EIC: Mercado CO_2 en el transporte Aéreo
Infraestructuras

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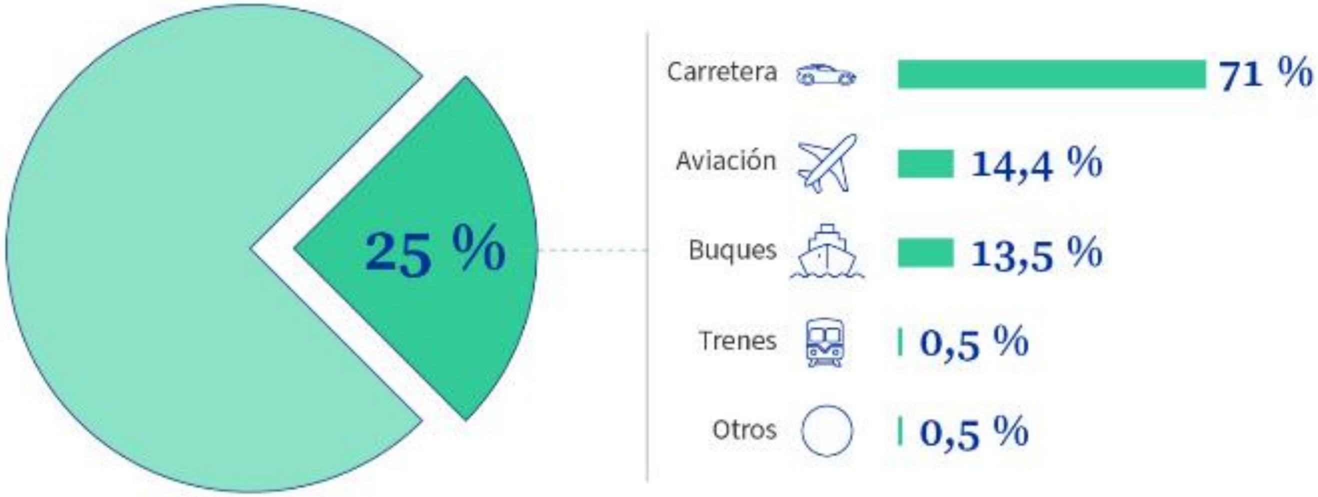
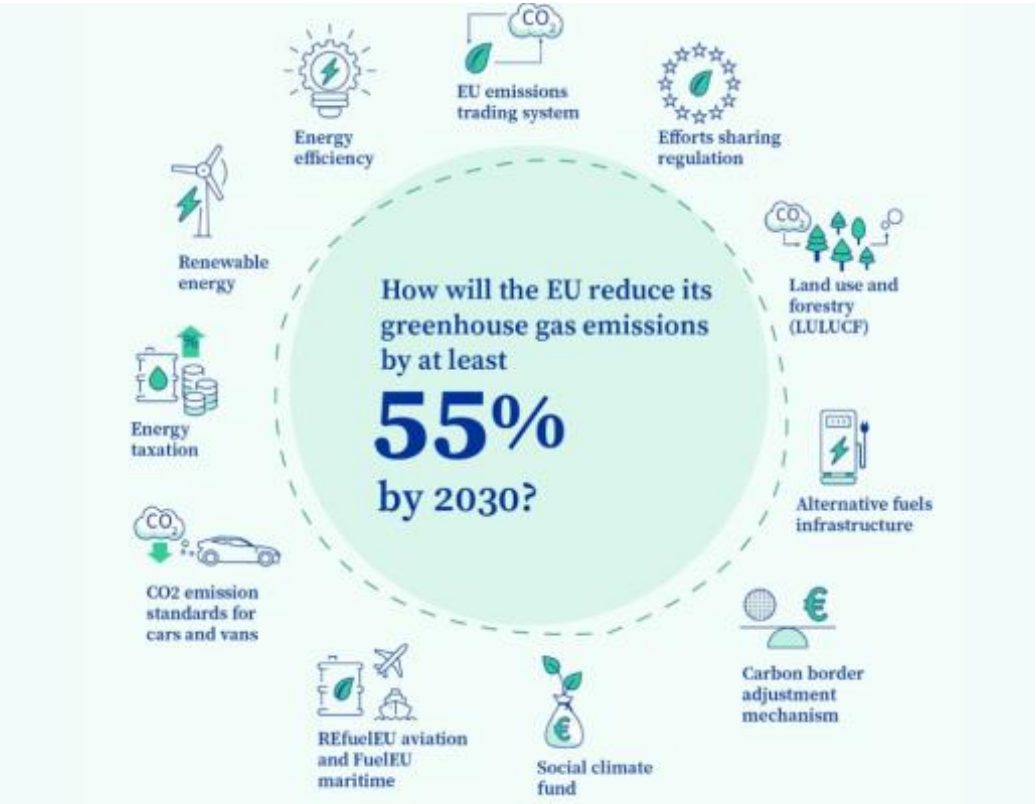
Barcelona 17 octubre 2024

Europe fit for 55

El **transporte** es responsable de casi el 25 % de las emisiones de gases de efecto invernadero en la UE.





Qué es el Reglamento sobre la Infraestructura para los Combustibles Alternativos

El objetivo del Reglamento es que haya una infraestructura suficiente para la recarga o repostaje de los turismos, los camiones, los buques y los aviones con combustibles alternativos (como el hidrógeno o el metano licuado) y que la cobertura en toda la Unión sea lo suficientemente buena como para evitar el miedo a la falta de autonomía.

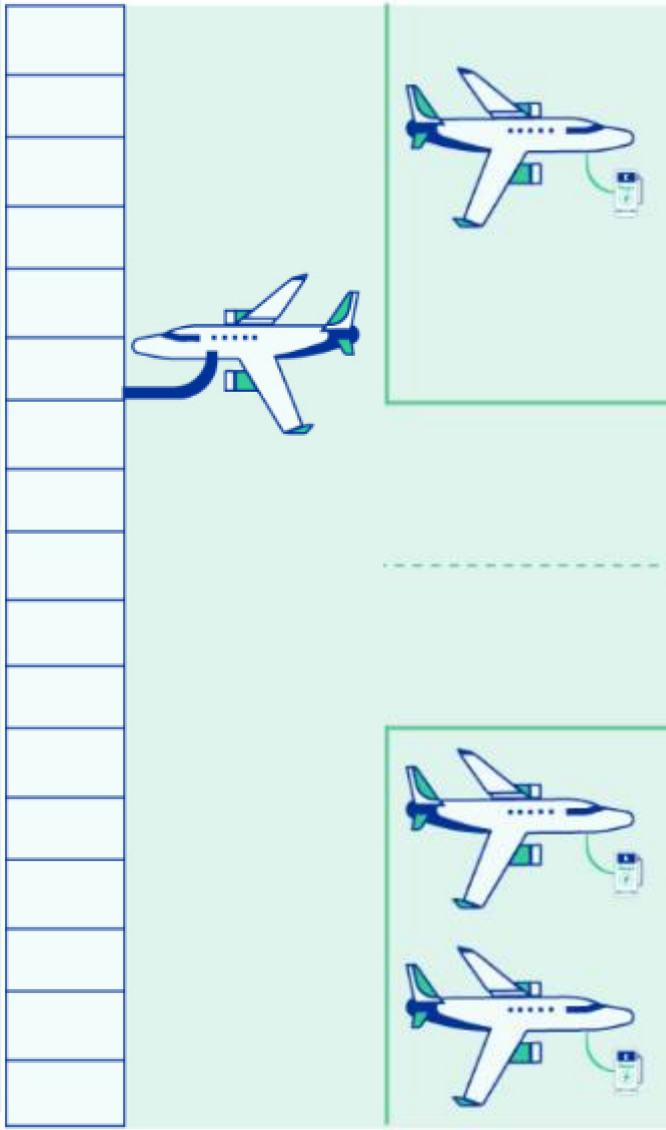
Aeropuertos

Suministro de electricidad para:

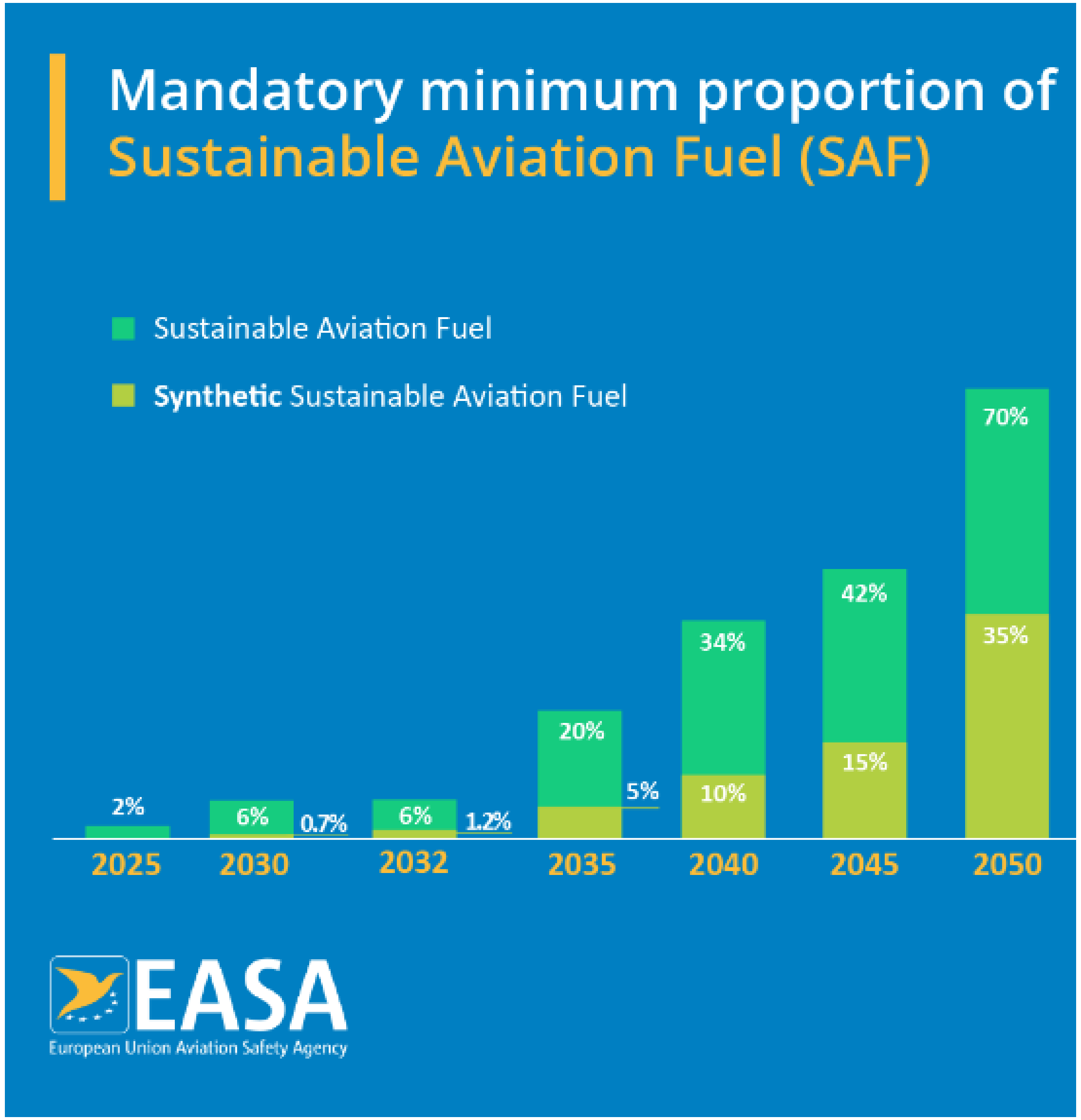
→ todos los puestos de aeronaves situados al lado de la terminal para 2025

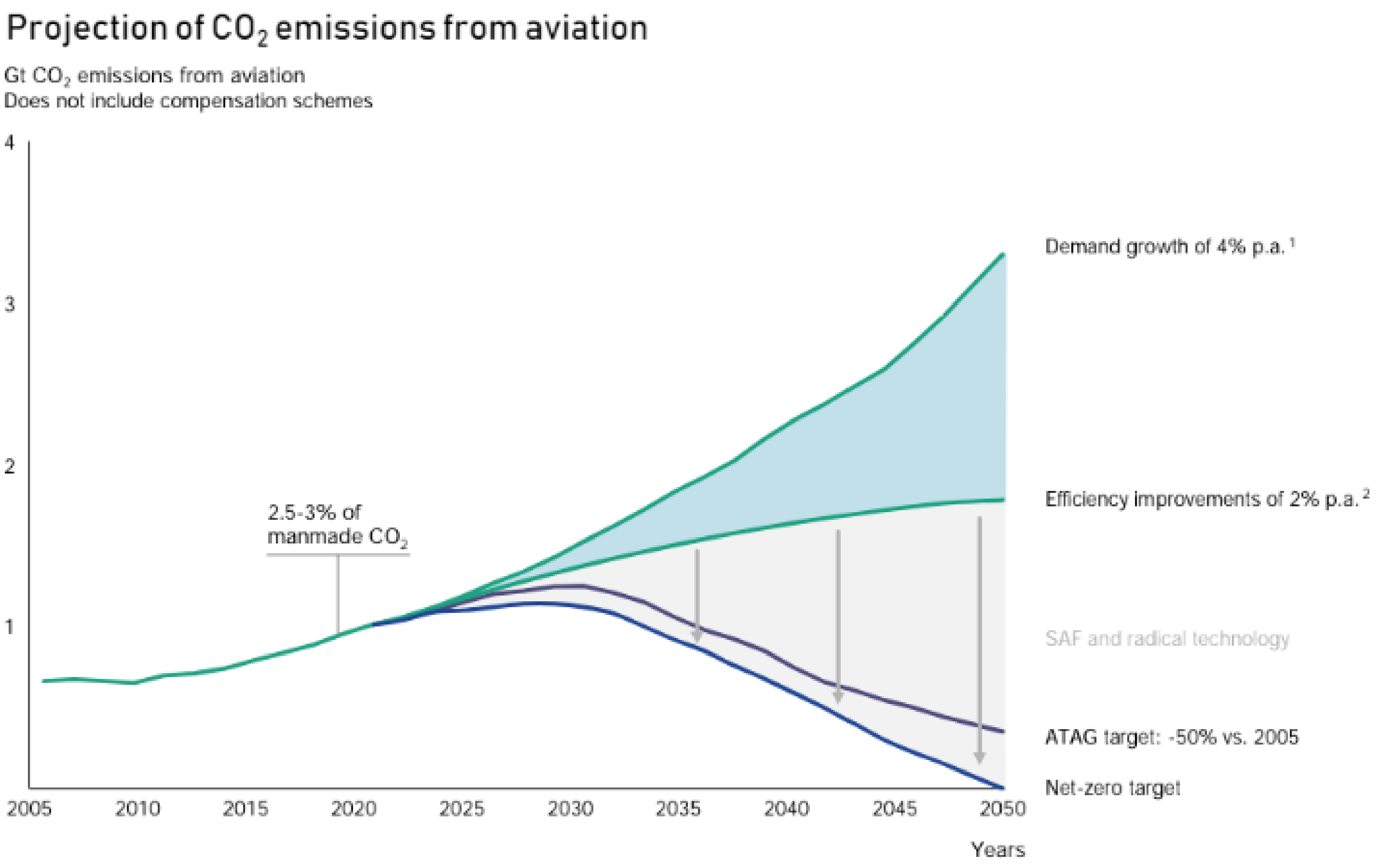
→ todos los puestos de estacionamiento de aeronaves para 2030

Podrán quedar exentos los puestos de estacionamiento de los aeropuertos que operen menos de 10 000 vuelos al año.



Objetivos de SAF

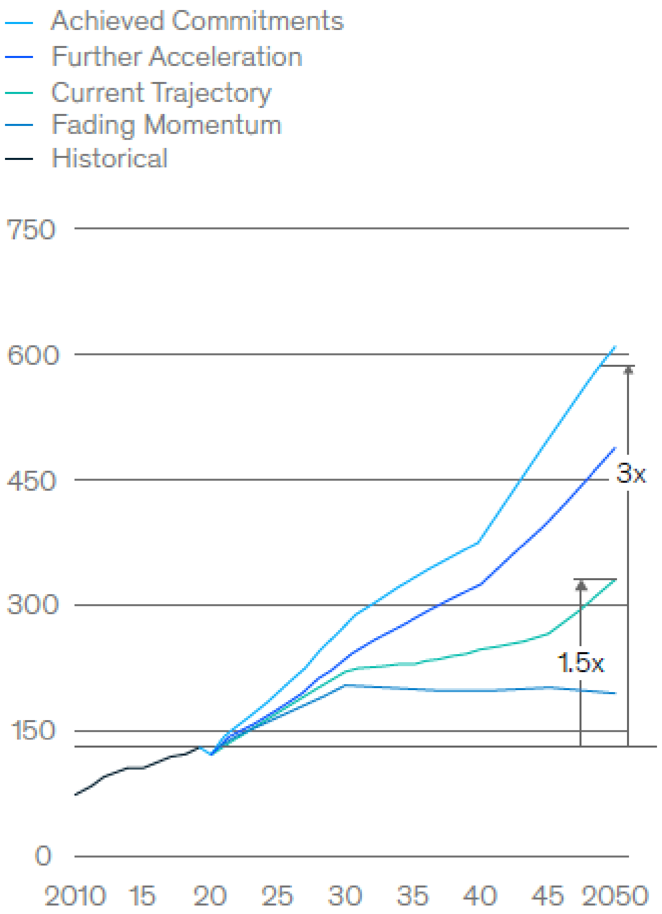




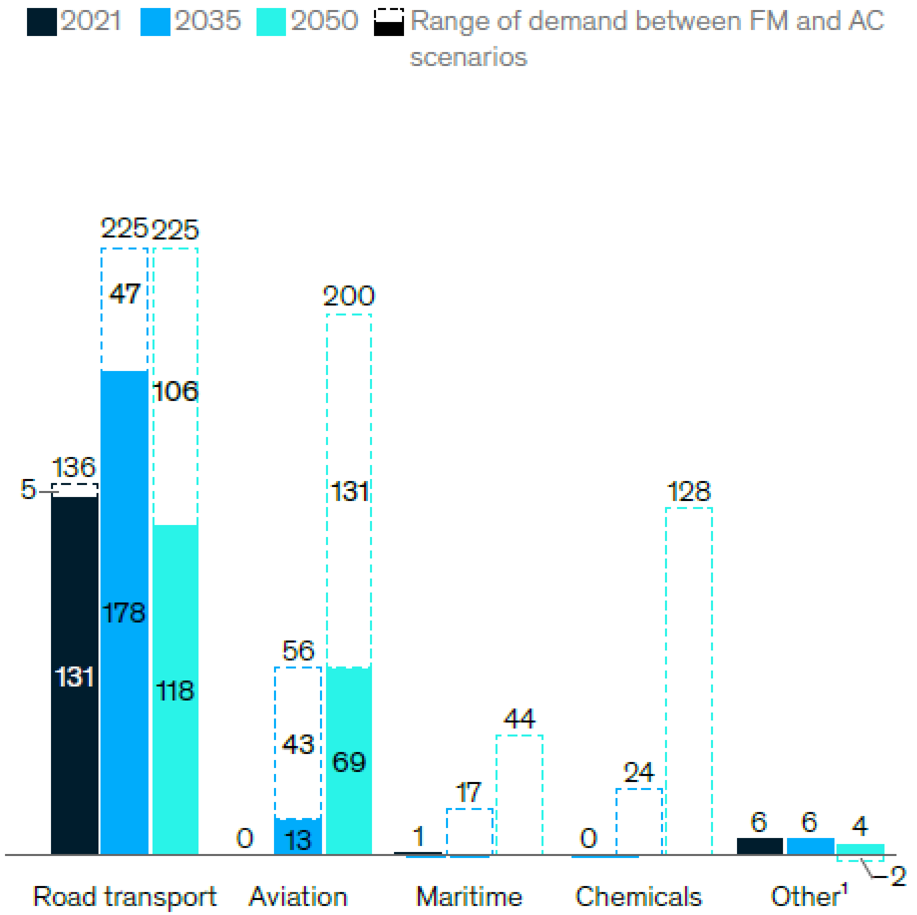
1. Assumption based on growth projections from ATAG, IATA, ICCT, WWF, UN
2. ICAO ambition incl. efficiency improvements in aircraft technology, operations and infrastructure

Proyección de demanda de combustibles sostenibles

Global sustainable fuels demand outlook by scenario, Mta

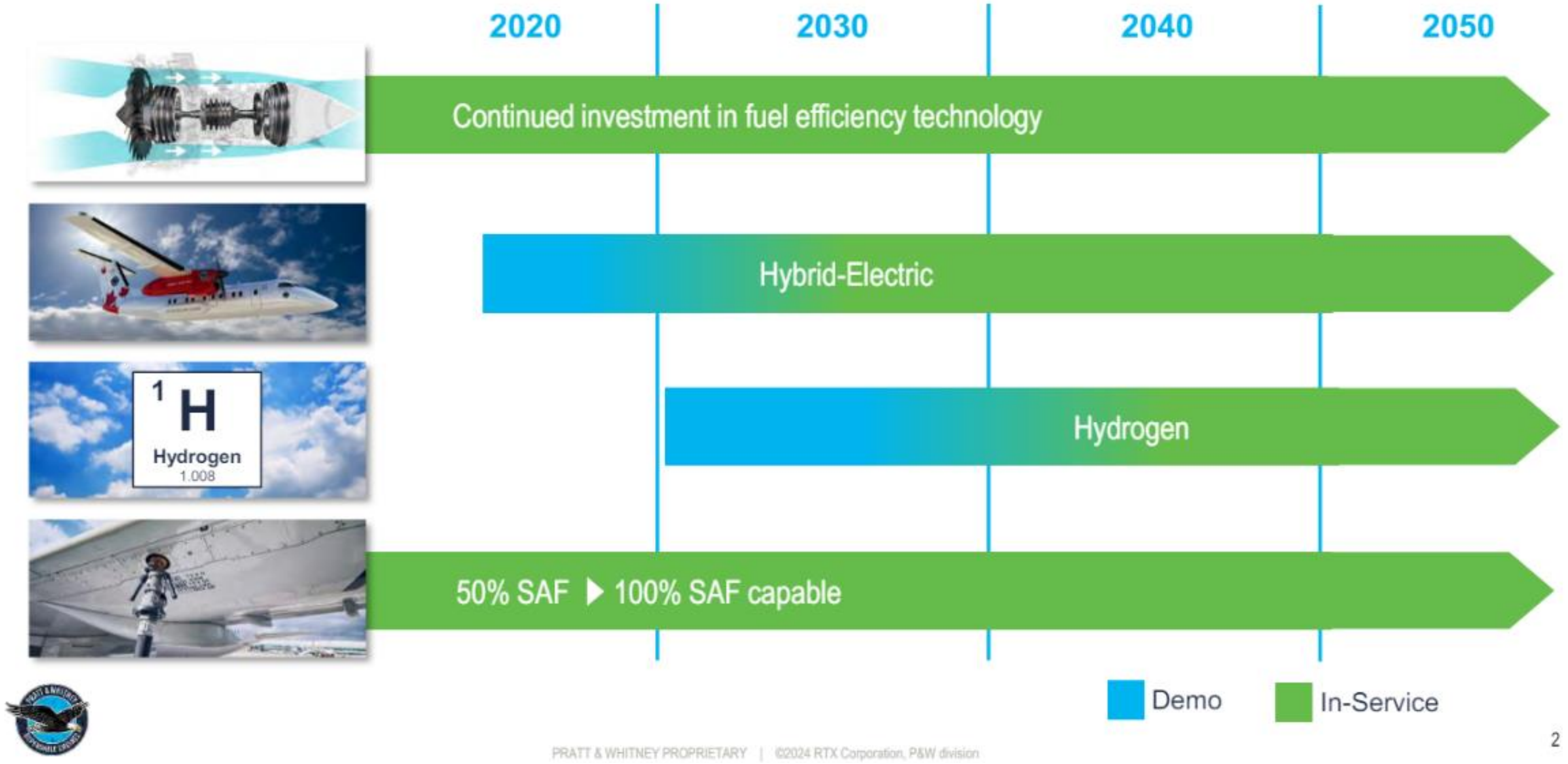


Global sustainable fuels demand by sector, Fading Momentum to Achieved Commitments scenarios, Mta



[1]Other includes iron and steel, other industry, buildings, and electricity generation.
Source: McKinsey Energy Solutions' Global Energy Perspective 2023; McKinsey Sustainable Fuels Model

Alternativas de descarbonización del sector aéreo (fuente: Pratt & Whitney)



SAF vs H2 (font: Cleansky2, Hydrogen-powered Aviation)

	H_2 fuel cell	H_2 turbine	Synfuel
Climate impact	75-90% reduction	50-75% reduction	30-60% reduction[1]
Aircraft design	Only feasible for commuter to short-range segment	Feasible for all segments except for flights >10,000km	Only minor changes
Aircraft operations	1-2x longer refueling times for up to short-range	2-3x longer refueling times for medium- and long-range	Same turnaround times
Airport infrastructure	LH_2 distribution and storage required		Existing infrastructure can be used
Fuel supply chain	1.7x energy[2] required for fuel production		4.6x energy[3] required for fuel production
Cost comparison between H_2 and synfuel	Lower for commuter to short-range aircraft	Lower for medium-, higher for short-range aircraft	Higher than H_2 aircraft for commuter - medium-range

1. CO_2 from direct air capture assumed
2. Assuming PEM electrolysis, compression, pipeline transport, liquefication, storage and distribution
3. Assuming PEM electrolysis, CO_2 direct air capture, synthesis, pipeline transport, and distribution

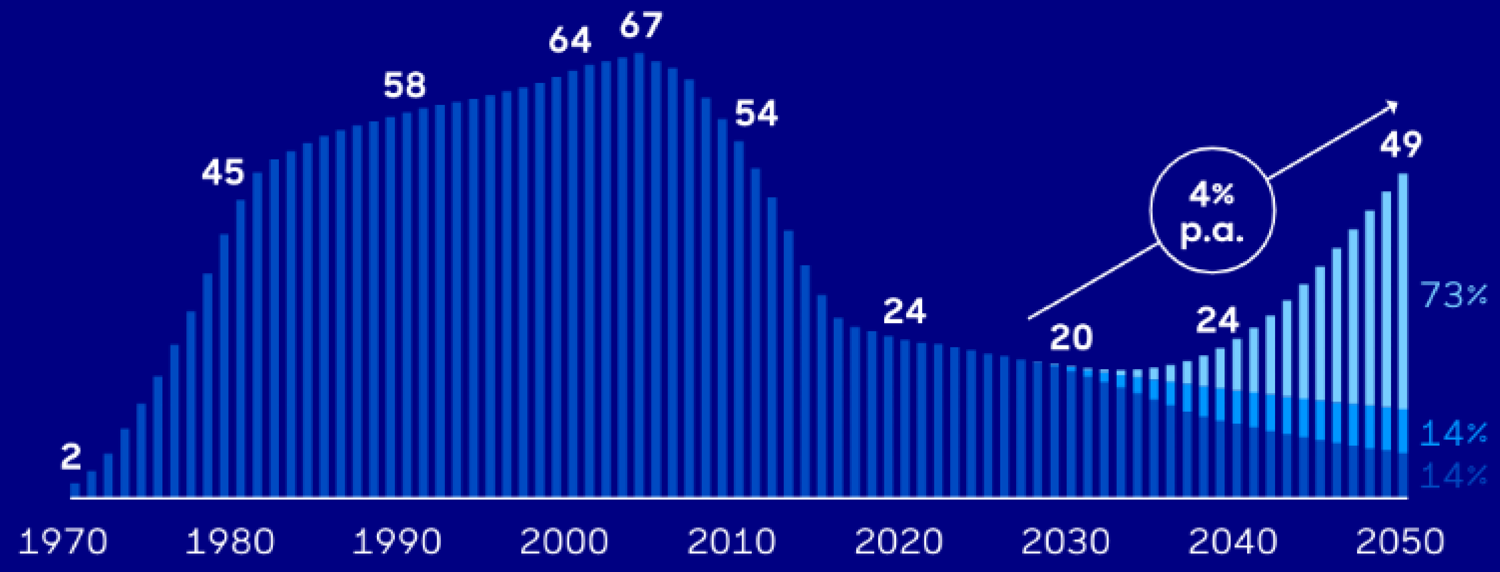
Segmentación de previsiones de mobilidad aérea verde (fuente: McKinsey)

	NOW & TOMORROW	2030	2040 & BEYOND
Urban 1–8 passengers Range up to 100 nm **Sub-regional** 9–19 passengers Range up to 500 nm	**Battery & Fuel Cell** Low-carbon, electric-powered urban air mobility vehicles such as those powered by batteries or hydrogen fuel cells offer potential to accelerate battery technology development. Battery performance currently limits passenger and range capability.	**Battery & Fuel Cell** Small electrified regional and sub-regional aircraft could be flying in this decade as battery capability improves. Life cycle CO_2 reduction will depend on renewable energy to charge batteries or create hydrogen.	**Hydrogen Fuel Cell** Fuel-cell powered air vehicles could start to penetrate the market in the regional and sub-regional segment. Abundant renewable energy and a widespread hydrogen economy will be required.
Regional 20–80 passengers Range up to 1,000 nm **Short & Long haul** Over 80 passengers Range over 1,000 nm	**Sustainable Aviation Fuels** Outside of operational efficiencies, drop-in SAF is the best available solution to reduce emissions from today's airliners and those that will be built in the coming decades. Currently, drop-in SAF is less than 1% of aviation fuel and high in cost. Innovation, supportive policies and public-private partnerships are crucial to help catalyze commercial-scale production and use.	**Hydrogen for SAF** Hydrogen is required to produce almost all SAF—and must be produced and scaled sustainably to improve life cycle emissions reductions. Over 96% of hydrogen produced today comes from fossil fuels—mostly natural gas.	**Hydrogen Combustion** Aircraft powered by turbine engines using liquid hydrogen fuel are feasible for regional, short-haul and long-haul aircraft. Liquid hydrogen requires over four times the volume of today's jet fuel for the same given energy and must be cooled to -253°C.

La nova aviació regional (font: Roland Berger)

Installed fleet of 5-9 and 10-19 seater aircraft

Installed fleet, base case, 1970-2050 [# k]



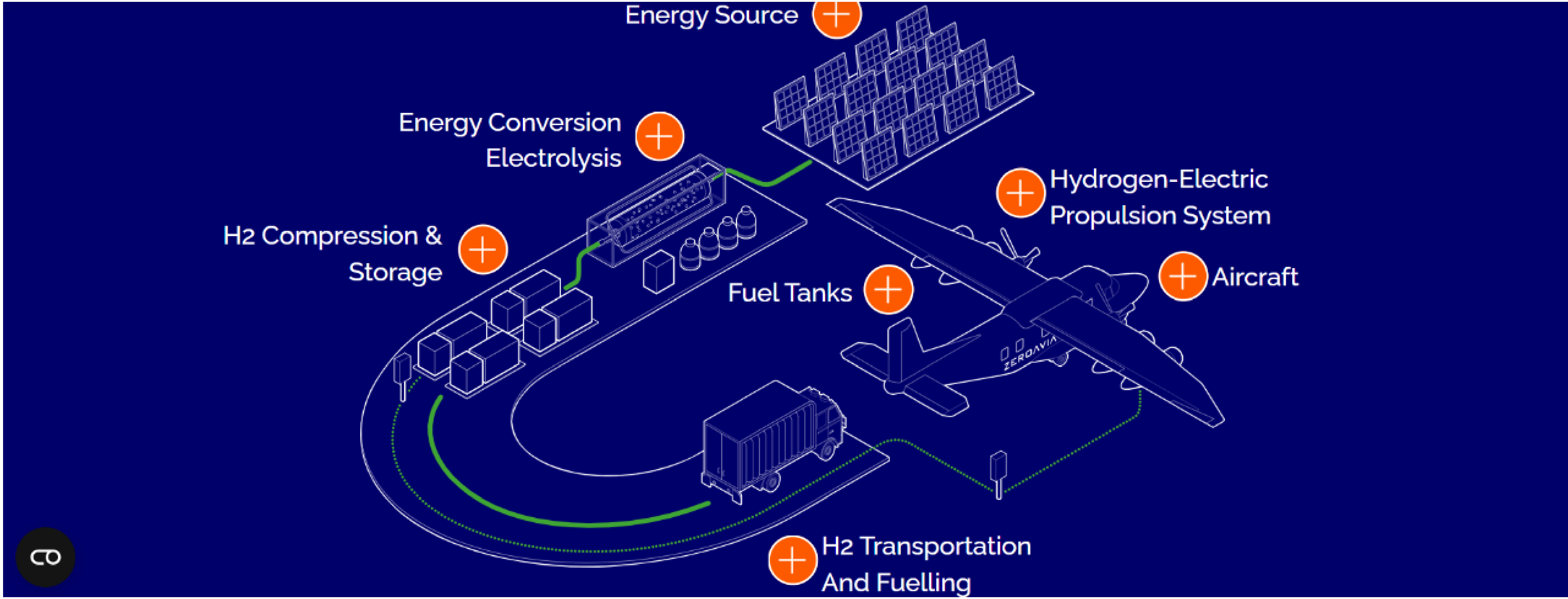
5-19 seater aircraft market has been declining in the past, but new use cases as well as aircraft concepts and propulsion technologies will bring back growth

Zeroavia


2025
10-20 seats
300 NM range
ZA600
2027
40-80 seats
700 NM range
ZA2000
2029
100-200 seats
2,000 NM range
ZA2000RJ
2032
200 seats
3,000 NM range
2040
200+ seats
5,000 NM range

Airbus zeroe

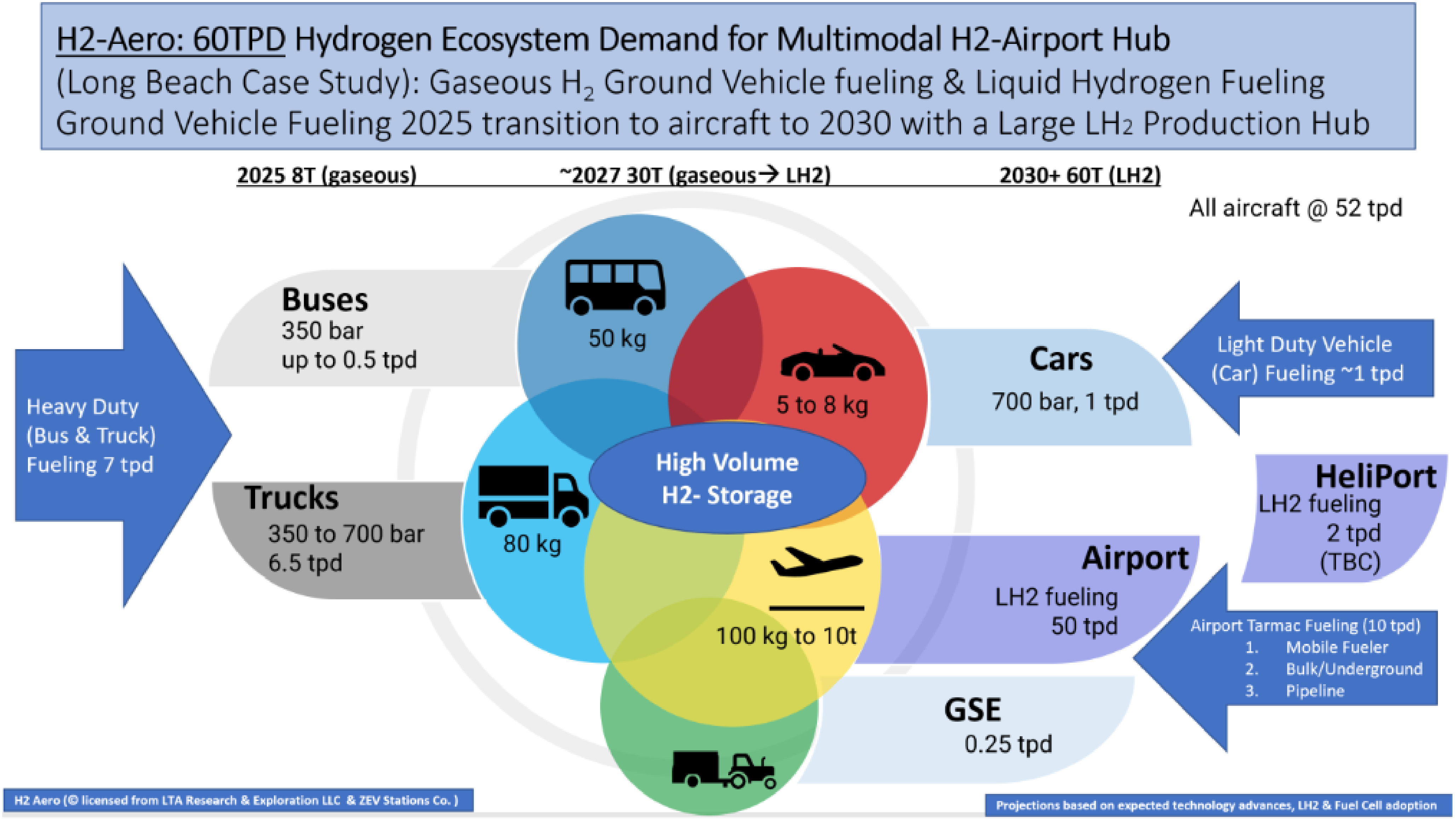
Aeropuertos: nuevos hubs de energia verde (fuente: zeroavia)



Aeropuertos: nuevos hubs de energia verde (Fuente: ZEV Station)

H_2-Aero Vision: Multimodal H_2-Airport Hub @ Scale for Ground & Aircraft (GH_2/LH_2)

Aeropuertos: nuevos hubs de energia verde (fuente: LTA Technologies, ZEV Station)



- Ausencia de marco regulatorio

Posibilidad de aplicación de estándares de otros sectores

- Ausencia de offtakers para conseguir retoros a la inversión

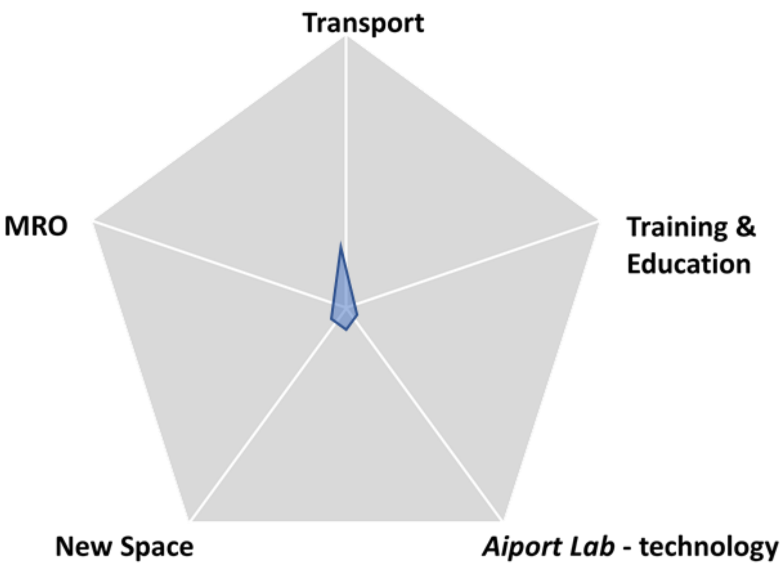
Desarrollo de modelos que incentiven el consumo frente a la inversión

- Necesidad de infraestructuras “piloto”

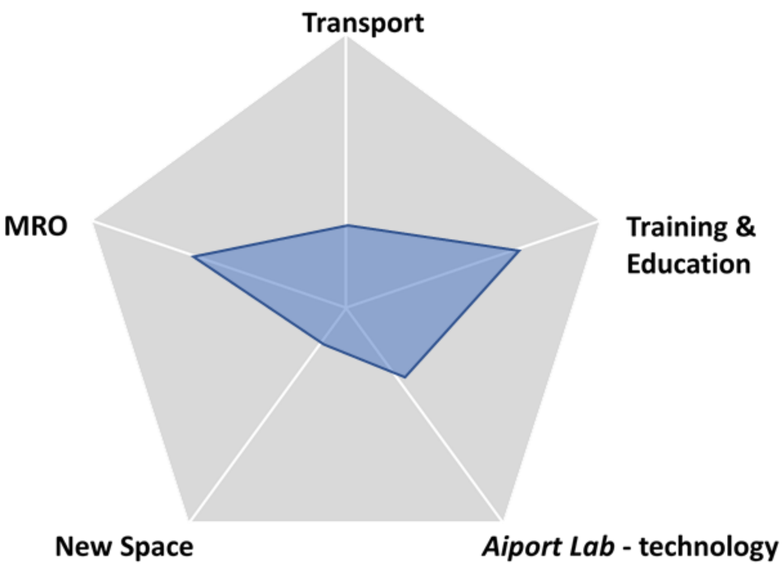
Oportunidad para aeropuertos regionales

Lleida-Alguaire airport – estrategia

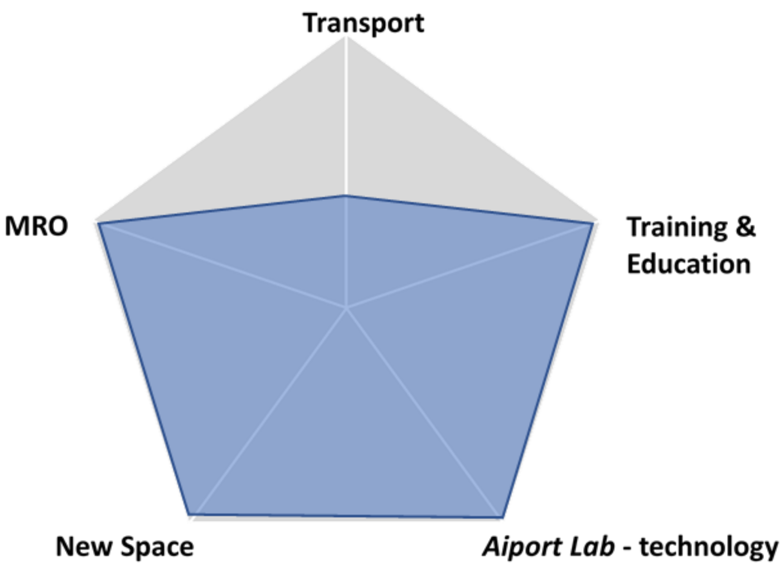
2010



now



2030

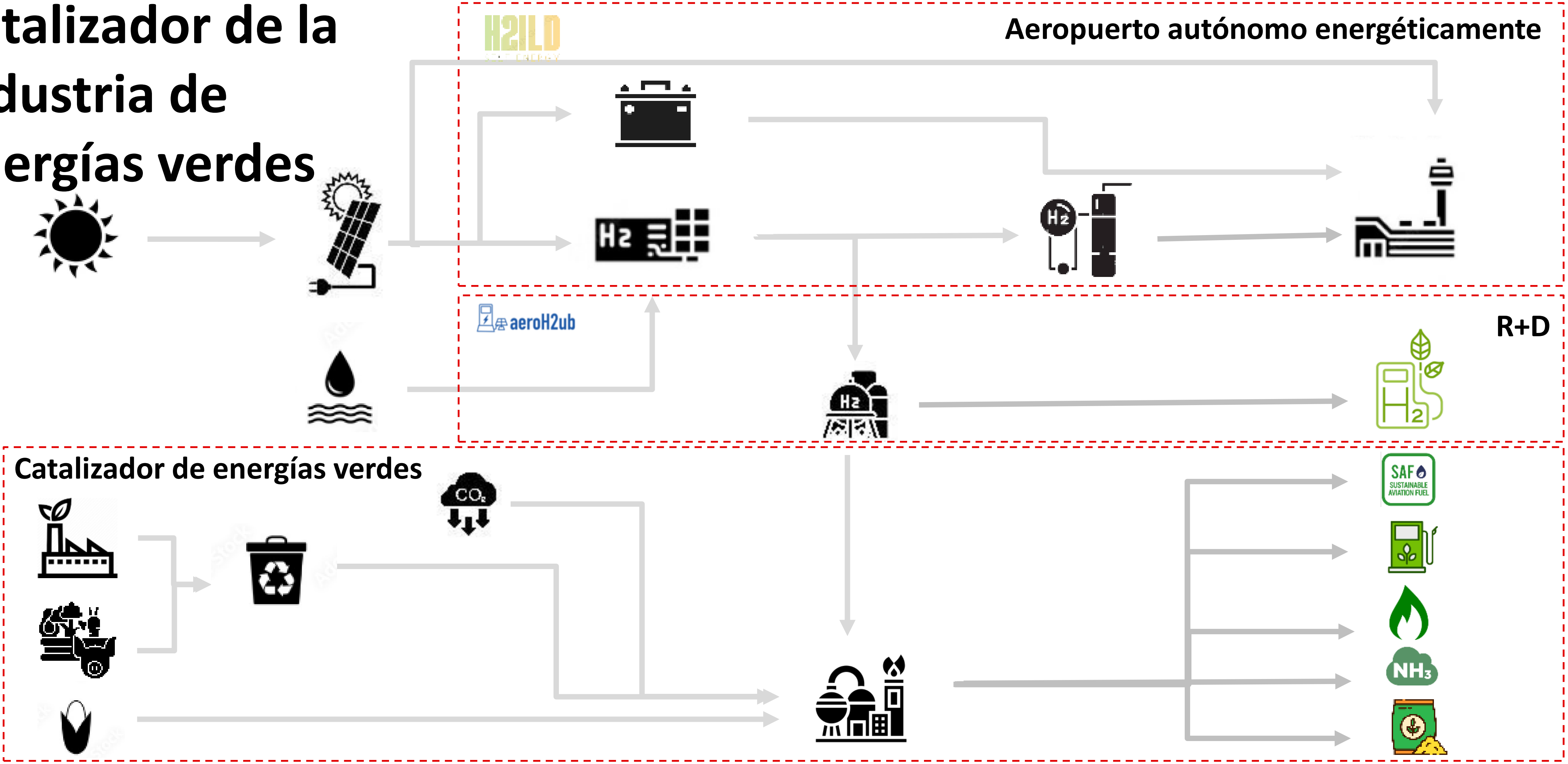


Lleida-Alguaire

Lleida-Alguaire

El hub de energia verde en Lleida-Alguaire: un proyecto escalable

Catalizador de la industria de energías verdes



aeroH2ub a Lleida-Alguaire

Key data
- Production of green H2 from existing solar plant.
- 0,3 MWh solar plant.
- 100kwh – 200kwh Hydrolyser.
- Hydrogen station.
- H2 Retrofitting of handling equipment and airport ground vehicles.
- H2 powered logistics drone.
- Ground vehicles and handling equipment testing bench.
- Drone testing bench.
- Test bench and labs developed by technological institutes.

Budget
- Total: 3,2 MEUR.
- Nextgen financing: 1,8 MEUR.

Calendar
- Start of the project: May 2023.
- Start of H2 production: July 2024.

Consortium

Aeroports de Catalunya

ALDDRATECH

EVARM

aeroH2ub

With the support of

UPC

UNIVERSITAT ROVIRA i VIRGILI

VALL DE L'HIDROGEN CATALUNYA

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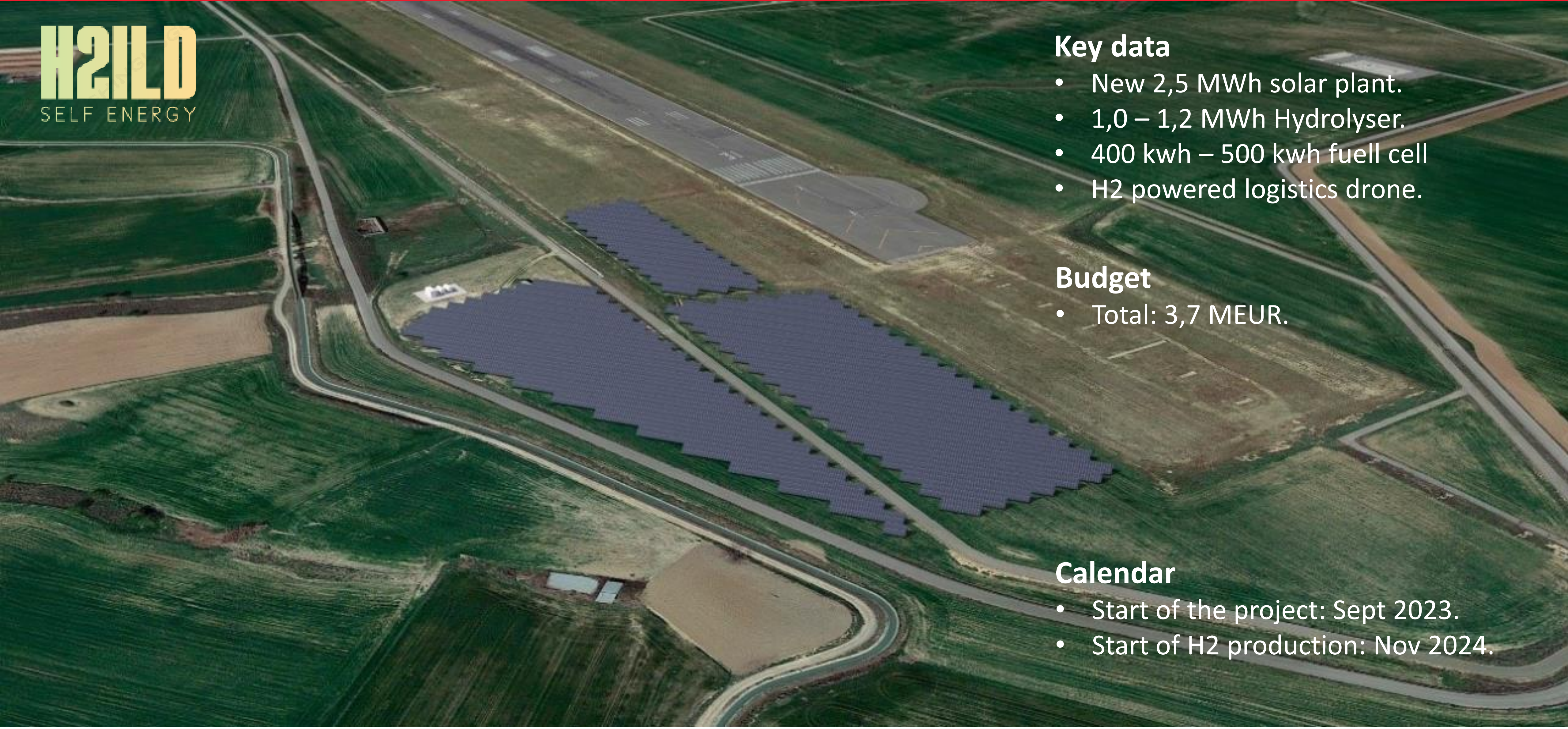
Financed by

Generalitat de Catalunya

IDAE

Plan de Recuperación, Transformación y Resiliencia

Scaling up – Stage 2 – H2ILD



H2ILD
SELF ENERGY

Key data

- New 2,5 MWh solar plant.
- 1,0 – 1,2 MWh Hydrolyser.
- 400 kwh – 500 kwh fuell cell
- H2 powered logistics drone.

Budget

- Total: 3,7 MEUR.

Calendar

- Start of the project: Sept 2023.
- Start of H2 production: Nov 2024.

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