Hinicio

CertifHy

Ammonia Energy Conference
2021

A PIONEERING VISION WITH A GLOBAL REACH

Active in Europe, Asia and The Americas, with a 360° approach in technology, strategy and markets.

+ 350 studies and projects in more than 20 countries.

Hinicio

STRATEGY

INVESTMENT

POLICIES

PROJECTS

ABOUT HINICIO

Founded in 2006 we are **globally recognized as a leading player in the field of hydrogen**

Ownership without conflict of interest
The majority of HINICIO's capital is held by internal teams

We provide support to public & private on their **strategies** and **implementing complex large-scale industrial projects**.

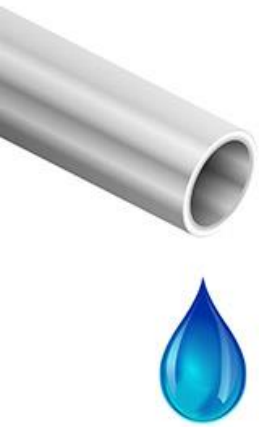
THEY WORK WITH US

TRUSTED BY INDUSTRY LEADERS

Shell
gasunie
TOTAL
ENGIE
SOLVAY
Nouryon
galp
ENEDIS
THE LINDE GROUP
PRAXAIR
McPhy
equinor
nel
Helion
HYDROGEN POWER
Cummins
NUON
TenneT
EDF
FCH
European Commission
AREVA
edp
ceatech
HDF
RWE
DEME
SNCF
Air Liquide
aes
THE WORLD BANK
Hydrogen Europe
PLASTIC OMNIUM
ArcelorMittal
ABB
NAVAL GROUP
Vestas
hynamics
GROUPE EDF
AsahiKASEI
IRENA
HYDROGENICS
MICHELIN
Chemours
MITSUI&CO.
ALSTOM
AFHYPAC
Petroleum Development Oman
POWERCELL
Port of Antwerp
Port of Rotterdam
REN

CertifHy® in a nutshell

Since 2014, Hinicio has been leading the development and implementation of CertifHy®



Key Info

- 1st EU-wide Guarantee of Origin (GO) scheme for Green and Low Carbon Hydrogen
- Initiated at the request of the European Commission and financed by the Fuel Cell and Hydrogen Joint Undertaking (FCH-JU)

By end 2019:

- ***76 000 GOs issued***
- ***3 600 GOs cancelled (used)***

Phases of CertifHy®

A three-phase project still running today

PHASE 1

Define a **widely acceptable definition of green hydrogen**

Determine **how to design and implement** a robust **EU wide GO scheme**

PHASE 2

Set-up a **hydrogen GO Stakeholder platform**

Finalise scheme design

Run a pilot scheme to test the proposed design

Identify actions to **achieve an EU wide deployment**

PHASE 3

Prepare EU wide deployment and harmonization of GOs across Europe

Scheme expansion:

- Include new Hydrogen production pathways
- Investigate downstream H2 uses (Power-to-Liquids)
- Internationalization
- Expand to RFNBO certification

2014 2016 2017 2018 2019 2020s…

Phases of CertifHy®

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Define a **widely acceptable definition of green hydrogen**

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Affiliated partners:

TOTAL, THE LINDE GROUP, colruyt, MACHIELS, AIR PRODUCTS, AREVA H_2Gen, Shell, EDF, AIR LIQUIDE, BMW, AkzoNobel, HYDROGENICS (SHIFT POWER | ENERGIZE YOUR WORLD), uniper, OMV

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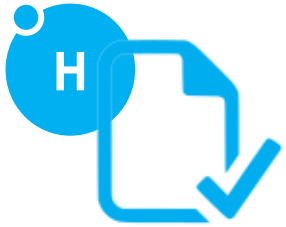
2014 2016 2017 2018 2019

CertifHy® Phase 1

Preparing the ground for a hydrogen certification scheme



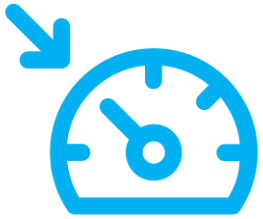
Selecting criteria for green H2 definition

In:

- Renewable energy
- CO2 footprint
- Technology neutral
- …

Out:

- Rare earth materials
- Water



Selection of GHG threshold

- Pass or fail
- Benchmark:
  SMR of Natural Gas
- Low carbon:
  60% below benchmark
  (to include many bio-based pathways)

Determining the renewable share of H2 production

Renewable hydrogen will be as renewable as the energy input into the production device

Many other ideas

- Creating ‘few’ zero carbon H2 certificates from ‘many’ low carbon H2 certificates
- Offsetting GHG foorprint through reforestation
- ….

CertifHy® Phase 1

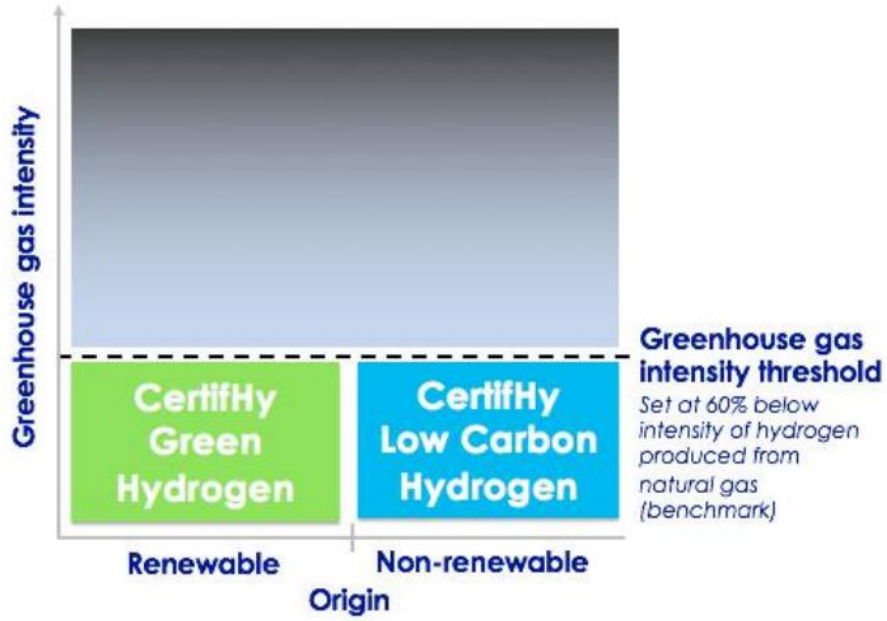
We ended up with a factual sheet and two labels

PART 1: Factual information	Comments
• Account number	
• Identity of the Production Device o Production device identifier o Name o Location country o Location city o Commissioning date o Installed production capacity	
• Date and time of hydrogen production: beginning and end of the production batch	dd.mm.yyyy
• Fuel (or heat source) and Technology o Fuel (or heat source) code(s) (see Annex A) for up to ten fuels including respective share of total fuel input o Technology code (see Annex B); including main/by-product	
• Financial support to hydrogen production or input fuel production o investment supported, and/or o production supported, and/or o supported scientific/demo/pilot project, or o unsupported, or o no information available	
• Share of renewable energy for each input energy carrier for producing the hydrogen	%
• GHG balance: o GHG emissions intensity	g $CO2_{eq}$ /MJ_{H2}
• GO identity o Identifier (the unique number which has been assigned to the GO) o Issuing date o Cancellation/Expiry date	ID dd.mm.yyyy
• Certification Body	Name

CertifHy

Two labels are defined for hydrogen having a greenhouse gas intensity below benchmark by at least 60%

- **CertifHy Green Hydrogen** if the hydrogen is made from renewable energy
- **CertifHy Low Carbon Hydrogen** otherwise



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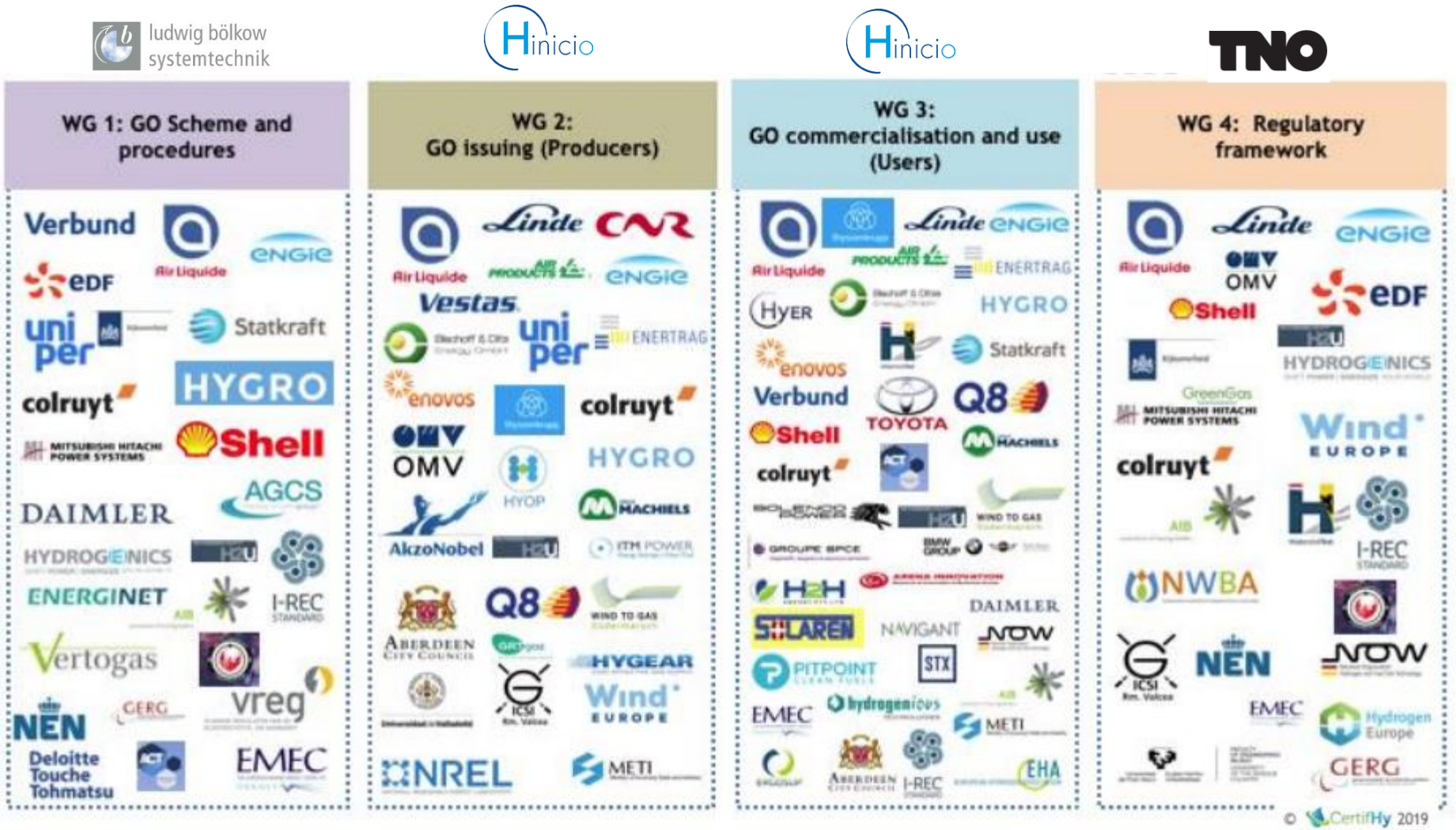
2014 **2016** **2017** **2018** **2019** **2020s…**

CertifHy® Phase 2

A stakeholder forum has been created to represent industry, policy makers, and civil society



CertifHy® Phase 2

Pilot of four hydrogen plants demonstrating different production pathways

SMR + CCS. France

Using BioMethane as feed gas

Water electrolysis. Belgium

To feed forklifts, heavy duty vehicles and passenger cars

Chlor Alkali process. Netherlands

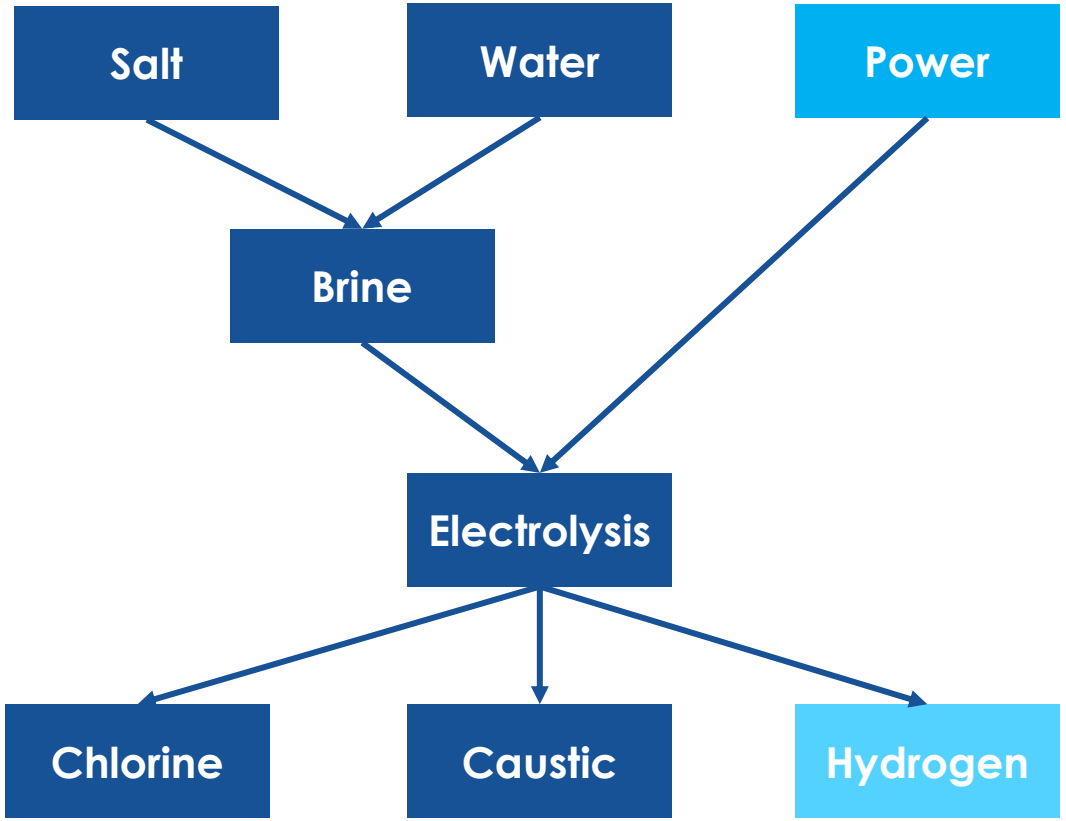
By-product H2 from a Chloralkali process fed with renewable electricity

Wind electrolysis. Germany

To feed into the natural gas grid or used as input for methanation

CertifHy® Phase 2

GHG allocation example: Hydrogen produced as a by-product of chlor-alkali processes



Allocation Method	H2 Emissions Share	H2 Emissions (g CO2e/MJ LHV H2)
Energy-Based	N/A	N/A
Mass-Based	1%	7
Market Value-Based	9-11%	34-59
Molar-Based	25%	134
Enthalpy-based	53%	282
Benchmark-Based (ODC process)	21%	134

Source: CertifHy® and IPHE

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