



# European Hydrogen Policy: an overview

Hydrogen & P2X conference

*Carla Benauges, Policy Officer, DG  
CLIMA*

*European Commission*

# I/ Overview of the main regulatory framework elements

# Where we started: July 2020 – the EU Hydrogen strategy

2024

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

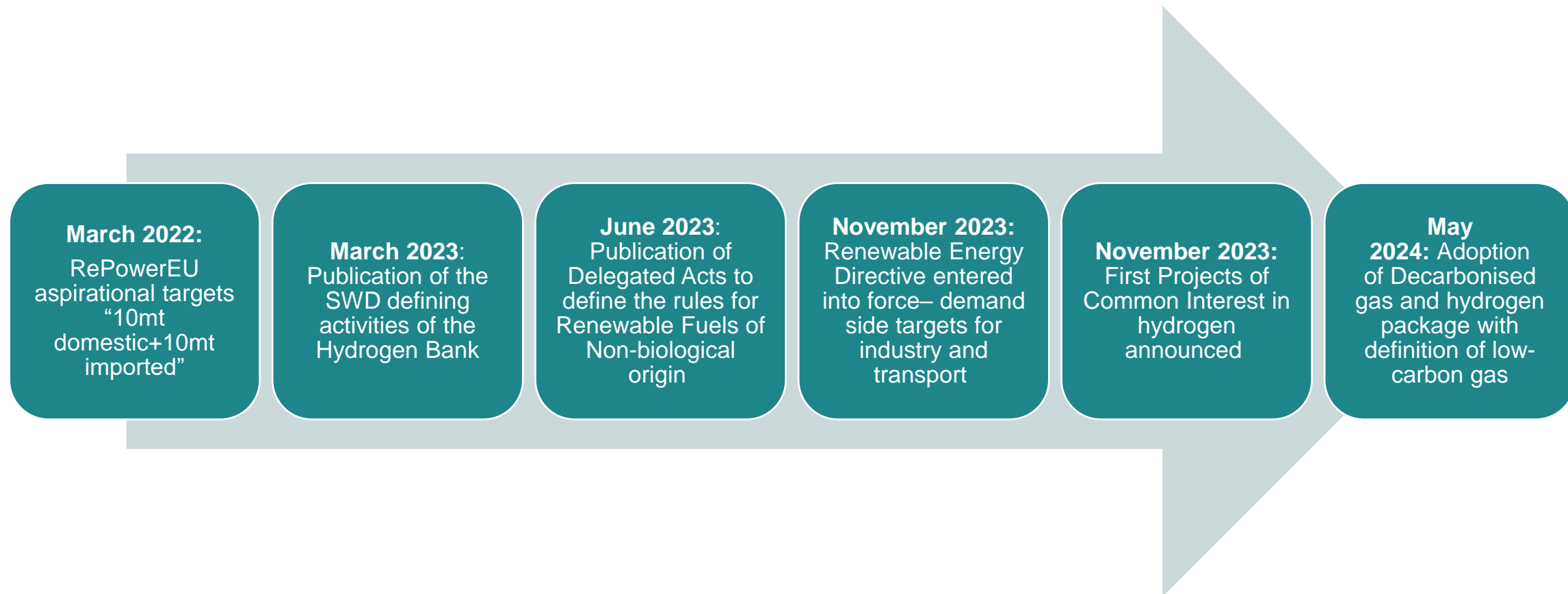
2030

- 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

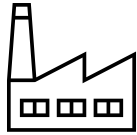
- Scale-up to **all hard-to-decarbonise sectors**
- Expansion of hydrogen-derived **synthetic fuels**
- EU-wide infrastructure network
- An open international market with € as benchmark

# Where we are now: European policy framework almost completed



# The Renewable Energy Directive – subtargets for Industry & Transport sector

## INDUSTRY



- New binding target for RFNBO (renewable fuels of non-biological origin)
  - ✓ **42% in 2030**
  - ✓ **60% in 2035**
  - ✓ *Possible discount of 20% in 2030 for Member States on track towards their expected national contribution to the binding overall Union target with a low share of hydrogen from fossil fuels consumed (no more than 23% in 2030 and 20% in 2035)*

## TRANSPORT



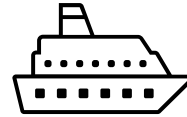
- At **least 5.5% advanced biofuels** and RFNBOs (combined target of which at least 1 percentage point RFNBOs)
- Incentives for advanced biofuels and RFNBOs
- Multipliers of 1.5 for use in aviation and maritime for RFNBOs

# Refuel EU Aviation and Fuel EU maritime



## Refuel EU aviation

- Adopted on 31 October 2023
- Share of Sustainable Aviation Fuels include synthetic aviation fuels
- Mandatory RFNBOs sub-quotas of 1.2% in 2030 all the way to 35% in 2050



## Fuel EU maritime

- Adopted on 22 September 2023
- If RFNBO share is less than 1% by end of 2031, subtarget will apply from 2034
- A special incentive regime to support the uptake of renewable fuels of non biological origin (RFNBO) with a high decarbonisation potential.

# The Hydrogen and Gas markets decarbonisation package adopted in May 2024 completes the EU framework

- Directive and Regulation establish the main rules for the set up of the future hydrogen network as well as the definition of low-carbon fuels (including hydrogen)
  - *By ... [12 months from the date of entry into force of this Directive], the Commission shall adopt delegated acts in accordance with Article 90 to supplement this Directive by specifying the methodology for assessing greenhouse gas emissions savings from low-carbon fuels*
- To avoid conflicts of interests, a separate association of hydrogen transmission network operators (ENNOH) will be set up



# Hydrogen infrastructure will expand significantly, creating a European hydrogen network



## Need for hydrogen transmission

- Production costs of renewable hydrogen vary significantly between locations depending on RES availability
- Hydrogen demand centres in central Europe will require significant volumes of hydrogen imports

## Infrastructure expansion

- Existing pipelines only cover 1,600 km – all privately operated and not interconnected
- REPowerEU envisions 7 potential hydrogen corridors and an integrated European network
- Infrastructure includes pipelines, storage and terminals



# Clear rules are set for hydrogen imports from third countries to facilitate trade

## Hydrogen Imports

- REPowerEU envisions that up to 50% of EU hydrogen demand will be covered by imports
- More than 10 MoUs related to hydrogen signed with e.g. Morocco, Ukraine and Namibia

## Regulatory framework

- Obligation to conclude bilateral or EU-level agreements for hydrogen import pipelines to ensure EU rules are applied
- Importers face the same requirements regarding e.g. certification of renewable and low-carbon hydrogen as domestic producers

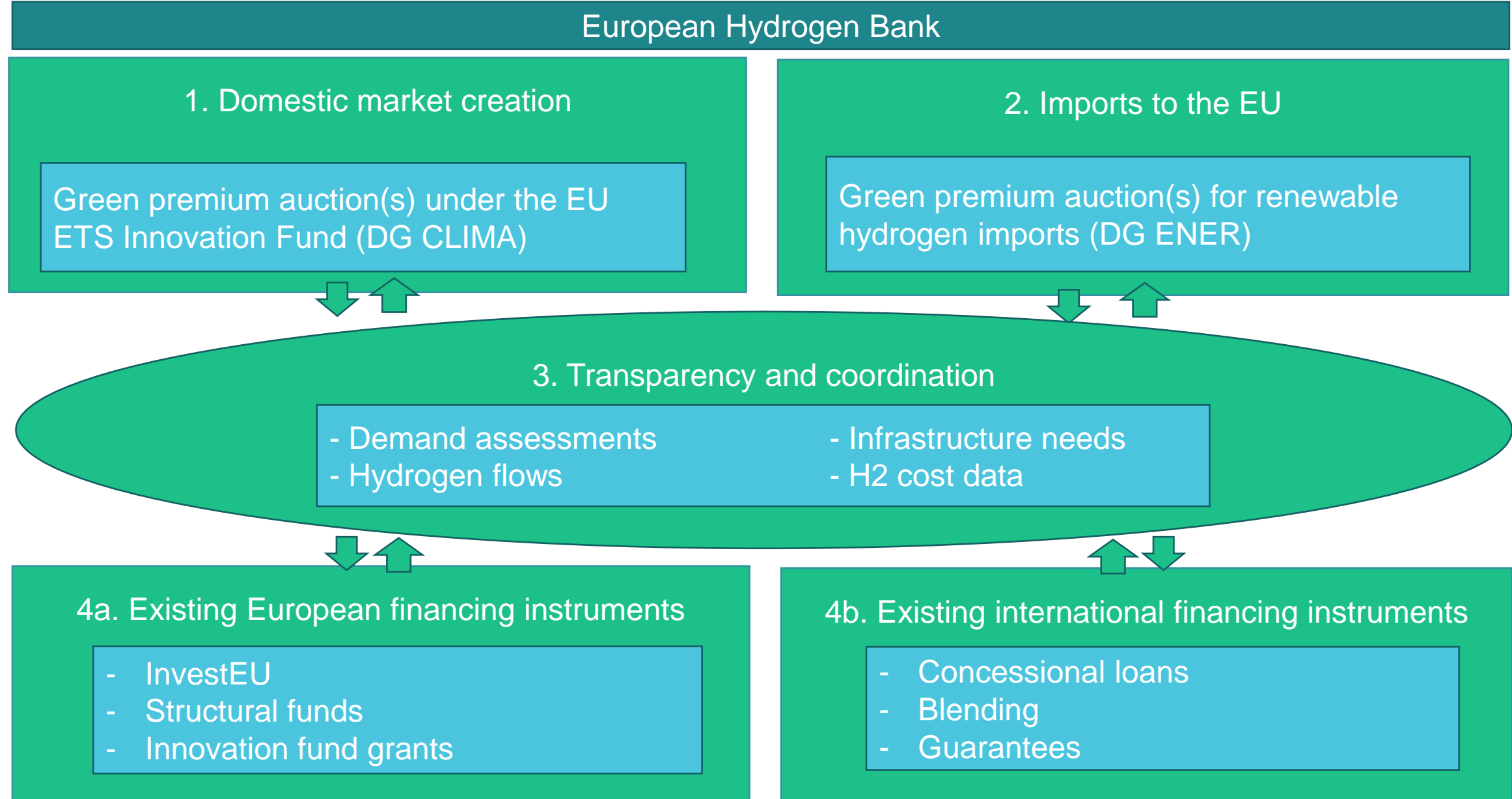


Source: HySTRA

# Mechanism to support the market development of hydrogen

- ❖ **Voluntary** mechanism implemented under the activities of the European Hydrogen Bank
- ❖ Wide scope: activities which can be implemented by the mechanism, including:
  - (a) collection and processing market data;
  - (b) collection and assessment of demand from off-takers;
  - (c) collection of offers for supply of hydrogen from suppliers;
  - (d) access to relevant and necessary information collected
- ❖ **Timeframe: 5 years**, until 31 December 2029
- ❖ Possibility: to contract a **service provider**; provide liquidity support by Member States; set up a coordination group
- ❖ **Participation:** undertakings established in the EU, open also to the Energy Community Contacting Parties
- ❖ Final assessment: before expiry of the pilot

# European Hydrogen Bank: Proposed activities

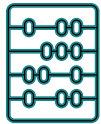


# II/ A growing pipeline of investments

# Where we are now – Project pipeline is growing but still a long way to go

- ✓ Europe is leading in terms of hydrogen projects announcements
- ✓ Electrolyser manufacturers plan to increase capacity to 21 GW by 2025

## However...



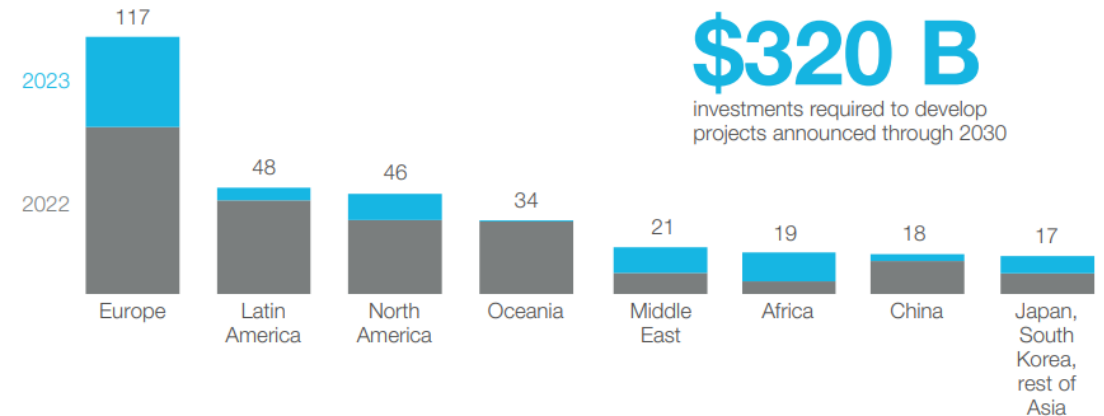
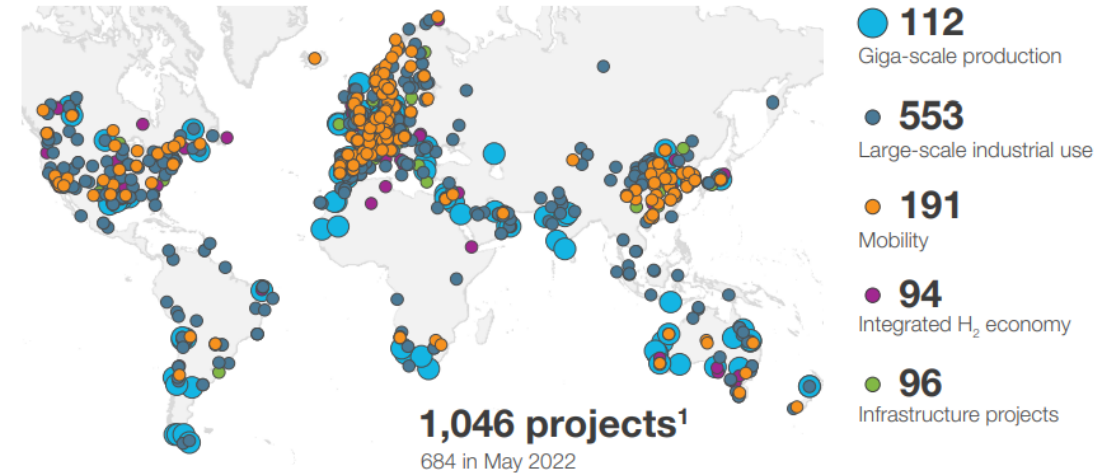
20 million tonnes of H<sub>2</sub> corresponds to 160 to 200 GW of electrolyser output capacity and 300 GW to 400 GW of renewable capacity.



Today less than 400 MW of electrolyser capacity is installed worldwide and only 160 MW capacity in the EU.



Annual electrolyser manufacturing capacity was 7GW in 2022.





# Many hydrogen projects supported by EU Funds

Towards an EU Roadmap for Hydrogen Valleys – Regional actors and their role



Hy2Infra regional hydrogen clusters contributing to emergence of EU-wide hydrogen network



Electrolysers  
~3.2 GW



Pipelines  
~2,700 km



Storage  
~370 GWh



LOHC Handling terminals  
~6,000 t/y



Clean Hydrogen Partnership



STRONG  
NORTHERN  
NETHERLANDS  
POWERED BY SNN



LIFE  
NEW HYTS

ZERO-EMISSION IN GROENE WATERSTOF  
IN DE PROVINCIE UTRECHT



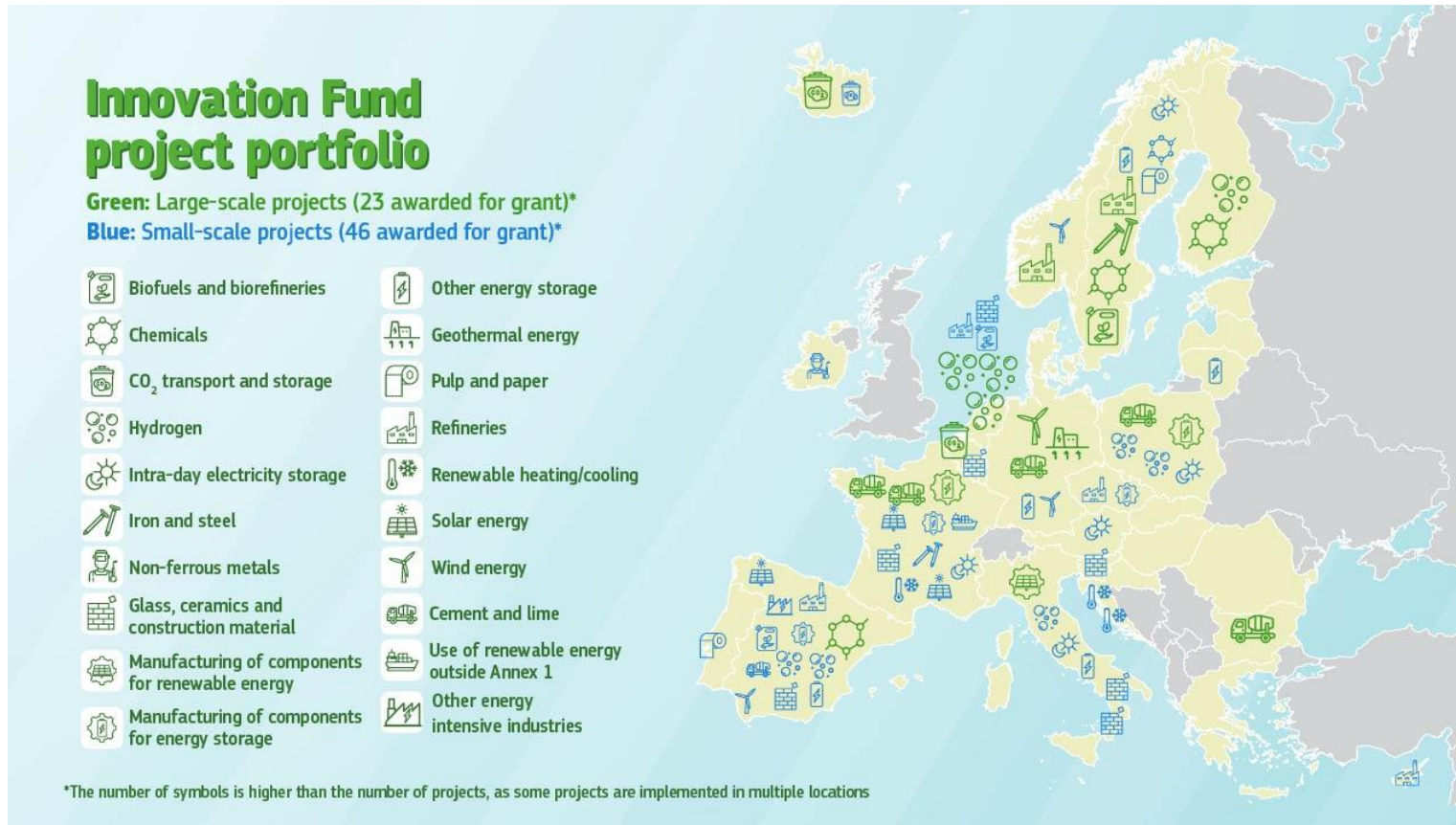
KICK-OFF LIFE NEW HYTS  
VRIJDAG 24 JUNI NIEUWEGEIN

Het Life NEW HYTS project heeft financiering ontvangen van het LIFE Programma van de Europese Unie.



European  
Commission

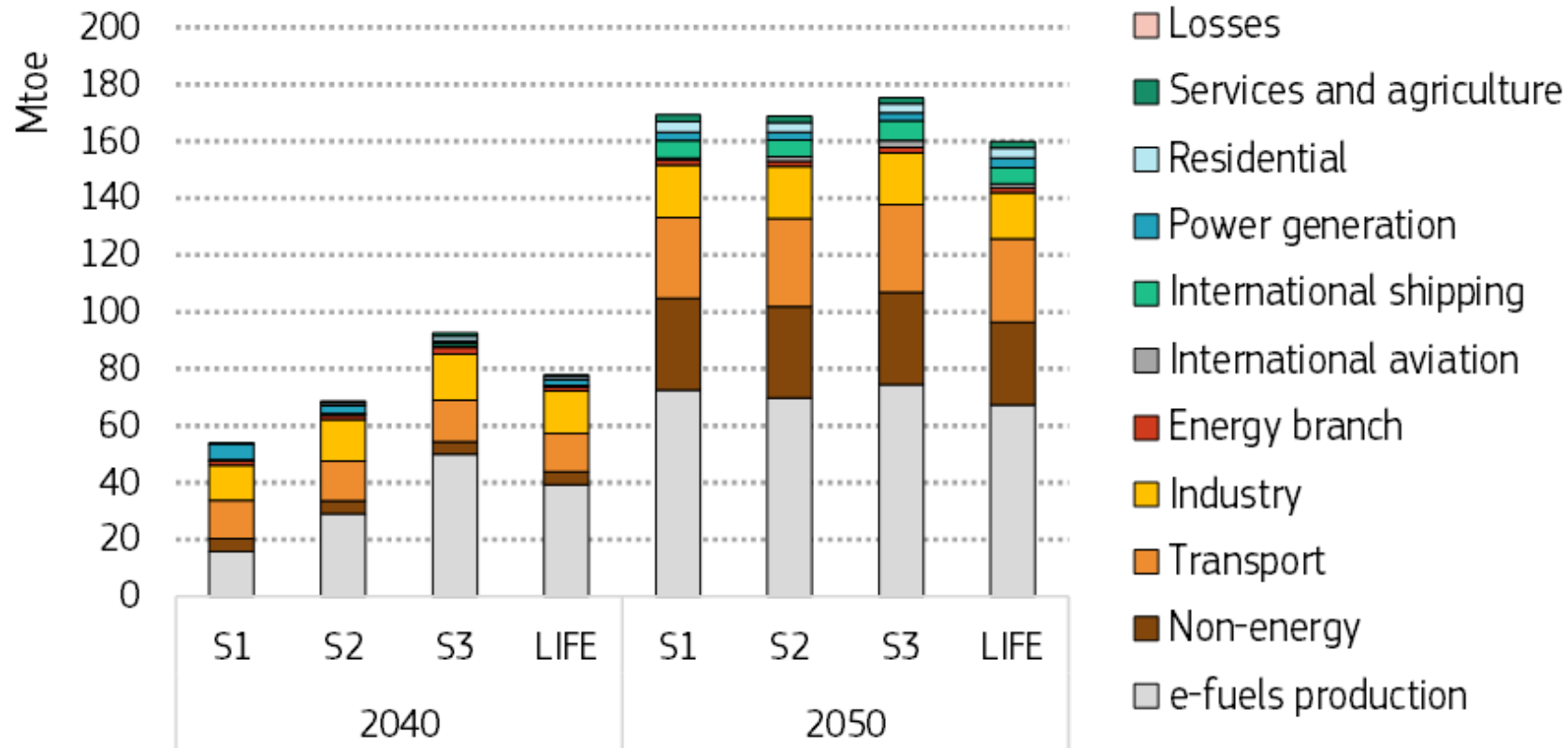
# More than EUR 800 million to 20 hydrogen projects in the Innovation Fund with more to come





# III/Next steps – implementation vs first data

# 2040 Impact Assessment: Where do we see the development of the hydrogen market?



Source : 2040 impact assessment, European Commission



# Seven bid selected for a total 1.5 GWe of electrolyser capacity

Project acronym	Project Coordinator	Project location	Bid price (EUR/kg)	Bid volume (kt H <sub>2</sub> /10years)	Bid capacity (MWe)	Expected GHG abatement (ktCO <sub>2</sub> /10years) *	Total requested funding (EUR) **
eNRG Lahti	Nordic Ren-Gas Oy	Finland	0.37	122	90	836	€ 45,228,375
El Alamillo H2	Benbros Energy S.L.	Spain	0.38	65	60	443	€ 24,605,819
Grey2Green-II	Petrogal S.A.	Portugal	0.39	216	200	1477	€ 84,227,910
HYSENCIA	Angus	Spain	0.48	17	35	115	€ 8,104,918
SKIGA	Skiga	Norway	0.48	169	117	1159	€ 81,317,443
Catalina	Renato Ptx Holdco	Spain	0.48	480	500	3284	€ 230,463,819
MP2X	Madoquapower 2x	Portugal	0.48	511	500	3494	€ 245,178,772
			Ø 0.44 €	Σ 1580 kt_H2	Σ 1502 MWe	Σ 10 808 kt_CO2	Σ 719,127,056 €

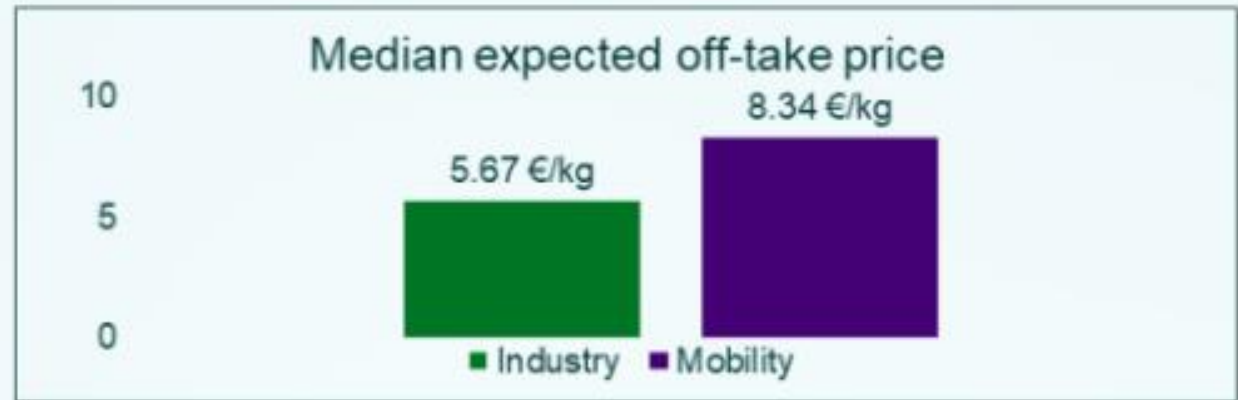
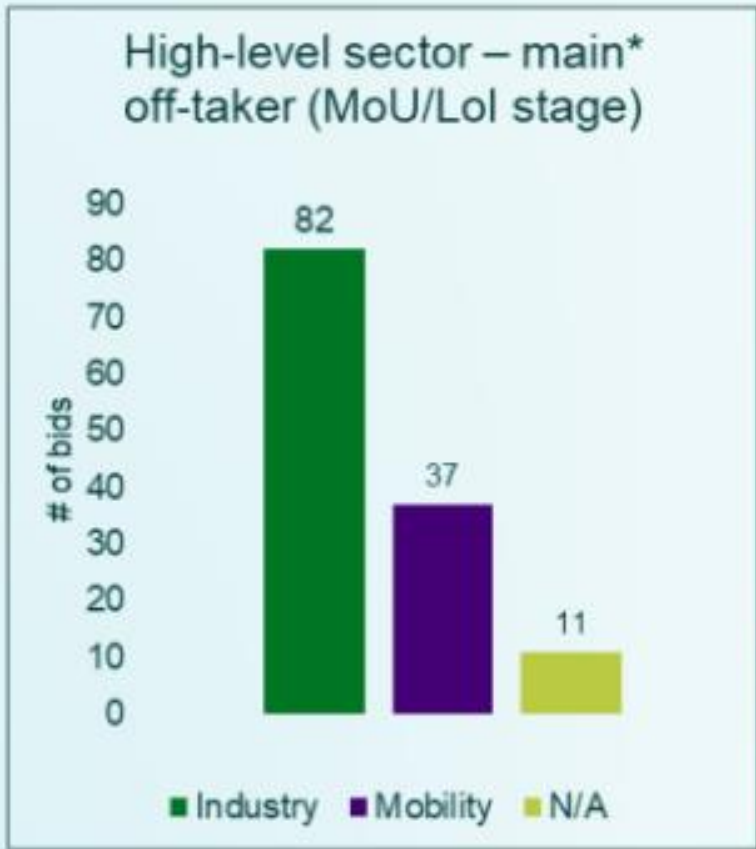
\*Calculated vs the 2021-2025 ETS benchmark of 6.84<sup>e</sup>/tH<sub>2</sub>. Not taking into account additional carbon abatement due to substitution effects

\*\* Remaining budget will accrue back to the Innovation Fund

# First data on the future hydrogen market collected thanks to the first auction

- Budget was 15 times oversubscribed demonstrating the appetite of EU stakeholders to create a hydrogen market
  - Large differences in bids for the auctions (from less than EUR 0.5 to the ceiling price of EUR 4.5/kg hydrogen) confirm the strong difference in prices
  - Also confirmed by differences of average levelised cost of renewable hydrogen of bids from 5.8 to 13.5 EUR/kg
- **2<sup>nd</sup> auction in preparation will allow to increase data collection and support more projects accross Europe**

# Despite higher willingness to pay in mobility, bids with proposed industrial off-takers are competitive



# Many steps left to take today to make the EU hydrogen market of tomorrow



## Finalisation of policies

- The Renewable Energy Directive - extend Delegated Acts to all RFNBOs
- definition of methodology for low-carbon gases through the Hydrogen and decarbonised gas package



## Deployment of Infrastructure and implementation of policies

- Connecting Europe Facility
- Net Zero Industry Act and Strategic Technologies Platform for Europe
- For transport/e-fuels implementation of RefuelEU Aviation and FuelEU Maritime



## Finalisation of Investments

- Currently 90% of hydrogen projects in the EU are waiting for Final Investment Decision



# Thank you



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