

Shaping Europe's eSAF industry in Rotterdam

A socio-economic impact analysis of the production and supply of eSAF by eFuels Rotterdam

This study was commissioned by Power2X and conducted by Ecorys. Power2X provided technical input and contextual expertise to support the analysis.

The Netherlands has built its industrial prosperity on fossil molecules, from the refining clusters of Rotterdam to the petrochemical industry that supports European value chains. As the energy transition accelerates, the next generation of industrial activity will be built on clean molecules: renewable fuels, green hydrogen, and synthetic feedstocks.

The Netherlands is well positioned for this transition. With its port infrastructure, established refining expertise, and extensive logistics networks, the Port of Rotterdam is emerging as an anchor for Europe's clean molecule economy.

This transition is not limited to fuels: it also creates pathways for the existing petrochemical cluster to move from fossil feedstocks towards renewable carbon, including methanol-based routes into olefins, synthetic fuels and chemical intermediates.

Aviation is one of the sectors where this opportunity is most visible and most immediate. As part of the EU's Fit for 55 package, which translates climate ambitions into legally binding emissions reduction targets across sectors, the ReFuelEU Aviation regulation requires fuel suppliers and airlines to gradually increase the use of Sustainable Aviation Fuels (SAF), including a dedicated mandate for synthetic eSAF. These requirements take effect from 2030 and increase over time. Meeting them will require large-scale production capacity. The Netherlands has the infrastructure, industrial base, and expertise needed to help meet these targets and build the new value chains that support them.

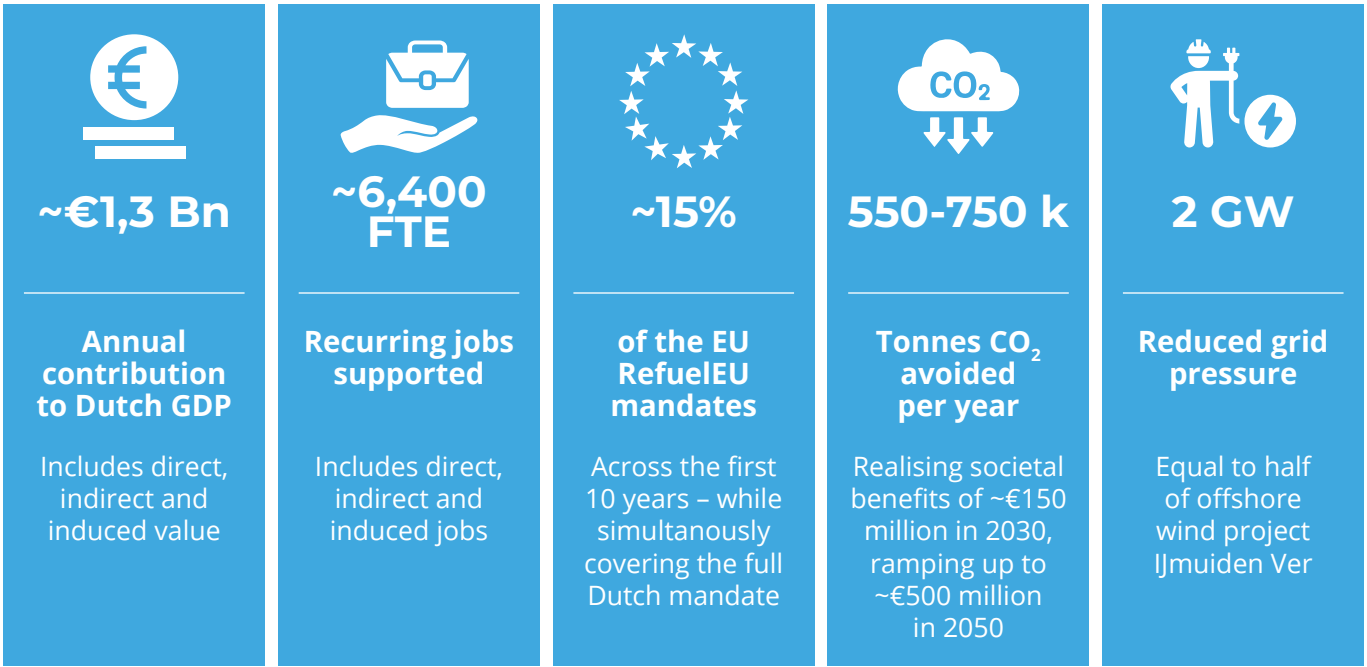
The Netherlands and Europe face growing energy security challenges. Europe remains heavily dependent on imported jet fuel and imported crude oil. Around one-third of jet fuel is imported directly, while much of the remaining supply is refined domestically from imported crude. European refining capacity is under pressure and is expected to decline further over time¹.

Against a backdrop of geopolitical tensions, including the war in Ukraine, instability in the Middle East, and shifting US trade policy, dependence on imported fossil fuels creates an increasing strategic vulnerability. Expanding domestic eSAF production will help diversify fuel supply, strengthen resilience, and improve long-term energy security.

Securing early eSAF investment in the Netherlands supports energy transition and climate objectives, as well as broader economic and strategic industrial goals. It will generate GDP and employment, anchor knowledge-intensive activity in Dutch industrial clusters, and strengthen domestic fuel supply.

This study assesses the socioeconomic impact of Power2X's eFuels Rotterdam (eFR) project, a planned facility in the Port of Rotterdam that will convert imported renewable methanol into approximately **250 kt of eSAF per year**. With an investment over **€2 billion**, eFR is currently one of the largest planned eSAF production facilities in Europe.

Figure 1



1 Woodmac (2024): [Assessing refineries at risk of closing](#)

What eFuels Rotterdam Delivers

This figure 1 illustrates that eFR is an economic and energy system asset for both the Netherlands and the Port of Rotterdam, while supporting energy transition and climate objectives.

Why eFR matters

- Contributes to the Dutch economy:** eFR will contribute approximately €1.3 billion annually to Dutch GDP, encompassing direct, indirect, and induced economic value.
- Supports jobs in the Netherlands:** The project supports up to 6,400 jobs, in addition to approximately 11,000 construction-related FTE-years during the realisation phase.
- Supports compliance with eSAF mandates:** Over the first ten years of the ReFuelEU mandate (through 2039), eFuels Rotterdam is capable of supplying an average of ~15% of the mandated European eSAF demand, while simultaneously covering the full Dutch mandate obligation.
- Anchors the Rotterdam chemicals cluster:** The project represents a first step towards establishing a domestic renewable methanol hub in the Port of Rotterdam, helping to attract a new wave of chemical sector investment.
- Strengthens energy security:** eFR will reduce long-term reliance on imported kerosene by diversifying supply sources and expanding domestic production capacity.
- Provides access to competitively sourced renewable methanol:** By sourcing renewable methanol from regions with cost competitive renewable power in the early phase, eFR avoids competing for scarce Dutch grid capacity needed for the electrification of homes, industry, and mobility. Producing equivalent upstream volumes domestically would require around 2 GW of additional renewable electricity capacity, alongside CO₂ sourcing, grid infrastructure, system balancing, land use and permitting. Imports therefore provide a bridge while Dutch and EU renewable methanol production scale over time.

- Increases innovation and competitiveness:** The project will stimulate the development of a synthetic fuels cluster in Rotterdam and strengthen investor confidence through scale, learning effects, and future replication. It will also create demand for a broad ecosystem of contractors, suppliers and service providers, helping to retain and renew the industrial capabilities that underpin the Port of Rotterdam's long-term competitiveness.

Background

Climate change remains a defining global challenge, increasingly intertwined with energy security and economic resilience. The Dutch government and the European Commission have committed to ambitious climate targets. The scale-up of Sustainable Aviation Fuels (SAF), and particularly synthetic Sustainable Aviation Fuels (eSAF), will be crucial for decarbonising the aviation sector. European regulations such as ReFuelEU Aviation, part of the Fit for 55 package, mandate a gradual increase in the use of SAF in aviation. This creates both challenges and opportunities for the Netherlands. Dutch climate and aviation policies emphasise the need to increase the use of SAF, including eSAF, towards 2030 and beyond. The National SAF Roadmap (2025–2035) and related policy documents outline an ambitious pathway focused on expanding production capacity and fostering innovation across the entire eSAF value chain.

Beyond emissions reduction, the Netherlands also possesses strategic industrial capabilities, including a strong refining sector. As Europe's energy gateway, Rotterdam has a refining capacity of 1.3 million barrels per day and favourable logistics infrastructure. More than 1,500 km of pipelines connect the Port of Rotterdam to the European mainland, while the Rhine waterway is the Netherlands' second-largest export route². Currently, 95% of Europe's jet fuel depends on imports. Of this, roughly one-third is imported directly, while two-thirds is produced domestically using imported crude oil³. This dependence leaves Europe vulnerable to geopolitical conflict and market disruption. The 2026 Middle East conflict triggered the most severe oil supply disruption on record, exposing the structural risks associated with Europe's dependence on imported energy. The combined effects of the closure of the Strait of Hormuz and targeted strikes on Gulf production and export infrastructure drove global oil prices sharply higher. Europe's ability to secure alternative supplies was further constrained by competing global demand, as redirected shipments were absorbed by Asian markets facing acute shortfalls of their own.

2 HCSS (2026): [No fuel no fight](#)
3 T&E (2026): [eSAF made in Europe – A source of jobs, growth and energy security](#)

The economic dimension of this transition is equally pressing for Rotterdam and the Netherlands. In 2025, the Port of Rotterdam contributed €29.6 billion, approximately 2.9% of Dutch GDP, and supported nearly 200,000 direct and indirect jobs⁴. This economic significance rests heavily on the port's role as Europe's energy and industrial gateway, a position now under structural pressure as refining capacity declines and the chemical industry contracts. This pressure reflects a combination of structurally high European energy costs, weaker refining margins and tightening environmental decarbonisation requirements that raise the cost of operating older European assets. Across Europe, chemical plant closures have increased sixfold since 2022, representing approximately 9% of European production capacity and the direct loss of 20,000 jobs⁵. Preserving and renewing this industrial base requires attracting the next generation of energy investments to Rotterdam, including clean molecules, synthetic fuels, and the associated value chains. Whether this happens will depend critically on the investment climate.

Across both Europe and the Netherlands, the industrial investment climate is under growing pressure from a combination of structural barriers. These include comparatively high energy prices, which encourage strategic industries to relocate elsewhere, electricity grid congestion that delays new connections, and slow or inconsistent licensing and regulatory processes⁶ ⁷. As a result, many industrial companies are postponing or cancelling investment decisions, or relocating activities outside the Netherlands and Europe⁸.

When industrial companies delay or relocate investments, this disrupts the broader industrial ecosystem in which they operate. Such decisions weaken upstream and downstream value chains, as suppliers, service providers, and dependent sectors face reduced demand, constrained supply, and heightened uncertainty. Conversely, attracting investment generates economic value through increased gross domestic product (GDP) and employment. In doing so, it stimulates broader economic development while strengthening the knowledge position of both the Netherlands and Europe.

eFuels Rotterdam – Power2X

Power2X is developing the eFuels Rotterdam (eFR) project (see Figure 2), the largest planned eSAF production facility in Europe, located in the Port of Rotterdam. eFR is designed as a large-scale conversion and distribution hub, connecting global renewable methanol supply with European fuel synthesis and aviation markets. This approach enables industrial-scale deployment while maintaining flexibility in feedstock sourcing and integration with existing infrastructure.

As a result, the project is not reliant on a single co-located upstream production configuration, such as a fully integrated site where renewable power generation, electrolysis, CO₂ capture, and fuel synthesis are all developed at one location. Once operational, eFR is expected to produce approximately 250,000 tonnes of eSAF annually. At this scale, the facility's output would be equivalent to approximately 125% of the cumulative EU eSAF mandate during the first decade of implementation, representing a higher share in the early years and a lower share as mandate requirements increase over time. Put simply, the facility could supply the entire Dutch mandated eSAF demand through 2039.

The project is being developed in partnership with Advorio and Honeywell UOP. The eFuels Rotterdam project is currently the largest eSAF facility under development in Europe⁹. The facility will connect to existing jet fuel logistics and distribution infrastructure, including a connection to the Central Europe Pipeline System (CEPS)¹⁰, enabling the delivery of blended eSAF to major civil airports across Europe.



Figure 2 Impression of eFR facility

4 OECD (2025) :[OECD Economic Surveys: Netherlands 2025](#)

5 Cefic (2026): [European Chemical Closures & Investments Radar 2022-2025](#)

6 Wennink (2025) [The Route to future prosperity: A strong Netherlands in a relevant Europe](#)

7 EY (2025) [Het Nederlandse investeringsklimaat staat onder druk](#)

8 E.g. Shell and BP halted the construction of their planned biofuels plants in Rotterdam. Shell (2025). [Shell will not restart construction of Rotterdam biofuels plant](#) & Reuters (2025). [BP abandons plans to build Rotterdam biofuels plant](#).

9 T&E (2026) [Spotlight on eSAF: eSAF projects around the world](#)

10 Central European Pipeline System [CEPS](#)



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