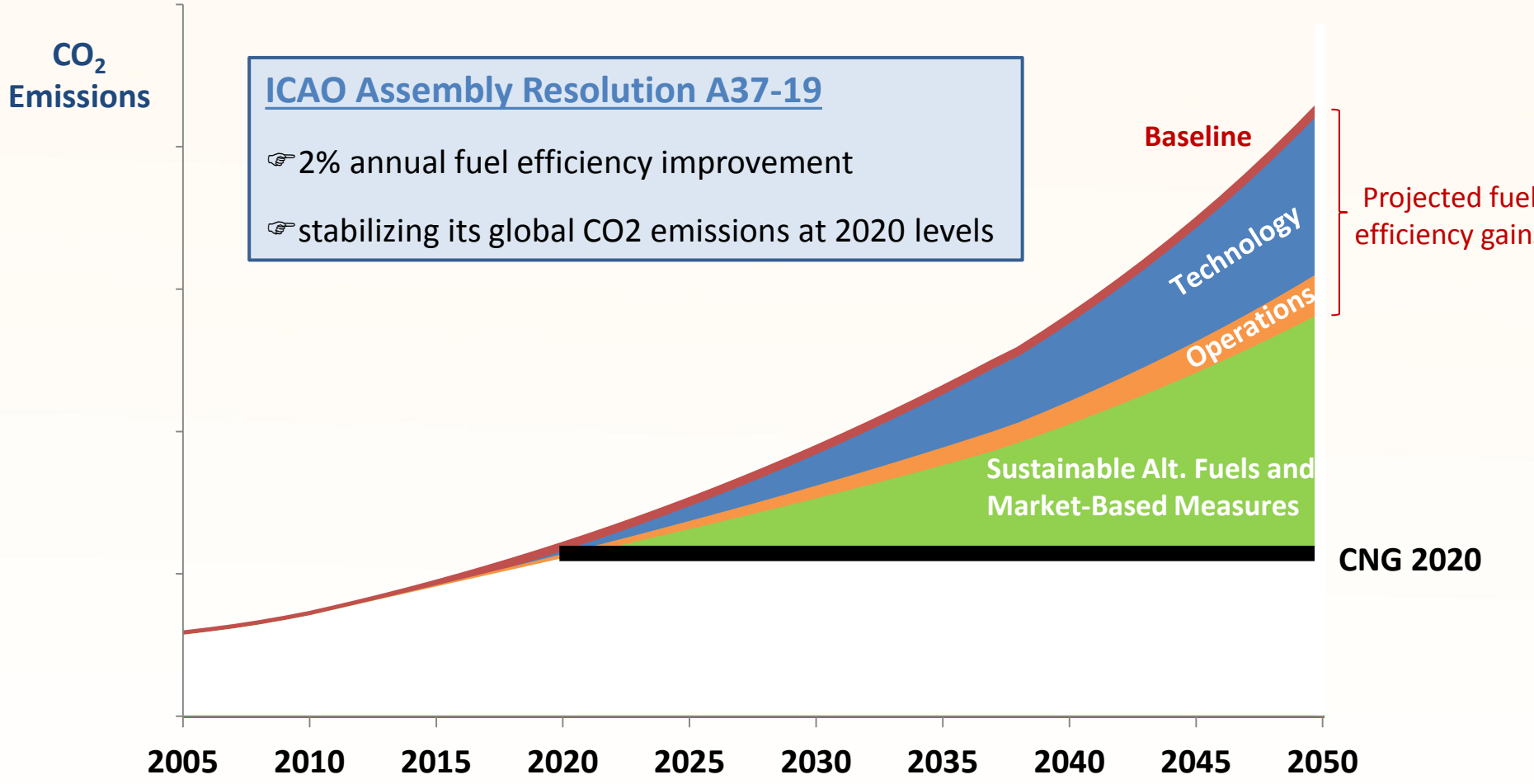
Introduction to Sustainable Alternative Fuels for Aviation and ICAO’s activities

Ph. Novelli – ICAO Environment Branch

Content

- Introduction to sustainable alternative fuels
- ICAO's activities

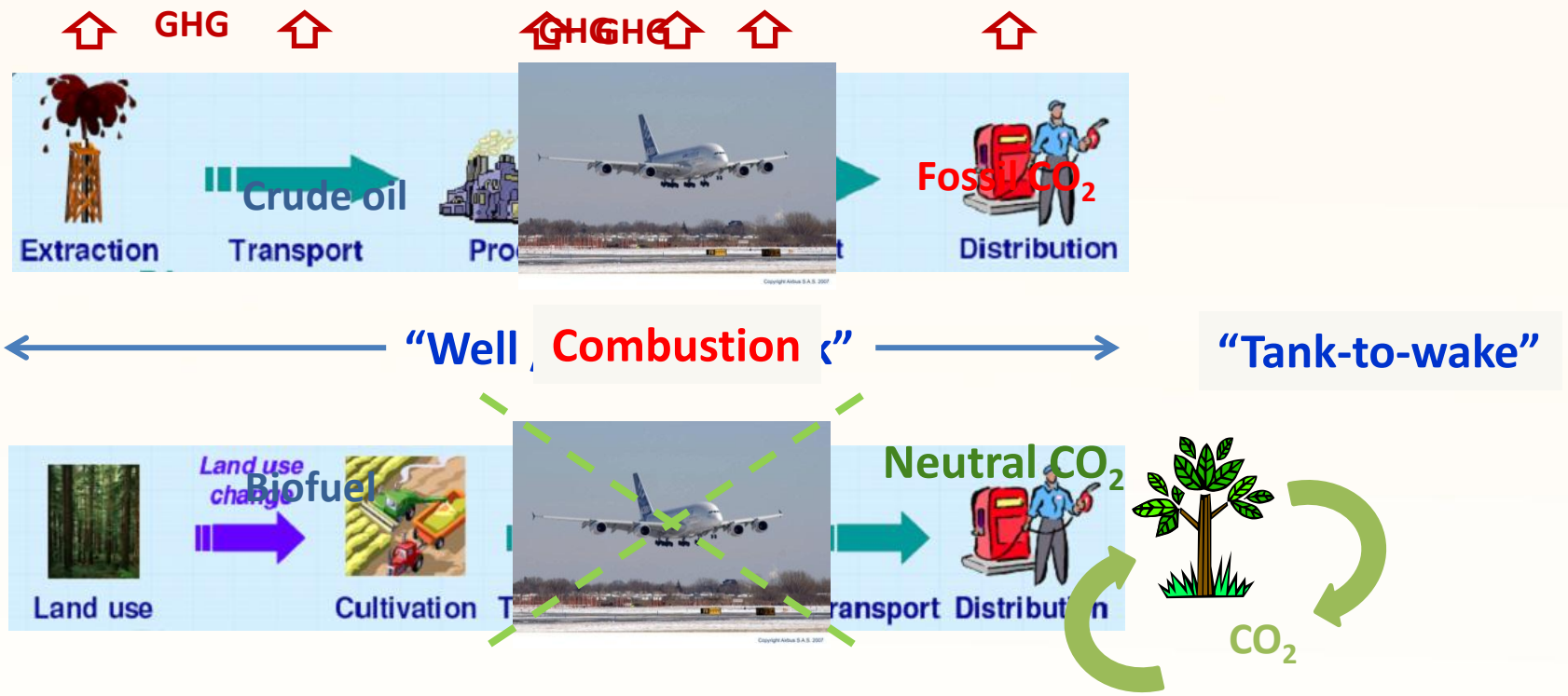
Emission trends and aspirational goals



Sustainable alternative fuels

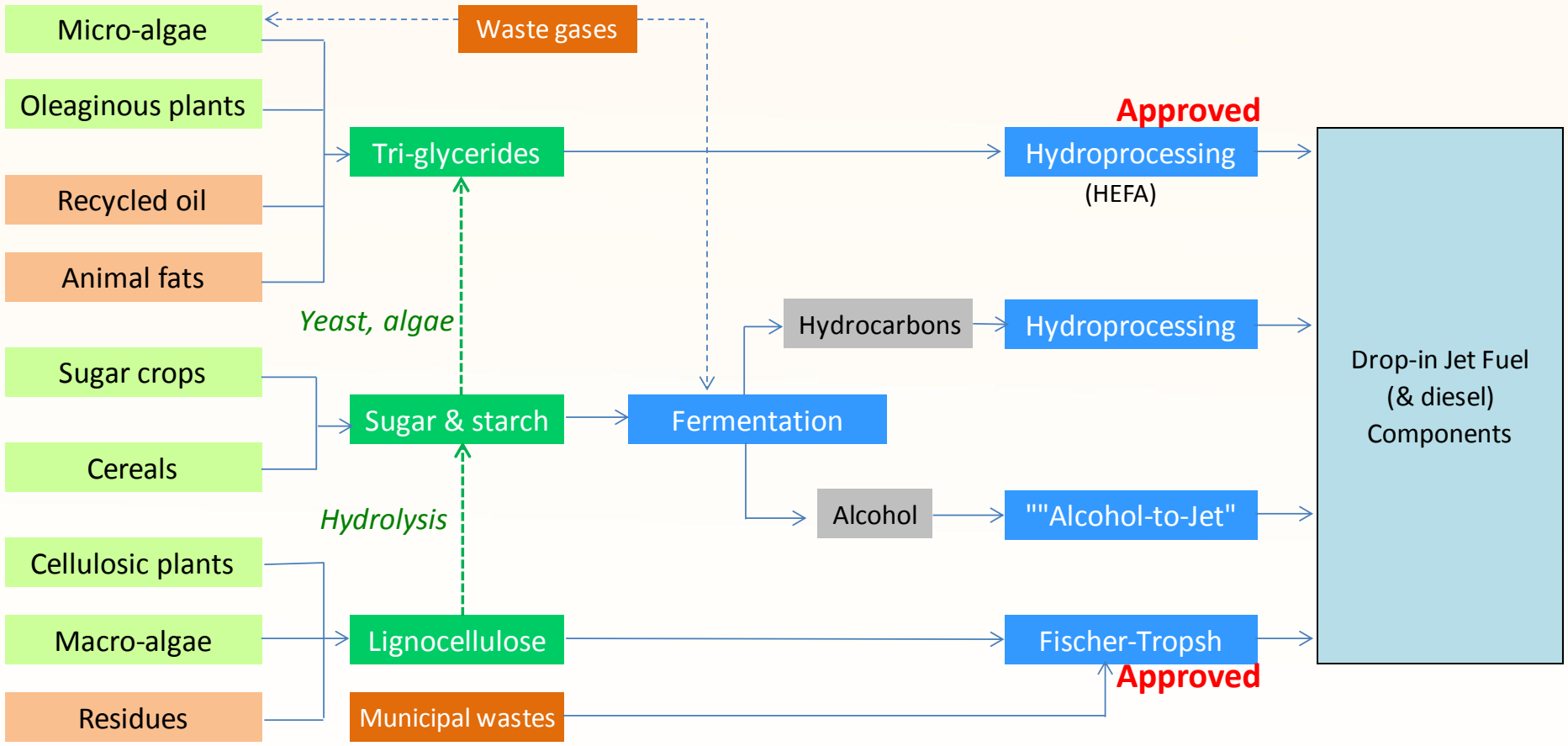
- Hydrocarbon “drop-in” fuels
- Sourced from renewable biomass or wastes
- If properly produced, potential for significant emissions reduction on a life cycle basis

GHG emissions on a life cycle basis

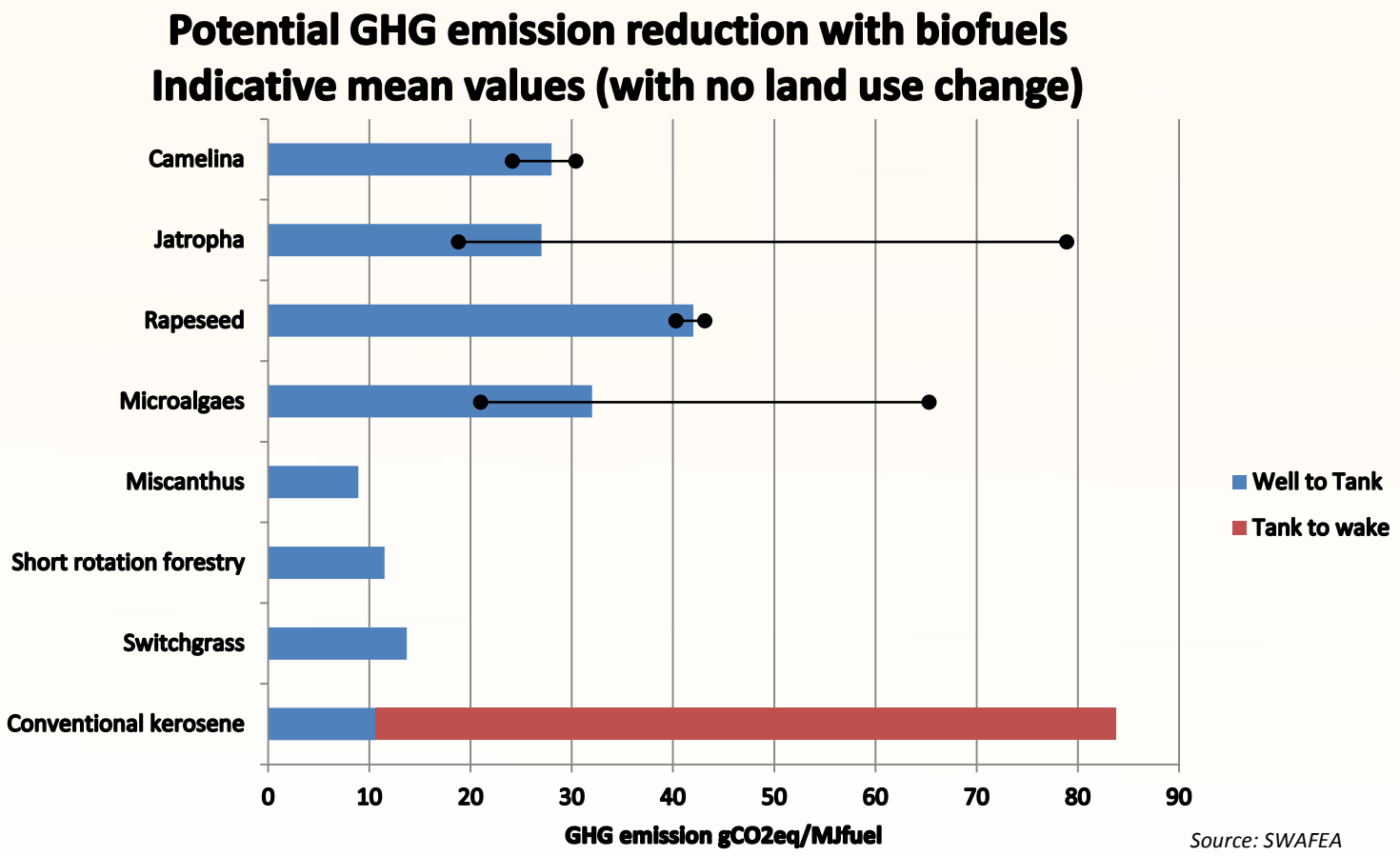


Sustainable alternative fuels

Simplified view of pathways for alternative jet fuels



Example of biofuels GHG savings



Source: SWAFEA

Corner-stones in alternative fuels development for aviation

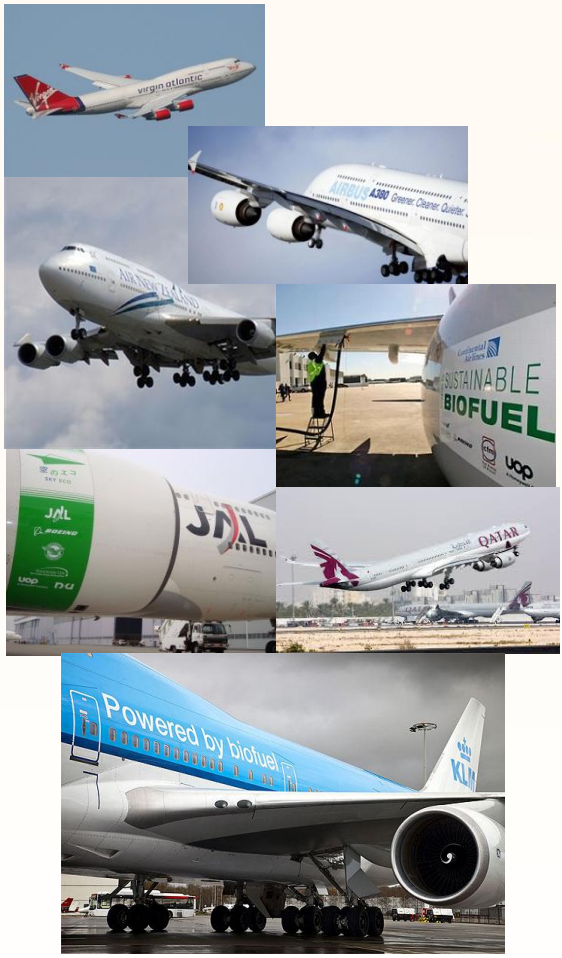
Destination Green

- **First "drop-in" fuels approved for aviation**
  - ☞ ASTM 2009 (FT) and 2011 (HEFA)
- **Demonstration flights (2008-2011)**

  Virgin Atlantic (2008), Airbus (2008), Air New Zealand(2008), Continental (2009), JAL (2009), KLM (2009)…

  ⇨ Demonstration of performance and safety
- **Emergence of commercial flights (2011 ⇨ …)**
  - Proof of safe and harmless regular use
  - Proof of airlines interest and engagement

⇨ **It works – The challenge is now to deploy**



ICAO
and sustainable alternative fuels

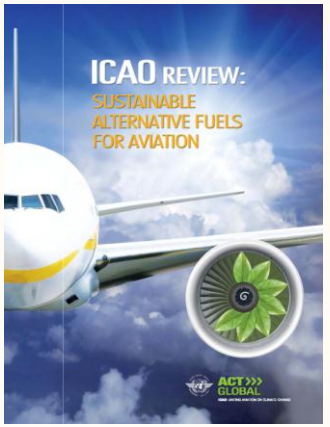
Destination Green

- **Resolution A37-19 (2010):** requests States to
  - develop policy actions to accelerate appropriate development and use
  - work together through ICAO to exchange information and best practices
  - consider measures and incentives to support:
    - research and development,
    - investments in feedstock cultivations and production facilities
    - commercialization and use
- **ICAO: a facilitator for the emergence of alt. fuels**

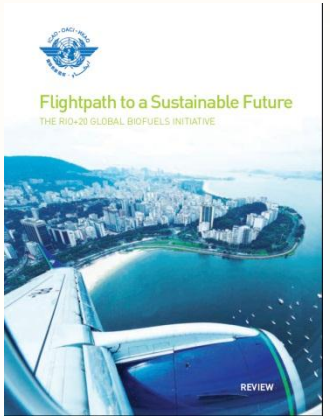
Achievements and on-going initiatives

Destination Green

- **ICAO's conference and workshops**
  - ✓ Rio November 2009: Conference Aviation and alternative fuels
  - ✓ Montreal Feb. 2009 and Oct. 2011: workshops on alternative fuels



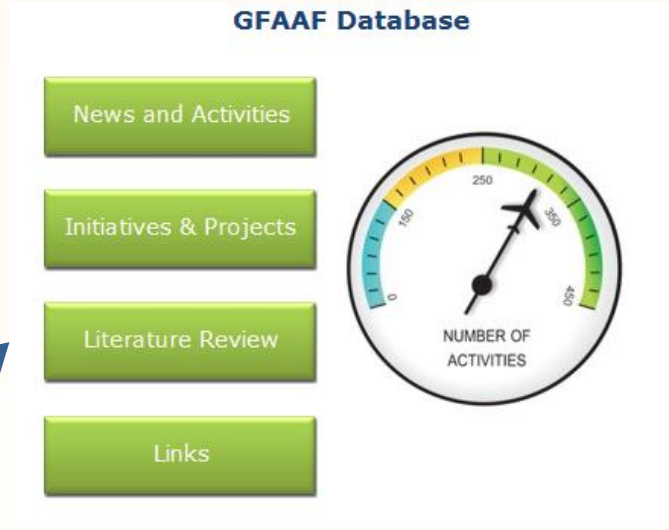
- **Rio+20: the ICAO's "Flightpath" initiative**
  - ✓ Four connected flights using biofuels from Montréal to São Paulo
  - ✓ "Green flights": biofuels + flight optimization
  - ✓ http://www.icao.int/environmental-protection/Pages/Rio+20.aspx



Global Framework for Aviation Alternative Fuels (GFAAF)

(http://www.icao.int/environmental-protection/GFAAF/Pages/default.aspx)

Destination Green



The SUSTAF experts group

- **Mission:** "to facilitate the development and deployment of alternative fuels for aviation"
  - Initiated in July 2012
  - 40 experts from various geographic areas and stakeholders
- **Deliverable:** recommendations to support States and industry in developing and deploying sustainable alternative fuels

  ⇨ To be presented to ICAO Assembly in October
- **Work focused on possible options**
  - To overcome near-term challenges for deployment
  - To address sustainability

The SUSTAF experts group

- **Economics: critical issue**
- **Need to create a market perspective**
  - ⇨ Defining renewable energy policy considering aviation
- **Multidisciplinary coordinated approach at State's level**
- **Sustainability needs to be part of policy**
  - ⇨ Existing approaches to be combined to ensure sustainability
- **Potential benefit from increased harmonization or mutual recognition**

Next steps

- **ICAO engaged in:**
  - Sharing information and successful practices
  - Building trends and projection for long term aviation emissions
- **Need to develop:**
  - a global view of future alternative fuel production
  - Means to account for change in GHG emissions
- **Aviation needs to connect with other sectors:**
  - In areas that would benefit from increased harmonization (e.g. sustainability, LCA emissions)
  - Projection for biomass availability and use

GFAAF

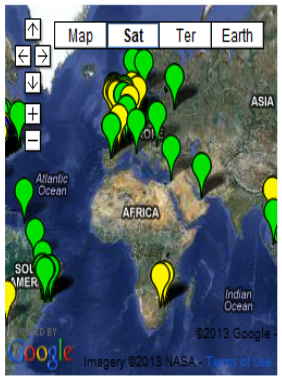
News and Activities
Initiatives & Projects
Literature Review
Reference Documents
Additional Documentation
Links

SAAFA

This page gathers news and activities related to alternative fuels for aviation since 2006 and is regularly updated with the last announcements.

- The items can be sorted by date, entity, country, product by clicking on the corresponding column title, or filtered by category.
- Plain text search is possible through the search function which will return all items containing the searched word.

Click here to change the SAAFA list.



View Larger Map

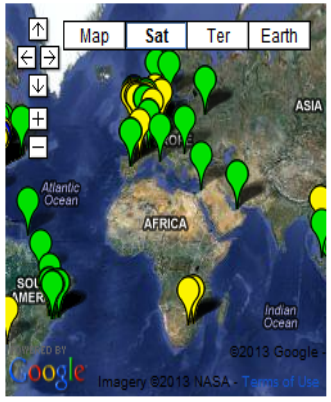
Research and Development
Fuel contract MoU
Flights (test and commercial)
Policy

Search:

Date	Summary	Entity	Country	Product	Category
2013-01-11	**USDA Announces Investments in Bioenergy Research and Development** In the frame of President Obama's strategy to spur innovation of clean bioenergy in the United States and reduce dependence on foreign oil, Agriculture Secretary Tom Vilsack announced $25 million to fund research and development of next-generation renewable energy and high-value biobased products from a variety of biomass sources. Four projects have been selected for funding through USDA's National Institute of Food and Agriculture (NIFA): • **Kansas State University** (5 M$) to make the oilseed crop camelina a cost-effective biofuel and bioproduct feedstock - Camelina production will be incorporated into a cropping system with wheat-based crop rotations in Montana and Wyoming; • **Ohio State University** (6.5 M$) for an anaerobic digestion system for the production of liquid transportation fuels and electricity from animal manure, agricultural residues, woody biomass and energy crops - the novel anaerobic digestion system will be integrated with partial oxidation and Fisher-Tropsch technologies to produce gasoline; • **Ceramatec, Inc.** (6.5 M$) for the conversion of lignocellulosic biomass to infrastructure-compatible renewable diesel, biolubricants, animal feed and biopower - new hybrids of energy sorghum will be developed, and other biomass resources include switchgrass and forestry residues, the biomass will be converted to hydrocarbons using innovative pretreatment, fermentation and electrochemical technologies; • **USDA-Agricultural Research Service** (6.8 M$) to develop an on-the-farm distributed technology for converting forest residues, horse manure, switchgrass and other perennial grasses into biofuels and high-value specialty chemicals - the process will use a patent-pending unit that will mimic the petroleum industry's catalytic cracking process. Grant recipients are required to contribute a minimum of 20 percent matching funds for research and development projects and 50 percent matching funds for demonstration projects. Read more	USDA	U.S.A	Biofuels	R&D
2013-01-11	**Introduction of synthetic GTL jet fuel at Doha airport** A Qatar Airways Airbus A340-600 flight from Doha to London on Wednesday 9 February marked the introduction of commercial-scale synthetic jet fuel produced in Qatar. The natural gas-to-liquid (GTL) jet fuel, which is blended 50/50 with conventional Jet-A1, is being produced by the Pearl GTL plant, a venture involving Qatar Petroleum and Shell	Qatar Petroleum, Shell	QATAR	FT-GTL	Deployment

GFAAF

- News and Activities
- **Initiatives & Projects**
- Literature Review
  - Reference Documents
  - Additional Documentation
- Links



View Larger Map

Initiatives and Projects

This page is still under construction and will be complemented with additional projects and initiatives in a near future.

ICAO encourages States/Organizations/Companies/Initiators/Research Institutes to share their initiatives on sustainable alternative fuels for aviation by completing this form.

Click here to Edit List

Country / Region:	Name of Initiative / Project:	Category:	Value-chain step:	Type of pathway:	Status:
(All)	(All)	(All)	(All)	(All)	(All)

Country / Region	Name of Initiative / Project
Brazil	ABRABA
Germany	Aviation Initiative for Renewable Energy in Germany - AIREG
Spain	Bioqueroseno
Europe	Sustainable Way for Alternative Fuels and Energy In Aviation (SWAFEA)
Europe	European Advanced Biofuels Flight Path
U.S.A.	Commercial Aviation Alternative Fuels Initiative - CAAFI
Australia, New-Zealand	Flight Path to Sustainable Aviation Fuels
U.S.A.	Northwest Advanced Renewables Alliance (NARA)
International	Sustainable Aviation Fuel User Group (SAFUG)
U.S.A	Sustainable Aviation Fuels Northwest (SAFN)

Back to Initiatives & Projects List

Sustainable Aviation Fuels Northwest (SAFN)

Objective

SAFN's goal was to map a flight path to develop a safe, sustainable and economically viable aviation biofuels industry in the Northwest.

Description

The initiative was launched in July 2010 by Boeing, Alaska Airlines, the operators of the region's three largest airports – Port of Seattle, Port of Portland and Spokane International Airport – and Washington State University, a center for advanced biofuels research. Climate Solutions, a Northwest clean-energy nonprofit, was retained to manage a stakeholder process that included more than 40 o4rganisations ranging across aviation, biofuels production, environmental advocacy, agriculture, forestry, federal and state government agencies, academic research and technical consultancies.

The SAFN initiative:

- Analyzed the most promising, local biomass sources for commercialization;
- Assessed all phases required to develop a sustainable biofuel industry, including biomass production and harvest, refining, transport infrastructure and use; and
- Prioritized state and federal policy recommendations needed to spur creation of sustainable fuels for aviation.

Category
Feasibility study

Value-chain step
All

Type of pathway
All

Starting time and duration
July 2010 - May 2011

Stakeholders
All types

Regional scope
Regional

Involved countries
U.S.A

Status
Closed

Partners

Alaska Airlines, Boeing, Port of Portland, Port of Seattle, Spokane International Airport, Washington State University
+40 stakeholders

Achievements to date

SAFN published its report and recommendation in May 2011.

GFAAF

- News and Activities
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  - **Reference Documents**
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ICAO > Environmental Protection > GFAAF

ReferenceDocuments

This page is currently under construction.

Search:

Category	Title	Authors/Organization	Year	Links
Sustainability	Life Cycle Greenhouse Gas Emission from Alternative jet Fuels	R.W. Stratton, H.M. Wong, J.I. Hileman - PARTNER Project 28 report	2010	Link
Sustainability	Environmental Analysis Report	SWAFEA European Study - D6.2 report	2011	Link
Sustainability	Framework and Guidance for Estimating Greenhouse Gas Footprints of Aviation Fuels (Final Report)	AFRL (AFRL-RZ-WP-TR-2009-2206)	2009	Link
Sustainability	The GBEP Sustainability Indicators for Bioenergy	Global Bioenergy Partnership (GBEP)	2011	Link
Sustainability	Bioenergy Decision Support Tool	FAO - UNEP		Link
Sustainability	Good Environmental Practices in Bioenergy Feedstock Production	FAO - BEFSCI	2012	Link
Overview and synthesis	SWAFEA Final Report	Ph. Novelli - SWAFEA European Study	2011	Link
Overview and synthesis	Review of the potential for biofuels in aviation	A. Bauen, J. Howes, L. Bertuccioli, C. Chudziak - E4tech (for CCC)	2009	Link
Overview and synthesis	Near-Term Feasibility of Alternative Jet Fuels	James I. Hileman & al. - MIT (RAND-TR554)	2009	Link

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