Presented by

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Aviation Alternative Fuels Towards sustainable air travel

A manufacturer's perspective

ICAO Side-event – Bonn – June 3rd, 2009

The industry is committed to action on climate change





As leaders of the aviation industry, we recognise our environmental responsibillies. and agree on the need to:

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Therefore, we, the undersigned aviation industry companies and organisations declars that we are committed to a pathway to carbonneutral growth and aspire to a carbon-free Suburs.

To the end, in the wift the lauration of empy or endorsed at the 2007 CASI Assembly, we will

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We urge all governments to participate in these efforts by:

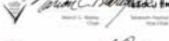
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- provides for approving remain provid development, and X. (analyze) and represents a phost, a protes and choice in the with the United Nations could not agreed in Station Occurrence 2007.

Our efforts and commitment to work in partnership with governments, other industries and representatives of civil society will provide meaningful benefits. on tackling climate change and other environmental challenges.

We strongly encourage others to join us in this endeavour,

















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Therefore, we, the undersigned aviation industry companies and organisations declare that we are committed to a pathway to carbonneutral growth and aspire to a carbon-free future.











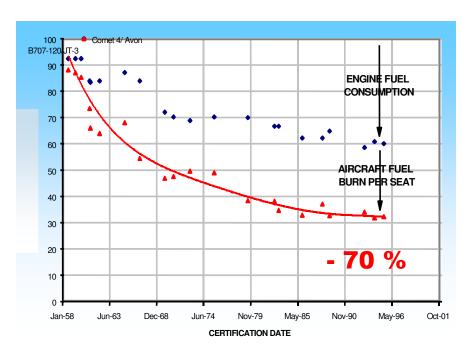




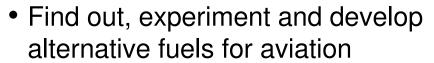


AARDON

Manufacturers's challenges



- Maintain or improve our historical level of fuel efficiency improvements
 - New engines
 - Lighter materials
 - Advanced aerodynamics
 - Optimized integration processes
 - New concepts

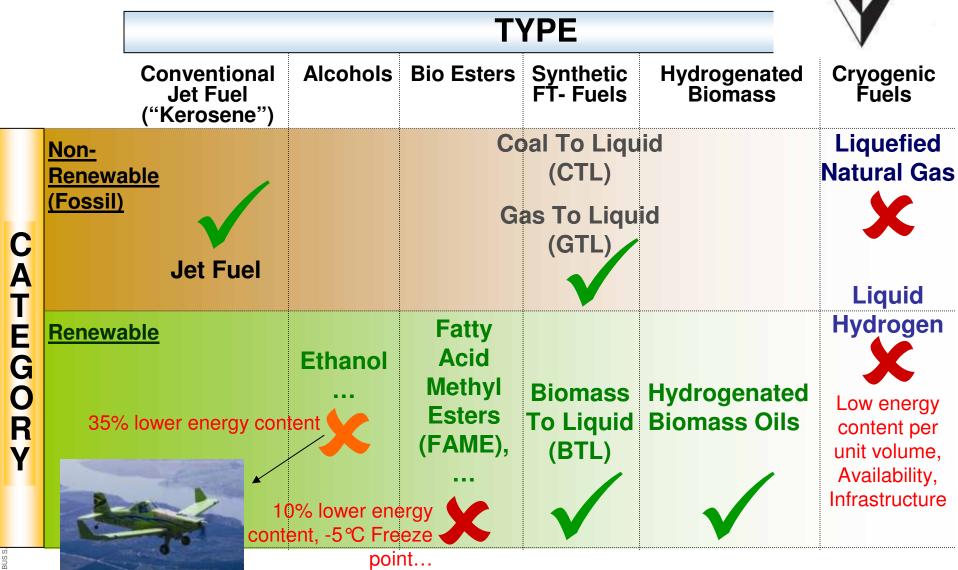


- Same or better operational performance
- Drop-in fuel
- Lower CO2 emissions (on a life-cycle basis)
- Additional environmental savings

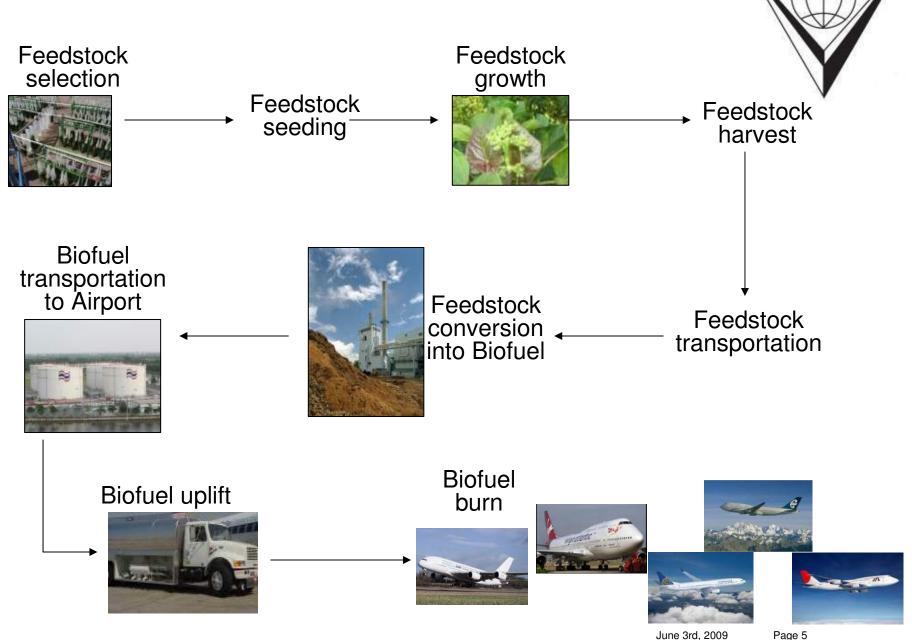




Potential alternative fuel candidates

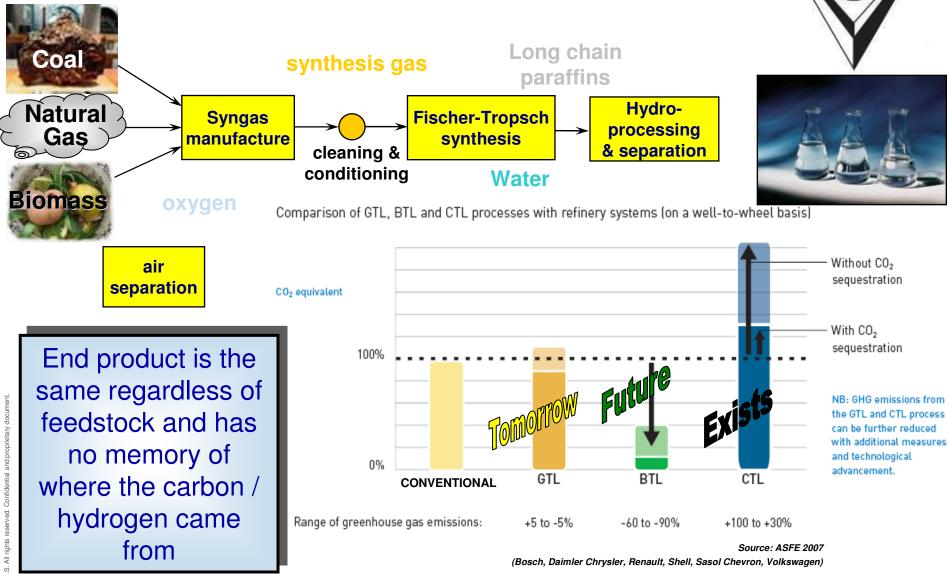


Alternative Fuels Lifecycle (e.g. Bio Fuels)

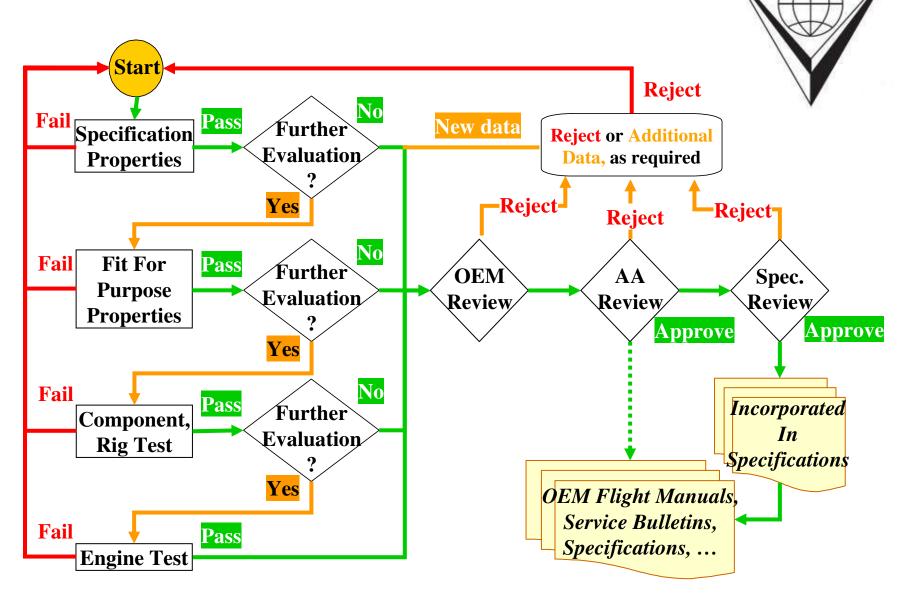


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Synthetic fuels for commercial aviation (XTL)



Overview of alternative fuels approval



OEMs engine and combustor test program

- To assess effects of SASOL fully synthetic jet fuel (FSJF CTL) on engine performance and operation, engine manufacturers (RR, P&W, GE and Honeywell), in coordination with SwRI, conducted engine and combustor tests:
 - ▶ Engine performance and endurance (P&W)
 - ▶ Emissions (United Technologies P&W)
 - ▶ Low temperature atomization (Honeywell)
 - ► Cold ignition, altitude relight and lean blowout (RR and Honeywell)

Demonstrate technical feasibility Flight tests





- ▶ Airbus A380 Rolls-Royce Engines
- ▶ Blend 40% GTL (Shell Technology Centre UK)



- Feb 24th, 2008
 - ▶ Virgin Boeing 747-400 General Electric Engines
 - ▶ Blend 20% from babassu nuts and coconuts



- Dec 30th, 2008
 - ▶ ANZ Boeing 747-400 Rolls-Royce Engines
 - ▶ Blend 50% HRJ from jatropha



- Jan 7th, 2009
 - ▶ Continental Boeing 737-800 –CFM (GE-Snecma) Engines
 - ▶ Blend 50% HRJ from algae / jatropha



- Jan 30th, 2009
 - ▶ JAL Boeing 747-300 P&W Engines
 - ▶ Blend 50% HRJ from camelina / jatropha / algae

A matter of partnership





CAAFI's goal is to promote the development of alternative fuel options that offer equivalent levels of safety and compare favourably with petroleum based jet fuel on cost and environmental bases, with the specific goal of enhancing security of energy supply.

European Commission DG TREN: New feasibility study SWAFEA

- establish a comparative analysis of alternative fuel options
- + environmental + business case analysis;
- input to policy makers, suggest roadmap



Partners: Onera, Bauhaus Luftfahrt, German Aerospace Center (DLR), Altran, IFP, University of Sheffield, AIRBUS, AIR FRANCE, CERFACS, CONCAWE, EADS-IW, EMBRAER, ERDYN, IATA, INERIS, INRA, ROLLS ROYCE (UK and Germany), SHELL, SNECMA.

Sustainable Aviation Fuel Users Group

Partners : Air France, KLM, UOP, Air New Zealand, ANA, JAL, Virgin, Gulf Air, Cargolux, SAS, Boeing

...and many more

Partnership with ICAO





- February 2009 workshop
 - Participation of various ICCAIA member companies
- Side event in Bonn June 2009
 - ▶ ICCAIA supports the event
- ICAO conference on Aviation alternative fuels
 - ▶ ICCAIA supports the event
 - ▶ ICCAIA is an active member of the process to set up the global framework (technical, certification, economic...) for alternative furls for aviation

Aviation is uniquely structured to maximise benefits of sustainable bio-fuels







Tens of thousands fueling stations

 Hundreds of millions of vehicles Several hundred fueling stations (airports)

20,000 vehicles

A stable and manageable market to demonstrate the sustainability of alternative fuels for aviation.