BRIEFING

E-SAF made in Europe - A source of jobs, growth and energy security

An analytical assessment of the socio-economic benefits of European e-SAF production

Briefing published: 9 April 2026

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Summary

E-SAF can play a key role in reducing European aviation emissions. While the climate benefits of e-SAF are well understood, much less attention has been paid to what scaling up European production could mean for Europe's economic growth, jobs and energy security. T&E therefore commissioned consultancy ERM to fill this gap.

Key data points

Up to 85%	**€20 billion**	**4,000 jobs**
of investments into European e-SAF plants could stay in Europe	gross value added from building European e-SAF plants to meet the ReFuelEU 2030 targets	could be supported by operational e-SAF plants required to meet the ReFuelEU 2030 targets

To meet the ReFuelEU and UK SAF mandate 2030 e-SAF targets through domestic production, Europe would need to build **around nine e-SAF plants, each with 75 kt e-SAF annual production capacity**. These facilities require significant upfront investment but could deliver substantial long-term economic and social returns. The analysis shows that a large share of this value can be captured within Europe if domestic production and technology is prioritised over imports.

Scaling up e-SAF production represents **a major industrial investment opportunity.** A single industrial-scale plant could require close to **€2 billion in direct investment**, rising to around €4 billion when associated renewable electricity generation is included. Up to **85% of this capital investment** could stay in Europe, reflecting existing strengths in sectors such as wind energy, electrolysers, hydrogen infrastructure and fuel synthesis technologies.

These investments could generate **significant gross value added (GVA) across the supply chain**. Each plant could generate more than **€4 billion in combined construction and operational GVA**. Meeting the 2030 mandates through domestic production could generate around €20 billion in GVA from plant construction alone, alongside approximately €1.5 billion annually from operations. Looking ahead to 2050, the scale-up of e-SAF could increase combined economic contributions very substantially, potentially reaching a scale comparable to a significant share of aviation's current direct contribution to European GDP.

The deployment of e-SAF production facilities also represents **a major opportunity for job creation** across Europe. A single plant could support over **3,000 jobs during a 4-year construction period and around 500 ongoing jobs during operation**. Many of these are high-skilled roles such as electrical and process engineers, hydrogen and electrolysis specialists, plant operators, and technicians in advanced manufacturing and maintenance. Meeting the 2030 targets would require building multiple plants within a short timeframe, potentially supporting around 30,000 full-time jobs during construction. By 2050, the e-SAF value chain could support tens of thousands of direct and indirect jobs annually. This scale is similar to direct employment in Europe's existing oil refining sector, suggesting that e-SAF could provide a viable pathway for workforce transition.

Finally, domestic e-SAF production can significantly **enhance Europe's energy sovereignty.** Currently, the **EU relies on imports for more than 95% of its jet fuel supply**, with heavy reliance on the Middle East. This reliance heavily exposes the aviation sector to geopolitical risks and price volatility, as demonstrated by the drastic increase in European jet fuel prices due to the Middle East crisis in early 2026. Domestic e-SAF production can reduce this dependence by replacing imported oil with fuels produced from European renewable electricity. Compared to biofuels, e-SAF also offers a more secure long-term pathway. Sustainable bio-based feedstocks are limited within Europe, leading to growing reliance on imports. In contrast, e-SAF production is less constrained by resource availability (electricity, carbon), making it a more scalable and sovereign solution. Whilst it is likely that Europe will need to rely on imports to meet part of the mandate - especially as other countries like China and the US are already making significant strides in e-SAF supply chains - T&E recommends that Europe identifies e-SAF as a key strategic industry to prioritise in upcoming policy decisions.

Key recommendations

The socio-economic benefits outlined above are not automatic. They depend on where e-SAF is produced and how much of the supply chain is located in Europe. Capturing these benefits therefore requires deliberate policy choices to support European production and reduce over-reliance on imports. To help achieve this, **T&E recommends the following:**

- **Preserve the e-SAF sub-targets under ReFuelEU Aviation and the UK SAF mandate**
- **Use the market intermediary and SAF allowances to prioritise made-in-Europe e-SAF**
- **Accelerate implementation through Member State funding of the e-SAF pilot auction**

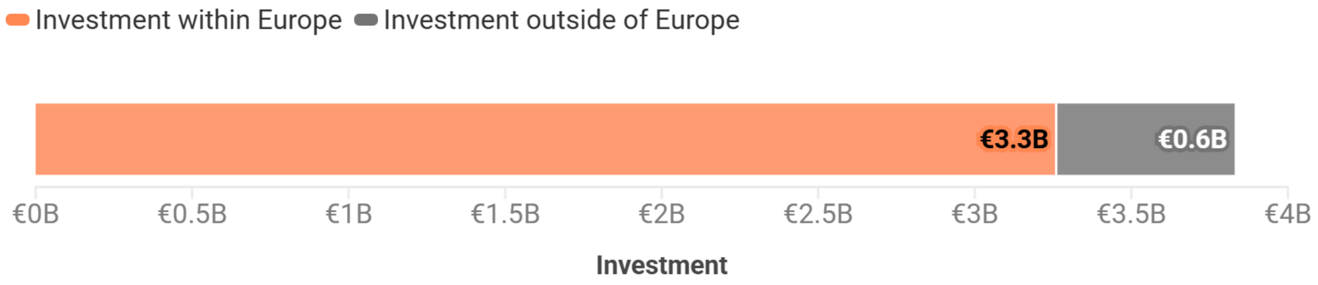
01

How much economic value can e-SAF generate?

The study finds that a single industrial-scale e-SAF plant requires close to €2 billion of investment. If we include the renewable energy generation that e-SAF production requires, the capital expenditure increases to around €4 billion. Up to 85% of this investment could stay in Europe according to ERM modelling. In particular, wind energy investments are assumed to be largely European. For core industrial equipment like electrolysers, hydrogen storage and the synthesis process, a majority share is assumed to be sourced from European manufacturers, reflecting existing industrial capacity. The main exceptions are solar modules due to strong dependence on Chinese manufacturing.

A large share of investment in e-SAF plants could remain within Europe

Investment for e-SAF plant including renewable electricity production



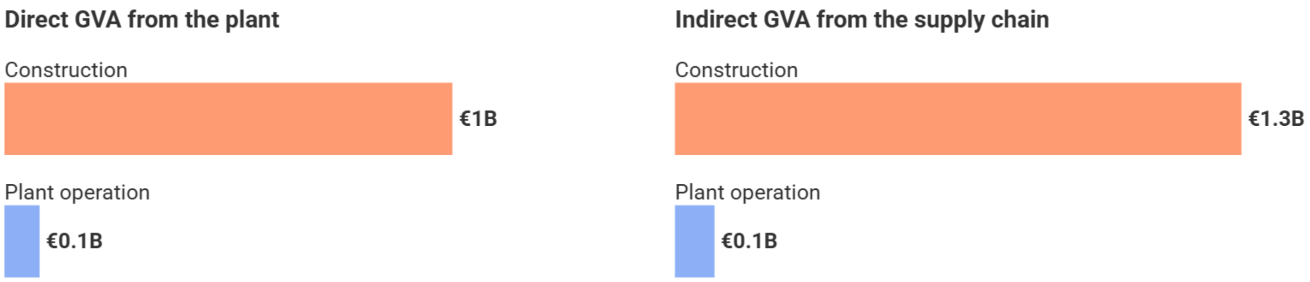
Source: T&E (2026), based on ERM (2026) • Assume e-SAF plant producing 75 kt of e-SAF and 25 kt of e-naphtha per year.

Investments into e-SAF plants drive economic activity. Gross value added (GVA) is a simple way of showing how much an activity contributes to the economy. It captures the value created by building and running e-SAF plants in Europe, after accounting for the cost of inputs. In practice, this means measuring how much economic activity is generated across the supply chain, from construction and equipment manufacturing to ongoing operations.

A single e-SAF plant could unlock around €2 billion of GVA during construction and around €0.2 billion per year during operation. The investment into the additional renewables required to supply the plant could generate another €3 billion of GVA. The ReFuelEU Aviation and UK SAF mandates would require the construction of around **nine e-SAF plants with 75 kt annual production capacity by 2030**. Their construction could generate around €20 billion in GVA, while plant operations would contribute roughly €1.5 billion per year. Another €25 billion of GVA could be created through the investment into renewables needed to supply these plants with electricity. By 2050, e-SAF production will need to increase by more than twenty-fold compared to 2030. As a consequence, the construction and operational GVA contribution of e-SAF could reach a substantial fraction of aviation's direct contribution to European GDP of €110 billion per year.

A single e-SAF plant could generate more than €2B in GVA during construction and around €0.2B per year during operation

Direct and indirect GVA created during the construction and operation of an e-SAF plant excluding renewable electricity production



Source: T&E (2026), based on ERM (2026) • Assume e-SAF plant producing 75 kt of e-SAF and 25 kt of e-naphtha per year.

02

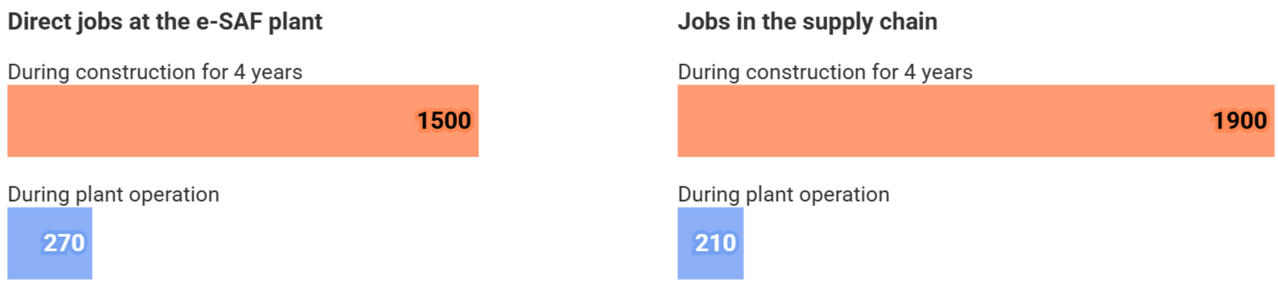
How many jobs can e-SAF generate?

The study finds that a single industrial-scale e-SAF plant can support more than 3,000 jobs during construction and around 500 jobs during operation. During the building phase, jobs are created across construction, engineering, equipment manufacturing and supply chains. Meeting the 2030 European e-SAF mandates would require the construction of nine e-SAF plants with 75 kt annual production capacity. The construction of these e-SAF plants to meet the 2030 mandates could therefore support **around 30,000 full-time jobs**. By 2050, the construction of the e-SAF value chain could support hundreds of thousands of jobs across Europe. Including the additional renewable energy deployment driven by e-SAF in Europe, these numbers could double.

Once operational, plants support direct roles in plant operation and maintenance and indirect roles in supporting services such as logistics, utilities and insurance. As production scales to meet higher blending mandates, these ongoing jobs increase steadily. By 2030, European e-SAF plants could sustain around **4,000 permanent jobs**. By 2050, a fully scaled European e-SAF industry could **sustain tens of thousands of direct and indirect jobs annually**. For context, this is broadly comparable in order of magnitude to employment in Europe's roughly 70 refineries today, suggesting that e-SAF could become a new source of industrial employment as the energy system transitions.

A single e-SAF plant could support more than 3,000 jobs during construction and around 500 jobs during operation

Jobs supported during the 4-year-long construction and operation of an e-SAF plant excluding renewable electricity production



Source: T&E (2026), based on ERM (2026) • Assume e-SAF plant producing 75 kt of e-SAF and 25 kt of e-naphtha per year.

03

What are upskilling and reskilling opportunities from e-SAF?

Skills shortages could become a major bottleneck to scaling e-SAF in Europe, but the sector also offers strong upskilling and reskilling opportunities. Large-scale deployment of e-SAF facilities requires a broad skills base spanning electrical, mechanical and civil engineering, process engineering, plant operations and maintenance, and construction and enabling works such as welding, site management and health and safety. These skills are needed across the full value chain, from renewable power generation and hydrogen electrolysis to carbon capture and fuel synthesis. **However, Europe already faces persistent shortages in many of these occupations.** Evidence from CEDEFOP, national skills bodies and the IEA points to chronic gaps in electrical and energy engineering, mechatronics, skilled trades and STEM roles, all of which are critical for e-SAF deployment. Without targeted intervention, these shortages risk becoming a bottleneck to scale-up. This underlines the importance of expanding and tailoring vocational training, apprenticeships and technical education to the specific needs of the e-SAF value chain.

EU-level initiatives such as the Net-Zero Industry Academies provide a strong foundation. The Solar and Hydrogen Academies, and the forthcoming Wind Academy, are already developing curricula, credentials and delivery mechanisms that can be adapted to e-SAF production, supporting workforce mobility and skills transfer across borders. Aligning these programmes with national training systems and Just Transition strategies will be essential to ensure an inclusive and resilient labour market.

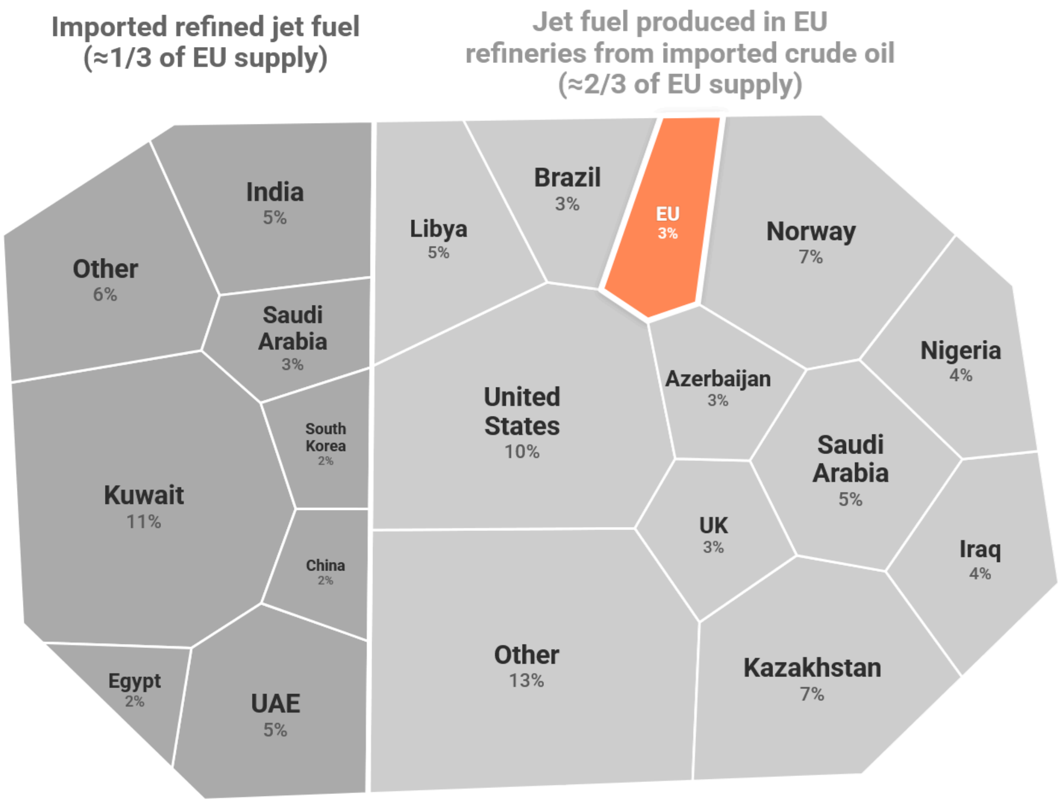
04

What benefits does e-SAF have for the wider energy system?

The ERM study also highlights that domestic e-SAF production could displace crude oil and refined jet fuel imports and would therefore strengthen Europe's energy sovereignty. The EU currently imports around 95% of its crude oil and therefore almost all of the crude oil used for jet fuel refining within the European Union. Additionally, roughly one third of European jet fuel demand is met by directly importing refined jet fuel, with the Middle East as the main supplier. IATA notes that the **Middle East conflict exposes jet fuel supply vulnerability**, leading to a drastic increase in European jet fuel prices in March 2026.

Over 95% of EU jet fuel depends on imported fossil fuels

Origin of EU jet fuel supply in 2024



Source: T&E (2026), based on ERM (2026) • Country shares for refined jet fuel are estimated based on the origin of crude oil imports. Differences in crude yield are not reflected but do not materially affect the overall picture. Jet fuel import ratio based on 2023 data.

Domestic e-SAF is also a more sovereign choice than biofuels, primarily due to the limited availability of sustainable bio-waste feedstocks within the EU. T&E estimates that domestic, sustainable advanced and waste biofuels could cover up to **~15% and 7.5% of the projected EU jet fuel demand in 2030 and 2050**. This structural constraint already translates into import dependence: around **two-thirds of SAF feedstocks** reported to EASA in 2024 originated from outside the EU, with China and Malaysia as the main suppliers.

E-SAF production could strengthen Europe's wider energy transition. **It could cut costs, speed up infrastructure build-out and support skills development across renewables, hydrogen, shipping fuels and low-carbon chemicals**. Greater deployment of renewables and electrolysers driven by e-fuels demand is expected to reduce costs through learning effects, economies of scale and increased competition, lowering input costs for multiple decarbonising sectors. The production of intermediates such as green hydrogen and e-methanol also provides market flexibility, reducing investment risk by allowing producers to serve multiple end uses such as e-ammonia for shipping and fertilisers or e-methanol for shipping and plastics as demand evolves.

At the same time, **e-fuels can support workforce transition from declining oil and gas activities** by developing transferable skills applicable across hydrogen, chemicals and industrial decarbonisation, in line with EU clean industrial policy objectives. Finally, the modular and adaptable nature of e-fuels assets enables future repurposing of generation, capture, storage and synthesis infrastructure, enhancing system resilience and reducing the risk of stranded assets as Europe's energy system continues to evolve.

Recommendations

01

Preserve the e-SAF sub-target under ReFuelEU Aviation

The dedicated e-SAF sub-target is essential to **unlock investment certainty and avoid overreliance on unsustainable biofuels**. Weakening or removing it would undermine Europe's ability to capture the industrial, employment and energy security benefits identified in this study. The sub-target should be maintained as the backbone of a European e-SAF industry.

02

Use the market intermediary and SAF allowances to prioritise made-in-Europe e-SAF

The announced EU market intermediary should be designed to channel **support towards domestically produced e-SAF**, while avoiding over-reliance on biofuels. In parallel, SAF allowances could be structured to incentivise the uptake of European e-SAF, ensuring that public support translates into European investment, jobs and industrial capacity rather than imports.

03

Accelerate implementation through Member State funding of the e-SAF pilot auction

In the short term, Member States should commit financial support to the planned pilot double-sided auction for e-SAF. Despite strong participation in the Early Mover Coalition, only a minority of countries have pledged funding so far. Early national contributions are **critical to de-risk first projects**, demonstrate proof of concept, and build momentum towards an EU-wide mechanism.

Methodology and limitations

All estimates presented in this briefing are based on ERM techno-economic modelling of a representative industrial-scale e-SAF value chain. Because the underlying CAPEX estimates are pre-feasibility estimates, the **results should be understood as order-of-magnitude estimates with significant uncertainty**. The reference case is a standardised plant configuration producing around 75 kt of e-SAF per year from a 100 kt/year e-fuels plant, using a RWGS-Fischer-Tropsch pathway. **Results are scaled from this per-plant model** to estimate European impacts in 2030 and 2050. They are assumed to be broadly representative of alternative e-SAF pathways, such as methanol-to-jet, with differences treated as falling within the overall uncertainty range.

The analysis models a scenario in which European production meets 100% of mandated e-SAF demand under ReFuelEU Aviation and the UK SAF mandate. Since a **share of e-SAF is likely to be imported in practice, these results should be interpreted as an upper-bound or best-case domestic production scenario**. In this analysis, "Europe" refers to the EU-27, the EEA countries, and the UK, consistent with the ERM study scope.

A central assumption is that around 85% of capital expenditure is retained within Europe, while operational expenditure is assumed to take place fully within Europe. Results therefore depend strongly on assumptions about domestic manufacturing content, project location, and the extent to which Europe captures the supply chain. **To avoid overstating the socio-economic benefits, the study presents GVA and jobs figures without the additional renewable electricity build-out by default**, since including those associated investments would materially increase the results.

Economic value added and jobs are estimated using national input-output tables from Eurostat and the UK ONS, and should be interpreted as gross socio-economic impacts. They capture direct and indirect effects across supply chains, but exclude wider macroeconomic feedback and do not model induced consumer-spending effects.

The 2050 estimates **do not assume technological learning or productivity improvements over time**. This simplifies comparison across time, but may overstate future labour intensity and the socio-economic contribution associated with each unit of output. The analysis also does not fully capture real-world bottlenecks such as permitting delays, grid constraints, CO2 availability, or skilled labour shortages.

Further information

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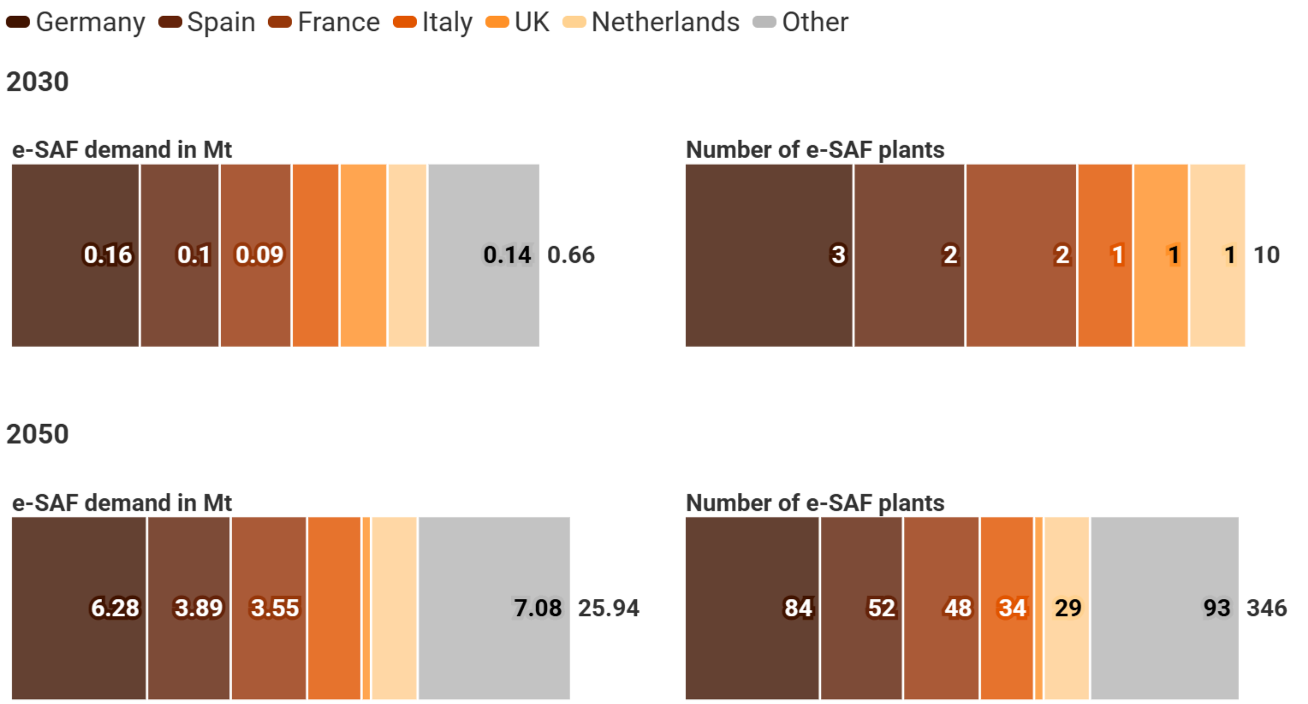
Annex

National opportunities

To illustrate the scale of the opportunity, we project aviation fuel demand to 2030 and 2050 and ask what it would take to meet each country's e-SAF needs through domestic production. The answer points to a major industrial build-out, with significant implications for investment, jobs and economic value. By 2030, countries such as Germany, Spain, France and the UK would already require multiple large-scale plants as modelled by ERM, with demand rising sharply towards 2050, highlighting the opportunity to anchor a new clean fuel industry domestically.

EU and UK e-SAF demand from ReFuelEU Aviation and UK SAF mandates



Source: T&E (2026) • Assumes that national e-SAF demand from major jet fuel consumers is met through domestic production, resulting in a slight overcapacity by 2030.