



Member of the SNC-Lavalin Group

An insight into achieving future fuels readiness



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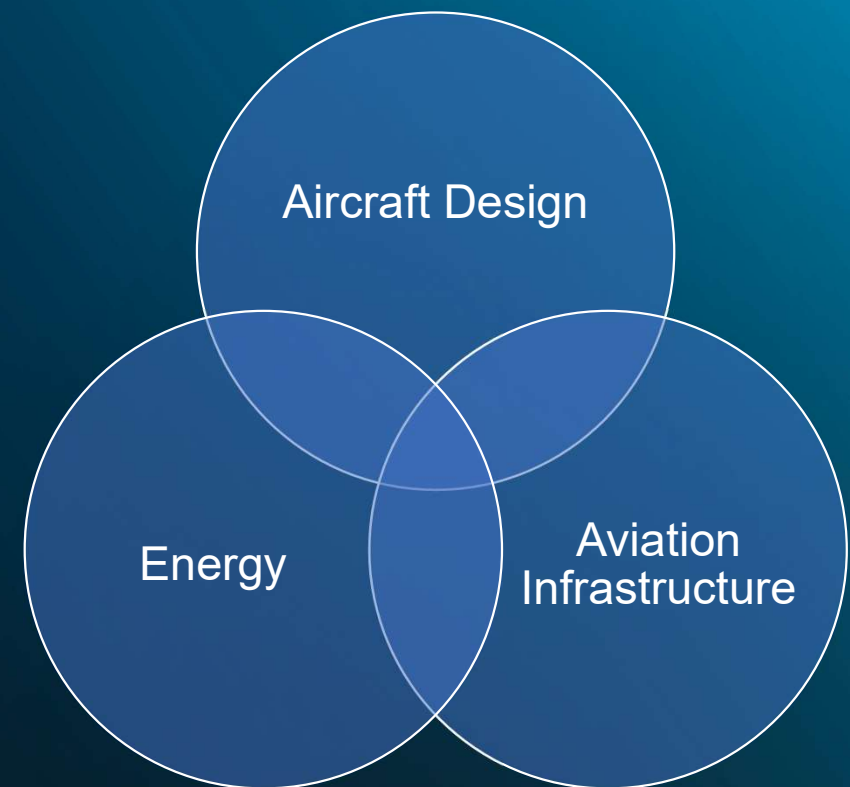


The right intersections of sectors to understand the future of aviation

The future of aviation is occurring at the intersections of traditional sectors - having understanding here provides the most meaningful insight

Designing for the future is about more than predicting what it looks like.

It's about having the know-how and the expertise to turn predictions into projects that deliver results and meet ever-changing needs.



Future Fuels Readiness

We cut through the complexity of technology OEM and sector roadmaps to find actionable insights to inform airport decision makers on the critical impacts of future fuels.

Bringing together our capabilities across aerospace, infrastructure and energy, we identify the vital areas for focus, unbiased by any particular technology solution and considering the airport ecosystem as a whole.



Process Overview

Sustainable Aviation Fuel
Hydrogen
Electrical

DEMAND

Understanding the scale of storage required for future fuelled flight operations.



SUPPLY

Exploring how to secure the energy resources required to power your fleet.



IMPLEMENTATION

Identifying the critical challenges and opportunities of future fuels to planning and infrastructure activities.



Future Fuels Readiness

As the industry moves towards a net-zero carbon footprint, airlines and airports are looking for ways to reduce their carbon footprint. This report provides a high-level overview of the challenges and opportunities of future fuels.

Key findings include the need for a clear understanding of the scale of demand for future fuels, the need to explore how to secure the energy resources required to power your fleet, and the need to identify the critical challenges and opportunities of future fuels to planning and infrastructure activities.

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Not one, but all:

Airports will need to transition to multiple future fuels to service future fleet mix.

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Technology evolving at varying paces:

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SAF, electric and hydrogen aviation will mobilise within differing timescales – intelligent planning is key to maximising benefits, removing uncertainty and enabling a path to Net Zero aviation.

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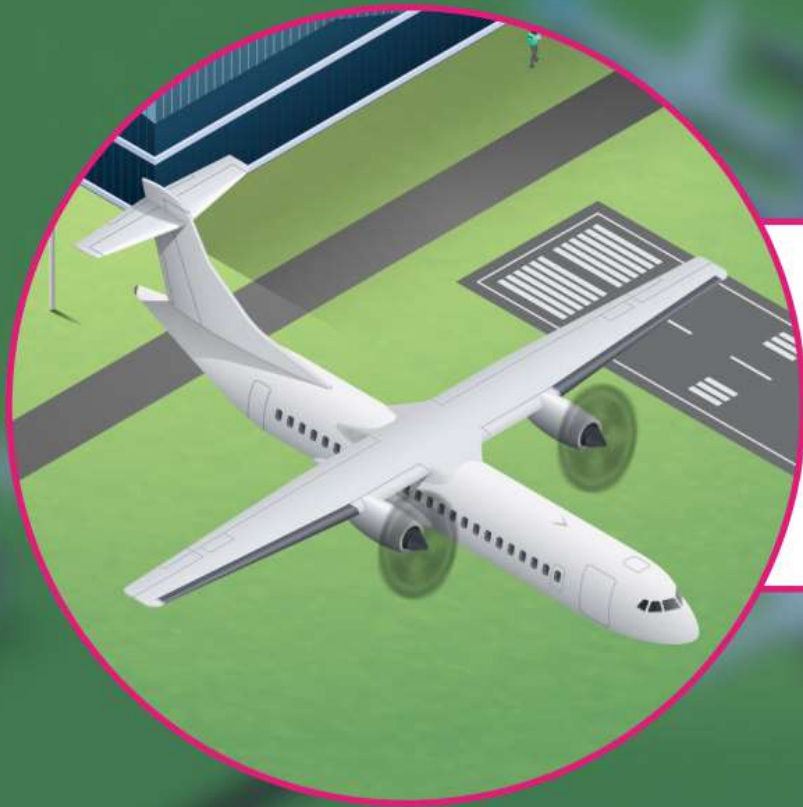
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Demand defined by routes:

The fleet mix demand will vary depending on the individual airport strategy and regional requirements.

Future Fuels Readiness – Getting ahead

A systematic approach is required for assessing what the transition to advanced propulsion means for each airport, considering specific operations and varying constraints

Drivers for change and the pace of transition will be different for each airport.



See our 'Alternative Fuels' paper for more information

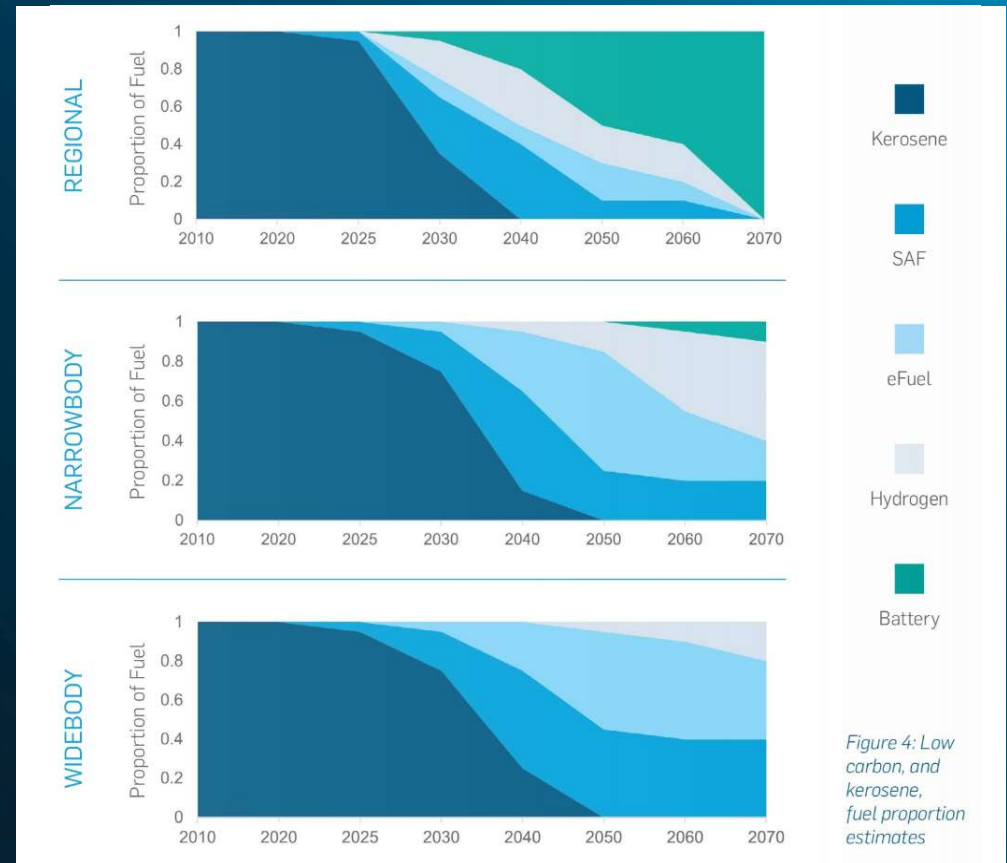


Figure 4: Low carbon, and kerosene, fuel proportion estimates

Estimated global fuel mix by aircraft size

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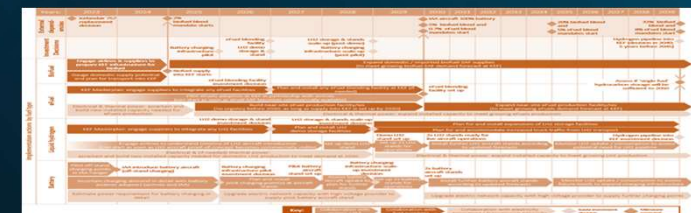
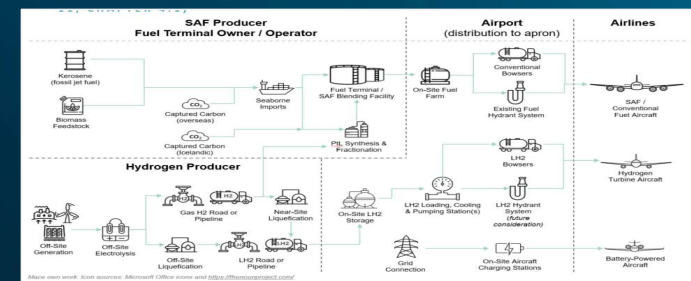
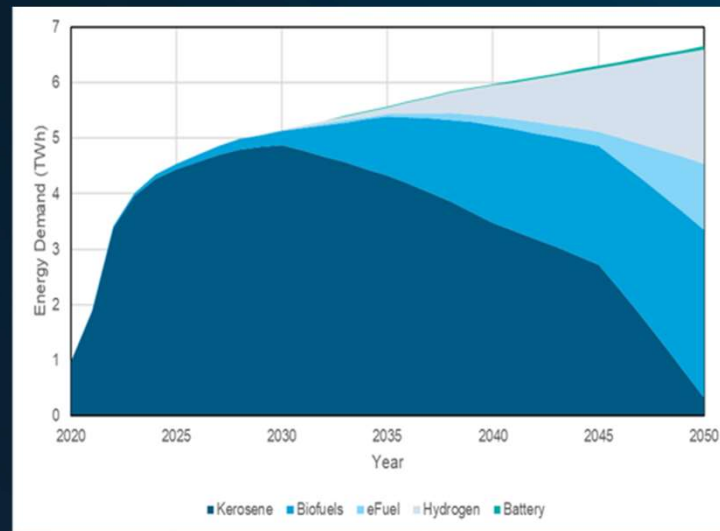
Evolving the business model:

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Significant implementation challenges across the full lifecycle – energy generation, fuel production, transportation and storage – mean that airports may become energy centres.

Future Fuels Readiness – case study at Keflavík

Approach taken:



Future Fuels Readiness – case study at Keflavík



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Outcome: 5 infrastructure investment decisions

LH2 storage and on-site liquefaction:
<64,000m² footprint estimated

Electric network expansion:
2.6x by 2030
12x by 2050

SAF blending facility:
Area ringfenced in masterplan to accommodate on-site blending, if required

Hydrogen transport:
1-12 cryogenic semitrailers per day; GH2 pipeline likely needed by 2045

Airside vehicle fuel station:
Downsizing opportunity once airside vehicles are replaced by EV models

Benefits: findings used with 4 stakeholder groups

National government & multilateral bodies
Feed into aggregated demand, to shape national-level transport decarbonisation plans
Support multilateral funding applications

Local government
Feed into municipal masterplan for areas bordering airport boundaries
Shape demand signal for local hydrogen production plans

Electricity generator
Shared electricity demand for SAF and hydrogen production
Feed into aggregated demand, to inform plans for new power plants

Airlines
Validate demand against fleet replacement plans
Shared implementation roadmap to build confidence in airport's ability to supply SAF, electricity for aircraft charging and hydrogen

Future Fuels Readiness – next steps

Airport-led planning



Demand Forecast

Outputs:

- Forecast demand levels / volumes per future fuel
- Forecast demand volumes for fossil jet fuel (diminishing share of fuel mix)



Infrastructure Sizing and Siting

Outputs:

- Maximum and minimum change scenarios identified
- Suitable locations mapped
- Footprints estimated
- Masterplan updated with findings



Cost and investment planning

Outputs:

- Capex & opex estimates for airport infrastructure requirements
- Sources of financing evaluated (private, national, multilateral, etc.)
- Supply chain capacity and technology readiness assessed



Regional / national planning



Energy Requirements for Fuel Production

Outputs:

- Estimated electric and thermal power needed to produce eFuel SAF and hydrogen
- Estimated electric power needed to charge aircraft
- Forecast installed capacity needed to satisfy aircraft demands



Government Planning (National / Local)

Outputs:

- Multi-modal transport decarbonisation planning – aggregate energy requirements to include aviation demand



Private Sector Planning

Outputs:

- Fuel producers – include aviation demand signal in production capacity plans
- Energy sector – incorporate aviation into aggregate electricity demand forecasts to inform plans for new power stations and transmission networks

Is your airport Future Fuel ready?

For more information, contact:



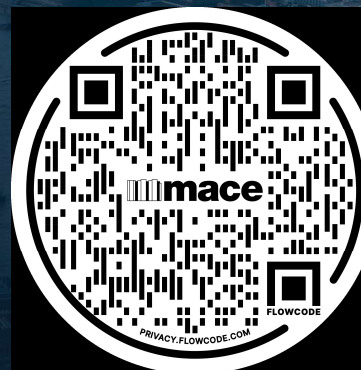
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Read more about the Atkins Future Flight activities, including our 'Alternative Fuels' paper



Read more about Mace's aviation fuel transition service offer

