

D4.2 Technical and operational comparison of the biomethane/renewable gas GO system and the electricity GO system

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1 Introduction and task description

1.1 REGATRACE in a Nutshell

REGATRACE (REnewable GAs TRAde Centre in Europe) aims to create an efficient trade system based on issuing and trading biomethane/renewable gases certificates/Guarantees of Origin (GO) with exclusion of double sale.

This objective will be achieved through the following founding pillars:

- European biomethane/renewable gases GO system
- Set-up of national GO issuing bodies
- Integration of GO from different renewable gas technologies with electric and hydrogen GO systems
- Integrated assessment and sustainable feedstock mobilisation strategies and technology synergies
- Support for biomethane market uptake
- Transferability of results beyond the project's countries



Figure 1: REGATRACE countries and partners

The network of issuing bodies will be established by including existing national biomethane registries (Austria, Denmark, Estonia, Finland, France, Germany, The Netherlands, Switzerland and UK) and by





creating issuing bodies in the Target countries of the project (Belgium, Ireland, Italy, Lithuania, Poland, Romania and Spain).

Moreover, REGATRACE will prepare the ground for setting-up national biomethane registries in other 7 Supported countries (Croatia, Czech Republic, Greece, Latvia, Slovenia, Sweden, Slovakia, and Ukraine).

Using a participatory process involving several stakeholders, REGATRACE will develop strategic visions and national roadmaps to boost the biomethane market.

1.2 Introduction

Across Europe, different national systems and databases are in operation for the verification and documentation of the origin and the characteristics of renewable energy carriers. In most cases, system operators are appointed by national governments or stakeholders for the issuance of renewable energy certificates in order to address national circumstances and comply with regulatory requirements. Trading of such renewable energy certificates between national schemes becomes very complex, particularly when including cross-border trades between Member States. It is prone to fraud and errors if many bilateral agreements on legal and organisational issues have to be made and individual technical solutions for the exchange of data have to be developed. European schemes provide solutions to overcome these barriers which comprise:

- IT solution for the exchange of data,
- harmonized content and format of exchange certificates,
- rules and standards for verification of renewable energy characteristics,
- joint terms and conditions for the exchange of certificates.

Europe-wide schemes, comprising the necessary organisational and IT-structure, are in operation or are currently under development for different energy carriers and different application purposes (see Figure 2).



Figure 2: European schemes for cross-border certificate transfer under development and in operation (adapted from REGATRACE D2.4)



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A Union Registry for the accounting of emittance and transfer of EU-ETS allowances between account holders was established in 2012. The European Commission is mandated to develop a similar database recording the production of biofuels. The focus of this report is on European schemes of other organisations that are operating and working on the development of such systems, namely the Association of Issuing Bodies (AIB), CertifHy, and European Renewable Gas Registry (ERGaR). While CertifHy and ERGaR are focused on hydrogen and renewable gases respectively, AIB provides schemes for all gaseous energy carriers and electricity. Their common aim is providing a robust solution that enables a harmonized, efficient, and transparent title-transfer of different energy carriers across borders and between national systems. This report provides an overview and comparison of the mentioned schemes to point out commonalities and challenges for future collaboration to provide a robust organisational framework for the European renewable gas/energy market.

1.3 Objective of REGATRACE Deliverable 4.2

REGATRACE Deliverable 2.1 (Updated guidelines for creating the European Biomethane GO) provides insights and guidelines on establishing a secure, trustworthy, transparent, Europe-wide tracking system of renewable gas consignments, enabling the allocation of renewable gas towards all application purposes. REGATRACE D4.2 takes a more practical approach by presenting European Schemes which already exist and aim to facilitate trading certificates Europe-wide. To avoid any multiple counting of the same production energy amounts, recorded by the different databases and issuing bodies, it is important that existing schemes may communicate with each other. Furthermore, in REGATRACE D4.1, verification guidelines for cross-sectoral technologies (hydrogen/synthetic methane, bio-LNG, biomethanol) were developed. An important finding of D4.1 is that cross-sectoral renewable gas concepts require linking the various certification schemes based on the strengths of each one of them. The present Deliverable aims to highlight the strengths of existing European Schemes (AIB, CertifHy, ERGaR) for paving the way for D4.3 and D4.4. REGATRACE D4.3 will provide a set of harmonized rules for GO handling in relation with energy carrier conversion. D4.4 will identify technical and organisational strategies to enable a coordinated process for handling of GOs in relation with energy carrier conversion. European Schemes do not only facilitate cross-border transfer, but also cross-sectoral transfers of certificates. In this regard, a special focus will be to provide information on the schemes' procedures and rules to verify, process and exchange the information recorded on the certificates.

It is the objective of the task to compare the systems of AIB, CertifHy, and ERGaR on technical and operational aspects based on specific criteria. In a first step, the regulatory framework for the issuance and documentation of renewable gas and renewable electricity certificates is introduced. As a result, different elements that need to be integrated and considered for the verification and documentation of the different renewable gases energy carriers are described.

This assessment of the European framework forms the basis to outline which energy carriers and types of certificates are covered by the assessed schemes. The schemes' IT set-up and requirements to exchange certificates between account holders / scheme participants shall be described to provide some insights on the technical requirements to become a scheme participant / account holder. In order to compare the operational aspects of the schemes, the measures and provisions on the verification and processing of information and claims are assessed between the schemes. This is accompanied by the schemes undertakings to prevent fraudulent behaviour and multiple counting / claiming. A description of the organisational framework shall provide information about the organisational requirements to become a scheme participant / account holder and how liability is addressed and





balanced between scheme operator, scheme participants and account holders (of the issuing bodies, registration databases).





2 European Framework on Renewable Gases

2.1 Introduction into the European Framework

Before comparing different European Schemes, it is crucial to understand the European regulatory framework and other framework conditions on renewable gases. The recast of the Renewable Energy Directive (EU) 2018/2001 (so called RED II) is the major European regulation with regards to renewable energy sources providing targets, as well as a set of rules and criteria for tracking energy from renewable energy sources. It does not consider renewable gases in their holistic nature, but rather defines different requirements for renewable energy carriers when applied for specific purposes (end uses). Subject to compliance with these rules and criteria, Member States (MS) can count renewable gases to their national renewable energy targets and economic operators are able to claim gas being renewable that is supplied to final customers. RED II is considered to provide the predominant rules shaping renewable gas categories and the underlying European Schemes for the issuance and transfer or renewable gas certificates.

Many other European regulations are directly or indirectly linked to RED II with regard to the use of renewable energy carriers. The Commission Implementing Regulation (EU) 2020/2085 in combination with Directive (EU) 2003/87, for example, defines rules for the monitoring of greenhouse gas emissions from installations covered by the European Emission Trading Scheme (EU-ETS). Amongst others, it includes the methodologies and verification requirements to determine the quantity of biogas that was withdrawn from the gas grid and used in EU-ETS installations. The Regulation (EU) 2018/842 (Effort Sharing Regulation), the Fuel Quality Directive (EU) 2009/30 (FQD) and the European Taxonomy Regulation (EU) 2019/2088 are some other important European rules that shall accelerate the market uptake of renewable energies in Europe.

Changes on the regulatory framework that could derive from the implementation of the Green Deal might have an impact on the documentation of renewable gases in the future. In the light of the Green Deal, a draft proposal for the revision of RED II was announced for the second quarter of 2021. Having this timing in mind, for the intended comparison of the European schemes, the assessment of the regulatory framework focuses on RED II and EU-ETS. It may serve as input to European institutions to consider the findings of this report beside other REGATRACE deliverables.

2.2 Recast of the Renewable Energy Directive (RED II)

2.2.1 Targets

RED II sets binding targets for the share of energy from renewable sources and it further develops the common framework for the promotion of energy from renewable sources by 2030. It includes the following targets on the promotion of renewable energies:

- All Member States shall contribute to increasing the share of renewable energy in the Union's **gross final energy consumption** to at least 32% in 2030 (Article 3 (3) RED II). Furthermore, Member States' share of renewable energies must never be lower than the national target share of 2020.
- Member States shall increase the share of energy from renewable sources in the heating and cooling sector by 1.3% annually (Article 23 (1) RED II).





• In the **transport sector**, each Member State shall ensure that the share of renewable energies reaches at least 14 % by 2030 (Article 25 (1) RED II). It comprises a sub-target on advanced biofuels from feedstocks listed in Annex IX Part A of 3.5% by 2030.

For the calculation of each Member States' consumption of:

- 1) electricity from renewable sources,
- 2) renewable energy in heating and cooling and
- 3) renewable energy in transport

biogas and other biofuels shall be taken into account only, if they fulfil certain sustainability criteria and greenhouse gas emission savings. Certificates are an important means for economic operators to demonstrate compliance with national targets and stipulations that are based and aligned with RED II rules and objectives.

For the purpose of compliance with the renewable energies target in the transport sector, the European Commission will develop rules to determine the origin of the renewable electricity and establish a methodology to calculate their input for producing renewable fuels of non-biological origin (RFNBO). Recycled carbon fuels (RCF) can be taken into account for the calculation of the share of renewable energies in the transport sector, too.

2.2.2 Sustainability and Greenhouse Gas Saving Requirements for Biogas and other Biofuels

Biogas and other biofuels have to fulfil sustainability and greenhouse gas saving criteria in order to be eligible for being counted towards the RED II targets described in chapter 2.2.1. The sustainability criteria

- determine the categories of land which comply with land-related sustainability criteria,
- protect the soil quality and carbon content of soils from harvesting agricultural residues
- define thresholds on the greenhouse gas emissions savings.

An exemption is made for the use of biogas for non-transport energy applications. Member States can decide whether biogas that is delivered to installations with less than 2 MW thermal input shall be subject to sustainability and greenhouse gas saving criteria.

In order to prove compliance with the above-mentioned sustainability and greenhouse gas saving criteria, economic operators have to use a mass balancing system in accordance with article 30 (1) RED II. Documents providing evidence for the compliance with these criteria can be referred to as Proof of Sustainability (PoS).

Note on practicalities:

Economic operators and their production facilities can be certified according to the rules of so-called voluntary schemes in order to demonstrate compliance with sustainability criteria of RED II and its antecessor Directive (EU) 2009/28. Voluntary schemes have to apply for recognition by the European Commission. Up to now, the scheme rules of ISCC, REDcert and NTA 8080 have been approved to





document the sustainability of biomethane under Directive (EU) 2009/28. The process of recognition under RED II has started.¹

2.2.3 Renewable Fuels of Non-Biological Origin

Renewable fuels of non-biological origin (RFNBO) are fully counted towards the share of renewable energies in the transport sector. However, renewable electricity must be used for producing them and the GHG emissions derived from their production and supply must be below a certain threshold. Article 27 (3) RED II differentiates between three concepts to provide evidence on the share of renewable electricity for the production of RFNBO:

- 1. average share in the grid mix of renewable electricity in the country of production
- 2. direct connection of the renewable electricity installation with the RFNBO production facility without taking electricity from the grid
- 3. renewable electricity from the grid subject to a temporal and geographical correlation between the renewable electricity installation and the RFNBO production facility

Furthermore, RED II requires that renewable electricity must fulfil an element of additionality² which has to be further specified. The European Commission shall adopt a delegated act on the renewable evidence of electricity for RFNBO production and the concept of additionality by 31 December 2021.

Economic operators that produce and/or trade RFNBO for the purpose of complying with renewable transport fuels in the transport sector have to use a mass balancing system and report to the Union database (see chapter 2.2.3).

2.2.4 Union Database

Article 28 (2) RED II states that the European Commission shall set up a database that allows tracing liquid and gaseous transport fuels that are eligible to count towards the transport target set in article 25 (1) and the Union target set in article 3 (1). In other words, such fuels must comply with the sustainability criteria of RED II. The intention of the database is to improve the traceability of such fuels and to facilitate the cross-border trading of biomethane. It shall reduce the risk of multiple counting of the same energy content.

The database shall cover liquid and gaseous biofuels, renewable fuels of non-biological origin and recycled carbon fuels. Member States shall ensure that economic operators enter into the database information on the sustainability characteristics and the transactions of the respective fuels. RED II allows Member States to set up their own database and connect it with the Union database.

Note on practicalities:

A scoping study³ on the Union Database was prepared for the European Commission. In addition to technical and operational aspects of the database, the authors of the study give some recommendations on the scope and reporting requirements:

³ Alberici, S. Toop, G. & Martinez-Blat, J. 2020: Scoping study setting technical requirements and options for a Union Database for tracing liquid and gaseous transport fuels. Utrecht.



¹ More information on voluntary schemes and the process of recognition can be found here: <u>https://ec.europa.eu/energy/topics/renewable-energy/biofuels/voluntary-schemes_en</u>

² The additionality criteria ensures that additional demand for renewable electricity is met by additional supply. And that the demand for powerfuels does not interfere with the electricity production that is reserved for the electricity sector (Global Alliance Powerfuels, 2020).



- Information on the full upstream supply chain (from point of origin of biomass/energy source until the fuel producer) shall be covered.
- For biomethane, the scope shall be extended to all energy end-uses.
- In contrast to the RED II, the Union Database shall be the primary database for the documentation of sustainable fuels which, at a later step, make data available to Member States.

2.2.5 Guarantees of Origin

The purpose of Guarantees of Origin (GOs) is demonstrating to final customers the quantity of renewable energy with respect to their energy consumption (see REGATRACE D4.1). Comparing to the revised Directive (EU) 2009/28, Article 19 (7) extends the concept of electricity GO to gaseous energy carriers (including hydrogen) and heating and cooling. In this regard, producers of renewable energy can request the issuance of a GO for each unit of renewable energy they generate from the dedicated issuing body. Member States may issue GO for non-renewable energy carriers.

A further requirement for the issuance of GO is that Member States take into account the market value of GOs in case the production installation receives any financial support.

According to RED II, it must be ensured that the following information is provided on the GO:

- the origin, type and capacity of the renewable energy installation
- if and which kind of financial aid has been granted to the renewable energy installation
- commissioning date of the plant
- date and country of issuance
- start and end dates of renewable energy production

For the purpose of disclosure, GO that relate to renewable gases do not have to comply with sustainability and greenhouse gas saving criteria (Article 27). In this respect, mass balancing is not mandatory. Article 19 (2) further clarifies that GOs shall have no function in terms of Member State's compliance with Article 3 RED II and they shall not be taken into account for the calculation of the gross final consumption of energy from renewable sources.

The revision of the CEN Standard EN 16325 on GOs related to energy will expand the concept of GOs for electricity to other energy carriers such as gas, hydrogen, heating and cooling. The updated Standard will help EU Member States to implement the provisions of RED II once it is transposed into national legislation. The Standard is currently under revision and is expected to be finalized before the RED II transposition deadline on June 30th, 2021. The Standard's revision process received the input of Task 2 from the FaStGO project (Facilitating Standards for Guarantees of Origin) in the form of a text proposal for the revised Standard. FaStGO was a project funded by the EU Commission. Additional to the aforementioned text proposal, the project also mapped the challenges in the management of systems for GOs; identified opportunity areas in standardisation; brought forward a vision for a future IT architecture, a data transfer protocol and system requirement specification. It also developed opportunities for the GO statistics, essentials for the residual mix for all energy carriers and a proposal for increased VAT fraud prevention measures. FaStGO started on December 16th, 2019 and concluded on January 21st, 2021 with the final presentation vis-á-vis the EU Commission (DG ENER).





2.2.6 EU-ETS

The Commission Implementing Regulation (EU) $2020/85^4$ on the monitoring and reporting of greenhouse gas emissions pursuant to the EU-ETS in the 4th trading period defines the requirements and the methodology on how economic operators can claim zero CO₂-emissions from burning biomass fuels in an installation under EU-ETS. With regard to biomethane that was received from a gas grid, the following requirements apply:

- Compliance with sustainability criteria according to article 29 of RED II
- Verification and documentation of sustainability criteria in line with Articles 30 and 31 (1) of RED II
- Purchasing records equivalent to the energy content of biomethane must be provided
- Biomethane is not claimed for any other purpose or by any other party (evidence can be provided by a biomethane GO)
- EU-ETS installation and biogas producer are connected to the same gas grid

Certificates issued by an issuing body for tracing biomethane that was set up by one or more Member States can demonstrate compliance with these requirements.

2.3 Other framework conditions

The scope and purpose for the promotion and the consumption of renewable gases can be different from the RED II targets and the EU-ETS. For example, Member States might establish support mechanisms or mandatory obligations to use energy from renewable sources in non-EU-ETS sectors to achieve the national greenhouse gas emission mitigation targets set by the Effort Sharing Regulation. As a result, many different requirements and specifications on the characteristics of renewable gases can be found all over Europe.

On a corporate level, the European Taxonomy Regulation (EU) 2019/2088 is another example that could impact the use and verification of renewable gases in the future. Financial market participants and large companies have to disclose (amongst others) information on their alignment with the objectives of the Paris Agreement and their performance in relation to environmental matters, including the use of renewable energy. Economic activities shall qualify as substantially contributing to climate change mitigation, if, amongst others, renewable energy is produced, stored, transmitted or used in line with RED II. By means of a delegated act, screening criteria shall be established, determining whether or not economic activities comply with the Taxonomy Regulation.

2.4 Labels

Besides the European and national framework conditions, voluntary labels may set criteria and rules for the production and supply of renewable gases. With regard to renewable gases, the purpose and the scope of voluntary labels can be very different. However, such labels can be based on RED II criteria for target compliance of biomethane and RFNBO. Another way of linking labels with renewable gase certificates is to disclose the information about compliance to the label scheme via the certificate.

According to article 19 (13) RED II, options to establish a Union-wide green label with the aim of promoting renewable energy from new installation shall be assessed by the European Commission.





2.5 Overview of Elements of the European Regulatory Framework

The scope of European schemes is closely interlinked with the elements of the European regulatory framework that it covers. Above all are the energy carriers that are covered by the scheme. Taking into consideration European rules and provisions on renewable energy, gases can be grouped according to their origin:

- Biological origin such as biogas and biomethane
- Renewable fuels of non-biological origin (RFNBO)
- Recycled carbon fuels (RCF)
- Other non-renewable gases (e.g., fossil, low carbon).

The gas origin category, the purpose and the underlying regulation determine which requirements must be fulfilled and how compliance is to be demonstrated by economic operators (for an overview see Figure 3). For example, to count the renewable content of biomethane towards RED II targets, compliance with sustainability criteria must be demonstrated (by means of PoS) and documented with mass balancing schemes. In the future, a mandatory reporting of biofuels such as biomethane towards the Union Database shall be introduced comprising the biofuels' sustainability performance and GHG savings.

For the purpose of disclosing the renewable content (or low carbon emissions) of an energy carrier to a final customer, a GO has to be issued by a competent issuing body. With regard to GO, RED II neither asks to demonstrate compliance with sustainability criteria nor to report the production of the renewable gas to the Union Database. Depending on the purpose and the needs of the final customer, a PoS, or other mandatory proofs, label related, or any other voluntary information can be attached or combined with a GO and any other certificate respectively.

Energy source of gas product								
Biogas	Rene Biolog	Renewable Fuels of Non- Biological Origin (RFNBO)		Recycled Carbon Fuels (RCF)				
	Requi	irements for o	demon	stratin	g complia	nce w	ith	
Sustainability Sustainability criteria GHG emission saving thresholdsRenewable energy content Additionality of energy Temporal correlation Geographic correlationMass balancing					ncing			
	Requiremer	nts and option	ns for v	verifica	ation and o	docun	nentation	
Certific Proof of Sustain Guarantee of C	ates ability (PoS) Drigin (GO)	Entities for documentati Issuing bodies Mass balancing sys Union Databas	Entities for cumentation suing bodies palancing systems ion Database		tary and Nat Schemes	S CertifHy ERGaR		Schemes for der transfers AIB ertifHy RGaR
		Purpose	e of ga	is certi	fication			
RED II targets (union, transport, heating)	Disclosure renewable & low carbon energy carriers	EU-ETS (zero CO2- emissions for biomass)	Fuel C Direc	Quality tive	Taxonom Regulatic sustainab finance	ny on La ole	abelling	Others (e.g. national support schemes)

Figure 3: Major purposes and elements for demonstrating compliance with European Regulatory Framework for different renewable and recycled gas categories





3 Introduction to European Schemes for the Documentation of Renewable Energies

3.1 AIB (gas and electricity)

3.1.1 Introduction of the Association of Issuing Bodies

The Association of Issuing Bodies, shortly AIB, is a not-for-profit, Brussels-based international association under Belgian law (ivzw). It was founded in 2002 in close dialogue with, but as a separate organisation from, the renewable electricity traders' association RECS International. AIB gathers the issuing bodies of energy certificates and operates the European Energy Certificate System (EECS[®]), being a voluntary standard that enables reliable and efficient cross border transfer of energy certificates for its members the operation and maintenance of EECS[®], including its IT supportive mechanisms and a discussion forum with a robust decision-making structure that enables continuous development of this voluntary standard, strengthened by a contractual framework that adequately allocates liabilities of all parties involved. The principles of EECS[®] were copied in the EN16325 standard for guarantees of origin in 2013, while EECS[®] comprises harmonisation of more detailed protocols to ensure efficiency in cross border transfers while still allowing the flexibility to adapt to changing circumstances.

AlB Members can be mandated under their national law for issuing guarantees of origin or support certificates. While in 2020 all AlB members are working under such a mandate, not all AlB members in the past have been doing so and such is not a condition for AlB membership. AlB in 2020 revised its articles of association to facilitate independent decision making by issuing bodies for electricity respectively for gas, for energy-carrier-specific topics.



Figure 4: Organisational structure of AIB

In February 2020, 30 issuing bodies were members of AIB, from 27 European countries. At that time, six AIB members had been appointed by law for issuing gas GOs (AT, BE-F, BE-W, EE, IT, PT), and four are in the process of becoming so.





Within the AIB, decision making is delegated to several organs. A delegation matrix as approved by the general meeting sets out how responsibilities are divided. Figure 4 illustrates the organs in AIB's decision making structure.

3.1.2 Introduction AIB schemes

The European Energy Certificate System has evolved over two decades, from a "Basic Commitment" (2002) to "the Principles and Rules of Operation" (2005) to the "EECS® Rules" (2011) which has been subject to constant updating to the Release 7 version 12 as it stands in February 2021.

EECS[®] is set up as a ruleset for a generic certificate system, setting out the basic components of certificate system management, complemented with scheme specific rules. Several types of Products are defined under EECS[®], and more can be added following a decision by the AIB members. The current Products defined under the generic part of the EECS[®] rules are GOs, Support Certificates and Non-governmental Certificates (also called Independent Criteria Schemes operated by AIB).

Further, the EECS[®] rules define Schemes, to which an issuing body can apply for Scheme Membership. The EECS[®] Electricity Scheme has been in operation for the longest time, and built up experience with various products. The most used product is the EECS[®] GO (in 2020 GOs were issued for almost 900 TWh of electricity, and more than 600 million electricity guarantees of origin were transferred across borders over the AIB hub). Within the product GO, there is further categorisation between different product types (relating to the certificate quality being built upon either the energy Source, the production device Technology, or both). Support certificates have found no substantial interest in cross border transfer over the AIB hub so far. Non-governmental Certificates (NGC) however have been very important for the development of EECS[®]. The predecessor of the legislative GO system was the Non-governmental certificate "RECS", upon which the legislative GO system has built its principles. Over time the use of RECS Certificates has faded out while the GO system became broadly implemented over Europe. Another type of NGC has been "EECS[®]-Disclosure", for non-renewable energy sources, in specific countries.

The EECS[®] Gas Scheme has been in draft status since 2008-2009, but only in 2019 did it come to its establishment as a dedicated chapter of the EECS[®] Rules. This followed the REDII publication in December 2018, which added GOs for gaseous energy carriers, in relation to which several AIB members are being charged with the corresponding responsibility for gas GO issuing. The EECS[®] Gas Scheme foresees mandatory data fields and optional data fields. Those aim to facilitate both the already obvious needs and those likely to become relevant. Being a relatively young scheme, it remains up to the members of the EECS[®] Gas Scheme Group to update the scheme rules in relation with the needs and developments in Europe.

Intellectual property, scheme operation and IT operation of all the above are allocated with the AIB.

Further, the EECS[®] Rules enable to link an EECS[®] Certificate with an external certification system: an external <u>Independent Criteria Scheme (ICS)</u>. Hereto, the AIB has procedures for acknowledgment of the ICS. When the operator of the ICS has an agreement with an AIB member, this AIB member can accordingly place a mark of the ICS on the EECS[®] Certificates it issues. This is often referred to as 'adding a label' to an EECS[®] certificate. In this case, the issuing body does not take responsibility for compliance with the criteria of the ICS, which is the responsibility of the ICS scheme operator.

3.1.3 Scheme documents

Figure 5 shows the main part of the documentary framework that constitutes the EECS[®] Rules. The principles and rules are set out in the mother document of the EECS[®] Rules. Subsidiary Documents





contain further detailed rules, amongst which rules for member assessments and IT system operation Fact Sheets hold together dynamic information, like member names and addresses, error codes of the hub, energy source and technology codes, etc. The implementation of the EECS[®] Rules at each members' domain is set out in that member's domain protocol, which follows a standardised template. This allows easy comparison and mapping with the EECS[®] Rules.



Figure 5: Overview of the document framework that constitute the core components of the European Energy Certificate System (EECS®

This documentary framework is complemented with a contractual framework that allocates liability of all parties involved. Every issuing body connected to the AIB hub signs the Hub Participant Agreement with the AIB. Every account holder having access to an account with EECS® GOs must sign the Standard Terms and Conditions which also contain some standardised provisions to maintain the strength of the overall European Energy Certificate System.

3.2 CertifHy

3.2.1 Introduction in CertifHy schemes

The CertifHy Scheme document governs the CertifHy Scheme – a European Certification Scheme for hydrogen fulfilling specific criteria. At this stage, the scheme covers Guarantees of Origin, and the framework leaves room for additional purposes.

CertifHy's mission is to advance and facilitate the production, procurement, and use of hydrogen fulfilling ambitious environmental criteria in order to protect the climate and improve the living conditions of humankind. CertifHy wants to contribute to and promote an environmentally, socially, and economically sustainable production of hydrogen in all uses including energy, mobility, chemical conversion, etc.

In order to achieve this, CertifHy has established a high-quality European GO scheme covering the entire upstream supply chain to the production device exit gate at defined quality and providing the framework for ensuring transparent information. It was established and is continuously reviewed and





improved by means of a multi-stakeholder dialogue. Openness, reliability, integrity, quality, and transparency are core features of the CertifHy scheme and are fundamental for CertifHy's relationship with its stakeholders.

The CertifHy Scheme's intellectual property is owned by the European Commission while Grexel owns the intellectual property of the IT system which supports the CertifHy Scheme.

At this stage, CertifHy is a scheme operated by one single Issuing Body with no cross-border transfers going through a hub. Grexel acts as the issuing body during CertifHy 3⁵ and operates the transfers within the single registry.



Figure 6: Overview of main elements of CertifHy Scheme and GO life-cycle

3.3 ERGaR

3.3.1 Introduction of the scheme operator: ERGaR European Renewable Gas Registry

The European Renewable Gas Registry (ERGaR) aisbl is an international, non-governmental, non-profit organisation established under Belgium law. As of February 2021, ERGaR has 28 members from 15 European countries. Amongst the members are nine national biomethane registries (AT, CH, DE, DK, FR, IE, LT, NL, UK), some of which have already been appointed as issuing bodies for gas GOs (such as France, the Netherlands, Lithuania and Ireland). Additional members are biogas associations, gas DSOs and TSOs and other major energy organisations interested in supporting the development of ERGaR's vision – the integration of biomethane into the European gas market. ERGaR is involved in several initiatives:

- project partner of the EU H2020 project REGATRACE (2019 2022)
- project partner of the FaStGO project (2020)
- liaison partner of CEN EN 16325 on Guarantees of Origin
- Memorandum of Understanding for collaboration with AIB Association of Issuing Bodies
- Letter of Intent for collaboration with the CertifHy project.

⁵ CertifHy 3 is a three-year project to harmonize hydrogen GO schemes across Europe and beyond: <u>https://www.certifhy.eu/</u>.



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ERGaR builds on the expertise of established national registries and experience of commodity traders. ERGaR supports the establishment of national registries in every European country and will endeavour to incorporate all national registries into its schemes. Building on national registries, ERGaR wishes to establish an independent, transparent, and trustworthy documentation scheme for cross border transfer and mass balancing of renewable gas injected into the European natural gas network securing the exclusion of double sale and double counting.

3.3.2 Introduction ERGaR schemes

ERGaR's objective is to facilitate the European-wide cross-border title transfer of renewable gases by establishing an independent, trustworthy, and transparent documentation system for renewable gases that are distributed via the European, interconnected gas network. Main principles/goals are to prevent double sale and double counting by providing documentation for cross-border transfer of sustainable biomethane consignments (Certificates of Origin) and enabling transfer processes via the IT-system ExtraVert Platform which was developed and is maintained by Vertogas B.V. The procedures of the ERGaR schemes are agreed, applying the knowledge and the experience of operating national registries through harmonisation and cooperation.

To satisfy the needs of a certification system eligible for target compliance, ERGaR has developed the ERGaR RED MB Scheme, which makes ERGaR the only organisation in Europe proposing an administrative solution for mass balancing biomethane along the European, interconnected natural gas network. The scope of the scheme comprises the application of biomethane transported via the European, interconnected gas network as sustainable biofuel for target compliance with the transport/biofuel target of Art 25-31 RED II. The four core principles of the ERGaR RED MB Scheme are: sustainability, mass balancing, single logistical facility and export destination. ERGaR is seeking recognition as voluntary scheme by the European Commission for its ERGaR RED MB Scheme. Since the scheme is currently under review by the European Commission, the scheme rules and further details have not yet been made public. For the purpose of this report, ERGaR has provided some summarised information about the scheme which can also be found on the ERGaR website.

ERGaR CoO Scheme			ERGaR RED	MB Scheme	
APPLICATION PIRPOSE	Consumer disclosure	Initiatives by Market & Society	Target compliance transport sector		
BACKGROUND	Art 19 RED II	Market and Scheme Rules	Sustainability & Mass Balance Art 25-31 RED II		
COMPETENT AUTHORITY	Issuing Bodies by Government Mandate	Registries	Voluntary Scheme recognised by EC	Registries via ERGaR RED MB Scheme	
Rules and Standards	CEN-EN16325	ERGaR CoO Scheme	E.g.: ISCC, REDCert	ERGaR RED MB	
DOCUMENT TYPE	GoO Guarantee of Origin	CoO Certificate of Origin	PoS Proof of Sustainability	ERGaR PoO Proof of Origin	
STATUS	under dev	velopment	under recognition Commission as v	by the European voluntary scheme	

Figure 7: Main principles of ERGaR RED MB Scheme and ERGaR CoO Scheme

ERGaR has adopted the term CoO (Certificate of Origin), to describe documentation of renewable gas injections, that may hold the same information as a GO under Article 19 RED II but may not have been





created by a national biomethane registry who has been appointed as a "competent body". A CoO may also include additional information, for example information of greenhouse gas emission intensity or a PoS issued by complying with the rules of a recognised voluntary scheme. The ERGaR CoO Scheme was primarily designed to meet the demand of consumers for a method of disclosing their use of renewable gas which, depending on the countries and the reporting methodology, can have various benefits. These benefits are largely related to corporate emissions reporting and statutory uses. The Scheme is designed to evolve as the market develops and the implementation of RED II takes place across Europe and other sectors, e.g., the EU ETS.





4 Comparison

4.1 Scope of Scheme

4.1.1 Energy sources

A major categorisation of European Certification Schemes is based on the energy carriers for which documentation is offered. This can be further differentiated between the source of energy and the means of transport.

AIB gas and electricity schemes cover various energy sources (Table 1), including all kinds of renewable energy sources, nuclear and fossil energy as well as recycled carbon fuels. The same is true for CertifHy.

The ERGaR CoO scheme is dedicated to renewable gaseous energy sources. With respect to RFNBOs, power-to-gas concepts are allowed and labelled as such. If the Scheme Participants start to issue CoO for RFNBOs that could not be described as coming from a "power to gas" process, then it will be considered how to describe them within the certificate. Technical and scheme rule updates will be made as necessary. Currently, there are no options for labelling CoO as coming from RCF. If there is a demand from members, ERGaR board will consider how to describe them and how to adapt scheme rules accordingly. The ERGaR RED MB scheme does not cover any energy source outside of bio-based ones.

		AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)	ERGaR (MB)
	Biomass	Yes	Yes	Yes	Yes
Source of	RFNBO	Yes	Yes	Power-to-gas concepts are covered, other RFNBOs need an assessment first.	No
energy	RCF	Yes	Yes	Not yet. Could be a future option.	No
	Fossil	Yes	Yes	No	No
	Other	Yes	Yes	No	No

Table 1: Comparison of source of energy

4.1.2 Means of gas transport

The infrastructure for the transport of energy carriers is essential for the physical exchange of energy between countries. The most efficient and common infrastructure of transporting electrical energy is by means of electricity grids. When it comes to energy carriers in form of gaseous molecules, different means of transportation are available. Usually, gaseous energy carriers are transported through the European gas grid or dedicated hydrogen grids. However, off-grid transportation (road, waterway or railway) is applied too and gaining importance when thinking about liquefied biogas or hydrogen. With regard to mass-balancing, a physical connection between the production and consumption of





sustainable liquid, solid and gaseous energy carriers is an important requirement⁶ that needs to be addressed when assessing transport infrastructure. This is why a further distinction is made between the European gas grid and isolated gas grids (Table 2).

		AIB (EECS [®] gas)	CertifHy	ERGaR (CoO)	ERGaR (MB)
	European gas grid	Yes	Yes	Yes	Yes
Means of gas	lsolated gas grids	Yes	Yes	Yes	No
transport	Off-grid transport	Yes	Yes	Not yet. Broadening of scope to include biomethane transported by road and waterway is envisaged.	No

Table 2: Comparison of scheme coverage of means of gas transport

Both, AIB gas scheme and CertifHy include all means of transport. The documentation and verification of ERGaR CoO scheme is based on the injection and removal of gas from gas grids. A broadening of the scope to include biomethane transported by road and waterway is envisaged. By definition of mass-balancing, ERGaR RED MB only addresses the interconnected European gas grid.

4.1.3 Energy carrier conversion

In an integrated energy system, the conversion of energy carriers into other energy carriers will become common. REGATRACE report *D4.1 (Guidelines for the verification of cross-sectoral concepts)* provides an in-depth analysis of energy carrier conversion for some renewable gases. Major conversion routes are:

- Electricity to hydrogen
- Hydrogen to methane
- Hydrogen/methane to electricity
- Hydrogen/methane to liquid fuels.

Comparing the European schemes with regard to energy carrier conversion, the questions are whether and how the schemes address this topic. AIB scheme rules, being the European Energy Certificate System (EECS®) Rules, are generic and can be applied to handling of energy certificates in relation with conversion processes between all energy carriers. The rules in the November 2020 draft of EN16325 regarding energy conversion are based on the EECS® Rules. The EECS® rules in their version of end 2020 do not yet harmonise rules on how to disclose hydrogen that is injected into the gas grid, hence leaving such to the discretion of the competent body in the respective domain. To prove the energy source of the output, certificates for the input energy carrier must be cancelled. Of the cancelled certificates, some attributes of which the energy source is the most important one, must be mentioned

⁶ Communication from the Commission on voluntary schemes and default values in the EU biofuels and bioliquids sustainability scheme (2010/C 160/01)





on the certificate that will be issued for the output energy carrier. CertifHy's provisions on energy carrier conversion are similar to AIB scheme rules. A cancellation of GOs for the required input energy carriers is needed for the issuance of the corresponding GOs for output energy carriers. There are no dedicated rules for energy carrier conversion in ERGaR CoO scheme. It may remain the case that the sending and receiving scheme participants of such CoO decide to enable transfers or not if they feel it is within the rules and regulations that they must adhere to at a national level. By virtue of focusing on biomethane, ERGaR RED MB scheme does not cover energy conversion.

AlB and CertifHy have generic rules for the issuance of certificates that derive from the conversion of other energy carriers. It remains to be seen, if these rules need to be adjusted, or complemented, for some energy carriers and/or conversion routes in the future. In REGATRACE report D4.1, it was clearly stated that a proper documentation of energy conversion is crucial for the verification of renewable energy carrier related information, notably for the production of hydrogen and other RFNBO. ERGaR CoO scheme leaves this responsibility with the scheme participants, since the main focus of the scheme is biomethane at the moment. However, the scheme rules require scheme participants to apply proper and independent verification procedures to proof the renewable content and characteristics that are claimed with the issuance of certificates.

	AIB (EECS [®] gas)	CertifHy	ERGaR (CoO)
Rules for energy carrier conversion	EECS [®] certificate conversion = The issuance of an EECS [®] certificate corresponding to energy carrier conversion, and for which EECS [®] certificates representing input to that installation have been cancelled	Requires cancellation of GOs for input energy carriers and issuance for output energy carriers.	No dedicated rules for energy carrier conversion are available yet. Following national legislation and market rules, Scheme Participants may decide to enable such transfers. Depending on the developments of the CEN 16235 standard, respective rules will be applicable for
Proof that input energy carrier are sufficient to produce output energy carrier	The certificates contain information on the type of energy source from which the output was produced. The number of cancelled certificates for the input must correspond to the measured input into the production device where the energy conversion takes place.	Measurements are based on volumes of cancellation and issuance.	ERGaR members and may require an update of ERGaR scheme rules.

Table 3: Comparison of energy carrier conversion

4.1.4 Documentation of attributes of renewable energy

RED II describes different elements and requirements that must be fulfilled for disclosure, respectively, target counting of renewable and low-carbon energy carriers (see chapter 2.5). In accordance with RED II, the requirements can be categorized as:



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- evidence on the renewable content of electricity from non-biological origin (Article 27 (3)) which shall count towards the transport target of RED II
- sustainability and GHG saving criteria according to Article 29 (2) to (7) and (10) RED II
- provisions on the verification of compliance with sustainability and GHG savings according to Article 30 (1) and (2) RED II
- any piece of information that is relevant for an energy consumer to make an informed choice on their energy supply, such as the energy source, the age of the production device, whether or not government support has been granted for the production, the country of origin, the capacity and/or technology of the production device, the production period, the relation with an independent quality label.

Economic operators and other stakeholders might request additional information and/or nonmandatory sustainability criteria that shall be verified by means of certificates. Examples are criteria on water consumption of electrolysers or the source of carbon with regard to the production of renewable fuels of non-biological origin (see REGATRACE D4.1 Guidelines for the verification of crosssectoral renewable gas technologies) might be requested and need to be documented by means of European schemes.

A methodology and rules to determine the **renewable energy content of renewable fuels of nonbiological origin** shall be implemented by a delegated act by the end of 2021. Hence, it is too early to assess which schemes are ready to document RFNBOs in relation to RED II article 27 (3) which is reflected by the response of the involved scheme operators. With the existing data fields of EECS[®] gas and electricity certificates, evidence on additionality, temporal and geographical correlation could be provided (see Table 4). However, at the time of drafting this report, it remains to be awaited which requirements need to be fulfilled to produce RED II compliant RFNBOs. CertifHy intends to implement the documentation of RFNBOs, ERGaR does consider it for the CoO scheme.

Category of attributes	Attribute	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
	Additionality of installation	Data field on certificate indicates whether support was given and which type of support	Not implemented yet.	Under consideration.
	Energy source	covered		
Renewable content of electricity	Temporal correlation	certificate can no longer be cancelled nor transferred after expiry. Further no obligations on temporal correlation in EECS®. Data on EECS® certificate facilitates correlation with production period (current granularity facilitated: 1 day, while this single-day production period is in use, most issuing bodies issue for monthly production periods)		

Table 4: Documentation of attributes regarding renewable content of electricity





Geographical	data field on certificate about	
correlation	production device location facilitates	
	to correlate certificate cancellation	
	with consumption in same geographic	
	area, up to postal code level, or	
	geographical coordinates	

A key requirement for counting biomass fuels, RFNBOs and RCFs towards the RED II targets is to demonstrate compliance with **sustainability and GHG saving criteria**. These criteria are complemented by a methodology on the calculation of GHG emissions. Voluntary, as well as national schemes, can be recognised by the European Commission for the verification of compliance with RED II sustainability criteria. It is important to notice that other methodologies for the calculation of GHG emissions and non-mandatory sustainability criteria exist. However, there are market-based options of GO Schemes, which also show characteristics of PoS (sustainability requirements, GHG emissions performance, mass balancing).

All schemes are capable to include information on sustainability and GHG emissions, being it mandatory or non-mandatory information. Either information is documented by data fields on the certificate, a reference to an independent certification or PoS from voluntary and/or national schemes can be attached to the transferred certificates. EECS® facilitates optional data on the certificates to include information on GHG emissions. In addition, AIB schemes (EECS®) allow to include information that is related to independent certification schemes (ICS). EECS® facilitates both AIB operated ICSs and external ICSs (like EKOENERGY, Naturemade, TüvSüd). An external ICS needs to be assessed and recognised by both AIB and the respective issuing body, in order to document a reference to this ICS on EECS® certificates. CertifHy developed a methodology on the calculation of GHG emissions and on the allocation of GHG emissions in case of multiple inputs to a hydrogen production device. Sustainability information that shall be documented with ERGaR RED MB scheme must be provided in accordance with rules of voluntary or national schemes that are recognised by the European Commission. ERGaR CoO scheme offers to include additional information in form of a free data field and complement it with the upload of a PDF document including this information.

Category of attributes	Attribute	AIB (EECS® gas and electricity)	CertifHy	ERGaR (CoO)	ERGaR (MB)
Methodologies on calculation and documentation of sustainability and GHG saving criteria	GHG emission calculation and reporting	Generic EECS® Certificate: optional data field for CO2 emissions. Gas: optional data field for CO2 emissions saved & produced. Harmonised methodology	Methodology developed by CertifHy in accordance with RED2	On a voluntary basis, information may be included in accordance with one of the recognised voluntary schemes.	in accordance with one of the recognised voluntary schemes (ISCC, REDcert, etc.) or by one of national systems established under the RED.

Table 5: Documentation of attributes regarding sustainability and GHG emissions



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	to be determined in subsidiary document under development.			
Allocation of GHG emission savings towards one/multiple applications	Not yet covered, methodology to be developed.	GHG allocation method in case of multiple products	-	
documentation of sustainability criteria	Optional data field records whether or not sustainability criteria are met (Y/N), together with a reference to certification body and sustainability certification report.		A PoS and relating sustainability information (e.g., voluntary scheme, issuing date, biomass information, GHG emission value, ID number of PoS etc.) can be included in the CoO.	Information of PoS to be included on mandatory basis.

In order to demonstrate compliance with sustainability criteria, economic operators must use **mass balancing systems** and provide **information if and which kind of financial support** was received for the production of the respective consignment. Although mass balancing is not yet defined in the EECS[®] rules, optional data fields on EECS[®] gas certificates can be used to link to mass balancing. CertifHy has not yet implemented mass balancing in its scheme rules. Mass balancing is not in the focus of ERGaR CoO since this is the main scope of ERGaR RED MB scheme. ERGaR MB concept is based upon the prerequisite that the European gas grid is acknowledged as one single logistical facility. Since neither ERGaR RED MB scheme has started operation nor other schemes have included mass balancing in their scheme rules yet, the documentation of mass balancing requirements can be considered to be in its infancy when it comes to cross-border certificate transfer.

Information on financial support can be included by means of existing or additional data fields. AIB schemes (EECS[®]) include this information, CertifHy has not implemented them so far. It is a mandatory rule of ERGaR CoO scheme to include information whether financial support was received for the energy production to which the certificate refers to as well as whether investment support was granted to the installation producing renewable gas. ERGaR CoO leaves it to the scheme participants on how to gather this information. EECS[®] leaves it open how and when the support information is gathered, as it is up to the competence of the issuing body in relation with national data collection systems, yet records on the certificate whether investment support has been granted for the production device, or





production support for the produced amount of energy represented by the certificate, or both, or none.

Thus, it seems to be a minor issue for the assessed schemes to provide information whether financial support was granted or not. What remains to be a challenge is establishing a common methodology on gathering information on financial support which allows to compare and assess certificates against the received support in the future.

From experience of the authors, it is administratively very complex (i.e., expensive) to quantify total support granted, as there may be support systems that at the time of production of the respective amount of energy, have not yet confirmed or quantified their amount of financial support. Also, the issuing body may not have access to all varying types of support schemes (like local municipality support, tax exemptions, etc.) for which a verification of such quantification would be very complex. The certificates do not cover the amount of support granted within the attributes.

Category of attributes	attribute	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)	ERGaR (MB)
	Use of mass balancing system	Mass balancing is not defined in EECS [®] . Optional data fields on EECS [®] Gas Certificates facilitate usage in relation with mass balancing.	Not impleme nted	Not in scope	Concept for mass balancing is based upon the prerequisite that the European gas grid is acknowledged as one single logistical facility.
Provisions on the verification	Informatio n on financial support	Type of support: production support, investment support; both or none. At registration of PD, by registrant; can also be complemented by issuing body		Yes/no-information on financial investment and production support is a mandatory information. It is up to the scheme participants to collect and verify this information from their account holders and/or national authorities.	Yes/no-information on financial investment and production support is a mandatory information. It is up to the scheme participants to collect and verify this information from their account holders and/or national authorities.

Table 6: Additional requirements to prove compliance with RED II sustainability criteria

4.1.5 Types of energy certificates

Two types of energy certificates are derived from the European regulatory framework. GOs for the purpose of disclosing to the final consumer the source of the energy delivered and PoS to prove sustainability criteria for target compliance. In order to count biomass fuels, RFNBO and RCF towards the Union and the transport targets of RED II, economic operators must prove that a mass balance system was used to show that sustainability and GHG emission saving criteria have been fulfilled. Due





to the fact that European Schemes are not limited to handle GOs and PoS only, a third category describes other kinds and purposes of certificates (Table 7).

EECS[®] facilitates the issuance, transfer and end-of-life of **GOs** for electricity and all kinds of gaseous energy carriers. These comprise hydrocarbon gas, hydrogen, electricity and other gaseous energy carriers. Liquefied biogas (so-called bio-LNG) is not excluded from the EECS[®] gas scheme. In this respect, AIB gas scheme rules will be aligned with CEN standard EN 16325 where the committee draft of November 2020 comprises the issuance of GOs for bio-LNG.

CertifHy is dedicated to hydrogen and does not issue any GOs for other energy carriers.

The ERGaR CoO scheme allows the transfer of hydrocarbon and hydrogen gas GO if scheme participants are authorized to issue and transfer GOs for the respective energy carrier. GOs are not foreseen for ERGaR Red MB scheme.

EECS[®] in general by means of the concept of Independent Criteria Schemes, and the EECS[®] gas scheme explicitly for this purpose, provides the possibility to attach **PoS** related information to a certificate. From a regulatory perspective, this is required in case biogas, RFNBO or RCF shall comply with RED II sustainability and GHG emission saving criteria. Mass balancing is not defined in the EECS[®] rules. Depending on the concept and definition of mass balancing, two opportunities are available to document mass balancing with AIB today. First is the data on the certificates which could be used for the documentation of mass balancing. Second, the certificate contains data fields that can link with a mass balancing system. Further, the EECS[®] Rules could be extended to cover mass balancing, once a clear definition of the concept is given. The concept of mass balancing gases over a single logistical facility comes close to the requirements EECS[®] imposes regarding avoidance of double disclosure of the same amount of renewable gas. Where the EECS[®] electricity scheme elaborates such requirements into a higher level of detail in relation with a supervisory mechanism, for the EECS[®] Gas Scheme such is likely to be elaborated in the future.

EECS[®] facilitates broader certificate types than the concepts of GOs and PoS which are envisaged in this report. Another existing EECS[®] Product is the EECS[®]-Disclosure Certificate, and in the past there were the RECS certificates. Both fall under the EECS[®] Product category of non-governmental certificates, being AIB operated Independent Criteria Schemes. Another EECS[®] Product is the EECS[®] Support Certificate, which can be issued in relation with a legislative support system. Currently the concept of the EECS[®] Support Certificate is only applied at national level.

CertifHy envisages the documentation of RFNBO in the future. This implies that information in relation to PoS and mass balancing shall be included for the purpose of issuing and transferring RFNBO with the CertifHy scheme.

Sustainability characteristics according to RED II can be forwarded alongside the information contained in a ERGaR CoO for biomethane. It is up to the national biomethane registries (scheme participants) to decide whether the documentation via a ERGaR CoO complies with their (national) requirements on a PoS or if additional information is to be provided /measures are to be taken. The scope of ERGaR RED MB scheme is the documentation of PoS along a cross-border transfer in combination with a Proof of Origin (PoO) for the transport sector. The scheme rules contain dedicated provisions on how mass balancing within the European gas grid has to be proven by scheme participants. PoS' for RFNBO and/or RCF are not foreseen.





Table 7: Comparison of type of certificates

Type of certificate	Energy carrier	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)	ERGaR (MB)
	hydro- carbon gas	Yes	No	Yes, if scheme participant is an appointed issuing body	No
	hydrogen	Yes	Yes	Yes, if scheme participant is an appointed issuing body	No
	Others	bio-LNG: neither explicitly included nor excluded in gas scheme (definition to be aligned with EN16325).	No	No	No
	electricity	Yes	No	No	No
PoS (combined with mass balancing)	Biogas	The concept mass balancing is not defined in the EECS® Rules. The certificate contains data which could be used for mass balancing depending on the definition of the concept 'mass	No	PoS can be forwarded with a CoO. It is the scheme participant's decision if documentation via ERGaR CoO complies with their national requirements.	Yes (for transport)
	RFNBO	balancing'. As an alternative, it can be	No (envisaged)	No	No
	RCF	balancing system.	No	No	No
Other certificates		EECS® certificates are further categorized according to their purpose which can be disclosure (GO) or support (EECS® support). Certificates for the purpose of target accounting have been removed (since there was no demand for target-sharing certificates) but can be re-introduced (if MS will use it as such). Besides the EECS® GO and the EECS® Support Certificate, non- governmental	Νο	Certificate of Origin (CoO) for biomethane and, if power-to-gas technology, for hydrogen and synthetic methane. RCF no option.	No



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	certificates with their		
	own criteria are		
	facilitated in EECS® by		
	means of an		
	independent criteria		
	Scheme. This can be an		
	ICS operated by AIB		
	(=NGC) and/or an		
	externally operated ICS		
	in relation with an		
	EECS [®] GO, EECS [®]		
	Support certificate or		
	an EECS [®] NGC.		

In addition to GOs and PoS, AIB and ERGaR provide the possibility to issue **other kinds of certificates**. AIB's EECS[®] gas certificates are generic and can be configured by scheme participants in a way that fulfils their needs to comply with national purposes. EECS[®] support certificates, for example, can be issued to show that the amount of energy that refers to the certificate is eligible to receive national/regional support. Usually, such support certificates are not used for cross-border transfers today. Essential in EECS[®] is that the purpose of the certificate is fixed at the time of issuing it. It is possible to have a single certificate with multiple purposes, on condition that the issuing body declares this on the certificate.

The concept of ERGaR CoOs supports multiple purposes such as disclosure in the end-use sector. It is the scheme participant's and the national authority's decision for which purposes gas certificates can be applied and if other scheme participants' CoOs are recognised.

Apart from ERGaR RED MB scheme, all schemes offer cross-border transfers of GOs. The strength of AIB is that GO for all gaseous (hydrogen and hydrocarbon) energy carriers and electricity are covered. CertifHy and ERGaR are focused on certain gaseous energy carriers. Thus, in principle, the exchange and mutual recognition of GO between different schemes is possible. This includes energy carrier conversion of GO, e.g., from electricity to hydrogen or from biomethane to electricity between schemes.

Up to now, rules on the documentation of PoS and mass balancing are either not well elaborated or not in the scope of the described schemes. ERGaR is seeking recognition by the European Commission for their RED MB scheme and concept of mass balancing by the European Commission. When ERGaR MB concept is approved, it could become a benchmark for the international exchange of PoS combined with mass balancing for renewable gases that are injected and transferred via the gas grid. Having this in mind, it seems that the involved schemes need to work further on this topic before going into the technical details of a coordinated exchange for PoS between the assessed schemes (it has to be determined whether the legislative framework is providing sufficient clarity in time to extend the scope of REGATRACE task 4.3 from only GOs to include PoS).

4.1.6 Geographical Scope

The countries that belong to the European Union and the European Free Trade Association (EFTA) are in the scope of all assessed schemes. In addition to that, contracting parties of the Energy Community can become member of AIB, too. For ERGaR, the constraints are that countries need to be connected to the interconnected European natural gas network as defined in Article 2.3 of Directive 2009/73/EC.





30 issuing bodies are members of the AIB electricity scheme (see <u>https://www.aib-net.org/facts/aib-member-countries-regions</u>) of which six are appointed by national law for issuing gas GOs, too. Another four members are in the process of being appointed as issuing body for gas at the publication date of this report. For several other members, it is not yet clear whether they will be appointed or not for gas GOs, while it is also clear that in some countries a different issuing body is appointed for gas than the electricity GO issuing body.

No information on participating countries can be provided for CertifHy and ERGaR MB, because none of them is yet in operation. However, four ERGaR members are in the process of registering at the CoO scheme.

	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)	ERGaR (MB)
Geographical scope	EU and its future or former member states, EFTA countries and contracting parties of the Energy Community.	CertifHy covers the European Union plus the European Economic Area plus Switzerland. Issuing of CertifHy GOs for production devices outside this geographical scope is not possible. Cancellation of CertifHy GOs for hydrogen uses outside this geographical scope is not possible	Countries that are connected to the interconnected European natural gas network as defined in Art. 2.3 2009/73/EC. Should the United Kingdom of Great Britain and Northern Ireland no longer be part of the EU, EFTA or EEC, it will still be considered part of the Natural Gas Network, unless explicit legal or regulatory exclusions are made to which the Scheme must adhere.	European Union (EU), European Free Trade Association (EFTA).
Countries participating today 01/21	electricity: 29, see https://www.aib- net.org/facts/aib- member-countries-regions gas: none today, 6 are appointed for issuing gas GOs, 2 members are in the process of becoming appointed, 1 observer aiming for operating an EECS® voluntary scheme.	Only a pilot CertifHy scheme is currently running.	4 members are in the process of registering.	Not in operation.

 Table 8: Geographical scope and participating countries as of 01/2021





4.2 Technical Aspects

4.2.1 Transfer Architecture

The way the IT of scheme participants and account holders is arranged and connected to each other, defines the technical framework for the exchange of certificates cross-border. The comparison shows that all schemes rely on account-based IT solutions but have different concepts to organise the exchange.

The AIB system is set up around the concept of accounts in registries, of which account holders can manage their own certificate portfolios. Account holders drive the transfers, by setting up trade agreements with a counterparty (in the same or in another Domain), outside the AIB control perimeter, and subsequently execute the transfer of certificates that is related with such trade agreement, by initiating the transfer in the EECS® registration database of the scheme participant in the country of origin, indicating the country and account holder of destination, which sends this transfer message through the AIB hub (in case the account holder situates in another domain). While awaiting the cumulated validation message from the hub and receiving registry (checking on format, content and successful acceptance by the receiving EECS® Registration Database), the certificates on the sending account are frozen. After a certificate transfer message successfully passed through the AIB Communications Hub (following positive validation), the certificates have arrived on the account of the counterparty account holder in the receiving registry and they are removed ('exported') from the account of the sending account holder in the sending registry.

In CertifHy, all transfers take place in one and the same IT. To initiate a transfer, an account holder sends a transfer request to the issuing body. After a positive validation of the transfer request by the issuing body, the certificate is forwarded to the account holder (recipient) who can accept or deny the request. When the transfer is accepted, the transfer is executed and the accounts of two trading account holders are balanced accordingly.

ERGaR's IT system (ExtraVert platform) connects the IT systems of the national scheme participants. Each scheme participant has an ExtraVert account with an upload/download function to exchange certificates with other scheme participants. An account holder requests the transfer of a certificate to its scheme operator, including information about the destination and the receiving market participant. The scheme operator in its function as scheme participant of ERGaR CoO examines the request, temporarily blocks the certificate and creates a data package that is transferred via the ExtraVert platform directly to receiving scheme participant. It depends on the receiving scheme participant's IT solution how the transfer request is forwarded to the account holder who is the counterpart of the transfer. If the transfer is feasible and accepted by the receiving account holder, the certificate is permanently cancelled on the account of sending market participant and a ERGaR CoO (newly created national certificate) is booked onto the account of the receiving market participant.

4.2.2 Technical requirements on scheme participant's IT

In order to establish a reliable, secure and efficient cross-border certificate transfer, the set-up of the IT and technical aspects are key. There are different concepts of organising the exchange of certificates between countries, national organisations and market participants. REGATRACE report D2.4 (Investigative study of IT system options for harmonized European cross border title-transfer of biomethane/renewable gas certificates) differentiates between decentralised, centralised and hybrid IT-solutions.

Decentralised means that national organisations operate a domestic database for the documentation of renewable gas and/or electricity production and the issuance of certificates accordingly. For the





exchange of certificates with each other, the national/regional databases are connected via an interface to a central platform. In a centralised solution one single IT system is operated for the documentation and verification of national installations and production volumes, the issuance of certificates and the international exchange and cancellation of certificates. The hybrid IT-solution is a set-up providing both, interfaces to exchange certificates with domestic databases and direct documentation of renewable energy installations, their production volumes and attributes.

The IT set-up of CertifHy can be categorised as centralised. Therefore, an assessment of **technical requirements on the scheme participant's IT** is not applicable for CertifHy. The IT systems of AIB and ERGaR are set up in a decentralised framework with a centralised IT supporting infrastructure, meaning that interfaces exist for the certificate exchange between a central the IT hub/platform and national databases. Both organisations provide web-interfaces for the external exchange of data in XML-format meaning that system participants must be able to provide and to read XML data. Both AIB and Furthermore, ERGaR requires that the national connected IT platform is an electronic, account-based documentation system.

	Requirements	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
Technical requirements on scheme participant's IT	Kind of interface(s) for exchange of information	web-interface, xml- exchange over the IT hub, not applicable as CertifHy has a		Upload/download-function of ExtraVert Platform
	General requirements	Elaborated in EECS® Subsidiary Document 03- HubCom: EECS® Registration Databases	centralised IT set-up.	System participant must be able to provide and read data in XML format. Technical interface test with Extravert Platform is part of the application process.
	IT-security	Systems shall be reliable and secure and have adequate capacity: contingency plans and backup facilities should be established in order to allow timely recovery of records and operations and completion of the transfer process. Detail in EECS® SD03 (HubCom).		There are no dedicated requirements on IT security of the scheme participants' IT.
	IT-architecture	Yes, Elaborated in EECS [®] Subsidiary Document 03- HubCom: EECS [®] Registration Databases		Electronic, account-based documentation system.

Table 9: Technical requirements on scheme participant's IT

The application process of ERGaR CoO scheme consists of a technical interface test with the ExtraVert platform, the IT solution which enables scheme participants to exchange the CoO amongst each other.



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Only after successful passing of the connection test, the approval for participation in the CoO scheme is granted. The ExtraVert platform complies with the highest security standards particularly related to the login procedure for scheme participants and operational requirements.

The procedure to connect the registry of an issuing body to the AIB hub, in parallel with the approval of an in-depth review of the domain scheme rules compared to the EECS[®] Rules, consists out of a technical connection testing procedure, followed by a technical audit which validates that the EECS[®] Rules are respected in the handling of electronic transfers of certificates. A comprehensive description of IT requirements for scheme participants of AIB can be found in the hub user compliance document (HubCom). ⁷ This document includes requirements for the IT security of the national systems, which shall be reliable, secure, have adequate capacity as well as backup facilities.

AIB members shall ensure that transfer of their certificates to each other takes place electronically over the AIB hub. The EECS[®] Rules provide that EECS[®] Certificates shall be cancelled in the country where the corresponding energy is being consumed. Only in exceptional circumstances, where there is a technical problem in the registry connection and it is not possible to transfer EECS[®] Certificates directly or via the Hub, it is allowed that a certificate is cancelled in another country than the country of energy consumption. This exceptional process of cancelling certificates for usage in another domain, is called Ex Domain Cancellation (EDC).

4.2.3 Future proof of IT system

It is important that IT systems are developed in a way that allows modifications and adaptations in the future (see REGATRACE D2.4). Such changes can be related to the software that is used, the flexibility to modify the data and the scalability in terms of volumes of transactions and data.

The IT systems of AIB and ERGaR are flexible to add and/or modify transfer data. However, it is important to mention that it is usually the resources of the national databases and issuing bodies that put constraints on such modifications regarding the structure of the transfer messages, as updating such comes with a cost of change for all connected parties. Neither AIB nor ERGaR see any constraints to scale up the number of transferred data and/or transactions. AIB, for example, handled about 600 million cross-border transfers in 2019.

AlB's IT investment strategy follows the business requirements. Procedures are in place for continuous development and quality assurance on both short and longer term. In the information systems unit, the AIB members come jointly to decisions related to IT maintenance and development, in line with the association's strategic business level decisions.

ERGaR develops the functionality of the IT according to the needs of the market and its members respectively. The IT is constantly monitored, maintained and updated with recent software by Vertogas' IT department.

The schemes can be considered to operate state of the art IT systems and to have approaches in place maintaining and updating their IT. It cannot be evaluated within the framework of the report, if the IT systems would be able to handle a massive increase of data volumes (scalability) that could derive from changes in the verification requirements of renewable energy carrier in the future. It is not expected that such a massive increase of data volumes will happen on short-term which would allow IT operators to react and prepare in advance.

⁷ Association of Issuing Bodies (AIB) 2020: Hub user compliance document (HubCom). EECS rules subsidiary document AIB-EECS-SD03: EECS registration database. Version 7.5.





Table 10: Flexibility and scalability of IT

	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
Flexibility to add/modify transfer data	IT system/ data transfer protocol at hub is flexible, subject to agreement by the members of the Information Systems Unit (ISU), and supervised by dedicated contractors and ISU chair. Cost of change for national registries for changing/adding data fields is relevant element to consider for every change.	No transfer message at the moment, the pilot scheme is operated by CMO Grexel with no other scheme being able to transfer GO	Data fields can easily be added and modified within Extravert, however scheme participants' IT might have some constraints (resources).
scalability of IT	Standardised data protocol, in 2019 600 million cross border transfers. Bigger number of transfers through increasing data capacity. Ready to plug-in new registries; standardised test protocol, technical audit before connecting new registries. Continuous focus on IT development, following business needs.	-	There are no physical constraints to scale up the number of transactions (data) and to increase the number of scheme participants.

4.2.4 Usability

The usability of an IT system is an important factor for all persons who are working with the IT on a regular basis. Each additional transaction consumes time and could prolong the time of executing a cross-border transfer. Transactions which are executed manually could pose a risk of error and should be reduced as much as possible. While automated transfer handling is thus highly recommended, it has to be acknowledged that it is challenging to justify low transaction volumes with relatively high costs for sophisticated and automated IT systems in the start-up phase.

AlB guarantees electronic cross-border transfers for countries connected to their hub, which processes these transfers in an automated way, with a transaction log and a dashboard that allows management to follow-up. However, some small national registries are not fully automated, yet. Due to the fact that CertifHy is a centralized IT solution integrating all account holders (gas producing installations, traders and consumers) and issuing bodies in one IT system, the level of usability is very high. A transfer request will be checked by the issuing body, and, if validated positively, the certificate will be forwarded to the account of the buyer. If the receiving account holders accepts the transfer request, the transfer will be executed. The ExtraVert platform of ERGaR allows for the electronic exchange of data relating to certificates between scheme participants and records all these transactions automatically. Scheme participants have to manually execute the uploading, downloading and verification of the respective data from or into the ExtraVert platform.





ERGaR's IT-system deliberately provides free choice for national scheme participants to design certain business processes individually. This way, the national situation of renewable gas markets is considered while allowing all scheme participants to exchange harmonised data in a common data format. CertifHy and ERGaR CoO schemes require a manual interaction for the exchange of the certificates between account holders (CertifHy) and scheme participants (ERGaR) while AIB hub is designed in such way that all checks are automated and does not require a manual action for standard transfers. For AIB members connected to the hub, a high level of service is guaranteed, for the ones that are not connected to the hub, which may occur during a limited time in the beginning of AIB membership, cross-border transfers have to be executed manually upon execution of an "Ex Domain Cancellation agreement" between the relevant issuing bodies.

It can be stated that the usability of the compared IT systems reflects the different development stages of the markets for electricity and renewable gases and of the IT systems of the national scheme participants.

		AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
Usability of IT	Automation level of cross-border transfers	100% for countries connected to the Hub.	Not applicable	The ExtraVert platform allows for the exchange of data in a standardized format and keeps record of all transactions. Uploading, downloading, verification of data, conversion of national certificates from or into ERGaR CoO and communication between scheme participants has to be executed manually.
	Manual actions	No manual intervention for normal transactions in most registries. In case of error: involved issuing bodies and AIB Hub superuser resolve the matter	 Transfer request to issuing body (Grexel) Validation check to clear the transfer Forwarded to buyer: accept/denies request Final transfer takes effect 	Several manual and automated steps are needed, starting with the transfer request of the account holder of the source scheme participant and ending with the transfer of the CoO to the destined account in the receiving scheme participants database/IT.

Table 11: Usability of scheme's IT systems for the exchange of certificates

4.3 Verification of information and their security with regard to processing and exchanging of data

4.3.1 Gathering and exchanging information

After establishing the initial recognition and connection, the exchange and recognition of certificates between scheme participants and their account holders takes shape through the exchange of data. Some of these data are gathered and registered with the sending scheme participant's database



(attributes level 1,2,3), other attributes (level 4) are created during the process of transferring certificates. For enabling the recognition of information and certificates between schemes, the information must be comparable with regards to verification quality, reliability and traceability and meet the overall quality requirements of the importing scheme participant. In relation to technical aspects for enabling exchange, data must be format- and content-wise synchronized.

The information that is exchanged via the schemes' IT systems are mapped in the Annex Comparison of information exchanged via schemes. While the majority of the mentioned data is mandatory, some of it is voluntary. Note that the comparison does not provide detailed information about the format of the information.

It can be concluded that similar information is gathered and exchanged about the production installation, the energy carrier, and its source. Since different terms and definitions of biomass feedstocks are applied on national level, ERGaR CoO scheme has developed a biomass coding system to provide harmonized biomass categories. If biomass coding is applied according to ERGaR CoO rules, this will be indicated, and the original biomass source must be provided.

All schemes record the date of issuance and exchange information on the expiry date. To reflect different, national legal requirements on the expiry date, ERGaR's scheme participants have a variety of options. If a certificate does not have an expiry date by law, the exchanged information on the expiry date may be set according to national stipulations. The determination of the expiry date is left up to the scheme participant in AIB, in order to align with national law.

A special feature of AIB schemes is information on the status and the purpose for which the certificate has been issued. Both AIB and CertifHy dedicate data fields to exchange information whether a certificate has been issued to an accredited label (Independent Criteria Scheme) or CertifHy's labels (Green Hydrogen or Low-Carbon Hydrogen). Label-related information can be documented and exchanged via ERGaR CoO, too, using a data field for additional information which allows to add free text.

A data field that is only mandatory to ERGaR CoO scheme participants, is information whether a certificate meets mass balancing requirements. If scheme participants and the involved account holders agree on national mass balancing rules, this enables them to document mass balancing accordingly. It might be the case that additional documentation and verification is required to fulfil national mass balancing requirements.

All schemes gather and exchange information on financial support (whether or not production and investment support had been granted). The required level of detail is different between the schemes. An in-depth analysis would be necessary to address this topic in detail.

AIB and ERGaR exchange some additional, gas specific information that are related to the type of gas and the production capacity. One of AIB's data fields is related to the calorific value that was used to calculate the output energy. ERGaR has applied a calculation methodology to cover differences of calorific values. Furthermore, information is exchanged on the means of delivery.

A last category of information is related to sustainability and GHG emissions. All schemes have default data fields to exchange information on GHG emissions, however, the exchange of this information is voluntary within all schemes except from ERGaR Red MB. AlB has additional data fields to inform whether sustainability and/or GHG saving criteria are met in accordance with RED by referring to the relevant certification body and report which confirmed that this is the case. ERGaR data fields allow to




document the compliance with RED sustainability criteria by referring to the proof of sustainability, the Sustainability Scheme and the scheme ID.

In Annex Comparison of information exchanged via schemes information on the data fields that relate to EECS[®] electricity certificates are listed as well. As this information is unique to AIB, the analysis is will be taken up in task 4.3.

4.3.2 Safeguarding the authenticity and integrity of data that is provided by account holders

The issuance of renewable gas certificates requires trustworthy and traceable processes to verify the authenticity of the claims and information on the respective certificates. The renewable gas installation and the gas output are the major source of data that will be entered into the databases of issuing bodies and registries. It depends on the type of registered information to determine which approaches are suitable to gather and to verify data (see Figure 8).



Figure 8: Different levels of information gathering for the issuance of renewable gas certificates⁸

According to REGATRACE D2.1 and D2.2, the attribute level 1 is considered as plant/installation specific information comprising e.g., type of plant, date of commissioning or investment subsidies. Level 2 is information that is related to the energy carrier such as type of energy carrier, amount of energy and production period. Qualitative data on the sustainability of the feedstocks and input energy carriers as well as GHG emissions are categorised as level 3 attributes. Transfer related information (level 4) does not provide any information on the renewable gas product per se but on the transfer of the certificates such as unique identification number and date of the issuance.

In many countries renewable gas installations must be audited by third-parties before economic operators can register them with national issuing bodies or any national database. Installations for renewable electricity are an exception. It is at the discretion of national issuing bodies, if and how installations must be audited before being registered.

⁸ REGATRACE D2.1 Updated guidelines for creating the European Biomethane GO.





The second level of verifying the gas production is usually based on meter readings. Within the rules of AIB's EECS[®] gas scheme, it is obligatory to audit whether the correct position and the accuracy of the measuring device are adequate for determining the correct number of certificates to be issued within the rules of AIB gas scheme. The meter readings are determined and collected by the authorised measurement body. The allocation of the role of measurement body may vary between different countries or domains. Often this is the grid operator, sometimes the producer or registrant if verified on a regular basis by an independent inspection body, in some cases it is the production registrar or the issuing body himself. Based on the evidence of metered data, GO for the production of hydrogen or vehicle-transported gases can be issued. However, within a course of twelve months, the reported hydrogen output and the respective energy input(s) must be verified by a third party audit. It is the decision of AIB's issuing bodies, if substrate and energy input specific attributes need to be audited or not.

According to CertifHy scheme rules, renewable gas installations have to be audited by certification bodies. In some cases, account holders might ask CertifHy Issuing Body for a label (CertifHy Green Hydrogen or CertifHy Low-Carbon Hydrogen) which requires the auditing of additional information/characteristics of the hydrogen production: energy input (via the cancellation of GOs), greenhouse gas footprint of the hydrogen produced (according to ISO standards ISO 14044 and ISO 14067 as well as Annex V and Annex VI of the RED II) e.g., CO2 threshold, source of energy.

ERGaR CoO stipulates meter readings that must be verified either by gas grid operators, balancing group coordinators or independent auditors. The verification usually takes place before GOs are issued for the corresponding gas volume.

In relation with the issuing of EECS[®] certificates for product types that relate to the origin of the energy carrier, the type of substrate and energy input are to be inspected, in accordance with the energy source to be recorded on the certificates to be issued. It is the decision of AIB's issuing bodies, whether more detail on this substrate and energy input specific attributes need to be audited. ERGaR schemes rules require attributes on substrates and energy input either to be audited by a third party or provision of information in accordance with national regulations. This implies a validation that the use of feedstock (could be extended to energy input in the future) is plausible compared to the output of renewable gas. By this, PoS related information must be verified according to the rules of a voluntary scheme.

AIB gas & elec	tricity schemes	ERGaR Certif	icate of Origin
Level 1	Level 3	Level 1	Level 3
Plant specific • electricity: at discretion of issuing body. • gas: inspection at registration of installation	Substrate/energy input specific • Audit of production declaration at discretion of issuing body	Plant specific • Third-party audit • Audit of production installation • At registration, in case of adaptions	Substrate/energy input specific • Third-party audit for production period • According to national regulations • For PoS: according to voluntary scheme
Level 2 Gas specific • Audit of position and accuracy of installation and measuring device • measurement in line with certificate calculation principle	Level 4 Transfer specific • Automated checks (hub & registries) to comply with rules • Technical audits of the registries • Automated checking of existence of destination Account • Code of conduct • Automated transfer patterns checks for fraud detection	Level 2 Energy carrier specific • DSO/TSO meter readings • Verification: DSO/TSO, Balancing Group, auditors • before issuing of CoO	Level 4 Transfer specific • Verification of data accuracy before transaction process • Check and verification of incoming data (integrity, fraud, feasibility)



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<u>CertifHy</u>					
Level 1	Level 3				
 Plant specific Independent third-party audit of installation before registration 	Substrate/energy input specific • Auditing is required if label related information/ characteristics shall be documented				
Level 2	Level 4				
 Energy carrier specific Metering data comprising output and respective energy input(s) Audit of consignments within 12 months 	Transfer specific Validation by issuing body 				

Figure 9: Overview of approaches / requirements for data verification

A major difference between schemes can be seen if and how information on energy carriers, substrate and energy input are verified by third parties. Within AIB scheme rules, issuing bodies have some discretionary power if gas and substrate (energy input) specific data have to be verified by a third party. This relates to the fact that such data or verification may already be available from other data flows (like environmental licencing, subsidy follow-up systems, etc) in the respective country/domain. CertifHy and ERGaR require information to be verified by auditors. In case attribute related information is provided on national stipulations and regulations, ERGaR CoO scheme participants might deviate from that rule.

Economic operators of renewable energy installations have freedom to choose an auditor or certification body for the auditing of renewable gas installations and/or the gas related attributes in many countries. However, auditors must be approved by AIB's issuing bodies. With CertifHy it is also the issuing body/scheme participant who define which certification bodies are eligible to execute audits according to CertifHy scheme rules. At ERGaR, certification bodies are recognized by the scheme participants.

4.3.3 Data processing, security and transfer within the scheme's IT

When data is entered into or transferred to the database of a European scheme, the way data is processed and transferred is crucial for scheme participants. To describe the similarities and differences between the schemes in this regard, criteria on the standardisation and immutability of data were developed. A third category addresses data security in a very broad sense.

It is state of the art that web-based applications have **data fields** that are content and format wise standardised. No scheme deviates from this standard. ERGaR CoO scheme allows for some explanatory notes regarding the upload, download, withdrawal, acceptance or rejection of CoOs. Free text facilitation is possible for some data fields with AIB schemes. This does not apply for transfer related data.





Table 12: Comparison standardisation of data

	AIB (EECS® gas and electricity)	CertifHy	ERGaR (CoO)
Standardisation of data	Transfer messages follow standardised format and standardised data fields. Free text facilitation is possible with some data fields, within the definition of the standardised data field but not for transfer related messages.	Data fields and content are standardised.	All data on the certificate that is uploaded within a data package follows a defined format and structured content. Most information is mandatory other is voluntary. Explanatory notes are possible regarding the upload, download, withdrawal, rejection or acceptance of CoO. All communication must be labelled with the Exchange ID of the respective certificate.

The **immutability of data and error handling** is a key requirement for the issuance and transfer of data; the data on a certificate may not be altered during or after its transfer. All schemes adhere to this principle. However, there could be situations justifying data to be changed, corrected or added. Hence, it is more interesting to compare the scheme's rules and approaches in case of errors and/or missing data. AlB's framework comprises a code of conduct to rectify errors. A scheme participant can alter erroneous data on certificates that are registered with its database under the provisions of its terms and conditions and with the agreement of the account holder. The rejection of a transfer request is possible if scheme participants can provide evidence that a certificate from another scheme participant does not comply with the provisions of EECS[®] rules, or when it does not meet the national import criteria.

Table 13:	Immutability	of data	and	error	handling
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	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
Immutability of data	It is not allowed to change data of a certificate. In case of errors, a code of conduct is available for rectification.	CertifHy GO data shall not change in any way after issuance.	No information may be changed or added. Where data cannot be included into the certificate, the scheme participant must inform the scheme operator about the reasons. The receiving scheme participant may only translate the content of the data into the appropriate national terminology with regards to language and handling of biomass codes. Neither the scheme operator, nor the scheme participants will adapt or add any information within a certificate.
Error and dispute handling	Code of conduct for error handling	In order to correct or to complete missing data	In case the sending scheme participant becomes aware of possible errors in CoO that it has





between AIB members.	GO shall be withdrawn and re-issued.	exported, the involved parties will agree on a process to correct the
Reasons of rejection of transfer request are stated in EECS® rules. A code of conduct,	No guidance which reasons justify the rejection of a transfer request. In order to finally commit	errors. In event of defined reasons, the receiving scheme participant has to reject the transfer and inform the requesting scheme participant about the reason of rejection.
liability arrangements and a dispute resolution protocol in the Domain Protocol of each member are measures to handle disputes.	the GO transfer the buyer must acknowledge the reception of GO within 3 business days. If the buyer does not commit within the time limit, the GO transfer is rewound in the Registry.	A Control and Sanction Committee is established that could solve disputes between scheme participants and impose sanctions on scheme participants.

CertifHy rules state that hydrogen certificates have to be withdrawn and re-issued in order to correct and/or complete data. There is not yet any guidance, under which a transferred certificate can be refused by an account holder. But account holders must proactively accept the receipt of an incoming certificate within 3 business days.

ERGaR CoO scheme rules leave it open to the involved scheme participants to agree on a process to solve such issues. In case a scheme participant cannot include all data, which were transferred via the ExtraVert Platform, it must inform the scheme operator about the reasons. With the aim to provide a suitable information to economic operators in the country of destination, the receiving scheme participant might translate the biomass related information into the appropriate national terminology. In event of defined reasons, the receiving scheme participant has to reject the transfer and inform the requesting scheme participant about the reason of rejection. The involved parties will agree on a process to correct the errors. A control and sanction committee is established to solve disputes between scheme participants.

The six principles illustrated in Figure 10 were identified and applied to compare the schemes with regard to **data and IT security**. It is obvious that in a public report like this not too many details can be provided on such sensible issues such as cyber security. For this reason, a detailed comparison cannot be executed. However, the three organisations consider all six principles either by means of contracts with their IT provider or by provisions in their scheme rules.







Figure 10: Criteria on data and IT security

4.4 Prevention of fraud

4.4.1 Multiple counting and claiming

The risk of multiple counting and claiming of the renewable characteristics can be found at different occasions and levels during the lifetime of a renewable gas certificate. When it comes to cross-border transfers, special attention must be paid to the process of issuance, transfer and cancellation of certificates. In this regard, decentralised IT solutions must rely on the national databases operators and issuing bodies to apply robust and effective mechanisms. Considering certificates can be applied for different purposes, it must be clearly stated which claims can be made and which not.

In addition to the measures and rules for safeguarding the authenticity and integrity of data (see chapter 4.3.2) at the level of the scheme participants, the procedures that are directly linked to crossborder transfers of certificates are crucial to reduce the risk of **multiple counting** of certificates. A difference between, on the one hand side, AIB and, on the other side, CertifHy, as well as ERGaR, is how multiple counting is addressed. AIB has installed a monitoring to detect multiplication of certificates during erroneous transfers. This is accompanied by rules that shall avoid duplication of certificates. CertifHy and ERGaR have rules to avoid certificates being duplicated that include a validation of transfer requests by the issuing body (CertifHy) or by the receiving scheme participants (ERGaR). Transfers between ERGaR CoO scheme participants can only be concluded when a cancellation statement is provided by the sending scheme participant.

Multiple claiming is interlinked to multiple counting of certificates. Multiple claiming describes a situation when one certificate is claimed for different purposes. In many countries the issuing bodies





for electricity are obliged to supervise the disclosure of electricity GO. AIB has dedicated one section of the EECS[®] electricity scheme rules to disclosure supervision. For gas GO and other certificates no similar rules and provisions exist. ERGaR entrusts its scheme participants that they have mechanisms and rules in place to prevent the final recipient of gas certificates from claiming the wrong purpose or multiple purposes.

Table 14: Multiple counting of certificates

		AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
multiple counting	Issuance, transfer and cancellation of certificates	Rules on avoidance of double issuance (like EECS® Rules A2 & C3.3.1), Domain Protocol reviews and Member audits by AIB Monitoring on the AIB hub avoiding duplication during erroneous transfer, Rules on avoidance of duplication during transfer. AIB member audits. Rules stating that cancellation is the end of life of the certificate and that no form of Disclosure is used for the energy, other than by cancellation of the corresponding certificate (like EECS® Rules section A.2.1.2) Detailed protocols in EECS® Subsidiary Document 03 HubCom.	Subject to the track- record of the Account Holder, Production Device and previous GO issuances, a Production Batch Audit is required which is done by an approved Certification Body of the Account Holder's choice. Subject to evidence, the Issuing Body gives clearance and GOs are issued in the Registry. Audits will be performed by an Auditor of the Certification Body that was selected and contracted by the Operator. Upon inspection of the documents the Issuing Body will either (a) give clearance for GO issuing in the CertifHy Registry; or (b) claim rework of the registration and further inspections of the Production Batch(es) where needed; or (c) dismiss and deny the registration of Production Batch(es)	When requesting a CoO transfer, the underlying CoO must be deactivated/ blocked in the scheme participants IT system. Sending scheme participant must provide a cancellation statement of the original CoO before the receiving scheme participant creates a new CoO When a data package of a CoO is uploaded to ExtraVert, the data must not be available to account holders of the uploading scheme participant. Reversal transfers are only possible if the respective CoO are still available in the IT of the receiving scheme participant and have not been cancelled and allocated to gas consumers.



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			for GO Issuing in the CertifHy Registry. The CertifHy Scheme is designed to operate on checks and balances and to take corrective measures – when necessary – to maintain and restore the CertifHy core principles."	
Claiming	Multiple claiming	electricity scheme: section N9: disclosure supervision		It is the scheme participant's responsibility to prevent CoO from being claimed for multiple purposes.

Another way to commit fraud is claiming the wrong purpose. The certificates that are issued according EECS[®] scheme rules have to indicate the purpose. Thus, there should be no doubt to which purpose the certificates refers to. ERGaR CoO scheme's approach is different. Due to the situation of many different national and market driven purposes for the use of renewable gas certificates, the purpose of ERGaR CoO certificate is not predefined. However, with the mandatory set of information on a gas CoO, the purpose of the certificate shall be defined. Based on the information from the mandatory and voluntary information such as fulfilment of sustainability criteria of a voluntary scheme, the gas consumer shall be able to apply the correct purpose. Since the final purpose has to be recorded on the cancellation statement, a monitoring of the purpose of the ERGaR CoO certificates is possible.

 Table 15: Claiming wrong or multiple purpose

		AIB (EECS® gas and electricity)	CertifHy	ERGaR (CoO)
Purpose	Wrong purpose	A data field on the certificate indicates the purpose. The supervisory body can check the purpose of the certificates cancelled.		All CoO include a mandatory set of information that shall enable the gas consumer to apply CoO to the correct purposes. The final purpose must be recorded on the cancellation statement.
	Multiple purpose	it is allowed to claim certificates for multiple purposes, on condition that they are issued for multiple purposes. For single-purpose certificates, the certificates can only be	Where a request has been submitted by the owner for GO cancellation, the Issuing Body may decide to either	It is the scheme participant's responsibility to prevent CoO from being claimed for multiple purposes.



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		used for the purpose for which they are issued	 (a) give clearance for GO cancellation and automatically cancel the GO in the Registry; or (b) claim for rework of the GO cancellation request and ask the owner to check for completeness and accuracy of the required information; or (c) dismiss the GO cancellation and inform the owner accordingly. Upon GO cancellation (a), the GO owner will be able to request a Cancellation Statement. Information about the content of the statement can be found in the CertifHy Scheme in "Section 7.3. Cancellation Statement". Where a GO cancellation (a) has been successful, a GO cannot be trade-transferred to other accounts anymore 	
Claiming	Multiple claiming	Core principle that the cancellation of the certificate shall be the sole proof of the qualities of the output for the associated output. Electricity scheme: section N9: disclosure supervision		It is the scheme participant's responsibility to prevent CoO from being claimed for multiple purposes.

4.4.2 VAT fraud

Digital technologies such as IT systems for the standardized international exchange of renewable energy certificates are exposed to the risk of value added tax (VAT) fraud. The reason is that usually no major (logistical) efforts are needed to trade digital GOs. There are different forms of VAT fraud. The failure to pay VAT and the fraudulent claim of input tax are common.

A common and easy to establish measure to reduce the risk of VAT fraud are Know-Your-Customer (KYC) rules. AIB recommends its scheme participants to apply KYC procedures when registering a new account holder. At AIB hub, a monitoring of transactions allows to identify suspicious transfer patterns. CertifHy also relies on a KYC form upon account holder registration.

The semi-automated cross-border transfer of ERGaR CoO creates a hurdle for fraudulent VAT activities. Scheme participants verify and observe cross-border transfer transactions giving them the ability to identify deviations in transfer patterns. On the level of scheme participants, economic operators have to undergo an admission process.





Table 16: VAT fraud prevention measures

	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
VAT fraud prevention measures	Harmonised account holder registration procedures. KYC procedures recommended. Transaction monitoring on the hub for suspicious transfer patterns.	KYC form upon account holder registration. Account holder registration needs to be approved by the issuing body	Admission process at registries. The semi-manual cross-border transfer of CoO does not facilitate fraudulent behaviour. Data verification by scheme participants at export and import.

4.5 Organisational aspects

4.5.1 Becoming a scheme participant / account holder

Becoming a scheme member or an account holder of one of the schemes, requires an application process which could comprise many different aspects. In chapter 4.2.1 technical requirements were already introduced. Others are contractual and legal obligations which must be fulfilled by the applicants.

CertifHy is still at its pilot phase and the only scheme participant is Grexel. The membership process for new scheme participants is not covered in the CertifHy scheme yet. Account Holders can become members of the registry thanks to the procedures mentioned below (approval of issuing body including a Know-Your-Customer (KYC) process).

In AIB only AIB members can connect to the AIB hub. These issuing bodies operate a certificate registry in their own domain, into which economic operators can apply for an account. This account gives access to their own certificate portfolio, like a bank account gives access to one's financial portfolio. In some domains any party can become an account holder, including natural persons and legal entities, while in other domains only producers and suppliers of energy have the right to open a certificate account in the registry of an issuing body. However, harmonized procedures are applied to become an account holder with issuing bodies that are connected with AIB, and it is only allowed to become an account holder after signing the standardised terms and conditions. In this regard a KYC process is recommended by AIB and broadly used, but not mandatory.

In order to join the AIB gas and/or electricity scheme, the applying organisation must not be appointed by the national government for the obligatory scheme. Until a scheme participant's database is connected to the AIB hub and goes live, eight steps must be successfully undertaken. The latter are described in detail in the "How to join"-document of AIB⁹.

An organisation can start with being an observer to the AIB and get familiar with the procedures while preparing its own processes. Application for AIB membership can be sent to the secretary general, by filling in a questionnaire and is brought to the AIB board for approval. Applying for Scheme membership is done by sending in a draft domain protocol that describes the situation in the domain in relation to the EECS[®] Rules, together with any additional relevant documentation. This Domain

⁹ AIB 2020: How to join AIB.





Protocol follows a standardised template (see EECS[®] Fact Sheet 10a) and leaves (limited) room for deviations from the EECS[®] Rules that don't harm the core principles.

A pair of reviewers verify whether an issuing body applying to participate in the applicable scheme AIB Hub complies with AIB scheme requirements. Usually, one reviewer is a member of AIB, at least one the other is a professional auditor. They note their observations in a review report, to which the applicant can provide a reply and adjust its draft domain protocol where applicable. After several iterations of questions and answers, the reviewers conclude the review report, and form an advice for the relevant Scheme Group in AIB. The members of this scheme group approve the domain protocol and scheme membership by majority decision. Scheme membership comes with granting of voting rights in the relevant scheme group.



JOINING ROUTEMAP

Figure 11: Joining route map AIB scheme¹⁰

Subsidiary Document 07 describes the procedures for a domain scheme assessment as mentioned above, in relation to scheme membership approval and the 3-yearly audit. It also sets out the procedure for a compliance assessment. Such can be carried out when there is a complaint or when a member has reasons to question compatibility with the EECS[®] rules for a particular domain.

ERGaR scheme foresees accounts for national issuing bodies and registries only. For the exchange of Certificates of Origin, a reliable registry system is a pre-requisite (see Table 17) but a governmental mandate is not required since several systems have been set up on market initiatives. GOs can only be exchanged between scheme participants who are appointed as issuing bodies by their government. Furthermore, joining ERGaR scheme goes without an obligation to become a member of ERGaR aisbl. Nevertheless, a set of requirements must be fulfilled for becoming a scheme participant (see Table 17).

¹⁰ AIB 2020: How to join AIB.



Applying organisations are audited according to their national requirements and must provide all available audit reports to the scheme operator annually. The audit must be conducted by external auditors who confirm the accuracy of scheme participant's processes for issuing CoO. ERGaR reserves the right to commission its own audit (auditor is appointed by ERGaR) of the scheme participant. A check list with transparent guidelines is available for all interested parties who enter the registration process. The following steps describe the process to join ERGaR CoO scheme:

1) prepare for and successfully comply with auditing requirements

2) submit application form including copy of audit report, terms and conditions of scheme participant, description of organisational structure, functions and procedures, handbook for national market participants, proof of successfully concluded test transfer in each direction, declaration of acceptance of prevailing ERGaR scheme rules, detailed description of auditing requirements for biomethane installations

3) if review of ERGaR Secretary General is positive, a proposal for admittance is submitted to the Executive Board

4) subject to a positive decision by ERGaR Executive Board, the participation agreement is signed.

ERGaR leaves the responsibility with the scheme participant to define the requirements and procedure to become an account holder of the national organisation's database. There is no harmonized KYC procedure among ERGaR scheme participants yet, because each organisation applies its own terms and conditions for becoming account holder.

Each national issuing body and registrar has the freedom to decide which legal entity can become participant of its scheme or not. This and national framework conditions are the main reasons for varying application requirements on the level of scheme participants. It is agreed with ERGaR scheme rules that each scheme participant applies its individual approach of registering and assessing applying account holders. EECS[®] rules stipulate harmonised registration procedures that need to be applied by their issuing bodies.

The different set-up of the three schemes makes it difficult to compare AIB and ERGaR with CertifHy in this respect. The requirements to become a scheme participant of AIB or ERGaR are harmonised within the schemes. Although the approach is different, both schemes take into account national circumstances of the applicants. In AIB each applicant develops a domain protocol that reflects the procedures, laws and practices in the domain and is reviewed as part of the member application assessment procedure and subsequent first-year-after-membership audit, followed by a three-yearly audit. A crucial part of ERGaR's application procedure is the assessment of national procedures and functions of the participant's scheme as well as an external audit confirming the accuracy of the processes for the issuance of CoO.

	AIB (EECS [®] gas)	CertifHy	ERGaR (CoO)
Requirements to become an account holder	harmonised procedures, to be elaborated in the publicly available	The applicant, requesting for entry in the CertifHy Registry must be a legal entity, e.g., a private individual or an organisation. The identity of the legal entity is subject to proof for	Individual approach of scheme participant.

Table 17: Requirements to become a scheme participant / account holder



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	Domain Protocol of each issuing body. KYC procedure is recommended, broadly used, but not mandatory.	review by the issuing body, including a KYC process.	
Requirements to become a scheme participant	Elaborated in chapters F, G, I of the EECS® Rules. Member application procedure: see "joiners brochure" on AIB website.	Not applicable.	 1) qualification process after signing of participation agreement 2) maintain independence from economic operators 3) must not own biomethane CoO or participate in markets associated with biomethane CoO 3) adhering to relevant laws and regulations 4) having an auditable system documenting the issuance, the handling and cancellation of CoO 5) following appropriate auditing procedures and conducting external audits on accuracy of processes of issuing CoO 6) keep any documentation for a minimum of 5 years 7) biomethane CoO must be created based on reliable and accurate metering data provided by DSO or TSO only 8) must not issue CoO for fossil gas 9) appropriate risk management procedures must be in place for the activities in the ERGaR CoO scheme

4.5.2 Liability coverage

There are many reasons that could cause damages/losses to one or more of the involved parties with regard to the issuance and transfer of certificates. An unforeseen breakdown of an IT-system, for



example, could delay the transfer of certificates and result in a loss of financial support. Due to the importance of the matter liability is addressed within the scheme participant's terms and conditions. Within this comparison liability focuses on the questions how and to which extend liability is covered between the involved parties. CertifHy does not cover liability in its scheme rules at the moment and hence will not be compared with the other schemes.

Similar to other topics, EECS[®] scheme rules cover the relationship between scheme participant and account holder in this regard, too. All scheme participants have to adopt liability clauses in their terms and conditions with their account holders. A template provided by AIB enables a harmonised approach of including liability. ERGaR scheme rules do not stipulate if and how liability has to be covered by their scheme participants.

AIB and ERGaR have defined in their terms and conditions with scheme participants in which cases the contract partners are excluded from liability and to which amount or if at all the liability is capped in the other cases. In addition to that, AIB requires scheme participants to prove that they have a liability insurance that covers a minimum of two million euros.

It can be concluded that AIB pays more attention and enforces more harmonisation to liability issues in their contractual framework than this is the case for ERGaR CoO scheme. It was not assessed if and to which extent the liability of auditors verifying the correctness and validity of information is covered by the schemes. However, this might be a future area of action to further evaluate the trustworthiness and reliability of the schemes.

Liability coverage	AIB (EECS [®] gas and electricity)	CertifHy	ERGaR (CoO)
Account holders	through Standard Terms and Conditions, template from AIB to be adopted by all issuing bodies, binding the account holders to the applicable domain protocol and the EECS® Rules, capping liability of involved parties	Not covered by the scheme currently	Not covered by the Scheme rules.
Scheme participants	Minimum 2 million euro insurance coverage to be proven before receiving hub access Contractual framework addresses the following areas: Domain rules described in domain protocol, compliance with the EECS® Rules, intellectual property, confidentiality and non-competition, liability, data protection, termination Hub Participants Agreement		 Liability insurance is not required. Liability is covered as follows: In event of malicious intent or gross negligence by a party, its legal representatives, employees or agents the liability is unlimited. In event of culpable violation of fundamental contractual obligations, the liability is limited. In all other cases liability is excluded.
Scheme provider	Liability insurance is existing. Liability is covered and capped in the contractual framework.		Liability is covered as follows: 1) In event of malicious intent or gross negligence by a party, its legal

Table 18: Liability coverage



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	representatives, employees or
	agents the liability is unlimited.
	2) In event of culpable violation of
	fundamental contractual
	obligations, the liability is limited.
	3) In all other cases liability is
	excluded.

4.6 Experience in documentation of international transfers

The EECS[®] electricity scheme has operated for almost two decades now. The cross-border transfers of electricity GO has increased since the EECS[®] electricity scheme was commissioned. In 2019, the energy volume referring to electricity GO that have been exchanged between scheme participants amounts to more than 600 TWh. None such cross-border transfers can be reported for the EECS[®] gas scheme so far.

CertifHy has gained experience in cross-border transfers of hydrogen certificates from some test transfers that were executed in the past. ERGaR aisbl members can claim experience in bilateral transactions conducted before the launch of ERGaR CoO scheme based on agreements to mutually recognise biomethane certificates. Based on these bilateral agreements biomethane certificates were exchanged between biomethane registries from Austria, Denmark, Germany and the United-Kingdom (AGCS, dena, Energinet and GGCS). Under the ERGaR CoO scheme, no transactions have been executed so far.

The volume of bilateral transactions between ERGaR members corresponds to an energy volume of 0.72 TWh in 2019. Compared with the amount of energy that was documented by EECS[®] electricity scheme, the international exchange and mutual recognition of biomethane certificates between biomethane registries/issuing bodies is still in its infancy. With the EECS[®] gas scheme, ERGaR CoO scheme and CertifHy offering solutions to facilitate the exchange of certificates for gaseous energy carriers for an increasing number of issuing bodies and registries in different countries, it can be expected that the volume of cross-border transfers will increase in the years to come.





5 Conclusions

The target of the present REGATRACE report is the comparison of existing European Schemes which aim at facilitating Europe-wide trading of (renewable gas) certificates. To understand the **status quo, the differences and the commonalities of the compared schemes**, their background is mentioned here.

AlB has more than 20 years of experience on electricity certificates, amongst which the GO is being the most used type of certificate. In this time, a comprehensive set of harmonised rules, guidelines, decision making procedures and measures to improve cross-border exchange of certificates were elaborated. The scheme participants have joined efforts to develop and maintain their IT-systems in a way that supports an automatic character for business processes of cross-border transfers. Following the publication of RED II, AIB extended its EECS[®] rules to gas with dedicated gas scheme rules in 2019, a decade after the first draft for this section was developed.

CertifHy is a young initiative, supported by the Fuel Cells and Hydrogen 2 Joint Undertaking (FCH 2 JU). It has set up a first version of a GO scheme, as well as labels for renewable and low-carbon hydrogen, all of which are reviewed and endorsed by 100+ companies from the CertifHy Stakeholder platform. The scheme is in a pilot phase and will be further developed under the framework of CertifHy 3 project to be compliant with the CEN EN16325 standard as well RED II provisions on hydrogen GOs. The new version of the scheme will serve as preliminary research for the development of the EECS® Gas Scheme rules and will be piloted in four domains (Flanders, Wallonia, Netherlands, Austria) during CertifHy 3 and the scheme will also expand to hydrogen certification for the transport sector (seeking recognition as EU Voluntary Scheme for Renewable Fuels of Non-Biological Origin).

ERGaR was founded in 2016 building on the expertise of established national registries and acknowledges the current national differences in framework conditions and market uptake of renewable gases. ERGaR's scheme and IT-solution are aimed at providing business processes which are harmonised as much as possible while deliberately keeping some specific administrative requirements under the responsibility of ERGaR's national scheme participants (national registries / issuing bodies). A launch of the ERGaR CoO scheme is envisaged for the first half of 2021.

This report was prepared in a period when the **framework conditions and definitions of renewable energy carriers** were being developed on European level and the recast of the Renewable Energy Directive (RED II) was being implemented on national level. Having this in mind, it is important to mention that AIB, CertifHy and ERGaR have developed and adopted their schemes to the new provisions of RED II. At the moment of finalising this report, however, the AIB electricity scheme was the only scheme that was operational. The AIB gas scheme was launched and will be operational as soon as the first scheme participants join.

The ERGaR CoO Scheme is ready for its launch. Two scheme participants are undergoing the admission process to join the scheme, two further potential scheme participants are in the process of preparing the registration files. The first cross-border transfers are expected to be performed in the first half of 2021.

The situation was different for CertifHy's scheme and the ERGaR RED MB scheme. For the latter, documents had been submitted to the European Commission for recognition as voluntary scheme. As a consequence, these scheme rules had not been made public yet, and thus were not covered by the indepth comparison from the present work. For these reasons, not all criteria were applicable to CertifHy and ERGaR RED MB.





With the aim to describe the **scope of the schemes** in the present report, the European framework for the issuance and transfer of renewable energy carrier certificates was assessed (see Chapter 0). As a result, the purpose, the energy source, and the documentation of sustainability were identified to be the most important characteristics to differentiate between the scope of the schemes for the cross-border transfer of renewable energy certificates. Except for the ERGaR RED MB scheme, all schemes cover Guarantees of Origin (GOs). AIB (EECS[®] rules) covers all types of energy carriers, CertifHy is focused on hydrogen and the scope of ERGaR CoO scheme entails all types of renewable gases.

All schemes offer the documentation of **sustainability characteristics** (Proof of Sustainability, PoS). The concepts for mass balancing are under development (while, in the meantime, they provide a set up to be linked with a dedicated mass balancing certification system). ERGaR (RED MB scheme) has a fully developed concept for mass balancing which undergoes a recognition process by the European Commission. Since mass balancing is needed to document sustainability in accordance with RED II, the schemes have to proof this aspect in the future at least for those purposes which require such an approach.

Due to their generic set-up, the schemes can be extended to cover the RED II requirements on sustainability and additionality of Renewable Fuels of Non-Biological Origin (RFNBO) and Recycled Carbon Fuels (RCF) in the future. However, the European legal framework is not finalised (delegated acts are outstanding) in this respect, and definitions of the certificates and verification requirements must be developed by the European Commission and the voluntary schemes respectively before they can be incorporated into the schemes.

Against this background, it is recommended to start the development of harmonised rules for the **conversion of energy carriers** and the handling of the respective gas GOs, as it is foreseen in REGATRACE task 4.3. Since the schemes have different energy carriers in their scope, the conversion of energy carriers can be assessed within schemes and between the schemes. Furthermore, all gas related directions (gas referring to hydrogen and hydrocarbon gas) of energy conversion can be covered: electricity to gas, gas to electricity, hydrogen to hydrocarbon gas and hydrocarbon gas to hydrogen. When the schemes have further developed their concepts and requirements for the documentation of mass balancing and more information is available on the verification requirements of RED II compliant RFNBO, the rules for the energy conversion of GO can be adopted to the conversion of one or more energy carriers into sustainable gaseous fuels.

All investigated schemes have organised to establish **trustworthy and traceable business processes to verify the authenticity of the claims and information** on the respective certificates. This is very important for the mutual recognition of certificates that are transferred between two issuing bodies / registries. In an integrated energy system, the method of data verification becomes even more important with regard to the conversion of energy carriers and the respective certificates that shall serve as a proof for the energy input of conversion processes.

In this regard it has to be considered, which and how quantitative and qualitative information related to the gas production has to be verified for the issuance of certificates. Within AIB scheme rules, issuing bodies have some discretionary power if substrate (energy input) specific data (production volume, type and sustainability of substrate and energy input etc. see 4.3.2) have to be verified by a third party. CertifHy and ERGaR require this information to be verified by auditors. In this regard, verification requirements would need some adjustments to recognise certificates that were issued under other scheme rules. From this comparison it can be concluded that with regards to the production data quality verification no major differences were identified. However, an in-depth analysis would be necessary to identify whether





certificates that were issued under other scheme rules could be used to evidence the origin and characteristics of the input energy carrier.

Another topic to safeguard the integrity of data is the area of data processing and security. It is key to the European scheme operators to guarantee the authenticity and integrity of data within their schemes and to take measures that protect the IT from cyber-attacks and prevent scheme participants from data losses. They achieve this either by means of contracts with their IT provider or by provisions in their scheme rules.

The different technical set-up of the schemes IT determines some of the **organisational differences** that were observed. CertifHy is based on one centralised database that neither has interfaces to national IT systems nor to databases but rather includes account holders that operate renewable gas installations. AIB and ERGaR facilitate the transfers among their scheme participants' databases via an electronic hub (AIB) and a platform (ERGaR) respectively, whereas scheme participants are issuing bodies and registries. Operators of gas producing installations cannot become scheme participants neither with AIB nor with ERGaR.

The compared schemes have taken different measures to avoid double counting and claiming. Responsibilities and duties to prevent from **multiple counting** are organised differently between the assessed scheme operators and their scheme participants. In the current situation, with different issuing bodies for different types of certificates and energy carriers on the one hand side and different European schemes on the other side, it is crucial that the involved European schemes exchange information with one another and constantly monitor the framework conditions to identify potential new risks of multiple counting and fraud. The European legislative framework can play an important role to support scheme operators in this regard.

From the comparison of other organisational aspects such as application procedures, liability coverage and Know-Your-Customer (KYC) procedures, a systematic difference between AIB and ERGaR can be observed. AIB scheme rules comprise a comprehensive set of rules and approaches aiming at harmonising all business processes that are related to the issuance, transfer and cancellation of certificates. AIB provides a contractual framework that clarifies the **liability** of each party involved, thus protecting the scheme operator, other scheme participants and account holders abroad from unjustified liability claims. The scheme rules and the processes of ERGaR CoO scheme were developed based on ERGaR members' (established registries) experience of issuing and exchanging gas certificates with the aim to harmonise procedures as much as possible while acknowledging national circumstances and procedures. As a result, some specific administrative requirements are kept under the responsibility of national scheme participants.

Another aspect is the level of **automation** in the processing of transfers. The AIB hub and CertifHy facilitate fully automated transfer processes and quality checks of certificate transfer across borders. The ERGaR platform is semi-automated, involving its scheme participants to check and verify incoming and outgoing transfers. Thus, the effort to connect national IT systems to the ERGaR platform is low at the beginning, while the work related to checking cross-border transfers is increasing with the market development.

In order to facilitate the market development, it is important that the described European schemes can communicate, which is even more relevant with energy carrier conversion and various purposes of certification. The major working areas for enhancing recognition and exchange of information between the studied schemes, relate to the following aspects:

- the data integrity and quality assurance frameworks of the organisations are not recognised by each other,





- the data recorded on certificates, its verification requirements and the format of this data is not fully synchronised between the various schemes,
- the IT systems and the transfer protocols of the three organisations today are not synchronised in their design,
- the liability coverage framework is not levelized among the different schemes.





6 Glossary

Account Holder

Person or organisation in respect of whom a transferable account or a cancellation account is maintained on a registration database (for the issuance of certificates).

Additionality (electricity)

The additionality criteria ensures that additional demand for renewable electricity is met by additional supply. And that the demand for renewable fuels of non-biological origin for the transport sector does not interfere with the electricity production that is reserved for other sectors (adapted from Global Alliance Powerfuels, 2020).

Association of Issuing Bodies (AIB)

AlB is an international non-profit organisation established under Belgian law registered in Belgium as aisbl. The Association of Issuing Bodies (AIB) operates the European Energy Certificate System (EECS®), a multipurpose and multi-energy carrier certificate system facilitating standardised cross border transfer of energy certificates. This system was in 2019 complemented with the EECS® Gas Scheme. Early 2020 AIB reorganised to facilitate independent decision making by respectively electricity and gas issuing bodies for all topics that relate to either electricity or gas specifically. Guarantees of Origin under REDII art.19 can be issued under the EECS® Gas Scheme, as can other type of gas certificates, either or not under independent criteria schemes.

Attribute

Data specifying the characteristics of energy produced by a renewable gas producing installation in terms of the input(s) used and/or the details of that production installation and production process.

Book & Claim

A term to indicate that the certificate can be transferred, independently of the transfer of energy to which it is related, from one holder to another, i.e. trade of the physical product is decoupled from the transfer of the certificates. Consumption of the physical energy can only be attributed to the source and other attributes mentioned on the "Book and claim" certificate, if the corresponding certificate is cancelled.





Certificate (Renewable Gas Certificate)

An electronic document that records or guarantees information in relation to attributes of the input consumed in a production installation and the production method and amount of a specific energy carrier that is yielded by this production installation.

CertifHy

CertifHy is a project, funded by the Fuel Cells and Hydrogen Joint Undertaking (FCH JU) of the European Commission. It is dedicated to developing a European framework for Guarantees of Origin for hydrogen.

Cross-sectoral concepts

Cross-sectoral concepts link different energy sectors with one another through conversion of energy carriers. It is the integration between different parts of an energy system e.g., electricity and heat or transport. Examples for cross-sectoral concepts are the conversion from power-to-heat, power-to-gas, and cogenerated heat and power production (Thellufsen & Lund, 2017). In this context, power refers to power conveyed in the form of electricity.

Chain of Custody

Refers to the process of tracing the origin and ownership of products throughout the value chain.

Competent Body

Body duly authorised under the laws and regulations of any state to exercise or discharge any legislative, governmental, regulatory or administrative function associated with the administration of a national GO scheme designated by the government in accordance with Article 19 of the RED II.

Disclosure

Provision of information to a final customer about the attributes and quantity or share of energy that has been supplied.

EECS®-certificate

A unique electronic certificate specifying and representing the quality and method of production of a specific quantity of Output, which is maintained on an EECS[®] Registration Database and Issued in accordance with the provisions of the EECS[®] Rules.

EECS[®] GO





The EECS[®] Rules define an EECS[®] GO as "an EECS[®] Certificate corresponding to a type of Guarantee of Origin".

The EECS[®] Rules define a Guarantee of Origin as "a certificate issued by (a) a Competent Authority, or (b) by an AIB Member acting as the duly authorised agent on behalf of a Competent Authority, under the laws of a State as a guarantee of the nature and origin of energy for the purpose of providing proof to the final consumer of energy that a given share or quantity of energy, as the case may be:

- Was produced from the energy source to which the guarantee relates, and/or
- Was produced by the specified technology type to which the guarantee relates, and/or
- Has, or the Production Device(s) which produced it has (or have) other attributes to which the guarantee relates.

ERGaR aisbl

ERGaR (European Renewable Gas Registry) aisbl is an international non-profit organisation established under Belgian law. ERGaR was founded in September 2016 as a cooperation between national renewable gas registries and other major energy organisations interested in supporting the development of ERGaR's vision to enable cross border transfer of renewable gas certificates in Europe. The association currently counts 28 members from 15 European countries comprising established biomethane/renewable gas registries, gas distribution and transmission system operators, biogas associations and other major stakeholders of the European biomethane market.

ERGAR Certificate of Origin (CoO)

An electronic document that corresponds to renewable gas certificates that were issued and transferred to the ERGaR CoO scheme by an ERGAR Scheme Participant with the purpose of transferring it to another ERGaR Scheme Participant. ERGaR CoO provides proofed qualitative and quantitative information about a biomethane consignment injected into the Natural Gas Network. CoO are primarily designed to meet the demand of consumers for a method of disclosing their use of renewable gas which, depending on the countries and the reporting methodology, can have various benefits. These benefits are largely related to corporate emissions reporting and statutory uses.

ERGaR CoO Scheme

The ERGaR Certificate of Origin scheme (ERGaR CoO scheme) is organised and operated by the European Renewable Gas Registry (ERGaR) aisbl. The Scheme allows the Europe-wide cross-border title transfer of Certificate of Origin (CoO) between participating national biomethane registries, who create such





documents in respect of biomethane that has been injected into the natural gas network in their country of operation.

ERGaR RED MB Scheme

The ERGaR RED Mass Balancing Scheme (ERGaR RED MB Scheme) is under review at the European Commission for recognition as a voluntary scheme. It will be organised and operated by the European Renewable Gas Registry aisbl. ERGaR RED MB is a verification scheme for biomethane consignments forwarded through the natural gas pipeline network only. ERGaR RED MB is a European administrative system designed to facilitate the mass balancing of cross-border transactions of sustainable biomethane consignments that meet all the necessary requirements to be accepted as sustainable biofuel (in accordance with the RED) in the importing country. ERGaR RED MB carries out the mass balancing of injected biomethane on a consignment by consignment basis: every injected biomethane consignment is registered individually, and the relevant Proof of Sustainability (PoS) is inseparably attached to the Proof of Origin (PoO).

Energy carrier conversion

The production of an energy carrier from one or more inputs including at least one other energy carrier

External audit/inspection

External audits/inspections are carried out by independent, third party professionals who perform an impartial audit/inspection of the renewable gas production installation and the renewable gas produced within a dedicated time period..

Geographical correlation

Geographical correlation refers to a spatial limitation regarding the extent to which the production of renewable fuels of non-biological origin contributes to the need for additional grid capacity in order to avoid producing hydrogen in Europe from electricity that was i.e. produced in North Africa (adapted from Global Alliance Powerfuels, 2020).

Guarantee of Origin (renewable energy carrier)

A Guarantee of Origin means an electronic document which has the sole function of providing evidence to a final customer that a given share or quantity of energy was produced from renewable sources.





Hydrocarbon gas

An energy carrier consisting of chemical compounds composed mainly of the elements of carbon and hydrogen, which are in gaseous state when they are at 20°C and atmospheric pressure. (FastGO)

Independent Criteria Scheme (ICS)

The EECS[®] Rules define an ICS as a scheme that provides assurance that the Output certified by an EECS[®] Certificate, and/or the relevant Production Device with which it is associated, conforms to a specific set of qualities which are additional to those established for the EECS[®] Product.

An EECS® Certificate may convey an ICS of which the quality is guaranteed by the ICS operator.

Mass balancing

In relation to RED II, mass balancing is an approach to document compliance with RED sustainability criteria and greenhouse gas emissions savings thresholds in relation to the production and supply of liquid and gaseous energy carriers. (Other definitions and interpretations of mass balancing exist.)

Multiple Counting

Multiple counting concerns a renewable gas certificate being counted multiple times towards the same purpose (double-claiming), or it being duplicated during transfer (double transfer), it being used multiple times (double cancellation), multiple certificates being issued for a same amount of energy for the same purpose (double issuance), or the same attributes of renewable gas being counted multiple times regardless the existence of a corresponding renewable gas certificate.

Non-Governmental Certificate (NGC)

The EECS[®] Rules define an NGC as "a voluntary equivalent of a guarantee of origin (GO), which is not issued in the framework of a Legislative Certification Scheme."

Proof of Sustainability (PoS)

A document detailing the verification of sustainability claims relating to biofuel consignments that comply with sustainability and greenhouse gas emissions saving criteria in accordance with RED2 Art. 25- 30)). PoS are issued by conformity assessment bodies (certification bodies) associated with a voluntary scheme recognised by the European Commission under the RED.





Purpose (of a certificate)

The original intended use for which a certificate is issued, whether this is disclosure, support, target counting, demonstrating compliance with a label or a combination of these.

Recycled Carbon Fuels (RCF)

Recycled carbon fuels are liquid and gaseous fuels that are produced from liquid or solid waste streams of non-renewable origin which are not suitable for material recovery, or from waste processing gas and exhaust gas of non-renewable origin which are produced as an unavoidable and unintentional consequence of the production process in industrial installations.

Renewable transport fuels of non-biological origin (RFNBO)

Within the framework of RED II, renewable transport fuels of non-biological origin refer to liquid or gaseous fuels other than biofuels or biogas and which are used in the transport sector. Their energy content is derived from renewable sources other than biomass. RFNBO can be applied to comply with the 14% renewable energies target described in Article 25 from RED II provided that the origin of the renewable electricity and the greenhouse gas emissions savings are fulfilled. The latter are to be defined by a Delegated Act.

Scheme Participant

National/ voluntary schemes linked to a European scheme operator.

Temporal correlation

Temporal correlation refers to the temporal link between the production of the energy carrier input and energy carrier output. The aim is to avoid issuing certificates for hydrogen based on electricity, which was generated after the hydrogen (adapted from Global Alliance Powerfuels, 2020).





7 Literature

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Annexes

List of criteria

The following criteria were identified by the project partners to describe and compare the European schemes:

Ownership and Operation of Scheme
Which legal entitiy owns the intelectual property of the scheme?
Which legal entity owns the intelectual property of the IT system for cross border transfers?
Which legal entitiv operates the scheme?
Which legal entity operates the scheme IT for cross border transfers?
scope of scheme
which gas categories can be documented and for which purpose(s), what is the geographical scope and
what kind of renewable gas transport is included in the scheme?
gas category
hydrogen
hydrocarbon gas
other (methanol, bio-LNG, etc.)
source of energy
biomass
renewable fuels of non-biological origin
recycled carbon fuels
fossil
other
means of transport
European gas grid (no isolated grids)
Does the scheme include isolated gas grids? If yes, how are certificate issuance and cancellation considered
with regard to mass balancing?
off-grid transport (road, water, air, railway)
geographical scope
which domains/countries are covered by the scheme in general (EU27, UK, EFTA, others) ?
which domains/countries are participating in the scheme today
purpose of the renewable gas documentation
RED2 related
end consumer disclosure (art. 19 RED2)
biogas for transport and heat & power >2MW for transport and union target (art. 3 & 25 RED2)
biogas for power & heat <2MW for union target (art. 3 RED2)
Renewable fuels of non-biological origin RFNBO for transport target (and union target) (art. 3 & 25 RED2)
other (non-biological) renewable gases for Union target (art. 3 RED2)
other purposes
statistics: does the scheme publish statistics on renewable gas transfers? Which?
other purposes
scope of supply chain
Which part of the supply scheme is covered by the scheme?





technical aspects

technical requirements for scheme participants

which kind of interface(s) exist for the exchange of information with scheme participants

What are the technical requirements?

What type of IT security requirements must be fulfilled?

Are there requirements on architecture of the scheme participants registry configuration? If yes, which? other interfaces from scheme IT to other applications

Are there any other interfaces? Which? (e.g. Union biofuel database)

future proof system

To what extent is the IT system flexible to add/modify data on a transfer message

scalability of IT

state of the art IT-technology

usability

Automation level of cross border transfers

manual actions needed

prevention of fraud

multiple counting / claiming

Which measures are taken to avoid multiple counting on the level of:

issuance

transfer

cancellation of transfers

What is done to avoid certificates from being applied for the wrong purpose?

What measures are taken to prevent certificates from being claimed for multiple purposes?

multiple claiming

VAT fraud

Which type of VAT fraud prevention criteria are required in addition to KYC?





Data
safeguard the authenticity and integrity of data from account holders
who is allowed to execute audits of renewable gas installations?
who approves auditors? how are they observed? Consequences for non-conformity with auditing rules for
auditors?
what are the auditing requirements for renewable gas installations - level 1 - (frequency, consequences in
case of non-conformity)
what are the verification requirements for renewable gas production - level 2&3 - (amount, substrates,
mass balancing, sustainability, etc.)
which criteria are applied to the data provision (e.g. metering, clearing, auditing etc.)?
Is an independent third party audit on sustainability and ghg criteria of renewable gases acc. to art. 30 (3)
RED2 considered? If yes, how?
documentation of attributes of renewable gases
requirements on renewable gases according to art. 30 RED2
methodology for mass balancing
how is information on financial support proved and provided?
information on sustainability and ghg emissions according to art. 29 RED2
methodology for ghg emission calculation and reporting
how does the scheme secure that ghg savings are only considered once?
methodology for documentation of sustainability criteria
renewable origin of electricity (RFNBO) according to art. 27 (3) RED2
How does the scheme secure that renewable gas was produced from renewable electricity according to
art. 27 (3)
Additionality of RES electricity plant
Temporal correlation
Geographical correlation
Does the scheme request additional information on sustainability issues?
No deliberate production of CO/CO2
Carbon source
Water consumption/stress
others
addtional, other information on renewable gases
which additional information can be documented?
how is additional information proved and provided?





criteria for conversion of energy carriers

Is energy conversion covered by the scheme and how is it defined?

If hydrogen is covered by the scheme, how is the injection of hydrogen into the gas grid considered?

How is secured that no certificates were issued for the input energy carrier and certificates are cancelled with the purpose of energy conversion respectively?

If and how is proved that the input energy carriers and materials are sufficient to produce the final energy carrier?

data processing, exchange, privacy and security of schemes IT

standardization of data content

Are there data field definitions (content) on certificates

Are there data field definitions (IT)

Free text facilitation in transfer messages (what is it used for and how is it processed)

immutability

Is it allowed to change data on a certificate after a transfer was initiated? What are the requirements, rules for modifications? Who is allowed to change data?

How are scheme participants and account holders informed in case of changes?

Is it possible to change/modify data in order to correct errors and/or to complete data?

data security

authenticity: information is genuine

availability: accesible and usable upon request

integrity: safeguard the accuracy and completeness of information

non-repudiation: trace back all actions (e.g. transaction log)

information backup: real-time backup and redundant backup (how many?)

cybersecurity: protection against cyberattacks

error and dispute handling in relation to transfers

process of rejection of certificates

reason of rejection

measures to avoid duplication or disappearence of rejected certificates

handling of disputes between scheme participants, scheme operator





organisational aspects

registration processes

account holders (see terminology)

requirements to become an account holder

KYC rules for account holders

contractual obligations of account holders towards national scheme

scheme participants

requirements to become a scheme participant

is an independent audit verifying the compliance of the scheme participant with scheme rules/requirements? Who is allowed to conduct an audit? How often?

Registration process (how many steps does the scheme participant have to go through)

contractual obligations of scheme participants towards scheme

liability coverage (extent to which there is a contractual framework covering the following aspects)

account holders

Liability of account holders vis-a-vis the scheme participant

scheme participants

Liability Insurance requirements on scheme participant

(Areas covered in) Contractual commitment to the scheme operator

Framework for legal claim against the scheme operator in case of technical transfer

errors/delay/disruption occur

scheme provider

Liability Insurance coverage by scheme provider

Extent of liability of the scheme provider in contractual framework (protection of scheme provider balanced out against its responsibilities)

democratic control

how are rights and power shared between scheme operator and participants and IT system provider?

experience in international transfers

renewable gas transfers (hydrogen, hydrocarbon gas, bio-LNG, biomethanol, ..)

Annual volume (TWh) of cross border transfers 2019/20

number of cross border transfers 2019/20

other renewable energy carriers

Annual volume (TWh) of cross border transfers 2019/20

number of cross border transfers 2019/20





Comparison of information exchanged via schemes

AIR	ERGaR CoO	CertifHy
Information on energy installation and account holder		continy
(a) the EECS Product under which it has been Issued so identifying		
the carrier by which energy is conveyed, where this may be:		
(i) electricity; or		
(ii) fuel, whether gaseous, liquid, or solid; or	Energy Medium	Fuel (or heat source) and
		Technology;
		Fuel (or heat source) code(s)
		(see Annex A) for up to ten
		Share of renewable energy for
		each input energy carrier for
(iii) heat (including cooling), whether this is conveyed by gas, or by		
liquid, or by heat transfer by conduction or radiation;		
	Energy MWh	
(h) the unique provides a second to it hugh a Origination Manual and in	Gross or Net Energy	
(b) the unique number assigned to it by the Originating Member in	Exchange ID,	GO identity
accordance with the subsidiary Document Hubcom;		which has been assigned to the
		GO)
		Cortification Rody
(c) the date on which the Originating Production Device became	Date Of Commission	Commissioning date
operational (as determined in accordance with relevant national		
legislation), as verified by the Production Auditor during the		
registration process for that Production Device;		
(d) the first day on which the Output to which it relates was	Production Date From	Date and time of hydrogen
produced;		production: beginning and end
		of the production batch
(e) the last day on which the Output to which it relates was	Production Date To	
(f) the energy source from which the Output was produced (by	Biomass Description;	
reference to the types of energy sources set out in the EECS Rules	Biomass Classification	
Fact Sheet" Types of Energy Inputs and Technologies";	Description;	
	Original Biomass Description	
(g) the type of the Originating Production Device, by reference to the	Technology	Technology code (see Annex B);
types of installation set out in the EECS Rules Fact Sheet" Types of		including main/by-product
Energy Inputs and Technologies";		
(h) the identity of the Originating Production Device, where this shall	Device Name	Identity of the Production
include:		Device;
		production device identifier;
		Name
(i) the unique number which has been assigned to the Production	Device ID	
Device according to Section C2.1.2(b); and (ii) optionally, the name of		
the Production Device as specified in the application for registration		
of that Production Device, provided that the Registrant of the		
Production Device has agreed to this information being recorded on		
(i) the Country of Issue; (j) the location of the Originating Production	Device Country	Location country
Device, being its:		
(i) latitude and longitude in accordance with the EECS Rules Fact	Street and Number, Postal Code	Location city
Sheet "Geographical Coordinates"; and/or (ii) country, city, and		
postal code;		
(k) the Capacity of the Originating Production Device, as specified by	Production Capacity	Installed production capacity
the Section of PART IV of the EECS Rules establishing the EECS		
Scheme in relation to the relevant Output;		
(I) its Face Value in accordance with the Section of PART IV of the		
EECS Rules establishing the EECS Scheme in respect of the relevant		
Output;	Course Desistant	
(in) the identity of the Originating Member;	Source Registry	Account number
	Number Postal Code City	





AIB	ERGaR CoO	CertifHy
Information on issuance, purpose and characteristics of certificates		
	Information on original	
	certificate (Batch ID, original	
	certificate number, created by),	
(n) the Date of Issue;	Issuing Date	Issuing date
	Expiration Date	Cancellation/Expiry date
(o) the status of the EECS Certificate, by reference to whether the		
Certificate is a Guarantee of Origin, a Support Certificate, or an NGC;		
and		
(i) where the Certificate is a Guarantee of Origin, whether it is a		
Guarantee of Origin in relation to the energy source for the Output		
to which it relates and/or the technology type used in producing		
such Output;		
(ii) where the Certificate is a Support Certificate, the type of Support		
Certificate which it is;		
(iii) where the Certificate is a Support Certificate and/or a Guarantee		
of Origin, the Competent Authority (or Competent Authorities where		
appropriate);		
(p) the Purpose for which the EECS Certificate has been issued,		
being:		
(i) Disclosure; and/or		
(ii) Support;		
(q) an indication, as appropriate, as to whether:		
	Tracking Claim (Mass Balancing;	
	Book&Claim)	
(s) where the Certificate has been issued in respect of a Production		CertifHy label:
Device which is accredited to an ICS and the Scheme member is		CertifHy Green hydrogen;
supporting that ICS, the relevant ICS identifier.		CertifHy Low-Carbon hydrogen
C3.5.5 Each EECS Certificate and the information contained in it, or		
to be indicated by it, shall be in the format specified in the Subsidiary		
Document "HubCom".		





AIB	ERGaR CoO	CertifHy
Financial support	·	
(i) the relevant EECS Registration Database records that no Public Support has been, is being or will be given in respect of the Originating Production Device;		
(ii) the relevant EECS Registration Database records that Public Support has been given in relation to an investment in the Originating Production Device or its owner;	investment support	investment supported, and/or
(iii) the relevant EECS Registration Database records that Public Support is being or will be given with respect to the Output of that Originating Production Device;	production support	production supported, and/or
 (iv) the relevant EECS Registration Database records that both: 1 Public Support has been given to an investor in the Originating Production Device in relation to its investment therein or in the body which owns that Production Device; and 2 Public Support is being, or will be, given in respect of the Output of that Originating Production Device; or 		
(v) the relevant EECS Registration Database does not record whether or not Public Support has been, or is being, given in respect of the Originating Production Device;		
		supported scientific/demo/pilot project, or unsupported, or no information available
(r) such other information as is specified by the Section of PART IV of the EECS Rules establishing the EECS Scheme in relation to the relevant Output as being required to be provided in respect of the energy source and type of Originating Production Device to which the Certificate relates;		

AIB	ERGaR CoO	CertifHy
Gas specific information		
O7.1.1 For the purposes of Section C3.5.4(a), an EECS Certificate in		
respect of Gas shall record the medium by which energy is conveyed		
as "Gas", in the format specified in the Subsidiary Document		
"HubCom".		
O7.1.2 For the purposes of Section C3.5.4(k), an EECS Certificate in	Production capacity	
respect of Gas shall record its Nominal Capacity as the capacity of		
that Production Device.		
O7.1.3 In addition to the data mentioned in Section C3.5.4, EECS		
Certificates corresponding to the Gas Scheme must specify the		
following information in respect of the Output, in the format		
specified in the Subsidiary Document "HubCom":		
(a) the type of gas, referring to the chemical composition of the	type of gas	
energy carrier, being "Methane", "Hydrogen" or "Other gas";		
(b) the Calorific Value used for calculating the MWh of Output, being	defined by calculation	
the higher calorific value;	methodology	
(c) the means of supply, as identified in EECS Rules Fact Sheet	Delivery (grid injection)	
"Means of Supply".		
And the following optional data fields for gaseous energy carriers:		
O8 Additional information on EECS Gas Certificates	Additional Information	





AIB	ERGaR CoO	CertifHy
Sustainability and GHG emission related information		
O8.1.1 EECS Gas Certificates corresponding to Products relating to the CO2 impact of the production shall contain the following data:		
(a) CO2 emissions produced; and	Greenhouse Gas Emission Chain	GHG emissions intensity
(b) CO2 emissions saved relating to the Nett Gas Production and including a reference to the methodology used to calculate this information, as identified in EECS Rules Subsidiary Document "Methodology for calculating CO2 impact of production";	According to the Sustainability Scheme	
	Sustainability Scheme Name	
	Proof of Sustainability	
	Sustainability Scheme ID	
O8.1.2 EECS Gas Certificates corresponding to Products relating to the sustainability criteria referred to in the Renewable Energy Directive shall contain the following data:		
(a) Whether or not the Production Device complies with the applicable sustainability criteria referred to in the Renewable Energy Directive, together with an indication as to whether these criteria have been met, a reference to the certification body which confirmed that this is the case, and a reference to the relevant report produced by this certification body;	Information is provided by Proof of Sustainability	
(b) Whether or not the CO2 emission savings criteria are met, as referred to in the Renewable Energy Directive;		
(c) End-use of the Gas as set out in EECS Rules Fact Sheet "Use of Gas".		





AIB	ERGaR CoO	CertifHy
Electricity specific information (EECS electricity rules)		
N6.5.1 For the purposes of Section C3.5.4(k), an EECS Certificate in respect of Electricity shall		
contain:		
(a) the Electrical Capacity; and		
(b) where such EECS Certificate corresponds to a Product relating to the technology type of		
the Originating Production Device where such technology type is Cogeneration, the Thermal		
Capacity; and		
(c) where appropriate, the Mechanical Capacity.		
And for specific products relating to electricity:		
N6.6.1 EECS Certificates corresponding to Products relating to the technology type of the		
Originating Production Device where such technology type is High-Efficiency Cogeneration		
must specify the following information in respect of the Output, in the format specified in the		
Subsidiary Document "HubCom":		
(a) use of heat, being the value identified in the EECS Rules Fact Sheet "Cogeneration GO		
Codes" which represents the predominant use of the relevant heat:		
(b) lower calorific value in megajoules per kilogramme of fuel or megajoules per cubic metre		
or gaseous fuel of megajoules per litre of liquid fuels;		
(c) Primary Energy Savings, including:		
(i) the primary energy saved expressed as a percentage according to the Energy Efficiency		
Directive; and		
(ii) the actual amount of primary energy saved expressed in megajoules per MWh; and (iii)		
the overall primary energy savings expressed as a percentage based on the total energy input		
and output flows of a Cogeneration unit (whereas the Annex II primary energy savings		
calculations identified in section N6.6.1(c)(i) are based on the Cogeneration inputs and		
outputs only); and		
(d) Information relating to CO2 emissions, comprising:		
(i) the CO2 emissions produced per unit of highly efficient Cogeneration electricity in		
kilograms per MWh, calculated by subtracting the fuel for Cogeneration heat based on		
Harmonised Efficiency Reference Values for separate production of heat from the total		
Cogeneration fuel; and		
(ii) absolute CO2 emissions saved per MWh of highly efficient Cogeneration electricity		
compared with the best available and economically justifiable technology for separate		
production of heat and electricity using the same fuels; and which was on the market in the		
year of construction of the Cogeneration unit, as defined in the Energy Efficiency Directive.		
N6.6.2 FECS Certificates in respect of Output produced from a fossil fuel by any Production		
Device must record the CO2 emitted by the Originating Production Device in the production		
of 1 MWh of electrical energy and associated with the relevant Input in kilograms per MWh		
of final energy produced, by reference to the source types and reference values set out in the		
EECS Rules Fact Sheet "Types of Energy Inputs and Technologies". The format of such		
information shall be in accordance with the Subsidiary Document "HubCom".		
N6.6.3 EECS Certificates in respect of Output produced from nuclear fuel must record the		
radioactive waste produced per MWh of electricity. The format of such information shall be		
in accordance with the Subsidiary Document "HubCom".		
INb.b.4 Input and technology types shall be those set out in the EECS Rules Fact Sheet "Types		
or Energy inputs and Technologies".		


AIB: The European Energy Certificate System (EECS)

EECS Compared to the REGATRACE task 4.2 criteria









- Scope of schemes
- Technical aspects
- Prevention of fraud
- Data verification, processing and security
- Organizational aspects
- Experience in international transfers

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AIB, Guaranteeing the Origin of European Energy



Not-for-profit Brussels-based association – AISBL – since 2002

Developer and custodian of the EECS[™] standard

27 countries connected (30 members)

All AIB's members are competent bodies for GOs

About half AIB's members are also competent bodies for electricity disclosure supervision

6 AIB members assigned by government for gas GO issuing Several members likely to be assigned for gas soon





The European Energy Certificate System (EECS)



EECS Rules	 Certificate Administration Core principles – objectives & aspirations Plant registration Certificate issue, transfer and cancellation EECS participation rules Membership, admission, compliance, disputes & change Scheme specific rules electricity, gas 	EUROP ENERG CERTIF
Detail ("subsidiary documents")	 Decision-making – disputes, voting etc Registry system & networking standards Approval of agents Change management Assignment of codes Audit & periodic reviews 	
Dynamic information ("fact sheets")	• Addresses, membership details, codes, guidelines	
Domain protocols	• Description of regulations in a specific country	

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EECS Rules chapters



Generic harmonised framework for energy certificates

- A. Core principles
- B. Definitions
- C. Harmonisation measures
- D. EECS Products
- E. EECS Schemes
- F. Admission and Expulsion Procedures
- G. Probity of Members
- H. Members Agents and Measurement Bodies
- I. Compliance
- J. Disputes
- K. Assessment Panels
- L. Change Procedures
- M. General

Scheme-specific rules

- N. Electricity Scheme
- O. Gas Scheme

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What does an EECS certificate look like



Generic Certificate

Energy Medium
Product
Unique certificate number
Production period (start and end dates)
Energy source
Type of installation
Production device info
Identity and country of originating member
Issue date
Identity and country of relevant competent body
Purpose
Support received by type
Independent Criteria Schemes (Labels) *
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Additional on Gas Certificate

(EECS Rules Release 7 v12)

Type of Gas

• Network compatible gas, Hydrogen, Other gas

Calorific Value

Means of Supply - category

CO2 Emissions saved & produced *

Sustainability Criteria Met? *

• Y/N, Name Certification Body, reference to report

GHG saving criteria met? *

End-use of gas category *

 $^{m{*}}$ Yellow text: optional data field

⁴ Data field definitions will be updated after revision of EN16325



- EECS GO: issued by a competent authority under the laws of a state for the purpose of providing proof to a final customer
- ICS: EECS Disclosure: Independent criteria scheme operated by AIB on electricity from non-renewable sources
- EECS Support certificate
- ICS Certificates
- (past: ICS RECS: Independent criteria scheme operated by AIB, on electricity from renewable sources)
- (future: CertifHy, as an Independent Criteria Scheme in EECS)

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□ NGC = ICS operated by AIB as EECS Product

or

- Other ICS, recognised by AIB: EECS Subsidiary Document 09
 - ICS can be associated with EECS Certificate to provide traceability.
 - *ICS flag on an EECS Certificate* indicates that the Output fulfils the criteria of the ICS.
 - Accreditation of production devices to an ICS & consuming the certificate beyond cancellation are out of scope for EECS.
 - Recognition of an ICS by AIB:
 - ICS application procedure to AIB,
 - in relation to specific Domains in which Scheme Members have agreed to place ICS Flags for this ICS onto EECS Certificates at Issue;
 - Application form in SD09
 - Current ICS's in use: EKOENERGY, Tüv-Süd, Naturemade



ProductStatus

- GO (governmental guarantee of origin)
 - ICS::RECS
 - ICS::2
- (NGC Non-governmental certificate)
 - ICS::RECS
 - ICS::2

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Ownership (of schemes, IT for cross border transfer, operation, ...)

- Association of issuing bodies, non-profit association under Belgian law (ivzw)

The European Energy Certificate System

- Generic certificate governance system, facilitating currently the following schemes:
 - Electricity
 - Gas (gaseous energy media, of which the principal purpose is to carry energy content towards an energy consumer)
 - Types of Gas: methane, hydrogen and other gas
- Geographic scope: the EU and its future or former member states, EFTA countries and contracting parties of the Energy Community
- All energy sources (see EECS Fact Sheet 5 values for data field "energy sources")
- All means of transport (gas: data field indicating the "means of supply", values in EECS Fact sheet 20)
- Supply chain scope:
 - Input to production device, production (of the gas/electricity), issuing of certificate, transfer of certificate, cancellation of certificate, framework for usage of the certificate (avoiding double consumption claims)
 - For electricity: disclosure supervision incl residual mix calculation

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Data field 'Purpose'

- Current values in EECS: Disclosure, Support
- (original additional value 'Target' can be reintroduced if MS will use it as such – likely in case art. 8.1 of REDII will be used)

Single purpose versus multi-purpose certificate

- One certificate can have more than 1 purpose
- In case of several single-purpose certificates issued for the same MWh: avoidance of cross-purpose double counting is to be ensured

EECS Certificate



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Technical Aspects

• Detailed requirements

- in EECS Subsidiary Document 03 EECS Registration Databases (HubCom)
- Architecture:
 - web-interface, xml-exchange over the IT hub, (a-)synchronous validation
 - Ex Domain Cancellations (only in exceptional circumstances)
- Fully automated transactions
- Error handling procedures
- Scalability
 - Increasing # transactions = increasing data capacity
 - Increasing # registries =
 - Plug & play
 - Standardised test protocol & technical audit for new registry connection
- Flexibility in data format
 - By decision amongst issuing bodies (voting structure)
 - Cost of change at registries

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HubCom Content:



~	_	
2	P	rinciples and rules of operation to be observed by Hub Users
	2.1	Responsibilities in the framework of handling and transmission of data
	2.2	Security
	2.3	Hub User's obligations and warranties
	2.3.1	General
	2.3.2	Specific rules in relation to Certificates
	2.3.3	Error handling
	2.3.4	Contingency
	2.3.5	Performance
	2.3.6	Miscellany
	2.4	Consequences of data transfer - Evidence
3	C	ertificate Information
	3.2	General information
	3.2.1	Each EECS Certificate shall contain the following information:
	3.3	Electricity scheme rules
	3.3.1	Face Value
	3.3.2	Additional Information in Certificates
4	D	ata Exchange Processes
	4.1	Basic Model
	4.2	Basic Data Transmission Protocol
	4.2.1	Responsibilities of Sender
	4.2.2	Responsibilities of the AIB Hub
	4.2.3	Responsibilities of Recipient
	4.3	Export and Import of Certificates
	4.3.1	Introduction
	4.3.2	Responsibilities of Sending Account Holder
	4.3.3	Responsibilities of Exporting Issuing Body
	4.3.4	Responsibilities of the Importing Issuing Body
5	R	equirements



Double counting avoidance:

- Issuing:
 - Rules on avoidance of double issuance (like EECS Rules A2.1.2 &C3.3.1), Domain Protocol reviews and Member audits by AIB;
- Transfer:
 - Monitorring on the AIB hub avoiding duplication during erroneous transfer, Rules on avoidance of duplication during transfer. AIB member audits.
- Cancellation:
 - Rules stating that cancellation is the end of life of the certificate and that no form of Disclosure is used for the energy, other than by cancellation of the corresponding certificate;
- Cross purpose usage:
 - A data field on the certificate indicates the purpose. The supervisory body can check the purpose of the certificates cancelled.
- Multiple claiming:
 - No EECS GOs shall be issued in respect of Output that is otherwise disclosed. (C3.3.1)
 - Electricity scheme: section N9: disclosure supervision

VAT carousel fraud (MTIC fraud)

- Harmonised Account holder registration procedures. Know-Your-Customer procedures recommended. Transaction monitorring on the hub for suspicious transfer patterns.



Production auditor:

- appointed by Issuing body,
- has access to Production Device, corresponding data in registry, registered measurement data
- Check on conformity of auditors is left to national discretion.

Production Device Inspections:

- Gas: mandatory at PD registration
- Electricity: At discretion of issuing body, Issuing Body is responsible for data quality guarantee
- Audit of: Production device, measurement device position and accuracy, EECS Certificate calcluation formula
- At discretion of issuing body: Audit of production declarations

Re-registration of production device at least every 5 years



• Sustainability criteria:

- Gas: Optional data field on gas Certificate may link the EECS Certificate with additional criteria e.g. on sustainability audit
- Electricity: not part of EECS, but an Independent Criteria Scheme indicated on the GO may testify compliance
- Mass balancing:
 - Is not defined under EECS
 - Optional data fields on EECS Gas Certificates facilitate usage in relation with mass balancing
- GHG emission calculation methodology to be developed
- Data on GO:
 - support, production period, production device location (city/coordinates), ICS
 - Technology Type of production device and Energy Source Type

CO2 Emissions saved & produced

• Methodology: see subsidiary document under development

Sustainability Criteria Met? *

• Y/N, Name Certification Body, reference to report

GHG saving criteria met? *

End-use of gas category *

- (a) Transport
- (b) Production of heating or cooling
- (c) Production of electricity
- (d) Input to chemical processes
- (e) Input to industrial and manufacturing processes.

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• Energy Carrier Conversion

- Definition:
 - Energy Carrier Conversion: the transfer of energy carried by one type of energy carrier to another type of energy carrier;
 - EECS Certificate Conversion: the issuance of an EECS Certificate corresponding to Energy Carrier Conversion, and for which EECS Certificates representing Input to that Production Device have been Cancelled;
- Issuance rules extended with EECS Certificate Conversion
- Immutability
 - Not allowed to modify data on GO after issuance

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- Hub Participant Agreement:
 - between AIB and members: domains and domain protocol, intellectual property, confidentiality and non-competition, liability, data protection, termination,
 - Liability insurance for AIB and all issuing bodies (>= 2m€/per party)
- Standard Terms of Conditions
 - for ALL account holders involved in international tranfer through ALL issuing bodies connected to the hub
 - Accepting the rules in the respective Domain protocol and liability issues.
- Hub Contract with Hub provider, subject to regular re-tender
- SuperUser: bridges between the members and the Hub Provider
- Transaction log in hub and in registries
- Domain Protocol publicly available to find the rules/differences/contact data in a Domain in a harmonised structure
- Domain Protocol audit and Technical audit of registries: every 3 years
- Code of conduct for error handling between issuing bodies
- Dispute resolution protocol in the Domain Protocol of each Issuing Body

Organisational aspects

- Articles of Association: updated February 2020
- Decision power is with General Meeting
- Delegation matrix delegates decisions per area of operation to the various organs in AIB
 - ISU: members decide on changes to the Hub
 - Gas Specific topics are decided by Gas Scheme Group participants only

AIB				
General Meeting				
Board				
EECS Electricity Scheme Group Scheme Group				
EECS Unit				
External Affairs Unit				
Information Systems Unit				
Disclosure Platform				

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2005: HubCom Common technical standard for GO registries 2006: Hub v1 - Pilot 2011: Hub v2 2016: Hub v3 – Fully functional, Secure, Evolving 2020: > 600 million EECS electricity GOs transferred over the hub

Domain A \mathbf{m} omain omain The HUB **Domain D**

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International transfers of electronic documents



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How to join AIB?

- 1. Optional: Observer status in AIB: application to secretary general
- 2. Appoint/create an Issuing Body & agents to support the activities of the Issuing Body (if required)
- 3. Select, implement and configure Registry Software
- 4. Fill in AIB Membership Application Form and Questionnaire
- 5. Draft a Domain protocol, setting out how the system will work in your country
- 6. Finetune Domain Protocol in AIB review
- 7. Test the interconnection of your registry with the AIB Hub
- 8. Gain the approval of membership of the relevant Scheme Group





Let's lay solid grounds for the future of energy certification

Katrien Verwimp

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CertifHy 2 Stakeholder Platform Endorsement of CertifHy Scheme Document & Subsidiary Documents

Matthias Altmann, Ludwig-Bölkow-Systemtechnik

Brussels, 25 March 2019



CertifHy Scheme Document & Subsidiary Documents





CertifHy Scheme documents: Development Process





The CertifHy Scheme documents...

- Shall serve as basis for CertifHy Scale-up over the coming 2-3 years
- Are "RED II ready":
 - i.e. are aligned with RED II as far as currently possible
 - allow for adjustments/amendments in light of national transposition of RED II & relevant delegated acts under RED II due in 2021
- Will **remain flexible** allowing for any necessary adjustments/amendments by the CertifHy Stakeholder Platform in the coming months and years
- Caveat: CertifHy documents shall be valid, not formulations in this presentation



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CertifHy Scheme Document



- 1 Introduction
- 2 Core Principles
- 3 CertifHy Goal and Mission
- 4 Scope and Normative References
- 5 Definition of Terms
- 6 Roles & Responsibilities
- 7 GO Labels and Content
- 8 Procedures
- Annex A: Fuel (or heat source) codes
- Annex B: Technology codes



- 1 Introduction
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- 7 GO Labels and Content
- 8 Procedures
- Annex A: Fuel (or heat source) codes
- Annex B: Technology codes

Uniqueness, Transparency, Immutability, GO ownership, Operational reliability, End of life, Consumption period



- 1 Introduction
- 2 Core Principles
- 3 CertifHy Goal and Mission
- 4 Scope and Normative References
- 5 Definition of Terms
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- 8 Procedures

Annex A: Fuel (or heat source) codes Annex B: Technology codes ... hydrogen fulfilling ambitious environmental criteria in order to protect the climate and improve the living conditions of humankind.

... environmentally, socially and economically sustainable production of hydrogen for all uses...



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- 8 Procedures
- Annex A: Fuel (or heat source) codes
- Annex B: Technology codes

Geographic scope: EU & EEA & Switzerland Technologies: All Applications: All



CertifHy Scheme document: 6 Roles & Responsibilities



ROLES IN Scheme:

- The CertifHy Stakeholder Platform acts as Competent Authority as long as a legal basis for hydrogen GOs is not available.
- CertifHy Stakeholder Platform to appoint or approve certain bodies necessary for the operation of the Scheme such as Issuing Body(ies), registry operator(s), Certification Bodies.



- 1 Introduction
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- 8 Procedures

Annex A:	Fuel (or heat source) codes
Annex B:	Technology codes

Labels:	"CertifHy Green Hydrogen"
	"CertifHy Low Carbon Hydrogen"
GO Content:	Part 1: Factual information
	Part 2: Evaluation (\rightarrow which Label)
Cancellation S	tatement: Content and Requirements
	Labels: GO Content: Cancellation S



- Fuel (heat source) and technology codes; harmonized approach with AIB/EECS and CEN/CENELEC
- Production Batch Audit report:
 - Confidentiality issues
 - GO issuing before Production Batch Auditing may require detailed reconsideration of how Batch Audit Reports can be linked to the GOs in the CertifHy Registry
- Potential adjustments of CertifHy Scheme documents to RED II:
 - Clarifications
 - National transposition (by mid-2021)
 - Delegated acts (by end 2021)
 - Methodology for GHG impact calculation for H₂
- Alignment with Standardisation, notably EN 16325 (referenced in RED II art. 19(6))



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CertifHy Hydrogen Criteria subsidiary document



- Definition of 'energy from renewable (RES) sources' → identical to RED II
- In multi-fuel plants using RES and non-RES sources for H2 production, only part of H2 produced from RES sources shall be taken into account for the calculation of the quantity of CertifHy Green H2 (using the lower calorific value).
 → Formulation consistent with RED II
- A **production batch** is the amount of H₂ produced by a registered device between any two points in time selected by the Operator for which the quantity of GOs is calculated.
- A **sub-batch** is the part of a production batch defined in accordance with production process specific calculation procedures to be defined in a subsidiary document.



- CertifHy Green hydrogen
 - Hydrogen from renewable energy that additionally fulfils the criteria of CertifHy Low-carbon hydrogen (\rightarrow GHG footprint)
 - **Renewable part** of the production batch
- CertifHy Low-carbon hydrogen
 - Hydrogen (production batch or sub-batch) having a GHG footprint equal to or lower than a specified limit.
 - > This limit will be defined based on requirements from RED II
 - Until the time that these requirements have been clearly established, the specified limit is 36.4 g_{CO2eq}/MJ


GHG footprint of non-CertifHy hydrogen in the last 12 months below benchmark

Benchmark process: state-of-the art steam reforming of natural gas in large installations;

Benchmark GHG footprint: 91 g_{CO2eq}/MJ (lower heating value)



CertifHy Hydrogen Criteria: Overview of criteria





- System boundary
 - include all life-cycle stages "from well to gate"
 - include all stages needed to reach a H₂ purity of at least 99.9%_{vol} and a gauge pressure of at least 3 MPa (if lower, include calculated energy consumption for achieving this)
- **GHG footprint calculation** shall follow methodologies in
 - ISO 14040/14044 and ISO 14067
 - Annex V and Annex VI of RED II by applying them analogously to H₂
 - GHG impact of electricity used for H₂ production shall be zero for electricity from wind, solar photovoltaic, and hydropower
- The renewable origin of energy consumed in the form of electricity, gas or heat from the grid or a district heating network shall be established by cancelling **Guarantees of Origin**



- Residual Mix (see session 3 today)
- Greenhouse gas emissions allocation methods will be defined in a subsidiary document to this document (see session 3 today)
- Potential adjustments of CertifHy Scheme documents to RED II
- Alignment with Standardisation, notably EN 16325 (referenced in RED II art. 19(6))



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CertifHy Procedures documents

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Procedure	Торіс	Motivation / Comment
P0.2 Registration of	Every 5 years Audit of the Production	Operator additionally required to report
Production Device	Device (onsite)	changes to production device
P0.3 Registration of Certification Body	Approval of Certificaton Body for 5 years and annual reporting by Certification Body	In analogy to RED II voluntary schemes
P1.1 GO Issuing	Maximum Batch Production period 12 months	Credibility; limitation to physical hydrogen production time
P1.1 GO Issuing	Maximum Production Batch(es) period (from first Batch <u>start date</u>) to register for GO issuing is 12 months. Audit is due for Production Batches within time limit for GO issuing (12 months; no further GO issuing before audit)	GO issuing for new production batches only, if un-audited Production Batches have not reached the time limit of twelve months

Scheme document:

• Consumption period for GOs: Physical hydrogen consumption for which the CertifHy GOs are cancelled shall be between the beginning of the production batch, on which the CertifHy GOs are based, and the cancellation date of the GOs.



Sequencing & time limits for GO Issuing & Audit



- Only 90% of registered GOs are issued before 1st successful Audit of Production Batch(es).
- Production Batch(es) must be audited within a maximum period of 12 months from the start of the first production batch. In case of deviations, issued GOs are balanced with the 10% reserve; 100% GOs are issued.
- Recommended GO Issuing request frequency: monthly or longer.



- Development of Procedures
 - P0.X | Complaints handling
 - P0.Y | Sanctioning of Account Holders / registered Production Devices
 - P0.Z | GO Export / Import
 - P0.4 | Registration of Issuing Body
 - P1.5 | GO Correction
- Potential adjustments of CertifHy Scheme documents to RED II
- Alignment with Standardisation, notably EN 16325 (referenced in RED II art. 19(6))



Questions & Answers

Questions and Answers



Endorsement of Scheme documents

Endorsement by the Stakeholder Platform



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Thank you!



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INTRODUCTION INTO ERGAR'S SCHEMES

REGATRACE project consortium 09/12/2020



ERGaR THE ASSOCIATION

ERGaR – The association

- International non-profit, non-governmental organisation (BE law) established in September 2016.
- → Founded by established biomethane registries

27 ERGaR members in 15 European Countries

- Established biomethane / renewable gas registries, appoiented issuing bodies
- Gas DSOs & TSOs
- Biogas associations
- Traders
- Other major stakeholders of the European biomethane market

Full Members









ERGaR: team work and bottom-up approaches



- Development of Scheme Rules for the ERGaR CoO Scheme
- Development of the Documentation Package for the ERGaR RED
 MB Scheme for recognition process to become voluntary scheme by the European Commission
 - Engagement of Vertogas B.V. as IT-provider
 - Development of the ExtraVert Platform as IT-system
 - Harmonisation of attributes (list, specification), technology codes, biomass codes
 - Harmonisation of business processes
 - Finding common denominator for countries, independent of level of advancement
 - Collaboration Tech WG
 - Leader: VP Jesse Scharf, GGCS (UK)
 - Understanding each other's systems

 Building on knowledge, expertise and resources of established registries



SCOPE OF ERGAR SCHEMES

ERGaR CoO Scheme ERGaR RED MB Scheme

ERGaR Schemes: Overview

		ERGaR CoO Scheme		ERGaR RED	MB Scheme
APPLICATION PIRPOSE	(Consumer disclosure	Initiatives by Market & Society	Target compliance transport sector	
BACKGROUND		Art 19 RED II	Market and Scheme Rules	Sustainability & Mass Balance Art 25-31 RED II	
COMPETENT AUTHORITY		Issuing Bodies by Government Mandate	Registries	Voluntary Scheme recognised by EC	Registries via ERGaR RED MB Scheme
Rules and Standards		CEN – EN 16325	ERGaR CoO Scheme	E.g.: ISCC, REDCert, NTA 8080	ERGaR RED MB
DOCUMENT TYPE		GoO Guarantee of Origin	CoO Certificate of Origin	PoS Proof of Sustainability	ERGaR PoO Proof of Origin
STATUS (Feb 2021)		preparation for launch		under recognition Commission as v	by the European voluntary scheme

ERGaR Schemes: Overview

	ERGaR CoO Scheme	ERGaR RED MB Scheme	
Gas Category	Biomethane Hydrogen (on request and update of scheme rules)	Biomethane	
Source of Energy	Biomass RFNBO and RCF (under consideration)	Biomass	
Means of Transport	European gas grid isolated gas grids	European gas grid	
Geographical Scope	Countries that are connected to the Natural Gas Network as defined in Art. 2.3 2009/73/EC	EU, EFTA	
Supply Chain	European natural gas transmission and distribution systems	European natural gas transmission and distribution systems	



Negotiation under RED I, re-submission under RED II Renewable Energy Directive

Seeking recognition as VS by the European Commission

ERGaR RED MB Voluntary S

Scheme

We are the only organisation proposing an administrative solution for handling biomethane in the interconnected, European natural gas network.

Mass Balancing as defined in Art 18 RED I Art 25 – 31 RED II Administration system as defined in Art 19 of RED I Art 30 of RED II





ERGAR COO SCHEME ORGANISATIONAL ASPECTS

ERGaR CoO Scheme: Introduction

- Operator
 - The Operator of the Scheme is ERGaR aisbl.
- ExtraVert Platform
 - A central, stand-alone IT-system enabling European certificate exchanges, operated by Vertogas B.V.
- Certificate of Origin (CoO)
 - An electronic document that records information about biomethane that has been injected into the Natural Gas Network.
 - A CoO can be used by a gas consumer to demonstrate their use of a biomethane consignment, in that the biomethane consignment described in the CoO can be set against an energy amount of gas that the consumer has withdrawn from the Natural Gas Network.
 - CoOs follow the approach detailed in Article 15 of Directive (EU) 2009/28 on the promotion of the use of energy from renewable sources, including amendments as per Directive (EU) 2015/1513 (RED I) and Article 19 of Directive (EU) 2018/2001 (RED II).
- Proof of Origin (PoO)
 - Certificate of Origin, which incorporates the PoS inseparably.
- Expected Scheme Participants
 - AGCS (AT), DENA (DE), Energinet (DK), Vertogas (NL), GGCS (UK);
 - Market volume of approx. 2/3 of European biomethane production volumes



ERGaR CoO Scheme: Admission

Admission process

- There is no precondition that the National Registry must be a member of the association ERGaR.
- Any registry who wishes to become System Participant has to successfully undergo the admission process, including
 - o submission of complete registration files,
 - o successful vote by the ERGaR Executive Board,
 - successful completion of activation tests.

Principles for European exchanges

- Registries become System Participants and enter into a direct contractual relationship with the ERGaR CoO Scheme.
- Registries are responsible to perform cross-border transactions according to the ERGaR Scheme Rules.
- Neither ERGaR (as operator of the Scheme and the ExtraVert Platform) nor market participants are directly involved in business processes for transactions.



ERGaR CoO Scheme: Admission

- Auditing requirements on registry systems of Scheme Participants
 - Scheme participants must follow auditing procedures and conduct external audits on accuracy of processes of issuing CoO.
 - Scheme participants are audited according to their national requirements by external auditors who confirm the accuracy of scheme participants processes for issuing CoO.
 - The scheme operator reserves the right to commission its own audit of the scheme participant. The auditor is appointed by the scheme operator.

Requirements on objectivity of Scheme Participants

- Scheme participants must maintain independence from economic operators.
- Scheme participants must not own CoO or participate in markets associated with CoO.



ERGaR CoO Scheme: Principles

Requirements for registry operators

- Scheme participants must adhere to relevant laws and regulations.
- Scheme participants must implement appropriate risk management procedures.
- Scheme participants must have an auditable documentation system.
- Scheme participants must keep any documentation for a minimum of 5 years.

Requirements on accurate data processing by Scheme Participants

- CoO must be created based on reliable and accurate metering data provided by DSO or TSO.
- No CoO must be issued for fossil gas.
- Only CoO for the purpose of cross-border title transfers are eligible. No CoO with the purpose to be placed on the national market are eligible for European exchanges.



ERGAR COO SCHEME TECHNICAL ASPECTS EXTRAVERT PLATFORM

ExtraVert Platform

- ERGaR IT-system as a central, Europe-wide platform solution (comparable to REGATRACE D2.4 IT-option 4).
- A stand-alone IT-system between Scheme Participants to communicate with each other.
- Allows the transfer of certificates via upload and download by Scheme Participants.
- Allows transfer of supporting documents, e.g., auditing reports, cancellation statements (PDF-format).
- IT-provider: development, operation and maintenance by Vertogas B.V. under the authority of ERGaR aisbl (via SLA).
- Web-based, MFA-secured, auditable IT-solution.
- Each Scheme Participant (national renewable gas registry) receives an individual account.





Specifications

Attributes

- Are data fields which contain the information on the certificate and respective biomethane consignment.
- Are specified in an **XSD-format**.
- Certain attributes are mandatory and must be completed for the transfer to be valid.

Biomass codes

- There is no Europe-wide harmonisation yet (CEN EN 16325 could provide remedy).
- Different biomass coding schemes are supported by the ERGaR Scheme.
- It remains in the responsibility of market participants (and their external auditors) to provide information on biomass codes in a format suitable/acceptable by the importing country (national regulations and systems) and importing end consumer.



Specifications

XSD

- Provided by Scheme Operator ERGaR.
- Implementation into national IT-systems by Scheme Participants.

XML

- CoO are transferred between Scheme Participants in XML-format.
- template provided by Scheme Operator.

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ERGaR CoO SCHEME DATA PROCESSING

Data processing by scheme participants

Certificates and their attributes

- Are translated into an electronic document (XML) to allow European exchanges.
- One CoO may represent any energy amount of biomethane from 1 MWh upwards.
- New CoO in target country can only be issued when receiving the cancellation statement of the original certificate from the sending registry.

Certificate Cancelling

- Cancelling a CoO means recording its final purpose on a cancellation statement and ensuring that it cannot be used again for any other application purpose.
- The CoO is not deleted and stays available to be audited.
- A CoO that is cancelled because it has been exported via the ExtraVert Platform will be marked as "cancelled because of transfer via ERGaR CoO Scheme".



ERGaR CoO Scheme: Attribute list

_				
	# Field Name	# Field Name	# Field Name	# Field Name
	1 Exchange ID	15 Trader City	29 Delivery	43 Date Of Commission
	2 Creation Date Time	16 Trader Country	30 Metering Point	44 Production Support
	3 Source Registry	17 Tracking Claim	31 Biomass Coding Scheme	45 Investment Support
	4 Trader ID	18 Certificate Batch ID	32 Biomass Code	46 Technology
	5 Trader Name	19 Original Cert Number	33 Biomass Description	47 Sustainability Scheme ID
	6 Trader Street And	From	34 Biomass Classification	48 Sustainability Scheme Name
ł	Number		Description	49 Issuing Date
5	I Trader Postal Code	21 Created By	35 Original Biomass Description	50 Expiration Date
	8 Trader City	22 Creation Date	36 Proof Of Biomass Origin	51 Country Of Origin
1	9 Trader Country	23 Valid To	37 Device ID	52 Creenbourg Can Emission
1	0 Target Registry	24 Energy MWh	38 Device Name	Chain
1	11 Trader ID	25 Energy Medium	39 Device Street And Number	53 Additional Information
1	2 Trader Name	26 Gross or Net Energy	40 Device Postal Code	54 Proof Of Sustainability
-	Trader Street And	27 Production Date From	41 Device Country	55 Biomass Scheme Description
	Number	28 Production Date To	42 Production Capacity	
	4 Trader Postal Code			,



ERGaR CoO SCHEME FRAUD PREVENTION

ERGaR Schemes: prevention of fraud

Registry Audit

- First-level audit by registries
- Audit certificate part of Scheme admission

Market participants

- Responsibility of scheme participants
 → registries on national level
- Admission process at registries (KYC)

Prevention of VAT fraud

- Semi-automatic processes
- Data verification of Scheme Participants at export and import



ERGaR CoO Scheme: data verification



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