

# Aviation Biofuels: Leading the World Toward a Green Energy Future

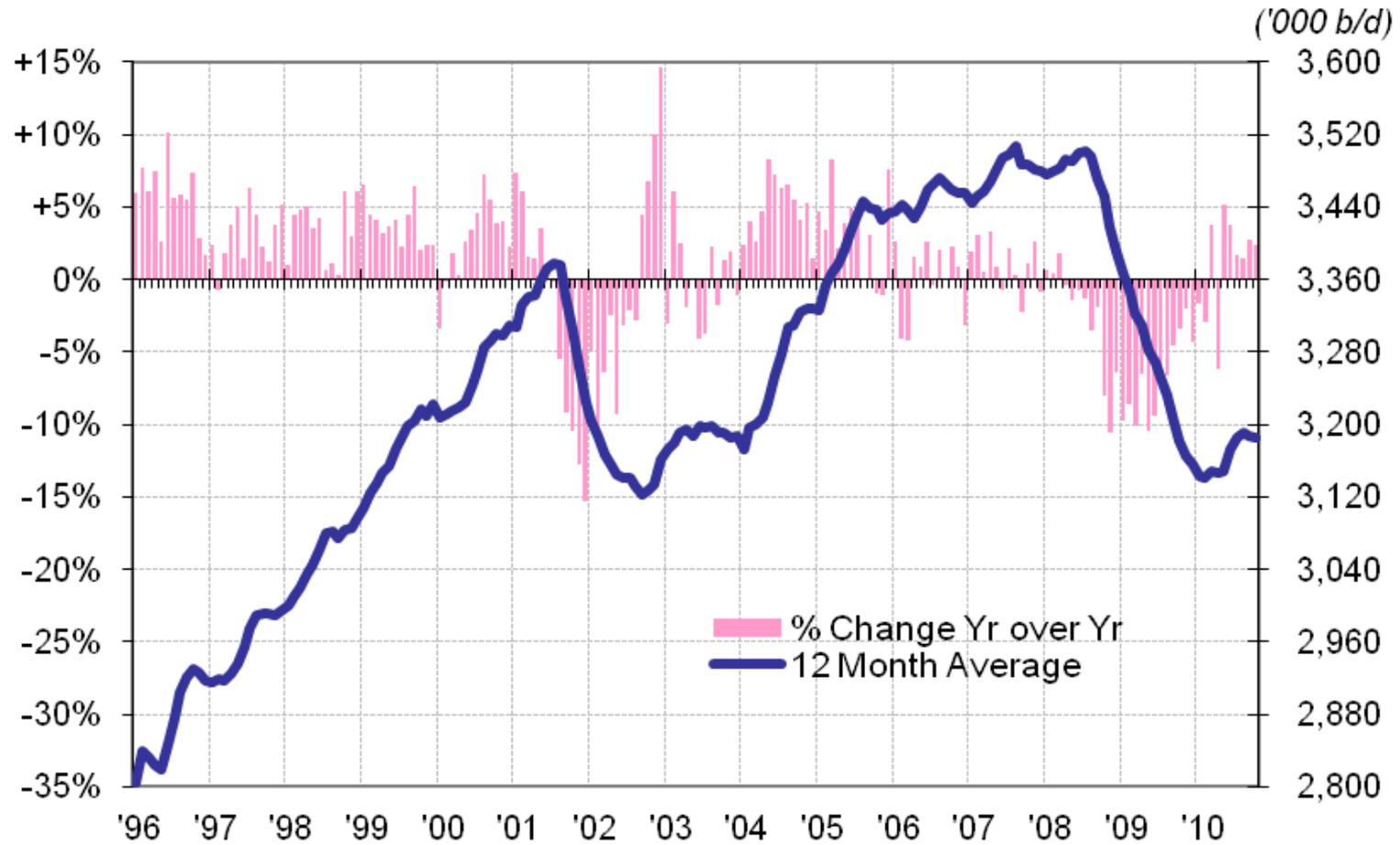
Cristina Haus, Executive Editor  
Energy Intelligence Group

New York Energy Forum, February 17, 2011



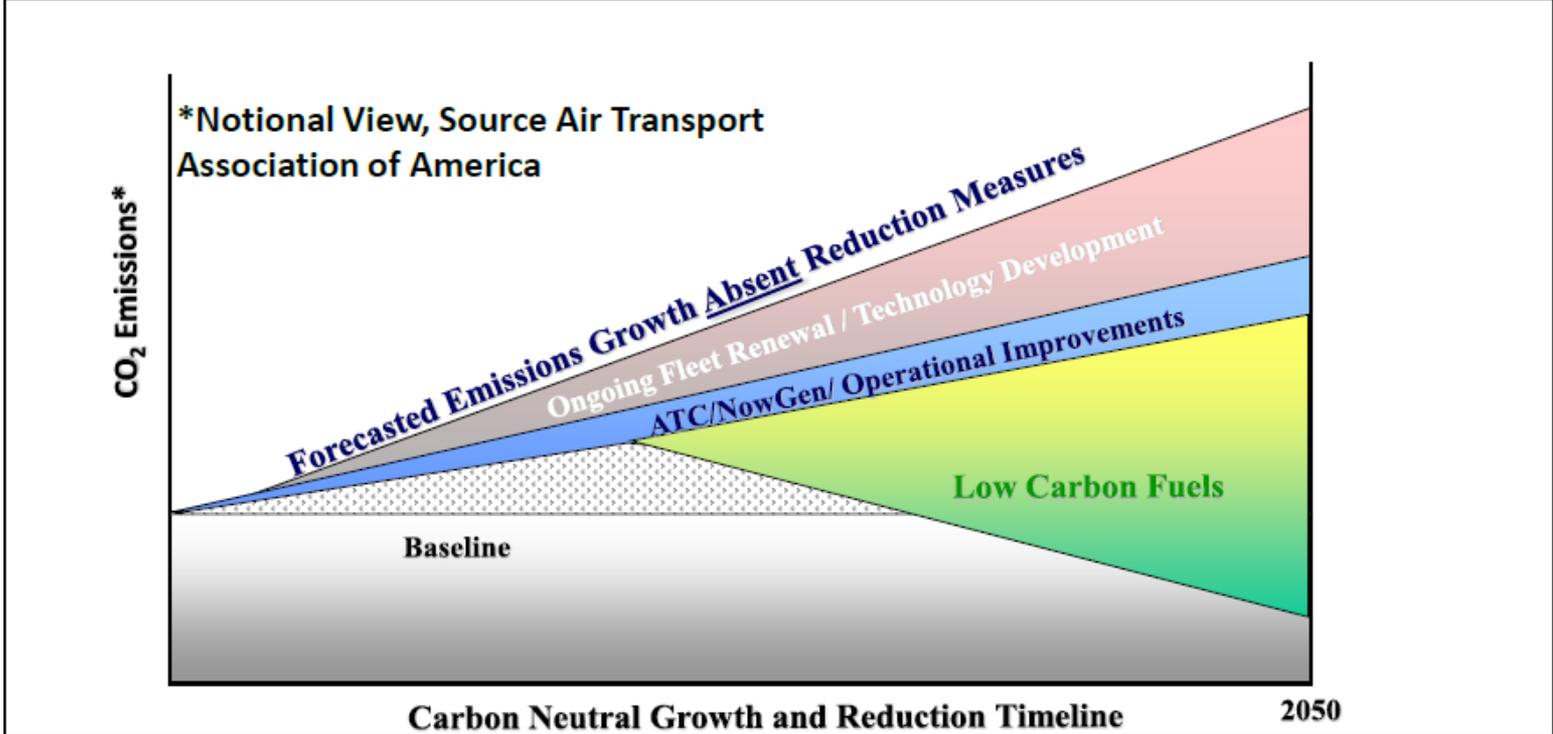
**Powerful Thinking**  
for the global energy industry

## OECD Jet Fuel Demand 12 Month Moving Average vs Year over Year % Change



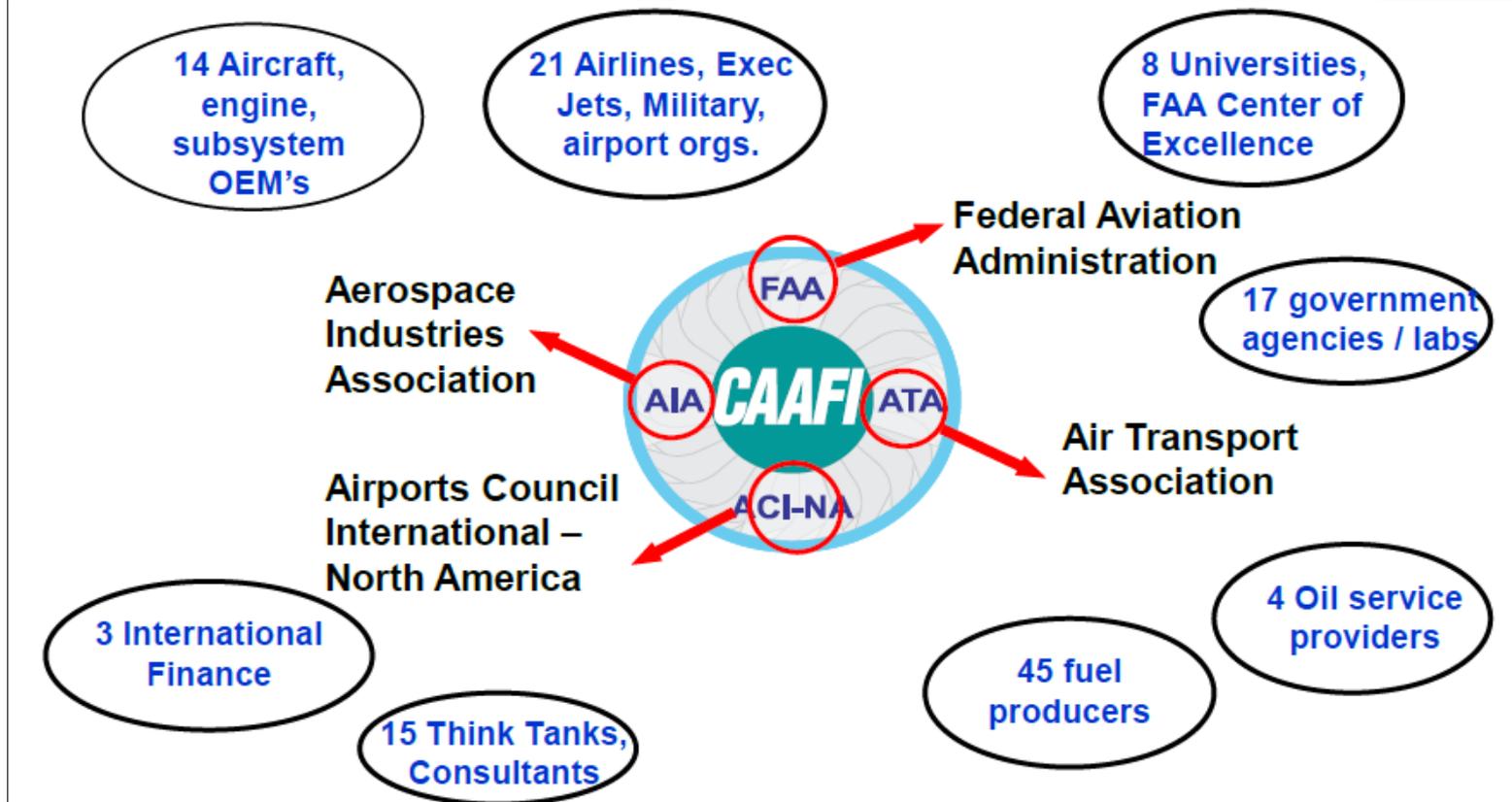
Source: EIG Jet Fuel Intelligence

# Aviation Carbon Neutral Growth Imperative



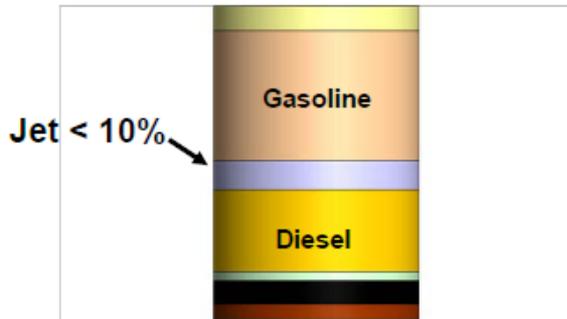
Source: Commercial Aviation Alternative Fuels Initiative (CAAFI)

# CAAFI - Who We Are

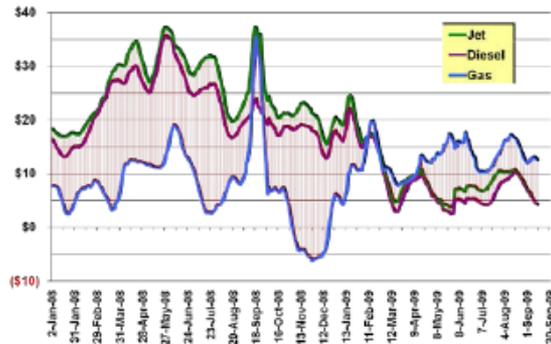


Source: Commercial Aviation Alternative Fuels Initiative (CAAFI)

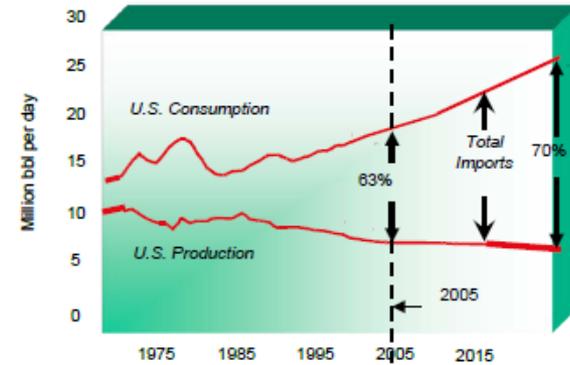
# Sustainable Fuel Dynamic Economic Need



## Improve Fuel Fraction



## Reduce Crack Spread



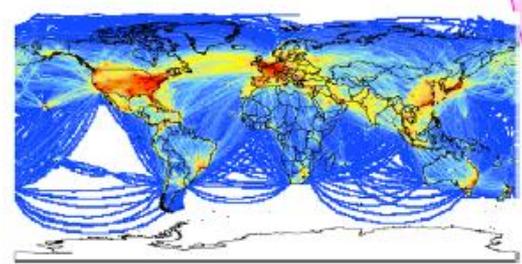
## Enhance Supply Security

Source: Commercial Aviation Alternative Fuels Initiative (CAAFI)

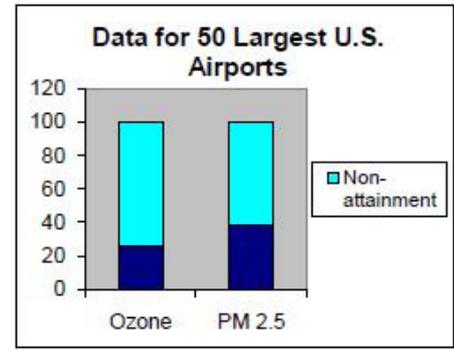
# Sustainable Fuel Dynamic Environment Need



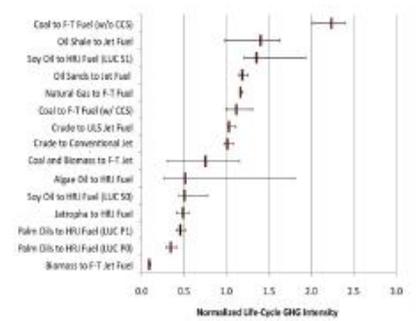
**Air Quality**



**Global Climate**



**Reduce PM 2.5**

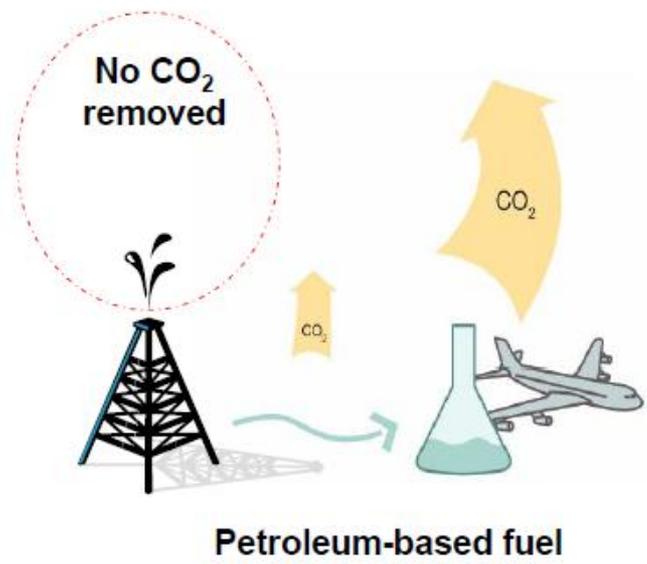


**Contain CO2 Growth**

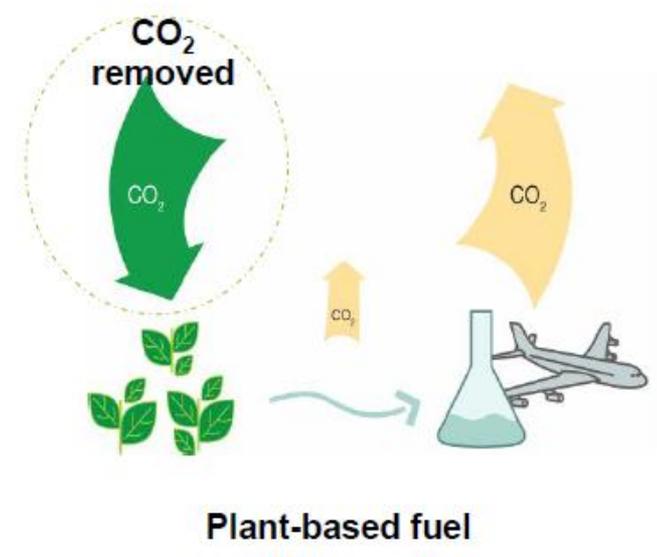
Source: Commercial *Aviation Alternative Fuels Initiative (CAAFI)*

# Plant sources remove CO<sub>2</sub> from the atmosphere

Petroleum releases CO<sub>2</sub> that has been locked underground

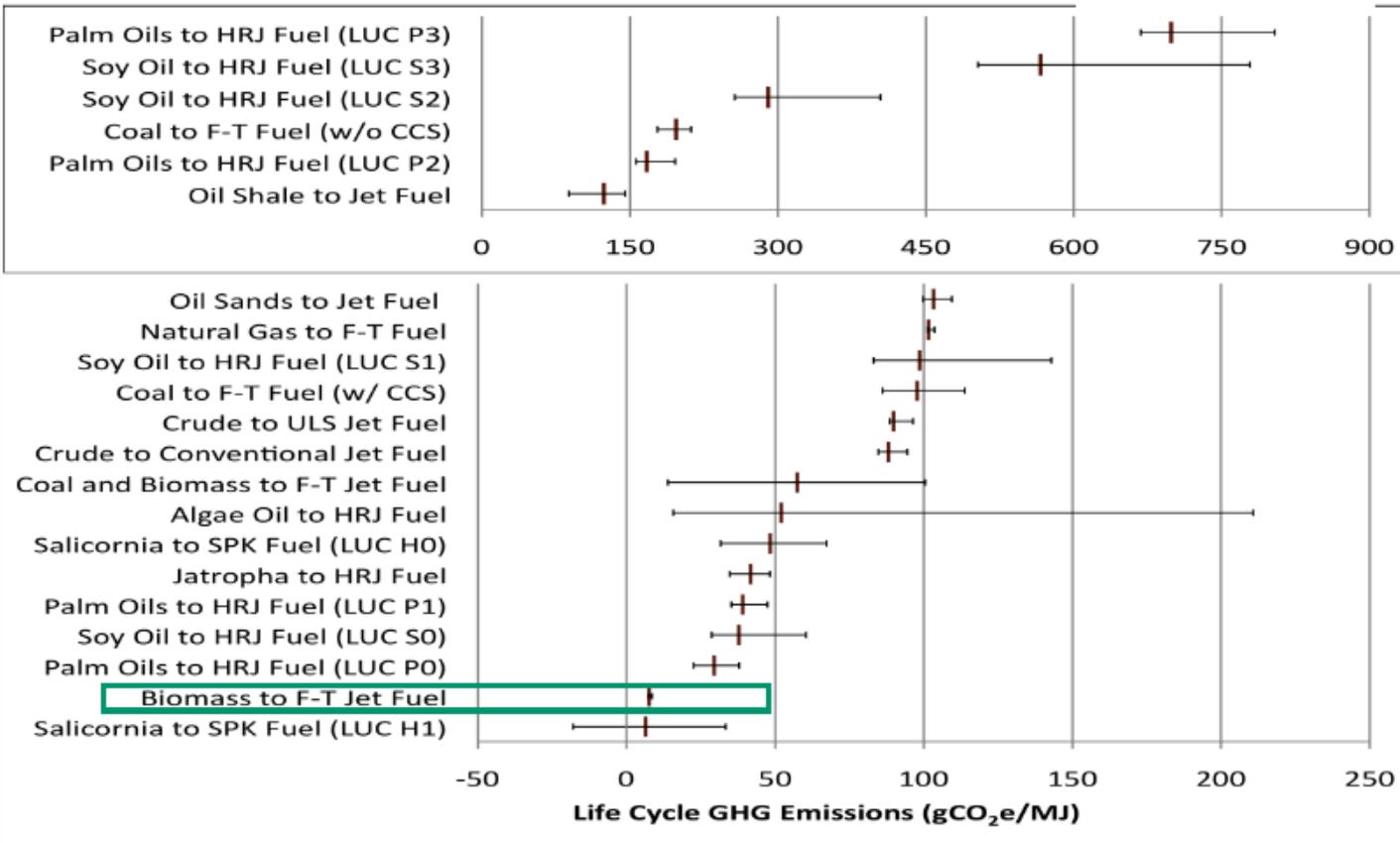


Plant feedstocks re-absorb CO<sub>2</sub> emissions as they grow



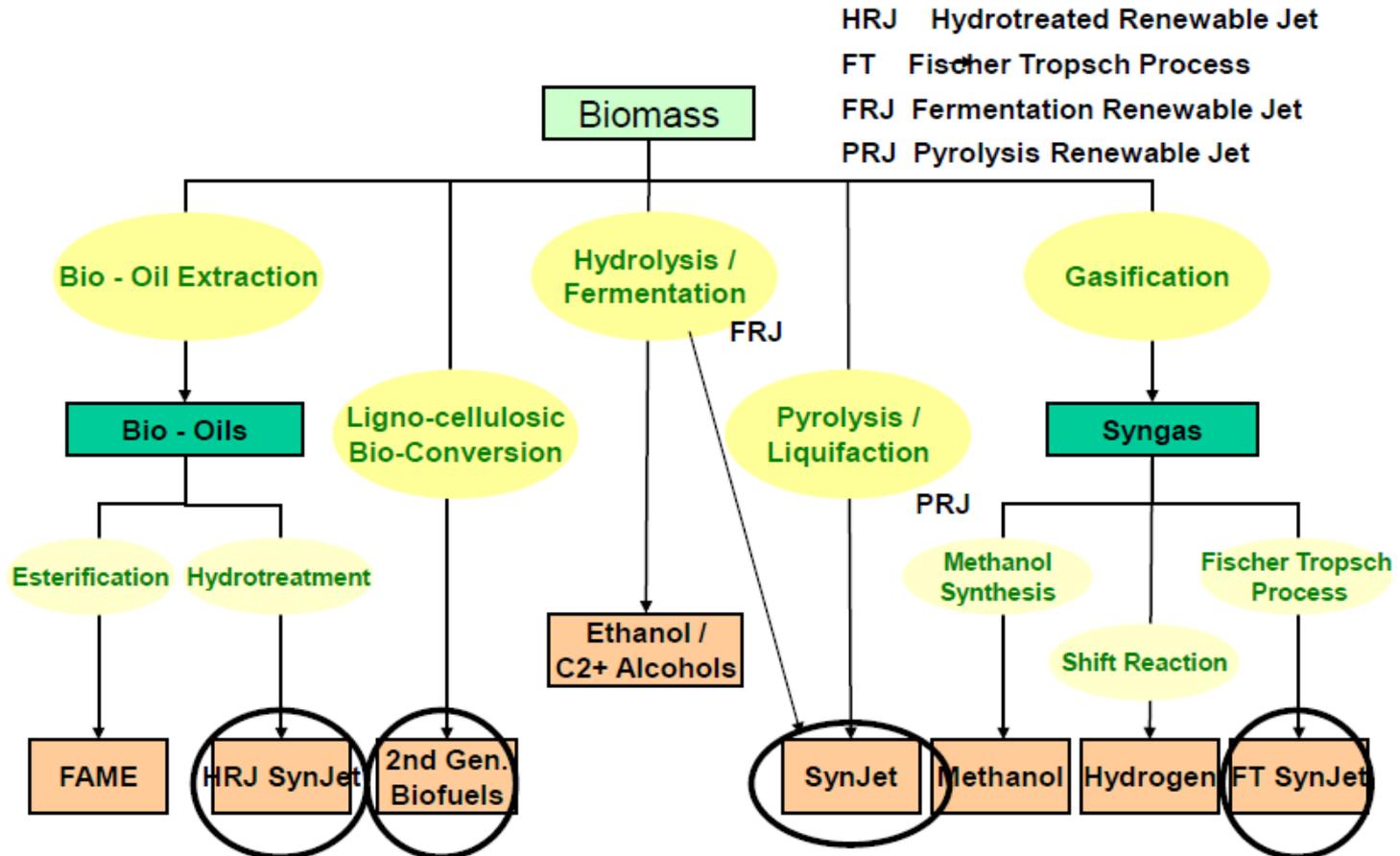
Source: Boeing

# Lifecycle GHG Emissions



Source: Commercial Aviation Alternative Fuels Initiative (CAAFI)

# Jet Fuel Bio-Feedstock / Process Options



HRJ Hydrotreated Renewable Jet  
 FT Fischer Tropsch Process  
 FRJ Fermentation Renewable Jet  
 PRJ Pyrolysis Renewable Jet

○ Present "Drop-in" Options Examined by CAAFI Sponsors/Stakeholders for carbon positive Aviation Fuels

Compliments AirBP – 4/08 Future Fuels Conference, London, England (framework only)

Source: Commercial Aviation Alternative Fuels Initiative (CAAFI)

# Deployment – Technology’s Valley of Death



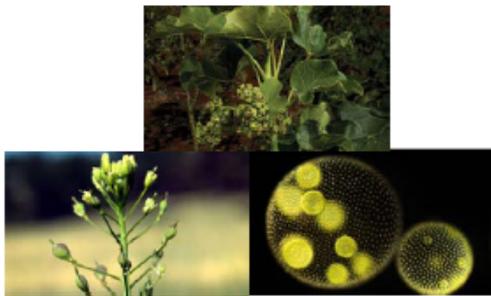
Source: Commercial Aviation Alternative Fuels Initiative (CAAFI)

# Sustainable aviation biofuel projects by region



Source: Boeing

# Sustainable aviation biofuel moves forward



also see [www.safug.org](http://www.safug.org)

- Focus on low lifecycle CO<sub>2</sub> plant-based fuels
- Four flight tests Feb 2008 – Jan 2009
- Results met or exceeded expectations
- Excellent fuel properties
  - Lower freeze point
  - Higher thermal stability
  - Higher energy content
- Test results released – fuels approval 2011
- Harmonized sustainability criteria in work
- Public policy development in work
- Initial production facilities in work
- Goal: market viability by 2015

**Great progress. Superior fuel. Early in the journey.**

Source: Boeing

# Striving to achieve market viability by 2015

- Commercial Aviation
- 600+ million gallons/yr of bio content
  - 5-10 feedstock/fuel production projects



## Fuels Approval

Successful flight tests with approval expected in early 2011



## Feedstock Viability

Feedstock and sustainability assessments underway



## Airport Infrastructure

"Drop in Fuel"



## Commercial Production

Initial projects announced



## Sustainable Approach

Harmonized sustainability criteria and methods in work

Source: Boeing

# Developing a sustainable aviation fuel supply



***SAFUG is committed to advancing the development and commercialization of sustainable aviation biofuel.***



Source: Boeing

**Thank you for your attention.**

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