



Funding net-zero aviation technology

A dialogue about

Finance & Innovation for low carbon aviation



Skyfinity Mission

Catalysing effective development and implementation of sustainable aviation



Agenda

Case studies Innovation & adoption

1. Early-stage VC (funding for 115 sustainable aviation start-ups)
2. Project finance (SAF trends)

Key takeaways

- EU's strong innovation potential lacks alignment between funding sources
- Risk / return balance for SAF scale-up hampered by uncertainty (market, technology, regulatory, feedstock availability, and more).

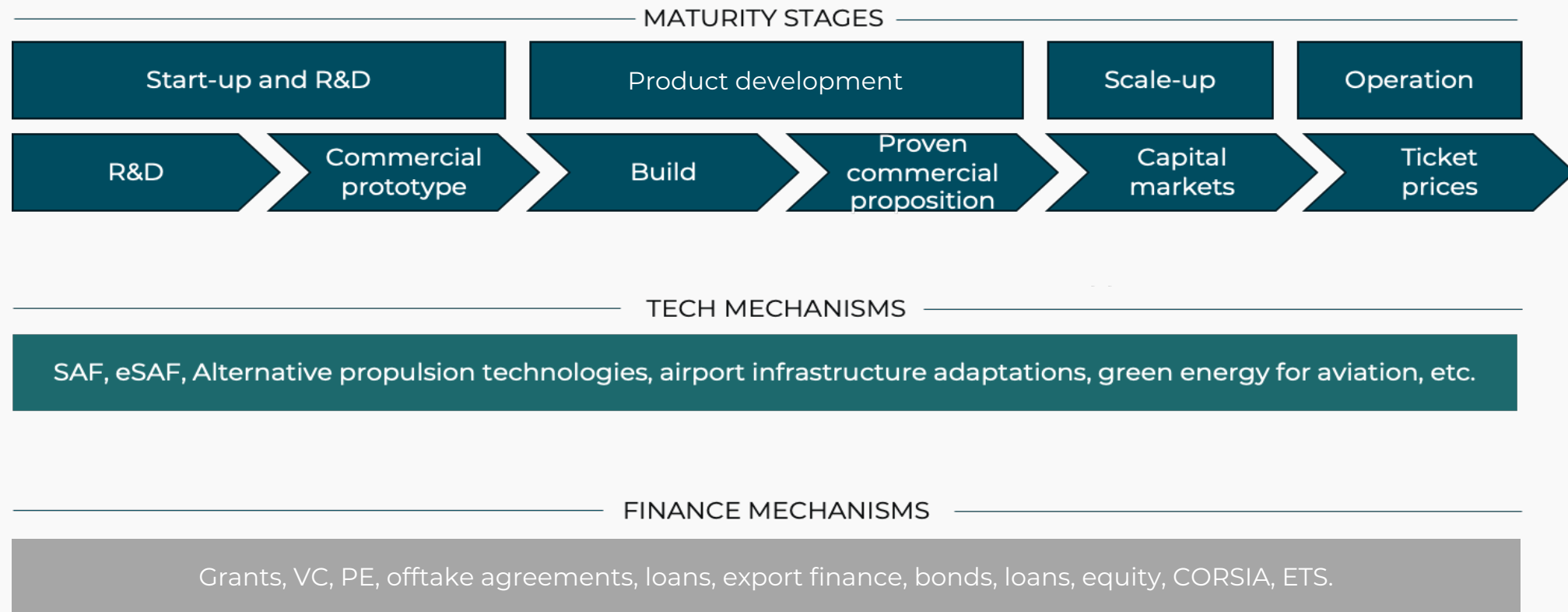


Case study

Early-stage funding for start-ups in aviation

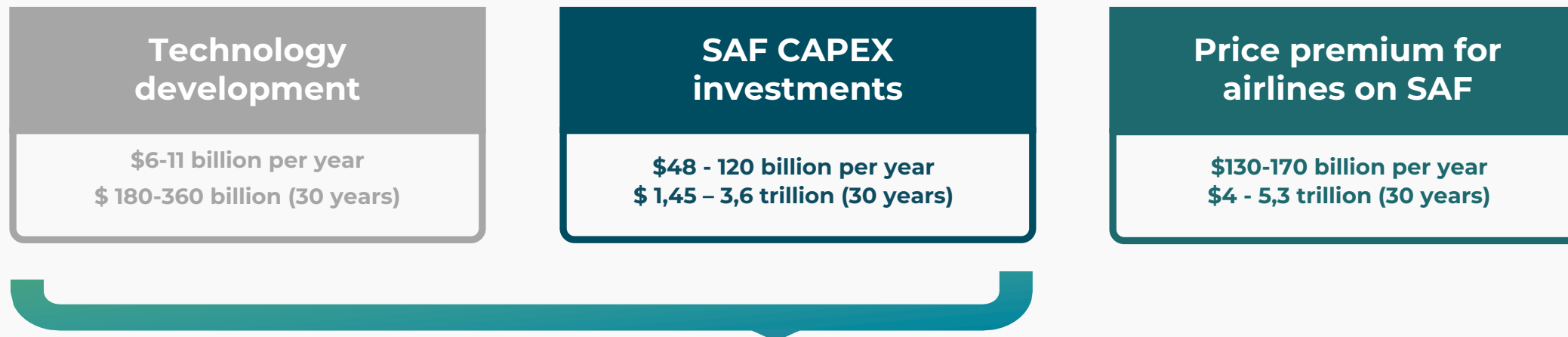


Aviation finance structure





Estimated \$4 trillion for net zero 2050



Development and Scale-up by:

Research
institutes

Start-ups

(Consortiums)
Established
parties

Case study of Start-ups with sustainable aviation focus



Aircraft Technologies (electric, hybrid, hydrogen)



Fuel Technologies (SAF, hydrogen)



Multi-industry Technologies



Infrastructure / Operations

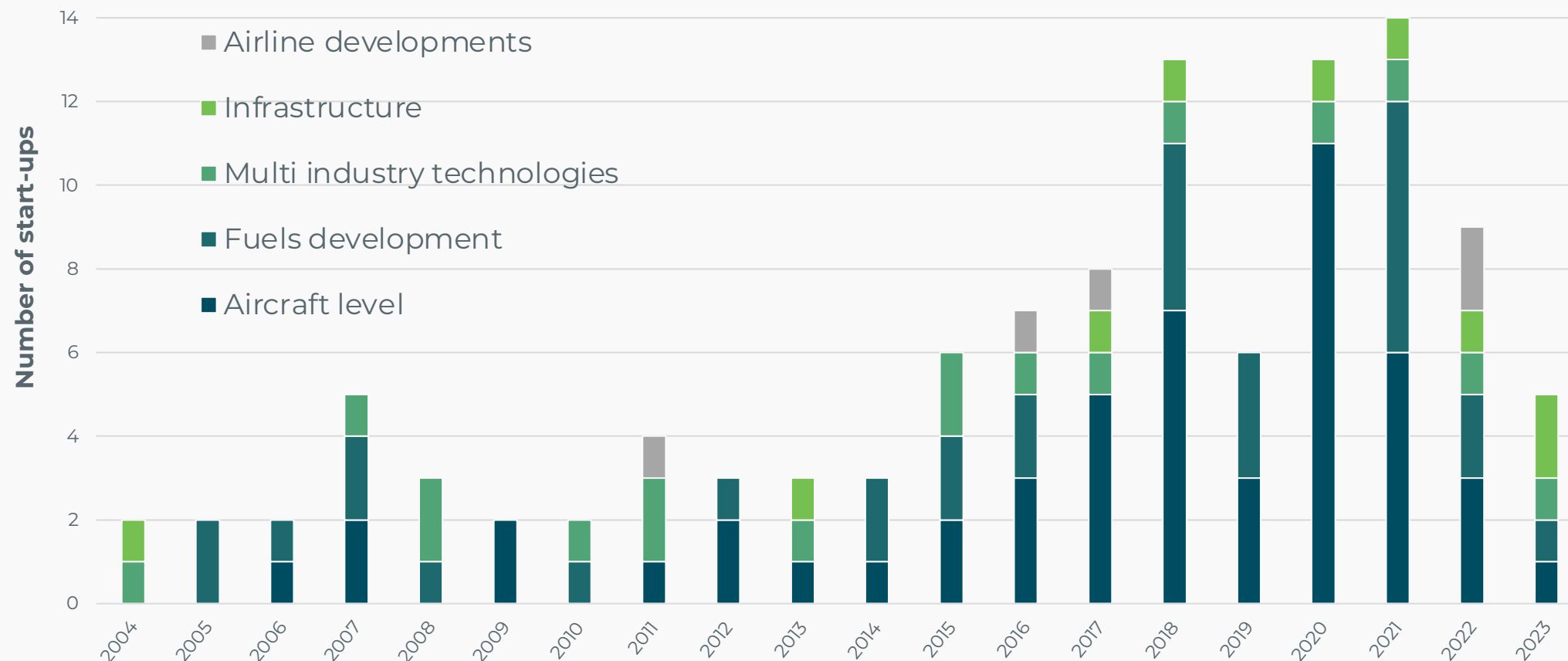


Zero-emission Airlines





Sustainability paradigm attracts start-ups



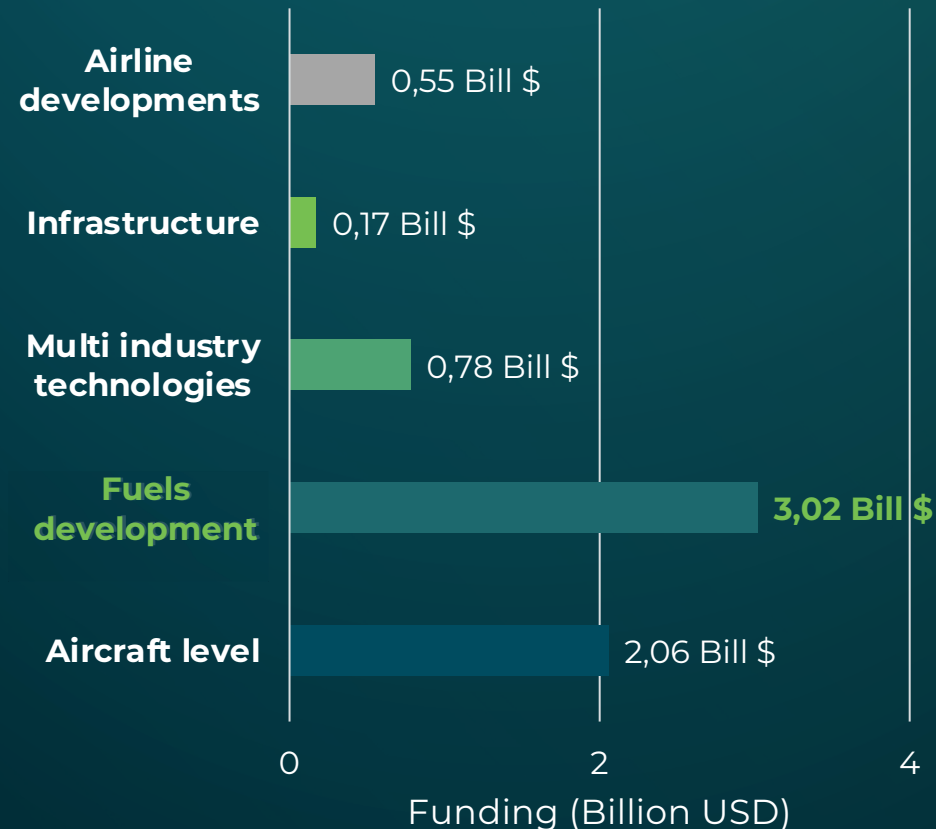
Start-ups take some time before they receive attention, the lower number in 2023 is therefore not a trend change but shows a visibility bias.
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SAF attracts most funding

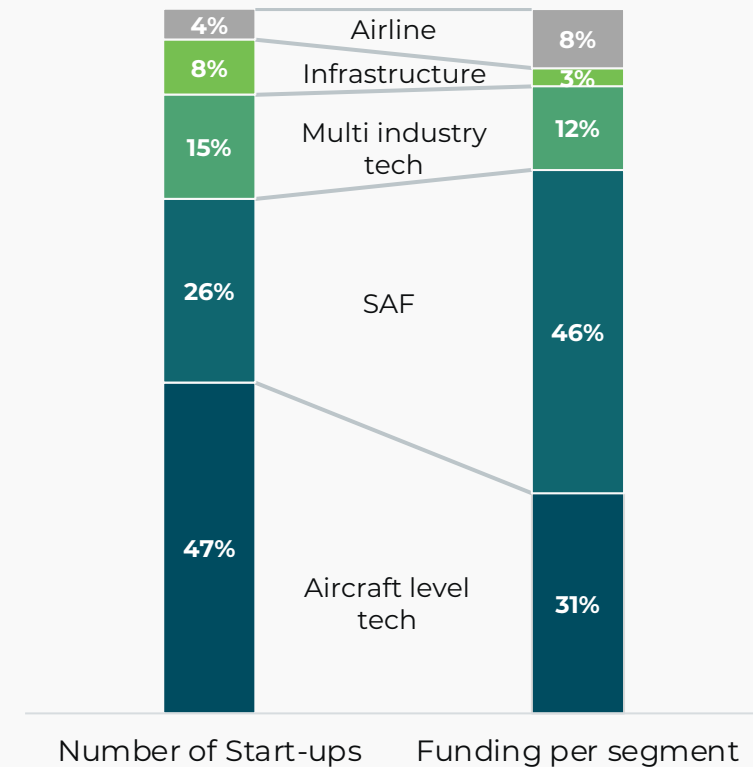
Yet, most start-ups are developing novel aircraft tech



Sum of funding (2004-2023)



Percentage of start-ups & funding per segment



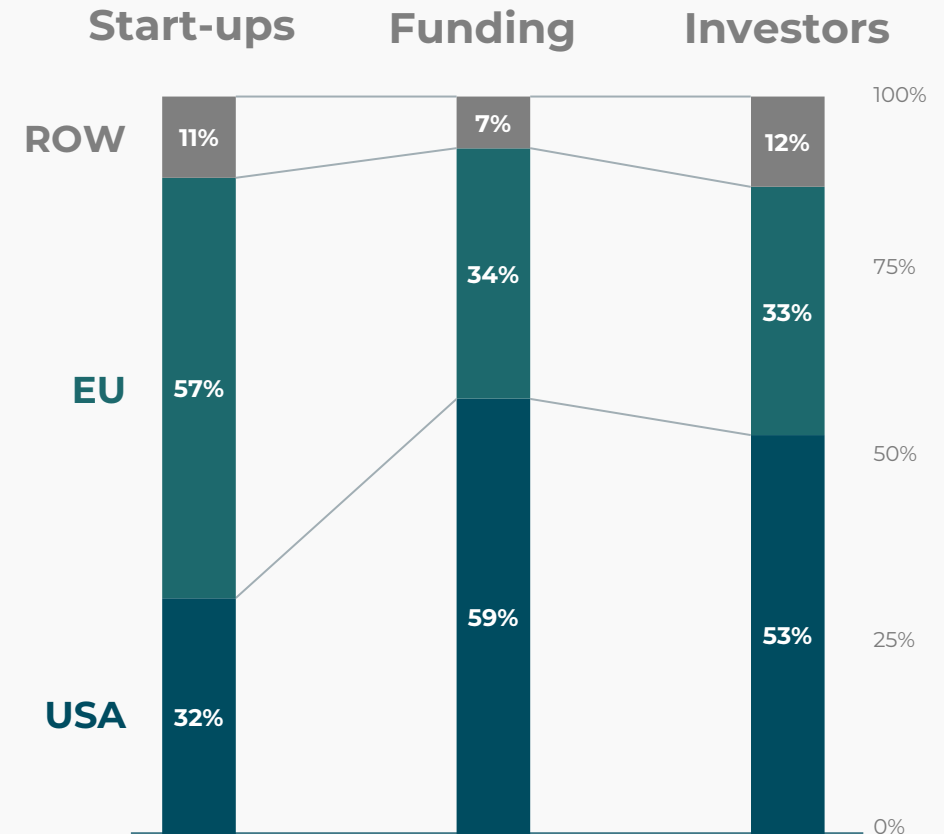


Gap across the Atlantic

Tech potential needs funding

- Strong innovation potential in Europe.
- Stronger venture capital scene in the US and subsidies aligned with start-ups.
- Start-ups select location for
 1. Funding,
 2. Talent, and
 3. Test environments.

Region	Grants (B\$)	Number of start-ups	Total funding (B\$)	Funding/ grant
US	~0,5	37	3,9	7
R.O.W.	~0,5	78	2,7	4,5

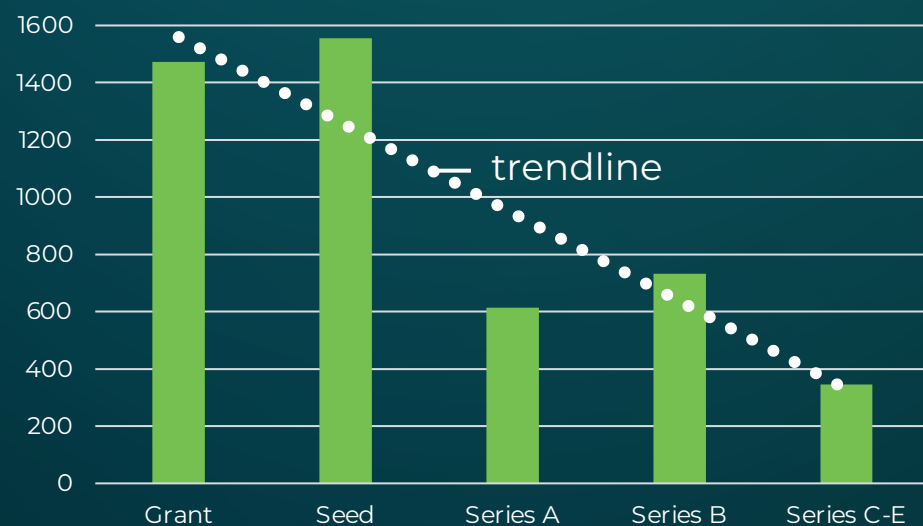


Case study from Skyfinity on 115 start-ups in sustainable aviation (2004-2023), 370 investors, data obtained from Crunchbase, Dealroom, etc.

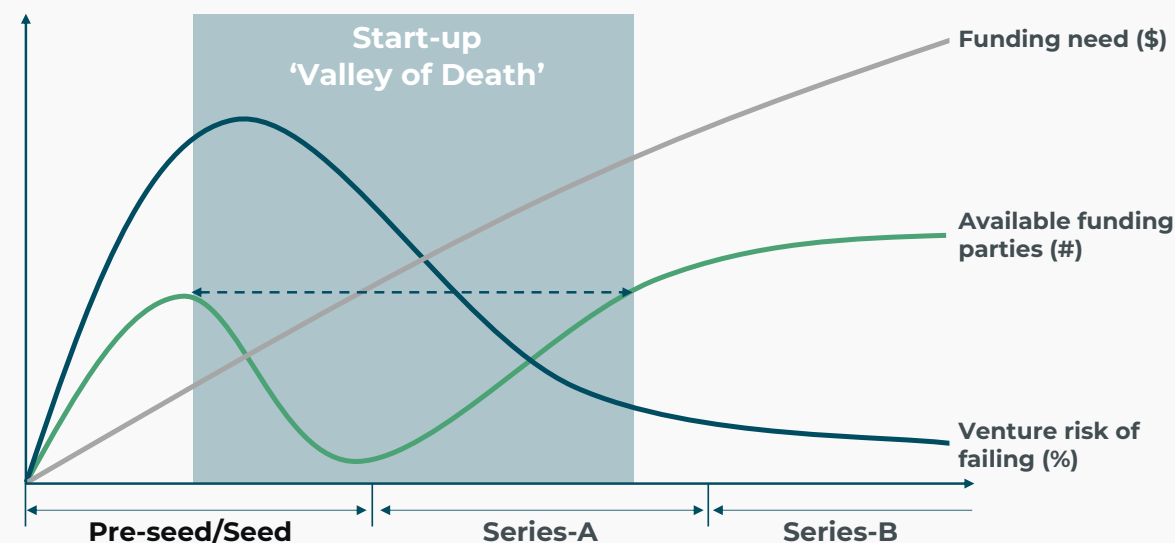


Start-up funding mismatch

Total funding start-ups per round



Ideal funding cycle with funding gap





We need innovation in finance

Europe

Offers more subsidies for R&D at consortiums

Examples:

- H2Gear
- EAG
- Conscious aerospace
- Deutsche aircraft

US

Offers more funding directly to start-ups

Examples:

- Jetzero
- Zeroavia
- Lanzajet
- Magnix

Miscellaneous

Some start-ups use equity crowd funding

Examples:

- Dovetail
- Flying whales

General remarks on VC funding in aviation:

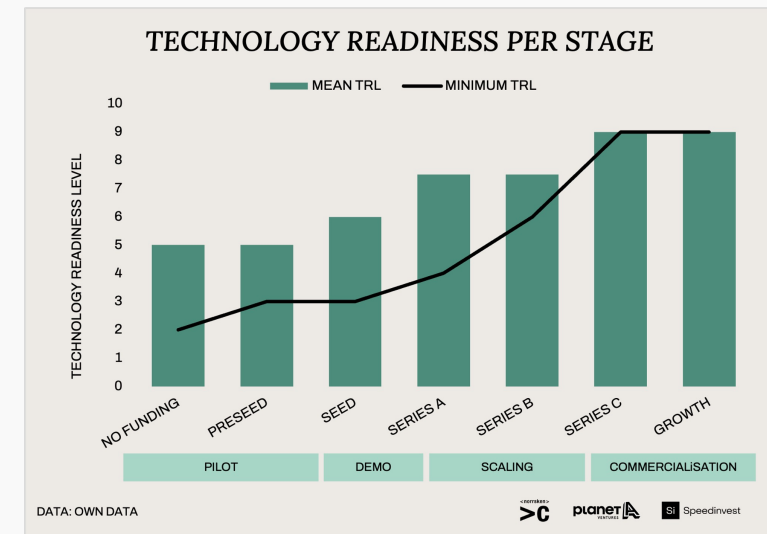
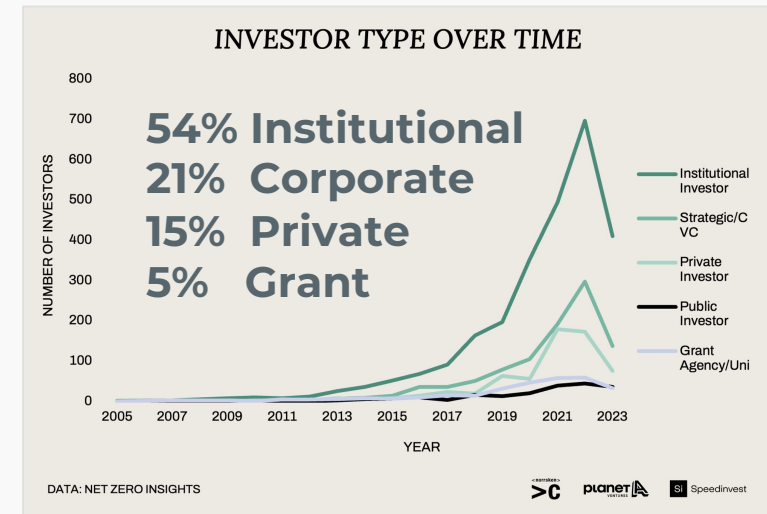
- Breakthrough Energy, Microsoft climate innovation fund, Starburst invest regularly in aviation.
- There are many impact funds (industry agnostic) that diversify their portfolio with investments in aviation.
- CVC: Lockheed martin, Boeing Xcellerated, Airbus ventures, Jetblue, united airline ventures, Bloomberg NEF, Total, BP ventures.

Hardware start-ups generic

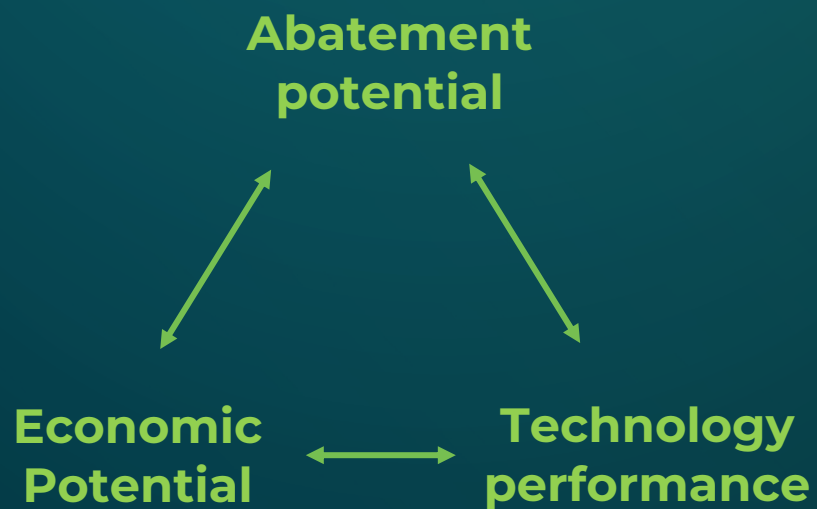


Hardware is hard, why?

- Cleantech v1.0 lost money
- Lower margins & green premiums
- Longer time to market
- Lower capital efficiency
- Lower multiples yet more stable
- Fewer exits
- Fewer VC's with expertise

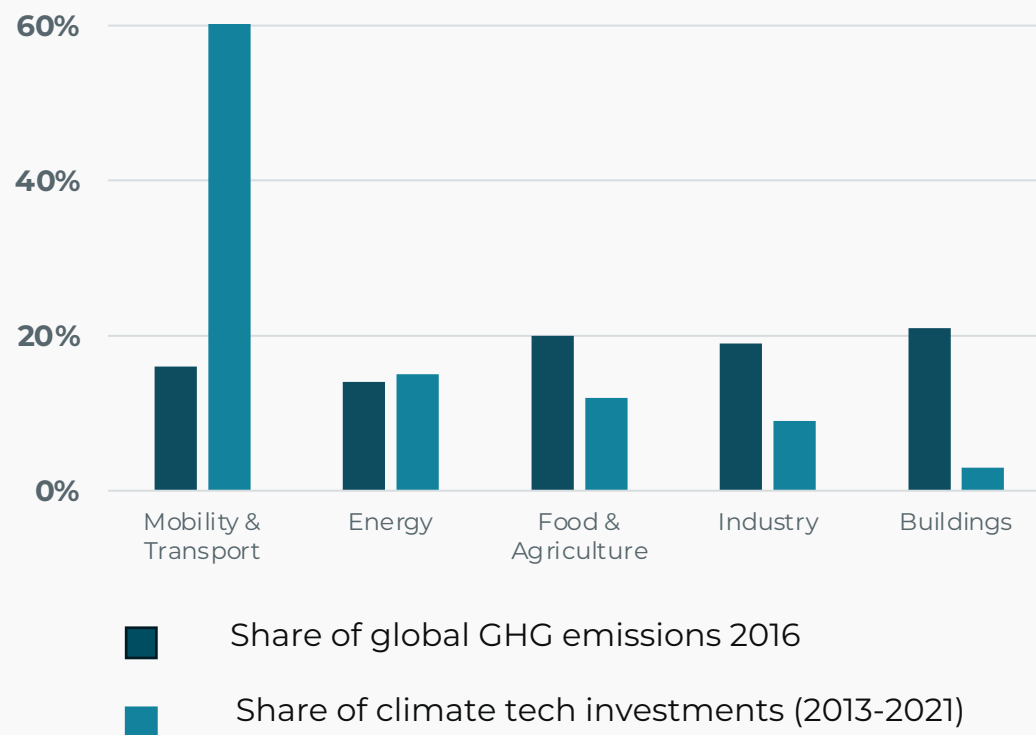


Economic opportunities Versus abatement potential



- Life Cycle Assessments
- Techno Economic Assessment

Climate tech investment vs GHG emissions





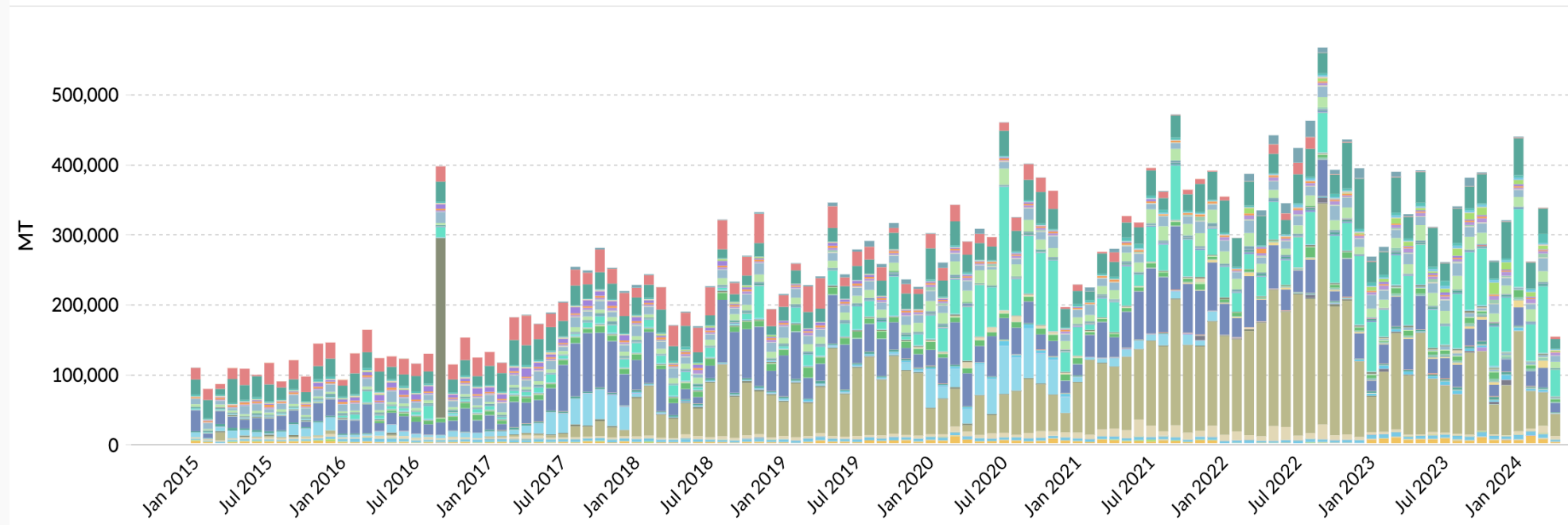
Case study

Project finance (SAF trends)



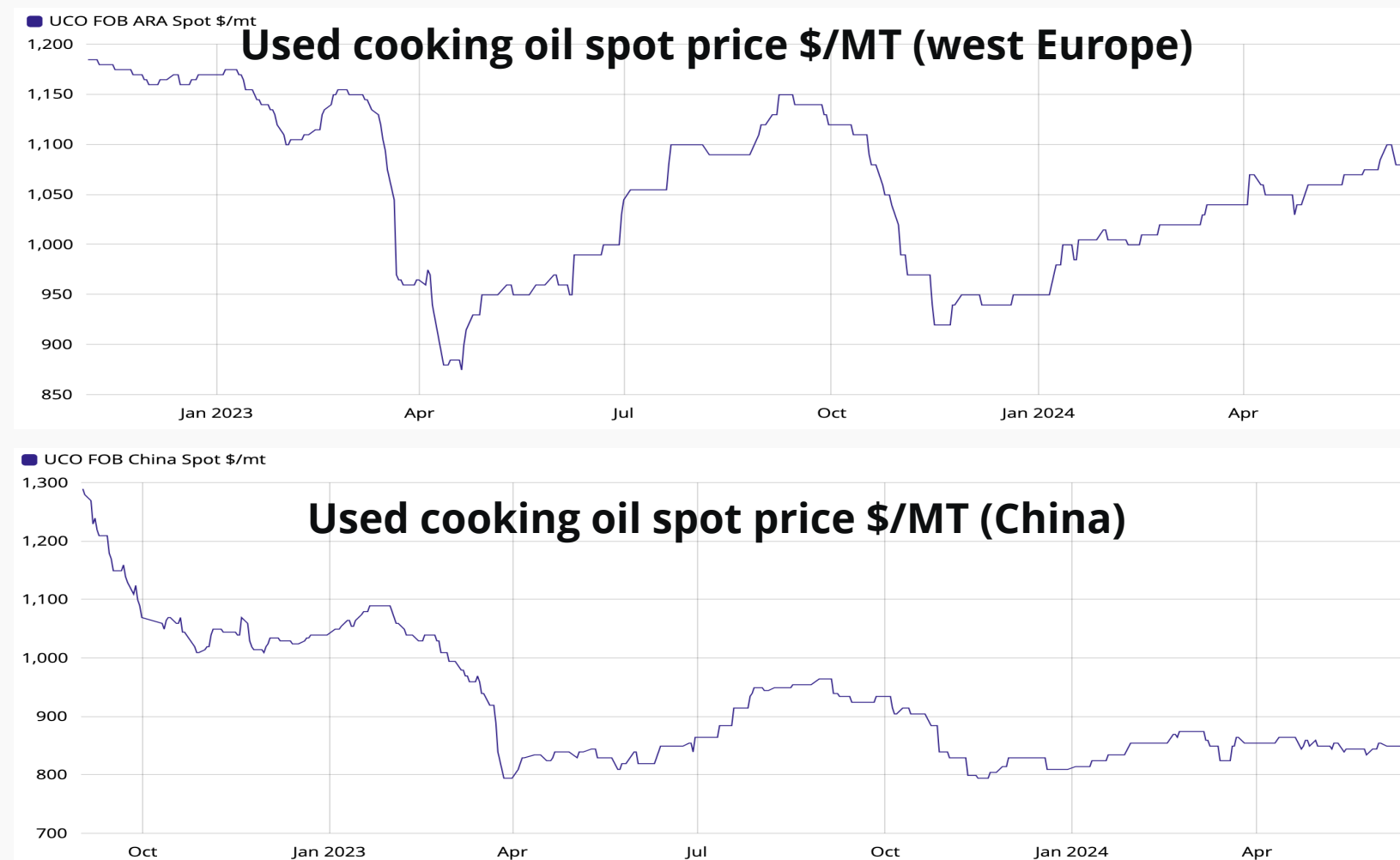
How stable is feedstock supply?

EU UCO Imports (Source: Eurostat)





Feedstock prices close to kerosene price

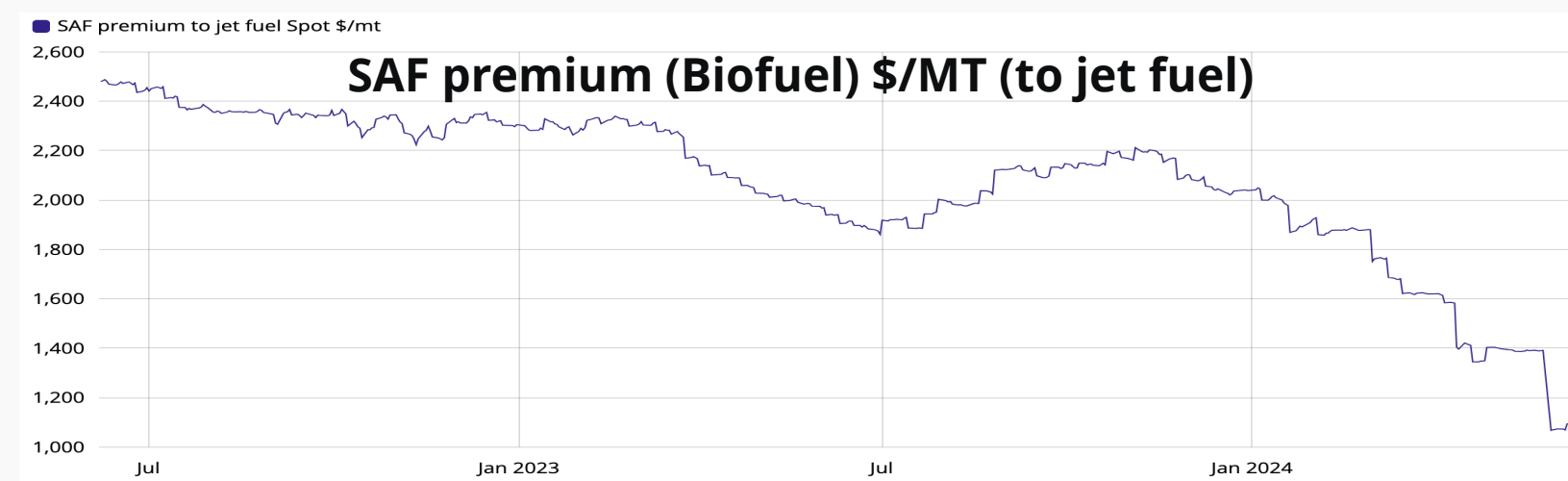
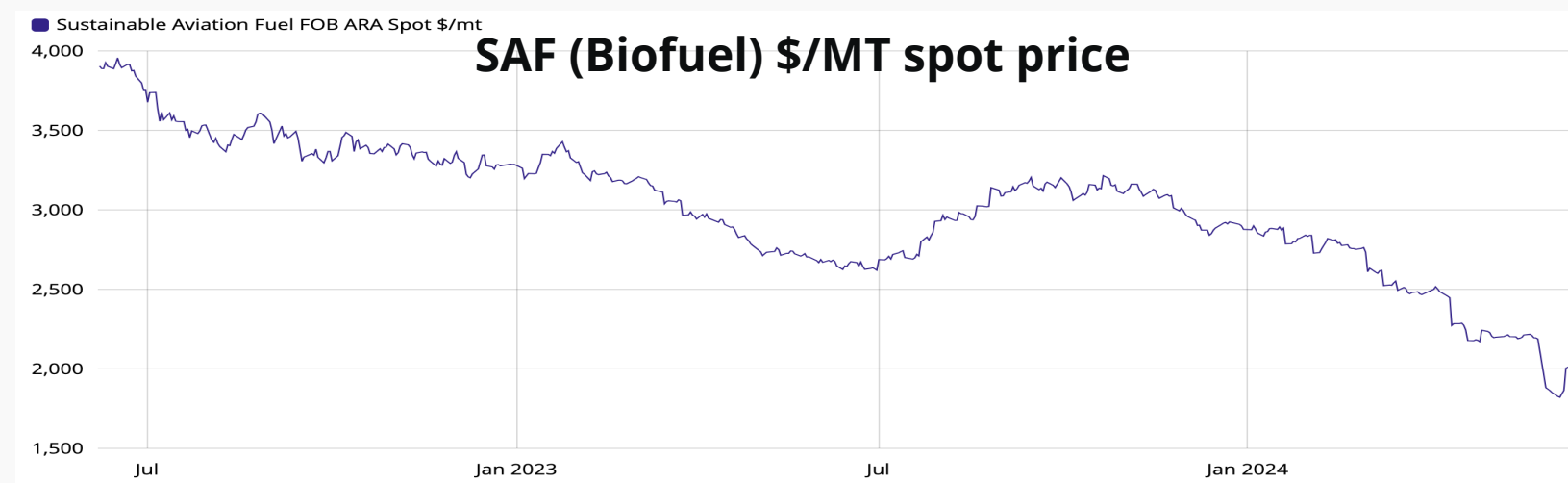


1050 \$/Mt (spot price)

840 \$/Mt. (premium)

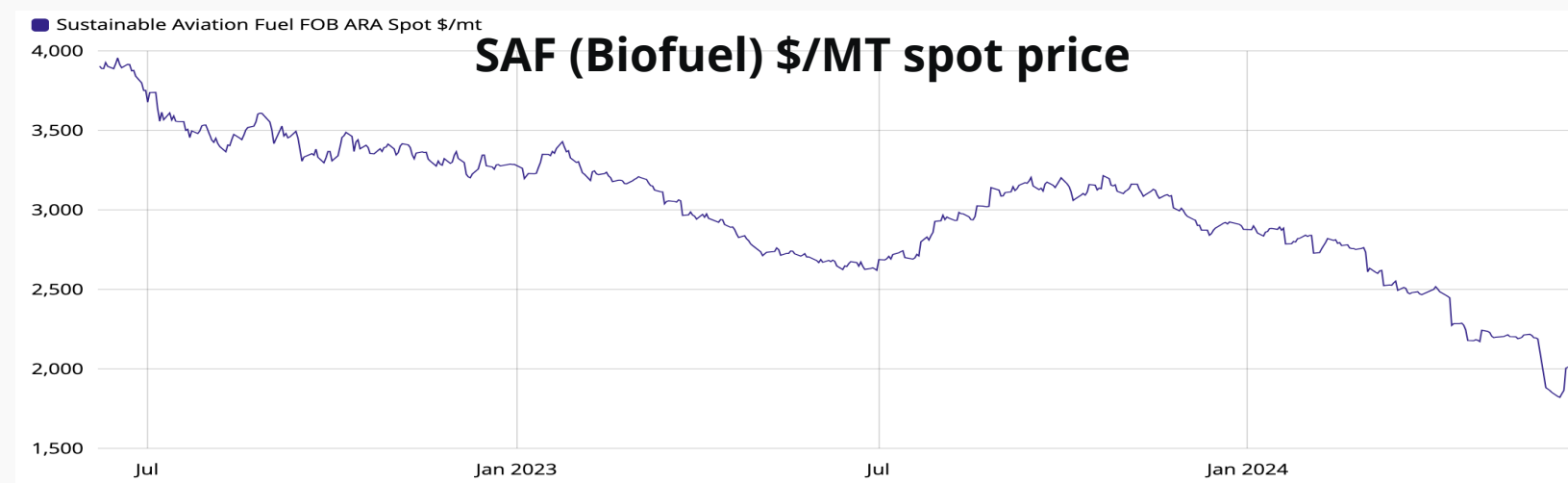


Liquid market is still small, yet significant green premium

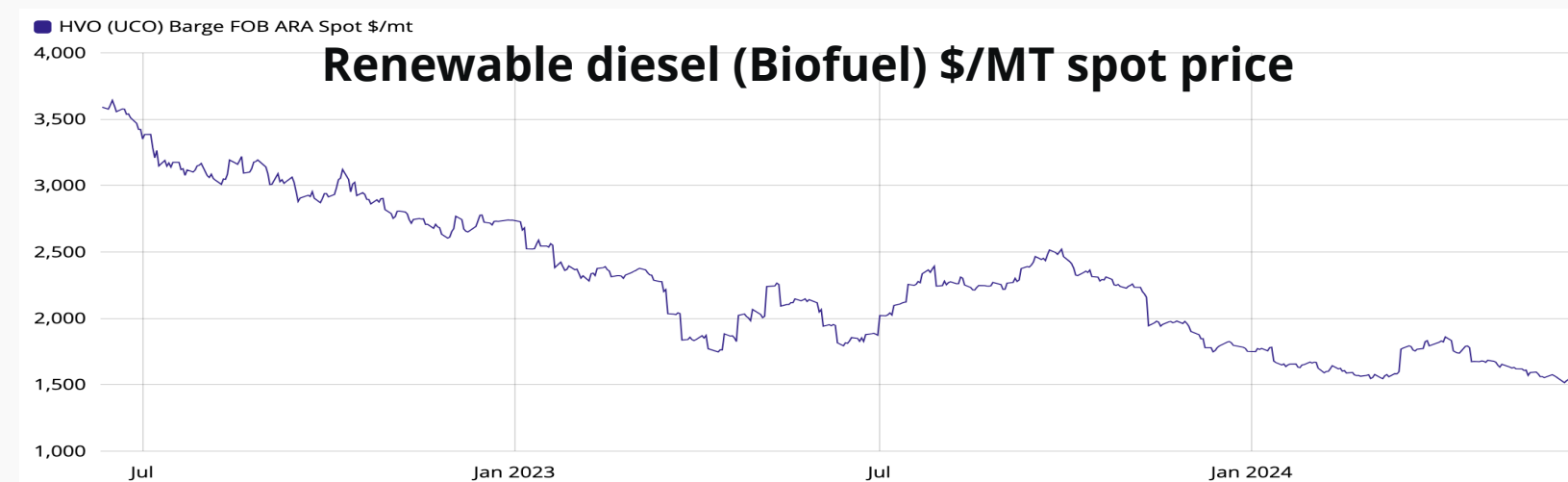




Large difference between renewable diesel and SAF price



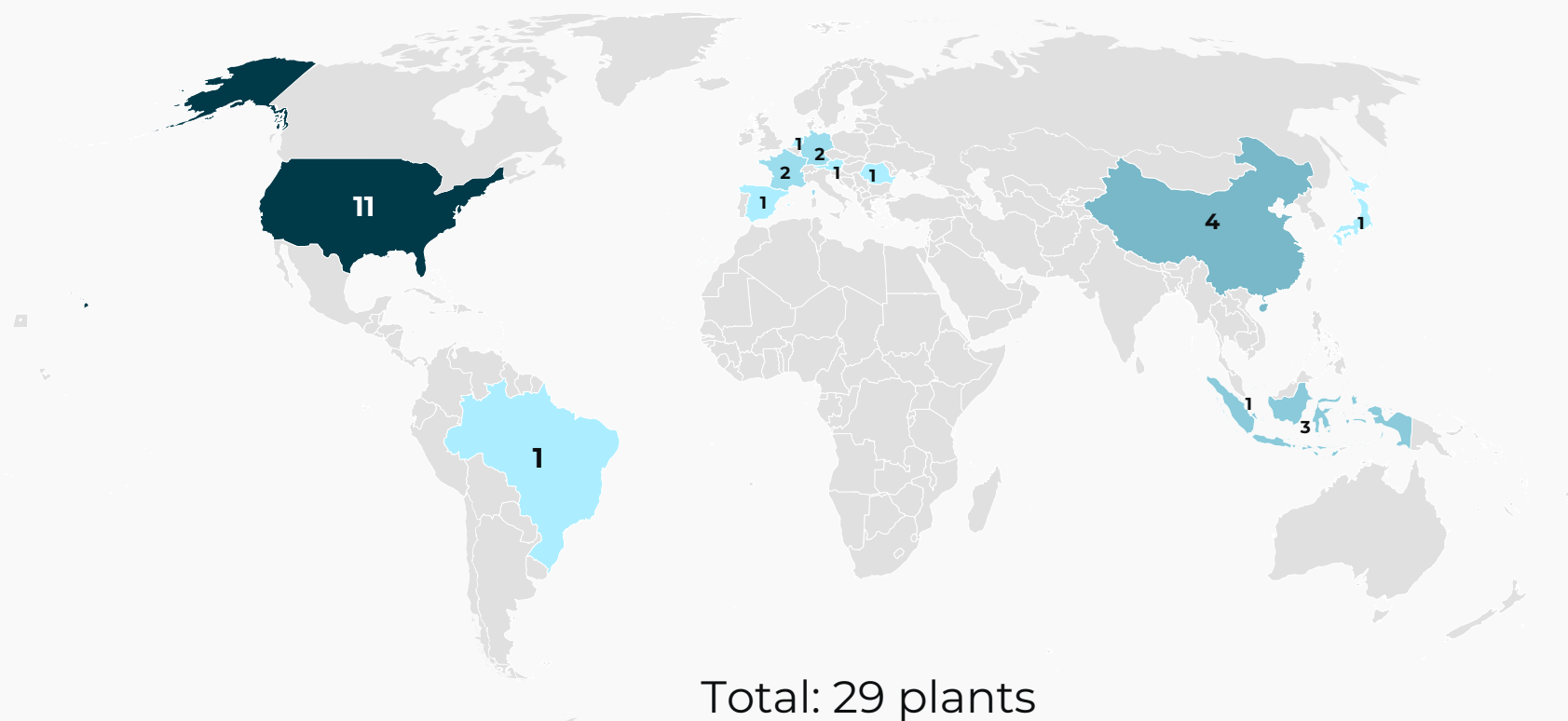
2019 \$/Mt (SAF spot price)



1550 \$/Mt (HVO spot price)



Overview operational SAF plants



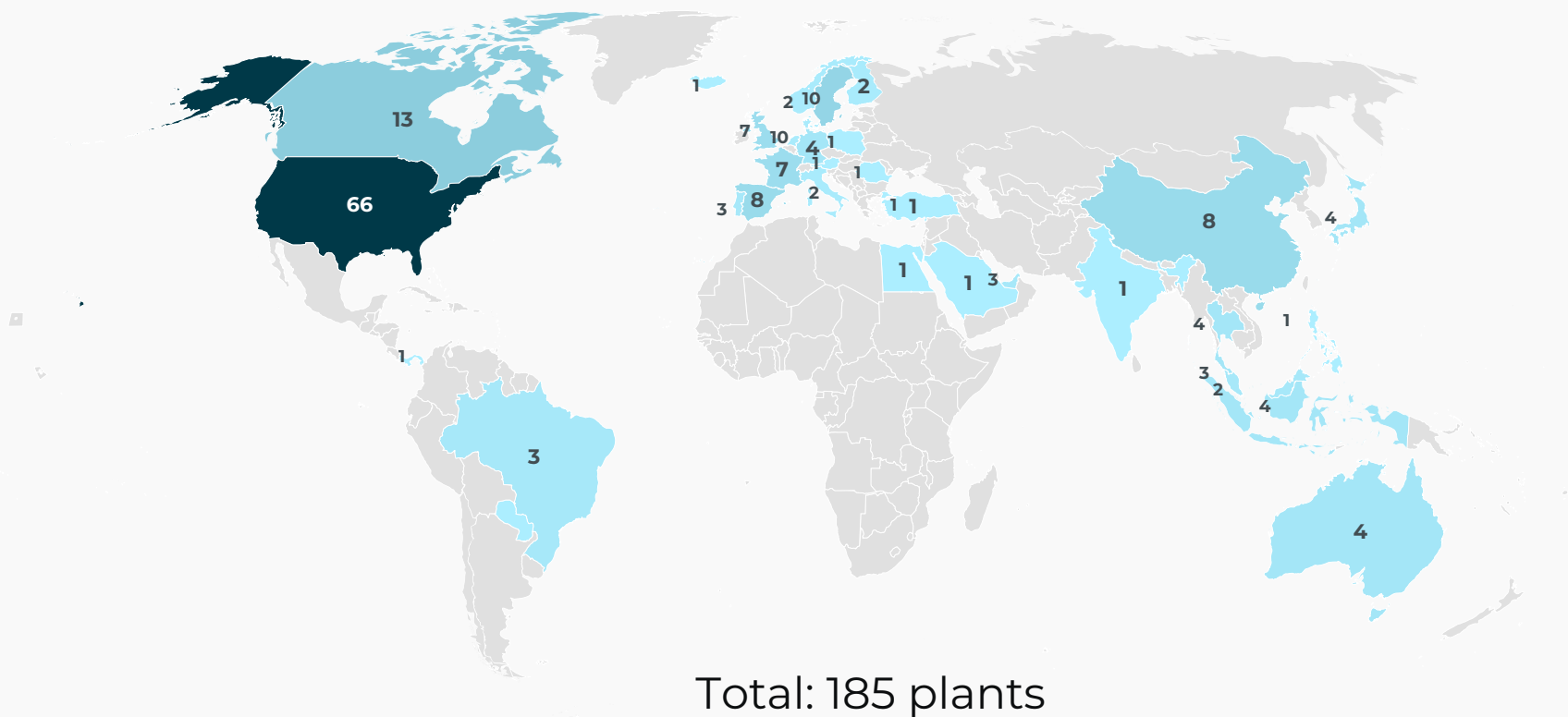
Year	SAF% of total fuel	SAF million Liter (source IATA)
2022	0,1%	300
2023	0,18%	600
2024	0,53%	1.830

Pathway	SAF% of total fuel
HEFA	85%
AtJ, FT, etc.	15%





Planned SAF plants by 2030



Year	SAF% of total fuel	SAF million Liter (source IATA)
2021	0,008%	300
2022	0,021%	600
2023	0,028%	1.830
2030	3%	43.000 (estimated)





First mover challenges

Producer Fulcrum facing bankruptcy in new blow to UK SAF hopes

Biofuels

29 May 2024

Quantum Commodity Intelligence – Sustainable aviation fuel producer Fulcrum Bioenergy is facing bankruptcy, according to a Bloomberg report, potentially placing the UK government and several airlines' SAF strategies at risk.

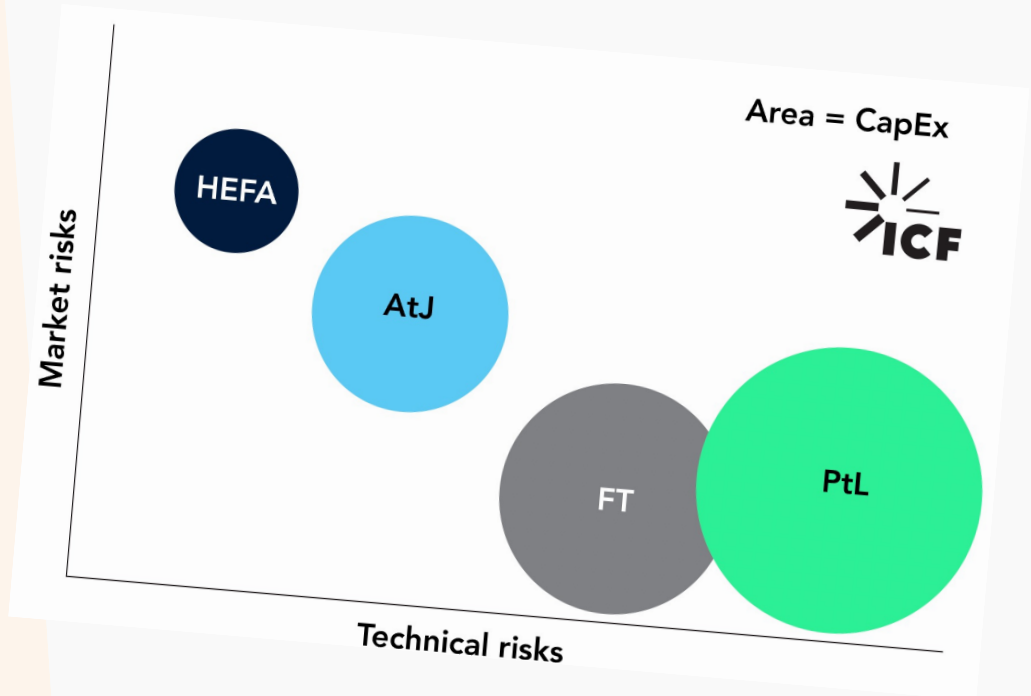
The firm – which operates a waste-to-SAF plant in Nevada and is developing two plants in Indiana, US and Ellesmere Port, UK – laid off nearly all of its employees on May 17 and halted most of its operations, said the report, while the company's website also appeared to be down.

The UK project is one of five government-backed flagship SAF projects hoped to begin construction next year and help create domestic supply to meet growing demand from the country's SAF mandate; it received a £16.8 million (\$21.35 million) government grant in 2022.

Sources:

- <https://www.eib.org/en/publications/20240101-financing-sustainable-liquid-fuel-projects-in-europe>
- <https://www.qcintel.com/biofuels/article/producer-fulcrum-facing-bankruptcy-in-new-blow-to-uk-saf-hopes-25151.html>
- <https://www.icf.com/insights/aviation/requirements-sustainable-aviation-fuel-financing>

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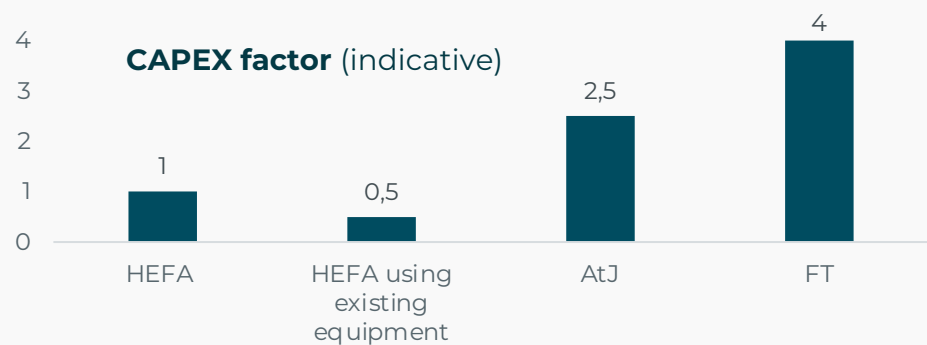
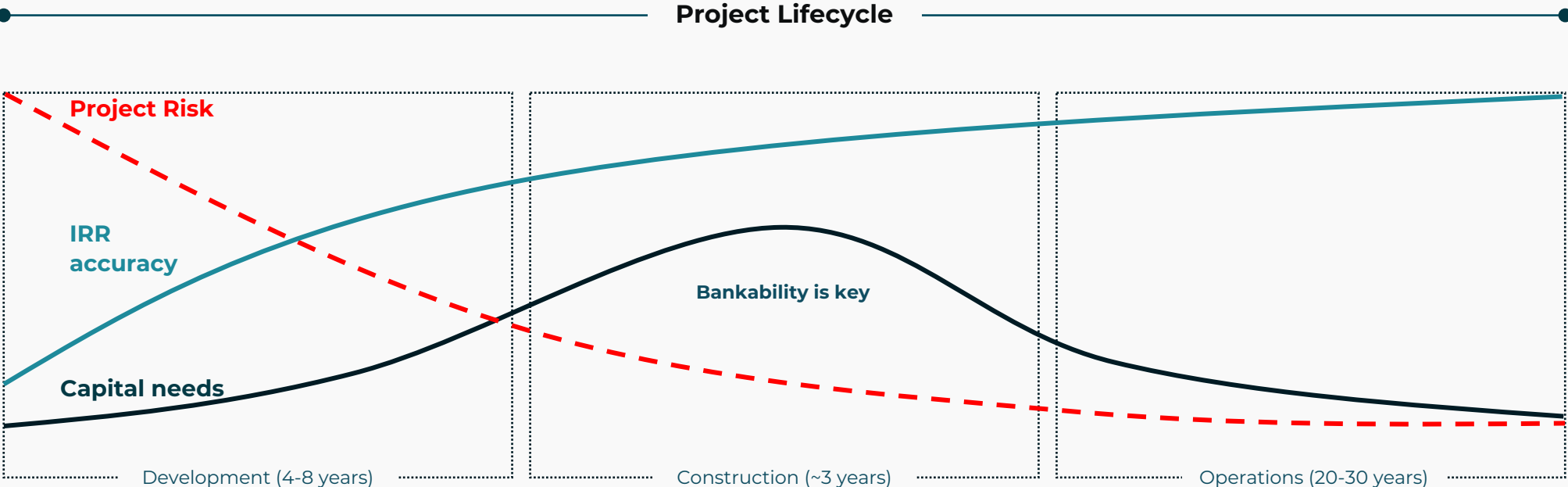


Financing sustainable liquid fuel projects in Europe: Identifying barriers and overcoming them





Risk return balance for project finance remains critical



Percentage of project finance per segment (finance statistic)	Size of project
63%	< \$500M
22%	\$500M – \$1.0B
11%	> \$ 1.0 B



Skyfinity Next steps



Lets build a Techno-Economic Model



Contact Us

- Share your thoughts with us
- Support us in building the Techno Economic Model



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