



# **Airlines' test programmes and ongoing activities on alternative fuels**

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**Aviation Alternative Fuels –  
Towards Sustainable Air Travel  
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# IATA's Vision

- Is for carbon neutral growth
- Leading to a zero carbon emissions future
- Low-carbon fuels needed to achieve this goal



# Low-carbon fuels: Airline requirements

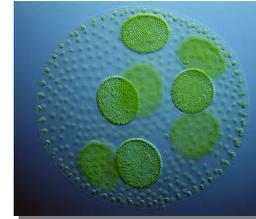
- Key operational parameters
  - Safe
  - “Drop-in” – can be blended with existing jet fuel
  - Low freeze point / High flash point
  - High energy density
  
- Key sustainability parameters
  - Offer net carbon reductions over their lifecycle
  - Do not compete with freshwater needs
  - Do not compete for land with food crops
  - Do not cause deforestation or biodiversity loss



# The promise of new-generation biofuels

Candidate feedstock for jet fuel:

- Algae
- Jatropha, camelina, halophytes etc.
  
- Can be grown in poor soils or in the sea
- Can be grown with polluted or waste water
- High energy yield
- New livelihood opportunity for developing countries
- Reduce dependency on imported oil



# Airline activities – Test flights

- First tests on operations with alternative fuels focused on CtL/GtL
  - Valuable experience gained for testing and certification
  - But no benefit for CO<sub>2</sub> emissions without carbon sequestration
  - Since July 1999: CtL fuel available at Johannesburg Airport
  
- More recently strong focus on sustainable biofuels
  - Various tests since 2008



## Airlines' biofuel test flights

Carrier	Aircraft	Engine	Fuel supplier	Date	Biofuel
 virgin atlantic	B747-400	GE CF6	Imperium Renewables	23 Feb 08	20% Coconut & Babassu oil blend (one engine)
 AIR NEW ZEALAND	B747-400	Rolls-Royce RB211	UOP, Terasol	30 Dec 08	50% Jatropha (one engine)
 Continental Airlines	B737-800	GE/Snecma CFM56	UOP, Sapphire	7 Jan 09	47% Jatropha, 3% Algae (one engine)
 JAL	B747-300	Pratt & Whitney JT9D	UOP, Sustainable Oils	30 Jan 09	42% Camelina, 8% Jatropha, 0.5% Algae blend (one engine)
 jetBlue	A320	IAE V2500	UOP	TBC	Camelina, Jatropha and Algae blend (TBC)
 * interjet	A320	CFM56	TBC	early 2010	Halophytes (TBC)

# Flight tests – Some results

- Test programme
  - Typical flight duration 2 h
  - Quick accelerations and decelerations
  - Engine shut-off and restart in the air
- Efficiency
  - Energy density up to 48 MJ/kg – average Jet-A1 appr. 43 MJ/kg (Continental)
  - On a 12-h flight with a 747-400, estimated savings of 1.4 t fuel (1.2%) (Air New Zealand)
- Greenhouse gas savings
  - Camelina: up to 84% (Michigan Technological University)
- Comprehensive report in preparation

# Partnerships

Organisation / Project	Objective	Members (from aviation)
ICAO Alternative Fuels Roadmap	Pave way for development and deployment of alternative fuels	ICAO, ICCAIA, EC, CAAFI, Fuel suppliers, ICSA, IATA
SWAFEA	EU study on feasibility and impact assessment of alternative fuels	Airbus, RR, Snecma, IATA, Air France, Shell, Research
Roundtable on Sustainable Biofuels	Bring together stakeholders, establish sustainability principles and criteria	IATA, Virgin, Boeing, Shell
Sustainable Aviation Fuel Users Group	Advance development, certification, and commercial use of drop-in sustainable aviation fuels	Air France, Air New Zealand, ANA, Cargolux, Gulf Air, JAL, KLM, SAS, Virgin Atlantic Boeing, UOP, WWF, NRDC
Algal Biomass Organisation	Advancement of the algal biomass industry	ANZ, Continental, Fedex, Virgin Atlantic, IATA, ATA, Boeing
CAAFI	Exchange information and coordinate stakeholder efforts	Sponsors: FAA, ATA, ACI-NA, AIA



**Thank you!**