WPAC Conference

EMERGING TECHNOLOGIES DRIVING NEW USES

WOOD PELLET ASSOCIATION OF CANADA

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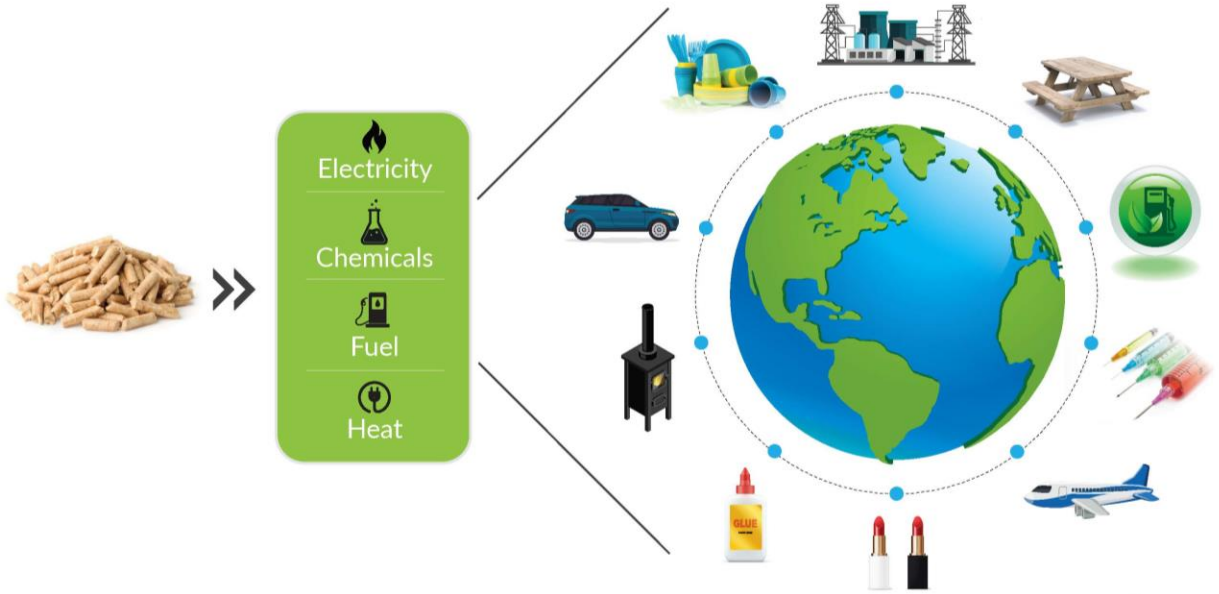
ADVANCING CANADA'S BIOECONOMY

- Fibre used for highest & best use.
- Cascading Principle = energy final use for wood fibre.
- Pellets ideal for bioproduct and biochemical applications.
- Pellets offer opportunity to produce different high-value fuels and biomaterials.



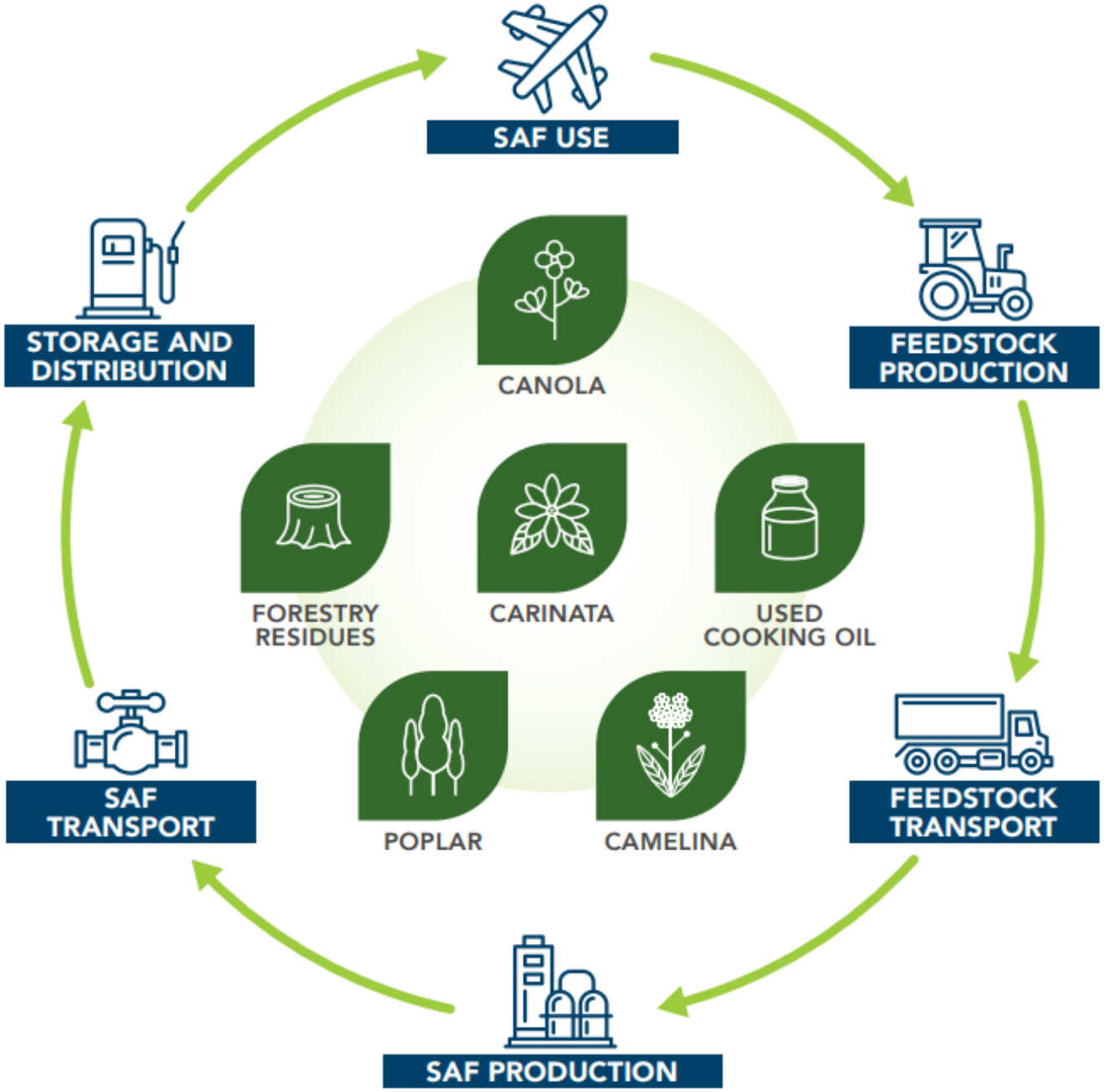
And it can all start with pellets.

DECARBONIZE AVIATION & MARINE

- Transport sector responsible for ~1/4 of energy-related CO_2 emissions.
- ~75% of emissions come from road transport.
- ~22% comes from aviation and marine
  - Harder to abate than road, which can more easily switch to alternative fuels or use electric power.

SAF: POTENTIAL FOR BIOMASS

- ***Canada's Aviation Climate Action Plan:*** vision for net-zero GHG emissions by 2050.
- **Widespread availability and use of sustainable aviation fuels (SAF)** will drive down significant portion of GHG emissions to 2050.
- ~70% of fuel used by 2050 would be SAF.



Source: Canada's Aviation Climate Action Plan 2022-2030

CANADA'S OPPORTUNITY & STRATEGY

C-SAF Roadmap:

- Canada has sustainable biomass for 7-10 billion litres of SAF a year.

In feedstocks:

- Canada has opportunities across SAF pathways.
- Short-term, volumes from HEFA-based SAF from oilseeds.

To scale SAF to meet the 2030 1 billion litres target, we need technologies and projects that utilize Canada's strengths in forest and agriculture residues, municipal solid waste, ethanol, and power-to-liquids.

SKY'S THE LIMIT

- Key action needed to deliver near term goal is to use wood and build supply chain for wood feedstock:
  - Co-locate SAF facilities with forestry operations.
  - Create efficient hub-and-spoke system for wood residue collection and processing.
  - Explore mechanical bundling of forestry residues.
  - Prioritize the collection of wood slash.
  - Work with FPAC.

Wood pellet plants can act as hub to produce SAF

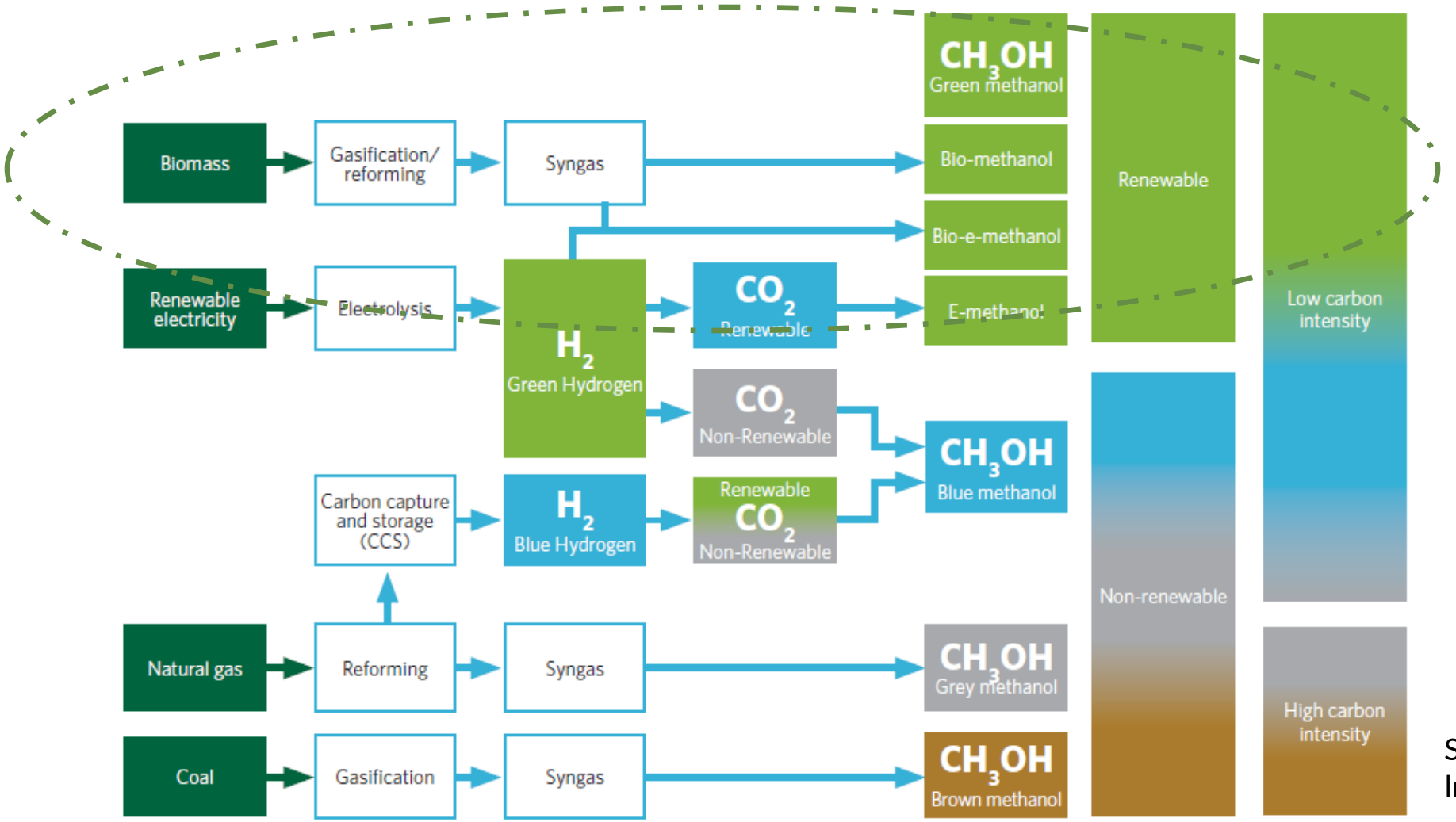
FUEL: MARINE METHANOL

- Decarbonizing shipping requires range of solutions:
  - Carbon capture for ships.
  - Low-carbon fuels.
- Methanol as marine fuel greatly lowers emissions of:
  - Sulfur oxides (SOX).
  - Nitrogen oxides (NOX).
  - Particulate matter (PM).

- Switching to methanol, ship operators can immediately comply with the IMO's most stringent SOX and PM emissions regulations by switching to methanol.

FUEL: MARINE METHANOL

Marine methanol emissions reductions vs HFO/MGO **SOX -99% PM -95% NOX** Up to **-80%**



Source: IRENA and Methanol Institute, 2021

FUEL: MARINE METHANOL

Enerkem, partners propose Quebec waste-to-biofuels plant

by **Melody M. Bomgardner**

December 17, 2020 | A version of this story appeared in **Volume 98, Issue 48**

Biomass Magazine

SunGas Renewables to develop green methanol facility in Louisiana | Biomassmagazine.com

SunGas Renewables Inc. on July 26 announced the formation of Beaver Lake Renewable Energy LLC, which will construct a new green methanol...

News > Biofuel Biofuels

Origin Materials and methanol producer Proman to explore biofuels production

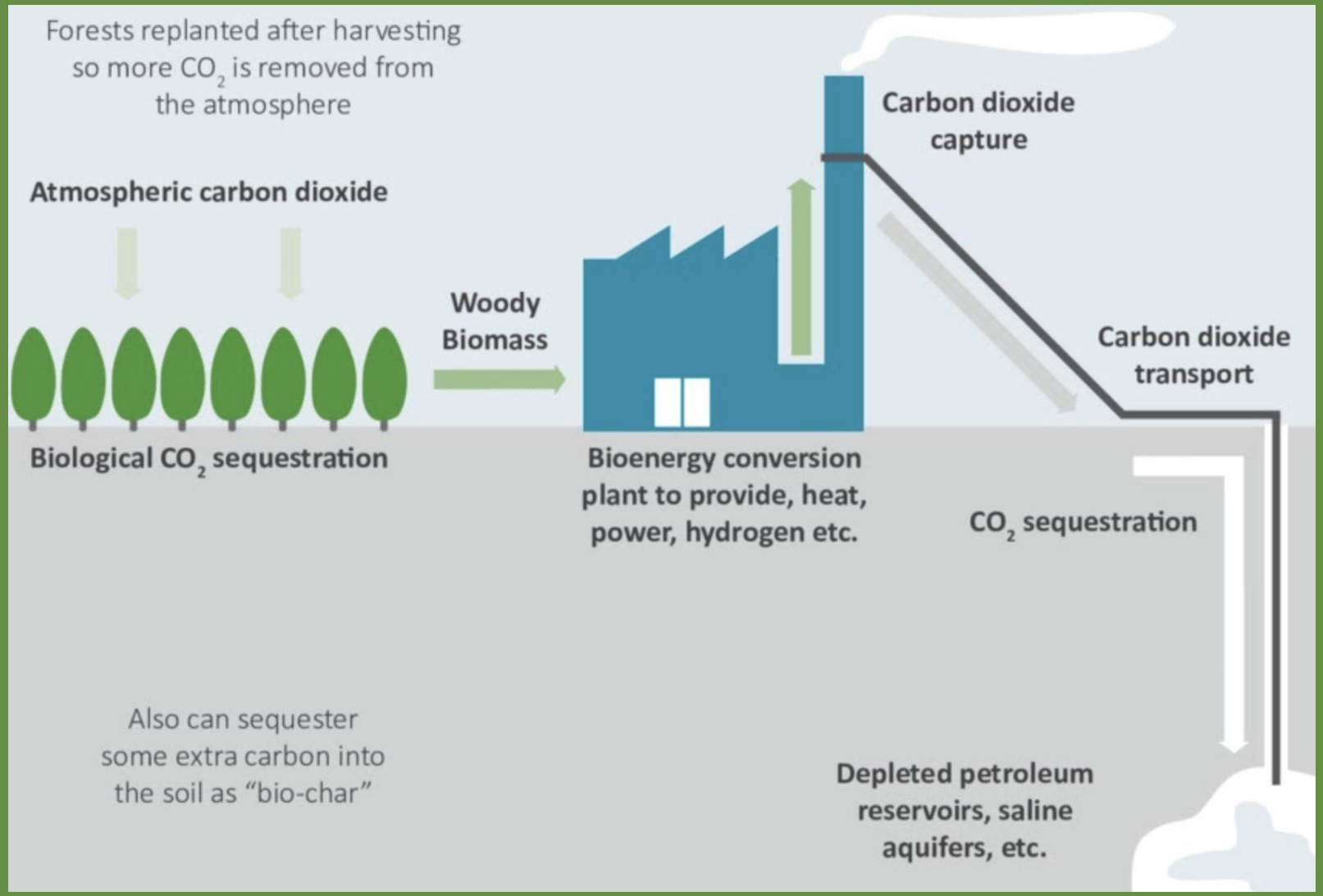
August 9, 2023 By Origin Materials

BIOMASS MATERIALS

- Potential to convert sustainable wood residues into biobased materials like chloromethylfurfural (CMF).
- CMF - a carbohydrate-derived platform molecule produced in high yield under mild conditions from raw biomass.
- Commercial markets of synthetic manipulation of CMF: renewable monomers, fuels, and specialty chemicals.

Source: European Bioplastics Association

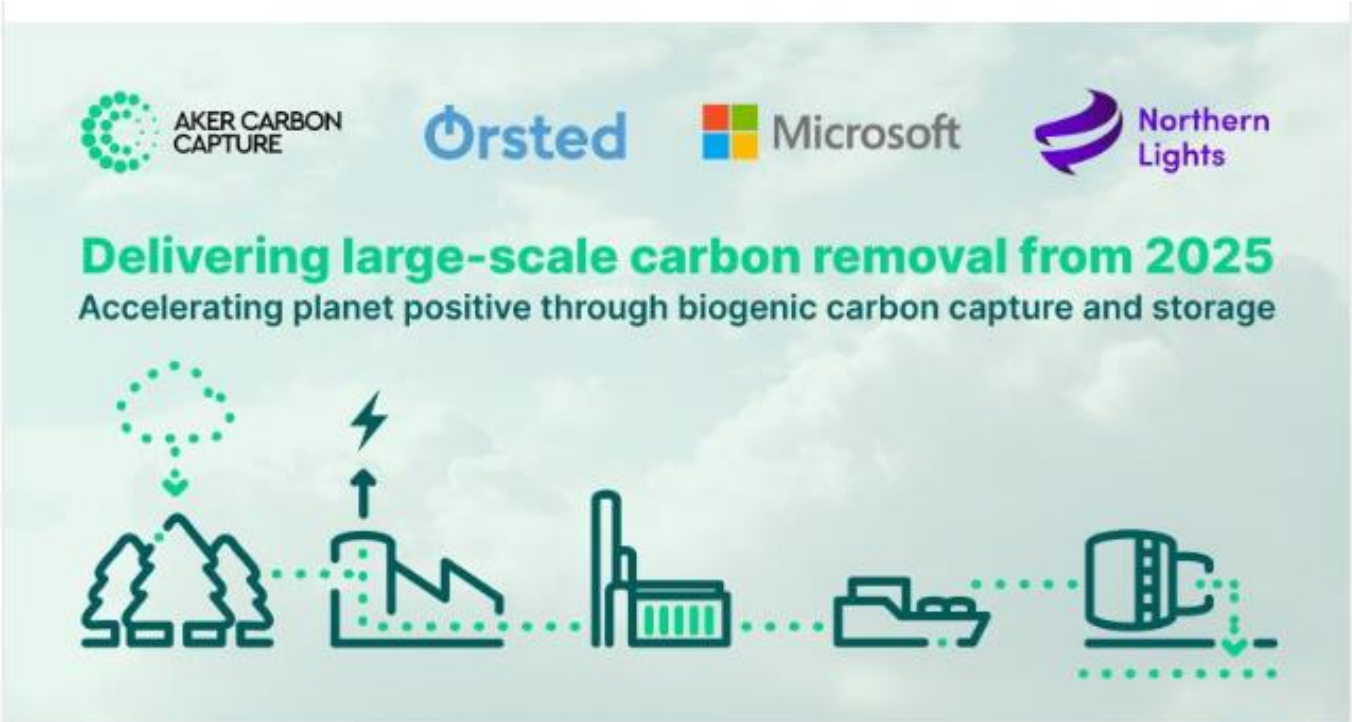
CANADA'S NET ZERO ECONOMY WILL NEED CARBON CAPTURE & STORAGE



BECCS is used in 3 out of 4 model pathways the Intergovernmental Panel on Climate Change (IPPCC) has set out to limit global warming to 1.5°C.

SUCCESSFUL PARTNERSHIPS: MICROSOFT & ØRSTED

- ~250,000 t/yr BECCS CO_2 removals (CDRs) over 11 yrs.
- Total 430,000 t CDR/yr.
- CO_2 from Ørsted's biomass district straw and wood chip heating plants.
- Liquefied biogenic CO_2 transported to terminal in Norway for permanent offshore storage.



SUMMARY & CONCLUSIONS

- Wood pellets are an ideal feedstock for many bioproduct and biochemical applications.
- Transport sector is responsible for ~1/4 of total energy-related CO_2 emissions.
- Decarbonizing aviation and marine sectors a priority.
- Potential to produce SAF and Methanol using wood residues.
- Conversion of wood residues to CMF also promising pathway.
- BECCS is Canada's largest GHG reduction opportunity – any decarbonization roadmap without inclusion of BECCS is incomplete.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