



FLIGHTPATH TO AVIATION BIOFUELS IN BRAZIL: ACTION PLAN

Sustainable Aviation Biofuels for Brazil

ETHANOL SUMMIT

São Paulo, Brazil July 28th 2013





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The Aviation Industry Vision

Aviation industry vision to reduce CO₂ emissions

The aviation industry will have, in the next 20-40 years, a transition towards the use of sustainable biofuels in substitution of petroleum-based jet fuels. The use of biofuels in aviation will have to be effective, efficient, and advantageous from the environmental, social and economic points of view, in order to consolidate the expansion of the aviation industry worldwide.



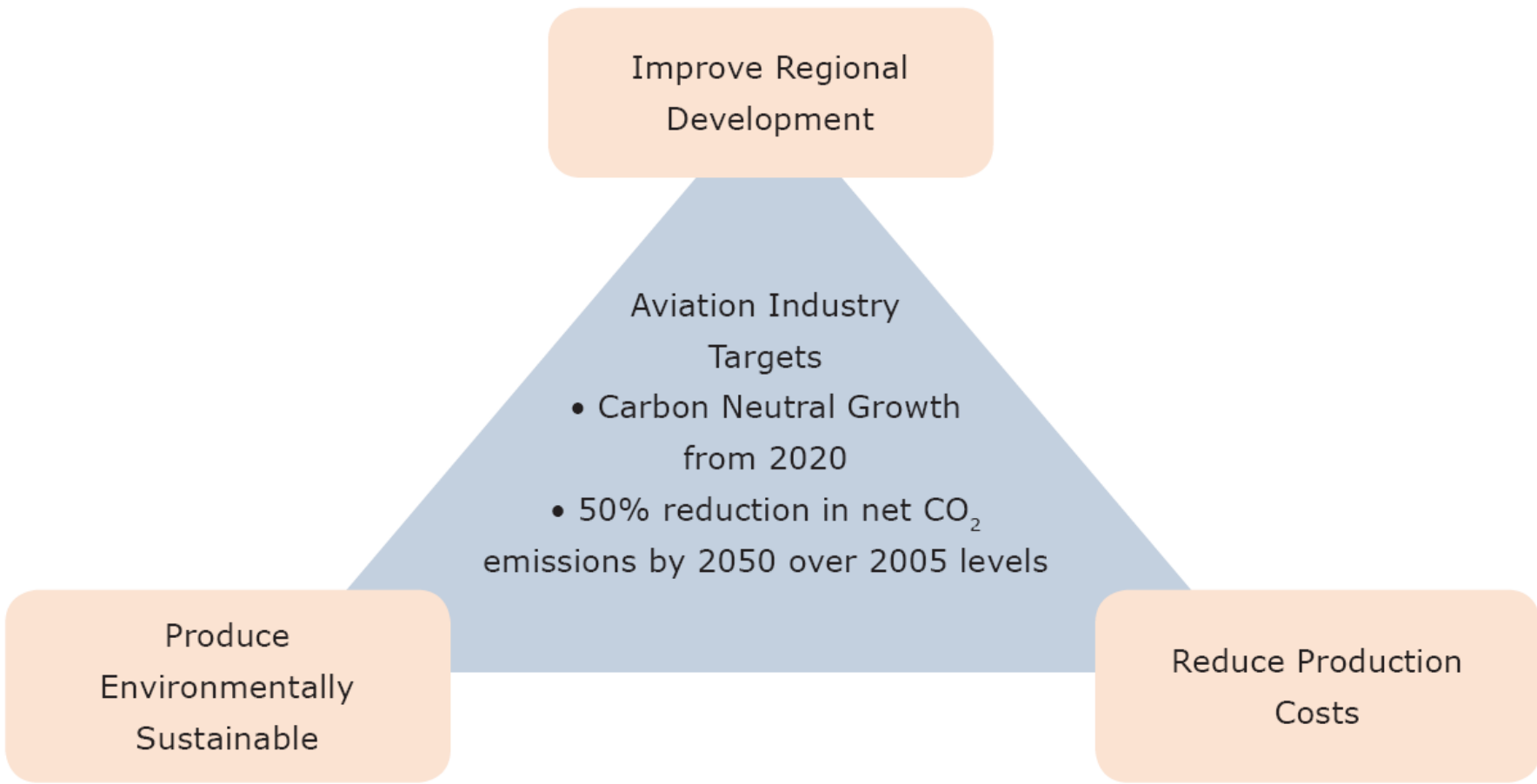
Sustainable Aviation Biofuels for Brazil Project – Roadmap Targets

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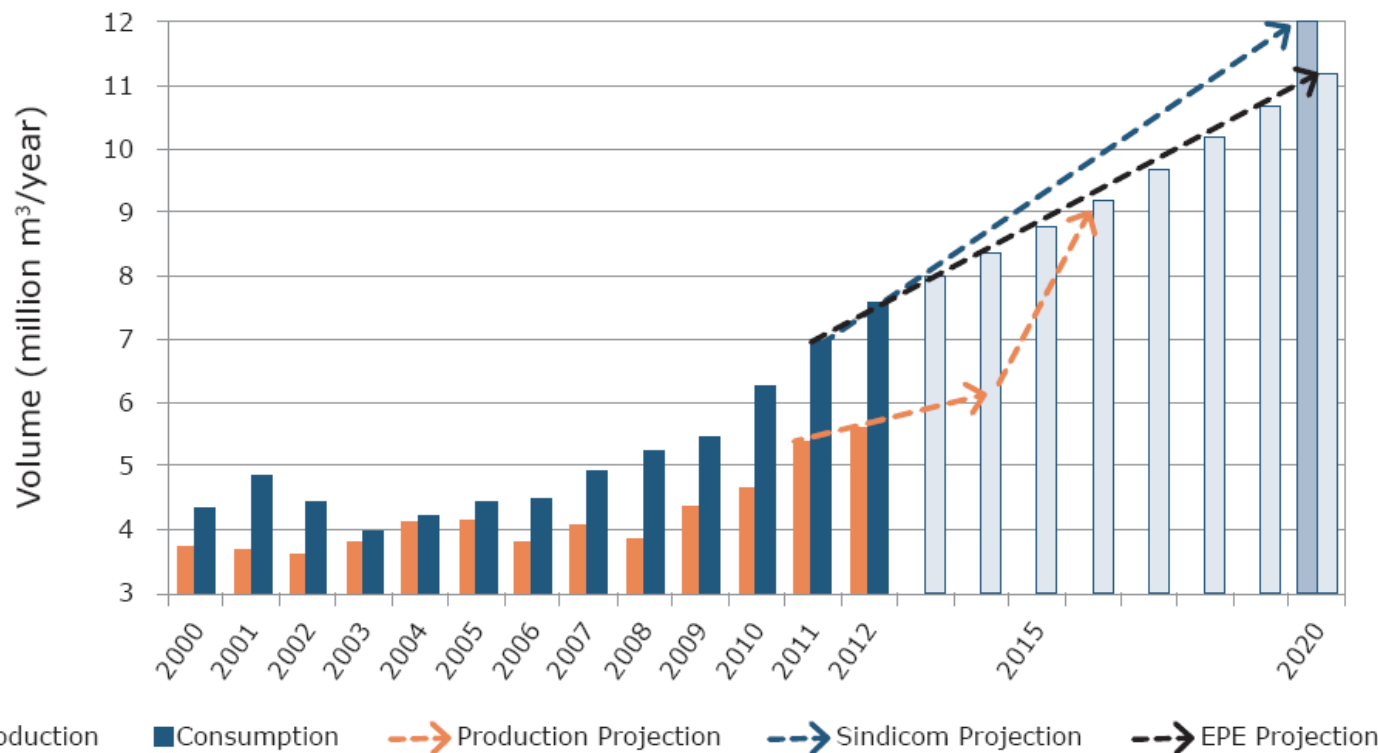
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Project Context & Drives

Energy and Aviation – Situation in Brazil

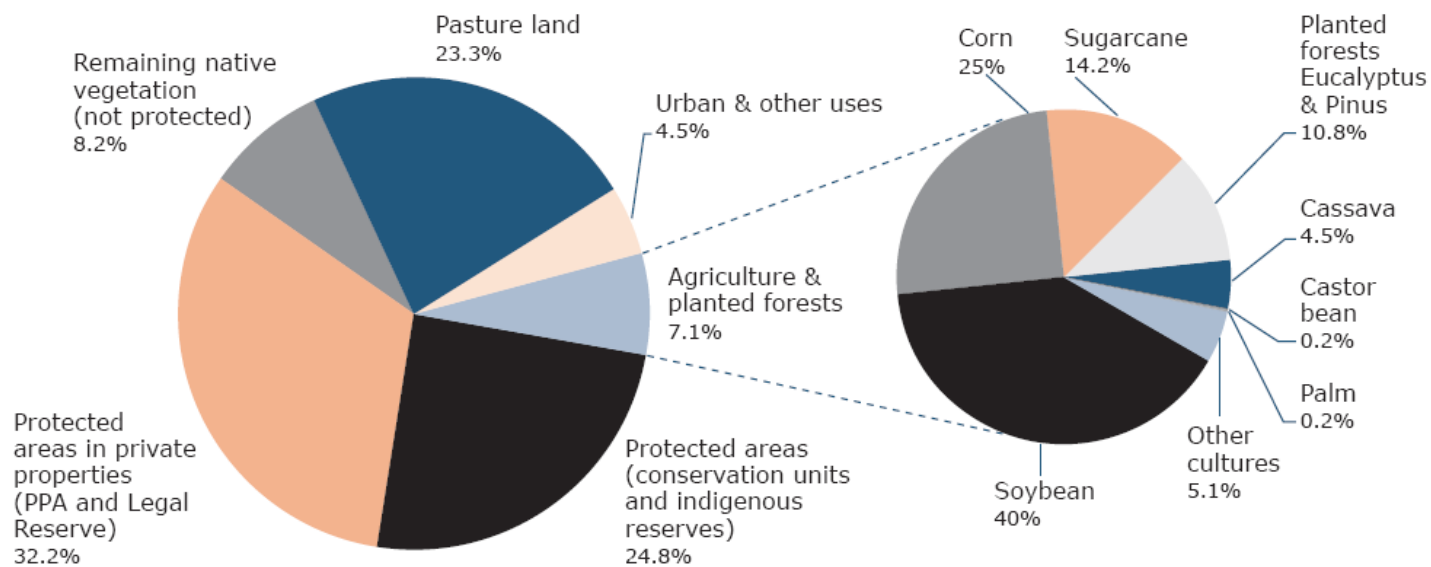
- ❖ the energy demand of the aviation industry is almost totally focused on petroleum-based jet fuel, a form of kerosene made to be used in jet turbines with efficiency and safety.



Project Context & Drives

Feedstocks

- ❖ Brazil has a strong agricultural tradition and is among the world's leading producers and exporters of many agricultural products, and this relevant position was attained due to abundant land, good climate conditions, long-term investment in research and development, and an entrepreneurial private sector.



Brazil total area: 850 Mha



Sustainability indicators

The sustainability assessment for the production of feedstocks in Brazil was carried out according to the principles and criteria of the currently available and most well-known international sustainability standards for biofuels production, namely Bonsucro, Roundtable on Sustainable Biomaterials (RSB) and the International Sustainability and Carbon Certification System (ISCC)

| | |
|--|---|
| (i) Laws and International Conventions | (ii) Waste production and disposal |
| (iii) Land Rights | (iv) Crop Management and Agrochemical Use |
| (v) Employment, Wages and Labor Conditions | (vi) Direct Land Use Changes |
| (vii) Human Health and Safety | (viii) Social and Environmental Impact Assessment |
| (ix) GHG emissions | (x) Rural and Social Development |
| (xi) Biodiversity and Ecosystems | (xii) Contractors and Suppliers |
| (xiii) Soil conservation | (xiv) Engagement and Communications with Stakeholders |
| (xv) Water use and contamination | (xvi) Economic Viability and Production and Processing Efficiency |
| (xvii) Air pollution | (xviii) Food Security |



Main outcomes of the Workshops carried out in the Project

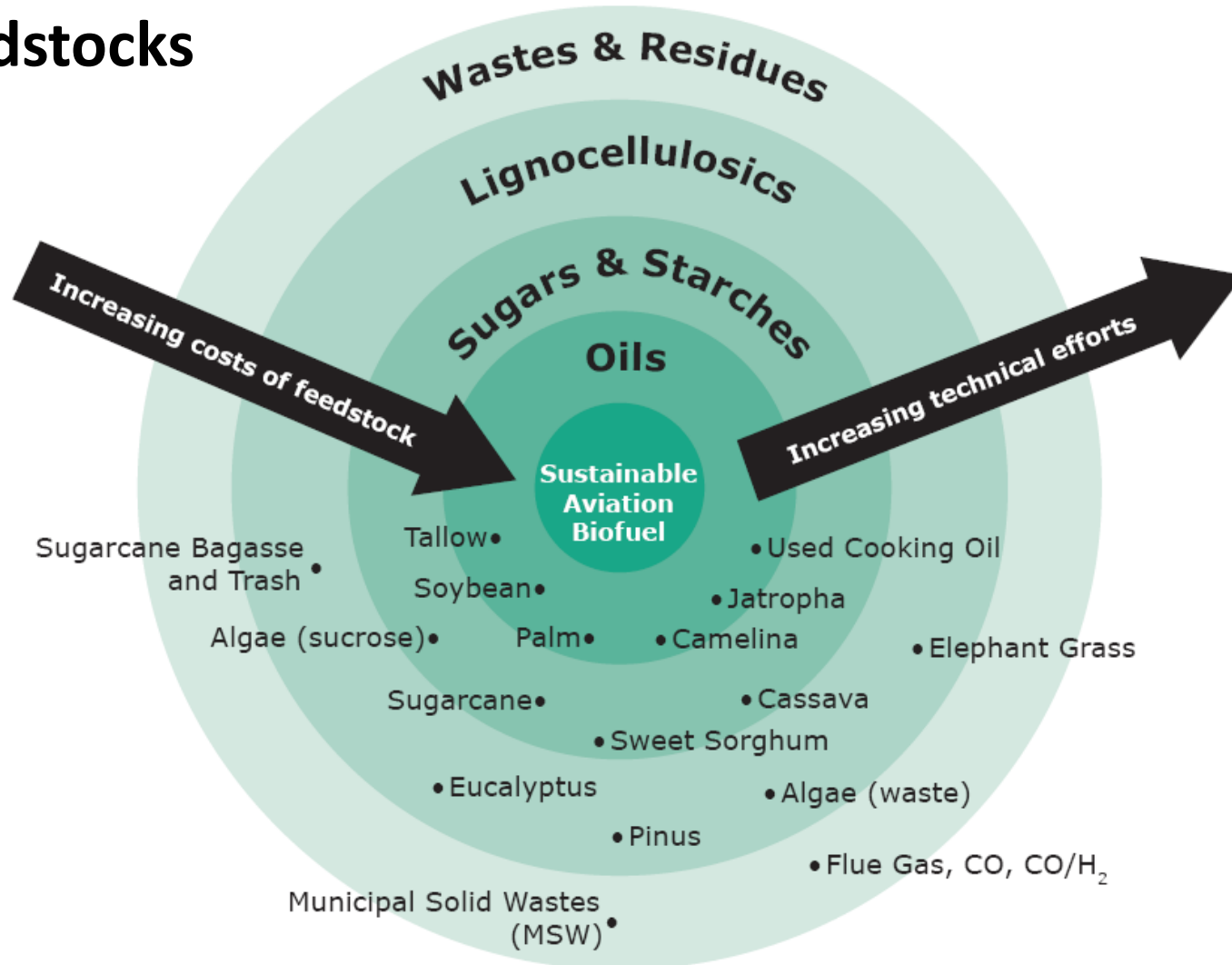
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Feedstocks





Main outcomes of the Workshops carried out in the Project

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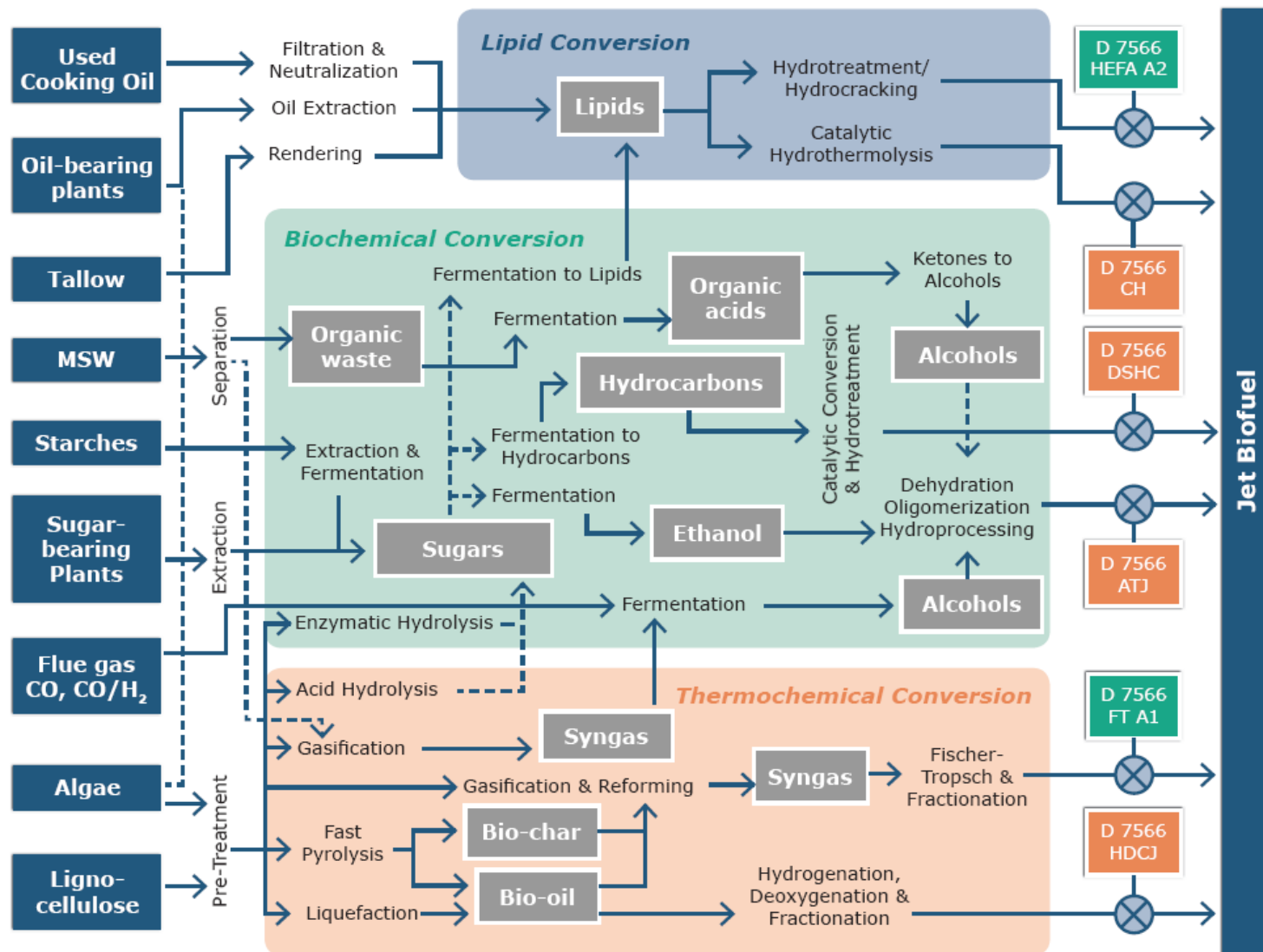
Identified Pathways

A combination of a feedstock, pretreatment, conversion and specific jet fuel production process

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Jet Biofuel

Conclusions and Recommendations

Why jet biofuels in Brazil?

- ❖ the rich Brazilian experience on the modern and sustainable production of biofuels, reconciling sustainable bioenergy production with food security;
- ❖ the current production of bioenergy in Brazil is much larger, in energy terms, than the total jet fuel consumption in the country;
- ❖ the active and growing aviation industry.

However, there are challenges related to select and develop the best pathways to produce drop-in jet biofuels, requiring efforts in R&D and a proper regulatory framework.





Conclusions and Recommendations

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Which R&D efforts are necessary?

(mainly)

- ❖ improve agricultural productivity of identified feedstocks;
- ❖ improve energy efficiency of processing technologies;
- ❖ study the best location and foster the construction of demonstration and pioneer commercial for jet biofuel production ;
- ❖ consolidate the competence for testing and certification of jet biofuel.

Which infrastructure and regulatory actions are needed in Brazil?

- ❖ develop logistic studies for feedstocks and jet fuel specifically;
- ❖ evaluate and take actions to assure the competitiveness of jet biofuel with regards to conventional fuel in Brazil and abroad;
- ❖ prepare the set of regulations on jet fuels to accept biofuels according to ASTM guidelines;
- ❖ establish the “drop-in” sites in the distribution to assure fuel quality and technical certification .



Conclusions and Recommendations

Main specific policy recommendations

- ❖ *promote the development of human resources on jet biofuels technology;*
- ❖ *promote LCA studies on crops with bioenergy potential;*
- ❖ *develop assessment on residues availability and collection;*
- ❖ *support (financing) for pilot and demonstration plants;*
- ❖ *evaluate infrastructure needs of regions with potential for biofuel production;*
- ❖ *consolidate the sustainability certification process of jet biofuels*
- ❖ *establish a governmental long-term program, with a clear agenda of strategic actions;*
- ❖ *promote information campaign on potential, benefits and implications of jet biofuels.*



Conclusions and Recommendations

The effective introduction of sustainable jet biofuels means a very important opportunity for developing the aeronautic sector and the agroindustry, beneficial for the society and the environment.

Brazil has an excellent position to become a global player.

There are challenges to overcome to create this new industry, but Brazil has resources to face them and cannot afford not to participate.