

## Sustainable aviation fuel policy in the EU

- The EU has acknowledged the role of sustainable aviation fuels (SAFs) as a significant solution pathway to reaching net-zero aviation and is developing a policy framework to support the growth of the SAF market.
- The ReFuelEU Aviation Initiative, finalised in 2023, establishes a regulatory mandate for the supply of SAF while prioritising the growth and importance of synthetics (PtL/e-fuels).
- Further actions to support SAF, such as via the Net Zero Industry Act and EU Emissions Trading Scheme, are underway in 2024, with pressure mounting to employ additional measures in line with individual countries' policies and broader climate action goals.

Across the EU's member states, direct emissions from aviation make up around three per cent of total greenhouse gas emissions from the bloc<sup>1</sup>. Despite measures to curb growth, the European Commission estimates the number of commercial flights in the EU could increase by as much as 42 per cent by 2040 compared to 2017<sup>2</sup>. Amongst the numerous actions that could be taken to address the climate impact of aviation — from operational efficiencies to demand reduction measures — the EU has made sustainable aviation fuel (SAF) a priority and is leading the charge towards establishing a SAF market. The bloc has a unique opportunity to mandate collective action while building upon individual member state ambition and is in the process of creating this policy framework. However, ambition on climate may face challenges in light of elections held in 2024. Though Ursula Von der Leyen and her Commission achieved a narrow victory, the Parliament saw gains for right-leaning parties who have historically resisted measures under the Green Deal, and post-election priorities have now shifted to a Clean Industrial Deal<sup>3</sup>.

### ReFuelEU

The "[ReFuelEU Aviation Initiative](#)", finalised in 2023, mandates that all jet fuel suppliers must blend a certain proportion of SAF into the jet fuel they deliver to EU airports by target dates. The EU distinguishes SAF as drop-in aviation fuels that can be: advanced biofuels or biofuels produced from the feedstock in line with sustainability criteria, recycled carbon fuels or synthetic fuels. Within the proposal and for ease of differentiation, they are further refined into:

- Sustainable aviation fuels, meaning fuels of a biological origin, which can include fuels like HEFA (hydroprocessed esters and fatty acid fuels), advanced biofuels and "sustainable" biofuels, or, as a sub-category of SAF:
  - Synthetic aviation fuels, meaning fuels of a non-biological origin, which can also be referred to as "e-fuels", "e-kerosene", "synthetic fuels" or "power-to-liquids" (PtL).

<sup>1</sup> [Reducing emissions from aviation | European Commission](#)

<sup>2</sup> [European Aviation Environmental Report 2019 | EASA](#)

<sup>3</sup> [Von der Leyen Pledges New Clean Industrial Deal in New Mandate as EU Commission President | ESG Today](#)



The mandate requires two per cent of the fuel made available at EU airports to be SAF by 2025, rising to six per cent in 2030, 20 per cent in 2035 and gradually up to 70 per cent in 2050. Within the mandate, the proportion of synthetic fuels as a sub-mandate to those targets grows in significance and it will need to make up a larger part of the fuel mix over time.

From 2030, 1.2 per cent of fuel available must be synthetic, rising to 35 per cent by 2050 — half of the total SAF requirement (as shown in Figure 1). To ensure enforcement, Member States are legally obliged to establish non-compliance penalties for fuel suppliers by the end of 2024, alongside a requirement to make-up the shortfall in the subsequent reporting period<sup>4</sup>. Beyond SAF-related measures, ReFuelEU Aviation introduces additional requirements pertaining to fuel lifecycle and non-CO2 emissions reporting. It is estimated that 104 to 106 additional SAF plants need to be built in the EU by 2050 to cater for the necessary SAF production capacity<sup>5</sup>.

Significant action is required to make ReFuel EU’s SAF mandate a reality. ICCT estimated that the production cost of e-kerosene (a synthetic fuel) in the EU was 10 times higher than that of fossil kerosene in 2020, but that gap is set to decrease substantially towards an estimated 2.5 times in 2050 as the market matures, technology improves, and the cost of renewable electricity continues to decline<sup>6</sup>. But of the circa 45 planned synthetic fuel plants in Europe, none have reached final investment decision (FID)<sup>7</sup>, so the EU risks falling short of these targets.

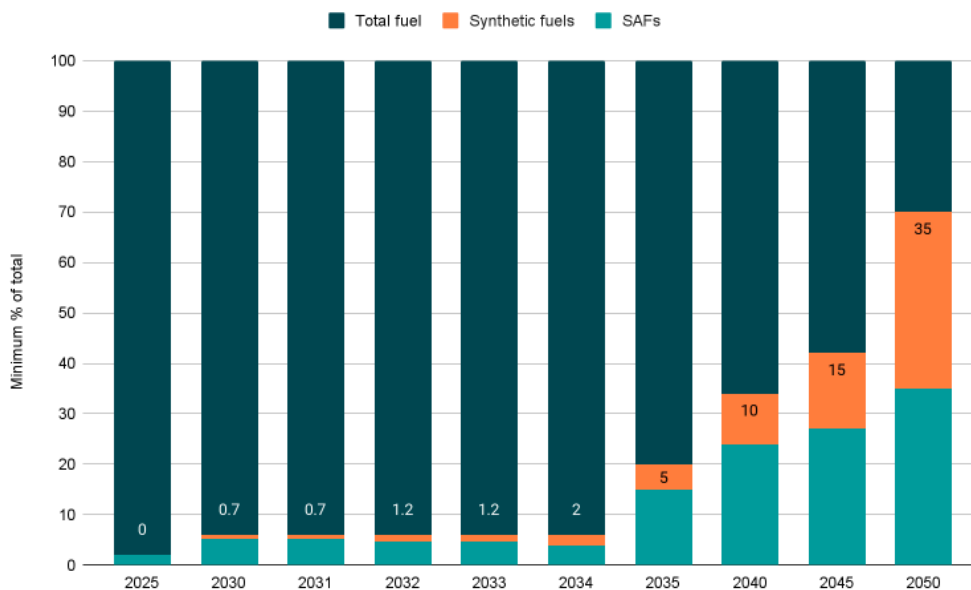


Figure 1: SAF mandate percentages under the ReFuelEU Aviation Initiative. Source: Adapted from EU legislation, 2023

<sup>4</sup> [Regulation \(EU\) 2023/2405 of the European Parliament and the Council on ReFuelEU Aviation | Official Journal of the European Union](#)

<sup>5</sup> [Ensuring a level playing field for sustainable air transport | EU monitor](#)

<sup>6</sup> [Current and future cost of e-kerosene in the United States and Europe | ICCT](#)

<sup>7</sup> [E-fuels for planes: with 45 projects, is the EU on track to meet its targets? | Transport & Environment](#)



The EU's mandate reflects the current scalability and sustainability of synthetic fuels as compared to those of bio-based SAF. Synthetic fuels use renewable energy as a feedstock as opposed to waste or conventional biomass, which are limited; the production of crops and by-products for energy uses in the transport sector alone already requires five per cent of arable land in the EU-27<sup>8</sup>. Scaling synthetic fuels is therefore an immediate priority to ensure a viable pathway to reaching net-zero aviation to avoid further land use issues.

## EU Taxonomy

The EU Taxonomy Regulation<sup>9</sup> provides a classification system for sustainable activities designed to direct investments to those which are most needed for the net-zero transition. It stipulates that, from 2030, planes must run on a 15 per cent SAF blend, a proportion which will rise by two per cent annually thereafter<sup>10</sup>, though aircraft produced for private or commercial business are excluded from the regulation.

Under current EU Taxonomy rules, planes are afforded a "green" label as long as they produce lower CO<sub>2</sub> emissions than limits set by the ICAO's, a classification justified on the basis that no commercial zero-emission aircraft exist yet<sup>11</sup>. This move has drawn legal challenges from NGOs which claim the rulebook enables greenwashing, in that high amounts of pollution would be permitted under the bar set by the ICAO<sup>12</sup>.

## EU Emissions Trading Scheme

The EU Emissions Trading Scheme (EU ETS) is a "cap and trade" system designed to bring down the emissions associated with certain economic activities over time by issuing decreasing numbers of tradeable emission allowances to polluters in specific sectors. The number of free allowances for aircraft operators was reduced by 25 per cent in 2024, and will be further reduced by 50 per cent in 2025, to be completely eliminated in 2026<sup>13</sup>. That means that by 2026, aircraft operators must pay for their own emissions, incentivising them to pursue activities that reduce their emissions, such as using SAF.

In a bid to accelerate SAF usage and mitigate the cost of removing free allowances, a dedicated SAF allowance mechanism has been established, allocating 20 million allowances — with an estimated value of €1.7 billion — until 2030 for aircraft operators, based on the amount of SAF they uplift<sup>14</sup>. This means that airlines and other purchasers of SAF will be able to reclaim the

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<sup>8</sup> [E-Kerosene for Commercial Aviation: From Green Hydrogen and CO2 from Direct Air Capture – Volumes, Cost, Area Demand and Renewable Energy Competition in the United States and Europe from 2030 to 2050 | German Energy Agency](#)

<sup>9</sup> [Regulation \(EU\) 2020/852 of the European Parliament and the Council on sustainable investment | EUR-Lex](#)

<sup>10</sup> [Sustainable aviation fuels \(SAF\) in Europe | Deloitte](#)

<sup>11</sup> [EU Taxonomy Regulation and aviation: A transition to sustainability | Norton Rose Fulbright](#)

<sup>12</sup> [EU hit with lawsuit over green labelling of aviation and shipping investments | Climate Home News](#)

<sup>13</sup> [Reducing emissions from aviation | European Commission](#)

<sup>14</sup> [Sustainable Aviation Fuels | EASA](#)



price premium between conventional jet fuel and SAF based on its environmental integrity — the rules and tiers for which will be finalised by the end of 2024, with a high potential for increase in 2027 under the Fit for 55 reforms<sup>15</sup>.

RED-compliant SAFs are currently attributed as “zero emissions” under the scheme<sup>16</sup>, which has drawn criticism as SAFs do produce emissions; however, the expectation is that via this proposed mechanism, the fuels with the highest environmental integrity — widely considered to be synthetic fuels produced with green hydrogen and captured carbon — will be able to access the largest subsidy.

The EU ETS operates separately from the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)<sup>17</sup>, a global market-based measure established by the ICAO to address carbon emissions from international aviation. However, their coexistence presents challenges in applying climate policy, as the two systems overlap in scope for international flights within the EEA. The EU ETS imposes a more ambitious climate protection target, with stricter rules and procedures and greater predictability regarding its future evolution, whereas CORSIA remains subject to the uncertainties of international agreements.

## Net Zero Industry Act

In early 2024, the EU deemed SAF a strategic technology and acknowledged that it “needs to ensure that the regulatory environment and support framework for producers of sustainable aviation and maritime alternative fuels technologies enables them to increase their production capacities”<sup>18</sup>. One thing the EU’s Net Zero Industry Act (NZIA) does is facilitate this production through expedited permitting and administrative support amongst other measures that aim to break down barriers to scaling SAF along the fuel value chain<sup>19</sup>.

## Funding

The EU has allocated significant, but still insufficient, funds to support the growth of the SAF market. The investment need is in line with the scale of that of other sector transitions; SAF producers estimate they will need 10.4-10.5 billion Euros<sup>20</sup> over the period from 2011 to 2050. EU funding mechanisms target activities across [Technology Readiness Levels \(TRLs\)](#), from the innovation stage through to demonstration. The table below provides a snapshot of funding available as of May 2024.

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<sup>15</sup> [ETS2 for Buildings, Road Transport and Additional Sectors | European Commission](#)

<sup>16</sup> [Sustainable Aviation Fuels \(SAF\) | EASA](#)

<sup>17</sup> [Carbon Offsetting and Reduction Scheme for International Aviation \(CORSIA\) | ICAO](#)

<sup>18</sup> [General approach to the NZIA | Council of the European Union](#)

<sup>19</sup> [SAF gets ‘strategic’ tag in EU’s plan to cut carbon emissions | SAF Investor](#)

<sup>20</sup> [Ensuring a level playing field for sustainable air transport | EU monitor](#)



Table 1: EU funding mechanisms relevant to sustainable aviation fuel (for a mapping that includes national funding mechanisms, see [our website](#))

Fund name	Organisation(s)	Description	Total fund
<a href="#">Clean Aviation Joint Undertaking</a>	<ul style="list-style-type: none"> <li>European Commission</li> <li>European aviation sector</li> </ul>	A public-private partnership funding R&D across three themes driving the energy efficiency and the emissions reduction of future aircraft: hybrid electric regional aircraft, ultra-efficient short and short-medium range aircraft, and disruptive technologies to enable hydrogen-powered aircraft.	Budget of €4.1 billion divided into €1.7 billion in EU funding and no less than €2.4 billion in private funding
<a href="#">Alternative Fuels Infrastructure Facility (AFIF)</a>	DG Move	To support alternative fuels infrastructure for road, maritime, inland waterway and air transport. In addition to the support to high power electricity recharging stations and hydrogen refuelling stations, the following new funding opportunities will be available: 1) Support to Megawatt recharging stations for Heavy Duty Vehicles, 2) Support to electricity and hydrogen supply at airports, 3) Support to electricity supply and ammonia and methanol bunkering facilities in ports.	€1 billion
<a href="#">EU Innovation Fund (EIF)</a>	<ul style="list-style-type: none"> <li>European Commission</li> <li>European Climate, Infrastructure and Environment Executive Agency</li> </ul>	Funding via EU ETS. Innovation Fund projects cover a wide range of innovative technologies in areas such as energy-intensive industries, with allocation assessed on the following criteria: effectiveness of GHG avoidance, degree of innovation, project maturity, replicability and cost efficiency.	€40 billion
<a href="#">Horizon Europe</a>	European Commission	Horizon Europe is the EU's key funding programme for research and innovation. It tackles climate change and boosts the EU's competitiveness and growth. It provides support to researchers and innovators to drive systemic changes to ensure a green, healthy and resilient EU.	Circa €95.5 billion



<a href="#">Proceeds of EU ETS (SAF Allowances)</a>	European Commission	Airlines and other SAF purchasers will be able to reclaim the price difference between fossil-based jet fuel and SAF from 2024-2030.	~€1.7 billion
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## Possible EU interventions

There are still several policy areas and interventions that the EU may explore to address the growing inequity and climate impacts of the aviation sector:

- Updates to ReFuelEU: Under Article 15 of ReFuel EU, the Commission is legally obliged to assess possible additional measures to support the SAF market.. This includes “setting up or recognising a system of tradability of SAF to enable fuel supply in the Union”, suggesting that incorporating elements of a [book and claim scheme](#) “could enable aircraft operators or fuel suppliers, or both, to purchase SAF through contractual arrangements with aviation fuel suppliers and to claim the use of SAF at Union airports”<sup>21</sup>. As of December 2024, the assessment and report remain pending.
- Further changes to the EU Emissions Trading Scheme (ETS):
  - Expansion: Should the ETS be extended to all departing flights as of 2027 — rather than only flights within the EU/EEA and departing flights to Switzerland and the UK — the total revenue could reach 72 billion Euros by 2030<sup>22</sup>.
  - Non-CO<sub>2</sub> emissions: Monitoring rules are being put in place to “create a new system for airlines to monitor, report and verify non-CO<sub>2</sub> emissions and climate effects of aviation”<sup>23</sup>. Beyond conventional jet fuel, SAFs also produce non-CO<sub>2</sub> emissions at varying levels and potential impacts<sup>24</sup>, which are likely to impact purchase decisions.
- Addressing feedstock barriers:
  - Renewable energy: Higher renewable electricity prices in the EU compared to places like the US means the average e-kerosene price is about 45 per cent more expensive than conventional jet fuel<sup>25</sup>. Policies such as [REPowerEU](#) aim to address this, but urgent action will reduce this cost gap for the benefit of the SAF market and the EU’s energy transition more broadly.

<sup>21</sup> [ReFuelEU Aviation | European Parliament](#)

<sup>22</sup> [The challenges of scaling up e-kerosene production in Europe | Transport & Environment](#)

<sup>23</sup> [European Green Deal: new rules agreed on applying the EU emissions trading system in the aviation sector | European Commission](#)

<sup>24</sup> [Updated analysis of the non-CO2 effects of aviation | European Commission](#)

<sup>25</sup> [Current and future cost of e-kerosene in the United States and Europe | ICCT](#)



- Green hydrogen: The EU Hydrogen Strategy<sup>26</sup>, established in 2020, aims to promote the production and adoption of renewable hydrogen across key sectors. Binding targets for renewable hydrogen usage were introduced under the revised Renewable Energy Directive (RED)<sup>27</sup>, requiring 42% of the hydrogen used in industry from 2030 onward to come from renewable fuels of non-biological origin (RFNBOS).
- Carbon capture: Delegated Acts on renewable liquid and gaseous fuels of non-biological origin (RFNBOS) set a cut-off date of 2036 for using fossil carbon and as such, open a policy opportunity for the EU to create meaningful incentives for more sustainable sources of carbon — such as from direct air capture (DAC) or point-source capture where it is preferable from a lifecycle sustainability perspective — for the production of high-integrity SAF<sup>28</sup>.

The EU is still building its policy framework to support the growth of the SAF market as part of a blossoming global industry. EU policy has set a trend in the SAF space, with the UK having finalised its own [mandate](#) and the [Inflation Reduction Act](#) incentivising action on SAF in the US. It's likely in the coming decade that others will follow suit in order to achieve their own national net zero targets and overall [ICAO goals](#), seeing SAFs as a key step on the pathway to net zero aviation. Activities from the public sector alone will not be enough to see this market take off, and we are working closely with the investor community to accelerate action. To find out more, visit our [website](#) or get [in touch](#).

<sup>26</sup> [European Commission Communication \(COM/2020/301\) on a hydrogen Strategy for Europe | EUR-LEX](#)

<sup>27</sup> [Directive \(EU\) 2023/2413 of the European Parliament and Council regarding the promotion of energy from renewable sources | EUR-LEX](#)

<sup>28</sup> [The challenges of scaling up e-kerosene production in Europe | Transport & Environment](#)

