Will Government Net Zero Carbon Objectives Limit Aviation Growth?

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Aviation's Impact upon the Development of Humankind

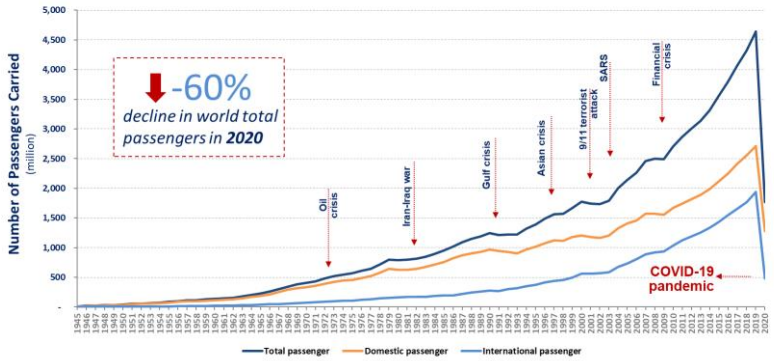
- Global economy
- Global / multicultural society
- International political alliances (EU)
- New patterns of trade and migration
- Accessibility and connectivity
- The benefits are enormous

Importance to Economy and Society (Greece)

- Geographical location
- Island communities
- Global tourism
- Hellenic diaspora

The Unthinkable has Happened

- Governments, planning bodies, industry, investors have historically assumed exponential growth in air transport…..
- And linked economic growth and development to greater global mobility and airport expansion



Is Aviation Growth Sustainable in a Low Carbon World?

- Recovery from COVID-19 will occur but is an assumption of continuing exponential growth valid in the context of climate change and government responses to the climate threat.

Rapid Cuts Across Every Sector

- Call for urgent and deep cuts in CO_2
- Net Zero Carbon by 2050
- Some sectors will be able to transition (cars)
- Major threat to aviation because it will be legacy user of carbon fuel and producer of CO_2 beyond 2050.
- NZC requires residual CO_2 is captured and stored.

Aviation Carbon Intensive

- Due physics of flight
- A380 fuel consumption per passenger kilometre same as small family car.

BUT

- Annual fuel consumption of tens of thousands of cars.
- Many still flying in 2050

Improvements in Fuel Efficiency

- Conventional aircraft more fuel efficient, but not compensating growth
- Improvements harder and more expensive.
- The result aviation emissions grow to 2050.

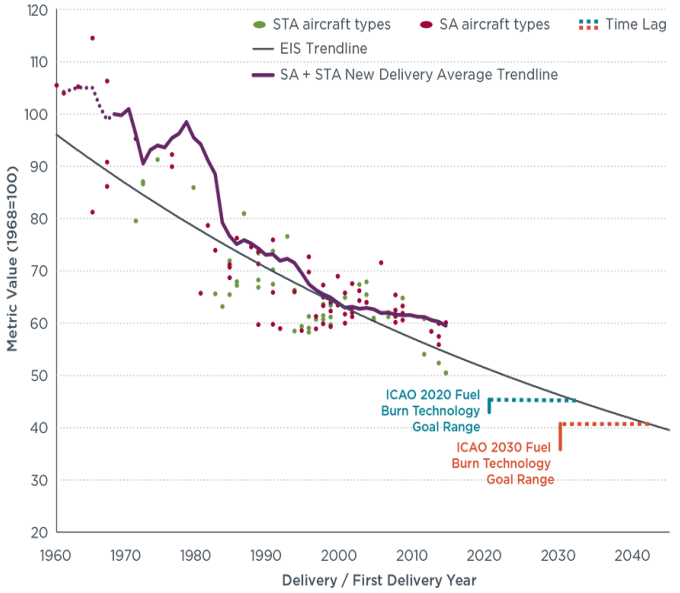


Figure ES-2. New single-aisle and small twin-aisle jet aircraft metric value vs. ICAO fuel burn technology goals

Step Change Technology Required

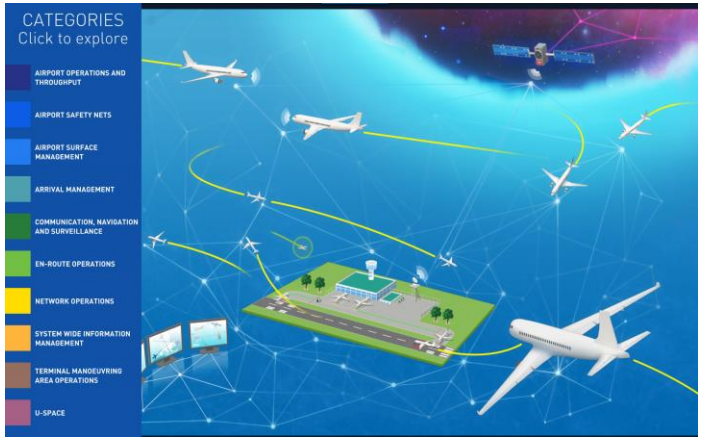
- Electric / H2 aircraft.
- Still under development
- Significant cost.
- Requires supporting airport infrastructure.
- Decades to deploy at scale.

Sustainable Aviation Fuels

- From waste, plant, chemical, algae.
- Low but not zero carbon.
- Costly c.f. current fuels.
- At present can only blend small % with conventional fuels

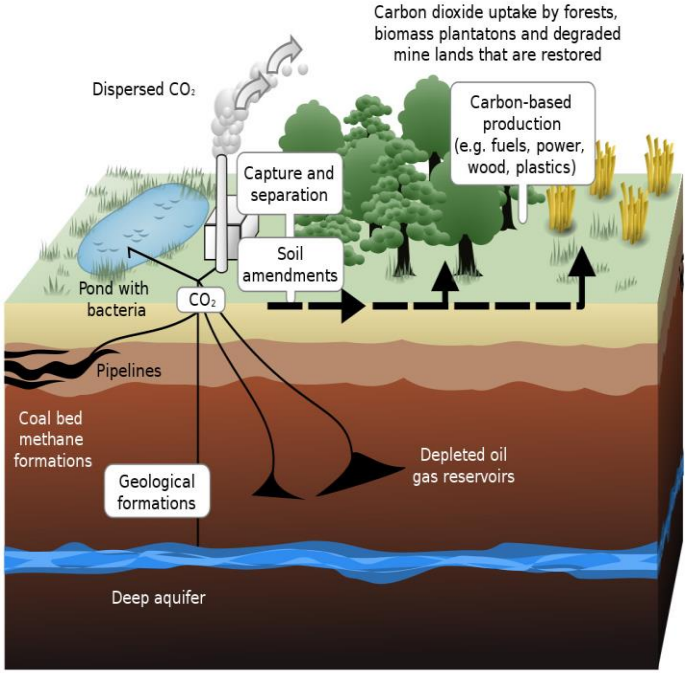
ATM Improvements

- Massive investment needed
- Limitations:
  - Time required to deliver.
  - Safety critical factors.
  - Aviation weather dependent.



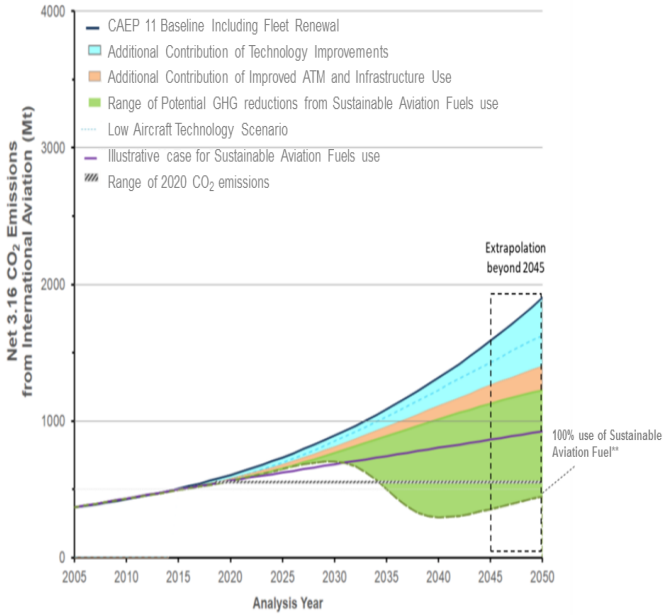
Carbon Capture / Sequestration

- Chemical processes and biomass/habitat management.
- Chemical processes in infancy, need to scale up.
- Will sufficient capacity be available for aviation?
- Significant costs.



ICAO Response to NZC by 2050

- Big residual emissions so major investment in carbon capture required.
- Future technology not guaranteed.
- The ability to deploy at scale not guaranteed.
- Economic cost could depress demand.



Will Governments Constrain Airline and Airport Growth?

- Airline carbon taxes being discussed/planned (France).
- Airports now facing planning constraints (Heathrow) .
- What impact upon regional economies?
- How will they adapt if reliant upon aviation? (Greece)
- What role will aviation play in low carbon economy?