CertifHy

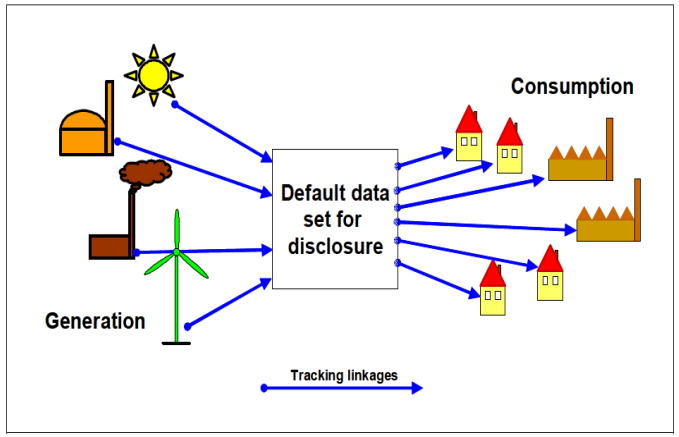
A European tracing and tracking system for renewable and low carbon hydrogen

Project supported by the FCH JU

25 September 2019, Tokyo, Japan

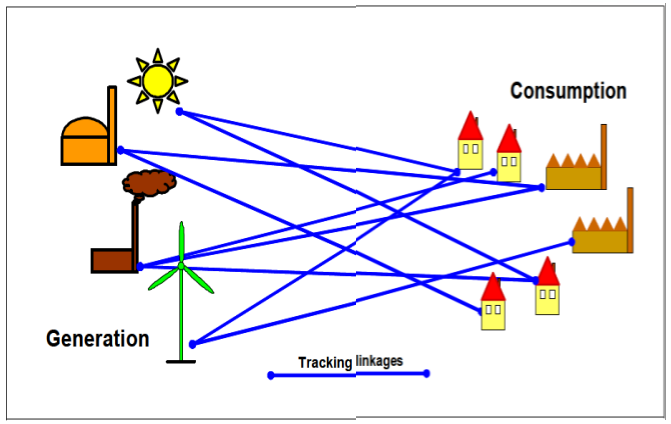
CertifHy was inspired based on Guarantees of Origin (GOs) for Renewable Electricity (RE): a brief overview of history

1990's No tracking



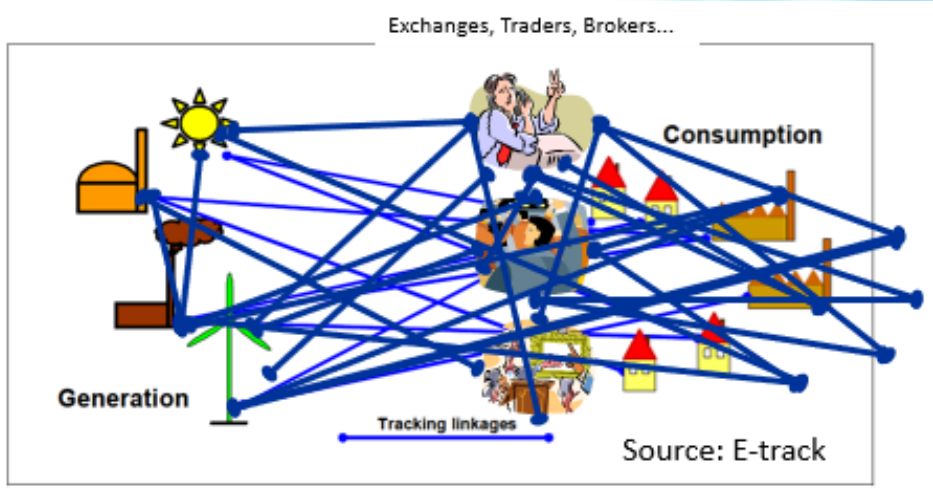
Energy origin of **electricity consumed by consumers is the production mix of the country or that of their individual producer-supplier**

Late 1990s - Need for tracking emerges



Growing interest towards buying green electricity
To satisfy the need suppliers start contractually allocating certain production to certain consumers
Contractual linkages to track the value of energy origin of electricity

Turn of 2000's - Contractual linkages in modern electricity markets

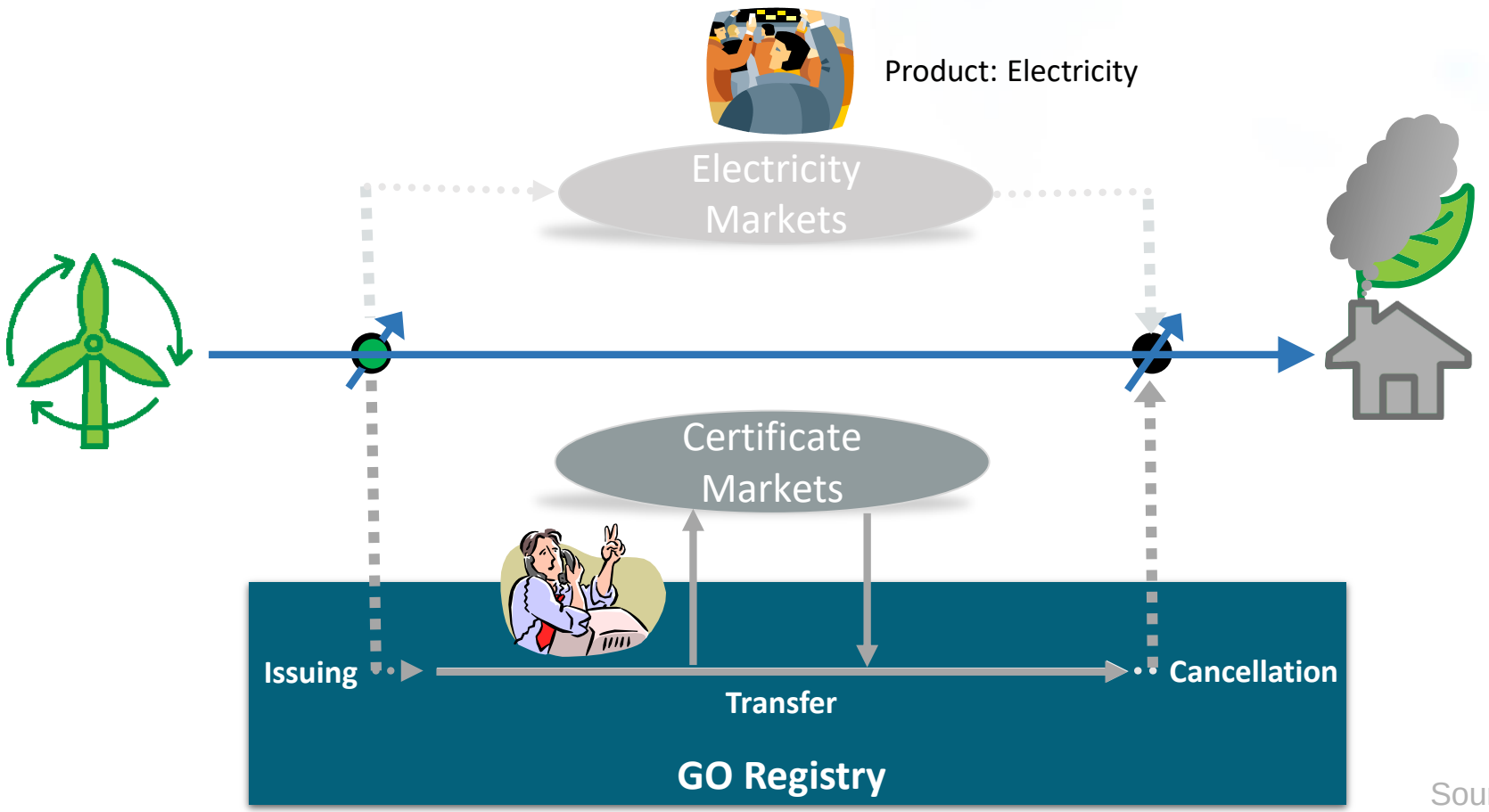


Contractual linkages to track the value of energy origin of electricity from one asset to another **too complex**

Source: Grexel

Renewable Electricity Certification is Commercial Tracking and allowed renewable electricity to be sold to households: it inspired CertifHy

Late 1990s - Electricity Market Gets Increasingly Complicated with unbundling and end-user market liberalisation



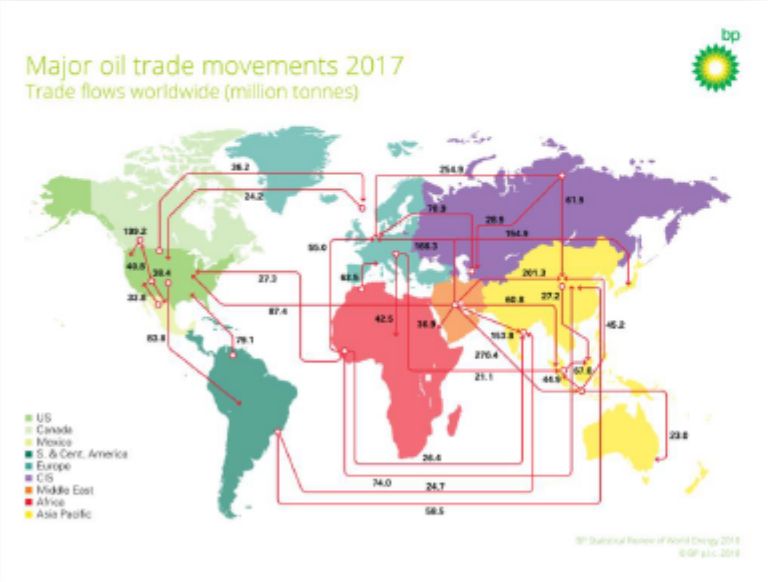
Source: AIB

Product: Energy Origin (Wind, renewable, geothermal, bio, hydro etc...)

In the Hydrogen Council's vision (but also EC, EIA, IRENA, UN, etc.) hydrogen could be the next energy carrier

VISIONS FOR HYDROGEN ENERGY IN 2050 ?

Hydrogen, the possible energy vector of tomorrow



Today
Oil & Gas

Possible end-game?
Hydrogen & Electricity

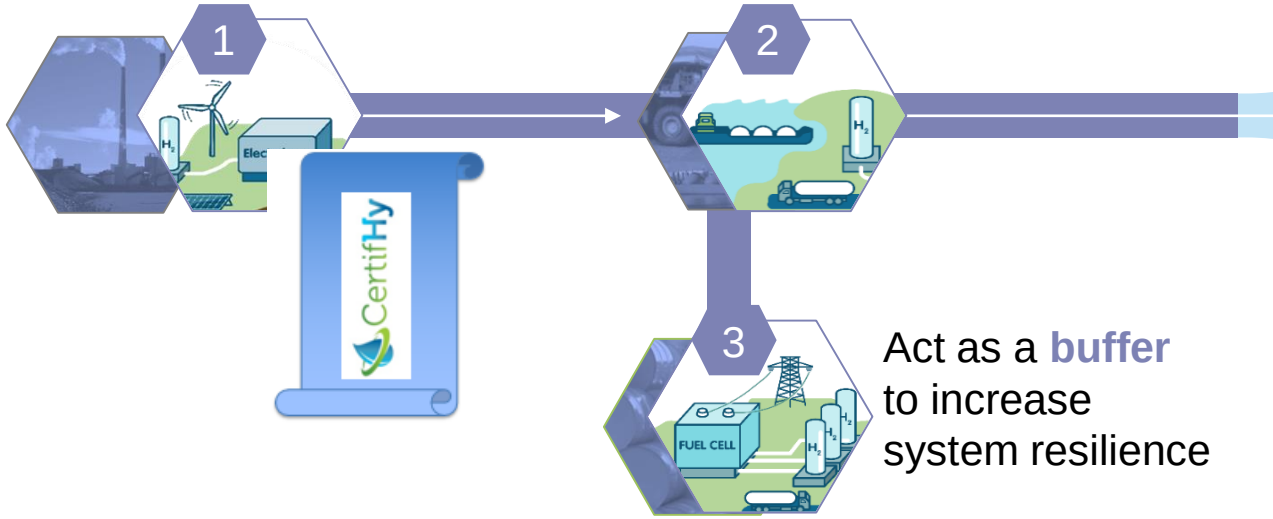
Source:
Hydrogen Council, Antwerp Mission Innovation conference

Hydrogen GO is a prerequisite for Hydrogen as an enabler of the Energy Transition

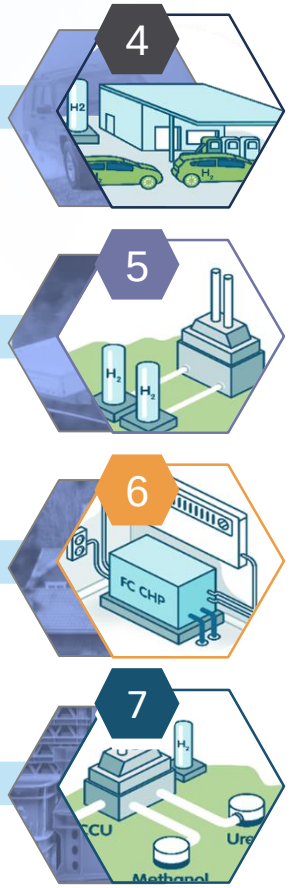
Enable the renewable energy system → Decarbonize end uses

Enable **large-scale renewables integration** and **power generation**

Distribute energy across sectors and regions



Act as a **buffer** to increase system resilience



Decarbonize **transportation**

Decarbonize **industrial energy** use

Help decarbonize **building heat and power**

Serve as **feedstock,** using captured carbon

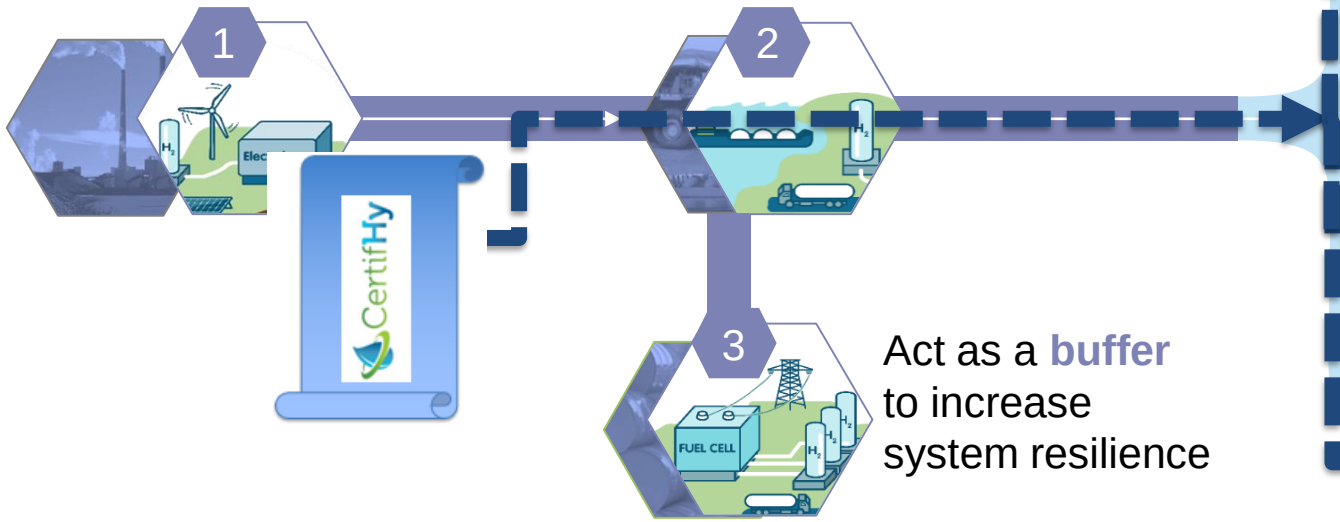
Source:
Hydrogen Council, McKinsey study 2017

Hydrogen GO can propagate environmental attributes along industrial chains

Enable the renewable energy system → Decarbonize end uses

Enable **large-scale renewables integration** and **power generation**

Distribute energy across sectors and regions



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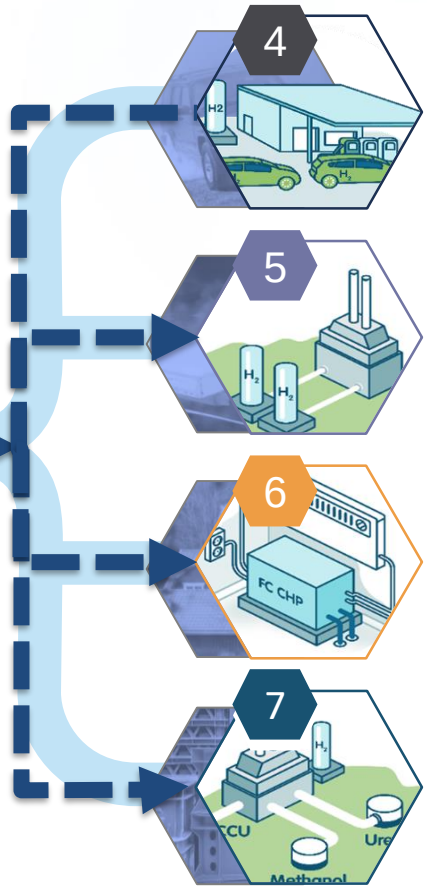


Decarbonize **transportation** — g CO2/km

Decarbonize **industrial energy** use — g CO2/kWh

Help decarbonize **building heat and power** — g CO2/kWh

Serve as **feedstock**, using captured carbon — g CO2/kg

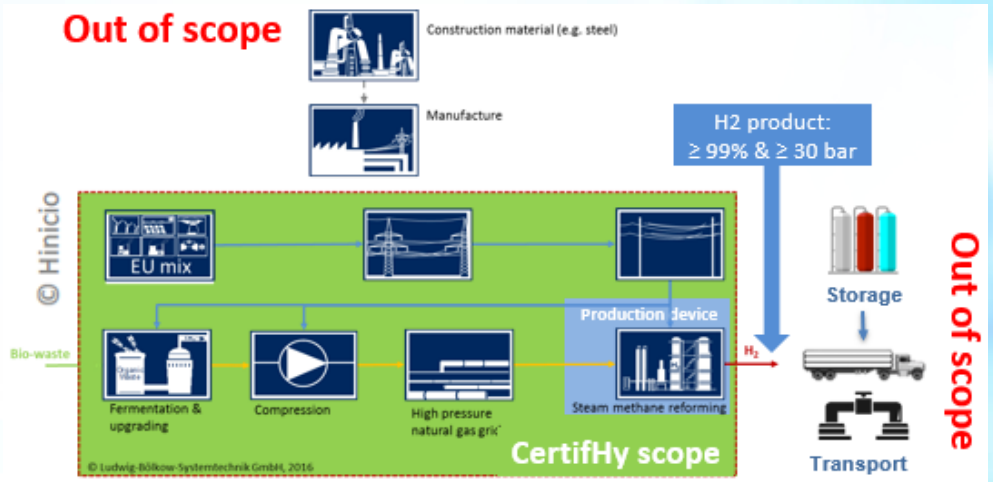
Source:
Hydrogen Council, McKinsey study 2017

This mean we need to agree on a.o. GHG allocation methods (which CertifHy already did for water electrolysis, chloralkali electrolysis & steam methane reforming (of biomethane or Carbon Capture & Sequestration)

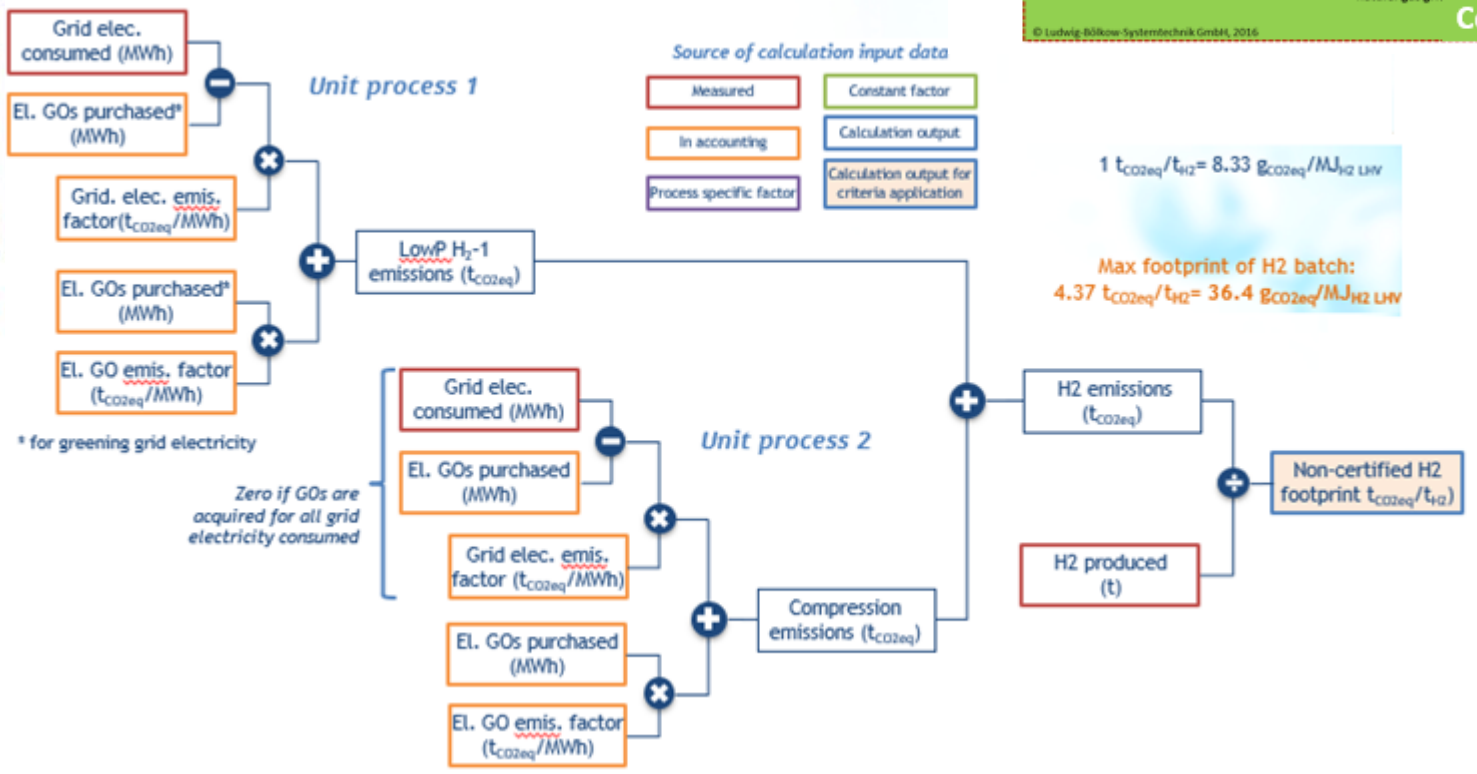
SMR Port Jerome I France
The pilot plant by Air Liquide produces Low Carbon hydrogen using steam methane reforming with a Carbon Capture unit or Green Hydrogen using BioMethane as feed gas.

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

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



Between t_1 and t_2:



CertifHy

Next to a robust tracing and tracking system for hydrogen production, CertifHy developed two labels: “CertifHy Green” and “CertifHy Low Carbon” together with Policy makers, Civil Society, and Industry.

Factual data fields on GO Scheme

Data on Origin Production Batch	Units
• Date and time of hydrogen production (beginning and end) • Facility (identity, location, date of start of operation, process and capacity) • Energy sources (including GoO information if applicable) • Raw material sources (including sustainability information if applicable)	
• GHG emissions intensity of hydrogen produced	g $CO2_{eq}$ /MJ_{H2}

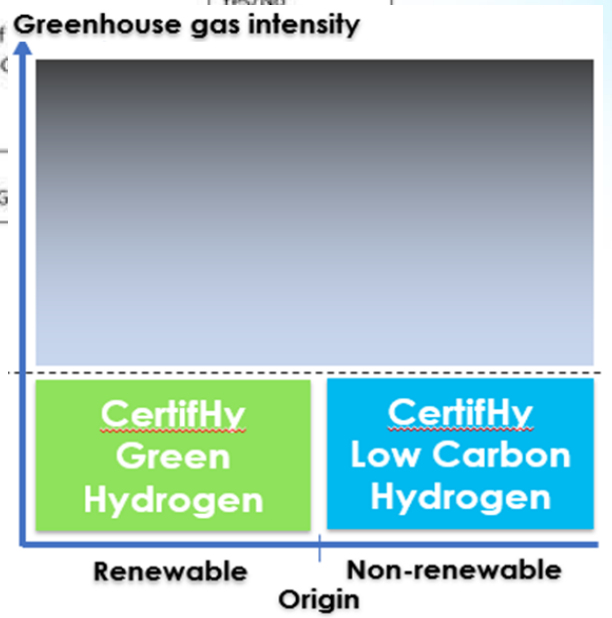
• Information on any support scheme (e.g. investment support, feed-in tariff, …)
• For hydrogen produced as a by-product:
  ○ Main product
  ○ Basis of GHG emissions allocation (e.g. input energy share)	

• Average GHG emissions intensity of all H_2 produced by the facility during the 12 months preceding date of production	g $CO2_{eq}$ /MJ_{H2}
• Share of renewable energy in total energy input* for producing the hydrogen	%
• Average GHG emissions intensity of the renewable share	g $CO2_{eq}$ /MJ_{H2}
• Average GHG emissions intensity of the non-renewable share	g $CO2_{eq}$ /MJ_{H2}
*excluding ancillary energy consumption	

A robust tracking system for characteristics of hydrogen production: production technology, place of production, energy sources used, financial support received, GHG allocation methods, etc.

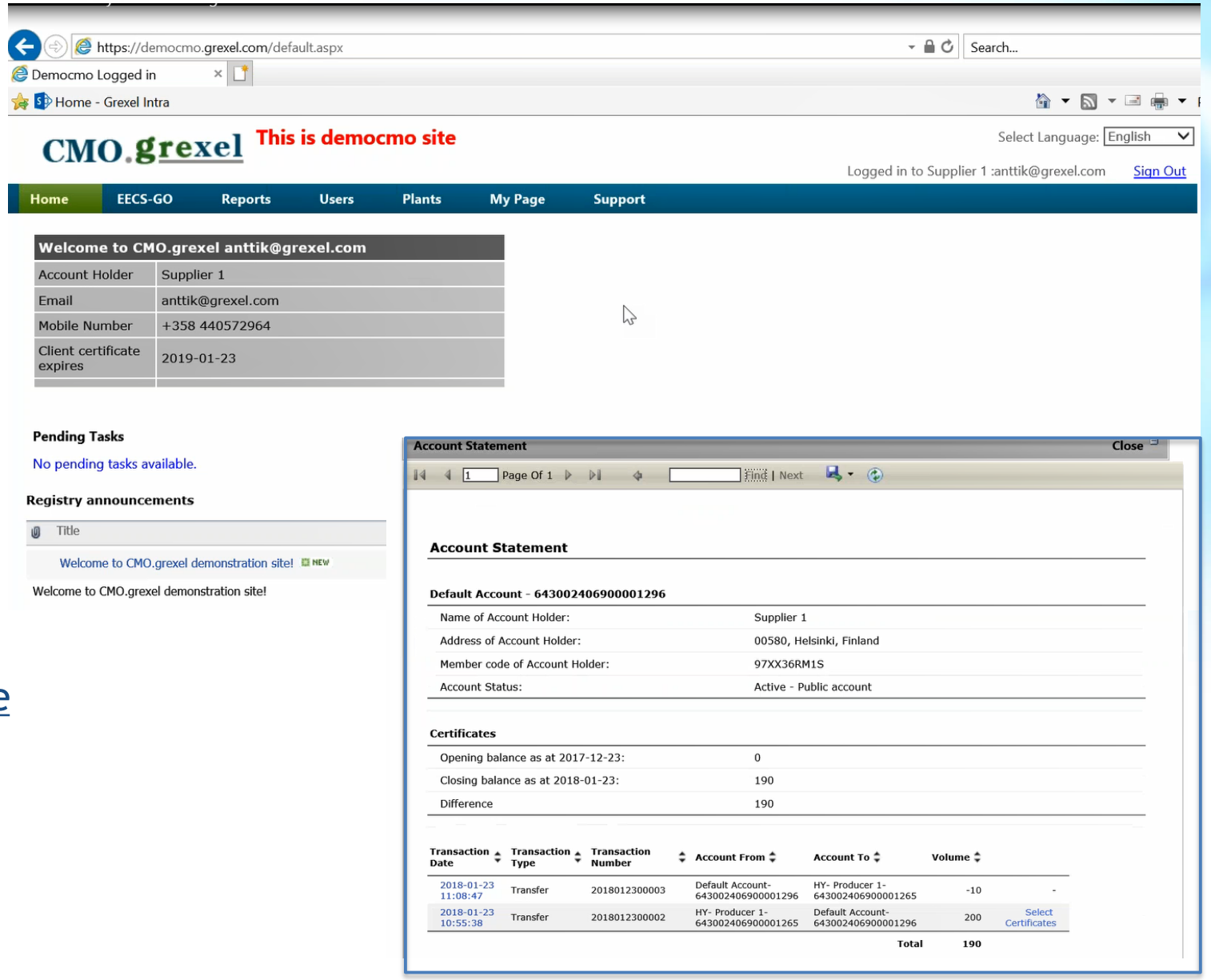
Two labels were developed, others can do depending on user requirements

Eligibility for *CertifHy Green Hydrogen* Guarantee of Origin	
CertifHy Green share of production [options]	%
Allocated GHG emissions intensity [options]	g $CO2_{eq}$ /MJ_{H2}
CHG emissions offsetting	Yes/No
Criteria:	
Does the unit quantity of hydrogen covered by this document belong to the CertifHy Green share of production?	Yes/No
Is the emissions intensity of the unit quantity of hydrogen covered by this document lower or equal to the CertifHy Low-GHG threshold (36,4 $gCO2_{eq}$)?	Yes/No
***CertifHy Green Hydrogen* Guarantee of Origin**	**Yes/No**
Eligibility for *CertifHy Low-GHG Hydrogen* Guarantee of Origin	
Allocated GHG emissions intensity	g $CO2_{eq}$ /MJ_{H2}
CHG emissions offsetting applied	Yes/No
Criterion: Is the emissions intensity of the unit quantity of this document lower or equal to the CertifHy Low-C $gCO2_{eq}$)?	
***Low GHG Hydrogen* Guarantee of Origin**	
Issuing Number :	
(At least one of the above criteria must be satisfied for a G	



CertifHy puts both a Guarantee of Origin (GO) "scheme" as well as a "system" 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/PublicPages/Statistics.aspx

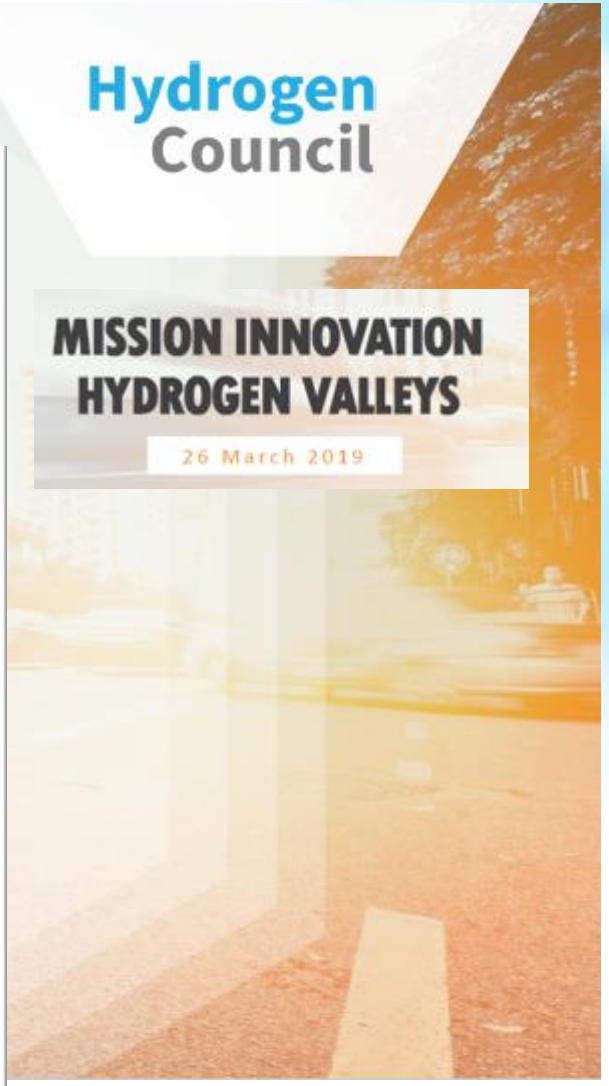


The Hydrogen Council pushes CertifHy forward as the international scheme for hydrogen certification

THE MISSION INNOVATION "HYDROGEN VALLEYS" WORKSHOP, ANTWERP, MARCH 2019

HYDROGEN DEPLOYMENT FRAMEWORK MATRIX

THEMES	CLEAN HYDROGEN TO MARKETS	UPSTREAM SUPPLY CHAIN	TRANSPORT	TOPIC DEVELOPMENT APPROACH
RULES / REGULATIONS	Pathways / Rules *(Europe lead - Certifhy)*	Maritime rules *(Japan/Australia lead)*	Infrastructure & supply chain regulations *(Lead Japan)*	Public / private workshops *(CEM/IPHE support)*
R&D	Private sector driven	Public / Private	Private sector driven	Public / Private effort *(MI support)*
MARKETS	All	Energy	Heavy duty, public transport & intensive usage for light duty vehicles	n/a
EDUCATION	Communication channels & events (public-private driven – CEM?)			n/a
SAFETY	Public / Private			n/a
SUPPORTING SCHEMES	Policies / Contract For Difference / CO2 Price	Large demonstration schemes	Policies & guarantee mechanisms	Public / private workshops - *Hydrogen Council lead*



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For questions, please contact

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