My Canada drives electric.

Clean Fuel Regulations 101 & status update

EMC members webinar
May 9, 2024

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Research Director
Electric Mobility Canada

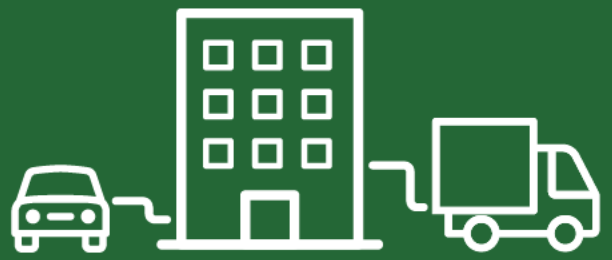
Agenda

1. Objectives for today's webinar
2. Clean Fuel Regulations: a brief history – the "what & why"
3. Program mechanics – the "how"
4. Program status, timelines, and regulatory outlook
5. Opportunities for policy innovation
6. Key resources & program materials

Clean Fuel Regulations: A brief history

- Sustained federal policy engagement to secure a Clean Fuel Standard by EMC, members, allies (2016–2022)
  - CFS Advocates (CFSA) successfully advocated for a stringent, technology-neutral policy to drive transport decarbonization:
    - https://clean50.com/projects/clean-fuel-standard-advocates-coalition/
    - https://cleanfuels2030.ca/

- Clean Fuel Regulations (CFR) were registered on June 21st, 2022, and subsequently published in Part II of the Canada Gazette on July 6th.
  - Requirements on suppliers of high-carbon fuel (gasoline & diesel) entered into force on July 1st, 2023.



Clean Fuel Standard advocates

CFS evolution 2016-2019 (pre-CG1)

November 2016

30Mt CFS

"The CFS will …incent the use of a broad range of lower carbon fuels, alternative energy sources and technologies, such as electricity, hydrogen, and renewable fuels, including renewable natural gas."

December 2017

30Mt CFS

Liquids

Gaseous, Solids

December 2018

30Mt CFS

Liquids
23Mt
2022

Gaseous, Solids
7Mt
2023

June 2019

"The CFS will…incent innovation and adoption of clean technologies in the oil and gas sector and the development and use of low-carbon fuels throughout the economy."

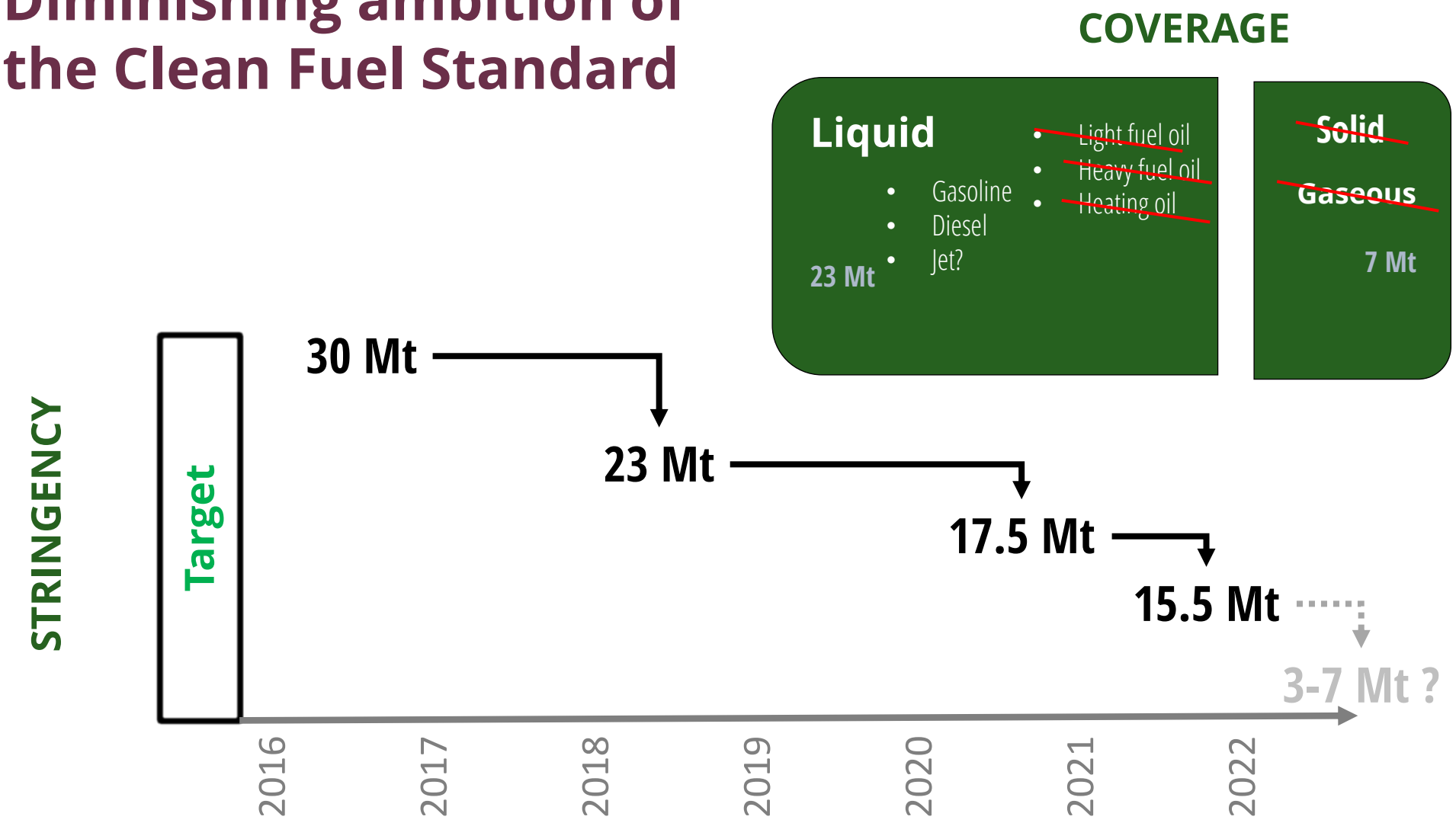
23 Mt Liquid

Cleaner oil and gas

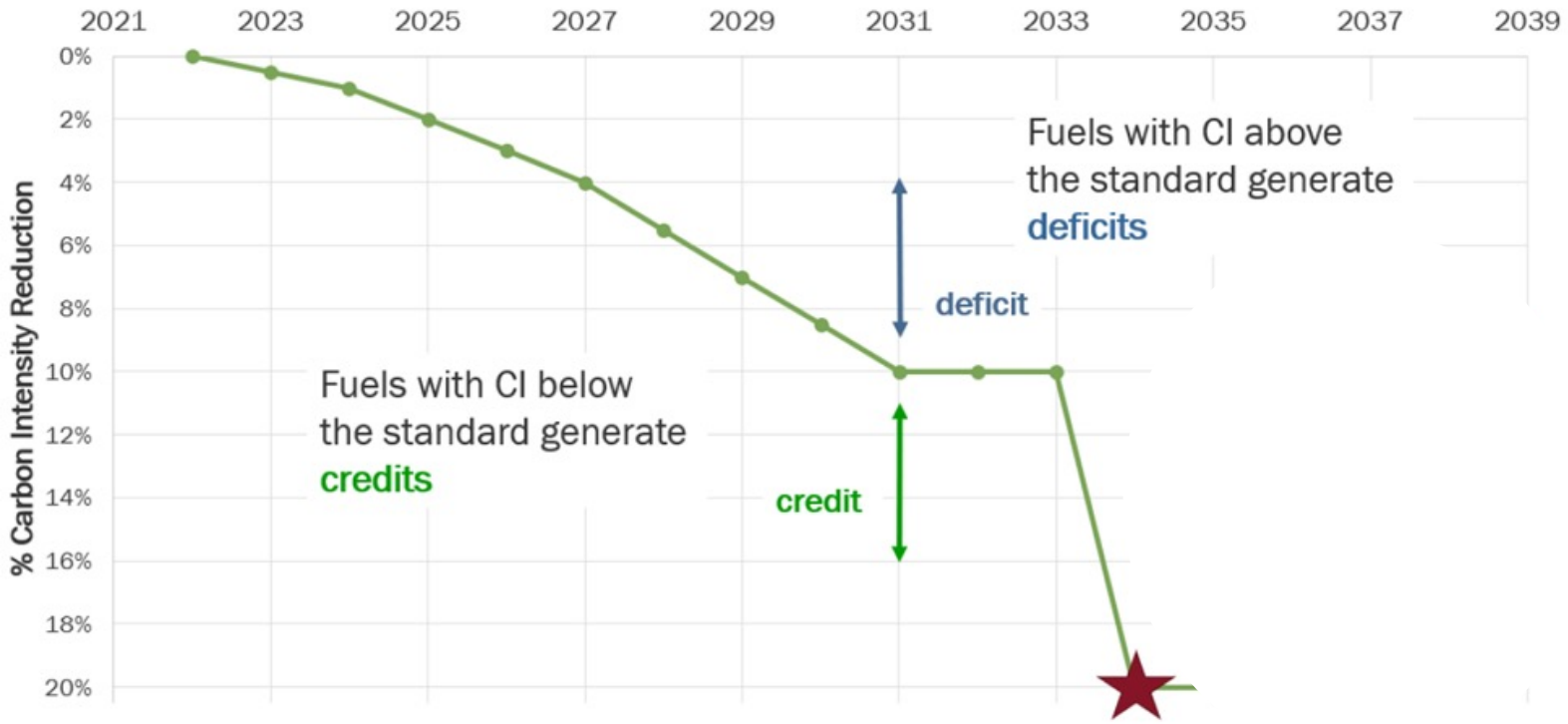
Non-fossil clean fuels

7 Mt
Gaseous, Solids

Diminishing ambition of the Clean Fuel Standard

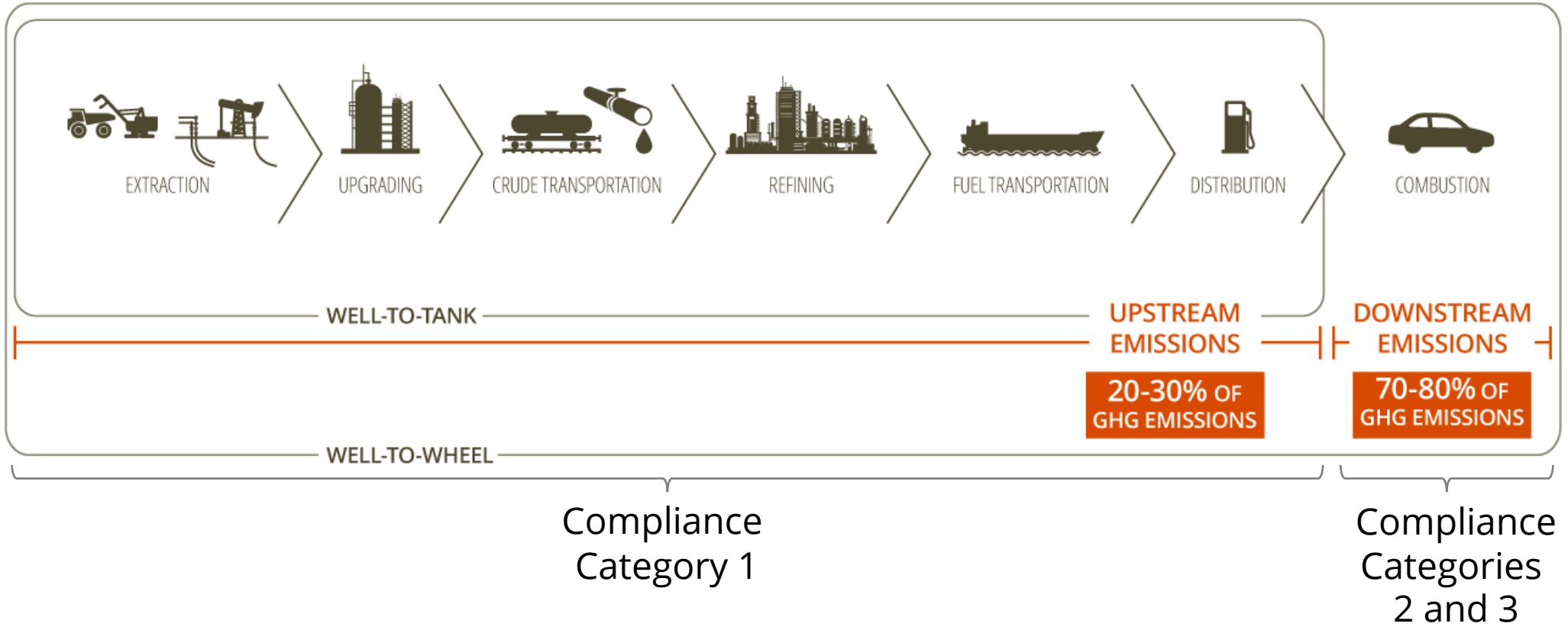


What is it?



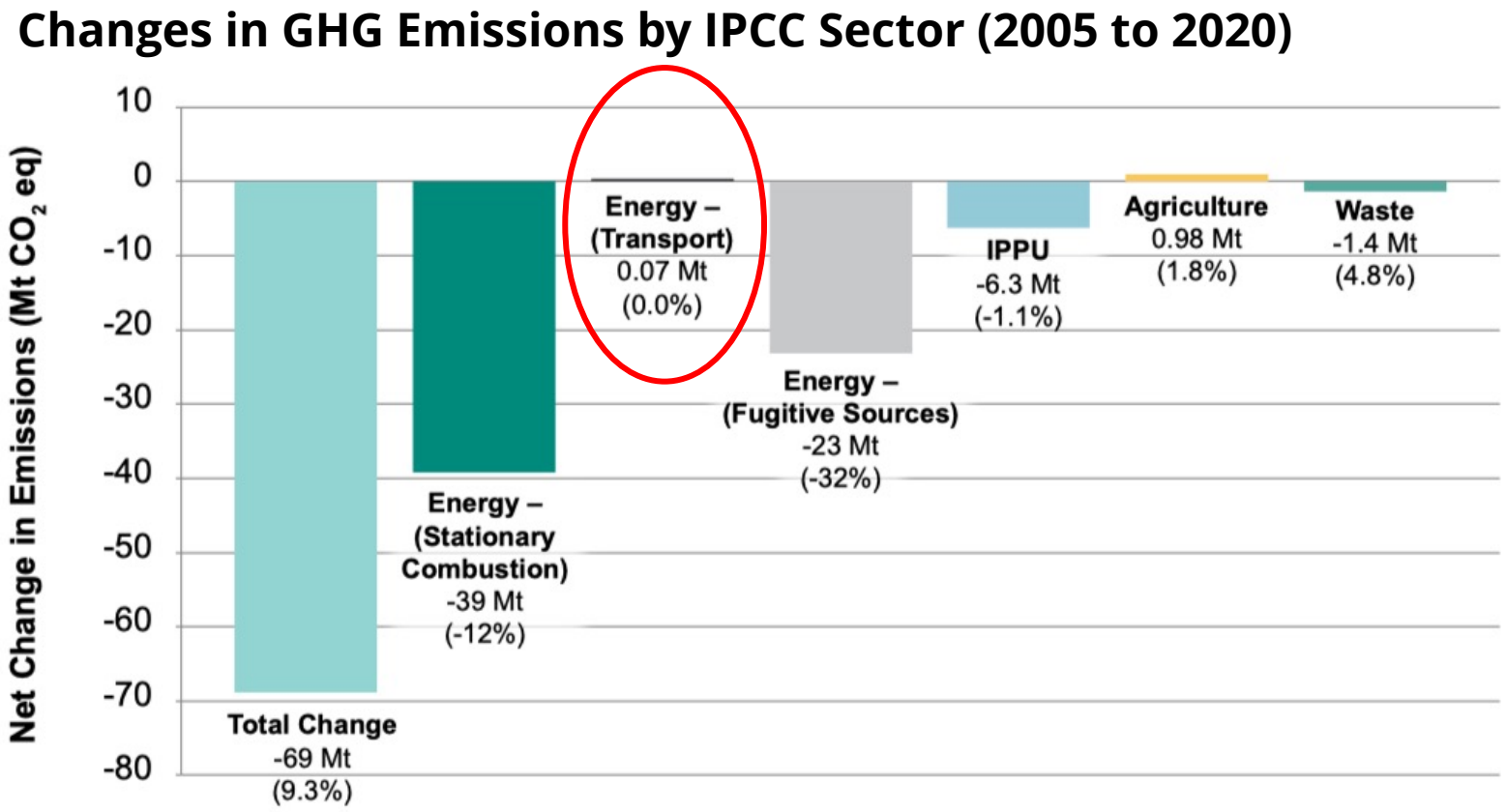
An economic equalizer for transport fuels & market-maker for clean energy.

What is it? A lifecycle approach



Why we need a CI-based fuel standard

1. Reduce the climate impact of transportation.



Government of Canada. Environment and Climate Change Canada. NC8 / BR5. January 2023. https://unfccc.int/documents/624782

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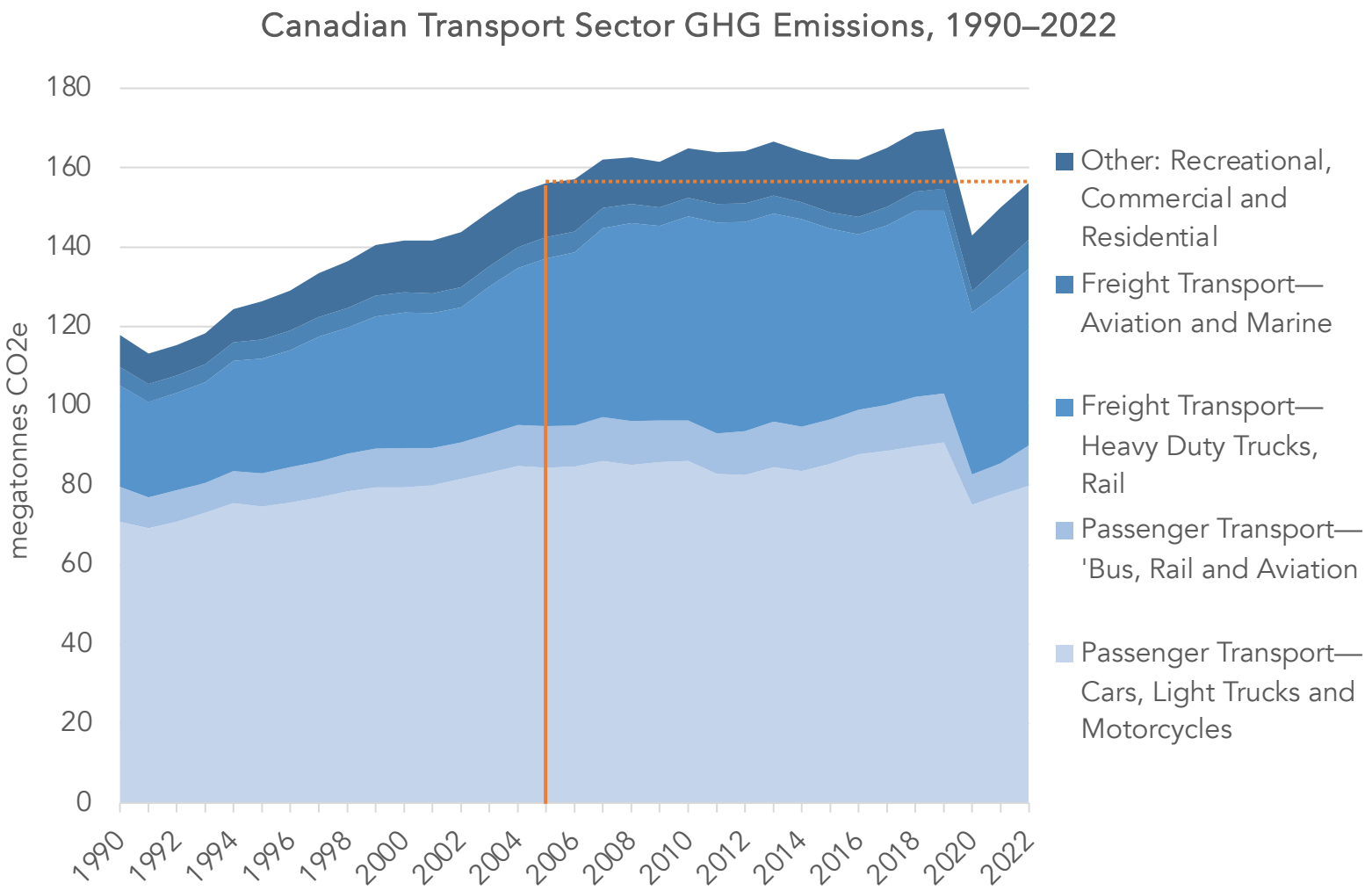

Environment and Climate Change Canada. National Inventory Report 2024: Greenhouse Gas Sources and Sinks in Canada 1990–2022. https://publications.gc.ca/site/eng/9.506002/publication.html

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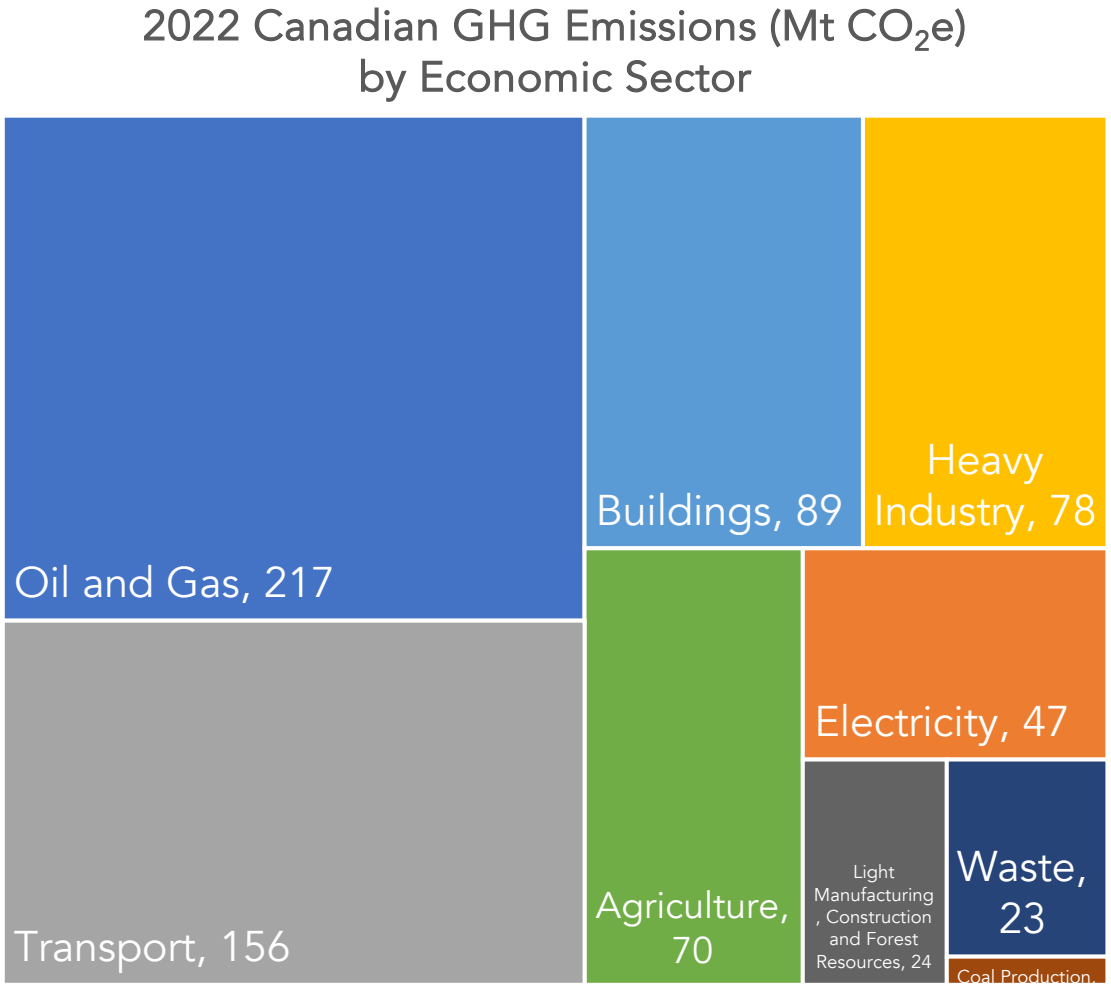
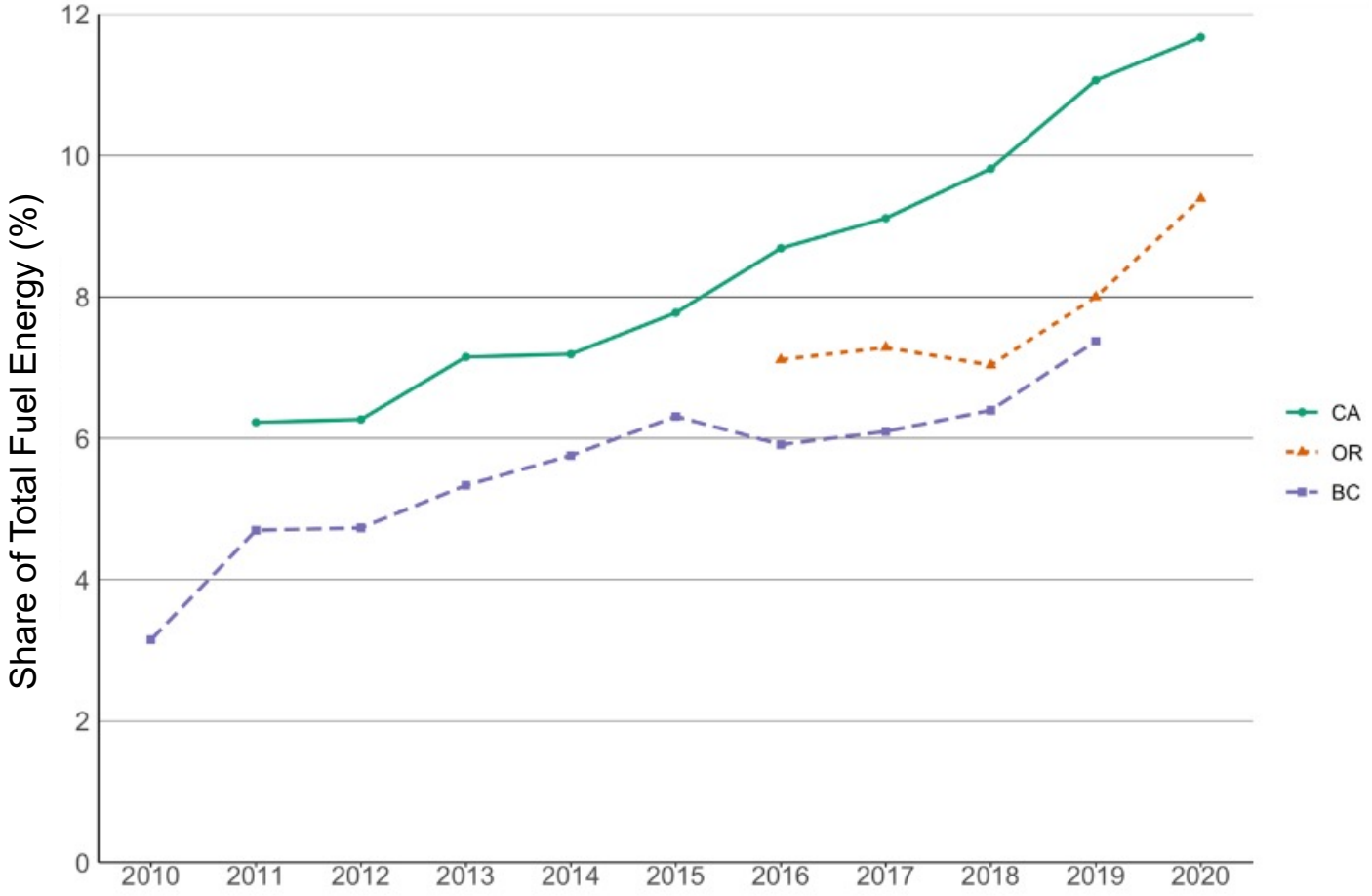


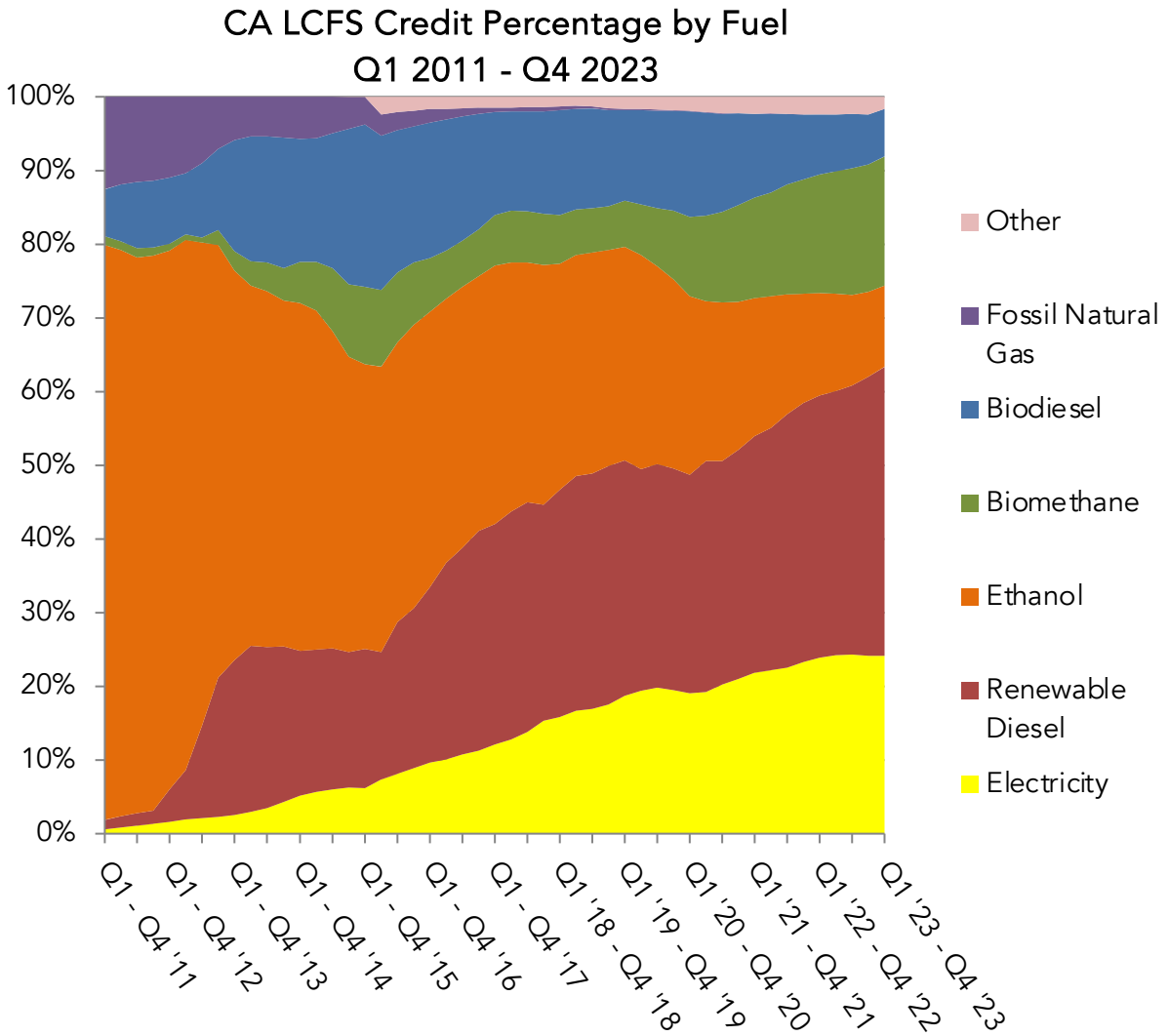
Environment and Climate Change Canada. National Inventory Report 2024: Greenhouse Gas Sources and Sinks in Canada 1990–2022. https://publications.gc.ca/site/eng/9.506002/publication.html

2. Grow clean energy and displace fossil fuel demand

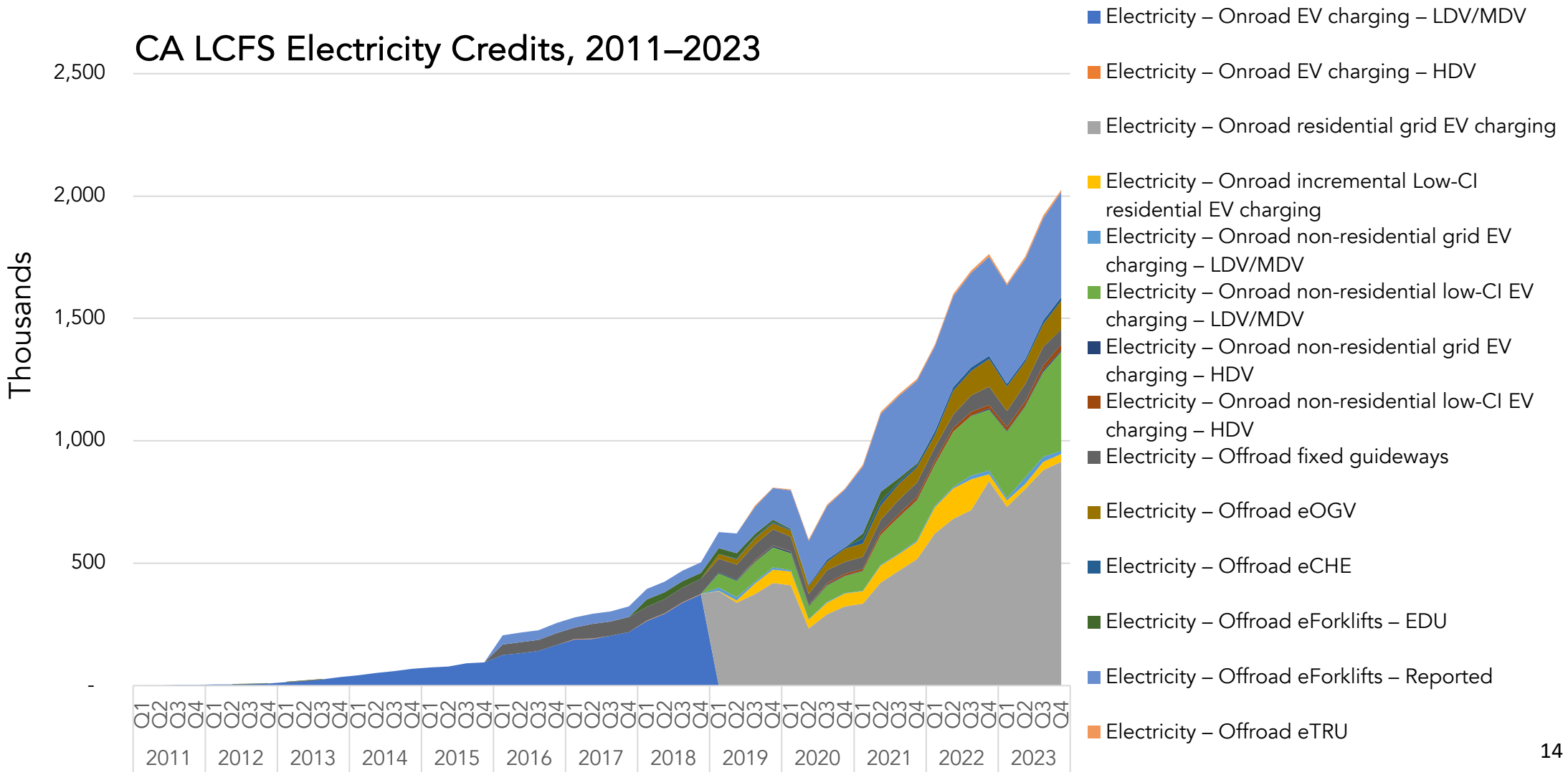


https://escholarship.org/uc/item/080390x8, p7

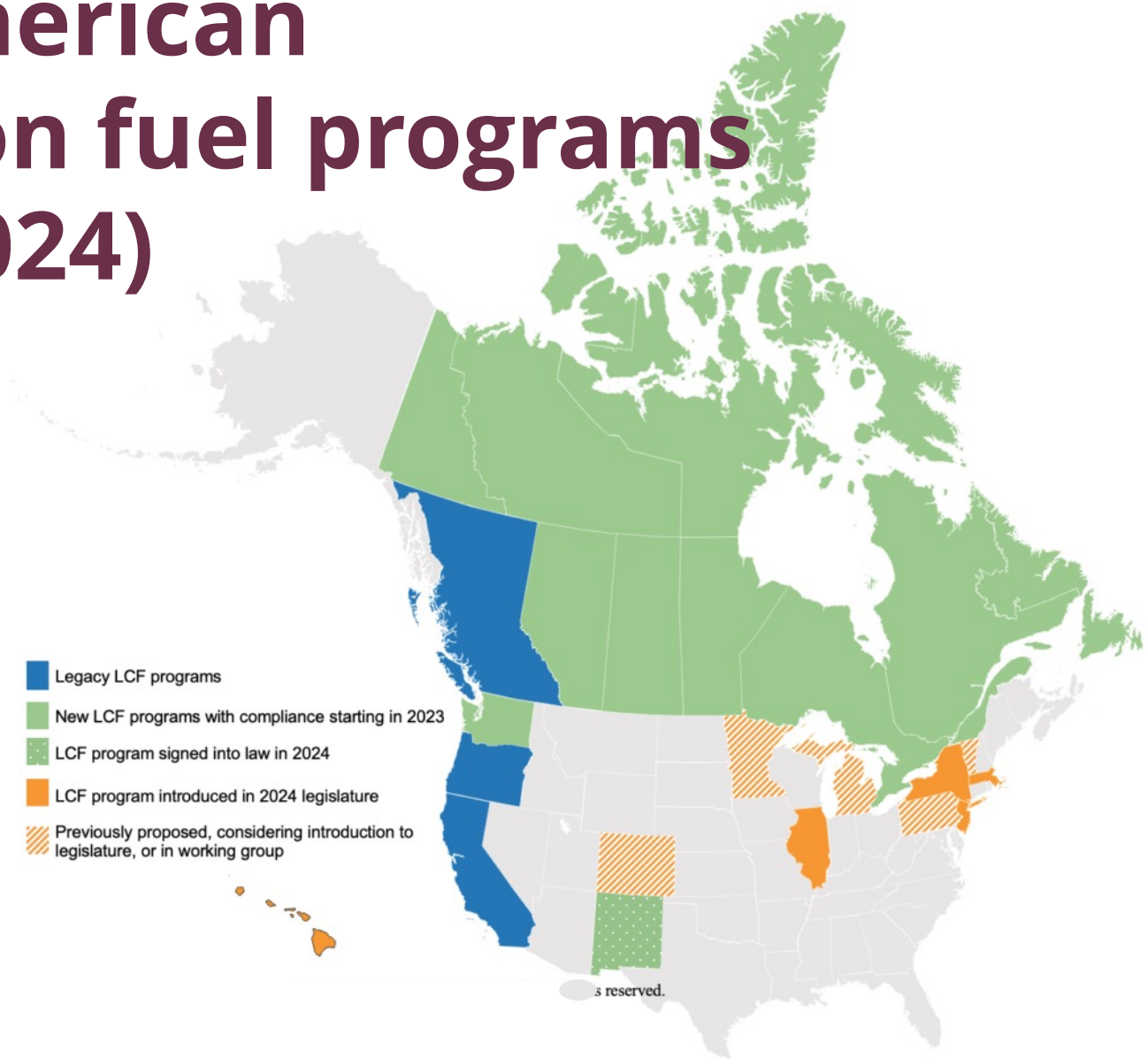
3a. Increase fuel diversity and resilience to fossil energy/price volatility.



3b. Increase fuel diversity and drive clean innovation.



North American low carbon fuel programs (March 2024)



- https://stillwaterpublications.com/low-carbon-fuel-program-proliferation-2024/
- https://stillwaterassociates.com/as-lcfs-programs-proliferate-dont-get-behind-the-8-ball/
- https://static1.squarespace.com/static/62f3c595ddafd51a38c02b2a/t/63ee6dd65e8c67721a600d93/1676570074265/AJW_DriveClean_WhyUSNeedsACFSNow_021623.pdf

North American LCFS

> https://www.usefuse.com/about-fuse/pending-regulations/

3. CFR program mechanics (i)

3 main compliance strategies / credit-generating activities

1. “actions that reduce the carbon intensity of fossil fuel throughout its lifecycle”
   - Includes: industrial process/facility energy efficiency (e.g. methane capture or LDAR, but must be beyond existing regulatory requirements); carbon capture and storage; enhanced oil recovery; co-generation; **electrification**; co-processing biocrude

2. “supplying low-carbon fuels”
   - will allow producers and importers of renewable or other low-carbon fuels to generate credits based on amount of energy (MJ) their products supply to the Cdn market annually.
   - Includes: renewable natural gas (RNG), ethanol, biodiesel, renewable diesel (HDRD), hydro-treated vegetable oil (HVO), alternative jet fuel (biojet), biogas, synthetic fuels, renewable propane

3. “specified end-use fuel switching”
   - liquid fuel stream: end-use fuel switching from a higher carbon intensity fossil fuel used for transportation (i.e., gasoline, diesel) to specified lower-carbon fuels will be eligible for credit generation: natural gas, propane, and non-carbon energy carriers such as electricity or hydrogen

CFR Program Mechanics (ii)

Overview of reduction requirement calculation

Reduction requirement (tonnes CO_2e) = CI_{diff} x (Q x D) x 10^{-6}

Compliance Report:
Sch. 18, item 2(j)

Q

Quantity of fuel subject to the reduction requirement

Compliance Report:
Sch. 18, item 2(i)

=

par. 8(1)(a)

Volume produced in Canada, either dispatched from the facility or used to fuel a vehicle or other mobile equipment at the facility (sum for all production facilities)

Compliance Report:
Sch. 18, item 2(b)(ii)

+

par. 8(1)(b)

Volume imported into Canada (sum for all provinces of import)

Compliance Report:
Sch. 18, item 2(c)(i)

-

ss. 8(2) volumes subtracted are the volume sold or delivered for

(a) a use other than combustion,
(b) use in a marine vessel that had a non-Canadian port as its destination,
(c) non-industrial purposes in a geographic area that is served by neither an electrical distribution network that is subject to the standards of the North American Electric Reliability Corporation nor a natural gas distribution system,
(d) the purpose of space heating, or
(e) use in the generation of electricity in a geographic area that is served by neither an electrical distribution network that is subject to the standards of the North American Electric Reliability Corporation nor a natural gas distribution system.

(for all provinces of import and production facilities)

Compliance Report:
Sch. 18, item 2(f) with regards to the production facility(ies)
Sch. 18, item 2(g) with regards to the volumes imported

These volumes exclude the volumes listed in ss. 4(2)

(a) aviation gasoline
(b) exported from Canada
(c) used for scientific research, other than research on consumer preferences in respect of various properties of fuels or market research; or
(d) sold or delivered for the purpose of supplying the engine of a vehicle, including a marine vessel, that is used exclusively for competition.

Compliance Report:
Sch. 18, item 3

Note:

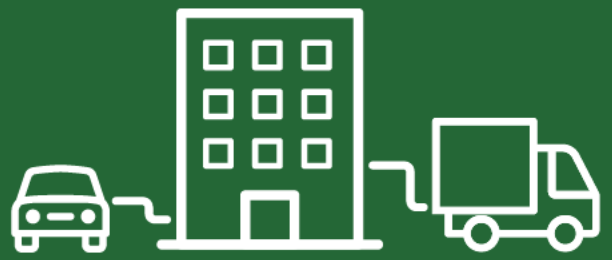
CI_{diff} is the difference, expressed in gCO2e/MJ, between the baseline carbon intensity of that fuel, as set out in subsection 5(3), and the limit for that fuel for that compliance period, as set out in column 2 of the table to subsection 5(1);

D is, at the election of the primary supplier, the energy density of the fuel as set out in column 2 of Schedule 2 or as set out in the Specifications for Fuel LCA Model CI Calculations.

ECCC. Clean Fuel Regulations – Factsheet for Primary Suppliers. Sept. 2023.
https://drive.google.com/file/d/1iM3VLKib_DkQ3P7f4EMK-ImupoLEXGdb/view

The beating heart of the CFR

Fuel carbon-intensity limits — CFR s. 5(1)								
Liquid Fossil Fuel	Limit for Each Compliance Period (gCO2e/MJ)							
	2023	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030+**
Gasoline	91.5	90.0	88.5	87.0	85.5	84.0	82.5	81.0
Diesel	89.5	88.0	86.5	85.0	83.5	82.0	80.5	79.0



KEY DEFINITIONS (§1 Interpretation)

i. **Charging-network operator** (CNO) means a person who operates a communication platform that collects data on the electricity supplied by a charging station and who is the owner of that data.

ii. **Charging-site hos**t (CSH) means a person who owns or leases a charging station and who has the legal right to have the charging station installed.

iii. **Charging station** means a device that is used in Canada to charge the battery on board an electric vehicle by supplying electricity to the electric vehicle and that is capable of communicating with a server, whether through the Internet or using a cellular signal or connected vehicle communications, to report the quantity of electricity supplied and the time at which it is supplied.

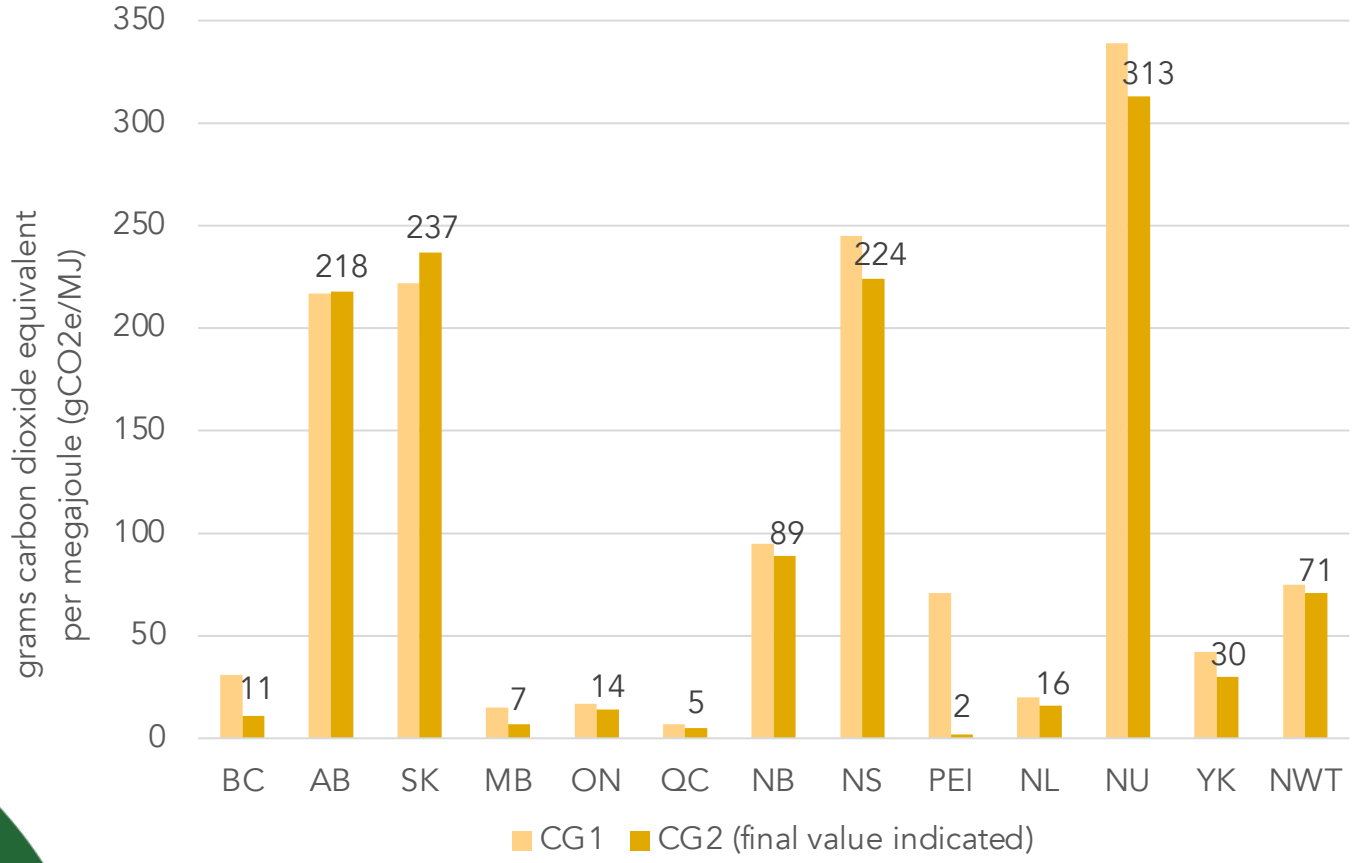
iv. **Electric vehicle** means a vehicle that is propelled by an electric motor whose source of electricity is a rechargeable battery that is charged from a source of electricity that is not on board the vehicle. It includes a plug-in hybrid electric vehicle.

v. **Fuelling station** means a facility in Canada at which vehicles are supplied with fuel or with hydrogen used as an energy source and includes a mobile facility.

Key sections for e-mobility

- Section 101 (charging site host – CSH)
- Section 102 (charging network operator – CSO)
  - Credits for residential charging of EVs will be **phased out** by the end of 2035 for charging stations installed by the end of 2030. Any residential charging station installed after the end of 2030 will not be eligible for credits.
- Section 103 (reinvestment requirements)
  - Expand charging infra. (including electricity distribution);
  - Reduce cost of EV ownership
- Section 107 (compliance credit transfer system – fair market value)
- Schedule 6, s. 9 (default provincial electricity CIs)

Default lifecycle carbon intensity of electricity by province/territory in draft (CG1) and final (CG2) Clean Fuel Regulations



Sources

— Clean Fuel Regulations, Canada Gazette Part 2, Vol. 156, No. 14 (June 2022). Schedule 6, s.9.
— Clean Fuel Regulations, Canada Gazette Part 1, Vol. 154, No. 51 (Dec. 2020). Schedule 5, s.8.

> https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-140/page-12.html#docCont

Other key characteristics of credit market structure (compliance flexibilities)

- **Compliance Fund:**
  - 'strike price' for the fund(s) is proposed to be set at $350/t in 2022 (indexed)
  - obligated parties can pay into the fund to satisfy up to 10% of their compliance obligation in a given reporting period.
  - Approved funds:
    - Emission Reduction Advancement Program (EVAP) – federal
    - Newfoundland and Labrador Emissions Reduction Fund (NLERF)
    - Emission Reduction Alberta

- **Credit Clearance Market:**
  - CCM proposed price of $300/t in 2022 (indexed)
  - CCM participation is obligatory for regulated entities in a deficit position (i.e., short on compliance for a given reporting period); if there aren't enough credits pledged to the CCM, obligated parties must buy a share of available credits pro-rated to the extent of their remaining obligation.
  - increases certainty on compliance costs, facilitates credit sales (including smaller-scale credit generators), strengthens incentives to invest in and produce low-CI fuels, and reduces probability of credit shortfalls.
- **Cross-class trading (gaseous credits)** up to 10% of annual obligation.
- **Deferral** of CI obligations for up to 10% of obligation (after every other flexibility has been exhausted) for up to 5 years.

Credit generation process

1. Opt-in (registration in CATS)
2. Purchase and install equipment
3. Operate vehicles
4. Monitor energy volumes
5. Report & Validation
6. Receive credits
7. Monetize credits
8. Optional: Application for calculated/specific CI

Fuel price impacts

Estimated range in incremental fuel price impacts in 2030 (cents per litre, 2021 CAD)			
Fuel pool	**No credits go to market (All credits are self-created)**	**Some credits go to market (Some credits are self-created)**	**All credits go to market (No credits are self-created)**
Gasoline pool	6	10	13
Diesel pool	7	12	16

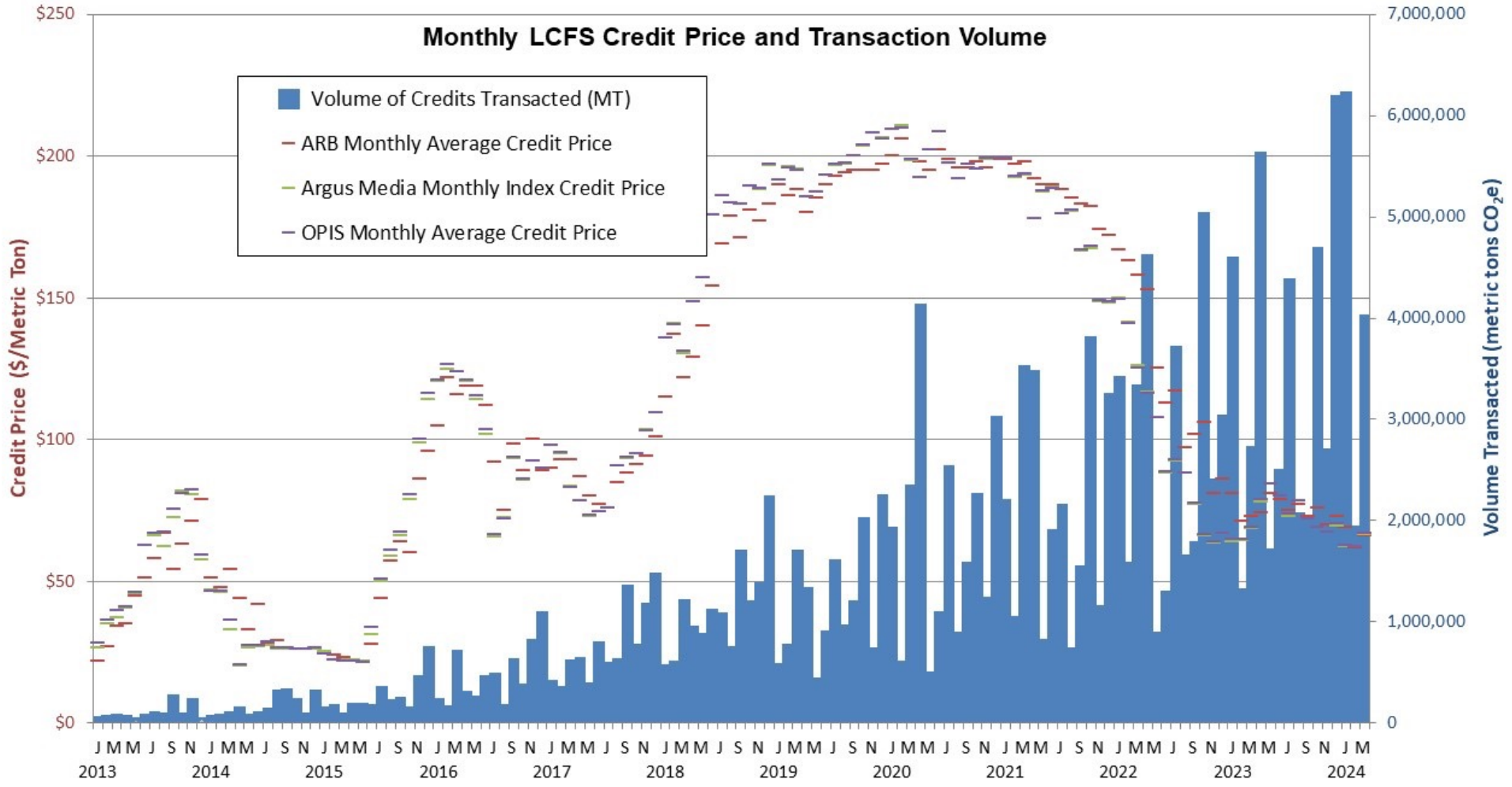
Source: Government of Canada 2022. CFR Regulatory Impact Analysis Statement, Table 23.

May 18, 2023

A Distributional Analysis of the Clean Fuel Regulations

https://www.pbo-dpb.ca/en/publications/RP-2324-004-S--distributional-analysis-clean-fuel-regulations--analyse-distributive-reglement-combustibles-propres

Credit Prices—California



> https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard

Last Updated 04/16/2024

Current status: State of the market

- Clean Fuel Regulations (CFR) were registered on June 21st, 2022, and subsequently published in Part II of the Canada Gazette on July 6th
- Credit-creation reporting so far:
  - CC1 & CC3: Annual credit-creation report for the period of June 21st to December 31st, 2022; and of Jan. 1–Dec. 31, 2023 (due April 30).
  - CC2 – quarterly

- Little visibility on market properties to date
- BC LCFS prices regularly $400–$500/t (no cost containment)

Current status: State of the market

Figure 18: Lifecycle CI by fuel type within Canada, from 2010 to 2021 with an estimate for 2022.

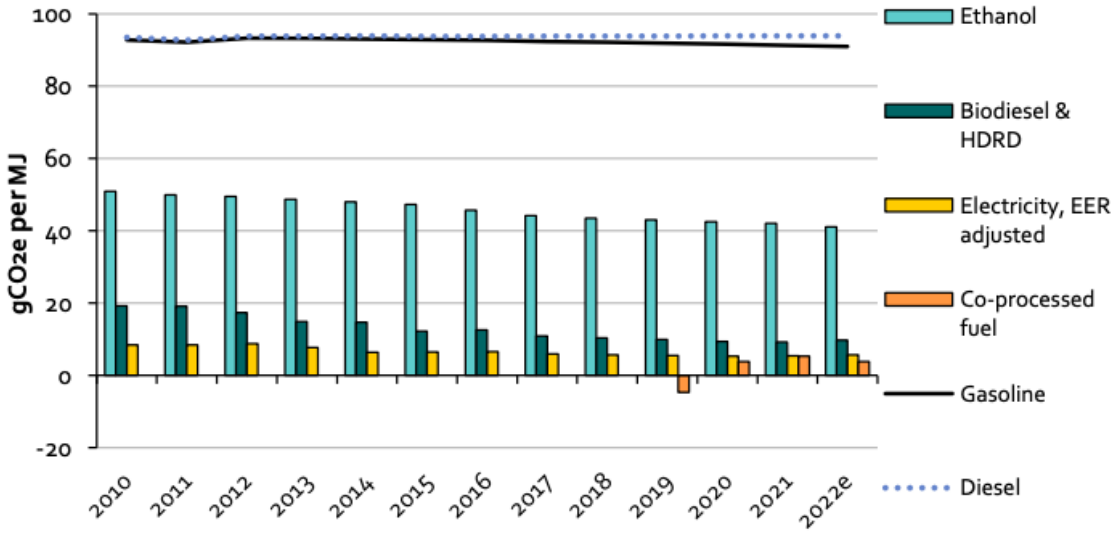
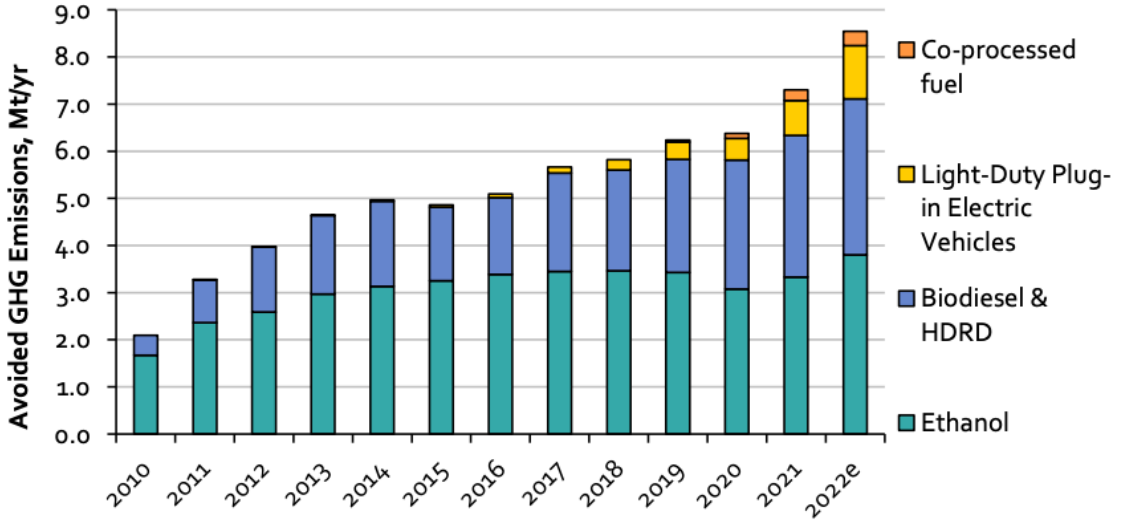


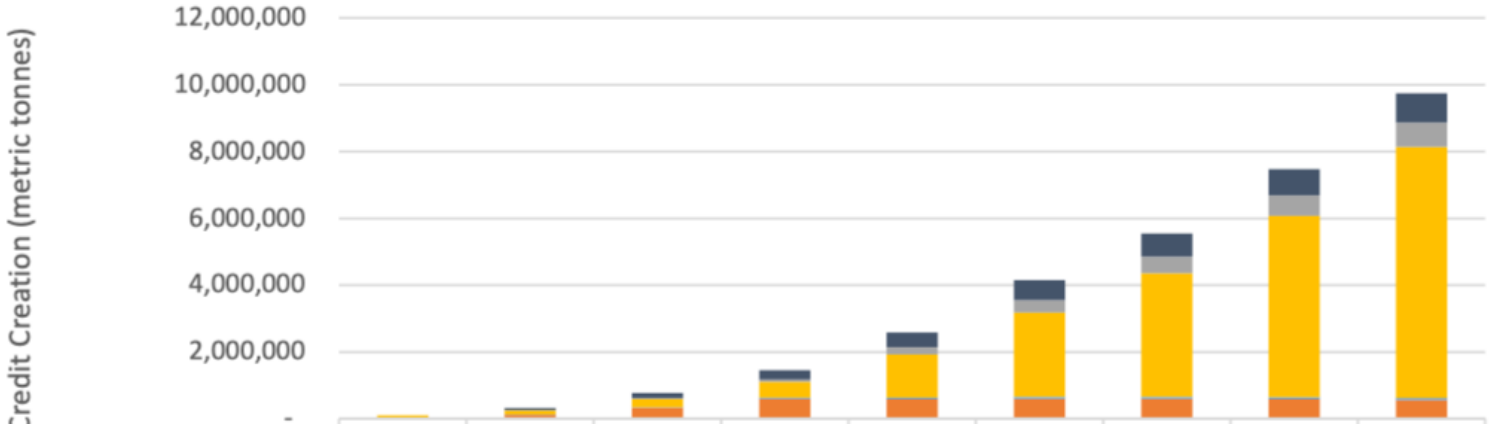
Figure 20: Avoided lifecycle GHG emissions 2010-2021, with an estimate for 2022



> https://www.naviusresearch.com/wp-content/uploads/2023/12/Biofuels-in-Canada-2023-2023-12-14.pdf

Current status: State of the market

Projected CC3 credit creation



	2022	2023	2024	2025	2026	2027	2028	2029	2030
Buses EV	-	54,370	144,008	268,245	446,751	597,853	692,445	784,796	873,813
Heavy duty EV & PHEV	-	14,854	39,016	72,038	213,345	367,737	491,230	610,491	725,520
Light duty EV & PHEV	77,618	126,053	238,740	477,957	1,298,38	2,528,92	3,703,85	5,426,24	7,518,15
Hydrogen vehicles	-	4,015	15,026	31,486	43,715	50,925	52,467	53,805	54,939
Gaseous vehicles	26,736	125,025	333,177	598,231	585,969	601,795	603,729	591,771	565,920

> https://esmia.ca/wp-content/uploads/2024/01/2023-12-29_ESMIA_CFR_ComplianceCosts_FinalReport.pdf#page=53

Current status: Regulatory agenda

- Regulatory review (opportunity for amendment) anticipated in 2027

- Consultations ongoing
  - Fuel LCA Model update (June 2024)
  - Emission Reduction Funding Program
  - Land Use & Biodiversity
  - RFR Compliance Unit Roll-Over
  - Verification
  - Credit market data report*

- 164 active organization accounts in the Credit and Trading System (CATS) as of November 8th, 2023
  - more than 200 registration reports submitted
  - over 375 users (multiple users per organization)

- Continuous development & guidance
  - Guidance for primary suppliers on exported crude oil
  - CC1 Quantification Methodologies

- Political risk!

Opportunities for policy innovation

**disclaimer: none of these proposals is an official EMC policy position.*

- Capacity crediting for DCFC
- Pooled EV incentives to streamline reinvestment requirements → s. 103(b)
- New CFR-enabled financial products / financing structures for (i) ZE MHD vehicle acquisition; (ii) EV-ready retrofits
  - Role for Canada Infrastructure Bank?
- Consistent with EMC's 2030 EV Action Plan:
  - Pillar 2 (Medium, Heavy-Duty and Off-Road Fleet Electrification), Rec. 6
  - Pillar 3 (National EV Infrastructure Deployment Plan), Rec. 13, 18

My Canada drives electric.

Key CFR resources & program materials (I)

- Government of Canada – ECCC – CFR main site
  > https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-regulations.html

- ECCC Clean Fuel Regulations Google Drive (regularly updated)
  > https://drive.google.com/drive/folders/1-DaMtrlJzDlmyiW9gB8IDJsARxI6Omeo

- CFR – Consolidated regulatory text: Government of Canada – Justice Laws
  > https://laws-lois.justice.gc.ca/eng/regulations/SOR-2022-140/page-1.html [html]
  > https://www.gazette.gc.ca/rp-pr/p2/2022/2022-07-06/pdf/g2-15614.pdf#page=5 [pdf]

- ECCC CFR Regulatory Impact Analysis Statement – Canada Gazette, Part II
  > https://www.gazette.gc.ca/rp-pr/p2/2022/2022-07-06/pdf/g2-15614.pdf#page=219 [pdf]
  > https://www.gazette.gc.ca/rp-pr/p2/2022/2022-07-06/html/sor-dors140-eng.html [html]

Key CFR resources & program materials (II)

- Credit and Tracking System (CATS):
  > https://marchescarbone-carbonmarkets.canada.ca

- CATS User Guide: Compliance with the Clean Fuel Regulations (update forthcoming)
  > https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-regulations/compliance.html

- Fuel LCA Model: Database, Methodology, User Manual:
  > https://www.canada.ca/en/environment-climate-change/services/managing-pollution/fuel-life-cycle-assessment-model.html

- CFR Specifications for Fuel LCA Model CI Calculations and Data Workbook: Carbon Intensity Calculations for the Clean Fuel Regulations
  > https://data-donnees.az.ec.gc.ca/data/regulatee/climateoutreach/carbon-intensity-calculations-for-the-clean-fuel-regulations/en/Resources/?lang=en

Other sources

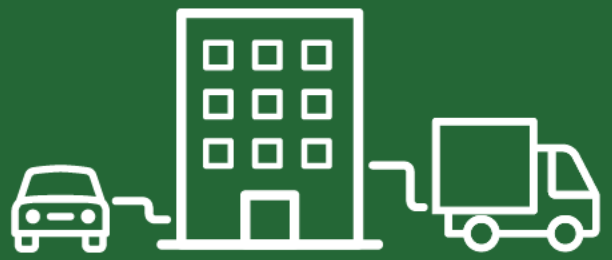
1. BC Ministry of Energy, Mines, and Low-Carbon Innovation. BC LCFS main site https://www2.gov.bc.ca/gov/content/industry/electricity-alternative-energy/transportation-energies/renewable-low-carbon-fuels
2. California Air Resource Board (CARB)
   > LCFS Data Dashboard: https://ww2.arb.ca.gov/resources/documents/lcfs-data-dashboard
   > LCFS regulatory text: https://ww2.arb.ca.gov/sites/default/files/2020-07/2020_lcfs_fro_oal-approved_unofficial_06302020.pdf
3. CALSTART. *Taking Commercial Fleet Electrification to Scale* (March 2021) https://calstart.org/taking-commercial-fleet-electrification-to-scale-financing-barriers-and-solutions/
4. ESMIA. *Compliance Costs under the Clean Fuel Regulations: Estimating near-term credit prices, compliance costs, and impacts on fuel prices* (Dec. 2023) https://esmia.ca/en/projet/compliance-costs-under-the-clean-fuel-regulations-estimating-near-term-credit-prices-compliance-costs-and-impacts-on-fuel-prices/
5. Hoyle, Aaron, Jotham Peters, Mark Jaccard, and Ekaterina Rhodes. 2024. “Additional or Accidental? Simulating Interactions between a Low-Carbon Fuel Standard and Other Climate Policy Instruments in Canada.” *Energy Policy* 185 (February): 113919. https://doi.org/10.1016/j.enpol.2023.113919
6. Mazzone et al. (2021) Multijurisdictional Status Review of Low Carbon Fuel Standards, 2010–2020 Q2: California, Oregon, and BC. https://escholarship.org/uc/item/080390x8
7. Witcover et al. “Comparison of the Canadian Clean Fuel Regulations with Fuel Carbon Intensity Standards in California, Oregon and British Columbia.” Joint Clean Climate Transport Research Partnership (JCCTRP) (October 2022). https://decarbonisation.uqam.ca/wp-content/uploads/sites/10/2022/10/WitcoverEtAl_JCCTRP_WG5_2022_Final_6oct2022.pdf

EVVE 2024

EMC's National Conference
September 10-13, 2024
Halifax, NS

Find out more at: https://evve.emc-mec.ca

Early-bird deadline is Tuesday, May 14. Register now to save!



Thank you!

Questions?

bora.plumptre@emc-mec.ca

My Canada drives electric.