

"Specification of rules and obligations of the GO scheme (requirements, methodologies, certification process and registration of GO)"



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Authors:

J. Castro (TÜV SÜD Industrie Service GmbH)

K. Nürnberger (TÜV SÜD Industrie Service GmbH)

M. Londo (ECN)

M. Altmann (Ludwig-Bölkow-Systemtechnik GmbH)

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Table of Contents

1	Introduction	5
1.1	Definition of CertifHy Green Hydrogen.....	5
1.2	Objective and structure of this report	6
2	Requirements for producer, trader, supplier and user	8
2.1	General requirements	8
2.2	Specific requirements for producers	11
2.3	Specific requirements for users	11
3	Methodology for the evaluation of compliance.....	12
3.1	Level of assurance	12
3.2	Materiality.....	12
4	Certification process	13
4.1	Application	13
4.2	Certification documentation.....	14
4.3	Termination, reduction, suspension or withdrawal of certification.....	14
4.4	Further steps	14
5	Requirements for Certification Bodies and approach for the accreditation of Certification Bodies.....	15
5.1	Requirements for Certification Bodies.....	15
5.2	Approach for the accreditation of Certification Bodies.....	16
6	Basic specifications for designing a Registry (database for GO).....	17
6.1	List of specifications	17
7	Information content of a plant / production device declaration	19
8	Information content of a GO	21

Abbreviations

AIB	Association of Issuing Bodies
EECS	European Energy Certification System
EU	European Union
GHG	Greenhouse Gas
GO	Guarantee of Origin
H ₂	Hydrogen
LCA	Life-cycle Assessment
RED	Renewable Energy Directive
SMR	Steam Methane Reforming

1 Introduction

The European project CertifHy develops the first EU-wide framework for the generation of Guarantees of Origin (GO) for green hydrogen. The objectives of this ambitious initiative are to develop and to design a robust GO scheme for green hydrogen (H₂), based on a widely accepted definition; and to propose a roadmap to implement the initiative throughout the EU.

The present document provides a specification of rules and obligations of the GO scheme, and is based on the experience gained by working in different schemes e.g. Electricity GO scheme and Bio fuels certification. The structure of the present document uses information already available in the market related to GO schemes. The most important documents used for the specification of rules and obligations are:

- ISO 19011 in relation to the Auditor requirements;
- ISO 17065 covering the accreditation requirements;
- “Principles and Rules of Operation of the Association of Issuing Bodies (AIB)” for the European Energy Certificate System (EECS) covering the structure of a GO;
- EN 16325 covering requirements for GO

This specification of rules and obligations of the GO scheme is based on the “Technical Report on the Definition of ‘CertifHy Green’ Hydrogen” (CertifHy report No. D 2.4) and based on international standards for auditing and certification.

1.1 Definition of CertifHy Green Hydrogen

The adopted approach within CertifHy report No. D 2.4 allows for the generation of (i) “CertifHy Green hydrogen” (combining renewable origin with low carbon emissions) and for (ii) hydrogen that carries a low level of GHG emissions hereafter referred to as “CertifHy Low-carbon hydrogen”.

The following conditions for producing CertifHy Low-carbon and/or CertifHy Green hydrogen are defined:

- Only facilities producing H₂ with GHG emissions lower than the benchmark value - 91.0 gCO_{2eq}/MJ¹ - since sign up or over the preceding 12 months, whichever duration is the shorter are eligible.

¹ This value has been calculated within the CertifHy project in: Altmann, M., Weindorf, W.: Extended Life-cycle Analysis of Hydrogen Production, Deliverable No. 2.3, 3 July 2015; the benchmark value should be re-evaluated regularly to accommodate for relevant changes such as e.g. efficiency improvements in the benchmark process.

- Under the additional conditions listed further below, these facilities will be able to produce:
 1. CertifHy Low-carbon H₂
 2. CertifHy Green H₂ in proportion of the share of renewable energy² in the non-ancillary energy used.
- The further conditions are the following:

Condition 1: The emissions associated with CertifHy Green H₂ and CertifHy Low-carbon H₂ must be lower than the Low Emissions Threshold, set at 36.4 gCO_{2eq}/MJ, i.e. benchmark value minus 60%.

Condition 2: H₂ produced by this facility that is neither CertifHy Green nor CertifHy Low-carbon must have emissions lower than the benchmark value.

Figure 1 below presents the above mentioned conditions graphically.

1.2 Objective and structure of this report

This document seeks to elaborate on the rules and obligations of the GO scheme, in terms of requirements, methodologies, certification process and registration of GO. This document is divided into two parts, the first – chapters 2 to 5 – defining the compliance system and the second part – chapters 6 to 8 – defining mainly the registry.

Chapter 2 covers the requirements of the parties (producer, trader, supplier and user) holding GO certificates. The methodology for the evaluation of compliance of these requirements is presented in chapter 3. In order to assure that the evaluation is performed in the same way by different third party companies, chapter 4 defines the certification process. Furthermore chapter 5 defines the requirements that the certification bodies shall comply with and a possible accreditation approach.

The GO scheme requires a GO Registry; and the basic specification for its design is presented in chapter 6. The plant production or device declaration is included in chapter 7. Finally, chapter 8 includes an overview of the information to be declared in a GO certificate.

² Any raw material input without energy content is not considered for the calculation of the renewable share.

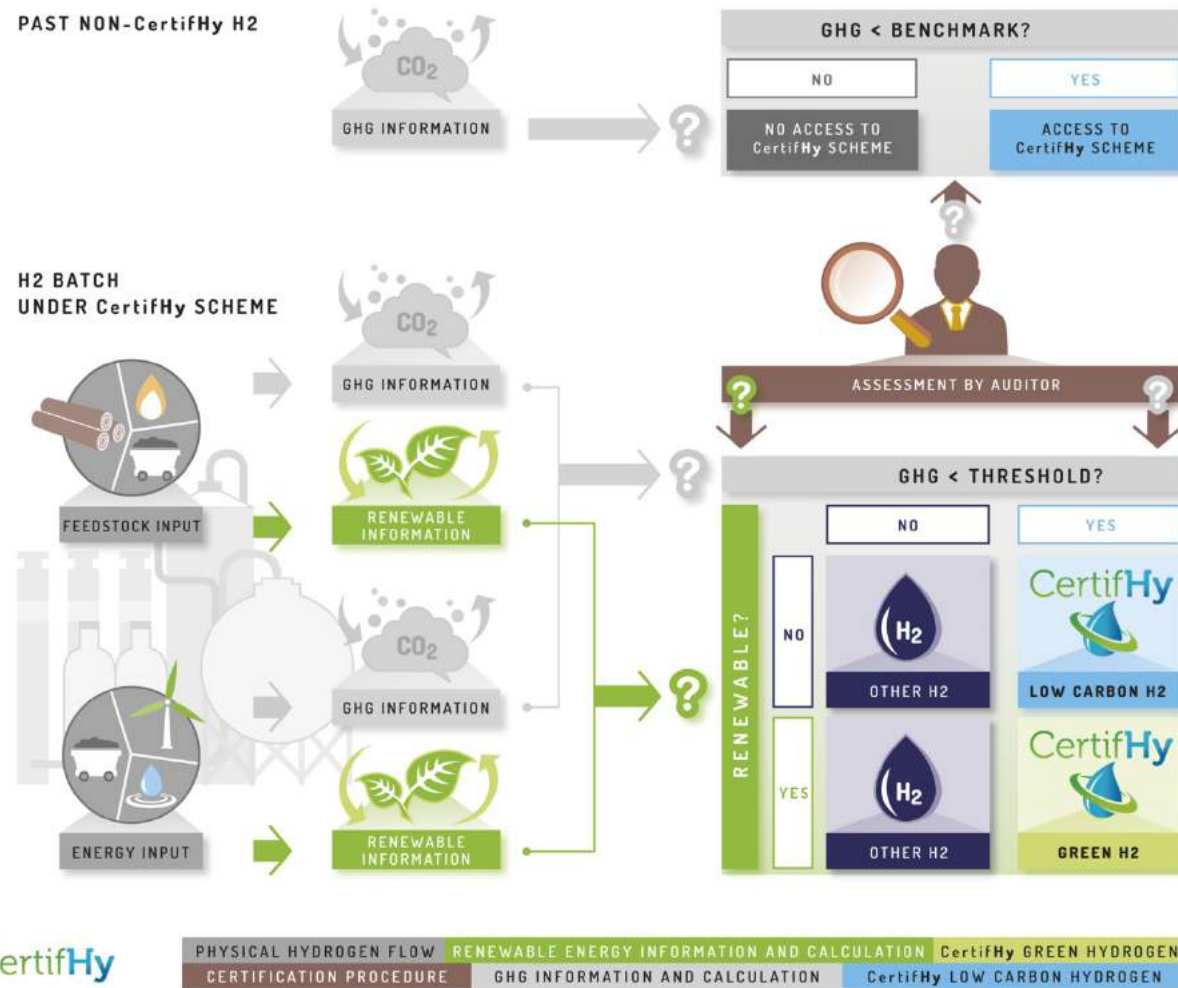


Figure 1. Assessment of Green and Low-carbon hydrogen definition

2 Requirements for producer, trader, supplier and user

The GO organization and structure are explained in the CertifHy report D 4.1 “Definition of scope, main principles of the GO scheme as well as rolls and tasks of the relevant actors”. Figure 2 and 3 represent the organization and structure respectively.

Every entity willing to participate in this GO scheme needs to comply with certain requirements. The participation in this scheme foresees the use of an account within the registry. The requirements can be divided into three main groups:

- General requirements for all account holders;
- Further requirements for producers; and
- Further requirements for users.

2.1 General requirements

In order to participate in this GO scheme every legal entity shall comply with the following requirements:

- to formally apply for registration providing all the requested information;
- for corporate entities, to provide its most recent Financial Report / Statement;
- to accept the General Terms and Conditions of the GO Registry; and
- to appoint one or more authorised representatives, who will have access and will use the registry on its behalf.

The detailed list of requested information depends on the role the entity will have in the GO scheme.

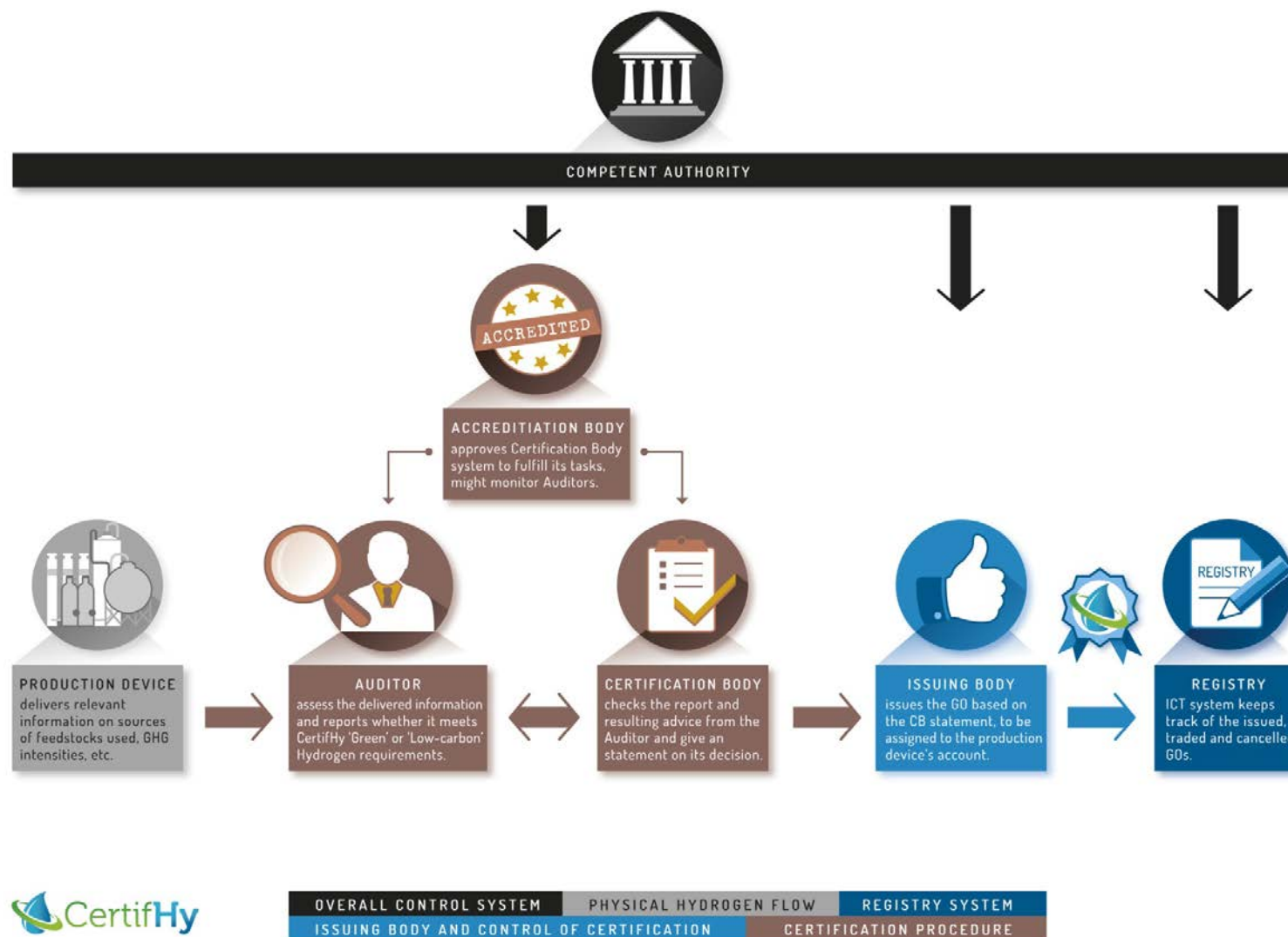


Figure 2. Organization of the GO scheme

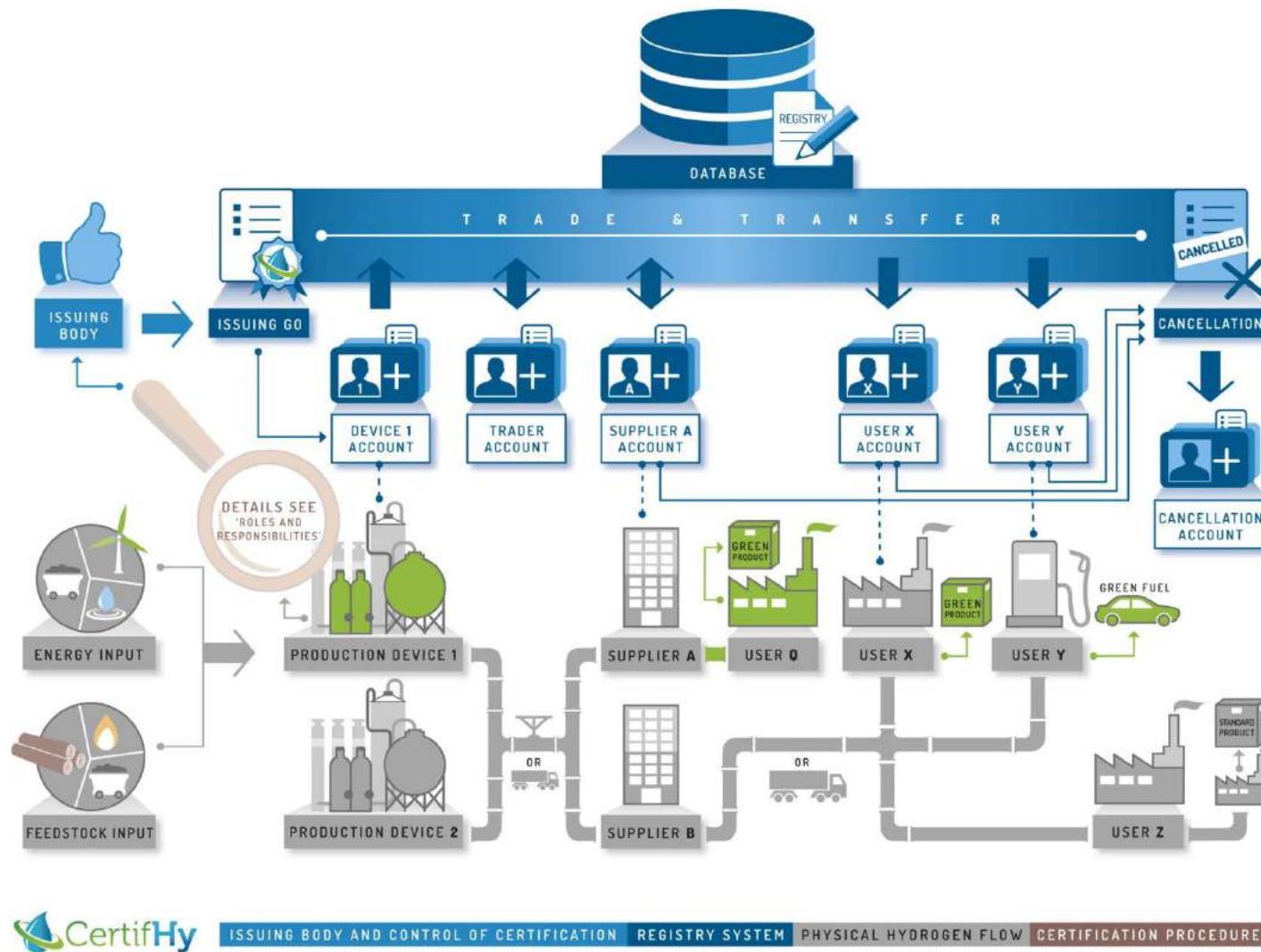


Figure 3. Structure of the GO scheme

2.2 Specific requirements for producers

Producers shall comply with the following requirements:

- The account holder must provide evidence to the satisfaction of the Issuing Body that it has the appropriate authority to register the production device, which is under its operational control;
- The producer has to provide a plant declaration with several formal and technical details (see chapter 7);
- The plant declaration is based on an audit report. The audit report issued by a Certification Body shows the fulfilment of the requirements to join the Hydrogen GO scheme (see chapter 4);
- Registration requires the Production Device to comply with all applicable legal requirements;
- The producer accepts that the Issuing Body or the appointed Certification Body, its servants or agents, have access to the production device together with records relating thereto so as to verify the information provided;
- The metering equipment for the inputs and outputs of the Production Device comply with the relevant regulations for the trading of hydrogen (if any); and
- The producer is obliged to provide correct information, notify of changes taking place in advance and to inform in due time when unplanned changes took place.

The rules and principles to be complied with are presented in the CertifHy report D 4.1 “Definition of scope, main principles of the GO scheme as well as rolls and tasks of the relevant actors”.

2.3 Specific requirements for users

Entities that are taking the role of a user within this scheme, shall comply with the following requirements:

- A signed statement warranting that the account holder is able / has the right to physically deliver hydrogen to final consumers or that the entity consumes the hydrogen it selves;
- A signed hydrogen disclosure form declaring the proportion of conventional, Green / Low-carbon hydrogen delivered to final consumers over the past year; and
- Testified turnover of delivered hydrogen to final consumers during the past year.

3 Methodology for the evaluation of compliance

The requirements presented in the chapter above shall be evaluated by an independent third party (see Figure 1 Assessment by auditor). The CertifHy project does not intend to develop a new methodology for the evaluation of compliance; hence the approach is to use already established methodologies.

The requirements mentioned above can be evaluated through clear auditing processes. ISO 19011 (Guidelines for auditing management systems (ISO 19011:2011)) includes the basic principles (ISO 19011, § 4) and the different steps for conducting audits (ISO 19011, § 6). By following this standard, the result of the assessment independently of the third party performing it will be the same.

Taking into account that the evaluation of compliance includes the verification of data, the following additional principles are required.

3.1 Level of assurance

In order to reduce the risks to an acceptably low level within the circumstances of the assessment a reasonable level of assurance is proposed for this GO. The International Standard on Assurance Engagements 300 – Assurance Engagements other than Audits or reviews of historical financial information – establishes the basic principles and essential procedures to achieve this level of assurance.

3.2 Materiality

Taking into account that the scope of work of an audit cannot cover 100% of the information related to the above-mentioned requirements, a standard approach is the inclusion of materiality in the audit process (defined by each certification body). A materiality level of 5% is proposed for this scheme.

The materiality principle is an auditing principle used to identify inaccurate information of the audited company. Information is considered material if it could lead the consumer to draw an incorrect assumption about the certified product. According to the materiality principle, a certification process must be organised in such a way that all material errors can be identified and the non-audited data do not contain any material errors.³

³ Adapted from International Standard on Auditing 320 – Materiality in planning and performing an audit

4 Certification process

Any entity requiring a certification of Green hydrogen shall be bounded to a certification process. In order to assure a standard approach, CertifHy follows the requirements from ISO/IEC17065 (2012-09-15) “Conformity assessment — Requirements for bodies certifying products, processes and services”.

The certification process is detailed in § 7 of ISO 17065. The following aspects are defined in ISO 17065.

- General (determination that the certification body is able to perform the certification);
- Application (see section 4.1);
- Application review (determination if sufficient information is available);
- Evaluation (determination of audit plan);
- Review (quality assurance of the audit results);
- Certification decision (formal information to the issuing body);
- Certification documentation (see section 4.2);
- Directory of certified products (not applicable to this scheme);
- Surveillance (periodical control of the issued GO);
- Changes affecting certification (not applicable to this scheme);
- Termination, reduction, suspension or withdrawal of certification (see section 4.3);
- Records (certification body keep all documents related to the certification);
- Complaints and appeals (certification body procedure to deal with complaints and appeals).

In order to apply a standardized approach, some of the different steps of ISO (underlined aspects) within the context of the Green hydrogen GO certification are specified as follows:

4.1 Application

The entity requiring a certification of its products (CertifHy Low-carbon H₂ or Green H₂) or a registration in the GO scheme (applicable for production devices) shall present to the certification body as a minimum the following information:

- the product(s) to be certified (CertifHy Green hydrogen and/or CertifHy Low-carbon hydrogen or Registration of production device) including the respective GHG emission calculations;
- the general features of the client, including its name and the address(es) of its physical location(s), significant aspects of its process and operations (including the role in the value chain – producer, trader, etc -), and any relevant legal obligations; and

- information concerning all outsourced processes used by the client that will affect conformity to requirements; if the client has identified a legal entity/entities for producing the certified product(s) that is different from the client, then the certification body can establish appropriate contractual controls over the legal entity/entities concerned, if necessary for effective surveillance; if such contractual controls are needed, they can be established prior to providing formal certification documentation.

4.2 Certification documentation

Taking into account that all GO issued are to be included in a Registry, the formal certification documentation (result of the certification process) shall also be provided to the Registry administrator and the Issuing Body.

In case of a denial of the product certification (recommendation not to issue any GO related to this certification), this information shall be submitted to the respective Issuing Body within the GO scheme.

4.3 Termination, reduction, suspension or withdrawal of certification

Taking into account that GO will be issued based on the registration of the production device, surveillance is required periodically. If surveillance detects non-conformities, the relevant amount of GO affected by this non-conformity shall be cancelled in the Registry and the prohibition of new GO issuances is established until the non-conformity has been solved, as confirmed by the Certification Body.

4.4 Further steps

ISO 17065- § 7.8 “Directory of certified products” is not relevant within this GO scheme as the GO will be managed within the Registry database.

ISO 17065 § 7.10 “Changes affecting certification” does not apply to the Certification Body. Every account holder is responsible for assuring compliance with the scheme including any new or revised requirements.

5 Requirements for Certification Bodies and approach for the accreditation of Certification Bodies

A Certification Body is a legal entity entitled to perform the assessment of the H₂ production requiring issuance of GO. The Certification Body might be accredited against a specific standard (see section 5.2). The Issuing Body is an entity designed by the competent authority (see Figure 2) which is responsible for the registration of production devices and issuance of any GO. The registration is based on the documentation submitted by the Certification Body. The issuance is based on a request of any registered production device.

5.1 Requirements for Certification Bodies

As mentioned above, the Green hydrogen GO scheme follows ISO 17065; hence any certification body willing to participate in this GO scheme shall cover all the requirements of ISO/IEC 17065:2012 (or any update thereof); additionally, the Certification Body shall have established procedures on how to apply reasonable level of assurance and materiality principles.

Furthermore, the evaluation of the competence of the auditors shall follow the requirements of ISO 19011:2011 (or any update thereof) specified in § 7 “Competence and evaluation of auditors”. Further competence of the auditors is the understanding of the level of assurance and materiality concepts.

At least the following specific knowledge and skills for the certification of green hydrogen shall be covered by the audit team⁴ (see Figure 1 Auditor):

- Level of assurance and materiality principles;
- GHG verification processes, requirements and methodologies;
- Life cycle Assessment (LCA);
- hydrogen production process;
- hydrogen delivery conditions (e.g. pipeline pressure) and its effect on the total GHG emissions;
- this GO scheme;
- quantification, monitoring and reporting;
- situations that may affect the materiality of the GHG assertions, e.g. typical and atypical operating conditions.

⁴ Adapted from EN ISO 14065:2012 § 6.3.3

5.2 Approach for the accreditation of Certification Bodies

A Certification Body shall demonstrate compliance with the above-mentioned requirements in order to be able to participate in this GO scheme.

Several options are available possible to demonstrate compliance, i.a.:

- Option 1. Self declaration;
- Option 2. Accreditation under ISO 17065;
- Option 3. Accreditation under a new green hydrogen accreditation standard.

In order to evaluate the most appropriate approach the table below shows some pros and cons related to the three options.

Option	Pro	Con
1	Does not require any control and allows any certification body to participate in the system.	The quality of the certification cannot be proven.
2	System is installed in the certification body and accredited.	Accreditation does not include the scope of green hydrogen and also might not include the scope of GHG emissions.
3	System is in full compliance with the requirements	A new accreditation standard is to be developed and accreditation body(ies) need to be installed.

Option 1 is not recommended. This approach is only appropriate when the information declared does not influence the business models.

Within the CertifHy project it is proposed to start with option 2 as long as the accreditation under ISO 17065 is based on a scheme with GHG related emissions (e.g. bio fuels) with the goal to achieve option 3 (specific accreditation) within a reasonable period of time (e.g. by 2025).

Auditing of production devices shall include the requirements in accordance with EN 162471 “Energy audits - Part 1: General requirements”.

6 Basic specifications for designing a Registry (database for GO)

This chapter includes the basic specifications for a registry and the processes for registering/issuing, transfer and redemption/cancellation of GO.

The objective of the registry is to generate unique GO (electronic document) for each produced/registered energy unit of green hydrogen and to track them from generation/issuance till use/cancellation, so that double use or double counting within the registry is excluded. The registry must be fraud-resistant. The registry should be able to generate reports/statistical data for different kinds of purposes (e.g. for the account holder itself, for the competent bodies, for European and national statistics, for the registry administrator). The individual GO contains the origin of green hydrogen with further related information.

The life cycle of a GO encompasses: issuance, transfer and cancellation. GO are only issued on a registry (one central registry or several interlinked registries) operated by the issuing bodies/registry administrators and supervised by the competent authorities. GO are only issued for produced Green hydrogen by production facilities in connection with EU legislation considering further national requirements. They may be transferred from the producer’s account to that of a trader and to that of a supplier and so on; either within the country of origin or to other account holders located in other countries. GO may be cancelled and removed from circulation when the GO owner claims the use of the hydrogen with the characteristics stated in the GO or when during a surveillance a non-conformity is detected. GO will be cancelled when the certificate is used outside of the geographical scope of this scheme or registered in another GO scheme e.g. in biomethane. GO may be cancelled by suppliers and/or consumers in recognition of the qualities they represent. This GO scheme might be used for financial incentives from government; or to discharge contractual or legal obligations.

6.1 List of specifications

- The user front-end of the Registry should be available at least in the most common European languages (e.g. English, French, German, Spanish, etc.).
- Any issued GO shall get a unique identification number (GO-ID) which will be kept during the entire life-cycle of the GO.
- Any registered production device shall get a unique identification number (Device-ID).
- The generation and the code of GO-ID and Device-ID have to be done in a harmonized way for all Member States or geographic areas.

- GO-ID should contain certain information, e.g. a country code, registry code, technology code, etc.
- A registered production device shall contain information as defined in chapter 7.
- A GO shall contain information as defined in chapter 8.
- The details of any GO shall not be changed once it has been issued, except in very special cases (e.g. occurrence of errors).
- A GO has to be marked with a certain state. Before issuance of a GO it should be possible to preliminary register a unit of produced green hydrogen. After confirmation by the appointed certification body and/or issuing body the GO will be issued. Besides “preliminarily registered” and “issued” another state could be “cancelled”.
- After cancellation of a GO further transfer is prohibited.
- Clearly defined and differentiated rights and obligations for the different types of account holders (producer, trader, supplier and user) and for the other stakeholders must be ensured.
- The respective certification body / auditor shall get insight and access to the account of the producer in order to confirm preliminarily registered volumes (i.e. not yet issued) of hydrogen and its quality (Green H₂ or Low-carbon H₂).
- The data transmission (Electronic Data Interchange) from the producer to the GO registry should be done in an EU-wide harmonized format which is specified for the Green Hydrogen scheme and which is under full control of the issuing bodies or the registry administrators.
- The registries and their protagonists should use or accommodate appropriate international communication procedures and standards in order to facilitate effective, efficient and secure transfers.
- The main production plant data shall be defined only once and might be available for other external data systems / schemes. The data set should be harmonized as far as possible with other official registries and data systems.
- In case there are different registries for different geographical areas the respective registry has to inform the transferor and transferee about the executed transfer.
- It should in principle be possible for the respective competent authority or issuing body to intervene in order to prevent the import or export of GO to / from another geographical area.
- Where an account holder requests that an issuing body transfers/cancels a number of GO then such a request shall contain the following information:
 - a) the type of installation;
 - c) the relevant number of GO associated with each production device to be transferred/cancelled;
 - d) the relevant production period(s);
 - e) the beneficiaries of the transfer/cancellation, being:

- the type of consumer, being either “hydrogen supplier” or “user”;
 - the identity of the hydrogen supplier or user;
 - Location and country of hydrogen supplier or user.
- Data security at least certified according to ISO 27001.
 - Data security considers the EU General Data Protection Regulation.
 - Contingency plans and backup facilities should be established to allow for timely recovery of records and operations and completion of the transfer process.
 - The risk of an unauthorised instruction with respect to a GO being acted upon should be minimized.
 - In case an error is introduced upon issuing of the GO or in the course of the processing of the GO correction/alteration of any data of the GO should be possible, but only performed by the Competent Authority or Issuing Body.
 - For the preparation of transfers / cancellation it should be possible to gather GO within one account according to several selection criteria e.g. commissioning year, country, producer, production device, technology, production year, support, raw material, main or by product, GHG emissions-threshold, GO quality, upstream account holder.
 - The registry shall have interfaces to common trading software systems in order to export relevant data to the account holders.
 - After certain activities are performed such as confirmation by a Certification Body, issuance of GO or executed transfer, the registry should inform the respective parties (producer, certification body, issuing body, etc.) via emails or similar.
 - Account holders should have the possibility to create sub-accounts for their special purposes. The sub-accounts can be easily deleted when no GO are registered there.
 - Standing order for transfers or other automatic kinds of transfers should be possible (e.g. GO with a certain specification bundled in a sub-account).
 - Comfortable search features and/or filter features should be available.
 - Cancellation or transfers should be performed in a preliminary way. A reset of preliminary cancellation or transfers should be possible.

7 Information content of a plant / production device declaration

Before any produced unit of green hydrogen can be issued, the respective production device must be registered. An application is required in order to get a production device registered.

Certain data describing the production device are needed. In order to have a more transparent and clear presentation the content of such an application form is shown in the following table:

Factual information	Comments
<ul style="list-style-type: none"> • Name and address of the producer (legal entity) 	VAT number
<ul style="list-style-type: none"> • Account number (Account-ID) of the account into which the produced units of hydrogen shall be transferred 	
<ul style="list-style-type: none"> • Identity of the originating facility/Production Device <ul style="list-style-type: none"> ○ Name of the Production Device ○ Country of the Production Device ○ Location (geographical coordinates” and/or address, city and postal code) ○ The date on which the Production Device became operational 	
<ul style="list-style-type: none"> • Type of Technology <ul style="list-style-type: none"> ○ Electrolysis (incl. chloralkali electrolysis) ○ Steam Methane Reforming (SMR) ○ Chemical processes (partial oxidation (POX), cracking, etc) ○ New technologies (biomass gasification or pyrolysis, thermo chemical cycles, biological processes, etc.) 	
<ul style="list-style-type: none"> • Output capacity 	Nm ³ /h // MWh/a
<ul style="list-style-type: none"> • Public Support <ul style="list-style-type: none"> ○ Details of any payments, where relevant (other than payments arising from the sale of GO): <ul style="list-style-type: none"> ▪ whether and to what extent the installation has benefited from public investment support; ▪ whether and to what extent the unit of energy has benefited in any other way from a public support scheme; and ▪ the type of public support scheme. 	
<ul style="list-style-type: none"> • Main or by-product: <ul style="list-style-type: none"> ○ Main product ○ By-product 	
<ul style="list-style-type: none"> • Identity of the metering point in order to transfer the production data 	
<ul style="list-style-type: none"> • Information about way of measuring the production of hydrogen 	
<ul style="list-style-type: none"> • Name, address and accreditation number of chosen certification body 	
<ul style="list-style-type: none"> • Confirmation of certification body 	

8 Information content of a GO

The GO content is divided into two parts, the first containing factual information about the plant and the hydrogen produced; while the second part presents an evaluation of the type of GO that is issued.

In order to have a more transparent and clear presentation the content is shown in the following table:

PART 1: Factual information	Comments
<ul style="list-style-type: none"> • Producer (legal entity) 	VAT number
<ul style="list-style-type: none"> • Identity of the originating facility/Production Device <ul style="list-style-type: none"> ○ Production Device ID; the unique number which has been assigned to the Production Device (see chapter 7) 	
<ul style="list-style-type: none"> • Date and time of hydrogen production (beginning and end) of the batch • Production year 	dd.mm.yyyy
<ul style="list-style-type: none"> • Energy sources (the level of detail shall be established during the Road map implementation) This is a proposed level of detail: <ul style="list-style-type: none"> ○ Electricity from renewable sources (unsupported, i.e. not supported under public support scheme) <ul style="list-style-type: none"> ▪ Electricity from Wind energy (unsupported) ▪ Electricity from Solar energy (unsupported) ▪ Electricity from Geothermal Energy (unsupported) ▪ Electricity from Ocean Energy (unsupported) ▪ Electricity from Hydropower (unsupported) ▪ Electricity from Biomass <ul style="list-style-type: none"> • solid sustainable Biomass (unsupported) • liquid sustainable Biomass (unsupported) • gaseous sustainable Biomass (biomethane) (unsupported) • biodegradable fraction of waste (industrial and municipal) (unsupported) • residues from biological origin from agriculture, forestry and related industries including fisheries and aquaculture (unsupported) ○ Electricity from conventional sources (coal, oil, gas, nuclear, etc.) 	MWh/year

PART 1: Factual information	Comments
<ul style="list-style-type: none"> • Type of public support <ul style="list-style-type: none"> ○ investment supported ○ production supported ○ supported scientific/demo/pilot project ○ unsupported 	
<ul style="list-style-type: none"> • Share of renewable energy in total energy input for producing the hydrogen (excluding ancillary energy consumption) 	%
<ul style="list-style-type: none"> • Raw material sources (the level of detail shall be established during the Road map implementation) This is a proposed level of detail: <ul style="list-style-type: none"> ○ Sustainable liquid biomass ○ Sustainable solid biomass ○ Sustainable biomethane ○ Sustainable bionaphta ○ Waste (biogenic / conventional) ○ Water ○ Natural Gas ○ Fossil Oil ○ Coal ○ Peat ○ Non sustainable biomass ○ Other 	Kg/year // Nm ³ /year
<ul style="list-style-type: none"> • GHG balance (the level of detail shall be established during the Road map implementation). This is a proposed level of detail: <ul style="list-style-type: none"> ○ GHG emissions intensity of total hydrogen produced in the production period ○ Average GHG emissions intensity of the low carbon share ○ Average GHG emissions intensity of the renewable share ○ Average GHG emissions intensity of non low carbon share 	g CO ₂ _{eq} /MJ _{H2}
<ul style="list-style-type: none"> • Main or by-product: <ul style="list-style-type: none"> ○ Main product ○ By-product <ul style="list-style-type: none"> ▪ GHG emissions allocation by input energy share 	g CO ₂ _{eq} /MJ _{H2}
<ul style="list-style-type: none"> • ID of GO 	

PART 2: Evaluation of information	Comments
<ul style="list-style-type: none">• Type of GO quality:<ul style="list-style-type: none">○ CertifHy Green hydrogen○ CertifHy Low-carbon hydrogen	
<ul style="list-style-type: none">• Certification Body	Verifier
<ul style="list-style-type: none">• ID of GO	