



## Four scenarios for the future of (sustainable) air travel

*Scenario analysis for governments and industry players*

In an effort to become more sustainable, the aerospace industry is facing its greatest challenge since its inception. Whereas aircraft have become much more fuel-efficient in many ways, the long term aviation market growth is still outpacing fuel efficiencies by a factor three to four<sup>1</sup>. There is little doubt that the aviation industry has to do more to reduce its climate impact. Recently, as a response to the COVID-19 pandemic, many governments demand the commitment to reduce climate impact as a prerequisite for financial support. These commitments provide incentives to accelerate sustainable transformation for the entire aviation ecosystem.

Unfortunately, there are no easy solutions or silver bullets. The aviation ecosystem is globally 'locked-in' in the interplay between needs and constraints from various stakeholders and aspects: business & capital, policy makers, technology, safety, infrastructure, environment and consumers. Any decision or policy is sure to affect the whole system, and potentially in unexpected ways. An integral understanding of the ecosystem is required to achieve sustainability goals as set by the United Nations (ICAO)<sup>2</sup>, the European Commission and other governments worldwide. Given the complexity of the ecosystem the change is slow and the potential solutions have to come from many fields. Policy, Scenario and Strategy analysis should guide this sustainability transformation.

Scenario building is a well-established method for decision makers to assess alternative futures and acts as a guide to understand all the forces at play<sup>3</sup>. Furthermore, scenarios are a powerful tool to create common insights across a team, support consensus and clarity of view. Ultimately, scenario's provide the basis for decisions and actions. The method is particularly powerful when used to harness expert knowledge. Resulting scenario's form the outer bounds of the alternative futures.

ADSE's aviation scenarios that form the four outer bounds for next 20-30 years are introduced on the next page. The scenarios are based upon our broad and deep understanding of the aviation ecosystem. These scenarios shine a light on the future of air travel and support creating; strategies, policies and strategic roadmaps for governments and industry players.

Relevant scenarios are always made organisation specific. Want to understand how new technologies and the changing environment impact your future, get in touch with our colleagues from ADSE.

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<sup>1</sup> IATA: <https://www.iata.org/en/pressroom/pr/2019-12-12-01/>

<sup>2</sup> ICAO: <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>

<sup>3</sup> Harvard Business Review: <https://hbr.org/2013/05/living-in-the-futures>

## The Jet Set and the beast

High, faster, connected, cheaper – Luxury and mass travel prove stronger than sustainability, especially amongst the largest emitters. Space travel, Air taxis and Supersonic flight have an adverse effect on aviation emissions. Air travel continues to grow, amid further cost cuts, the world unable to halt the momentum and influence society. An ever stronger distinction between haves and have-nots.

### Kill Bill

Aviation growth slows, a victim from war, social unrest, terrorism, rising costs, environmental pressure, or health risks. Operators and manufacturers struggle to survive, through new models, reorganisations and mergers. A major shakedown of the industry happens. Strapped from cash, operators and manufacturers are unable to enforce any innovation. Governments that agreed on CO2 reduction but who are unable to enforce innovation on their own may see no other option than to slowly reduce air travel.

## Green Dragon

Western manufacturers continue to focus on existing order books and struggle to look beyond short term shareholder targets and benefits. Without strong leadership nor roadmap the Western manufacturers and governments find themselves in competition with each other for resources and preferred concepts. At the same time, Asian markets see their chance, with major investment, strong government steering and supporting regulations. Wide-ranging experiments with electric, electric-hybrid, hydrogen, Artificial Intelligence and radical configurations are being performed. Western countries struggle to keep up and to even allow Asian aircraft in their airspace.

### Burn away

Reducing the climate impact of the largest source 'long haul' turns out technically impossible. Amongst increasing aviation taxes, ETS<sup>4</sup> and CORSIA<sup>5</sup> schemes, aviation continues on the path of incremental innovation to improve the efficiency of aircraft and ATC<sup>6</sup>, but remains as the last and much-disliked user of fossil fuel amid electrified road & sea transport. Biofuel is increasingly used but production cannot keep up with demand and depletion of oil reserves eventually increases fuel prices, necessitating a slow transition to other sustainable alternatives. Synthetic fuels remain the only viable option, taking a long time to complete, resulting in a fight over renewables and most efficient aircraft.

**About ADSE Consulting and Engineering BV.** ADSE is a consultancy and engineering firm based in the Netherlands. We focus on transportation systems and its required infrastructure of today and tomorrow within our key markets Aerospace, Defence and Mobility. Transportation systems which are becoming more and more autonomous, digital and sustainable. We add value to our customers with our expertise, providing integrated design solutions for the system life cycle, improving engineering (development), certification manufacturing (production), operational and maintenance processes and organizations, and make innovations successful. For over 20 years we make it work.

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<sup>4</sup> ETS: Emission Trading System, [https://ec.europa.eu/clima/policies/ets\\_en](https://ec.europa.eu/clima/policies/ets_en)

<sup>5</sup> CORSIA: Carbon Offsetting and Reduction Scheme for International Aviation, <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>

<sup>6</sup> ATC: Air Traffic Control

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