



An initiative funded by the FCH 2 JU



# A Tracing and Tracking system for renewable and low carbon hydrogen

21 May 2021, Brussels, Belgium

- Why a uniform way to characterise H2
- CertifHy developed a GO system: what is it (and what not)?
- Current status at the end of CertifHy 2
- Recommendation
- CertifHy 1 developed a label for green and low carbon H2 to give a starting reference point to Green & LC H2 producers

# Why a uniform way to characterise



An initiative funded by the FCH 2 JU





We need a “data sheet” for Hydrogen to enable customer choice, just like car industry has standardised data sheets..

Criteria	Car X	Car Y
#Seats	4	5
CO2	95 gr CO2 / 100 km	110 gr CO2 / 100 km
Color	Green	Green (RAL 6002)
Consumption	4 l / 100 km	30 miles / gallon

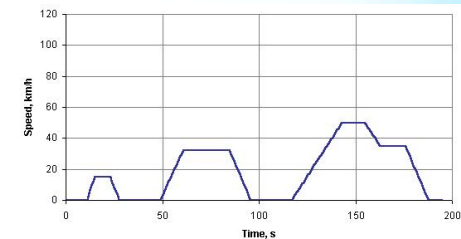


Figure 1. ECE 15 Cycle

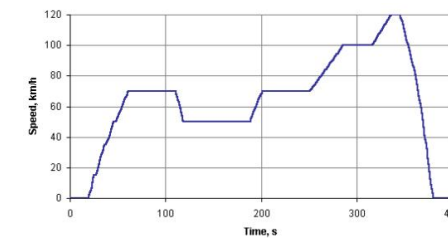
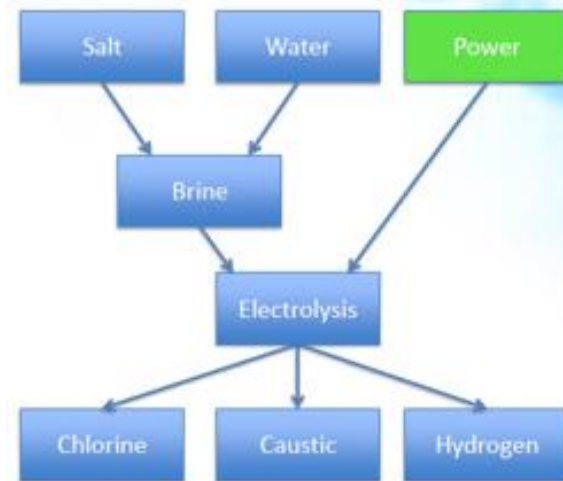


Figure 2. EUDC Cycle

Source: Hincio analysis, drivemag.com, dieselnet.com



## CertifHy has developed a data sheet for Hydrogen & methodology to measure GHG footprint for e.g. Chloralkali electrolysis



Example: coal based electricity: x GHG / MWh

PART 1: Factual information	Comments
<ul style="list-style-type: none"> <li>Account number</li> </ul>	
<ul style="list-style-type: none"> <li>Identity of the Production Device               <ul style="list-style-type: none"> <li>Production device identifier</li> <li>Name</li> <li>Location country</li> <li>Location city</li> <li>Commissioning date</li> <li>Installed production capacity</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>Date and time of hydrogen production: beginning and end of the production batch</li> </ul>	dd.mm.yyyy
<ul style="list-style-type: none"> <li>Fuel (or heat source) and Technology               <ul style="list-style-type: none"> <li>Fuel (or heat source) code(s) (see Annex A) for up to ten fuels including respective share of total fuel input</li> <li>Technology code (see Annex B); including main/by-product</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>Financial support to hydrogen production or input fuel production               <ul style="list-style-type: none"> <li>investment supported, and/or</li> <li>production supported, and/or</li> <li>supported scientific/demo/pilot project, or</li> <li>unsupported, or</li> <li>no information available</li> </ul> </li> </ul>	
<ul style="list-style-type: none"> <li>Share of renewable energy for each input energy carrier for producing the hydrogen</li> </ul>	%
<ul style="list-style-type: none"> <li>GHG balance:               <ul style="list-style-type: none"> <li>GHG emissions intensity</li> </ul> </li> </ul>	g CO <sub>2</sub> eq / MJ <sub>H<sub>2</sub></sub>
<ul style="list-style-type: none"> <li>GO identity               <ul style="list-style-type: none"> <li>Identifier (the unique number which has been assigned to the GO)</li> </ul> </li> </ul>	ID
<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Issuing date</li> <li>Cancellation/Expiry date</li> </ul> </li> </ul>	dd.mm.yyyy
<ul style="list-style-type: none"> <li>Certification Body</li> </ul>	Name

Allocation method	% of GHG from Power allocated to H <sub>2</sub>	% of GHG from Power allocated to Cl	% ...to Caustic
Mass based allocation			
Energy based allocation			
Value based allocation (EUROSTAT prices averaged)			
Mole based allocation			
Bench mark based (against ODC process, producing Chlorine but no H <sub>2</sub> )			

Temporary solution

Likely to be end solution: ODC process is now mature & benchmark = ~ system expansion allocation

CertifHy developed a GO system:  
what is it (and what not)?



An initiative funded by the FCH 2 JU



(55) Guarantees of origin issued for the purposes of this Directive have the sole function of showing to a final customer that a given share or quantity of energy was produced from renewable sources. .... with a view to ensuring that a unit of renewable energy is disclosed to a customer only once, double counting and double disclosure of guarantees of origin should be avoided.

(56) It is appropriate to allow the consumer market for renewable electricity to contribute to the development of energy from renewable sources. Member States should therefore require electricity suppliers who disclose their energy mix to final customers pursuant to Union law on the internal market for electricity, or who market energy to consumers with a reference to the consumption of energy from renewable sources, to use guarantees of origin from installations producing energy from renewable sources.

It is

- Made for the sole purpose of **informing the user** about the **production attributes of a product**
  - Renewable Origin
  - GHG footprint
  - Production technology
  - Geographic Origin,
  - ...
- Providing the guarantee that the quantities supplied have been **produced** within the perimeter of the system
- Made to avoid double counting
- Agnostic regarding the usage of the product

It is Not

- A GHG reporting system (a way to account for a country or a corporation GHG emissions)
- Providing information about distribution or delivery
- A certificate giving right to incentives (at least in Europe)
- Meant to explicitly support investment in specific production technology (at least in Europe)
- Making a physical link between the production facility and the delivered product
- A full Life Cycle Assessment

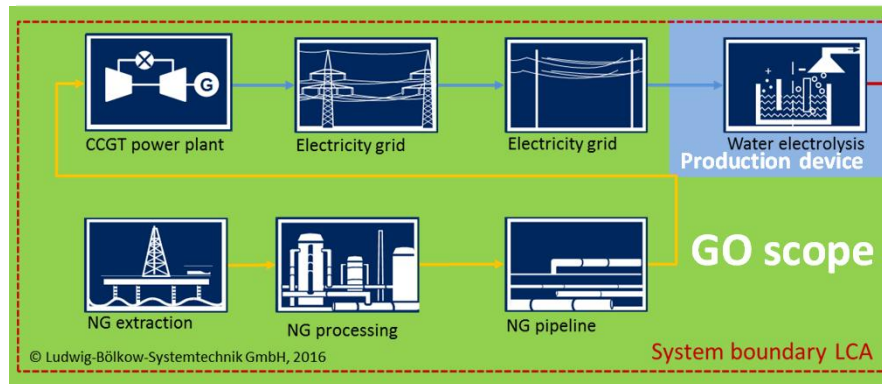
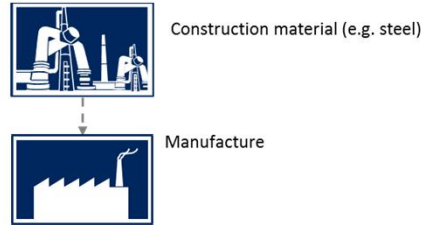


Expansion possible

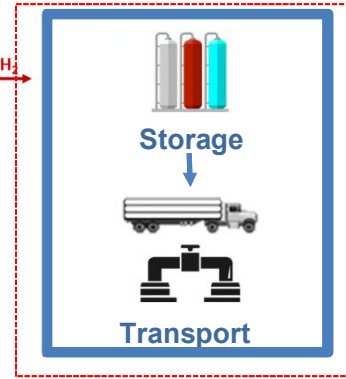


**RFNBO scope:**  
 Sustainability criteria for elec:  
 Additionality & "in-sync" with RE

**Out of scope**



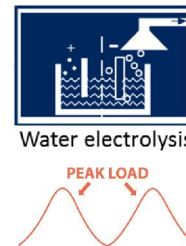
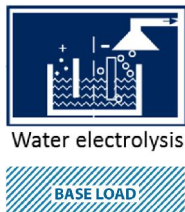
**RFNBO scope**  
+ mass balance



Additional system boundary LCA

Application	Labelling: consumer disclosure	Transport sector	
Legal background	Labelling RED II Art 19	RED II - Art 25	Mass Balance (RED I Art 18 and RED II Art 30)
Mode of delivery	Book & claim	Mass Balancing	
Organization	Issuing Bodies by Government mandate	Voluntary Scheme recognized by EC	RFNBO: non-existent (yet)
Applied scheme	CertifHy GO Scheme (in process)	RFNBO: non-existent (yet)	RFNBO: non-existent (yet)
Document type	GoO Guarantee of Origin	PoS Proof of Sustainability	PoO Proof of Origin
Value	End Consumer disclosure: <u>i.e.</u> CSR/ Marketing	RED II: 14% Renewable Fuel in Transport obligation on Fuel Suppliers	

- Note: Art 19 & Art 25 renewable plant configurations are intrinsically different.



# Current Status at the end of CertifHy 2



An initiative funded by the FCH 2 JU



2014 2016 2017 2018/9 2020s..

## Phase 1

- 1 Define a widely acceptable definition of green hydrogen
- 2 Determine how to design and implement a robust EU wide GO scheme

### Affiliated partners:



## Phase 2

- 1 Set-up a hydrogen GO Stakeholder platform
- 2 Finalise the scheme design ensuring it can be the main route to guarantee the origin of green & low carbon hydrogen across EU Member States
- 3 Run a pilot scheme to test the proposed design
- 4 Identify actions which need to be undertaken after the completion of the study to achieve an EU wide deployment of the scheme

## Phase 3

- 1 Prepare EU wide deployment: Implement Scheme:
  - Gas Scheme Group of AIB
  - Voluntary Issuing Body
  - Expand Stakeholder Forum with WG on Issuing Bodies
- 2 Expand from GOs to RFNBO certification

In absence of a Competent Authority (CA) & before RED 2 makes hydrogen GOs obligatory, a stakeholder forum has been created to represent industry, policy makers, and civil society; including observers from DG ENER, DG MOVE, DG CLIMA

The image displays four working groups (WG 1-4) with their respective logos and names:

- WG 1: GO Scheme and procedures** (purple header): Includes logos for Verbund, ENGIE, EDF, Air Liquide, GRTgaz, uni per, Statkraft, colruyt, HYGRO, Shell, AGCS, DAIMLER, HYDROGENICS, ENERGINET, I-REC STANDARD, Vertogas, NEN, GERG, vreg, Deloitte Touche Tohmatsu, and EMEC.
- WG 2: GO issuing (Producers)** (olive header): Includes logos for Air Liquide, Linde, CNR, ENGIE, uni per, ENERTRAG, enovos, colruyt, OMV, HYOP, MACHIELS, AkzoNobel, H2U, ITM POWER, ABERDEEN CITY COUNCIL, Q8, WIND TO GAS, GRTgaz, HYGEAR, Wind EUROPE, NREL, and METI.
- WG 3: GO commercialisation and use (Users)** (light blue header): Includes logos for Air Liquide, Linde, ENGIE, ENERTRAG, HYER, Statkraft, enovos, Verbund, Q8, Shell, TOYOTA, MACHIELS, colruyt, equinor, GROUPE BPCE, ARERA INNOVATION, DAIMLER, H2H, SILLAREN, ERGOSUP, PITPOINT CLEAN FUELS, GRTgaz, EMEC, hydrogenious, METI, ECOFYS, ABERDEEN CITY COUNCIL, I-REC STANDARD, and EHA.
- WG 4: Regulatory framework** (orange header): Includes logos for Air Liquide, Linde, ENGIE, OMV, EDF, Shell, HYDROGENICS, GreenGas, Wind EUROPE, colruyt, HyER, AIB, I-REC STANDARD, NWBA, ICSI, NEN, NOW, GRTgaz, EMEC, Hydrogen Europe, and GERG.

# Platform decided on issues during 4 pilots a.o. GHG allocation methods (which CertifHy already did for water electrolysis, chloralkali electrolysis & steam methane reforming (of biomethane or CCU/CCS))



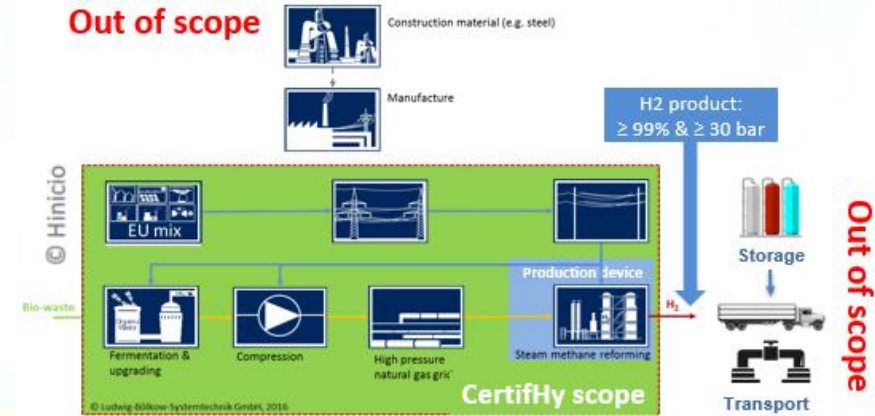
**SMR Port Jerome | France**  
The pilot plant by Air Liquide produces Low Carbon hydrogen using steam methane reforming with a Carbon Capture unit or Green Hydrogen using BioMethane as feed gas.



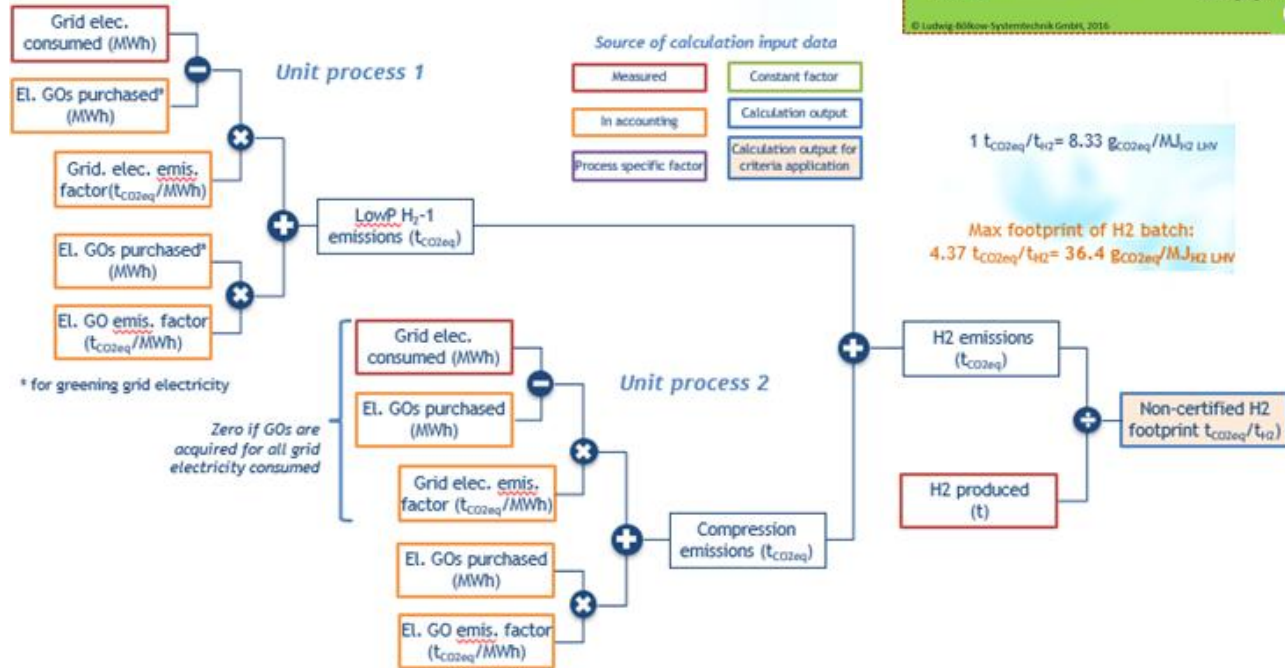
**COLRUYT GROUP Water electrolysis | Belgium**  
The pilot of the retailer Colruyt Group produces Green Hydrogen with electrolysis for their forklifts, heavy duty vehicles and passenger cars.



**Nouryon Chlor Alkali process | Netherlands**  
The pilot demonstration by Nouryon and Air Products uses a chlor alkali process to produce Green Hydrogen in Rotterdam Botlek.



Between  $t_1$  and  $t_2$ :





# CertifHy developed the a pilot Guarantee of Origin (GO) “scheme” and “system” now at the disposal of Member States (MS): <https://cmo.grexel.com/Lists/PublicPages/Statistics.aspx>

- Member States are free to choose whether they only adopt the “scheme” (i.e. the data fields on the GO, all procedures, etc.), which is important for cross border trade
- or (part of) the “system” that CertifHy developed (Notification Body, GO Issuing Body, GO registry, etc.); yet MS are also free to develop their own Registry: cfr <https://cmo.grexel.com/Lists/PublicPage/Statistics.aspx>

The screenshot displays the CMO.grexel website interface. At the top, the URL is <https://democmo.grexel.com/default.aspx>. The page title is "CMO.grexel This is democmo site". The user is logged in as "Supplier 1 :anttik@grexel.com".

**Welcome to CMO.grexel anttik@grexel.com**

Account Holder	Supplier 1
Email	anttik@grexel.com
Mobile Number	+358 440572964
Client certificate expires	2019-01-23

**Pending Tasks**  
No pending tasks available.

**Registry announcements**

Title
Welcome to CMO.grexel demonstration site! <span>NEW</span>

Welcome to CMO.grexel demonstration site!

**Account Statement**

**Account Statement**

**Default Account - 643002406900001296**

Name of Account Holder:	Supplier 1
Address of Account Holder:	00580, Helsinki, Finland
Member code of Account Holder:	97XX36RM1S
Account Status:	Active - Public account

**Certificates**

Opening balance as at 2017-12-23:	0
Closing balance as at 2018-01-23:	190
Difference	190

**Transaction List**

Transaction Date	Transaction Type	Transaction Number	Account From	Account To	Volume
2018-01-23 11:08:47	Transfer	2018012300003	Default Account-643002406900001296	HY- Producer 1-643002406900001265	-10
2018-01-23 10:55:38	Transfer	2018012300002	HY- Producer 1-643002406900001265	Default Account-643002406900001296	200
<b>Total</b>					<b>190</b>

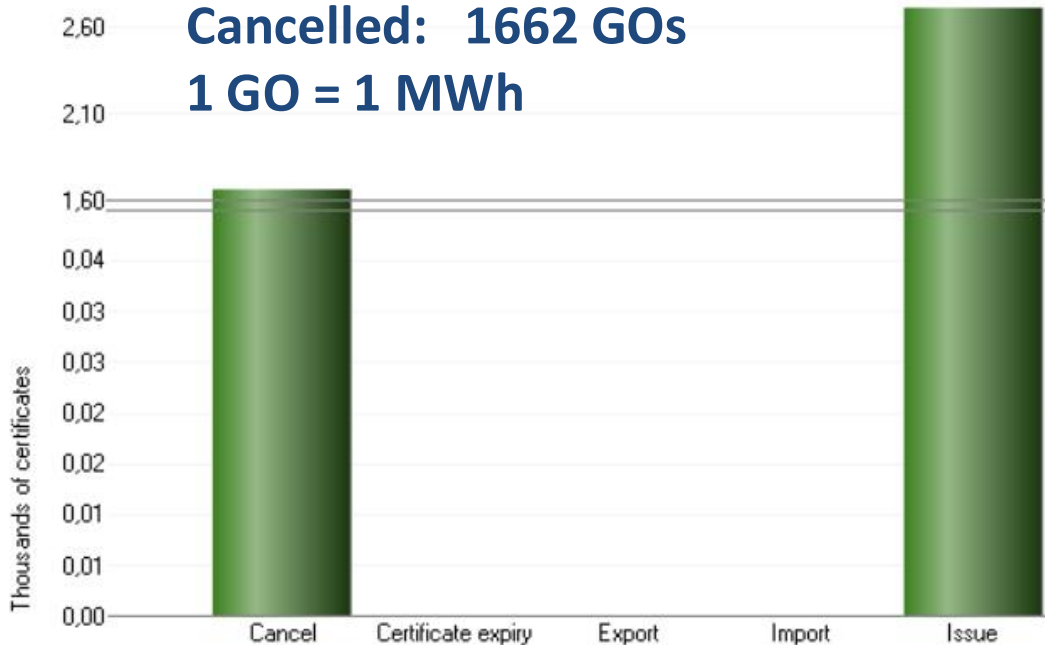


The first commercial transactions already took place, i.e. issuance and use ('Cancellation') of first green H2 GOs: H2 Mobility Deutschland & Transport for London

Domain Transactions

Domain: CertifHy; Transaction Date: 2019-01-01 To 2019-02-28

**Issued: 2714 GOs**  
**Cancelled: 1662 GOs**  
**1 GO = 1 MWh**



News Release

Air Products launches European project to certify renewable hydrogen

One of the first to receive Guarantees of Origin under CertifHY; renewable hydrogen will support vehicle fuelling stations

07/02/2019 Rotterdam, The Netherlands

As part of the pilot project, two of Air Products' hydrogen customers in the mobility sector will receive GOs for renewable hydrogen. The first is H2 MOBILITY Deutschland, an organisation operating a network of hydrogen fuelling stations in Germany. The second is London's integrated transport authority, Transport for London, which operates hydrogen buses across the United Kingdom's capital.

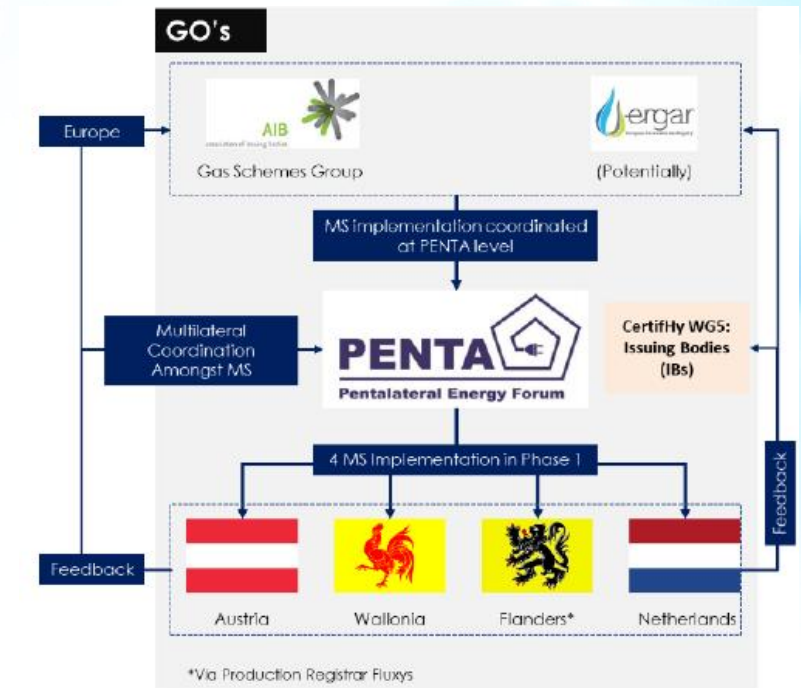
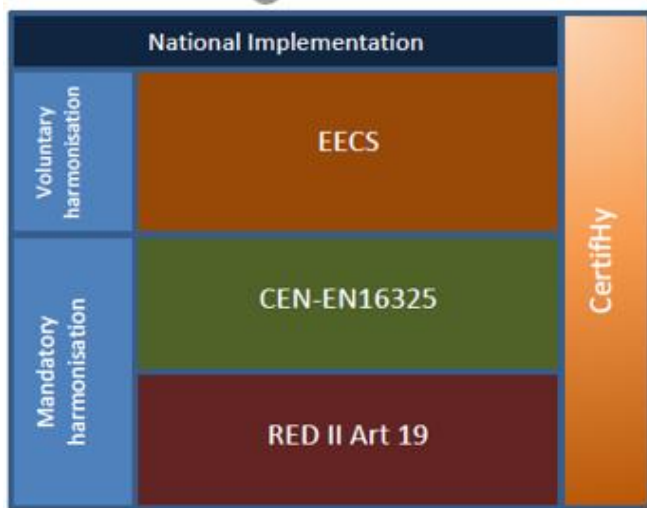
<http://www.airproducts.co.uk/Company/news-center/2019/02/0207-air-products-launches-european-project-to-certify-renewable-hydrogen-uk.aspx>

Energy Source	Issue	Transfer	Cancel	Ex
F01000000 Renewable	2 714	-	1 662	





## Development of a harmonized market for GOs: increasing level of details from RED2 -> CEN Standard -> EECS -> CertifHy



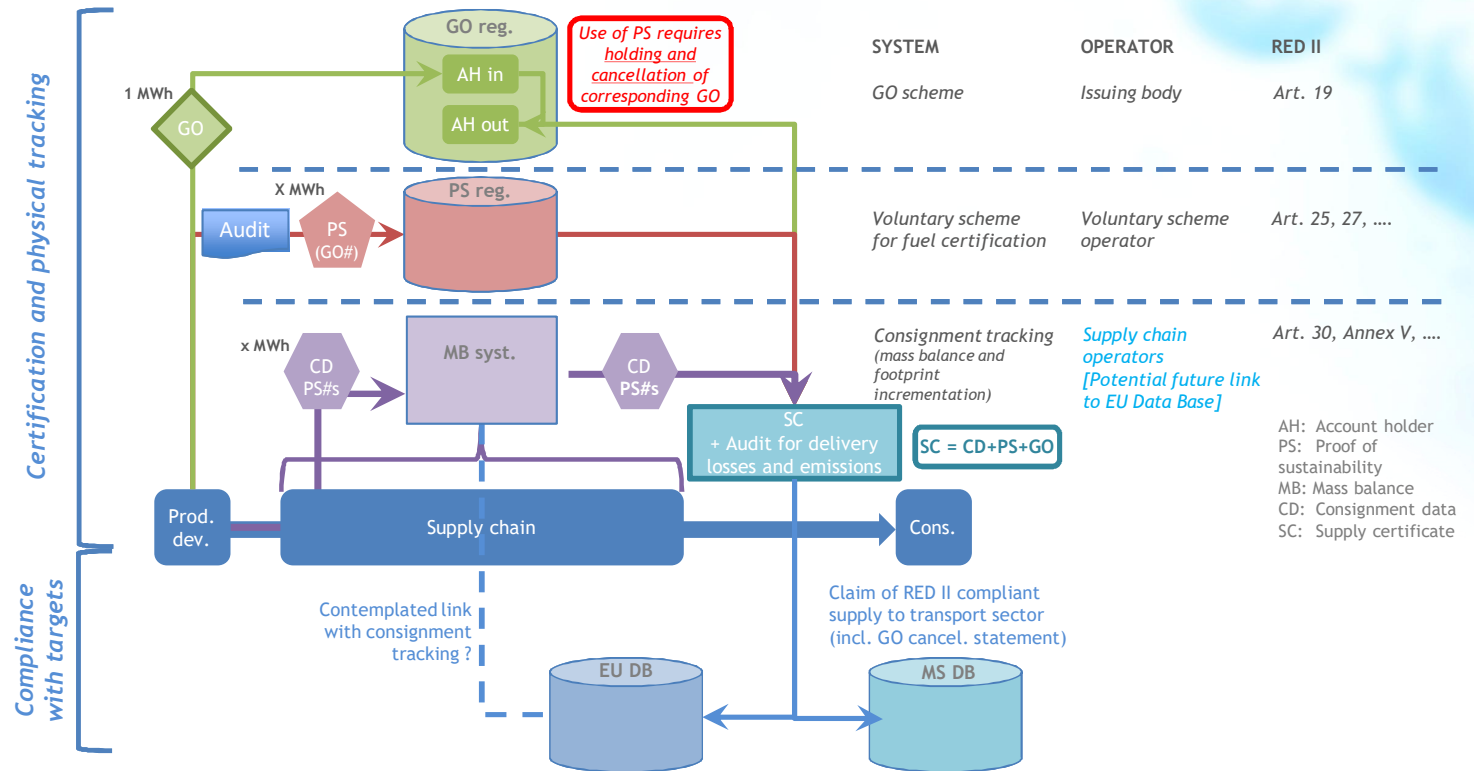
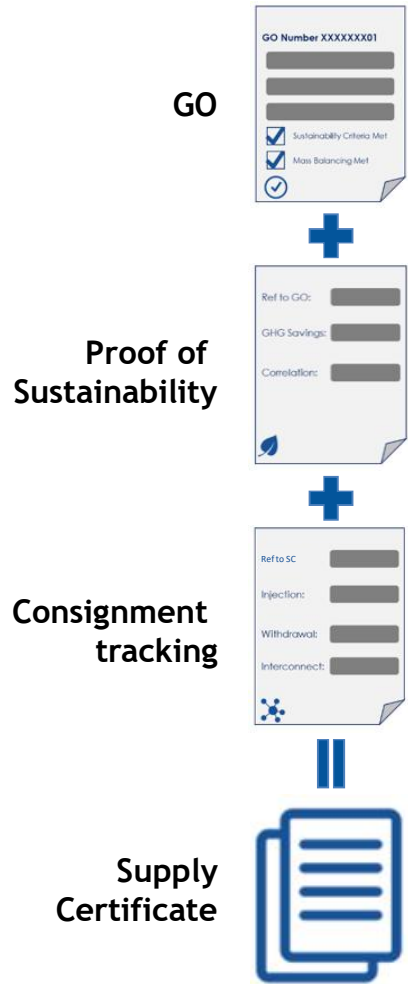
CertifHy stakeholder platform provides input:

- GHG allocation methods for specific pathways
- Define data fields which might not be required by RED2 / implemented in MS
- Define labels (which could be used to add data fields to National Gos)

- In EU CertifHy contributes to development of EECS' Gas Scheme
- With IPHE: provide input to GHG allocation methodologies

- CertifHy assist 4 European Issuing Bodies to implement H2 GO scheme
- 1<sup>st</sup> level capacity building with Morocco for import/export of GOs

# From Gos to RFNBO: CertifHy proposes an architecture with logical actors along certification value chain, avoiding double counting via an integrated system & allowing for renewable fuels tracking WtW



# Recommendations



An initiative funded by the FCH 2 JU



- For renewable or low carbon hydrogen to take off, there is need for harmonized scheme at European/ world-wide level to allow for cross border trade (as also H2 supply chain is cross border).
- Policy makers should take a role to ensure harmonized implementation of H2 GO scheme (i.e. data fields, measurement units, allocation methods, measurement techniques, audit standards, quality assurance, etc.) while labels / definitions can be developed at local level catering for local political appetite (but, see next point)
- From an investment & competitiveness perspective a common labels/definitions might make sense to avoid market distortion, yet this could be realized in a parallel track to the development of a harmonized GO scheme.



An initiative funded by the FCH 2 JU



For questions, please contact  
[certifhy@hinicio.com](mailto:certifhy@hinicio.com)