allowing them to work like a thermal battery.^{bbbb} Water could be heated when electricity is cheapest with time-of-use pricing or when electricity production is the least emissions intensive. This would allow the utility to delay the heating of water

²⁶ UEF ≥ 2.20 for split-system heat pump water heaters (HPWH) or Integrated HPWHs with 120 V/ 15 amp circuits; UEF ≥ 3.30 for integrated HPWH

²⁷ Proposed efficiency standards as part of Amendment 18 can be found [here](#) for electric, [here](#) for gas and [here](#) for oil.

during peak periods or to preheat water to a higher temperature when there is a surplus of cheap electricity to ensure no additional heat is needed during the peak. However, the U.S. Energy Policy and Conservation Act, authorizing the DOE to regulate energy efficiency, requires any “new or amended standard must result in a significant conservation of energy”.^{cccc} Therefore, demand shifting is currently outside the DOE’s jurisdiction, and the policy has not gone forward since its introduction in Congress in 2022.^{dddd} However, the states of Oregon, Washington and Colorado already require new electric water heaters to have demand response capabilities.²⁸

What could Canada do for water heater efficiency?

Canada should align with the proposed U.S. DOE standards for water heaters and set a future date to adopt the more ambitious ENERGY STAR efficiency levels as standard.

As oil water heaters are very inefficient (an ENERGY STAR HPWH can be more than six times more efficient), there is not an ENERGY STAR certification for oil water heaters. NRCan should set a date when new oil water heaters can no longer be sold.

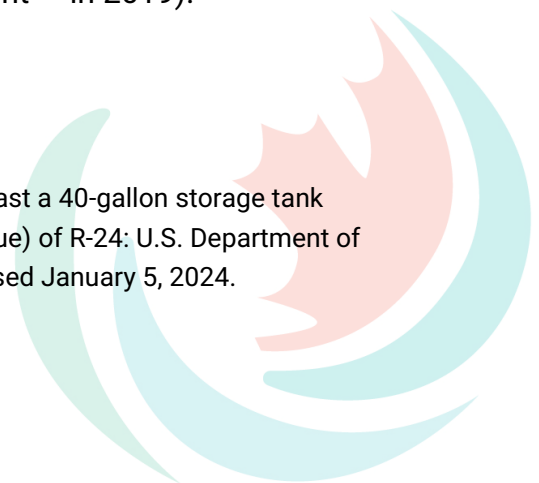
All electric water heaters in Canada should be required to be manufactured with smart controls and sufficient insulation to allow for demand flexibility.²⁹

Space heating and cooling

Space heating is the largest contributor to residential and commercial energy use in Canada (61.1 per cent and 56.6 per cent, respectively, in 2020).^{eeee} Space cooling is a smaller yet rapidly growing share (1.6 per cent^{ffff} in 2019).

²⁸ For residential resistance and heat pump water heaters with at least a 40-gallon storage tank

²⁹ The U.S. DOE recommends a minimum thermal resistance (R-Value) of R-24: U.S. Department of Energy - Energy Saver. “Storage Water Heaters.” Energy.gov. Accessed January 5, 2024. <https://www.energy.gov/energysaver/storage-water-heaters>.



Furnaces

Most new gas furnaces in Canada must have at least 95 per cent annual fuel utilization efficiency (AFUE).^{ggggg} The U.S. DOE has issued a final rule that starting in late 2028, residential natural gas furnaces must achieve at least a 95 per cent AFUE^{hhhhh}, catching up to Canada.

Given our far colder climate than the U.S.,³⁰ it makes sense to look towards other cold climate countries for space heating policy. For example, in The Netherlands, hybrid heat pumps (or better) will be the standard from 2026 for all replacement heating systems.ⁱⁱⁱⁱ Sweden has a target of 50 per cent greater energy efficiency in 2030 than in 2005,^{jjjj} they are achieving these efficiency gains through their National Strategy for Energy Efficient Renovation, requiring triple-glazed windows and significant insulation, as well as electrifying heating with heat pumps, either on individual buildings or industrial-sized heat pumps that are part of the district heating system.^{kkkk} More than 40 per cent of Swedish homes were heated with oil in 1983^{llll} and as a result of strong energy policies, fossil fuels now account for less than five per cent of heating in Sweden.

Oil is the highest-emitting heating fuel source and the most expensive in Canada.^{mmmm} Since December 31, 2021, installing oil space or water heating in new construction has been banned in Quebec.ⁿⁿⁿⁿ As of December 31, 2023, that ban has been expanded to existing buildings, including a prohibition from repairing oil space heating equipment that was installed more than 20 years before and oil water heating more than 10 years before.

Heat pumps and central air conditioners

Canada and the U.S. are currently harmonized on the cooling efficiency of residential central air conditioners (CACs) and heat pumps since January 1, 2023, as part of Amendment 17 to the *Energy Regulations*.^{oooo} CAC and heat pump cooling efficiencies are measured by their seasonal energy efficiency ratio 2

³⁰ The U.S. had fewer than 2,000 population-weighted heating degree days in 2021, whereas Canada had more than 4,000: Rosenow, J., Gibb, D., Nowak, T. *et al.* Heating up the global heat pump market. *Nat Energy* 7, 901–904 (2022). <https://doi.org/10.1038/s41560-022-01104-8>.

(SEER2), which measures their efficiency over the entire cooling system. Below are the current minimum efficiencies for each product category (higher is more efficient):

Product description	SEER2		Heating Seasonal Performance Factor 2 (HSPF2) (Region V) for heat pump only
	Air conditioner	Heat pump	
Single package central, other than those that are space-constrained	≥ 13.4	≥ 13.4	≥ 5.4
Single package central that are space-constrained	≥ 11.7	≥ 11.9	≥ 5.0
Split system central, other than those that are space-constrained or small-duct and high-velocity	≥ 13.4	≥ 14.3	≥ 6.0
Split system central that are small-duct and high-velocity	≥ 12.0	≥ 12.0	≥ 4.9
Split system central that are space-constrained	≥ 11.7	≥ 11.9	≥ 5.0

Table 9 - current Canada & U.S. air conditioner & heat pump minimum efficiencies

ENERGY STAR has proposed sunseting certification for residential furnaces and air conditioners effective December 30, 2024.^{ppppp} In the letter to stakeholders detailing the proposal, they state “the need for the ENERGY STAR label to serve as a market signal moving [...] towards energy efficient heat pumps”.

Large air conditioners and heat pumps, for commercial and industrial use, were included in the pre-consultation for Amendment 18.³¹ Before January 1, 2023, large air conditioner and heat pump MEPS were aligned in Canada and the U.S. at the U.S. DOE’s Tier 1. The U.S. has increased stringency to Tier 2,^{qqqqq} and NRCan proposes Canada align with this higher standard for large air conditioners and heat pumps manufactured on or after January 1, 2025. See [here](#) for the proposed standards across categories.

³¹ Between 19 and 223 kW, excluding single package vertical air models: Natural Resources Canada. “Large Air Conditioners and Large Heat Pumps - Technical Bulletin on Amending the Standards.” Government of Canada, August 3, 2022. <https://natural-resources.canada.ca/energy-efficiency/energy-efficiency-regulations/large-air-conditioners-and-large-heat-pumps/24425>.

Standalone air conditioners

As of 2021, 16 per cent of Canadian households have a standalone air conditioner.^{rrrrr} Standalone air conditioners generally fall into two categories; portable and room (window).

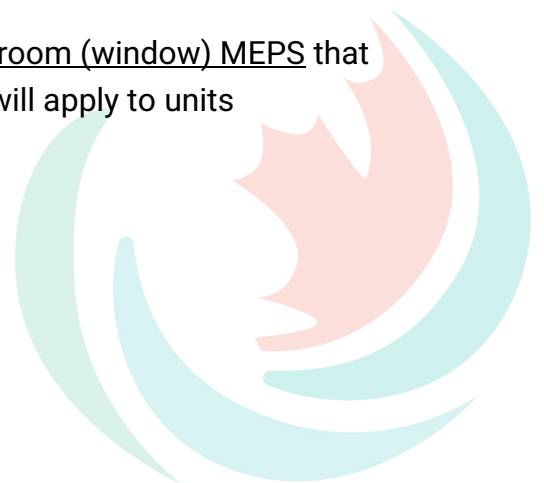
While CAC and heat pump efficiency is measured by SEER2, standalone air conditioner efficiency is measured by their combined energy efficiency ratio (CEER) which accounts for the electricity consumption when the compressor is running and when the system is in standby mode^{sssss} and is measured in British thermal units (Btu) per Watt · hour (Wh).

Both portable and room air conditioners were included in the pre-consultation for Amendment 18.^{ttttt}

Currently, there are energy efficiency reporting requirements, but no MEPS for portable air conditioners in Canada.^{uuuuu} MEPS for portable air conditioners have been proposed in Amendment 18, which can be found [here](#) and are consistent with the current U.S. DOE standard.^{vvvvv} These new MEPS would apply to products manufactured on or after January 10, 2025, and come into force six months after the publication in the *Canada Gazette, Part II*, which should be mid-2025, based on the current timeline.

Currently in Canada, Minimum CEER requirements for room (window) air conditioners range from nine to 11 depending on the style and cooling capacity of the product.^{wwwww} For room air conditioners, NRCan has also proposed aligning with U.S. DOE testing and efficiency standards, which would also come into force six months after their publication in the *Canada Gazette, Part II*.^{xxxxx}

In March 2023, the U.S. DOE issued the final rule for the room (window) MEPS that NRCan has proposed aligning with. The new standards will apply to units manufactured or imported after 2026.^{yyyyy}



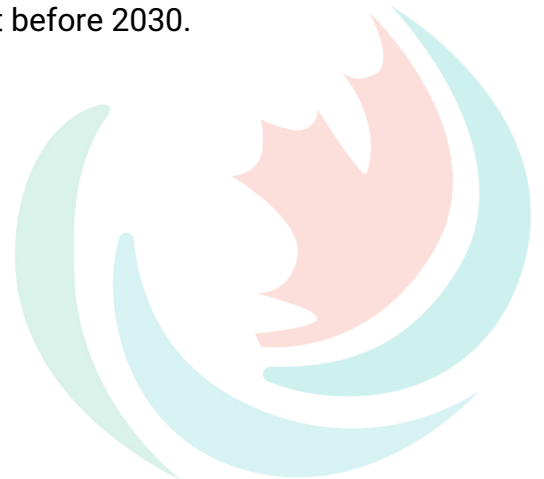
What could Canada do for space heating and cooling efficiency?

Canada has a history of moving ahead of the U.S. on space heating, by mandating higher furnace standards. Given Canada's colder climate and ambitious climate goals, the federal government should plan to lead in this product category, in particular.

The federal government could start by requiring every residential central air conditioner be a heat pump. A Vancouver, B.C., by-law requiring new central air conditioners in detached homes to also provide low-carbon heating (an electric heat pump) came into effect on January 1, 2023.^{zzzzz} Given the small price difference between equally efficient air conditioners and heat pumps and the impressive energy savings from the highly efficient heating in addition to the cooling provided,^{aaaaaa} requiring air conditioners to provide both heating and cooling (a heat pump) should be implemented as soon as possible, with the potential to be included in Amendment 19.

The federal government could also follow British Columbia's lead by requiring a minimum efficiency of 100 per cent for space and hot water heating in 2030.^{bbbbbb} The 2030 timeline is important given the 15-20 year lifespan of furnaces and boilers, along with Canada's net-zero by 2050 commitment.^{cccccc}

Fuel oil is the highest emitting and most expensive heating source in Canada. With very clear cost and emissions savings from switching off oil,^{ddddd} NRCAN should set a date where new and replacement oil furnaces and boilers are no longer permitted. Given the high financial and environmental costs of fuel oil, the many alternatives, and access to the Oil to Heat Pump Affordability Program for low-income Canadians,^{eeeeee} oil heating should be phased out before 2030.



Window heat pumps are a nascent industry (particularly in Canada,³² but cold climate window heat pumps that are now available in the U.S.^{ffffff}) could be an important energy and cost savings tool for Canadian renters, who would otherwise buy a window or portable air conditioner and/or have inefficient and costly oil or electric resistance heating that could be mostly offset by a cold-climate window heat pump unit. Policies supporting their manufacture in, or import into, Canada should be explored.

For residential central cooling, heat pumps provide both highly efficient heating and cooling, compared to air conditioners that can only cool. If air conditioners remain on the market, cooling efficiency standards (SEER2) for air conditioners should be at least as high as for heat pumps. Currently, the minimum SEER2 for several categories of residential air conditioner³³ are lower than for equivalent heat pumps, creating an unfair advantage for air conditioners, due to the lower upfront cost of less efficient models.

Conclusion

The potential contribution of appliance and equipment energy performance standards to putting Canada on a path toward a net-zero economy by 2050 is often overlooked. Improving energy efficiency was recently identified in the IEA's *Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach* report as one of the four technologies available today that can deliver more than 80 per cent of the

³² LG is the only brand of window unit I could find with any heating available in Canada: "LG Electronics 18,000 BTU Heat and Cool Window Air Conditioner with Wifi Controls." Bed Bath & Beyond. Accessed September 11, 2023. <https://www.bedbathandbeyond.com/Home-Garden/LG-18-000-BTU-Heat-Cool-Window-Air-Conditioner-w-Wifi-Controls/33849395/product.html>.

³³ 1) *Single package central units that are space-constrained and split system central units*
2) *Split system central, other than those that are space-constrained or small-duct and high-velocity*
3) *Split system central that are space-constrained*: Government of Canada. "Regulations Amending the Energy Efficiency Regulations, 2016 (Amendment 17): SOR/2022-265." Canada Gazette, December 21, 2022. <https://canadagazette.gc.ca/rp-pr/p2/2022/2022-12-21/html/sor-dors265-eng.html>.

emissions reductions needed.³⁴ Given the timelines associated with proposing, consulting on, and finalizing new or amended standards, governments should be mindful not to waste any opportunity to move toward more stringent energy-efficient standards.

This brief reviewed current and proposed standards in Canada, the United States, and some international best practices. For many product categories, Canadian energy efficiency standards fall short of other IEA members and have not been updated in 10 or more years.

Harmonization with the U.S. is a significant consideration in Canadian appliance and equipment standards policy. This brief has shown that the U.S. is currently planning on moving ahead on energy efficiency. However, due to their own political dynamics, this will take a considerable amount of time. Furthermore, Canadians cannot be guaranteed these U.S. policy proposals will be implemented if there is a change in the political agenda. Given Canada's own climate, clean electricity, and customer affordability objectives, it cannot simply mimic U.S. policy. This brief has shown there are interim energy efficiency standards that can be implemented to capture more immediate energy savings in Canada on the way towards harmonizing with U.S. regulatory plans while mitigating the risk of waiting too long to take domestic action.

Canada's abandoned efforts to make ENERGY STAR certification mandatory for many home appliance product categories in 2019/2020 led to further lost opportunities. If we wait further by imitating the more complex and delayed U.S. regulatory process, we will have foregone considerable energy savings and GHG reductions for most of the 10 years leading up to 2030. Canada should return to the original plan of mandatory ENERGY STAR certification. Doing so would help to improve energy use and GHG emissions from homes and businesses and establish an important interim step toward stricter requirements harmonized with the U.S. in 2027 and beyond.

³⁴ The other three are: Ramping up renewables, cutting methane emissions and increasing electrification: IEA (2023), *Net Zero Roadmap: A Global Pathway to Keep the 1.5 °C Goal in Reach*, IEA, Paris <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach>.

To make sure Canada's efficiency regulations remain up to date, the federal government should establish a schedule to regularly revisit standards, similar to how the U.S. Energy Policy and Conservation Act requires product energy efficiency standards to be revisited every six years.³⁵

Some proposed efficiency standards in Amendment 18 would represent considerable progress, for example on standalone air conditioners, large air conditioners, and heat pumps. While Amendment 18's proposed lighting MEPS of 45 lumens per watt is a significant improvement from the current efficiency standard, there is a danger this standard, coupled with an agenda to eliminate mercury from Canadian lighting, will result in backsliding toward less efficient halogen incandescent or the lowest quality LEDs. A technology-neutral MEPS of 90 lumens per watt for lighting would eliminate mercury and energy waste in lighting products.

In the critically important product category of space heating, Canada should consider strategies to retain its leadership. The federal government should consider regulatory strategies to require all central residential air conditioners to be heat pumps, to prohibit new and replacement oil heating, and to establish a clear timeline for moving to net-zero heating solutions. Energy efficiency regulations could make a further step towards net-zero heating by requiring at least 100 per cent efficiency for space and hot water heating, as proposed in British Columbia.

Finally, policymakers should consider how appliance and equipment regulations could be used to help solve other pressing energy system-related challenges in a

³⁵ "EPCA also provides that not later than six years after issuance of any final rule establishing or amending a standard, DOE must publish either a notice of determination that standards for the product do not need to be amended, or a NOPR including new proposed energy conservation standards (proceeding to a final rule, as appropriate). (42 U.S.C. 6295(m))": U.S. Department of Energy. "Energy Conservation Program: Energy Conservation Standards for Consumer Clothes Dryers." Federal Register National Archives, August 23, 2022. <https://www.federalregister.gov/documents/2022/08/23/2022-17900/energy-conservation-program-energy-conservation-standards-for-consumer-clothes-dryers>.

net-zero transition. Electricity saved, even if ‘clean’ electricity, is electricity that can be used to facilitate electrification. Additionally, demand flexibility will be essential to ensuring resource adequacy and reliability of tomorrow’s electricity grids. Using appliance and equipment regulations to ensure the technical capacity exists to participate in load shifting arrangements or virtual power plants could help reduce electricity system costs and emissions while integrating more renewable energy sources and giving Canadian energy users a way to get paid for providing grid service.⁹⁹⁹⁹⁹⁹

The current amendment process to Canada’s appliance and equipment standards is an opportunity to make up for lost time, to create an important interim step toward stricter future requirements, and to continue to demonstrate Canadian leadership in strategic areas such as space and water heating.



Citations

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- ^b Natural Resources Canada. "Appliances for Residential Use." Government of Canada, August 21, 2023. <https://natural-resources.canada.ca/energy-efficiency/products/appliances-for-residential-use/13630>.
- ^c Natural Resources Canada. "Energy Use in the Commercial/Institutional Sector." Government of Canada, August 8, 2022. <https://oee.nrcan.gc.ca/publications/statistics/trends/2018/commercial.cfm>.
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- ^f Delforge, P. "Heat Pump Water Heaters as Clean-Energy Batteries." NRDC, January 7, 2020. <https://www.nrdc.org/bio/pierre-delforge/heat-pump-water-heaters-clean-energy-batteries#:~:text=How%20does%20this%20work%3F,for%20use%20in%20the%20evening>.
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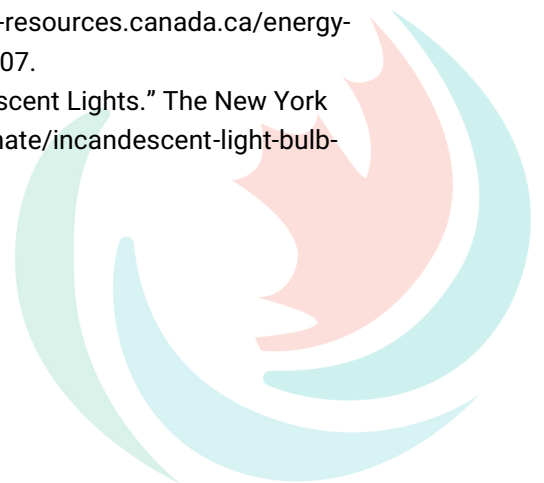
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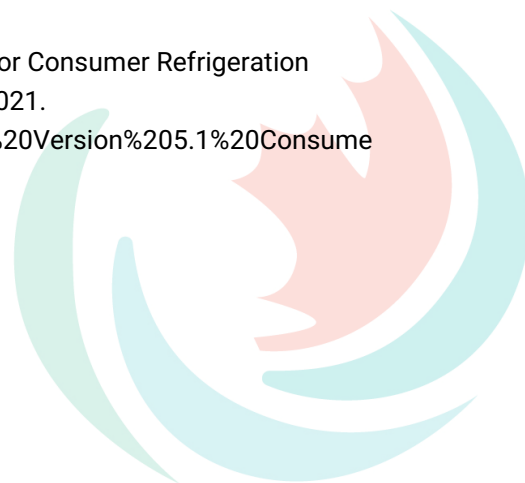
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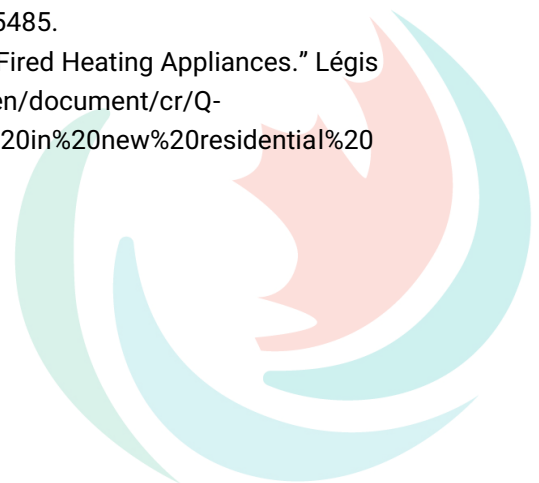
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