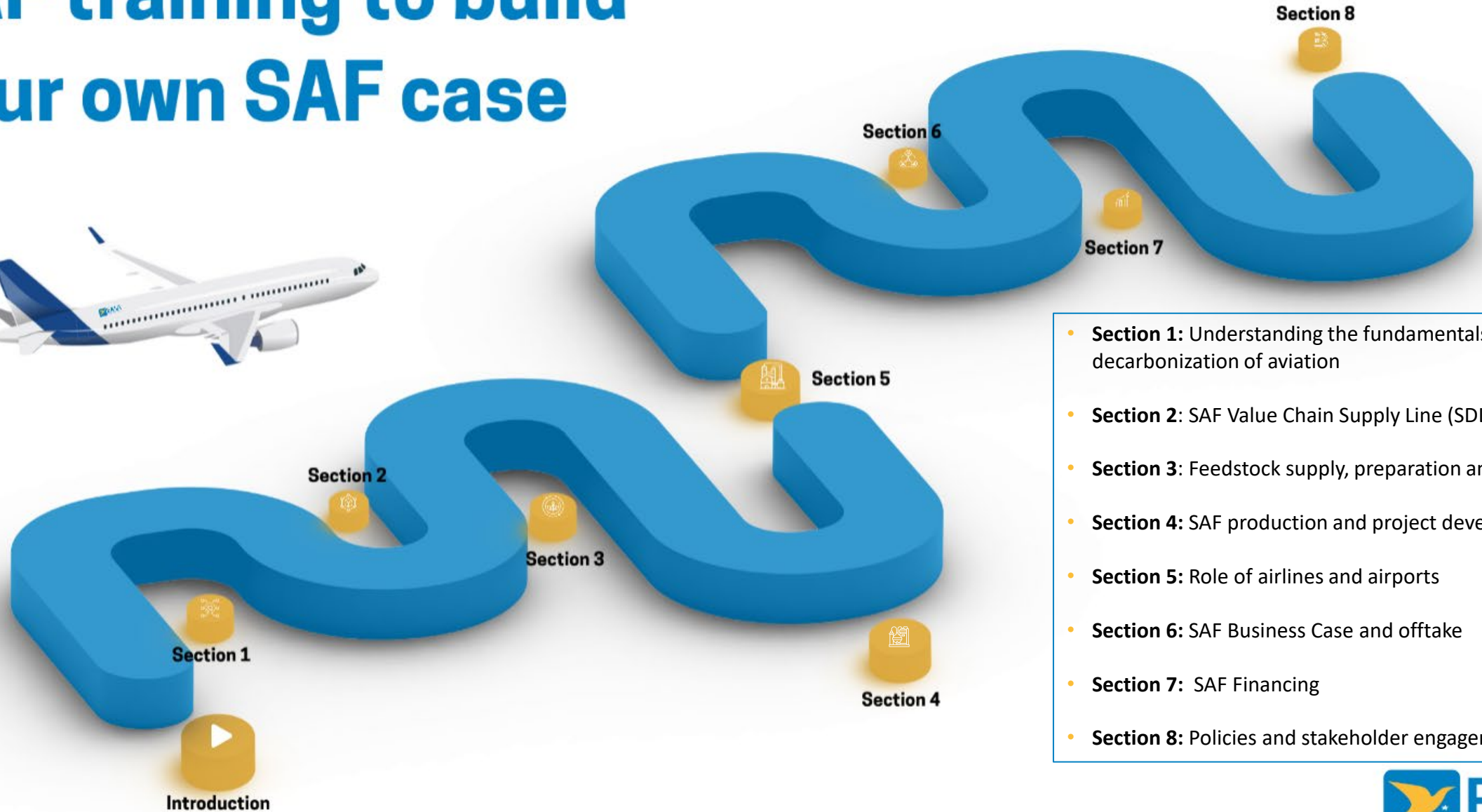


# SAF training to build your own SAF case



- **Section 1:** Understanding the fundamentals of SAF and decarbonization of aviation
- **Section 2:** SAF Value Chain Supply Line (SDL) Concept
- **Section 3:** Feedstock supply, preparation and certification
- **Section 4:** SAF production and project development
- **Section 5:** Role of airlines and airports
- **Section 6:** SAF Business Case and offtake
- **Section 7:** SAF Financing
- **Section 8:** Policies and stakeholder engagement



# Overview on eight SAF Training Sections

## The fundamentals of SAF

**Section 1**  
Understanding the fundamentals of SAF and decarbonization of aviation



**Section 2**  
SAF Value Chain Supply Line (SDL) Concept



Day 1

## Central elements of the SAF Direct Supply Line

**Section 3**  
Feedstock supply, preparation and certification



**Section 4**  
SAF production and project development



**Section 5**  
Role of airlines and airports



Day 2

## SAF Direct Supply Line enablers and supporting functions

**Section 6**  
SAF Business Case and offtake



**Section 7**  
SAF Financing



**Section 8**  
Policies and stakeholder engagement



Day 3

# Q&A and Quiz

Join at  
**slido.com**  
**#saf-training03**



# Economic Principle and Perspectives on SAF Implementation

**How to become SAF ready? How to make SAF happen?**

**SAF Training for ACI Africa & AFRAA**

23.-25.04.2025, Arusha, Tanzania

### Topic

# Economic Principle and Perspectives on SAF Implementation



**Raphaela Spielberg**

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CBR Sustainability Partners



Project Manager

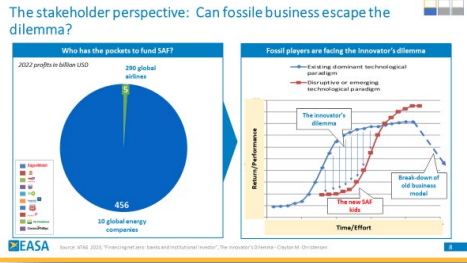
Raphaela Spielberg has over 7 years professional experience in the financial field, and 5 years of experience in strategy development and implementation of impact projects and climate technologies and with experience in thematical investment consulting and climate risk management of ESG compliant projects. She is experienced in assessing and developing business cases in the PtX field, analysing global challenges and opportunities, executing the financial modelling and conducting deep-dive research of risk and sensitivity.

#### *Consulting Focus @ CBR Sustainability Partners*

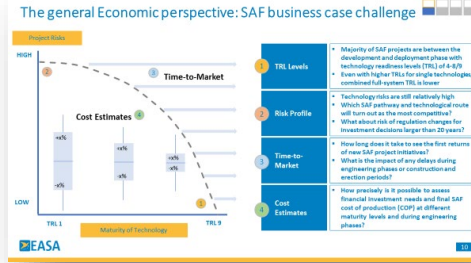
- Project management and business planning, e.g., application support for EU funding programs for the demonstration of innovative low-carbon technologies (EU Innovation Fund)
- Sustainability (CSR) and ESG concept development and implementation (strategy, roadmaps, reporting, labels)

#### *Education*

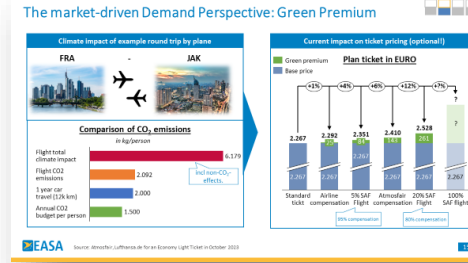
- Sustainability & Climate Risk Professional, GARP
- Master in Sustainable Finance, NOVA SBE, Lisbon



Where do we stand today  
and who has the strength  
to drive SAF?



## Why is SAF no straight forward implementation case?



## What are the reasons for the Green Premium and what are strategies to address the challenge?



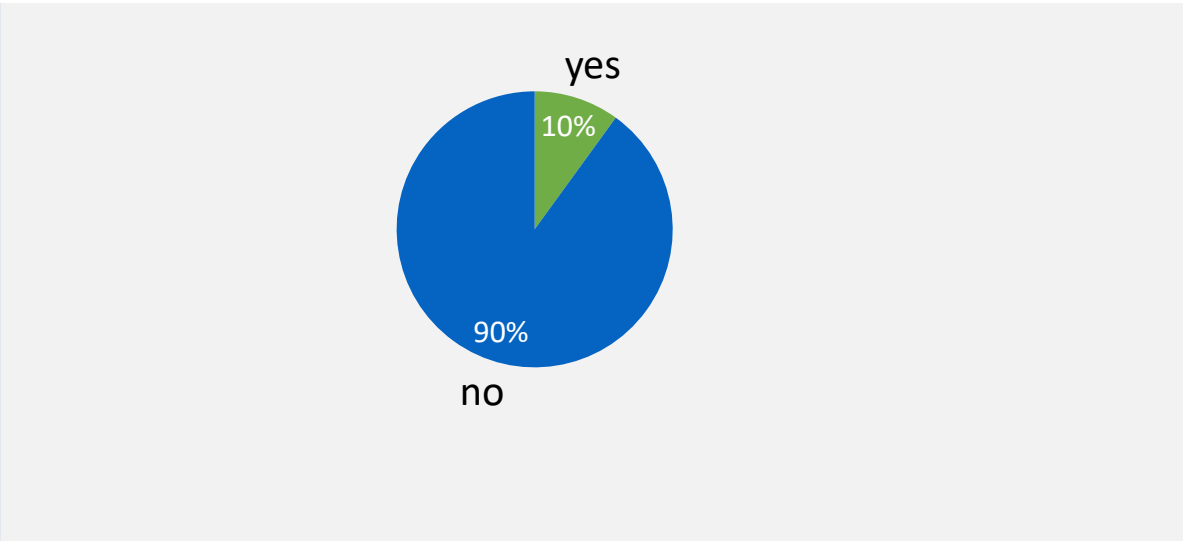
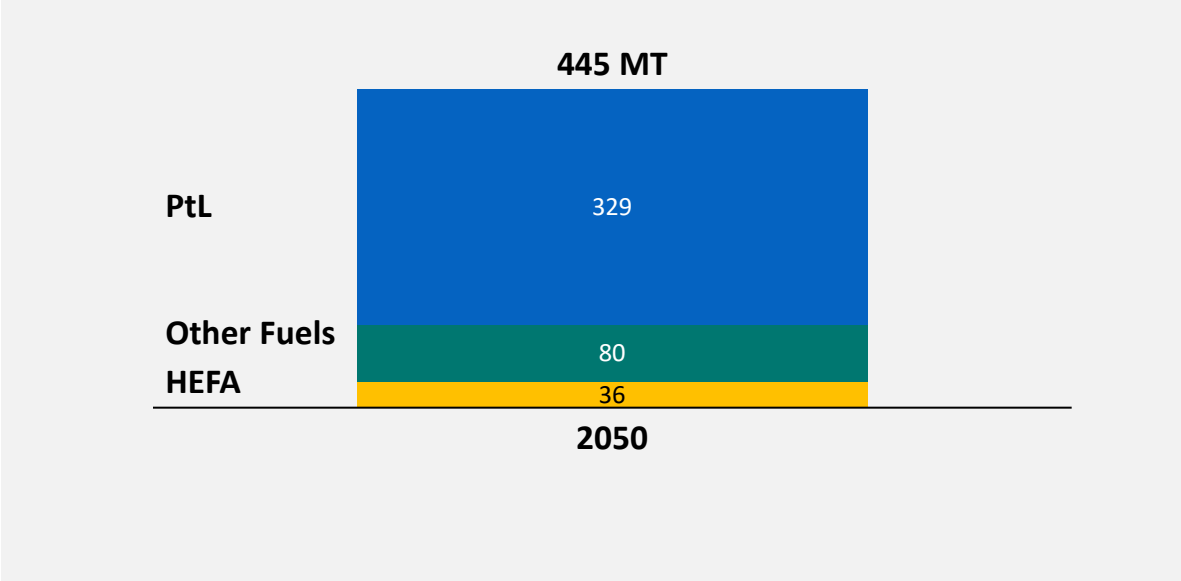
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The Stakeholder  
perspective:

Where do we stand today  
and who has the strength  
to drive SAF?

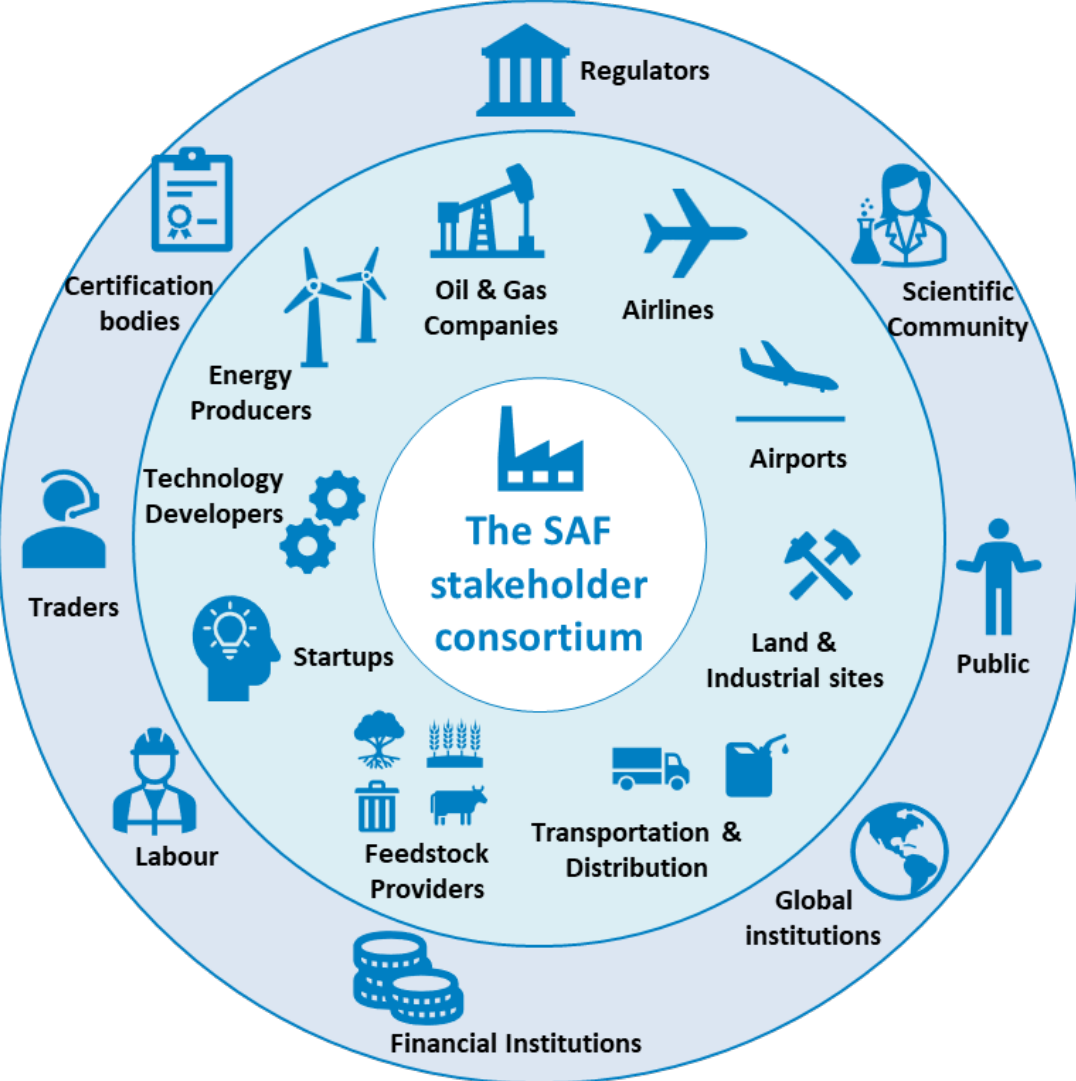


# PtL SAF contribution to reach net-zero targets



% of projects that reached FID status

# The stakeholder perspective: Changing players with changing roles



## Established players



**Current: Focus on HEFA**  
(+) Need to defossilize their current business  
(-) High capex, threat of product cannibalization



**Current: Shifting role from offtaker to strategic shareholder**  
(+) Influence on project bankability through comofftakes  
(-) Green premium of SAF impairs their businesses margin

## New stakeholders



**Current: Decarbonization and expertise of by-products**  
(+) Allocation of product slate into other industries  
(-) Traditional industry, not willing to take on the innovation risk



**Current: Chance to tap into huge markets for SAF**  
(+) Faster than the industry taking early technology bets  
(-) High initial costs, project risks, lack of expertise



**Current: SAF risk-return profile not convincing yet**  
(+) Interested in aligning portfolios with ESG criteria  
(-) "Wait and See" attitude until regulation undermines business case



## The producer perspective

- **CAPEX investments** over a **trillion USD** to achieve **required SAF market volumes**
- **Technological, commercial and project implementation risks**, in particular first-of-its kind commercial plants
- **Securing projects' bankability** with mid-to-long-term **offtake agreements**

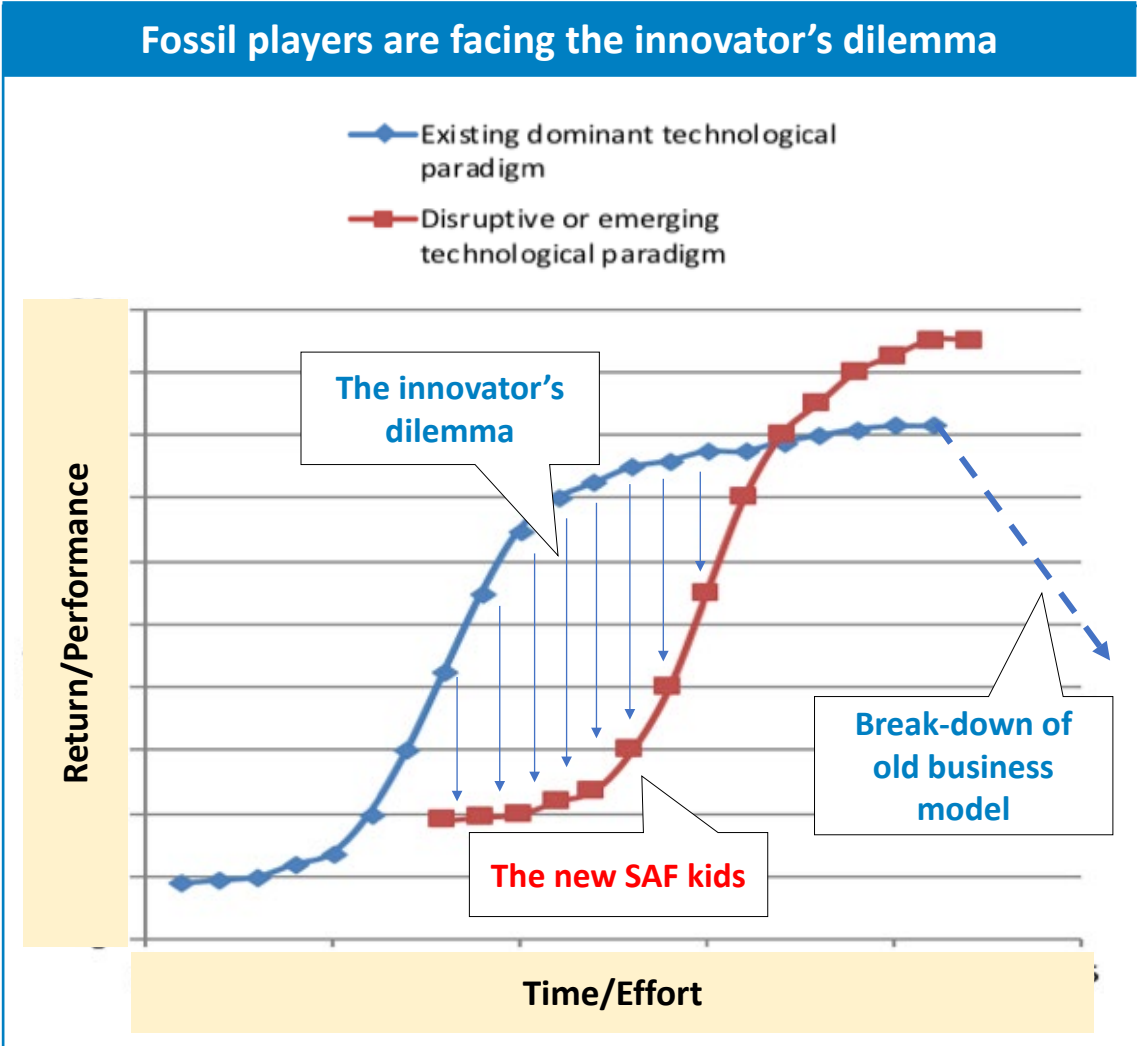
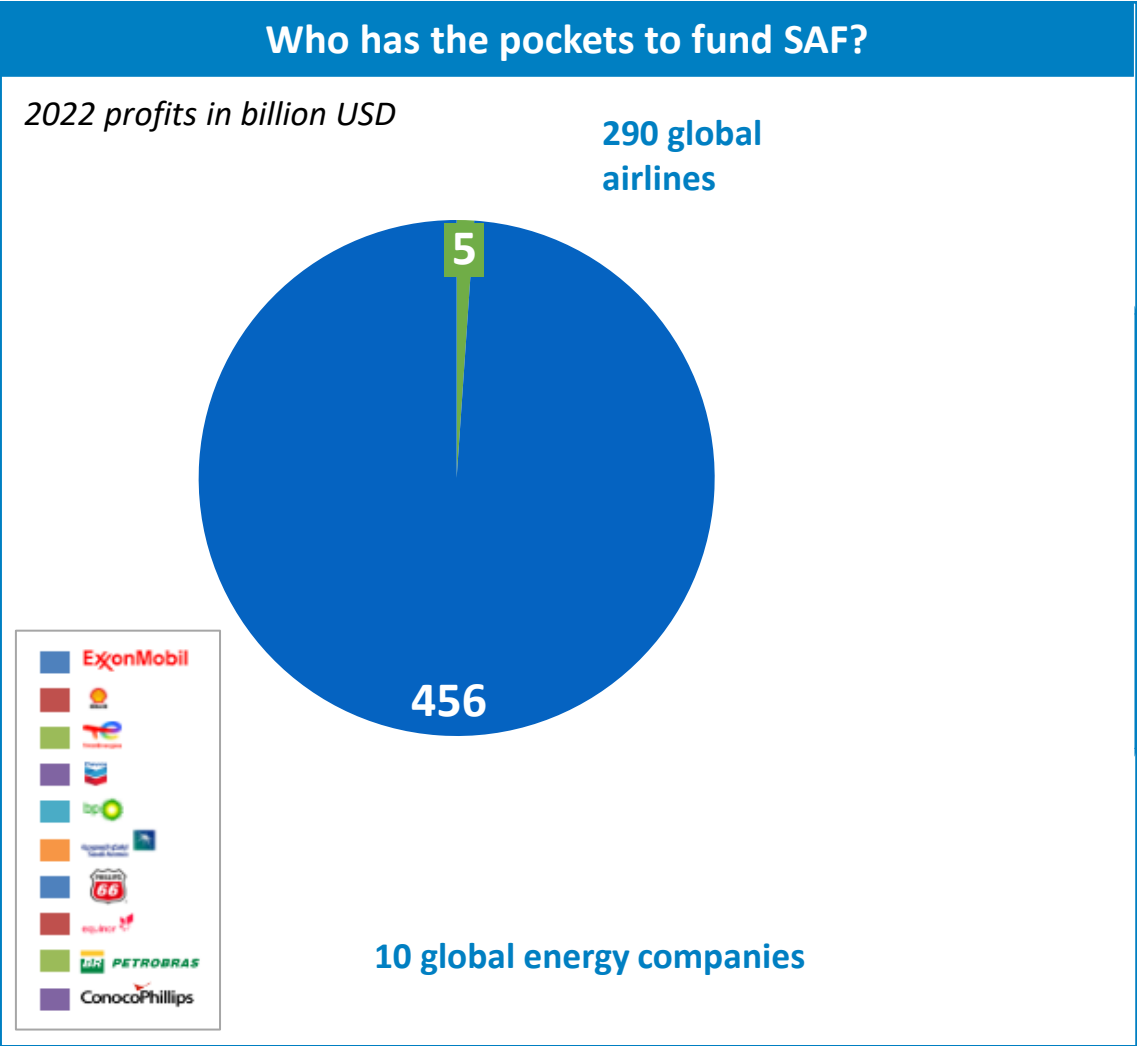
- Shift of **investment focus** to comply with **ESG targets**
- Tap into **large return potential** from **future green energy markets**
- Minimize **financing risks** guaranteed by mid-to-long-term **offtake agreements**
- Need to bridge the **gap** between **project risk profiles** and **return rates**

## The investor perspective

## The airline perspective

- **Customer SAF awareness** and **willingness-to-pay** for sustainability
- **Financing** the **SAF premium** to fulfill sustainability goals, SAF mandates, etc. via increased ticket prices, etc.
- **"Balance sheet burden"** due to **offtake agreements beyond 10 years**, especially of new SAF conversion pathway projects

# The stakeholder perspective: Can fossil business escape the dilemma?



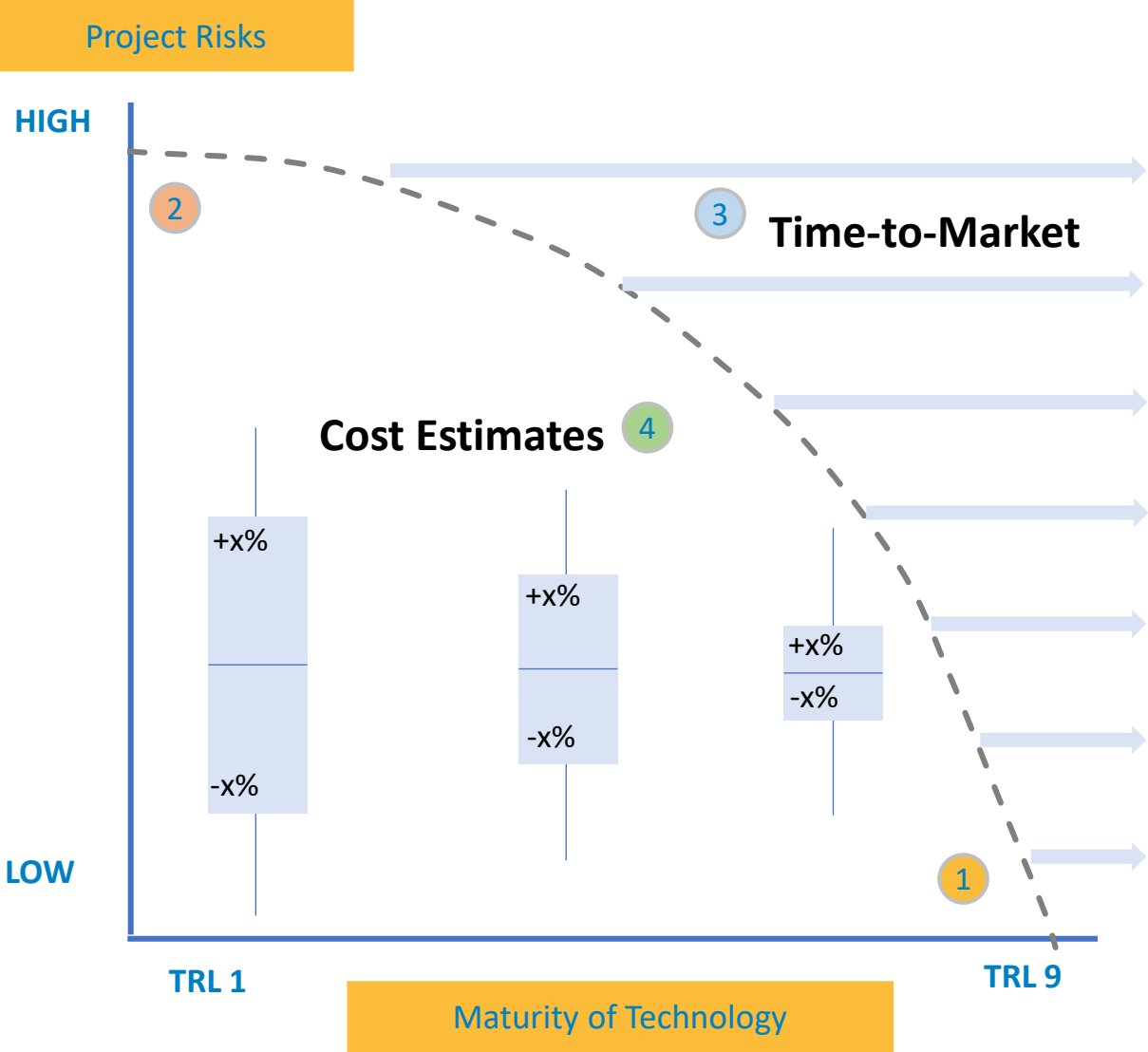


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The Economic  
perspective:

Why is SAF no straight  
forward implementation  
case?

# The Economic perspective: SAF business case challenges



1	TRL Levels	<ul style="list-style-type: none"><li>Majority of SAF projects are between the development and deployment phase with technology readiness levels (TRL) of 4-8/9</li><li>Even with higher TRLs for single technologies, combined full-system TRL is lower</li></ul>
2	Risk Profile	<ul style="list-style-type: none"><li>Technology risks are still relatively high</li><li>Which SAF pathway and technological route will turn out as the most competitive?</li><li>What about risk of regulation changes for investment decisions larger than 20 years?</li></ul>
3	Time-to-Market	<ul style="list-style-type: none"><li>How long does it take to see the first returns of new SAF project initiatives?</li><li>What is the impact of any delays during engineering phases or construction and erection periods?</li></ul>
4	Cost Estimates	<ul style="list-style-type: none"><li>How precisely is it possible to assess financial investment needs and final SAF cost of production (COP) at different maturity levels and during engineering phases?</li></ul>

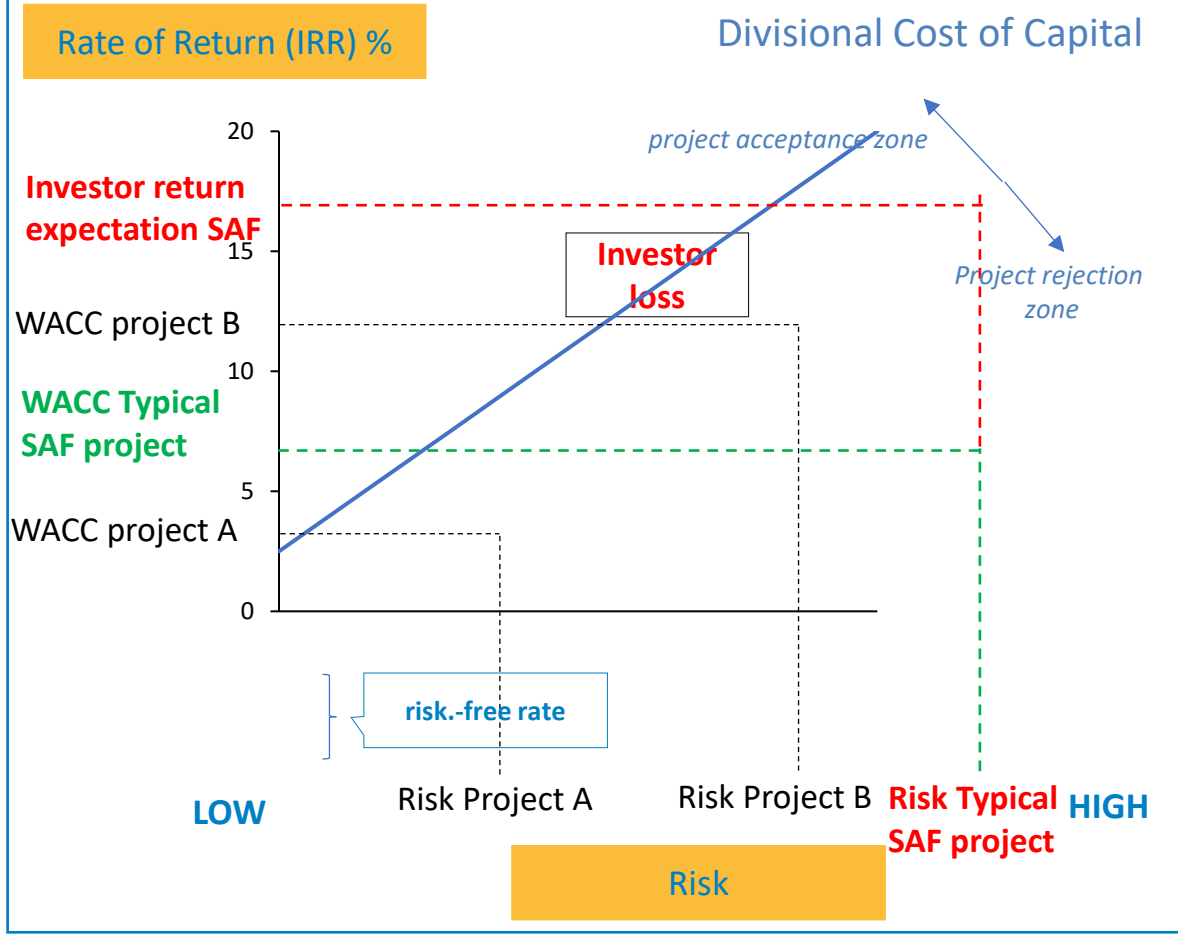
# The Economic perspective: Risk-and-Return imbalance



1

2

## Impact of Technology Risk on SAF project



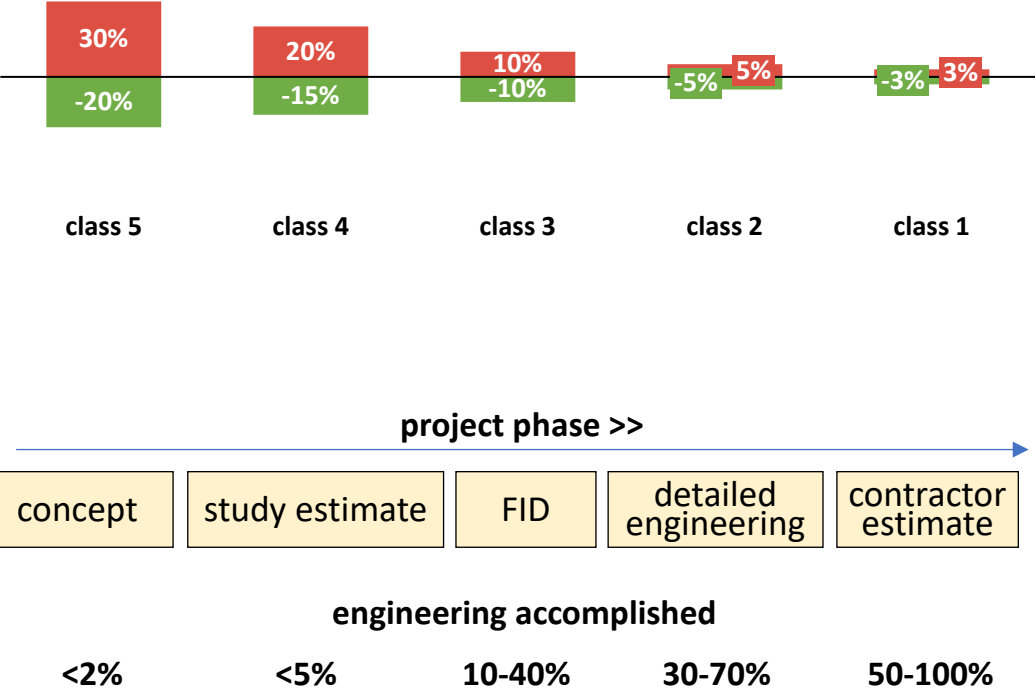
- The higher the project risk, the higher the cost of capital and investor return expectations
- Investor should only accept a project where the NPV of the future cash flows (DCF) is positive → this means  $IRR > WACC$  (project acceptance zone)
- Standard WACC applied in SAF projects is often around ~10% and thus, Return expectation of SAF projects are not congruent with risk profile of SAF projects
- Opportunity costs: Investor would almost get ~10% on global stock market
- VC/PE on average achieve  $IRR > 20\%$
- Higher return expectations / cost of capital would make SAF more expensive

# The Economic perspective: Cost uncertainty

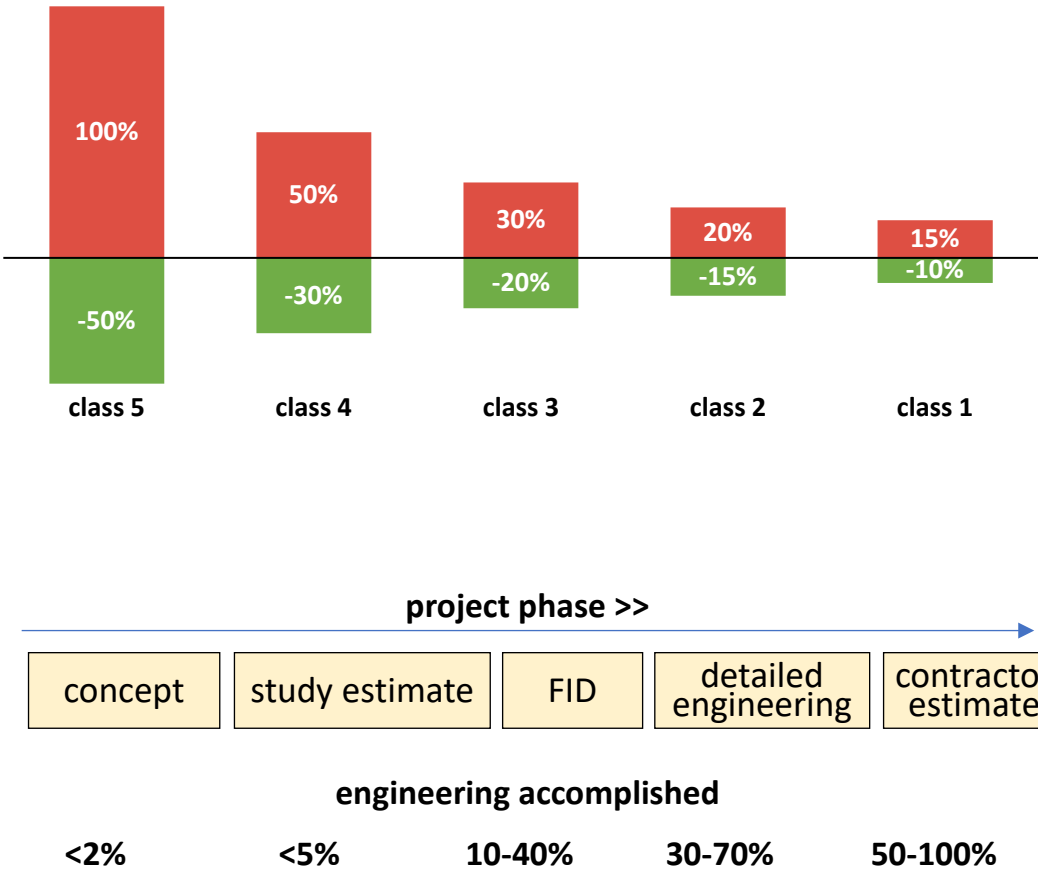


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## Cost accuracy - **KNOWN** process/production



## Cost accuracy - **UNKNOWN** process/production



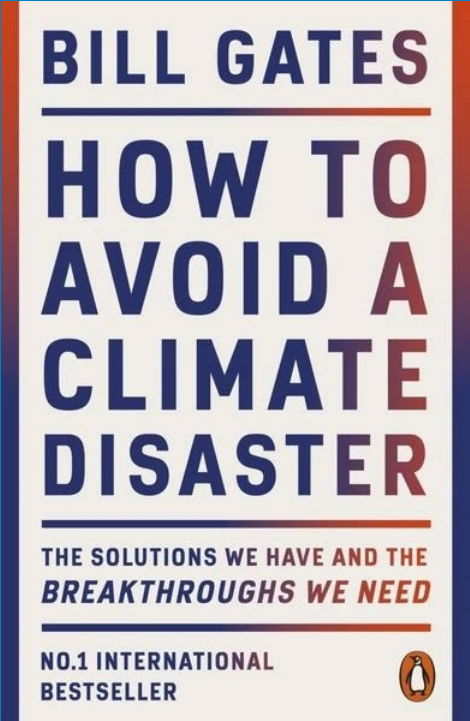


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The Market perspective:

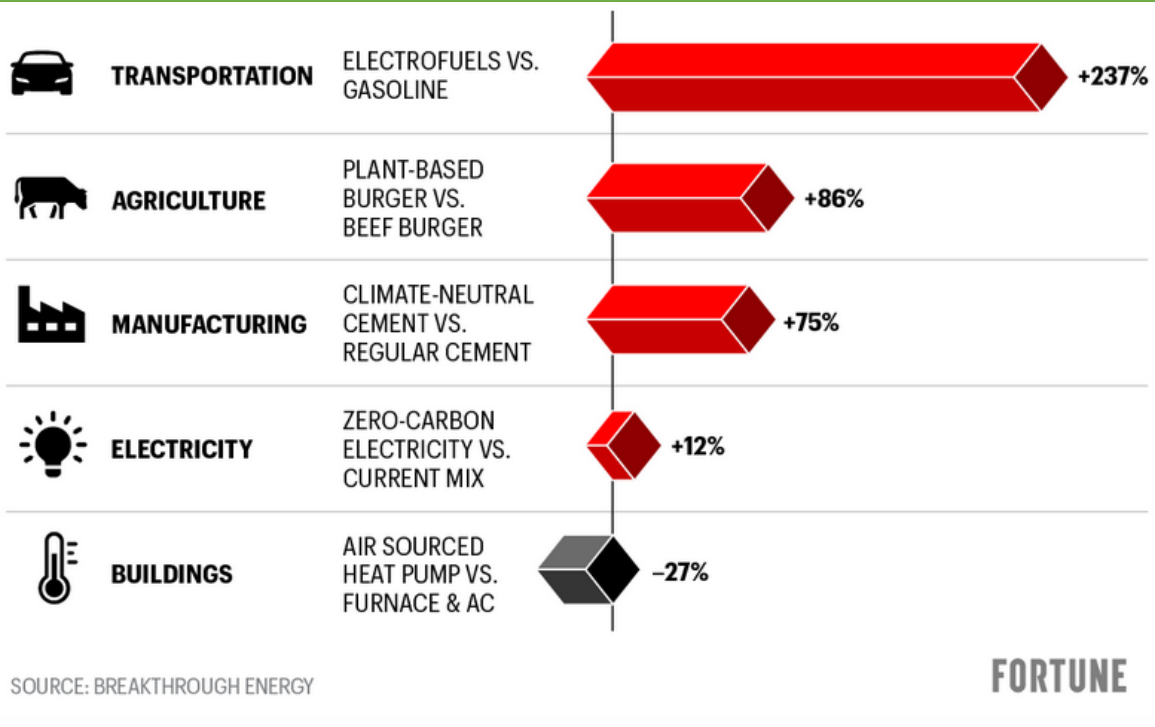
What are the reasons for the Green Premium and what are strategies to address the challenge?

# The market challenge:



# The Green Premium

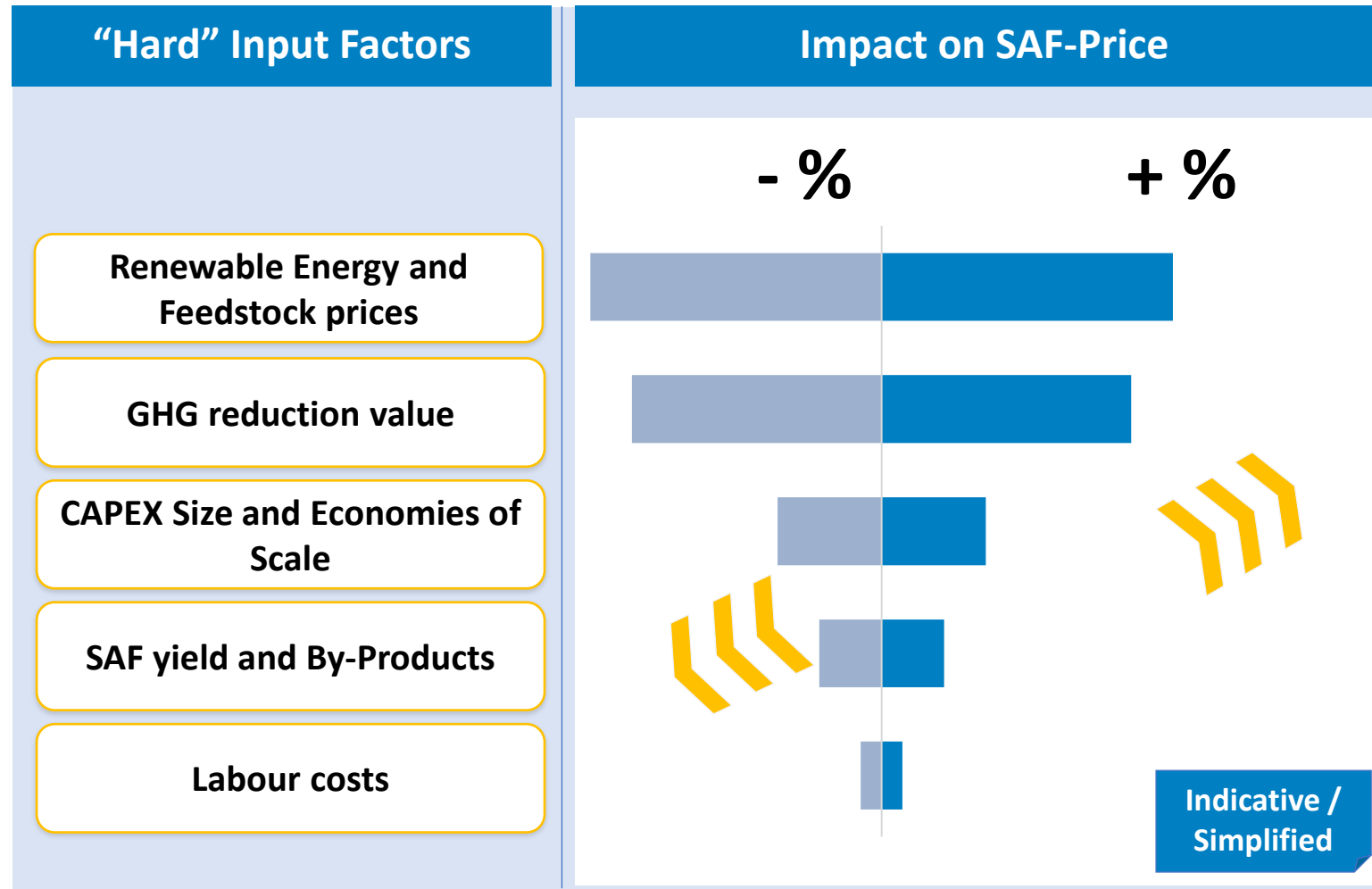
the additional cost for a product or service that doesn't emit CO<sub>2</sub>



# “Hard” techno-economic factors driving the Green Premium



Access to price competitive feedstocks and renewable energy are one of the most important success factors of SAF business cases

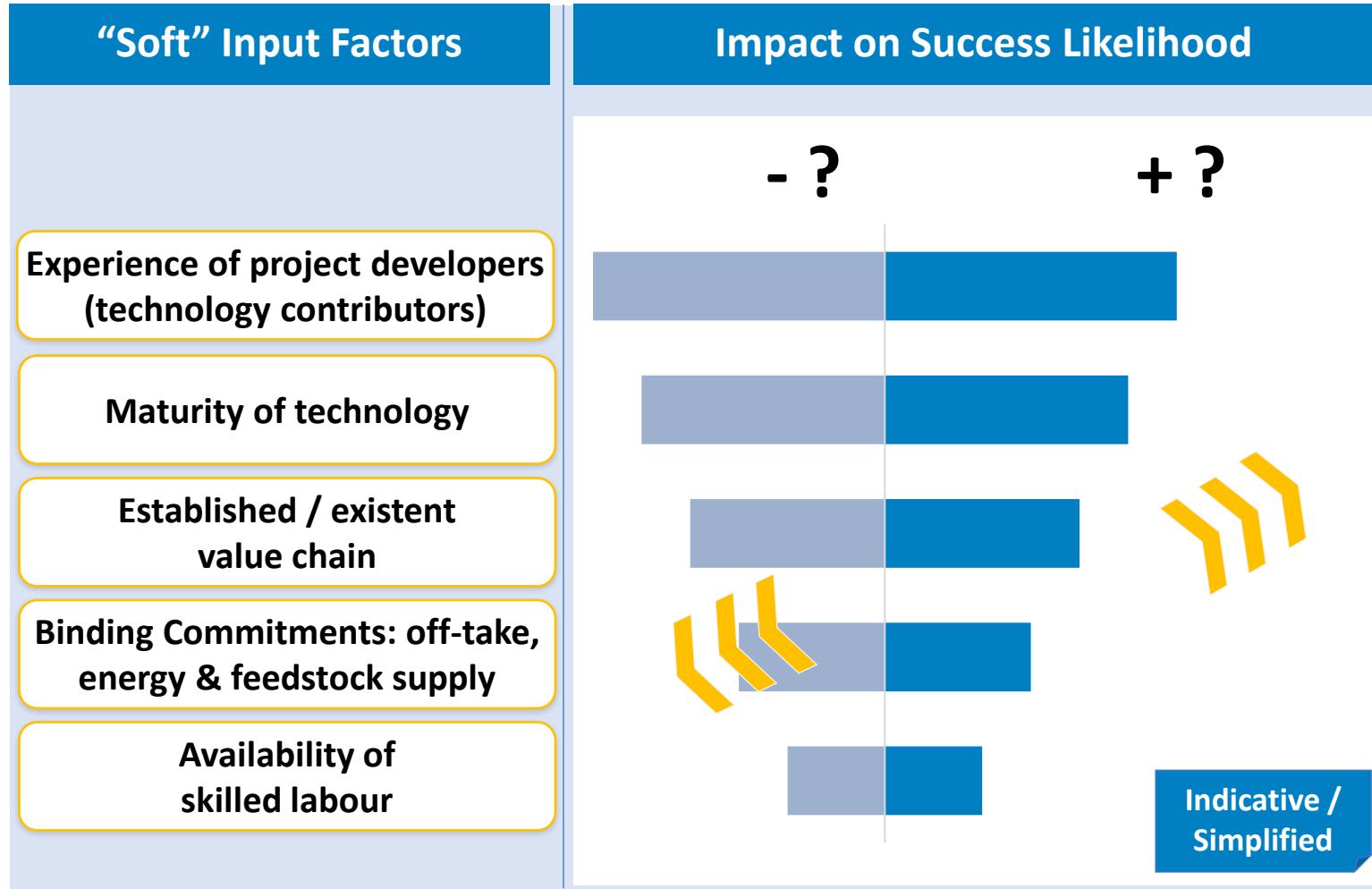


- Access to abundant feedstocks and renewable energy at favourable prices has the highest sensitivity.
- Several geographies get the opportunity to position themselves as **SAF producer regions**. Regulation of applicable feedstocks and “green” energy will **directly impact the business cases**.
- **Green premium** needs to be closed through GHG reduction incentives, to **level SAF and fossil fuel prices**.
- CAPEX related **economies of scale** over time **challenge** the long-term competitiveness of current **smaller first-of-its-kind SAF plants**.

# “Soft” techno-economic factors driving the Green Premium



Soft factors are equally important to reduce project risk and enhance the likelihood of matching expected business case returns



- **Experience in technology development, integration of production setup and plant engineering** are often underestimated.
- **Maturity of the individual technical components (TRL)** decreases the tech-risks and enhances the probability of reaching **time to market** of current SAF projects.
- **The integration into an existing value chain** (transportation, logistics, site infrastructure...) and their impact on certification processes are key.
- **Binding commitments** increase **bankability** and funding likelihood.

# Selected Measures to reduce the Green Premium of SAF



1	<b>CO<sub>2</sub>-Price/Tax</b>	<ul style="list-style-type: none"><li>➤ Increases the price of emissions and sets incentives to minimize emissions</li><li>➤ Will increase over time and if high enough, can eliminate the Green Premium</li></ul>
2	<b>Corporate Initiatives</b>	<ul style="list-style-type: none"><li>➤ Forerunners accepting the Green Premium help the build-up of SAF with their demand and allows fulfilling of own ESG targets</li></ul>
3	<b>Public Grants/Loan Guarantees</b>	<ul style="list-style-type: none"><li>➤ Due to current maturity of SAF routes, public funding plays still a substantial role</li><li>➤ Lowers capital needs, increases Return-on-Equity (ROE) and reduces SAF price</li></ul>
4	<b>Contracts for Difference</b>	<ul style="list-style-type: none"><li>➤ Carbon contracts for difference aim to make carbon pricing more predictable</li><li>➤ If SAF price deviates from agreed strike price, then the government pays the difference.</li></ul>
5	<b>Special Tax depreciations for investments</b>	<ul style="list-style-type: none"><li>➤ Investments into climate related innovations allow for use of preferential tax depreciation mechanisms</li></ul>
6	<b>Tax credits</b>	<ul style="list-style-type: none"><li>➤ Tax reduction based on the amount the reduction of specific GHG emissions (in the US for example between 1,25 and 1,75 US-\$/gal SAF)</li></ul>

# Corporate initiatives willing to bear the Green Premium



## Example initiative to counter Green Premium hurdles

### Sustainable Aviation Buyers Alliance (SABA)

BANK OF AMERICA

BCG

Meta

McKinsey  
& Company

BOEING

Deloitte.

Microsoft

NETFLIX

JPMORGAN CHASE & CO.

salesforce

Alliance to  
foster  
investments  
into SAF

## Example of corporate travel initiative

pwc

Skyscanner



**BOARD NOW**

coalition for sustainable flying

BANK OF AMERICA

prosus

SKYNRG

Microsoft

BCG

novo nordisk

south pole

VERTIS

NRDC  
NATURAL RESOURCES  
DEFENSE COUNCIL

workday

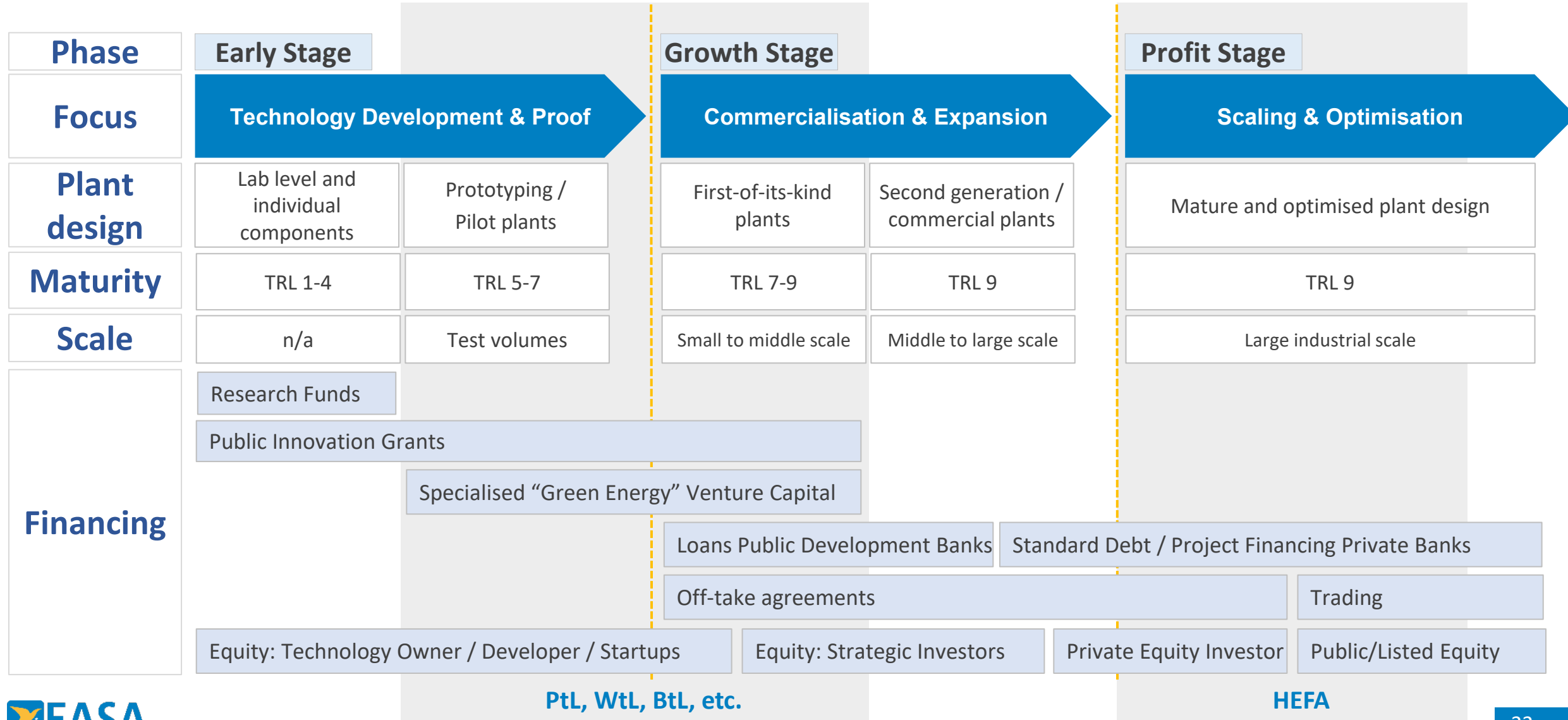
apg

climateworks  
FOUNDATION

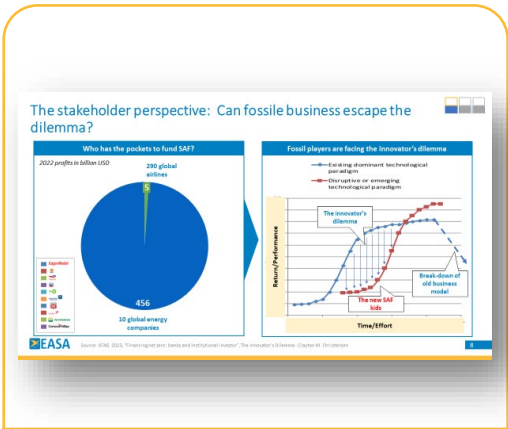
Climate  
Neutral  
Group

Members  
with binding  
commitment  
to buy SAF

# Public R&D funding, grants and loan guarantees are still key to overcome economic challenge of SAF business cases

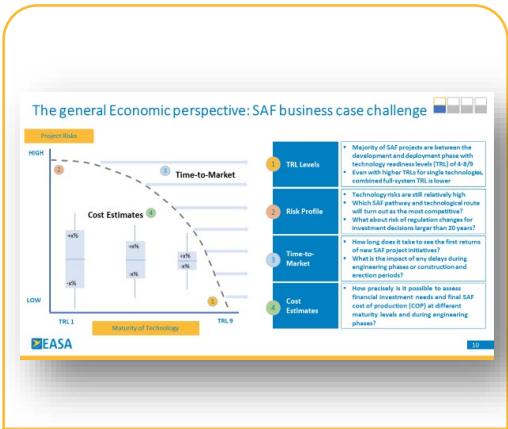


# Guiding questions today



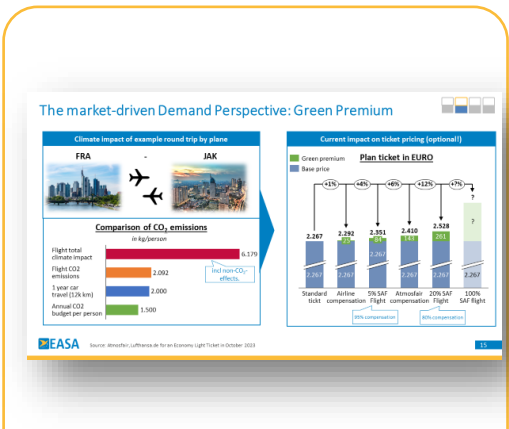
## The Stakeholder perspective:

The SAF market is facing the typical innovator's dilemma. New players have the chance to untap the huge potential of sustainable aviation.



## The Economic perspective:

SAF is still an early technology. Current Risk-Return imbalance led financial investors still waiting on the side-line.



## The Market perspective:

The Green Premium of SAF will stay for many years. Private and Public initiatives are key to make SAF pricing attractive.

# Thank you for your attention!

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