



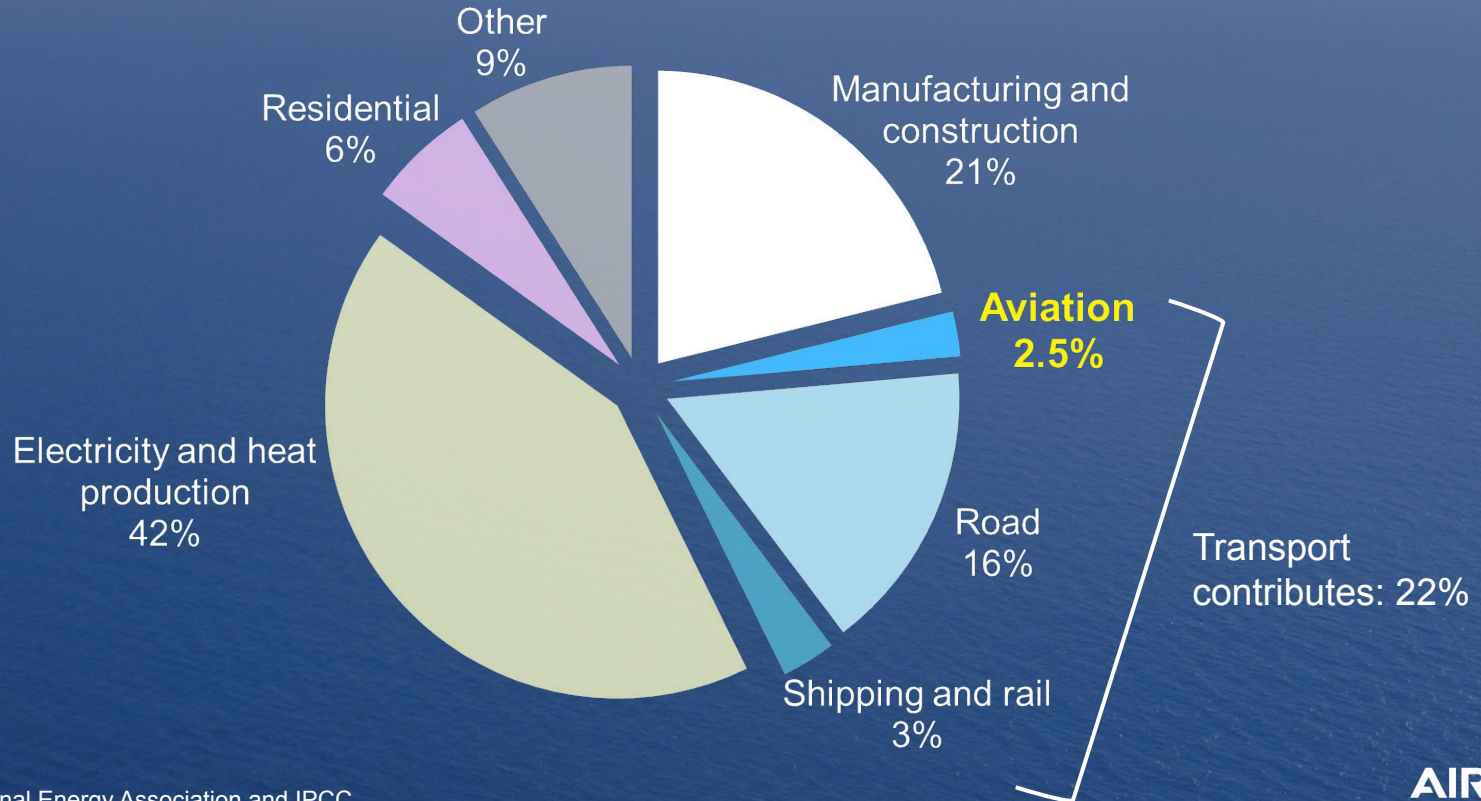
The Future Of Air Travel Will Be Carbon Neutral And More Autonomous

Dr. Grzegorz (Greg) Ombach
HO Disruptive R&T
SVP

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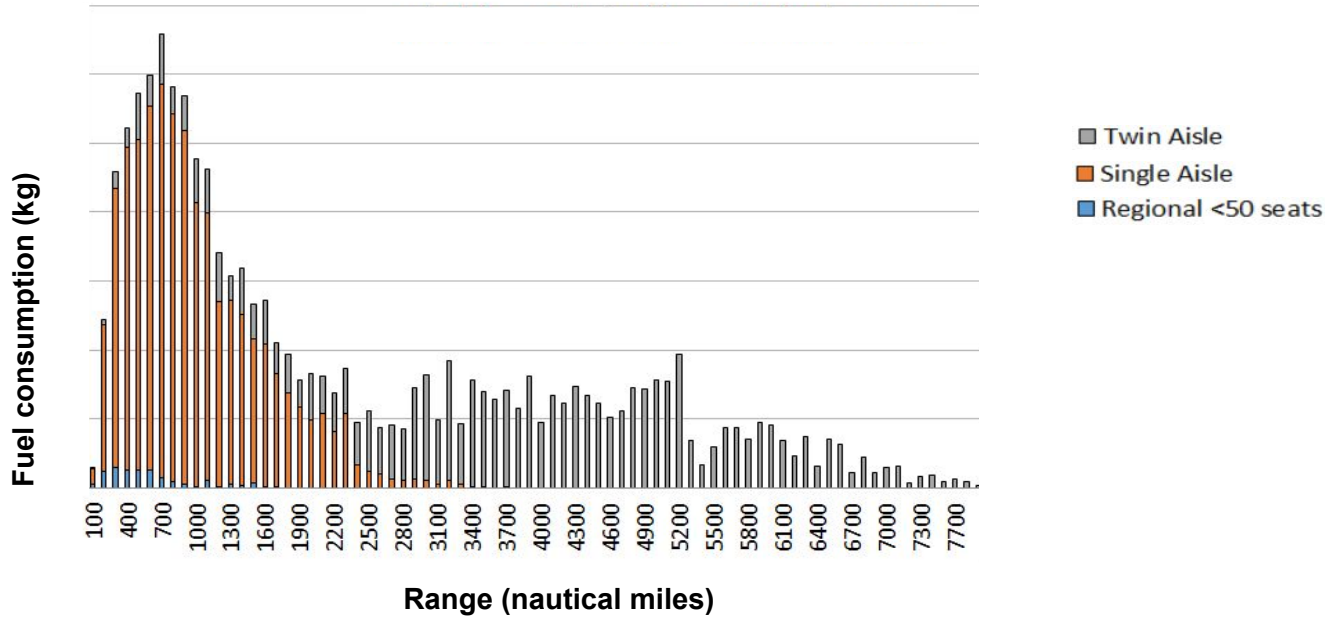
Aviation contributes 2.5% to global man-made CO₂ emissions



Source: International Energy Association and IPCC

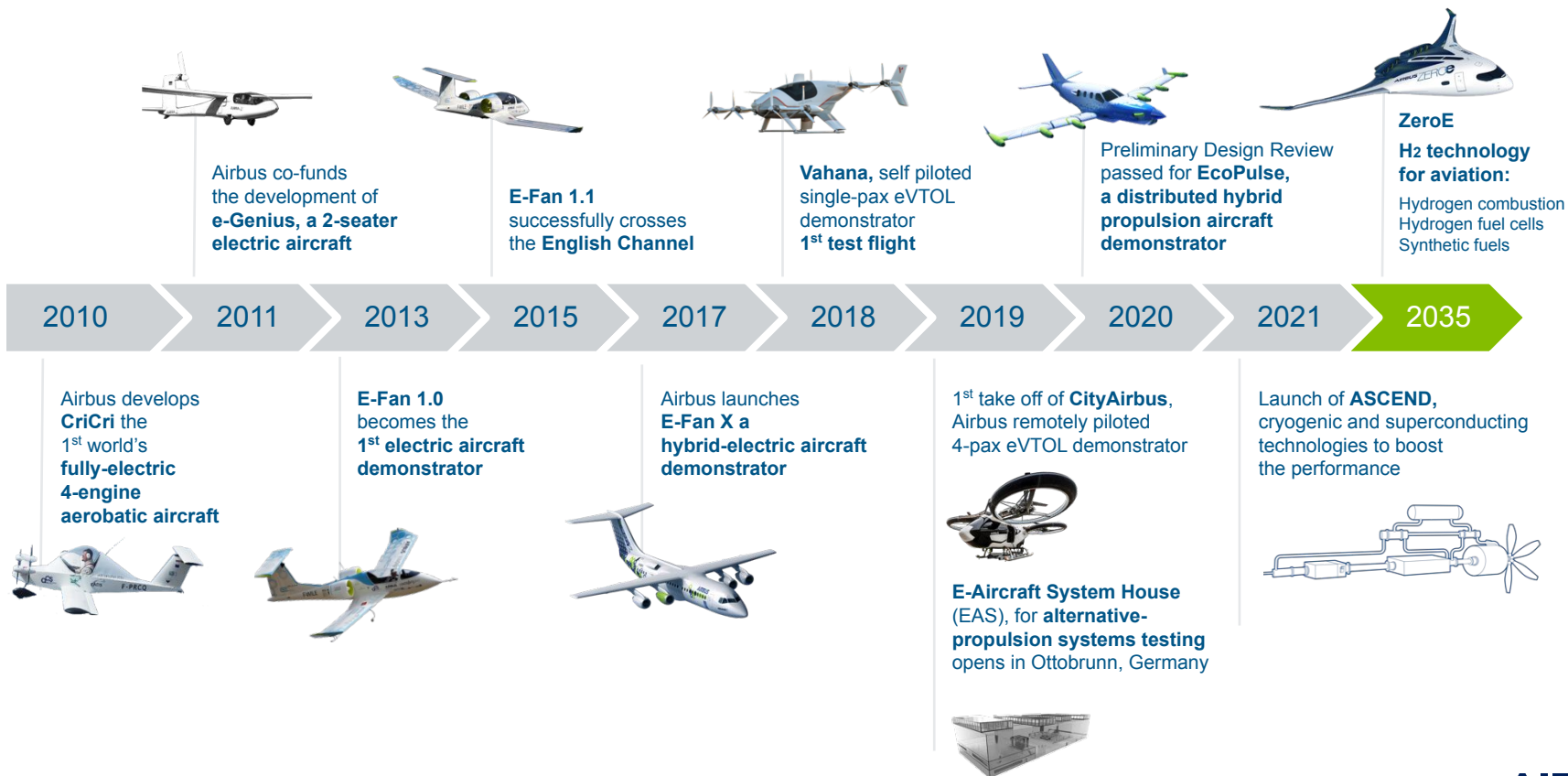
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ZEROe | Potential to reduce climate impact

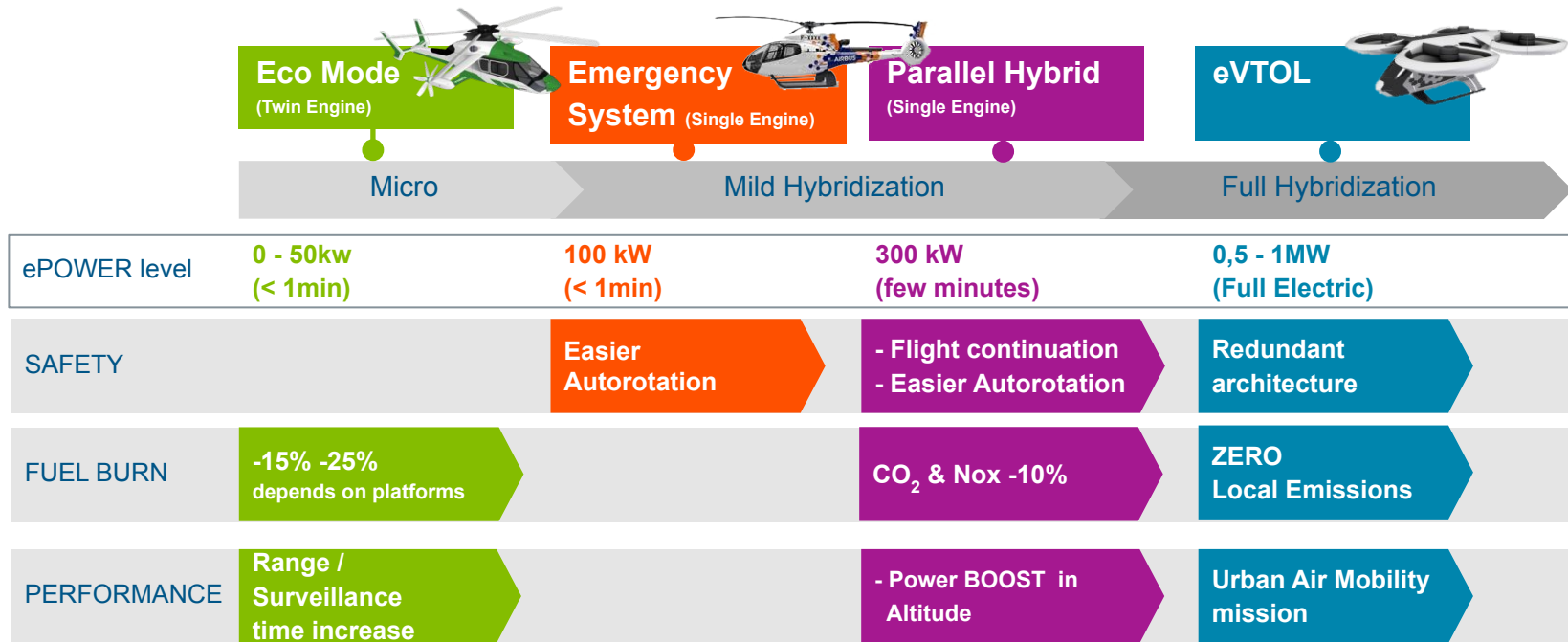


58% of 2019 global aviation fuel consumption was on flights below 2,000 Nm

Electrification | An exponential impetus of e-flight roadmap



Hybrid Helicopters | Hybridization functions and power levels



Micro-Hybridization Awareness | Operational Concept



A/C propulsion

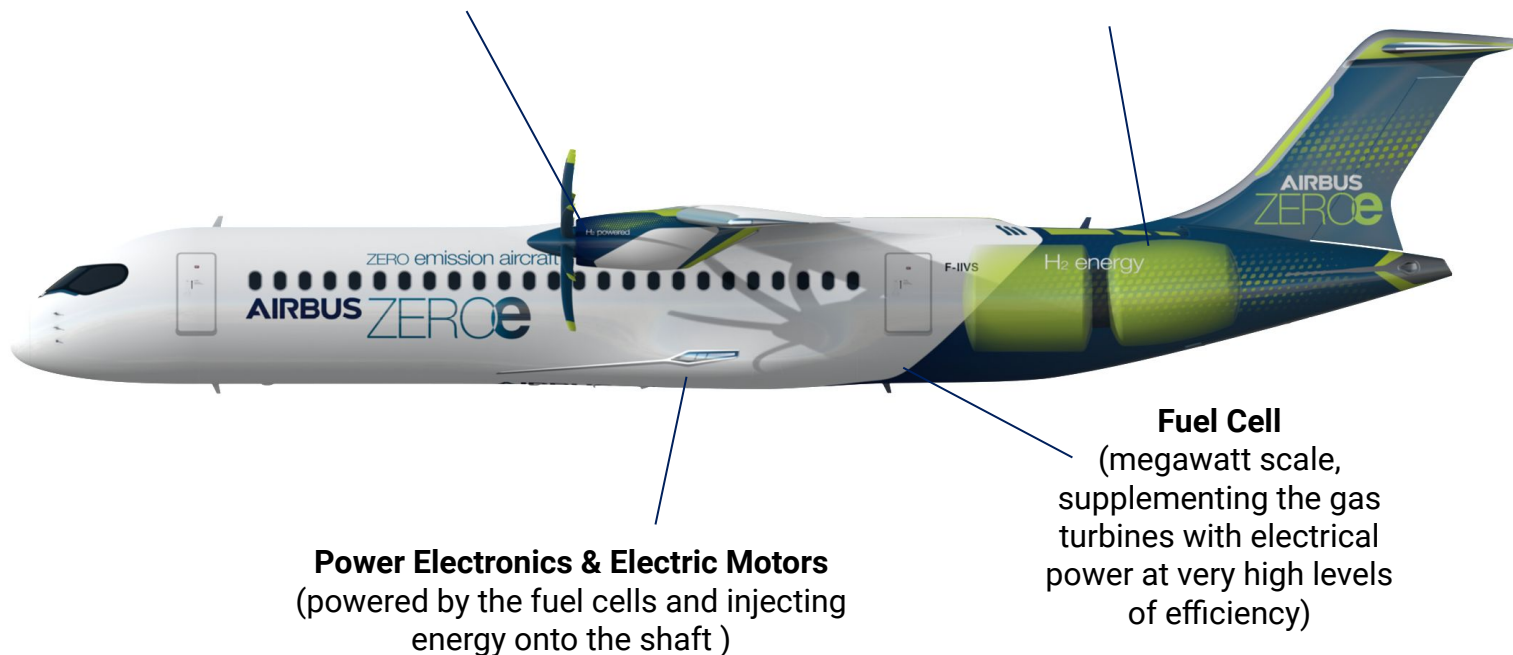


- Electrical power used transiently for acceleration or continuously to get additional thrust
- Electrical power issued from battery, APU, generators

ZEROe | Aircraft & Technologies

Hydrogen Powered Gas Turbines
(Gas turbines with modified combustion chamber, fuel injectors and fuel system)

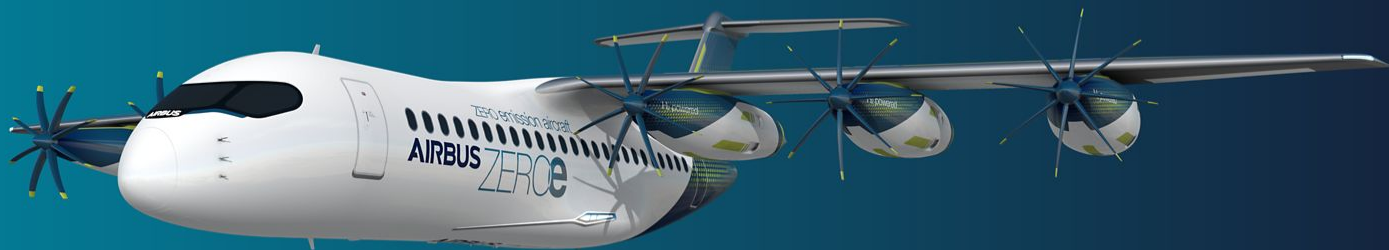
Liquid Hydrogen Storage
(in non-pressurised zone behind rear pressure bulkhead)



Power Electronics & Electric Motors
(powered by the fuel cells and injecting energy onto the shaft)

Fuel Cell
(megawatt scale, supplementing the gas turbines with electrical power at very high levels of efficiency)

ZEROe The “Pod” configuration



6 “pods”

that act as standalone turboprop motors



8-bladed propellers

made of composite materials



Distributed hydrogen

fuel cell propulsion system

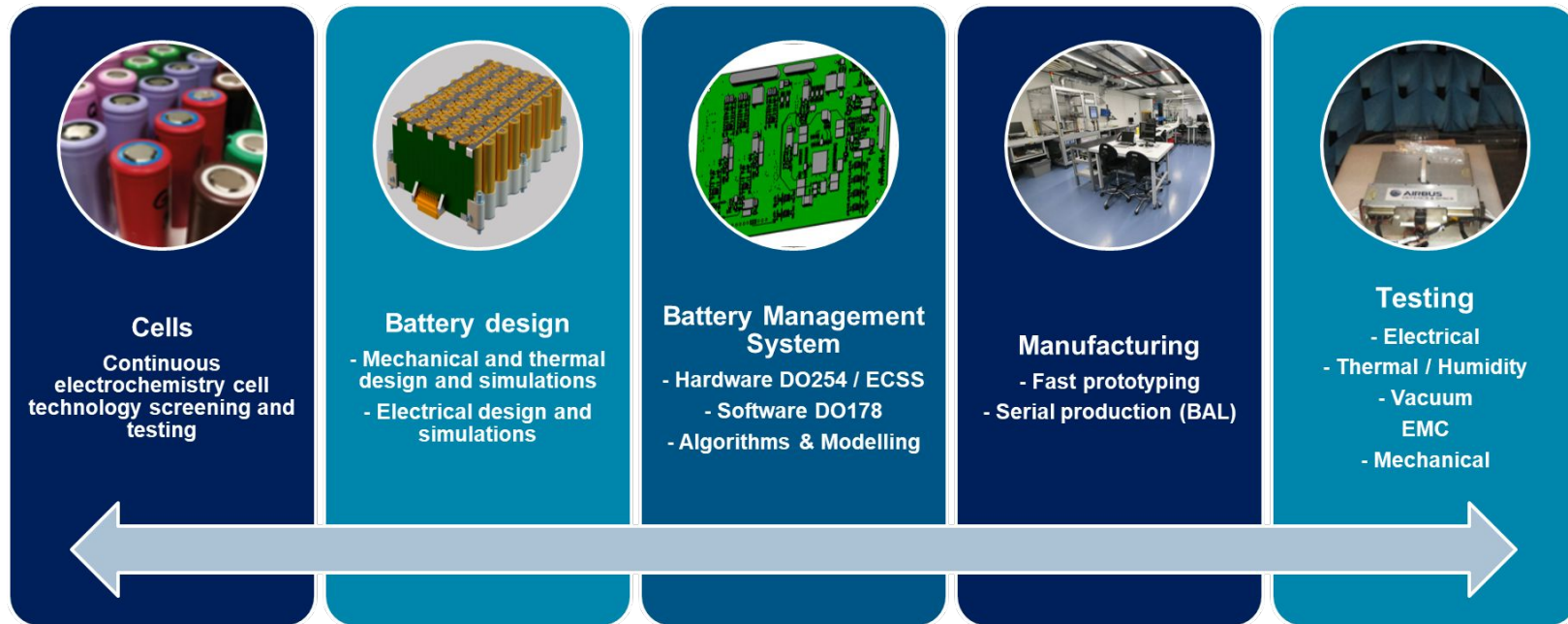


Removable fixtures

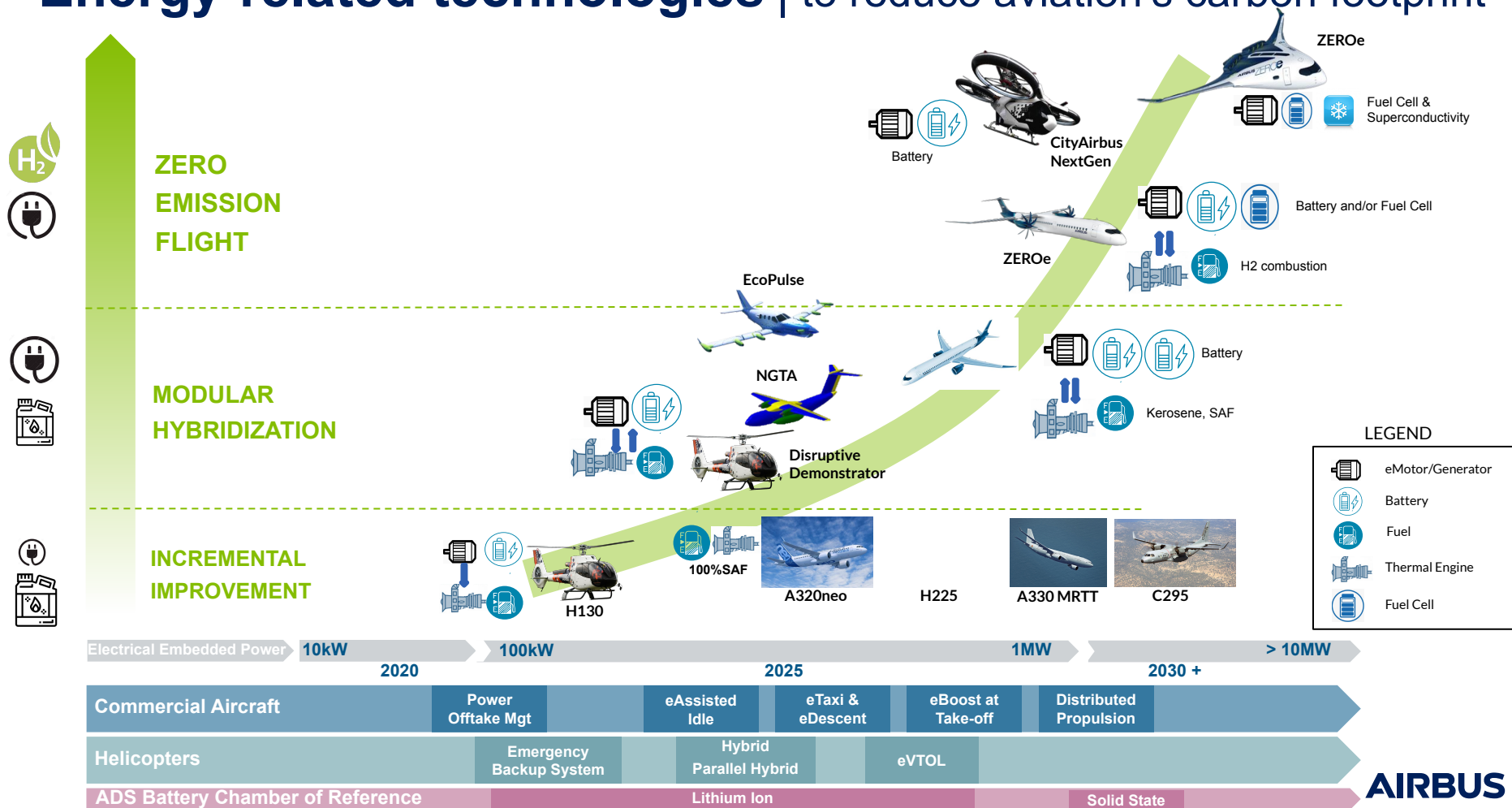
along wing for quick pod assembly
& disassembly

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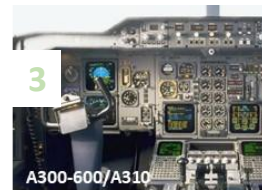
Electrification | Airbus Battery Chamber of Reference



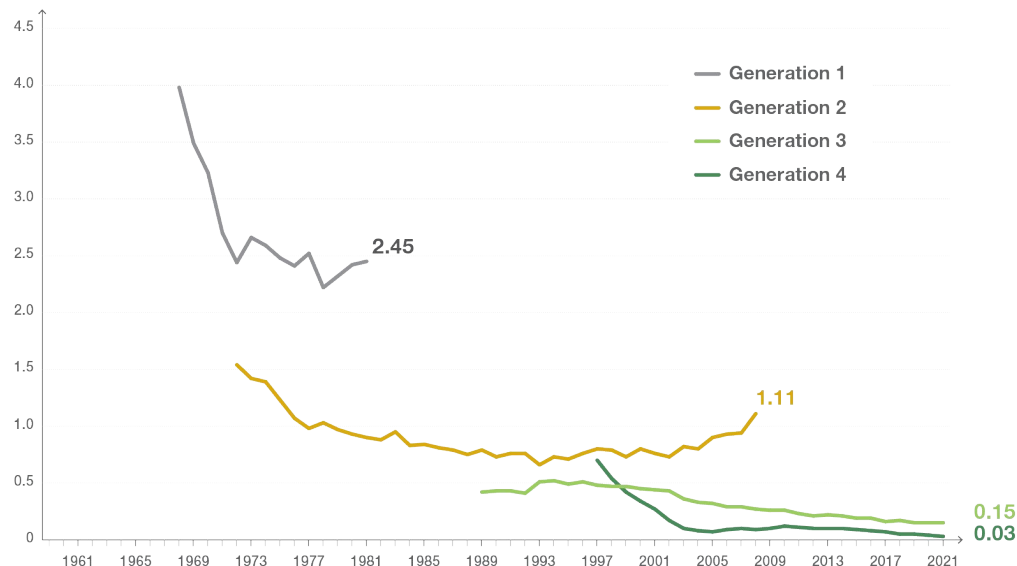
Energy-related technologies | to reduce aviation's carbon footprint



Continuous safety enhancement



10 year moving average fatal accident rate (per million flights) per aircraft generation



Innovation in technology
contributed to the
reduction of accident
rates

www.accidentstats.airbus.com

Continuous safety enhancement

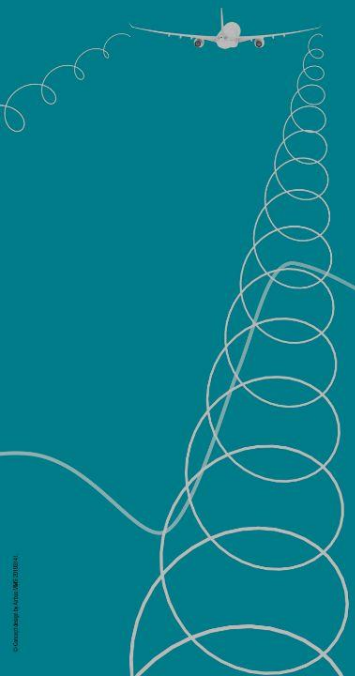


How to go even further?

TCAS: Traffic Collision Avoidance System

fello'fly

Wake energy retrieval demonstrator



Inspired by
the flight technique
of migrating birds



Using air upwash
to lift a follower aircraft



fello'fly project to prove
safe technical and
operational principles



Industry collaboration
with airlines, Air Traffic
Control providers
& regulators



5% to 10%
fuel savings
on long-haul trips

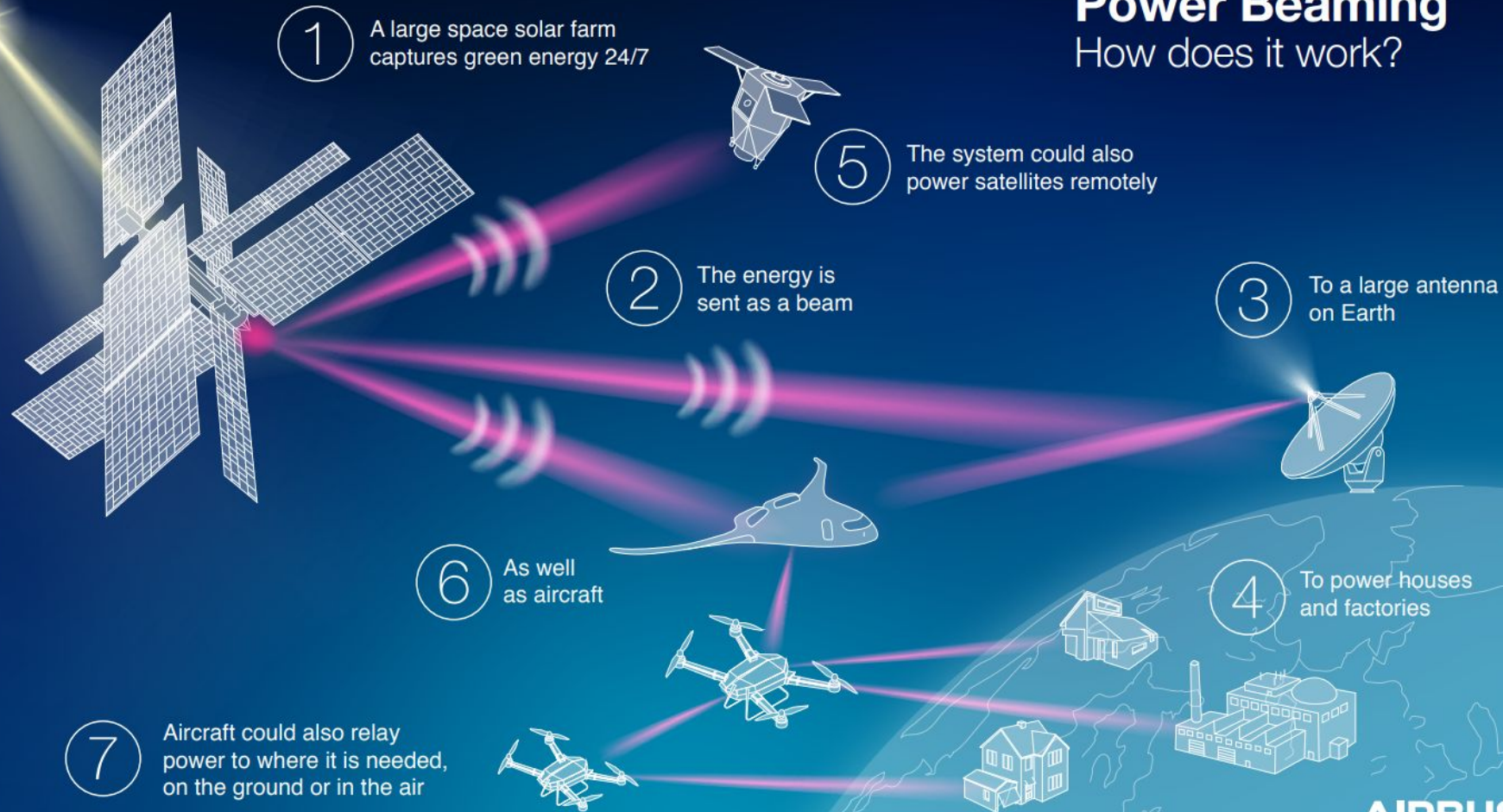


Significant
emissions reduction

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Power Beaming

How does it work?



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AIRBUS SUMMIT 2022

Gathering pace towards sustainable aerospace

30 Nov - 1 Dec 2022

#AirbusSummit

<https://www.airbus.com/en/airbus-summit>

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Grzegorz (Greg) Ombach
Head of Disruptive R&T ♦ Senior Vice
President ♦ at Airbus



Thank you

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