



Sustainable Aviation Fuel Policy Toolkit

Brazil - ProBioQAV

November 2021



AGENDA

SAF POLICY TOOLKIT @ ETC COMMISSIONERS MEETING

1. CST OVERVIEW
2. WHAT IS THE POLICY TOOLKIT
3. WHAT IS IN THE TOOLKIT
 - THE NEED FOR POLICY INTERVENTIONS
 - SAF STRATEGY GUIDANCE
 - POLICY FRAMEWORK TO SCALE SAF



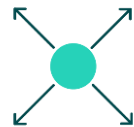
Clean Skies for Tomorrow – Project Overview

CST is a global, cross-value-chain coalition working to facilitate the transition to net-zero flying by mid-century. In partnership with ambitious senior leadership from industry, government, and civil society, the initiative is driving a shift to zero-emissions aviation through a focus on Sustainable Aviation Fuels (SAF).

Members are collectively advancing the commercial scale of viable SAF production for broad adoption through supply, demand, policy, and financial levers.



Net-Zero
Strategy



Democratize
Global SAF
Supply



Industry-
backed
Policy

ETC



Scaling
demand
signals



Financing
the
transition



CST Coalition

Steering Committee

Secretariat

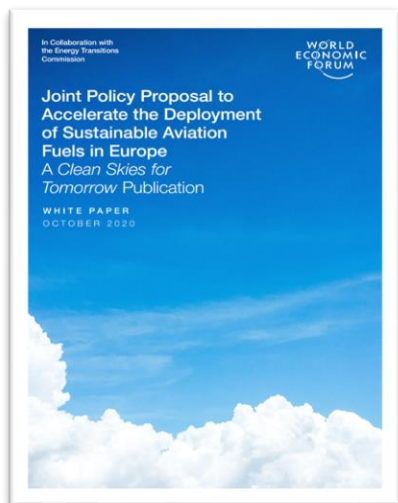
Knowledge Partners

Advisory Partners

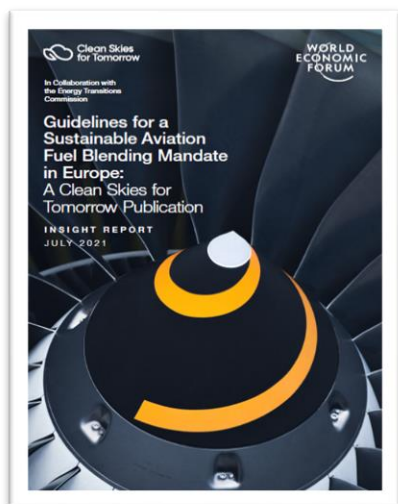
Community

SAF Ambassador Community

CST/ETC Publications – Policy Workstream



October 2020



July 2021



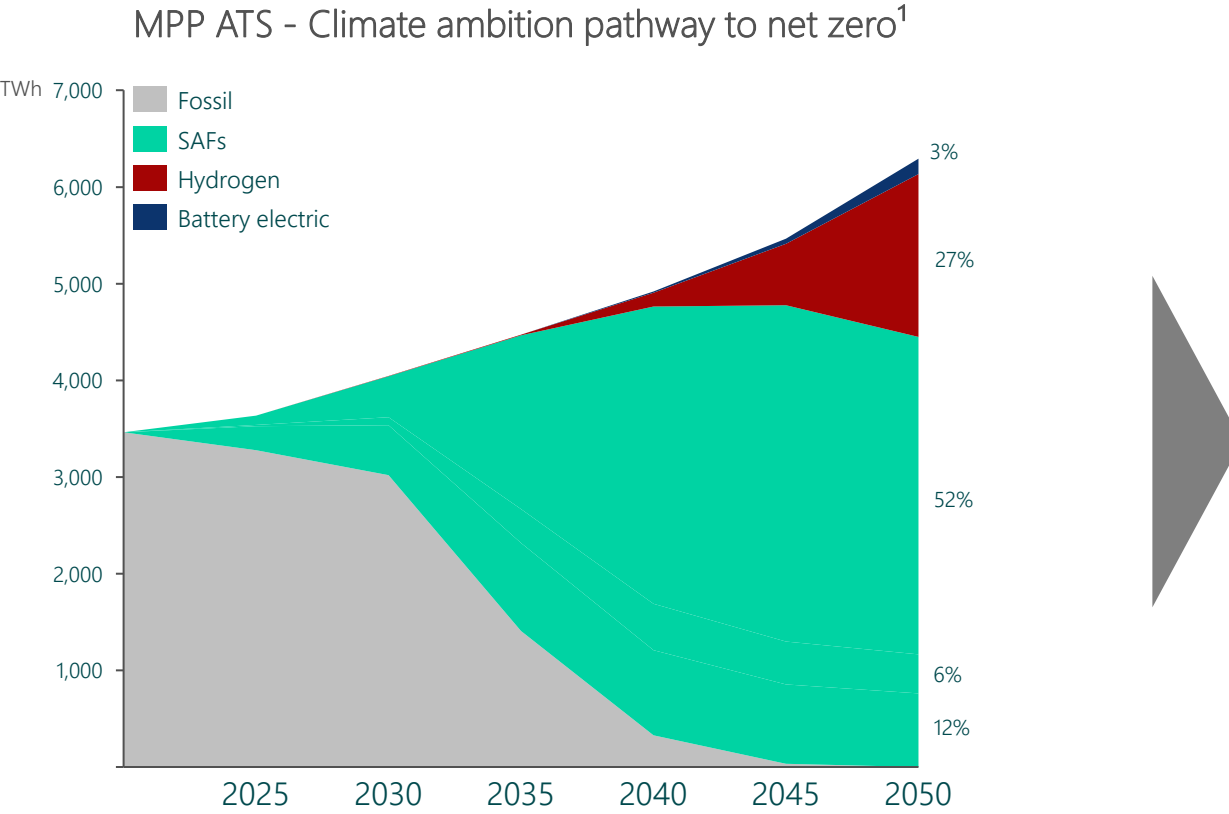
November 2021

SAF Policy Toolkit is an indicative “menu of options” for policy-makers worldwide to support the scaling of sustainable SAF markets across regions.

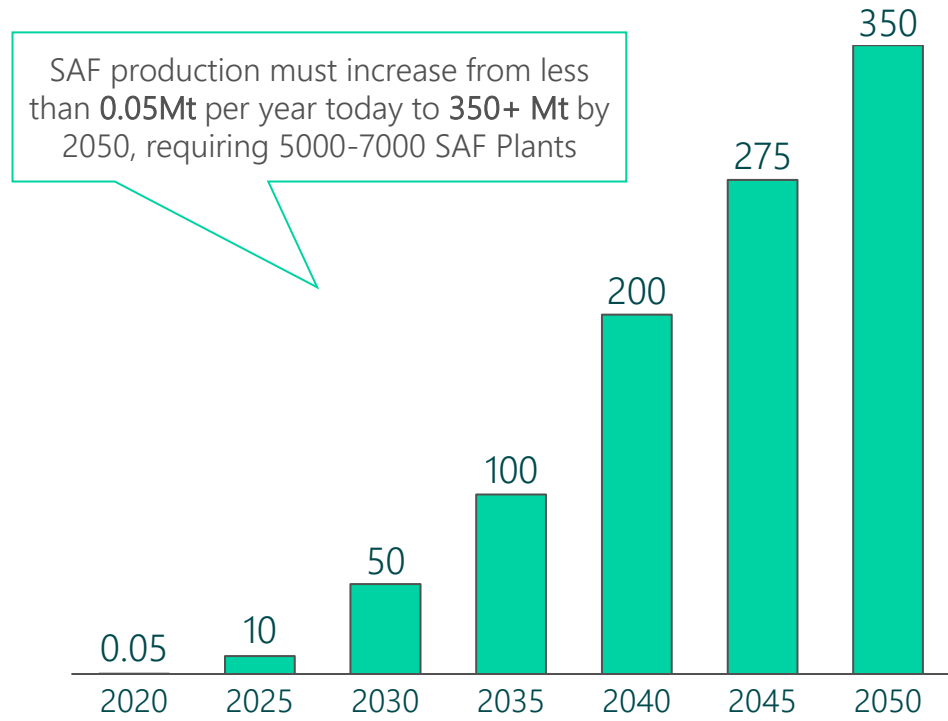
- Why SAF policy is needed
- Critical actions before pursuing specific policies
- Decision pathway for policy options available



SAFs need to account for ~70% of total jet fuel consumption in 2050 in net-zero scenarios



SAF ramp up required for net-zero alignment globally



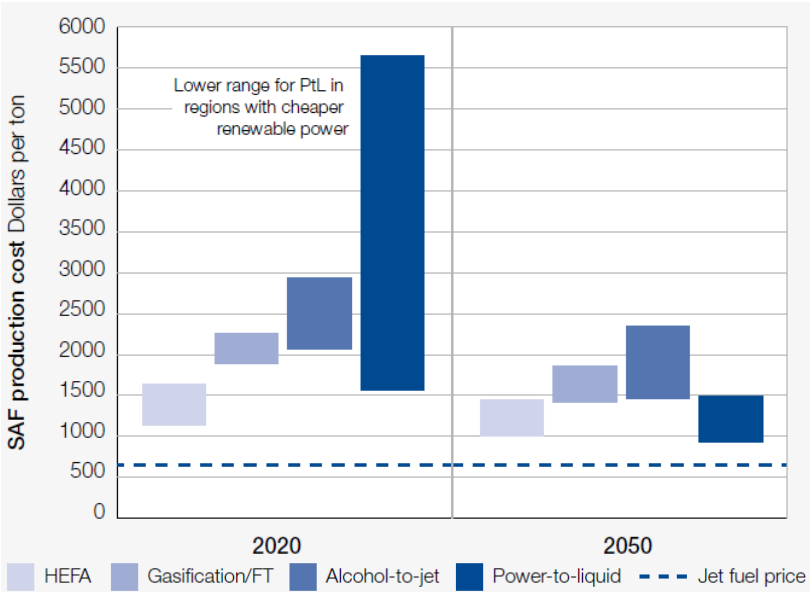
1. WORK IN PROGRESS
 SOURCES: MPP AVIATION TRANSITION STRATEGY AND ATAG WAYPOINT 2050, 2021

Scaled SAF deployment is currently held back by major barriers and policy interventions will be required to unlock supply and demand at scale



Cost Differential

SAF cost 2 to 4 times or more the price of fossil kerosene depending on the technology. Prices will come down, but not to parity



Supply Chain Investments

A whole new supply chain needs to be built up – e.g. in Europe, investments of €15 billion/year on average required until 2050



Technological Readiness

New scalable production routes (AtJ, G+FT, PtL) are still at low TRL and need to be proven at commercial scale



Level-Playing Field

Uptake of SAF despite cost differential risks of competitive distortions and carbon leakage

Before implementing SAF policies, states should first develop a coherent national SAF strategy

Considerations to Inform Policy Direction:

Gather intelligence and establish a fact base

Set a vision for SAF

Create a transition pathway

Build flexible and inclusive policy

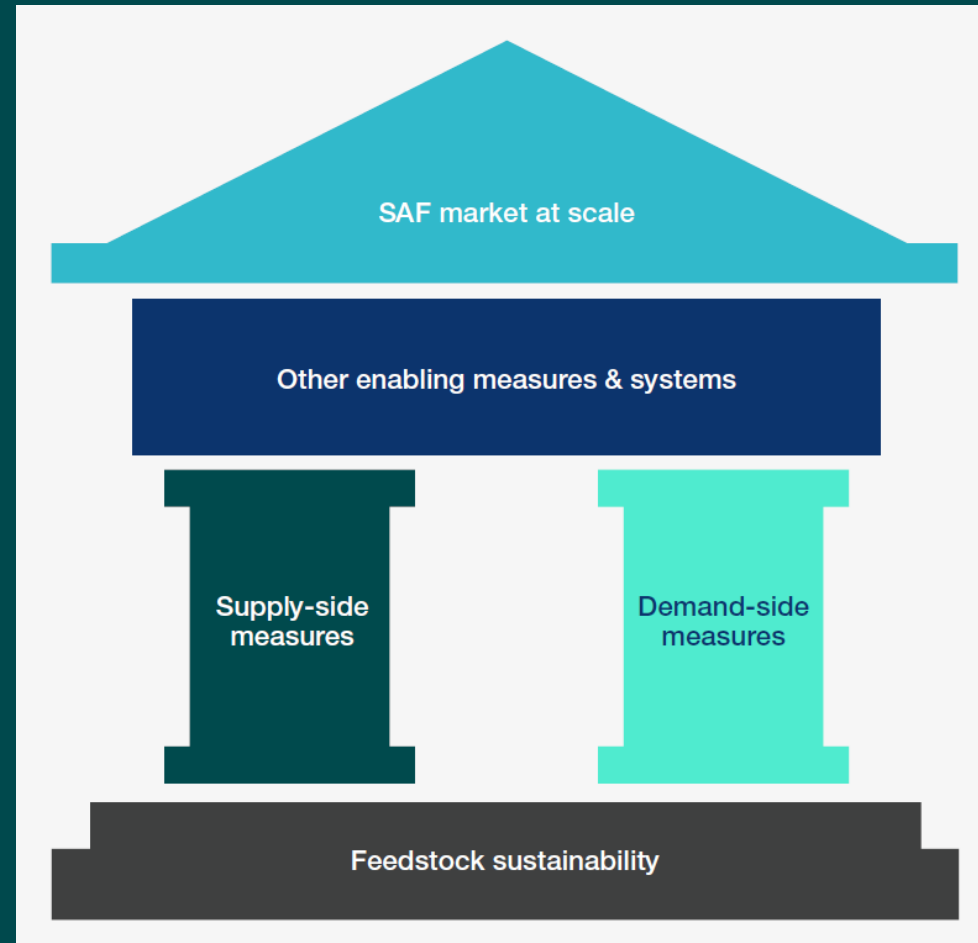
Manage risks that may arise

Cooperate on national, regional and international level



Example of an SAF study for India - June 2021

A range of policy Supply, Demand and Enabling instruments need to be planned and implemented in a coordinated way.



Overview of regulatory framework for a SAF market at scale

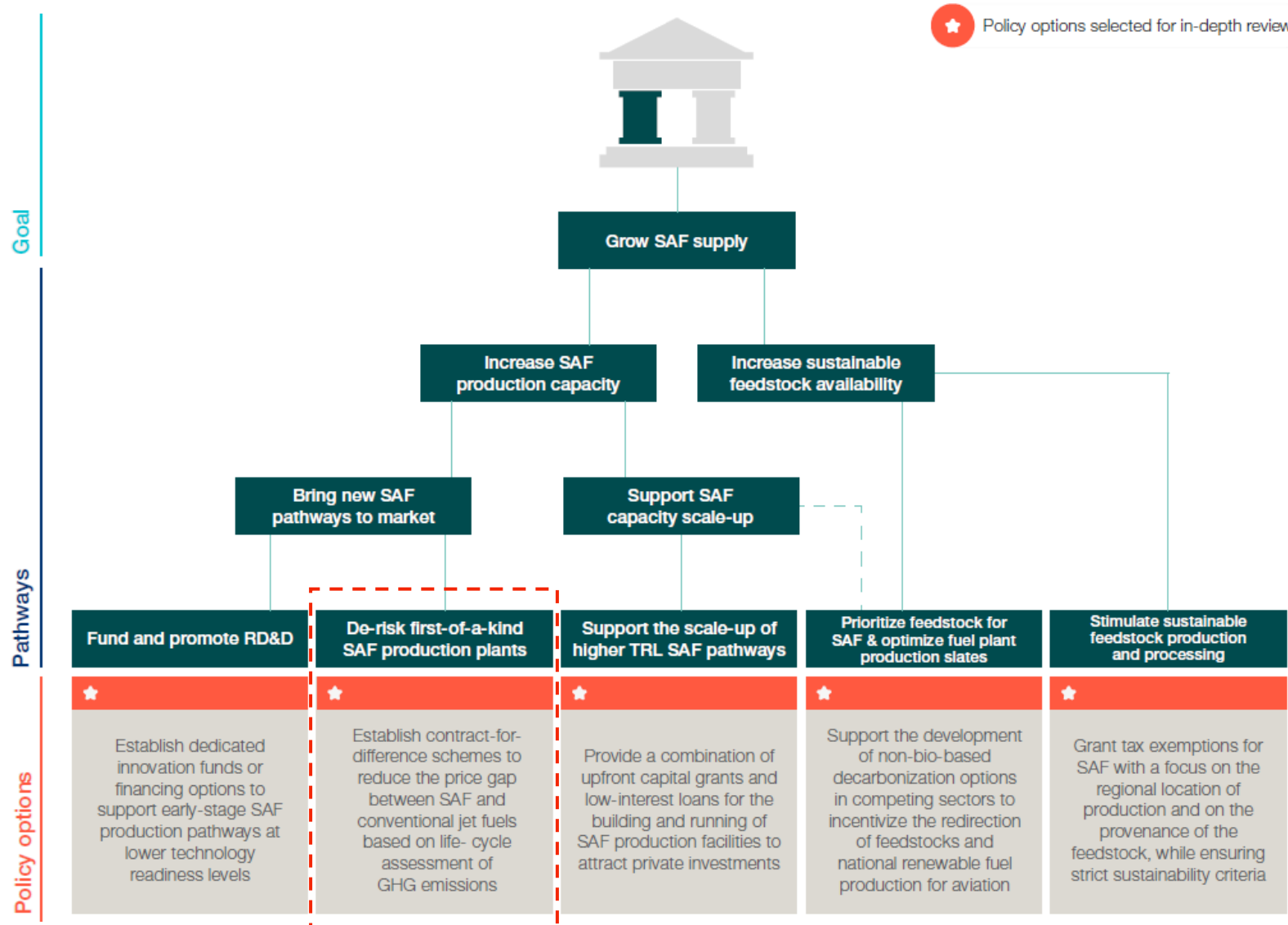
SAF must be produced from sustainable feedstocks that significantly reduce LCA GHG emissions

CST guiding principles are outlined as a quick-reference guide for policy-makers

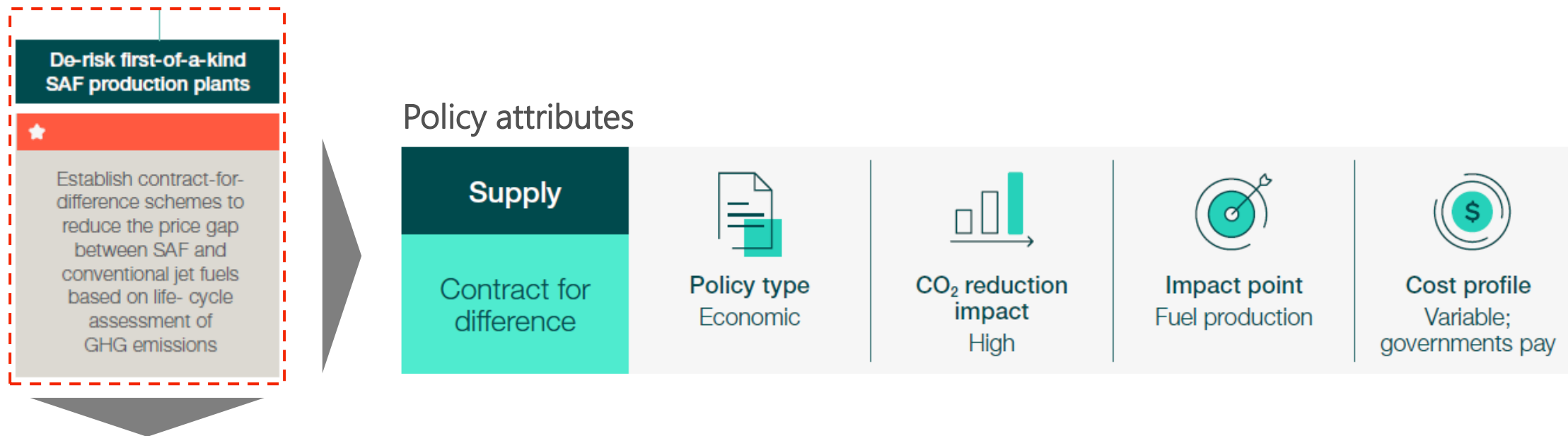
Feedstock type	Feedstock category	Feedstock ^{vi}	Substantial GHG savings potential ^{vii}	Low sustainability concerns ^{viii}		
1 st gen / crop-based	Edible oil crops	Palm	✗	✗		
		Soybean	✗	✗		
		Other (incl. sunflower, rapeseed/canola)	✗	✗		
	Edible sugars	Sugar cane	⊙	✗		
		Maize	✗	✗		
		Other	✗	✗		
Advanced and waste	Waste and residue lipids ⁱ	Used cooking oil (industrial or private sources)	✓	✓		
		Animal waste fat (tallow)	✓	⊙		
		Other (incl. tall oil, technical corn oil, fish oil, POME, PFAD)	✓	⊙		
	Purposely grown energy plants	Oil trees on degraded land	Jatropha, pongamia	✓	⊙	
			Rotational cover crops	Oil cover crops	Camelina, carinata, pennycress	✓
		Cellulosic cover crops	Miscanthus, switchgrass, reed canarygrass	✓	⊙	
			Agricultural residues	Rice straw	✓	✓
	Forestry residues ⁱⁱⁱ	Sugar cane bagasse	✓	✓		
		Other (incl. corn stover, cereal residues)	✓	✓		
	Wood-processing waste ^{iv}	✓	✓			
	Municipal solid waste ^v	✓	✓			
	Recycled carbon	Reusable plastic waste	✗	✓		
		Industrial waste gas	CO ₂ from point source capture (CCS)	✓	✓	
Other (e.g. flue gas from steel production)			✓	✓		
Non-biomass based ⁱ	CO ₂ from direct air capture (DAC)	✓	✓			

Focus of analysis ✓ Satisfied ⊙ Potentially satisfied^{ix} ✗ Not satisfied

The toolkit provides a decision pathway and a range of policy options available



An in-depth review for selected policy options



Brief explanation of the policy

Implementation considerations

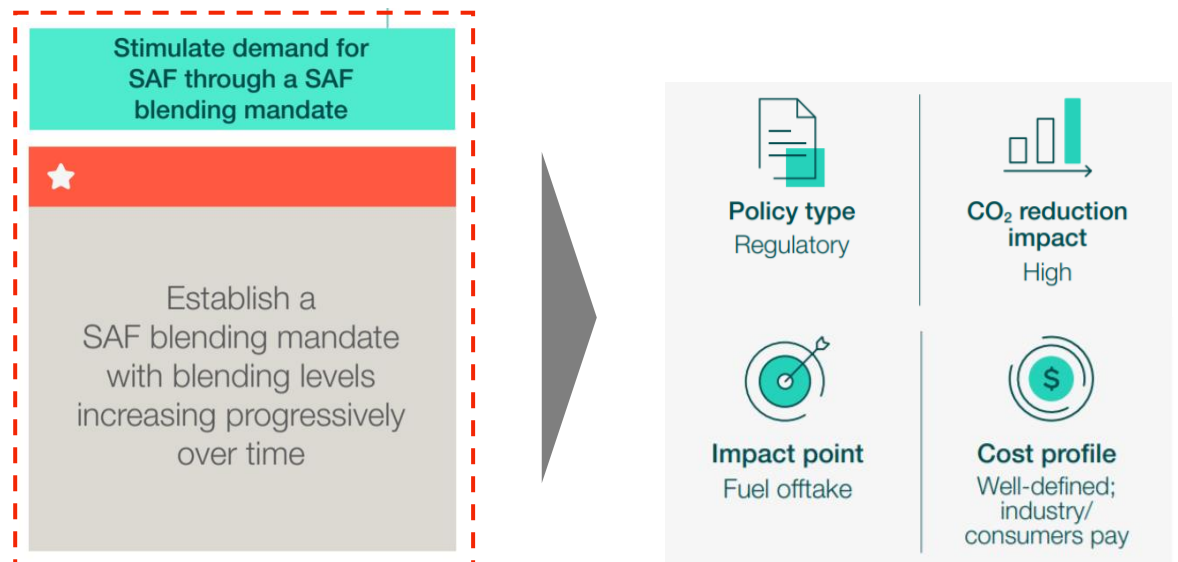
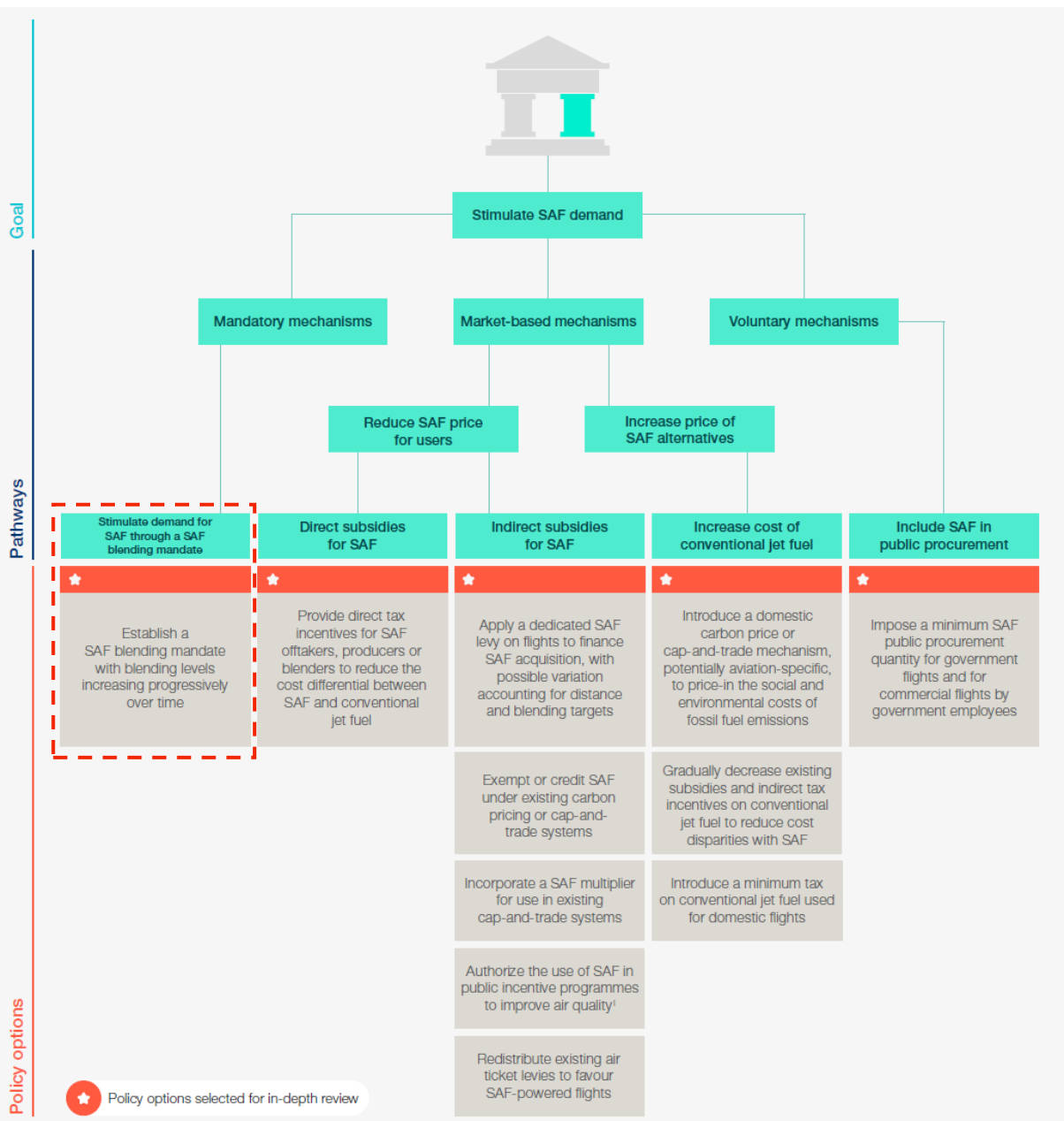
- **Policy duration:** CfD schemes need to be sufficiently long to match the necessary investment cycle.
- **Tailoring:** CfD mechanisms can be tailored to stimulate SAF production from specific pathways.
- **Funding:** funding for such programmes often comes from dedicated green levies and taxes on the general market.
- **Allocation:** CfDs should be given based on GHG savings rather than volumes.

Example

- The SDE++ (stimulation of sustainable energy production and climate transition) programme in the Netherlands

DEMAND-SIDE measures & supporting policies

In-depth review of selected polices - Example



Implementation considerations

- Sub mandates
- Types of Targets
- Need for Oversight
- Market Distortions
- Implementation Mechanisms
- ...

Example:

- ReFuel EU

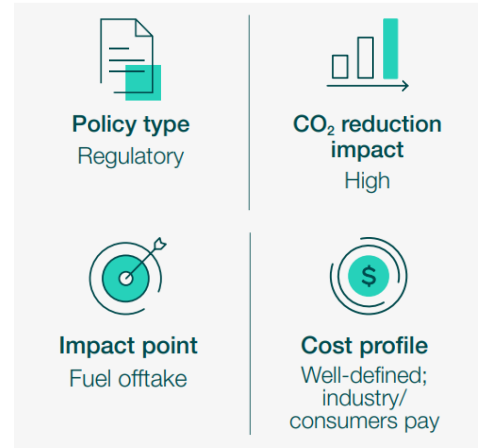
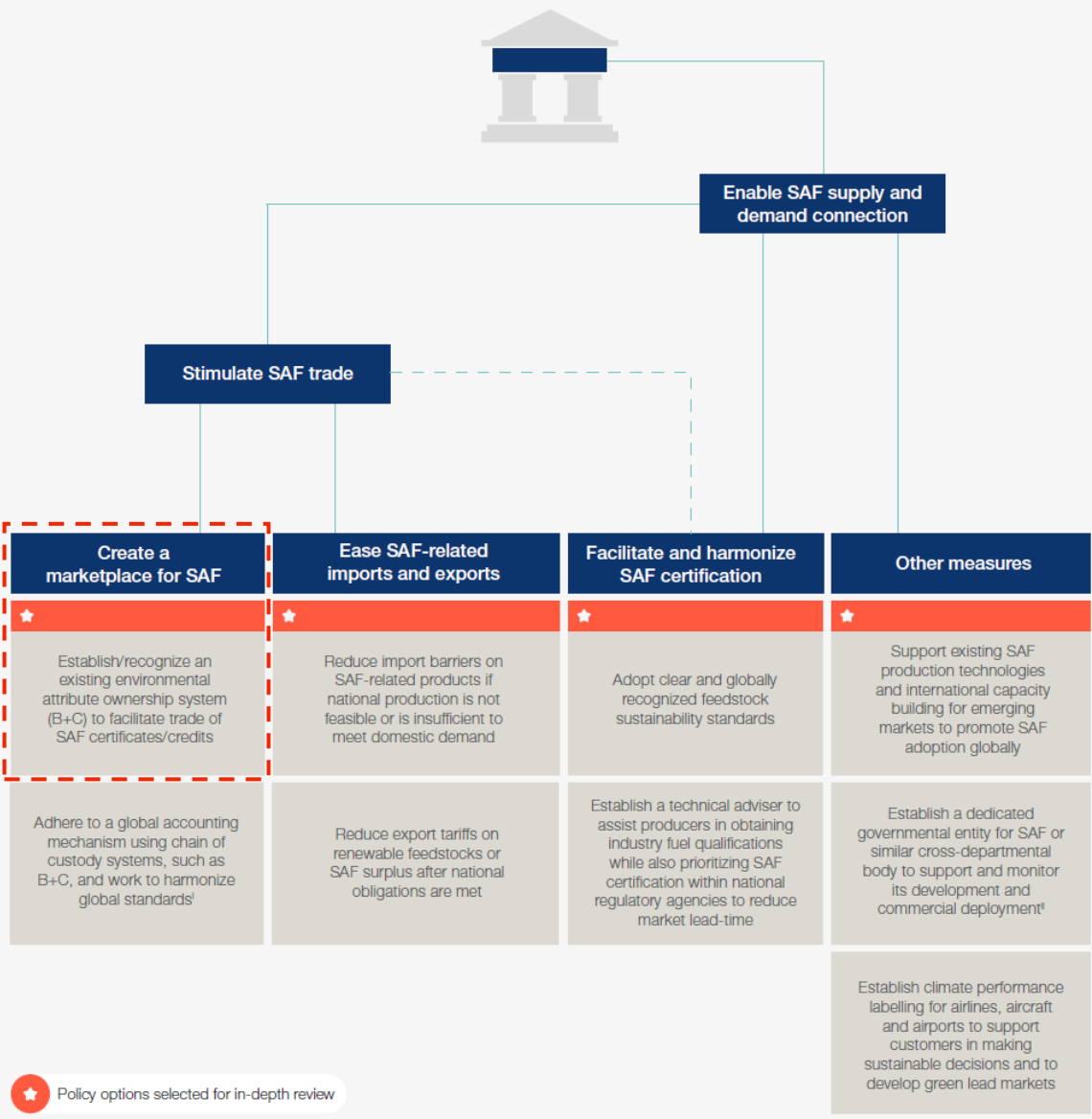
ENABLING measures & supporting policies

In-depth review of selected polices - Example

Goal

Pathways

Policy options



Implementation considerations

- Design of certificates
- Harmonization amongst markets
- Need for Oversight
- Costs to implement
- Reputational risks
- ...

Example:

- CST SAF Certificates for private companies

The industry is moving: CST Ambition Statement



Members of the coalition agree that achieving the emissions caused by the aviation sector energy efficiency through the use of new technologies will be balanced by appropriate carbon removal.

Hybrid-electric and hydrogen-powered aircraft are on the horizon, but development and deployment of short to medium-range aircraft. The deployment will significantly reduce the aviation industry's emissions beyond 2050.

Sustainable Aviation Fuels

The Clean Skies for Tomorrow Coalition puts the aviation value chain, to align on a clear pathway for the industry to achieve carbon neutrality.

Synthesized from sustainable, renewable lipids, or developed through a power-to-liquids. It is fully compatible with existing aircraft and investment required to underpin the transition.

The key issue currently preventing the production of jet fuel and SAF, which remains profitable with supply and demand, costs will come down due to economies of scale, but fuel providers are at a low due to the high price premium. Further investment is required to underpin the transition.

Members of the coalition are committed to producing and carriers are both either using or investing in technologies to reach a scale where they are profitable.

To break this impasse, members of the coalition are championing sustainable low-carbon aviation fuels (bio-based and power-to-liquids) independently championed by industry initiatives for carbon-neutral flying, co-investment in value-chain industry blueprints.

Achieving our ambition will require continued leadership from governments, industry, and investors. We are therefore calling on governments, industry, and investors to achieve our vision through comprehensive policy mechanisms, targeted investments and fiscal support and regulations that afford a level-playing field while incentivizing transformation. Together we can take a giant leap towards the decarbonized, sustainable and affordable aviation industry needed for our global future.

2030 Ambition Statement

Through the concerted effort of ambitious industry and state leaders, together we can put the global aviation sector on the path to net-zero emissions by 2050 by accelerating the supply and use of SAF technologies to reach 10% of global jet aviation fuel supply by 2030.

The Challenge

Climate change is one of the most urgent challenges of our time and requires collective action to solve, embodied in a shared vision and collaboration across government, industry and society. Aviation, one of several harder-to-abate sectors, accounts for about 1 billion metric tons, or 2-3% of global CO2 emissions annually, with overall impacts on climate change even higher as a result of climatic-forcing mechanisms.

The economic and social benefits of air travel are undeniable, providing global access to goods and services and opportunities to experience new places and cultures. The aviation industry has played a large part in enabling the benefits of globalization, and as the aviation industry is forecast to continue to grow year on year post the COVID-19 pandemic, the sector's share of global CO2 will increase, especially as other sectors decarbonize in coming years. It is in this context that the aviation industry and its entire value chain is today confronting the challenge of how to continue to deliver benefits in an environmentally sustainable way.

The decade until 2030 is our window of opportunity to shift the sector to a global sustainable future through targeted investments and business model transformation, and members of the Clean Skies for Tomorrow Coalition are committed to achieving a net-zero emissions sector by mid-century.

A multi-pronged approach to decarbonization

As travel picks up in the wake of the pandemic, aviation could return to producing about 2-3% of total global GHG emissions if we take no action – with overall impacts on climate change at even higher percentages as a result of climatic-forcing mechanisms. Additionally, as other sectors accelerate towards net-zero emissions, the aviation sector's share may increase even further, and the industry, known for leading in innovation and its early climate commitments, may lag and face heavier scrutiny from society.



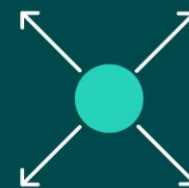
80+

Stakeholders across the aviation value chain



1/3

Representing 1/3 of aviation's CO2 emissions



22

From 22 different countries



3Bn

Representing a SAF demand of 3B gallons by 2030



10%

Join forces to achieve 10% SAF by 2030



17

Airlines representing over 1/3 of total aviation revenue

Obrigado.
carlos.agnes@systemiq.earth

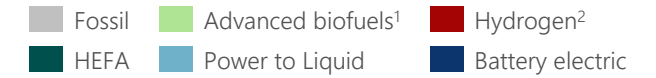


QR Code to access the
SAF Policy Toolkit

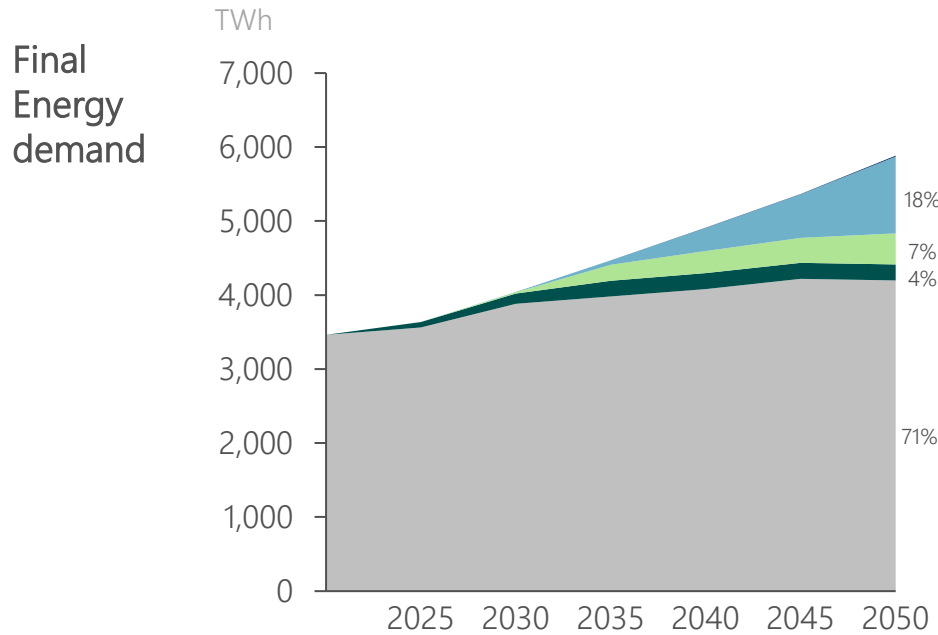


Energy
Transitions
Commission

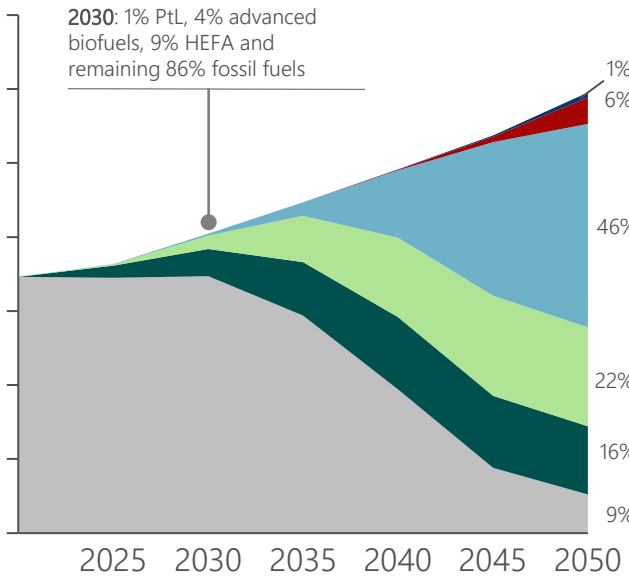
Energy carrier mix as output of the three modelled pathways



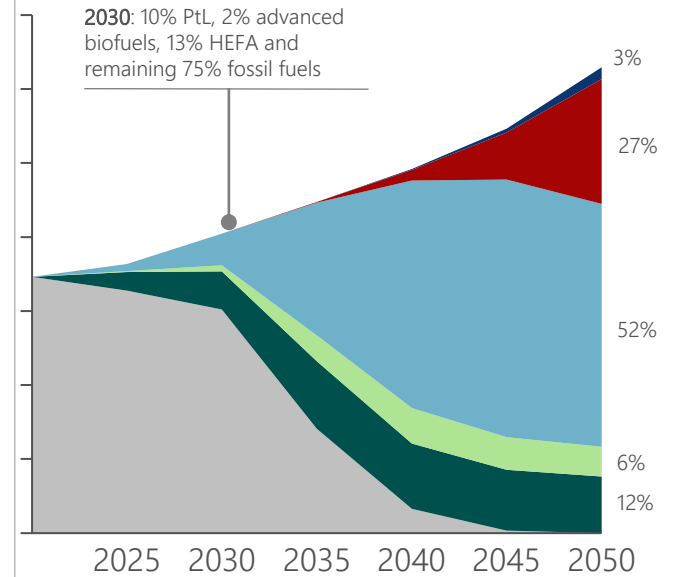
BAU pathway



Moderate tech pathway



Climate ambition pathway



What we need to believe

- No willingness to pay additional cost for reducing carbon footprint
- Intended use of SAFs in EU and US materializes

- Willingness to pay a **green premium of 30%**
- Medium reduction in LCOE until 2050
- PtL scales in late 2030s to compete with biofuels
- **Later scaling of novel propulsion technologies**

- Willingness to pay a **green premium of 25%**
- **Significant reduction in LCOE** until 2050
- PtL scales and becomes competitive earlier
- **Earlier scaling of novel propulsion technology**

Note: Underlying demand growth follows a CAGR of 3.8%

1. Advanced biofuels are defined as non-HEFA biofuel production pathways; the cost of G-FT is taken as a proxy fuel production pathway - advanced biofuels could however include Alcohol to Jet (AtJ), pyrolysis and other advanced biofuels
2. Includes H2 fuel cell and H2 combustion