



**CAAIFI 2014
General Meeting
& Expo**

CAAIFI®

International Initiatives

Moderated by: Lourdes Maurice, FAA

Special Guest: Jane Hupe,
Chief of ICAO Environment Branch

Produced by



Coordinating with Global Efforts



CAAFI



ABRABA/SABB



SWAFEA/Alfabird



Australia / AISAF



Aireg



Bioqueroseno.es



Sky NRG



IFP Energy Nouvelle



ICAO

- **Formal and informal coordination**
 - **Coordination with R&D organizations**
 - **International Airshows**
 - **Bilateral Cooperation Agreements**
- **ICAO as forum for exchange**





**CAAIFI 2014
General Meeting
& Expo**

CAAIFI[®]

& Expo

International Initiatives

Jane Hupe,

Chief of ICAO Environment Branch

Produced by





INTERNATIONAL CIVIL AVIATION ORGANIZATION

A United Nations Specialized Agency

SUSTAINABLE ALTERNATIVE FUELS IN THE CONTEXT OF INTERNATIONAL AVIATION

Jane Hupe

Chief, ICAO Environment Branch

About ICAO



International Civil Aviation Organization

- **Specialized Agency of the United Nations**
- **Created** in 1944 by the Convention on International Civil Aviation (Chicago Convention)
- **Membership:** 191 Member States
- **Mission:** to ensure the safe and orderly development of international civil aviation
- **Mandate:** to establish and update the Standards and Recommended Practices (SARPs) of the Annexes to the Convention

About the ICAO Assembly



- The ICAO Assembly is the Organization's sovereign body.
- It meets at least once every three years and is convened by ICAO's governing body, the Council.
- ICAO's 191 Member States and a large number of international organizations are invited to the Assembly, which establishes the worldwide policy of the Organization for the upcoming triennium.

ICAO Environmental Goals



Limit or reduce the impact of aviation GHG emissions on global climate

Limit or reduce the number of people affected by significant aircraft noise

Limit or reduce the impact of aviation emissions on local air quality

Quantify
Mitigate
Implement

Minimize the adverse effect of global civil aviation on the environment

ICAO's Role with Alternative Fuels



ICAO is a FACILITATOR

- Outreach
- Information exchange
- International collaboration
- Broader view
- **Globally**

ICAO's Work on Alternative Fuels



**Resolution
A36-22**
Promote
improved
understanding

Rio Conference
ICAO as a
facilitator

GFAAF Created

**Rio+20: the
ICAO's
"Flightpath"
Initiative**

**Resolution
A38-18**

2007

2009

2009

2011

2012

2013

2013

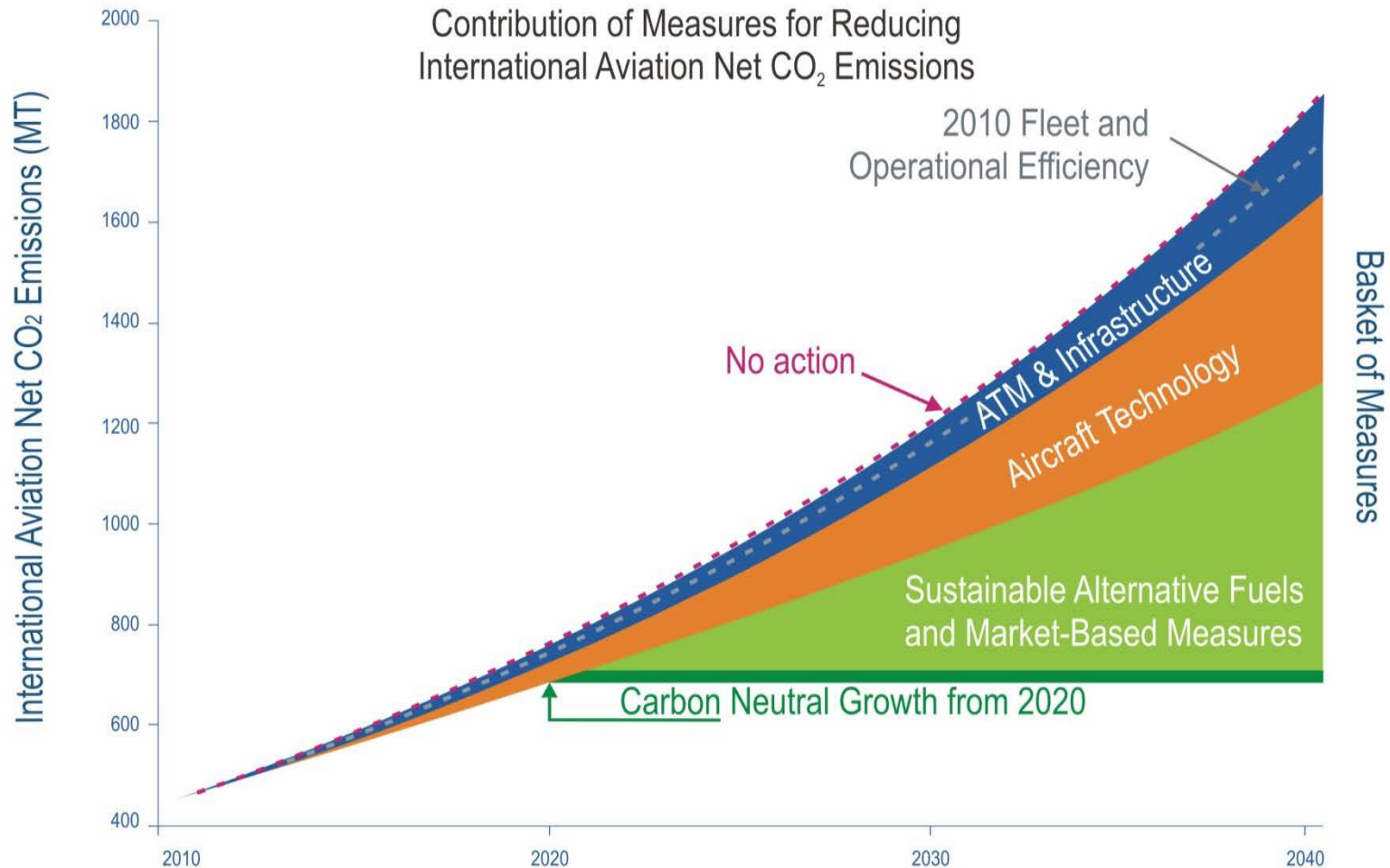
Workshop
Cooperation
and
Harmonization

Workshop
States, financial
institutions and
stakeholders

**ICAO SUSTAF
Group**
Input to
Assembly

Climate change

Aspirational goals and basket of measures



Global Framework for Aviation Alternative Fuels (GFAAF)



INTERNATIONAL CIVIL AVIATION ORGANIZATION
A United Nations Specialized Agency

ICAO > Environmental Protection > GFAAF

ICAO Global Framework for Aviation Alternative Fuels

News and Activities Initiatives and Projects Literature Review Links

Latest News

New BIOjet Abu Dhabi Team to support a biojet fuel industry in UAE 2014-01-19

Boeing sees potential in "Green Diesel" for aviation sustainable fuel 2014-01-14

The Global Framework for Aviation Alternative Fuels (GFAAF) was launched at the [ICAO Conference on Aviation and Alternative Fuels in 2009](#) as part of ICAO strategy to support solutions that reduce aviation contribution to climate change.

It provides a continuously updated database about activities and development in the field of alternatives for aviation, as well as useful documentation and links, to support information sharing and dissemination for the benefit of aviation fuels community.

New! ICAO's SUSTAF Expert Group Report (May 2013):
[The Challenges for the Development and Deployment of Sustainable Alternative Fuels in Aviation](#)

Resolution A38-18: ICAO's Mandate from its 191 States on Alt. Fuels



- Member States, industry, financial institutions and other international organizations to actively participate in **exchange of information** and **best practices** and in further work under ICAO on sustainable alternative fuels for aviation
- Continue to maintain the ICAO Global Framework for Aviation Alternative Fuels (GFAAF)
- **Collect information on progress of alternative fuels in aviation, to give a global view** of the future use of alternative jet fuels and to account for changes in life cycle GHG emissions in order to assess progress toward achieving global aspirational goals
- Work with financial institutions to **facilitate access to financing infrastructure development projects** dedicated to sustainable aviation alternative fuels and incentives **to overcome initial market hurdles**

Resolution A38-18: Additional related requests

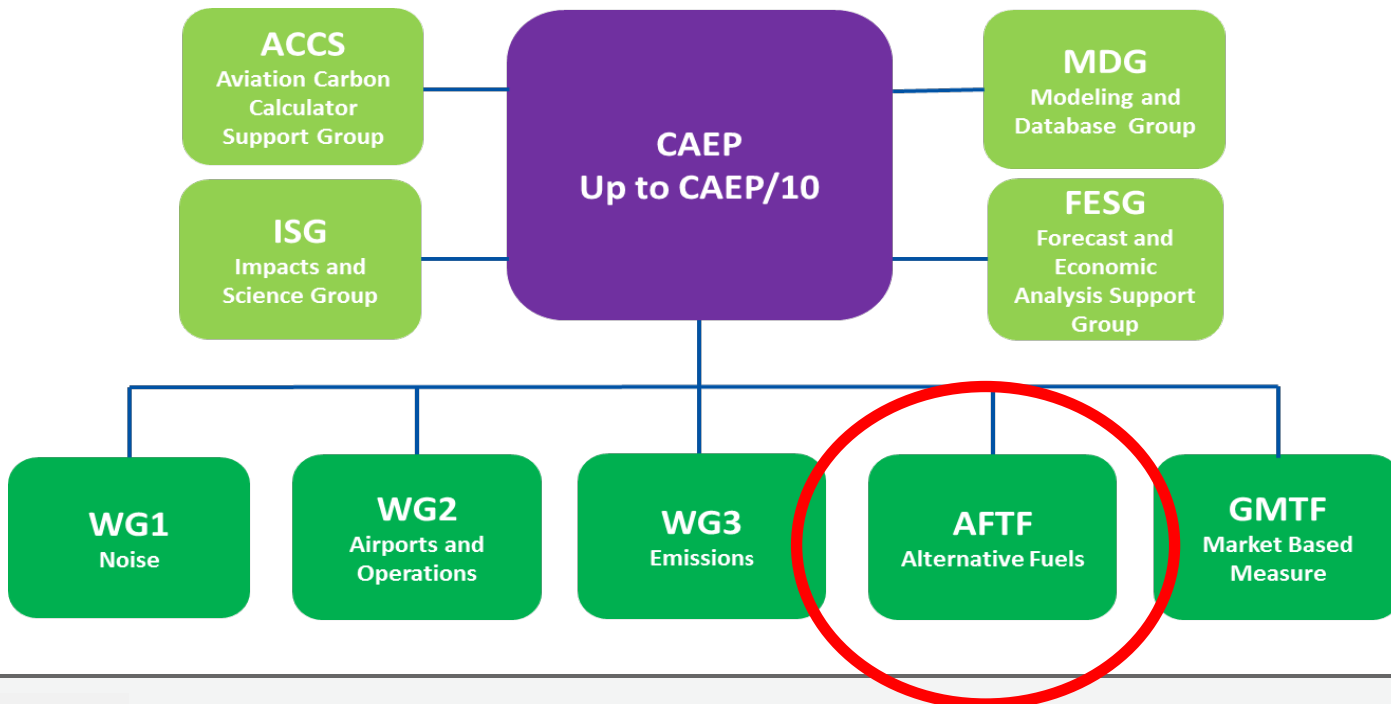


- Voluntary preparation and update by States of **action plans** outlining policy actions on CO₂ emissions reduction and fuel efficiency improvement activities
- **Guidance and assistance** for preparation of action plans
- **Estimation, monitoring and verification** of global greenhouse gas (GHG) emissions produced by international aviation
- **Update of environmental trends assessment**
- **Many elements developed with the support of CAEP**

Committee for Aviation Environmental Protection (CAEP)



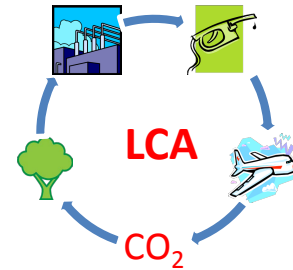
- Established by the ICAO Council in 1983
- 23 members States – 16 Observer States and Organizations
- 400 internationally-renowned experts involved



CAEP Alternative Fuels Task Force



- Goal: **assessing the potential range of emissions reductions** from the use of alternative Fuels to 2050
- 2 directions of work:
 - **Life Cycle Assessment of alternative jet fuels**
 - Projection of the **future production** of alternative jet fuels

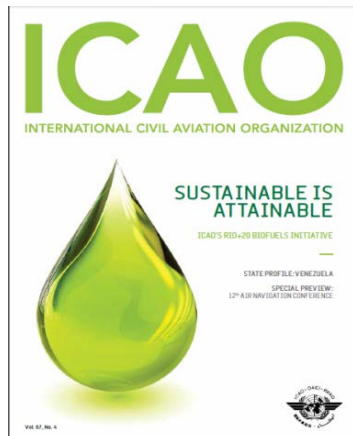
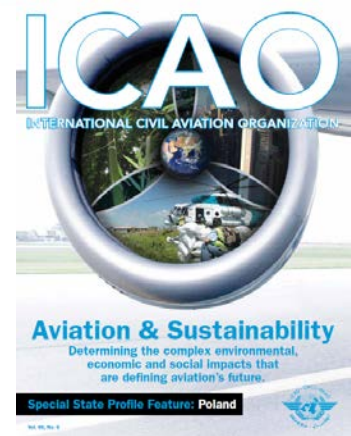


Conclusion



- **International cooperation is the core of ICAO's activities**
 - Information/best practices sharing and dissemination
 - Global view to support decision making built on States' contributions
- **Cooperation among aviation stakeholders and with the energy sector is key, in particular to addressing sustainability and securing access of aviation to sustainable fuels**

Additional information



For more information on our activities, please visit ICAO' website: <http://www.icao.int/env>



**CAAIFI 2014
General Meeting
& Expo**

Joachim Buse,

Vice Chairman, Av. Init. for Renewable
Energy in Germany e.V., aireg

Produced by



aireg

Aviation Initiative for Renewable Energy in Germany

*The future of climate-friendly aviation:
Ten percent alternative aviation fuels by 2025*

Joachim Buse
Deputy Chairman
Washington D.C.
Jan. 29th, 2014

Global Aviation Market Forecast 2013

World Fleet Forecast	2012	2032	% Change
RPK (trillions)	5.5	13.9	151%
Passenger aircraft fleet	16,094	33,651	109%
New passenger aircraft deliveries		28,355	
Dedicated freighters	1,645	2,905	77%
New freighter aircraft deliveries		871	
Total New Aircraft Deliveries		29,226	

Market value of \$4.4 trillion

Goals have been defined

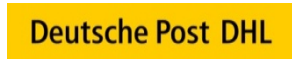
“The future of climate-friendly aviation:
Ten percent alternative aviation fuels by 2025”

Top-3-goals for 2025, to achieve CO₂-reduction targets set by policymakers and the aviation industry:

- Domestic biorefining capacity with at least **one industrial-scale facility**
- **Bilateral government agreements** to safeguard provision of foreign feedstock
- Blending of **10% alternative aviation fuel** in Germany



33 members





Provision of
Feedstock



Technologies
of Fuel
Production



Fuel Utilisation



Quality and
Certification



Sustainability

5 Working Groups cover the core areas from crop to tank

First agreements have been signed

- **USA and Germany** signed a government agreement to support and use alternative aviation fuel during ILA Berlin Air Show 2012
- **Goals:** Strengthening of cooperation for the development of sustainability standards, the qualification of new production pathways and the expansion of the feedstock base for alternative aviation fuel



- The Mobility and Fuels Strategy of the Federal German Government calls for a **“National Development Plan Alternative Aviation Fuels”**
- aireg suggests following items for the Development Plan to follow:

1. Provision of Feedstocks:

Pilot projects and risk minimization

2. Biorefineries:

Location scouting and investment support

3. Market Readiness:

Reduction of margins and upscaling



Status quo:

- Financing of biomass projects is too often hampered by investment risks
- Security of supply as a policy goal is underrated

Suggested abatement / mitigation measure:

- Lowering of investment risks (country and climate risk) through publically financed and scientifically conducted pilot projects

Realization:

- *e.g. extension of the scope of the German Raw Materials Agency (DERA) to include biomass as a strategic resource*
- Goal: bioenergy task force to identify, organize and finance feedstock trials

Deliverables:



- Selection of biomass project with predictable success rate
- Bilateral gov't agreements on production and export criteria
- Clarification of market potential of by-products
- **Costs: ca. 30 Mio. € over a 10-year timeframe**

Provision of Feedstocks – structure of DERA bioenergy task force

DERA's mission statement:

“The German Raw Materials Agency (DERA) is the center of competence for the feedstock industry and the central platform for information and consulting on mineral and energy resources for the German Economy.”

Comparison of aireg goals and DERA's mission

aireg goal	DERA's mission	Compatibility
Financing of biomass trials	exploration support program	
Investment guarantees for biomass projects	Investment guarantees for exploration	

Possible structure and competencies of DERA bioenergy task force

Financial Support	Country Expertise	Co-Financing	Consulting	Demand
				

“Research, development, testing and use of regenerative fuels should be accelerated for aviation.” (German Energy Agency (dena), 2011)

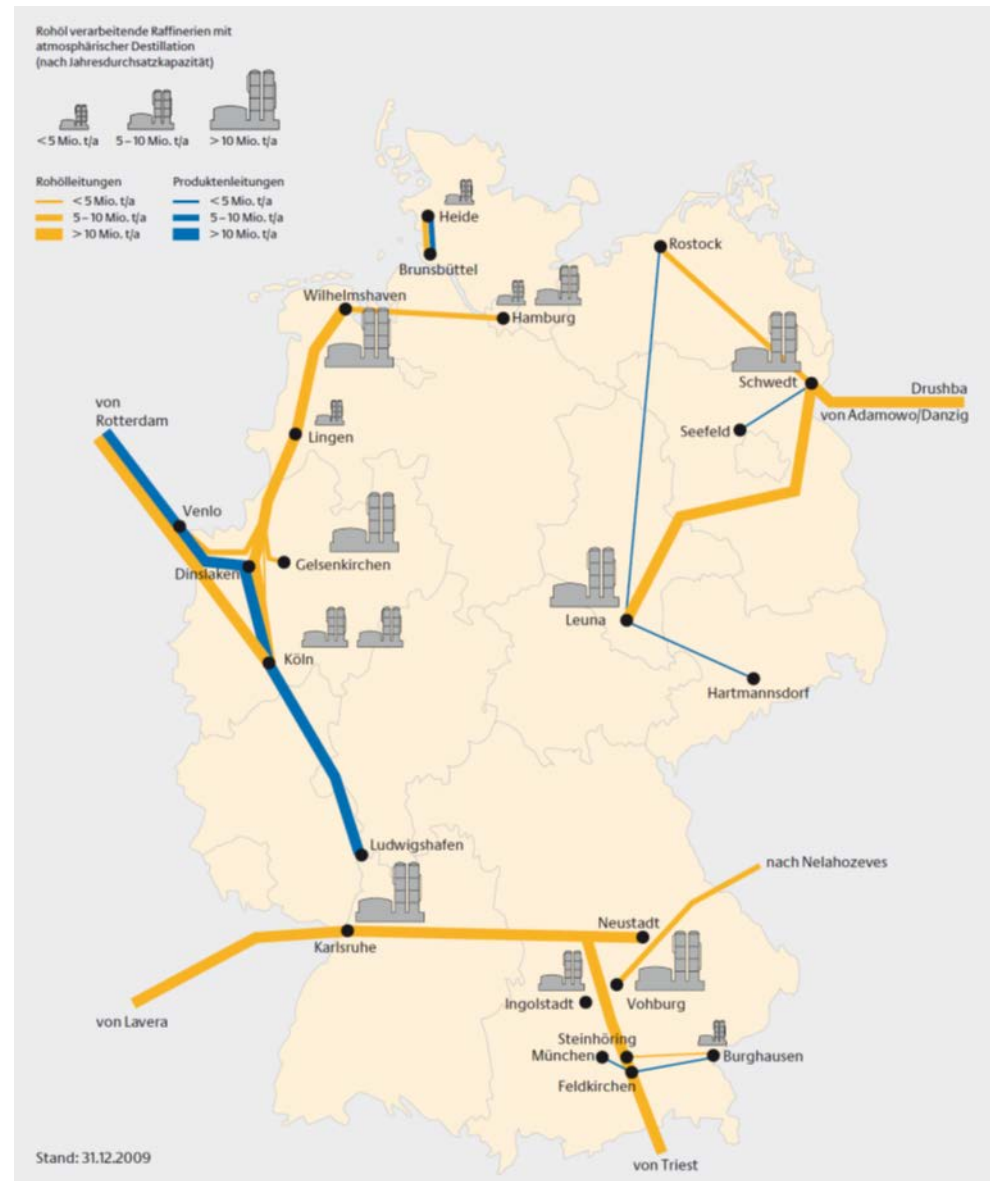


IMPORTANT:

Study on German biorefining options

- Analysis of all German refineries regarding suitability for upgrading or extension into biorefineries (HEFA, BioGtL, Co-Processing)
- Evaluation of economic benefit of domestic biorefineries, incl. export opportunities for plant manufacturers and reduction of dependency on product imports
- Suggestions for operator models and marketing of by-products

Costs: ca. 500.000 €

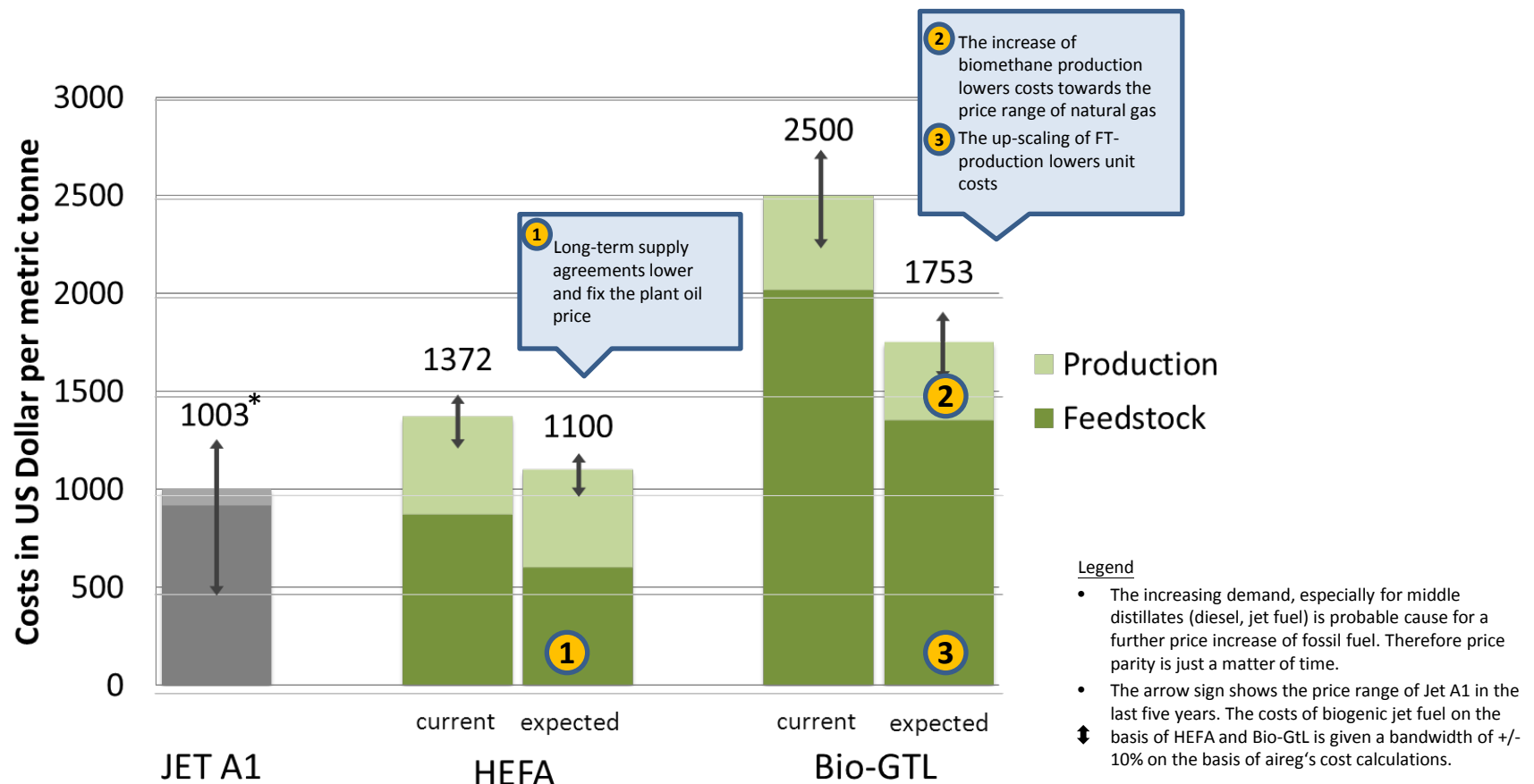


KfW investment program “biorefineries”

- On the basis of the aforementioned study, the construction of a biorefinery of industrial scale shall begin until 2015
- An investment facility “biorefineries” by the public banking group KfW is to give grants of 30% of the investment costs (€ 0.6 to 1 billion for each plant)
- Benefit:
 - Construction of next-generation biorefineries
 - Synthetic fuel for several modes of transport without blending walls
 - Support for the “Energiewende” in the transport sector
 - Competitive advantage for export-oriented plant manufacturers
- **Cost share: ca. € 600 Mio. for 2 plants**
- Example: Environmental Innovation Program
(German Ministry of the Environment)

Current price differences prohibit an increased usage of alternative aviation fuel

- The aforementioned measures contribute to lowering the high price of alternative aviation fuel
- The most important lever is the price of feedstock



Thank you!

Contact:

aireg e.V.
Georgenstr. 25
10117 Berlin
Germany

kontakt@aireg.de
www.aireg.de

**Hope to see you again at Berlin!
May 20-25, 2014**

 **Berlin Air Show**



**CAAIFI 2014
General Meeting
& Expo**

Susan Pond,

Chair, Australian Initiative for
Sustainable Aviation Fuels, AISAF

Produced by





Dr. Susan M Pond
AISAF Chair

CAAFI International Panel
29 Jan 2014



- Founded in August 2012 within The United States Studies Centre at the University of Sydney by consortium of leaders in the public and private sectors
- Strategic direction-setting group aiming to
 - facilitate the development and growth of SAF industry in Australia
 - create a platform of robust collaborations throughout the entire SAF value chain, including civil and military aviation
 - work collaboratively with international partners, including CAAFI under the US Australia MOU signed in Sep 2011
- Joined forces with Aviation Aerospace Australia August 2013

AISAF Structure & Governance



Steering Committee Chair & Members

Working Groups

1. Feedstocks & Processing Technologies

Collaborate on R&D gaps
Support novel fuel R&D
Share technology info
Identify feedstock issues

2. Certification

Coordinate data/activities
Advocate new certifications
Support commercial flights

3. Environmental Impacts

Coordinate analysis
Address research gaps
Advocate standards

4. Commercialisation

Share commercial analyses
Share methodologies
Share supply chain best practice

Industry & Government Stakeholders

AISAF Steering Committee



BAKER & MCKENZIE



[W: aisaf.org.au](http://aisaf.org.au)

[E: aisaf-chair@aviationaerospace.org.au](mailto:aisaf-chair@aviationaerospace.org.au)

SAF Industry Opportunity for Australia

Criteria	Score
Market Need/Leading Edge Customers	✓ ✓ ✓
In Australia's national Interest – security, economy	✓ ✓
Competitive capacity/capability to build on	✓ ✓
Comparative advantage to exploit	✓ ✓ ✓
Not too late to enter field	✓ ✓ ✓
Evident overseas market opportunity	✓ ✓ ✓

Australian Market Leading Demand

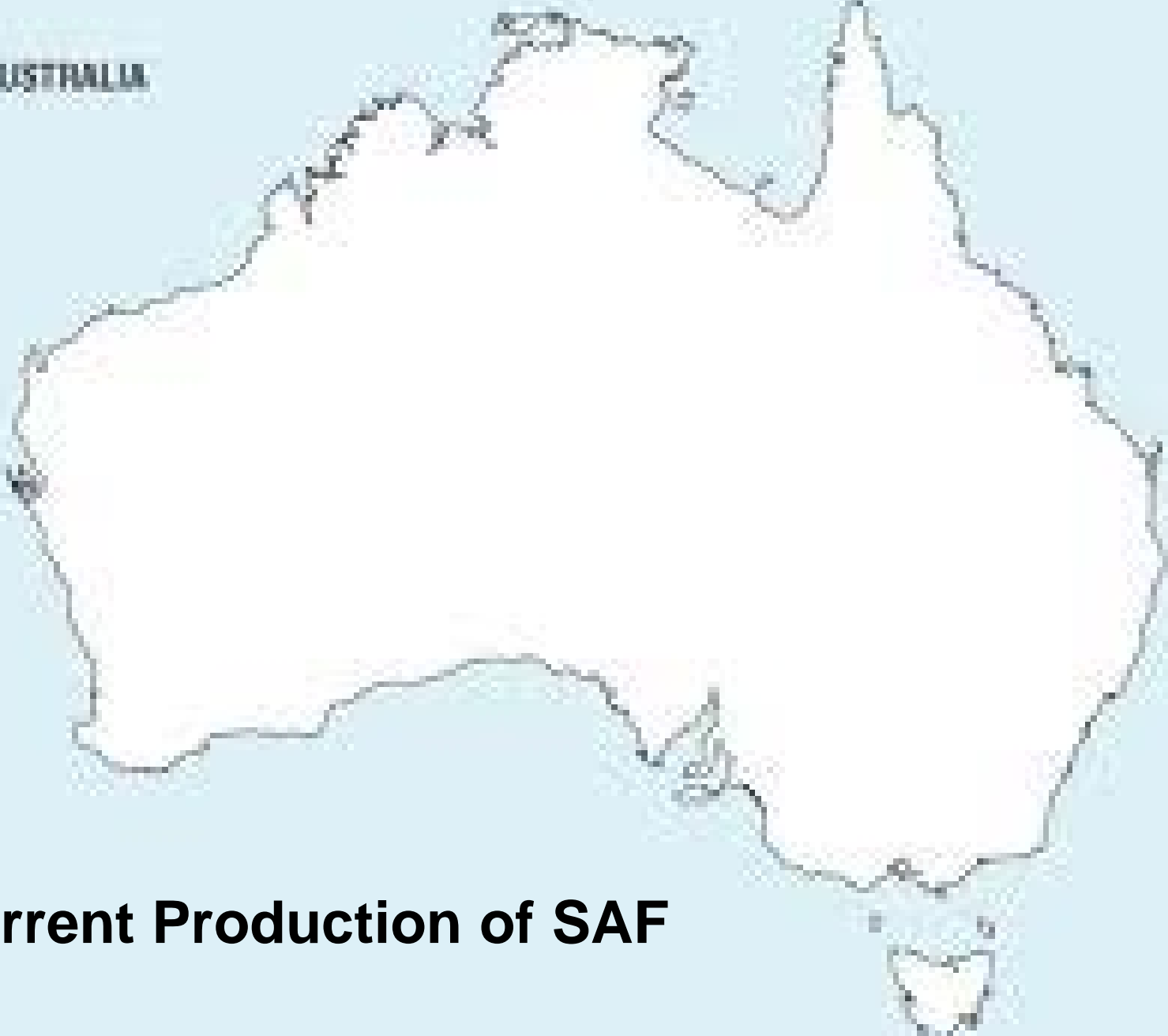


**2012 fuel costs: Qantas, \$4B; Virgin, \$1B
ADF, premium, boutique, low volume fuels
Government engagement**

<http://www.aisaf.org.au/events/low-carbon-jet-fuel-the-industry-flight-path>

<http://www.aisaf.org.au/events/advanced-biofuels-industry-day>

AUSTRALIA



Current Production of SAF



**A long-term future for aviation powered
by sustainable fuels**

W: aisaf.org.au

E: aisaf-chair@aviationaerospace.org.au



**CAAIFI 2014
General Meeting
& Expo**

CAAIFI[®]

Alexandre Filizola,

Environment Technical Manager, ANAC

Mike Lu, Coordinator, Brazilian

Biojetfuel Platform

Produced by

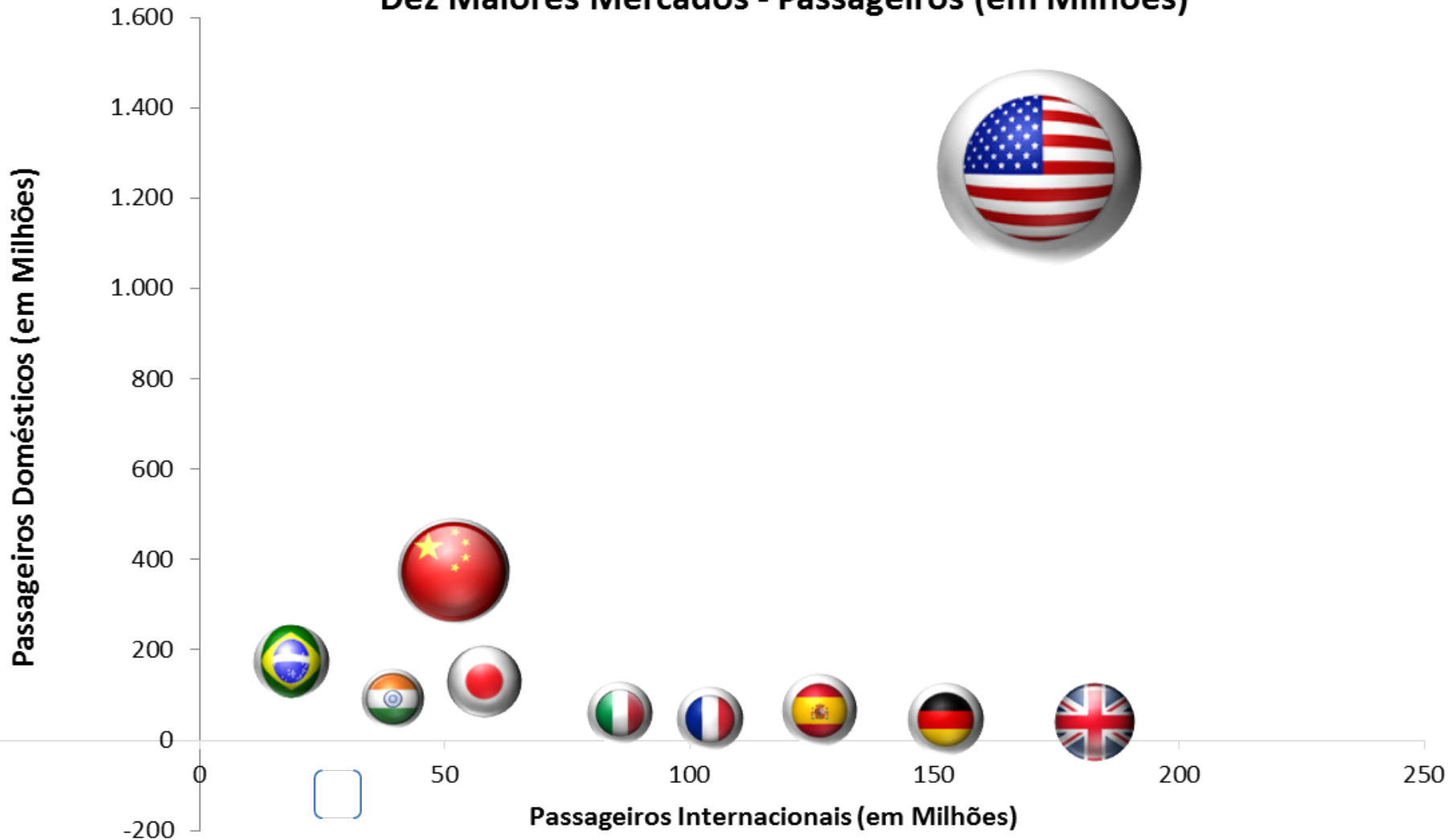




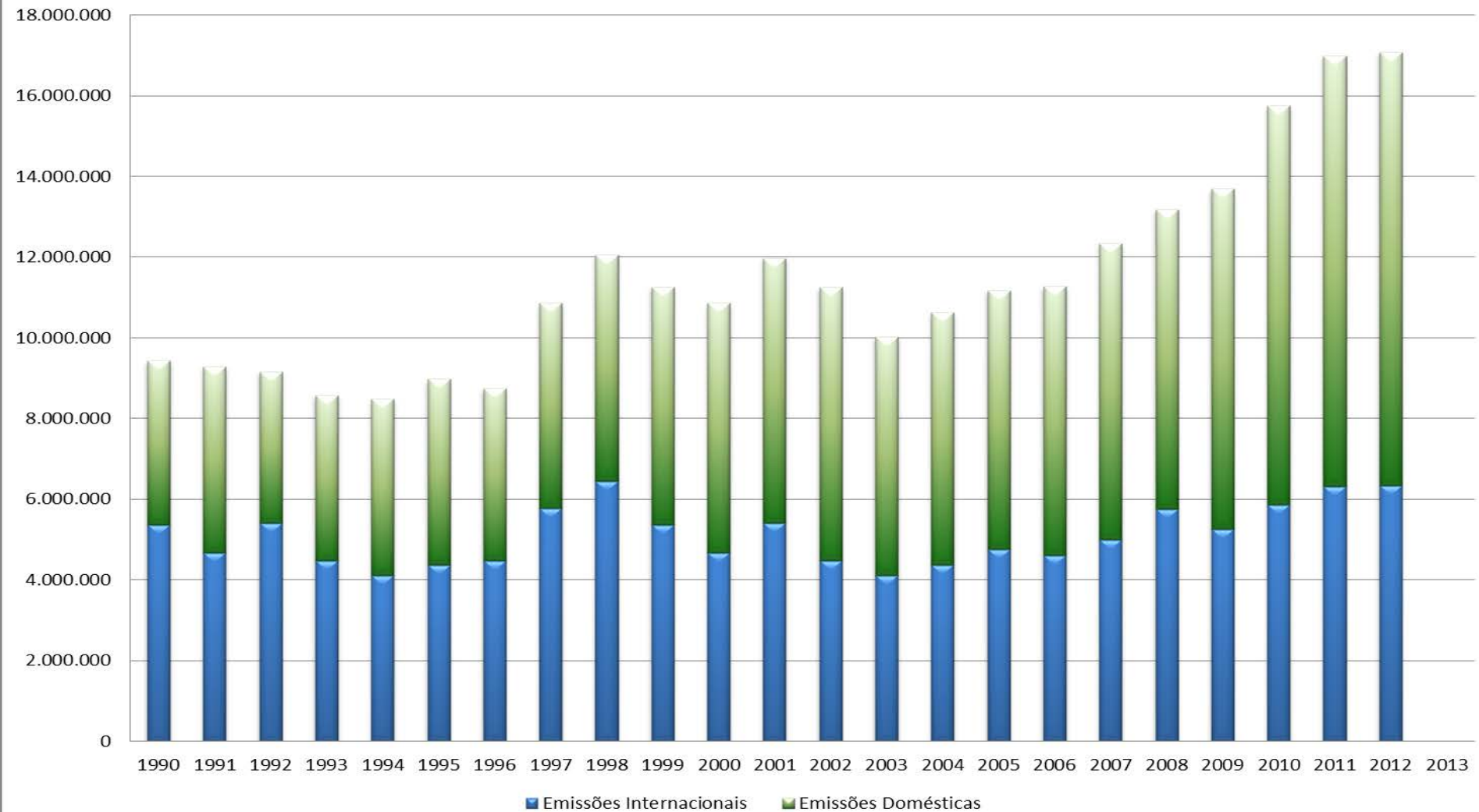
Brazilian Efforts for Aviation Alternative Fuels Development ANAC Initiative

Jan. 28 – 29th, 2014
2014 CAAFI General Meeting
Washington, D.C

Dez Maiores Mercados - Passageiros (em Milhões)



Emissões de CO₂ - em toneladas



GOVERNMENT INITIATIVES

Regulatory
Framework

ANP
Resolution 20
June 2013

Approves the usage of
alternative fuels in
country; (ASTM 7566).

Brazilian
Action
Plan

Presented to
ICAO during
the 38th
Assembly;

Brazil presented a
reservation to the
item in the
resolution that
propose the 2020
carbon neutral
growth.

ALTERNATIVE JET FUEL SUSTAINABILITY ANALYSIS LCA FOR SUGARCANE FEEDSTOCK

- Objective: Foster the development and adoption of locally produced biofuel, based on existing feedstock sugarcane by providing precise information regarding the environment benefits of this particular type of renewable biofuel.

ASSESSMENT OF CNG NEEDS FOR BRAZILIAN AVIATION

- Objective: Provide support for government and industry actions/decisions based on a common goal for renewable bio-jet fuel production within the country.



THANK YOU !

Alexandre Filizola
Manager of Environmental Analysis
Superintendence of International Relations
Email: alexandre.filizola@anac.gov.br
+ 55 61 3314-4620
www.anac.gov.br

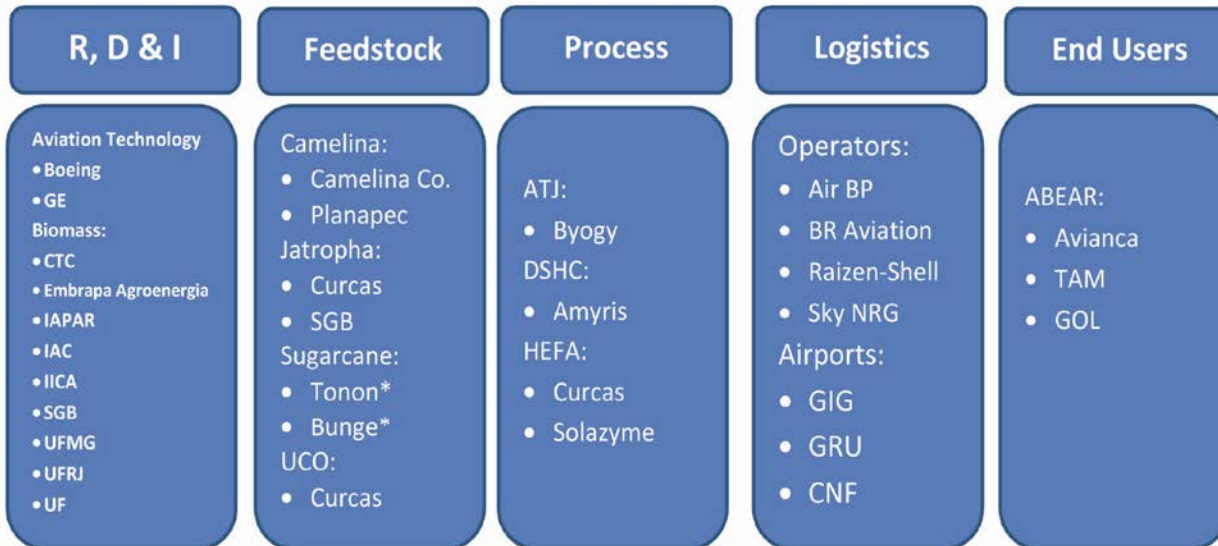


Jan. 28 – 29th, 2014
2014 CAAFI General
Meeting Washington,
D.C.



Brazilian Biojetfuel Platform

Taking off with Sustainability



*Suppliers

CURCAS – Integration RSB Services - Sustainability

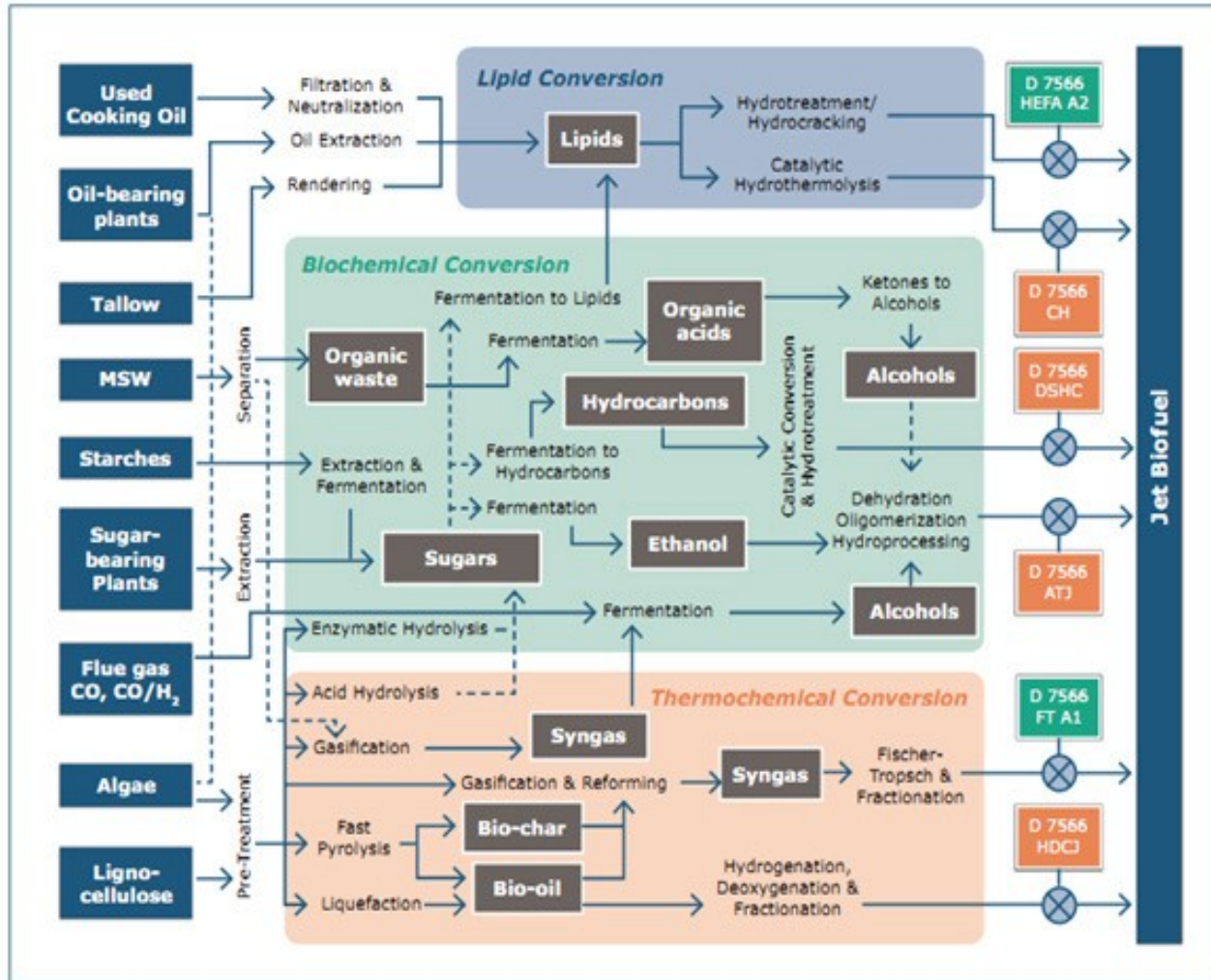


Brazilian Biojetfuel Platform

- Formally structured in August 2013 to implement a feedstock agnostic, multi-process platform: HEFA, DSHC, ATJ.
- Focus on integrated value chain and sustainable feedstock production based on the Brazilian biodiversity, climatic conditions, Family Farming, and Agribusiness.
- Consolidates the stakeholders of the full spectrum of the value chain: optimization.
- Committed to the efforts of the Brazilian Action Plan submitted to ICAO.



SABB - Biojetfuel gap analysis

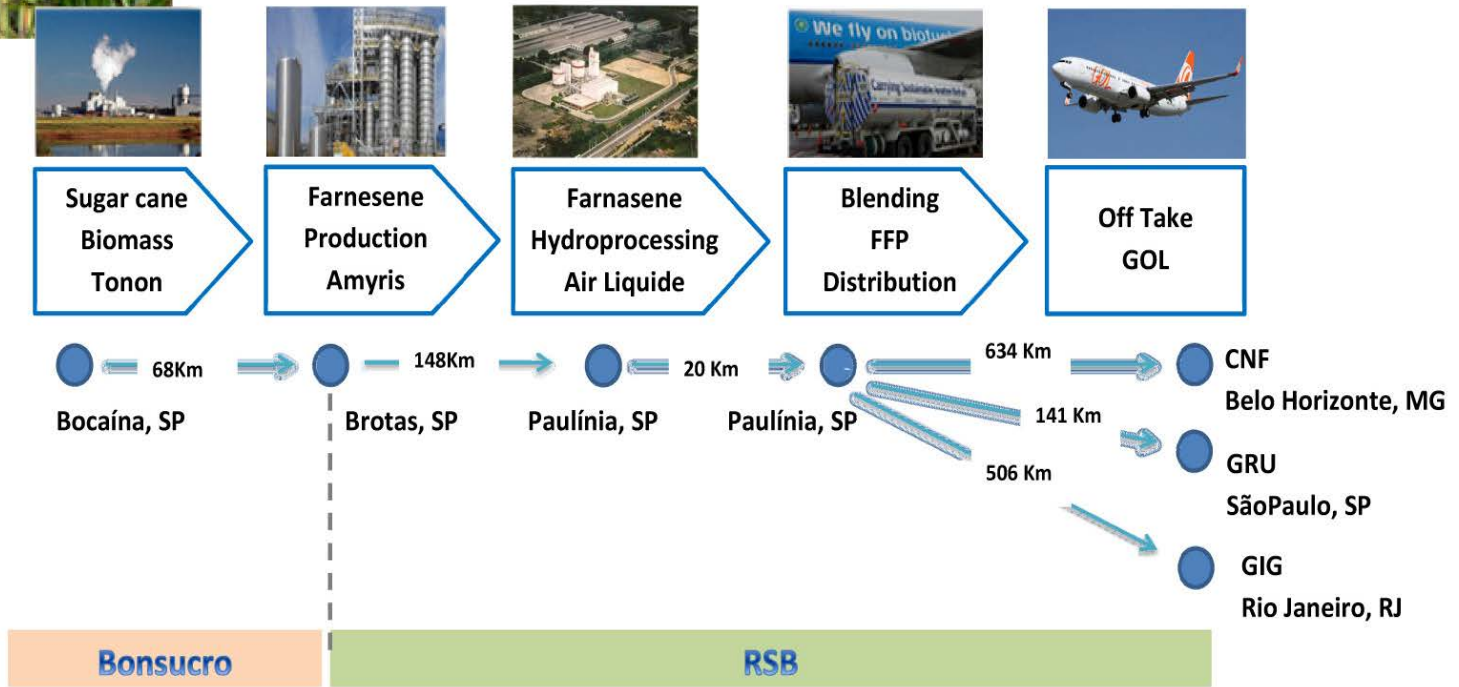




Sustainable DSHC value chain

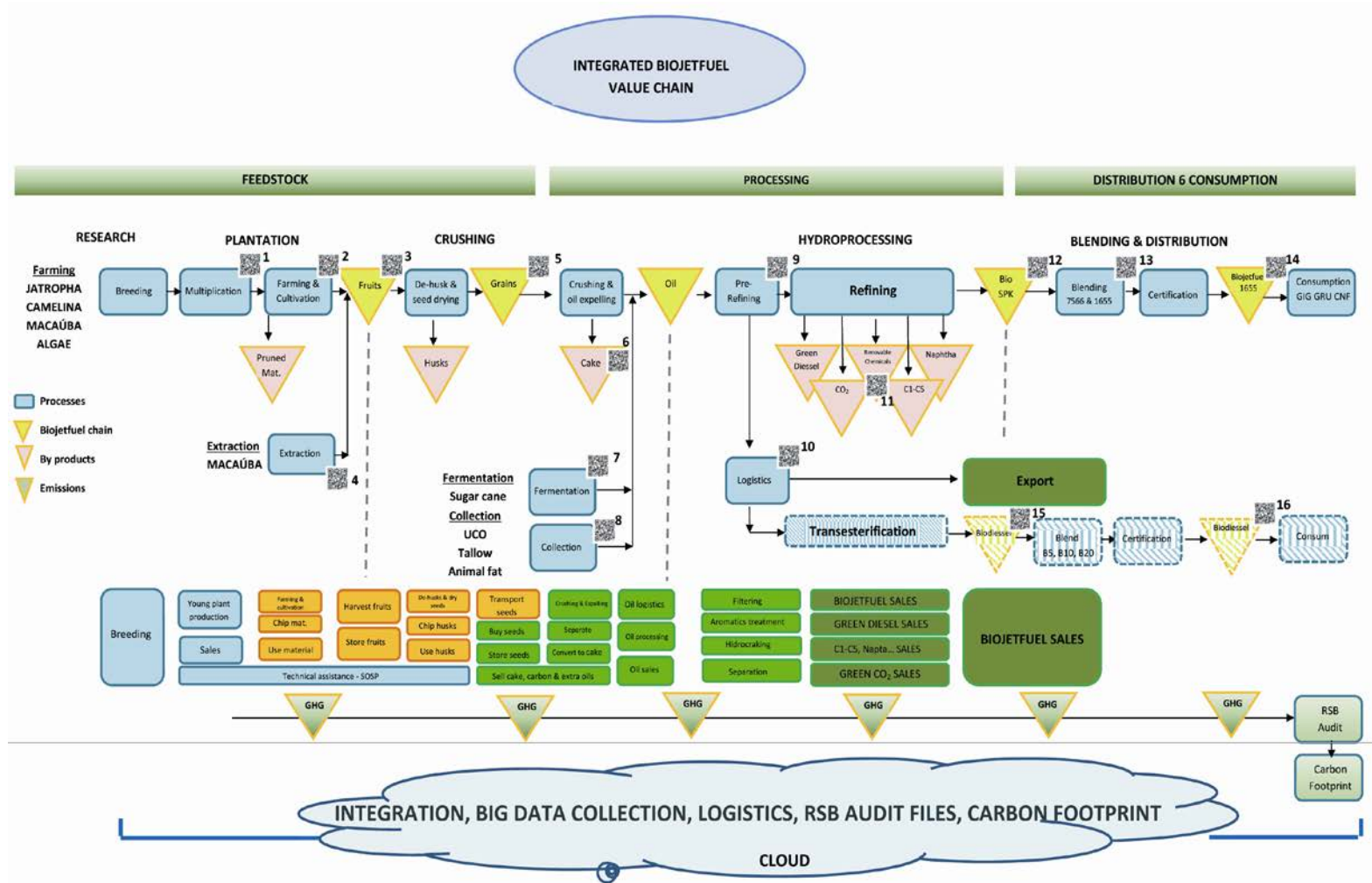


DSHC Value chain sustainability certification





Biojetfuel HEFA value chain





Brazilian Biodiversity: Macaúba value chain





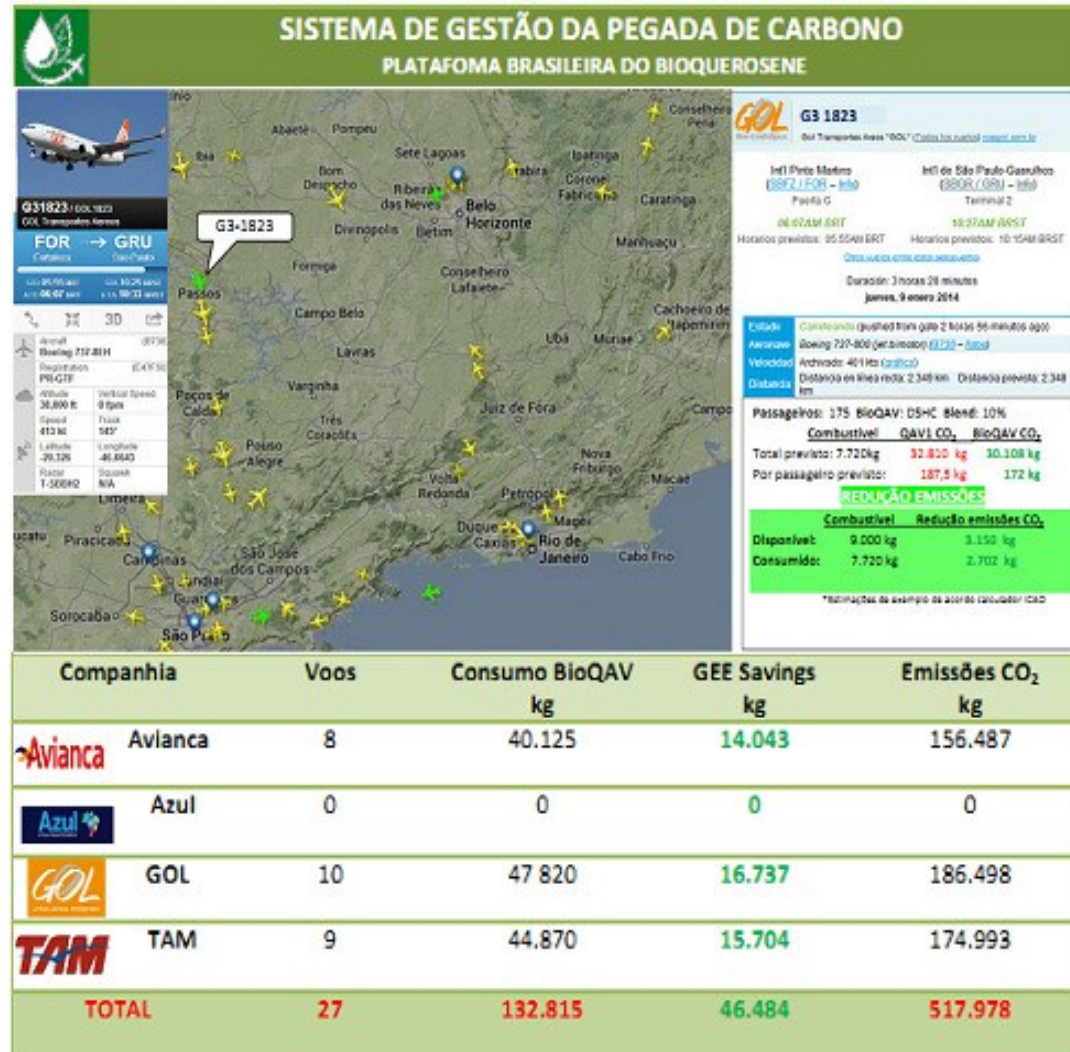
Flying Green Program

Carbon Footprint Offset





Flying Green Carbon Footprint





Brazilian Biojetfuel Platform

Taking off with Sustainability

Thanks !

Mike Lu

Coordinator Brazilian
Biojetfuel Platform

mike.lu.44@gmail.com

+55 11 98438 3743





**CAAFI 2014
General Meeting
& Expo**

César Velarde Catolfi-Salvoni,
SENASA, OBSA Manager, Bioquereseno

Produced by





2011



2012 US – SPAIN
Declaration of
Cooperation
on Aviation Alt. Fuels

Supported by

Management



FEEDSTOCK



TECHNOLOGY



LOGISTICS/USE



SUSTAINABILITY





Roadmap

2010 – 2011

FEASIBILITY
STUDY

2011 – 2013

DEMONSTRATION
PHASE

2014 – onwards

IMPLEMENTATION
PHASE



Initiative Towards A sustainable Kerosine for Aviation



12 partners

from 9 States

	SENASA		Airbus
	Asociatia Centrul de Biotehnologii Microbiene BIOTEHGEN		Compañía Logística de Hidrocarburos S.A. (CLH)
	EADS		École Polytechnique Fédérale de Lausanne (EPFL)
	EMBRAER		Manchester Metropolitan University (MMU)
	Neste Oil		SkyEnergy
	Camelina Company España (CCE)		Consorzio per la Ricerca e la Dimostrazione Sulle Energie Rinnovabili (RE-CORD)



Roadmap

2010 – 2011

FEASIBILITY
STUDY

2011 – 2013

DEMONSTRATION
PHASE

2014 – onwards

IMPLEMENTATION
PHASE



www.core-jetfuel.eu

European coordination
and support actions

FORUM-AE



ICAO CAEP
Alternative Fuels Task Force (ATFT)





GOBIERNO DE ESPAÑA

MINISTERIO DE FOMENTO



GOBIERNO DE ESPAÑA

MINISTERIO DE MEDIO AMBIENTE Y MEDIO RURAL Y MARINO



IDAIE
Instituto para la Diversificación y Ahorro de la Energía



GOBIERNO DE ESPAÑA

MINISTERIO DE INDUSTRIA, TURISMO Y COMERCIO

bioqueroseno.es

Iniciativa española para la producción y consumo de bioqueroseno para la aviación

www.bioqueroseno.es



www.itaka-project.eu

CORE - JetFuel

www.core-jetfuel.eu

FORUM-AE

SUSTAINABLE AVIATION FUELS WEEK



MADRID,
21-24 October 2014



CÉSAR VELARDE

Manager, Observatory of
Sustainability in Aviation (OBSA)
cvelarde@senasa.es

SENASA

Avenida de la Hispanidad, nº 12
28042 Madrid, Spain