



The Chartered
Institute of Logistics
and Transport



Creating Strategic Value Through Sustainability

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Fuels (C-SAF)



Creating Strategic Value Through Sustainability



Janet Drysdale

Vice-President

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September 15, 2022



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Outline

1. Context: How ESG is Shaping our Future

2. About CN

3. Tackling Climate Change

4. Strengthening Our Safety Culture

5. Embracing Diversity and Inclusion

6. Driving Continuous Improvement

ESG is Shaping our Future



Investors urge 1,600 companies to set science-based targets for carbon emissions

IR Magazine, September 2021

Nestle and Delta are among dozens of firms most at risk of climate change hazards, investors warn

Forbes, September 2021

Lawyer who defeated Shell predicts 'avalanche' of climate cases

Financial Times, December 2021

Big business pledged nearly \$50 billion for racial justice after George Floyd's death

Washington Post, August 2021

BlackRock adds diversity target for U.S. boardrooms

Reuters, December 2021

Climate change will alter where many crops are grown

The Economist, August 2021

ESG assets may hit \$53 trillion by 2025, a third of global AUM.

Bloomberg, February 2021

Investors tell Australian firms to improve Indigenous relations

Bloomberg, December 2021

The world inches closer to 'alignment' on global ESG standards

Fortune, December 2021

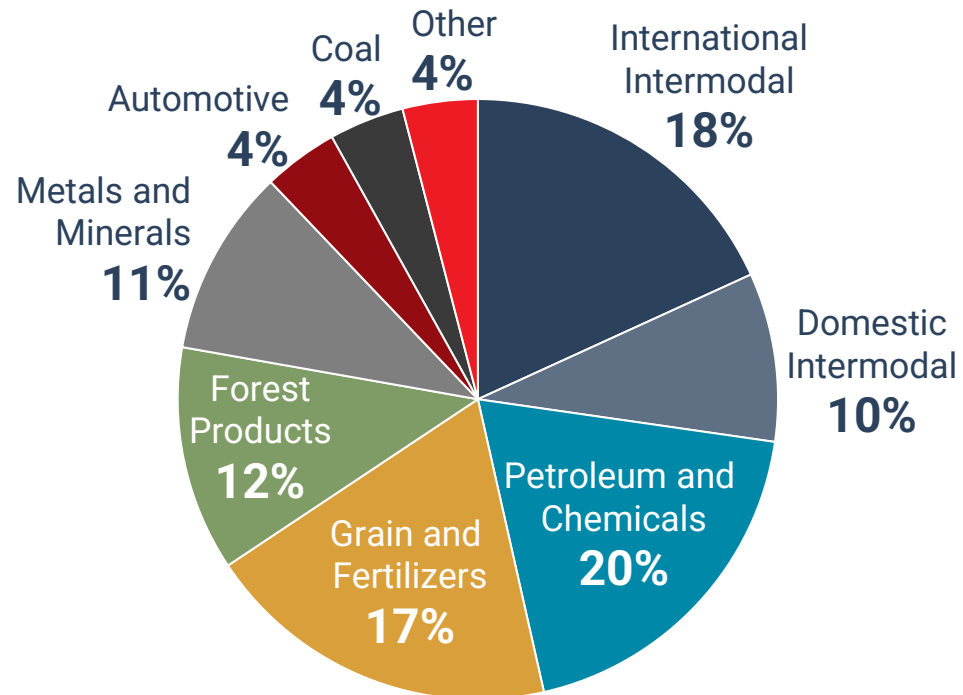
How climate change can be addressed through executive compensation

World Economic Forum, January 2021

A Great Franchise



Well-Diversified Portfolio



Global West 29%

Domestic Canada 18%

Transborder 31%
Southbound 21%
Northbound 10%

Global East 4%

Domestic U.S. 16%

Global South 2%

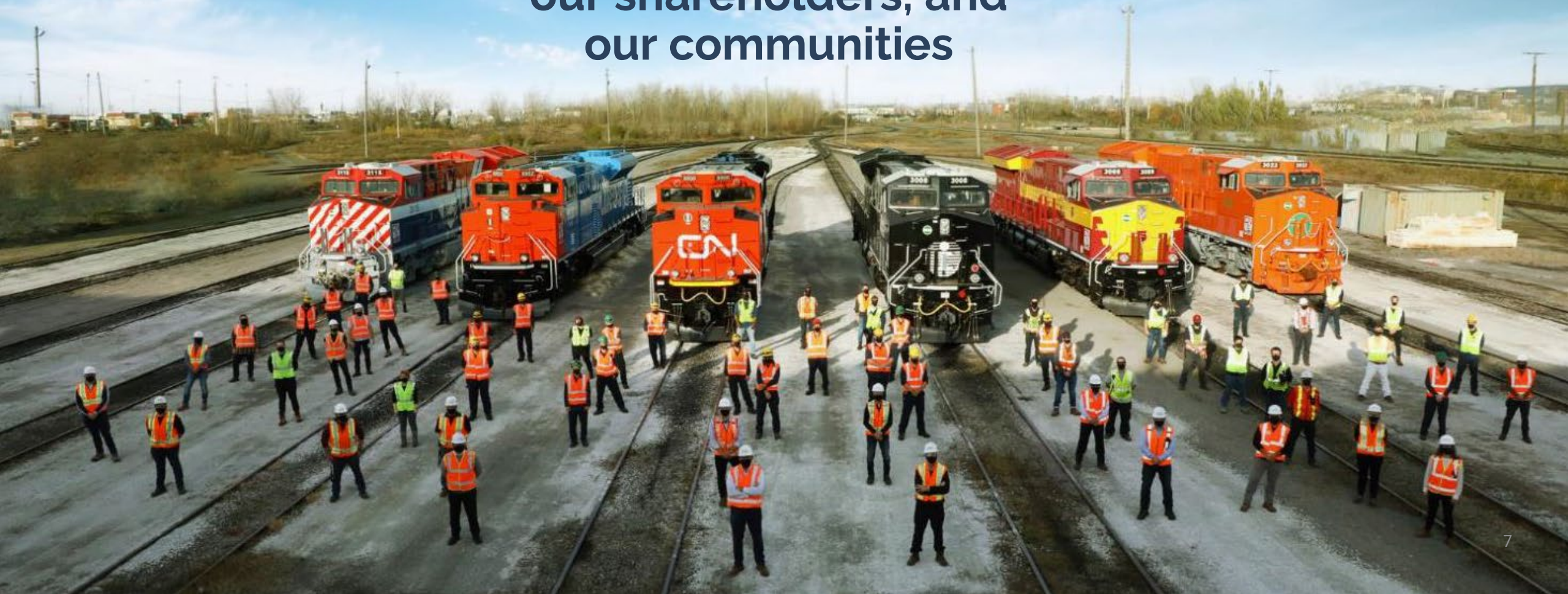
TRAFFIC DENSITY LEGEND
GTMs per route mile



A Clear Vision



Powering sustainable growth for
our customers, our people,
our shareholders, and
our communities

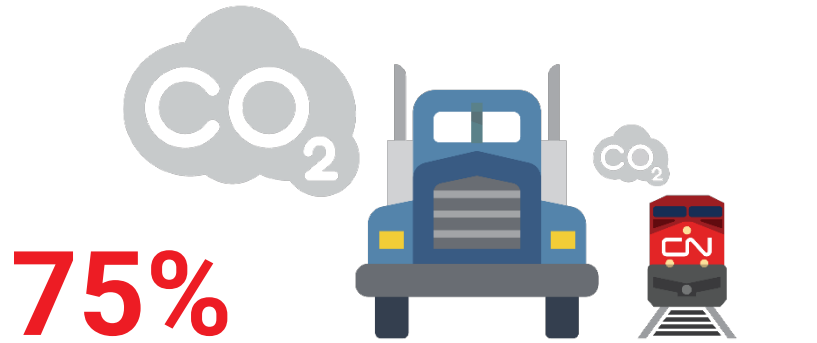


A Responsible Approach

Delivering Responsibly defines how we conduct our business every day and our contribution to building a more sustainable future.



Rail Offers Significant Environmental Benefits



Moving freight by train instead of truck reduces GHG emissions by up to 75%



Railroads are approximately 4 times more fuel efficient than trucks



One train can move, on average 1 ton of freight 480+ miles on 1 gallon of fuel



A single freight train can replace over 300 heavy duty trucks

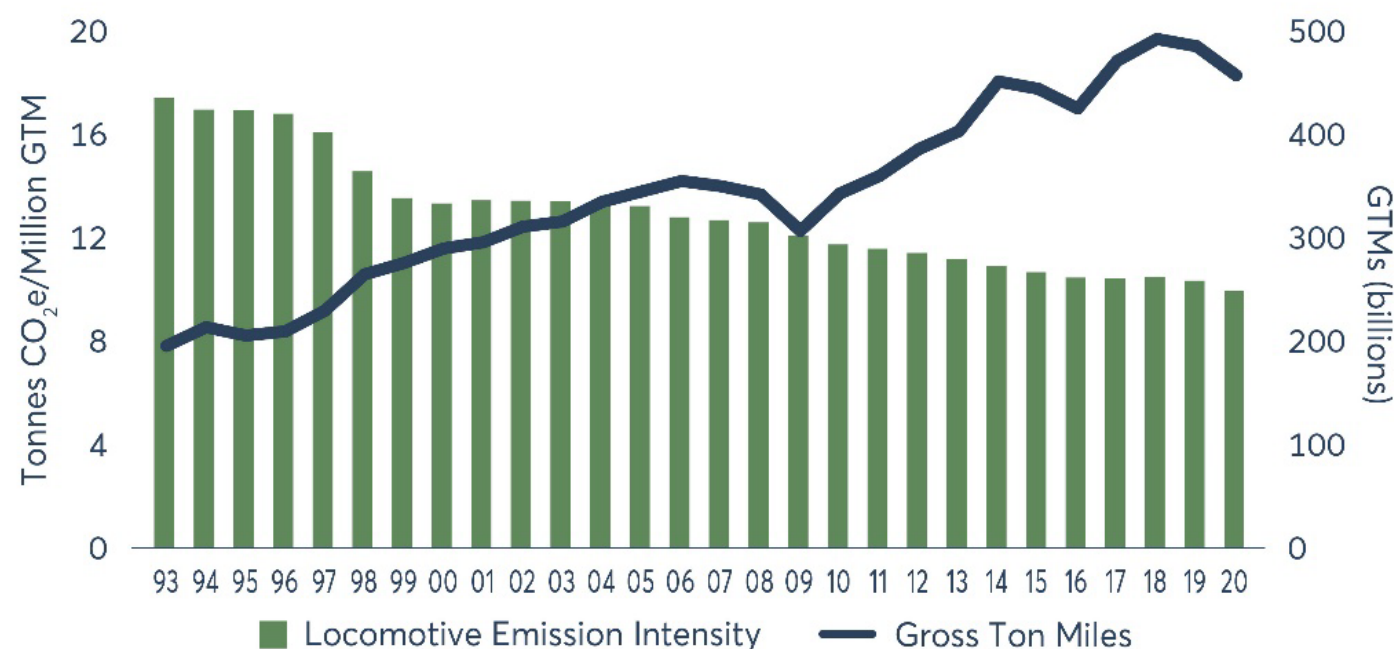
Moving More of our Customers' Goods with Less Fuel



Decoupling Growth from Carbon Emissions Intensity

LOCOMOTIVE GHG INTENSITY vs. GROSS TON MILES (GTM_s)

(Tonnes CO₂e/Million GTM vs. Traffic Billion GTM)



SINCE 1993:

↓ 43%

REDUCTION IN LOCOMOTIVE
GHG INTENSITY

↓ 48 million

TONNES OF CARBON AVOIDED
WHILE CONTINUING TO GROW IN
THE VOLUME OF FREIGHT WE MOVE

CN's Commitment to Further Reduce Emissions



1st railroad in North America, and amongst the **first** 100 companies globally, to set an approved science-based target

2030 Target

↓ 43%

REDUCTION IN GHG
EMISSIONS INTENSITY

Renewable Fuels Pilot

Collaborative approach to the first of its kind long-term test of high-level renewable fuel blends

To better understand the long-term durability and operational impacts of renewable fuels on locomotives, especially in cold weather



Progress Rail
A Caterpillar Company



Beyond 2030....Towards Net Zero by 2050



Key pilots underway to
advance our knowledge
of **zero emission**
alternative propulsion
technology development



Strengthening Our Safety Culture

Safety is a core value that guides our actions at all times. Our goal is to eliminate serious injuries and fatalities from our workplace and become the safest railroad in North America.



Embracing Diversity and Inclusion

Building a respectful, inclusive, and supportive culture is integral to our ability to innovate, and to meet the expectations of our employees, our customers, our shareholders, and the communities in which we operate.



Setting ESG Targets and Long-Term Goals

Raising our level of ambition to deliver for a sustainable future

Environmental Protection

Reduce GHG emission intensity by 43% by 2030,
based on 2019 levels

First N.A. rail to commit to having a net-zero target by joining Business Ambition for **1.5°C** and 'Race to Zero' Campaign



Social Responsibility

Goal to **reduce serious injuries and fatalities to zero**

Targeting **30% women** on the executive management team by 2022



Strong Governance

Targeting at least **50% of independent directors coming from diverse groups**, including **gender parity**

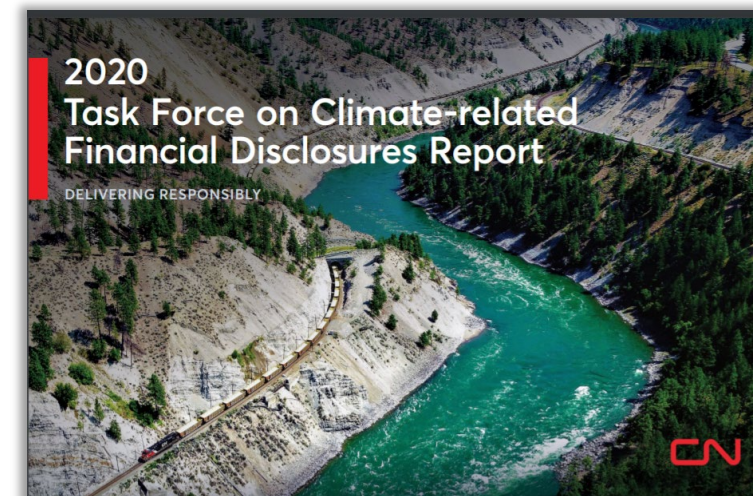
Strengthening relationships with **Indigenous People** and Communities



Thorough, Transparent Disclosures



Commitment to be open about our business and to communicate our progress with focus, clarity and comparability



Thank You





Canadian Council for Sustainable Aviation Fuels
Conseil canadien des carburants d'aviation durables

Sustainable aviation fuels in Canada

The Chartered Institute of Logistics and Transport

Sep 15, 2022



Geoff Tauvette, Executive Director of the
Canadian Council of Sustainable Aviation
Fuels (C-SAF)



C-SAF is an FSM Group managed company

The aviation net-zero plan

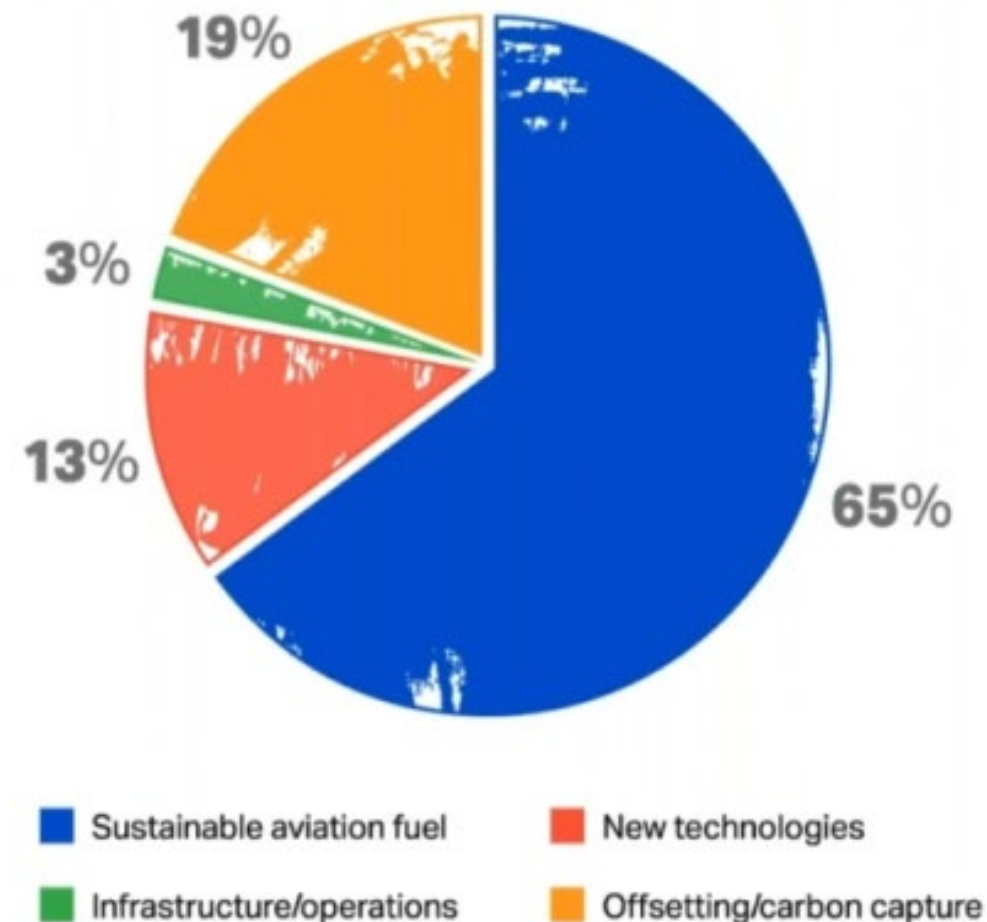


Industry commits to net-zero emissions by 2050

A global solution



Contribution to achieving Net Zero Carbon in 2050



ATAG Waypoint 2050 technology assessment

	2020	2025	2030	2035	2040	2045	2050
~73% of CO ₂	Long-haul 250+ seats 150+ minute flights ~30% of industry CO ₂						
	SAF	SAF	SAF	SAF	SAF	SAF	SAF
	Medium-haul 100-150 seats 60-150 minute flights ~43% of industry CO ₂						
~27% of CO ₂ emissions	SAF	SAF	SAF	SAF	SAF	SAF	SAF potentially some Hydrogen
	Short-haul 100-150 seats 45-120 minute flights ~24% of industry CO ₂						
	SAF	SAF	SAF	SAF potentially some Hydrogen	Hydrogen combustion and/or SAF	Hydrogen combustion and/or SAF	Hydrogen combustion and/or SAF
~27% of CO ₂ emissions	Regional 50-100 seats 30-90 minute flights ~3% of industry CO ₂						
	SAF	SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF
	Commuter 9-50 seats <60 minute flights <1% of industry CO ₂						
~27% of CO ₂ emissions	SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF	Electric or Hydrogen fuel cell and/or SAF

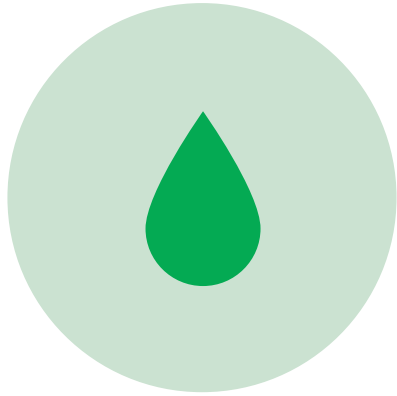
Source: ATAG Waypoint 2050 Report, rev 2021

Electric & Hydrogen initial commercial market entry in regional markets in 2030's, short-haul markets in 2040's

Medium and long-haul markets require **Hydrocarbon Fuel** over long-term

Large volumes of **Sustainable Aviation Fuel (SAF)** essential to meeting 2050 ambitions

What is SAF?



LIQUID



DROP-IN



LOW CARBON

SAF is SAFE and can be deployed now to reduce emissions from aviation

We know how to make it – but it is expensive

			
HEFA	Alcohol-to-jet	Fischer-Tropsch	Power-to-liquid
Now - Proven, scalable technology	Next - Near to mid term potential		Long term opportunity
Waste and residue lipids (fats, oils, greases), purpose grown sustainable oil energy plants	Ag and forestry residues, municipal solid waste, sustainable cellulosic crops Crop based sugar alcohols	Agricultural and forestry residues, municipal solid waste, sustainable cellulosic crops	Renewable energy, industrial gases
Mature Commercial 2016+	Demo proven Commercial 2022+	First commercial plants in construction Commercial 2021+	Technology in development Commercial 2030+
Challenge: long term scale limited by feedstock availability	Challenge: feedstock accessibility, production scale up	Challenge: feedstock accessibility, production scale up	Challenge: tech readiness, cost and competition for renewable energy
50% blend limit / Up to 84% LCA	50% blend limit / Up to 72% LCA	50% blend limit / Up to 94% LCA	50% blend limit / Up to 100%* LCA (with 100% renewable energy)

Source: WEF Clean Skies for Tomorrow Report, ICAO

From start to finish,
Canada has all the right
ingredients to build a
competitive SAF market

So how come there is no
made-in-Canada SAF?



C-SAF was formed to coordinate SAF efforts in Canada



Vision

Facilitate the **production** and **use** of sustainable aviation fuels (SAF) that are:

- ▶ Affordable
- ▶ Low-carbon/Sustainable
- ▶ Made-in Canada

Mission

Accelerate **commercial production** and **deployment** of SAF in Canada by:

- ▶ Catalyzing the ecosystem and **activate value chains**
- ▶ Designing and **promoting** public **policy, strategies** and a **roadmap** for SAF development in Canada
- ▶ Acting as a neutral and balanced **technical expert**
- ▶ Providing the "**go-to-place**" for SAF deployment in Canada

Mobilizing the ecosystem

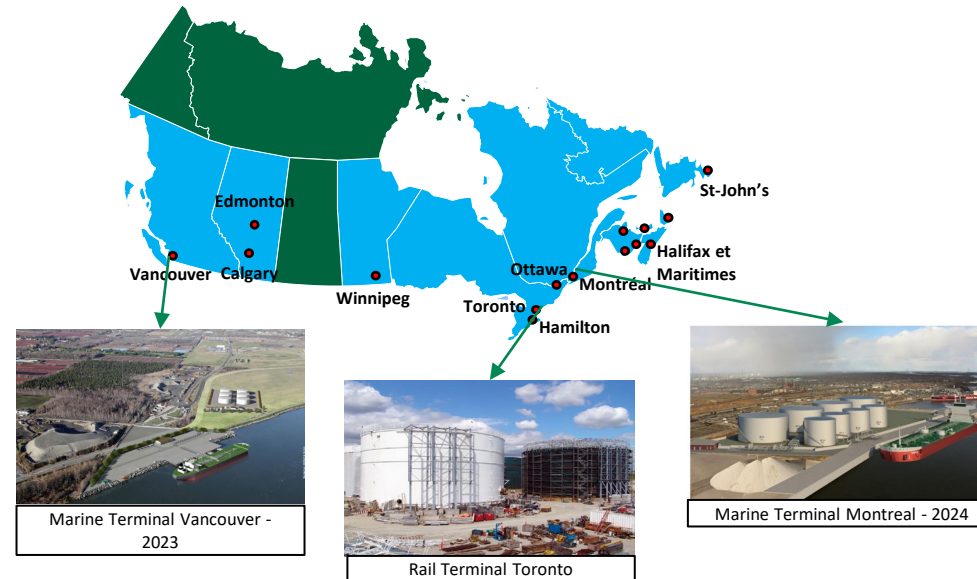
+60
Airlines/End Users

10
Fuel Infrastructure Consortia

45
Key Stakeholders



- Domestic
- Regional
- International
- Charters
- Cargo



- Owned and operated by commercial airlines
- 6 billion Litres handled in 2019

Fuel refiners

Government

Technology providers

Feedstock producers

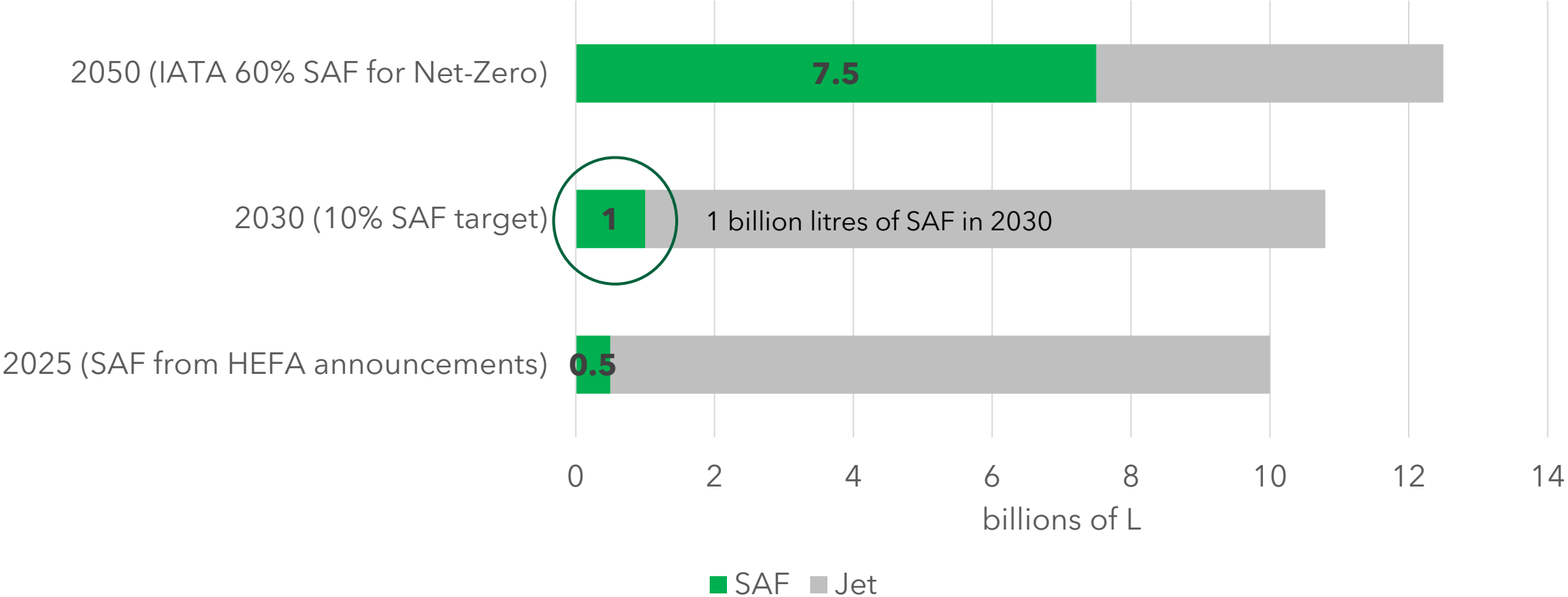
Airports

OEMs

Academia

Financial sector

How much SAF are we talking about?



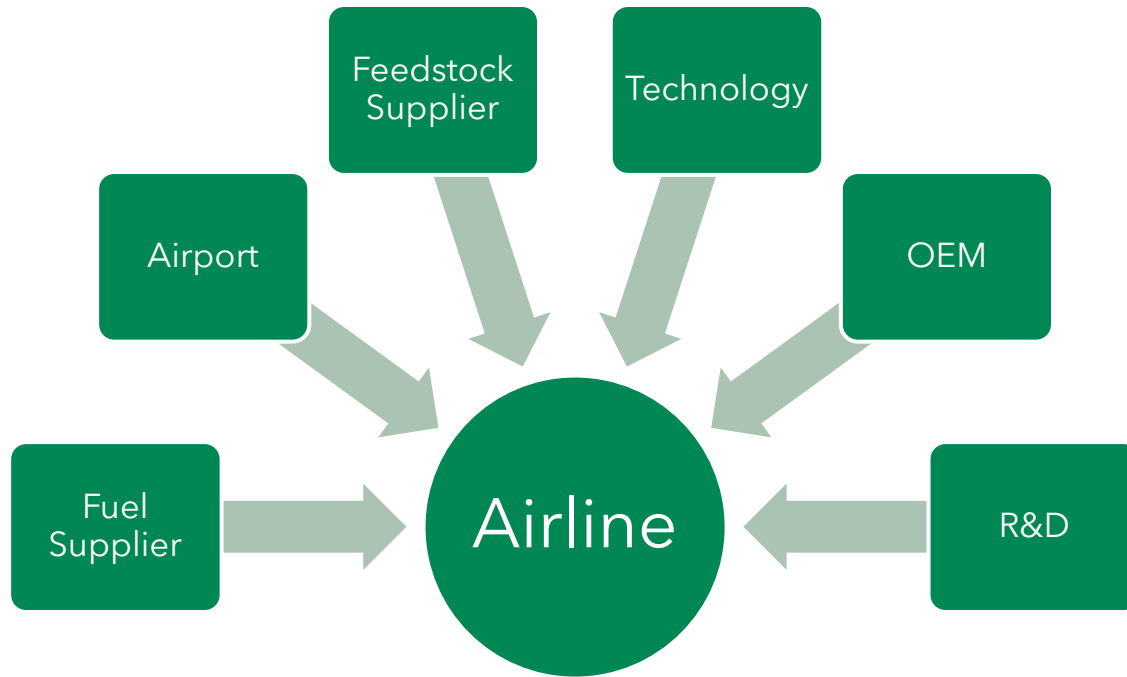
What policies, how fast and what effort is needed to fill the gap to 1B L



Moving Forward?

C-SAF bring the SAF Value Chain together

Airline meet farmer...



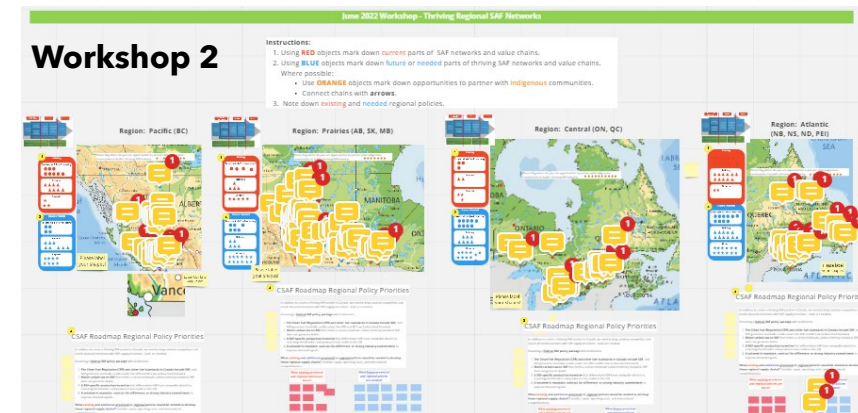
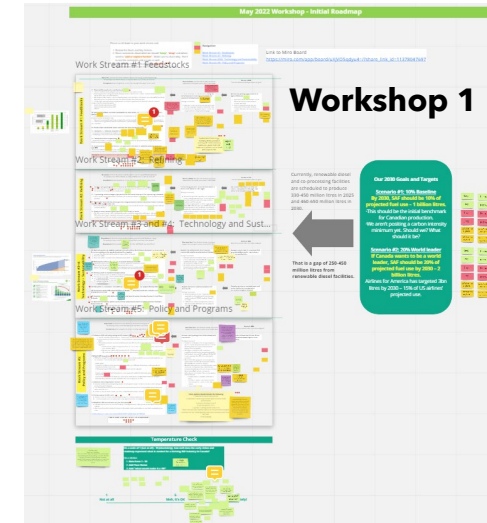
Airlines need rateable supply

- ▶ SAF price estimated at 2 to 8 times more than Jet
- ▶ What model does an airline use for pricing
 - ▶ Need for rateable supply
 - ▶ Who gets credit?
 - ▶ Where do we Blend and who does it
 - ▶ SAF Pathway is safe?
 - ▶ Long term returns vs short term
- ▶ How do you design pricing strategies for customers

C-SAF Clean Competitiveness SAF Roadmap

SAF is a piece of Canada's energy system transition to net-zero

- ▶ Identify **the priority actions, policies, and investments**
- ▶ Build **long-term economic value** and decarbonize the industry.
- ▶ Align **the whole supply chain**
- ▶ Get down to **concrete initiatives.**



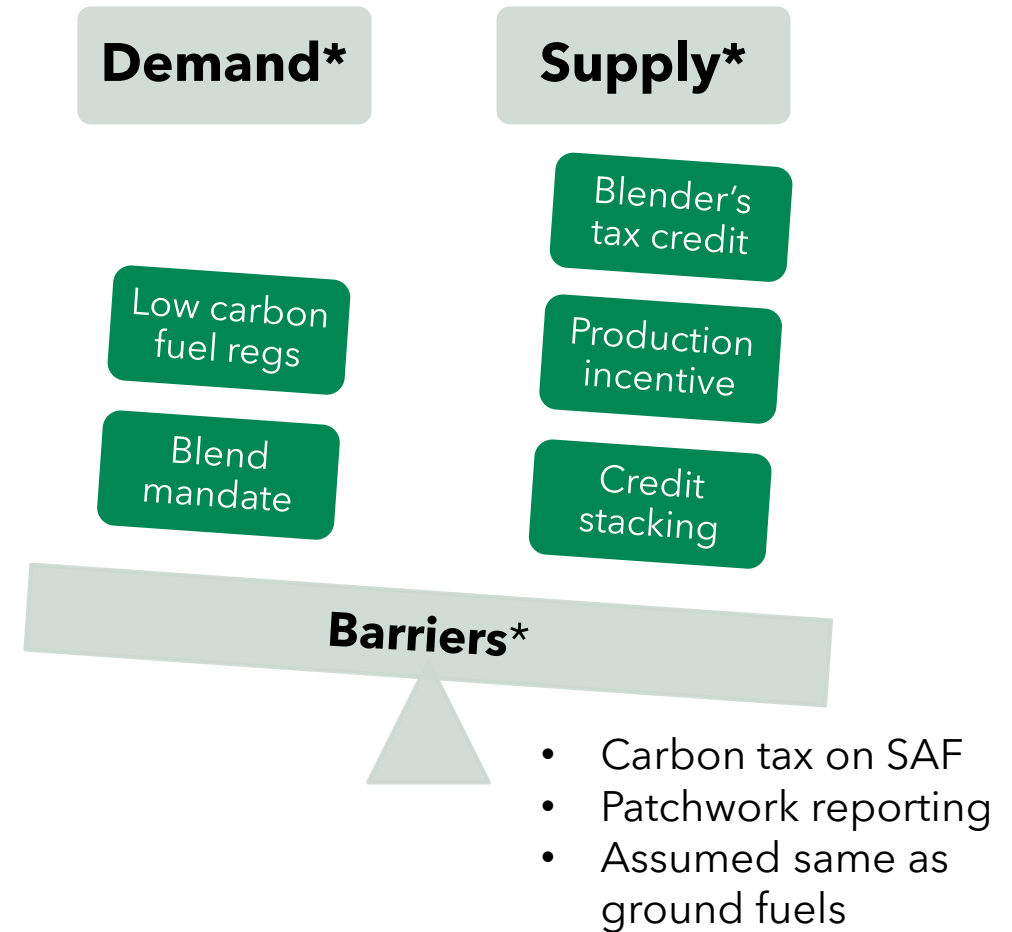
SAF principles in Canada

- ▶ Ensure SAF **availability** in Canada
- ▶ Ensure sector **competitiveness**
- ▶ **Limit** impact on aviation customers
- ▶ Ensure regulatory **certainty**

SAF Policy will be key !

Keeping aviation competitive in a net-zero future

- Policies **Tailored** for aviation
- SAF is **harder to make** than renewable diesel
- Compete with SAF incentives in **other countries**
- **Create** a stable and long-term investment regime



Final thoughts

Scope 3

- ▶ What are your customers needs for reducing emissions related to products or services

Book and Claim



Working together

- ▶ Optimizing logistics
- ▶ Airports
- ▶ Rail/Heavy Duty Trucks
- ▶ Operations
- ▶ Fuel



Let your SAF demand and requirements be known!

Thank you!



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Canadian Council for Sustainable Aviation Fuels
Conseil canadien des carburants d'aviation durables



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Promoting members' education and professional development in the fields of transport and logistics.

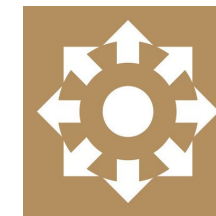
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