Europe

Legal framework and strategies for the market uptake of SAF

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Agenda

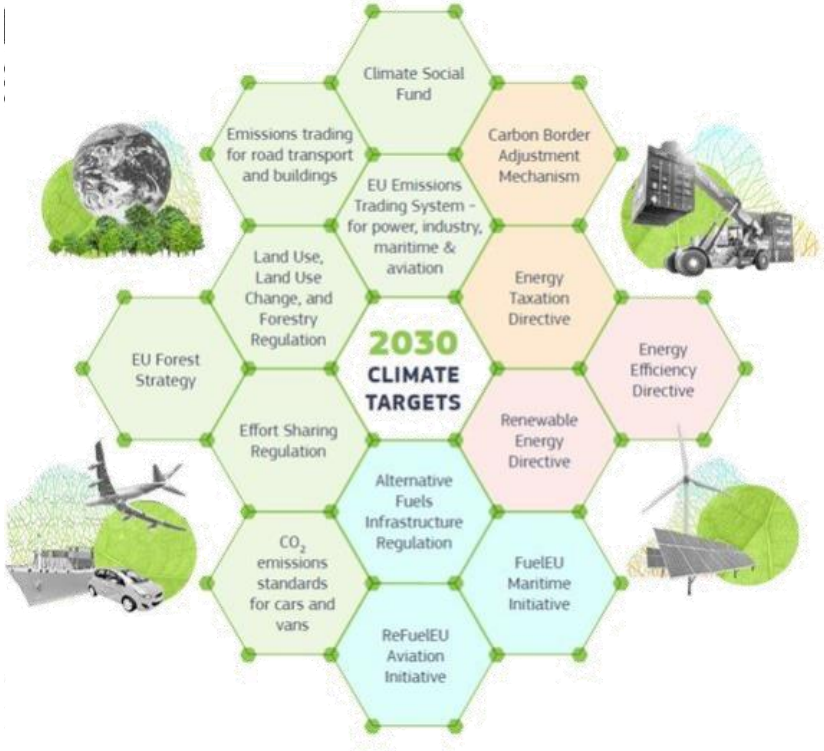
- IEA AMF Task 63 on Sustainable Aviation Fuels (SAF)
- EU - legal framework and strategy
- National strategies and strengths
  - Austria
  - Denmark
  - Germany
  - Switzerland
- Conclusion

IEA AMF Task 63: Sustainable Aviation Fuels (SAF)

- Project overview
  - November 2021 – April 2023
  - Scope: Global status quo, national assessments, best practice examples of international stakeholders
  - Workshops and online seminars
  - Task member countries: Austria (lead), Brazil, China, Denmark, Germany, Switzerland, USA
  - Final report will be available on the project website: https://iea-amf.org/content/projects/map_projects/63

Legal framework EU

- Green Deal (Fit-for-55 Package)
  - Reducing GHG emissions by at least 55% by 2030 compared with 1990 levels
- RED II (RED III under negotiation)
  - 1.2 multiplier for SAF (non-food/feed)
- EU-ETS
  - Incentives for biobased SAF in compliance with RED II sustainability criteria „zero emission“
- CORSIA (ICAO international)
  - Use SAF that comply with dedicated sustainability criteria instead of purchasing emission offsets



https://ses.jrc.ec.europa.eu/eirie/en/news-and-events/news/fit-55-major-step-towards-decarbonized-eu-2050

Decarbonize aviation & meet green deal target

- RED II and EU-ETS have not led to a sufficient market uptake of SAF
- CORSIA on its own did not provide sufficient economic incentives
- The aim of the EU is a clear regulatory roadmap for decarbonizing the aviation sector and reinforcing a level playing field, by
  - Increasing the share of SAF with blending requirements
  - Tackling fuel tankering practices
  - Strengthening EU-ETS and CORSIA
- SAF are considered to have the most potential to reduce GHG emissions of the aviation sector in the short-term
  - Since alternative propulsion technologies will not be commercially available in the next decade

https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/698900/EPRS_BRI(2022)698900_EN.pdf

ReFuelEU Aviation Initiative (under negotiation) Proposal by the Commission

- EU proposed regulation 2021/0205 on ensuring a level playing field for sustainable air transport
  - On **all commercial flights** carrying passengers (including business travel), cargo or mail traveling **within the EU and departing from the EU**
  - Gradual increase of the **volumetric share** of SAF in the fuel supplied to operators at EU airports with a sub-target on synthetic aviation fuels

[%]	2025	2030	2035	2040	2045	2050
SAF	2	6	20	32	38	63
Synt. SAF	0	0.7	5	8	11	28

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0561

SAF 2% about 0.8 million tons
63% about 25-30 million tons

Worldwide capacities SAF (2021)

- Status quo ~ 0.18 million tons
- Planned capacity ~ 1,80 million tons

ReFuelEU Aviation Initiative (under negotiation) Proposal by the Commission

- EU proposed regulation 2021/0205 on ensuring a level playing field for sustainable air transport
  - SAF are defined as drop-in fuels, either synthetic aviation fuels or advanced biofuels - **Feed and food crop-based fuels are excluded** due to limited scalability potential and sustainability concerns
  - **Fuelling obligation** for aircraft operators who have to ensure that 90% of the annually required aviation fuel is uplifted at a given EU airport
  - **Reporting obligation** for aircraft operators and fuel suppliers with **financial penalties** for non-compliance

https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52021PC0561

Position of the European Parliament and Council

Parliament (July 2022)

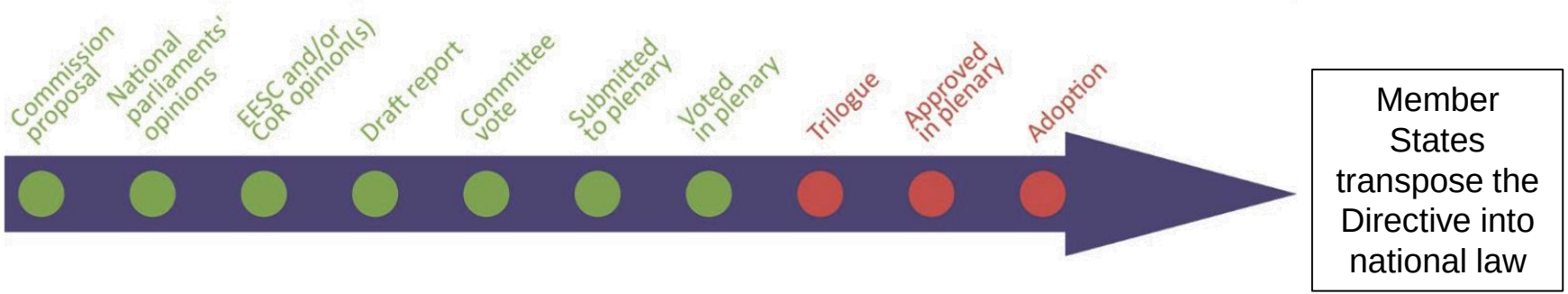
- Raise SAF targets up to 85% by 2050
- Exclude SAF based on food and feed crops, intermediate crops and palm- and soy derived materials
- Increase and add sub-target for synthetic SAF and define as renewable hydrogen, renewable electricity or RFNBOs as defined in RED II
- Allocate revenue from fines to a new sustainable aviation fund

Council (June 2022)

- Extend the list of eligible fuels (excluding food and feed crops)
- RFNBOs should be eligible when complying with GHG emission saving threshold of RED II
- Extend the transition period from proposed 2029 to 2034
- Increase number of operators within the scope of the rules
- Member states should ensure that revenue from fines are used to support SAF research and innovation programs

https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/698900/EPRS_BRI(2022)698900_EN.pdf

Next steps

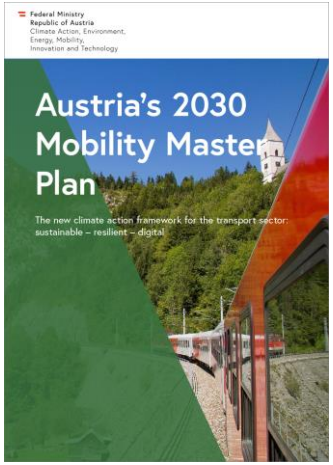


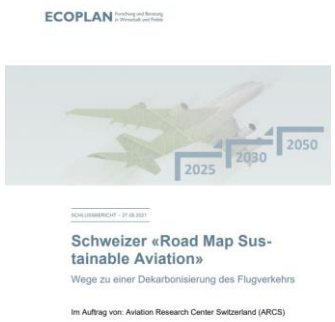
- Estimated investment requirement for SAF producers between 2021 and 2050 are about €10.5 billion
  - Additional ~100 SAF production facilities are needed
- Additional administrative costs are estimated at €264 million for Member States and €2.7 million for EU authorities

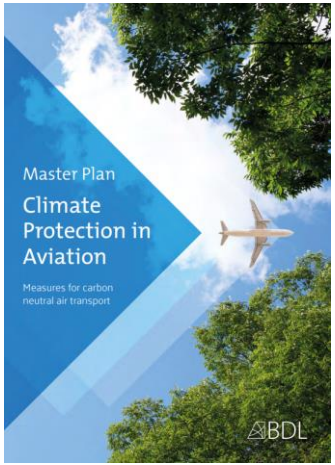
https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/698900/EPRS_BRI(2022)698900_EN.pdf

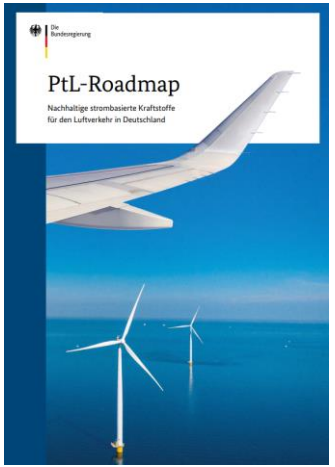
National strategies

- Several countries already commissioned or published strategies or roadmaps on SAF market uptake









Austria

Targets	Climate neutrality by 2040 • For industries, energy systems and transport (except aviation)
Strategies	Hydrogen strategy & Renewable gas strategy • H_2 for industries which are hard to decarbonize (incl. aviation) • Green gas only for sectors with no substitution option (excl. aviation) Mobility master plan • Promotion of e-fuels, hydrogen and battery for aviation • Advanced biofuels for aviation if there is no other more efficient application SAF roadmap (under development)
Projects/ Initiatives	SAF action plan • Joint position of leading companies in the mobility & energy sector TAKE OFF program (Austrian Research Promotion Agency) • Implementation of the research strategy for the Austrian aviation sector
Strengths	Agreement on the importance of SAF of politics and industry Know-how, there are several related research institutes and technology providers

Denmark

Targets	One green domestic flight route in 2025 All domestic aviation must be green by 2030
Strategies	Aviation plan announced • Transition will be financed by imposing a flat passenger fee of €1.70 (domestic and international flights – excl. transit)
Projects/ Initiatives	Bornholm Energy Island • Huge investment in off-shore production of electricity in the north sea together with Germany, The Netherlands and Belgium • Electricity from the energy island shall be converted into e-fuels for the marine and aviation sectors ALIGHT project • Copenhagen Airport as example for a sustainable airport of the future GreenLab project • First and largest commercial PtX facility
Strengths	A strong political willingness to foster investments and research

Germany

Targets	PtL SAF capacity of at least 200,000 t/a by 2030
Strategies	PtL SAF roadmap (linked with National hydrogen strategy) & BDL master plan • Clear focus on PtL SAF by industry and government • Aimed market ramp up in Germany of at least 200,000 t/a by 2030 GHG quota with the compliance option PtL in aviation: 0.5% by 2026 (about 50,000 t/a), 1% by 2028 (about 100,000 t/a), 2% by 2030 (about 200,000 t/a); amounts can be double-counted
Projects/ Initiatives	Several projects and demonstration plants for SAF production are ongoing, e.g.: • BP is co-processing UCO in an existing refinery • A first PtL plant in Germany with a capacity of 360 t/a • Project Amelia for a ATJ plant with a capacitiy of 60,000 t/a • Different SAF related projects on DE/EU level (e.g. KEROSyN100, HyKero, TULIPS, HyFlexFuel and ALIGHT)
Strengths	Well developed fuel infrastructure (especially important for importing SAF) There are leading technology providers and users as well as R&D institutions Accompanying funding for PtL SAF projects

Switzerland

Targets	Reduction of fossil CO_2 emissions from aviation with SAF by at least 60% by 2050 • Compared to a development without measures
Strategies	Following the ReFuelEU Aviation proposal by the EC • Without any notable differences in quota or sustainability criteria Swiss Emission Trading System (linked to EU-ETS) • Allows crediting of SAF use on flights starting in Switzerland Biogenic fuels are tax exempted when complying with sustainability criteria • Dedicated cultivation of biogenic resources for the purpose of SAF production is not supported (residues only) Swiss Roadmap for Sustainable Aviation (RMSA) was elaborated • SAF (biogenic and synthetic) seen as central and most important measure
Projects/ Initiatives	Funding of pilot and demonstration plants • Helvoil – production of biofuels (incl. SAF) from UCO and waste animal fats Multiple projects (biogenic and synthetic SAF production) are currently in the concept phase, but have not yet been publicly announced
Strengths	Excellent network of universities and notable technology providers Highly motivated actors to contribute to a quick upscaling of SAF

Conclusion

- European strategy is mainly driven by the ReFuelEU Aviation proposal
  - Main focus is ensuring a level playing field for sustainable air transport
- Although legal framework is set on European level, strategies of Member States vary
  - Several Member States already published SAF roadmaps
  - Denmark and Germany have a strong focus on PtL
- In all four countries SAF is considered as important measure to decarbonize aviation by politics and industry
- There are notable technology providers and university networks

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