

Revision of the Renewable Energy Framework: Amending the Renewable Energy Directive

The eFuel industry constitutes enormous transformation potential to not only decarbonize hard-to-abate sectors but also bridge the gap in the road sector, which is facing delayed electrification. More than 300 projects have already been announced globally which could translate into a production capacity of more than 20-billion-liter gasoline in 2030. However, just 6% of these projects have a final investment decision (FID). The European hydrogen sector is not on track to meet the goals laid out by the European Hydrogen Strategy (COM/2020/301). The current national implementation processes of the Renewable Energy Directive (RED) unveil the complicated and fragmented methodology with Member States struggling to implement the directive in time. The upcoming revision of the RED requires not only urgent political adjustments. It also offers an opportunity to address structural problems, including simpler and binding rules on multipliers and penalties, a clearer vision for RFNBOs, stronger investment certainty, and a clear definition of the sectors covered in order to avoid regulatory conflicts with ReFuelEU Aviation and FuelEU Maritime. We therefore welcome the planned revision of the Renewable Energy Framework in the Commission working program 2026 (COM/2025/870).

As the eFuel Alliance, we represent over 160 companies, associations and consumer organizations along the whole value chain of renewable fuels – including around 25 eFuel producers and project developers. This document is structured as follows: First, we briefly outline the current market situation of eFuels, followed by an analytical overview of the RED and its development in terms of national implementation processes. The core of the paper describes best practices to develop a pathway for RFNBOs in transport until 2050. Hence, we take this as a basis for our recommendation on the Renewable Energy Framework, specifically focusing on the 4th revision of the Renewable Energy Directive. Additionally, we provide an overview of additional targeted measures to speed up the RFNBO market ramp-up, including a CO₂ content related revision of the Energy Taxation Directive and better funding options.

Our recommendations for the revision of the Renewable Energy Framework

- The eFuel industry is ready and has announced more than 300 projects with production capacity in 2030 – but just 6% have a final investment decision.
- The Renewable Energy Framework should further develop clear ambitious but realistic RFNBO targets for industry, transport and heating. Overall GHG reduction targets should be in line with EU climate targets.
- For transport, we recommend setting mandatory targets of at least 5% RFNBOs in 2035; 12% in 2040; 18% in 2045 and 25% in 2050. These ambitious targets require clear political support across the institutions.
- Complexity and overregulation of the EU Renewable Energy Framework must be reduced and ensured alignment among regulatory files for all transport sectors beside ReFuelEU Aviation and Fuel EU Maritime. We recommend developing standardized, binding systems for penalties, multipliers, addressed sectors and databases.
- Additional measurements to speed up the RFNBO development are the consideration in the revision of CO₂ emission standards for cars and trucks, Energy Taxation Directive and Emission Trading System as well as better funding options until the market is developed.
- Safeguarding Investments in existing early projects by ensuring regulatory stability.

Market situation of eFuels

Our recent [study](#) conducted in collaboration with Porsche Consulting found that more than 300 eFuel projects are currently in development worldwide, representing a combined production capacity of 20 billion liters of eFuels in 2030 and an estimated €550 billion investment potential. The study has focused on eFuels for transport. Ammonia as well as hydrogen in refineries come on top. More than 80% of the analyzed projects are following the methanol route for synthesizing hydrogen and CO₂, 14% the Fischer-Tropsch route and 5% the Sabatier route (eMethane). European projects are characterized by small or medium-sized production capacities due to reduced access to renewable electricity and eligible CO₂ sources - a limitation that can be directly attributed to the production rules for RFNBOs. In North America some larger projects are still under development although the Trump administration has cut incentives which were previously introduced under the Inflation Reduction Act. China is about to become a hot spot for the development of hydrogen and eFuels. Three of the world's five largest projects are being developed in China. According to the 2025 Hydrogen Review of the International Energy Agency (IEA), China has built up 60% of the global electrolysis production capacity and can offer prices 20-30% lower than Western competitors. China's strong position is driven less by climate protection objectives than by industrial strategy and energy resilience. If European Union wants to maintain its market position, it must act without delay.

The Industrial Accelerator Act (COM(2026)100) takes an important step in the right direction by recognising the need to strengthen the EU's industrial base, reduce strategic dependencies on third countries, and accelerate the deployment of net-zero technologies across Europe. In particular, it places greater emphasis on fostering European value chains and promoting the use of European-made components for RFNBO production. However, funding mechanisms must become more effective and streamlined, bureaucratic procedures must be reduced, and restrictive production rules need to be revised. As noted above, only 6% of announced projects have reached a final investment decision (FID). The Renewable Energy Framework forms the foundation of the regulatory framework for RFNBOs, and a targeted revision could significantly accelerate market development.

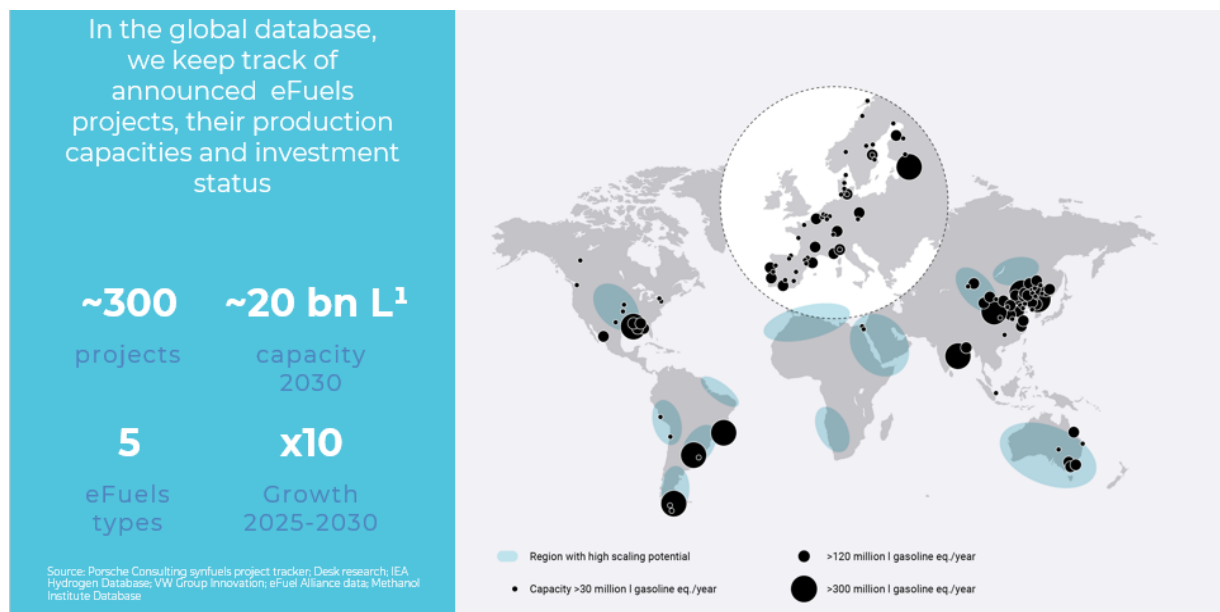


Figure 1: Overview of announced RFNBO projects for the transport sector excluding ammonia, low carbon hydrogen and RFNBOs in refineries according to Porsche Consulting

Development of the Renewable Energy Framework – Overview, targets and implementation

The Renewable Energy Directive (RED), accompanied by the Fuel Quality Directive (FQD), are cornerstones of the European Union's climate and energy policy framework. The first directive of the RED (2009/28/EC) was adopted in 2009 to promote the use of energy from renewable sources across the EU, establishing binding targets for member states to achieve minimum 20 percent renewable energy by 2020. Following the EU's commitment to climate neutrality by 2050, the directive was amended in 2018 (2018/2001/EU), raising the binding target to at least 32 percent by 2030 and introducing provisions for renewable hydrogen and advanced biofuels. With the European Green Deal, the REDII was revised and EU Parliament and Council agreed on the so-called REDIII (EU 2023/2413) in 2023 with overall targets of 42.5% renewable energy.

Unfortunately, proposals from the EU Commission to introduce a quota for RFNBO in the transport sector of 1% in 2028 and 2.6% in 2030 were disregarded. The proposal was officially increased to 5% in the REPowerEU plan. Yet, legislators agreed on just 1% in 2030 and introduced regulatory multipliers for RFNBOs that effectively lower the mandatory physical fuel amount to be brought to market. This means that the actual RFNBO quotas are decreased to 50% in the road sector and 33% in the maritime and aviation sector. Further aggravating the situation, no additional binding targets were introduced prior or beyond 2030. The absence of ambitious and binding long-term RFNBO targets creates significant investment backlog across the value chain. eFuel and hydrogen projects are highly capital-intensive and depend on long-term offtake agreements to secure financing. Without predictable demand trajectories beyond 2030, industrial consumers, fuel suppliers, and project developers lack the certainty required to commit to large-scale investments. As a result, many announced projects remain at an early stage and fail to progress toward final investment decisions (FID).

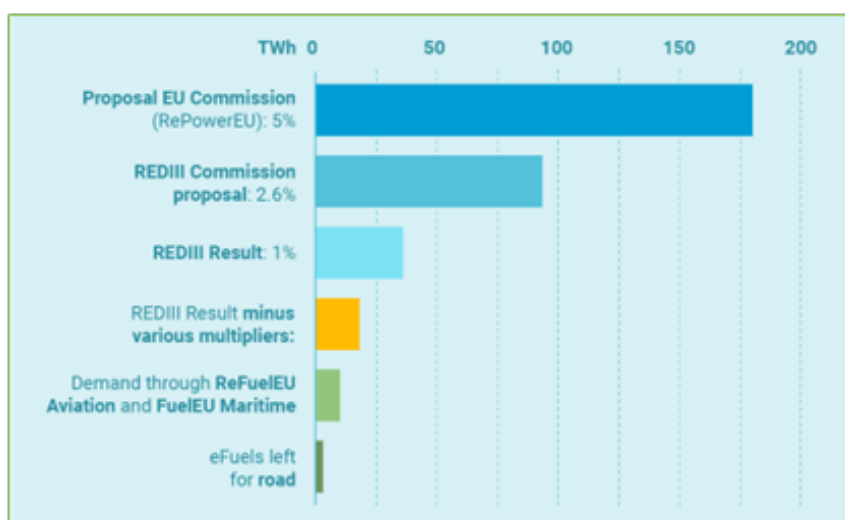


Figure 2: Development of RFNBO targets for 2030 during the legislative process of REDIII

Member states were obliged to implement REDIII within an 18-month period until May 2025. The eFuel Alliance has tracked the national implementation and actively participated in most national consultations. According to the EU Commission, only Denmark managed to implement the RED in time. In July 2026, 12 member states fully implemented the transport targets of REDIII. 10 other member states have announced plans with detailed figures for RFNBOs. Several Member States have demonstrated strong commitment to the energy transition in their national transpositions of the REDIII by adopting binding targets well above the REDIII requirements. Finland has introduced a 4% RFNBO quota without multipliers, Belgium proposes a 4% quota (with double counting), and

Spain's recent RED proposal includes a 2.5% quota by 2030, with interim targets applying from 2028 and some flexibilities. Recently, Germany adopted the REDIII transport targets with a 1.5% quota in 2030. Unlike obligated by the RED framework, Spain, Belgium and Germany have extended proposed RFNBO targets until 2040 of up to 10%. This trajectory should be considered in the revision of the Renewable Energy Framework.

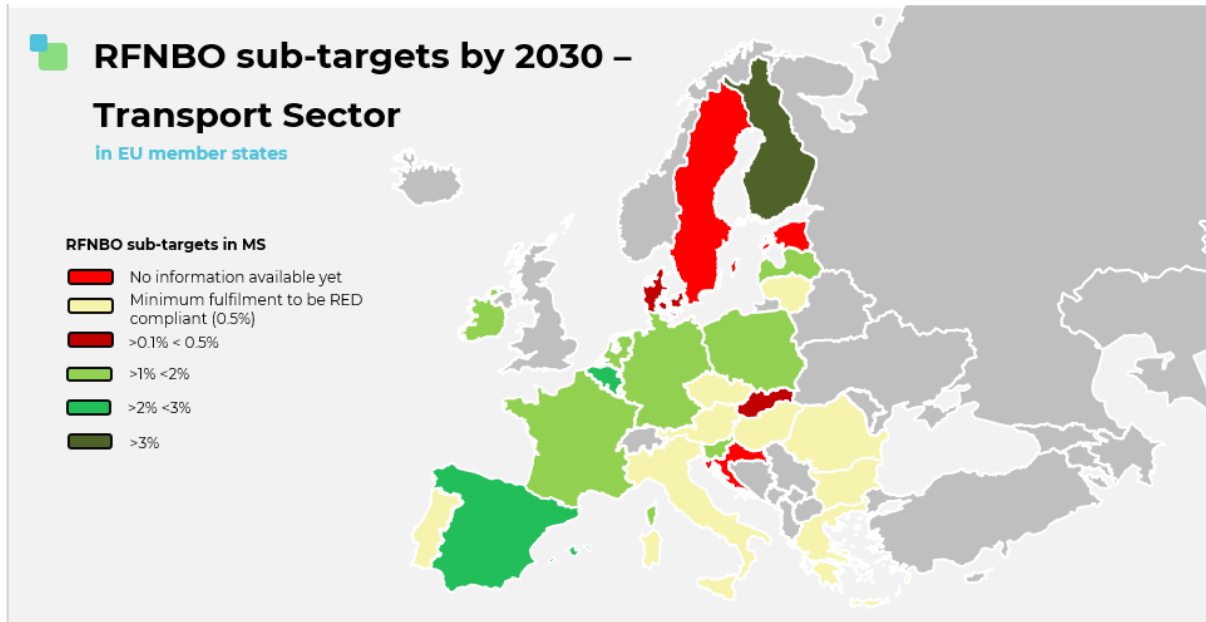


Figure 3: Different RFNBO ambition levels in the national implementation of REDIII

With demand driven by RED III implementation surpassing 34 TWh when combined with ReFuelEU Aviation, a tangible market pull for RFNBO has begun to emerge. As analyzed by [Wood Mackenzie](#), early investments in the order of 5 billion USD in non-fossil hydrogen in Europe have already been realized. Fuel production facilities represent the largest demand as they are the biggest consumers of hydrogen in existing industrial processes. However, the refinery route alone cannot deliver the scale required for long-term RFNBO market development. Only a limited share can realistically be substituted with renewable hydrogen. At the same time, diverging national implementation rules create regulatory fragmentation and undermine the emergence of a unified European RFNBO market. For example, Spain sets extra targets for fuel suppliers with refineries; Belgium is discussing a correction factor to make this option less attractive; Finland is setting a cap on RFNBOs in refineries; in Germany the whole hydrogen demand – also for desulphurization – can be considered. Taking these developments into account leads to no more than 1-3% of fuel demand in transport to be able to be covered by RFNBOs delivered via the refinery route.

A potential next use case for RFNBOs in the transport sector is the co-processing of biofuels e.g. in Hydrotreated Vegetable Oil (HVO) or biodiesel (FAME) production. The production of one ton of HVO requires around 40-50 kg H₂. Moreover, the processing of biological feedstock is more hydrogen-intensive than production from fossil hydrocarbons, requiring [5-10 times more hydrogen](#) per unit of processed feedstock. 10% eMethanol can be used in FAME production. As a result, global hydrogen demand in biofuel production has grown steadily in recent years, reaching more than 27 TWh in 2025 according to the International Energy Agency. Biofuel production already accounts for nearly two-thirds of global hydrogen demand from new industrial applications, and this share is expected to continue increasing. In its scenarios, the [IEA projects](#) that hydrogen demand for biofuels will reach 47 TWh by 2030, almost doubling the 2024 level. The use of hydrogen in biofuel productions offers great synergies including access to available biogenic CO₂ source, operational experience and established fuel distribution systems. However, the refinery and biofuel

routes alone are unlikely to meet RFNBO demand instituted by European targets. As quotas increase, Europe will increasingly depend on imported RFNBO volumes from regions with abundant renewable energy resources. To maintain a secure and resilient European industrial base and to reduce strategic dependencies, it is essential to promote European content in eFuel projects serving the European market. As eFuel Alliance, we therefore strongly support the objectives set out in the EU Industrial Accelerator Act.

The implemented RFNBO targets until 2030 demonstrate a potential pathway for the transport sector, representing a minimum level of ambition. In the mentioned [study](#), we analyzed the maximum technical potential of eFuels until 2050. Therefore, different growth rates for electrolysis, synthesis reactors, carbon capture technologies as well as wind and photovoltaic modules have been considered. In the first 5 years, the growth is in line with announced projects. From 2030 to 2035, we are following the ‘Announced Pledges Scenario’ (APS) of the [IEA](#). From 2035 on, the year with the highest growth rate has been taken into account. Also, the demand from other regions is considered. Following that methodology, it is possible to already displace the entire fuel demand with eFuels by 2046.

While the technical maximum scenario demonstrates full substitution potential, such pathway is unlikely to materialize due to competing decarbonization routes, infrastructure constraints, and cost differentials. Considering the EU goal of climate neutrality in 2050 and the availability of conventional and advanced biofuels, we propose a balanced approach for interim targets of RFNBOs in the transport sector. In 2035 and 2040, we propose to follow the German REDIII implementation, which includes high electrification rates, with slightly higher ambitions in 2040 (12%). In 2045, we are proposing 18% as an interim target. In the year 2050, we consider a 25% RFNBO share a realistic yet ambitious policy target that ensures sufficient investment signals. We are aware that ambitious targets can only be achieved if we receive clear political support. This includes a timely, pragmatic review of the production criteria for RFNBOs and a non-ideological assessment of the use of RFNBOs in different sectors.

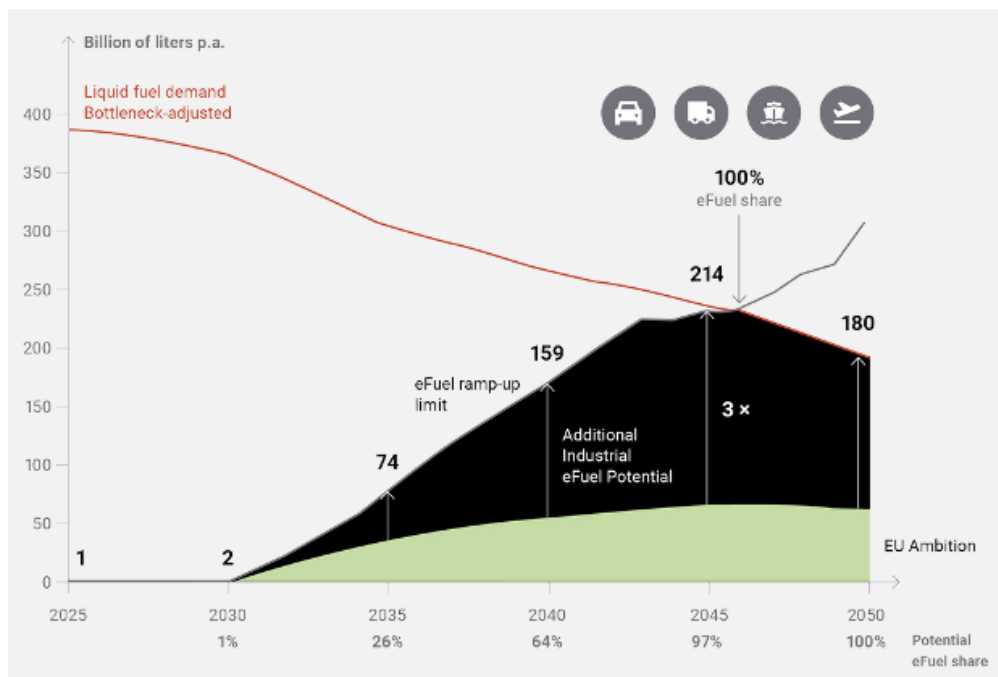


Figure 4: Maximum scaling potential of RFNBOs

In a bottleneck-adjusted scenario of the mentioned study, an overall energy demand in the transport sector of 2,172 TWh is calculated by 2050. For conventional biofuels, we are assuming a constant

level of today's amount (approx. 100 TWh). Advanced biofuels, RFNBOs as well as other sustainable solutions like low carbon hydrogen and recycled carbon fuels should be in fair competition. 25% of RFNBOs in 2050 would result in a demand of 534 TWh or approximately 60-billion-liter gasoline equivalent.

Revision of the Renewable Energy Framework: Penalty systems, Targets, Fuel databases and multipliers

Ambitious RFNBO quotas can only stimulate investment when supported by a predictable and harmonized enforcement framework. Under the current Renewable Energy Framework, enforcement remains fragmented across Member States, resulting in widely diverging inducement structures for compliance.

Our analysis shows that penalties for non-compliance with RFNBO targets to ensure a minimum share of synthetic fuel vary significantly across the EU, ranging from approximately 11.5 €/GJ in Poland to 132 €/GJ in Belgium. The Belgium penalty corresponds to an implied carbon cost of more than 1,400 €/tCO₂. In several Member States, penalty regimes are still undefined or rely on case-by-case administrative or judicial interpretation, further increasing regulatory uncertainty.

In addition, the absence of a fully harmonized tracking infrastructure, with parallel national systems such as Nabisy in Germany and HBE in the Netherlands alongside the still-developing Union database for biofuels (UDB), further complicates cross-border trade and verification of compliance. It is crucial that the Commission works with stakeholders to advance the dialogue on UDB implementation and enable third-country integration as swiftly as possible. It is also vital that integration of national databases within the EU bloc is conducted in a swift manner, to avoid delay in certification attributed to UDB.

Member States also apply divergent sectoral scopes and crediting rules. Some jurisdictions include maritime and inland shipping explicitly, while others exclude key sectors such as maritime transport. These differences risk distorting fuel allocation across transport modes and undermine the internal consistency of EU-wide demand creation, particularly in maritime bunkering and aviation overlapping with ReFuelEU Aviation.

Whereas some Member States refrain from artificially increasing the fuel share by integrating multipliers in their respective frameworks, other Member States apply varying multipliers ranging from a factor of 1.5 – 3, depending on the sector. In Germany, RFNBOs have a great incentive with a triple counting on the overall GHG reduction quota. In Italy, Greece and Portugal the double counting is diluting the targets. Multipliers that mathematically increase the share of renewable energies do not lead to real capacity and should be abolished in a timely manner. In the short term, we welcome the steering effect of multipliers to incentivize early movers. We also respect the additional multiple crediting option in aviation and shipping. Nevertheless, we would like to point out that sufficient but limited quantities of eFuels are needed to bridge the gap of delayed electrification, though, not endangering the EU climate targets.

Overall, the current fragmentation of penalty systems, tracking mechanisms, sectoral definitions, and crediting rules results in an inconsistent investment environment across Europe. A revision of the Renewable Energy Framework should therefore prioritize harmonization of enforcement rules, clarification of sectoral scope, and a more consistent incentives framework to ensure that RFNBO quotas translate into real, bankable production capacity.

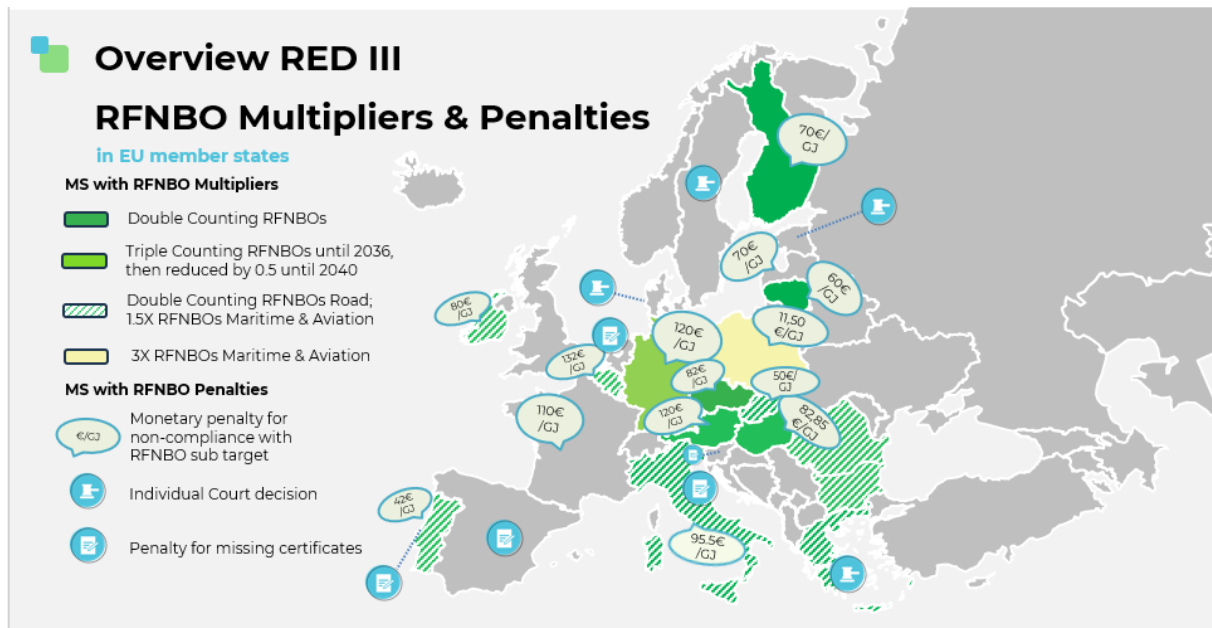


Figure 5: Different interpretation of penalties, multipliers and addressed sectors in the REDIII implementation for the transport sector leads to a patchwork in Europe

For the industry sector, we are proposing binding, long-term targets, realistic and according to the status of the market and supported by a harmonized penalty structure in the event of non-compliance. These markets have other conditions as well as different competing technologies. However, tenders for green steel, the use of low carbon materials in the automotive industry or blending ratios in the German Building Energy Act are showcasing use cases of RFNBOs in these sectors. A scientific impact assessment is required to quantify the minimum demand of RFNBOs which could be supported by binding quotas in the revision of the Renewable Energy Framework.

Additional measurements to support the uptake of RFNBOs

The market ramp-up of eFuels is hindered by the political exclusion of road transport as a major, economically attractive target market and largest single carbon emitter in the EU. Driven by an “efficiency first” mindset, policymakers have de facto reserved eFuels for hard-to-abate sectors such as aviation and shipping, while committing the road sector almost exclusively to battery-electric vehicles. This could possibly cause various problems because road transport could be decisive for scaling the technology, especially as BEV uptake lags behind expectations and infrastructure remains unevenly distributed. The road transport sector serves as a market driver to provide the necessary scale for the growth of sustainable aviation fuels (SAF) and sustainable marine fuels (SMF). This is particularly relevant given that fuel production facilities often co-produce fuels for multiple applications (such as road, maritime and aviation) within the same infrastructure. Such integrated production enables economies of scale and enhances cost competitiveness across fuel types. At the same time, aviation and shipping are highly price-sensitive, exposed to global competition and face uncertain long-term offtake conditions, which constitutes a risky outlook when it is politically constructed as the only demand pillar. Furthermore, existing refinery, logistics and filling station infrastructure represents a strategic asset for the energy transition. eFuels can leverage these established systems, significantly reduce transition costs and accelerating market deployment compared to pathways requiring entirely new distribution infrastructure.

The review of the EU CO₂ standards for cars and vans in 2026 offers the right opportunity to ensure that both renewable fuels and electrification are recognized as complementary and equally important technologies to decarbonize the road sector. Instead of favoring specific technologies,

we advocate for a more technology open approach and **recommend recognizing vehicles running exclusively on renewable fuels as zero-emission in the CO₂ emission standards of new vehicles.**

Future rounds of funding schemes like IPCEIs, Innovation funds, the European Hydrogen Bank or H2Global will still be necessary, although they will realize only few projects due to high operational expenditures. We want to encourage Member States to provide extra budget for the maritime and aviation sector within the Auction as a Service Modell of the European Hydrogen Bank. Addressing the price difference of fossil and renewable energy carriers is crucial to achieve a break-even point. These funding schemes are supporting fuel producers. The so-called 'SAF allowances' support end-users who purchase eFuels. We highly welcome that aviation revenues of the ETS are used to compensate for the price difference between fossil fuels and SAF. However, based on a scientific impact assessment **we recommend prolonging this instrument beyond 2030 and locking in a certain budget for eFuels.** A comparable instrument for the maritime sector is missing although this sector got integrated into the ETS as well.

In addition, the biggest lever to close the price gap between fossil and renewable fuels is the European Energy Taxation Directive (ETD). Currently, renewable fuels like HVO or eFuels are taxed like fossil fuels. To promote climate-friendly technologies a differentiation is required. The EU Commission has proposed quite attractive low tax rates for advanced biofuels and eFuels. Due to a unanimous vote in the Council in November 2025, a revision of the ETD has seen less progress. However, using existing minimum tax rates is also possible on national level and could accelerate the market uptake of eFuels. We recommend amending the proposal in the specific aspects that are causing the blockage and focus only the existing scope and minimum tax rates for electricity and renewable fuels.

Safeguarding Investments as a necessary protection of early projects

As already recognized by the European Commission in the Sustainable Transport Investment Plan (STIP) and noted in AccelerateEU, safeguarding investments from a potential retroactive regulatory change should be done through so called grandfathering conditions. A revision of the renewable energy framework must therefore provide clear fixation of certification and production criteria eligibility at Final Investment Decision that would make the project compliant for its whole lifetime. Without such protection against retroactive changes to RFNBO eligibility criteria, long-term offtake contracts cannot be secured and projects will not reach investment decisions, undermining bankability, regardless of the EU's quota ambition.

About the eFuel Alliance

The eFuel Alliance is a stakeholder initiative committed to promoting the political and social acceptance of eFuels and to securing their regulatory approval. We represent more than 160 companies, associations and consumer organizations along the value chain of eFuel production. We stand for fair competition and a level-playing field for all relevant emission reduction solutions. We are clearly committed to more climate protection and aim to win broader recognition of the significant contribution eFuels can make in the drive for sustainability and climate protection. Our goal is to facilitate industrial production and widespread use of carbon neutral fuels made from renewable energy sources