



Analysis of the EU, UK, and US Approaches to Regulatory Frameworks for RFNBOs

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EXECUTIVE SUMMARY

This report, conducted by the eFuel Alliance, offers a comprehensive comparison of how the European Union (EU), the United Kingdom (UK), and the United States (US) regulate the production of synthetic fuels known as Renewable Fuels of Non-Biological Origin (RFNBOs). These fuels—mainly hydrogen and its derivatives—are seen as key components in the global shift toward cleaner energy, especially for sectors where electrification is difficult, like aviation, shipping and heavy industry.

The study highlights significant differences in the regulatory approaches of each region. The EU has adopted the strictest rules, requiring that all electricity used in RFNBO production be newly generated, unsubsidized, and closely aligned in time and location with the fuel production. The UK, while following the EU's framework, introduces both stricter timing rules and greater flexibility—particularly in allowing more types of carbon dioxide (CO₂) sources and some subsidized energy. Meanwhile, the US takes a markedly different path, prioritizing financial incentives over rigid rules. Its system rewards low-emission hydrogen production with generous tax credits, regardless of energy source, including nuclear and fossil fuels with carbon capture.

In addition to the regulatory comparison, the report explains how RFNBO production is certified. Certification systems like CertifHy, ISCC, and REDcert verify that producers follow sustainability rules, accurately track emissions, and meet official EU requirements. These certifications are essential for market access, as they confirm that fuels are genuinely low-carbon and traceable. Each scheme includes detailed procedures, independent audits, and penalties for non-compliance, ensuring transparency and accountability.

Overall, the findings underscore both the opportunity and challenge of developing a global eFuel market. While regional regulations vary widely, a longer-term goal of harmonizing standards could help unlock the full potential of synthetic fuels in the fight against climate change.

Comprehensive overview of regulatory schemes



The EU-27 has invented the strictest rules of RFNBO production. The electricity must be sourced from new, non-funded installations (not older than 36 months) with temporal (hourly from 2030) and geographical correlation (same bidding zone). Industrial CO₂ sources are only allowed until end of 2040 and needs to be integrated in an effective carbon pricing system. Exemptions exist if more than 90 % of the electricity comes from renewable sources or if the carbon intensity of the electricity grid is below 18 g / MJ. In July 2028, a review of the RFNBO production rules shall take place.



The UK follows the EU-approach but provides some more flexibility but also stricter rules. For additionality a wider use of curtailed electricity can be used. Temporal correlation shall be in 30-minute which is more ambitious than on EU-level. Electricity can be sourced from neighboring bidding zones if grid congestion does not prevent the energy from reaching the production facility. CO₂ from industrial waste processes can be used in addition. Electricity from some funded installations is eligible e. g. via carbon contracts for difference, investment aid or tax reduction.



The U.S. is following a different approach. Tax reductions of up to \$3 per kg of hydrogen are possible in accordance with the lifetime carbon footprint, which is calculated by the GREET model. Subsidized electricity generation is allowed as well as all potential CO₂ sources. In terms of temporal correlation and additionally the EU-approach is followed. However, electricity can be provided through a book-and-claim system that tracks renewable electricity use virtually if connected. Nuclear power is possible as well. The tax reduction for clean hydrogen can be combined with incentives for renewable electricity, direct air capturing and production of sustainable aviation fuel.

RFNBO production rules in the European Union

The European Union has established one of the most rigorous regulatory environments for RFNBO production, designed to ensure that these fuels contribute effectively to decarbonization and energy security goals. The development of production criteria for RFNBOs were defined in the Renewable Energy Directive (RED) ((EU) 2018/2001). In summer 2023, the Commission specified in two delegated acts the guidelines for RFNBO production. [Delegated Regulation \(EU\) 2023/1184](#) specifies the requirements for the electricity supply. [Delegated Regulation \(EU\) 2023/1185](#) defines the methodology to calculate the carbon footprint of RFNBOs. Here, eligible CO₂ sources are defined as well. In a non-legal [Q&A document](#) additional clarification takes place.

In order to claim electricity as fully renewable (e. g. zero carbon intensity), the principles guiding the EU's approach are additionality, temporal as well as geographical correlation. These criteria are more important for grid-connected facilities. Additionality means that renewable electricity used in RFNBO production must originate from new or capacity-expanded installations (not older than 36 months when first RFNBO production starts). This requirement prevents what is known as "negative additionality," where existing renewable energy projects are merely redirected toward RFNBO production rather than contributing to overall renewable energy expansion. To further regulate the sustainability of RFNBO production, the EU enforces temporal correlation, requiring that the electricity used to produce hydrogen aligns with renewable energy generation on a monthly basis until 2030, after which hourly matching becomes mandatory. This shall optimize a grid-friendly operation. Geographical correlation is another important requirement, ensuring that renewable electricity must be generated in the same or a closely connected region ('bidding zone') as the RFNBO facility to avoid excessive reliance on long-distance energy transport, which may introduce inefficiencies and emissions. The EU also mandates that imported RFNBOs must comply with the same criteria as domestic EU production.

Another aspect of the delegated acts are the rules for demonstrating the origin of renewable electricity. To claim electricity as fully renewable, Power Purchase Agreements (PPAs) are required from renewable electricity installations that have not received operating or investment aid. Refurbished installations can be used as long as all additional costs are, as above, unfunded by the state and represent more than 30 % of the investment needed to build a similar new installation. Also, PPAs from energy storage assets are possible if all the above-mentioned criteria on state support are met. If the electricity source has received any governmental support, it needs to be paid back completely to meet the requirement. The EU restricts RFNBO production to clean energy sources, such as wind, solar, hydro, and geothermal power. Notably, biomass-derived electricity and nuclear power are explicitly excluded from the EU's definition of renewable energy for RFNBO production. Another delegated act for low carbon fuels is currently under preparation for non-renewable electricity sources. It is expected in the first half of 2025.

Several exemptions exist: Countries with more than 90 % renewable electricity generation don't have to meet these criteria (currently only Norway). Countries with less than 18g CO₂ per MJ carbon intensity of the electricity grid don't have to meet the additionality criteria (e. g. Sweden, France and soon Finland). For RFNBO facilities that start operations prior to 2028, grandfathering is provided exempting the facility from additionality until 2038. It is also possible to use electricity from grid ancillary services like redispatch. A review for the first delegated act is announced for July 2028.

The second delegated act provides a formula for calculating the carbon footprint of RFNBOs. In addition, in article 10 eligible CO₂ sources are defined. The EU accepts biogenic sources, if feedstocks are in line with the sustainable and greenhouse gas savings criteria of biofuels in RED, directly captured atmospheric CO₂ as well as geological sources if naturally emitted. Industrial point sources are allowed only until 2041 (or 2036 from installations that generates electricity) and those installations need to be in an effective carbon pricing system. The Commission has further clarified the definition of effective carbon pricing systems, and to date conclude industrial point sources only under the EU-ETS and UK ETS are eligible.

The delegated acts add additional uncertainty and increase production costs as shown by several publications¹. In the '[Clean Industrial Deal](#)', the Commission said that they will conduct a study to investigate the effectiveness of the delegated act of RFNBO production. On 4th of February in a [joint letter](#) initiated by the eFuel Alliance, 17 European associations called for an early impact assessment of the delegated acts.

¹ According to the [ECA Report](#), the strict temporal and additionality correlation criteria increase the costs of production by 25–35%. These findings are supported also by a recent academic modelling exercise conducted by Stanford University and by the 2024 ACER Hydrogen Market Monitoring Report. The [University of Duisburg-Essen](#) demonstrated that the electricity criteria reduce the installed electrolysis capacity in Central Europe by 33%. German economic minister Robert Habeck wrote in a letter to the Commission dated on 16th of September, 2024, that these criteria are increasing the hydrogen production costs by 2.4 €/kg.

RFNBO production rules in the United Kingdom

The United Kingdom's [regulatory framework](#) largely follows EU principles but provides more flexibility in compliance requirements and implementation timelines. The framework as a whole is called the [Renewable Transport Fuel Obligation \(RTFO\)](#). While the UK retains the additionality requirement, its definition is broader than in the EU. In the UK, additionality can be demonstrated in multiple ways, including grid connections with contractual evidence of exclusive renewable supply and the use of curtailed renewable electricity that would otherwise go to waste. In terms of defining additionality, the UK requires new, upgraded or recommissioned electricity sites come into operation at the same time or after the RFNBO production site start operating, which is stricter than the EU window of 36 months. **Importantly, the UK legislation does allow procurement of energy from subsidized renewable energy assets, which is a key impediment in the EU framework.** As an analogue to the EU's allowance for counting power delivered via an already high renewable or low carbon intensity grid as additional, the UK allows RFNBOs producers using non-additional power from the national or regional grid to account for the renewable fraction of that grid supply as eligible—however, they must use the national or regional grid average carbon intensity for that fraction in the lifecycle assessment.

The UK's temporal correlation requirement is stricter than EU's approach. While the EU mandates a transition from monthly to hourly matching by 2030, the UK requires a 30-minute temporal matching requirement for wholly additional renewable electricity. For non-additional renewable electricity from national or regional grid power use, the average renewable supply fraction can be determined in 30 minutes increments up to annual averages, as 30 min generation supply data for national/regional grids does not yet exist. For additional renewable electricity installations that are not directly connected, PPAs are required when delivered via the grid, including when procured from waste or otherwise curtailed sources.

Geographical correlation in the UK follows a less prescribed regionalized approach. Instead of requiring additional renewable electricity to be sourced from the same or adjacent bidding zone, as mandated by the EU, **the UK allows electricity to qualify if it comes from any connected grid recognized by the government**, provided there is no systematic congestion between the electricity generator and the RFNBO producer. This means that RFNBO producers may use electricity from connected offshore wind farms or other regional sources, provided that grid congestion does not prevent the energy from reaching the production facility. The UK's approach supports offshore wind energy integration, which plays a critical role in the country's decarbonization strategy.

The UK regulatory framework is designed to support innovation and early adoption of RFNBO production. It allows for transitional measures to ease compliance burdens, particularly for companies investing in new hydrogen production facilities. The UK also operates the RTFO scheme, which sets mandates for renewable fuel blending in transport and provides incentives for the production of low-carbon fuels, including RFNBOs. The RTFO's certification system ensures compliance with sustainability criteria and lifecycle emissions reductions, similar to the EU's program.

In terms of CO₂ sourcing, the UK does not place the same restrictions as the EU on utilization of industrial CO₂. **In fact, CO₂ can originate from waste fossil sources, such as flue gases from coal and natural gas power plants or other industrial combustion processes.** It can also come from biological sources, like alcohol fermentation or anaerobic digestion, as well as from atmospheric, naturally occurring, or geothermal sources.

Additionally, the UK has outlined future funding mechanisms aimed at accelerating the development of RFNBO production capacity, including competitive grants and direct subsidies for early-stage projects. These measures reflect the UK's commitment to fostering a domestic RFNBO industry that is competitive within global markets.

RFNBO production rules in the United States

The United States follows a different model, emphasizing financial incentives, technological neutrality, and market-driven mechanisms to encourage RFNBO production. Unlike the EU and UK, which are more prescriptive in the electricity sources allowed, **the U.S. allows a more flexible approach, allowing renewable power, nuclear energy, and fossil fuels with Carbon Capture and Storage (CCS)**. This broader scope is intended to accelerate investment in hydrogen infrastructure while ensuring emissions reductions.

Under the [Inflation Reduction Act \(IRA\) and Section 45V Clean Hydrogen Production Tax Credit](#), RFNBO producers can receive tax credits of up to \$3 per kg hydrogen for 10 year's operation based on the carbon intensity of their production process. The lower the emissions per kilogram of hydrogen produced, the higher the tax credit, which incentivizes cleaner production methods. Unlike EU and UK subsidy systems, the U.S. model directly ties financial benefits to emissions performance. The 45V tax credit has introduced a new level of financial support for RFNBOs, ensuring that producers have an incentive to develop lower-carbon pathways.

The U.S. temporal correlation approach requires annual matching of renewable electricity with RFNBO production until 2030, after which hourly matching is required. Geographical correlation rules are similar to the EU requiring renewable energy is generated in the same region as the RFNBO facility, with limited ability to allow electricity from neighboring regions. PPAs are not strictly required, as compliance is more flexibly provided through acquiring and retiring Energy Attribute Certificates (Renewable Electricity Certificates in the case of electricity which is equivalent to Europe's Guarantee of Origin).

The U.S. supports a wide range of hydrogen production technologies, including hydrogen from renewable electricity, renewable gases and low-carbon hydrogen (methane reforming with CCS or from nuclear power). This broader technological scope encourages innovation and allows companies to select the most cost-effective decarbonization pathway. Unlike the EU, which excludes nuclear and biomass-based electricity, the U.S. permits these sources if they contribute to lower lifecycle emissions. The Department of Energy's [GREET model](#) is the primary tool used for calculating emissions intensity, and is planned to be updated on an annual basis. **Hydrogen producers have the one-time option to lock in their initial GREET model or use the most recent version each year. That averts risks for future potential changes.**

The U.S. government has also implemented major funding initiatives to boost clean hydrogen infrastructure, including direct investment in hydrogen hubs and grants for new RFNBO projects. These efforts, combined with a more flexible regulatory framework, make the U.S. one of the most attractive markets for large-scale RFNBO development. The rules for hydrogen production have been finalized under the Biden-administration. Currently, it is unclear if the Trump-administration will make changes or not. Useful additional information and summaries for the IRA by Princeton University can be found [here](#).

Comparison of the production rules in EU, UK and USA

When comparing these three regulatory approaches, clear distinctions emerge. The European Union enforces the most stringent sustainability criteria, requiring strict adherence to additionality, temporal and geographical correlation, and permitted energy sources. The United Kingdom offers flexibility on CO₂ sourcing but has stricter rules for renewable power sourcing on additionality and temporal matching. Meanwhile, the United States prioritizes market development and investment incentives, permitting a broader range of technologies and energy sources to accelerate RFNBO production.

The European Union has the most stringent RFNBO regulatory framework, emphasizing additionality, temporal and geographical correlation, and strict eligibility criteria for electricity and CO₂ sources. Renewable electricity must come from new installations, with monthly matching required until 2030, when hourly matching becomes mandatory. Industrial CO₂ sources are only allowed until 2041 provided it is under an effective carbon price and is an ETS listed activity, and nuclear and biomass electricity are excluded.

The United Kingdom follows similar principles but, in several respects, have stricter compliance criteria for renewable electricity. Additionality has a strict timing requires at the same time or later than the RFNBO site. Temporal correlation requires a 30-minute settlement period, and geographical correlation permits sourcing from regional grids, provided there is no congestion between them. But more CO₂ sources are eligible e.g. CO₂ from industrial wastes. The UK's Renewable Transport Fuel Obligation (RTFO) supports innovation and early adoption through transitional measures and incentives.

The United States takes a more market-driven approach, prioritizing financial incentives over strict mandates. The Inflation Reduction Act (IRA) provides tax credits based on emissions performance rather than specific energy sources, allowing RFNBOs to be produced using renewable, nuclear, or fossil-based electricity with Carbon Capture and Storage (CCS). Temporal and geographical correlation are similar to the EU approach.

These regional differences shape the strategic considerations for stakeholders in the global hydrogen economy. Companies operating in the EU must adhere to rigid sustainability and certification requirements, while those in the UK benefit from more flexible compliance pathways. In contrast, the U.S. offers a highly incentive-driven market that encourages diverse technological investments. Understanding these variations is critical for industry players seeking to navigate the evolving regulatory landscape of RFNBOs and position themselves for long-term success in the global clean energy transition.

	European Union	United Kingdom	United States
Definition of eligible electricity sources	<p>RFNBOs are made from renewable electricity (wind, solar, hydro, geothermic) excluding bioenergy.</p> <p>Threshold: 70 % of fossil reference factor (94.1 gCO₂/MJ).</p>	<p>RFNBOs are made from renewable electricity (wind, solar, hydro, geothermic) excluding bioenergy.</p> <p>Biomass-derived electricity cannot be used to generate a RFNBO. Biomass-derived electricity used in a hydrogen electrolyser therefore generates a hydrogen fuel that is not a fossil fuel, not a biofuel and not a RFNBO. Similarly, nuclear fission-derived electricity cannot be used to generate a RFNBO, as nuclear power is not listed as a renewable energy source, so again, the resulting fuel would neither be a fossil fuel, nor a biofuel, nor a RFNBO.</p> <p>Threshold: 65 % of fossil reference factor or 32.9g CO₂/ MJ under the RTFO program.</p>	<p>Green hydrogen derivative fuels are produced from renewable or zero carbon intensity electricity sources including solar, wind, or hydroelectric power (including the potential for renewable gas).</p> <p>Nuclear power is eligible as well.</p> <p>Threshold: Full credit is received for <0.45 kg CO₂e per kg of hydrogen, with reduced credit values from 0.45–4 kg CO₂e per kg of hydrogen.</p>
Additionality	<p>36 Months between start of production of electricity generation and RFNBO unit</p>	<p>The electricity production site (- is new, upgraded or recommissioned, and/or it was specifically built, upgraded, life-extended or brought back into service for the purposes of providing electricity via an electricity grid to a given RFNBO production site.</p> <p>For new, upgraded or recommissioned sites, evidence should be provided to demonstrate that the new generation capacity came online at the same time or after the RFNBO production site started operating.</p>	<p>Power generation unit commissioned no later than 36 months prior to RFNBO production.</p> <p>Exemptions:</p> <ul style="list-style-type: none"> • Old nuclear powerplant which are at risk of being retired can qualify as incremental – up to 200 MW per reactor • States with robust GHG emissions caps and clean electricity standards qualify as incremental • Electricity from a power generating facility that has added CCS within 36 months is considered incremental

	European Union	United Kingdom	United States
State aid	<p>Generating renewable electricity has not received support in the form of operating aid or investment aid, excluding support received by installations before their repowering, financial support for land or for grid connections, support that does not constitute net support, such as support that is fully repaid.</p>	<p>Key Element: Electricity used in production can receive support (e.g., Contracts for Difference (CfD)).</p> <p>Otherwise – as outlined in Chapter 6 of the Compliance Guidance: Any fuel rewarded under the RTFO must meet multiple incentive requirements .</p> <p>The fuel or its chemical precursor must not, at the time of application or in the future, be:</p> <ul style="list-style-type: none"> Counted under any UK renewable energy obligation other than the RTFO. Supported by any UK or international scheme that benefits the end fuel supply (e.g., feed-in tariffs, premium payments), except as outlined in paragraph 5.3. <p>Definition of "Support Scheme" (RTFO, Paragraph 5.3):</p> <ul style="list-style-type: none"> Any UK or international instrument promoting renewable energy by: <ul style="list-style-type: none"> Reducing energy costs. Increasing its selling price. Raising purchased volumes via renewable obligations. Includes: Renewable fuel obligations, direct price schemes (feed-in tariffs, sliding / fixed premium payments). Excludes: Investment aid, tax exemptions / reductions, and tax refunds. 	<p>Subsidized electricity can be used under the Inflation Reduction Act (IRA) for fuel production. Starting with the Clean Electricity 48E Investment Tax Credit (ITC) or the 45Y Production Tax Credit (PTC), which subsidize the price of clean electricity at rates of up to \$33 / MWh (PTC) or 70 % of the investment (ITC), this electricity can then be routed to a hydrogen electrolyzer. The manufacturing of this electrolyzer is further subsidized by the 48C Advanced Energy Project Tax Credit. However, stacking rules prevent multiple subsidies for the same facility to ensure efficiency across the supply chain.</p>
Temporal Matching	<p>Monthly alignment required until 2030; hourly alignment mandatory afterward. Review in July 2028.</p>	<p>Temporal period is 30 minutes</p>	<p>Annual matching until 2030, then hourly alignment required</p>
Geographical Correlation	<p>Within the same bidding zone.</p> <p>Interconnected bidding zone, including in another Member State, and electricity prices in the relevant time period on the day-ahead market in the interconnected bidding zone is equal or higher than in the bidding zone where the RFNBO is produced.</p> <p>Connected Offshore bidding zones.</p>	<p>For additional renewable electricity, producers must show either a direct connection or no systematic grid congestion between the electricity generator and the RFNBO production facility.</p> <p>For non-additional renewable electricity from use of grid power, producers must use the renewable supply fraction and average carbon intensity of the national grid the RFNBO producer is connected to. If the producer can show that their grid is a sub-grid physically separate from the rest of the national grid, they can use regionally specific data for the renewable supply fraction and average carbon intensity.</p>	<p>Facility must be in the same grid region as the eFuel unit, unless it can demonstrate direct electricity transfers between regions as described in the National Transmission Needs Study Department of Energy.</p>

	European Union	United Kingdom	United States
CO₂ Sourcing	Eligible CO ₂ sources are: Biogenic CO ₂ sources if biomass meet RED requirements; atmospheric CO ₂ directly captured; geological CO ₂ if naturally emitted; industrial point sources until 2041 and in an effective carbon pricing system (only 2036 if it comes from electricity generation).	CO ₂ can come from waste fossil sources (for example, waste flue gases from coal and natural gas power generation or similar industrial combustion processes), from biological sources (e.g. alcohol fermentation or anaerobic digestion) or from atmospheric or naturally occurring/geothermal sources.	All sources, including flue gas are eligible. Additional credits are applicable include for carbon capture and utilization (Section 45Q credit).
Exemptions	<p>If more than 90% renewable electricity is in the mix, the above-mentioned criteria has not to be met.</p> <p>If the carbon intensity of the electricity grid is below 18g CO₂ per MJ the additionality has not to be met.</p> <p>A grandfathering for the additionality exist until 2028.</p> <p>If the electricity price is lower or equal to EUR 20 per MWh or lower than 0,36 times the price of an allowance to emit 1 tonne of carbon dioxide equivalent during the relevant period the temporal correlation has not to be met.</p>	<p>Exemptions to prohibition on multiple incentives:</p> <ul style="list-style-type: none"> • Investment aid, tax exemptions or reductions, and tax refunds. • Investment aid for production plants (e.g., lab testing, demonstration-scale projects). • Duty reductions under the UK Hydrocarbon Oil Duties Act 1979 	<p>To qualify for hydrogen production credits in the US, hydrogen made from methane reforming (including blue hydrogen with carbon capture) or natural gas alternatives (like renewable natural gas or coal mine methane) must meet specific criteria.</p> <ul style="list-style-type: none"> • Upstream Methane Leakage: The final rules set methane leakage rates using default national values, with the potential for project-specific rates if verified data is available. • Natural Gas Alternatives: The regulations allow credits for hydrogen produced from a wider range of methane sources, including wastewater, animal manure, and landfill gas, with a lifecycle GHG emissions analysis required. • Lifecycle Emissions: Each hydrogen production process must be evaluated separately for emissions intensities, not blended. • Book-and-Claim Systems: These systems for alternative methane sources will be developed and available by 2027, allowing flexibility for producers. • Investment Certainty: Hydrogen producers can use the version of the 45VH2-GREET model available when construction begins, ensuring consistency for credit eligibility.

1. CertifHy

The [CertifHy EU RFNBO Voluntary Scheme](#) is an officially recognized certification framework by the European Commission, in line with RED for RFNBOs. It ensures a transparent and credible way for economic operators to demonstrate their commitment to sustainable fuel production while showing conformance with regulatory requirements. CertifHy describes themselves as the leader in the hydrogen and eFuels certification market.

CertifHy is a stakeholder organized platform initiated by the strategic consultancy Hinicio. Headquarter is in Brussels. Legal entities can become members of the stakeholder platform to improve and steer the certification process. This is connected to membership fees (€ 2,500). A selected scheme operator is managing the platform. In addition, a steering group and different working groups exist. CertifHy is offering paid masterclasses to inform economic operators about the certification process. In addition, certification bodies (CB) can apply to certify via their scheme. CertifHy also offers a prequalification of RFNBO projects.

The certification follows a structured approach. The application shall be sent to a recognized CertifHy Certification Body (CB). An independent audit is then conducted by a CertifHy-approved CB upon reception of the application, which checks that the sustainability and traceability criteria are respected. Provided all the requirements are fulfilled, the operator will be awarded a CertifHy certificate, which is valid for one year. To maintain compliance, annual surveillance audits shall be performed, and economic operators shall renew their certification on a yearly basis.

For the certification process different [documents](#) are available with detailed information about each step. For example, for the calculation of transport related emissions the cruise speed, transport distance (km or nautical miles) and RFNBO losses (% / day) need to be reported. The whole document for the calculation of GHG emissions & sustainability has 60 pages. In addition, document on traceability & Chain of Custody as well as risk management is required. CertifHy also has a price list for the certification process: Next to a general fee a volume-based fee must be paid (differs from 0.05 € / mt for eMethanol to 0.3 € / mt for hydrogen). Members of the stakeholder platform get a 10 % discount.

Failure to meet CertifHy standards can result in various penalties. Non-conformities are categorized into three levels. Minor Non-Conformities represent temporary lapses and must be improved before the next audit; Major Non-Conformities involve repeated violations, and certification might be suspended for 40 days while corrective actions are taken, while Critical Non-Conformities are fraud issues or serious regulatory non-compliances that will result in certification withdrawal and barring from the scheme for up to 60 months. In case of certification violation, the companies may be suspended, withdrawn, or excluded from the scheme, their names publicly listed on the CertifHy website.

CertifHy certification is only issued by independent EU-recognized CBs that undergo compliance assessments. CBs failing to maintain CertifHy standards can face consequences such as warnings for minor infractions, Yellow Cards for repeated or major non-conformities, Red Cards for critical breaches that ban them from issuing CertifHy certificates for up to 12 months, and contract cancellation for severe violations, permanently removing them from the system.

For companies seeking CertifHy certification, the necessary steps include the review of RFNBO production processes to meet the standards of CertifHy, selection of an EU-recognized CB for auditing, implementation of monitoring and reporting systems for tracking compliance, transparency in reporting to the Union Database, and staying updated with CertifHy regulatory changes.

2. ISCC

The International Sustainability & Carbon Certification (ISCC) system is a globally recognized certification that ensures the traceability and sustainability of feedstocks such as agricultural and forestry biomass, biogenic wastes, residues, circular materials, and renewable resources. With over 13,000 certificates issued in more than 130 countries, ISCC is a leader in global sustainability certification.

Developed through a transparent, multi-stakeholder process, ISCC is governed by the ISCC Association, which includes over 300 members from diverse sectors, including businesses, NGOs, research institutions, and public organizations. The ISCC guidelines for certifying RFNBOs are detailed in the document ISCC EU 202-6.

The ISCC Association (ISCC e.V.) governs the certification system, ensuring its integrity and representing the interests of stakeholders. Legal entities can become members of the ISCC Association, gaining participation rights, including the ability to vote at the General Assembly. The Board, elected at the Assembly, manages decision-making and implementation.

The process for ISCC certification for RFNBOs consists of four key steps.

- 1) The first step is **registration**, where economic operators must register with ISCC by signing a contract with an approved Certification Body (CB). After submitting a registration form, they will receive an ISCC registration number
- 2) Following registration, the second step is the **audit by the Certification Body**. The operator selects an ISCC-approved CB, which conducts an audit to verify compliance with ISCC's sustainability and traceability standards.
- 3) Once the audit is completed, the third step is the **certification decision**, where the CB issues an ISCC certificate if the operator meets the necessary criteria. This certificate is valid for one year, with annual surveillance audits required to ensure continued compliance.
- 4) The fourth step is **renewal and ongoing compliance**, where the operator must renew their certification annually and maintain transparency by reporting to the Union Database and ensuring traceability in RFNBO production processes.

ISCC provides essential documents to guide operators through the certification process. These include the ISCC EU 202-6 RFNBO & RCF Guidelines, which contain detailed rules for RFNBO certification, and the Terms of Use, which outline the responsibilities of economic operators and Certification Bodies. ISCC uses a clear fee structure based on the type of fuel, with discounts for members.

Failure to meet ISCC standards results in penalties, categorized into minor, major, and critical non-conformities. Minor non-conformities are temporary issues that require correction before the next audit, such as delays in certification documents. Major non-conformities involve repeated violations, potentially leading to suspension of certification for up to 40 days. Critical non-conformities include serious violations or fraud, resulting in the withdrawal of certification and exclusion from ISCC for up to 60 months. Certification bodies also face penalties for non-compliance. A **warning** is issued for minor non-conformities, requiring corrective actions within 14 days. A **yellow card** is issued for repeated or major non-conformities, with a 14-day corrective action period and notification to the CB's accreditation body. A **red card** is given for critical violations or failure to resolve yellow card issues, resulting in a restriction on issuing new certifications for up to 12 months. In cases of fraud or persistent critical non-conformities, ISCC may terminate the Certification Body's contract, prohibiting future certifications.

For economic operators seeking ISCC certification, it is necessary to first review and ensure compliance with ISCC sustainability standards for RFNBO production. They must then select an ISCC-approved Certification Body for the audit process and implement monitoring systems to track compliance. Transparency is key, and operators must report to the Union Database and regulatory bodies. It is also important for operators to stay informed about updates to ISCC guidelines.

The ISCC certification process involves several critical documents that operators must maintain. These include documents detailing the system user's information, such as company name, address, and point of contact, as well as the company's certification history and any relevant contracts and agreements related to sustainability. Operators are required to provide evidence of sustainability through declarations, proofs, and delivery documents. Documentation on mass balance tracking for material handling and greenhouse gas (GHG) emission data, as per ISCC EU System Document 205, are also required. Additionally, previous audit reports, whether under ISCC or other sustainability systems, must be submitted. An internal self-assessment signed and reviewed by management must be provided, focusing on compliance with ISCC requirements.

Audit-specific documents include a clear scope of certification, detailing the materials or processes covered, as well as site information, including the name, address, and geographic coordinates of certified sites. Annual sustainability data, including estimates of the amount of sustainable material handled, is required, along with a list of sustainable input and output materials. The audit process and evidence, including risk-based audit plans for sampling methods, claims verification, and remote auditing (if applicable), must be documented.

In specific cases, additional documents must be provided. These include records of non-conformities, corrective actions taken, and resolutions, along with verification records for mass balance and GHG calculations. A final audit summary report, assessing compliance and identifying any non-conformities, must be submitted, along with documents from previous audits if changing certification bodies. To comply with ISCC reporting obligations, accurate data on sustainable material and cultivation areas must be provided, along with the submission of audit procedures to ISCC. If remote audits are conducted, tools used must meet ISCC's standards for transparency, data consistency, and compliance. Finally, documents for verifying sustainability claims, including cross-checks with supplier and subcontractor records, must be maintained to ensure no double-counting of sustainability claims.

This documentation ensures the ISCC certification process is transparent, effective, and compliant with sustainability and risk management standards. It is crucial that operators maintain thorough records, including operational procedures, quality management systems, and sustainability evidence for each audit.

Source:

- More information about [System basics](#)
- More information about [Governance](#)
- More information about [RFNBO And RFC guidelines](#)

3. REDcert

REDcert GmbH was founded by leading associations and organisations of the German agricultural and biofuel economy in 2010. The main focus has been on the certification of biofuels so far. REDcert got approved as 'technical compliant' by the EU Commission end of 2024. In a [63-pager](#), REDcert outlines the certification process of RFNBOs. This document gives further insights how a certifier interprets the EU guidelines. For example, REDcert is mentioned the EU-ETS, UK-ETS and Swiss ETS as an effective carbon pricing for industrial CO₂ point sources. In addition, REDcert is describing that countries can reach out to the Commission to check whether a carbon pricing system is eligible or not. For the renewable electricity REDcert provides useful formulas e. g. how to calculate if the share of renewable electricity is above 90 %. Also, the calculation of the carbon intensity of the electricity mix for the exemption of the additionality is described in section 7.6.3. In case of electricity during an imbalance settlement period only redispatchment is mentioned and non-EU countries shall have 'very similar market rules'. REDcert defines 11 criteria that sufficient Power Purchase Agreements (PPAs) have to fulfill – for Guarantees of Origin (GoOs) 7 criteria exist. Regarding geographical correlation REDcert is differentiating between integrated and separated networks. If integrated the whole country is eligible. If the network is separated the individual network accounts.

The calculation of the carbon footprint of eFuels shall take place each calendar month in accordance to the temporal correlation of electricity sourcing. REDcert has a detailed description for emissions from the supply of rigid inputs – including rules for taking into account the loss of production of electricity, heat and products. For emissions from elastic inputs, which can be increased to produce extra quantities of RFNBOs, REDcert is naming different eligible databases like JRC-WTW report, IPCC or IEA reports or peer review publications. REDcert is providing formulas for the calculation of emissions from processing or transport. For transportation, the transport distance, fuel consumption, emission factor and other details need to be reported. Also, the calculation of processes with multiple outputs and allocation rules are described and examples given. In the annex of the above linked document REDcert is providing additional examples.

Auditors certifiing via REDcert should have a minimum of two years' experience in fuel life-cycle assessment, an experience in auditing GHG emission calculations in accordance with the methodology set out in Annexes V and VI to Directive (EU) 2018/2001, knowledge of the requirements of both delegated acts for RFNBOs, experience in ecology, natural science, engineering, energy management or a related field. In total, six different documents have to be handed in. A detailed check-list for RFNBO production can be found [here](#). The costs for the certification via REDcert vary from 0.08 € per ton of hydrogen, 0.1 €/t for methane and methanol to 0.116 €/t for electricity-based diesel, gasoline and SAF and even 0.12 €/t for other eFuels. In addition, basic fees come on top. This is significantly higher than the price list of CertifHy which we have mentioned above.

