

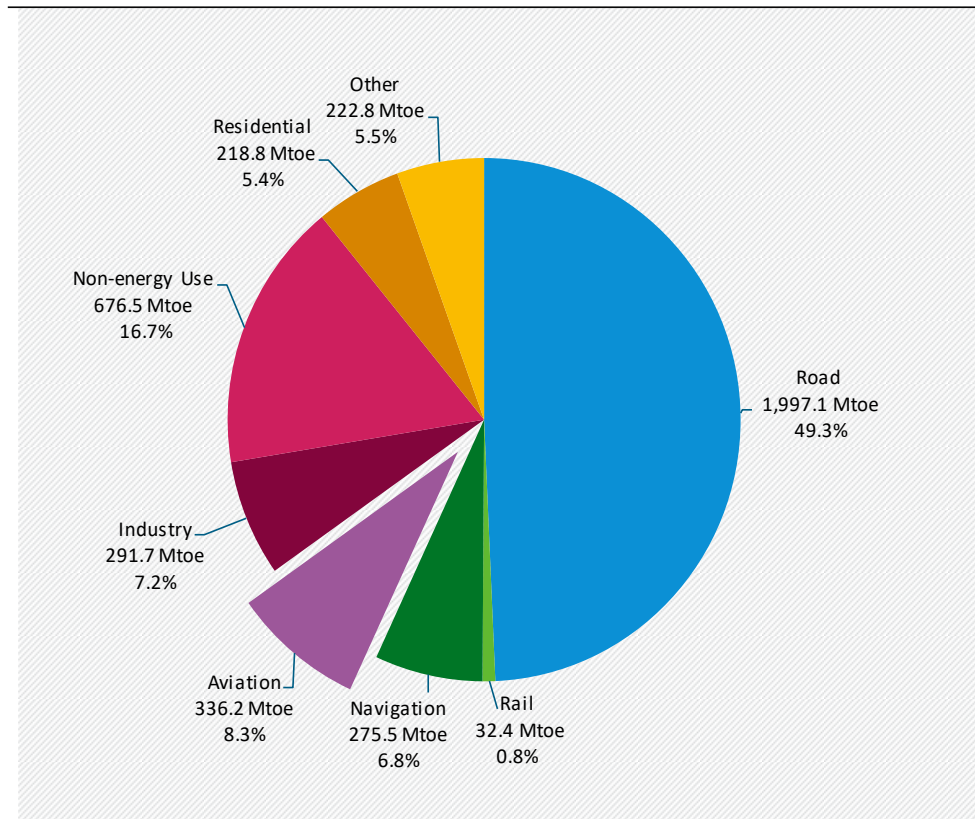
Future trends and scenarios in aviation

Climate protection in aviation and maritime transport

Berlin, Dessau, WebEx, 16/11/2021



Aviation's share in global crude oil demand (final consumption) 2018

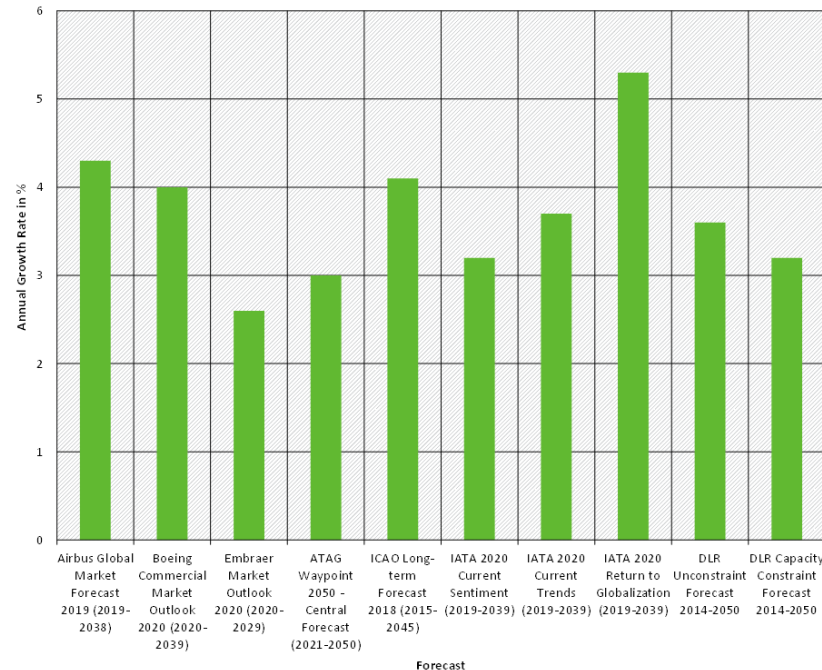


Source: IEA (2020a)

Aviation has a significant share in global oil demand!

Forecasts and scenarios on aviation development

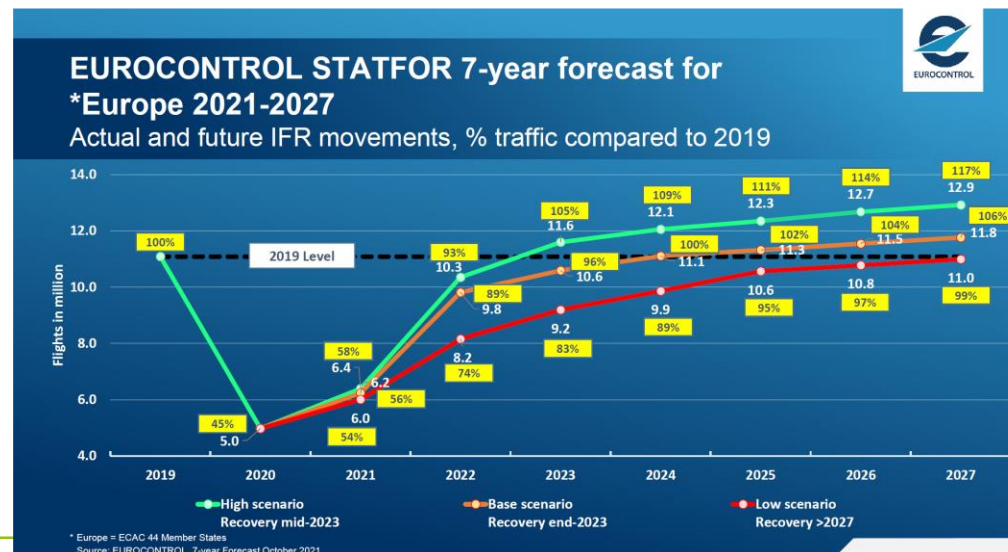
- Typically, aviation forecasts and scenarios predict **traffic development**, but not **energy consumption**
- Traffic forecasts predict medium- and long-term aviation demand growth between 2.8 % and 5.2 %



Source: Own Compilation

Impacts of the COVID-19 pandemic

- Temporary severe decline in aviation demand and energy consumption
- Aviation recovery is taking place – e.g. global domestic traffic in September 2021 only 24% below September 2019
- Updated medium- and long-term forecasts expect a small decline in growth rates (e.g. Boeing CMO 2021 4.0% p.a. vs. CMO 2019 4.6 %)

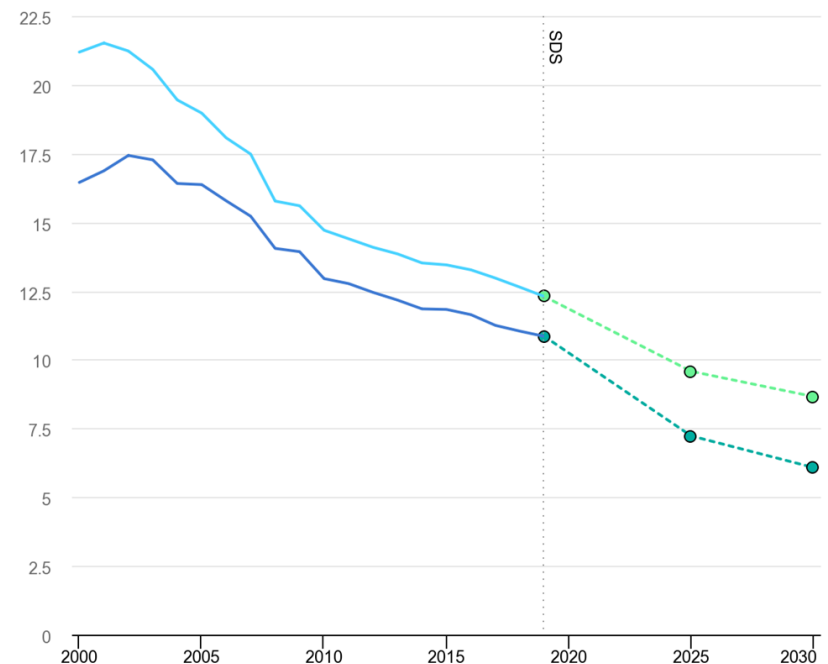


Source: EUROCONTROL (2021)

Trends in energy efficiency improvements

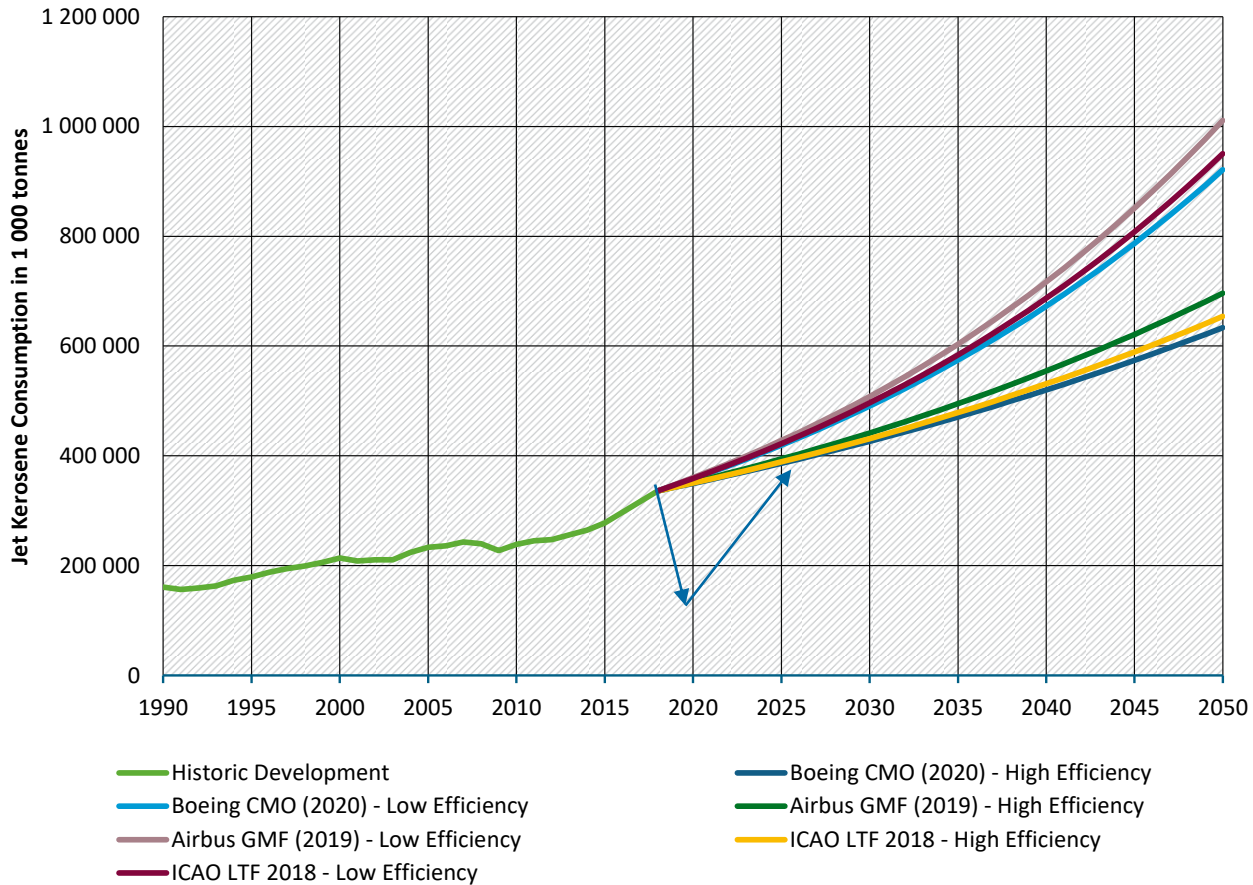
- Aviation has increased energy efficiency and decoupled energy consumption from traffic development
- Increasing marginal effort in reducing emissions (Germany):
 - 1990-2000: 2% p.a.
 - 2000-2010: 1.6% p.a.
 - 2010-2020: 0.9% p.a.
- Main contributing factor: engine technology and aerodynamics, flight efficiency by operations and air traffic management

Historical development and projection for global aviation energy efficiency



Source: IEA

Combining traffic and energy efficiency forecasts



Source: Own Compilation

Key takeaway messages

- Aviation is expected to grow on a global scale, despite COVID-19 pandemic, at a rate of ~4% p.a.
- Long-run efficiency increase by fleet renewal and operational improvements in the order of 1-1.5% p.a.
- COVID-19 has accelerated retirement of older, less fuel efficient aircraft
- As things stand, alternative energy carriers will be limited in their commercial use to small regional aircraft (battery-electric power) or short-medium haul jets (hydrogen), if at all
- Global fuel demand for aviation is expected to grow ~3% p.a.
- Sustainable aviation fuels are the most likely alternative for a decarbonization of aviation in a reasonable timeframe

Thanks for your attention!

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