

Book-and-claim to de-risk European e-SAF production

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A book-and-claim system can play a crucial role in addressing one of the major barriers to scaling up synthetic aviation fuel (e-SAF) in Europe: investment risk. Book-and-claim allows physical e-SAF and its green credentials to be sold separately. This expands market access for producers, reduces e-SAF's transport emissions and costs, and creates the financial certainty investors need to take final investment decisions.

But book-and-claim must be well regulated. An unrestricted book-and-claim system, like that proposed by some aviation industry actors, risks undermining climate goals, EU competitiveness, and energy security by boosting less sustainable alternative fuels and non-European industry.

The SASHA Coalition recommends the EU Commission supports e-SAF production and industrial competitiveness by **introducing a book-and-claim system that fulfils the three criteria that it:**

1. Is exclusively for e-SAF, the only truly sustainable drop-in fuel option.
2. Operates only within the European Economic Area (EEA).
3. Is time bound with a clear end-date.

Introduction

Europe's aviation emissions are on the rise¹, with mitigative action trailing behind what is needed. In 2022, aviation accounted for 4% of the EU's total greenhouse gas emissions², while the International Civil Aviation Organization (ICAO) estimated that by 2050, international aviation emissions could triple compared to 2015.³

Central to cutting aviation emissions is replacing fossil kerosene with less emission-intensive sustainable aviation fuels (SAFs). However, among the different SAF feedstocks, only synthetic fuel (e-SAF) made from renewable hydrogen and sustainably sourced carbon⁴ is currently the only credible drop-in fuel that can decarbonise long-haul aviation. Despite e-SAF's climate credentials, EU producers are struggling to get off the ground, with no large-scale projects having yet reached Final Investment Decision (FID).⁵

SAF uptake is mandated by the 2023 ReFuelEU Aviation regulation (RFEUA).⁶ The targets mean that 6% of jet fuel in 2030, and 20% in 2035, must be SAF, with a corresponding sub-target of 1,2% of fuel from 2030, and 5% from 2035 being e-SAF.

The RFEUA regulation currently includes a flexibility mechanism⁷ that is both too restrictive – in practice often enabling flexibility only within and not between Member States – and poorly targeted, failing to distinguish between e-SAF and biofuels. While other kinds of SAF are on track to meet 2030s targets⁸, e-SAF projects face challenges the existing flexibility mechanism is not designed to help with.

Book-and-claim can help unlock e-SAF production and uptake in the EEA. However, to date book-and-claim proponents in the aviation and fossil fuel industries have advocated for systems with global scopes that cover all SAF.⁹ This approach would neither bridge the specific challenges e-SAF is facing, nor support EU industry. On the other hand, the European Commission objects to book-and-claim for SAF out of concern that it may stymie the development of physical supply infrastructure.¹⁰

The SASHA Coalition proposes a third option, a book-and-claim system that is well regulated and designed to specifically boost e-SAF production in the EU while developing the infrastructure for long-term industrial resilience, by following these three criteria:

Criteria for a well-regulated book-and-claim system	
E-SAF only	To ensure support exclusively for e-SAF, the least developed fuel solution, yet that with the greatest potential to reduce emissions and scale.
EEA limited	To specifically boost European innovation, energy sovereignty and cultivate a global competitive edge in this nascent technology.
Time bound, with a set end date	To incentivise, and give reasonable time for, e-SAF producers to negotiate access to existing infrastructure controlled by incumbent fossil fuel suppliers (where available) or see new supply infrastructure developed, ensuring long-term e-SAF access across Member States.

What is book-and-claim?

Book-and-claim allows market actors to buy ('claim') and sell the sustainability characteristics of a product independently from the physical product itself, in a traced and transparent chain of custody.¹¹

For e-SAF, this means an e-SAF producer could sell the physical fuel to one buyer nearby at conventional fuel price, and sell a certificate attesting to the fuel's sustainability to another buyer. E-SAF producers benefit by not being restricted to buyers who are both geographically close and in need of e-SAF, and not seeing the price and the carbon intensity of the fuel increase because of transportation.

Buyers who purchase the certificate can claim the ETS zero rating on the e-SAF and do not surrender an ETS allowance for a fuel they don't need to physically have access to and burn.¹² This gives buyers access to a wider pool of potential fuel producers; important especially for airports in regions where there are currently insufficient nearby e-SAF projects planned, and that therefore have limited access to e-SAF.

Proposals for overly flexible book-and-claim mechanisms for SAF from aviation and fossil fuel industry actors have elicited substantial concerns. An unrestricted book-and-claim system may facilitate the development of unsustainable fuels with dubious certification, misleading consumers, while failing to stimulate production for sustainable e-SAF. This would undermine European industrial competitiveness, innovation, and climate action.

However, a book-and-claim system that is well-regulated can serve the clear purpose of driving high-integrity e-SAF in aid of EU climate and industrial goals, while avoiding the above risks.

Benefits of a well-regulated book-and-claim system for e-SAF

For e-SAF producers

Market access: Overcoming geographical limitations to supply widens the pool of viable buyers.

Transportation: Reducing costs and carbon emissions associated with transportation.

De-risking investment: Achieving revenue stability to de-risk investment by increasing buyers and reducing costs.

For offtakers

Market access: Increasing the pool of e-SAF producers for offtakers to purchase green claims from.

Transportation: Reducing costs and carbon emissions associated with transportation.

Regulation compliance: Making it easier to comply with ReFuelEU Aviation targets.

Why do we need **book-and-claim**?

E-SAF value chain **without** book-and-claim



E-SAF producers are often not located near airlines with high demand for e-SAF, which they purchase to meet EU fuel regulations. The upshot is that producers have to transport e-SAF over long distances to the next nearest buyers, increasing costs and emissions.

Airlines seeking to purchase e-SAF may not have nearby producers and so have to purchase from far away in order to comply with EU fuel regulations.

E-SAF value chain **with** book-and-claim

E-SAF producers can sell physical e-SAF to nearby buyers, and the same fuel's green credentials to far away buyers as separate products.

This widens the pool of potential buyers, allowing producers to sign more offtake agreements and achieve revenue certainty to de-risk investment.

Airlines that need to comply with EU fuel regulation have more producers to buy e-SAF's green credentials from.

Airlines that are already compliant can buy fuel from nearby producers without the green credentials.



What problems does book-and-claim resolve?

E-SAF projects are struggling to access finances – more than half of global e-SAF capacity is EU-based yet no large scale project has reached FID.¹³ This is partly due to high capital and operational expenditure, and the high price of e-SAF, increasing project risk and cost of capital. Other SAF types that enjoy lower prices today and more established value chains, do not face such challenges. **A well-regulated book-and-claim system can therefore help de-risk e-SAF production but only if it works exclusively for e-SAF.**

There is also a geographical discrepancy limiting e-SAF market development. E-SAF production largely occurs in places with high renewable electricity capacity, but which often are not close to significant airport hubs that are primary offtakers. The same discrepancy exists between Member States: our analysis demonstrates that Eastern and Southern Europe countries are set for an e-SAF deficit, while those in Northern Europe will initially enjoy a surplus.

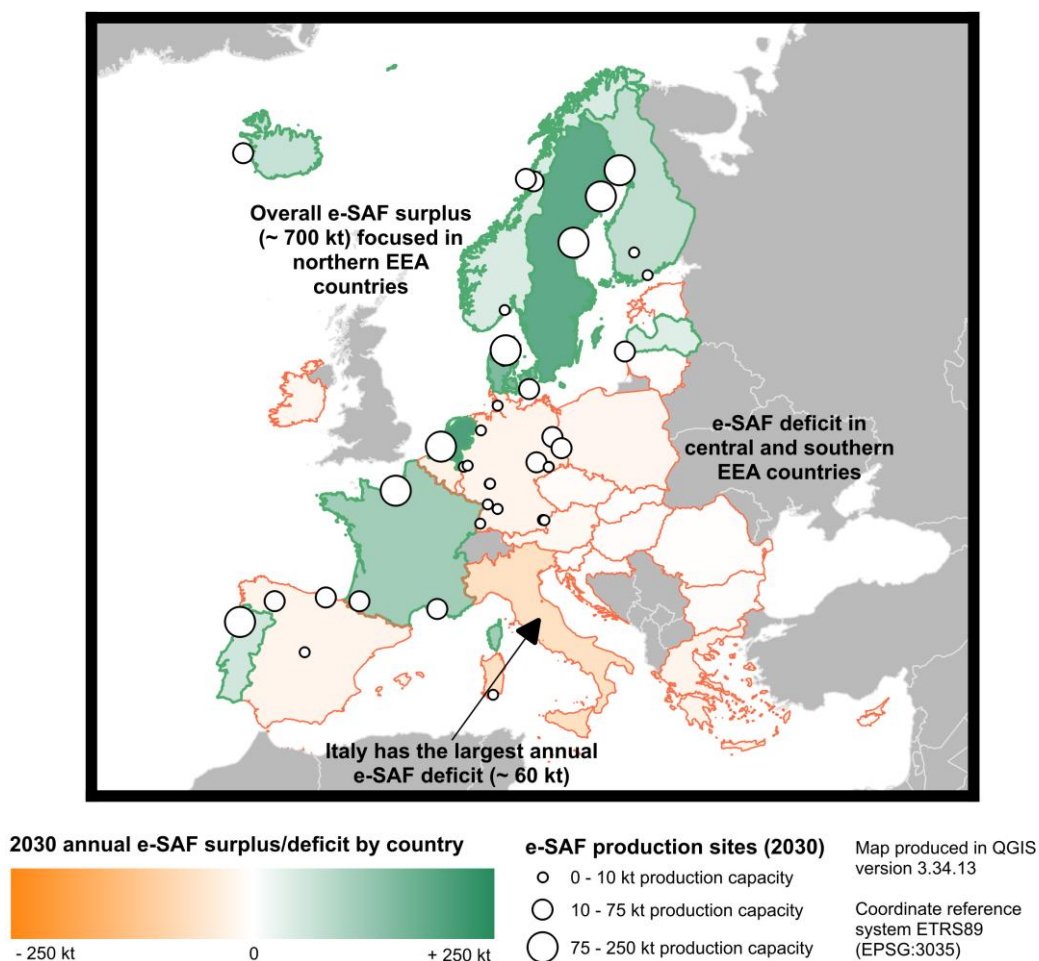


Figure 1: Difference between projected annual e-SAF production and demand in 2030 for European countries (EU27, Norway and Iceland). Countries shaded in green are projected to have a surplus of e-SAF, while countries shaded in orange are projected to have a deficit. e-SAF projects are taken from Mutrelle et al. (2025).¹⁴ country boundaries are from World Bank (2025).¹⁵ Calculation methods and data sources for e-SAF surplus/deficit are detailed in the footnotes.¹⁶

The Commission's 2025 report on RFEUA itself notes this disparity between Member States' synthetic aviation fuel production.¹⁷ However, the report's focus on fuel suppliers accessing e-SAF rather than producers achieving offtake agreements leads it to conclude that the RFEUA flexibility mechanism should not be expanded. The concern is that a virtual market will disincentivise supply chain infrastructure development and hamper distributed e-SAF access in the long term. **A well-regulated book-and-claim system can help stop geographical discrepancies' from limiting e-SAF production and market development, but it must be time-bound to mitigate against the risk of long term infrastructural underdevelopment.**

Three criteria to make book-and-claim boost European e-SAF industry

E-SAF only

- **Energy security:** Europe's dependence on fossil fuels is not just a climate issue, but also a sovereignty issue. Import dependence subjects our industry to price surges, and our political decisions to geopolitical pressure. E-SAF is the only low-emission drop-in fuel that is scalable inside Europe and can offer long term energy security, while over-reliance on biofuels will merely substitute dependency on one import for another.
- **Reducing emissions:** E-SAF produced with renewable hydrogen is the only truly sustainable and scalable drop-in fuel alternative to kerosene. Not only do other SAF, including biofuels, have less potential to reduce lifecycle emissions than e-fuels, but they also risk impacting biodiversity.
- **Industrial competitiveness:** Biofuels are at a greater technical readiness level than e-SAF, and have more established value chains. Including them in a book-and-claim system and increasing their market access would set them up to outcompete e-SAF despite them offering a lower competitiveness premium, fewer emissions, and less resilient future supply chains due to feedstock limitations and projected price volatility. Therefore, investment does not need de-risking to the same degree.

EEA limited

- **Energy security:** Incentivising e-SAF development inside the EEA is key to seizing the energy security opportunity e-SAF offers.
- **Industrial competitiveness:** A book-and-claim system with extra-EEA scope may in the short term help European airlines comply with regulation, but in the long run it would allow non-EU companies with stronger state support to outcompete European industry for the innovation, competitive manufacturing and economic opportunities.



- **Supply chain transparency:** Operating book-and-claim exclusively in the EEA, and excluding biomass feedstocks, makes it easier to ensure transparency in supply chains and robust certification to avoid greenwashing through double claiming or misrepresenting a fuel's climate credentials.

Time bound

- **Ensure investment:** The purpose of book-and-claim is to de-risk investment in e-SAF production in its nascency, and prevent the current lack of infrastructure from hindering market development. But a set end-date is necessary to ensure actors are incentivised in the long run to invest in the physical supply chain infrastructure, or negotiate access to existing infrastructure currently controlled by fossil fuel incumbents, ultimately enabling distributed access to e-SAF across Member States.

Conclusion

A book-and-claim system could robustly support e-SAF producers de-risk investment and overcome the challenge of achieving FID. But this system must follow strict criteria if it is to truly boost e-SAF production, help meet aviation's climate targets and cultivate competitive industry in Europe.

An unrestricted book-and-claim system, as some in the aviation and fossil fuel industries have proposed, risks boosting fuels that aid neither EU climate goals nor industrial competitiveness in the long run, and building manufacturing outside rather than within Europe.

But the Commission must not let these past proposals, that have had neither European industry nor the climate's best interests at heart, blemish book-and-claim outright.

The SASHA Coalition urges the Commission to introduce a book-and-claim system that follows the criteria that it is **exclusively for e-SAF**, operates **only within the EEA**, and has a **clear end-date**.

Book-and-claim is not a silver bullet and should not be treated as such. Giving e-SAF production the support it needs demands a package of policies including book-and-claim but also a contracts for difference financial mechanism with double-sided auctions backed by a market intermediary, and extending the EU Emissions Trading System to extra-EEA flights as a starting point.



About the SASHA Coalition

The [Skies and Seas Hydrogen-fuels Accelerator \(SASHA\) Coalition](#) brings together leading companies from the shipping and aviation supply chains who are driving their sectors' decarbonisation using renewable hydrogen solutions.

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¹ Transport and Environment, '[Airline emissions soar to pre-COVID levels as Europe fails to price their pollution](#),' 28 April 2025 (accessed 18 June 2025).

² European Commission, '[Reducing emissions from aviation](#),' (accessed 27 May 2025).

³ International Civil Aviation Organization, '[Trends in Emissions that affect Climate Change](#),' (accessed 22 May 2025).

⁴ These fuels are also known as e-fuels, electrofuels, PtL (power-to-liquid) fuels or renewable fuels of non-biological origin (RFNBOs).

⁵ Transport and Environment, '[The e-SAF market: Europe's head start and the road ahead](#),' June 2025 (accessed 18 June 2025).

⁶ [Regulation \(EU\) 2023/2405 of the European Parliament and of the Council of 18 October 2023 on ensuring a level playing field for sustainable air transport](#) (ReFuelEU Aviation).

⁷ As described under article 15 of ReFuelEU Aviation *ibid.* (n 6).

⁸ European Commission: Directorate-General for Mobility and Transport, Guidehouse, Ho, G., Pernot, S., Toop, G. et al., '[Assessment of the production and supply of SAF in Union airports and study on the feasibility of the creation of a system of tradability of SAF in the EU – Final report](#),' Publications Office of the European Union, 2025 (chapter 2.2. Sustainable aviation fuel in the EU).

⁹ Raman Ojha from Shell Aviation at the [2025 SAF Congress in Amsterdam](#).

¹⁰ European Commission, '[REPORT FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT AND THE COUNCIL The ReFuelEU Aviation SAF flexibility mechanism](#),' 27 February 2025.

¹¹ Paraphrased from *ibid* (n 8).

¹² This is in an ideal scenario where the ETS has been adapted to allow for such an approach, which it currently does not.

¹³ Project Skypower, 2025. Accessed 22 July 2025, from <https://project-skypower.org/news-publications/70-industry-leaders-call-five-key-policy-interventions-support-scale-e-saf>

¹⁴ Mutrelle, C., Catte, F., Kunkel, A., 2025. The e-SAF market: Europe's head start and the road ahead. Retrieved 18 June, 2025 from <https://www.transportenvironment.org/topics/planes/saf-observatory/spotlight-on-e-kerosene>. Only projects in relevant countries which plan to produce e-SAF before or by 2030 are shown.

¹⁵ World Bank, 2025. World Bank Official Boundaries. Retrieved 18 June, 2025 from <https://datacatalog.worldbank.org/search/dataset/0038272>

¹⁶ To calculate annual e-SAF demand in each country, we assumed that e-SAF demand across the entire EU27 will be 0.6mn tonnes per year in 2030.¹⁵ This is based on projected EU-27 aviation fuel demand and the ReFuelEU mandate which requires 1,2% of all aviation fuel used to be e-SAF by 2030 (note our conclusions as to whether a country will be in surplus or deficit are robust across the range 0,55 – 0,7mn tonnes, reflecting a range of demand scenarios). We then calculated each country's share of total EU27 aviation energy consumption (including both domestic and international aviation) in 2023, and used these proportions to calculate 2030 e-SAF demand for each EU27 country. For Iceland and Norway, we calculated the additional e-SAF required based on their 2023 aviation energy consumption, compared with the entire EU27. To calculate surplus/deficit, we took the difference between projected 2030 e-SAF demand and supply based on planned production capacity.¹⁵ 2023 aviation energy consumption data were taken from: Eurostat, 2025. Complete energy balances. Retrieved 01 July, 2025 from https://ec.europa.eu/eurostat/databrowser/view/nrg_bal_c_custom_17307940/default/table.

¹⁷ *Ibid* (n 10).