CORE - JetFuel

Discussion Panel I: Supply Chain Development and Deployment of Alternative Fuels
1. Background

The 2020 European Energy strategy:

- ↓ GHG by 20%
- ↑ share of renewable energy 20%
- Energy savings of 20%

To achieve these objectives EU Advanced Biofuels Flightpath sets up the objective to achieve 2 million tons of sustainable biofuel per year in 2020.

A key point is to promote and create an efficient supply chain, from OFFER - biomass cultivation and conversion- up to DEMAND (airlines and standards).

Several projects will work in this supply, one project, ITAKA, will link supply and demand by connecting the full value-chain: feedstock grower, biofuel producer, distributor and airlines.
1. Background

Core-JetFuel is a CSA aiming at:
- Acting as a contact point between all stakeholders to give recommendations to the Commission.

It's a collaborative project framed in the implementation of GLOBAL, EU and NATIONAL policies:

- **2009**: 1st International Conference on Aviation Biofuels held by ICAO
- **2011**: The EC presents the EU Advanced Biofuels Flightpath
- **2011**: Solar-Jet Starts
- **2012**: ITAKA starts
- **2013**: Core-JetFuel and Forum-AE Start
- **2014**: Biofelfy Starts
- **2015**: BSFJ (Swedish Biofuels)
2. Value Chain Development

- **Flights:**
  - Air France: weekly flight from Toulouse to Paris-Orly with 10% farnesane during 1 year starting in 2014
  - KLM: May 2014 Series of 20 flights
    March 2016 Series of 80 flights

- **Production (EU)**
  - Neste: by batches
    - Frankfurt-Hamburg (6 months) 1189 flights Lufthansa 800 tons,
    - Itaka (2012-2016, ~ 1000 tons)

Projected:
- Biorefly (2000 tons/year, 2nd gen.) BioChemtex
- BSFJ (4000 tons/year, Swedish Biofuels)
2. Value Chain Development

- Projects at EU level for Development of the Supply Chain
  - ITAKA (2012-2015, production + flight)
  - Biorefly (2 000 t + flights)

- Coordination Efforts
  - Coordination and Support Actions
    - Synthesize demo flights
• **OBJECTIVES**: Demonstrate the capability of the whole value chain.

• **Feedstock**: Focus on camelina plantations/UCO

• **Conversion technology**: Using an existing plant (Neste Oil’s Porvoo Refinery)

• **Logistics and Large Scale Use**: addresses all downstream logistics (i.e. blending, transport, storage and airport supply operations) at large scale

• **Engine and fuel systems testing**: Flight-testing is being carried out and relevant datasets shall be collected for the final assessment

• **Sustainability Assessment**: ensure that at least 60% GHG savings are reached by means of a lifecycle assessment. The socio-economic effects of the biofuel production will be addressed.

Linked to national initiatives:

**Bioport Holland**
Demonstrating the thermo-chemical conversion of lignin to jet fuel in an integrated industrial demo scale plant. Objective: construction of a 2,000 ton/y bio jet fuel plant

- Validation at pre-commercial scale of novel technologies for lignocellulosic-based aviation fuel production.

- Design, construction and operation of a first in its kind paraffinic fuel industrial based on innovative second generation technologies.

- Address the complete value chain, thus including the conversion of lignocellulosic energy crops and agro residues into biofuel.

- Test of jet fuel use in turbines and engines including demonstration flights.
R&D project to demonstrate on a lab-scale a process that combines concentrated sunlight with CO$_2$ captured from air and H$_2$O to produce Kerosene.

- **Work being carried out:**
  - Assessment of the technological potential of solar kerosene
  - Prototype Reactor and Experimental Demonstration
  - Optimized solar chemical reactor design for syngas production
  - Identification of further technology requirements and an initial assessment of the economic potential.

Develop solar-thermochemical conversion and CO$_2$ capture.

Solar reactor of Prof. Steinfeld’s group at ETH Zürich.
### 3. National initiatives

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- National initiatives usually count with a direct support from governmental institutions, public companies plus participation of industrial partners
3. National Initiatives: Bioport Holland

- Objective: Schipol airport working as a demand centre in the form of an airport and its airlines that is supplied by a dedicated regional supply chain
  - Schipol airport is intended to be logistically supported by the Port of Rotterdam, creating an integrated system
  - Work carried out to account biojet fuel under the RED specifications
  - Current work to set up a government/industry program of 80M Euro to help scaling up the Dutch bio jet industry

- Lab’Line for the Future came up as a platform to present the good practices of Air France and its partners.
- Carried out a societal study to measure the acceptance of the public.

- Launch of a 1 year long program (48 flights) to use 10% farnesane blend on a specific route (Total-Amyris SIP)
  - Route: Toulouse to Paris-Orly
  - 1 flight/week
  - Starting on Sept 2014
  - Total is the partner that validates the supply chain and the logistics
    - Farnesane handling and analytics
    - Blending and analyses
    - Delivery of the blend at the airport
    - Delivery of the blend to the wing with a dedicated re-fueller
THANK YOU!