

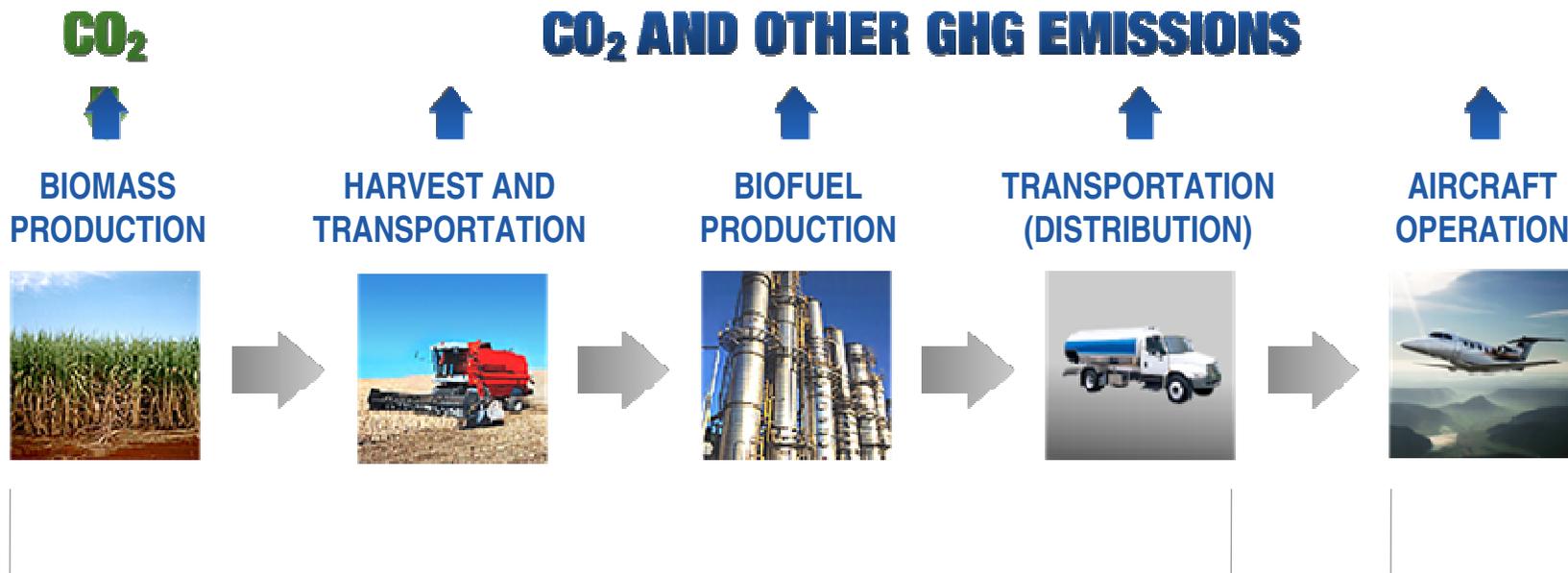


# Aviation Biofuels Development

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Guilherme Freire  
*Director, Environmental Strategies and Technologies*

October 18th, 2011



**Act as the integrator of the sustainability analysis.  
(Non-Embraer Products)**

**Sustainability analysis  
related to the aircraft  
operation.**



abraba

aliança brasileira para  
biocombustíveis de aviação

# Brazilian Alliance for Aviation Biofuels



Launched in São Paulo: May, 2010

## Formed by:

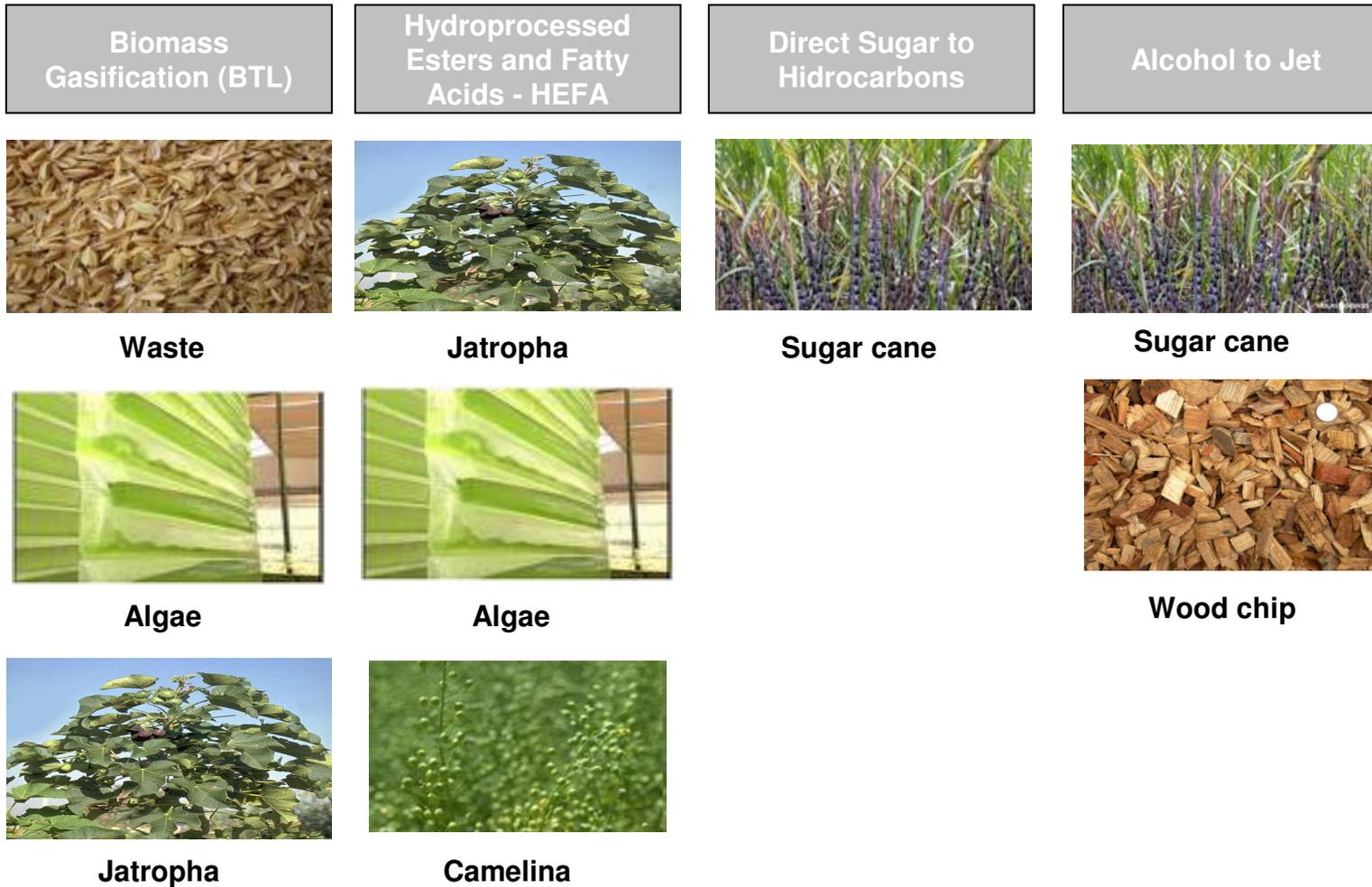
- Airlines
- Biofuel researchers
- Biomass producers
- Manufacturers

## Objectives:

- Support aviation industry commitment to act on climate change
- Foster the development of sustainable biofuels
- Support the production scaling up



# Drop in BioJet – Process & biomasses



# Biomass competition among industries



**Aviation**



**Fine  
chemistry**



**Trucks**



**Cars**



**Lubricants**



**Polymers**

# Where we are?



## HEFA - Hydroprocessed Esters and Fatty Acids



## Two new task forces:

- Alcohol to jet (ATJ)
- Direct Sugar to HC (DSHC)



# HEFA - Post Approval flights



## Aeromexico in first commercial biofuel transcontinental flight

03.08.2011

Categories: Engineering, Supply Chain Management, Energy, Green, Boeing,

Tags: Biofuels, Green, Boeing,

Share:

Aeromexico passed the test by flying from Mexico City to Madrid yesterday. The flight was made up of 70pc traditional kerosene and 30pc biofuel, made from the Jatropa Curcas oilseed plant, which is grown in several regions of the world, including Mexico, according to a statement released by Boeing.



## KLM launches commercial flights Amsterdam - Paris on biofuel

**AMSTELVEEN, 22 June 2011** – KLM Royal Dutch Airlines has taken another important step in aviation sustainability. In September KLM will launch more than 200 flights being operated on biokerosene between Amsterdam and Paris. “KLM has once again shown it is stimulating the development of biokerosene”, according to managing director Camiel Eurlings. “In November 2009 we demonstrated that it was technically possible to fly on biokerosene. Now, a year and a half after our first demonstration flight on Camelina, a new phase has been entered around the world, that of certification. Authorisation will soon be granted to operate commercial flights on biofuel. I am especially proud to announce that KLM will take this substantial step in September”.

## Lufthansa

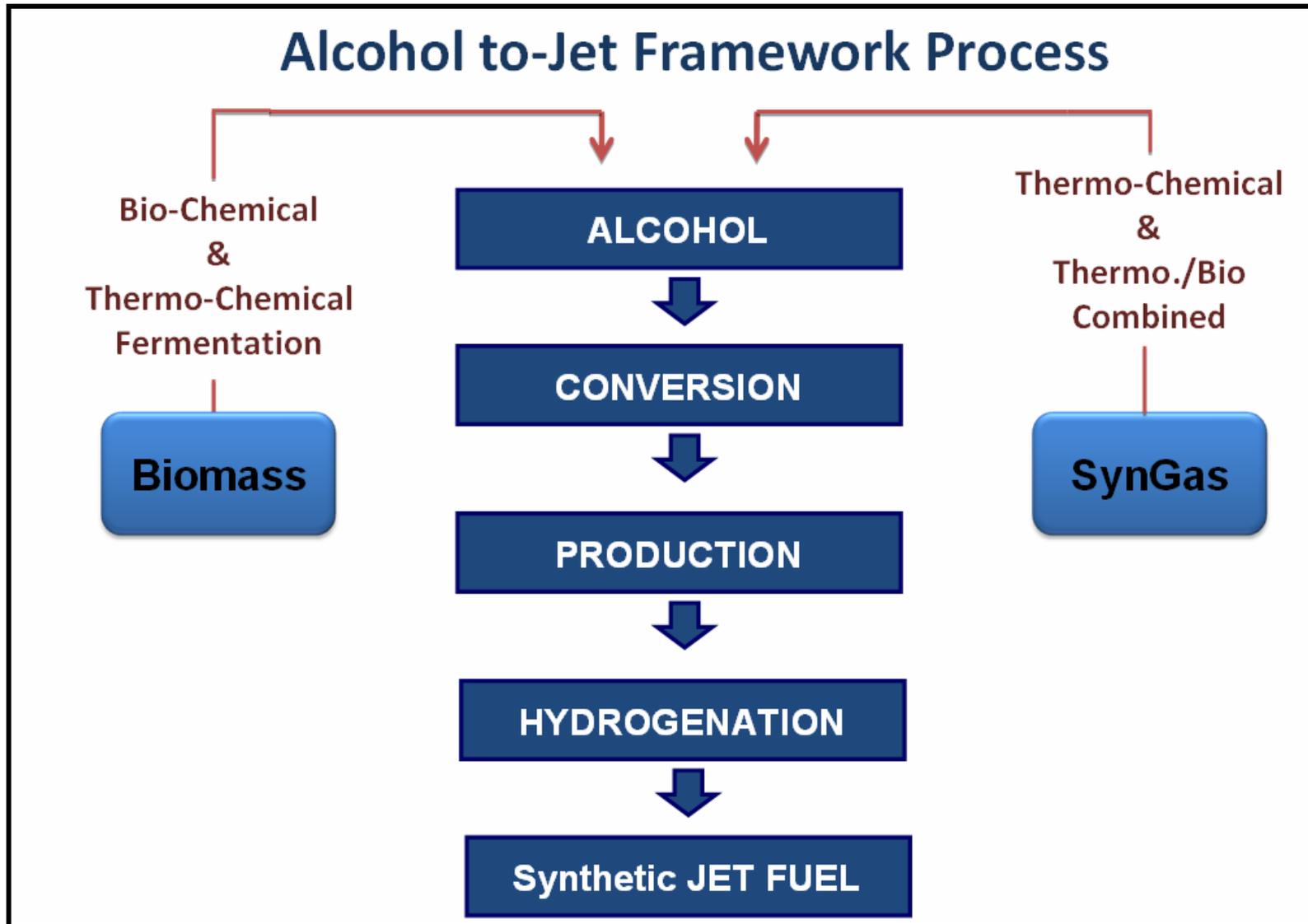
### Lufthansa launches first scheduled flights using biofuel

15.07.11

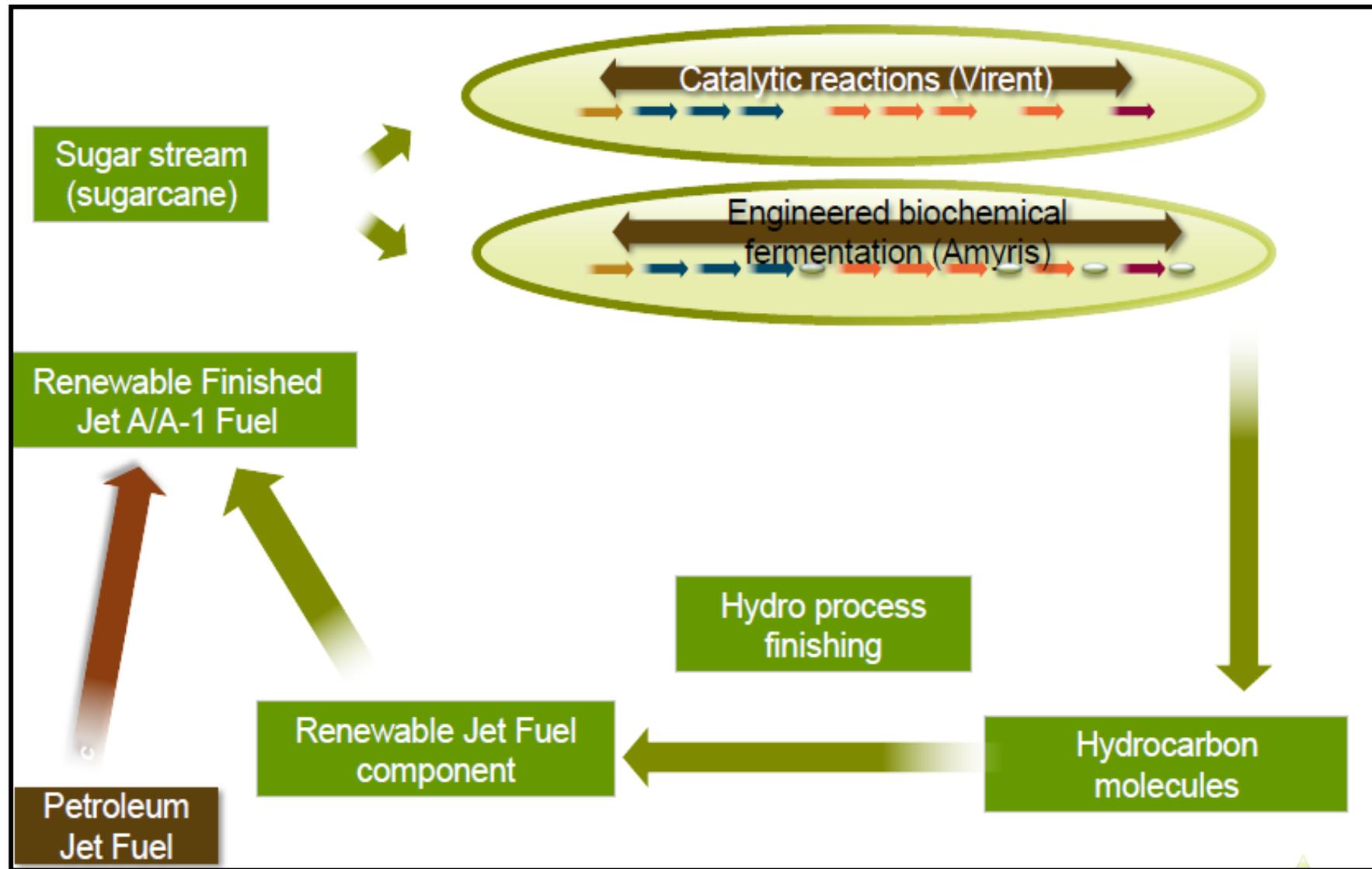
Worldwide first long term test run will reduce CO2-emissions and deliver research results / Lufthansa Airbus will operate daily flights between Hamburg and Frankfurt using biosynthetic kerosene.



# Alcohol to Jet process (ATJ)



# Direct Sugar to Hydrocarbon process (DSHC) ← EMBRAER





# ALTERNATIVE FUELS

## EMBRAER TECHNOLOGY DEVELOPMENT

# HEFA Tests on Embraer 170 (prototype)



- Project characteristics – Partnership with GE:
  - Engine: CF34-E - One engine fed with biojet fuel
  - Biofuel technology: HEFA SPK - Hydroprocessed Esters and Fatty Acids
  - Biofuel: Blend: 50% - Camelina
- Opportunities for Embraer:
  - Evaluate the operational characteristics of E170 and its GE engine when powered with a biofuel
  - Improving our development process for biofuels testing procedures
  - Demonstrate the Embraer and GE commitment in support sustainable biofuels for aviation

# Fermented Renewable Jet Fuel Evaluation



- a) Proven technical feasibility of using alternative drop-in fuels –  
It works!
- b) Encourage certification of new drop-in fuels
- c) Foster the utilization of different feedstock and production processes
- d) Support harmonization of alternative aviation fuel sustainability standards

*Thank you!*

