

# FIT FOR 55 -EMISSION TRADING AND OFFSETTING IN EU AIR TRANSPORT

## EMISSIONSHANDEL UND OFFSETTING IM EU -LUFTVERKEHR

**Herausforderungen an die Europäische Verkehrspolitik**

Theodor-Heuss-Akademie der Friedrich-Naumann-Stiftung für die Freiheit, Gummersbach, 19.-23.11.2023

Dr. Sven Maertens, Deutsches Zentrum für Luft- und Raumfahrt e.V., Institut für Luftverkehr



## Emission trading and offsetting in EU air transport – in the context of the Green Deal and Fit for 55

- **Introduction**
- **Challenges**
  - Negative externalities
  - The Aviation vs. Environment “Dilemma”
  - So what to do?
- **Market-based measures in EU air transport**
  - Genesis of market-based measures
  - Europe goes ahead – EU ETS
  - Late but global approach – CORSIA
  - CORSIA versus EU ETS
- **The Fit-for-55 measures for Aviation**
  - The Fit-for-55 package
  - Revision of the EU Emission Trading Scheme
  - Other Fit-for-55 elements: SAF & Jet Fuel Tax
  - Fit-for-55 measures: Potential cost and traffic impacts
- **Conclusion & Outlook**

# Introduction

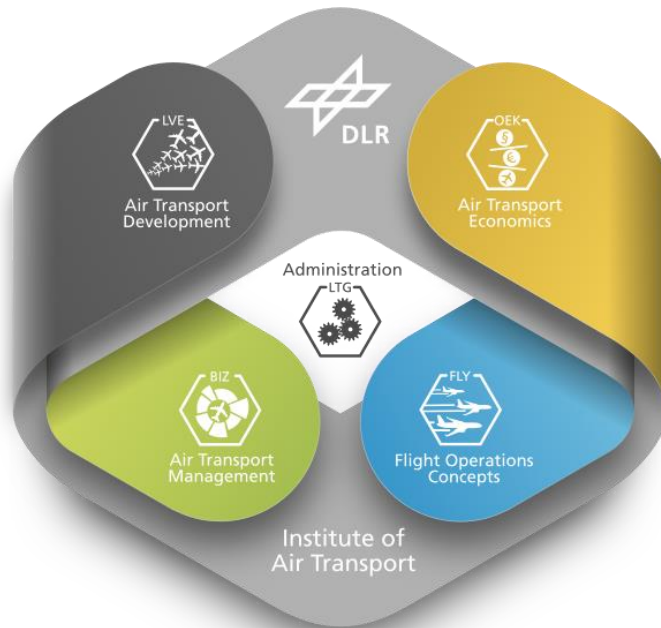


## Dr. Sven Maertens

- Studies at the University of Muenster (Business Administration with focus on Transport Economics, Marketing and Controlling)
- Researcher and Acting Vice Director at the Institute of Air Transport ([www.dlr.de/iv](http://www.dlr.de/iv)) of the German Aerospace Center (DLR)
  - Germany's national aeronautics and space research centre
  - 10,000 employees, 50 institutes and facilities, >10 research aircraft
- Skills/Research focus: Aviation industry business models, Environmental economics, Business aviation, Airline and airport competition...
- [sven.maertens@dlr.de](mailto:sven.maertens@dlr.de), +49 2203 601 2596



## Institute of Air Transport: Structure, Location, Mission



- **Development paths and drivers of the air transport system,**
- **Modelling and multi-criteria evaluation of the air transport system and related measures,**
- **Economic and business analyses along the entire air transport value chain(s),**
- **Knowledge generation and recommendations to increase the sector's sustainability and performance.**

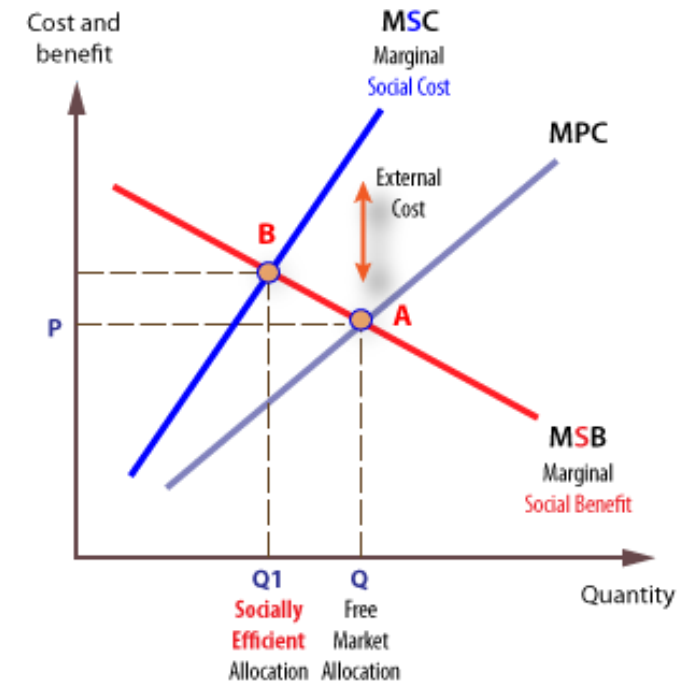
An interdisciplinary team forecasts, designs and evaluates the air transport sector as part of the transport system.

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## Negative Externalities

- **Cost** suffered by a **third party** instead of being (fully) mirrored in the cost function of a producer and/or its client/consumer
- Consequence: **Quantity too high**
- Examples: Waste, Noise, Climate-relevant gases...
- **Market-based solution**: External cost internalization to lower quantities or to incentivize the use of more efficient technologies
- Less efficient measures: **Command-and-Control policies** like standards or outright bans of activities
- Externalities can also be positive (**spillover effects**), and they are usually **difficult to quantify**



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Both negative and positive externalities require action to improve welfare – unless such action worsens the outcome!

## The Aviation vs. Environment „Dilemma“



Growing demand  
Economic growth  
Various job profiles  
Global connectivity  
Trade & tourism  
Disaster relief  
Access to remote regions  
Flexibility towards demand  
High safety & security levels  
Moderate land use / fragmentation

~2% of total and ~12% of transport-related CO<sub>2</sub> emissions globally<sup>1</sup>  
Non-CO<sub>2</sub> emissions like nitrogen oxides, sulphate and soot particles, and contrails at high altitudes  
Total climate impact 3-5%<sup>2</sup>  
Noise  
Constant, but relatively slow innovation due to high technological path dependencies (hard-to-abate sector)

<sup>1</sup> <https://www.atag.org/facts-figures.html>

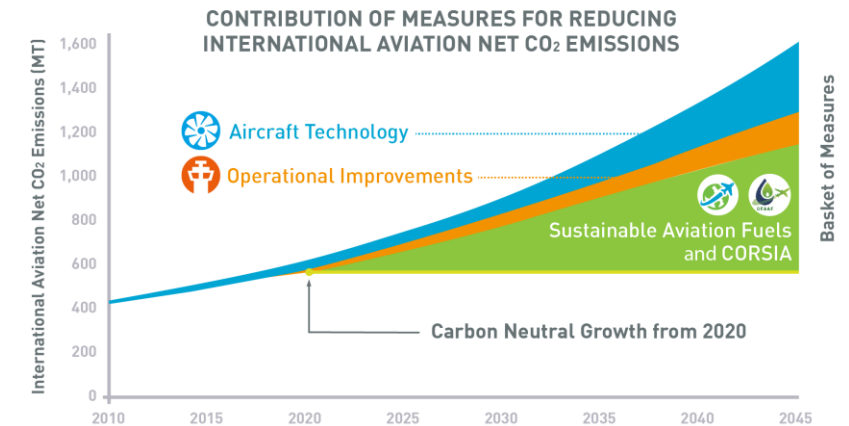
<sup>2</sup> Lee et al. (2021)

Long-term air traffic **growth** has so far outpaced **efficiency increase**.

# Challenges

## So what to do?

- “Basket of measures”
- **Technology and operational measures insufficient** to stabilize emissions
  - Strong weight and range restrictions for electric aircraft
  - Hydrogen requires new airframes and infrastructures
  - Slow operational improvements likely to be outpaced by traffic growth
- **Remaining solutions to achieve ICAO’s CNG 2020 goal:**
  - **Sustainable fuels (SAF): expensive – have to be scaled up first**
  - **Bans: ineffective, inefficient and (politically) unrealistic**
  - **Market-based measures: readily available**



<sup>4</sup> <https://www.icao.int/environmental-protection/pages/climate-change.aspx>  
ICAO = International Civil Aviation Organization

Long-term air traffic growth has so far outpaced efficiency increase.



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# Market-based measures in EU air transport



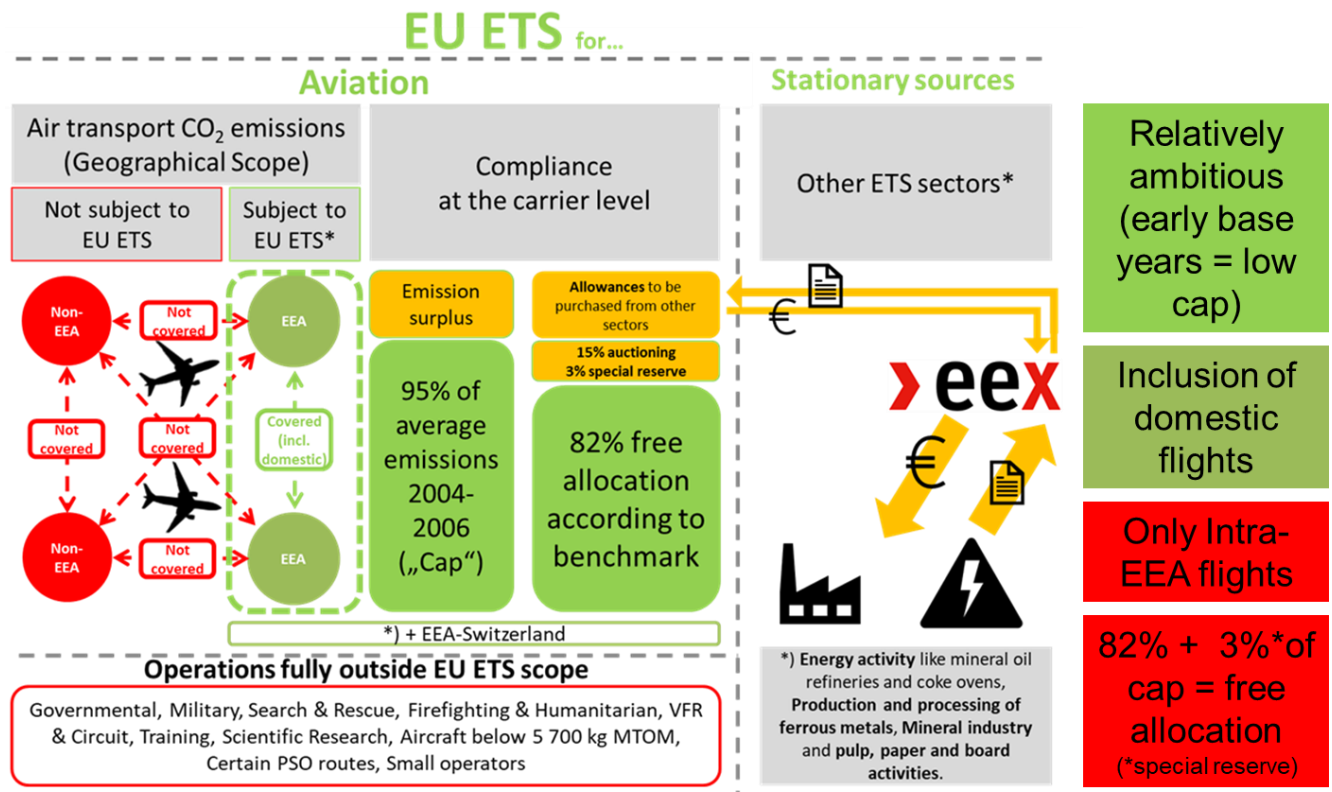
## Genesis of market-based measures

Year	World	EU / EEA
1997	Kyoto Protocol (Art 2): ICAO tasked to prepare policy measures to reduce aviation GHG emissions	
1997-2016	Long-lasting political process	2012: EU ETS for aviation (2008/101/EC, 2009/29/EC) Full scope -> Reduced scope

While the ICAO had been discussing policy measures to tackle aviation's CO<sub>2</sub> emissions for more than a decade, the EU introduced the EU ETS for aviation as an actual measure in 2012.

# Market-based measures in EU air transport

## Europe goes ahead – EU ETS



<https://www.easa.europa.eu/eco/sites/default/files/inline-images/EUETS%20Logo.jpg>

EU carbon trading prices surge  
€ per tonne



Source: Refinitiv © FT

Source: Financial Times

The cap & trade approach of the EU ETS means a fixed environmental goal is reached at the lowest possible cost. However, the scope is limited to intra-European air transport.

# Market-based measures in EU air transport



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2016	Assembly Resolution A39-3 on Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)	
2021	Inauguration of CORSIA offsetting	

In 2016, ICAO agreed on CORSIA, its own global offsetting scheme, to be introduced from 2021.

# Market-based measures in EU air transport



## Late but global approach - CORSIA

- **Carbon Offsetting and Reduction Scheme for International Aviation**
- **ICAO member state level**
- Agreed on in 2016 (A39-3)
- Airlines required to buy **offsets** to **compensate for emissions exceeding 2019/2020 levels**
- **Offsetting projects** shall generate **CO<sub>2</sub> savings** and include afforestation, regenerative agriculture, clean cookstoves, small biogas plants, green energy...



Source: <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>

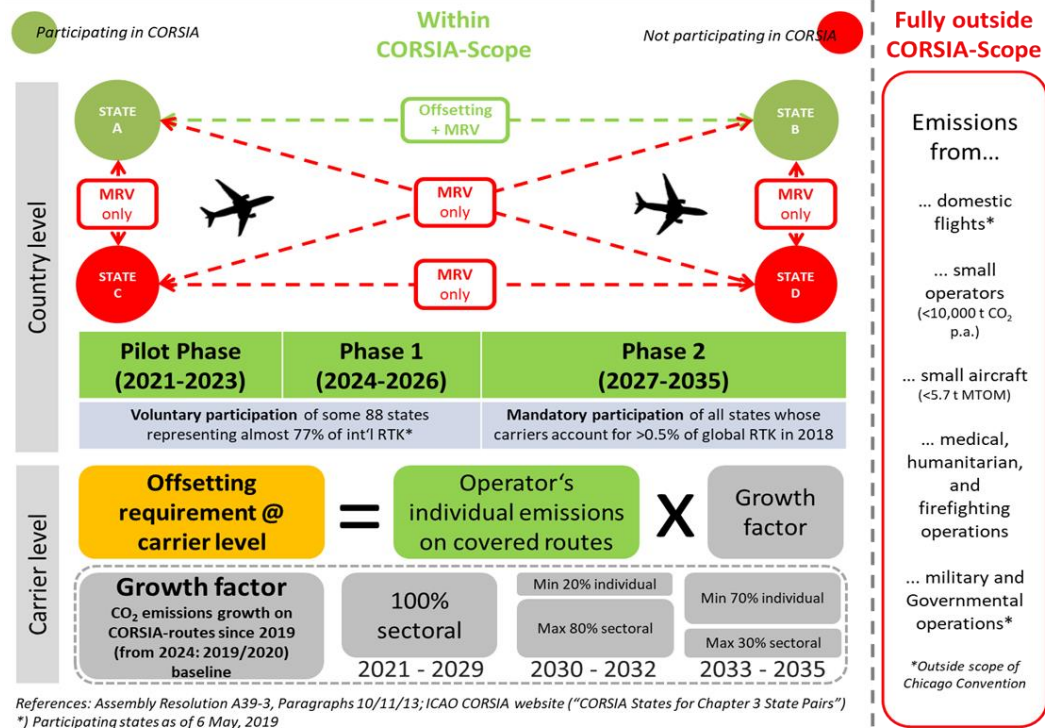
The idea behind offsetting is that an environmental goal can be reached at the lowest possible cost as firms will invest in the most efficient offsetting projects first.

# Market-based measures in EU air transport

## Late but global approach - CORSIA



Source: <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>



Less ambitious (late = high baseline)

Global approach

No inclusion of domestic flights

Baseline emissions „for free“

Offset integrity

Cames et al. (2016): “73% of the ... Certified Emissions Reduction (CER) supply have a low likelihood” and only “7% ... have a high likelihood of ensuring that emission reductions are additional and ... not over-estimated”

CORSIA is a global approach, but domestic flights are excluded and offset integrity is a challenge.

# Market-based measures in EU air transport

CORSIA vs. EU ETS			
Scheme		EU ETS	CORSIA
Fundamental similarities and differences	Aim	Reaching a fixed environmental goal efficiently	
	Methodology	Cap&Trade	Offsetting
	Environmental integrity	Not critical because overall cap is fixed	Depending on quality standards of the offsets
	Need for verification	Only at emitter level	Emitter and offsetting project level
Similarities and differences in implementation and application	Cap/Baseline	95% of avg. 2004/2006 emissions; stepwise further reduction of cap envisaged	Avg 2019/2020 emissions; no further reduction envisaged
	Scope	Intra-EEA including domestic flights (route-level approach)	Int'l routes between participating states (route-level approach)
	Affected carriers	All airlines operating on affected routes (few exceptions)	



Source: <https://www.icao.int/environmental-protection/CORSIA/Pages/default.aspx>



<https://www.easa.europa.eu/eco/sites/default/files/inline-images/EUETS%20Logo.jpg>

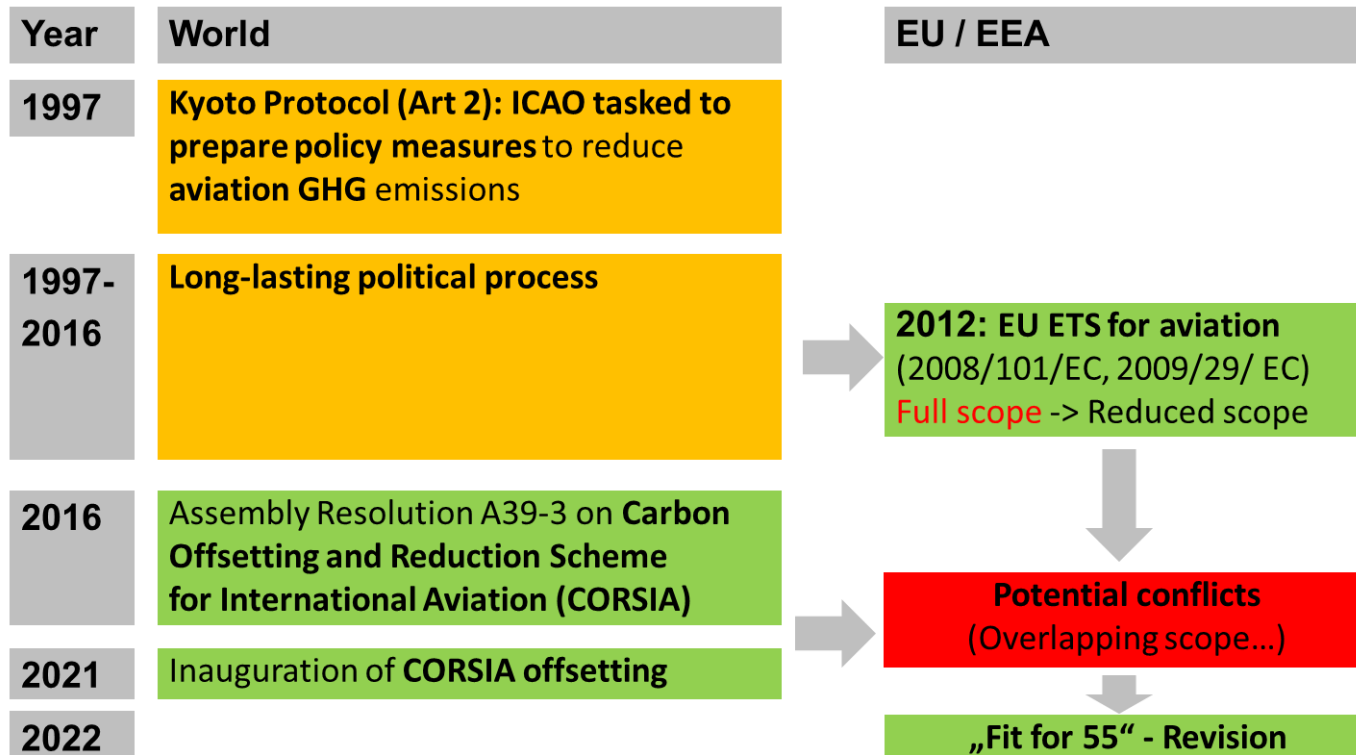
**Covid-19: Amendment of baseline - now 2019 only**

Irrespectively of the political ambition to strengthen the EU ETS, the EU had to act anyway to resolve overlapping scopes of EU ETS and CORSIA.

# Market-based measures in EU air transport



## Genesis of market-based measures



Irrespectively of the political ambition to strengthen the EU ETS, the EU had to act anyway to resolve overlapping scopes of EU ETS and CORSIA.



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# The Fit-for-55 measures for Aviation

## The Fit-for-55 package

**Green Deal:** Emission **reduction by 55%** until 2030 compared to 1990  
The European Commission proposed in July 2021 **various instruments with relevance to aviation** which are currently in the **legislative process**



[https://www.socialistsanddemocrats.eu/sites/default/files/styles/header\\_background/public/2022-04/fit%20for%2055%20eu%20flag.jpg?itok=nJzQ7sRV](https://www.socialistsanddemocrats.eu/sites/default/files/styles/header_background/public/2022-04/fit%20for%2055%20eu%20flag.jpg?itok=nJzQ7sRV)

- Market-based Measures:
  - EU Emission Trading Scheme
  - CORSIA implementation
- Sustainable Fuels: ReFuelEU Aviation
- Energy Taxation: Jet Fuel Tax
- Alternative Fuels Infrastructure: Ground Power

Which new rules were proposed and eventually agreed on?  
Which economic impacts of the proposed measures can be expected?

# The Fit-for-55 measures for Aviation

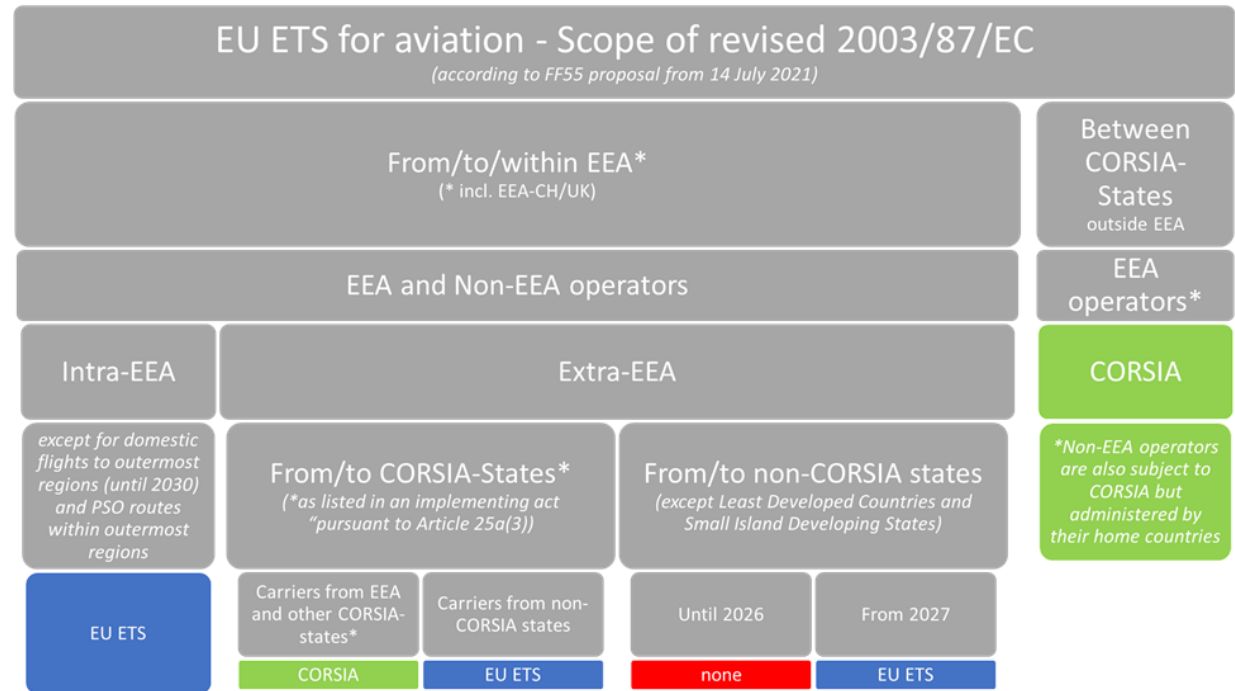


## Revision of the EU Emission Trading Scheme: draft proposal July 2021

[COM\(2021\) 552 final](#)

### Political objective in the original (draft) Fit-for-55 package published July 2021

- Phase-out of free allowance allocation by 2027
- Introduction of a higher **linear reduction factor** of 4.2 % p.a.
- **No intra-EEA implementation of CORSIA** (no double counting)
- Implementation of **CORSIA on most extra-EEA flights**
- **No coverage of non-CO<sub>2</sub> effects**



In July 2021, the EC proposed a complex revision of the EU ETS directive splitting markets into “EU ETS routes” and “CORSIA routes”.

# The Fit-for-55 measures for Aviation



## Revision of the EU Emission Trading Scheme: Trilogue results

- **Trilogue** = negotiations between Commission, Parliament and Council
- Free allocation of 20 million t CO<sub>2</sub> (2024 - 2030) to compensate for the use of Sustainable Aviation Fuels (SAF)
- Reduction of the EU-ETS-,cap':
  - -4.3 % p. a. (2024 – 2027) (~~Commission draft: -4.2%~~)
  - -4.4 % p. a. (2028 – 2030) (~~Commission draft: -4.2%~~)
- **Phase-out of free allowance allocation** by 2026 (~~2027~~)
- Non-CO<sub>2</sub> mandatory monitoring, reporting, verification (MRV) from 2025

The trilogue results are stricter than the original Commission proposal. Non-CO<sub>2</sub> emissions have to be monitored, reported and verified in the second half of the decade.

# The Fit-for-55 measures for Aviation



## Other Fit-for-55 elements: SAF & Jet Fuel Tax

- **ReFuelEU Aviation – Sustainable Fuels (SAF)**
  - Promising way of reducing aviation emissions by 70%-100%.
  - SAF can be blended with conventional fuel, allowing for gradual implementation.
  - Distribution of increasing levels of SAF (incl. e-fuels sub-quota) at EU airports: 2 % (2025); 6 % (2030); 20 % (2035); 34 % (2040); 42% (2045) and 70 % (2050)
  - All EU and non-EU Airlines must uplift increasingly SAF-blended fuel before each flight from an EU airport (90 % of yearly average as obligation to refuel locally to prohibit tinkering)
- **Jet Fuel Tax** (Revision of European Union Energy Taxation Directive, EU ETD): No agreement yet

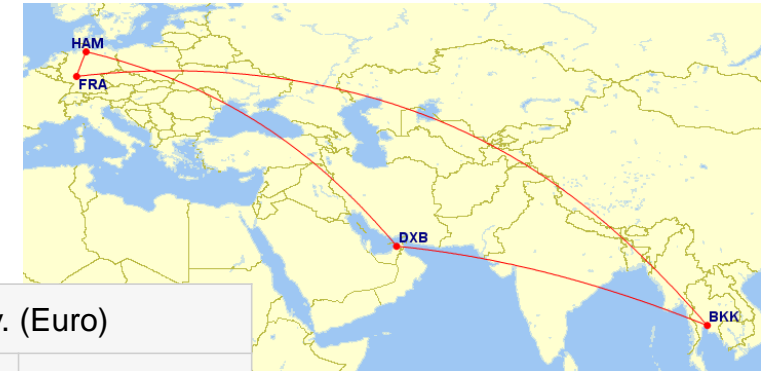
ReFuelEU requires SAF capacities of 40 million tons annually until 2050. Currently drafted plants for SAF production may handle about 10,000 t SAF / year at a cost of about 200 million €. Hence, massive learning curve effects, economies of scale and investment required.

# The Fit-for-55 measures for Aviation



## Fit-for-55 measures: Potential cost and traffic impacts

- Airline cost (and fare) increase especially on (intra-)EEA segments
- Likely shifts to non-EEA destinations and to non-EEA hubs
- Risk of carbon leakage



Source: Map generated by the Great Circle Mapper ([www.gcmap.com](http://www.gcmap.com)) © Karl L. Swartz

Unit costs (segment/pax) caused by FF55-measures	Hamburg-Frankfurt-Bangkok v.v. (Euro)				Hamburg-Dubai-Bangkok v.v. (Euro)			
	HAM-FRA	FRA-BKK	BKK-FRA	FRA-HAM	HAM-DXB	DXB-BKK	BKK-DXB	DXB-HAM
CORSIA	-	3.65	3.65	-	2.00	2.51	2.51	2.50
EU ETD*	3.66	-	-	3.66	-	-	-	-
EU ETS	3.56	-	-	3.56	-	-	-	-
ReFuelEU	0.86	15.23	-	0.86	8.36	-	-	-
Sum (Segment)	8.08	18.88	3.65	8.08	10.36	2.51	2.51	2.50
Total Sum (O&D)	38.69				17.88			

\* European Union Energy Taxation Directive

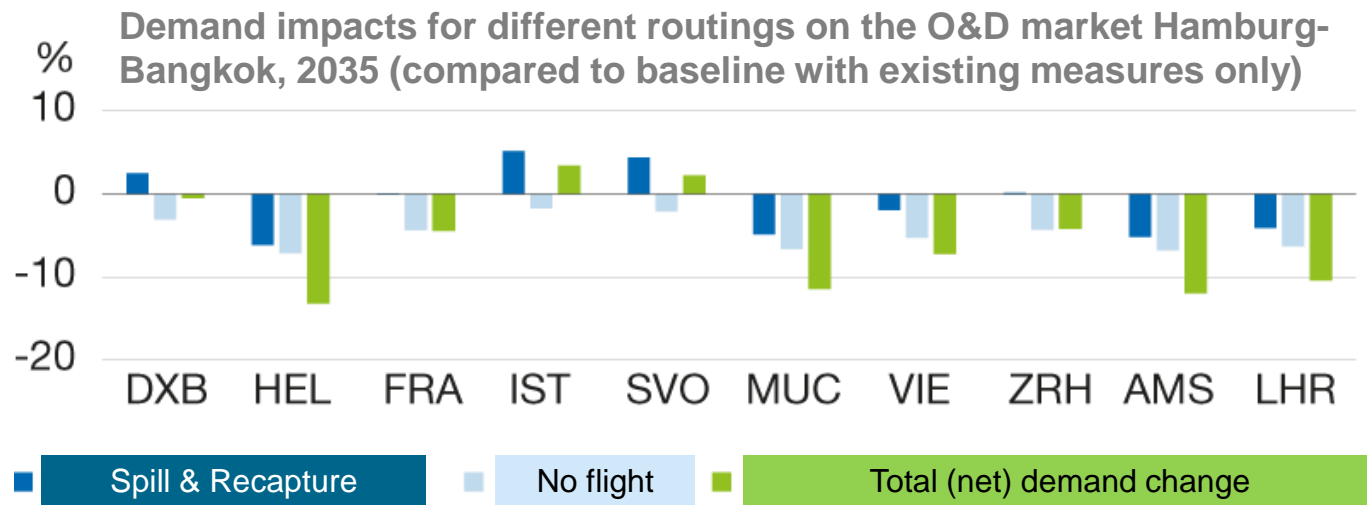
Source: Ehlers et al. (2022) [Auswirkungen der Fit-for-55-Instrumente auf die Preise in der Luftfahrt - Wirtschaftsdienst](#)

Carbon leakage occurs if passenger flows covered by the EU ETS are replaced by those outside the scope of the measure.

# The Fit-for-55 measures for Aviation

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## Key issues

- **Interaction** of the different Fit-for-55 instruments fairly complex
- EU network airlines fear **competitive disadvantages** when flying (transfer) **passengers** to non-EEA destinations (shift to hubs outside the EU like Istanbul or Dubai)
- **Competitive disadvantages** may also arise for **tourist destinations** in the EU, as price sensitive travelers may switch to “non-ETS” destinations (Spain ⇔ Turkey)
- While politically unlikely, the EU could ...
  - implement a **carbon leakage protection** for indirect non-EEA routings via EEA hubs (Reduction of EU ETS-related cost for intra-EEA feeder flights proportionally by the share of non-EEA transfer passengers on such feeders)
    - ➔ This may protect EU network carriers to some extent while demand shifts to non-EEA markets would remain likely!
  - replace the measures with a **distance-based air passenger tax** (which would only depend on the final destination)
    - ➔ Probably no incentive for airlines to reduce total or specific emissions

The EU actually plans to use 2 billion EUR in ETS revenue for funding of SAF R&D, in order to narrow the cost gap between conventional fuels and SAF.



# FRAGEN