



Trinity College Dublin
Coláiste na Tríonóide, Baile Átha Cliath
The University of Dublin

An “R&D” Perspective on Sustainable Aviation

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Fundamentals: Sustainability

- “The quality of being able to continue over a period of time”.
- For Sustainable Aviation:
 - **Sustainability of Environment**
 - Reduction in aviation noise.
 - Reduction in CO₂ emissions.
 - Reduction in other pollutants.
 - Good use of natural resources; Land, Water.
 - **Sustainability of Profits & Investments**
 - In 2018, fuel costs (~21%) compete with labour costs (~22%) as the major operating costs for global airlines [IATA].
 - **Sustainability of Passenger Demand**
 - How secure is consumer confidence in actual sustainability of aviation?

Technology
Efficiencies
&
Sustainable
Aviation
Fuels
(SAFs)

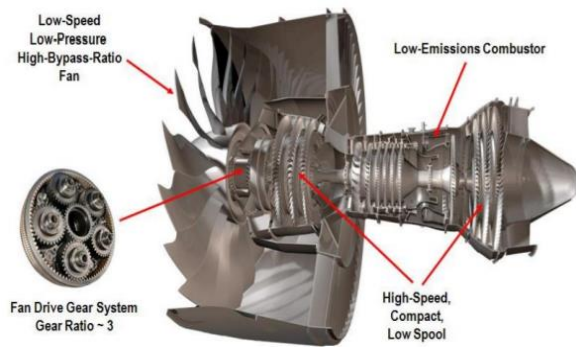


Sustainable Aviation Research at Trinity College Dublin

- 2021: Ryanair announce €1.5m Sustainable Aviation Research Center with Trinity College Dublin.

1. Advanced Propulsion Concepts, Electrification & Hydrogen

- Prof Stephen Spence.
- Technology foresight analysis.

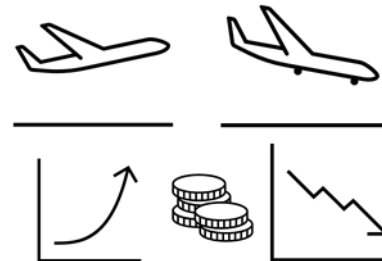
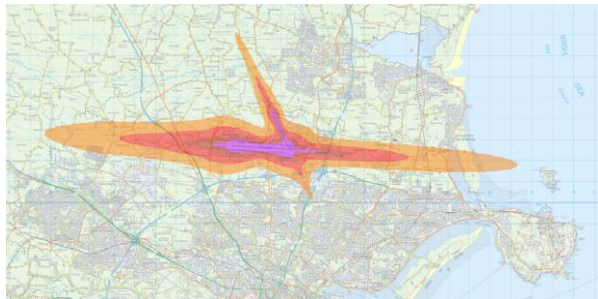


NASA blended wing concept aircraft



2. Aviation Noise Reduction Measures

- Prof Stephen Spence & Prof John Kennedy.

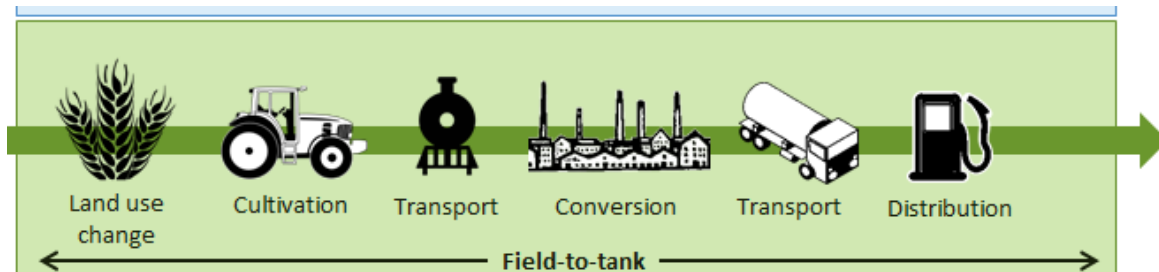


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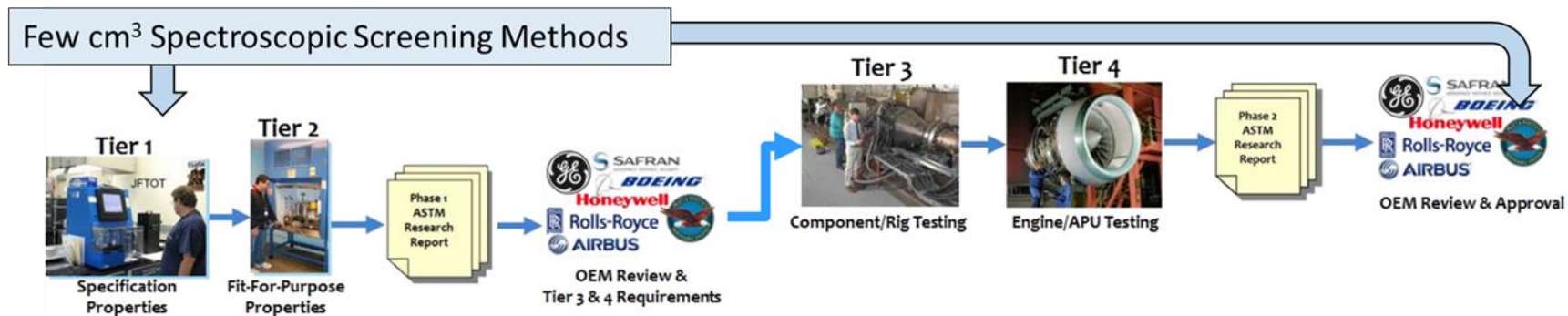
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3. Sustainable Aviation Fuels: Elevate EU Competence and Knowledge-Brokering on SAF.

- Prof Stephen Dooley.
 - Improved **rigor/specificity** of field-to-wake embodied CO₂(eq) of SAF.
 - Supply chain design for lowest CO₂(eq) possible.



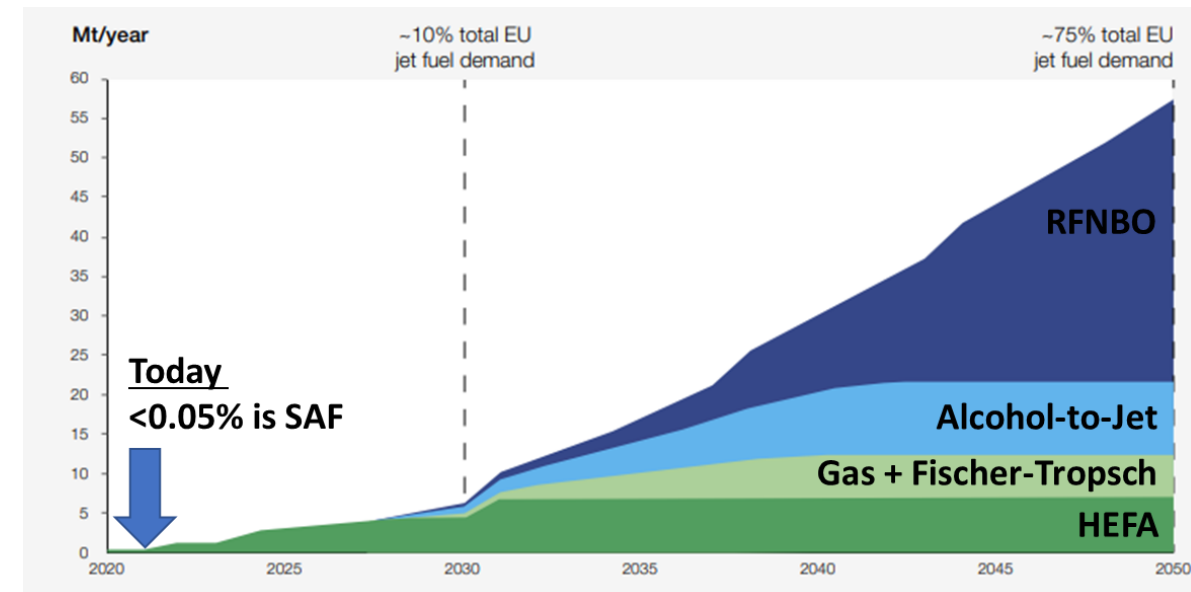
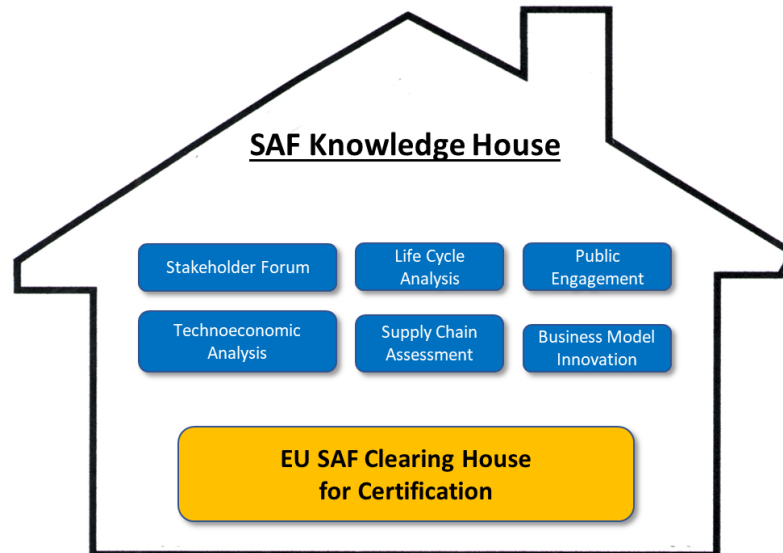
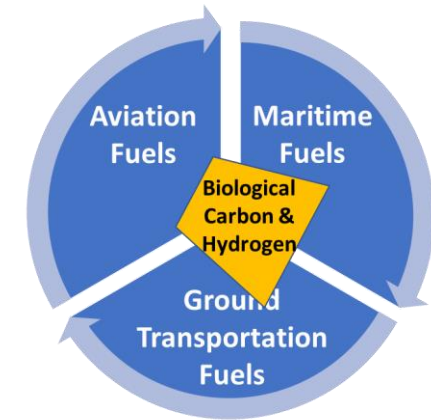
- Reduce cost barriers to SAF certification & enable certification of 50%+ SAF blends.
 - Research of robust science methods using small volumes of SAF.



Fundamentals: Sustainable Fuels

Key Concepts

- Energy vectors are not distinct, energy system interconnectivity is key.
 - Renewable Electricity ↔ Hydrogen ↔ SAFs ↔ Road transport Advanced Biofuels ↔ *RFNBOs.
- Massive technology development and scaling is needed.
- EU aviation can lead on sustainable fuel technology.
- Requires R&D, through a “SAF Knowledge House” concept.





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Thank You for Your Attention

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