



Clean Hydrogen Partnership

CertifHy 3

Guidelines for replication
of H2 Guarantees of Origin
schemes in Europe

A photograph of a hydrogen energy storage facility. In the foreground, there is a white building with a large 'H2' logo and the text 'HYDROGEN ENERGY STORAGE'. To the right, there are several large, cylindrical hydrogen storage tanks. In the background, there are solar panels and wind turbines under a blue sky with white clouds.

HYDROGEN
ENERGY
STORAGE

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Study on accelerating the deployment of Guarantees of Origin Schemes for Hydrogen and for the design of a Voluntary Scheme for compliance with RED II targets

Guide for replication of H2 GO schemes in Europe



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About the Clean Hydrogen Partnership

[The Clean Hydrogen Partnership](#) – the successor of the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) – aims to strengthen and integrate European Union research and innovation capacity to accelerate the development and improvement of advanced clean hydrogen applications ready for market, across energy, transport, building and industrial end-uses, while strengthening competitiveness of the Union clean hydrogen value chain. The three members of the partnership are the European Commission, fuel cell and hydrogen industries represented by Hydrogen Europe and the research community represented by Hydrogen Europe Research.

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Why do we need a harmonized H2 GO market?

Guarantees of origin will be a key enabler of the renewable and low carbon hydrogen market in Europe thanks to the harmonization of H2 GOs between Member States

Hydrogen production is expected to reach more than 10 million tons per year by 2030 in the EU. This has significant implications for changes in the EU energy balance; from 2025 to 2030, hydrogen needs to become an intrinsic part of an integrated energy system with a strategic objective to install at least 40 GW of renewable hydrogen electrolysis by 2030.

On the demand side, the European Commission says it will play a key role to achieve the EU's climate goals, estimating that 24% of global energy demand in 2050 could be met with clean hydrogen. Global demand for hydrogen is foreseen to reach 50 million tons by 2025 mainly used in industry and transport. It is predicted to grow just under 4 percent per year.

In a context where the uses as well as the means of production of hydrogen are multiple, crucial questions arise for all actors in the hydrogen value chain, from production to consumption: what are the environmental attributes of the produced and consumed hydrogen? Does the hydrogen meet specific criteria?

Hydrogen is not just a single molecule market. It is a product market, with multiple solutions characterized by their environmental attributes.

The Guarantees of Origin (GO) system has proven to be a key enabler in the power sector to foster the development of an EU renewable electricity market, bringing clarity and transparency to producers and consumers. While it provided a mechanism for producers to capture the premium value of renewable electricity, it also empowered consumers to make informed decision about the energy they procure. Electricity GOs represent nowadays a 500+ TWh / year market.

With the introduction of a dedicated system for hydrogen in RED2 art. 19, GOs will play the same role as an enabler of the renewable and low carbon hydrogen market in Europe. This effort will be led by Member States when they implement their national H2 GO system. However, market uptake for H2 GOs will heavily rely on harmonization of national systems to create a trustworthy and liquid EU market, as it has been the case for electricity in the past.

In fact, experience with the electricity market has shown that harmonization between H2 GO systems in Europe should:

- **Foster market uptake** by facilitating cross border trades and therefore improving liquidity
- **Contribute positively to the overall trustworthiness of the system** by limiting market distortion
- **Increase the value of H2 GOs for the end consumer** and therefore for all market participants

CertifHy has contributed to the harmonization of the H2 GO market since 2014 by collaborating with institutions, issuing bodies, policy makers and the hydrogen industry. This collaboration has led to the development of the CertifHy GO scheme which is mirroring the features of the GO system for electricity while addressing the specific needs of the hydrogen sector.

The knowledge base created through the implementing and piloting the CertifHy GO scheme has been also leveraged to actively contribute to the development of the extension of AIB's EECS rules for hydrogen.

CertifHy has also directly collaborated with H2 Issuing Bodies in Europe to transfer its preliminary knowledge and enable even further harmonization.

This publication aims at helping Competent Authorities and Issuing Bodies to take part to the development of a harmonized H2 GO market in Europe by:

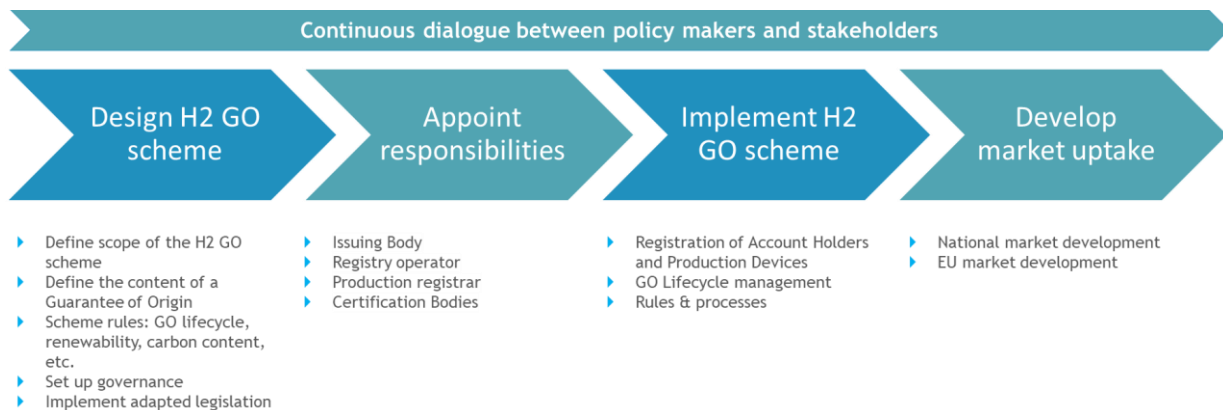
- **Summarizing useful documents and guidelines about H2 GOs** developed by CertifHy and other standardization bodies
- **Proposing guidelines** with regards to GO content, carbon footprint & renewability assessment
- **Identifying remaining open topics** to help with their anticipation

Important: this publication focuses on H2 GOs as an energy attribute tracking system for consumer disclosure. In practice, questions related to 1/ the tracking of renewable fuels of non-biological origin under RED2 and 2/ the criteria to hydrogen to be deemed low-carbon or renewable will **not** be addressed.

Key principles for the implementation of a H2 GO scheme

The successful implementation of a National H2 GO scheme will be facilitated by following several key principles:

1. **Legislation is key:** an adequate implementation of RED2 art. 19 will create a strong basis for an efficient H2 GO scheme in which all users can trust and find business opportunities. Legislation goes from the content of a GO to the governance of the overall system.
2. **The governance of the GO system should involve stakeholders who will contribute to the overall solidity of the system** by providing trust and expertise to all market participants.
3. **A strong & transparent operational regime** will foster the utilization of the H2 GO scheme by all users.
4. **Create conditions for a strong market uptake:** each national H2 GO scheme will only be as successful as its ability to create business opportunities for all users. Disclosure rules, ability to access to the European H2 GO market are amongst the solution which can be implemented.



This roadmap is meant to be used in full or in part, **depending on the current level of maturity in each country**. Moreover, the implementation of a successful H2 GO scheme is an iterative process. **Stakeholders should not hesitate to create feedback loops in between steps** to fine tune the system during the process of design and implementation. For instance, the choices made while developing market uptake will have an influence on the overall design and implementation of the system.

Design of the national H2 GO scheme

As per RED2 Art. 19, Member States shall implement their H2 GO Scheme in accordance with the standard CEN EN 16235.

When adopted and published, the updated CEN EN 16325 will set the standard with regards to:

- Overarching principles of a GO system for hydrogen and all other energy carriers
- Registration procedures for new Account Holders and new Production Devices
- Mandatory and non-mandatory information to be stored on a GO
- General rules related to the issuance (incl. energy conversion), transfer (incl. import / export), cancellation and expiry of a GO
- Monitoring & Auditing procedures
- Normative references

The CEN EN 16325 update for all energy carriers is still under development at the time of publication of this document, although some Member States may be willing to develop their National H2 GO scheme before the adoption of the new standard, for instance to address specific market needs.

In this case, the following schemes which are already available to the public provide necessary guidance regarding the implementation of a H2 GO scheme:

- EECS Rules Release 7 v15¹, developed by the Association of Issuing Bodies (AIB) and addressing all energy carriers including hydrogen
- The CertifHy GO scheme², updated in April 2022 and specifically addressing hydrogen

The EECS Rules and the CertifHy Scheme are mutually compatible when it comes to H2 GO to allow for further harmonization. Their intent is to go further into details than the CEN EN16225 while remaining compliant with it. In practice, it means that those schemes may be updated in the future for compliance reasons but **already give a comprehensive view on how to design and operate a H2 GO Scheme** in Europe.

¹ <https://www.aib-net.org/sites/default/files/assets/eecs/EECS%20Rules%20Release%207%20v15.pdf>

² <https://www.certifhy.eu/certifhy-documents/>

During the design of a H2 GO scheme, it is encouraged to consider the following questions closely:

Question	Reference in EECS Rules	Reference in CertifHy GO scheme
Definition of Hydrogen	Section O2.1.2	CertifHy Scheme Section 5
System boundaries for the calculation of the carbon footprint of Hydrogen	n/a	CertifHy-SD Hydrogen Criteria section 4
Determination of renewability of hydrogen	n/a	CertifHy-SD Hydrogen Criteria section 4
How to document GHG emissions on the GO	Section O8.1.1	CertifHy Scheme Section 7
Rules for energy conversion	Section C3.6	n/a

Focus: assessing the carbon content of hydrogen to be stored on a H2 GO

The CertifHy Stakeholder Platform has developed in 2022 a document looking to provide guidelines with regards to the methodology to be used when assessing the carbon content of one unit of hydrogen.

This document provides definitions, identification of data sources, emissions factors, and methodology for specific production pathways³. It can be referenced by any Issuing Body willing to report the carbon content of one unit of hydrogen on a H2 GO.

Each methodology has been developed through case studies ran in the framework of CertifHy WG2 (Working Group 2 – dedicated to Producers).

This document will soon be published on the Clean Hydrogen Partnership⁴ and CertifHy⁵ websites.

³ At the time of publication of this document, the following production pathways are defined: water electrolysis, SMR of natural gas or biomethane

⁴ https://www.clean-hydrogen.europa.eu/get-involved/hydrogen-certification_en

⁵ <https://www.certifhy.eu>

Appoint responsibilities

An adequate governance is key to the success of any certification scheme, as it provides clarity and trust to every user of the system.

As per RED2 Art. 19, the implementation and management of a H2 GO system falls under the responsibility of “Member States or designated competent bodies”. In practice, it means that Member States have a lot of room for the design of their national governance.

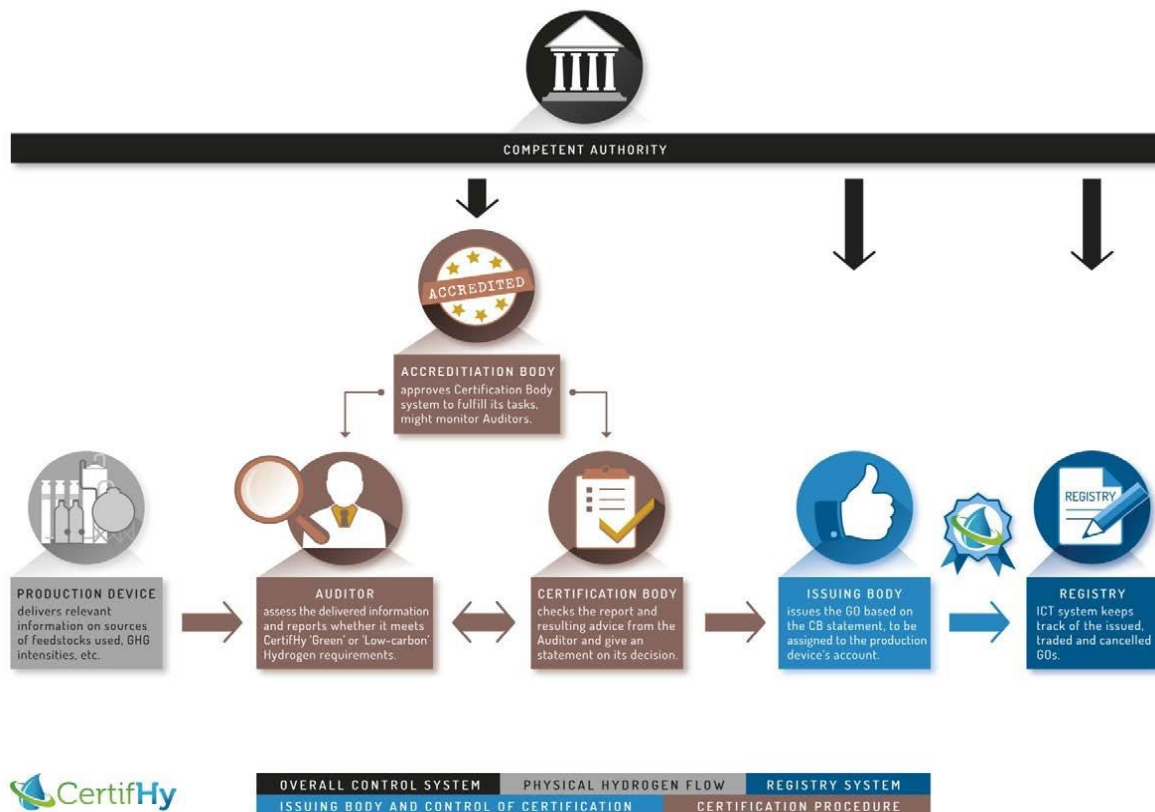
Experience from CertifHy as well as the electricity and gas sector has shown that at least the following responsibilities shall be covered in a GO system.

Stakeholder	Definition	Roles & responsibilities	Appointed by
Competent Authority	In relation to the exercise or discharge of any legislative, governmental, regulatory or administrative function, the body duly authorized under the laws and regulations of the EU to exercise or discharge that function	Managing entity. Governance	n/a
Production registrar	Entity responsible for a Production Devices, the registration is based on an auditor assessment.	Registration of Production Devices, CO2 emissions allocation	Competent Authority
Issuing Body	Entity responsible for registering entities and for issuing GOs	GO issuance	Competent Authority
Certification Body	Entity entitled to act as an environmental verifier or environmental verification organization	Certification of Production Devices & GO compliance	Competent Authority and / or Issuing Body
Registry operator	Entity appointed by the Competent Authority and/or Issuing Body to operate and maintain the registry	Registration of transactions Bookkeeping	Issuing Body

Several overarching principles can be derived from those roles:

- The Competent Authority, in the scope of National H2 GO schemes, is usually the entity responsible for GOs within a government.
- The Competent Authority can then decide to delegate responsibilities such as Production Registrar or Issuing Body. This delegation process can either take place via a nomination or a competitive process (tender).
- A single entity (either public or private) can fulfil one or several roles. For instance, the Issuing Body can also take the responsibility of Production Registrar and Registry Operator.

In the CertifHy Scheme, the interaction between the different part of the governance model is designed as follows.



Some specificities can be identified in the CertifHy model:

- The Issuing Body is also taking the responsibility of Production Registrar
- The Accreditation Body role has been added to create a specific entity able to appoints Certification Bodies who are responsible for the execution on onsite audits.

Implementation of the operational regime

The Issuing Body will be responsible for setting up its operational regime once nominated. This operational regime should be implemented in a way that guarantees transparency, trust and efficiency for market participants and for monitoring parties.

The operational regime must be compliant with the legislation in force (RED2 Art. 19, National Legislation) as well as the existing standards (CEN EN16325).

The operational regime is above all a matter of efficient and secure processes aimed at making sure that the data in the registry is always consistent and qualitative. This includes but does not limit to:

- processes to avoid double counting,
- checking production devices information and measurement data,
- handling disputes and errors,
- cross checking the content of the registry,
- user management, KYC (Know Your Customer) process,
- monitoring and reporting
- etc.

Those numerous questions are meant to ensure the operational reliability of the H2 GO system overall, therefore creating trust and fostering market uptake. Since it has proven challenging to design and implement the adequate system on the first try, the AIB has published for many years its Domain Protocol Template (DPT)⁶.

The DPT is originally used by Issuing Bodies willing to become AIB member and therefore access to the import / export infrastructure provided by the Association. However, it remains useful for any Issuing Body looking at implementing the adequate infrastructure to support a national H2 GO scheme.

While it does not provide straight answers, the DPT can be used as a guide for the design and implementation of the Issuing Body's processes and functions.

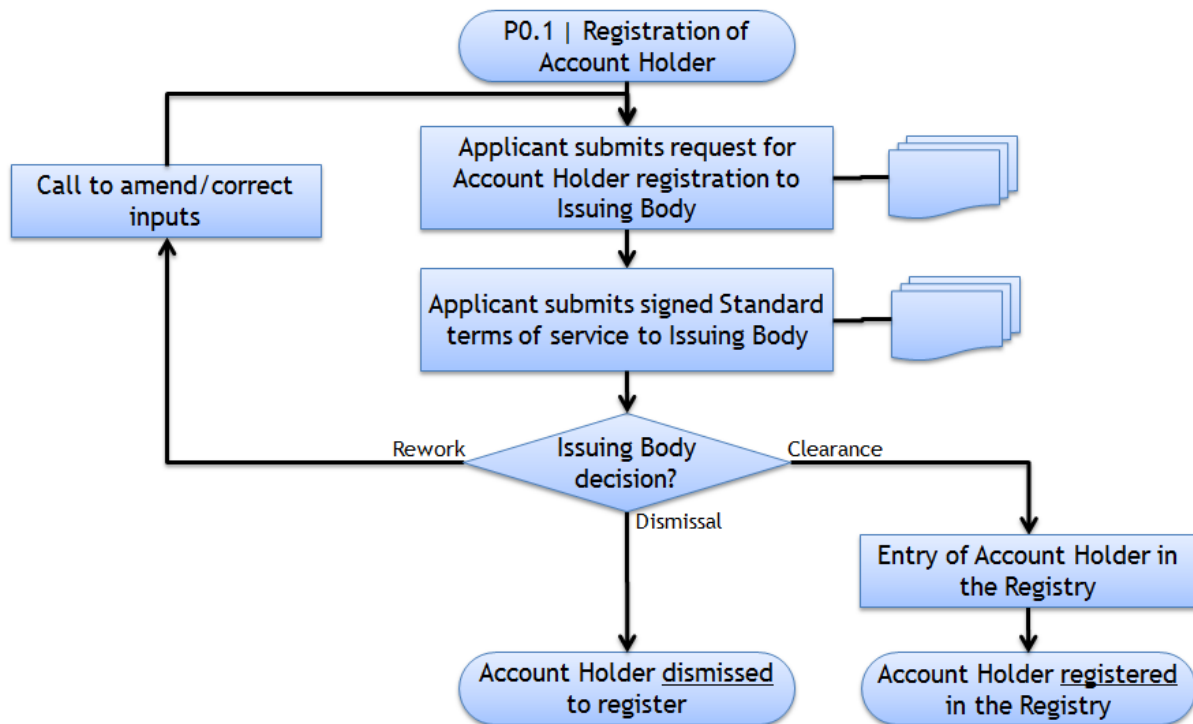
For instance, the following questions outlined in the DPT should be answered when design its Account Holder Registration process:

- Who can be an account holder?
- How to apply for registration (e.g., website form)?
- What is the content of the Know Your Customer form and process which should include any anti-fraud verification?
- How long the process normally takes?
- What Standard Terms & Conditions must be signed?
- Where the tariff of services can be found?
- How users belonging to the account holder gain access to the registry?

⁶ https://www.aib-net.org/sites/default/files/assets/eecs/facts-sheets/AIB-2021-EECSFS-10a%20EECS%20Rules%20Fact%20Sheet%2010a%20-%20Domain%20Protocol%20Template_20211013.docx

After addressing those questions, it is encouraged to create a visual representation of the future process which will then drive the development of operational checklists as well as software requirements.

The following examples describes the Account Holder Registration process under the CertifHy Scheme:



Note: The Domain Protocol Template also covers the relationship with the Production Registrar and Certification Bodies (Production Auditor in the DPT).

When the system is adequately designed, the Issuing Body can safely move towards implementation, either on its own or in collaboration with an external Registry Operator.

The Registry Operator will be responsible for making sure that the information stored in the Registry are always consistent and qualitative. The Registry Operator mostly relies on the processes designed by the Issuing Body and a digital solution.

While it is possible to develop its own registry digital solution in house, it is often recommended to procure an existing software or a licence to use a Software as a Service (SaaS)⁷.

⁷ <https://www.aib-net.org/facts/eecs-registries/service-providers>

Market uptake

Creating a robust H2 GO system from legislation to implementation as described previously in this document is the foundation of a dynamic market. However, it remains crucial to facilitate market uptake for all participants: producers, consumers and intermediaries.

1/ Implementation of disclosure rules for hydrogen

From a national market perspective, the implementation of **disclosure rules in the legislation has proven to be a strong driver** for the development of the electricity GO market.

The RE-DISS project⁸ provides the following definition of disclosure in the electricity sector:

“Electricity Disclosure is a requirement implemented in the revised Electricity Market Directive (2009/72/EC). All suppliers of electricity to final customers have to disclose to their customers the contribution of different energy sources to the portfolio of the supplier in the preceding year. They must also disclose related environmental impact indicators, at least in terms of CO2 emissions and the production of nuclear waste.

The objective of disclosure is to provide consumers with relevant information about power generation and to allow for informed consumer choice, and for choice not to be based on electricity prices alone. In a liberalized market, disclosure requires some sort of tracking of the required attributes from generation to the supplier.”

Similar need for hydrogen has been already introduced in the proposal for a revised gas markets and hydrogen directive released by the European Commission in December 2021. **The early implementation of disclosure rules for hydrogen along with the implementation of national H2 GO schemes** will facilitate market uptake in the short term by creating a natural, intrinsic value to each H2 GO which is issued and cancelled.

2/ Facilitating access to the EU market

Market uptake will also be fostered by the multiplication of business opportunities in Europe.

Per RED2 art. 19, “Member States shall recognise guarantees of origin issued by other Member States”. Recognition will be facilitated by the implementation of harmonized H2 GO system in Europe.

In fact, this document is looking to foster H2 GO market uptake by encouraging and facilitating EU harmonization.

⁸ <http://www.reliable-disclosure.org/electricity-disclosure/>

Conclusion

In support of the guidelines outlined in this document as well as in the references, it is crucial to point out that the design and implementation of a national H2 GO scheme should go through thorough policy dialogue involving all stakeholders at the national level.

We also encourage Competent Authorities and (future) H2 GO Issuing Bodies to join the CertifHy Stakeholder Platform.

Assisting Competent Authorities and Issuing Bodies in the implementation of their national systems is at the core of CertifHy 3's objectives. Therefore, Working Group 5 dedicated to them has been specifically created to facilitate the design and implementation of their H2 GO scheme, based on the preliminary knowledge developed since CertifHy phase 1 in 2014.

Registration takes place on the following link:

https://docs.google.com/forms/d/e/1FAIpQLSf0DGhKZ52X9DZHfG-BqB9jwCOtDRAWi_H6_92kHLjRQWKgg/viewform

Further information

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