



Scaling Up™ 2023

The Future is Now

Canada's 8th annual industrial bioeconomy business conference

November 6 - 8, 2023

Net Zero & Non-ZEV Transport: Why, How & Where's Canada?

Session Chair : Doug Hooper, Advanced Biofuels Canada

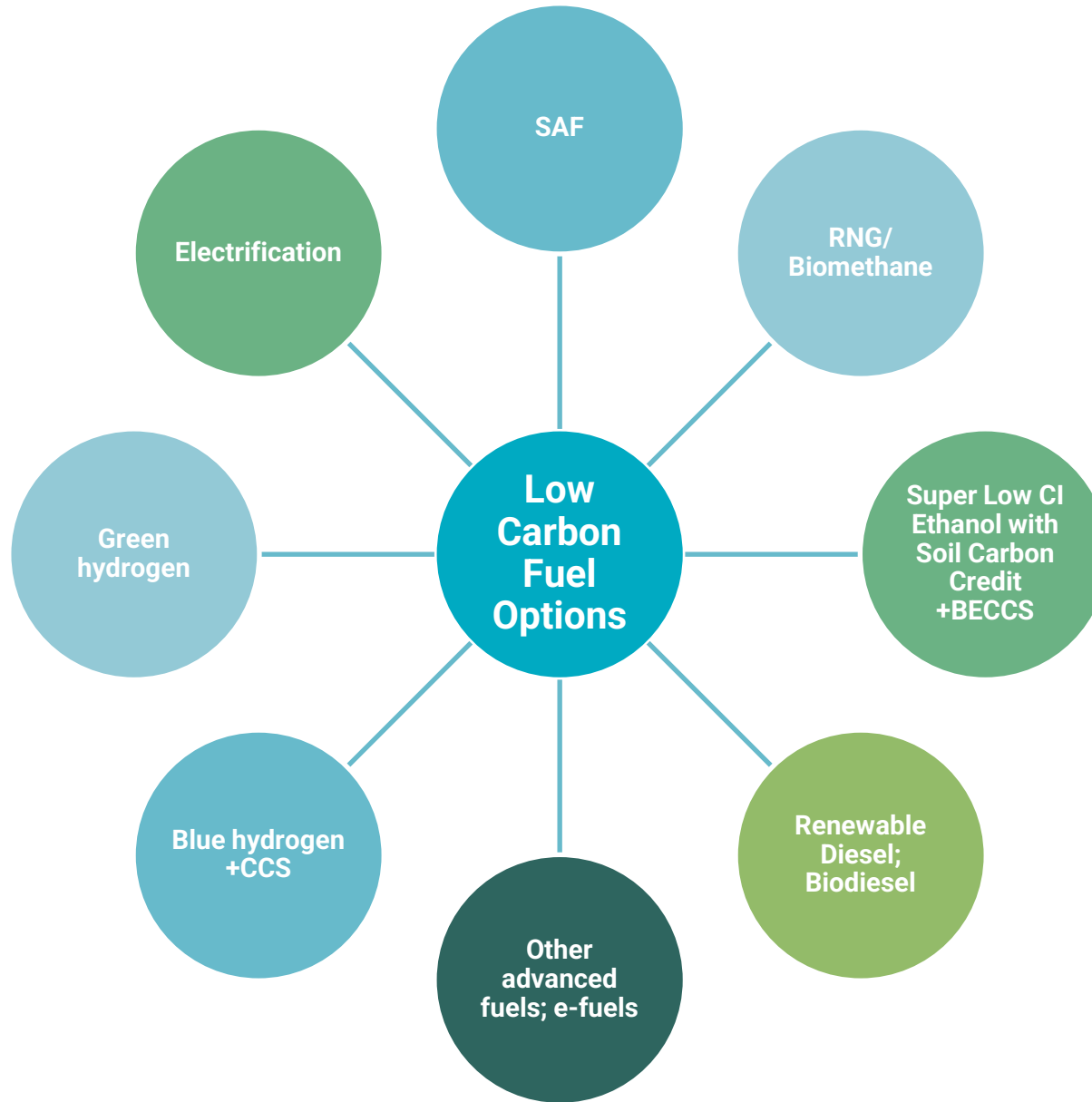
Tammy Klein, Transport Energy Solutions

Michael Wolinetz, Navius Research

Bob Larocque, Canadian Fuels Association

No One Fuel or Technology Will Dominate the Future...

It will be a mix of fuels and technologies that gets us to net zero – we must accept this



- Global refiners are looking at multiple solutions to deliver low, no and even net negative fuels
- All these fuel technologies are on the table
- However, only SAF, RNG, biodiesel, ethanol and renewable diesel are already or will be implementable and totally scalable within the next few years
- Advanced biofuels production technologies are being closely watched (e.g., gasification, fast pyrolysis and HTL)
- Electrification is just part of the mix but is not and should not be the only option, though NGOs push hard for this.
- We need “parallel pathways” to reach transport decarbonization.



New Types of Policies Are Driving Rapid Development of These Low Carbon Options – Some Examples

U.S. Inflation Reduction Act



Incentives for low carbon fuels, SAF, hydrogen, CCS, renewable Electricity

Fit for 55



- ReFuel EU Aviation & Maritime
- RePower EU (H2)
- AFID
- ETS, ETD, CABM

CO2/GHG Car Stds.



- U.S., California other U.S. states
- EU
- 20 other countries (car bans)

Low Carbon/Clean Fuel Standards



EU (REDI II/III), Brazil, several U.S. states

H2 Roadmaps



Over 40 countries focused on bringing H2 costs down for production, standards, infrastructure, etc.

What's not happening though (at least not yet)?:

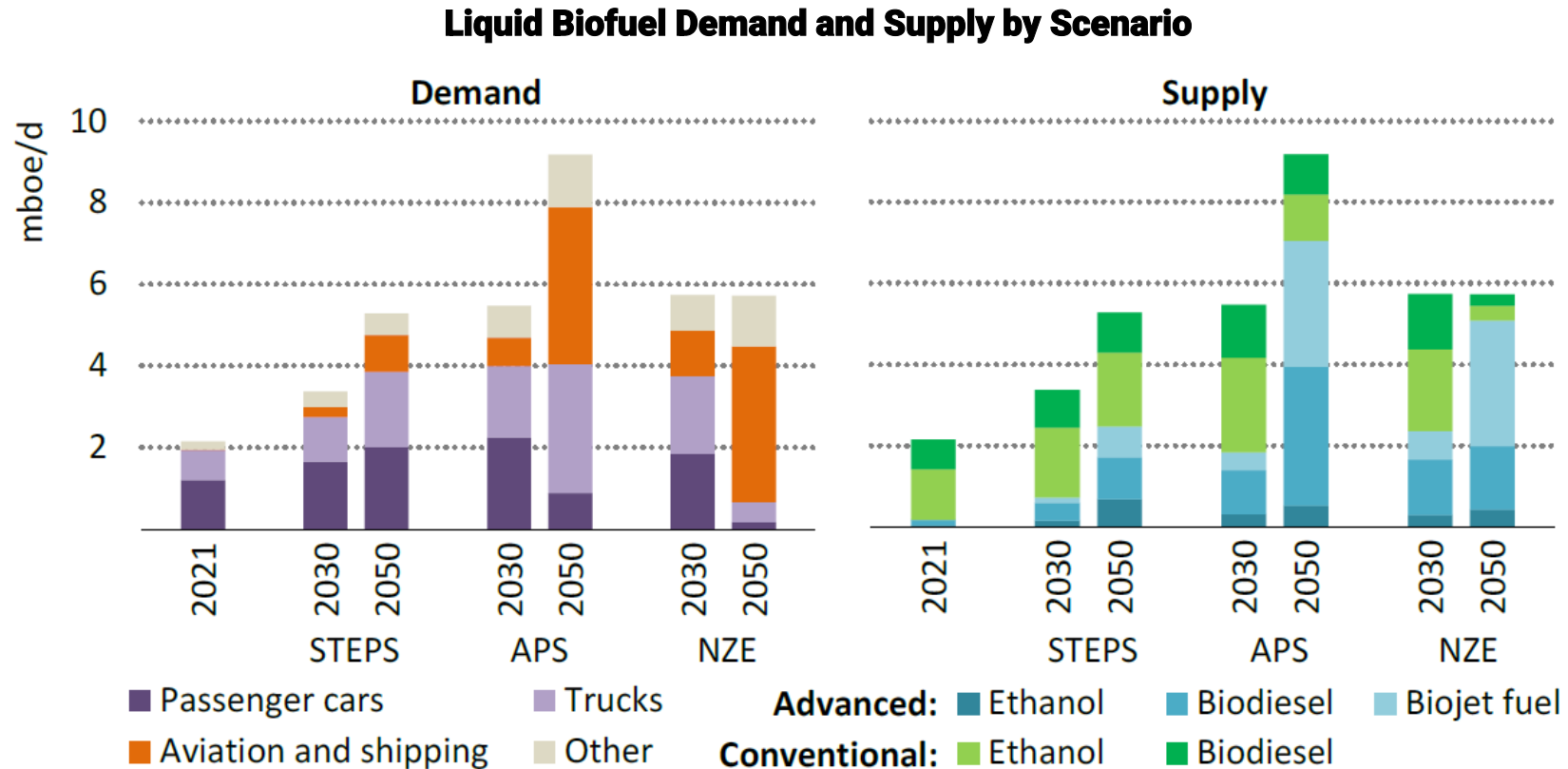
- The end of fossil fuel subsidies (in fact, they increased to a record US\$1 trillion in 2022, according to IEA)
- A strong, global price on carbon of above US\$100/ton to better help facilitate scale up of low carbon technologies (only Liechtenstein, Sweden, Switzerland and Uruguay at this level currently, according to the World Bank).

Governments want net zero but want to avoid the political/consumer pain of getting there.



The Road to Full Electrification in North America, EU and Other Places Will Be “Bumpy” – It Already Is

This means we will need to rely on sustainable, low carbon fuels to decarbonize



IEA. CC BY 4.0.

- Critical in the intervening years for road transport, and a bridge to growing near future demand for aviation and shipping.

Learn more about Transport Energy Strategies at <http://www.transportenergystrategies.com>.



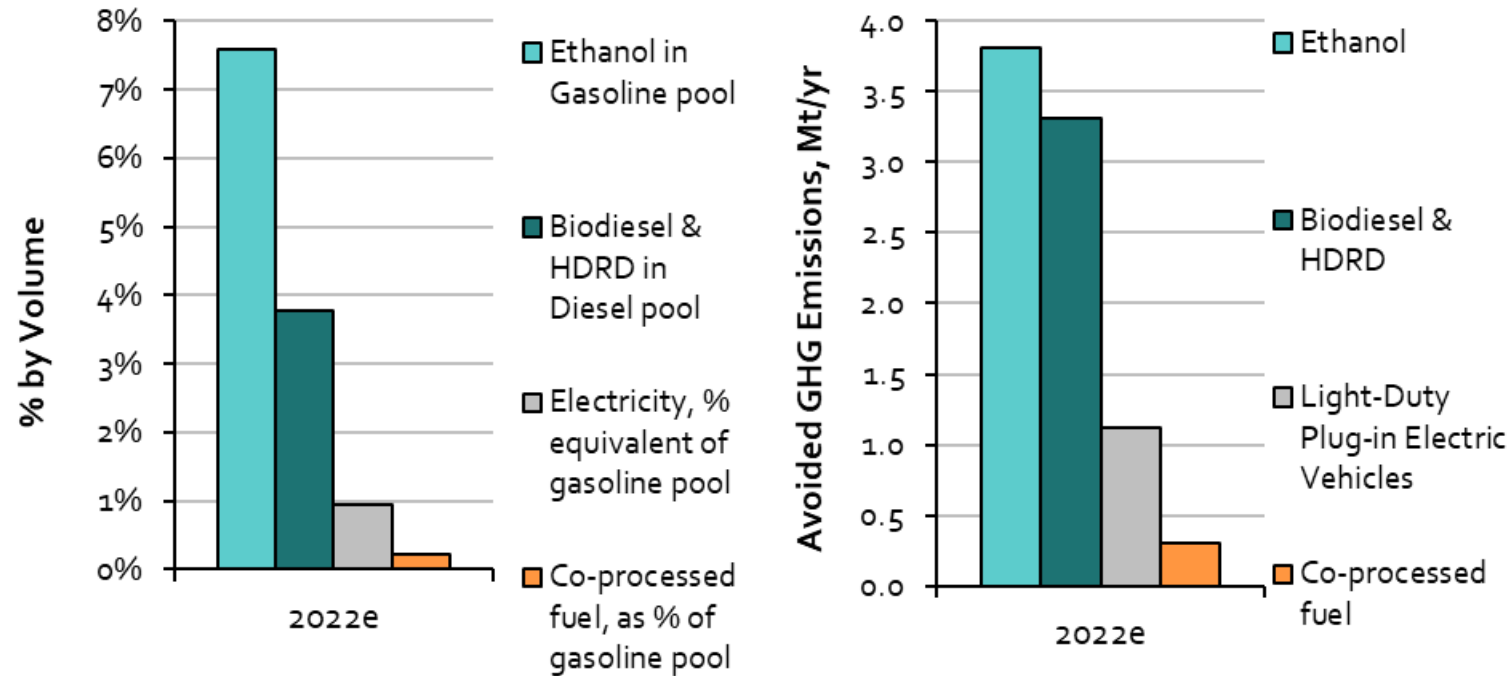
Net Zero and Non-ZEV Transport

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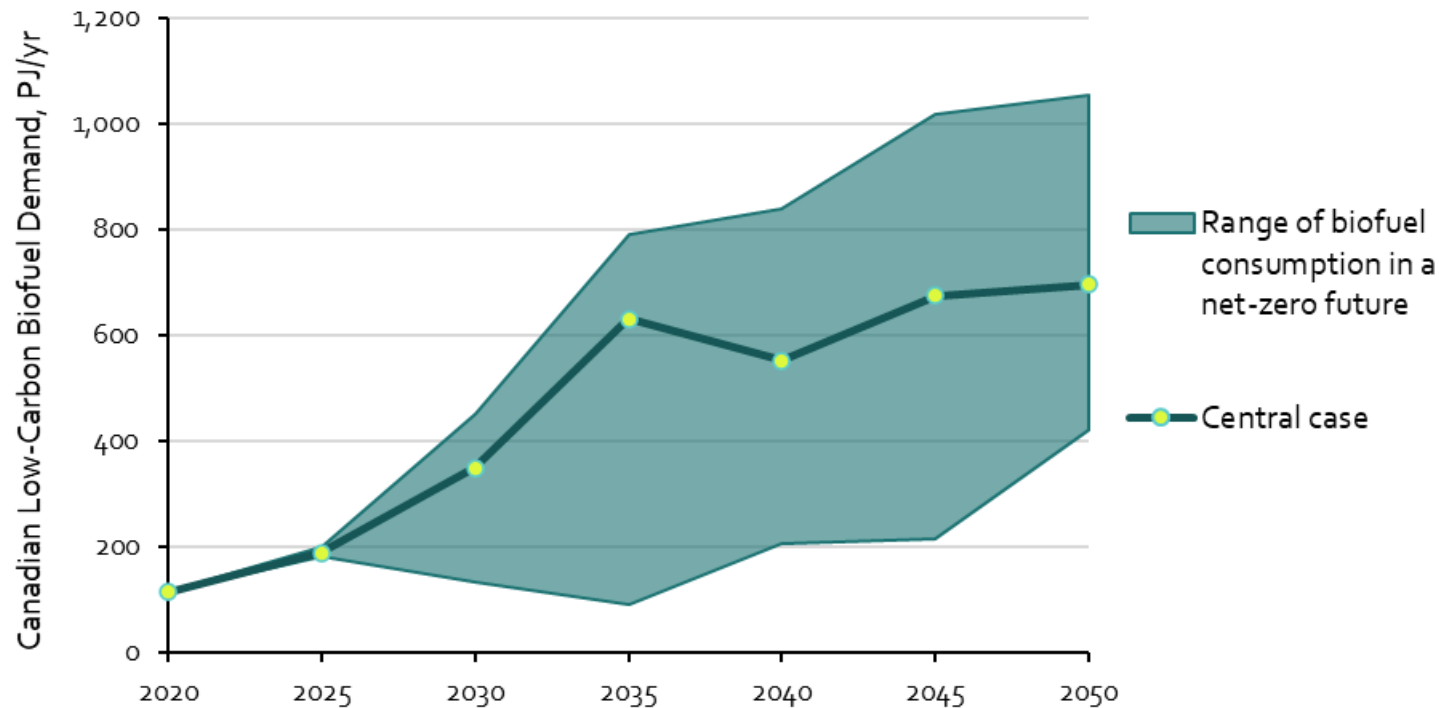
Where we are now



- Canadian Policy is driving low-carbon fuel consumption
- Approaching 8%_{vol} in gasoline, 4%_{vol} in diesel
- More than 7 Mt CO₂e/yr avoided
- North American policy is supporting investment in supply

Source: Navius Research. Biofuels in Canada, 2023
www.naviusresearch.com/publications/2023-biofuels-in-canada

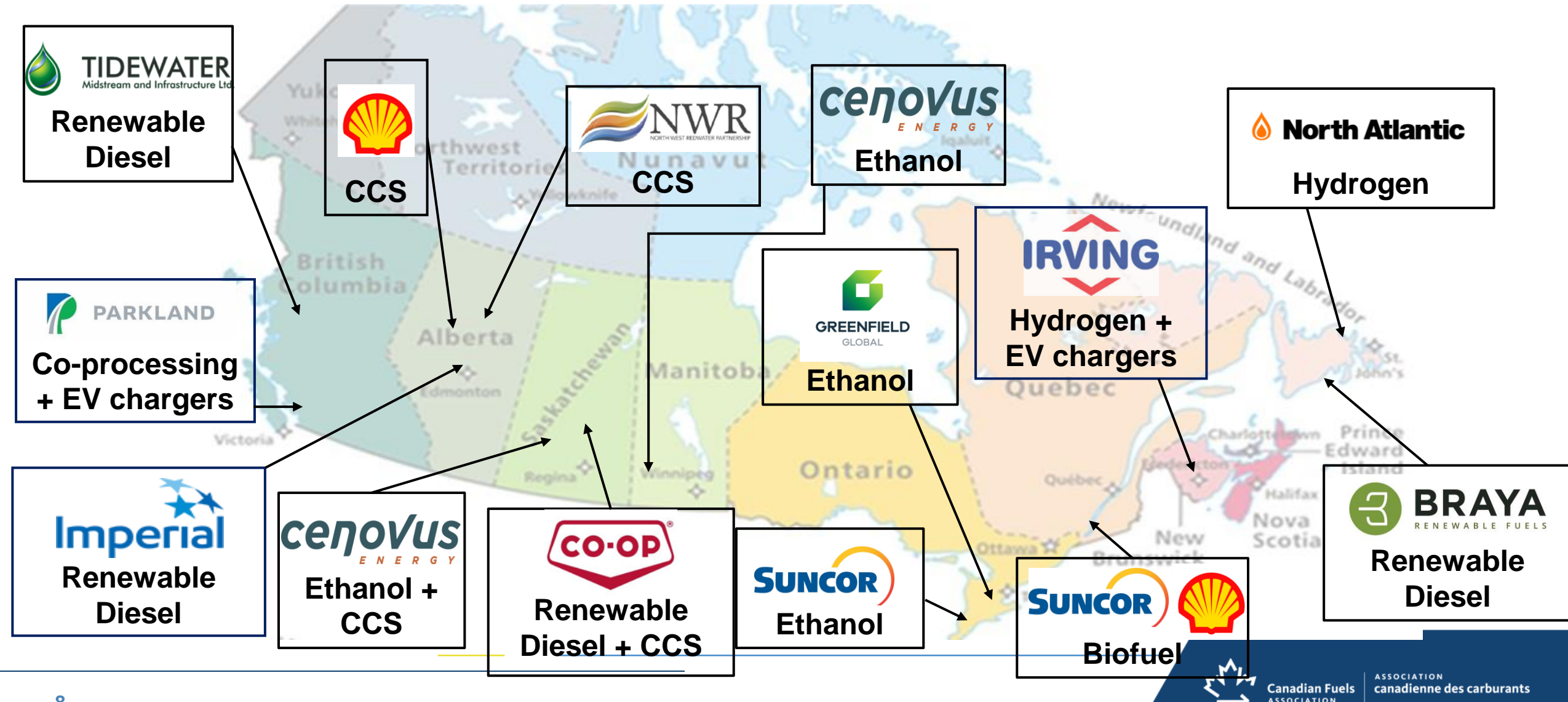
Where we're heading



Source: Navius Research. Canada Energy Dashboard
<https://canadaenergydashboard.com/index.html>

- Achieving 2030 and 2040 targets can't wait for fleet turnover
- Net zero by 2050 requires transformative change: **Four-to-ten-fold increase** in demand for energy-dense, low-carbon fuels
- These fuels are key to decarbonizing “non-road” and heavy-duty transport
- Low-carbon fuels address key challenges with:
 - Vehicle life
 - Nascent ZEV systems and “severe” range and reliability requirements
 - Current policy approaches

Canadian Investments – Coast to Coast



Policies impacting investments in Canada

- Need for a comprehensive package to drive investments for made-in-Canada low carbon fuels
- Policies
 - Clean Fuel Regulations
 - Provincial mandates and low carbon fuel standards
 - Sector roadmaps – SAF target
- Incentives
 - Biofuel consultations (as part of Federal Budget 2023) in response to US Inflation Reduction Act
 - CFR and BC LCFS credits
 - Programs funding (Clean Fuel Fund, Strategic Innovation Fund, etc...)



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Recent Updates

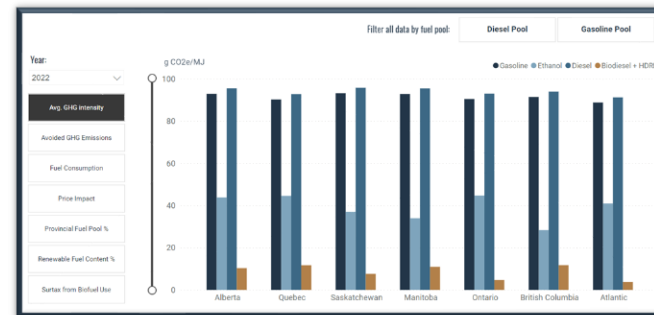
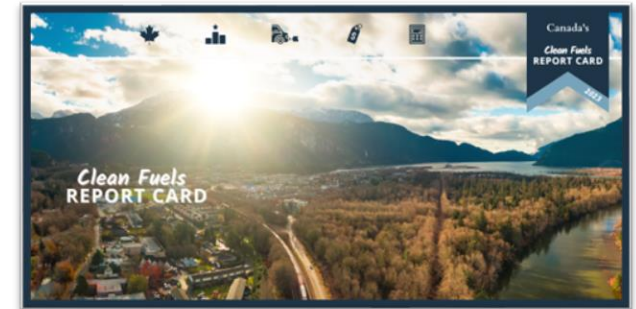
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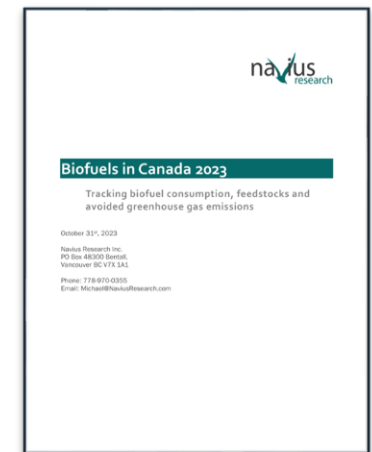
www.advancedbiofuels.ca/resources/



clean-fuels-report-card/

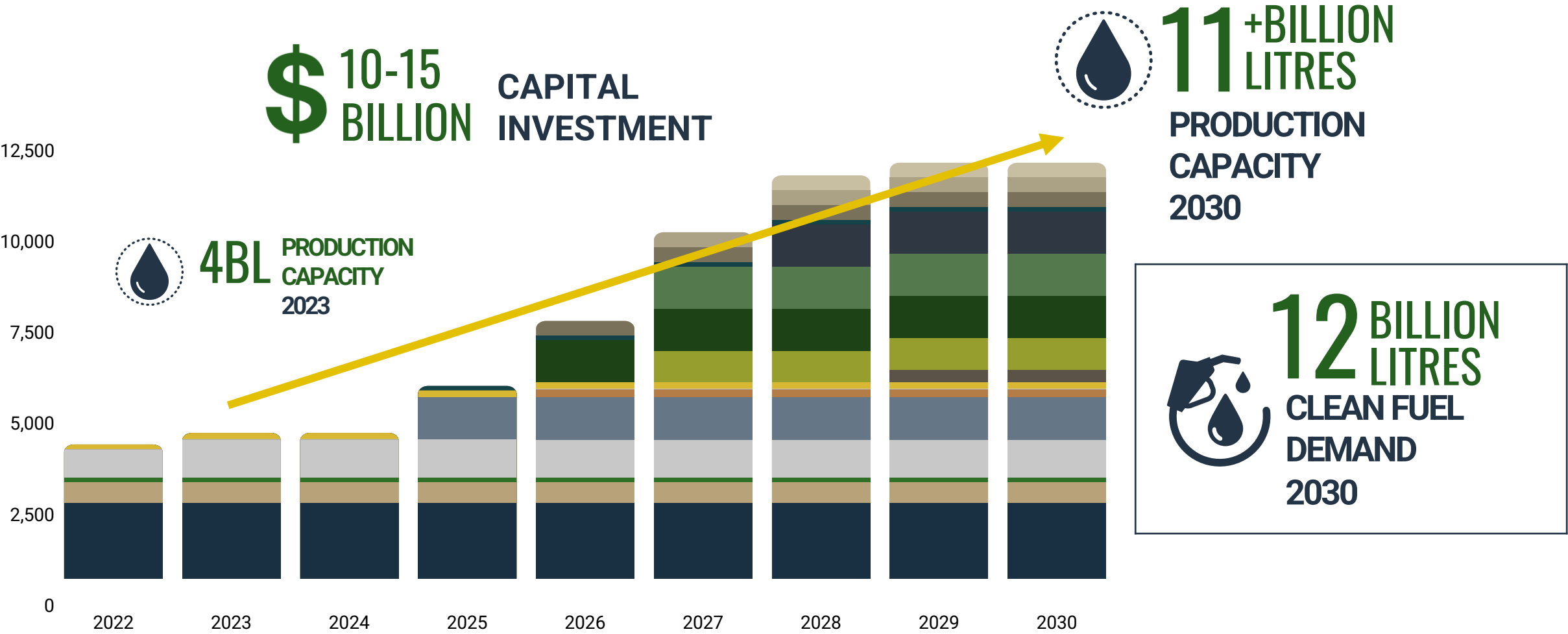


canadian-transportation-fuels-dashboard/



reports-and-studies/

Clean Fuel Capacity Buildout to 2030



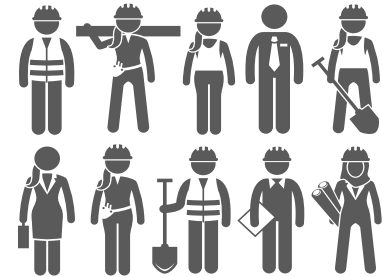
* ABFC Clean Fuels Strategy (Nov02-23): High Scenario

Fiscal Measures: Annual Impacts by 2030

18⁺ Mt of CO₂e
REDUCTIONS



20,000
New JOBS



~ \$8-10 COST OF
BILLION MEASURES



\$5+
BILLION
ECONOMIC
GROWTH

* ABFC Clean Fuels Strategy (Nov02-23): Low Scenario (Analysis by Navius Research)



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