



ASCENT 2022 Spring Meeting

5-7 April

Civil Aviation, Environmental Protection and Standards

Jon Obnamia



Transport
Canada

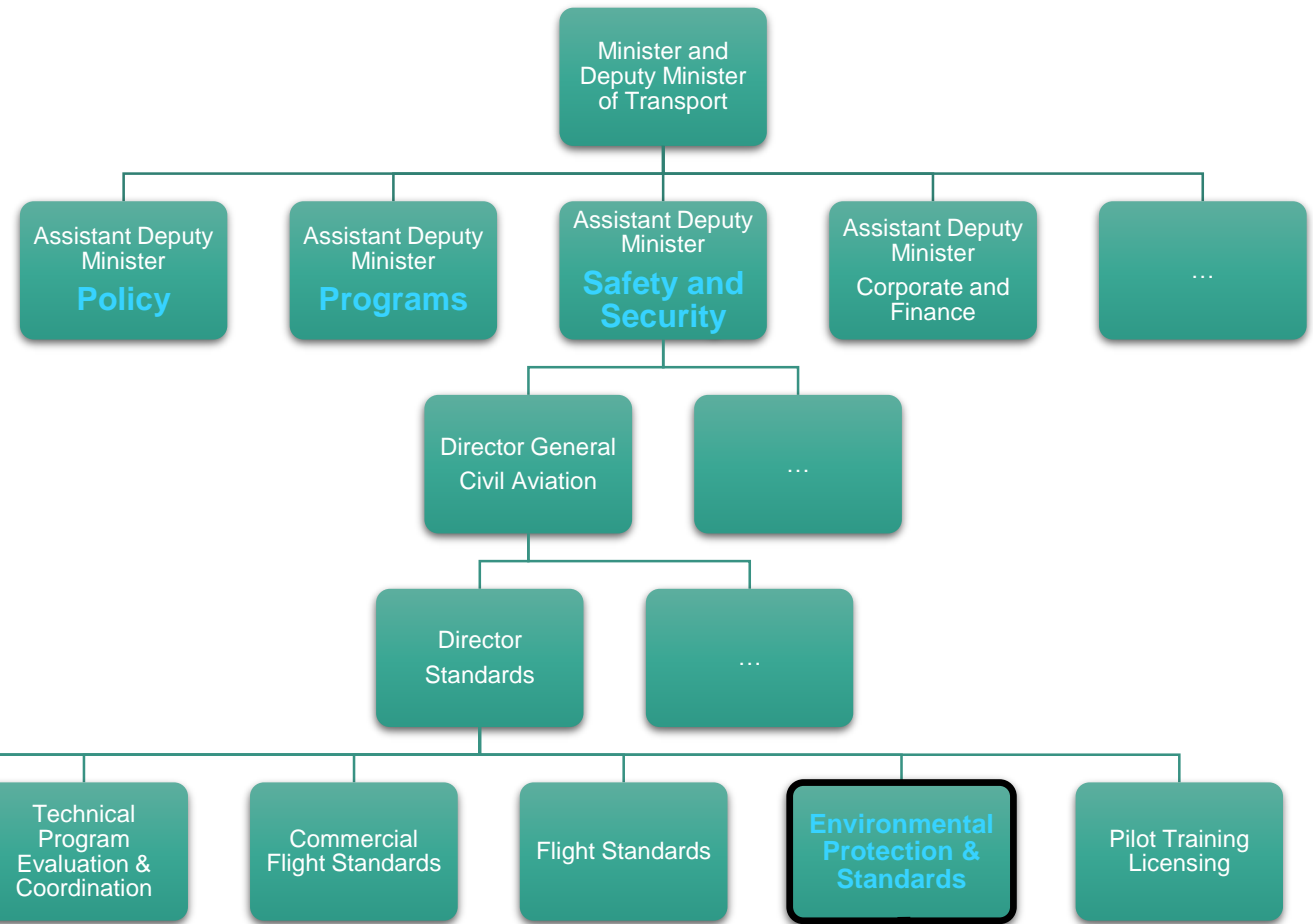
Transports
Canada

Canada

Transport Canada

TC Aviation Environmental Protection Section:

- Lead in ICAO CAEP
- Provide subject matter expertise for policy and program development related to aviation and the environment
 - Within Transport Canada
 - Across Government of Canada departments



Canadian Council for Sustainable Aviation Fuels (C-SAF)

- Launched February 23, 2022
- C-SAF is the new hub for SAF in Canada and aims to accelerate commercial deployment of SAF
- C-SAF brings together over 60 airlines operating in Canada and various SAF supply chain stakeholders:
 - Airlines
 - Academia
 - Feedstock producers
 - Fuel suppliers
 - Aerospace manufacturers
 - Airports
 - Finance
 - Technology providers

<https://c-saf.ca/>

<https://safcommunity.org/>



Canadian Council for Sustainable Aviation Fuels (C-SAF)

- C-SAF is being managed by FSM Management Group
- FSM has 15 years of experience managing aviation fuel and de-icing storage and distribution
- On the horizon:
 - Identify work streams, priorities, investment requirements for the industry
 - Identify partners to achieve objectives and advance SAF
 - SAF policy overview and solutions to support SAF development and pricing in Canada
 - Develop a roadmap to set actions that will decarbonize aviation
- Geoff Tauvette, C-SAF Executive Director (gtauvette@c-saf.ca)

<https://c-saf.ca/>

<https://safcommunity.org/>



Clean Fuel Regulations (CFR)

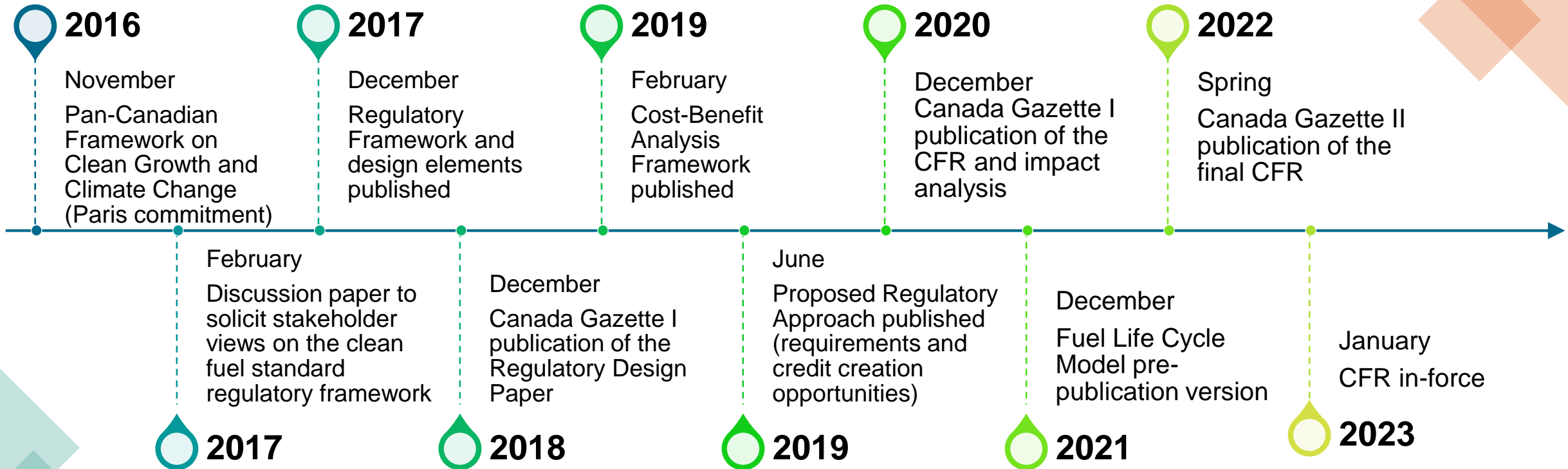
Reduce Canada's GHG emissions through:

- [1] Reductions in carbon intensity (CI) of liquid fossil fuels produced/imported into Canada
- [2] Creation of a credit market (1 CR = 1 tonne CO₂e lifecycle emission reduction)

Compliance Categories (CC)

- CC1: actions that reduce the CI of fossil fuel throughout its lifecycle (e.g., CCS, GHG reduction projects)
- CC2: supplying low carbon intensity fuels (e.g., ethanol)
- CC3: end-use fuel switching in transportation (e.g., gasoline to electricity LDV retrofit)

Clean Fuel Regulations (CFR) Timeline



Clean Fuel Regulations (CFR)

Fuel lifecycle CI reduction requirement to 2030

gCO ₂ e/MJ	Increment	2022	2023	2024	2025	2026	2027	2028	2029	2030+
CG I	1.2/y	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12
Proposed	1.5/y	0	3.5	5.0	6.5	8.0	9.5	11	12.5	14

2030 credit analysis (annual reductions by 2030)

Compliance Category	CG II Analysis (millions of credits)
CC1 (lifecycle CI reduction)	4
CC2 (supplying low CI fuel)	11
CC3 (end-use fuel switching)	7
Emerging technologies	8
Payment to designated fund	3
Total	34

Clean Fuel Regulations (CFR)

Fuel LCA Tool was developed for the CFR (pre-publication version Dec. 2021)

- Based on OpenLCA software (free software: [openLCA.org](https://openlca.org))
- Data included for (Province/State-level, Country-average level)
 - **Canadian feedstocks:** peas, barley, corn, wheat, canola, soybean, camelina, animal fats, yellow grease, agricultural residues, wood chips, wood pellets
 - **US feedstocks:** corn, sorghum
 - **Brazil feedstocks:** sugarcane
 - **Process inputs:** Cdn electricity, US electricity, Brazil electricity, source-specific electricity (e.g., coal, hydro, etc.), agrochemicals/fertilizers, process chemicals, enzymes
 - **Processes:** oilseed extraction, transportation and distribution



Clean Fuel Regulations (CFR)

More information:

CFR home page:

<https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-standard.html>

Proposed CFR:

<https://gazette.gc.ca/rp-pr/p1/2020/2020-12-19/html/reg2-eng.html>

Fuel LCA Model Methodology:

<https://publications.gc.ca/site/eng/9.893160/publication.html>

Pre-publication Fuel LCA Model:

<https://data-donnees.ec.gc.ca/data/regulatee/climateoutreach/government-of-canadas-fuel-life-cycle-assessment-model/en/?lang=en>

Canadian Initiatives

- Innovation, Science, and Economic Development Canada (ISED)
 - Strategic Innovation Fund and Net Zero Accelerator (CAD\$8B+ in funding)
 - 3 projects publicly announced July 2021: P&W Canada, Bell Textron Canada, Canadian Aviation Electronics (CAE)
 - Many many projects continue to be under review
 - <https://www.ic.gc.ca/eic/site/125.nsf/eng/home>
- Natural Resources Canada
 - Clean Fuels Fund (CAD\$1.5B)
 - TRL9 (commercial-ready) and Front-End Engineering and Design projects are being supported
 - Program closed last October 2021
 - Project proposals under review
 - <https://www.nrcan.gc.ca/climate-change-adapting-impacts-and-reducing-emissions/canadas-green-future/clean-fuels-fund/23734>
- Waterloo Institute for Sustainable Aeronautics
 - Launched last October 2021
 - Graduate program to launch September 2022
 - <https://uwaterloo.ca/sustainable-aeronautics/>



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