TRANSPOWER

Te Kanapu

Aviation fuel insights

Developing a **future grid** blueprint for Aotearoa

Aviation modelling insights and assumptions

Fuel Demand Growth (2024-2060)

- **Domestic:** 14 PJ →20-24 PJ (+75% - +110%)
- **International:** 44PJ→ 70-83 PJ (+90% - +125%)

System scale in 2060

- **Total demand:** ~90-105 PJ
- **International Share:** ~75%-80%

Fuel transition outcome (2060)

- **SAF/eSAF:**~40%-95% of total demand
- **Hydrogen + LPE:** <5% of total demand *(domestic shares higher)*
- **Fossil fuel:** Residual in lower ambition scenarios

SAF/eSAF uptake is strong

- Only NZ-made SAF/eSAF contributes to electricity demand
- **Lower** NZ-made share post-consultation
- Made In Aotearoa: **25% of SAF/eSAF** produced in NZ by 2050

Indicative 2060 aviation fuel mix by scenario (Domestic vs International)

Unit: PJ	Domestic				International	
Scenarios	LPE	H_2	SAF/eSAF	Fossil	SAF/eSAF	Fossil
Patchwork Nation	7%	-	74%	19%	30%	70%
Aotearoa electrified	7%	-	74%	19%	30%	70%
Global green rush	18%	3%	79%	0.1%	100%	0.1%
Made in Aotearoa	7%	-	74%	19%	40%	60%
Aotearoa intelligence	7%	-	74%	19%	30%	70%

Jet Fuel Demand

Jet fuel demand in New Zealand is assumed to grow materially from 2024 to 2060 across all scenarios. Growth is expected in both domestic and international aviation, with international demand remaining the larger component throughout the period.

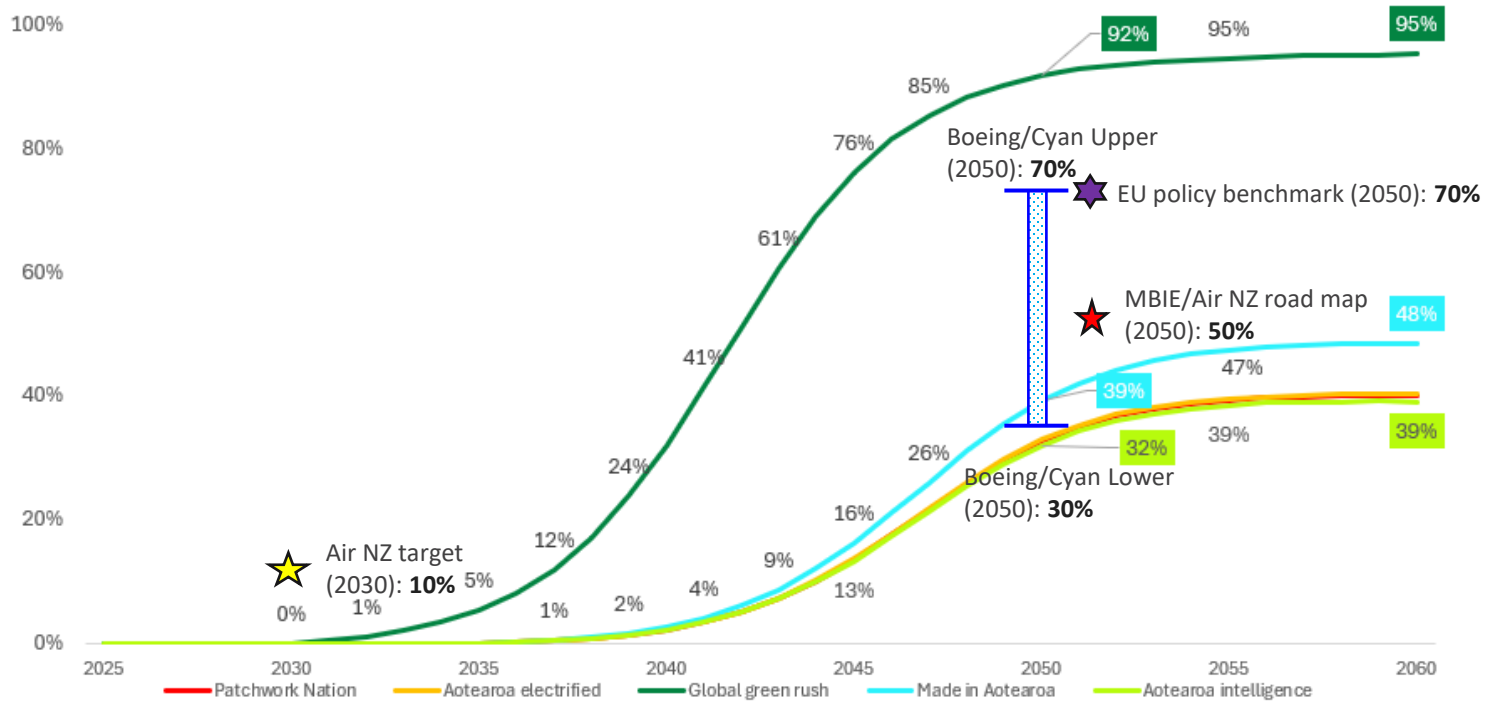
Jet Fuel Composition

For fuel composition, we assume different technologies play different roles by route type:

- LPE has high penetration (over 80%) in very short (<100 km) to short-haul (100–250 km) domestic flights, and reaches even higher uptake in GGR scenario.
- Hydrogen plays a more limited role, with around 3% penetration for domestic flights under 1,000 km in Global Green Rush scenario.
- SAF/eSAF supplies most of the remaining demand after LPE and hydrogen, particularly for domestic aviation, while international uptake is more scenario-dependent. For Transpower's purposes, the modelling focuses on electricity demand, so we start from higher-level SAF/eSAF uptake assumptions and only disaggregate to eSAF and SAF (50/50 split) where fuel is produced domestically, as that is the component that affects New Zealand electricity demand.
- The balance remains traditional jet fuel, especially in lower ambition scenarios

Aviation Fuel Transition: SAF and eSAF Uptake Across Scenarios and Benchmarks

SAF and eSAF as a Share of Total Aviation Fuel Demand vs External Benchmarks / Forecasts



Air New Zealand sustainability target: **10% SAF by 2030**

Boeing/Cyan NZ study (2025): **30% and 70% SAF pathways by 2050.**

MBIE Fuel Security Study (2025): **refers to Air NZ roadmap to 50% SAF by 2050.**

ReFuelEU Aviation**: 70% SAF by 2050.**

SAF/eSAF uptakes

The chart on the left shows SAF uptake across scenarios, with uptake remaining near zero through 2030 and ramping up from the early 2030s onward. This sits behind Air New Zealand's public target of 10% SAF by 2030, indicating a more conservative near-term transition in our scenarios.

By 2050, four scenarios reach ~30–40% SAF, broadly aligning with the lower range of the Boeing/Cyan New Zealand study and MBIE-referenced Air New Zealand roadmap (~50%). The Global Green Rush scenario reaches significantly higher uptake, approaching high-ambition international benchmarks.

eSAF

The model does not explicitly define eSAF as a fixed share of total jet fuel demand. Instead, we start from higher-level SAF/eSAF uptake assumptions and only disaggregate to eSAF where fuel is produced domestically, as that is the component that affects New Zealand electricity demand.

Post-consultation, we reduced the assumed share of SAF produced in New Zealand, rather than total SAF/eSAF uptake. In Made in Aotearoa, 25% of SAF is assumed to be produced in New Zealand by 2050, while other scenarios assume no domestic production. This is reduced from earlier assumptions of 35% in Made In Aotearoa, 5% in Aotearoa Electrified, and 15% in Global Green Rush, reflecting consultation feedback on local production capability, and NZ-made SAF is split 50/50 between SAF and eSAF.

For benchmarking purposes, applying this 50/50 split across total SAF results in an implied eSAF share of approximately **16–46%** of total jet fuel by 2050 across scenarios.

This range is broadly comparable with:

- Air New Zealand's internal modelling by 2050, and
- High-ambition international benchmarks such as the EU synthetic aviation fuels target (~35% by 2050).

Te Kanapu insights: Aviation fuel

About Te Kanapu Insights

This is one of a series of insights from the data that will underpin Transpower's Te Kanapu Future Grid Blueprint.

Insights are based on Transpower data, research and stakeholder engagement, represent a view at a point in time and are subject to change.

Glossary

SAF/eSAF: Sustainable aviation fuel/Electro-Sustainable Aviation Fuel

LPE: Light plane electrification

PJ: Petajoule

For more information:

Email us: feedback@transpower.co.nz

Visit: Te Kanapu technical approach