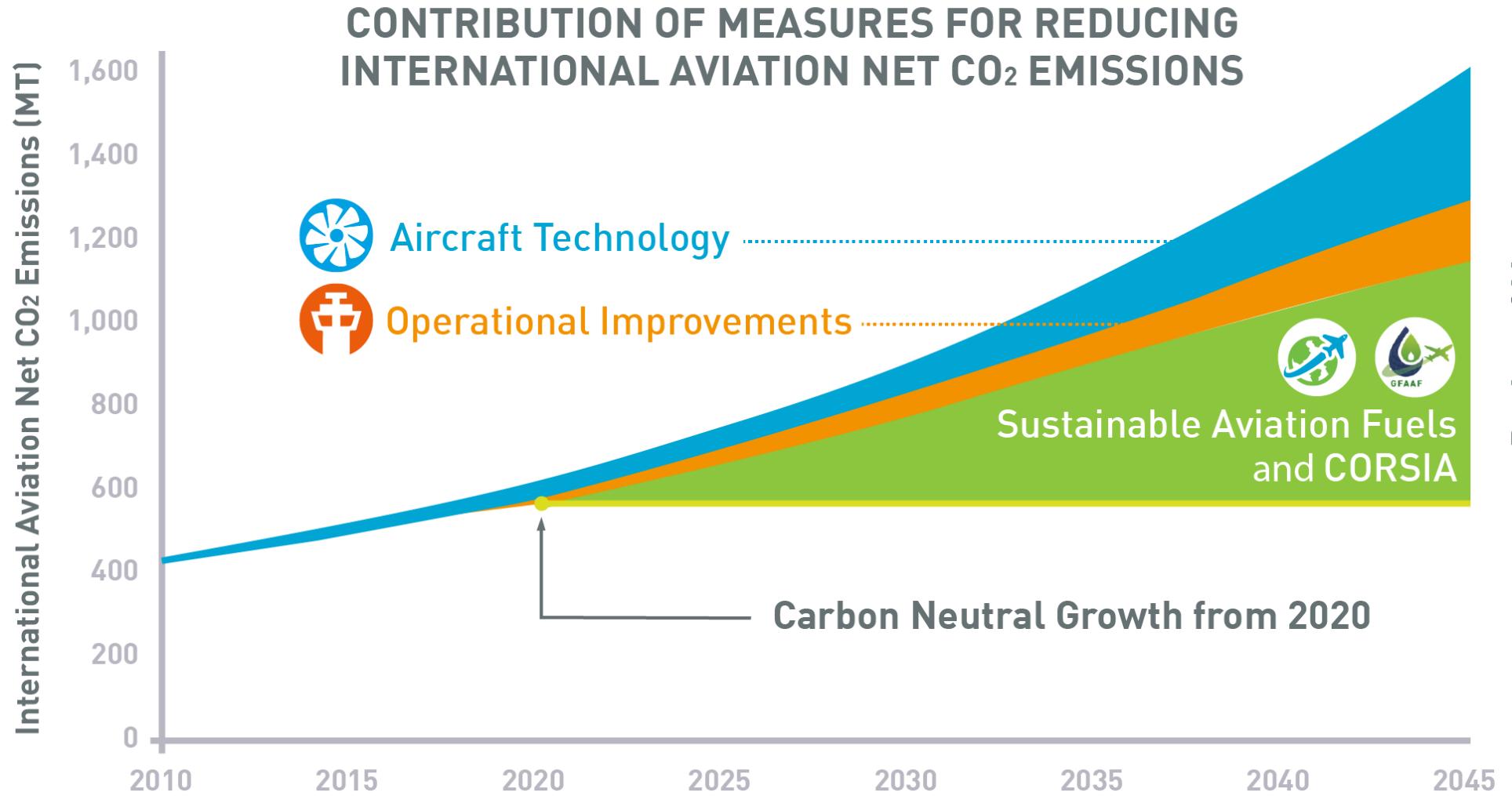


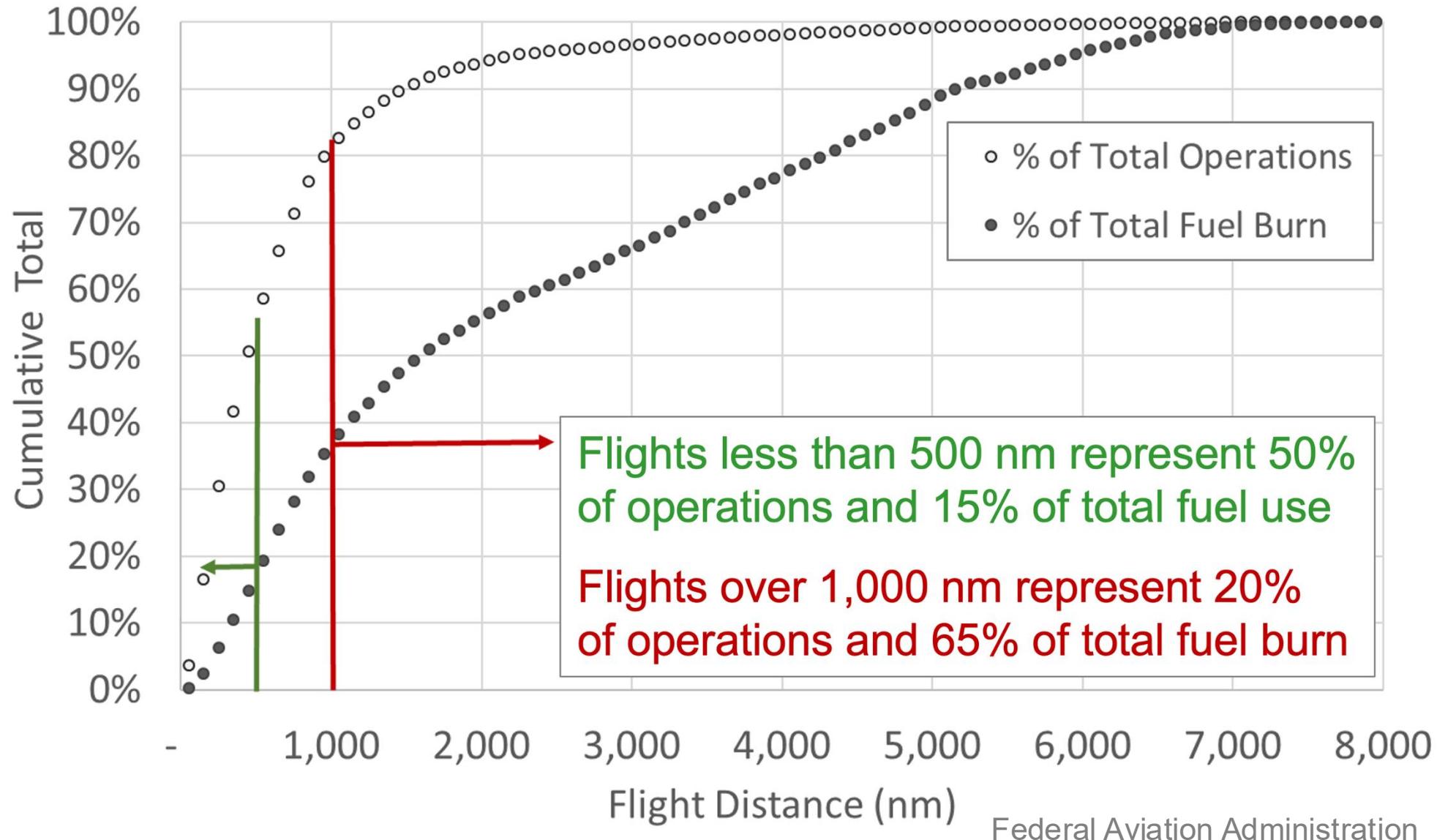


PATHWAYS TO SUSTAINABLE AVIATION

Michael Wolcott
Regents Professor & Director
ASCENT – FAA Center of Excellence
January 29, 2026

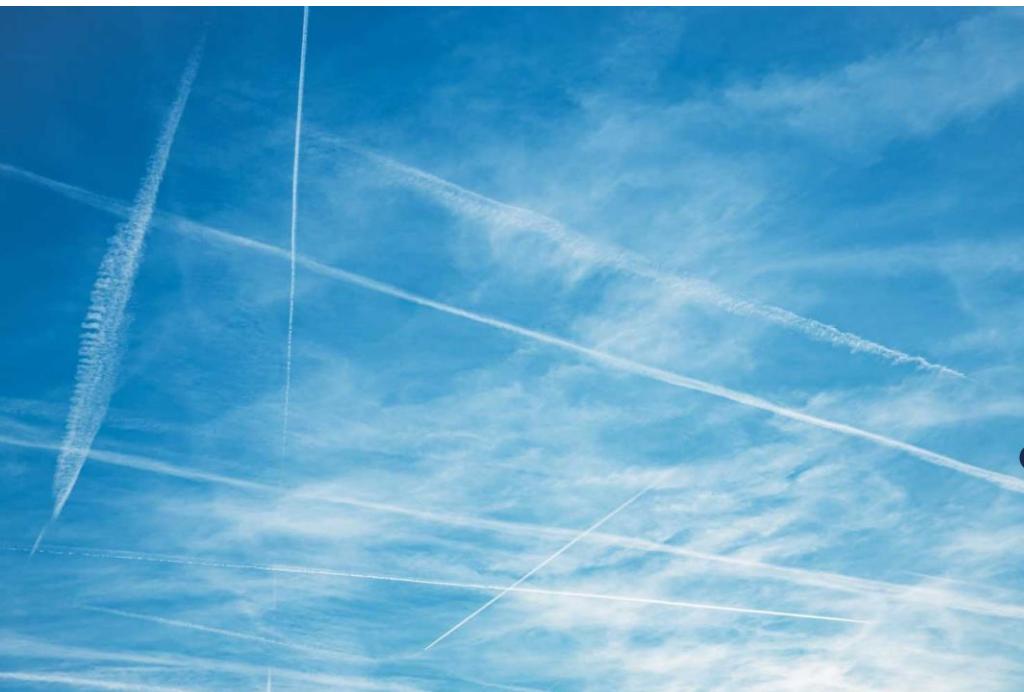


Long Haul Flights are Key



Operational Improvements

- Conventional Approach
 - Improved routing options
 - Reduced taxi times,
 - Electrification of tugs, PTO, etc
- Major impacts is contrail avoidance



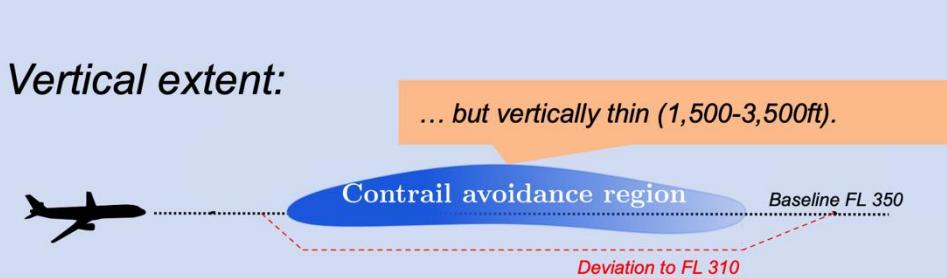
Persistent contrail forming regions (CFRs) are horizontally large but vertically thin

Lateral extent:

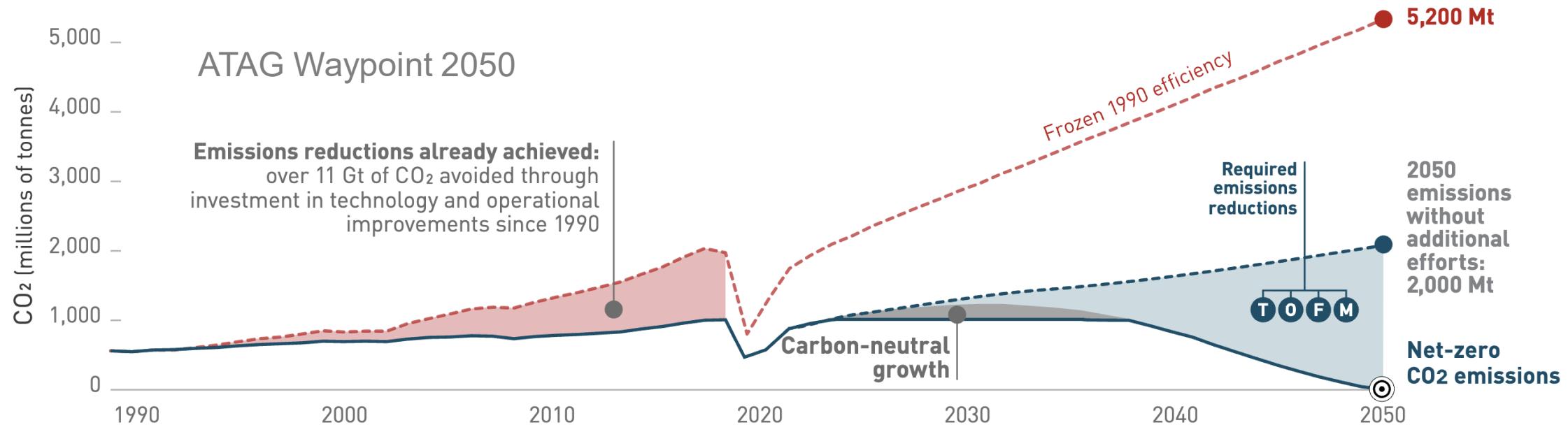


Contrail forming regions horizontally large
(Avg. flight distance through regions ~150km)...

Vertical extent:



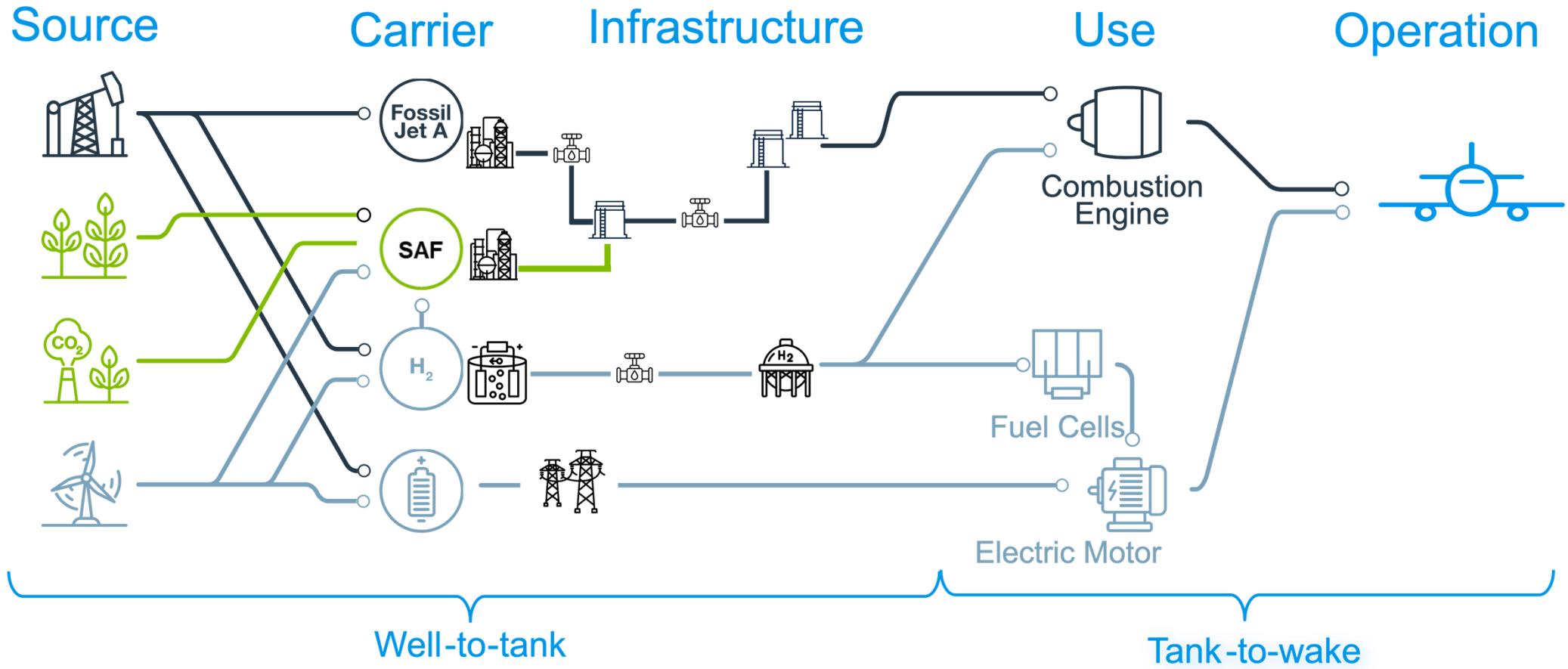
Technology Improvements



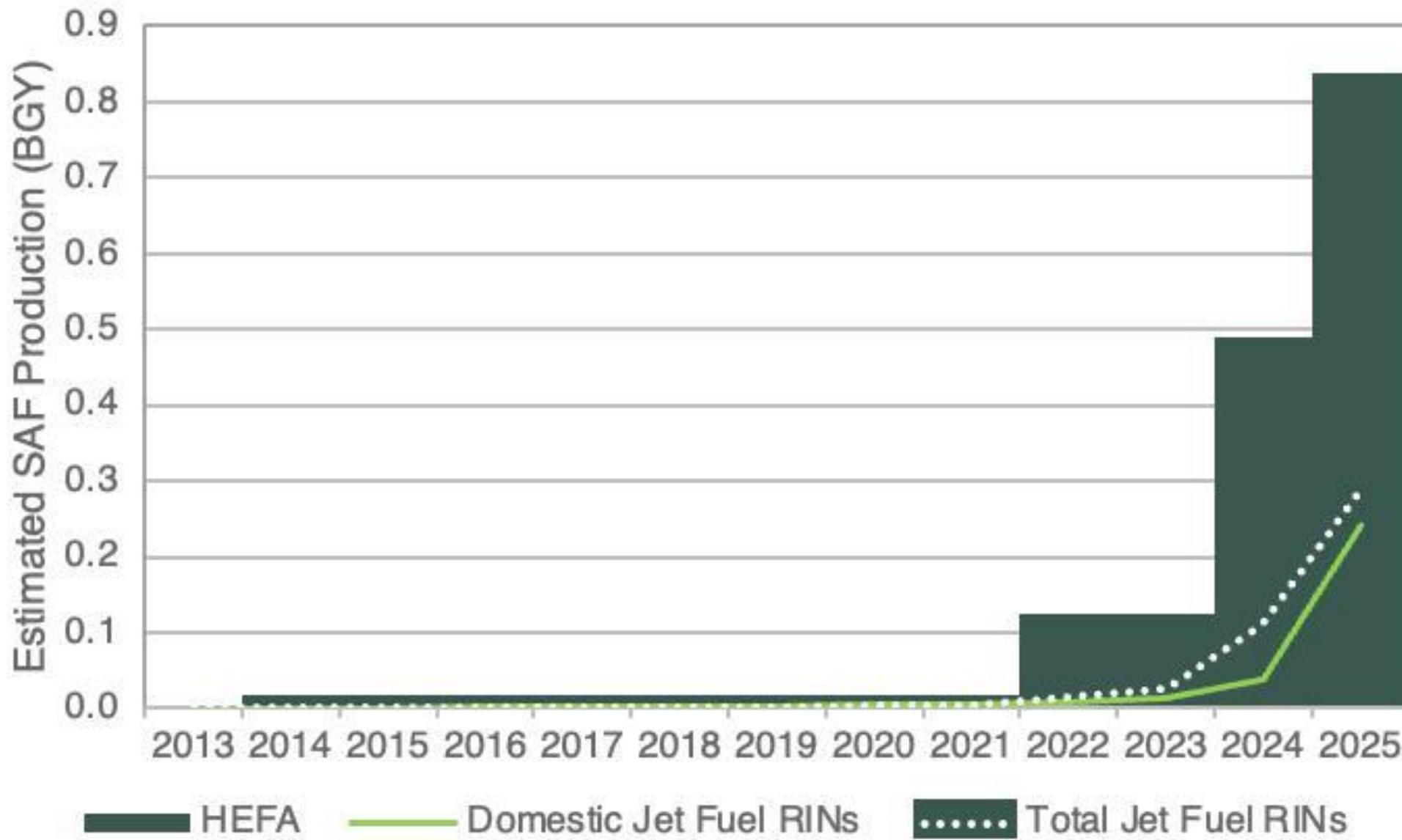
- Aircraft Efficiency has huge contributor
- Fleet renewal will continue this trend
- Major impacts may require radical advances
 - Airframe and wing design
 - Energy systems (hydrogen, electric, hybrid)



Energy System (of systems)



Potential US SAF Capacity vs Consumption





Thank You