



FUEL CELLS AND HYDROGEN
JOINT UNDERTAKING

***Making
Hydrogen & fuel cell
technology an
everyday reality***

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Strong public-private partnership with a focused objective



A combined private-public of 2 billion Euro has been invested to bring products to market readiness by 2020

FUEL CELLS AND HYDROGEN JOINT UNDERTAKING



Industry grouping
153 members (40% SME)
(65 in '08)



Research grouping
78 members
(45 in '08)



Energy

H₂ production
and distribution
H₂ storage
F/C for CHP



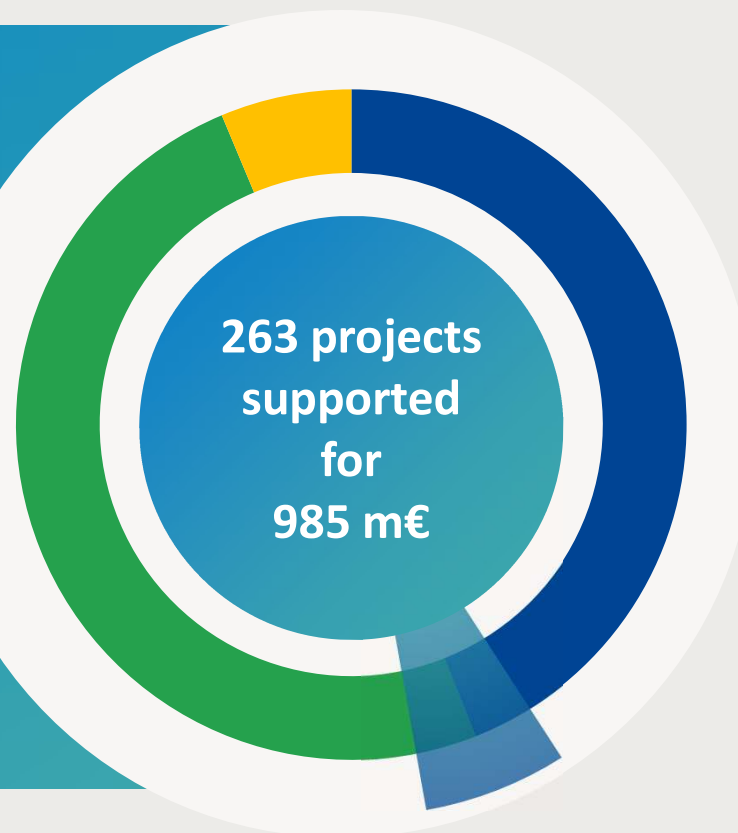
Transport

Road vehicles
Non-road vehicles
Refueling infra
Maritime, rail and
aviation applications



Cross-cutting

standards, safety,
education, consumer
awareness, ...



46 %



457 million euros
145 projects

41 %



404 million euros
70 projects

6 %



58 million euros
43 projects



7 %

66 million euros
5 projects

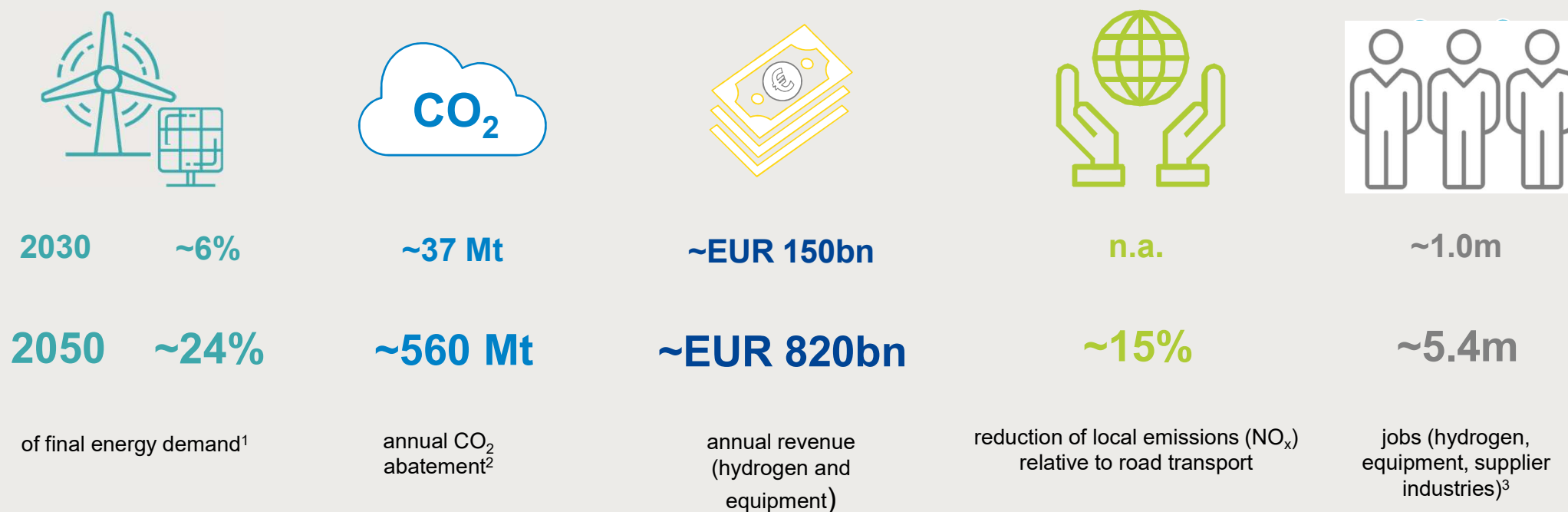


Similar leverage of other sources of funding: 1.005 b€

Besides CO₂ abatement, deployment of the hydrogen roadmap also cuts local emissions, creates new markets and secures sustainable employment in EU



2030 - 2050 hydrogen vision



1 Including feedstock 2 Compared to the reference technology scenario 3 Excluding indirect effects

SOURCE: Hydrogen Roadmap Europe team

EU Hydrogen Strategy of 8th July 2020

Objectives in 3 phases with the Hydrogen Alliance to support the investment agenda



Phase 1: 2020-2024

- **6GW** of renewable H₂ electrolyzers
- 1 million tonnes renewable H₂
- Replace **existing** H₂ **production**
- Regulation for liquid H₂ markets
- Planning H₂ infrastructure

Phase 2: 2025-2030

- **40GW** renewable H₂ electrolyser
- 10 million tonnes renewable H₂
- New applications in steel & transport
- H₂ for electricity balancing purposes
- Creation of "Hydrogen Valleys"
- Cross-border logistical infrastructure

Phase 3: 2030-2050

- H₂ technologies matured and deployed at large scale in hard to abate sectors.
- Expansion of hydrogen-derived synthetic fuels
- EU-wide infrastructure network
- An open international market

Clean Hydrogen Alliance to support the EU investment agenda



A full value chain approach



1. An investment agenda
2. Boosting demand and scaling up production
3. Develop hydrogen infrastructure and markets
4. Research and innovation
5. The international dimension



1. Hydrogen – an investment agenda



Next Generation EU, Invest EU, Cohesion Policy, CEF-E, CEF-T
ETS Innovation Fund, Horizon Europe

Renewable electricity
production

€220-340 BLN

Renewable
hydrogen
€24-43 BLN

Hydrogen
transport,
distribution,
and storage

€65 BLN

Transport
(HDV)
€13 BLN

Steel
€8 BLN

European Clean Hydrogen Alliance

2. Hydrogen – fostering demand



Renewable, and in a transitional period low-carbon hydrogen, 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 or its derivatives
- Hydrogen infrastructure access to all consumers
- Open and competitive hydrogen market with sold price signals

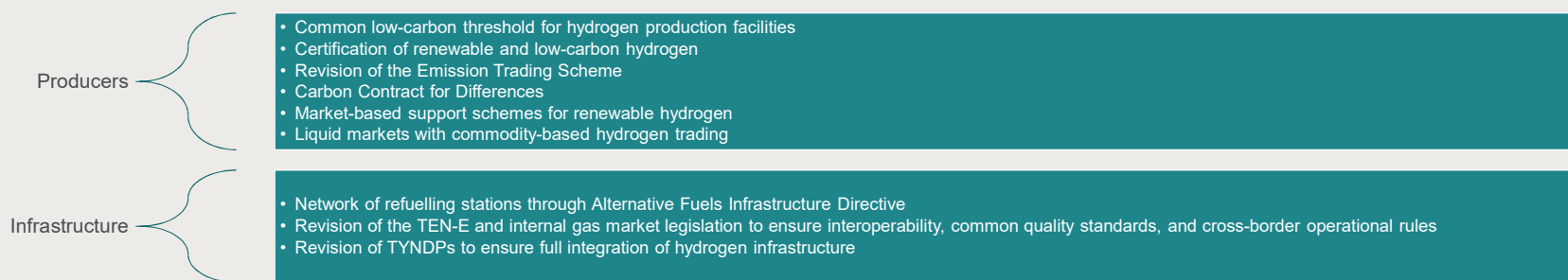


3. Hydrogen – supply and infrastructure



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

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



4. Hydrogen – Research and innovation



Maintain and strengthen EU's global leadership role through support:

- Establish Clean Hydrogen Partnership
- Targeted research and innovation in Horizon Europe
- ETS Innovation Fund
- Interregional Innovation Investment Instrument with pilot action on hydrogen technologies

H₂ Generation

Large size, more efficient and cost effective electrolyzers (GW-scale), mass manufacturing, new materials, low TRL (algae, direct sunlight splitting, pyrolysis)

Large scale end-use applications

industry (steel, chemical, petrochemical), transport (heavy duty road transport, rail, aviation, waterborne), pre-normative research (incl. safety)

Infrastructure

Distribute, store and dispense H₂ at large volumes and distances, repurposing existing gas infra

Cross cutting to support policy

Improved and harmonized (safety) standards, social and labor market impact, LCA, value chain, critical raw material, recycling, security of supply



5. Hydrogen – the international dimension



Strengthening Europe's global leadership role and putting renewable hydrogen high on its strategic agenda:

Bilateral and regional cooperation

- Clean hydrogen support under Neighbourhood Investment Platform
- Joint hydrogen research and development programmes through Association Agreements
- Hydrogen collaboration under the Africa-Europe Green Initiative
- Mainstream hydrogen in energy, diplomacy, climate, research, trade and international cooperation

International markets

- Set common GHG emission reduction standards and sustainability criteria
- Benchmark for euro denominated transactions in hydrogen
- Facilitate emergence of rules-based hydrogen market

Multilateral fora:





What is it?



- Launch on 8th July 2020
- Mission to create a project pipeline for a massive role-out of EU Clean Hydrogen technology
- Involving all active stakeholders in the clean hydrogen ecosystem, bringing together supply and demand

Hydrogen Production

Transmission & Distribution

Mobility Applications

Industrial Applications

Energy Applications

Residential Applications





Its mission!



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 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>






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*European Hydrogen week from
23 - 27 Nov. 2020*



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