Schweizerische Eidgenossenschaft
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Department of the Environment, Transport, Energy and Communication
DETEC

Swiss Federal Office of Energy SFOE
Energy Supply and Monitoring

Federal Office for the Environment FOEN
Climate Policy Section

Report from 23rd of November 2022

Renewable fuel registries in Europe: A review of systems implemented in The Netherlands, Austria and France

Follow-up study of the report “State of Play in the cross-border exchange of renewable gases in non-segregated supply chains in Europe” from July 2022

Date: 23rd of November 2022

Town: Bern

Publisher:

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Executive Summary

This report was produced by Hinicio and AGCS on request of the Swiss Federal Offices for Energy and Environment (BFE & BAFU), who are collaborating with Pronovo to design and implement a registry for renewable liquid and gaseous fuel certificates in Switzerland. The report reviews how other countries (France, The Netherlands, Austria) address some of the main challenges of implementing a registry that covers both Mass Balance and Book and Claim chain of custody models the application of which depends on the end purpose. This work is a follow-up study of the report "the State of Play in the cross-border exchange of renewable gases in non-segregated supply chains in Europe" by Hinicio, AGCS and Assmann Peiffer Rechtsanwälte from July 2022.

The time is ripe for BFE & BAFU to be scanning examples from abroad, as they are evaluating the specifications that need to be included in the design of the digital solution. BFE and BAFU will have, in this sense, the advantage of building a solution with a good knowledge of some of the pitfalls to avoid and of what works well in other countries.

In summary of the report, the following learnings can be extracted from the design and implementation of registries for gaseous and liquid fuels in other countries:

As much as possible, the registry for gaseous and liquid biofuels should be centralised within one single platform. This will create efficiencies in terms of information flows, reporting, statistics, the number of accounts to create and maintain and in terms of data governance. It will also facilitate transfers in the case of a conversion of a fuel from liquid to gaseous state.

Providing the possibility to link Guarantees of Origin (GOs) (used for disclosure) and Proof of Sustainability (PoS) information (used for compliance) in one single certificate reduces the risk of double counting. This means that if sustainability attributes are used for the purpose of disclosure (for liquid biofuels, for example), they cannot then be counted towards compliance targets. On the other hand, if certificates are used for compliance, they cannot then be cancelled for disclosure. This is, for example, what The Netherlands have implemented through the combination of certain Mass Balance and Book and Claim characteristics in their system for fuel tracking and tracing and the use of a single certificate (HBE), used for compliance, and that requires cancellation of the associated GO.

Requiring standard information within a certificate (used for compliance or disclosure) provides the flexibility of using the certificate for different purposes. This means getting the right balance between requiring enough standard information that the certificate can be used for different purposes but not requiring too much

standard information that it becomes unmanageable for the economic operators to meet requirements.

Swiss legal instruments and directives should align with requirements set at an EU level on the information that a certificate should contain for disclosure and compliance. This will facilitate trade of certificates between Switzerland and EU Member States. Switzerland should also survey evolutions regarding the Union Database to ensure compatibility between reporting systems implemented.

Swiss Federal Offices may follow upcoming EU directives on the trading of certificates for Sustainable Aviation Fuels. Currently, the EU has the ambition to introduce the possibility of trading SAF certificates to meet blending mandates and targets. Switzerland could align as much as possible with this approach to ensure a cohesive regulatory landscape for economic operators.

The countries studied (France, The Netherlands, Austria) do not allow for off-grid producers to trade certificates and value them towards grid-connected consumers. Indeed, this would break with the idea inherited from the electricity guarantees of origin system that the buyer and seller of a GO are physically connected to the same grid as the producer and consumers of the physical volume of electricity. The same principle applies for gaseous fuels.

The certification systems in the countries studied have evolved with market maturity and within a given regulatory framework. This is to be taken into account when assessing the learnings from each country. In the same way, using the learnings from the report in Switzerland should not make abstraction of the Swiss context.

Zusammenfassung

Dieser Bericht wurde von Hinicio und AGCS im Auftrag der Schweizer Bundesämter für Energie und Umwelt (BFE & BAFU) erstellt, die in Zusammenarbeit mit Pronovo ein Register für Zertifikate für erneuerbare flüssige und gasförmige Brenn- und Treibstoffe in der Schweiz entwickeln. Der Bericht gibt einen Überblick darüber, wie andere Länder (Frankreich, Niederlande, Österreich) einige der wichtigsten Herausforderungen bei der Implementierung eines Registers angehen, das sowohl ein auf einer Massenbilanz basierendes Rückverfolgbarkeitsmodell (chain of custody) als auch ein Book-and-Claim-Modell abdeckt, deren Anwendung vom jeweiligen Zweck abhängt. Diese Arbeit ist eine Folgestudie des Berichts "the State of Play in the cross-border exchange of renewable gases in non-segregated supply chains in Europe" von Hinicio, AGCS und Assmann Peiffer Rechtsanwälte vom Juli 2022.

Für BFE und BAFU ist es an der Zeit, Beispiele aus dem Ausland zu sichten, da sie die Spezifikationen bewerten, die in die Konzeption der Informatik-Lösung einbezogen werden müssen. BFE und BAFU haben in diesem Sinne den Vorteil, dass sie beim Aufbau der Lösung mögliche Stolpersteine bereits kennen und wissen, was in anderen Ländern gut funktioniert.

Zusammenfassend liefert der Bericht die folgenden Erkenntnisse aus der Gestaltung und Umsetzung von Registern für gasförmige und flüssige Brennstoffe in anderen Ländern:

Das Register für gasförmige und flüssige erneuerbare Brenn- und Treibstoffe sollte so weit als möglich auf einer einzigen Plattform zentralisiert werden. Dies wird zu einer höheren Effizienz beim Informationsfluss, bei der Berichterstattung, den Statistiken, der Anzahl der anzulegenden und zu pflegenden Konten und der Datenverwaltung führen. Zudem wird es den Transfer im Falle einer Umwandlung eines Energieträgers vom flüssigen in den gasförmigen Zustand erleichtern.

Die Möglichkeit, Herkunftsnachweise (HKN) (eingesetzt zur Offenlegung) und Nachhaltigkeitsnachweise (PoS) (eingesetzt zur Einhaltung von Vorschriften) in einem einzigen Zertifikat zu verknüpfen, verringert das Risiko der Doppelzählung. Das bedeutet, dass Nachhaltigkeitsattribute, die für die Offenlegung verwendet werden (z. B. für flüssige Biokraftstoffe), nicht auf die Erfüllungsziele angerechnet werden können. Andererseits können Zertifikate, die für die Einhaltung der Vorschriften verwendet werden, nicht für die Offenlegung gelöscht werden. Dies haben beispielsweise die Niederlande umgesetzt, indem sie in ihrem System zur Verfolgung und Rückverfolgung von Treibstoffen bestimmte Massenbilanz- und Book-and-Claim-merkmale kombinieren und eine einzige Bescheinigung (HBE)

verwenden, die für die Einhaltung der Vorschriften verwendet wird und die Annullierung des zugehörigen Herkunftsnachweises erfordert.

Standardinformationen in einem Zertifikat zu verlangen (für die Einhaltung der Vorschriften oder die Offenlegung) bietet die Flexibilität, das Zertifikat für verschiedene Zwecke zu verwenden. Dabei muss ein Gleichgewicht gefunden werden zwischen ausreichenden Standardinformationen, damit das Zertifikat für verschiedene Zwecke verwendet werden kann, und nicht zu vielen Standardinformationen, damit es für die Wirtschaftsakteure möglich bleibt, die Anforderungen zu erfüllen.

Die schweizerischen rechtlichen Anforderungen an die Informationen, die ein Zertifikat zur Offenlegung und zur Einhaltung der Vorschriften enthalten muss, sollten mit den Anforderungen der EU im Einklang sein. Dies wird den Handel mit Zertifikaten zwischen der Schweiz und den EU-Mitgliedstaaten erleichtern. Die Schweiz sollte auch die Entwicklungen der Unionsdatenbank verfolgen, um die Kompatibilität der implementierten Meldesysteme sicherzustellen.

Die Schweizer Bundesämter können sich an den kommenden EU-Richtlinien über den Handel mit Zertifikaten für nachhaltige Flugtreibstoffe orientieren. Die EU beabsichtigt, die Möglichkeit des Handels mit SAF-Zertifikaten einzuführen, um die Beimischungsmandate und -ziele zu erfüllen. Die Schweiz könnte sich diesem Ansatz so weit wie möglich anschließen, um eine kohärente Regulierungslandschaft für die Wirtschaftsbeteiligten zu gewährleisten.

Die untersuchten Länder (Frankreich, Niederlande, Österreich) erlauben es nicht, dass nicht netzgebundene Erzeuger mit Zertifikaten handeln und sie gegenüber netzgebundenen Verbrauchern einsetzen. Dies würde mit dem aus dem System der Herkunftsnachweise für Elektrizität übernommenen Gedanken brechen, dass Käufer und Verkäufer eines HKN physisch an dasselbe Netz angeschlossen sind wie Erzeuger und Verbraucher der physischen Strommenge. Das gleiche Prinzip gilt für gasförmige Brennstoffe.

Die Zertifizierungssysteme in den untersuchten Ländern haben sich mit der Marktreife und innerhalb des jeweiligen Rechtsrahmens entwickelt. Das gilt es bei der Bewertung der Lehren aus den einzelnen Ländern zu berücksichtigen. In gleicher Weise sollten die Erkenntnisse aus diesem Bericht in den Schweizer Kontext eingebettet werden.

Résumé

Ce rapport a été produit par Hinicio et AGCS à la demande des offices fédéraux suisses de l'énergie et de l'environnement (OFEN et OFEV), qui collaborent avec Pronovo pour concevoir et mettre en œuvre un registre de certificats de carburants et combustibles liquides et gazeux renouvelables en Suisse. Le rapport examine comment d'autres pays (France, Pays-Bas, Autriche) abordent certains des principaux défis de la mise en œuvre d'un registre qui couvre à la fois un modèle de traçabilité (chain of custody) basé sur le bilan massique et un modèle Book and Claim, dont l'application dépend de l'objectif final. Ce travail est une étude complémentaire au rapport "the State of Play in the cross-border exchange of renewable gases in non-segregated supply chains in Europe" par Hinicio, AGCS et Assmann Peiffer Rechtsanwalte de juillet 2022.

Le moment est venu pour l'OFEN et l'OFEV d'analyser les exemples étrangers, car ils évaluent les spécifications qui doivent être incluses dans la conception de la solution informatique. L'OFEN et l'OFEV auront, en ce sens, l'avantage de construire une solution en ayant une bonne connaissance de certains des pièges à éviter et de ce qui fonctionne bien dans d'autres pays.

En résumé du rapport, les enseignements suivants peuvent être tirés de la conception et de la mise en œuvre de registres pour les combustibles et carburants gazeux et liquides dans d'autres pays:

Dans la mesure du possible, le registre des carburants et combustibles renouvelables gazeux et liquides doit être centralisé sur une seule et même plateforme. Cela permettra de réaliser des économies en termes de flux d'informations, de rapports, de statistiques, de nombre de comptes à créer et à maintenir et en termes de gouvernance des données. Cela facilitera également les transferts dans le cas de la conversion d'un agent énergétique de l'état liquide à l'état gazeux.

La possibilité de lier les garanties d'origine (GO) (utilisées à des fins de transparence - *disclosure*) et les informations de preuve de durabilité (PoS) (utilisées pour le respect de prescriptions - *compliance*) dans un seul certificat réduit le risque de double comptage. Cela signifie que si les attributs de durabilité sont utilisés à des fins de transparence (pour les biocarburants liquides, par exemple), ils ne peuvent pas être comptabilisés pour atteindre des objectifs contraignants. D'autre part, si les certificats sont utilisés pour remplir une obligation, ils ne peuvent pas ensuite être annulés à des fins de transparence. C'est, par exemple, ce que les Pays-Bas ont mis en œuvre en combinant certaines caractéristiques de bilan massique et de Book and Claim dans leur système de suivi et de traçabilité des carburants et en utilisant

un certificat unique (HBE), utilisé dans le domaine des prescriptions, et qui exige l'annulation de la GO associée.

Le fait d'exiger des informations standard dans un certificat (utilisé pour la transparence ou dans le cadre d'obligations) offre la possibilité d'utiliser le certificat à différentes fins. Il s'agit de trouver le bon équilibre entre le fait d'exiger suffisamment d'informations standard pour que le certificat puisse être utilisé à différentes fins, mais sans exiger trop d'informations standard au point qu'il devienne impossible pour les opérateurs économiques de satisfaire aux exigences.

Les exigences juridiques suisses devraient s'aligner sur les exigences fixées au niveau de l'UE concernant les informations qu'un certificat doit contenir à des fins de transparence ou dans le cadre d'obligations. Cela facilitera les échanges de certificats entre la Suisse et les États membres de l'UE. La Suisse devrait également suivre les évolutions concernant la base de données de l'Union afin de garantir la compatibilité entre les systèmes de déclaration mis en œuvre.

Les offices fédéraux suisses peuvent suivre les directives européennes à venir sur l'échange de certificats pour les carburants d'aviation durables. Actuellement, l'UE a l'ambition d'introduire la possibilité d'échanger des certificats SAF pour répondre aux aux obligations et objectifs de mélange de biocarburants. La Suisse pourrait s'aligner autant que possible sur cette approche afin de garantir un paysage réglementaire cohérent pour les opérateurs économiques.

Les pays étudiés (France, Pays-Bas, Autriche) ne permettent pas aux producteurs hors réseau d'échanger des certificats et de les valoriser auprès des consommateurs raccordés au réseau. En effet, cela romprait avec l'idée héritée du système des garanties d'origine de l'électricité selon laquelle l'acheteur et le vendeur d'une GO sont physiquement connectés au même réseau que le producteur et les consommateurs du volume physique d'électricité. Le même principe s'applique aux combustibles gazeux.

Les systèmes de certification dans les pays étudiés ont évolué avec la maturité du marché et dans un cadre réglementaire donné. Il convient d'en tenir compte lors de l'évaluation des enseignements tirés de chaque pays. De la même manière, l'utilisation des enseignements du rapport en Suisse ne doit pas faire abstraction du contexte suisse.

Introduction

This report was authored by Hinicio, in partnership with AGCS for the Swiss Federal Office of Energy (Bundesamt für Energie, BFE), the Swiss Federal Office for the Environment (Bundesamt für Umwelt, BAFU) and Pronovo.

BFE & BAFU are collaborating with Pronovo (as current electricity Guarantee of Origin (GO) Issuing Body and future gas, hydrogen and liquid fuels GO Issuing Body) and stakeholders to identify options for the implementation of a **registry for the tracking of renewable liquid and gaseous fuels in the transport and combustion sectors.** The system adopted under Swiss law should **enable physical and non-physical tracking depending on needs of obligated stakeholders in one unique registry.**

This report presents insights into the traceability systems of three European countries for the physical and non-physical tracking of renewable fuels and the cohabitation of Mass Balance and Book and Claim systems.

Austria, The Netherlands and France were the selected countries as part of this study as they have developed methodologies for tracking production and consumption of renewable fuels, both for grid-connected and off-grid supply chains. The information in this report was gathered through interviews with key experts on the topic of certification of renewable fuels in each of the selected countries. In addition, Hinicio and AGCS teams have complemented the report with their expertise in terms of certification trends and challenges in Europe at large.

The report describes the tracking and tracing systems for liquid and gaseous biofuels in the selected countries. The differentiation between liquid and gas will be kept throughout the report, as well as the distinction between grid-connected and off-grid installations in the case of gaseous energy carriers.

EU countries' current legal framework on tracking and tracing systems for biofuels

On an EU-level, the revised renewable energy directive 2018/2001/EU (RED II) defines the legal framework and requirements for the production and consumption of liquid and gaseous biofuels. RED II required sustainability certificates to demonstrate compliance with the requirements, while Article 19 of RED II sets out the requirements for Member States (MS) to set up GO systems for consumer disclosure. Though RED II has enabled a level of harmonization across the EU on traceability and tracking requirements for biofuels, some differences remain regarding the interpretation of requirements and their level of implementation within the different Member States. This continues to complicate cross-border trade

and statistical transfers. These disparities are to be taken into account in the understanding and analysis of the systems implemented in the selected countries as well as in considering the recommendations for Switzerland to align with EU legislation concerning biofuels.

The RED II also envisions the application of a "Union database" (UDB) for biofuels and bioliquids (see Art. 28(2) Directive (EU) 2018/2001 – RED II). The database aims to ensure the tracing of liquid and gaseous transport fuels that are eligible for being counted towards the share of renewable energy in the transport sector in any Member State. The database is currently being developed by the European Commission (EC). Once it has started its official operation, relevant system users are required to provide specified information to the UDB on sustainability and GHG emissions savings characteristics that are related to batches of sustainable material transferred along the supply chain.

Regulatory context of Sustainable Aviation Fuels (SAF)

Currently, there are no generally applicable international sustainability criteria for SAFs. However, the International Civil Aviation Organization (ICAO) is developing a global standard as part of the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA), which aims to create a harmonized system at EU level based on transparency for both producers of aviation fuel and its consumers. At EU-level, RED II is the applicable legislation that regulates sustainability requirements, including SAF. The use of SAF can contribute to the 14% renewable share requirement in the transport sector imposed by RED II[1]. However, there are no specific supply targets for SAF to contribute to this percentage.

For a SAF producer to guarantee the sustainability of their product, certification from a Sustainability Certification Scheme (SCS) is required. This involves a detailed audit of the entire supply chain, carried out by a Certification Body (CB).

In 2021, in the context of ReFuelEU, the European Commission released its proposal of mandating SAF blending targets at European airports[2], and synthetic aviation fuel sub-targets from 2025[3]. In 2022, amendments were suggested by the Council

[1] DIRECTIVE (EU) 2018/2001 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 11 December 2018 on the promotion of the use of energy from renewable sources (recast), Article 25(1)

[2] European Commission, 2021. Proposal for a Regulation of the European Parliament and of the Council on ensuring a level playing field for sustainable air transport.

[3] Sears, S., 2021. Alternative Transport fuels elements of the European Union's "Fit for 55" package. https://theicct.org/wp-content/uploads/2021/12/alternative-fuels-fit-for-55-eu-sept21.pdf

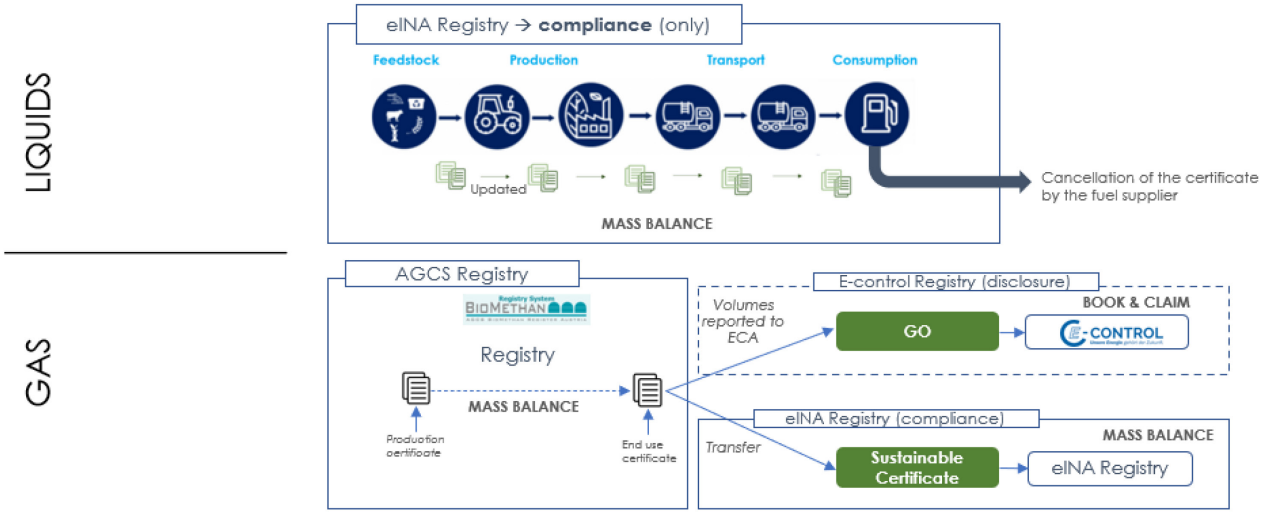
and the Parliament to the original proposal[4]. This has opened up the "trialogue" on the topic with the aim of finding a compromise for upcoming regulation. The regulatory uncertainty around SAF at EU-level is therefore reflected in the lack of implemented legislation and associated systems in the countries studied.

[4] European Parliamnet ReFuelEU Aviation initiative https://www.europarl.europa.eu/doceo/document/TA-9-2022-0297_EN.html

Austria

In Austria, there are 3 distinct registries, each responsible for specific applications: the **registry for biofuels - eINa** - managed by the Austrian Federal Agency for Environment; the **Biomethane Registry** managed by AGCS and the gas **Guarantees of Origin (GoO) registry**, managed by the appointed Issuing Body, E-Control. This **requires national cooperation** among all registry operators to avoid multiple counting of the same energy volume but still allow producers to flexibly use the volumes for different application types. The Renewables Expansion Act (EAG 2021, Erneuerbaren Ausbau Gesetz) requires that the three Austrian registry operators (E-Control, AGCS, Federal Agency for Environment) enter into cooperation to "ensure proper processing of data transfers in order to exclude double counting", as the legal text from § 81 (8) Erneuerbaren-Ausbau-Gesetz (EAG) translates[5]. The tracking systems in place in Austria for liquid and gaseous fuels are presented below with an overview of these systems provided in the illustration below:

Figure 1: Austrian registries and their interfaces



I LIQUID

Liquid biofuels are tracked for the purpose of compliance with national transport fuel targets through a Mass Balance system. The eINA register for biofuels is managed and operated by the Austrian Federal Agency for Environment (EEA). It is responsible for ensuring the monitoring of the production, consumption and any

[5] Federal Law on the Expansion of Energy from Renewable Sources (Renewable Energy Sources Expansion Act – EAG) https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20011619

intermediary steps in the liquid biofuel supply chain. Therefore, any data (usually manually uploaded) regarding liquid biofuels is tracked through elNA.[6]

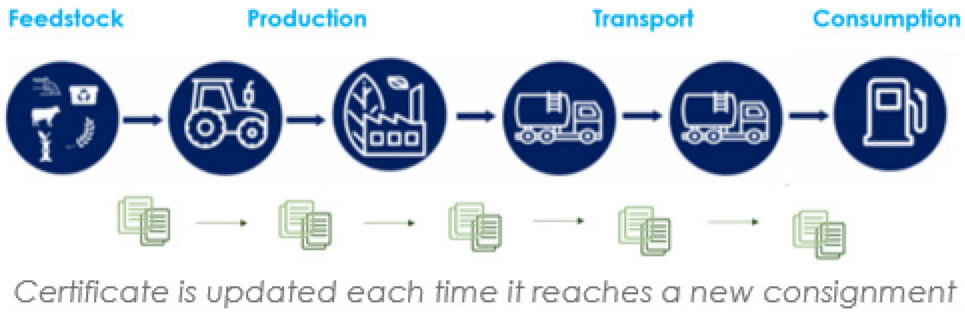
As liquid biofuels require a Mass Balance system, tracking is necessary at every point throughout the supply chain. At the point of production, a first certificate is issued. The producer must be certified according to an accepted certification system such as a Voluntary Scheme like ISCC or RED Cert. This certificate contains sustainable information that demonstrates compliance with Renewable Energy Directive (RED) requirements, and it is called the elNA "Sustainable Certificate".

The following information must be included in the certificate:

- The plant and substrate data
- Carbon footprint (CFP), expressed in kg or tons of CO_2eq
- Quantity transported
- Information regarding sustainability

Certificates may contain additional information to the list above. The tracking of the biofuel is ensured digitally through elNA's IT system. The IT system allows for the upload of additional data or information by economic operators along the supply chain (through pdf). The transfer of a consignment from one entity of the supply chain to the next is also documented in the IT system. A consignment is a defined as one defined unit of the energy carrier. Hence, the link between the physical product and the certificate is maintained throughout the supply chain, as shown in Figure 2.

Figure 2: Chain of custody model for liquid biofuels in Austria



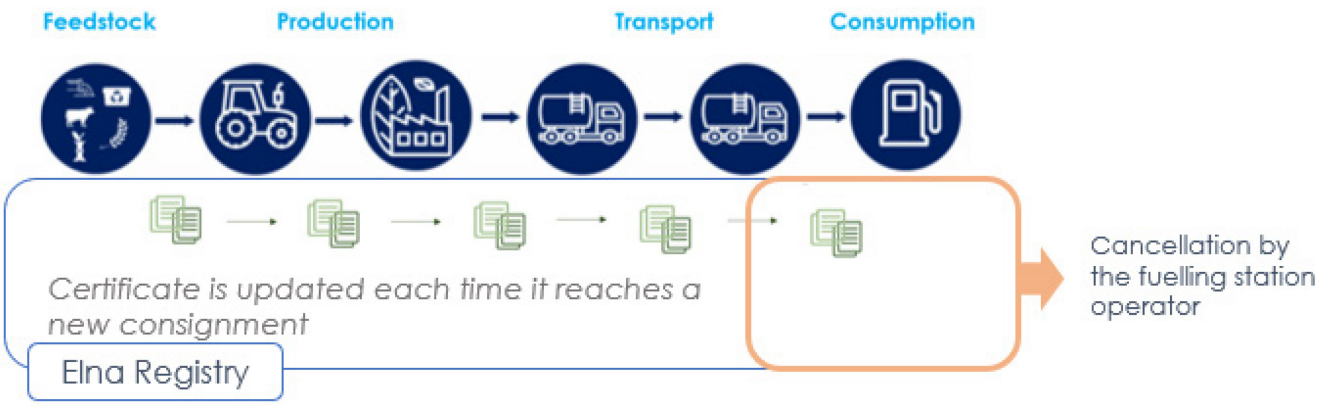
The elNa "Sustainable Certificate" may only be used for the biofuels sector and requires physical Mass Balance between production and consumption within each quarter of the year.
Example:

[6] Legal Acts implemented by Elna: https://www.umweltbundesamt.at/elna/elna-recht

Producer A produces sustainable biofuel in Q1 2022. Certificate is created on 01.04.2022.
Producer A is certified according to RED Cert.
Producer A transfers certificate for Q1 2022 to storage operator B. Physical transport documented additionally. Time: 05.04.2022
Storage Operator B transfers certificate to Fuel Station Operator C. Physical transport documented additionally. Time: 08.04.2022
Fuel Station Operator cancels certificate for final consumption at 10.04.2022 for Q1 2022. Physical consumption must be documented explicitly.

Once the consignment has reached withdrawal stations (typically the fuelling station), the Sustainable Certificate is cancelled in the elNa registry by the operator of the fuelling station, as shown below. With this cancellation, the owner of the certificate (generally the fuelling station operator) may provide evidence that it meets minimum thresholds of renewable fuels supplied and these volumes will be counted towards the compliance calculation for this entity within the elNA registry.

Figure 3: Point of cancellation of the Sustainable Certificate



II GAS

Gaseous biofuels require a Mass Balance system for the purpose of compliance with RED and a Book and Claim system for disclosure.

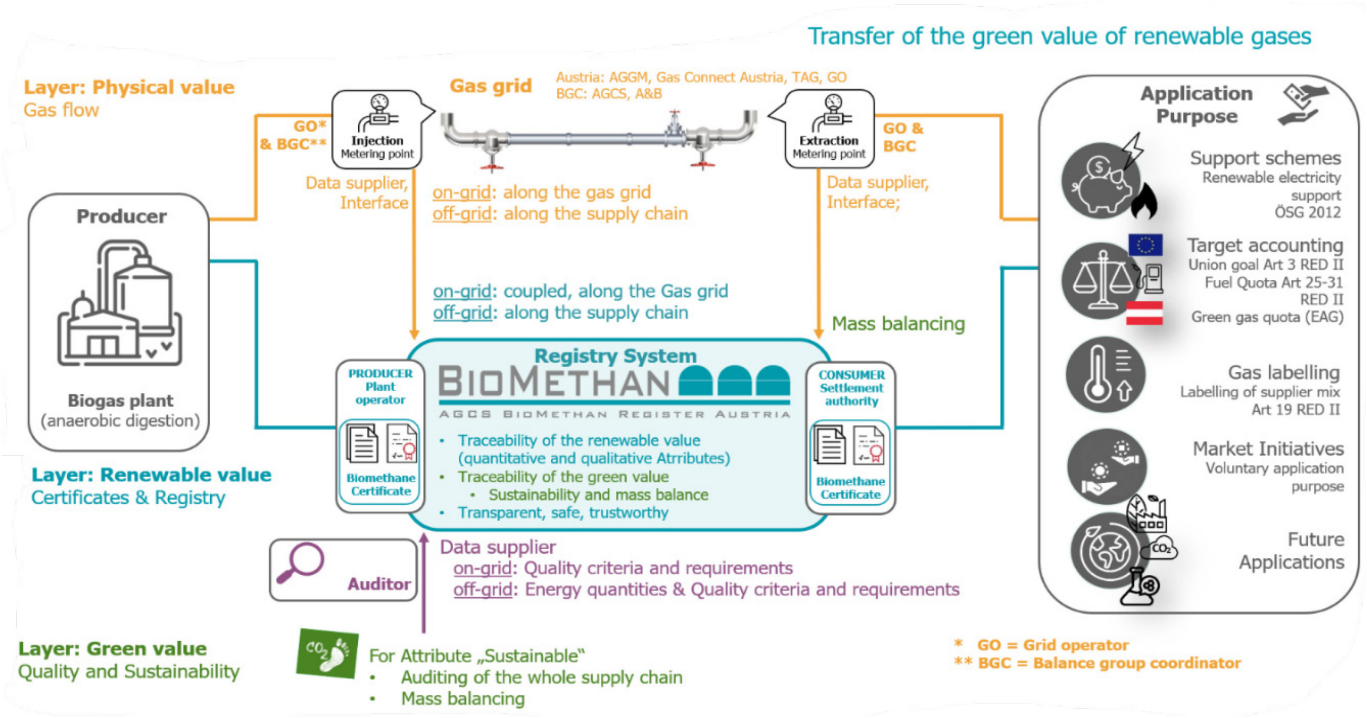
Mass balance system for compliance

The specific requirements at EU-level on implementing a mass balance system for compliance are not yet clear. Therefore, a national interpretation of European regulation has been applied in Austria.

The mass balance system is managed in part by AGCS as operator of the Austrian Biomethane Registry; and in part by the eINA registry to which the certificate from AGCS will be transferred if used for compliance purposes.

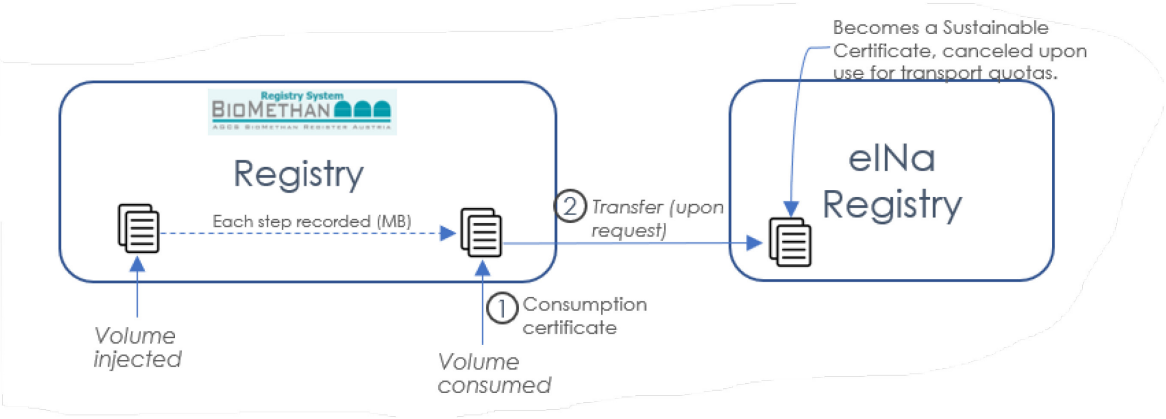
AGCS automatically issues monthly Biomethane Certificates to biomethane plant operators upon injection of biomethane volumes into the gas grid, based on meter readings and clearing data from Network Operators. The documentation of the Mass Balance volumes at production and consumption points therefore comes from meter readings (as seen in Figure 4) but checking consumption volumes requires a verification of the total gas consumption level of the market area: verification that the cancelled certificate volume is taken into account within the total gas consumption. The transportation through the gas grid is considered as one logistical facility and therefore no particular transfer documentation from the production to the consumption is necessary when the volume is produced and consumed in Austria. An overview of the link between the gas flow and the AGCS Registry is provided in Figure 4. Additional requirements may apply to transport volumes cross-border which are not harmonised at a European level (the expectation is that this will be harmonised in the future through the Union Database).

Figure 4: Working principle of biogas certificates in Austria



For use of the certificate for compliance in the transport sector, the Biomethane Certificate can be transferred from the AGCS registry to elNa managed by the Environment Agency Austria (EAA) upon request alongside a Proof of Sustainability certificate. Once the biomethane certificate reaches the registry of EAA (elNA) it becomes a "Sustainable Certificate". The certificate is cancelled in the AGCS registry and the mass balance verified. This provides proof to elNA that the mass balance requirements have been fulfilled and the volume has not been claimed multiple times. This information is documented on the cancellation statement of AGCS with dedicated attributes. (see Figure 5 below)

Figure 5: Transfer and cancellation of biomethane certificates



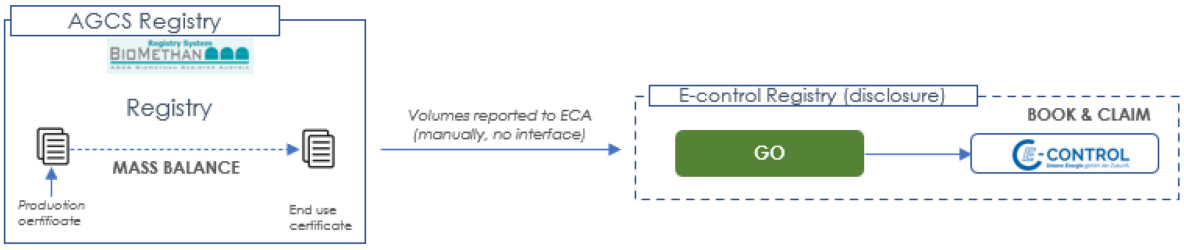
It is being discussed to restructure the gas Mass Balance process to require matching of production and consumption over a certain time period per application purpose (ranging from yearly to daily matching). The reasoning behind this initiative lies with the necessity of ensuring that matching of quantities is done efficiently and transparently, since detailed tracking throughout the gas network is not practical and physically not possible. However, in the event that production and consumption must match each time period, additional efforts are required from the relevant authority's side. It would also create a more rigid system since the trading partner would have to be known the moment of production to allow for an immediate transfer and subsequent issuing of the consumption document. If the gas is stored before reaching its final buyer, this requirement would not apply. Overall, due to additional bureaucratic processes and costs, daily matching is not considered a feasible solution.

Book and Claim system for disclosure

Following very recent developments, there are efforts to implement a harmonised exchange process with E-Control (appointed issuing body in Austria for gas GOs) for the GO market (disclosure). This would entail that a certificate issued within the AGCS registry would be cancelled for the associated volume. In the case where producers decide to use the full production volume for disclosure (GO issuance), the production facility can register directly at E-Control.

The verification of renewable gas GO is still subject to the official complication of CEN 16325 standard. Only once this standard is finalised will E-Control be able to provide a set of attributes for GOs and correspondingly set audit requirements (for example: proof of substrates).

Figure 6: Future link between the AGCS and e-control registry

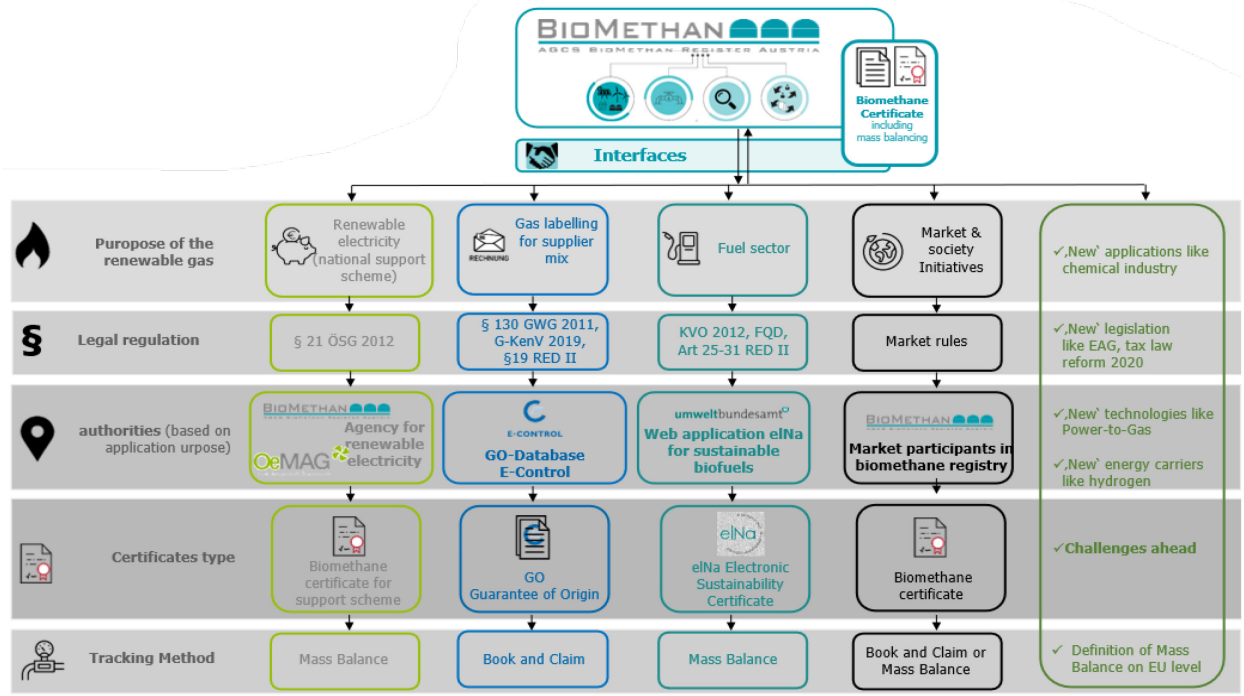


To note: finalising the set of attributes that will be part of a GO is dependent on final agreement on the CEN 16325 standard

Further observations

The fact that a certificate issued in the AGCS registry may be used for different purposes means that these certificates need to be compatible with the other registries and need to include relevant information for different end purposes. Given that audit criteria and the corresponding auditor's competence for renewable gases in Austria is determined by its application purpose, the producer must know the end application of the gas at the point of production to ensure the required information for audit purposes is provided. This is illustrated in Figure 7 below.

Figure 7: overview of the AGCS biomethane registry and certificates depending on the final use



III Trade Requirements

Liquid

To ensure Mass Balance for liquid biofuels for cross-border transfer, volumes need to be verified at the border, as the liquid volumes are transported by truck.

Gas

For cross border trade of certificates, additional sustainability information may be required in addition to data required for certificates used and traded within Austrian borders. These requirements differ based on application types (Erneuerbaren Ausbau Gesetz, §84[7]).

Today, Austria provides a link between the physical flow and virtual exchange of gas certificates by documenting the injection and final consumption through the gas clearing system of AGCS (using network operator data). This principle is extended to the cross-border import to Austria but has not been put into practice yet. For export from Austria to neighbouring countries, the mass balance documentation may differ depending on the requirements of the importing country, including the application purpose. Mass Balance of gas cross-border could request for capacity booking confirmations, which adds an additional layer to the certificate transferred and may only be required for certain end uses. This is not common and is not managed within the registry. It is managed on a case-by-case basis between market participants.

Currently, the rules for cross-border trade at EU level are not harmonised. However, the European Renewable Gas Registry (ERGaR) is working on facilitating cross-border transfer and harmonised mass balancing requirements of renewable gas injected into the European natural gas network, securing the exclusion of double sale and double counting. Requirements for documenting Mass Balance information will likely vary depending on the end use of the renewable gas.

The lack of harmonization at EU-level has led to bilateral agreements, including between Germany and Austria. Some steps towards harmonization have been taken, for example the ERGaR Certificates of Origin (CoO) Scheme (mass balance) has facilitated the transfer of certificates on an international level. Countries that have registries and are part of ERGaR produce 80% of the renewable gas in Europe

[7] Federal Law on the Expansion of Energy from Renewable Sources (Renewable Energy Sources Expansion Act – EAG) https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=20011619

that is injected into the grid. The remaining 20% (approximately) is produced by countries that either don't have a registry or have one but are not part of ERGaR.

The AGCS bilateral agreement with Dena (German biomethane registry), signed in July 2017, for cross-border exchanges and ownership settlement was the first of its kind in Europe and has been replaced by the ERGaR CoO scheme in 2021. Current cross-border ownership transfers are handled solely through the ERGaR Scheme. Around 10 GWh of biomethane certificates have been exported from Austria until now.

For transactions within Austria, the AGCS registry provides a transfer function via its registry system to AGCS market participants. For external users, particularly those using the eINA system for biofuel documentation, a dedicated interface and transfer process has been implemented. The same logic is applied to the transfer process for the GO market, regulated through the appointed Issuing Body E-Control (implementation ongoing).

Applicable to liquid and gaseous biofuels:

Transfers taking place within Austrian borders require a conversion of units that depends on the application purpose and the corresponding registry. For international transfers, the units do correspond to the units used within the respective registry. In the event that a registry would serve different application purposes, conversion methods are required. The units used are the following:

- AGCS biofuels: kWh
- IB for GO E-Control: MWh with 3 decimals
- Biofuels registry eINA: kg and tonnes

For biofuels, there is a trading agreement between Austria (eINA) and Germany (Nabisy) which ensures consistency. On an international level, ERGaR provides for its registry users with a harmonised exchange process. The AIB, as a European hub for GOs in the electricity sector, has expanded its transfer protocol to renewable gases as well.

A union wide database is foreseen by the European Commission to document all biofuels which would lead to harmonised definitions on how to transfer renewable gases cross-border with subsequent Mass Balance requirements along the gas grid, see introduction. Its implementation is expected.

IV Island and off-grid installations

Off-grid gas production functions differently to grid connected gas production.

In Austria "off-grid" also refers to installations where the volume produced is immediately consumed at that same location. In this situation, no production certificate is issued. This prevents selling of the renewable aspect of the fuel outside the production facility. In order to issue off-grid certificates that could be detached from the physical flow for these volumes and traded independently afterwards, the volumes would first need to be recorded in national statistics, which is currently not the case.

V Sustainable Aviation Fuel (SAF)

Austria has a strong interest in developing the upcoming European legislation on sustainable aviation fuels, as there is production of significant volumes of SAFs connected directly to an airport by a dedicated pipeline. The largest Austrian oil and gas company, OMV started to produce sustainable aviation fuels on the refinery Schwechat. Vienna international Airport is located just nearby. The refinery Schwechat produces aviation fuels for years and has a direct connection via a dedicated pipeline to supply Vienna International Airport. The production of sustainable aviation fuels is audited based on the ISCC standard confirmed by the auditor company TÜV SÜD. As there is a dedicated pipeline, there is no additional requirement for tracking of SAF as Mass Balance requirements of RED II are fulfilled.

Still, a direct pipeline connection between refinery and airport is just one possibility. Physical delivery of aviation fuels can also be transported by ship, train or trucks.

The process of transporting gaseous aviation fuels via the domestic gas grid has not been introduced yet. From a scientific and economic point of view there will be no gaseous fuels in the next years. Certification of these volumes under Austrian law is still under consideration with OMV experts. On a European level, trading SAF certificates is not possible since there is currently no legal basis to do this. It is very likely that the SAF will be covered soon within a new regulation by the EU, which will include detailed requirements on SAF feedstock. Indeed, blending mandates and targets are already under discussion for sustainable aviation fuels at EU level. Current Austrian SAF production is already in line with sustainability requirements of RED II. Furthermore, the European policy makers are requesting targets for synthetic sustainable aviation fuels in addition to SAF.

VI Taxation and customs

The goal of RED II is to set requirements to achieve ambitious targets for renewable energy production and total gross consumption within the European Union. However, most documentation of this consumption is covered by national statistics.

The issue of how to track these volumes arises, as renewable gas imports would not be considered in Austria's national statistics. Eurostat defines the methodology for the documentation and recent discussion on the inclusion of renewable gas transfers between Member States have started. This would allow to adapt national energy production and consumption statistics based on the cross-border transfer data reported to Eurostat. Currently, no accounting of cross-border transfer volumes is widely applied. Still, AGCS is aware of one known example: one Hungarian biomethane plant transfers the production volume physically through the European gas grid to a German end-consumer via Austria and this volume is accounted only in the German national energy statistic and not considered in the Hungarian national energy statistics regarding RED II targets.

Tax remuneration rules exist in Austria on the gas consumption tax for renewable gas volumes. The law was passed but the reimbursement mechanism is not yet in place, due to the tax volumes (itself impacted by the recent reduction of the gas consumption tax).

In Austria, a CO2 tax system is implemented since October '22. In certain cases a reimbursement will be possible when using renewable products such as renewable gases. However, the legal process for the actual reimbursement mechanism is missing. It is expected that certificates with a specific set of attributes will be accepted for this purpose.

VII Future developments

The development of the Union Database (UDB) for biofuels is expected to be operational in the future. This platform will create a harmonized set of rules and define the guidelines needed in the biofuel sector to centrally document all biofuels in Europe. It will most likely aid cross-border trade and facilitate tracking through defined Mass Balance requirements. The most pressing issues that are left in the hands of the future UDB relate to harmonization of certification processes on a European level, which may also require that conversions of energy carriers are covered. The UDB will cover specific requirements for hydrogen, as well as Liquified Natural Gas (LNG).

VIII Response to BFE/ BAFU specific questions

1. **Documentation of the physical flow - How the link between the certificates and the physical flow has been concretely implemented in those countries?**

See figure 4.

2. **In case of imports, how are the certificates in those countries being transferred…**

a. **When the energy quantity is transferred as well**

- Liquid: volume must be verified at the border (part of the Mass Balance information). There are trade agreements between Germany and Austria (cross-border transport via trucks)
- Gas: match production and consumption through meter readings as the European gas grid considered as one logistical facility; for specific application purposes capacity booking may be required (for biofuels matching of production and consumption quarterly)

b. **In case of a virtual exchange**

- Solely via certificates which document the specific attributes of the energy volume transferred

c. **When a register is available in the country of origin**

- Based on bilateral agreements for biofuels which will be replaced with EU-wide Union Database in the future. For other application purposes (end-uses) international cooperation is being developed, through the AIB and ERGaR for all registries.

d. **When no register is available? Please answer the question for liquid and gaseous fuels**.

- Experts are unaware of any transfers without involving documentation authorities (e.g. customs authorities) / registries because of security and trust issues.

3. **Cancellation of the GOs – How are GOs cancelled? At which step and through whom?**
    - Gas GOs:
        - For voluntary disclosure, GOs are created by the issuing body E-control Austria (based on information provided by AGCS or the DSO). The GOs are issued upon request and added to the account of the plant operator. They can be transferred to the account of an economic operator (supplier) that needs the GO for end-consumer disclosure.
        - For demonstrating compliance, the production certificates are transferred from AGCS to elNa, upon request. The certificate is then cancelled in AGCS and a Sustainable Certificate is created in elNa. The certificates are matched

with the physical Mass Balance Documentation the moment the Sustainable Certificate is created to provide evidence on the physical consumption.

- For liquids, once the consignment has reached the end user, the Sustainable Certificate is cancelled in the eINa registry.

4. Cohabitation of different chain of custody models

a. Can GOs be traded/exchanged between airports?

- Currently there are no SAF GOs and the legislation on SAF mandates and blending quotas are still under discussion at an EU level.[8][9]It is very likely that certificates won't be able to be transferred between airports, but airport fuel suppliers may provide an overall quota for all its airports even though only one airport is physically supplied with SAF.

b. Can GOs of biogas produced in island installations (off-grid) be traded and used for gas from the grid?

- Theoretically and technically yes, but the gas produced at the island installation is likely consumed at the same point. Therefore, no certificates are issued up to now for those installations. Depending on the application purpose this may be allowed from legal perspective, but it is questionable whether this makes sense. In certain cases where additional mass balance information can be provided, this may be relevant. . For example: liquification at the island installation and physical transport to final consumption point.

In general, there are different chain of custody models in Austria thanks to different registries and the application purpose of the final product. The interoperability of the registries and the certificates requires extensive cooperation between the registry organisations and their IT-systems. The application purposes of renewable gases are likely to be extended from GO, biofuel, subsidy scheme documentation, proof of tax exemption in the future to ETS sector and potentially sustainable aviation fuels. This increases the complexity of renewable gas documentation overall.

[8] European Parliament, 2021. ReFuelEU Aviation initiative Sustainable aviation fuels and the fit for 55 package https://www.europarl.europa.eu/RegData/etudes/BRIE/2022/698900/EPRS_BRI(2022)698900_EN.pdf

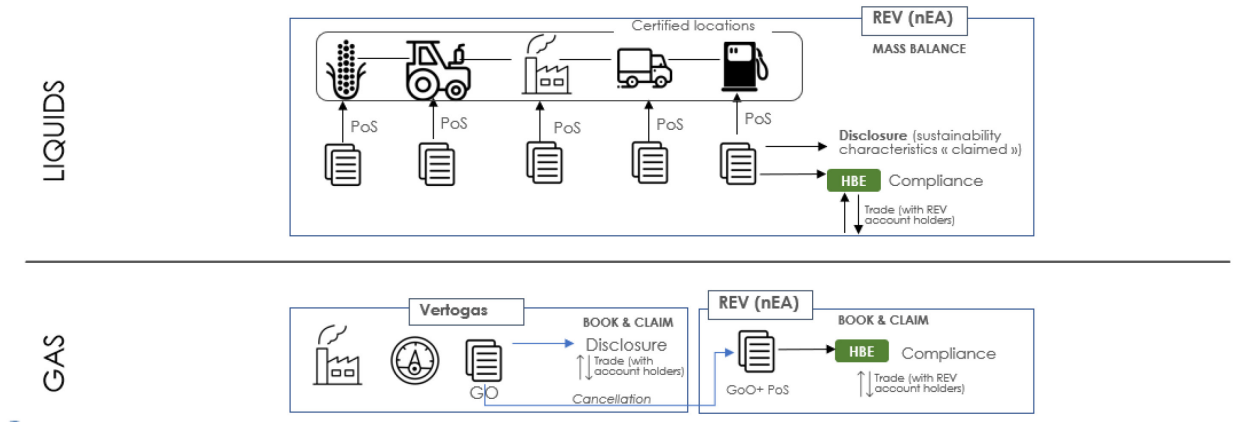
[9] Baldino, C., & Mukhopadhaya, J., 2022. Considerations for the ReFuelEU aviation trilogue. https://theicct.org/wp-content/uploads/2022/09/refueleu-definitions-trilogue-sep22.pdf

The Netherlands

Liquid biofuels are tracked through the Energy for Transport Registry (**REV**), managed by NEa, throughout the supply chain with information provided by audited economic operators that are certified through EU schemes. Gaseous biofuels are tracked by **Vertogas**, the Dutch certification body responsible for implementing the biomethane and hydrogen GO and Proof of Sustainability (PoS) schemes in the Netherlands on behalf of the Minister of Economic Affairs and Climate. Vertogas is a subsidiary of Gasunie, the national gas Transmission System Operator. The biomethane certification scheme has been operational since 2009. For compliance with regulatory targets, certificates for liquid and gaseous fuels must be converted to HBEs in the NEa REV registry system. Tracking systems for liquid and gaseous fuels in the Netherlands are presented separately below.

An overview of existing registries in The Netherlands is provided below:

Figure 8: overview of registries in The Netherlands for gaseous and liquid biofuels

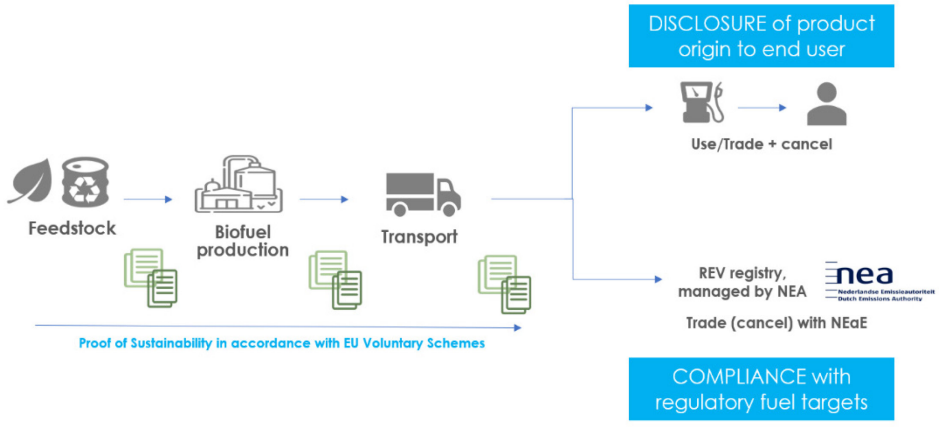


I LIQUID

Liquid biofuels use a Book & Claim chain of custody model with Mass Balance qualities. This entails the combination of the two systems and allows for decoupling between the physical product and the sustainable qualities that can be "booked" and "claimed". It requires every economic operator throughout the supply chain to maintain a separate Mass Balance calculation at its location by matching the volume received with the volume sold onto the next link in the chain. Each element of the supply chain must be certified by a recognized sustainability system (EU Schemes), which allows economic operators to issue a PoS themselves. Tracking every transfer is necessary to ensure transparency regarding sustainability claims.

Any producer can issue a certificate of sustainability from its certified locations. The PoS is linked to the consignment throughout the supply chain, as shown in Figure 9.

Figure 9: Working principle for the tracking of liquid biofuels in The Netherlands



Cohabitation of Book and Claim and Mass Balance systems in The Netherlands

As indicated in RED II Article 19, a Guarantee of Origin (GO) is used to disclose the origin of a volume of renewable energy and uses a Book and Claim system. A proof of Sustainability certificate is used to demonstrate compliance with RED II requirements (Art 25 – 30) and uses a Mass Balance System. The Netherlands have implemented a cohesive system that prevents double counting of sustainability characteristics or the counting of certificates for disclosure and compliance:

- For disclosure: sustainability characteristics can be "claimed" so that they cannot be claimed *again* for compliance purposes
- For compliance: a PoS can be added to a Go so that the GO certificate may not count for disclosure *and* compliance

Hence the system put in place avoids double counting of certificates and associated sustainability characteristics.

In order to issue a PoS certificate for the quantity supplied the following sustainability requirements must be added:

- Land use requirements
- GHG emission reduction targets
- Audit requirements

- Traceability requirements (producers must apply the system of Mass Balance of biofuels for their location(s) to track volume and type of feedstock used)

Any economic operator at a location that has been certified can issue this document, which then follows the whole production path, from the crops to the company that supplies the biofuel to the market.

The sustainability certificates can be used for two purposes:

1. **Consumer disclosure**; or

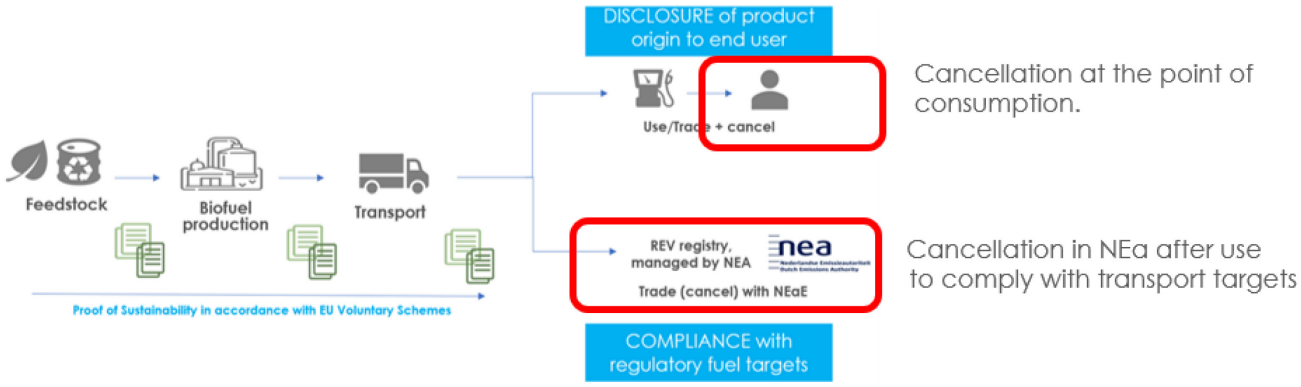
2. **Compliance** with fuel targets

To be used for disclosure, the certificate of sustainability must not undergo any further steps. The quantity of biofuel will simply be consumed by the end user (fuel supplier). In this case, the claiming company has claimed the sustainability characteristics and the certificate is cancelled. However, in order for the PoS to be used for compliance with transport obligations, it must follow these steps:

1. Be exchanged for an HBE certificate ("hernieuwbare brandstofeenheid") certificate in the NEa registry upon consumption of the fuel.
2. The new HBE certificate and the volume in question must be registered in the Energy for Transport Register (REV).

If a producer does not hold the HBE certificate and cannot prove the sustainability quality of the volume, the biofuel cannot be registered in REV and therefore does not count towards the quota. Cancellation of the HBE is done at the point of consumption (fuel supplier).

Figure 10: Cancellation mechanism for liquid biofuels



HBEs are the units that companies, within the Energy for Transport compliance system, use to comply with their annual obligation and their obligation to reduce greenhouse gas emissions. Companies must have an account in the REV to hold and trade HBEs.

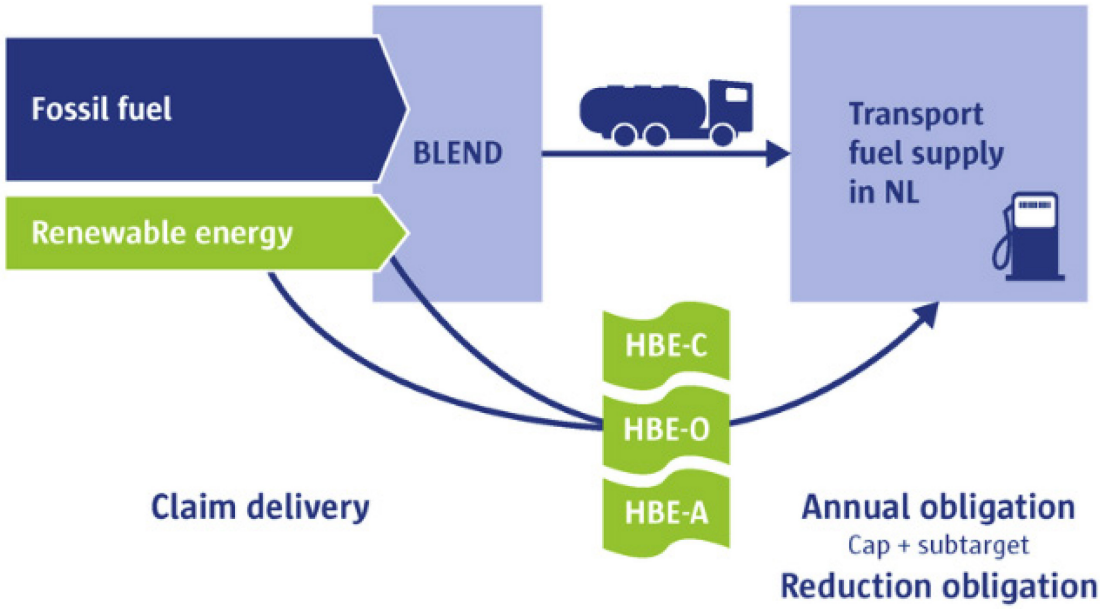
There are multiple types of HBEs deriving from different feedstocks and aimed at different purposes, as described in the Table below.

HBE Type	Created by claiming delivery of	Further Description
HBE ADVANCED **HBE-A or HBE-G**	Liquid/gaseous advanced biofuel	BF produced from feedstocks mentioned in Annex IX, Part A of RED
	Liquid/gaseous renewable fuel	Fuel where energy content comes from RE sources different to biomass
HBE CONVENTIONAL **HBE-C**	Liquid/gaseous conventional biofuel	BF produced from agricultural/energy crops
HBE OTHER **HBE-O**	Other liquid/gaseous biofuels	BF produced from feedstocks mentioned in Annex IX, Part B of RED
		BF produced from feedstocks NOT mentioned in Annex IX of RED and that do NOT come from agricultural/energy crops
	Electricity	Renewable only

Generally, 1 HBE = 1 GJ. However, biofuels made from certain raw materials allow for double counting, therefore 1 GJ can be counted as 2 HBEs in some cases. Economic operators that register double counted quantities into REV must have an accompanying statement that affirms that this counting has been confirmed by an independent auditor and meets the requirements. Other multiplication rules apply to aviation and maritime fuel.

Under the Dutch Energy for Transport compliance system, trading of HBEs is allowed between companies with a REV account to deliver their mandatory share of renewable energy. Hence companies can choose to deliver and claim delivery of renewable energy themselves thereby creating HBEs, or to buy HBEs to comply with their obligations.

Figure 11: Claiming HBE certificates



II GAS

In the Netherlands, Vertogas (subsidiary of Gasunie – national TSO) is the certification body in charge of implementing the GO and PoS schemes on behalf of the Minister of Economic Affairs and Climate for gaseous energy carriers.

The Vertogas certification system uses a Book & Claim approach, using a GO scheme for biomethane and a PoS certificate for the purpose of compliance with RED II. These certificates represent one combined document, called Guarantee of Origin (GoO), and contain, but are not restricted to, the following information:

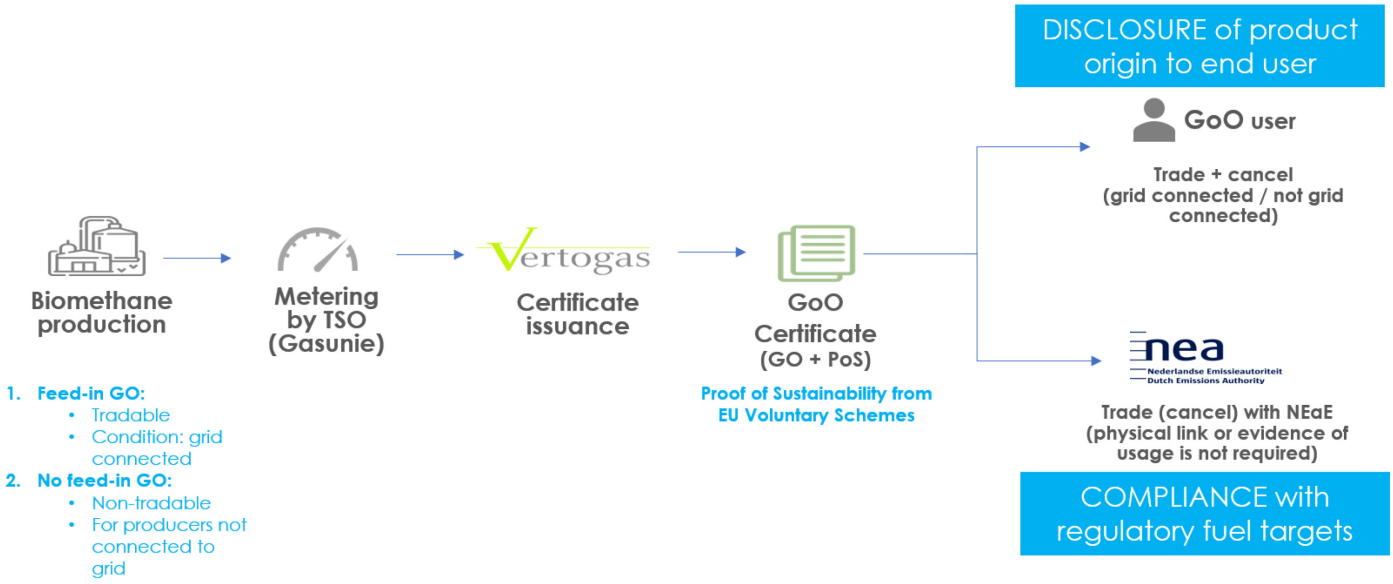
- Producer
- Production facility
- Applied facilities
- Sustainability criteria related to RED II
- Volume
- Biomass source

Prior to receiving the GoO certificate, producers need to be certified. After this step, GoOs are released automatically based on two inputs:

- Volume produced based on metering data from the gas TSO – Gasunie,

- Type and volume of biomass used (introduced manually by the producer to ensure the sustainability criteria have been met)

Figure 12: Working principle for gaseous fuels in The Netherlands



The GoOs can be used for one of two purposes, as described in Figure 12.

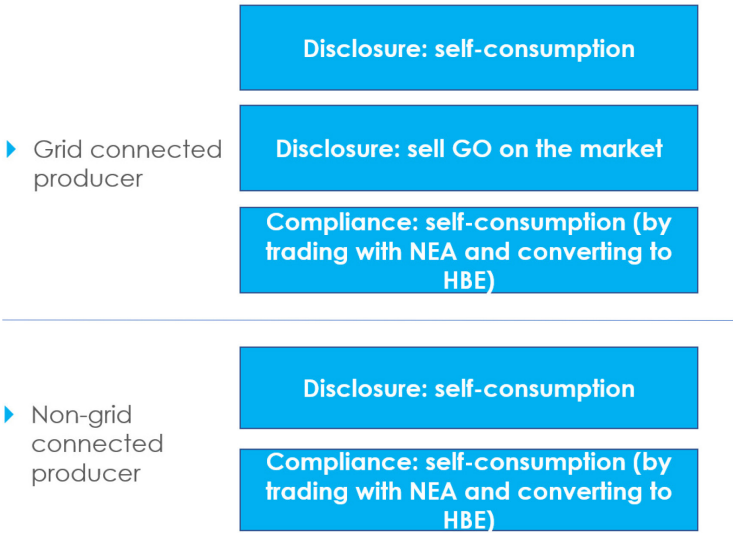
1. **Disclosure** to consumers

Disclosure certificates can be traded between market participants and must be requested to be cancelled by the fuel supplier / customer in the Vertogas platform.

2. **Compliance** to fulfil sustainable fuel targets set by NEa

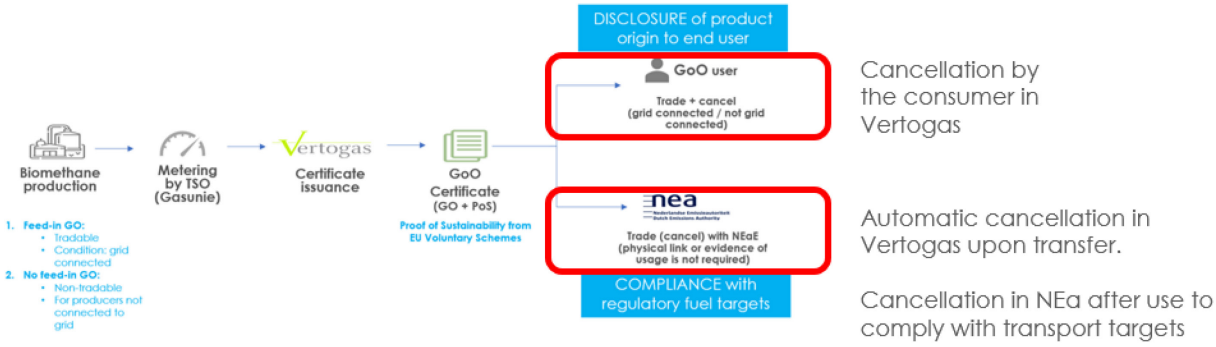
For compliance, Vertogas certificates must be converted into an HBE certificate, similar to the approach for liquid biofuels. This is done by transferring the GoO to NEa which automatically cancels the certificate in the Vertogas platform.

Figure 13. Pathways of GoOs based on grid connectivity requirement



The use of GoOs can follow five different pathways based on grid connectivity or lack thereof, as seen in Figure 13. As GoOs from off-grid production cannot be traded, this limits their use to being consumed or sold with the physical gas for disclosure or compliance. A grid-connected producer is able to sell the gas and the GoO separately for either purpose. The cancellation of the certificates is done at the end of the supply chain, upon voluntary consumption (in the Vertogas registry) or use to comply with a quota (in the REV registry by NEa). If the gas were to be liquified and traded in a tank, it would follow the liquid approach.

Figure 14: Cancellation of certificates for gaseous fuels



HBEs can only be obtained by converting certificates issued by Vertogas from biomethane installations that have not received national subsidies. This implies that biomethane produced outside the Netherlands cannot be used for compliance purposes, nor Dutch biomethane that has received SDE++ (production support).

In the case of off-grid production there is no need for a grid connection point on the certificate (EAN). The producer of off-grid gas can still receive a GoO.

There is no danger of double counting, as (smart) metering data from the TSO is used to automatically issue certificates based on the injected volume of gas. This system gives a lot of flexibility in terms of mobility and offers the possibility of choosing the end use of the certificate (compliance/disclosure).

III Trade Requirements

Imports of certificates are not currently permitted in the Netherlands, as they are not recognized by Vertogas. Exports of certificates are technically possible since Vertogas is an ERGaR CoO Scheme participant and this facilitates the process, however in practice there is no export of certificates since this is not feasible for the Netherlands.

Similarly, REV account holders cannot trade HBEs internationally or use them in connection with regulations in other countries. Conversely, companies cannot transfer units from comparable system in other countries to the REV.

In terms of physical trade, the Netherlands exports a small quantity of biofuels. No physical imports are currently taking place.

IV Island installations/ off grid

Island installations are able to receive certificates (GoO) even without grid connectivity, however, these certificates cannot be traded and therefore must be consumed at the location of production. The certificates can either be used for disclosure, or converted into HBEs and cancelled for compliance within NEa. As of today, the authors are unaware of cases where HBEs from island installations are traded further.

V Sustainable Aviation Fuel (SAF)

Under RED I, SAF targets were not required. However, a "voluntary opt-in" became an option at a national level in 2013. The Netherlands has applied this opt-in since 2013, which allowed SAF producers to sell the SAF to one party and the HBE certificates to another party in the transport sector as an additional source of income. Since the aviation sector does not currently have any quotas to fulfil (yet), the SAF producer can sell the associated HBE to any economic operator in the transport sector that must fulfil their supply obligation. This HBE can be traded between aviation fuel suppliers and is eventually canceled in NEa when used for compliance. As these are HBEs being traded, the certificate would not be bound to the physical product

The multiplier value for SAF is 1.2, which means that for every GJ of SAF produced, a multiplier is added according to the formula below. The volume is multiplied by the combustion value, then multiplied by 2 since the HBE for aviation fuel are double

counted and again by the multiplier value (1.2). The result is the number of HBEs issued.

Figure 15 Multipliers for aviation and maritime fuel – source: NEa

Number of HBEs	= Volume	**X**	Combustion Value	**X**	2	**X**	0.8 or 1.2	
	(in l15)		*(standard / variable*)*		*(if double counting)*		*(if sea/aviation)*	

VI Responses to BFE/BAFU specific questions

1. **Documentation of the physical flow - How the link between the certificates and the physical flow has been concretely implemented in those countries?**
    - Documentation of production through metering data
    - Certificates are released by Vertogas automatically based on the volume produced (based on TSO data) and the type and volume of biomass used (for the sustainability criteria)
    - Once gas is injected into the grid, the physical link to the certificates is disconnected
    - Consumption is tracked by Vertogas, as certificates are canceled in the registry by the account holder.
2. **In case of imports, how are the certificates in those countries being transferred…**
    - Export to other MS possible, imports not yet allowed. NL is a ERGaR CoO Scheme participant.
3. **Cancelation of the GOs – How are GOs cancelled? At which step and through whom?**
    - Gas GoOs are cancelled in the Vertogas platform by the consumer (utility) if they are being used for voluntary disclosure upon consumption. However, if the GoO is used for compliance, it is cancelled in Vertogas upon consumption and an HBE certificate is issued in NEa. The HBE is then cancelled once it is used to prove compliance with fuel targets in the REV registry managed by NEa.
    - A similar approach is used for liquids. If used for disclosure, the PoS is cancelled at the point of consumption. If used for compliance, it is converted into an HBE and cancelled in NEa after consumption.

4. **Cohabitation of different chain of custody models**

a. Can GOs be traded/exchanged between airports?

- The airports themselves do not own the HBEs, instead the fuel producers do. They can trade the HBEs between each other or sell them to parties that must comply with fuel quotas.

b. Can GOs of biogas produced in island installations (off-grid) be traded and used for gas from the grid?

- No, the GoOs from island installations cannot be traded. The official reason for this is not known. However, it is assumed that trading of off-grid certificates is not allowed as this would impact the credibility of the certificate system as a whole. Indeed, the idea behind a GoO system is that certificates can be traded for production connected to one single grid, demonstrating some link with the physical production and delivery of gas. Allowing trading of certificates between different grids breaks any link with the physical delivery.

France

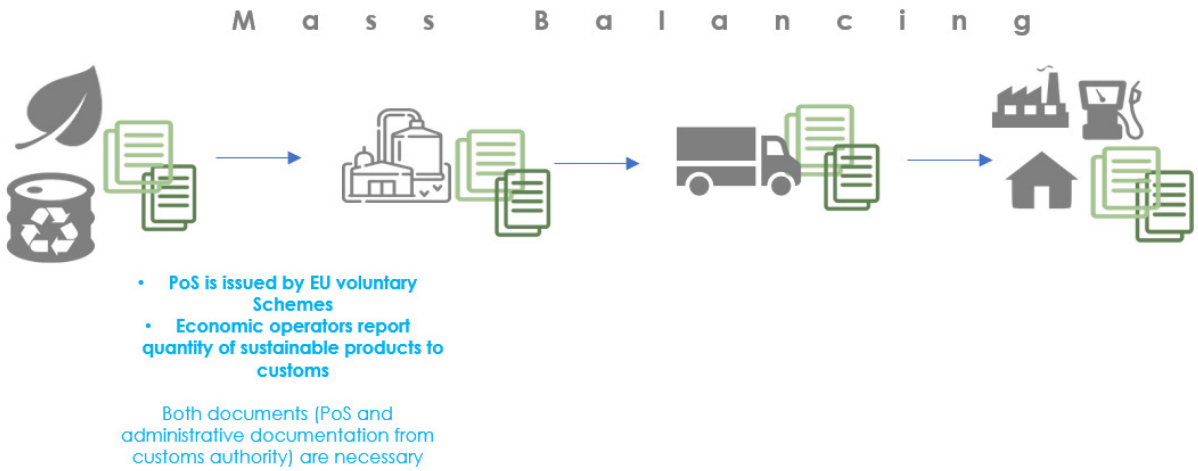
The liquid and gas certificates are handled by French Customs Authority and the French Distribution System Operator (GRDF) respectively. While the former uses a Mass Balance system, the latter is using a Book & Claim approach. The two function as two independent markets with minimal interaction. Both systems are presented in detail below.

I LIQUID

Liquid Fuels are tracked through a Mass Balance system, which is managed by the French Customs' authority. This system also manages the quantities imported in the country. There is no digital registry that currently tracks liquid biofuels in France.[10]

Economic Operators (EO, i.e., fuel suppliers) must report all renewable fuels to the Customs' Authority to comply with RED. This used to apply to biofuels as per RED I but has been extended to all renewable fuels (including RFNBOs) as per RED II (article 25). Renewable liquid fuels are recorded through the combination of certificates issued by EU Voluntary Schemes and specific administrative documents communicated by EOs to the customs. Fuel suppliers to end consumers (refuelling stations) need to show documentation throughout the supply chain. Verifying these claims is up to the customs authority from the point of production to the refuelling station.

Figure 16 Chain of Custody model for French liquid fuels



[10] The process for providing documentation and evidence to the French authorities is documented here: https://www.ecologie.gouv.fr/sites/default/files/Guide_Syst%C3%A8me%20de%20durabilit%C3%A9_2021.pdf

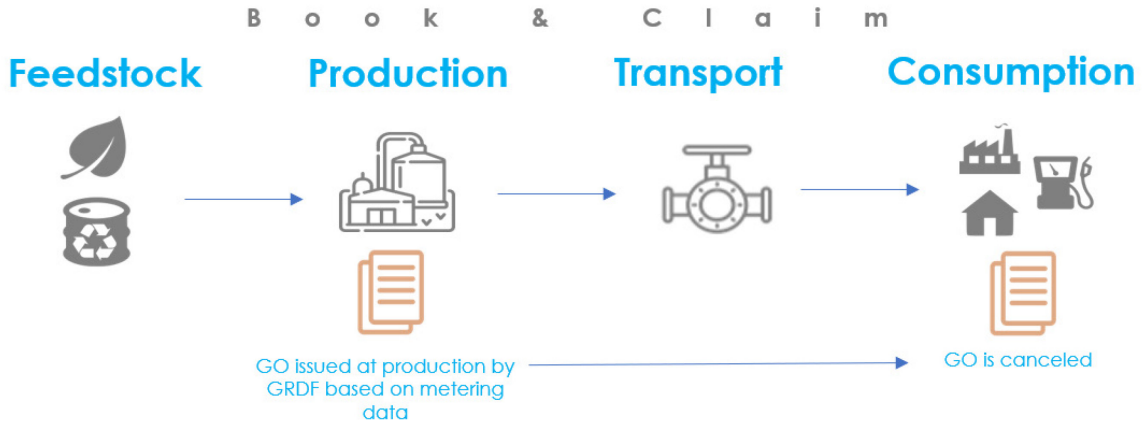
II GAS

Biomethane injected in the gas grid is tracked through a Book and Claim system (issuing Guarantees of Origin) operated by the French Distribution System Operator (GRDF). The Book and Claim system is managed through a digital registry operated by GRDF, namely GREXEL. Gos may exclusively be used for disclosure in the EU, as regulated by RED II article 19.

The amount of GOs issued is based on metering data from the gas Transmission System Operator (TSO) or Distribution System Operator (DSO), depending on the location of the production device. Injection and consumption point must be notified by suppliers of end consumers (only suppliers have access to the registry and may cancel GOs). Proof of consumption is provided by the meter number and the subsequent cancelation of the GO by the supplier.

There is no link between the Mass Balance system for Liquid Fuels and this Book & Claim system, as they operate as two independent markets.

Figure 17 Chain of Custody Model for French gaseous fuels

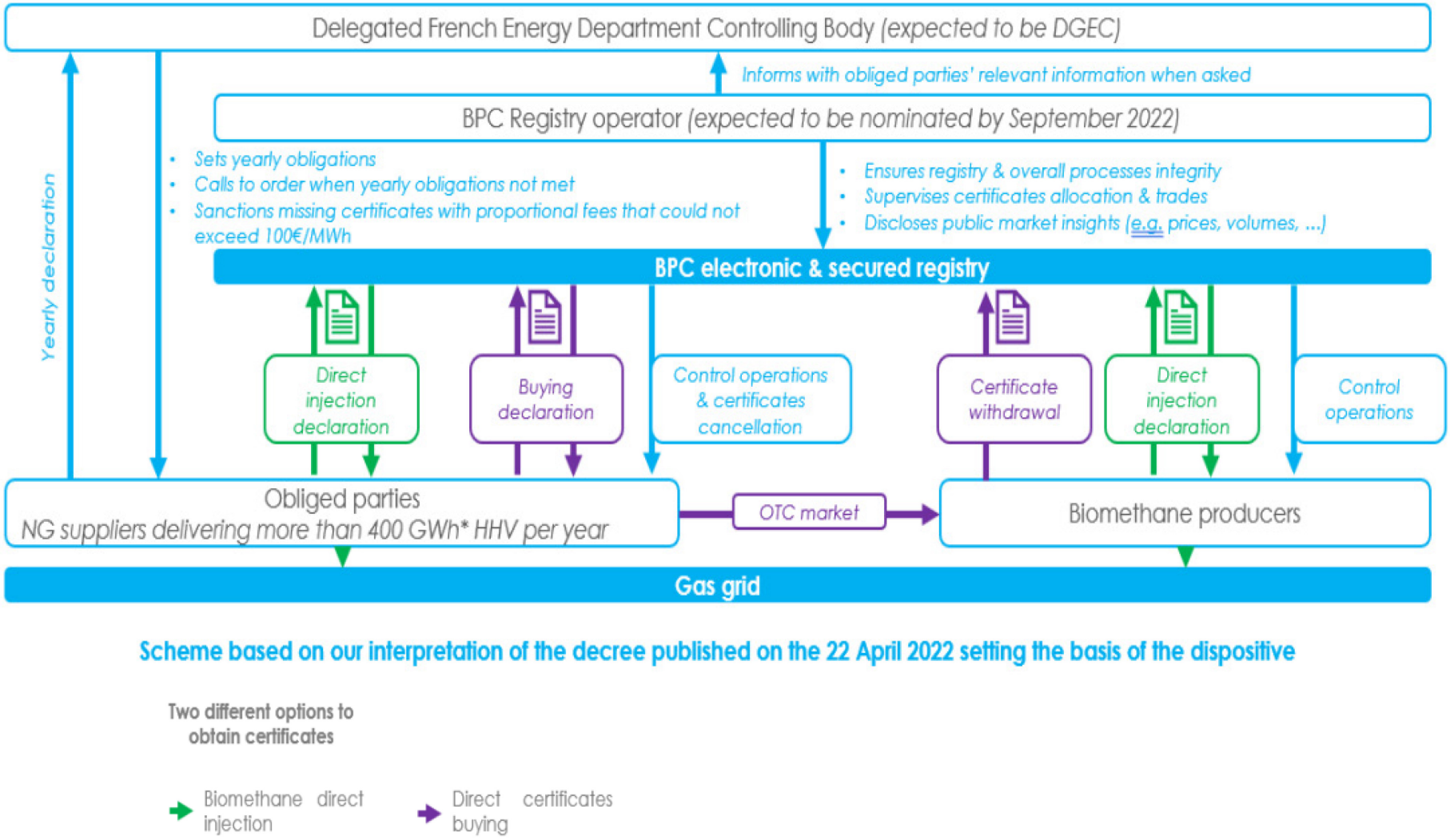


In terms of future prospects on the French gas market, the government is expected to implement a new biomethane certification scheme in 2023 ("Certificat de Production de Biométhane" / "Biomethane Production Certificate" (CPB/BPC)) which would be used to demonstrate compliance. The BPC will function like a "quota" system whereby biomethane producers and consumers will be able to demonstrate that they meet targets by acquiring BPCs. Today, it is unclear whether GOs can be converted into BPCs in the future. There is no framework in place

enabling the import of renewable gases for the purpose of obtaining BPCs, currently. These can be acquired either from their own production or obtained through a trading system for obliged parties. All suppliers will have obligations to integrate biomethane in their gas supply (1MWh = 1 certificate). When a biomethane producer requests a BPC for 1 MWh of energy, it will not be possible to request a GO for the same MWh. It is unclear, however, whether there will be exclusivity between a BPC and EU-ETS credits. The mechanism is effective but the trading of certificates will be enabled from April 2023.

The role of GOs will remain unchanged and will continue to be exclusively used for disclosure.

Figure 18 Future Biomethane Certification Scheme



III Trade Requirements

In the case of the transfer of liquid fuels (Mass Balance), the certificates are provided by the economic operators to the Customs. There is no virtual exchange possible.

Virtual exchange only happens for gaseous fuels going through the natural gas grid, since there is no physical tracking. In those cases, Guarantees of Origin are transferred within the registry operated by GRDF.

There is no possibility of import / export of GOs in France. It will be the case when RED2 is implemented. GRDF plans on using the ERGaR system to facilitate interconnection with other registries for cross border trading.

In the case of liquid fuels, there is usually no specific register. The molecule is tracked through a paper trail process by the customs upon entry in France.

IV Island installations/ off grid

There is no differentiation in French legislation between grid connected production and off grid production, since there is no meaningful volume of biogas production off-grid. In order to benefit from a feed-in-tariff, the producer must be connected to the gas grid.

V Sustainable Aviation Fuel (SAF)

Currently, there in lo legislation regarding the production or use of SAF in France.

VI Taxation

Renewable fuels for transport are subject to a tax incentive in France where EOs (fuel suppliers) pay based on their ability to reach their yearly target for inclusion of renewable fuels. This incentive was formerly referred to as "Taxe incitative relative à l'incorporation de biocarburants: (TIRIB[11]) but has now been extended to include renewable electricity and RFNBOs, becoming "Taxe incitative à l'utilisation d'énergie renouvelable dans le transport" (TIRUERT).

The TIRUERT works on a penalty principle. Economic operators (fuel suppliers) have a blending obligation and show compliance using certificates. If they do not meet their targets, a penalty tax is applied.

[11] Ministere de l'Economie, des finances et de la relance, charge des comptes publics, 2020. https://www.douane.gouv.fr/sites/default/files/uploads/files/2020-08/Circulaire%20du%2018%20aout%202020_TIRIB.pdf

The tax amount is calculated according to the missing volumes at the end of the fiscal year. In practice, if the biofuel blending target has not been reached, the amount of tax increases proportionally with the missing amount.

VII Future developments

In terms of documentation, there are no changes in sight within the French renewable fuels system. However, as per RED2, France will recognize the import of renewable gas GOs for quantities coming from the EU natural gas grid. Exports will also be possible, likely through the ERGaR scheme. Furthermore, France will implement two tracking systems for hydrogen as per the "Ordonnance n° 2021-167 du 17 février 2021 relative à l'hydrogène ". This entails a Book & Claim system (GO) and a Mass Balance system (Garanties de Traçabilité), where hydrogen must flow through a segregated supply chain without the possibility of blending.

VIII Response to BFE/BAFU specific questions

1. **Documentation of the physical flow - How the link between the certificates and the physical flow has been concretely implemented in those countries?**

In France, only liquid renewable fuels benefit from a Mass Balance system where there is a link between the certificates and the physical flow.

- In practice, Mass Balance is demonstrated through EU Voluntary Schemes (recognized by the European Commission). EU Voluntary Schemes have the responsibility to certify each step of the supply chain from Point of Origin to delivery of the fuel
- When a fuel enters France and / or is declared by economic operators for tax rebate purposes, economic operators must communicate those certificates to the Customs along with additional specific administrative documents
- The Customs are responsible for verifying the completeness of each declaration. Information is kept by the Customs but there is no digital registry available

2. **In case of imports, how are the certificates in those countries being transferred…**
    a. **When the energy quantity is transferred as well**
        - In the case of the transfer of liquid fuels (Mass Balance), the certificates are provided by the economic operators to the Customs
        - There is no physical tracking in the case of gaseous fuels going through the natural gas grid

b. In case of a virtual exchange

- There is no virtual exchange in the case of liquid fuels
- Virtual exchange only happens for gaseous fuels going through the natural gas grid. In those cases, Guarantees of Origin are transferred within the registry operated by GRDF. Until RED2 is implemented in France, import and export are impossible.

c. When a register is available it the country of origin

- There is no possibility of import / export of GOs in France. It will be the case when RED2 is implemented and GRDF plans on using the ERGaR system to facilitate interconnection with other registries

d. When no register is available? Please answer the question for liquid and gaseous fuels.

- Non applicable for gaseous fuels (see above)
- In the case of liquid fuels, there is usually no specific register. The molecule are tracked through a paper trail process by the customs upon entry in France

3. Cancelation of the GOs – How are GOs cancelled? At which step and through whom?

- Proof of consumption is provided by the meter number and the subsequent cancelation of the GO within GREXEL by the fuel supplier.
- There is no GO for Liquid fuels. Proof of Supply of renewable fuels are provided by Economic Operators (fuel suppliers) to the French Customs who are responsible for verifying the declarations thanks to certificates issued by EU Voluntary Schemes.

4. Cohabitation of different chain of custody models

1. **Can GOs be traded/exchanged between airports?**
    - No.
2. **Can GOs of biogas produced in island installations (off-grid) be traded and used for gas from the grid?**
    - No.

Cohabitation of different chain of custody models

What are the possibilities of combining different models (Book and Claim and Mass Balancing) with a list of pros and cons of the different models?

Country	Cohabitation model	Pros	Cons
Austria	Liquids (eINA): Mass Balance Gas (AGCS & eINA (& e-control in the future)): Mass Balance or B&C (depending on the end use)	Accurate and complete data collection for mass balance	▪ Coordination between different registries ▪ Needing to know the end use of a volume of gas to know what chain of custody model applies
France	Liquids (customs authority): Mass Balance Gas (GRDF): Book and Claim	Separate systems (book and claim // mass balance) may avoid double counting	▪ According to RED II requirements, certification systems for certain gases will require mass balance chain of custody (hydrogen) ▪ Lacking a reliable digital system. Paper trails risk fraud/ errors
The Netherlands	Liquids: combination of mass balance and book and claim Gas: Book and Claim	The system comprehensively allows the physical tracking (Mass Balance) *and* the trading of sustainable properties of a fuel (Book and Claim) High level of digitalisation and reliable data	

What are the possibilities of developing a market for certificates on- or off-grid or a mix between both?

On-grid:

Disclosure: market for gas GOs for disclosure is already possible in the countries studied. A market for Gos should be encouraged to impulse renewable energy consumption and production.

Compliance: market for HBEs is possible

A market for certificates for compliance should also be encouraged, as this enables the meeting of targets in a cost-effective way and will become increasingly important with RED requirements.

Off-grid:

GOs are usually traded separately from the physical delivery but still across the same gas grid network. Being able to trade off-grid certificates separately would fundamentally change this and may affect the credibility of the overall system.

Austria: possible but isn't done. Could add value to have a certificate if converted to a liquid fuel for mass balance?

Netherlands: a certificate is issued for disclosure or compliance but cannot be traded

France: there is no distinction between on-grid and off-grid production, but as there is no meaningful volume, no off-grid certificates are traded

Can the biofuels market be an inspiration for an off-grid market in gas area and how far?

Off-grid market does not seem appropriate given low production volumes and the fact this would break with the idea that the production and consumption of an energy volume are connected to the same grid as the issuer and user of the certificate.

For SAF, however:

Given the ambition at EU-level to introduce the possibility of trading SAF certificates to meet blending mandates and targets; may be introduced to align with the EU.

The Netherlands has applied a voluntary opt-in since 2013, which allowed SAF producers to sell the HBE certificates to the transport sector in order to fulfill quotas,

as an additional source of income. Since the aviation sector does not currently have any quotas to fulfil (yet), the SAF producer can sell the associated HBE to any entity in the transport sector that must fulfil their supply obligation. This HBE can be traded between aviation fuel suppliers and will eventually be canceled in NEa. This could be an intermediary step.

Which level of disconnection is recommended in those cases and at which point in time should the GOs or the canceled GOs be traded/exchanged?

An example from which to take inspiration is the system put in place in The Netherlands.

The « how » and « when » certificates are cancelled is up to the competent authority. However, recommendations are:

- To specify cancellation requirements in legal texts;
- To ensure the tracking of fuels in one single Registry; and
- To have an "if-gate" to avoid double counting if the certificate is cancelled for disclosure, it cannot be used again for compliance.

What are the implications on the consistency of the whole system; consistency of the data for the customs authority?

To ensure statistical transfers with the EU, consistency in terms of the data is necessary. This is especially important in light of the Union Database and includes consistency in terms of measurement units.

Conclusion

Below is an overview of the chain of custody model, registry, certificate-type and trading rules for gaseous and liquid biofuels in the countries studied:

		Austria	**Netherlands**	**France**
Liquid	Chain of custody model	MB	B&C MB qualities	MB
	Registry	eINa (compliance)	NEa	No registry Managed by French Customs Authority
	Certificate	Sustainable Certificate	PoS Can be turned into HBE for compliance	Certificates by EU voluntary schemes and documents communicated to customs by EO
	Cros border trade of certificates	No	No	No
Gas	Chain of custody model	MB	B&C	B&C
	Registry	AGCS -> eINA (compliance) AGCS -> E-Control (disclosure) AGCS (other)	Vertogas	GRDF (Issuing Body) GREXEL (IT provider)
	Certificate	Sustainable Certificate	GoO (GO+PoS)	GO
	Cros border trade of certificates	Yes	No	No

	Possibility of trade of certificates from off-grid production	Yes, in theory, but it is not the case in practice.	No	No

Below is a summary of the advantages and shortcomings of the reviewed systems.

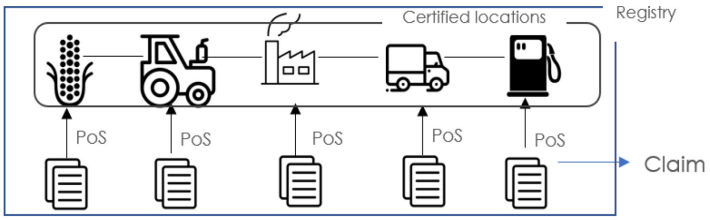
	Austria	Netherlands	France
Management simplicity	There are 3 different registries, which requires alignment: • GoO Issuing Body (E-Control = Austrian Regulator) • Biofuel Registry - Environment Agency Austria – eINA • Biomethane Registry – AGCS However, separate registries also guarantee clear division of responsibilities. There is a lack of transparency on the information needed in certificates depending on the end use.	Single document for disclosure and compliance *However*, there remains an extra step to change the GO into a HBE certificate for compliance which allows to trade certificates for compliance separately from the physical product.	No digital register for Liquid fuels makes traceability much more difficult, therefore increases fraud risk.
Risk of double counting	Need for harmonization between the registries to avoid multiple counting.	No risk of double counting, as certificates can only be used for compliance or disclosure.	Absence of a digital system for tracking and tracing increases the risk of double counting.

Data availability/ digitalization	The data required for the implementation of various Mass Balance requirements is already available (metering data, balancing level aggregation, import/export information).	High level of digitalization of the system and data availability. Certificates are issued automatically, based on metering by the TSO – high efficiency.	The Book & Claim system for gaseous fuels uses a well-established and reliable digital registry (Grexel).
Tax system	Tax exemptions: currently, entities pay the tax first and then will receive payback once the certificate & associated documentation is provided (quarterly for liquid biofuels). This applies cross-border: even if the information is available at the border, the authorities await the reception of the certificate in the national registry before applying the tax exemption.	Depends on the granting of HBE certification leading to a clear system.	Complex regulatory environment makes the tax exemption system difficult to navigate
Trade	Trade occurs on bilateral levels because of lack of harmonization at EU level	Imports not allowed (not recognized) Exports facilitated with ERGaR	Physical product and GO are traded separately domestically. Lack of harmonization at EU level

Documentation of physical flow

In the case of liquid biofuels, the link between the certificate and the physical flow of a given volume of biofuels must be guaranteed by design within the system and throughout the supply chain to ensure a reliable traceability system.

Figure 19 Chain of custody possibility

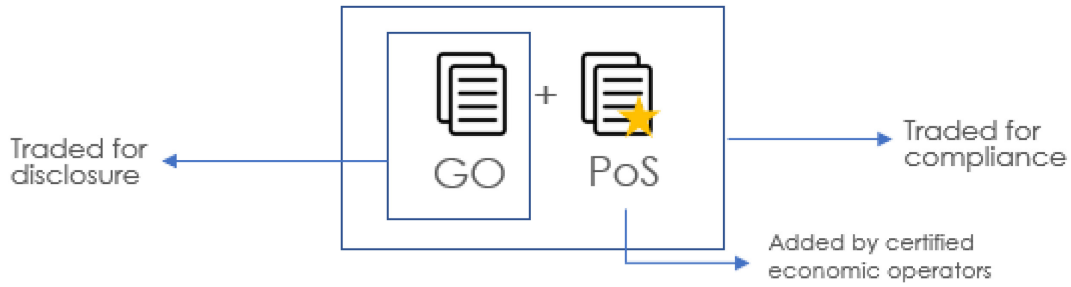


For liquid biofuels, it is recommended to implement a Mass Balance traceability system. Each economic operator along the supply chain should be certified by a third party to provide Mass Balance information on the consignment at its location to ensure validity of the data on the certificate. Thus each economic operator would add new "proof of sustainability" information to a single certificate. The

certificate may also automatically change certificate ID at each stage of the chain to document the changing "ownership" of the volume of liquid biofuel.

There is a possibility of combining the Mass Balance system with a Book & Claim system. As in the Netherlands, particular sustainability characteristics that are added as "Proof of Sustainability" by economic operators may be "booked" and "claimed" along the supply chain to meet various compliance targets of different instruments. This gives the system more flexibility and the possibility of booking and claiming the sustainable characteristics of the fuel at any point and ensures that the sustainability characteristics are not double counted as they can only be cancelled once. In the case of Switzerland, this could be used in the context of CO2 offsetting mechanism (Swiss "KOP" instrument).

Figure 20: example of certificate cancellation for different purposes



In the case of gaseous biofuels, the grid may be considered one logistical facility, and daily matching of volume injected and volume consumed shall be ensured. A Book and Claim system is likely better suited in this case, so that certificates can be disconnected early on from the physical flow, given that the steps between production and consumption need not be documented.

For either liquid or gaseous renewable fuels, the GO and PoS should be included into the same document (GoO) to avoid double counting. This document should contain standardized information that ensures flexibility in use for either disclosure or compliance. The contents of the document should not be restricted by application type, as this could potentially create a rigid system that requires more bureaucratic processing along the supply chain.

Cancellations of certificates

Cancelation rules offer a lot of flexibility and can be essentially decided at national level, depending on the approach that fits Switzerland's needs. While there are some similarities between the three case studies presented, the *how* and *when* these certificates must be cancelled within their specific registry can be decided by the competent national authority. The only recommendation is the requirement of specifying the guidelines within legal text. The tracking of all biofuels within one registry is recommended, as this facilitates the monitoring of volumes throughout the supply chain and across borders. To avoid double counting, an "if-gate" is proposed for cancellation purposes, meaning that *if* the certificate is to be cancelled for disclosure, it cannot be used again for compliance, as seen in the Netherlands.

Trade

Regardless of the level of flexibility within Swiss legislation, alignment with EU legislation is needed, at least to a certain extent, if Switzerland is aiming to import/export fuels or facilitate statistical transfers. This is an important consideration, especially in light of the future Union Database which will make bilateral agreements obsolete. Whether the aim is to use certificates for compliance or disclosure, gas GOs should align with REDII Art. 19, biofuels and RFNBOs should comply with RED II Art. 25-30 and the future SAF policy mix should consider REFuel EU Aviation guidelines. This is also relevant for the EU counterparts who would need to report imported Swiss biofuel in the Union Database. Therefore, alignment on requirements as well as measurement units and other relevant elements must be monitored. On a European level, most trade of volumes is taking place OTC but the conversation around statistical transfers includes high hopes for the Union Database to facilitate this type of trade. Furthermore, the revised RED will possibly introduce a new requirement for member states to set up a market for certificates for the transport sector. This remains to be determined soon.

SAF

Considering the little available information on SAF targets and its general use on EU level, the lack of implemented legislation and overall uncertainty at this point in time can only generate a stand-by recommendation. In the current context, the most feasible action that can be taken on a national level is awaiting EU legislation in order to ensure alignment.

Off-grid production in island installations

As shown by the case-studies, off-grid production of biogas is not monitored in national statistics since it is aimed at on-site use for industrial processes, as is the case in Austria. This chosen end use does not require the issuing of a GO, therefore production and consumption certificates are issued simultaneously. However, other approaches have been identified, where off-grid GoOs can be used on site or for the purpose of compliance. These, however, cannot be traded.

Under EU legislation both approaches are possible, therefore there is a high degree of freedom in terms of how these certificates can be utilized and it comes down to each country to define within national legislation whether off-grid GOs can be traded, start monitoring the volumes in national statistics and proceed to use these certificates to claim use of renewable biogas. The grid connected biogas market can be an example in this regard, to the extent desired.

On the one hand, trading certificates for off-grid production would mean breaking with the idea that there is a physical link between the delivery of a given volume (of biogas, for example) and its traded certificate as the consumers of the gas volume and user of the certificate would not be connected to the same grid. On the other hand, trading certificates for off-grid production would enable economic operators to value the sustainable characteristics of the fuel.

Data security

To ensure data security three layers should be considered. Firstly, the security of the market participants' data must be ensured in order to encourage participation and compliance. Secondly, the validity of the data itself needs to be ensured through third party verification. Lastly, the overall security of the platform, including the log-in information, account characteristics and data transmission processes.