



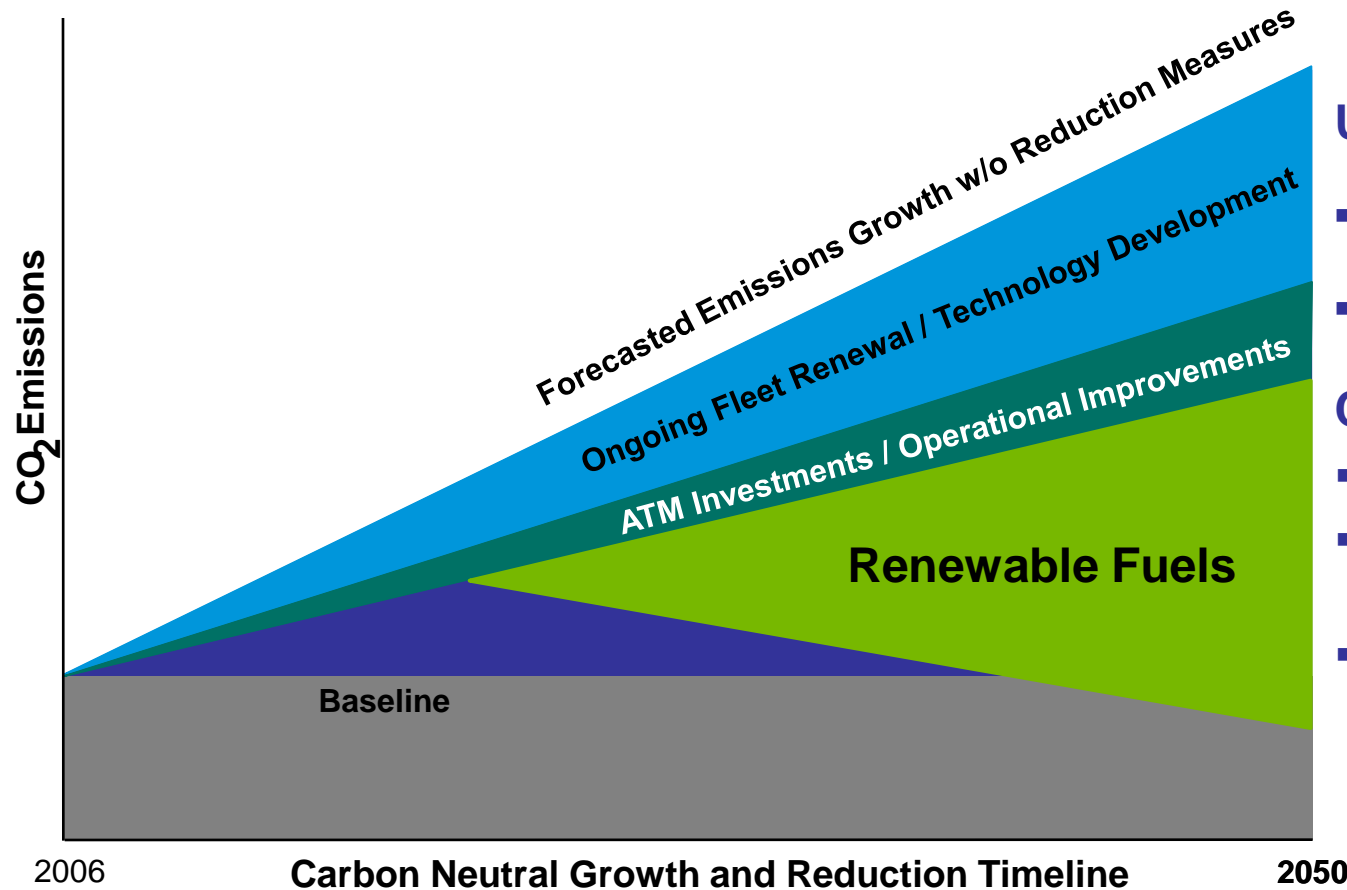
**Nicole Williamson**  
**Senior Technology Manager Sustainable Aviation Fuels**  
**Boeing Research and Technology - Australia**



# **Commercial Aviation and Sustainable Aviation Fuels**

## **Ausbiotech 2011**

# The Aviation Challenge: Carbon-Neutral Growth



## Using less fuel

- Efficient airplanes
- Operational efficiency

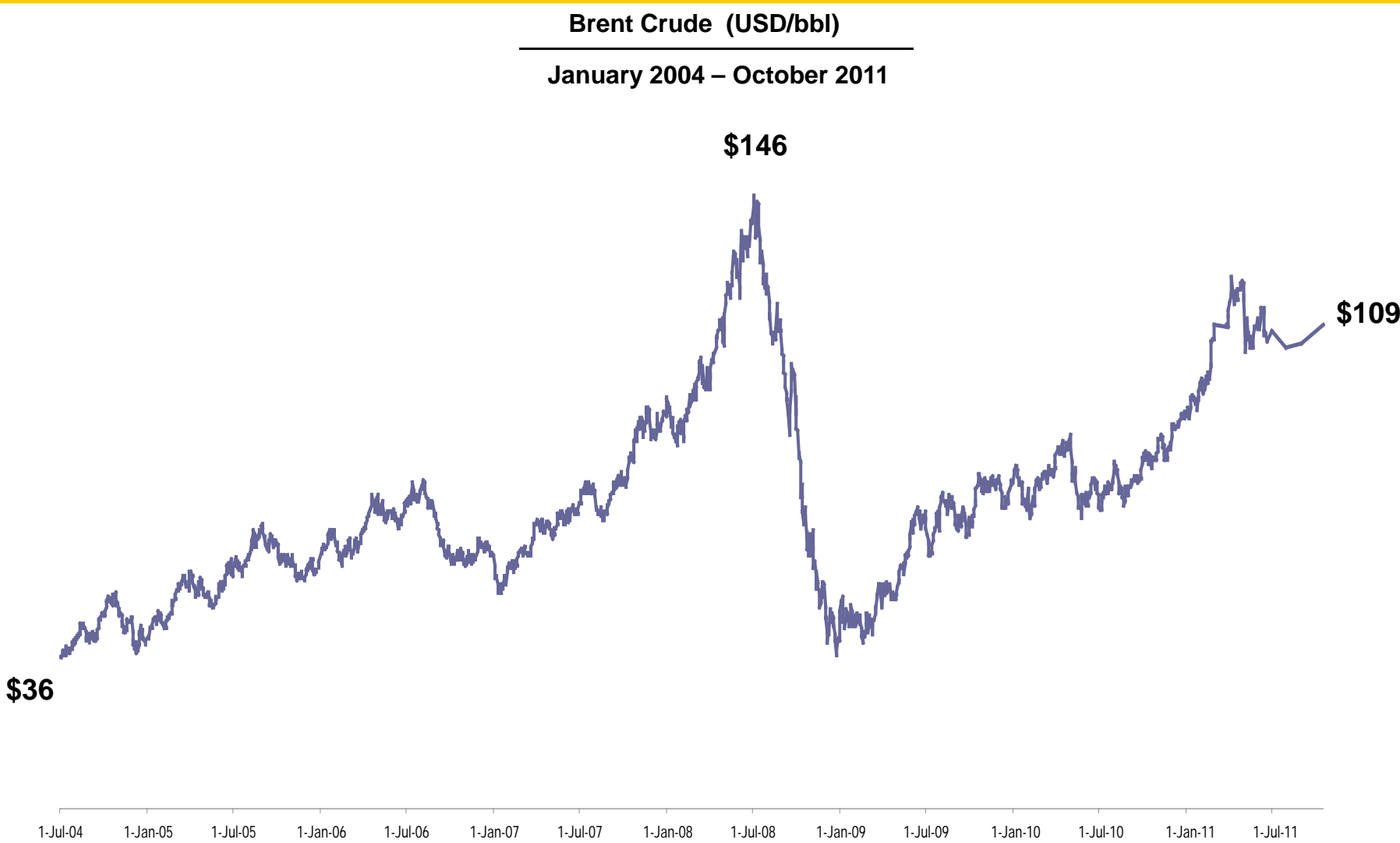
## Changing the fuel

- Lower lifecycle CO<sub>2</sub>
- No infrastructure modifications
- “Sustainable Aviation Fuel”

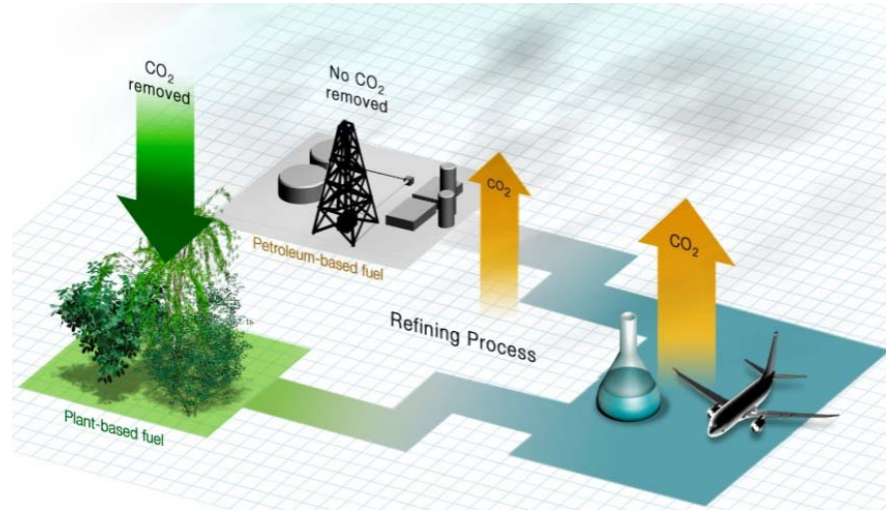
Presented to ICAO GIACC/3 February 2009 by Paul Steele on behalf of ACI, CANSO, IATA and ICCAIA

## *Sustainable Aviation Fuel Enables Continued Growth*

# Fuel Price Volatility and Energy Security



# Sustainability Considers Environmental, Economic and Social Impacts



Lower CO<sub>2</sub> lifecycle



***It Is Crucial To Get Sustainability Right***

# Sustainable Aviation Fuel Must Work in Existing Infrastructure

- Meets fuel performance requirements
- Requires NO change to airplanes or engines
- Requires NO change to infrastructure
- Can be mixed or alternated with today's Jet-A fuel up to 50% blend



***Sustainable Aviation Fuel = A “Drop-In” Fuel***



# Boeing's Sustainable Aviation Fuel Strategy



## Five focus areas

**Fuel  
Approval**

**Feedstock  
Pathways**

**Airport  
Infrastructure**

**Commercial  
Production**

**Advocacy**

***Acting as a catalyst to accelerate commercialization***

# Sustainable Aviation Fuel Test Flights



Feb 2008

**Virgin Atlantic**  
Coconut and Babassu



Dec 2008

**Air New Zealand**  
Jatropha



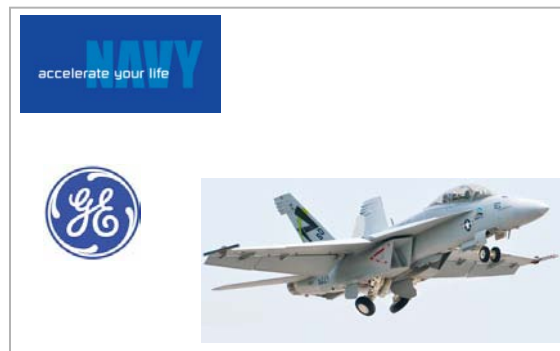
Jan 2009

**Continental**  
Algae and Jatropha



Jan 2009

**Japan Airlines**  
Camelina, Jatropha, Algae



Apr 2010

**F/A-18**  
Camelina



June 2010

**Dutch AH-64 Apache**  
Algae and Cooking Oil

***Flight tests exceeded expectations***

# First Transatlantic SAF Flight With Commercial Aircraft





## Members:



## New Members

Air China

Singapore

## Affiliates:



***Strong and Growing Group of Early Adopters***

# Sustainable Aviation Fuel Projects Around the World



# Flight Path to Sustainable Aviation: ANZ Roadmap



Rolls-Royce

THE CLIMATE GROUP



## Barriers and Challenges

- Aging refineries, trend to move offshore
- Oil price uncertainty. Investment and commercialisation of new value chain
- Competition for available biomass
- Sustainability: Water, biosecurity

## Conclusions

- SAF represents a significant opportunity
- Favorable climate, large land base, stable geopolitical environment, efficient agriculture
- Sufficient biomass
- Reduce aviation emissions; regional development/ 'green' jobs, reduce dependence on foreign oil

## Recommendations include

- National Strategy
- Innovative risk sharing arrangements
- Harmonised sustainability certification

# Sustainable Aviation Fuel Progress Report

## Progress

- Flight tests – met / exceeded expectations
- Comprehensive regional assessments completed – Australasia, Pacific Northwest
- ASTM HRJ SPK approval in July

## Next Steps

- Continued emphasis on sustainability
- Research in expanded feedstock
- New fuel technologies on certification roadmap
- Commercial production beginning
- Stretch goal: market viability by 2015 /16

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



# We Are Committed to a Better Future



*For more info: [www.boeing.com/commercial/environment](http://www.boeing.com/commercial/environment)*



