Benchmarking Canadian Minimum Energy Performance Standards for Appliances and Equipment

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Summary

Canada has the opportunity to achieve significant energy, cost, and emissions savings through strengthened minimum energy performance standards (MEPS) for electric motors, lighting, and major home appliances. Our analysis shows that Canada could achieve cumulative energy savings of 73.4 TWh, GHG emissions reductions of 2.9 Mt CO_{2e}, and save almost $5.7 billion (2025 CAD) by 2050 (see Table 1) by adopting world's best MEPS for electric motors and general service lamps. The savings potential is largest for electric motors due to their energy intensity, longevity, and ubiquity in industrial and commercial applications. For major home appliances, our analysis shows that the majority of appliances on the Canadian market would already comply with the strengthened MEPS the U.S. DOE finalized between 2023 and 2024 for all categories other than refrigerator-freezers. Therefore, Canada could adopt all but one without a significant decrease in the number of home appliance models available on the market, regardless of whether the U.S. moves forward with the standards.

Table 1. Cumulative estimated energy, cost and emissions savings from 2029 to 2050 from Canada adopting higher MEPS for electric motors and general service lamps in 2028

	Electric motors		Lighting - general service lamps		
	Policy Scenario 1 (IE4)	Policy Scenario 2 (IE5)	Residential	Commercial	Total
Cumulative savings (TWhs)	42.39	70.39	1.919	1.066	2.985
Cumulative utility cost savings (2025 CAD)	3.2 billion	5.3 billion	212.6 million	170.8 million	383.4 million
Cumulative emissions savings (kt CO2e)	1,633	2,717	138.6	75.7	214.3

Given their substantial energy use and long lifespans, stronger electric motor MEPS in Canada would have a significant impact on the country's energy use, utility costs and greenhouse gas (GHG) emissions. By improving MEPS for motors from the current

MEPS of NEMA Premium Efficiency (IE3) to Super Premium (IE4) or Ultra Premium (IE5), our analysis shows that Canada could achieve cumulative energy savings of 42.39 or 70.39 TWh, energy costs savings of $3.2 billion or $5.3 billion, and avoid 1,633 or 2,712 kt CO_{2e} of GHG emissions by 2050. Natural Resources Canada (NRCan) has proposed aligning with the U.S. DOE's finalized standards that would increase MEPS for some categories of electric motors to NEMA Super Premium.

Aligning with finalized U.S. MEPS for general service lighting, which are world-leading, would result in cumulative energy savings of almost 3 TWh, $383.4 million in energy cost savings and approximately 214 kt CO_{2e} of avoided GHG emissions by 2050. Canada's current MEPS for GSLs are already aligned with the U.S. DOE MEPS (45 lumens/watt) starting in 2026. However, the U.S. DOE has finalized world-leading MEPS for GSLs (ranging from 83.3 to 195.4 lumens/watt) with compliance starting in July 2028. NRCan could align with these MEPS through a Ministerial Amendment, which would bypass the typical two-year amendment consultation process.

Major home appliances is a diverse and vital class of equipment for which it is imperative for Canada to align with the highest feasible international standards. Most Canadian major home appliance MEPS are at least a decade old. Though improved standards for dishwashers, refrigerator-freezers, cooking products, and clothes washers and dryers were proposed in 2021 and 2022 Energy Efficiency Regulations amendment pre-consultations, these were withdrawn in anticipation of updated U.S. standards, which were finalized in 2023 and 2024 and are slated to be enforced by 2030. All major home appliances are expected to be included in the consultation for Amendment 19 to Canada's Energy Efficiency Regulations starting Spring 2026.

To demonstrate the feasibility of Canada aligning with the U.S.-finalized regulations, we evaluated the percentage of products currently on the Canadian market that would already comply with these improved standards. A high percentage would facilitate the passage of such policies (e.g., reduced manufacturer opposition and greater model choice for consumers). Our findings are summarized below:

- **Dishwashers:** Over nine out of 10 dishwashers shipped in Canada in 2021 were ENERGY STAR® certified. Nearly seven out of 10 standard-size and over nine out of 10 compact-size dishwashers available in Canada would comply with the coming U.S. standards.

- **Electric cooking products:** The U.S. DOE estimates that 77 per cent of available smooth cooktops and 95 per cent of electric ovens in the U.S. meet or exceed the new standards. Given the highly harmonized North American major home appliance market, these values are likely similar for Canada, indicating the ripeness of the market for MEPS improvements.
- **Gas cooking products:** The U.S. DOE estimates that 97 per cent of gas cooktops and 96 per cent of gas ovens already meet its finalized standards, a proportion that is expected to be similar in Canada. This suggests Canada could feasibly introduce even higher MEPS with little challenge for industry compliance.
- **Clothes washers/dryers:** In 2021, 75.2 per cent of clothes washers and 66.4 per cent of electric clothes dryers shipped in Canada were ENERGY STAR certified. Since the ENERGY STAR standard is the same as the U.S.-finalized MEPS for clothes washers and standard-size clothes dryers, the majority of these appliances shipped in Canada are already compliant with the U.S. DOE-finalized MEPS. There are 166 ENERGY STAR certified standard-size gas dryers currently on the Canadian market, all of which would be compliant with the U.S. DOE-finalized MEPS for gas dryers. As gas dryer efficiency is not currently regulated in Canada, we cannot know what percentage of total models that represents.
- **Refrigerator-freezers:** For the eight (out of 42) product categories analyzed, the percentage of models on the Canadian market that would already comply with the U.S. DOE-finalized MEPS was between one and 60 per cent, lower than for other appliance categories. While the U.S. DOE-finalized MEPS for most major home appliance categories are the same (or similar) to current ENERGY STAR standards, finalized MEPS for several refrigerator-freezer product categories are considerably more efficient (an upward of 30 per cent improvement from current Canadian MEPS compared to ENERGY STAR Version 5.1's 10 per cent). Therefore, the U.S. DOE enforcing its finalized refrigerator-freezer MEPS is likely essential for Canada to adopt standards for the product classes for which MEPS are being strengthened beyond the current ENERGY STAR standard. Canada's smaller market size may not be sufficient to induce the necessary product innovation and/or manufacturing retooling for more models to achieve the strengthened MEPS in 2029 without the U.S.

Introduction

According to the International Energy Agency (IEA), Canada's annual energy intensity progress from 2010 to 2022 trailed all other G20 nations.[1] Canada was the only nation that failed to improve energy efficiency by at least three per cent in any of the years analyzed, and it only achieved between two and three per cent efficiency improvements in two of the years. In contrast, the best-performing nation, the United Kingdom, improved its economy's energy intensity by four or more per cent in four of the years and by three to four per cent in another four years during the period analyzed.

At COP28 in 2023, Canada and nearly 200 other nations pledged to double their annual rate of energy efficiency improvements by 2030 from a global average of slightly above two per cent to over four per cent.[2] In addition to international pledges, Natural Resources Canada (NRCan) has a departmental target of 600 petajoules (PJ) of total annual energy savings from federal energy efficiency measures by 2030, including 77.4 PJ from strengthened minimum energy performance standards (MEPS) through the Energy Efficiency Regulations.[3] For fiscal year 2022–23, 99.2 PJ of total savings were achieved, including 16 PJ from MEPS. According to a 2024 independent Auditor General report, "this federal target is unlikely to be achieved by 2030 unless more aggressive action is undertaken."[4]

Canada's federal Energy Efficiency Regulations — which are set by NRCan and include MEPS, test standards, and energy labelling requirements[5] — are an important policy instrument to achieve lower energy bills for households and businesses, reduced greenhouse gas (GHG) emissions, and decreased peak electrical demand.[6] From their start in 1995 to 2023, Canada's Energy Efficiency Regulations have saved a cumulative 785 PJ of energy and avoided 680 MT CO_{2e} of GHG emissions.[7]

Canada's Energy Efficiency Regulations apply to all goods shipped into Canada or

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[1] IEA, *What Does Doubling Global Progress on Energy Efficiency Entail?*
[2] Compared to a 2022 baseline. *Natural Resources Canada, Powering Canada Forward.*
[3] Office of the Auditor General of Canada, *Departmental Progress in Implementing Sustainable Development Strategies - Clean Energy.*
[4] *Ibid.,* p. 15
[5] Natural Resources Canada, "Guide to Canada's Energy Efficiency Regulations."
[6] Office of Energy Efficiency & Renewable Energy, "Appliance Standards Fact Sheet."
[7] Natural Resources Canada, *Energy Efficiency: An Essential Part of Canada's Net-Zero Future - Report to Parliament under the Energy Efficiency Act 2021-2022.*

between provinces for sale or lease that fall into one of the approximately 80 regulated categories.[8] Several provinces also set point-of-sale efficiency standards for appliances and equipment to set standards higher than the federal Regulations and/or to set minimum standards for categories not (yet) covered by the federal Regulations.[9]

The Regulations are enabled by the 1992 Energy Efficiency Act,[10] which underwent amendments in 2009 and 2017. The former broadened its powers to regulate standby power.[11] The latter (also known as Amendment 13) simplified maintaining harmonized efficiency and test standards with other jurisdictions, such as the United States, by introducing Ministerial Amendments.[12] These allow regulatory alignment with another jurisdiction to be maintained without the standard two-year regulatory amendment process and two public consultation periods.[13]

MEPS are a powerful tool to contribute to global GHG emission reductions, in which the world, and Canada more specifically, is falling increasingly behind.[14] According to CLASP's *Doubling Energy Efficiency with Appliances* report, if all countries set MEPS at the level of today's best available technologies for eight appliance categories (air conditioners, refrigerators, fans, TVs, motors, lighting, space heating and water heating), global energy demand in 2030 would reduce by a fifth of what is needed to achieve net-zero emissions by 2050.[15]

Strengthening MEPS is also very cost effective. According to the IEA, improvements to appliance and equipment energy efficiency offer some of the lowest-cost ways to reduce energy consumption and GHG emissions, with typical societal benefit-cost ratios of 4:1.[16] Canada's most recent amendments to the Energy Efficiency Regulations have been even more beneficial — NRCan estimates that Amendment 18, finalized in March

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[8] Natural Resources Canada, "Guide to Canada's Energy Efficiency Regulations."
[9] Natural Resources Canada, "Energy-Using Products Regulated Federally and Provincially*."
[10] Minister of Justice, "Energy Efficiency Act (S.C. 1992, c. 36)."
[11] Natural Resources Canada, "Amendments to the Energy Efficiency Act Pass in the House of Commons."
[12] Minister of Justice, "Energy Efficiency Act (S.C. 1992, c. 36)."
[13] Natural Resources Canada, "Canada's Energy Efficiency Regulations."
[14] 440 Megatonnes, "2024 Emissions Estimate Shows Progress Stalled, Canada's 2030 Climate Target out of Reach"; United Nations Climate Action, "1.5°C: What It Means and Why It Matters."
[15] Jiayi Zhang, *Doubling Energy Efficiency with Appliances.*
[16] IEA/4E TCP, *Achievements of Energy Efficiency Appliance and Equipment Standards and Labelling Programmes – Analysis.*

2025, has a more than a 9:1 benefits-costs ratio.[17]

To take action toward reaching its energy efficiency targets, Canada can look to better-performing countries and emulate the strong MEPS that have contributed to their successes, like those detailed in CLASP's *World's Best MEPS* research.[18] Some examples are: China for electric motors,[19] the U.S. for general service lamps (lighting) and the European Union for cooking products.[20]

Scope

This report will focus on the MEPS component of Canada's federal appliance and equipment efficiency regulations, with energy efficiency labelling previously discussed in our 2024 *How to Modernize Canada's Energy Efficiency Act* report.[21] Test standards, a highly technical and complex topic, are mostly outside the scope of this report, except where differences in or changes to test standards affect the comparability of MEPS between jurisdictions or across time.

According to the United Nations Environment Programme, more than half of electricity globally is consumed by just four categories of products: electric motor systems, lighting, room air conditioners, and residential and commercial refrigerators.[22] Given their inclusion on both lists, this report will focus on electric motors, lighting and refrigerators, in addition to other major appliances included in the upcoming consultation for Amendment 19 to the Energy Efficiency Regulations.

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[17] Government of Canada, "Canada Gazette, Part 2, Volume 159, Number 8"; Natural Resources Canada, "Canada Gazette, Part 2, Volume 156, Number 26."
[18] Shirin Mavandad and Matt Malinowski, *2023 World's Best MEPS: Tracking Leaders in Appliance Energy Efficiency Standards;* "World's Best MEPS."
[19] CLASP, "China Adopts New Mandatory Efficiency Policy for Permanent Magnet Motors."
[20] Commission Regulation (EU) No 66/2014 of 14 January 2014 Implementing Directive 2009/125/EC of the European Parliament and of the Council with Regard to Ecodesign Requirements for Domestic Ovens, Hobs and Range Hoods.
[21] Riddell et al., How to Modernize Canada's Energy Efficiency Act, https://www.efficiencycanada.org/modernize-report/.
[22] United Nations Environment Programme, *Accelerating the Global Adoption of Energy-Efficient Electric Motor Systems, Policy Guide.*

Methodology

The energy, cost and emissions savings from electric motor efficiency improvements were quantified using Mepsy, an online, bottom-up, appliance and equipment climate impact calculator developed by CLASP that allows users to run custom analyses for 162 countries.[23] For lighting, particularly general service lamps, an Excel-based model based on data from the recent cost-benefit analysis (CBA) for Amendment 18 was developed to model energy, cost and emissions savings from Canada adopting higher general service lamp (GSL) MEPS. For major home appliances, the analysis focuses on the feasibility of aligning with the U.S. DOE's finalized MEPS for major appliances with compliance dates from 2027 to 2030, given the efficiency of current models on the Canadian market, proxied through product registry data.

A description of the methodologies and assumptions can be found in the Modelling methodology and assumptions section.

Electric motors

Electric motors are the backbone of machinery, from home appliances and air conditioners to manufacturing and transportation. Electric motors and motor systems, including pumps, fans, and compressors, are the single largest source (53 per cent) of electricity consumption globally.[24] Electric motors have a relatively long product lifetime, with lifespans ranging from 10–15 years for those less than one horsepower (hp) to 25–38 years for motors greater than 125 hp.[25] Motors can outlast these broad lifetime expectations, with one Swiss survey identifying several motors upward of 60 years old still operational.[26] With the long lifespans of large industrial motors, the majority of those manufactured today will still be operational in 2050.

Canada's current MEPS for electric motors were finalized December 2016 as part of Amendment 13 to the Energy Efficiency Regulations.[27] The current MEPS for regulated

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[23] "Mepsy - Methodology & Assumptions."
[24] 4E Electric Motor Systems Platform EMSA, "Electric Motor Systems Platform."
[25] M. Hasanuzzaman et al., "Analysis of Energy Savings for Rewinding and Replacement of Industrial Motor."
[26] Tieben et al., "EASY- Lessons Learned from Four Years of the Swiss EASY Audit and Incentive Program."
[27] Natural Resources Canada, "Canada Gazette, Part 2 – Energy Efficiency Regulations, 2016."

motors other than fire pump and medical imaging types are detailed in the National Electrical Manufacturers Association (NEMA) MG-1, Table 12-12.[28] The NEMA efficiency classification is primarily used in North America, whereas IEC is a more international electric motor standards organization. NEMA Premium Efficiency is equivalent to the International Electrotechnical Commission's (IEC) IE3, whereas IEC's IE4 motor efficiency class is equivalent to NEMA Super Premium Efficiency. NEMA MG-1, Table 12-12 specifies the full-load efficiencies for electric motors to achieve NEMA Premium Efficiency.[29]

As part of the 2024 preconsultation for Amendment 19 to Canada's Energy Efficiency Regulations, NRCan proposed aligning with the U.S. DOE's 2023 finalized efficiency and test standards for standard scope (0.75–559 kW) electric motors, for products manufactured on or after June 1, 2027.[30] The U.S. DOE Direct Final Rule sets MEPS of IE3 (NEMA Premium Efficiency) for some categories of electric motors and IE4 (NEMA Super Premium Efficiency) for others (see Table 2).

Table 2. U.S. DOE-finalized electric motor MEPS for June 1, 2027, compliance that NRCan has proposed aligning with

Category	Size	Efficiency Level
Medium electric motors, NEMA design A & B	0.75–75 kW (1–100 hp)	NEMA premium efficiency level (IE3)
	75–186 kW (100–250 hp)	NEMA super premium efficiency level (IE4)
	186–373 kW (250–500 hp)	NEMA premium efficiency level (IE3)
	374–559 kW (501–750 hp)	NEMA premium efficiency level (IE3)
Air over medium electric motors (standard frame size)	0.75–75 kW (1–100 hp)	NEMA premium efficiency level (IE3)
	75–186 kW (100–250 hp)	NEMA super premium efficiency level (IE4)

[28] Natural Resources Canada, "Electric Motors (1 to 500 HP/0.746 to 375 kW)."
[29] National Electrical Manufacturers Association, *Table 12-12 Full-Load Efficiencies for 60 Hz Premium Efficiency Polyphase Electric Motors Rated 600 Volts or Less.*
[30] Natural Resources Canada, "Electric Motors - Technical Bulletin on Amending the Standards."

Several jurisdictions — namely the EU and China — have introduced more stringent MEPS that may serve as models for improved Canadian MEPS.

In July 2023, the EU became the first jurisdiction to set a MEPS of IE4 for electric motors between 75 and 200 kW.[31] The same regulation sets a MEPS of IE2 for variable speed drives. These regulations have been estimated to save the EU 106 TWh of electricity annually by 2030, equivalent to the electricity use of the Netherlands.

On Oct. 1, 2025, China's Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades for Permanent Magnet Synchronous Motors (GB 30253-2024) policy came into effect, raising the MEPS for these electric motors from IE2 to IE4.[32] Additionally, China introduced a new IE5+ efficiency grade, the highest globally, to encourage further innovation in electric motor efficiency.

Mepsy model: Electric motors

CLASP's Mepsy appliance and equipment climate impact calculator was used to estimate the energy, cost, and emissions savings that could be achieved from Canada adopting higher MEPS for electric motors 0.75 kW or larger. Two scenarios were modelled: one less ambitious scenario, aligning with IE4 efficiency levels, and one more ambitious scenario, aligning with IE5 efficiency levels. Both scenarios represent an improvement from the baseline IE3 efficiency level but exclude motor system improvements such as the installation of variable-speed drives and other system efficiency improvements that may achieve significantly higher energy savings.[33] See the Modelling methodology and assumptions annex for additional information. Where inputs are omitted, Mepsy default values were used.[34]

Results

At current (2025 CAD) electric motor and electricity prices, businesses could save $234 over the lifespan of an electric motor by purchasing an IE4 efficient model rather than a baseline efficient (IE3) motor and $251 by purchasing an IE5 efficient representative

[31] EU Ecodesign, "Electric Motors and Variable Speed Drives."
[32] CLASP, "China Adopts New Mandatory Efficiency Policy for Permanent Magnet Motors."
[33] CLASP, "Mepsy."
[34] Jiayi Zhang, *Mepsy Methodology;* CLASP, "Technical Appendix: Electric Motors."

motor (see Table 3). This would result in a payback period of five years under Policy Scenario 1 (IE4) or seven years under Policy Scenario 2 (IE5).

Table 3. Lifecycle cost savings and payback time for a representative electric motor

Per motor impact	Business as usual	Policy Scenario 1 (IE4)	Policy Scenario 2 (IE5)
Lifecycle cost savings (2025 CAD)	–	234	251
Payback time (years)	–	5	7

The cumulative energy savings to 2050 from Canada adopting IE4 or IE5 efficiency MEPS in 2028 for electric motors 0.75 kW and larger would be 42.39 TWh under Policy Scenario 1 (IE4) (see Figure 1), almost as much electricity as Bruce Power (Canada's largest nuclear power operator) generated in 2024,[35] and would produce an estimated $3.2 billion (2025 CAD) energy cost savings. Under Policy Scenario 2 (IE5) cumulative energy savings would be 70.39 TWh, just less than electricity generation in British Columbia in 2021,[36] and would result in $5.3 billion of cumulative energy cost savings.

[35] 45.99 TWh: Bruce Power, "The Future Is Nuclear: 2024 Bruce Power Annual Review," 20.
[36] 71.7 TWh: Canada Energy Regulator, "British Columbia Energy Profile — Electricity."

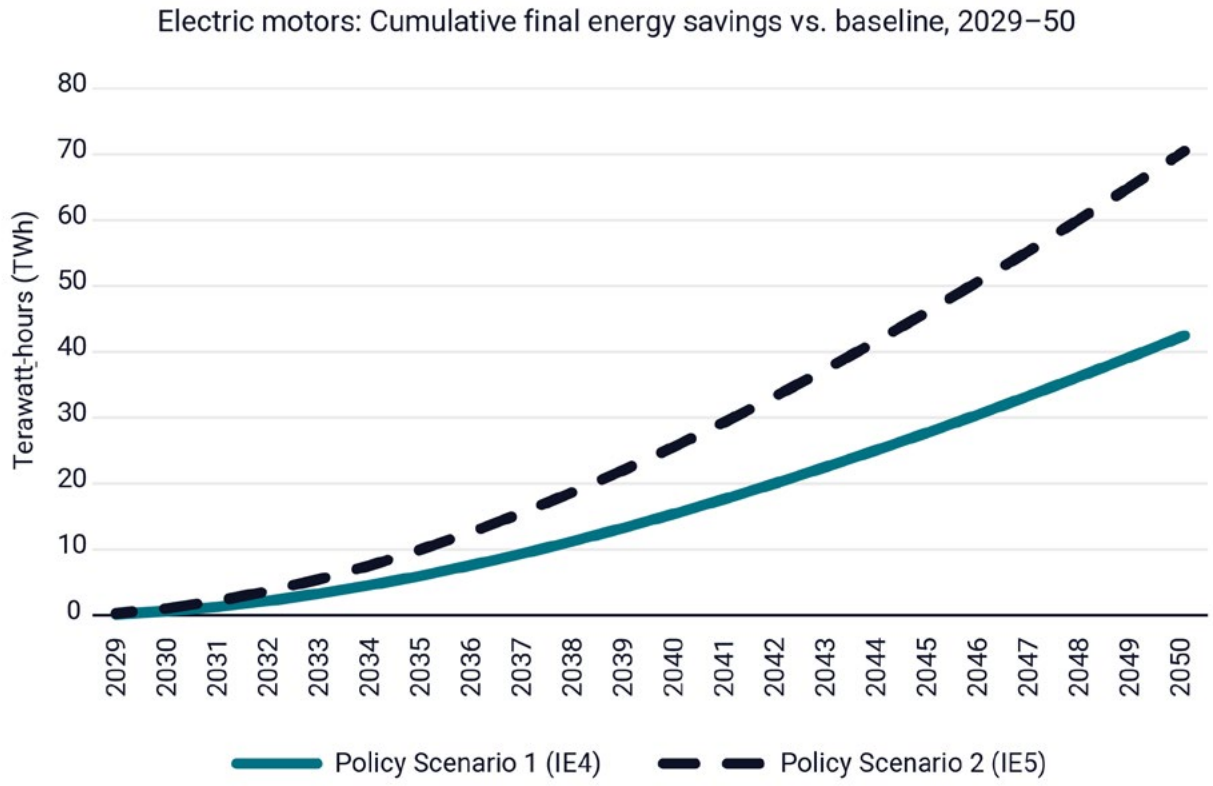

Figure 1. Modelled cumulative final energy savings from 2029 to 2050 if Canada adopted MEPS equivalent to IE4 or IE5 efficiency in 2028 for electric motors 0.75 kW or larger vs. electric motor MEPS remaining at IE3

Implementing an electric motor MEPS equivalent to IE4 or IE5 would result in an estimated cumulative GHG savings of 1,633 kt CO_{2e} under Policy Scenario 1 (IE4) or 2,712 kt CO_{2e} under Policy Scenario 2 (IE5) (see Figure 2). Modelled GHG emissions savings level off over time due to the Clean Electricity Regulations that were finalized December 2024, which, beginning in 2035, will set limits on emissions from electricity generation toward a net-zero grid by 2050.[37]

[37] Environment and Climate Change Canada, "Canada Gazette, Part 2, Volume 158, Number 26"; Environment and Climate Change Canada, "Canada's Clean Electricity Future."

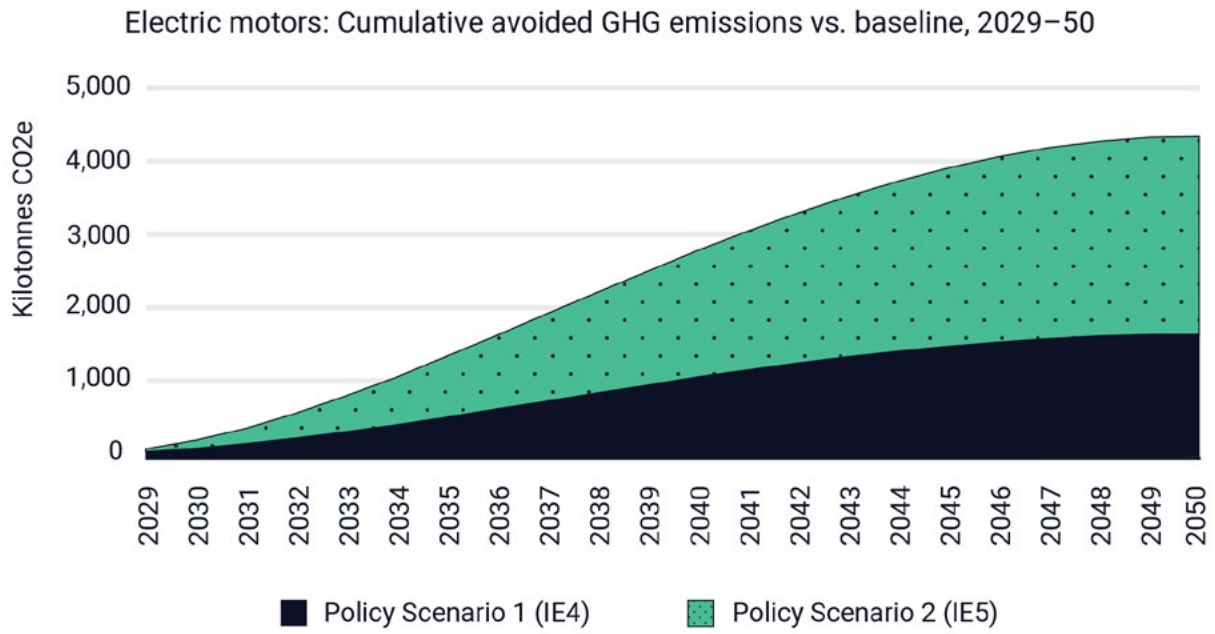

Figure 2. Modelled cumulative avoided GHG emissions from 2029 to 2050 if Canada adopted MEPS of Policy Scenario 1 (IE4) or Policy Scenario 2 (IE5) in 2028 for electric motors 0.75 kW or larger

Recommendations

Given the cost effectiveness and substantial energy and GHG reduction potential of stronger electric motor MEPS, NRCan should align with the U.S. DOE's finalized electric motor MEPS as part of Amendment 19 to the Energy Efficiency Regulations. Additionally, NRCan should establish dates when MEPS for all electric motors 0.75 kW or larger would ramp up to IE4 — aligning with the EU — and then further to IE5 efficiency levels. While an IE5 MEPS is already cost effective for the representative motor, IE5 motors are not yet widely available for all applications.[38] By setting staggered dates for increasingly strengthened MEPS through the Energy Efficiency Regulations, NRCan could provide industry with greater foresight, ensuring sufficient IE5 motors would be on the market before the enforcement date.

Ambitious electric motor MEPS complement incentive programs, such as NRCan's Green Industrial Facilities and Manufacturing Program or provincial energy efficiency

[38] Hayes, "Motoring into the IE5 Era for Energy Efficiency."

programs,[39] encouraging replacement of inefficient, beyond-service-life motors that may not otherwise be impacted by the implementation of ambitious MEPS. This dual-faceted approach could contribute significantly to Canada's commitments to double energy efficiency improvements by 2030 and to reach net-zero emissions by 2050.

Lighting

Although each light bulb uses relatively little electricity, their cumulative impact is significant. The average Canadian home has 25 light bulbs, and lighting accounts for 13.5 per cent of commercial and institutional energy use.[40] According to NRCan, the lighting in an average home can consume more than a dishwasher, refrigerator and clothes washer combined.[41]

There have been impressive advances in lighting efficiency for both residential and commercial settings in recent years. In the residential sector, traditional incandescents were replaced with more efficient (but mercury-containing) compact fluorescent lamps (CFLs), then increasingly by even more efficient light-emitting diodes (LEDs). For commercial applications, less efficient (and mercury-containing) linear general service fluorescent lamps (GSFLs) are being replaced by more efficient tubular LEDs (TLEDs).

In May 2024, Environment and Climate Change Canada released the finalized Regulations Amending the Products Containing Mercury Regulations, which mandates the phase-out of both the manufacture and import of mercury lighting starting Dec. 31, 2025.[42] This is expected to accelerate the country's transition to highly efficient LED technologies.

General service lamps

General service lamps (GSLs) are the most common type of household light bulb. As part of Amendment 18 to the Energy Efficiency Regulations, NRCan aligned with the U.S.

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[39] Natural Resources Canada, "Green Industrial Facilities and Manufacturing Program"; NB Power, "Industrial Energy Efficiency Program"; Save on Energy, "Retrofit Program Measures and Incentives."
[40] Statistics Canada, "Households and the Environment"; Natural Resources Canada, "Lighting - Buy ENERGY STAR® Certified Lighting to Save You Money!"
[41] Natural Resources Canada, "ENERGY STAR: Lighting - Infographic."
[42] Environment and Climate Change Canada, "Canada Gazette, Part 2, Volume 158, Number 13."

DOE's 45 lumens/watt (lm/W) MEPS for GSLs that have been in place in the U.S. since 2022, with a Jan. 1, 2026, compliance date.[43] Ontario, British Columbia and Quebec already set GSL MEPS of 45 lm/W, though with a more limited scope, several years prior.[44]

Amendment 18 effectively phases out inefficient halogen lamps by setting MEPS higher than can be achieved with that technology.[45] This amendment also expanded the scope of lamp types included in the GSL category, including general service incandescent lamps, modified spectrum incandescent lamps, CFLs, and general service incandescent reflector lamps.[46]

In 2024, the U.S. DOE finalized substantially higher MEPS for GSLs, ranging from 83.3 to 195.4 lm/W, with a July 25, 2028, compliance date.[47] According to CLASP's *World's Best MEPS* report, the U.S. DOE's finalized MEPS are at world-leading levels.[48]

General service lamps modelling

Aligning with the U.S. DOE's finalized MEPS for GSLs would result in $7.63–$49.05 of total cost savings over the lifetime of each lamp (2025 CAD), a 22.9–53.1 per cent savings (see Table 4). The lowest savings percentage-wise, large diameter directional PAR30 E26 (700–999 lm) was largely due to the relatively higher current purchase price, $21.78, for a model that is at least 92 lm/W efficient. The highest savings percentage-wise, omnidirectional A-shape or spiral E26 (750–1,049 lm) was predominantly due to the MEPS increasing 180 per cent for the U.S. DOE alignment scenario and the relatively low current purchase price of $7.89 for a compliant lamp.

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[43] Natural Resources Canada, "Canada Gazette, Part 2, Volume 159, Number 8"; Energy Conservation Program: Energy Conservation Standards for General Service Lamps: Final Rule.
[44] Natural Resources Canada, "Energy-Using Products Regulated Federally and Provincially*."
[45] Energy Efficiency Branch, B.C. Ministry of Energy & Mines, "General Service Lighting - Regulatory Proposal."
[46] Natural Resources Canada, "General Service Lamps - Technical Bulletin on Developing the Standards."
[47] U.S Department of Energy, *Energy Conservation Program: Energy Conservation Standards for General Service Lamps.*
[48] "World's Best MEPS."

Table 4. Total lifecycle costs and savings from Canada aligning with the U.S. DOE on GSL MEPS vs. the baseline of maintaining GSL MEPS at 45 lm/W per lamp

	Total life cycle costs (per lamp)			
Lamp category	Baseline scenario (2025 CAD)	U.S. DOE alignment scenario (2025 CAD)	Lifecycle total cost savings per bulb (2025 CAD)	Lifecycle total cost savings per lamp (%)
Omnidirectional A-shape or spiral E26 310–749 lm	27.67	16.02	11.65	42.1
Omnidirectional A-shape or spiral E26 750–1,049 lm	64.01	30.04	33.98	53.1
Omnidirectional A-shape or spiral E26 1,050–1,489 lm	40.08	24.20	15.88	39.6
Omnidirectional A-shape or spiral E26 1,490–1,999 lm	58.55	34.28	24.27	41.4
Decorative candle shapes (B/BA/C/CA) E12 310–499 lm	22.22	14.59	7.63	34.3
Decorative G-shape E26 310–499 lm	23.52	15.74	7.78	33.1
Large diameter directional PAR30 E26 700–999 lm	44.84	34.56	10.28	22.9
Large diameter directional PAR38 E26 1,000–1,299 lm	109.87	60.82	49.05	44.6
Small diameter directional PAR20 E26 400–599 lm	39.59	26.65	12.94	32.7

Cumulatively, aligning with the U.S. DOE's MEPS for GSLs would result in an estimated 1,919 Gigawatt-hours (GWh) of residential energy savings from 2029 to 2050 and 1,066

GWh of commercial energy savings (see Figure 3), for a total of 2,985 GWh of energy savings to 2050 from the regulation.

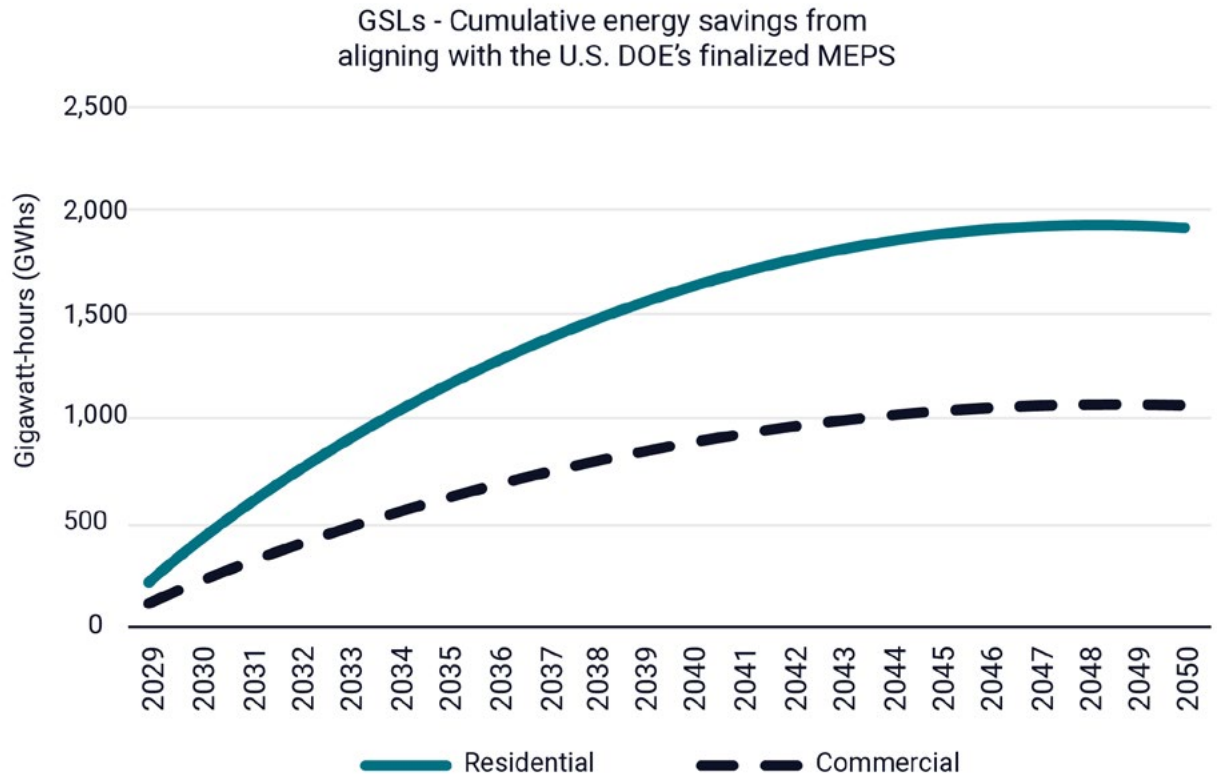

Figure 3. Cumulative residential and commercial energy savings from 2029 to 2050 from aligning with the U.S. DOE's GSL MEPS in 2028

Cumulatively, the regulation would produce an estimated $212.6 million (2025 CAD) in energy cost savings for the residential sector and $170.8 million for the commercial sector (see Figure 4) for a total of $383.4 million from 2029 to 2050.

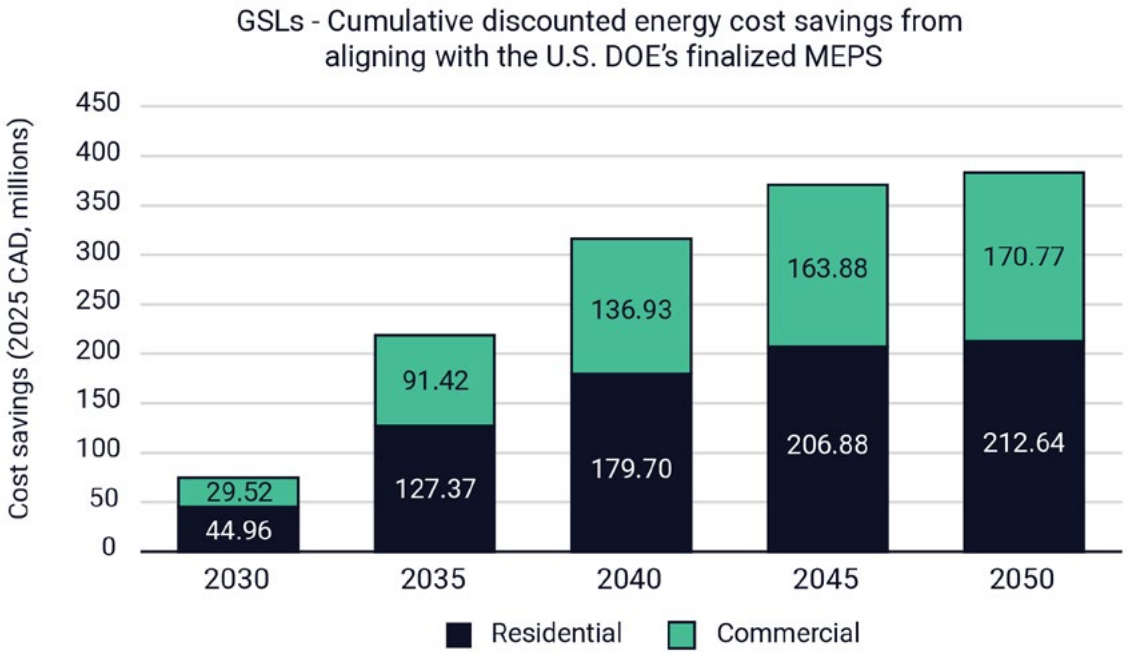

Figure 4. Cumulative energy cost savings to 2050 from Canada aligning with the U.S. DOE's GSL MEPS in 2028

Cumulatively, from 2029 to 2050, aligning with the U.S. DOE's GSL MEPS would avoid an estimated 138.6 kt CO_{2e} of GHG emissions for the residential sector and 75.7 kt CO_{2e} of GHG emissions for the commercial sector, for a total of 214.3 kt CO_{2e} of avoided GHG emissions (see Figure 5).

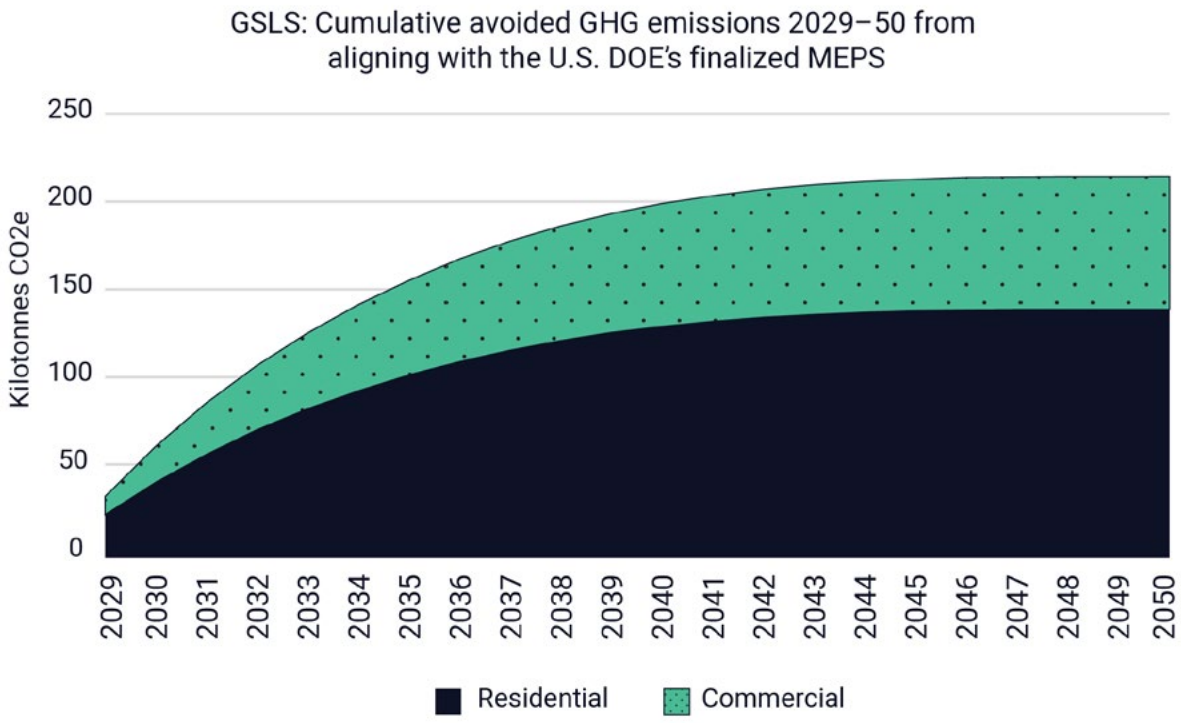

Figure 5. Cumulative residential and commercial sector emissions savings from 2029 to 2050 from aligning with the U.S. DOE's GSL MEPS in 2028

Linear/tubular lamps

In 2018, through Amendment 14, Canada aligned with the U.S. MEPS for GSFLs, ranging from 76.9 to 97.0 lm/W, depending on the lamp type and correlated colour temperature.[49] The regulations exclude linear fluorescent lamps with certain applications/characteristics, such as coloured or ultraviolet (UV) lamps or those designed to promote plant growth.

The U.S. Energy Policy and Conservation Act (EPCA) requires "that not later than 6 years after issuance of any final rule establishing or amending a standard, DOE must publish either a notification of determination that standards for the product do not need to be amended, or a notice of proposed rulemaking (NOPR) including new proposed energy conservation standards."[50] As a result, in May 2020, the U.S. DOE released a Request for

[49] Natural Resources Canada, "General Service Fluorescent Lamps - Energy Efficiency Regulations"; Natural Resources Canada, "Canada Gazette, Part 2, Volume 152, Number 22".
[50] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for General Service Fluorescent Lamps; Final Determination."

Information concerning energy conservation standards for GSFLs.[51]

In February 2023, the U.S. DOE issued a final determination not to amend the GSFLs, as its analysis did not find sufficient energy or cost savings. The U.S. DOE estimated that setting GSFL MEPS at "max-tech," the design option that includes all of the best available technologies on the market, would result in about one per cent energy savings. Additionally, the $200 million (2021 USD) of cumulative net present value of consumer benefits from 2026 to 2055 that were predicted were primarily attributed to the accelerated transition to LEDs that the regulations would encourage rather than lower energy consumption by GSFLs.

GSFLs are considered a mature technology with little opportunity for efficiency gains compared to TLEDs, a direct substitute for GSFLs that can achieve higher efficiencies and without the risks associated with mercury.[52] As a result, the U.S. DOE's finalized standards for GSLs also included MEPS for long (≥ 45 inches) GSLs, like TLEDs, ranging from 96 to 195.4 lm/W, depending on the lamp type.[53]

Recommendations

As Canada and the U.S. are currently aligned on GSL efficiency standards, NRCan could use a Ministerial Amendment to maintain alignment with the U.S. DOE's finalized standards without the typical two-year consultation process. Adopting the finalized GSL MEPS for July 25, 2028, compliance would be cost effective for consumers given the compliant models that are already on the market. However, because some decorative styles have few compliant models currently on the market, NRCan should announce the intent to align expeditiously to ensure manufacturers have adequate time to adjust production for the Canadian market. For the current 45 lm/W GSL MEPS, Canada aligned with the U.S. four years after it adopted the standard, resulting in costly and wasteful additional electricity consumption and GHG emissions compared to if Canada had aligned from the start. Waiting to align also opens up the possibility of dumping less efficient GSLs onto the Canadian market that can no longer be sold in the U.S.

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[51] U.S. Department of Energy, "Energy Conservation Program."
[52] Energy Efficiency & Renewable Energy - Building Technologies Program, "Solid-State Lighting Technology Fact Sheet."
[53] U.S Department of Energy, *Energy Conservation Program: Energy Conservation Standards for General Service Lamps.*

CLASP's *World's Best MEPS* report recommends a technology-neutral MEPS of at least 120 lm/W for GSLs.[54] NRCan and the U.S. DOE should set a compliance date of 2030, to increase the efficiency standards of the four GSL categories with MEPS lower than 120 lm/W in the U.S. DOE-finalized standards to this global benchmark.

GSFLs are being phased out in Canada by 2028 under the Regulations Amending the Products Containing Mercury Regulations[55] and TLEDs are a direct substitute for GSFLs. As part of the next amendment to Canada's Energy Efficiency Regulations, NRCan should sunset the GSFL category and include GSFLs in the GSL category in recognition that TLEDs are a more efficient, direct substitute for GSFLs. The GSFL category, by definition, only includes fluorescent lighting that will be obsolete in Canada by 2028, and given the two-year cycle of amendments to the Energy Efficiency Regulations, NRCan should introduce a technology-neutral linear lighting category in Amendment 20 that recognizes the efficiency gains of TLEDs.

Major home appliances

Introduction

Updated MEPS for major home appliances (dishwashers, refrigerator-freezers, electric and gas cooking appliances, and clothes washers and dryers) are long overdue in Canada. Most have not been updated since at least 2015, with the MEPS for gas ranges, for example, not updated since it was set in 1995.[56]

The need to strengthen major home appliance efficiency was recognized in the 2019 mandate letter to the then-Minister of Natural Resources that listed making "Energy Star certification mandatory for all new home appliances starting in 2022" a top priority.[57] As a result, in the 2021 pre-consultation for Amendment 17 to the Energy Efficiency Regulations, NRCan proposed MEPS for dishwashers, refrigerator-freezers, clothes washers, and clothes dryers aligned with December 2019 ENERGY STAR®

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[54] "World's Best MEPS."
[55] Environment and Climate Change Canada, "Canada Gazette, Part 2, Volume 158, Number 13."
[56] Natural Resources Canada, "Guide to Canada's Energy Efficiency Regulations"; Natural Resources Canada, "Gas Ranges - Energy Efficiency Regulations."
[57] Rt. Hon. Justin Trudeau, "ARCHIVED - Minister of Natural Resources Mandate Letter."

efficiency standards.[58] However, the Association of Home Appliance Manufacturers (AHAM) Canada critiqued the proposal, arguing that Canada should delay strengthening standards to harmonize with the U.S. DOE standards that were in development.[59] Subsequently, major home appliances were removed from Amendment 17.[60] Then, in 2022, NRCan included major home appliances in the 2022 pre-consultation for Amendment 18 and once again delayed in anticipation of finalized U.S. DOE standards.[61]

In September 2023, U.S. efficiency advocates, led by the Appliance Standards Awareness Project (ASAP), collaborated with the U.S. AHAM to produce a consensus set of recommended standards for major home appliances to the U.S. DOE.[62] As a result, the U.S. DOE finalized strengthened MEPS for major home appliances with compliance dates ranging from 2027 for dishwashers to 2030 for certain product classes of refrigerator/freezers.[63]

NRCan's 2024-2026 Forward Regulatory Plan announced that Ministerial Amendments would be used to harmonize Canadian MEPS with those finalized by the U.S. DOE for refrigerators/freezers, dishwashers, and clothes washers and dryers, with the same compliance dates.[64] As part of the pre-consultation to Amendment 19, the proposed introduction of a MEPS for gas clothes dryers was released June 2024, and proposed updates to the MEPS for electric and gas ranges (cooking products) were released November 2024.[65]

However, in May 2025, the U.S. DOE proposed rolling back 47 regulations, including "rescinding the amended design requirements" for both conventional cooking tops and ovens and rescinding the amended energy and/or water efficiency standards for

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[58] Amendment 17 Pre-Consultation webinar slides received by email from NRCan: Natural Resources Canada, "Amendment 17 - Energy Efficiency Regulations."
[59] Brett Bundale, "Higher Energy Efficiency Rules for Appliances Could Raise Costs, Industry Group Says."
[60] Natural Resources Canada, "Canada Gazette, Part 2, Volume 156, Number 26."
[61] Natural Resources Canada, "ARCHIVED: Pre-Consultations for Next Amendments - Energy Efficiency Regulations."
[62] Kelly Mariotti and Andrew deLaski, "AHAM/ASAP Multi-Product Agreement Letter to the U.S. DOE."
[63] U.S. Department of Energy, "2024-04-24 Energy Conservation Program: Energy Conservation Standards for Dishwashers; Direct Final Rule"; U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Direct Final Rule."
[64] Natural Resources Canada, "Amendments to the Energy Efficiency Regulations, 2016."
[65] Natural Resources Canada, "Pre-Consultations for Next Amendments - Energy Efficiency Regulations."

residential and commercial clothes washers and residential dishwashers.[66] The U.S. EPCA has an "anti-backsliding" clause that prohibits the U.S. DOE from amending energy conservation standards to either "(1) increase the maximum allowable energy or water use or (2) decrease the minimum required energy efficiency of a covered product."[67] Due to the anti-backsliding clause, it is still possible that enforcement of these finalized standards will begin from 2027. American appliance and equipment manufacturers and industry groups, including AHAM, also broadly oppose the proposed rollback.[68] However, the uncertainty around it has resulted in major home appliances no longer being an ideal candidate for harmonization with the U.S. through a Ministerial Amendment.[69] Therefore, NRCan's 2025-2027 Forward Regulatory Plan has added the major home appliances that were slated for Ministerial Amendments to the Amendment 19 consultation, scheduled to begin Spring 2026.[70]

Scope

The following sections will build on the March 2024 *Advancing Canadian Appliance and Equipment Standards* report,[71] making the case that with Amendment 19 to Canada's Energy Efficiency Regulations, NRCan should still adopt the MEPS for major home appliances that the U.S. DOE finalized between 2023 and 2024 with the same 2027–30 compliance timelines.

Dishwashers

Canada's current MEPS and water efficiency standards for dishwashers have been in effect since May 30, 2013 (see Table 5).[72] Different jurisdictions' test methods use different assumptions, including for wash cycles per year and standby power. Therefore, Table 5 has the dishwasher MEPS normalized to the 215 loads that the current Canadian

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[66] U.S. Department of Energy, "Energy Department Slashes 47 Burdensome and Costly Regulations, Delivering First Milestone in America's Biggest Deregulatory Effort."
[67] U.S. Department of Energy, "Appliance Standards Program and Test Procedures - Small Entity General Compliance Guide."
[68] deLaski, "Manufacturers Warn Trump's Proposed Energy Efficiency Rollbacks Would Strand Investments, Advantage Foreign Factories."
[69] Communicated by email: NRCan Office of Energy Efficiency, Sept. 17, 2025.
[70] Natural Resources Canada, "Forward Regulatory Plan."
[71] Riddell, *Advancing Canadian Appliance and Equipment Standards*, https://www.efficiencycanada.org/wp-content/uploads/2024/03/Advancing-Canadian-Appliance-and-Equipment-Standards-final.pdf.
[72] Natural Resources Canada, "Dishwashers - Energy Efficiency Regulations."

and ENERGY STAR specifications include, as well as the EU Ecodesign MEPS assuming 215 loads per year, for comparison. Ecodesign does not dictate maximum water consumption for dishwashers, but water consumption per cycle must be displayed on the label.

Table 5. Current and finalized dishwasher energy and water efficiency standards, normalized to 215 wash cycles per year*

	Standard (≥8 place settings plus 6 serving pieces)		Compact (<8 place settings plus 6 serving pieces)		
Regulator	**Maximum energy consumption (kWh/yr)**	**Maximum water consumption (litres/cycle)**	**Maximum energy consumption (kWh/yr)**	**Maximum water consumption (litres/cycle)**	**Compliance date(s)**
Canada - current	307	18.93	222	13.25	May 30, 2013
U.S. DOE - finalized[73]	260	12.5 (3.3 gallons)	203	11.73 (3.1 gallons)	April 23, 2027
ENERGY STAR (v. 6.0)[74]	270	13.25 (3.5 gallons)	203	11.73 (3.1 gallons)	Jan. 29, 2016 – July 18, 2023
ENERGY STAR (v. 7.0)[75]	240	12.11 (3.2 gallons)	155	7.56 (2.0 gallons)	July 19, 2023
ENERGY STAR 2025 Most Efficient[76]	225	12.11 (3.2 gallons)	N/A	N/A	Jan. 1 – Dec. 31, 2025
EU Ecodesign[77]	197–221	N/A	207	N/A	Compact: March 1, 2021; Standard: March 1, 2024

* Normalized values are underlined

[73] U.S. Department of Energy, "2024-04-24 Energy Conservation Program: Energy Conservation Standards for Dishwashers; Direct Final Rule."
[74] ENERGY STAR, "Residential Dishwasher Specification Version 6.0."
[75] ENERGY STAR, "Final Version 7.0 ENERGY STAR Residential Dishwasher Specification."
[76] ENERGY STAR, "Most Efficient 2025 - Recognition Criteria for Residential Dishwashers."
[77] Commission Regulation (EU) 2019/2022 of 1 October 2019 Laying down Ecodesign Requirements for Household Dishwashers Pursuant to Directive 2009/125/EC of the European Parliament and of the Council Amending Commission Regulation (EC) No 1275/2008 and Repealing Commission Regulation (EU) No 1016/2010.

Since Canada's MEPS were set in 2013, there have been significant advancements in dishwasher efficiency due to the introduction of technologies like soil sensors, multiple spray arms, tub insulation and improved control strategies.[78] In 2021, 92.8 per cent of dishwashers shipped in Canada were ENERGY STAR (Version 6.0) certified,[79] indicating that dishwashers on the North American market had become so efficient that virtually all were ENERGY STAR certified. As a result, the ENERGY STAR standard for dishwashers was strengthened in 2023, increasing the energy and water efficiency standards by 11 and eight per cent, respectively, for standard-size models and by 24 and 35 per cent, respectively, for compact-size models.

Each year, ENERGY STAR publishes a recognition criteria for its "Most Efficient" label for 14 categories of energy-using products, including dishwashers.[80] The 2025 Most Efficient standard requires a standard-size dishwasher to consume 27 per cent less energy than Canada's current MEPS.

The EU's Ecodesign requirements for compact-size dishwashers have been in effect since 2021 and are very similar to the U.S. DOE's finalized standard (207 compared to 204 kWh per year).

The EU Ecodesign requirements for standard-size dishwashers finalized in 2019 set an interim MEPS for 2021 and a higher MEPS for 2024 — a world-leading standard that is even more efficient than the ENERGY STAR 2025 Most Efficient Criteria (197–221 kWh per year, depending on the number of settings and type of standby/network connectivity, vs. 225 kWh per year). Announcing the next two MEPS increases with the same regulation provides at least two benefits of ensuring continued efficiency improvements, while providing manufacturers the opportunity to plan long-term and retool once to the most efficient standard, knowing that it is coming, rather than not having that foresight and potentially having to retool production twice to meet each MEPS increase.

Analysis for Amendment 19

There are currently 947 standard-size dishwasher models and 70 models of compact

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[78] U.S. Department of Energy, "Technical Support Document: Energy Efficiency Program for Consumer Products and Commercial and Industrial Equipment: Dishwashers April 2024."
[79] Natural Resources Canada, "Table 1 – ENERGY STAR Certified Appliances as a Percentage of Total Shipments in Canada, 2000–2021 (%)."
[80] ENERGY STAR, "ENERGY STAR Most Efficient 2025 Criteria."

dishwashers on the Canadian market.[81] Of those, 68 per cent of standard-size (646 models) and 91 per cent of compact-size models (64 models) already comply with the U.S. DOE-finalized MEPS for standard-size dishwashers.

Of those 710 dishwasher models on the Canadian market that would already comply with the U.S. DOE-finalized standards, 579 (81.5 per cent) already comply with the stronger ENERGY STAR (Version 7.0) criteria and 71 models (10 per cent) even meet the most stringent requirements for ENERGY STAR Most Efficient 2025 certification.[82] This indicates that Canada could further strengthen its MEPS for dishwashers beyond the U.S. DOE-finalized standard without a significant reduction in the models available to Canadians.

Recommendations

Due to the high market saturation of efficient residential dishwashers in Canada, there is no reason to delay strengthening MEPS. NRCan should continue to harmonize with the U.S. DOE's finalized MEPS for dishwashers and its April 2027 compliance date, regardless of whether the U.S. backtracks. Given that these standards are only marginally more stringent than the ENERGY STAR Version 6.0 criteria the 2019 mandate letter stated as a high priority, this is long overdue.

NRCan should also consider taking the Ecodesign approach of announcing what the next few strengthened MEPS will be within a single regulation to offer greater certainty for manufacturers and importers and to ensure continued progress. This could include aligning with the Ecodesign requirements for dishwashers in 2030, for example.

Cooking products

NRCan proposed aligning with the U.S. DOE-finalized standards for cooking products, including electric and gas cooktops, ovens and ranges (combined ovens and cooktops) as part of the pre-consultation to Amendment 19 of the Energy Efficiency Regulations.[83]

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[81] Natural Resources Canada, "Dishwashers - Searchable Product List."
[82] As of Nov. 13, 2025: ENERGY STAR, "Product Finder — ENERGY STAR Certified Dishwashers."
[83] Natural Resources Canada, "Electric and Gas Ranges (Cooking Products) - Technical Bulletin on Amending the Standards."

Electric cooking products

The electric ranges category of Canada's Energy Efficiency Regulations includes electric ovens, cooktops, and ranges, excluding 120 V portable ranges and microwave ovens.[84] To avoid ambiguity, the broader category will be referred to as electric cooking products throughout this section. The current MEPS apply to all regulated products manufactured on or after Aug. 1, 2003 (see Table 6).

The U.S. DOE finalized updated efficiency standards for electric cooking products in 2024 with a Jan. 31, 2028, compliance date.[85] The U.S. DOE-finalized standard includes a MEPS for smooth electric cooktops and a prescriptive design requirement for electric ovens, requiring them to have a more efficient switched-mode power supply (SMPS) rather than a linear power supply control system (LPS).[86] Because the U.S. DOE-finalized standards for electric cooking products do not include a MEPS for electric coil cooktops, NRCan has proposed eliminating the Canadian standard in order to align.[87]

[84] Natural Resources Canada, "Electric Ranges - Energy Efficiency Regulations."
[85] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Consumer Conventional Cooking Products; Direct Final Rule."
[86] SMPS can achieve 85–90 per cent efficiency, whereas LPS achieve 30–60 per cent efficiency. SMPS are also smaller, lighter and, due to the higher efficiency, produce less waste heat: Sattel, "Linear Regulated vs. Switch Mode Power Supply."
[87] Natural Resources Canada, "Electric and Gas Ranges (Cooking Products) - Technical Bulletin on Amending the Standards."

Table 6. Current and finalized electric cooking appliance energy efficiency standards, in kWh/year

	Cooktops				
Regulator	**Smooth element**	**Open element (coil)**	**Ovens**	**Ranges**	**Compliance date**
Canada - current	258	258	2.0V + 200	2.0V + 458	Aug. 1, 2003
U.S. DOE-finalized / Canada - proposed	207	N/A	SMPS required	207 for cooktop portion + SMPS for oven	Jan. 31, 2028
ENERGY STAR (v. 1.0)[88]	195	195	N/A	195 for cooktop portion, $E_{TLP,O} \leq 7$ for oven portion	Sept. 25, 2023
EU Ecodesign	$EC_{electric\ hob} < 195$	$EC_{electric\ hob} < 195$	$EEI_{cavity} < 96$	$EC_{electric\ hob} < 195$, $EEI_{cavity} < 96$	January 2019

The EU Ecodesign requirements for ovens and stoves cannot be directly compared to Canadian or U.S. MEPS. The EU employs an energy efficiency index (EEI) for stoves, a ratio of the amount of energy used by the model to heat a standardized load compared to Standard Energy Consumption based on a product's volume (L). Nonetheless, the EU has or is planning to incorporate several unique features into its regulatory framework for cooking appliances. For example, as part of the EU's Ecodesign directive, the European Commission is currently drafting new regulations for cooking appliances, with a planned adoption timeline of the third quarter of 2026.[89] As proposed, the updated Ecodesign regulations would account for the many different cooking modes that modern ovens have, in contrast to the current test method, which tests only at the most efficient mode. This test method revision is intended to more closely reflect typical household use, making it a more accurate signifier of a product's true efficiency level. Additionally, as part of this update, the European Commission is also proposing

[88] ENERGY STAR, "Program Requirements - Product Specification for Residential Electric Cooking Products: Eligibility Criteria Version 1.0."
[89] European Commission, "Cooking Appliances - Call for Evidence."

broadening the scope of the regulations to cover "ovens with microwave functions, steam functions, small and portable ovens."[90] Lastly, the 2014 Ecodesign requirement for domestic ovens, hobs and range hoods includes a schedule of improved MEPS for each appliance from one year, two years, and five years after the regulation enters into force,[91] offering regulatory certainty for manufacturers while ensuring MEPS continue to be strengthened in a timely fashion.

Analysis for Amendment 19

The U.S. DOE's impact assessment for the finalized standards projected that by the first year of compliance, 77 per cent of electric smooth element cooking tops and 95 per cent of electric ovens will already meet or exceed the standards.[92] Canada and the U.S. have a highly harmonized major appliance market, so this percentage is likely to be very similar in Canada.

The U.S. DOE's lifecycle cost analysis of the finalized standards estimated a simple payback period of only 0.6 years (seven months) for smooth electric cooktops and 2.1 years for electric ovens,[93] compared to the 15–20 year lifespan of cooking products.[94]

Gas cooking products

There is currently no Canadian MEPS for gas cooking products, including cooktops, ovens, and ranges. Instead, Canada has a prescriptive requirement that they "must not have a continuously burning pilot light," which has been unchanged since the first Energy Efficiency Regulation in 1995 (see Table 7).[95] Gas cooking products are regulated as "gas ranges" and include natural gas or propane cooking appliances that have an electrical power source.

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[90] European Commission, "Cooking Appliances - Call for Evidence," 3.
[91] Commission Regulation (EU) No 66/2014 of 14 January 2014 Implementing Directive 2009/125/EC of the European Parliament and of the Council with Regard to Ecodesign Requirements for Domestic Ovens, Hobs and Range Hoods.
[92] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Consumer Conventional Cooking Products; Direct Final Rule."
[93] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Consumer Conventional Cooking Products; Direct Final Rule," 12.
[94] Henriksen-Willis, "When Is the Right Time to Replace My Home Appliances?"
[95] Natural Resources Canada, "Gas Ranges - Energy Efficiency Regulations."

Table 7. Efficiency standards for gas cooking appliances

Authority	Cooktops	Ovens	Ranges	Compliance date
Canada - current	No continuously burning pilot light			Feb. 3, 1995
U.S. DOE-finalized/ Canada - proposed	1,770 kBTu/year	SMPS required	SMPS required + 1,770 kBTu/ year for cooktop component	Jan. 31, 2028
ENERGY STAR	N/A			

In February 2024, the U.S. DOE issued a Direct Final Rule setting a MEPS of 1,770 kBTu per year for gas cooktops and requiring an SMPS for gas ovens.[96]

In 2014, the draft EU Ecodesign regulation for gas cooking appliances also includes limits on indoor air pollution (NOx),[97] as health benefits are another important consideration for gas cooking appliance regulations.

Analysis for Amendment 19

The impact assessment that accompanied the finalized standards projected that by the first year of compliance, 97 per cent of gas cooktops and 96 per cent of gas ovens shipped in the U.S. would already meet the standard.[98] Given the highly harmonized major home appliance Canadian and U.S. major home appliance markets, this illustrates that Canada could very feasibly adopt the U.S. DOE-finalized MEPS for gas cooking appliances.

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[96] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Consumer Conventional Cooking Products; Direct Final Rule."
[97] European Commission, "DRAFT - Implementing Directive 2009/125/EC of the European Parliament and of the Council with Regard to Ecodesign Requirements for Household Ovens, Hobs and Cooking Fume Extractors and Repealing COMMISSION REGULATION (EU) No 66/2014."
[98] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Consumer Conventional Cooking Products; Direct Final Rule."

Recommendations

Given the high percentage of electric and gas cooking products on the market that the U.S. DOE estimates would already meet or exceed the finalized standard and the highly harmonized North American major home appliance market, Canada should align with the U.S. DOE's finalized standards, except for electric coil cooktops, as part of Amendment 19 to the Energy Efficiency Regulations. Canada currently has a MEPS for electric coil cooktops, while the U.S. finalized standards do not, meaning Canada would backslide on energy efficiency if NRCan aligned for this category. As electric coil cooktops are most common in low-income and rental housing, the potential additional energy consumption and associated utility costs associated with the elimination of this standard would impact vulnerable communities the most.

As almost all gas cooking appliances already meet or exceed the U.S. DOE-finalized MEPS, NRCan should set a more ambitious MEPS for gas cooking appliances in Amendment 20, including limits for NOx emissions to protect respiratory health.

Clothes washers and dryers

Canada and the U.S. have been aligned on clothes washer MEPS since 2018 and electric clothes dryer MEPS since 2015.[99] The U.S. DOE currently has a prescriptive design requirement that gas clothes dryers "shall not be equipped with a constant burning pilot light," while Canada does not currently regulate the efficiency of gas clothes dryers.[100] The U.S. DOE has finalized strengthened MEPS for clothes washers and dryers, including introducing a MEPS for gas dryers, with March 1, 2028, compliance dates.

Clothes washers

The efficiency of clothes washers is calculated according to two metrics: integrated modified energy factor (IMEF) and maximum integrated water factor (IWF) for standard-size top-loading and compact-size front-loading clothes washers for each of the standards listed. The greater the IMEF, the more energy efficient the clothes washer,

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[99] Natural Resources Canada, "Clothes Washers (and Household-Style Commercial) - Energy Efficiency Regulations"; U.S. Department of Energy, *Title 10 Chapter II Subchapter D Part 430 Subpart C § 430.32 Energy and Water Conservation Standards and Their Compliance Dates.*
[100] Natural Resources Canada, "Guide to Canada's Energy Efficiency Regulations."

whereas the lower the IWF, the more water efficient it is. Table 8 shows the IMEF and IWF for standard-size top-loading and compact-size front-loading clothes washers for Canada, the U.S., and two versions of ENERGY STAR.

Table 8. Current and finalized clothes washer energy and water efficiency standards in Canada and the U.S.

	Standard top-load		Compact front-load		
Authority	**Min. IMEF (L/kWh/cycle)**	**Max. IWF (L/cycle/L)**	**Min. IMEF (L/kWh/cycle)**	**Max. IWF (L/cycle/L)**	**Effective date**
Canada – current	44.46	0.87	32	1.11	Jan. 1, 2018
U.S. - finalized / Canada - proposed	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)	March 1, 2028
ENERGY STAR - current (v 8.1)[101]	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
ENERGY STAR v. 9.0 (DRAFT 1)[102]	62.30 (2.2 ft^3/kWh/cycle)	0.49 (3.7 gal./cycle/ft^3)	62.30 (2.20 ft^3/kWh/cycle)	0.49 (3.7 gal./cycle/ft^3)	Likely 2026 or 2027 (9 months after finalization date)
ENERGY STAR - 2025 Most Efficient[103]	87.79 (3.1 ft^3/kWh/cycle)	0.40 (3 gal./cycle/ft^3)	62.30 (2.20 ft^3/kWh/cycle)	0.49 (3.7 gal./cycle/ft^3)	Jan. 1– Dec. 31, 2025

[101] ENERGY STAR, "Program Requirements Product Specification for Clothes Washers Eligibility Criteria Version 8.1."
[102] ENERGY STAR, "Program Requirements Product Specification for Clothes Washers Eligibility Criteria Draft 1 Version 9.0."
[103] ENERGY STAR, "Most Efficient 2025 - Recognition Criteria for Clothes Washers."

The current ENERGY STAR efficiency standard for clothes washers is equivalent to the finalized U.S. DOE MEPS, making the ENERGY STAR certification an unreliable signaller of high efficiency products from 2028. Likely as a result of this phenomenon, in January 2025, Draft 1 of Version 9.0 of ENERGY STAR for Clothes Washers was released for comment. For compact washers, the proposed IMEF and IWF would be aligned with what is currently the criteria for ENERGY STAR 2025 Most Efficient. For standard-size washers, the IMEF would be strengthened seven per cent and the IWF 14 per cent from the current ENERGY STAR criteria.

Analysis for Amendment 19

75.2 per cent of clothes washers shipped in Canada in 2021 were ENERGY STAR certified.[104] ENERGY STAR also estimates that 20 per cent of residential clothes washer models on the market already meet the criteria specified in the draft ENERGY STAR (v. 9.0).[105] ENERGY STAR expects payback periods for ENERGY STAR (v. 9.0) certified washers to be between 0.7 and 3.6 years, depending on the product class, compared to the 10 - 13 year average lifespan of clothes washers and dryers.[106]

Recommendations

Because the market is already demonstrating high levels of efficiency and there are excellent payback periods for these higher-efficiency products, which save consumers money in the long-term, improving Canada's clothes washer MEPS is both feasible and necessary. Therefore, NRCan should align with the U.S. DOE's finalized clothes washer MEPS for March 1, 2028, enforcement.

Clothes dryers

As part of the pre-consultation to Amendment 19 of Canada's Energy Efficiency Regulations, NRCan proposed adding gas clothes dryers as a regulated product, and aligning with the MEPS specified in the U.S. DOE's March 2024 Direct Final Rule

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[104] Natural Resources Canada, "Table 1 – ENERGY STAR Certified Appliances as a Percentage of Total Shipments in Canada, 2000–2021 (%)."
[105] ENERGY STAR, "Program Requirements Product Specification for Clothes Washers Eligibility Criteria Draft 1 Version 9.0."
[106] Henriksen-Willis, "When Is the Right Time to Replace My Home Appliances?"

(see Table 9).[107]

The finalized U.S. DOE standards for clothes dryers are equivalent to the current ENERGY STAR criteria for three of the regulated categories, therefore the product specifications for ENERGY STAR clothes dryers, and combination all-in-one washer-dryers are currently being updated.[108] The draft ENERGY STAR (v 2.0) criteria are almost identical to the ENERGY STAR 2025 Most Efficient criteria, with the exception of select products (e.g. compact elected dryers and gas dryers).

Table 9. Electric and gas clothes dryer efficiency minimum Combined Energy Factor in lb/kWh

	Electric dryers							
	Standard	Compact						
		120 V		240 V		Gas dryers		
Authority		Vented	Ventless	Vented	Ventless	Standard	Compact	Compliance date
Canada - current	3.73	3.61	N/A	3.27	2.55	N/A	N/A	Jan. 1, 2015
U.S. DOE-finalized / Canada - proposed	3.93	4.33	4.33	3.57	2.68	3.48	2.02	March 1, 2028
ENERGY STAR - current (v. 1.1)	3.93	3.8	3.8	3.45	2.68	3.48	3.48	May 5, 2017
ENERGY STAR - v. 2.0 (DRAFT 1)	5.2	6.3	6.3	5.5	5.5	3.65	3.65	Likely 2026 (9 months after finalization date, which the EPA intends to be in 2025)
ENERGY STAR - 2025 Most Efficient	5.2	6.3	6.3	5.2	5.5	N/A	N/A	Jan. 1 – Dec. 31, 2025

[107] Natural Resources Canada, "Gas Clothes Dryers - Technical Bulletin on Amending the Standards"; U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Consumer Clothes Dryers; Direct Final Rule."
[108] ENERGY STAR, "Clothes Washer Specification Version 9"; ENERGY STAR, "Clothes Dryer Specification Version 2."

Analysis for Amendment 19

Of all electric clothes dryers shipped in Canada, 66.4 per cent were ENERGY STAR certified in 2021,[109] meaning at least this percentage would most likely already be compliant with the U.S. DOE-finalized standard. There are also currently 485 ENERGY STAR certified clothes dryer models on the Canadian market, of which 35 are ENERGY STAR Most Efficient 2025 certified.[110] Given that the ENERGY STAR efficiency levels for clothes dryers are the same as those of the finalized U.S. DOE MEPS for the three most popular product categories, the majority of electric clothes dryers sold in Canada would already achieve the MEPS finalized by the U.S. DOE for March 1, 2028, compliance.

There are 166 ENERGY STAR certified standard-size gas dryers currently on the Canadian market, all of which would be compliant with the U.S. DOE-finalized MEPS for gas dryers. However, as gas dryers are not currently part of the Energy Efficiency Regulations, they are not included in NRCan's searchable product list to determine the percentage of compliant models.

Recommendations

Given the high percentage of electric clothes dryers on the Canadian market that would already comply with the U.S. DOE-finalized MEPS and the high number of ENERGY STAR certified gas clothes dryers that would also already comply, Canada should continue to align with the U.S. DOE for electric and gas clothes dryers for March 1, 2028, compliance.

Household refrigerator/freezers

Canada and the U.S. have been aligned on MEPS for household refrigerators, refrigerator-freezers, and freezers (henceforth referred to as refrigerator/freezers) since June 28, 2017.[111] Efficiency standards for refrigerator/freezers are highly segmented in the U.S. and Canada — there are currently 42 different product classes, each with

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[109] Natural Resources Canada, "Table 1 – ENERGY STAR Certified Appliances as a Percentage of Total Shipments in Canada, 2000–2021 (%)."
[110] (As of Jan. 11, 2026) Cannot generate a percentage as NRCan's Searchable Product Finder currently includes 483 total models on the Canadian market: ENERGY STAR, "Product Finder — ENERGY STAR Certified Clothes Dryers."
[111] Natural Resources Canada, "Canada Gazette, Part 2 – Energy Efficiency Regulations, 2016."

their own MEPS formula, based on the adjusted volume (AV) of the appliance.[112] Each class designation is based on several factors including the size category (standard or compact), orientation (upright or chest), defrost capabilities (automatic or manual), the presence of water dispensing and icemaking equipment, mode of installation (built-in or free-standing), and freezer location (top, bottom or side mounted). The U.S. DOE finalized strengthened MEPS for refrigerator/freezers in 2024 for Jan. 31, 2029 or 2030 compliance. The finalized standard will add door coefficients as a factor in the MEPS calculation.[113]

To offer a simplified comparison of the various North American standards and international model regulations, Table 10 shows the maximum energy use of a standard top-freezer refrigerator/freezer with an AV of 400 L (300 L refrigerator, 100 L freezer).

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[112] Natural Resources Canada, “Refrigerators and Refrigerator-Freezers”; Natural Resources Canada, “Freezers - Energy Efficiency Regulations”; U.S. Department of Energy, *Title 10 Chapter II Subchapter D Part 430 Subpart C § 430.32 Energy and Water Conservation Standards and Their Compliance Dates.*

[113] Door coefficients allow increased energy consumption for models with transparent doors, door-in-door designs and added external doors for some models: U.S. Department of Energy, “Energy Conservation Program: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Direct Final Rule.”

Table 10. Efficiency standards and targets for a 400 L refrigerator-freezer with automatic defrost and a top-mounted freezer without through-the-door ice service, using a 32 C test temperature

Regulator	Maximum energy use (kWh/yr)	Effective date
Canada & U.S. - current	348	Manufactured on or after Sept. 15, 2014
U.S. DOE - finalized	295	Jan. 31, 2030
ENERGY STAR (v. 5.1)[114]	313	Sept. 15, 2014
ENERGY STAR 2025 Most Efficient [115]	254*	Jan. 1–Dec. 31, 2025
United for Efficiency - Intermediate [116]	282	September 2019
United for Efficiency - High efficiency	235	September 2019

* ENERGY STAR 2025 Most Efficient does not have a criterion for top-freezer refrigerators. However, for all other standard-size refrigerator-freezers, the product must be at least 27 per cent more efficient than current federal requirements, so that has been used to enable a comparison.

The current ENERGY STAR Specification for Consumer Refrigeration Products (Version 5.1) has been in effect since Sept. 15, 2014.[117] To achieve ENERGY STAR certification, refrigerator/freezers must consume at least 10 per cent less energy than the federal MEPS.[118] Among refrigerators shipped in Canada in 2021, 70.4 per cent were ENERGY STAR certified.[119] As with dishwashers, ENERGY STAR publishes a Most Efficient product criteria every year for refrigerator/freezers.[120] The 2025 recognition criteria for Consumer Refrigeration Products is that:

1. The product must be currently ENERGY STAR certified
2. Standard-size products must consume less than 637 kWh per year
3. Products must be more efficient than the current federal standard by at least:

[114] ENERGY STAR, "ENERGY STAR® Program Requirements Product Specification for Consumer Refrigeration Products Eligibility Criteria Version 5.1."
[115] ENERGY STAR, "Most Efficient 2025 - Recognition Criteria for Consumer Refrigeration Products."
[116] Holuj et al., "Climate-Friendly and Energy-Efficient Refrigerators - Model Regulation Guidelines."
[117] ENERGY STAR, "Product Specifications & Partner Commitments Search."
[118] ENERGY STAR, "ENERGY STAR® Program Requirements Product Specification for Consumer Refrigeration Products Eligibility Criteria Version 5.1."
[119] The last year of available data: Natural Resources Canada, "Table 1 – ENERGY STAR Certified Appliances as a Percentage of Total Shipments in Canada, 2000–2021 (%)."
[120] ENERGY STAR, "Most Efficient 2025 - Recognition Criteria for Consumer Refrigeration Products."

a. 27 per cent for standard-size refrigerator-freezers other than top freezers

b. 30 per cent for compact refrigerators and refrigerator-freezers

c. 15 per cent for standard-size chest freezers

In 2019, the United Nations Environment Programme published its United for Efficiency *Climate-Friendly and Energy-Efficient Refrigerators Model Regulation Guidelines* with global benchmarks for refrigerator-freezer MEPS. It established three "grades" for global refrigerator-freezer MEPS: low, intermediate and high efficiency. Canada's current MEPS has already surpassed low, therefore Table 6 includes the MEPS for the representative refrigerator-freezer that would put Canada in the intermediate- or high-efficiency categories.

Analysis for Amendment 19

There are currently 3,996 ENERGY STAR certified residential refrigerators and refrigerator-freezer models on the Canadian market (62.6 per cent of total models) and 620 ENERGY STAR certified standalone freezers (48.8 per cent of total models).[121] Of those, 778 refrigerator and refrigerator-freezer models (19.5 per cent of total models) and 26 standalone freezer models (two per cent of total models) meet the ENERGY STAR 2025 Most Efficient criteria.

For the analysis that informed the finalized standard, the U.S. DOE evaluated five incremental efficiency levels (EL 1 to EL 5) compared to the baseline model for each product class. For example, EL 1 represents modest design improvements, producing energy savings of five to 11 per cent, depending on product class. EL 5 represents "max-tech," the design option that includes all of the best available technologies on the market, producing energy savings of 22–28 per cent.[122] The U.S. DOE-finalized MEPS for refrigerator-freezers range from no change to EL 4, depending on the product class.[123]

Using NRCan's searchable product list, we calculated the number and percentage of

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[121] As of March 16, 2026: ENERGY STAR, "Product Finder — ENERGY STAR Certified Refrigerators."
[122] EL 5 is not established for standard-size freezers or compact refrigerators and freezers. EL 4 produced energy savings of 23–25 per cent and 30–32 per cent, respectively: U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Direct Final Rule" Table IV.4.
[123] Kelly Mariotti and Andrew deLaski, "AHAM/ASAP Multi-Product Agreement Letter to the U.S. DOE."

refrigerator-freezer models that fit the criteria for eight representative product classes that would already comply with the U.S. DOE-finalized MEPS for refrigerator-freezers (see Table 11).

Table 11. Number and percentage of refrigerator-freezer models currently on the Canadian market that would comply with the U.S. DOE-finalized MEPS, by product class, and the EL associated with the finalized MEPS

Product class	Efficiency Level (EL 1-EL 5)	Compliant models (#)	Compliant models (%)	Compliance date
Free-standing models				
1A) All-refrigerators—manual defrost	EL 3	13	17	Jan. 31, 2030
3) Refrigerator-freezers—automatic defrost with top-mounted freezer	EL 3	10	1	Jan. 31, 2030
9) Upright freezers with automatic defrost	EL 2	8	2	Jan. 31, 2030
11A) Compact all-refrigerators—manual defrost	EL 2	147	16	Jan. 31, 2029
17) Compact upright freezers with automatic defrost	EL 1	27	60	Jan. 31, 2029
Built-in models				
5-BI) Built-in refrigerator-freezers—automatic defrost with bottom-mounted freezer	EL 1	82	29	Jan. 31, 2029
7-BI) Built-in refrigerator-freezers—automatic defrost with side-mounted freezer	EL 4	15	15	Jan. 31, 2029
9-BI) Built-in upright freezers with automatic defrost	EL 1	35	23	Jan. 31, 2029

One to 60 per cent of current free-standing models that fit the criteria for each of the analyzed product classes already meet the U.S. DOE-finalized MEPS for refrigerator-freezers. For the built-in models analyzed, it is 15–29 per cent. However, a limitation of NRCan's searchable product list for refrigerator-freezers is that it does not specify the style of door (transparent or not) nor the number of doors. Therefore, to calculate the door coefficient,[124] a solid door — which gives the lowest MEPS — was assumed, so the number of compliant models may be understated.

The U.S. DOE-finalized MEPS allow built-in style refrigerator-freezers to consume significantly more energy than free-standing models.[125] For example, for product classes 7 and 7-BI, refrigerator-freezers with automatic defrost and side-mounted freezer, free-standing and built-in, respectively, a minimally efficient 400 L built-in refrigerator-freezer (300 L fridge, 100 L freezer) may consume 16.3 per cent more energy annually than an otherwise identical free-standing model. This is evident in the much higher compliance rates for built-in product classes compared to free-standing models with finalized MEPS of the same efficiency level.

Recommendations

The finalized U.S. DOE MEPS for refrigerator-freezers are significantly more efficient than the current U.S./Canada MEPS (upward of 20 per cent for some product classes), with many considerably better than the current ENERGY STAR standard.[126] Given the lower percentage of refrigerator-freezer models currently on the Canadian market that already comply with the U.S. DOE-finalized MEPS for some product classes, it will be imperative that the U.S. DOE proceeds with the finalized MEPS for refrigerator-freezers with 2029–30 compliance dates. This would allow Canada to also adopt those standards for the product classes that have fewer compliant models.

Given the high percentage of ENERGY STAR refrigerator-freezer models already on the Canadian market, Canada could move forward with a MEPS equivalent to the current ENERGY STAR standard without the U.S.

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[124] Natural Resources Canada, "Searchable Product List - Refrigerators and Refrigerator-Freezers."
[125] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Direct Final Rule."
[126] U.S. Department of Energy, "Energy Conservation Program: Energy Conservation Standards for Refrigerators, Refrigerator-Freezers, and Freezers; Direct Final Rule."

Stronger Canadian MEPS for refrigerator/freezers are long overdue, and aligning with the U.S. DOE-finalized standards would represent important progress for energy efficiency in Canada, offering households important energy and cost savings.

Conclusion

MEPS for appliances and equipment are a powerful, yet often overlooked, tool for federal and provincial regulators to lower energy costs for consumers and businesses, reduce GHG emissions, and shave peak electricity demand. With the upcoming amendments to Canada's Energy Efficiency Regulations, particularly Amendments 19 and 20, there is a vital window of opportunity to increase MEPS for key categories, including electric motors, residential and commercial lighting, and major home appliances that Canada should seize upon.

There are enormous opportunities for energy, cost, and emissions savings from strengthened electric motor and lighting MEPS. Our analysis shows that Canada could achieve cumulative energy savings of 73.4 TWhs, almost $5.7 billion (2025 CAD) of utility savings and cumulative avoided GHG emissions of 2.9 Mt CO_{2e} by 2050 by adopting world's best MEPS for electric motors and general service lamps.

This analysis also demonstrates that for dishwashers, cooking products and clothes washers and dryers, the majority of shipments in Canada (66.4–97 per cent) would already comply with the U.S. DOE-finalized MEPS. Therefore, NRCan should align with these standards in Amendment 19, regardless of any attempted backtracking from the U.S.

For refrigerators/freezers, the U.S. DOE-finalized MEPS are significantly higher than the current ENERGY STAR standard for several product classes, therefore the percentage of models on the Canadian market that already comply is lower (one to 60 per cent). Refrigerator/freezers have the latest compliance date of any of the U.S. DOE-finalized MEPS (Jan. 31, 2030, for many product classes), giving manufacturers enough time to innovate and/or retool to comply with the new standard. Given the lower compliance of existing models on the Canadian market for some product classes with the U.S. DOE-finalized standard, harmonization with the U.S. will be essential for the success of the strengthened MEPS in Canada.

For major home appliances, the (typically two-year) amendment consultation process

for Amendment 19, rather than a Ministerial Amendment, introduces the risk of industry pushback. This could lead to watered-down regulations or the removal of some, or all, from the proposed amendment, similar to how these appliances were announced as part of both of the last two amendments and subsequently removed.[127] Strengthened MEPS for major home appliances are long overdue, and NRCan should ensure that Amendment 19 produces meaningful efficiency improvements for dishwashers, refrigerators/freezers, cooking products, and clothes washers and dryers.

This analysis demonstrates that Canada has a wealth of high-efficiency appliances and equipment on the market. Underperforming models that use a disproportionate amount of energy — wasting consumers' and businesses' money on utility bills — should be eliminated from the market via strengthened MEPS through amendments to Canada's Energy Efficiency Regulations.

[127] Natural Resources Canada, "Canada Gazette, Part 1, Volume 157, Number 33."

Modelling methodology and assumptions

CLASP's Mepsy global appliance modelling tool was used for all quantitative analysis.[128] Unless specified below, default parameters were used.

Economic and energy sector data

Consumer discount and national discount rates: three per cent.

Table 12. Energy sector assumptions

Characteristic	Policy year	End year	Additional information
Electricity heat rate (%)	97	99	Reflects shift away from fossil fuels
Transmission & distribution losses (%)	5[129]	5	Assumed to remain constant
Electric GHG emissions per kWh (kg CO_{2e})	0.1	0.00195	Policy year uses 2022 data (latest available).[130] End year uses CER's projection of 2050 electricity generation under current measures: 973 TWh/year.[131] Emissions from electricity generation are projected to decrease to 1.9 MT/ year by 2050 due to the Clean Electricity Regulations.[132]

Electric motors data

CLASP's Mepsy Appliance & Equipment Climate Impact Calculator was used to

[128] CLASP, "Mepsy."
[129] International Energy Agency, "Electric Power Transmission and Distribution Losses (% of Output) - Canada."
[130] Canada Energy Regulator, "Provincial and Territorial Energy Profiles – Canada."
[131] Canada Energy Regulator, Canada's Energy Future 2023: Energy Supply and Demand Projections to 2050.
[132] Environment and Climate Change Canada, "Canada's Clean Electricity Future."

calculate the cumulative energy and emission savings, as well as the lifecycle costs,[133] from Canada adopting an electric motor MEPS equivalent to IE4 (Policy Scenario 1) or IE5 (Policy Scenario 2) compared to the baseline policy scenario (IE3) for all electric motors 0.75 kW or more.

Representative motor: An 11.4 kW 4-pole motor for centrifugal pumps and compressors is used in CLASP's Mepsy model.

Table 13. Energy consumption and cost data for each efficiency level analyzed for the representative motor

	Business as usual (IE3)	Policy Scenario 1 (IE4)	Policy Scenario 2 (IE5)
Purchase price (2025 CAD)	638	845	1,119
Unit energy consumption (kWh/yr)	21,702	21,260	20,968
Energy cost (2025 CAD)	2,173	2,128	2,099
Life cycle cost (2025 CAD)	22,266	22,032	22,015

Market data: 2020–30 average operating hours and actual and projected sales and price data was purchased from market-research firm Absolute Reports in September 2025.

The Canadian electric motor sales data that was available for purchase was broader than the commercial and industrial electric motors that would be subject to the regulation. Therefore, shipment data of the relevant motor types from Australia, a country with a similar-size economy, was used to scale shipments down to a suitable number.[134] In 2019 (the latest year of available data), approximately 200,000 commercial

[133] CLASP, "Mepsy."
[134] Australia: 1,757,022 vs. Canada: 2,243,637 (2024 USD): World Bank Group, "GDP (Current US$) - Data."

and industrial electric motors were shipped in Australia.[135] As electric motors make up the majority of industrial energy consumption,[136] Australia's and Canada's relative industrial energy consumption was used to adjust electric motor sales data. Australia's net industrial energy consumption was 4,711 PJ in its 2023–24 fiscal year,[137] whereas, Canada's 2022 was 9,002 PJ.[138] Therefore, it was assumed that Canada had 200,000 * 9,002/4,711 electric motor shipments in 2019. Figures from 2020 to 2030 were forecasted by applying this ratio to the purchased shipment dataset, while backcasting of 2005–18 and forecasting from 2031 to 2050 were done by linear interpolation of the calculated 2019–30 values.

Policy effective year: Given NRCan's proposed MEPS for motors would apply to products manufactured on or after June 1, 2027, a policy effective year of 2028 was used in Mepsy (policy year must be an integer value).

Shipment data

- Annual shipments: Historic electric motor sales volumes of motors 0.75 kW and larger from 2020 to 2024 and forecasted volumes from 2025 to 2030 were purchased from market-research firm Absolute Reports.
- Shipment backcast: 2005–19 shipments backcasted linearly using 2020–30 data.

Equipment data

- Equipment survival function: The Mepsy default of a Weibull equipment survival function, 12-year average equipment lifetime and curve shape (index) of 1.2 and curve delay (index) of 1 was used.
- Business-as-usual purchase decrease rate: The price of the representative motor has increased between two and four per cent, depending on the efficiency level, between 2020 and 2025 (purchased dataset). Despite the usual trend of the cost of technologies decreasing over time,[139] a rate of 0 per cent was assumed.

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[135] Energy Efficiency and Conservation Authority, "Consultation Regulation Impact Statement: Three Phase Cage Induction Motors."
[136] Fleiter and Eichhammer, "Energy Efficiency in Electric Motor Systems - Technology, Saving Potentials and Policy Options for Developing Countries."
[137] Australian Bureau of Statistics, "Energy Account, Australia, 2023-24 Financial Year."
[138] Statistics Canada, "Canada's Industrial Energy Use Trends from 2009 to 2022."
[139] Our World Data, "Data Page: The Cost of 66 Different Technologies over Time."

Scenario assumptions

Unit energy consumption of the representative motor (kWh per year):

- Business as usual (IE3): 21,702
- Policy Scenario 1 (IE4): 21,260
- Policy Scenario 2 (IE5): 20,968

Annual operating hours: 2,900 (from purchased market-research data).

Efficiency ratios (per cent): 91.4, 93.3* and 94.6, respectively.[140]

Efficiency improvement rate: 0 per cent across all three policy scenarios, as they are each fixed efficiency levels.

Currency: Purchase prices for each efficiency level from the purchased dataset in 2025 Canadian dollars.

Electricity price per kWh in policy year (2028): 9.96 cents. Average electricity rates for the major city/ies in each province were taken from Hydro-Québec's *2024 Comparison of Electricity Prices in Major North American Cities.*[141] As electric motors are largely an industrial application, the rate for large-power customers was used. Where rates were provided for more than one city in a province, they were averaged. Electricity rates for the territories were taken from their utility rate schedules as of Oct. 1, 2025.[142] As Mepsy uses a single electricity rate per country, the provincial and territorial electricity rates were weighted by total primary and secondary industrial energy use in 2023 (the latest available from Statistics Canada)[143] to get a Canada-wide weighted average industrial rate for 2025. To adjust for inflation to the policy year of 2028 and the policy end year (2060), the increase over the 10-year period between January 2014 and December 2023

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[140] Efficiency ratios provided by CLASP. *11 kW motor used.
[141] Specifically 10,000 kW power demand, 5,760,000 kWh consumption, 120 kV voltage and 80 per cent load factor as a median large industrial consumer: "2024 Comparison of Electricity Prices in Major North American Cities."
[142] Yukon Energy, "Rate Schedule 39 - Industrial Primary"; "Rate Schedule"; Qulliq Energy Corp. Nunavut, "Customer Rates."
[143] Statistics Canada, "Table: 25-10-0029-01 (Formerly CANSIM 128-0016)."

of Statistics Canada's *Electric monthly power selling price index* was assumed to be representative of the inflation rate of industrial electricity prices.

General service lamp data

As Amendment 18 set the MEPS for GSLs at 45 lm/watt as of Jan. 1, 2026, this model uses as inputs many of the outputs of the cost-benefit analysis (CBA) that NRCan performed to analyze GSLs for Amendment 18 to Canada's Energy Efficiency Regulations. For simplicity, only whole years are included in the analysis. Therefore, the policy is modelled to come into effect Jan. 1, 2029.

Shipment data: Shipment numbers for baseline scenario from NRCan's Amendment 18 CBA for GSLs. For the policy scenario, the same demand for GSLs is assumed.

Rated life: Baseline scenario: 10,000 hours, which is most common for lower-quality LEDs currently on the market. The advertised rated life of the LEDs on the market that just met the U.S. DOE-finalized MEPS for their categories were used for the "Aligning with U.S. DOE" scenario.

Daily operating hours: See Table 14.

Table 14. Lamp lifetime and daily operating hours assumed, by category and building type, in NRCan's GSL CBA for Amendment 18 to the Energy Efficiency Regulations

		Residential		Commercial	
Lamp category	Average lifetime (hours)	Daily operating hours	Lifespan (years)	Daily operating hours	Lifespan (years)
Omnidirectional A-shape or spiral E26 (310–749 lm)	3,048	2.3	2.90	11.5	0.58
Omnidirectional A-shape or spiral E26 (750–1,049 lm)	2,927	2.3	2.79	11.5	0.56
Omnidirectional A-shape or spiral E26 (1,050–1,489 lm)	2,173	2.3	2.07	11.5	0.41
Omnidirectional A-shape or spiral E26 (1,490–1,999 lm)	2,831	2.3	2.70	11.5	0.54
Decorative candle shapes (B/BA/C/CA) E12 (310–499 lm)	2,108	2.6	1.78	11.5	0.40
Decorative G-shape E26 (310–499 lm)	2,364	2.6	1.99	11.5	0.45
Large diameter directional PAR30 E26 (700–999 lm)	5,050	2.9	3.81	11.5	0.96
Large diameter directional PAR38 E26 (1,000–1,299 lm)	3,874	2.9	2.93	11.5	0.74
Small diameter directional PAR20 E26 (400–599 lm)	2,700	2.9	2.04	11.5	0.51

Residential electricity price:

- Policy year: 10.965 cents/kWh. Population weighted average of marginal provincial electricity rates as of Sept. 19, 2025, assuming the representative household consumes 1,000 kWh/month and pays a flat or tiered electricity rate rather than time-of-use, where applicable.

- End year (2060): 33.411 cents/kWh. The average electricity rate in Canada increased a total of 37 per cent in the decade of 2007–17.[144] Trend assumed to continue to the policy end year 2060.

Commercial electricity price: 14.93 cents/kWh in 2025. Hydro-Québec's *2024 Comparison of Electricity Prices in Major North American Cities* average prices for commercial small-power customers (less than 100 kW) rate was used, with city rates being averaged to generate a provincial rate (as described in electric motor methodology). Small-power customers were chosen as larger commercial customers are assumed to more commonly use linear lighting rather than the smaller lamps covered by GSLs in Canada. As the Hydro-Québec analysis displays the results using five representative customers, with increasing monthly power demand, consumption, and load factors, the median customer size of 40 kW, 10,000 kWh, and 35 per cent, respectively, was chosen as representative. Provincial/territorial electricity rates were weighted by provincial income-based GDP at market prices (2024) to get a single representative electricity rate.[145] Values that could be a better proxy, like commercial floor area, were available by region for the provinces, but not available for the territories.[146]

Commercial electricity rate, end year (2050): 26.01 cents/kWh. Commercial electricity rates are assumed to inflate at the same rate as industrial rates over time.

Individual lamp purchase price: As consumer purchasing decisions are largely price driven, the least expensive lamp that met the category description (bulb shape, base and lumen range) and MEPS of the policy scenario at major retailers, like the Home Depot, were chosen. Price data was collected Jan. 9, 2026. Ecosmart was the most common brand of lamps for the baseline (45 lm/W) scenario, and Philips' Ultra Efficient line was the most common for the Aligning with the U.S. DOE scenario (see Table 15).

[144] Canada Energy Regulator, "CER – Market Snapshot."
[145] Statistics Canada, "Gross Domestic Product, Income-Based, Provincial and Territorial, Annual."
[146] Statistics Canada, "Regional Distribution of Commercial and Institutional Buildings by Counts, Floor Area and Energy Consumption, 2014."

Table 15. Cost per lamp for a unit that meets or exceeds the MEPS under the baseline and policy scenario for each lamp category

	Baseline scenario (A18)		Aligning with U.S. DOE scenario	
Lamp category	MEPS (lm/W)	Cost per lamp ($)	MEPS (lm/W)	Cost per lamp ($)
Omnidirectional A-shape or spiral E26 (310–749 lm)	45	4.24	105	6.64
Omnidirectional A-shape or spiral E26 (750–1,049 lm)	45	0.96	126	7.89
Omnidirectional A-shape or spiral E26 (1,050–1,489 lm)	45	5.00	134	12.44
Omnidirectional A-shape or spiral E26 (1,490–1,999 lm)	45	3.53	137	16.99
Decorative candle shapes (B/BA/C/CA) E12 (310–499 lm)	45	4.00	93	6.50
Decorative G-shape E26 (310–499 lm)	45	4.95	93	7.66
Large diameter directional PAR30 E26 (700–999 lm)	45	7.00	89	16.70
Large diameter directional PAR38 E26 (1,000–1,299 lm)	45	14.99	92	21.78
Small diameter directional PAR20 E26 (400–599 lm)	45	2.50	83	7.99

Heating interactive effects: Given that CFL bulbs are roughly 85 per cent and LED bulbs 90 per cent efficient,[147] the increased heating and decreased cooling required by HVAC

[147] GE Light., "A Guide to Energy Efficient Light Bulbs."

systems due to less waste heat being emitted by more efficient lighting was considered negligible enough as to not be included in the analysis.

Major appliances

Dishwashers

Assumptions for calculating dishwasher MEPS normalized to 215 loads per year.

U.S. DOE-finalized dishwasher MEPS: The U.S. DOE-finalized MEPS for standard-size dishwashers is equal to the DOE's Efficiency Level (EL) 2 and EL1 for compact dishwashers.[148] According to a 2014 notice of proposed rulemaking for energy conservation standards for residential dishwashers, a standard-size EL2 dishwasher consumes 4.3 kWh per year in standby mode, while an EL1 compact dishwasher consumes 14.5 kWh per year in standby mode, assuming 215 one-hour cycles per year.[149]

The **EU Ecodesign requirement** for dishwashers is that the Energy Efficiency Index (EEI) must be less than 56 for household dishwashers with rated capacities of at least 10 place settings since 2014, and 63 for all other household dishwashers. The EEI is calculated by dividing the dishwasher model's energy consumption for a single cycle in the "eco programme" setting by the energy consumption of a standardized model with the same place setting capacity. In addition to the per dishwashing cycle efficiency standard, EU Ecodesign has standby power wattage maximums: 0.5 W for basic models, 1 W if information or status is displayed in standby mode, and 2 W if network connected.

In Table 5, for standard-size dishwashers, the lower end of the maximum energy consumption range, 197 kWh per year, represents a 10 place setting dishwasher that does not display information in standby mode, assuming its eco setting has a run cycle

[148] U.S. DOE-finalized efficiency levels are the same as those recommended in the Agreement letter: Kelly Mariotti and Andrew deLaski, "AHAM/ASAP Multi-Product Agreement Letter to the U.S. DOE."
[149] U.S. Department of Energy, *Energy Conservation Program: Energy Conservation Standards for Residential Dishwashers,* 60.

of 195 minutes.[150] The upper limit of the range, 221 kWh per year, represents a 14-place setting network-connected dishwasher, assuming a run cycle of 222 minutes.

Refrigerator/freezers

Representative model for Table 6: Refrigerator-freezer with automatic defrost and a top-mounted freezer without through-the-door ice service, using the 32 C test temperature that is standard in the Canadian and U.S. regulations.

For the feasibility of aligning with the U.S. DOE-finalized MEPS (Table 11): Eight representative product classes were selected with a range of characteristics and U.S. DOE efficiency levels (EL 1–EL 5) above the baseline current MEPS for refrigerators/freezers in Canada and the U.S.

Using NRCan's searchable product list for refrigerators and refrigerator-freezers and freezers,[151] the number of models currently on the Canadian market that fit into each of the eight product classes was determined. The adjusted volume for each model was calculated (see below). Then, the calculated maximum energy use (kWh per year) for each model under the U.S. DOE-finalized MEPS was compared to the rated energy use (kWh per year) of each of the models on the market to determine the number that would already comply with the regulations.

Door styles (transparent or solid) and number of doors are not specified in the searchable product list. All appliances were therefore assumed to have solid doors, all-refrigerators and freezers were assumed to have one door, and refrigerator-freezers were assumed to have two doors. Transparent doors and multiple doors result in door coefficients that allow for a higher maximum energy use. Therefore, the number of compliant models is likely underestimated.

Product class 7-BI: Built-in refrigerator-freezers - automatic defrost with side-mounted

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[150] The runtime of the best-performing 10 place setting household dishwasher at the time of entry into force of the regulation: Commission Regulation (EU) 2019/2022 of 1 October 2019 Laying down Ecodesign Requirements for Household Dishwashers Pursuant to Directive 2009/125/EC of the European Parliament and of the Council Amending Commission Regulation (EC) No 1275/2008 and Repealing Commission Regulation (EU) No 1016/2010.

[151] Natural Resources Canada, "Searchable Product List - Refrigerators and Refrigerator-Freezers"; Natural Resources Canada, "Searchable Product List - Freezers."

freezer, which will be required to meet the highest efficiency level of any of the product classes, EL 4, was chosen for illustrative purposes.

Maximum energy use (kWh/yr) based on adjusted volume (AV, in ft^3)

= (8.82AV + 384.1)*K7BI,

where K7BI is the door coefficient, and
AV = (refrigerator volume) + (freezer volume * 1.63)152

[152] Lauren Boucher and Yuping Wei, *2024 World's Best MEPS.*

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