European Green Deal
European Hydrogen Strategy
European Clean Hydrogen Alliance

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EU and Hydrogen – helicopter view

EU Green Deal

- achiving climate neutrality in 2050
- 55% reduction by 2030

Industrial Strategy for Europe

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

Hydrogen Strategy for a climate neutral Europe

- Using clean hydrogen for decarbonising all sectors
- 3 phases 2024/2030/2050 with concrete green Hydrogen production targets
- Breaking the supply demand dead-lock

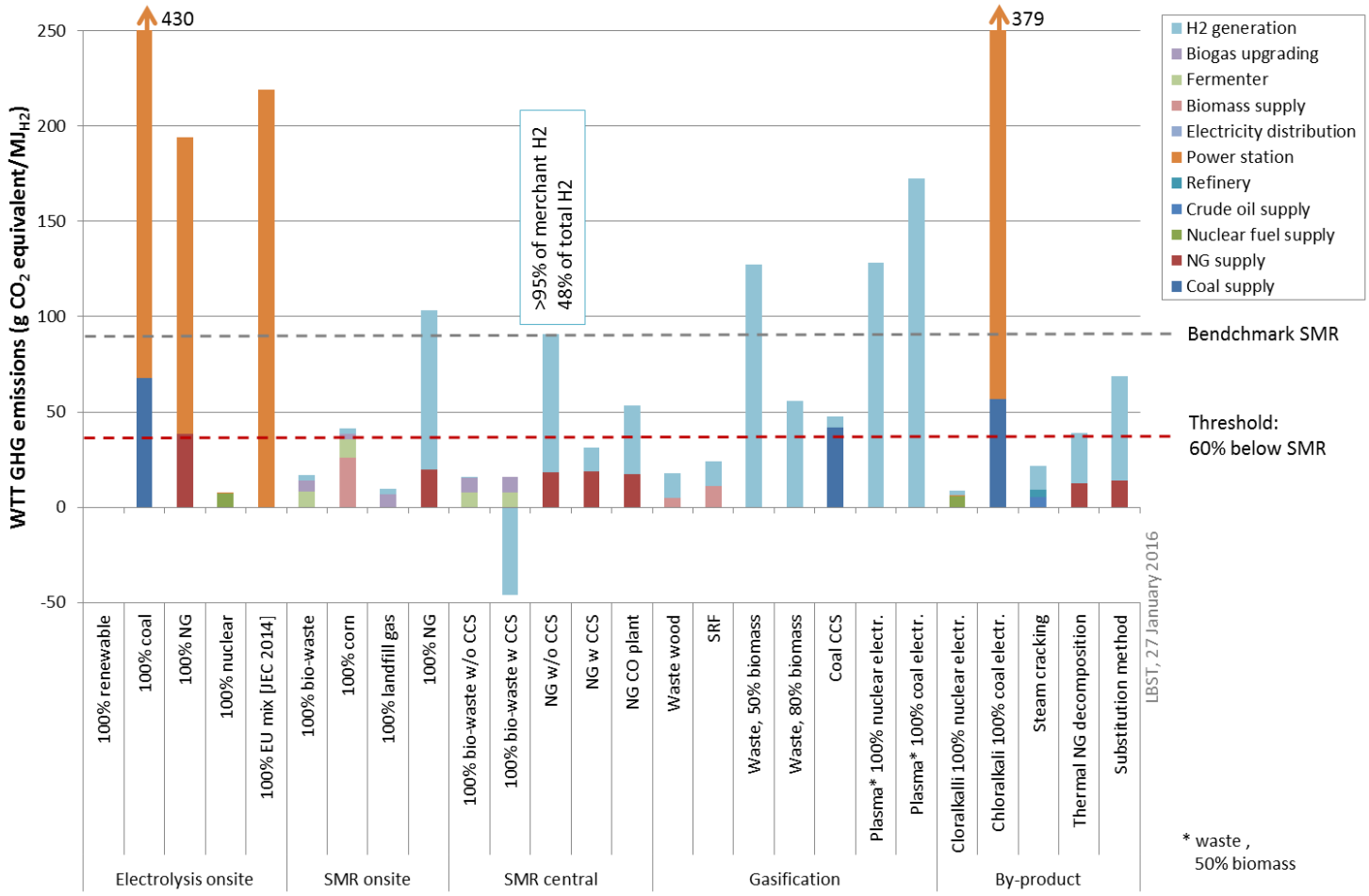
European Clean Hydrogen Alliance

- co-operation platform for European Hydrogen industry
- development of a massive project pipeline
- Kick-starting investments across MS borders
- Covering the whole value chain

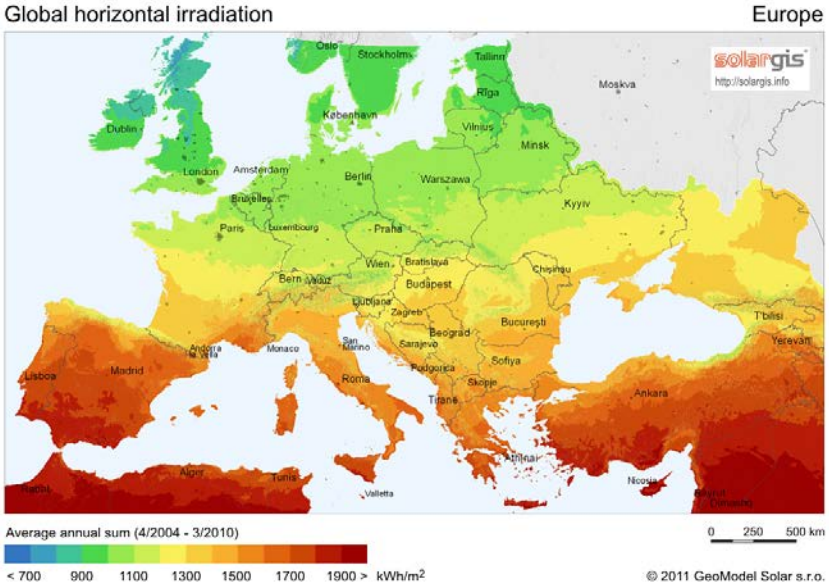
Narrative – Why Hydrogen

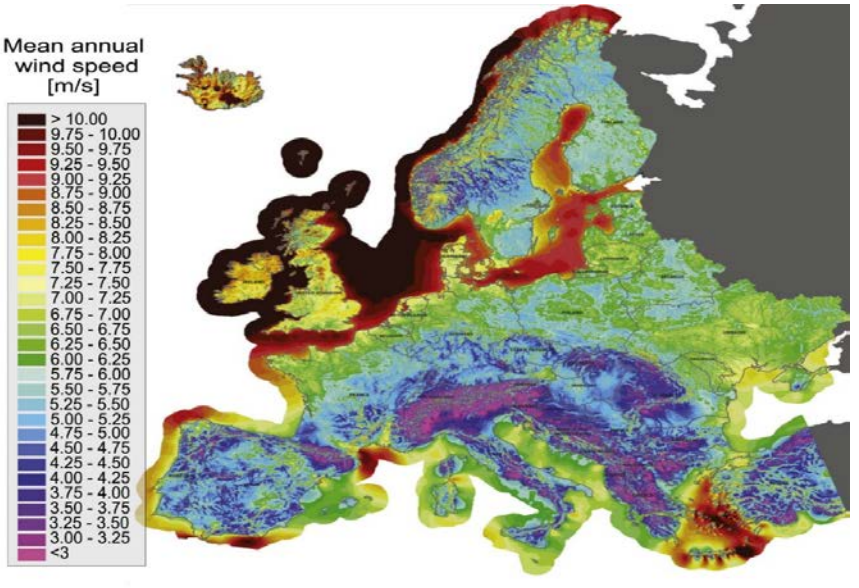
- Hydrogen is an environment- and climate-friendly (zero-emmission) energy carrier
- Produced from RES it has the potential to essentially replace fossile-based energy
- It suffers from a supply/demand deadlock which effectively hinders cost reductions by economies of scale
- Once Green Hydrogen becomes available in big quantities at lower cost a lot of applications in mobility, industry and energy sector suddenly become economically viable
- For many required technologies specialized and qualified manufacturers are found in Europe
- At the same time, many MSs are struggling to achieve the agreed emmission reduction targets in sectors which could be decarbonised with Hydrogen and risk significant fines

Zero emission is difficult to achieve



Green /Zero emmission Hydrogen = Renewable Energy





➔ Not all member states are equally gifted

The Challenges

- *Clean Planet for all forsees more than a doubling of electric energy*
- *Renewable energies need to be transported long way from place of (optimal) production to place of use*
- *Renewable energies are not available 24 hours*
- *Renewable energies are „anti-seasonal“*
- *The electricity grid reaches its hard limits (depends on MSs)*

→ **Big scale renewable energy grows big scale green Hydrogen**

… and the costs ?

- H2 for transport purpose is already at par with Diesel prices
- From a same „mass market level perspective“ fuel cell technology has lower production cost than combustion engine power trains
- Last Hydrogen Council report indicates much faster decrease of green hydrogen production cost than forseen earlier
- Industry claims green Hydrogen could be available at 1 €/kg before 2030
- Pipeline transportation expected to be at 10 c/kg
- Salt caverns provide a very cost-efficient and vast storage capacity for huge amounts of Hydrogen

How to get there?

Hydrogen Strategy – 3 phases

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

2024

2030

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

2050

- 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

Scaling up renewable hydrogen production

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

- Supporting producers through support mechanisms
- Develop a EU-wide hydrogen infrastructure

Producers

- Common low-carbon threshold for hydrogen production facilities
- Certification of renewable and low-carbon hydrogen
- Revision of the Emission Trading Scheme
- Carbon Contract for Differences
- Market-based support schemes for renewable hydrogen
- Liquid markets with commodity-based hydrogen trading

Infra-structure

- Network of refuelling stations through Alternative Fuels Infrastructure Directive
- Revision of the TEN-E and internal gas market legislation to ensure interoperability, common quality standards, and cross-border operational rules
- Revision of TYNDPs to ensure full integration of hydrogen infrastruct.

Fostering Renewable hydrogen demand

and in a transition al period low-carbon for

- Replacing **existing hydrogen** production (70-100 MT of CO2eq/yr)
- Green **fertilisers** and green **steel**
- Local buses, commercial fleets, or specific parts of the rail network
- **Heavy duty** road vehicles
- In the longer term, **maritime and aviation**

Supporting end-consumers

- EU strategy on clean steel
- Sustainable and Smart Mobility Strategy

Creating markets

- Certification of renewable and low-carbon hydrogen
- Specific end-use sectors quotas of renewable hydrogen / derivatives
- Hydrogen infrastructure access to all consumers
- Open and competitive hydrogen market with sold price signals

European Clean Hydrogen Alliance

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

Mission

- build up a robust pipeline of investments.
- establish an investment agenda
- support the scaling up of the hydrogen value chain across Europe.
- facilitate and help implementing the actions of the new European hydrogen strategy
- Massively scale up production and demand for clean hydrogen

The blueprint estimates investments of €430 billion by 2030

Who can join the Alliance ?

- The Alliance brings together industry, national and local public authorities, civil society and other stakeholders.
- It is spreading across the whole hydrogen value chain, covering renewable and low-carbon hydrogen from production via transmission to mobility, industry, energy, and heating applications.
- It is open to all public and private actors with activities for clean hydrogen in Europe ready to actively contribute to the objectives set out in the declaration of the alliance.

→ Sign the European Clean Hydrogen Alliance Declaration at :

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

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

- The big public plattform for all Alliance Members
- First conference last year on 26/27 November: setting the scene
- Spring Forum – 18-20 May 2021
  - Status review of round tables
  - Project presentation / company match-making
  - Financing options
- Virtual event with 50 virtual match-making tables

An IPCEI on Hydrogen

Objective

1) Significant support to the EU Climate objectives & Security of Energy Supply
2) Overcome the Market Failure (supply/demand deadlock) by a concerted effort
3) Kick-start the massive Hydrogen production & utilization in the EU
4) Improve the Competitiveness of EU Industry

What are IPCEI projects about?

- **Waiver of State Aid restrictions with specific conditions**
- **Project involving 2 or more Member States**
- **Contribution to Union objective(s) and significant impact on competitiveness, sustainability, or value creation across the EU**
- **Environmental, energy or transport projects of great importance for the achievement of EU strategies**
- **Positive spillover effects on internal market/Union/ society; benefits not limited to participating Member States & companies**
- **The project can be aided up to 100% of the funding gap on the basis of a large set of eligible costs**

Green Hydrogen fits the IPCEI concept

- Green Hydrogen will be needed with respect to sustainability (climate goals), societal goals (health) and competitiveness
- Green Hydrogen will only be generated at scale and at competitive prices if there are customers with voluminous demand (production/transport/usage go hand in hand)
- Existing achievements in innovation via e.g. the FCH JU can and should be exploited
- Investments in infrastructure (e.g. repurposing to H2 pipelines) are an added value for the EU making the usage of hydrogen affordable
- Common Hydrogen Technology projects will provide a big push to the internal market

➔ Big potential for a signicifanct support to the Union objectives in the climate, energy , environment and transport sector

European Commission

Hydrogen
for Climate Action

How to kick start the EU Hydrogen Industry to achieve the EU climate goals?

engie · gasunie · FLUXYS · Port of Antwerp · SALZGITTER AG

Green Octopus

PURPOSE: Creating a backbone of clean hydrogen between France - Belgium - The Netherlands – Germany, serving hydrogen supply and demand, facilitated by the ports and industrial clusters. Integrating energy systems and coupling sectors.

BENEFITS: Maximizing implementation of offshore wind energy, transforming natural gas pipelines to hydrogen pipelines, replacing fossil fuels in ports by green hydrogen. Making hydrogen endusers more sustainable (industry/mobility)

COUNTRIES:

- **20** companies
- **9.700M** investment
- **PV+Wind**
- **6,0** GW
- **2000** km
- **20** HRS
- **250** HDV
- **25** ships
- **Steel/Ref/Chem**

Hydrogen Europe

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hydrogen4climateaction.eu

European Commission

Hydrogen
for Climate Action

How to kick start the EU Hydrogen Industry to achieve the EU climate goals?

Verbund · DB SCHENKER · elringklinger · hydrogenics · SIEMENS · ÖBB

Green Hydrogen @ Blue Danube

PURPOSE:
- Produce green hydrogen on a large scale in South-East Europe using off-grid wind and solar energy
- Transport hydrogen via the River Danube to hydrogen users in countries of the Interreg Danube Transnational region
- Set up the necessary infrastructure in the involved member states

BENEFITS: Establishing this trans-European value chain will:
- Reduce dependence on fossil energy imports: renewables made in Europe
- Increase security of energy supply: increased flexibility and resilience
- Contribute to reach climate objectives of Member States
- Strengthen key European industry sectors

COUNTRIES:

- **12** companies
- **5.850M** investment
- **Solar+Wind**
- **2,0** GW
- **40** barges
- **Steel/Raff/Chem**
- **100** HRS
- **500** HDV
- **5.000** new + **50.000** secured
- **80.000** t/year
- - **3.200.000** t/year

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How to kick start the EU Hydrogen Industry to achieve the EU climate goals?

Bioway UniCRE

Black Horse

PURPOSE:
- Lower CO2 emissions in the heavy duty transport sector
- Help reach the GHG objectives for 2030
- Make hydrogen trucks commercially viable for transportation companies
- Shift from diesel to green hydrogen

BENEFITS:
- Construction of renewable power plants
- Production of green hydrogen for transport sector
- Rollout of large scale, state of the art hydrogen powered trucks
- Build HRS infrastructure for HDV, but also for passenger cars and buses

COUNTRIES:

20 companies | 5.797M investment | Wind, Solar Hydro

16,5 GW | 270 HRS | 10.000 HDV

12.500 new + 40.000 secured | 116.800 t/year | - 4.212.000 t/year

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Internal Market, Industry, Entrepreneurship and SMEs

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How to kick start the EU Hydrogen Industry to achieve the EU climate goals?

Resilient Group | Vopak | Anthony Veder | H2B2 | ABN·AMRO | Vestas. | edp | galp

Green Flamingo

PURPOSE:
- Jumpstart the Portuguese Hydrogen Economy by implementing the necessary infrastructures and economic critical mass;
- Secure synchronised value chain for Green Hydrogen production, transportation, distribution, demand, focused on leveraging Portugal's renewable energy as a factor of competitiveness with an export component;
- Leverage existing infrastructures, solar resource and local hydrogen demand in the port of Sines;
- Develop an Iberian green hydrogen export hub, connected by maritime route to the Port of Rotterdam, the gateway to Europe's mega chemical cluster;
- Contribute to The Netherland's and Europe's substantial emerging green hydrogen demand and decarbonisation pathways;
- Link and integrate green hydrogen industrial strategy, digitalisation and socio-economic vectors.

BENEFITS:
- Jumpstart Green Hydrogen markets within cross European strategic value chains;
- Focus on Industrialisation coupled with decarbonisation objectives;
- Develop resilient energy supply for industrial decarbonisation;
- Address Sustainable Development Goals and Green Deal goals for multiple domains.

GREEN FLAMINGO

COUNTRIES:

15 companies | > 3.500M investment | Solar+Wind | 5 GW

H2 shipping | Industrial off-take | HRS network | FC Busses

LH2 | LOHC | > 5.000 | 465.000t/year | -18.6 MT/year

#hydrogen4climate
hydrogen4climateaction.eu

Internal Market, Industry, Entrepreneurship and SMEs

Important considerations

- The process is industry driven
- Green vs. High-tech (Art 23 vs. Art 22)
- „Significant contribution“ requires an ambitious approach
- Truly joint initiative by companies from differnet Member States
- Difficult to predict if financial amounts are available at MS level
- Combination between different support programs possible
- Different speeds in different MSs will require multiple waves
- But early achievements are important to keep the momentum
- Support to be expected from the „NECP ministries“ in MSs

National calls - Timing and status

Country	Start	End	# submissions
IT	7/Feb/2019	Open	35
BE	6/March/2020	5/June/2020	21
HU	16/March/2020	29/May/2020	
FR	15/Apr/2020	25/June/2020	24
ES	20/April/2020	15/June/2020	27
PL	3/June/2020	31/Aug/2020	29
PT	17/June/2020	17/July/2020	74
NL	31/July/2020	22/Sept/2020	84
SF	17/Sept/2020	16/Oct/2020	7
AT	2/Oct/2020	20/Nov/2020	50+
CZ	9/Nov/2020	24/Nov/2020	?
SK	23/Nov/2020	15/Jan/2020	

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Further information

European Clean Hydrogen Alliance declaration /Round Table info :

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

European Clean Hydrogen Alliance web-site :

https://www.ech2a.eu

Hydrogen Joint Undertaking :

https://fch.europa.eu/

EU Hydrogen Forum :

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

Hydrogen Valley information :

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