



International Air Transport Association and Alternative Aviation Fuels

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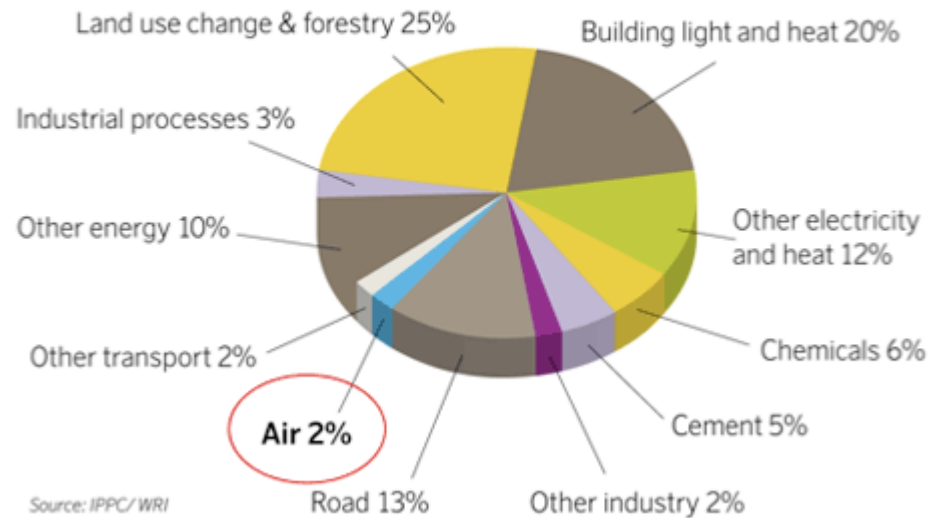
About IATA

- Represents 230 airlines, 93% of airlines worldwide
- Mission is to represent, lead and serve the airline industry
- Tasks:
 - Safety procedures and audits
 - Data analysis on various aspects of airlines
 - Guidance materials
 - Assigns airport and airline codes
 - Accredits travel agents
 - Clearing house for international flights
 - Training and development, etc.

Aviation Emissions

- In 2008, commercial aviation consumed 71 billion USG of fuel

Global CO₂ Emissions

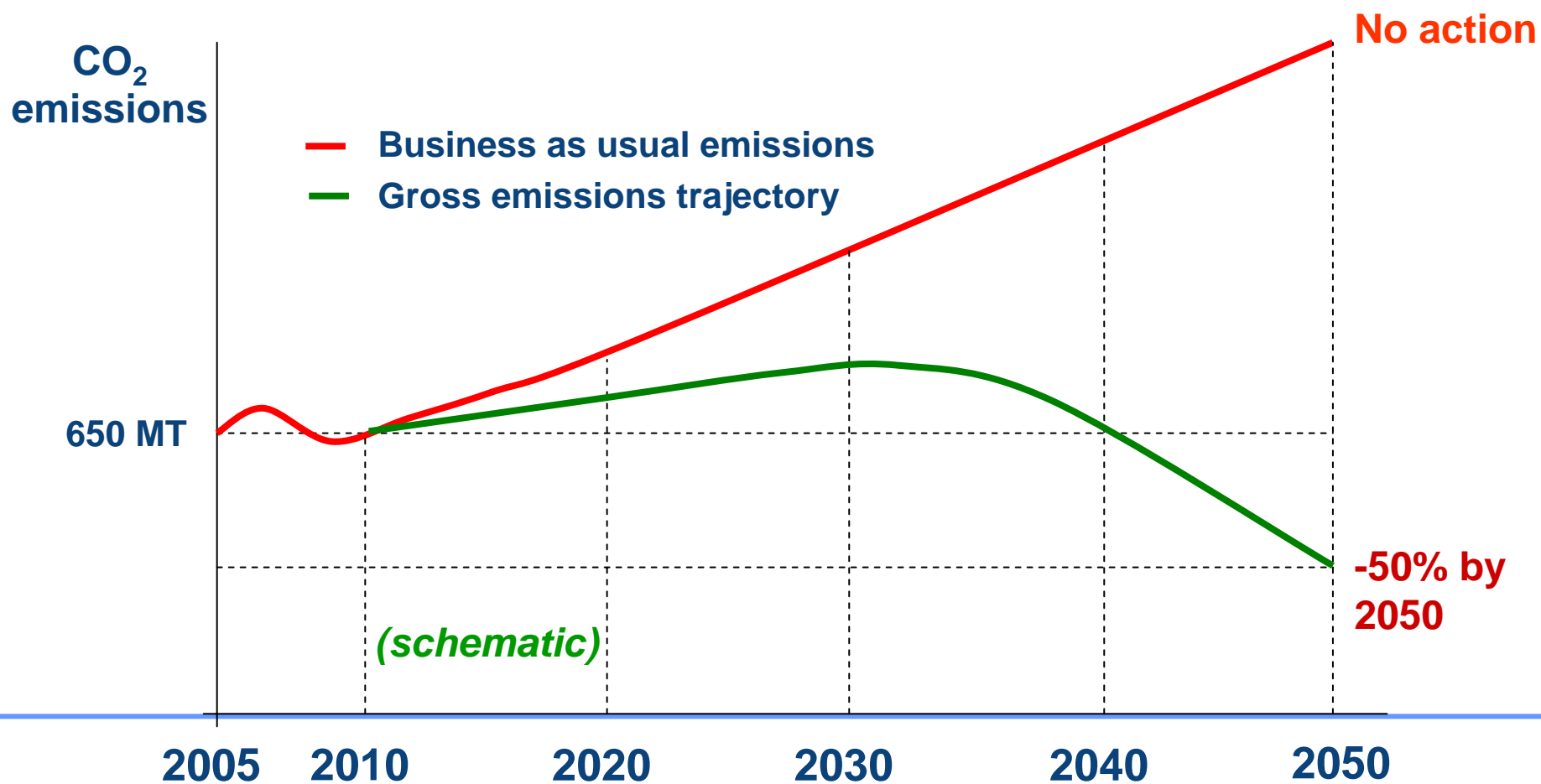


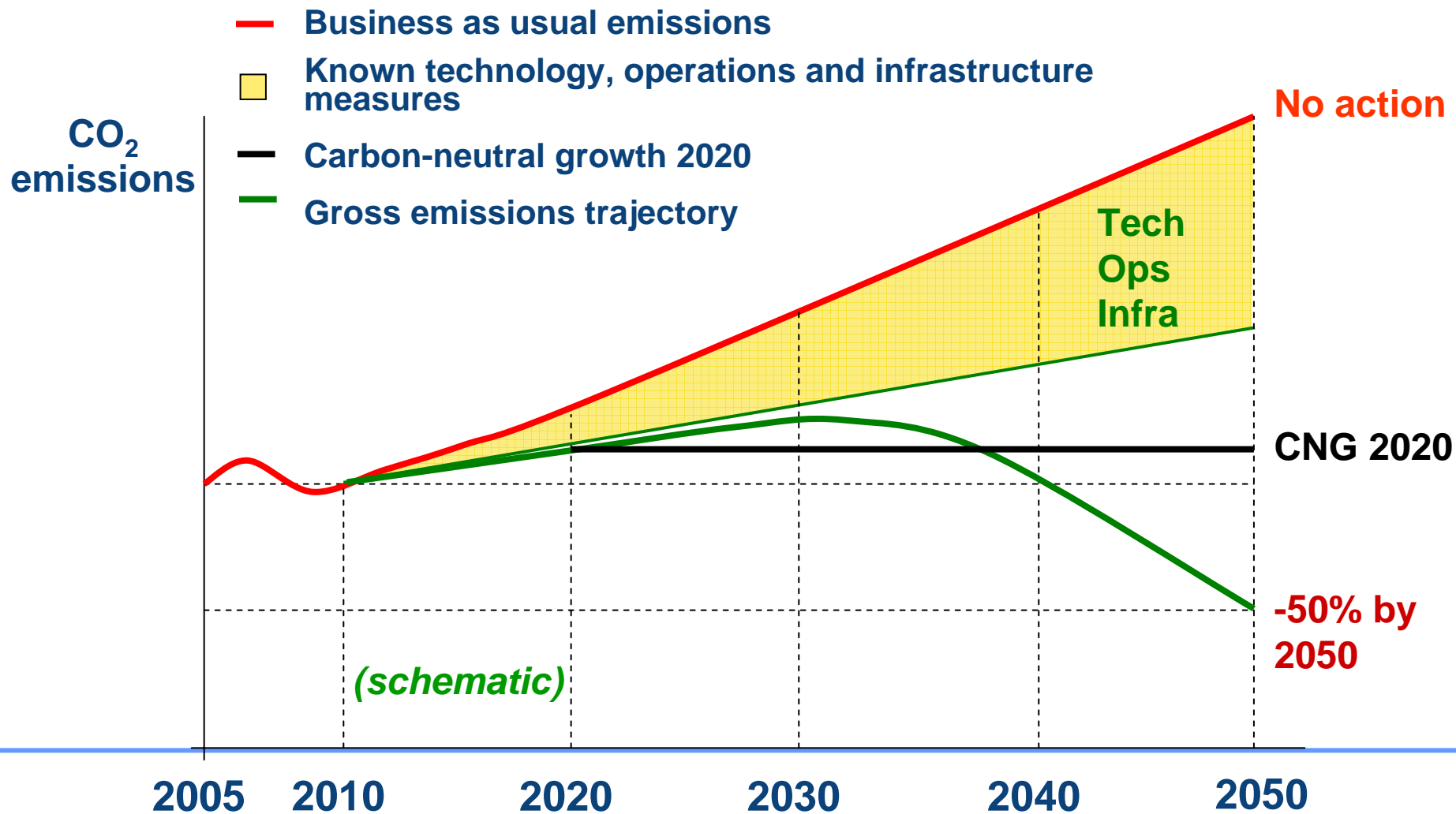
Four-Pillar Environmental Strategy

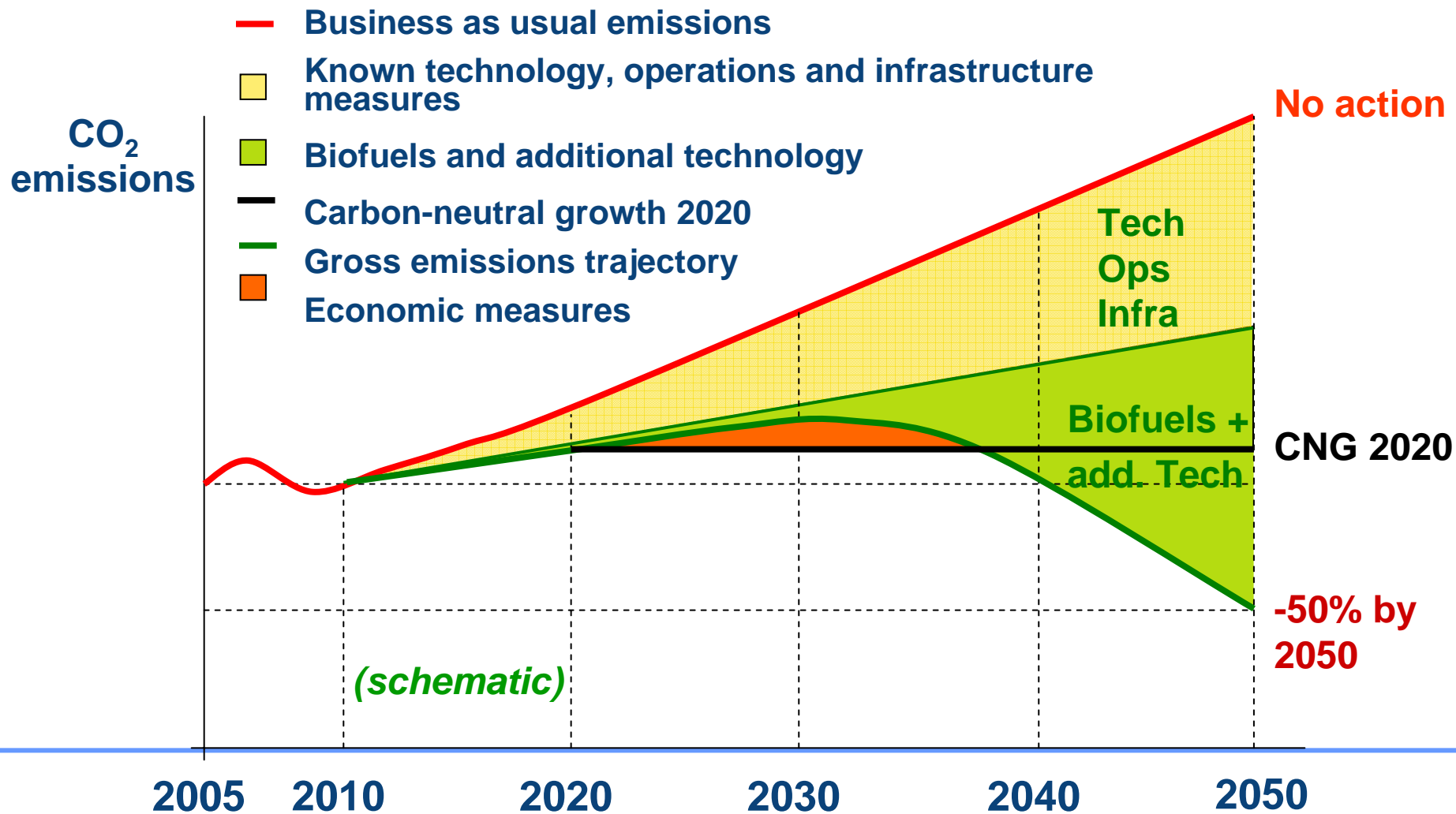
- Technology
 - Investing in technology
- Operations
 - Improving operational efficiency
- Infrastructure
 - Building and improving efficient infrastructure
- Economics
 - Carbon offsets, emissions trading



Emissions Reduction Roadmap









IATA Report on Alternative Fuels

- Released annually - 5th edition in 2010
- Available free on line
- Summarizes advances in aviation biofuels
- Input / updates from industry stakeholders

IATA Report on Alternative Fuels

Topics

- Production processes
 - Emissions
 - Sustainability
 - Economics
 - Specifications
 - Flight Trials
-



What Are Aviation Biofuels?

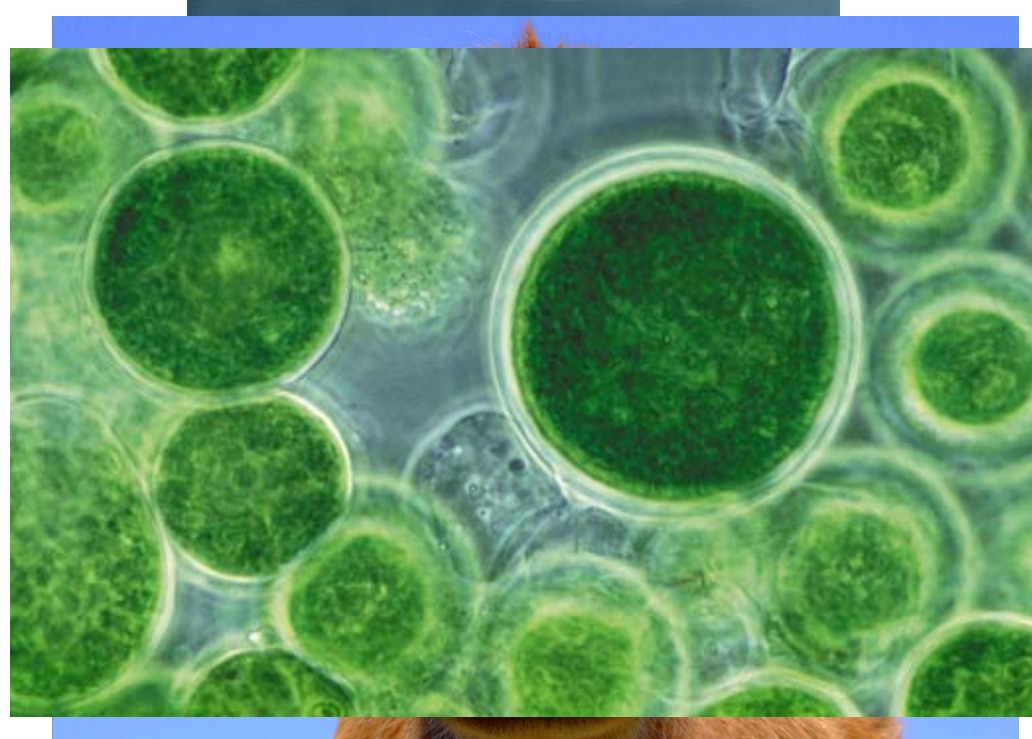
- Fuels that resemble typical jet fuel

- Dozens of varieties

- Extremely strict standards for properties such as:
 - Density
 - Freeze point
 - Flash point
 - Etc.

Renewable Sources

- Plant matter ←
- Vegetable oils ←
- Animal fats ←
- Algae ←



Fuels from Renewable Sources

	<u>Energy Source</u>	<u>Process</u>	<u>Certification</u>
Biomass-to-Liquid (BTL)	Energy crops, forestry residues, municipal waste	Gasification/ Fischer-Tropsch	Attained 2009
Hydroprocessed Renewable Jet (HRJ)	Conventional oil crops, Camelina, Jatropha, Halophytes, Algae	Hydrogen treatment	3 rd Quarter 2010
Fermented Renewable Jet (FRJ)	Sugars	Fermentation	2011+



Jet Fuels Must Be Certified

- ASTM D1655 – US standard for jet fuel
- Def Stan 91/91 – UK Military Standard
- AFQRJOS – EU Civilian Fuel Quality Requirement
- Others (Russian, etc.)



Designation: D 7566 – 09

An American National Standard

Standard Specification for Aviation Turbine Fuel Containing Synthesized Hydrocarbons¹

This standard is issued under the fixed designation D 7566; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ϵ) indicates an editorial change since the last revision or reapproval.

This standard has been approved for use by agencies of the Department of Defense.

1. Scope

1.1 This specification covers the manufacture of aviation turbine fuel that consists of conventional and synthetic blending components.

1.2 This specification applies only at the point of batch origination. Aviation turbine fuel manufactured, certified and released to all the requirements of this specification, meets the requirements of Specification D 1655 and shall be regarded as Specification D 1655 turbine fuel. Once released to this specification (D 7566) the requirements of this specification are no longer applicable; any recertification shall be done to D 1655. Field blending of synthesized paraffinic kerosene (SPK) with D 1655 fuel (which may on the whole or in part have







1.7 This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.

2. Referenced Documents

2.1 ASTM Standards:²





- D 56 Test Method for Flash Point by Tag Closed Cup Tester
- D 86 Test Method for Distillation of Petroleum Products at Atmospheric Pressure
- D 93 Test Methods for Flash Point by Pensky-Martens Closed Cup Tester

Alternative Fuel Test Flight Program

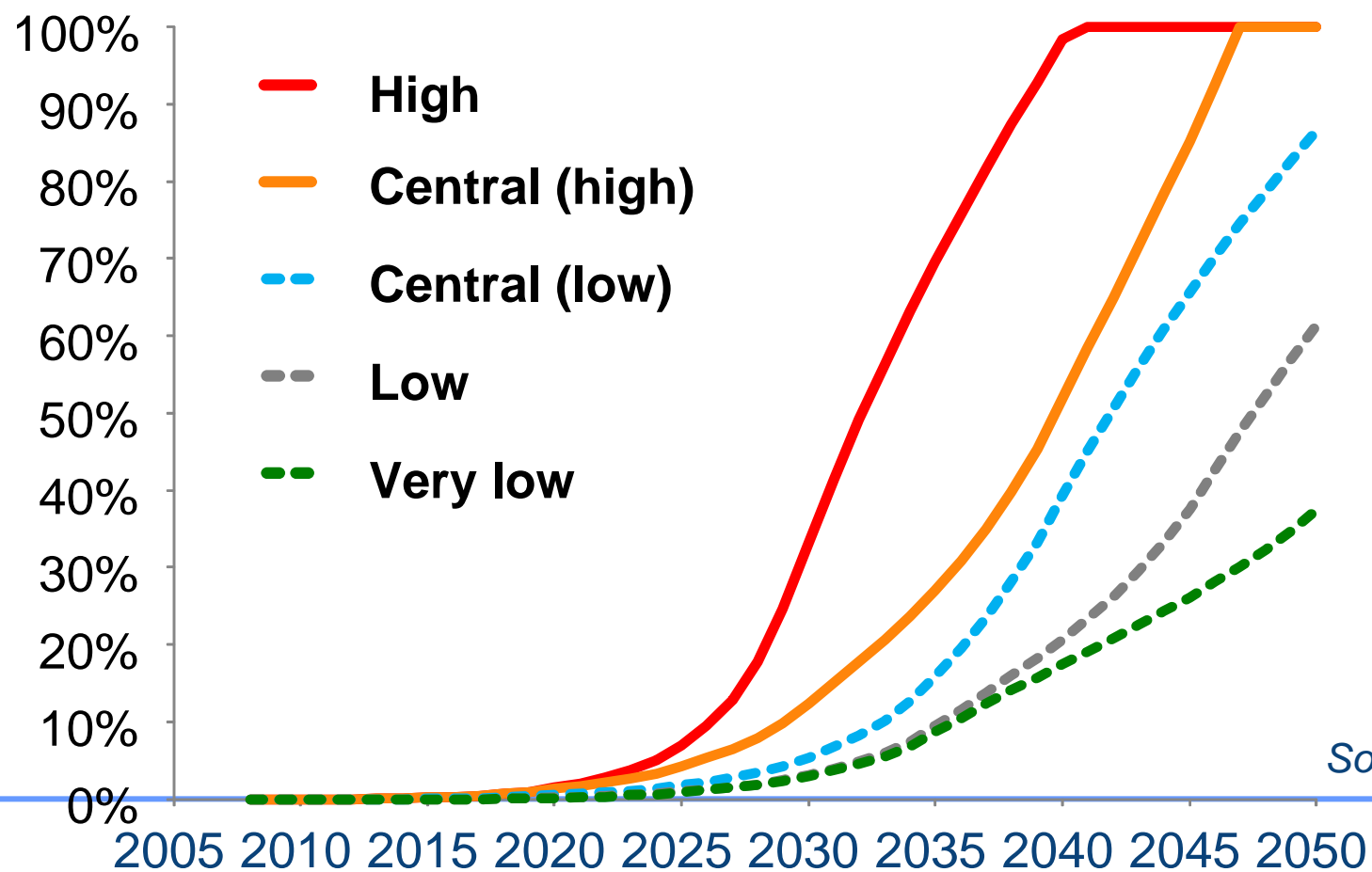
Carrier	Aircraft	Partners	Date	Alt Fuel	Blend
	B747-400	Boeing, GE Aviation	23 Feb 2008	Coconut & Babassu	20% one engine
AIR NEW ZEALAND	B747-400	Boeing, Rolls-Royce	30 Dec 2008	Jatropha	50% one engine
	B737-800	Boeing, GE Aviation, CFM, Honeywell UOP	7 Jan 2009	Algae and Jatropha	50% one engine
	B747-300	Boeing, Pratt & Whitney, Honeywell UOP	30 Jan 2009	Camelina, Jatropha, Algae blend	50% one engine
	A340-600	Airbus, Shell	12 Oct 2009	Gas to liquid (not biofuel)	50% four engines
	B747-400	GE, Honeywell UOP	23 Nov 2009	Camelina	50% one engine
	A319	Rentech	30 April 2010	Gas to liquid (not biofuel)	40% two engines



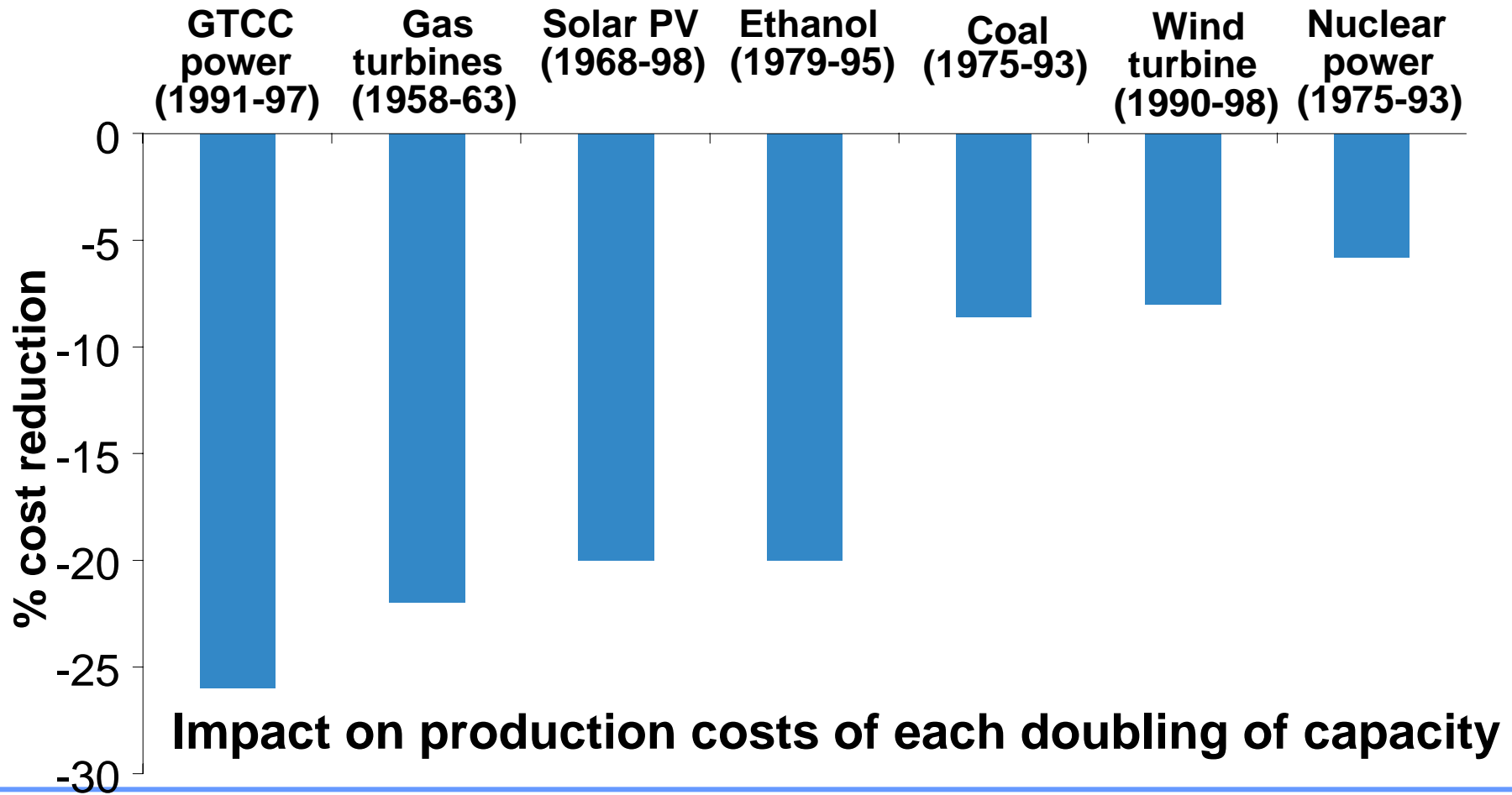
Scheduled Alternative Fuel Flights

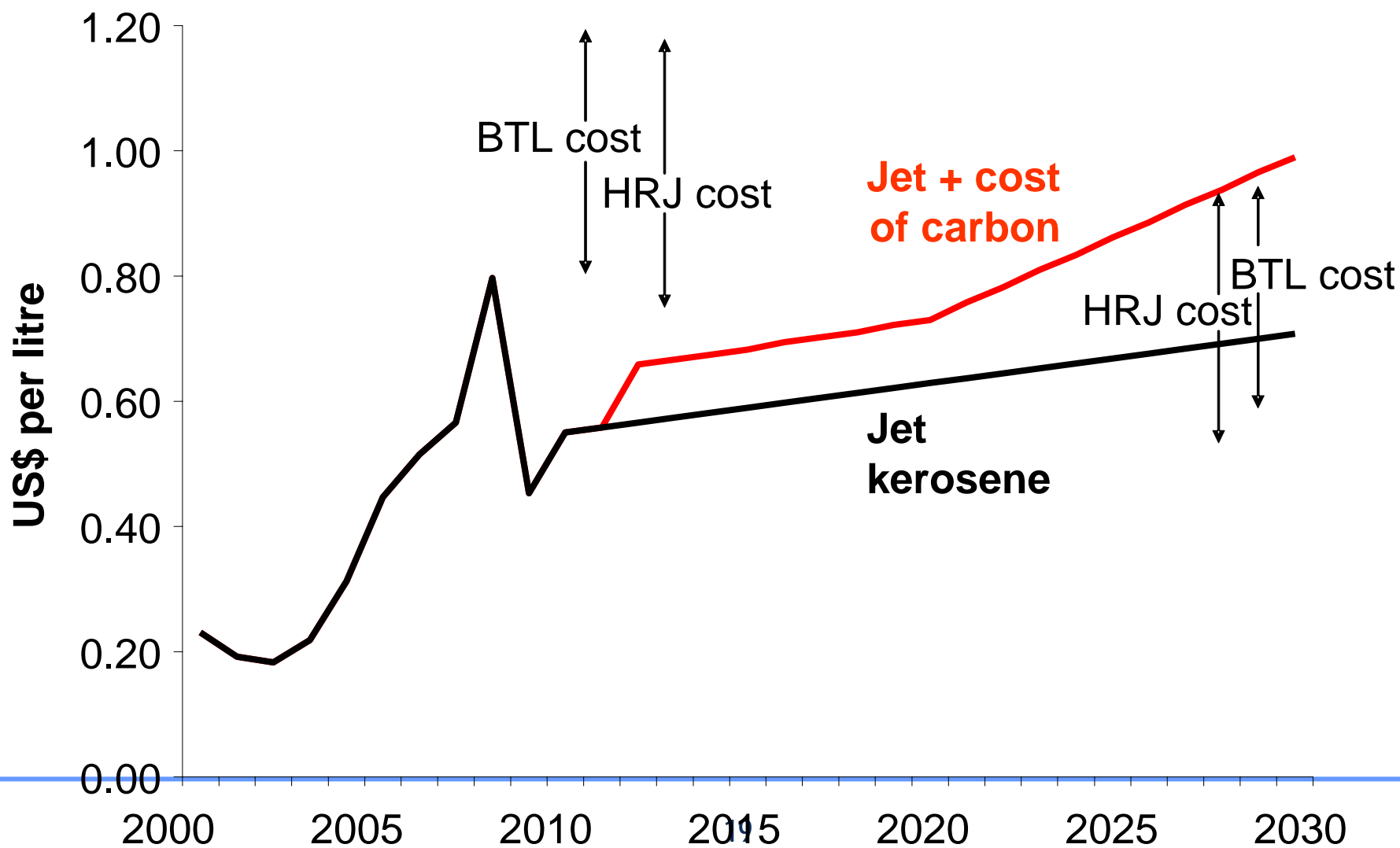
Carrier	Aircraft	Partners	Date	Alt fuel	Blend
	A320	Airbus, CFM	2H 2010	Jatropha	TBC
	A320	Airbus, IAE, Honeywell	2010	TBC	TBC
	A320	CFM, Safran, EADS, Airbus, Honeywell	2011	Salicornia	TBC
	E190	Embraer, Amyris, GE	1H 2012	Sugars	TBC

BioJet Uptake Scenarios



Source: E4tech





Source: IATA, IEA, various biofuel studies

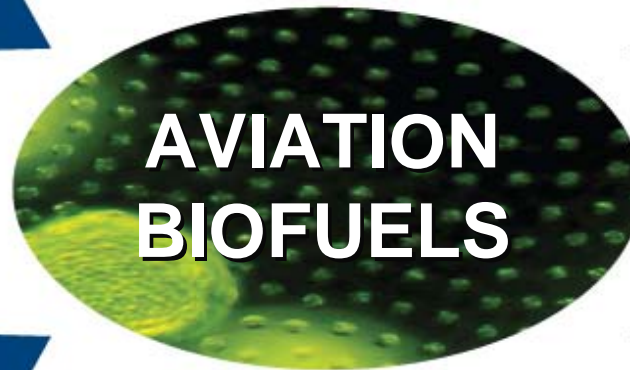
Sustainability pressures



LAND USE



FRESH WATER



**AVIATION
BIOFUELS**



FOOD CROPS



ENERGY USE

**IATA working with Roundtable
on Sustainable Biofuels**



What Is IATA Working On?

- 2010 Report on Alternative Fuels
- Guidance materials for airports
- Database of biofuel producers
- New reporting procedures for biofuel use
- New model aviation fuel purchase agreements for biofuel
- IATA Fuel Forum

The Way Forward

- Agree to common sustainability standards
- Agree to common carbon lifecycle calculations
- Demonstrate airline demand
- Increase crop yields
- Scale up production capacity
- Support from governments
 - R&D
 - Demonstration plants
 - Commercialization/implementation



Questions?

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to represent, lead and serve the airline industry