FLY NET ZERO

ATAG
AIR TRANSPORT ACTION GROUP

Unlocking investment in SAF

ishka
Aviation. Acumen. Attitude.

| 13 March 2024, London

Our members

Principal partners

Strategic associates

Supporters

- Arab Air Carriers Organization (AACO)
- Airlines for Europe (A4E)
- Airlines International Representation in Europe (AIRE)
- Asociación Latinoamericana y del Caribe de Transporte Aéreo (ALTA)
- Comac
- European Regions Airline Association (ERA)
- Fédération Nationale de l'Aviation et de ses Métiers (FNAM)
- Genève Aéroport
- International Air Rail Organisation
- International Chamber of Commerce
- International Coordinating Council of Aerospace Industries Associations (ICCAIA)
- Pacific Asia Travel Association (PATA)
- Paris Aéroport
- Administratia Romana a Serviciilor de Trafic Aerian (ROMATSA)
- World Travel and Tourism Council (WTTC)

What I shall cover off

The scale of the challenge

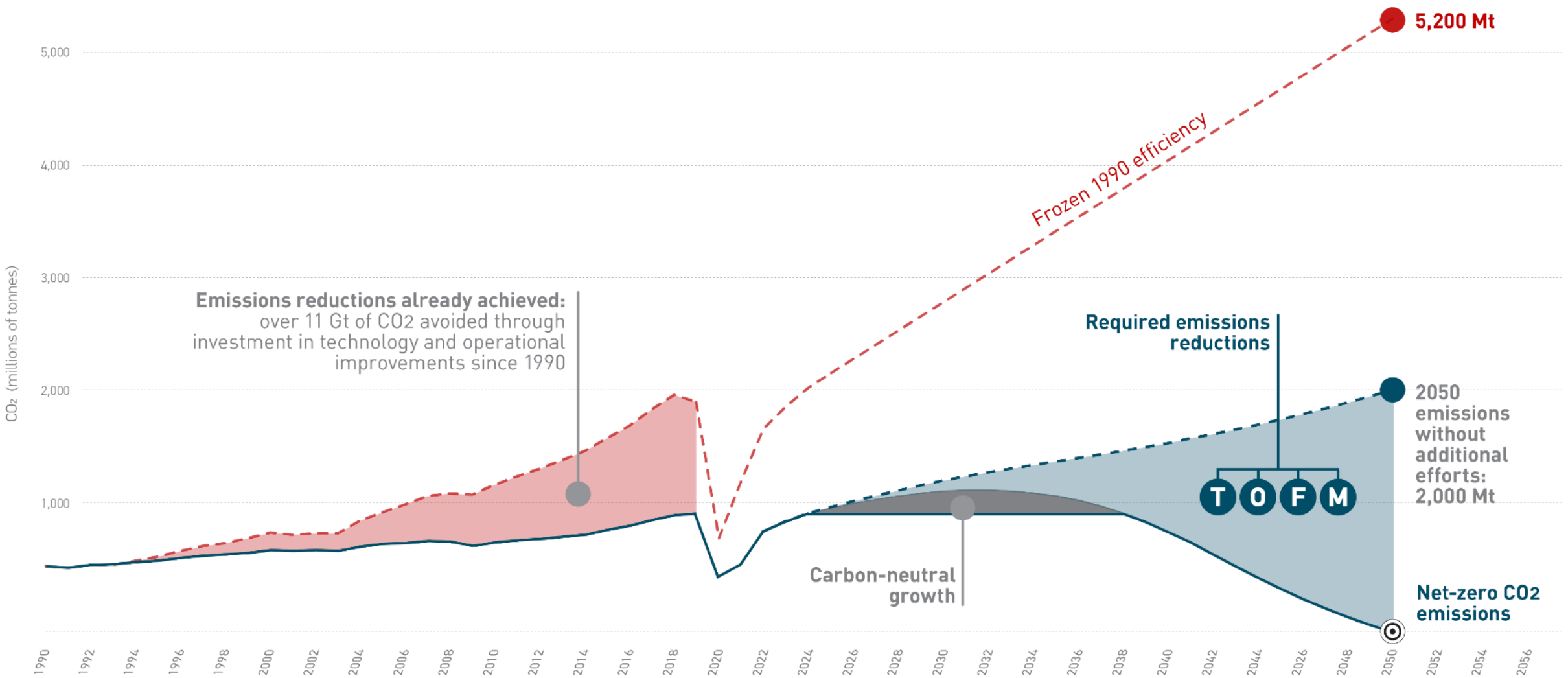
Demand and supply

Finance

Some things are taken as read…

- Assume you all **know what SAF is**…!
- There is no point in pursuing SAF if **sustainability** is not top-of-mind.
- We will tap in to a **menu** of feedstocks and pathways
- There is a need for SAF to be deployed **globally** – not just in Europe and North America (we need special attention on this).
- Technical hurdles to **100% SAF** use will be overcome.
- This is going to be the **challenge of the century**… but it can be done (if we all pull together).

Charting a course for 2050: net-zero globally



Development of the analysis

Experts in five working groups developed forecasts and likely pathways

These were developed into consolidated scenarios to meet the industry goal

- Traffic forecasting
- **T** Technology developments
- **O** Operations and infrastructure
- **F** Sustainable aviation fuel
- **M** Offsetting (market-based measures)

Scenario 1

Scenario 2

Scenario 3

Industry **2050** goal

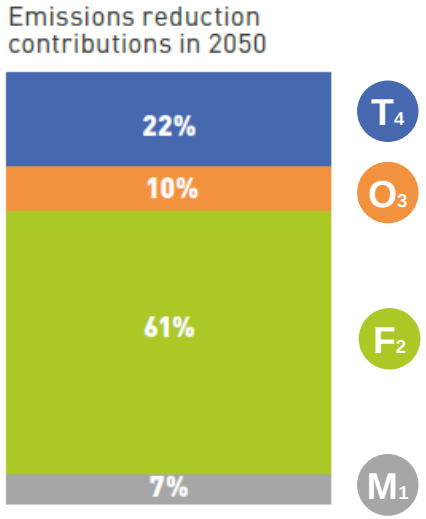
Net-zero CO_2

Meeting the industry goal by exploring different levers

Scenario 1

Pushing technology and operations

Industry prioritises technology and operational improvements

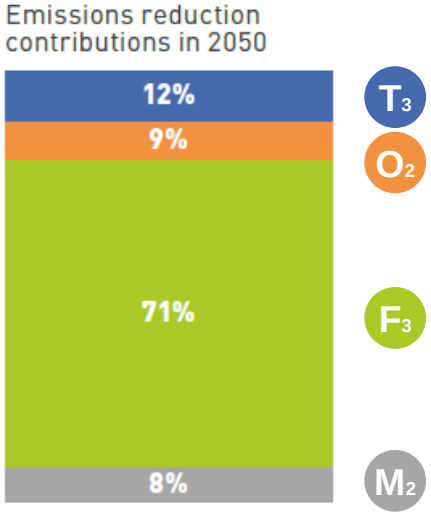


Electric and hybrid short-range (<100 seat) aircraft from 2035/2040. High-range operational improvements. 380 Mt of SAF by 2050.

Scenario 2

Aggressive sustainable aviation fuel deployment

Industry prioritises investment in sustainable aviation fuel over technology

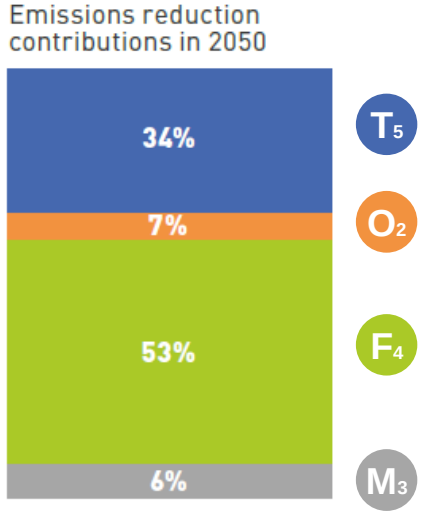


New airframe configurations such as blended wing body. Mid-range operational improvements. 445 Mt of SAF by 2050.

Scenario 3

Aspirational and aggressive technology perspective

Highly ambitious technology developments: electric and/or hydrogen for up to 200 seat aircraft before 2035



Very aggressive zero emissions aircraft (electric, hydrogen) by 2035-2040. Mid-range operational improvements. 330 Mt of SAF by 2050.

When will passengers fly on hydrogen or electric planes?

	2020	2025	2030	2035	2040	2045	2050	
Commuter » 9-50 seats » <60 minute flights » <1% of industry CO_2	**SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	~27% of CO_2 emissions
Regional » 50-100 seats » 30-90 minute flights » ~3% of industry CO_2	**SAF**	**SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	**Electric** or **hydrogen fuel cell** and/or **SAF**	
Short-haul » 100-150 seats » 45-120 minute flights » ~24% of industry CO_2	**SAF**	**SAF**	**SAF**	**SAF** potentially some **hydrogen**	**Hydrogen** and/or **SAF**	**Hydrogen** and/or **SAF**	**Hydrogen** and/or **SAF**	
Medium-haul » 100-250 seats » 60-150 minute flights » ~43% of industry CO_2	**SAF**	**SAF**	**SAF**	**SAF**	**SAF**	**SAF**	**SAF** potentially some **hydrogen**	~73% of CO_2
Long-haul » 250+ seats » 150 minute + flights » ~30% of industry CO_2	**SAF**	**SAF**	**SAF**	**SAF**	**SAF**	**SAF**	**SAF**	

ICAO Assembly/41 in 2022 delivered

Outcomes at CAAF/3

5% reduction

in the carbon intensity of the fuel used in 2030 through the use of SAF

This equates to around 23Mt of SAF at a global level, or 14Mt for international-only.

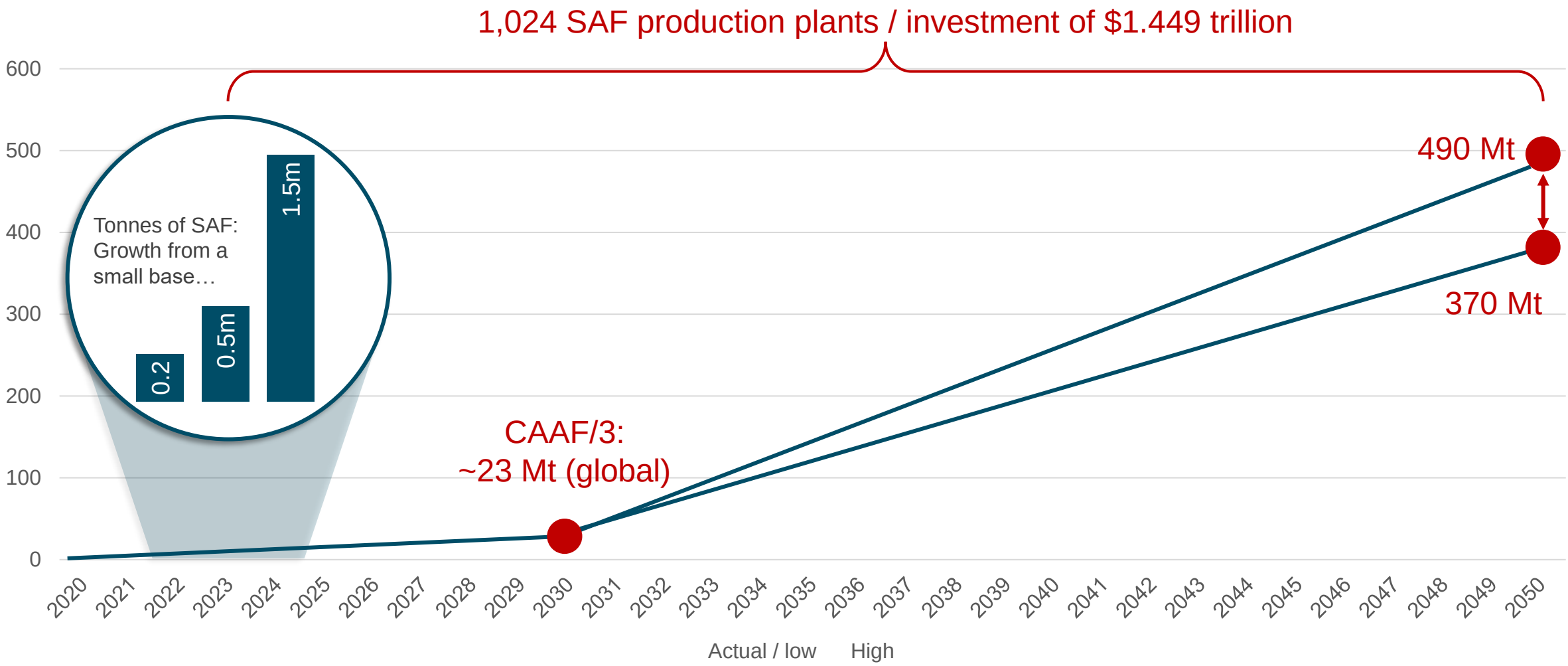
0.5Mt in 2023, 1.5Mt expected in 2024

ICAO Vision

Global framework

- Capacity building: ACT-SAF project
- Financing: Finvest Hub
- Enabling mechanisms: such as SAF accounting

From today to 2050 – what does the SAF ramp-up look like?



What I shall cover off

Some airlines are making longer-term SAF commitments: **10% by 2030**

Aer Lingus
BRITISH AIRWAYS
IBERIA
vueling
American Airlines
CATHAY PACIFIC
SriLankan Airlines
ROYAL JORDANIAN
FINNAIR
QANTAS
Jetstar

AIRFRANCE
KLM
transavia
jetBlue
malaysia airlines
Southwest
virgin atlantic
DELTA
Alaska
ANA
JAPAN AIRLINES

QATAR AIRWAYS القطرية
royal air maroc
AIR NEW ZEALAND
LATAM
5% commitment
HAWAIIAN AIRLINES
AEROMEXICO
FIJI AIRWAYS
CARGOJET
SpiceJet
IndiGo

RYANAIR
12.5% commitment

SAS
25% “in the 2030s”
norwegian
28% commitment
DHL
30% commitment
ups
30% commitment
FedEx
30% commitment

40+	32%	35%
airlines	Global passengers	Global RTKs

Demand intentions:

Significant growth in offtakes since CAAF/2

- Aegean Airlines
- Air Canada
- Air France
- Air Greenland
- Air Transat
- Alaska Airlines
- All Nippon Airways
- Amazon Air
- **American Airlines**
- Asiana
- Austrian Airlines
- British Airways
- Cathay Pacific
- Cebu Pacific
- **Delta**
- DHL Express
- EasyJet
- FedEx
- Finnair
- Hawaiian Airlines
- IAG
- IAG Cargo
- Iberia Airlines
- Icelandair
- ITA Airways
- Japan Airlines
- **JetBlue**
- **KLM**
- Korean Air
- LOT Polish Airlines
- **Lufthansa Group**
- Netjets
- Qantas
- Qatar Airways
- **Ryanair**
- SAS
- Scoot
- Singapore Airlines
- Southwest Airlines
- Sunclass Airlines
- **United Airlines**
- Verijet
- Virgin Atlantic
- VistaJet
- Wizz Air

Some airlines with several offtakes (portfolio approach)

7 airlines with 4 or more offtakes

Weighted average offtake term: ~10 years

Predominantly voluntary SAF procurement

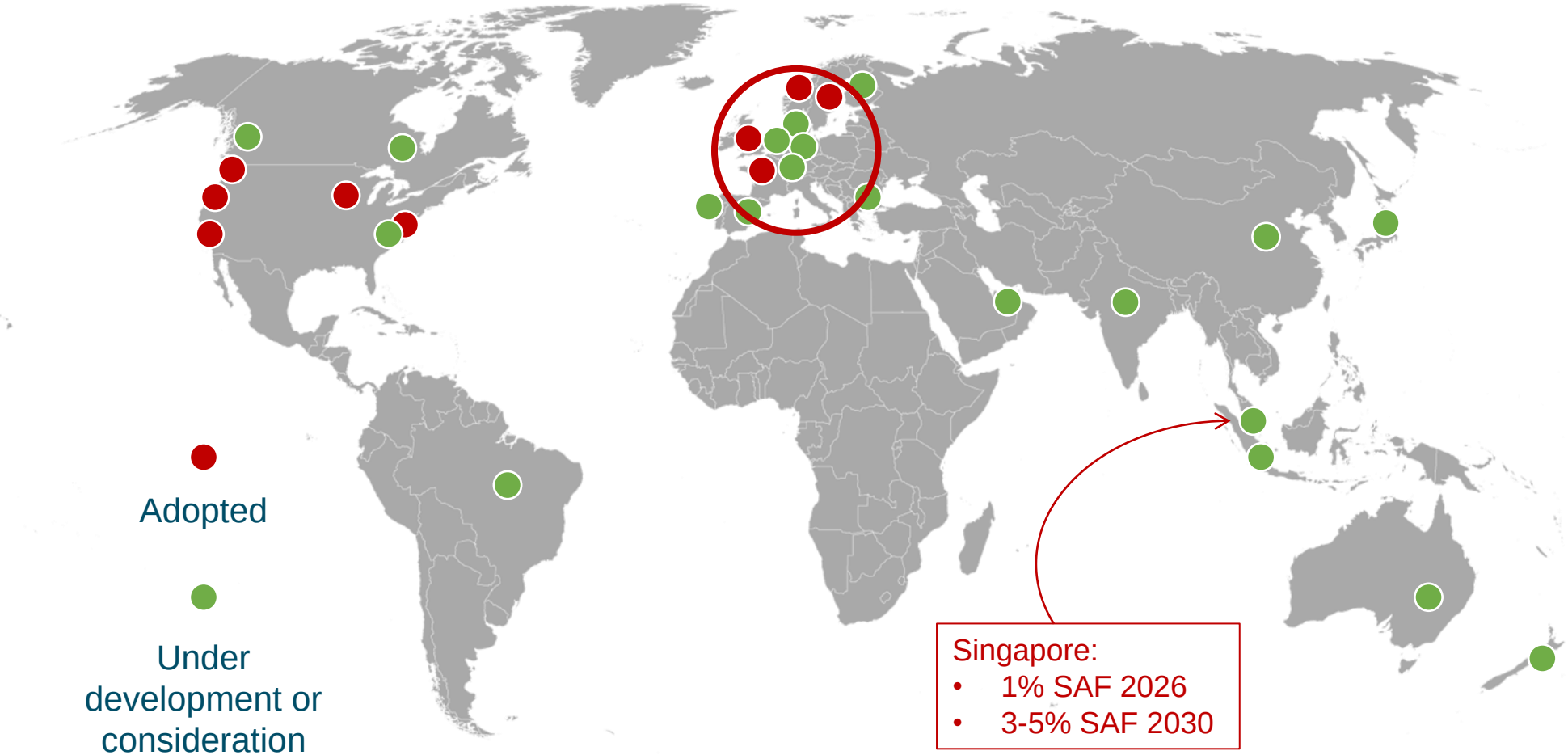
45

airlines with offtake agreements for SAF totalling over

37 Mt / ($45bn)

so far…

Government policy to add demand: **global picture**



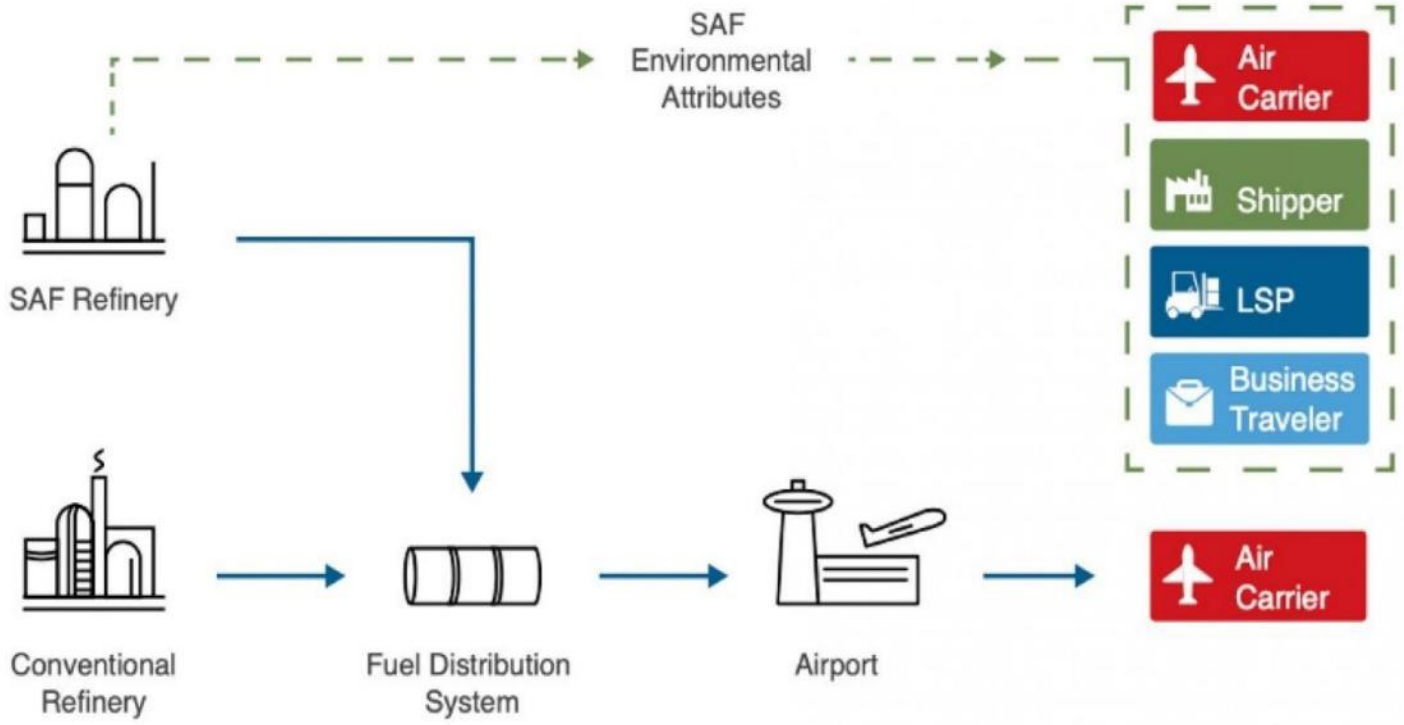
Around 40 countries covering about 65% of global jet fuel use are implementing or considering SAF policy options.

From those with detailed policy measures, around **23Mt of SAF** would likely be required in 2030.

Book and claim: a solution for mid-term action

Chain-of-custody model allowing “de-coupling” of environmental benefits from physical transfer of SAF via book and claim registry

- Allow companies to contribute to goals of Paris Agreement;
- Provide return on investment on innovative climate solutions;
- Allow for efficient capital deployment;
- Provide real emissions reductions.



Chain-of-custody model allowing “de-coupling” of environmental benefits from physical transfer of SAF via book and claim registry

Other initiatives, studies and roadmaps

By individual passengers

(as part of a ticket or separately through the booking process)

SAS
Lufthansa
brussels airlines
Eurowings
AirDolomiti
BRITISH AIRWAYS
airBaltic
SWISS
jetBlue
Austrian

By corporate customers

(large purchasers of tickets or air services)

CATHAY PACIFIC
KLM
DHL
virgin atlantic
UNITED
cargolux
BRITISH AIRWAYS
DELTA
AIRFRANCE
Alaska

Separate to airline

(direct purchase of SAF into the system)

SABA
SUSTAINABLE AVIATION BUYERS ALLIANCE
Fly Green Fund
First Movers Coalition
SKYNRG
Avelia

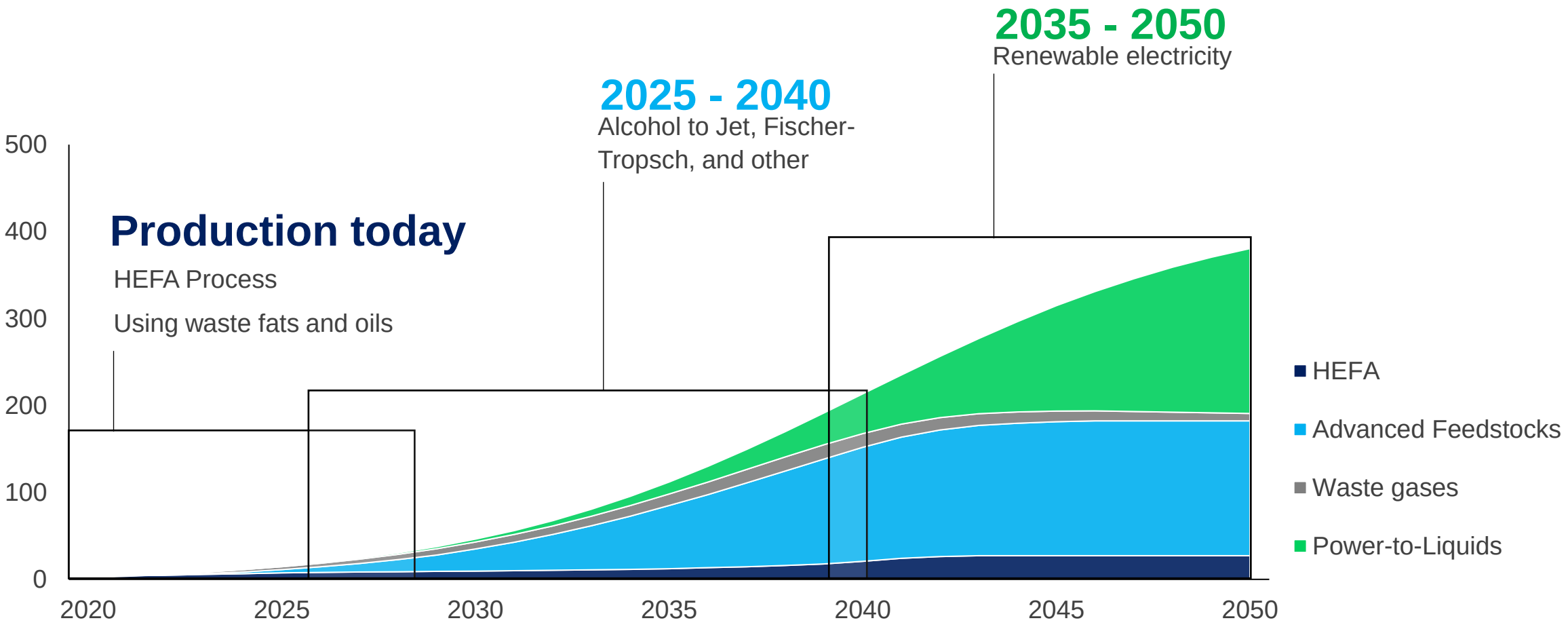
Global roadmaps

(Global roadmaps that provide SAF guidance)

WAYPOINT 2050
AN AIR TRANSPORT ACTION GROUP PROJECT
IATA
ICAO · OACI · ИКАО

What I shall cover off

The SAF industry will likely follow three waves of deployment requiring a consistent flow of capital



Source: https://www.icf.com/insights/transportation/deploying-sustainable-aviation-fuel-to-meet-climate-ambition

The aviation energy transition will create global opportunities

Building:

5,000 – 7,000 facilities

(including pre-processing of waste and raw feedstocks)

Improving energy security and resilience

Creating opportunities in all countries – 90% of current oil production is in 22 countries

Investment of:

$1.0-1.45 trillion

~6% of annual fossil and gas investment

And will create:

Up to 14 million jobs

With 90% across the supply chain

Supporting collection of feedstock and construction of facilities

Helping to support a just transition from fossil fuel jobs to clean energy

Source: https://www.icf.com/insights/transportation/deploying-sustainable-aviation-fuel-to-meet-climate-ambition

The scale seems daunting, but money is in the system

SAF scale-up:

$1.45 trillion
ATAG analysis

$3.2 trillion
ICAO analysis

Capital expenditure over 26 years

Does not include the SAF cost premium

Oil and gas 2022 upstream capex:

$499 billion

($4.9 trillion between 2023 and 2030)

Where is big oil?

Available capital:

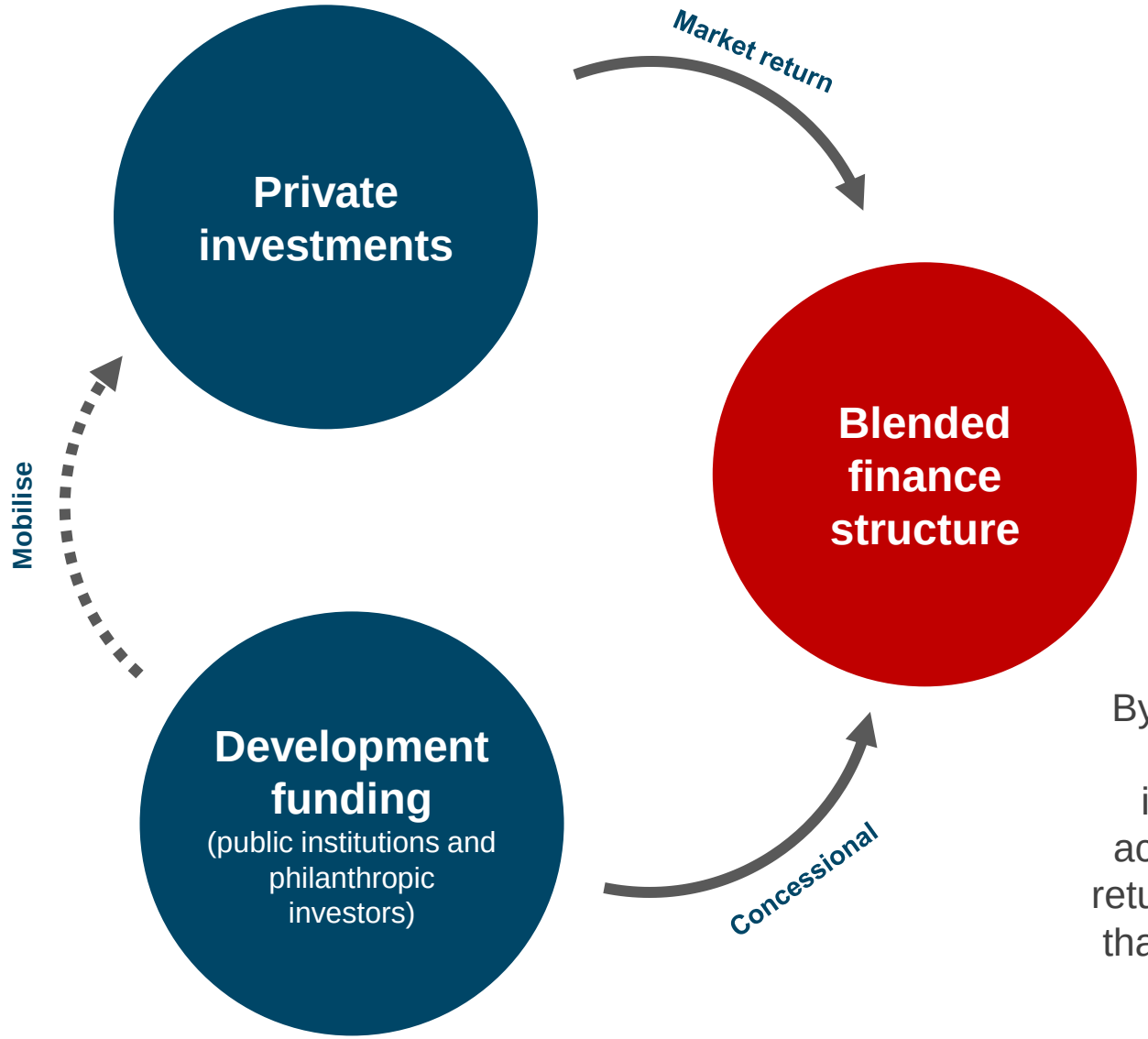
$172bn in 2021
Investment in infrastructure (60% in ‘green’ categories)

$200 trillion
In institutional investor funds

The mechanism: the role of ICAO and Finvest

- Focus on developing economies
- Matchmake between countries with projects, MDBs and other finance institutions
- Help to support feasibility studies and capacity building
- Help to support the early stages of investigation into plant development… and introduce potential developers to potential supporters.
- Expand the understanding and use of blended finance mechanisms.

The mechanism: blended finance



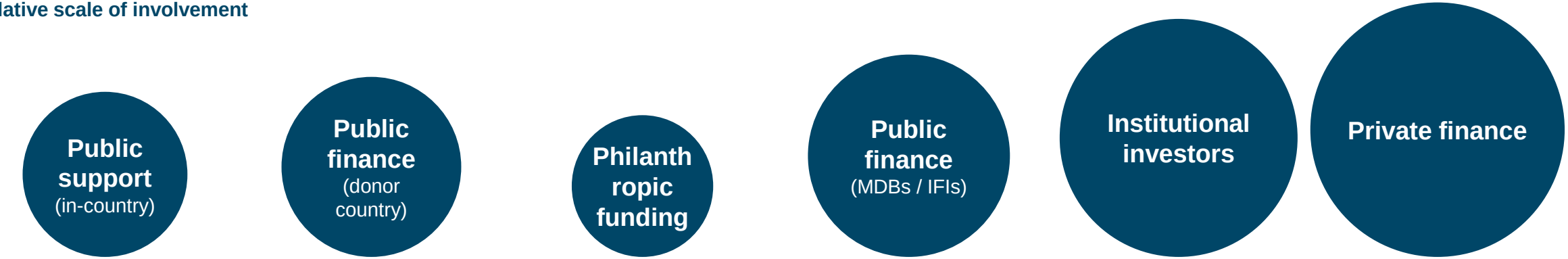
Public and private institutions should all play a critical role for the blended finance ecosystem to function efficiently and in proper synergy.

Private investors (e.g. private equity and venture capital firms, institutional investors, commercial investors) have the capacity to participate in blended finance transactions as arrangers and distributors, with the ability to provide commercial capital and leverage expertise from various divisions as well as global networks.

By offering catalytic capital (such as concessional capital), public institutions (MDBs, DFIs, etc.) can accept higher risk and concessional returns to enable private investments that otherwise would not be possible and help bridging financing gaps.

The mechanism: blended finance

Relative scale of involvement



- Tax and regulatory assistance for construction and operation (use of SAF).
- Project leadership.
- Limited initial financing.

- Assistance with capacity building and knowledge / technology transfer.
- Financing of initial de-risking of plants.

- Assistance with capacity building.
- Financing feasibility studies and collaboration initiatives.

- Financing of first series of plants.
- Assisting with the de-risking of projects across countries and for institutional and private finance.

- Providing scale investment, working alongside the MDBs and IFIs to fund plants 2, 3, 4 etc.

- Providing scale investment, working alongside the institutional investors to fund plants 5+.

Pressure on climate impact from across stakeholder spectrum

Public
Including *flugskam* and public attitudes to climate change shifting, worldwide.

Governments
Shift to net-zero in a number of jurisdictions, as well as regulatory pressure.

Passengers
Surveys show desire to fly only if they think airlines are taking climate change seriously.

Investors
Increasingly looking at climate impact of companies and putting pressure on shareholders.

Corporate customers
Large purchasers of tickets are demanding climate accountability.

Employees
Want to work for companies that take climate change seriously.

Legal
Increasing number of lawsuits (1,300 worldwide) to push for climate action – mostly aimed at governments, but increasingly on corporates.

Why should the finance sector care about SAF

Aviation assets

- Aircraft
- Airport investments
- Manufacturer loans

Long-term investments in a growing and important global sector.

Pressure to act on climate change

Need to meet climate commitments

SBTi (or other metric) Net-zero portfolio

SAF presents a perfect opportunity to balance portfolio across commodity trading, fixed income, equities, long-term (green) energy and infrastructure assets.

What support does the industry need to achieve net-zero?

- **Support from governments:** the right policy environment and programmes to help foster innovation, rather than place blunt costs on the sector.
- **Finance community:** significant investment required globally.
- **Energy industry:** need to get serious about the transition away from fossil fuels.
- **Research institutions:** investigate radical technology approaches, SAF pathways and production efficiencies.
- **Customers:** to help develop the market for SAF in particular

- This is a very fast-moving space in the future of air transport
- It will be a messy transition, but it will happen
- Support needed from all: aviation, energy, finance, governments
- We are in unchartered territory, but we have good guidance
- Despite daunting challenge, I am more and more confident this can be done