

ACCELERATE THE EUROPEAN ENERGY TRANSITION WITH INNOVATIVE HYDROGEN SOLUTIONS

Reach European climate goals with ambitious service providers!



FLEXIDAO

Simone Accornero

Co-founder
Flexidao



Christian Weinberger

Senior Adviser –
Advanced Industrial Technologies/
Hydrogen Coordinator
European Commission



Pierre-Emmanuel Casanova

Co-founder
HySiLabs



DCbrain

Benjamin de Buttet

Co-founder
DCbrain



Caroline Rozain

Co-founder
Sylfen



Knowledge Innovation Community

Raluca Vataseanu

Sales & Business
Development Manager
EIT InnoEnergy



Geoffroy Ville

International Business
Developer
Ataway

TUESDAY

24

NOVEMBER

9 AM

ONLINE MEETUP

EIT InnoEnergy is supported by the EIT
a body of the European Union





European Hydrogen Strategy European Clean Hydrogen Alliance

Christian WEINBERGER,
Senior Adviser - Advanced Industrial Technologies
European Commission
DG Internal Market, Industry, Entrepreneurship & SMEs

EU and Hydrogen – helicopter view

EU Green Deal

- achieving climate neutrality in 2050
- Around 50% reduction by 2030

Hydrogen Strategy for a climate neutral Europe

- exploring the potential of clean hydrogen to help the process of decarbonising the EU economy in a cost-effective way

Industrial Strategy for Europe

- making Europe's industry climate-neutral by 2050
- maintaining our global competitiveness and a level playing field, while enhancing Europe's industrial and open strategic autonomy
- shaping Europe's digital future

European Clean Hydrogen Alliance

- co-operation platform for European Hydrogen industry
- development of a significant project pipeline
- delivering investments across MS borders

Hydrogen Strategy – 3 phases

- **4 GW** of renewable hydrogen electrolyzers
- Replace **existing hydrogen production**
- Regulation for liquid hydrogen markets
- Planning of hydrogen infrastructure

2024

- Scale-up to **all hard-to-decarbonise sectors**
- Expansion of hydrogen-derived **synthetic fuels**
- EU-wide infrastructure network
- An open international market with € as benchmark

2030

- 40 GW of renewable hydrogen electrolyzers
- New applications in steel and transport
- Hydrogen for electricity balancing purposes
- Creation of “Hydrogen Valleys”
- Cross-border logistical infrastructure

2050

Scaling up renewable hydrogen production

and in a transitional period low-carbon hydrogen, through:

- Supporting producers through support mechanisms
- Carbon Contract for Differences
- Develop a EU-wide hydrogen infrastructure
- Revision of TYNDPs to ensure full integration of hydrogen infrastr.

Fostering Renewable hydrogen demand

and in a transition al period low-carbon for

- Supporting final customers
- Green fertilisers and green steel
- Heavy duty road vehicles
- Creating Markets for clean hydrogen
- Certification of renewable and low-carbon hydrogen

European Clean Hydrogen Alliance



- Launch on 8 July
- Involving all active stakeholders in the clean hydrogen ecosystem, bringing together supply and demand as well as society/NGOs
- >900 members to date – more in the pipeline

Sign European Clean Hydrogen Alliance Declaration at :

<https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance>

European Clean Hydrogen Alliance

Kick-starting the EU Hydrogen Industry to achieve the EU climate goals



Mission

- build up a robust pipeline of projects
- establish an investment agenda
- Integrate the hydrogen value chain across Europe
- implement the new European hydrogen strategy
- Massively scale up production and demand for clean hydrogen

The blueprint estimates investments of €430 billion by 2030

The Alliance Round Tables

- Put the focus on the specific issues of the pillar & industrial subsectors
- Chaired by CEOs
- Including all stakeholder groups
- Entrusted with building up the project pipeline / possible IPCEIs
- Identifying regulatory bottlenecks hindering implementation
- Defining dependencies on other RTs

Hydrogen Production

Transmission & Distribution

Mobility Applications

Industrial Applications

Energy Applications

Residential Applications



The European Hydrogen Forum

- ☐ Broad conference taking place on 26/27 November in the context of the EU Hydrogen Week
- ☐ Thursday = political level debates
- ☐ Friday = project day
- ☐ Virtual event with 50 match-making tables
- ☐ Investor pitching and company presentations

Further information

European Clean Hydrogne Alliance declaration :

<https://ec.europa.eu/growth/industry/policy/european-clean-hydrogen-alliance>

European Clean Hydrogen Alliance web-site :

<https://www.ech2a.eu>

European Hydrogen Forum :

<https://www.fch.europa.eu/european-hydrogen-week>

Hydrogen Valley information :

<http://s3platform.jrc.ec.europa.eu/hydrogen-valleys>



InnoEnergy
Knowledge Innovation Community



EIT InnoEnergy is supported by the EIT,
a body of the European Union

Engineering innovation A sustainable energy future for Europe

Webinar DC Brain – Hydrogen 24.11.2020

Making connections: the power of the network

6 regional offices

Activities in **17 EU** countries + in **Boston**

Direct presence in **Brussels**

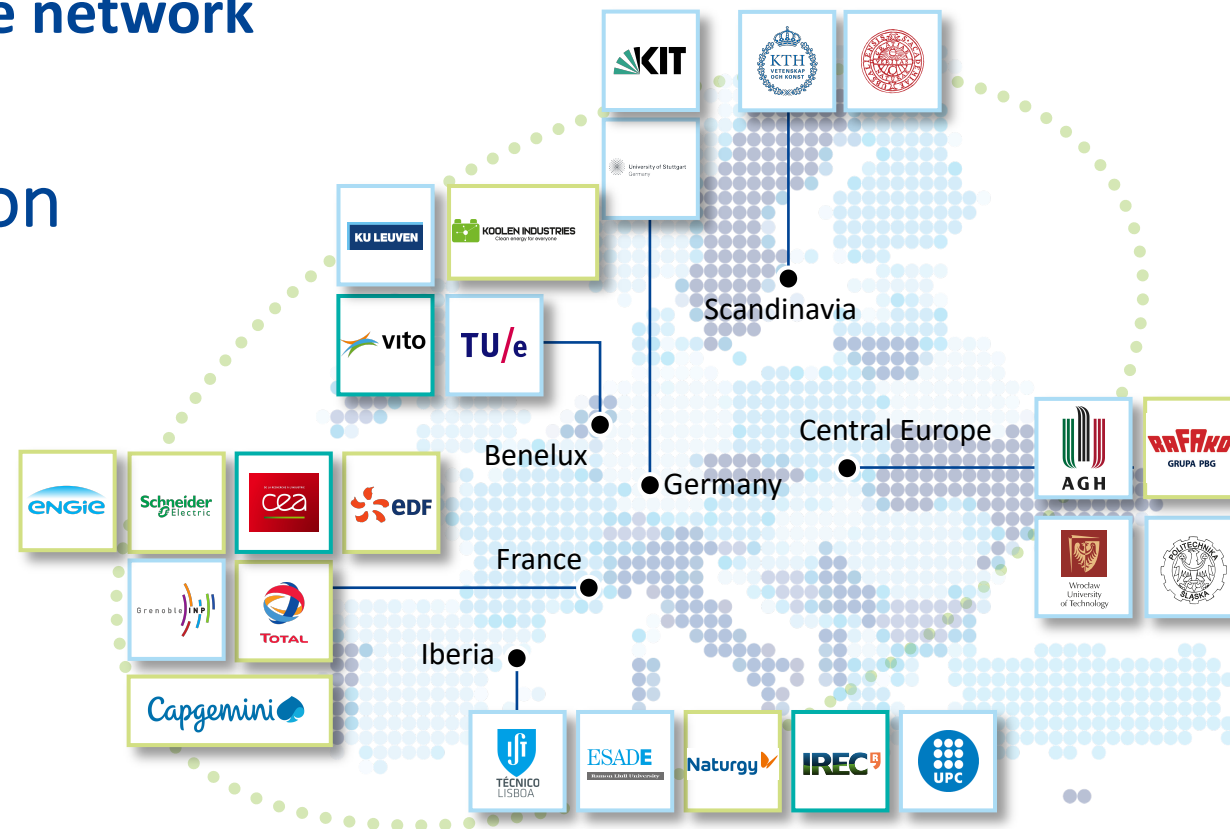
24 shareholders

500+ additional partners in Europe

480+ innovative solutions supported

560 MEUR EIT InnoEnergy investment

2,5 BEUR invested in our solutions



Our Shareholders

Research Institutes
 Universities

Industry Partners
 Regional offices

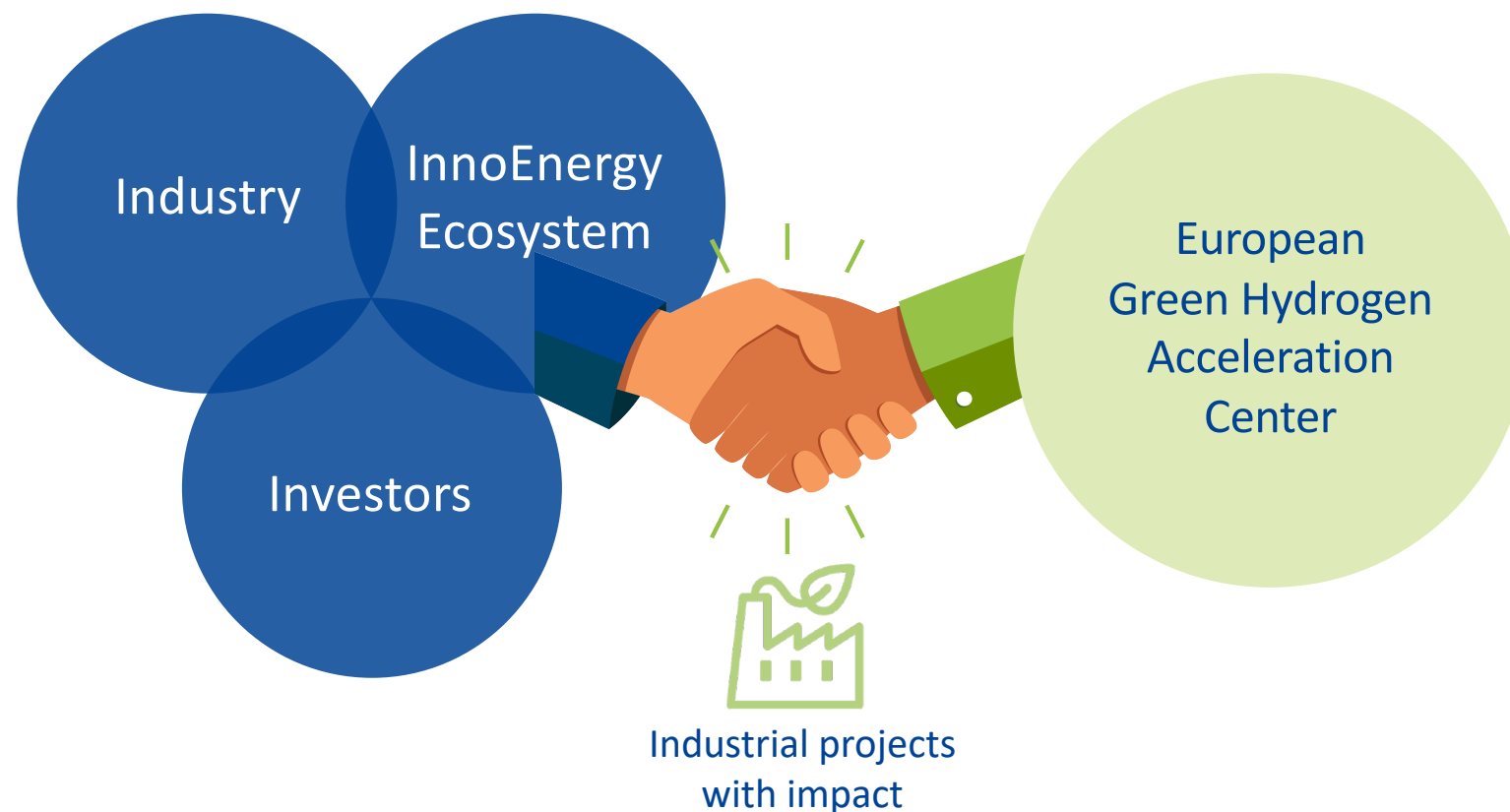
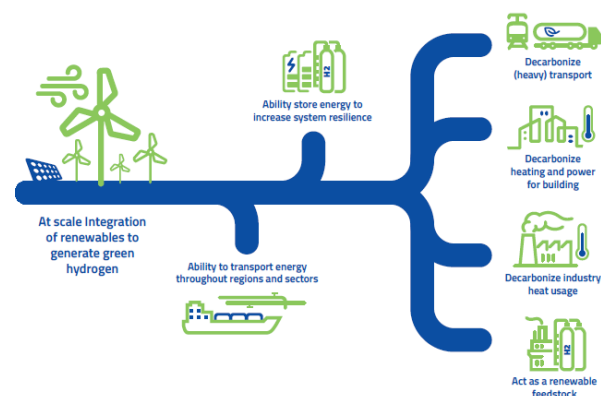
European Green Hydrogen Acceleration Center. By 2025:

1200TWh (10%)

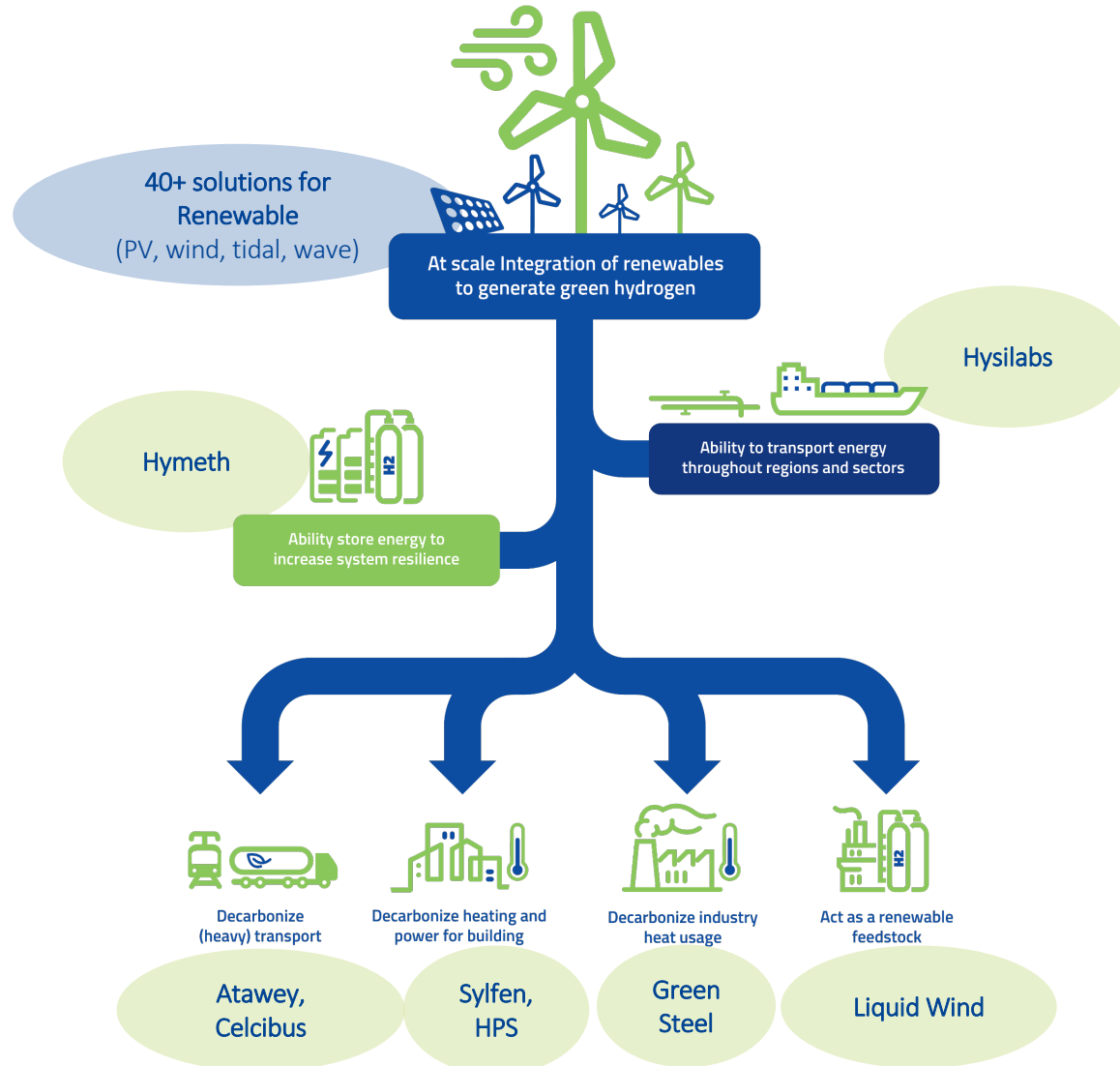
500.000 Extra Jobs

Realised Investments: €100 billion

The systemic role of green hydrogen In a zero-carbon energy system



The systemic role of green hydrogen in a zero-carbon energy system



InnoEnergy has invested in 20+ H2 related innovations across the value chain in recent years, in different stages of maturity. A sample, **with their operation/ commercialization (industrial scale) date**, are:

Hymeth: Electromagnetic electrolysis (2022)

Celcibus: Membranes for fuel cells (2022)

Hysilabs: Transport dissolved in liquid (2025)

DC Brain – AI for gas and physical flows optimisation (2016)

Flexidao : Real time renewable tracking based on blockchain (2018)

Ataway: H2 infrastructure for mobility (2017)

Sylfen: Long term storage off-grid (2018)

HPS: Home Heat & Power for premium segment (2018)

Liquid Wind: Decarbonizing industry & maritime transport (NH4) (2023)

Green Steel : Green steel production with green hydrogen (2025)



Raluca Vataseanu

Sales and Business Development Manager
InnoEnergy France

raluca.vataseanu@innoenergy.com

Cell phone: +33 6 45 95 86 33



www.InnoEnergy.com



EIT InnoEnergy is supported by the EIT,
a body of the European Union

Join us for our next webinars
26.11 – Benelux – in English & Dutch
12.01 – France – in French

And meet InnoEnergy innovations in person at
TBB Berlin – 3-4 Nov. 2021



HYSILABS
HYDROGEN CARRIER

Hydrogen is a key element in the
energy transition ...

By 2030, hydrogen could fuel ...



~1.0-1.5 m
autonomous taxis



~300-700k
autonomous shuttles



~3.0-4.0 m
delivery trucks and
vans



~4-8k
vertical take-off and
landing taxis (VTOL)



~1 TWh
of backup power in
data centers

... amounting up to ...



~5-7 m tons
of annual hydrogen
demand



~5.5-6.5 m
fuel cells in use



H2



250

billion € in 2030

.... but technical constraints
remain for its uptake:





Liquid

Liquid at Standard conditions



8,7%

H₂ storage capacity

7x

7x More

7 times more H₂ capacity compared to
conventionnel compressed gaz

Storage capacity (KgH₂/m³)

0 20 40 60 80 100 120

HydroSil 105,42

Liquified H2 70,97

Electriq Global 67,88

Hynertech 58,86

Hydrogenious 56,59

Chiyoda 47,06

NgrStorEdge 38,04

H2 gas (200 bar) 14,71



Value Chain

A



Industrial Processes to charge HydroSil with hydrogen and energy are plugged into hydrogen production sites.

B



HydroSil is stable and non-toxic and uses the same logistic as conventional liquid fuels.

C



Hydrogen is released on demand and without energy input from HydroSil to industrial or for the H₂ mobility sector.



MSc, Ing



MSc, MBA



PhD



PhD



PhD



PhD

Advisory board



Jean-Paul Reich
former CSO at ENGIE



Philippe Torrion
former Director EDF



Patrick Achard
Director of Research at
PERSEE Mines Paristech



GM. Papierok
Vibrac



François Fesquet
President of an
economic interest group



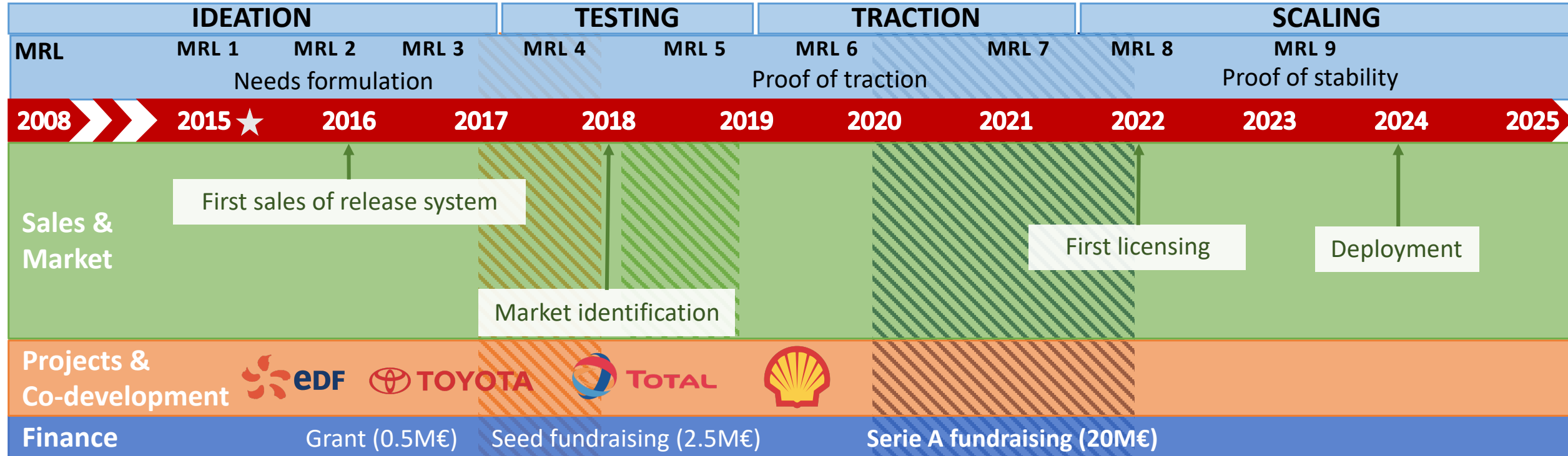
Bertrand Chauvet
CEO Seiya Consulting



Pierre Casanova
CEO DDH Partners



Timeline



On-Going Projects



AIRBUS



FUTURE Project (H2020)



HYNOVAR Project



RENAULT



Industry' Nov

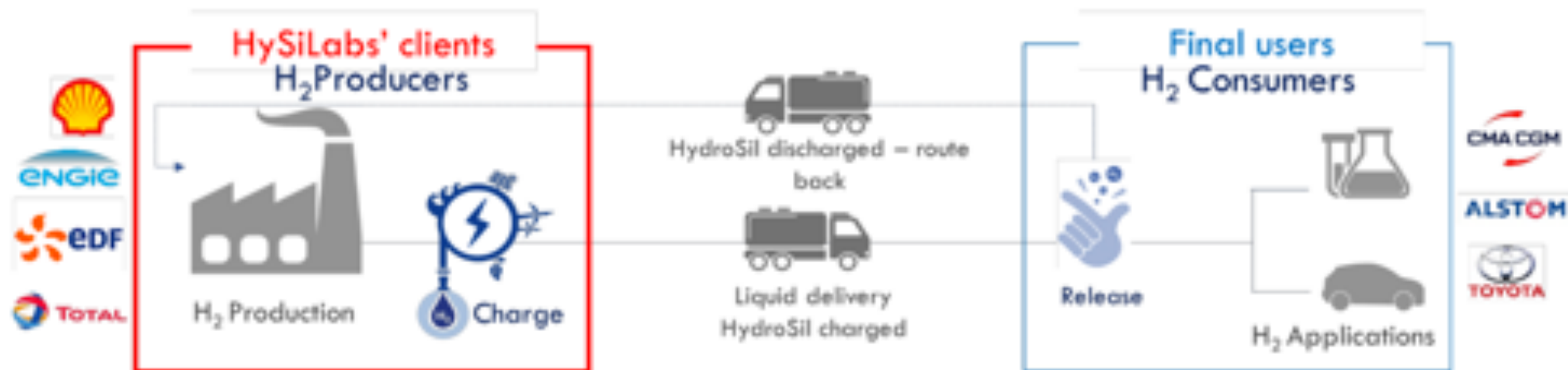


HYDEAL



Sun to X project (H2020)





Awards



We make hydrogen easy to deliver



Pierre Emmanuel Casanova
pecasanova@hysilabs.com



SMARTER NETWORKS WITH INES

The AI powered Smart Gas Management suite
that understands and optimizes your gas networks

Summary

1. The new challenges of the gas industry
2. A few words about Hybrid AI
3. Use cases



Your Challenges as a Gas Operator

Your day-to-day operations are changing drastically :



New rules to comply with

-40% Carbon emissions by 2030
Carbon-Neutral by 2050



New injections = Trickier to manage

More flexibility & dispatching
Gas quality data is crucial to operate



Regulators demand a high QoS

Penalties & Bonus : -3% / +2%
Millions of € paid each year



Network integrity & developments

Maintain assets & monitor 24/7
Plan evolutions

Decarbonization is there, and you must get ready quickly

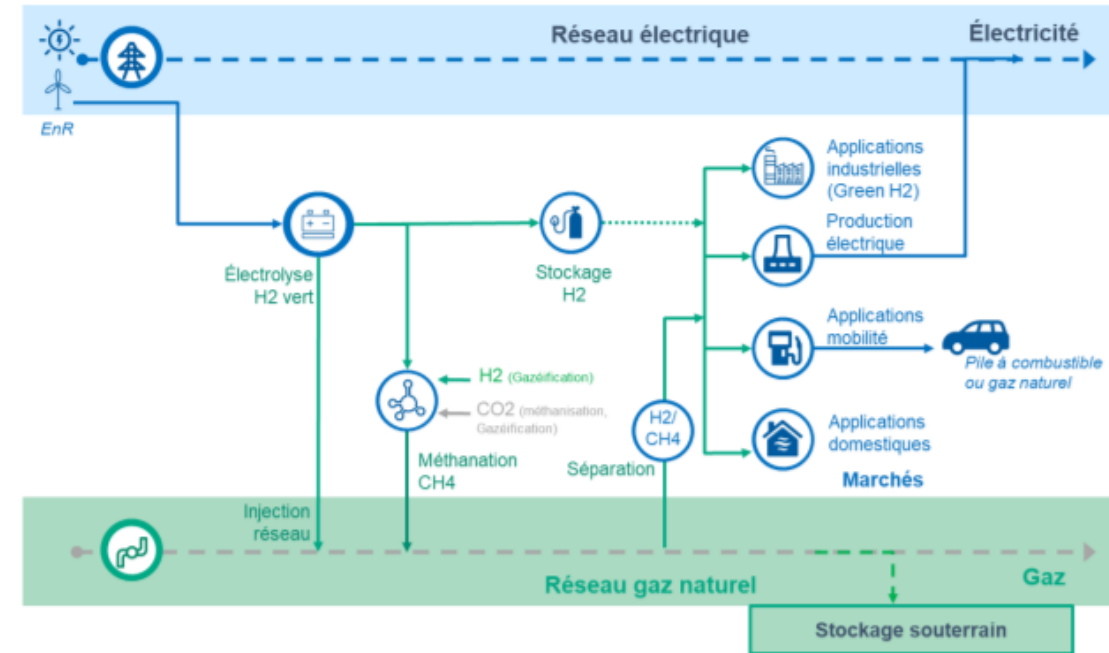
Injecting H2 into existing networks : interesting but challenging option...

Interesting option :

- To store and transport « green electricity » through PowertoGaz assets
- Help the balancing of Power Network
- With limited investment on existing assets

But Challenging :

- Not the same chemical composition as classical methane > Impact on asset integrity
- **Not the same gas quality > impact on network balancing , invoicing, Quality of service**

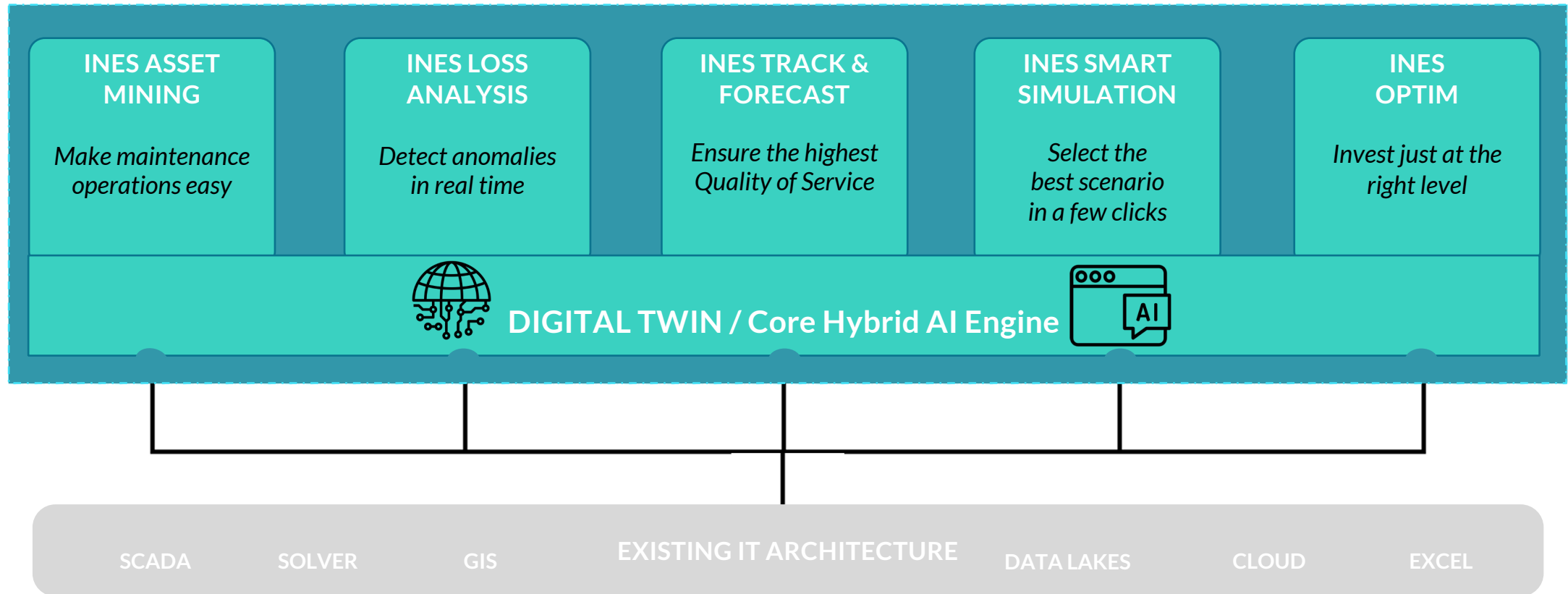


Summary

1. The new challenges of the gas industry
2. A few words about Hybrid AI
3. Use cases



That's why DCbrain created the most simple & reliable Smart Gas Management suite



Focus on the track and forecast module

1 — Reliable forecasting and tracking capacities

Learning network behaviour through data
Complete datasets with physical models

Automatic fine-tuning of propagation
modélisation (gas quality tracking)

Automatic modélisation of consumption
forecast per point

Data integration (CSV or API) with billing /
monitoring tools

Automatic data cleaning (Error log)

2 — Real time Anomaly detection

Static anomaly detection

Dynamic anomaly detection

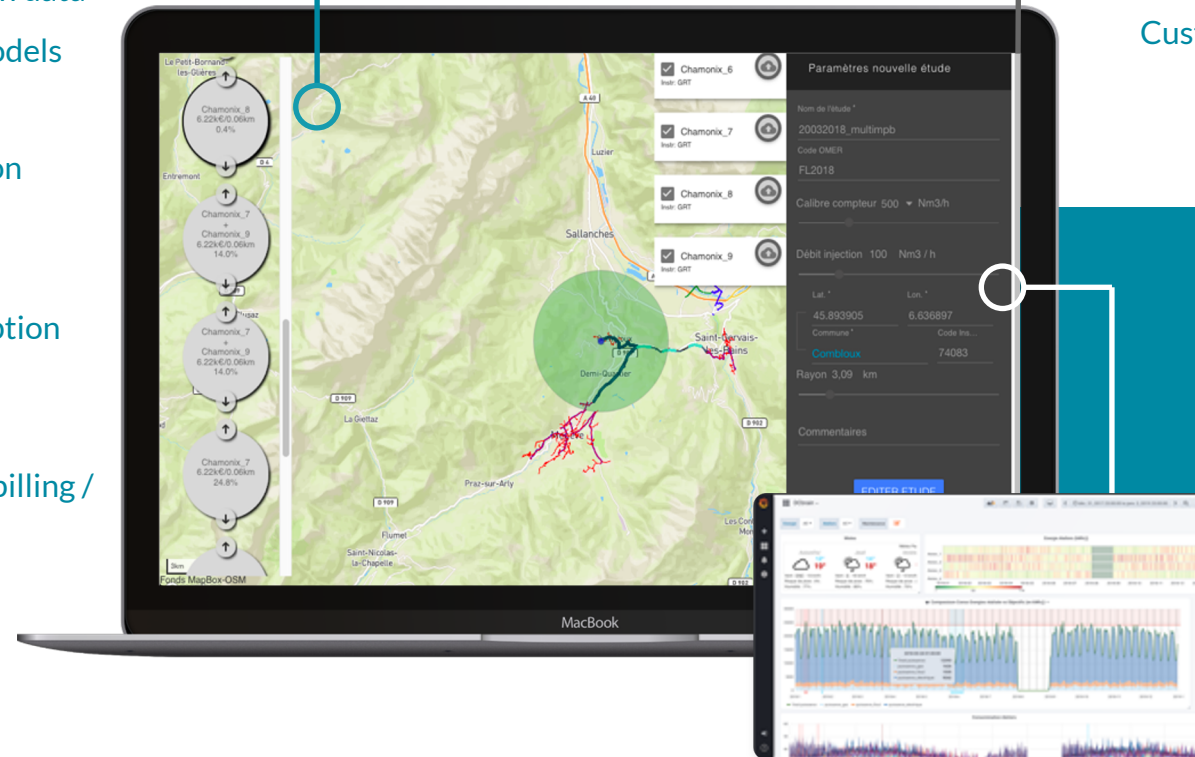
Alerting through emails

Customer profiling

3 — Share informations with teams

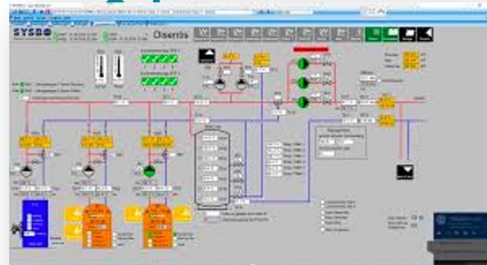
Create your own reports

Share your reports through PDF, URL,
API

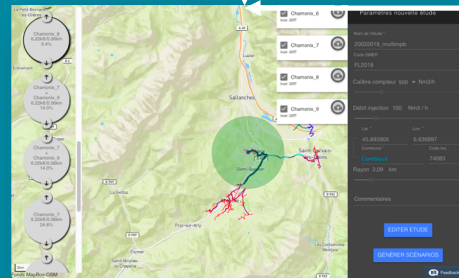
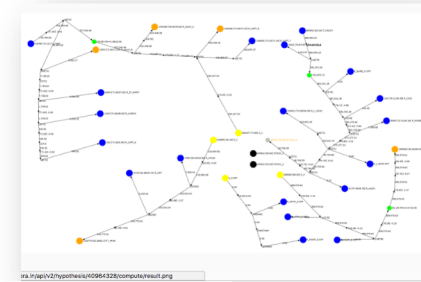


Classical Solvers VS AI VS Hybrid AI ? Why it is important to clarify ?

Classical



AI



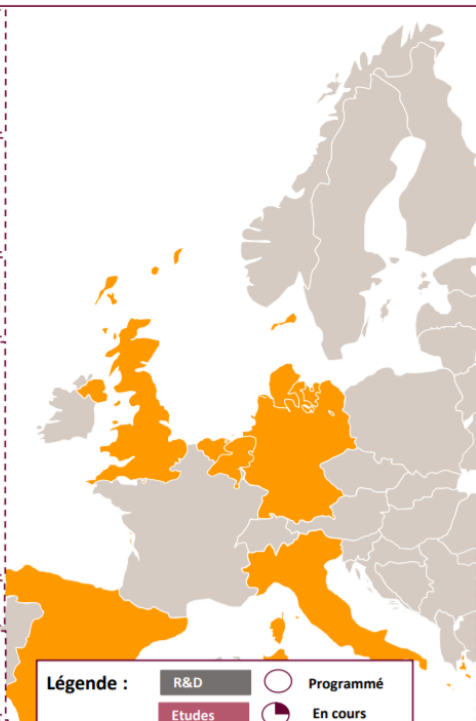
Hybrid AI

- Use Artificial Intelligence to enhance the physical models
- Automatic learning and/or configuration by experts
- Few parameters models
- Easy to understand
- Extrapolable
- Efficient models for optimisation

Summary

1. The new challenges of the gas industry
2. A few words about Hybrid AI
3. Use cases





Source : Analyse Sia Partners²³

Project (on going) : Track H2 propagation in the network

The project:

- Define the propagation zone of the H2 depending on
- H2 volume injection
- Gaz consumption per consumer
- Other gas injection

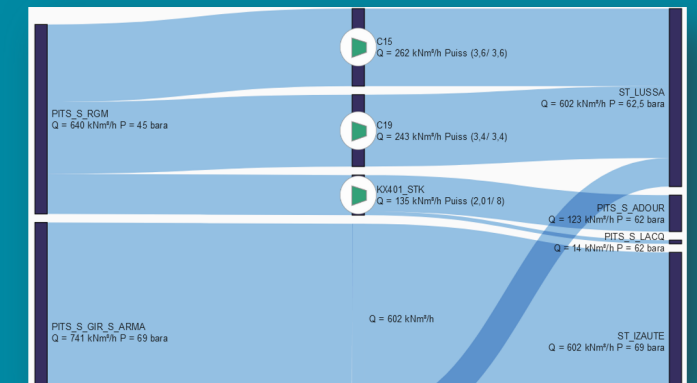
Our intervention:

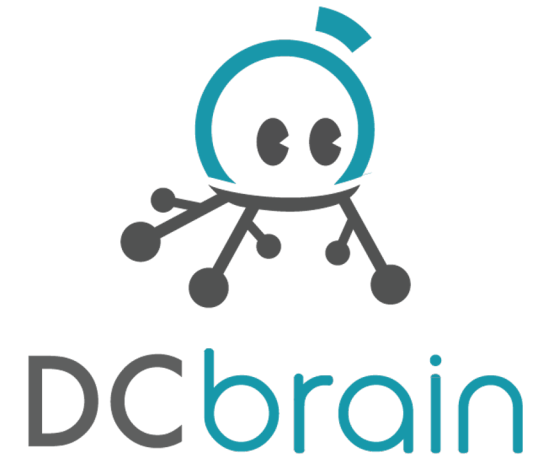
- Integration of multiple data sources (Including GIS) to learn from the topology of the network and the engaged volume
- Creation of a digital twin to visualise the gas measures and the propagation on the graph
- Fine tuning of propagation algorithm



The result:

- Gaz quality figure for each node
- Reports and comparative overviews
- Network visualisation





Thank you!

Doudja Kartobi – Business Developer

doudja.kartobi@dcbrain.com

+33 7 66 81 09 58

www.dcbrain.com



Green Hydrogen certification on blockchain



Context – The European Union has set new ambitious targets for renewable energy and other energy vectors to replace fossil fuels

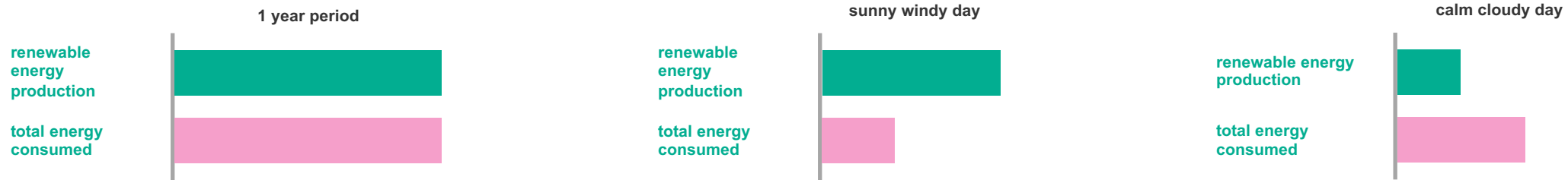


Hydrogen is expected to be one of the main energy vectors of the future

The RED II defines **time and location** between RE production and electrolysis consumption as a **critical point to certify green hydrogen**.*

* Renewable Energy Directive 2018/2001/EU & Energinet PtX Strategic Action Plan

Problem 1 - Time of production is necessary to prove the hydrogen is green: no existing certification mechanism can do it



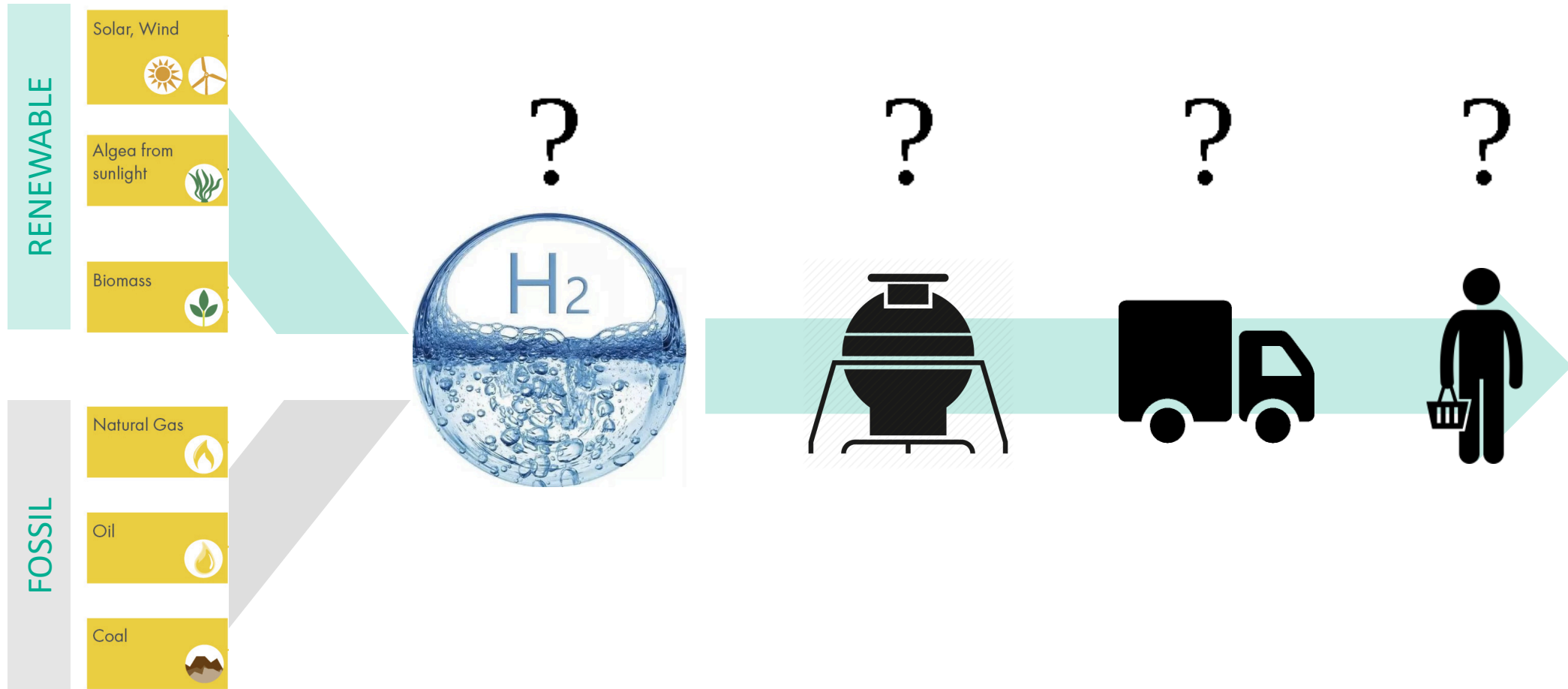
Guarantees of Origin are based on annual accounting and balancing principles, thus ignoring time of production. This flaw leads to 3 critical issues:

INABILITY to prove that the hydrogen stock is green for real

INACCURATE ASSESMENTS OF ENVIRONMENTAL TRANSPARENCY due to the inability of accounting for time-variations in grid carbon

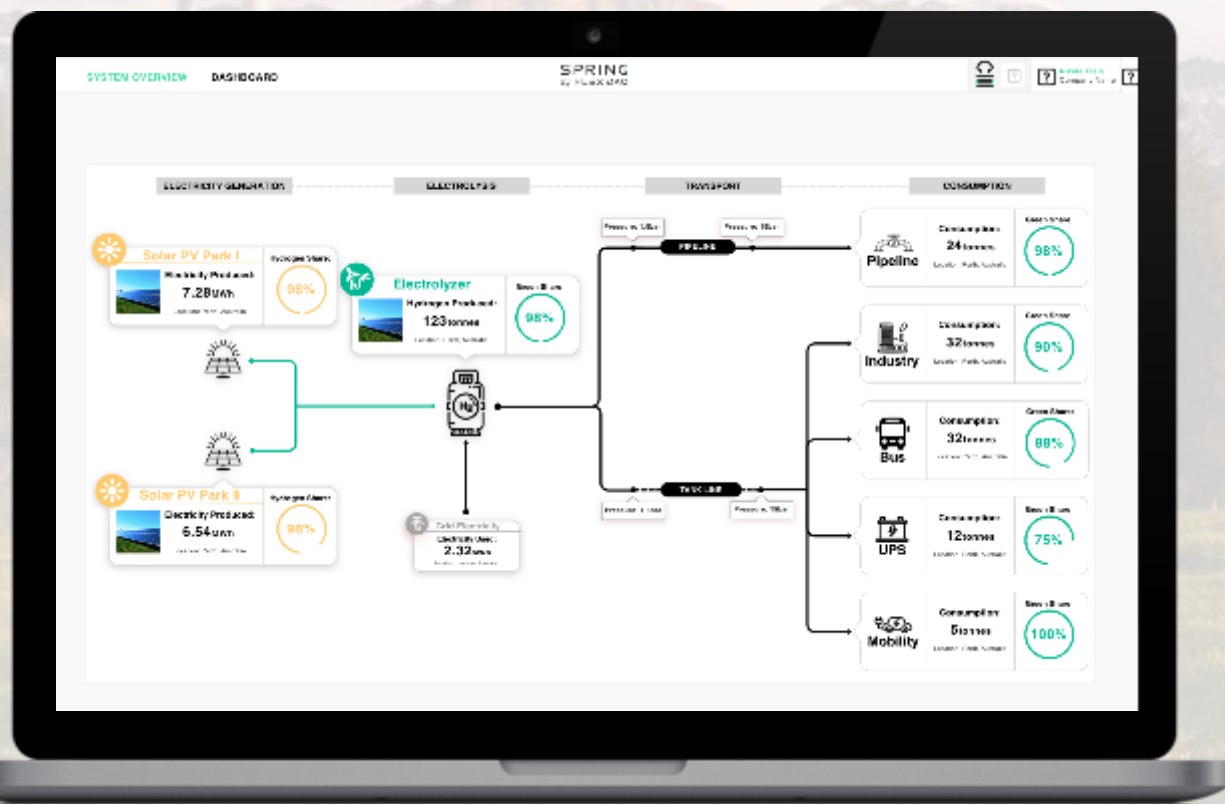
MISPRICING issues due to the price of electricity and the true value of the hydrogen generated

Problem 2 – No transparency and visibility across the supply chain





Certifies green hydrogen production and distribution across the entire supply chain through blockchain technology



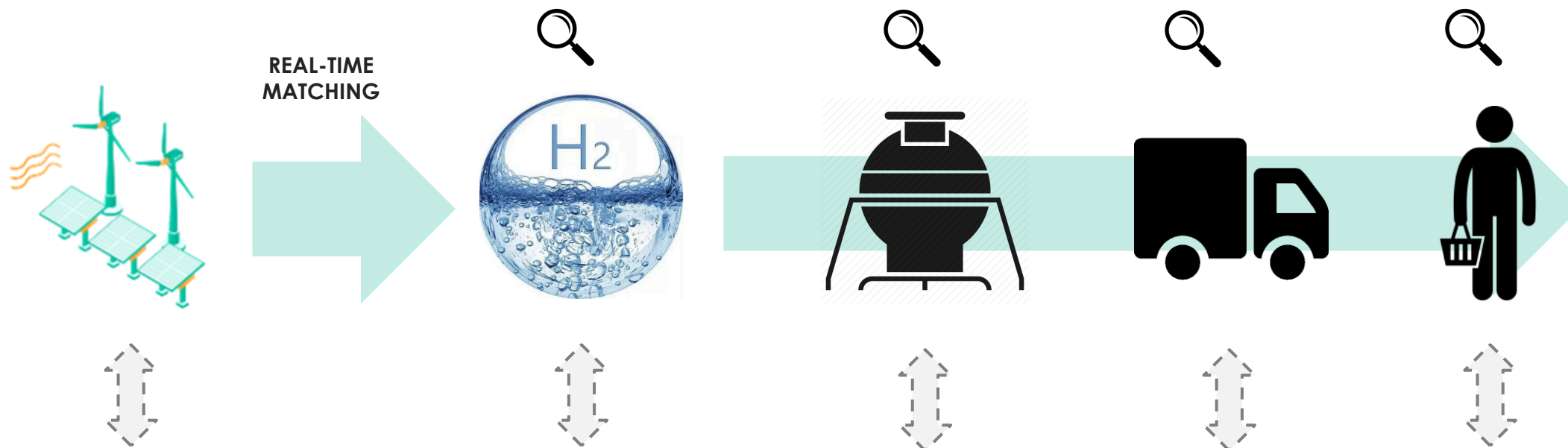
REAL-TIME CERTIFICATION FROM RENEWABLE PLANTS TO ELECTROLYZER



TRACEABILITY OVER ENTIRE H2 SUPPLY CHAIN



ALLOW STAKEHOLDERS TO VISUALISE AND AUDIT ENERGY



BLOCKCHAIN: The “digital notary” across the process

RESpring is the global leader in renewable energy tracking



RE·SPRING PARTNERS



+3

TWh/YEAR

24

CORPORATE
BUYERS

9

Countries

+180

CONNECTED
ASSETS

A new commodity is needed in the energy market for truly, zero-carbon electricity consumption

"We need to add an hourly timestamp to GOs to increase the granularity – a monthly timestamp just isn't enough." Lucy Hunt of World Business Council for Sustainable Development

*"100% renewable does not mean zero-carbon"
Why 100% renewable energy is not enough, Stanford 2019*



FlexiDAO is among the founding members of EnergyTag – the first global standard for high kWh and time granularity RECs

Hourly RE credits are the only possible mechanism to support Power-to-Gas, Demand response, 24/7 procurement, etc.

*Started in June '20. **Supported by +60 players in energy sector**, incl. Google, Microsoft, Air Liquide, 6 European TSOs and many others*

Let's work together on the Future of Hydrogen!



www.flexidao.com



s.accornero@flexidao.com



+34 681 615 628



Jordi Girona, 29
08034 Barcelona, Spain



Buildings are at the heart of the energy transition

November 2020

Sylfen overview

- ✓ Founded in Grenoble in 2015
- ✓ Staff: 18
- ✓ Turnover 2019: 457 k€
- ✓ Manufacturing (450m²) +
Offices (250m²)
Le Cheylas, Isère (30 mn Grenoble
or Chambéry, 1h30 Lyon or Genève)



✓ 3 signed pilot units

✓ 2 signed sales

First product launches on the European market



InnoEnergy
Knowledge Innovation Community

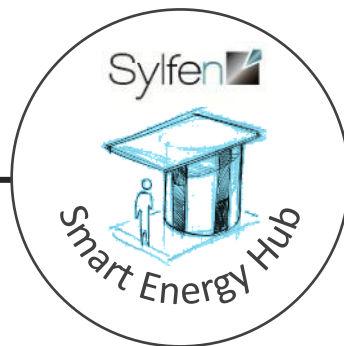
HORIZON 2020
LE PROGRAMME DE RECHERCHE ET DE
INNOVATION DE L'UNION EUROPÉENNE





Turning local **intermittent energy supply** into a **reliable, flexible and competitive solution**

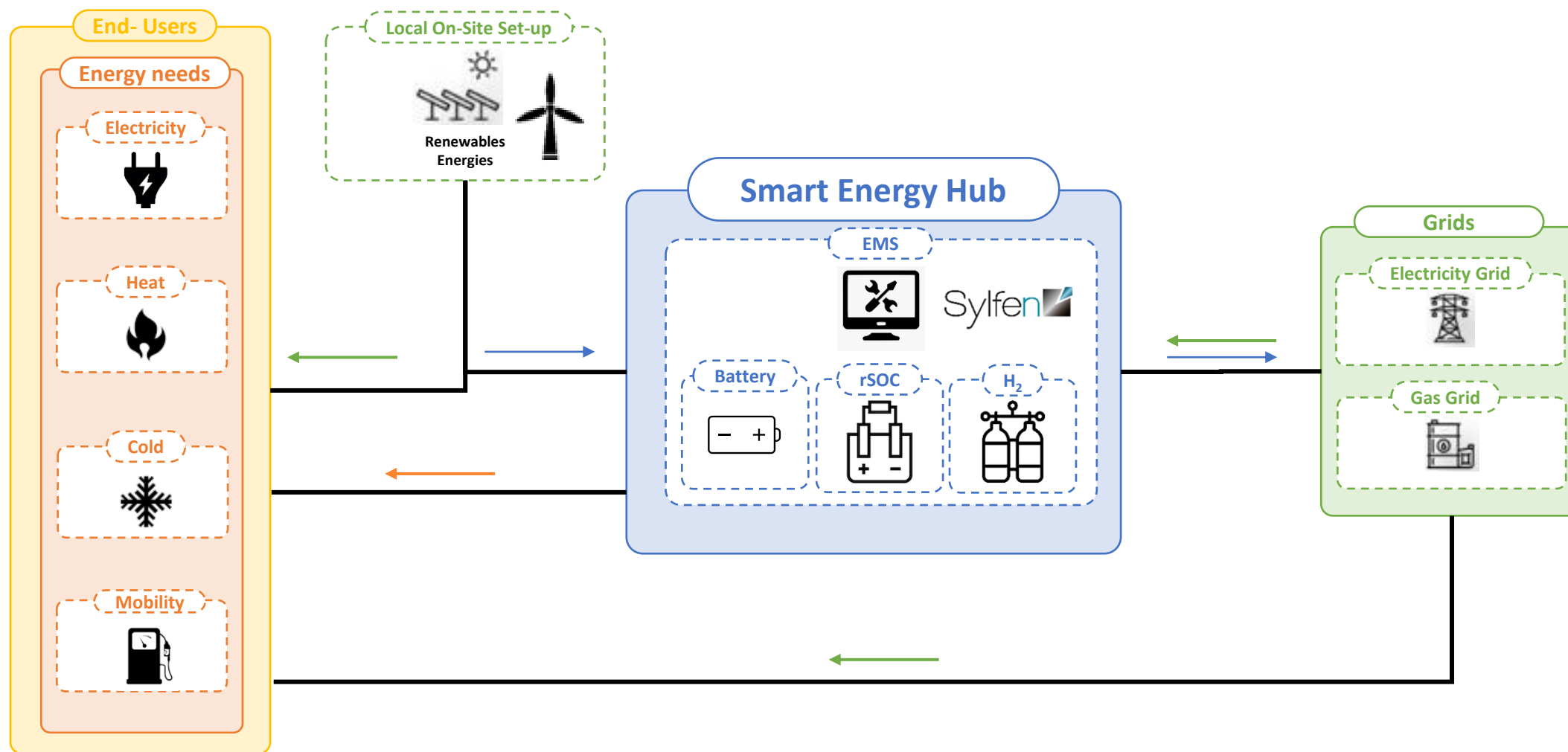
Down to 60 % reduction of energy bills and CO₂ emissions compared to actual grid-based energy



The Smart Energy Hub: a turnkey storage and cogeneration solution for buildings

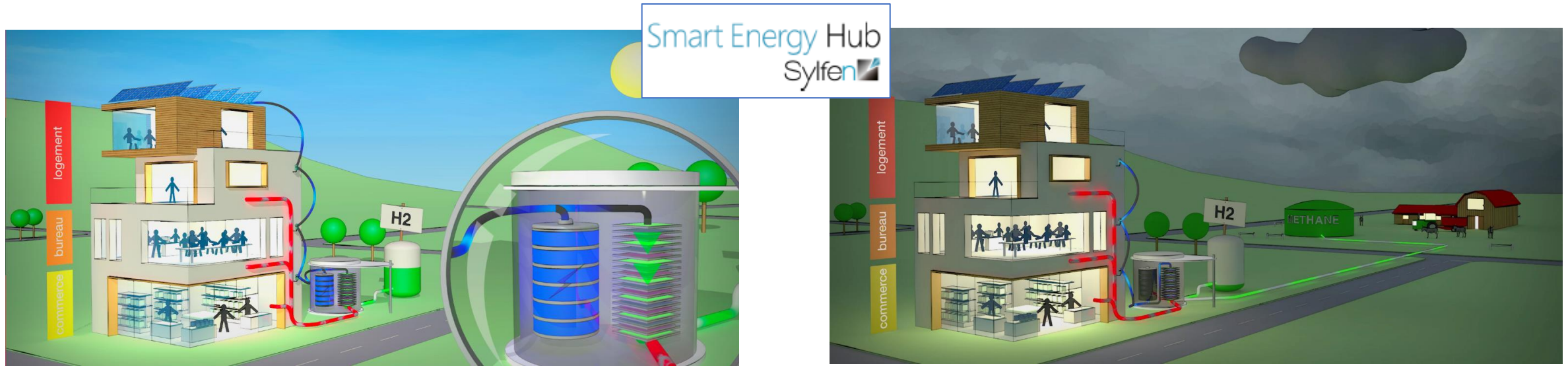


The Smart Energy Hub: a turnkey solution for buildings





An hybrid system to store and supply back power and heat



Energy Storage Mode

- Charging **batteries**
- Producing **hydrogen (and heat)** through reversible Solid Oxide **Electrolysis**

Energy Supply Mode

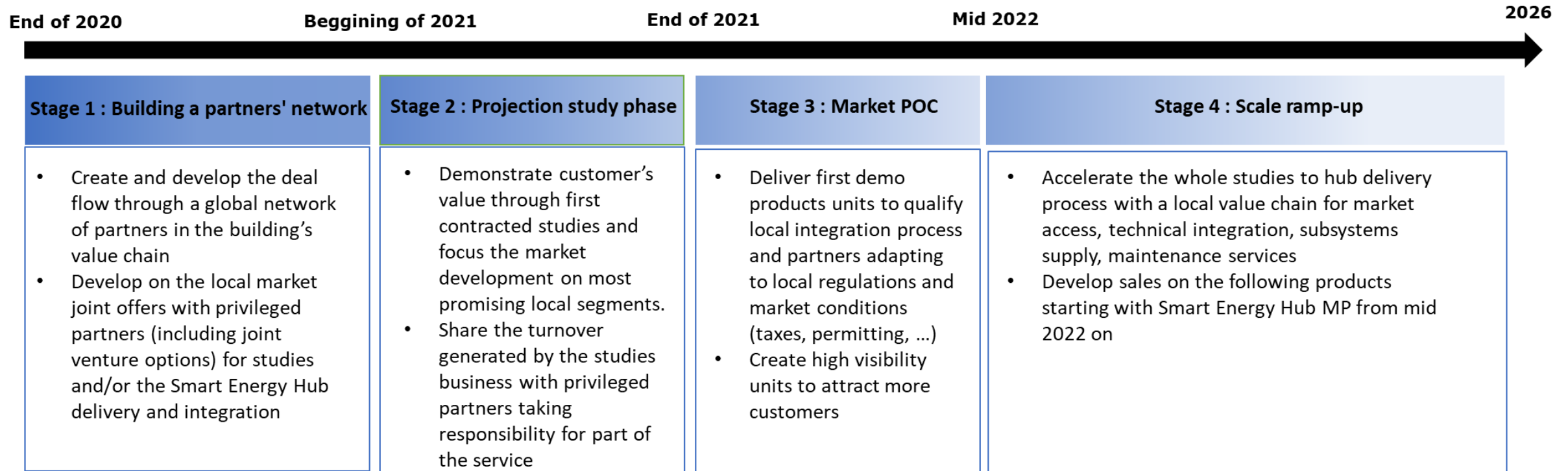
- Discharging **batteries**
- Producing **power (and heat)** through reversible Solid Oxide **Fuel Cell** from:
 - On-site stored 100% renewable **hydrogen** and/or
 - Natural gas, **biomethane**, other decarbonated gas...



Sylfen's proprietary Energy Management Software : piloting smart multi-energy (power and heat) and multi-technology (battery & rSOC) software from usages and renewable production forecasts.



Sylfen go to market strategy



We are looking for local partners who can provide access to local customers and knowledge of local energy markets and specific regulations



Carmelha tower - Monaco



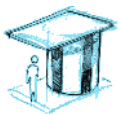
Monaco



Residential building R+9



PV



Smart Energy Hub
(rSOC energy processor: 40 kW)



Principality of Monaco



Improvement of environmental performance and demonstration of
innovation for Monaco's energy transition policy
E3 label from the E+/C- experimentation





The REFLEX project



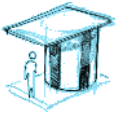
Torino, Italia



Academic building: Environment Park



PV + hydropower



Smart Energy Hub

(rSOC energy processor: 100+ kW)



Financement granted:
FCH2-JU programm (Europe)



Partners





The GIFT project



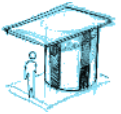
Procida, Italia



City hall



PV



Smart Energy Hub
(rSOC energy processor: 40 kW)



Financement granted:
H2020 programm (Europe)



Partners





Projects that did not work

Hydrogen for smart grid flexibility in Belgium

Partner : ORES (grid operator in Belgium)

Target call for financing : ERAnet

Pb : no funding possible for French company

→ ADEME was the funding window for French companies
but refused the project

Low carbon retail center thanks to H2 in Hungary

Partner : Bee Family office (owner of several retail centers
in Hungary)

No funding was found to fund the project

Several reasons possible: Hungary did not have clear
targets for energy transition at that time and therefore
few call for fundings on these topics, difficult funding of
abroad companies

Reliable is now reliable !



Caroline ROZAIN
Caroline.rozain@sylfen.com
+33 684 678 126

Sylfen 








November 24th 2020 // WEBINAR DCBRAIN-INNOENERGY

Hydrogen Refueling Stations

Geoffroy VILLE – g.ville@atawey.com – +33 (0)6 77 76 96 63

Atawey, a leading company in H2 refueling stations

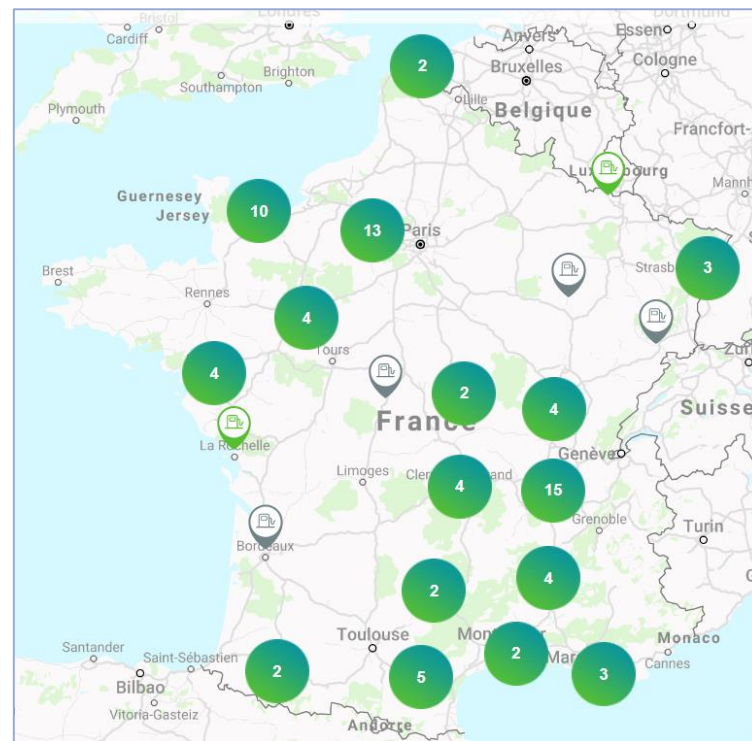
	2012	2014	2016	2017	2018	2019	2020
	Company creation by JM Amaré & PJ Bonnefond	Energy storage solutions for off-grid application (telecom, islands...)	Development of H2 refueling stations (HRS) for H2 BIKES	Development of H2 refueling stations (HRS) for CARS to initiate H2 mobility project (fleet 1 to 5 cars)	Development of H2 refueling stations (HRS) for CARS to create network of stations across territories	Development of H2 refueling stations (HRS) for CARS to create network of stations across territories	Development of H2 refueling stations (HRS) for LIGHT and HEAVY duty, SCALABLE solutions
Products	Standalone energy system coupling batteries and H2 chain	HRS with/without onsite H2 production (water electrolysis), distribution at 200b, 500 gr/day	HRS with/without onsite H2 production, distribution at 350/700b, 2 kg/day	HRS with/without onsite H2 production, distribution at 350/700b, up to 60 kg/day, public HRS	Scalable HRS, from 100 to 200 kg/day	Scalable solutions	Scalable solutions
							
Staff:	4	8	15	18	25	30	
Fund raising:	500 K€	-	1,3 M€	-	-	1 M€	
Turnover:	-	400 k€	700 k€	1,2 M€	2,5 M€	4 M€ (forecast)	
Product installed:	-	4	6	10	18	25+	
Key projects:	-	BHYKE, CARGHO	MORBIHAN ENERGIES	F1 CASTELLET CIRCUIT	LAST MILE (>15 HRS)	ZERO EMISSION VALLEY (20 HRS)	

Market challenge (1/2)

Limited number of hydrogen vehicles available for sales and on the road



Hydrogen refueling stations in
France
**September 2020 : ~40 stations
open / ~45 in project**



Hydrogen vehicles on the road
September 2020 : ~450 cars / 10-20 buses



Market challenge (2/2)

Limited number of hydrogen vehicles available for sales and on the road

- » 40 stations for 450 vehicles in France (not much better for other European countries)
- » Region Ile de France (Paris) : 5 stations for ~300 vehicles, 60 vehicles/station
- » Other parts of France : 35 stations for ~150 vehicles, **~5 cars/station**
- » **Current need is for small size hydrogen refueling stations**
- » Mid term H2 mobility market 2023-2025 : 5 000 light duty vehicles and 200 heavy duty vehicles.
- » H2 refueling station objectives : 100 stations H2, **~2 heavy duty vehicles/station et 50 light vehicles/station**
- » **Mid term need will be for medium size hydrogen refueling stations**

Atawey's positioning to answer today HRS market

Small and medium size hydrogen refueling stations

➤ **Pioneering projects** to initiate hydrogen mobility at a reasonable cost (1 to 5 cars)



➤ **Smooth H2 infrastructure network development**, dense coverage, at a well adjusted investment expenditure



➤ **Development of new H2 ecosystems** (bikes, cargo bike, material handling equipment)



Refueling stations to initiate H2 mobility projects

Fleet of 1 to 5 cars



Refueling stations to initiate H2 mobility projects

Fleet of 1 to 5 cars



Refueling stations to create network across territories

Refuel fleet of 100+ light vehicles and few heavy duty vehicles

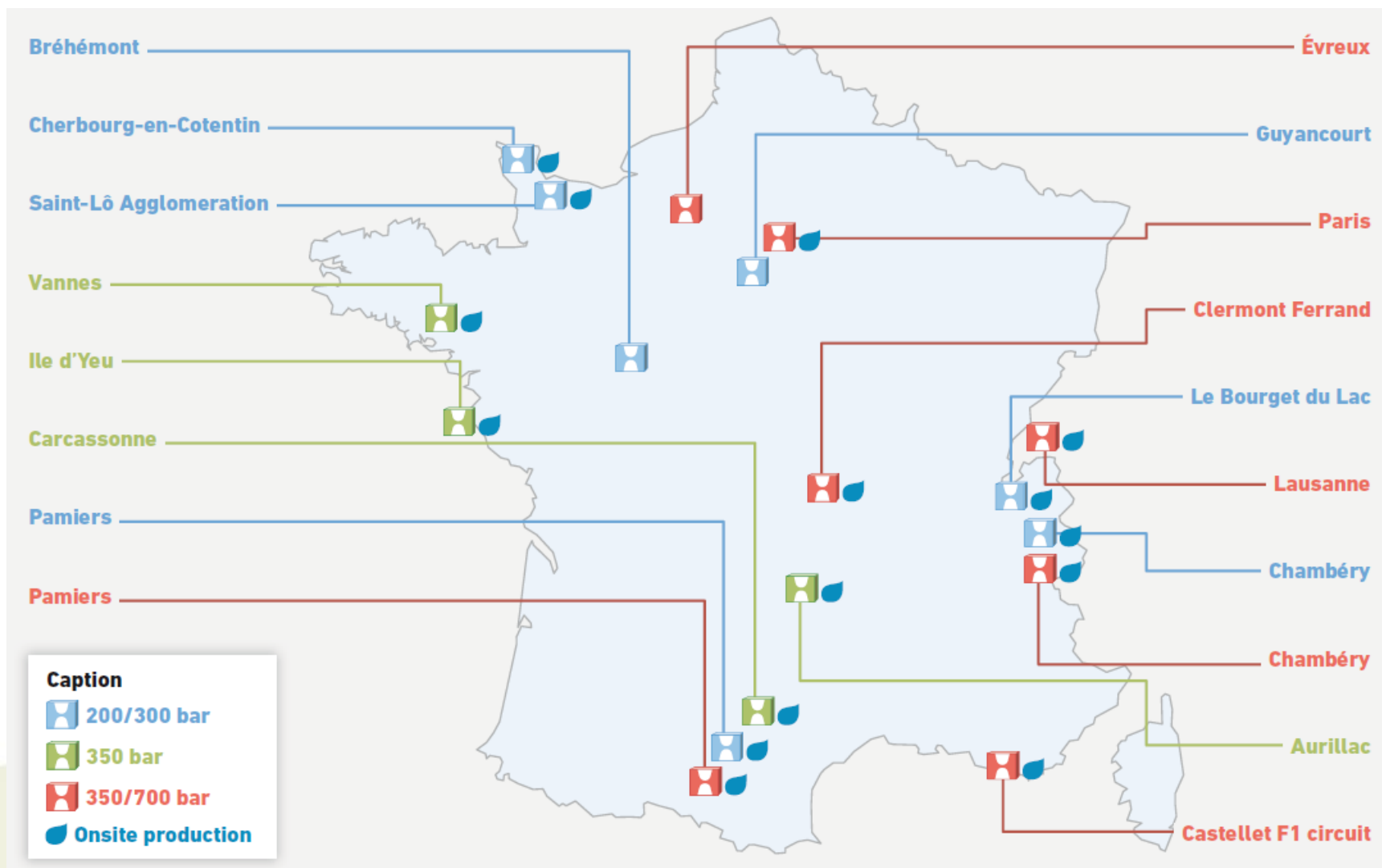


Refueling stations to create network across territories

Refuel fleet of 100+ light vehicles and few heavy duty vehicles



25 H2 stations sold, 18 in operation





EIT InnoEnergy is supported by the EIT
a body of the European Union



Join us for our next webinars:

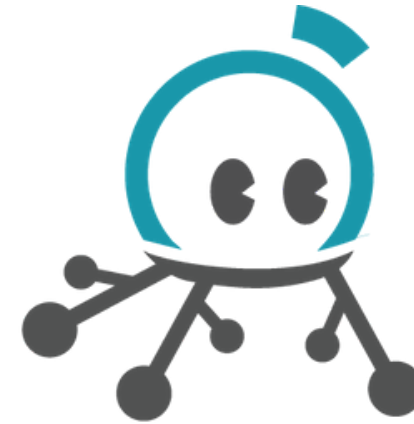
26.11 – Benelux (In dutch & English)

<https://itanks.eu/event/itanks-waterstof-update/>

12.01 – France

And meet InnoEnergy innovations in person at
TBB Berlin – **3-4 Nov. 2021**

<https://tbb.innoenergy.com/about/>



DCbrain

Join DCbrain for our next webinar:

08.12- How European cooperation will
pave the way for an easier Hydrogen
implementation?

<https://app.livestorm.co/dcbrain/how-european-cooperation-will-pave-the-way-for-an-easier-hydrogen-implementation>