State of Bioenergy in New Zealand webinar

Liquid Biofuels

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BIOENERGY ASSOCIATION

Why Liquid Biofuels?

Clean long duty cycle transport needs fuels with:

- Relatively high specific energy (MJ/kg)
- Relatively high volumetric energy density (MJ/L) at ambient
- Potentially drop-in

Essential in NZ for clean long haul Aviation and Marine

- NZ particularly exposed by location, and clean green exports

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Aviation (60+PJs local supply)

- SAF: refined to high spec, FAME and HVO available at a price

But 2025 Year of retreat in NZ

- Air NZ/Lanzajet SAF, Seadra Energy/Qantas/ChannelNZ hydrocracker, Fortescue/ChannelNZ e-SAF projects deferred
- AirNZ SAF being sourced overseas (Neste) < 5% of demand

Only biomass provides sufficient feedstock in NZ

- But conversion is further from market than for fats and oils

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Marine Fuels (20PJs local supply)

- FAME and HVO are being used in blends e.g. BP/Strait Shipping

But many marine engines can use less refined fuels

- Makes acceptable Biofuels easier/cheaper to produce

So Marine is the entry market for biomass based fuels

- And a B10 blend (say) only needs 2PJ pa

Within reach of current lower cost feedstock supplies

Conversion technologies

Two closest to market (IEA Biofuels)

- Fast catalytic pyrolysis of dried wood residues (a significant NZ resource)
- Hydrothermal liquefaction of wet wastes (wood wastes but also wastewater and food)

Both produce biocrudes that need further upgrading

- Internationally target using as refinery feedstocks, but NZ?

Pyrolysis of dryer wastes

Commercial plants emerging

- BTG Bioliquids (~18,000t pa) and Valmet (~50,000t pa)
- Scion has spun out Biowave to develop bio-marine fuel plant

+ve: Lower cost (CAPEX) and less complex operation

-ve: Needs to dry feedstock – significant overhead

-ve: Poorer quality, low HHV bio-oil

Hydrothermal liquefaction

Demo plants being built at scale

- Licella, Steeper Energy/Silva demo (15,000 - 20,000 t pa)
- Circlia Nordic, (2,000 t pa ex-sludge) available

Requires wet wastes e.g. 20% solids

- Uses supercritical water (350C, 20MPa), no drying overhead

-ve: More complex, high temp and pressure => higher CAPEX

+ve: Much better biocrude and better energy balance