

Summary of IATA 2009 Report on Alternative Fuels

This year's Report on Alternative Fuels, which will be presented at the Board of Governors meeting on Dec. 4, 2009, demonstrates that remarkable progress is occurring in IATA's commitment to the use of 10% renewable fuels by 2017. This report gives updates on biomass conversion efficiency, government research programmes, environmental impact, alternative fuel specifications, and economics. There is a thorough description of the multiple in-flight trials that have resulted in the creation of a new ASTM specification for bio-jet fuel blends. The following is a summary of what is contained in each chapter.

1) Biomass conversion efficiency:

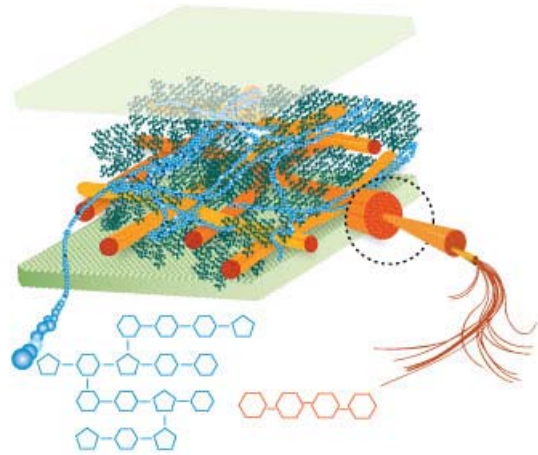
- Analysis of yields from different feedstocks
- Calculations of maximum theoretical yields for different process technologies such as Fischer-Tropsch (FT) synthesis, hydrodeoxygenated oils (HDO), bio-chemical approaches
- Comparison of mass ratios and energy efficiencies

Key results:

- Energy efficiency (fraction of biomass energy captured) 74% for FT vs 65% for HDO, accounting for process energy
- Methanol more efficient, but not a substitute for jet fuel
- Bio-chemical process yields are inherently low
- FT most promising technology for drop-in jet fuel

2) Partner programmes:

- SWAFEA - created by the EC to provide technical guidance to policymakers. Presented state of the art report in Brussels, April 2009



Molecular structure of biomass (from Ceres Biofuels)

- ALFA-BIRD – R&D partially funded by the EU to investigate and develop a variety of alternative fuels in aviation
- DESC – US military organisation supporting certification and increased use of alternative aviation fuels, awarded 3 contracts for FT fuels for testing
- AFCE – Air Force Certification Office has certified numerous platforms for the use of FT blends including B-52, C-17, B-1B, F-22 and F-15, with more to come



Evaluate & select feedstocks



Identify & pilot processing methods



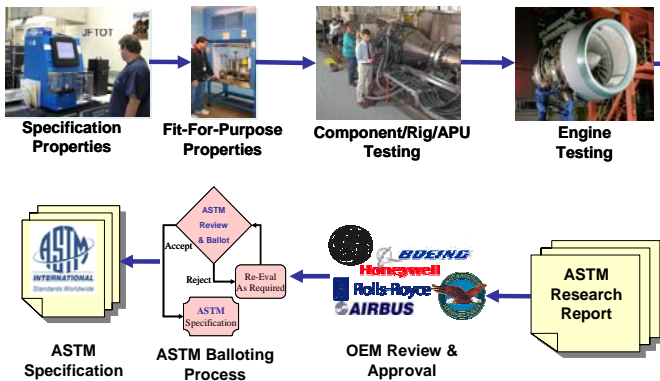
Flights & Engine Tests

3) Sustainability:

- Updates from the Steering Board of the Roundtable on Sustainable Biofuels
- Green house gas (GHG) emissions
- Industry commitments, including non-compete with food, reducing GHG for entire lifecycle of new fuels, positive socio-economic impact, respect for eco-systems

4) Specifications:

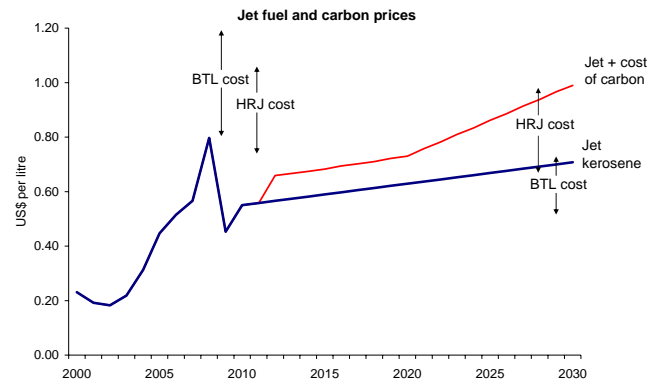
- New ASTM D7566 “Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons”
- D7566 gives criteria for blending renewable fuel components with aviation fuels
- D7566 is a framework for accepting new, alternative fuels as they are developed and qualified
- Synthetic Paraffinic Kerosene (SPK) fuels blended 50% with jet fuel qualify under new spec



5) Economics:

- Emissions Trading Scheme to add to fuel costs over coming years
- Biomass to Liquid (BTL) and Hydrotreated Renewable Jet (HRJ) currently more expensive than jet kerosene

- Costs of alternatives expected to fall as cost of jet kerosene + carbon expected to rise
- Uncertainty of economic forecast for biofuels makes government intervention essential to success of new facilities



6) Flight and engine tests:

- Ground and in-flight trials performed with Synthetic Paraffinic Kerosene (Bio-SPK)
- Jatropha, camelina, and algae-derived fuels blended with jet fuel 50/50
- Fuel properties nearly identical to jet fuel
- Continental Airlines, Air New Zealand, Japan Airlines performed successful in-flight trials using Boeing 737-800, 747-400 and 747-300
- No observed adverse effects

7) Meet future suppliers:

- BioJet Corp.
- Neste Oil
- Sasol
- Etc.