

AVIATION CO₂ REDUCTIONS



STOCKTAKING SEMINAR

TECHNOLOGY · OPERATIONS · SUSTAINABLE AVIATION FUELS



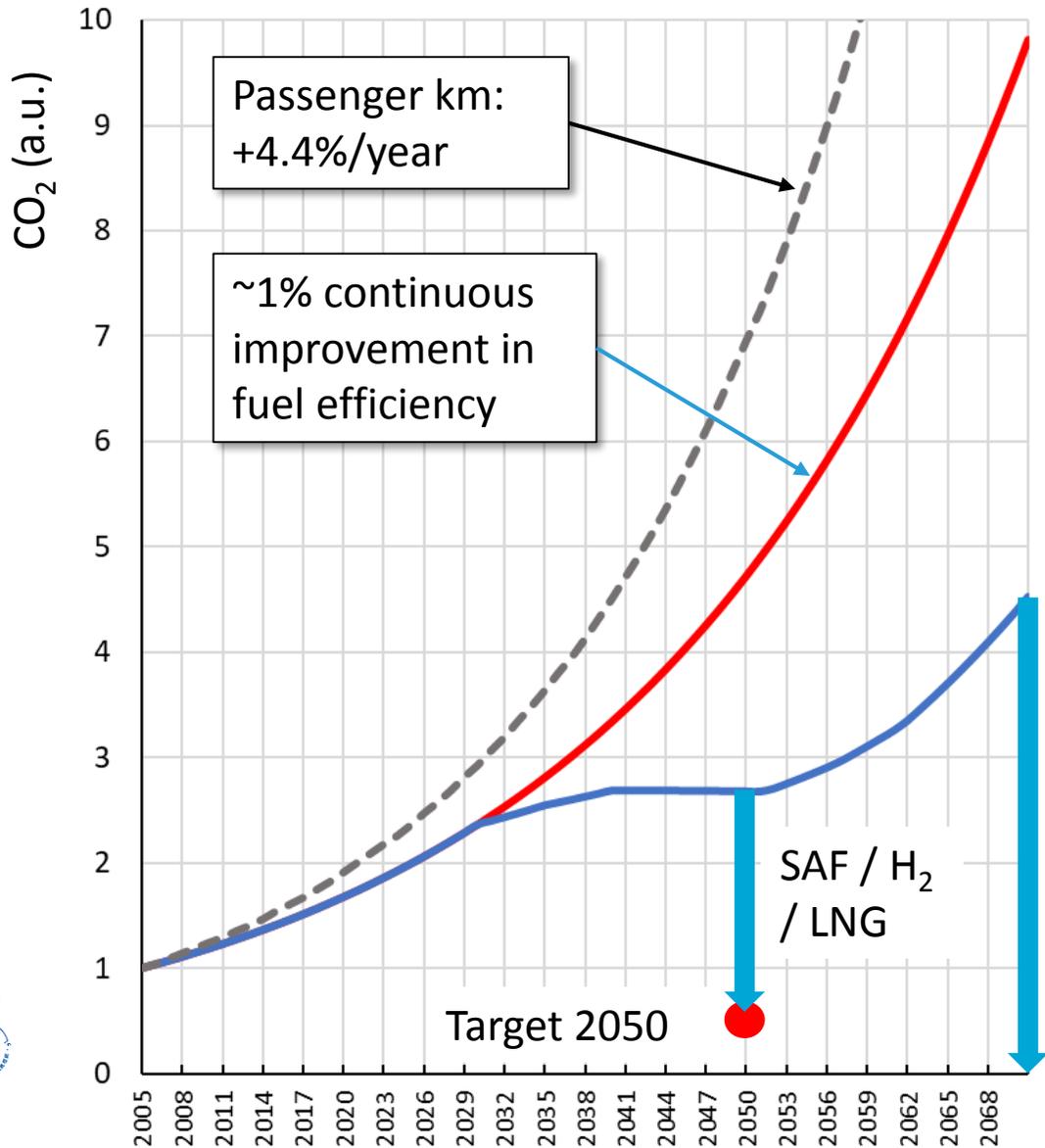
Novel aircraft technological concepts



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Is a “50% of 2005” target reachable in 2050?

Assuming a continuing growth of air travel

- Current technology forecasts imply that **electric planes** will be limited to relatively **short distances / few pax**, thus having only small impact on aviation-related CO₂.
- Even when using best-case scenarios regarding fuel efficiency and time-to-market, an overall **decrease of CO₂ emission will not occur**.
- **UNLESS, we switch to non-fossil fuels FAST**

Sustainable aviation fuels

Hydrogen, synthetic kerosene, synthetic methane (LNG)

Trade-off needed

- **Availability** (sustainable energy demand, production efficiency, scale-up of demoplants)
- **Cost**
- **Infrastructure** required
- **Storability** (cryogenic, boil-off, diffusion)
- Impact on **volume and weight**
- **Safety**
- **Climate effects** (CO_2 , NO_x -> O_3 , contrails -> cirrus clouds, ...)



Where do we encounter unrealistic requirements?

It starts with fuel-efficient plane

Regardless of the energy carrier used

Flight demonstration of **Flying-V** scaled model
(TU Delft, KLM, Airbus)

- Potential of **20% reduction** in fuel consumption (by improved aerodynamics and reduced weight)
- Suitability of **hydrogen** or **LNG** storage

Next development steps

- Improve handling quality (e.g. Dutch roll, yaw authority).
- Address LH₂ / LNG tank integration
- Engine integration





Technology

Passengers in wing, no normal fuselage. Suitable for hydrogen/LNG tanks.



	CO₂ reductions per flight	20%
	Level of finance required	TBD
	Timeframe	2040
	Main challenges	<ul style="list-style-type: none"> • Technological • Investments • Certification

Thank You



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