



**Commercial Airplanes**

# **Aviation and Sustainable Biofuel**



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# A New Vision for Aviation

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**Why Aviation  
Biofuel?**



**First industry steps**



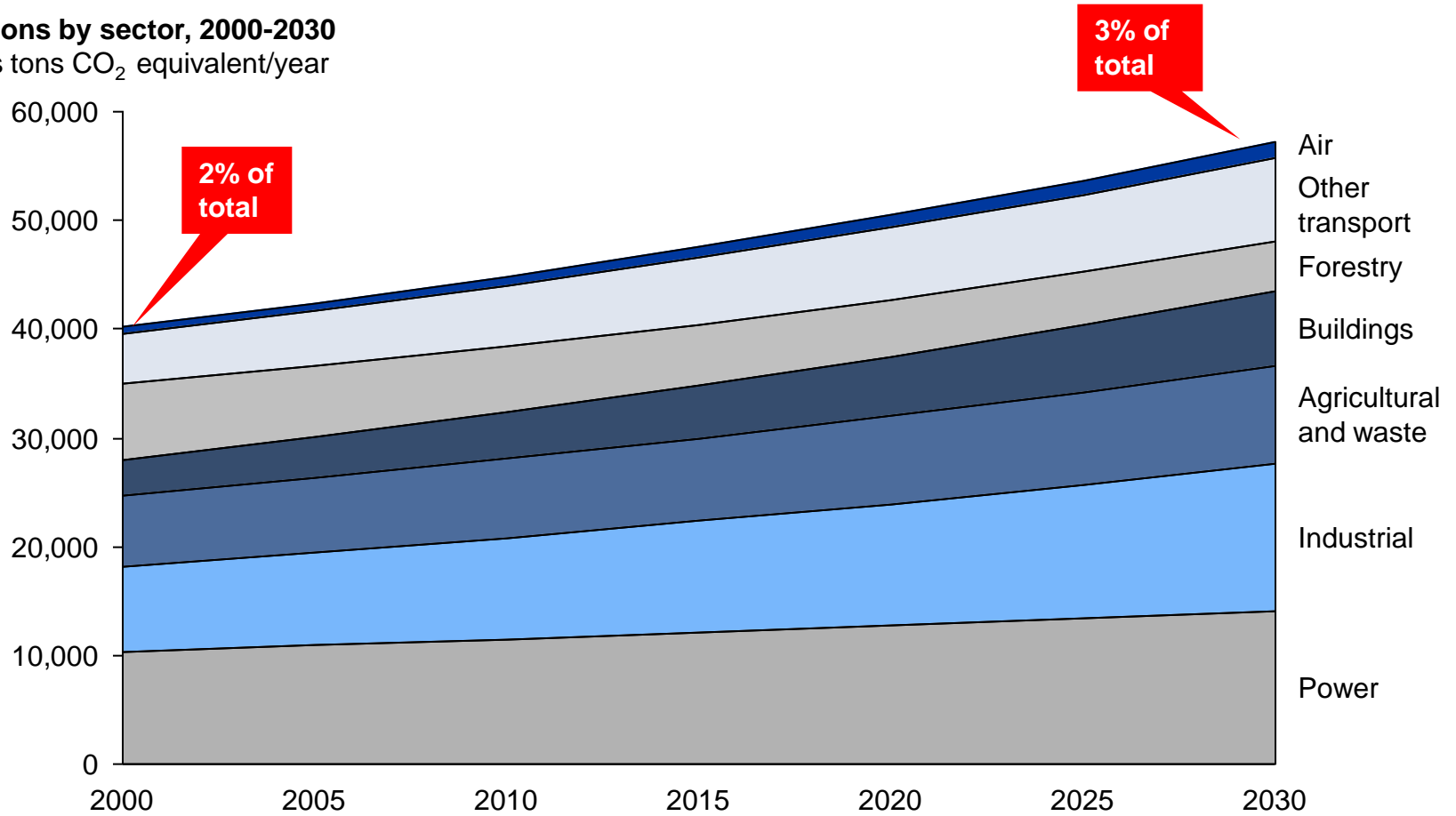
**The Boeing Role**



# Global CO2 Emissions



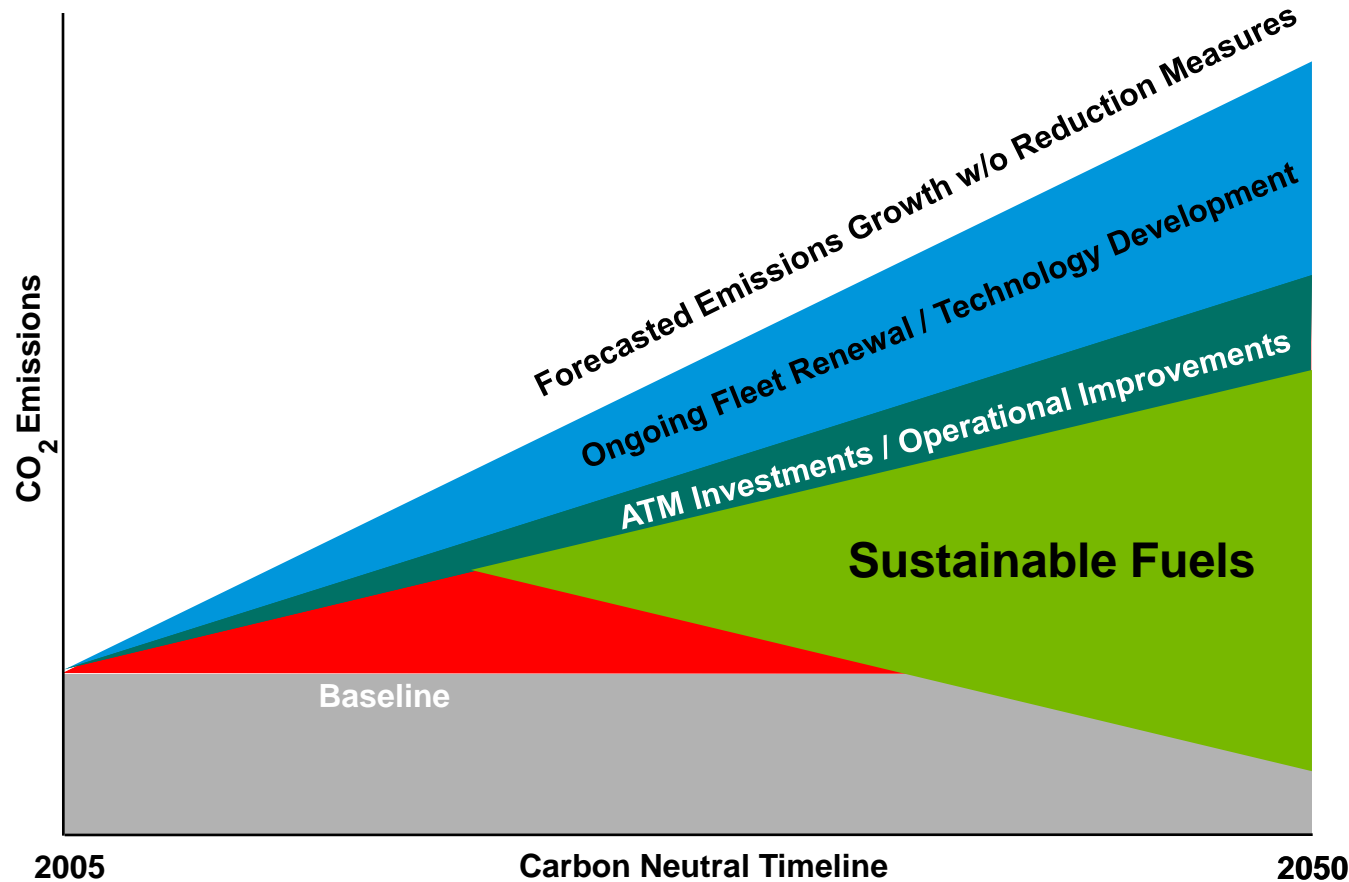
**Emissions by sector, 2000-2030**  
Millions tons CO<sub>2</sub> equivalent/year



**Small but growing share of emissions**

Source: IPCC

# Boeing's Strategy for Reducing Emissions



## Use less fuel

- Efficient airplanes
- Operational efficiency

## Change the fuel

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

**Sustainable aviation biofuel is an essential growth enabler**

# Boeing Supports “Drop-In” Fuels



- 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



**A new way of making the same fuel**

# Broad Demand for Aviation Biofuel



Test Flights  
2008 - 2011

Early commercial flights  
2011-2012

Ongoing operation  
2012+



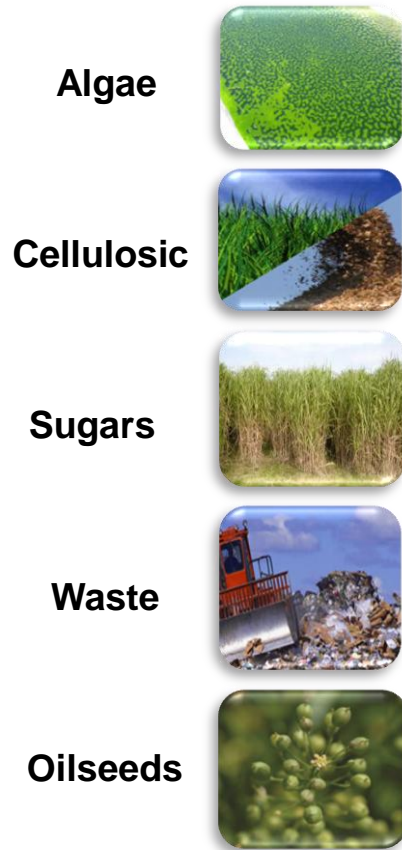
Demand is not a constraint

1. 1,539 as of July 2012

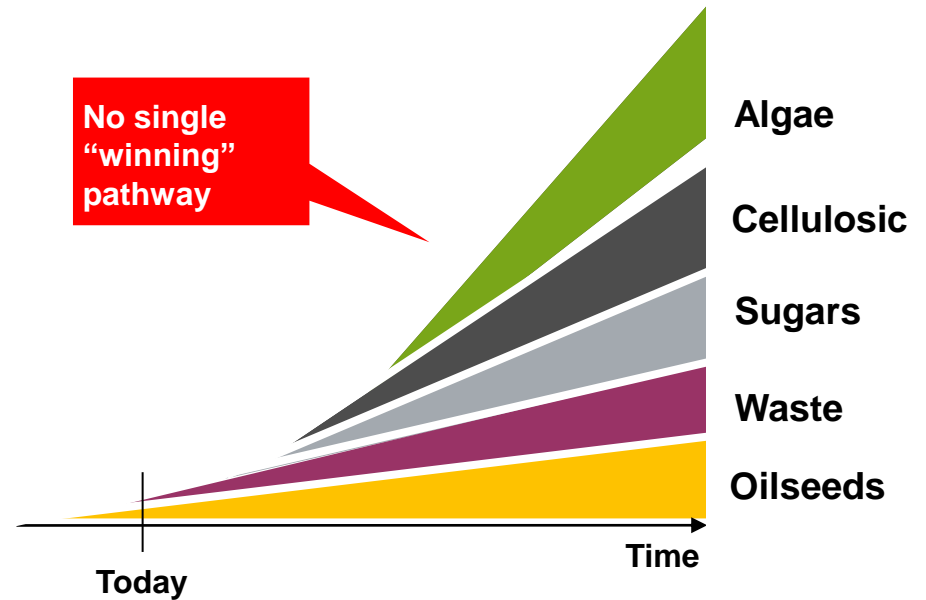
# Sources for Aviation Biofuel



## Sources of Fuel



## Expected Availability



Marketplace will determine future mix of fuel sources



# Boeing Global Biofuel Engagements



## Recent and Active Biofuel Projects



## Outcomes

- ASTM & DEF STAN approval
- SAFUG<sup>1</sup> established
- Commercial flights from June, 2011
- Focused regional research projects
- Biofuel roadmaps published

1. Sustainable Aviation Fuel Users Group



# Moving From Dreams to Reality



## Aviation Biofuel Progress

- ASTM approval for commercial use
- Regional assessments
- Favorable policy developments
- Commercial flights continue

## Next Steps

- Continued emphasis on sustainability
- ASTM approval for Alcohols-to-Jet
- Research - expanded feedstocks/pathways
- Commercial production scale-up

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