



ICAO

ENVIRONMENT

SUSTAINABLE ALTERNATIVE FUELS FOR AVIATION

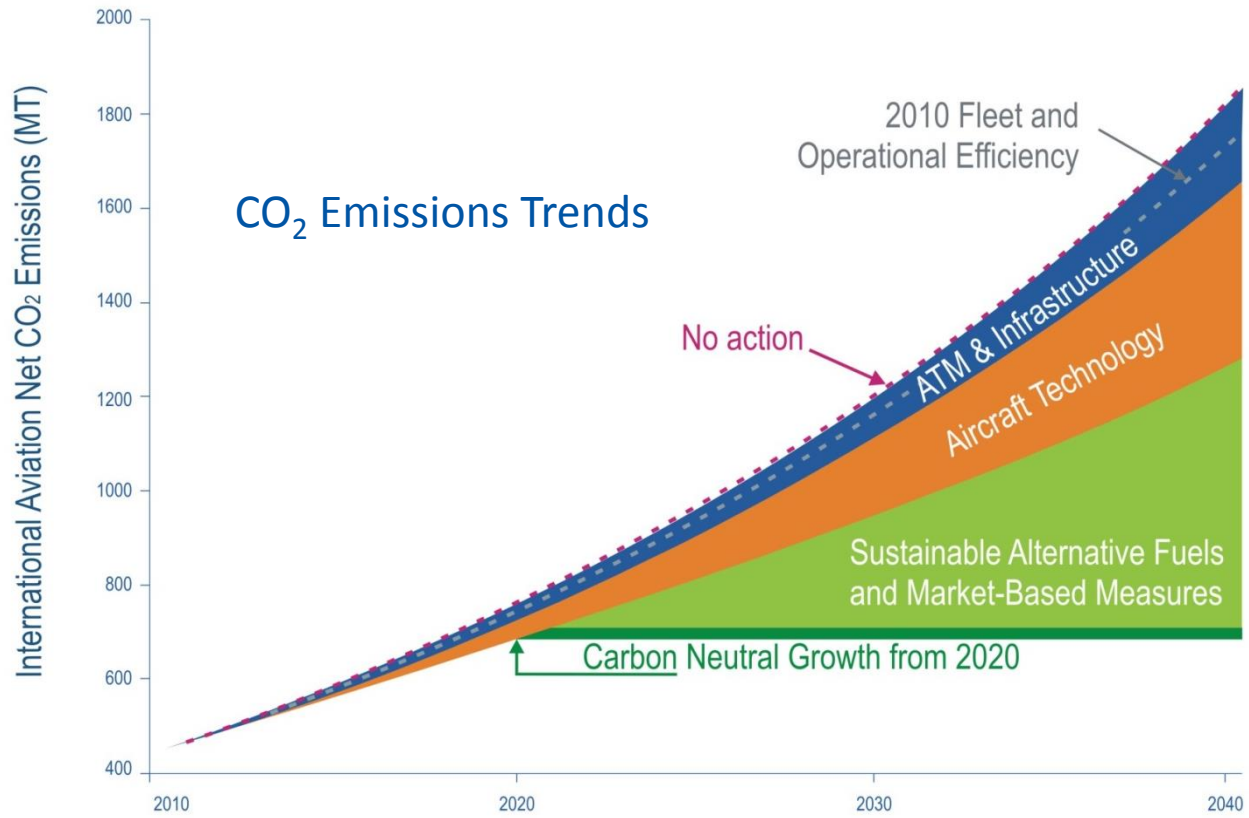
Philippe Novelli

Environment
ICAO Air Transport Bureau

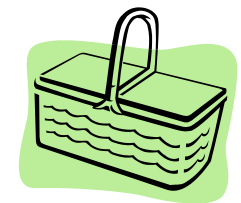


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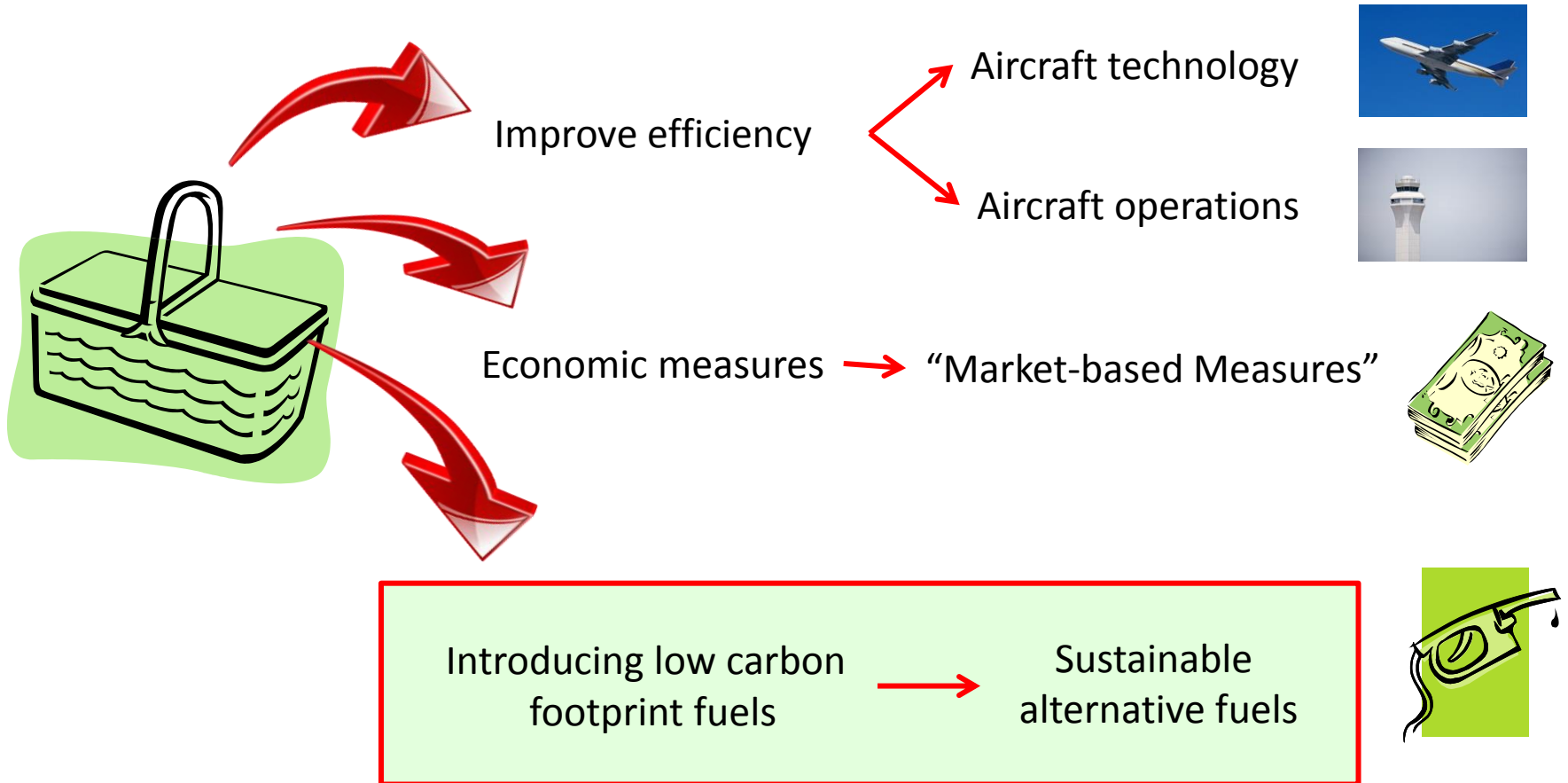
Aspirational goals



“Basket of measures”



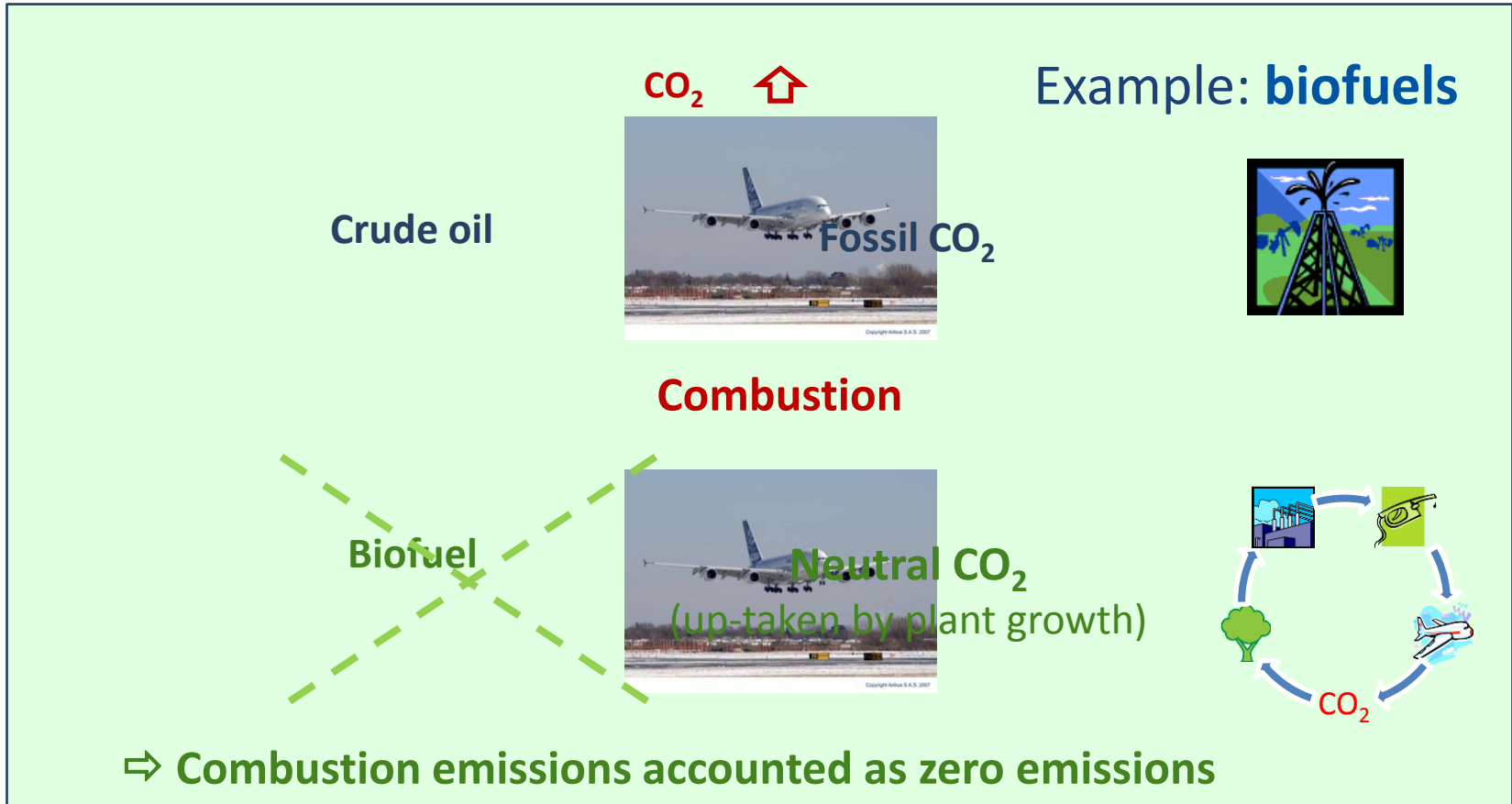
Basket of measures



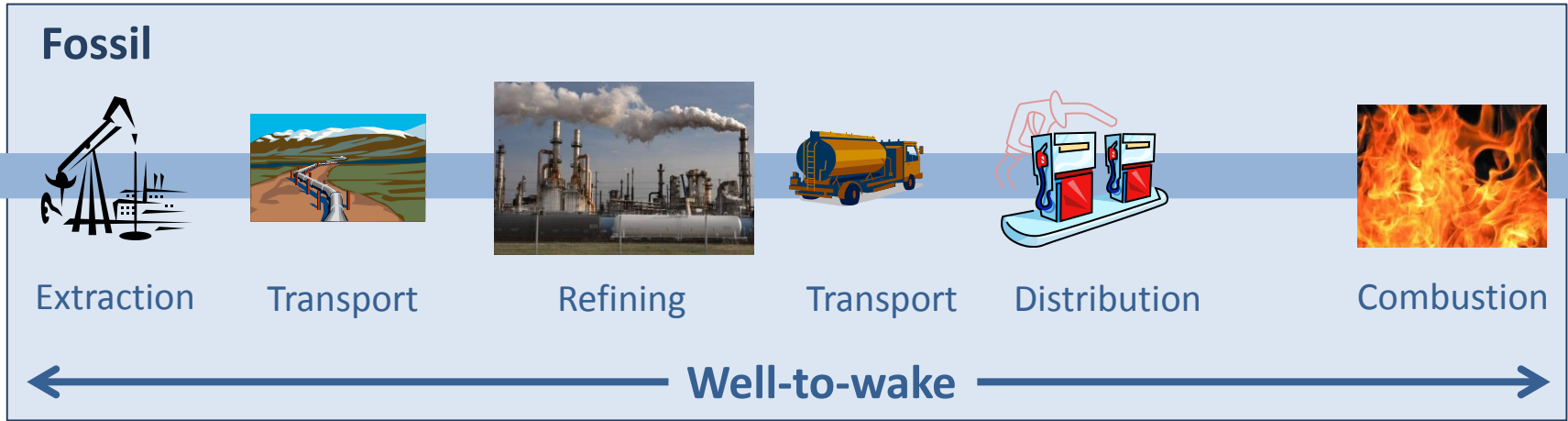
- **To reduce the carbon foot print of the fuel**
- **Without changing aircraft and infrastructure**
- Using **“drop-in”** fuels



“Low carbon footprint” fuel



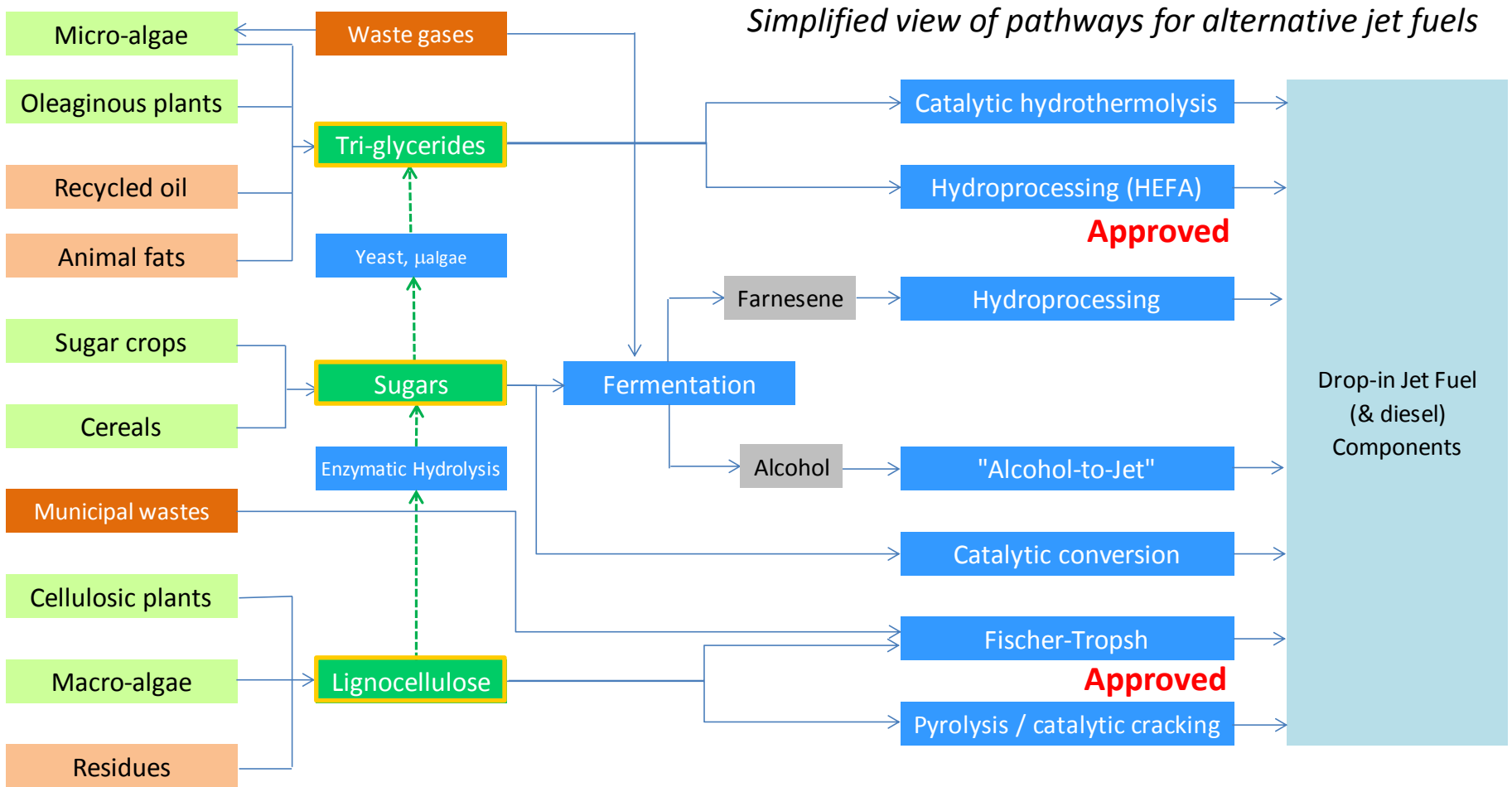
Life cycle GHG emissions



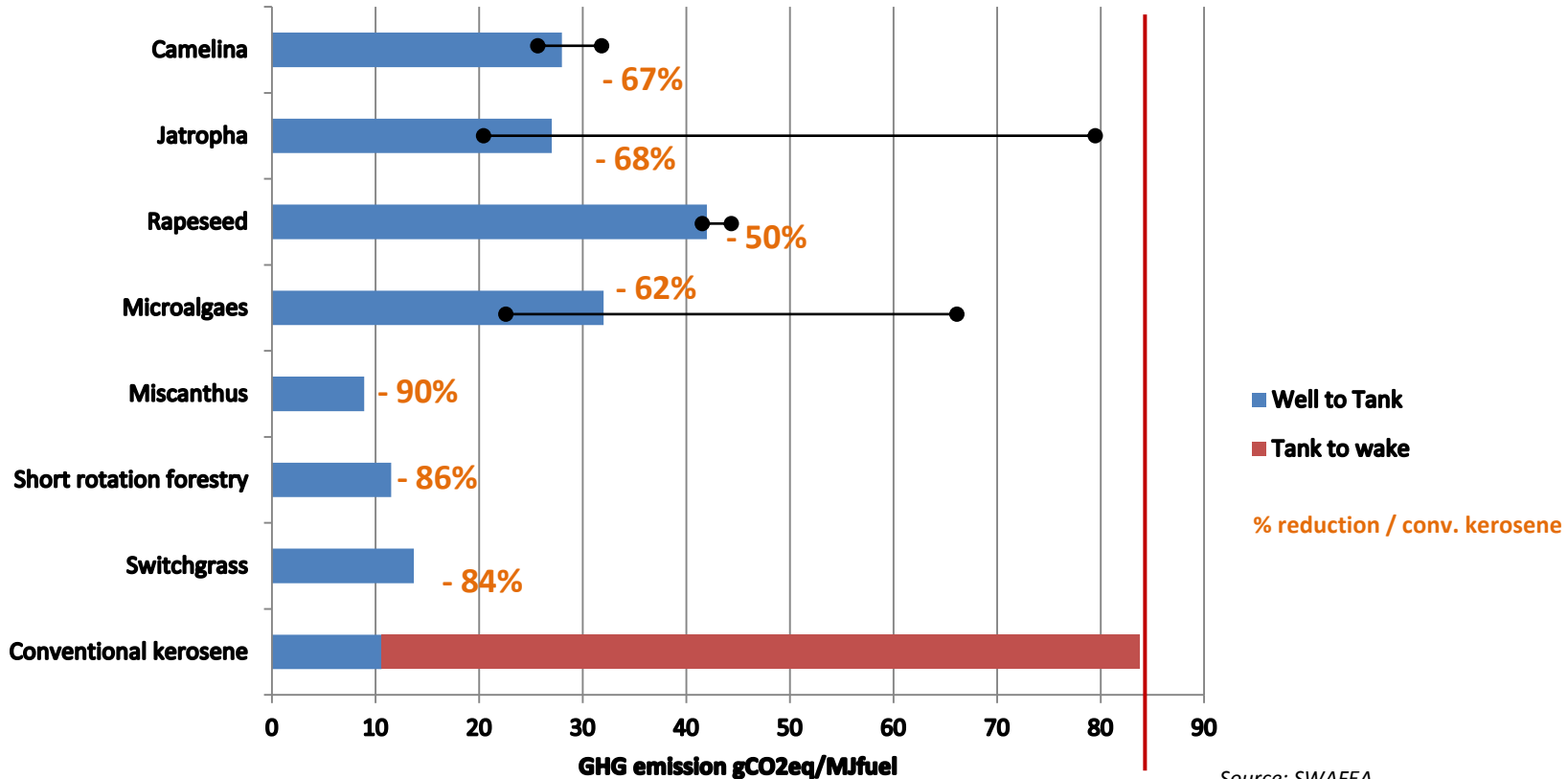
- **Biofuels used in road transportation are not suitable for use in aviation**
- **Severe constraints in use on aviation fuels**
 - Freezing point (- 47 °C)
 - Energy content
 - ...
- **Compatibility with existing system**
⇒ **“DROP-IN” fuel**
- **Aviation fuels need to be approved**
 - ASTM, DEFSTAN,...
 - First alternative fuels approved in 2009 and 2011



Pathways to sustainable fuels



Potential GHG emissions of biofuels



* with no land use change

● — ● Variation range (depending on cultivation conditions)



- **2 alternative fuel pathways approved**
6 additional approvals underway at ASTM
 - **First commercial flights in 2011**
More than 1500 flights by July 2012
 - **First regular flights initiated in 2013**
 - **First supply agreements signed by airlines**
- ⇒ **Feasibility is demonstrated, next step is to deploy**



- **Potential for significant emissions reductions**
 - Depends on feedstock type and cultivation, conversion process...
 - **Emissions reductions achievable with existing aircraft**
 - **Benefits will depend on:**
 - the availability of such fuels and the time profile of their deployment;
 - their actual lifecycle emissions reduction.
- **Challenges**
 - Decreasing production cost
 - Investment in feedstock production and conversion facilities
 - Ensuring sustainable deployment

⇒ **Policy support from States is required**





**Resolution
A36-22**
Promote
improved
understanding

**Resolution
A37-19**

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

**Resolution
A38-18**

2007

2009

2010

2011

2012

2013

Rio Conference
ICAO as a
facilitator
GFAAF Created

Workshop
States, financial
institutions and
stakeholders

**ICAO SUSTAF
Group**
Input to
Assembly



- **Development of coordinated national policy actions to accelerate the appropriate deployment of sustainable alternative jet fuels**
- **Measures to ensure sustainability of the fuels that should:**
 - Achieve net GHG emissions reductions on a life cycle basis
 - Respect areas of high importance for biodiversity, conservation and benefits from ecosystems
 - Contribute to local social and economic development, and avoid competition with food and water
- **Cooperation through ICAO to exchange information and best practices**
- **Need for increased harmonisation for sustainability**





- 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



CAEP Alternative Fuels Task Force



Methodology to assess fuel life cycle emissions for use in the Global Market Based Measure

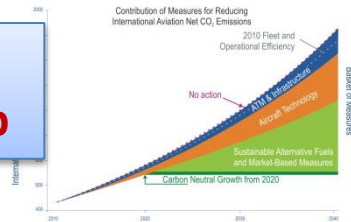
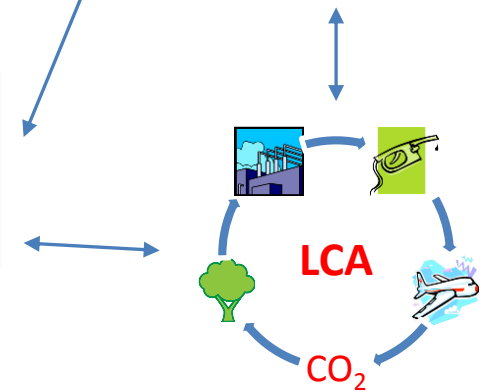
Assessment of potential emissions reductions from alternative fuels



Global Market Based Measure Task Force

Trends Assessment Modeling and Database Group

Fuel production



- **Promising solution but many challenges to address**
- **Cooperation among aviation stakeholders and with the energy sector is key, in particular to addressing sustainability and securing access of aviation to sustainable fuels**
- **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





- Visit the GFAAF website
<http://www.icao.int/environmental-protection/GFAAF/Pages/default.aspx>
- Read the SUSTAF experts group report (available on the GFAAF)
- Read Environmental Report 2013 chapter 4

The screenshot shows the ICAO website's GFAAF page. At the top, there's the ICAO logo and 'INTERNATIONAL CIVIL AVIATION ORGANIZATION A United Nations Specialized Agency'. A search bar and social media icons are on the right. A navigation menu includes 'About ICAO', 'Strategic Objectives', 'Meetings & Events', 'Publications', 'Online Store', and 'Employment'. A sidebar on the left lists 'GFAAF' categories: News and Activities, Initiatives & Projects, Literature Review, Aviation Fuels, General Documentation, and Links. The main content area features a header 'ICAO Global Framework for Aviation Alternative Fuels' and four image-based sub-sections: News and Activities, Initiatives and Projects, Literature Review, and Links. Below this is a 'Latest News' section with two entries: 'The Australian Sustainable Aviation Fuels Initiative joins forces with the National aviation and aerospace association.' (dated 2013-08-12) and 'EPA publishes the final 2013 rules for renewable fuels mandates' (dated 2013-08-07). A paragraph explains that the GFAAF was launched at the ICAO Conference on Aviation and Alternative Fuels in 2009. A 'New!' notice mentions the SUSTAF Expert Group Report (May 2013) titled 'The Challenges for the Development and Deployment of Sustainable Alternative Fuels in Aviation'.

