

Scaling Drop-In Fuels in British Columbia

2025 Scaling Up Bioeconomy Conference

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Drop-In Fuels in British Columbia

Key Question

What is the potential to economically decarbonize hard-to-abate sectors in BC using drop-in fuels?

What are Drop-In Fuels (DIFs)?

Advanced biofuels & synthetic fuels that directly replace fossil fuels in existing engines & infrastructures. For our study:

- **Excluded 1st generation** biofuels with blend limits
- Looked at **8 production pathways**
- Focus on DIFs that produce **zero or low emissions**

Why Do They Matter?



Decarbonizing hard-to-abate sectors

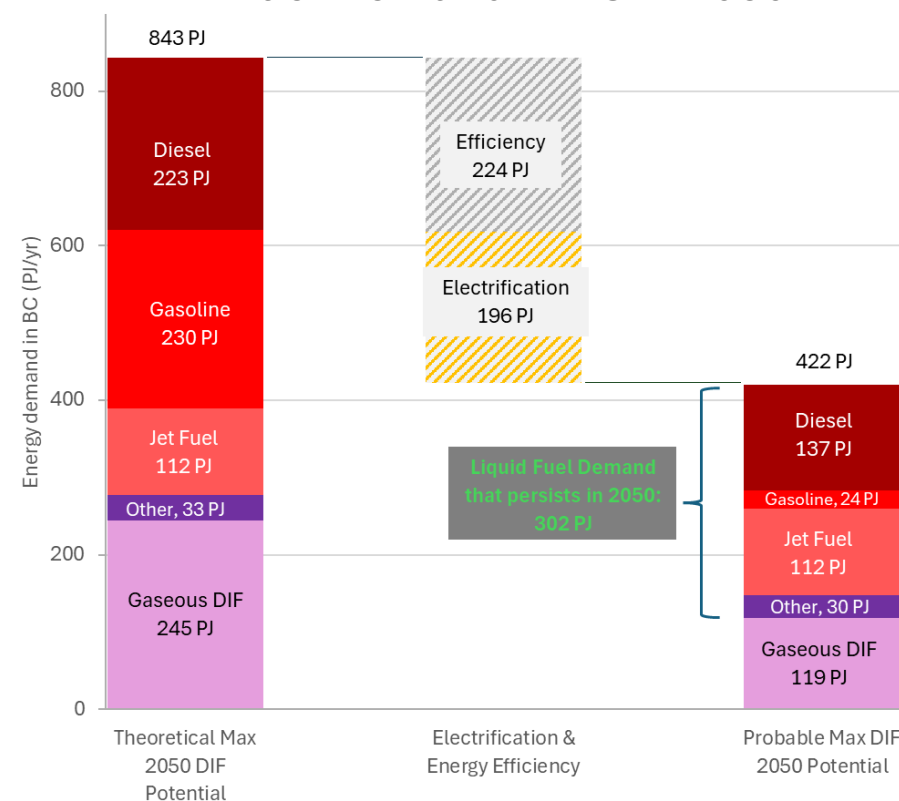
For example, outside of DIFs, options are limited for sectors such as aviation, heavy-duty transport, and offroad.



Creating new economic opportunities

Economic growth opportunities in DIFs such as SAF.

Fuel Demand in BC in 2050



8.1B L/yr

Expected demand for liquid DIFs in BC after ambitious electrification.

Industry Engagement

Developed with Strong Partnerships

A stakeholder advisory panel of 6 leaders across the DIF value chain provided ongoing project guidance:

1. FP Innovations
2. Clean Energy BC
3. Canadian Fuels Association
4. UBC Biofuels and Bioenergy Experts
5. GHGenius creator

Sought Input Over Multiple Sessions

3 stakeholder workshops with 50+ stakeholders & 25+ organizations to validate assumptions and approach:

- Market size and feedstock availability
- Costs, conversion processes, efficiency, GHG impacts
- Issues, barriers, risks
- Policy landscape
- **How to scale the most promising pathways**



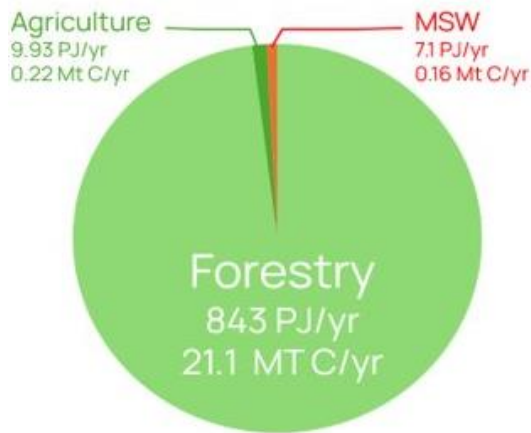
Emissions Reductions In Key Sectors

Opportunity

DIFs can deliver substantial GHG reductions in hard-to-abate sectors, provided the right conditions are in place.

The Importance of Woody Feedstock

- Woody feedstock is the only biomass option in BC that has the potential to **produce DIFs at scale**.
- Limited amounts of feedstock to make low or zero-emissions DIFs: **forestry slash piles** and **sawmill residues** offer the most cost-effective abatement options.



Making Strategic Use of DIFs

- Liquid DIFs are **expensive** and **difficult to produce** economically from limited feedstock (e.g. \$2-3/L vs. \$0.8-1.25/L for fossil fuels)
- Need to reserve DIFs for strategic end-uses where no other alternative has potential (especially **aviation**).

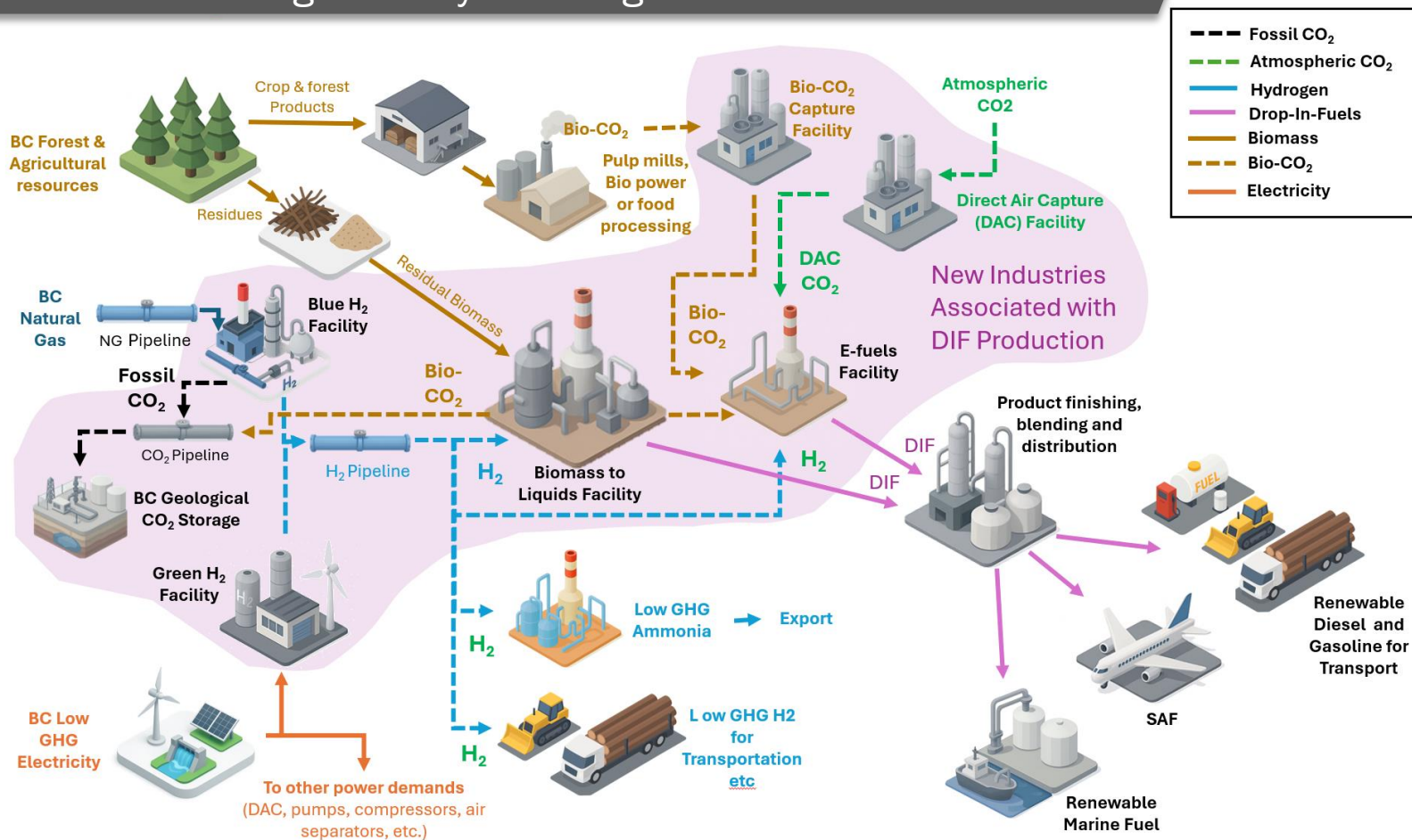
The Role of H2 and Carbon Capture

- No DIF sector without critical infrastructure for H2 and CCS.
- Can be shared across other sectors.
- CCF infrastructure enables DIF with negative CI and blue hydrogen production.

Creating New Industrial Value Chains

Opportunity

Producing drop-in fuels in BC can create new industrial value chains all while significantly reducing emissions.



A strategic and coordinated development of DIFs in BC could create economic opportunities, jobs, and regional growth.

Wildfire Management & Community Development

Co-Benefit

Drop-in fuels production in BC can support wildfire management efforts and benefit remote & Indigenous communities.

Wildfire Management

- Drop-in fuels don't just replace fossil fuels; they give BC a way to harvest risk out of its forests.
- Using forest residues for fuel production **reduces slash-pile burning**, cuts smoke and GHG emissions.

Indigenous Partnership Feedback

1. Early Engagement.
2. Build Trust.
3. Phased Risk Sharing.
4. Stewardship Alignment.

First Two Post-FID Facilities Built on Indigenous Partnerships

1. **Arbios Biotech:** 100k ODT residues (at scale) into ~30M lpy of bio-crude, 100% Indigenous-owned company managing slash recovery.
2. **WBCEC:** 70k ODT forest residues into ~20M lpy DIF, unique Indigenous-led industry-supported consortium.



Arbios Biotech, world's largest HTL facility in Prince George, BC

Strategic Considerations

1 DIFs have a strategic role to play in BC

- DIFs are expensive and difficult to produce, but often only solution for some hard-to-abate sectors such as aviation.
- DIF production is technically ready, but requires long-term, stable policy environment.

2 Funding tools need to be aligned and stable

- Competitiveness with fossil fuel incumbents challenged with scrapping of consumer carbon tax.
- Pioneer plants and demos would benefit from **direct grants** for CAPEX or **contracts-for-difference** for offtake instead of investment tax credits.
- **CFR and BC LCFS credit market** stability is critical for DIFs since long-term plant economics continue to depend on credits.

3 US is not backing away from DIFs

- US Section 45Z tax credits extended through 2029.
- US is more advanced on ethanol-to-jet pathways.
- **Canada can lead on biomass-to-liquids** with the right supports in place.

4 DIFs can grow BC's economy & communities

- New industrial value chains are required to support growth.
- Most strategic pathway remains for **aviation**, focus efforts on building up this segment.
- Early **demand signals** like procurement, aviation fuel mandates or offtake agreements are key to attract private capital for SAF.
- Partnerships with **Indigenous communities** are key.

Opportunity for Canadian Innovators



Advancing wildfire resilience technologies across Canada

NorthX is investing in Canadian-based innovators developing technologies to detect, prevent, manage, and recover from wildfires, reducing related emissions and strengthening climate resilience in British Columbia and across Canada.



Investing in industrial decarbonization solutions

NorthX is investing in Canadian-based innovators developing commercial pathways to scale hard-tech industrial decarbonization solutions across all industrial emitting sources in British Columbia.