

# Transport Canada Update to the ASCENT Advisory Board



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Transport Canada

October 14-16, 2025



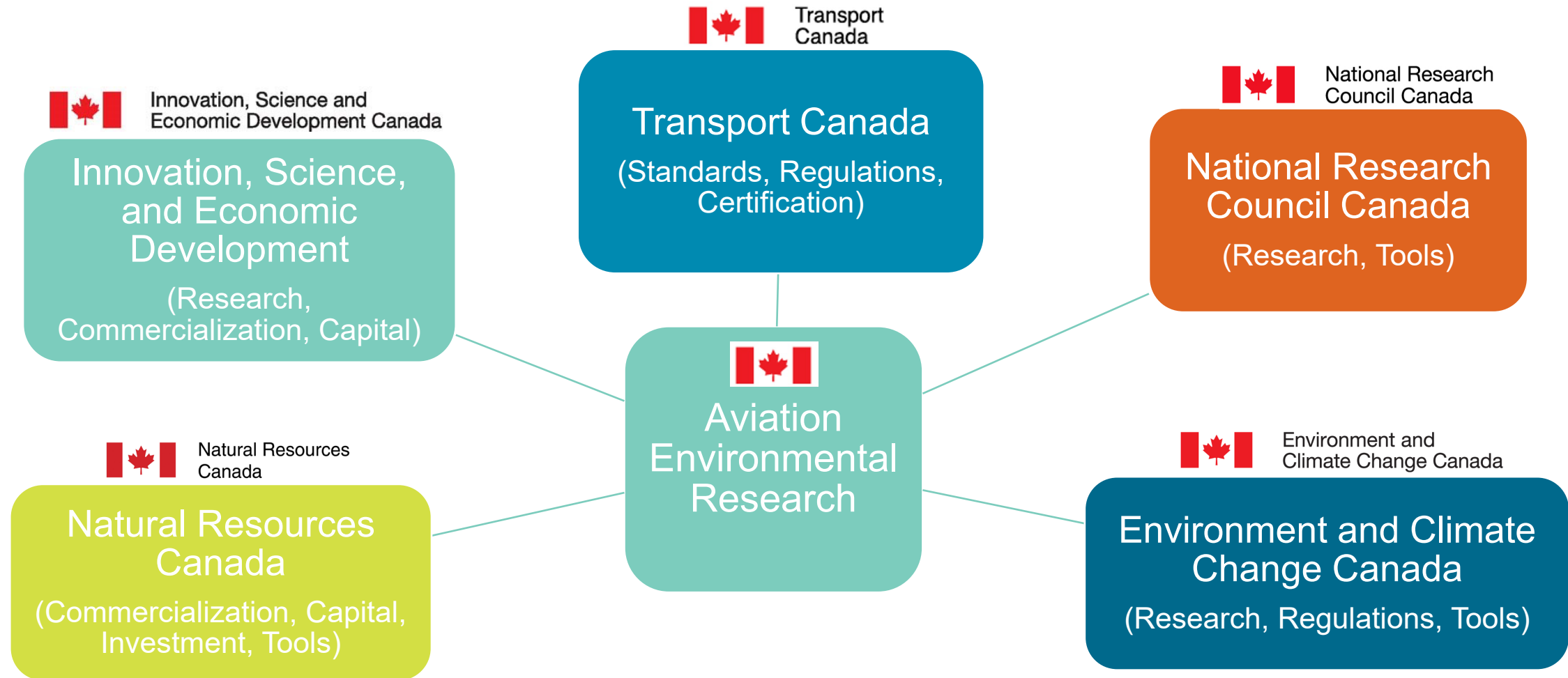
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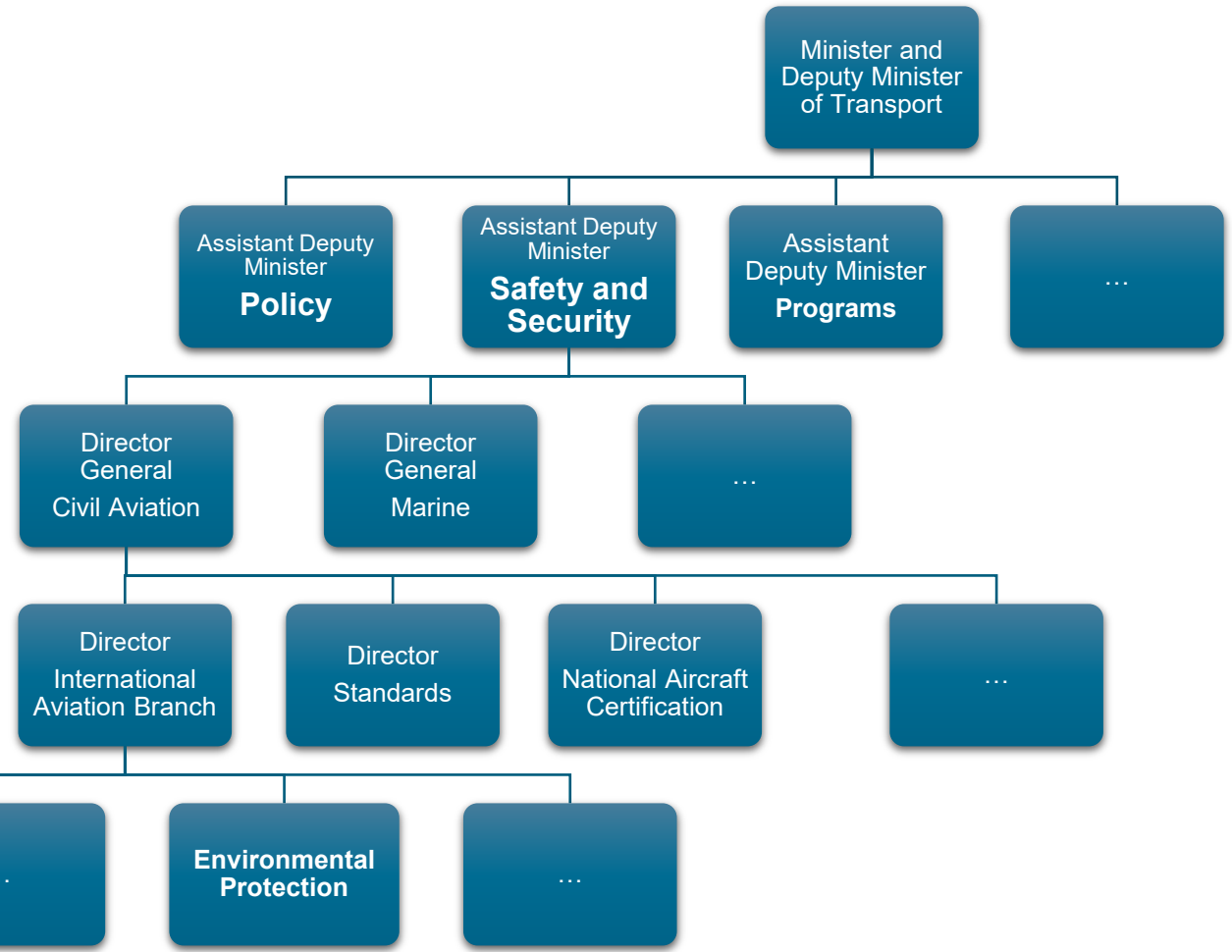
# Canadian Aviation Environmental Work



# Transport Canada

## TC Aviation Environmental Protection

- Lead in ICAO Committee on Aviation Environmental Protection
- Subject matter expertise for policy and program development on aviation and the environment
  - Within Transport Canada
  - Across Government of Canada departments



# Ongoing Work

## ➤ **Engagement through the Sustainable Aviation Task Force**

- To finalize the SAF Blueprint for Canada
- Develop a new aviation technology roadmap and advance development of the Clean Transportation Strategy

➤ **Develop a Clean Transportation Strategy** to present the economic opportunities associated with emissions reductions such as supporting jobs, business investment and competitiveness, affordability and growth.

➤ **Legislative** – Updating Canada's Canadian Aviation Regulations and Standards to align with revisions to the second edition of ICAO's Annex 16 Volume IV Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA).

➤ **Continuing Technical Work at ICAO's Committee on Aviation Environmental Protection** – TC leads and participates in several working groups under ICAO's environment committee including WG1 Noise; WG2 Airports and Operations; WG3 Emissions; WG4 CORSIA; WG5 Fuels; the Modelling and Database Group; and the Sustainability Certification Schemes Evaluation Group (SCSEG).

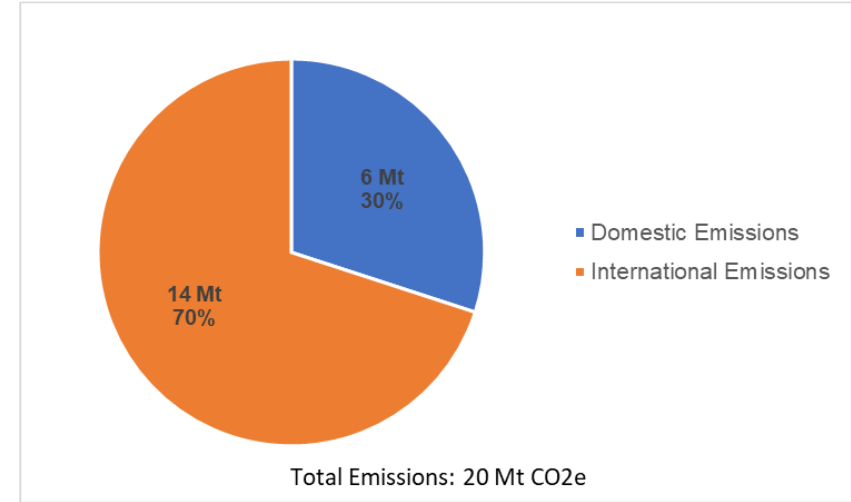
➤ **Support research, development, certification, and commercialization of zero-emission aircraft technologies / infrastructure**, such as electric or hybrid-electric planes.

➤ **Coordinated efforts** – ASCENT, International Aviation Climate Ambition Coalition (IACAC)

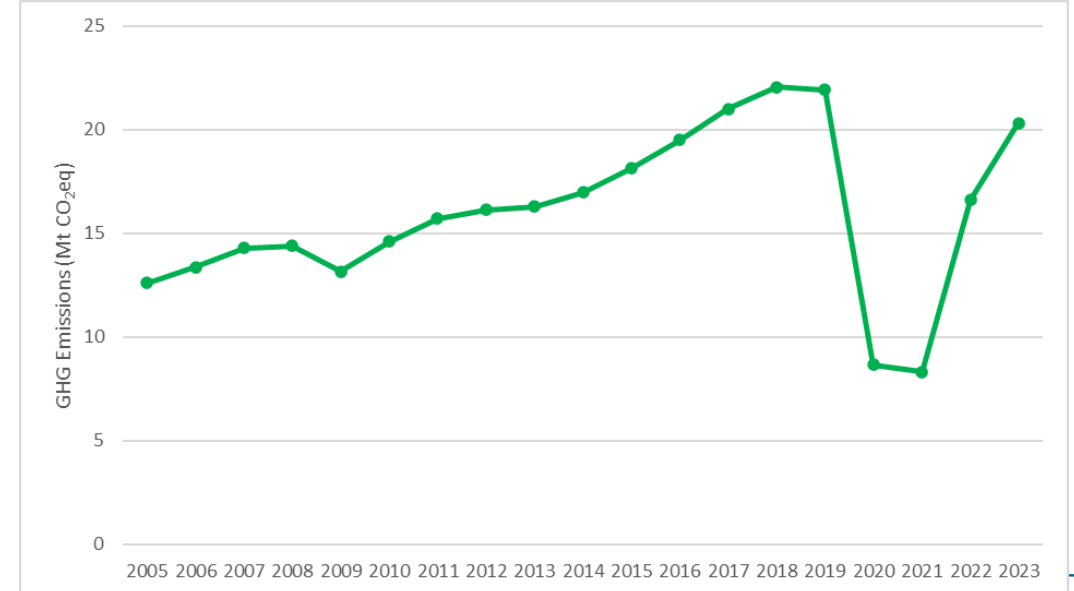
# Aviation Sector Emissions Profile

## Domestic vs International Emissions (2023)

- Domestic aviation at ~1/3 of aviation GHG emissions (~ 5% of Canada's transportation emissions)
- International aviation emissions from Canadian air carriers accounts for ~2/3 of aviation GHG emissions (~12% of Canada's transportation)
- Emissions from Canadian air carriers (domestic and international operations) have increased by 4 Mt between 2005 and 2023.
- Canada has been working closely with international partners through the International Civil Aviation Organization (ICAO) to ensure alignment of international policies with domestic policies, methodologies, and Canadian data.



## Aviation Emissions Trend (2005-2023)



# Canada's SAF Blueprint



## SAF as key to low carbon transition

- Path to meet 2030 10% SAF use aspirational goal and 2050 net zero target
- A SAF Blueprint to inform needs for SAF growth and development in Canada



## An Assessment

- Feedstocks and Fuel Production
- Current and projected SAF production
- Policy and Regulatory Landscape
- Collaboration opportunities, sustainability standards, emissions reporting
- Future infrastructure needs



## Potential Actions

- Potential actions for both government and non-government stakeholders
- Ensure sufficient availability and access to SAF towards 2030 (1B L / ~0.27B gal)
- Building up towards 2050
- Action oriented themes:
  - Strategic Partnerships
  - De-Risk Investment
  - Build Supply Chains and Establish Supporting Infrastructure
  - Codes and Standards
  - Accelerate Technology Development and Innovation
  - Emissions Accounting and Book & Claim
  - Education and Awareness



**Anticipated Q1/Q2 2025**  
**Q4 2025**

# NRC Activities - Metrology

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The National Research Council Canada (NRC) provides research and technical support to Transport Canada for emissions and new technologies for civil aviation, supporting standards development through providing scientific-based evidence (e.g. for aircraft icing, electrification, SAF, etc.)

NRC supports TC through active participation in:

- SAE E-31 Aircraft Engine Gas and Particulate Emissions Measurement Technical Committee
- ICAO/CAEP WG3 Emissions Technical and the Impacts and Science Group (ISG)

Research efforts include ongoing lab research to support improved measurements of nvPM mass concentration, as well as participating in & conducting analysis of results of international field measurement campaigns.



# Activities in 2023-2025

- Field measurement campaigns
  - EcoDemonstrator 2023 (fieldwork performed Q4 2023)
  - CERMS ILC (fieldwork performed Q1 2023)
  - DICE IV (second CERMS ILC – scheduled for December 2025)
  - UNIC: Understanding Non-CO<sub>2</sub> Impact for deCarbonized aviation (2025 – 2028)
- Analysis of field measurement campaigns
  - ECLIF III
  - EcoDemonstrator 2022
  - EcoDemonstrator 2023
  - CERMS ILC
- Flame Spray Pyrolysis
  - To produce nvPM with properties emulating those from aircraft engine emissions
  - New FSP enclosure being investigated as a laboratory bench-top tool to act as a diffusion flame combustion aerosol source (DFCAS) for future research of aviation nvPM from liquid fuels (e.g., SAF, SAF blends)
  - Carleton University + NRC Metrology Lab + Transport Canada



# ECCEC - Contrail Avoidance Tool (CoAT)

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- Well developed base model used at **Environment and Climate Change Canada**
- **Physically based** numerical weather prediction model
- Used for generating **daily forecasts** and to issue weather related warnings

CoAT (developed within the base model framework)

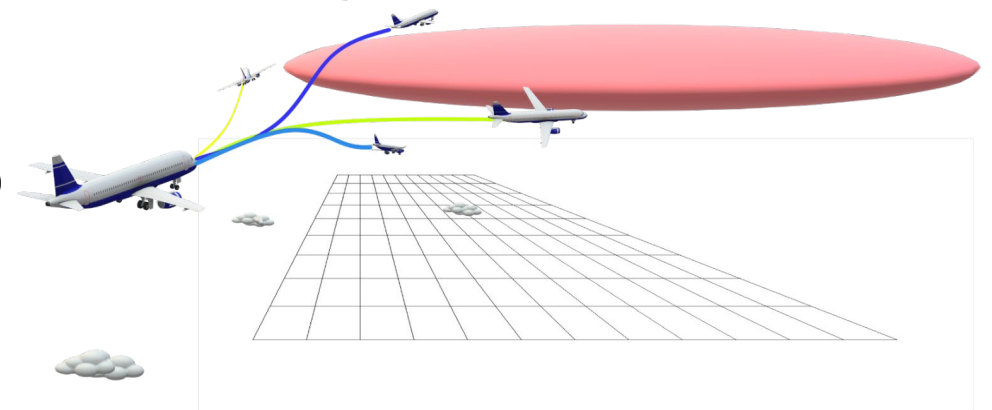
- Predict regions for contrail formation
- Forecasts can be used by flight planners for flight mitigation strategies
- Flight planners can then assess new flight paths and the **cost** for **diverting aircraft**

Research studies

- Climate impact of using alternate fuels (SAF or Hydrogen)

CoAT support

- Environment and Climate Change Canada – lead
- Transport Canada as cost-share partner



# ECRC - Clean Fuel Regulations (CFR)

## Review and Amendment

Compliance credits can be created in three ways:

- Compliance category 1 (CC1): GHG emissions reduction projects that reduce the carbon intensity of liquid fossil fuels throughout their lifecycle
- Compliance category 2 (CC2): producing and importing low-carbon-intensity fuels
- Compliance category 3 (CC3): supplying fuel or energy to advanced vehicle technologies

	2022	2023	2024	2025	2026	2027	2028	2029	2030
% below 2016 levels	0%	4%	5%	7%	8%	10%	12%	13%	15%
Expected reduction requirements* (Mt)	0	4.7	13.7	17.5	21.2	24.7	28.0	31.2	34.3

Submitted CIs using the Fuel LCA Model as of July 25, 2024

Fuel	Number of Approved CIs included in the publication	Min CI (g CO <sub>2</sub> e/MJ)	Max CI (g CO <sub>2</sub> e/MJ)	Average CI (g CO <sub>2</sub> e/MJ)
Ethanol	15	29	50	41
Hydrogenation-Derived Renewable Diesel	16	20	56	30
Biodiesel	9	14	29	19
Other Liquid Low-CI Fuel	20	20	55	31

- On September 5th, Prime Minister Carney announced a new set of measures to support industries impacted by recent global trade pressures – including the biofuel sector.
- As part of this announcement, a **targeted amendment to the CFR** will be undertaken to support the domestic biofuel sector, while maintaining the Regulations' primary focus on lowering emissions
- ECRC will only be considering targeted amendments that advance this objective at this time. A **separate regulatory review will be conducted later**, which will include a review of broader issues, including credit creation opportunities and reduction requirements.

# Airport Updates – Hydrogen Focus

## Edmonton (YEG)

<https://h2canfly.com/>

- **YEG joined the H2CanFly** partnership to leverage from land assets and local expertise aiming to make Canada a globally recognised H2 platform for aviation.
- Executive partner of the Edmonton Region Hydrogen Hub (ERH2) - The HUB focuses on building a robust hydrogen value chain through collaboration, system integration, and policy advocacy.
- Fleet of 12+ hydrogen powered vehicles including Toyota Mirai and Hyundai Nexo
- Reliable H<sub>2</sub> supply in situ at YEG - Temporary H<sub>2</sub> refuelling station with a local Premium partner.
- Retrofitting 2 snow sweepers to dual engine (Diesel/Hydrogen engines) through a local innovative partnership.
- Exploring feasibility of hydrogen production and refueling station on our Airport City Sustainability Campus

## Toronto Pearson (YYZ)

- The GTAA has a vision for significant transformation into one of the most advanced, sustainable, and passenger-friendly airports in the world. The vision includes a path to Net Zero that looks at sources of clean energy including hydrogen as an opportunity.
- Toronto Pearson partnered to build Ontario's first publicly accessible H2 fueling station for light- and heavy-duty vehicles, which opened in 2025. The airport has also introduced hydrogen into its light-duty fleet, and started hydrogen-powered equipment trials, both groundside and airside.
- Pearson is undertaking a feasibility study for development of a H2 pipeline to YYZ from large-scale H2 production sources.
- The airport is also participating in a feasibility study with Airbus and ZeroAvia for the future of hydrogen-powered flight at Canadian airports. The study reflects the partners shared ambition to use their respective expertise to support the decarbonization of the aviation industry and to achieve net-zero carbon emissions by 2050.

# Hydrogen study at Canadian Airports (Carleton University)

- Research 2022/2023 – **A benefit-cost analysis of hydrogen adoption in Canada's airports** – The project estimates the amount of hydrogen that would be needed in the year 2050 to serve multiple energy services at Canada's busiest airports.
- Research 2023-2026 – **Optimizing hydrogen microgrids for adoption at Canada's airports** – This project will develop an energy system optimization model for a hydrogen-backed microgrid deployed at Canadian airports.





# Transport Canada Civil Aviation – International Aviation Branch Aviation Environmental Protection Unit

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