



# Le partenariat « Clean Hydrogen for Europe » dans Horizon Europe

**Laurent Antoni** 

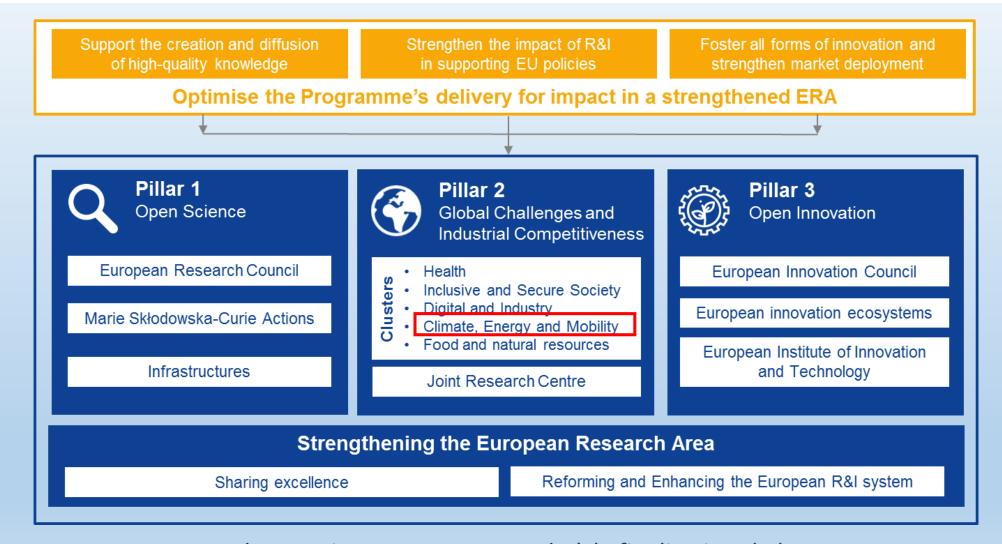
Paris, 5 février 2020



# Horizon Europe



## THE NEXT EU RESEARCH & INNOVATION PROGRAMME (2021 – 2027)



Budget Horizon Europe suspendu à la finalisation de la MFF



# Horizon Europe



## New approach to European Partnerships

Partnerships with public or private sector partners can achieve certain Horizon Europe objectives more effectively than the Union alone. A new generation of objective-driven and more ambitious partnerships in support of agreed EU policy objectives are planned to be set up.

## **Key features**

- Simple Simple architecture and toolbox
- **Coherent life-cycle approach**
- **Strategic orientation**

Based on MoUs / contractual arrangements; implemented independently by the partners and by Horizon **Europe** 

Co-funde

Based on a joint programme agreed by partners; commitment of partners for financial and in-kind contributions and integration of activities, while Horizon Europe also makes a financial contribution

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Based on long-term dimension and need for high integration, partnerships based on Articles 185 / 187 of the TFEU and the EIT-Regulation will be set-up and supported by Horizon Europe



# Horizon Europe - Calendrier



- On May 2019, Shadow Strategic Programme Committee (SSPC) first discussion on proposed partnerships
  - Overview of partnership landscape; focus on institutionalised European Partnerships (Clean H2 for Europe)
  - EC published an Inception Impact Assessments
- June 2019 Start of Impact Assessments
  - Followed by public consultation



On September 24-26 (Research & Innovation Days), each partnership had a dedicated session



# Horizon Europe - Calendrier



- December 2019, submission of IPPP requests and Strategic Research & Innovation Agenda (SRIA)
- February 2020 Finalisation of Ex-ante Impact Assessment, submission of drafts to the Regulatory Scrutiny Board
- In parallel: **Partnership proposal** is further developed together with partners, based on common guidance/template;
- Drafting of COM proposals for Article 185 and Article 187 initiatives
- Commitments from Partners, finalisation of Strategic Research and Innovation agenda/roadmap
- Agreement on budgetary provisions for all partnerships in the portfolio
- Commission adopts proposal for Article 185/7 initiatives
- **Negotiation in Council (and European Parliament),** in parallel: preparatory work (MGAs, preparation of first Annual Work Programme ...)
- By End of 2020 Adoption of basic act
- By early 2012 Launch of the European Partnership, preparation and launch of implementation structure, subsequent launch of activities, including calls for proposals





# We have 3 convictions

1. The energy transition in the EU will require hydrogen at large scale. Without it, the EU would miss its decarbonisation objective.

2. FCH 2 JU has been a key instrument: we should build on its success and expand it

 Hydrogen Technologies and Systems will play a key role in the EU's (re)industrialisation policy















## These convictions are now well-shared

IPHE Steering Committees on Enabling Hydrogen and Fuel Cells Progress Through Global Collaboration

April 2019, Vienna, Austria and october 2019, Seoul, Korea

**G20 Ministerial Meeting** on Energy Transitions and Global Environment for Sustainable Growth June 15-16, 2019, Karuizawa, Japan

The importance of hydrogen has been referred in the Communique and Action Plan (first time). Hydrogen Report released at G20 by IEA

## **CEM -New Hydrogen Initiative**

May 27-29, 2019, Vancouver, Canada

Objective: Advance policies, programs and projects to accelerate commercial scale deployment of hydrogen and fuel cell technologies across all sectors of the economy

## MISSION - INNOVATION – Innovative Challenges 8 « Renewable and Clean Hydrogen Challenge"

May 27-29, 2019, Vancouver, Canada

Objective: To accelerate the development of a global hydrogen market by identifying and overcoming key technology barriers to the production, distribution, storage, and use of hydrogen at gigawatt scale

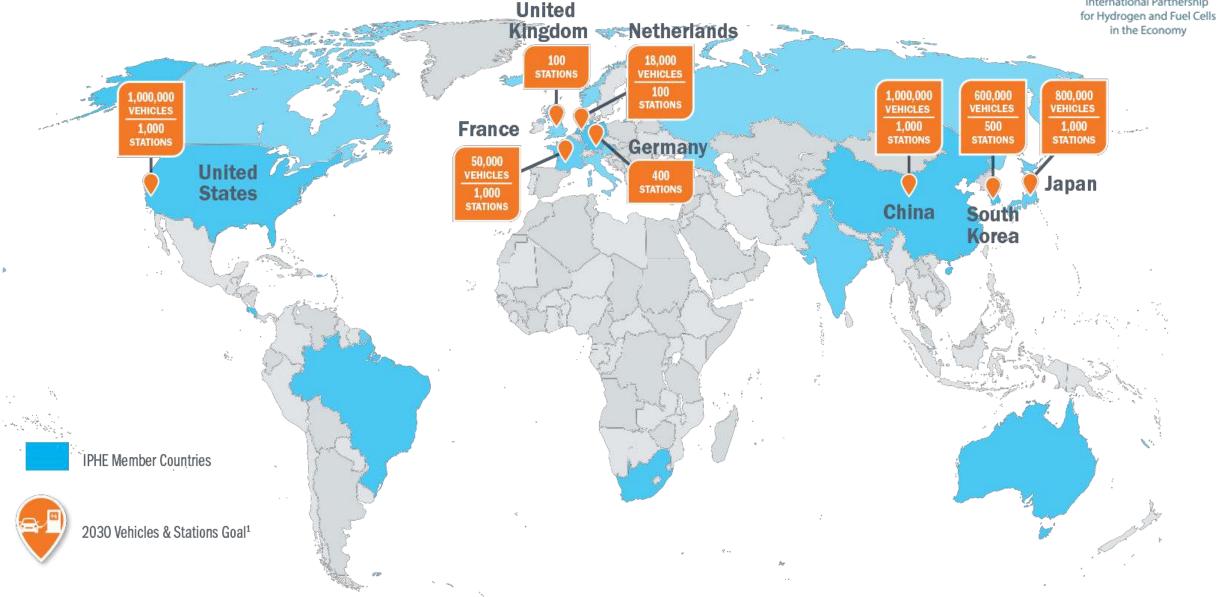
## **HEM - Hydrogen Energy Ministerial Meeting 2019**

September 25, 2019, Tokyo, Japan

Objective: Follow up "Tokyo Statement" to realize it and set "Global Hydrogen Target" to share global goal.

# IPHE members comprise 2/3 of the world's GDP and invest nearly \$1 Billion annually on H<sub>2</sub> and fuel cells





# **Key Drivers**





- 1. Environment and Climate Change
- 2. Energy System Resiliency and Stability
- 3. Energy Security
- 4. Economic Growth: Innovation & Technology

# **IPHE Activities**





## Regulations, Codes, Standards and Safety (RCSS)

- Foster RCS harmonization across countries
- Share safety information, best practices, lessons learned

## Outreach

- Policy forum events
- Workshops

## **Sharing information between members**

status, gaps, analysis, opportunities, etc.

## **Develop Partnerships to Accelerate Progress**

Ministerial Meetings, IEA, Mission Innovation, Clean Energy Ministerial, IRENA, Hydrogen Council,



## International Partnership for Hydrogen and Fuel and Fuel Cells in the Economy

## 24th Steering Committee Meeting





## International Partnership for Hydrogen and Fuel and Fuel Cells in the Economy

## 24th Steering Committee Meeting





# Réunion IPHE 2020 en France





- 1. Lyon Hôtel de Région 14, 15, 16 juin 2020
- 1.1 Comité de pilotage 14 et 15 juin (Réunion restreinte)
- 1.2 Colloque international 16 juin (250 invités)

"Importance of Regions in the development of the hydrogen economy"

## 2. ENGIE La Défense 17 juin

Réunion « Perspectives politique et économique de l'Hydrogène en France et dans le Monde » (130 participants)

3. Workshop « Hydrogen production analysis methodology » 18 juin, au CEA





## These convictions are now well-shared





Frans Timmermans

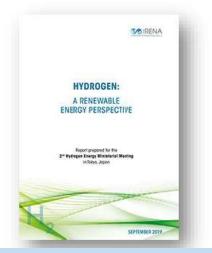
Executive Vice President of the European Commission

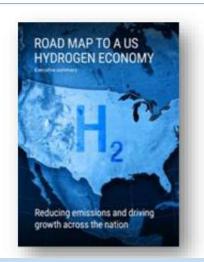
Responsible for Europe's Green Deal "**Hydrogen** could be a huge opportunity for our economy"

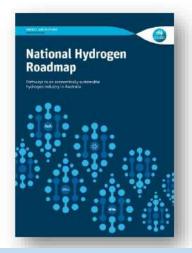
"It is not that difficult to use gas infrastructure to import [green] **hydrogen** using gas infrastructure"

"we need to protect our industries and [...] help them free themselves from fossil fuels, for example when **hydrogen** is used in the manufacturing of steel"





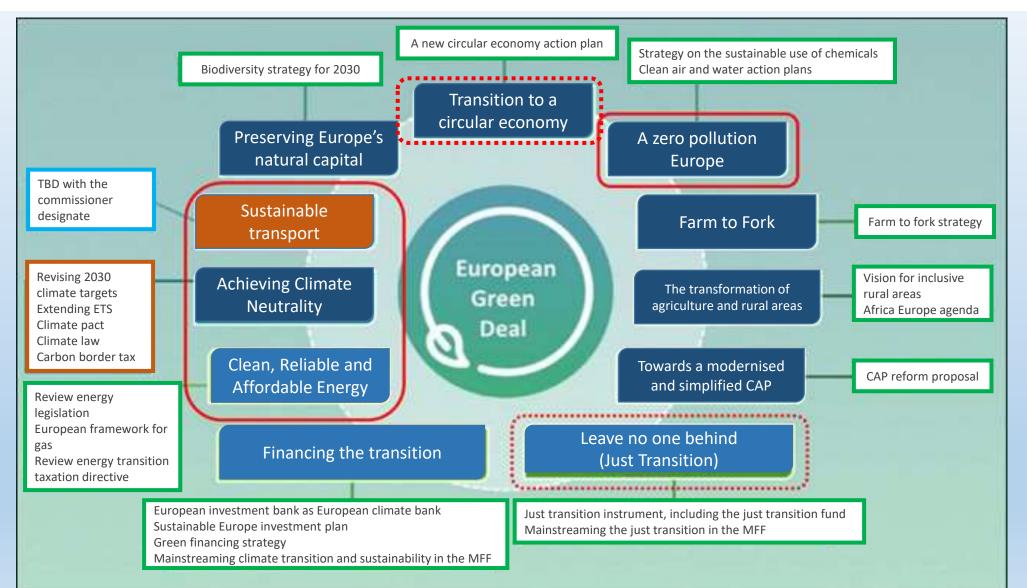






# Clean Hydrogen for Europe is well aligned with the goals of the European Green Deal







Mrs von der Leyen



M. Timmermans





FCH JU mid-term review: "The choice of a Joint Undertaking as instrument continues to ensure good alignment with both policy and industrial objectives. The IEG is of the view that Europe's competitive position would be less favorable without the activities of the FCH 2 JU"

## ➤ Strategic Forum for IPCEI:

Strengthening Strategic Value Chains for a future-ready EU Industry

Report of the Strategic Forum for Important Projects of Common European Interest





#### HYDROGEN TECHNOLOGIES AND SYSTEMS

- → Potential to replace fossil-based energy with low-emission renewable hydrogen.
- → Could enable and optimise large-scale renewable electricity generation.
- → Could increase EU energy security and resilience.

#### RECOMMENDATIONS:

- Develop a roadmap for a future European Hydrogen Economy.
- Build a supportive regulatory framework by reviewing legislation on renewable energy, develop common standards.
- Support R&D investments and build an innovative industrial system through crossborder collaboration and partnerships in Horizon Europe.
- Ensure safety and public acceptance through demonstrations and standardisation.

4





## A continuation of a strong European support is however needed to create a hydrogen economy

Strategic Opportunities

Problems

Drivers (Root causes)

Solution

Clean Hydrogen technologies are on the brink of reaching commercial maturity, competing against (and winning over) fossil based alternatives.

Large scale deployment of Clean Hydrogen technology would have immense positive impacts on climate. energy and environmental goals

European companies hold global leadership and/or strong positions in key parts of the clean hydrogen value chain

Some applications do not exist yet commercially / are not mature enough or have not been demonstrated

Mature Clean Hydrogen technologies are more expensive compared to fossil based alternatives

Clean Hydrogen is not available, in sufficient quantities and at low cost when and where it is needed

Infrastructure not in place or ready to store, transport and distribute hydrogen at scale

Stakeholder knowledge and acceptance not sufficient

necessary to progress further in Technology Readiness Levels (TRL)

Research funding is

Mature clean hydrogen technologies do not reach the scale necessary to catalyze cost reductions

Infrastructure and demand

need parallel development

Stakeholders (policy

makers, private actors

general public) require

clear information

Improvements in efficiency, cost, durability and manufacturability are necessary

> Distribution for purpose

infrastructure is not fit

Safety should be

embedded at all levels

Long-Term, strategic

development plans are

necessary to priorities

resources

**RCS** barriers persist

The development and

deployment of

hydrogen applications

is usually part of

broader systems

involving other

hydrogen applications

and/or other sectors

therefore requiring a

large coordination

effort

Geographical differences create large gaps between regions

Innovative applications have not been proven. at scale, in real-life scenarios

Large scale H2 storage and transport solutions need to be proven

An Institutional PPP, which leverages public and private resources, channeling them at addressing all drivers holding back the large scale deployment of clean hydrogen technologies using:

**Funding instruments** tailored to address the root causes behind the problems identified, while targeting

Production

Distribution

End-uses

As well as

Horizontal tasks, which address broader societal issues





## Overall ambition and policy impacts pursued by Clean Hydrogen for Europe

#### Clean Hydrogen for Europe **GENERAL OBJECTIVES** SOCIETAL IMPACT **GOAL** 1. Accelerate the commercial 1. Reduce and eliminate **Demonstrate sectoral** maturity individual hydrogen emissions in transport, integration through technologies across transport, industry and heating hydrogen as a necessary heating&power, and industry. 2. Integrate higher shares element of a of variable renewable sustainable and 2. Enable at scale and integrated energies ensuring system decarboniszed energy deployment efficiency system. 3. Generate **economic** 3. Ensure a safe and frictionless **benefits** for Europe deployment







GO1: Accelerate the commercial readiness of nearly zero GHG emission hydrogen-based technologies across energy, transport, building and industrial end-uses

GO2: Enable at scale deployment capacity for key parts of the clean hydrogen value chain

GO3: Ensure a safe and frictionless deployment of Clean Hydrogen technologies

#### Programme design and implementation focused on:

- Long-Term, strategic research challenges and research actions (Low TRL)
- Innovations which aims to develop new applications or strengthen the capabilities of mature applications (Medium - High TRL)
- Deployment at large-scale (Flagships) and of entire systems (Valleys)
- Enhancing manufacturing and scale-up capacities (Supply Chain)
- · Cross-cutting activities

#### PILLAR HZ PRODUCTION

#### SO1: Low carbon H2 production

RM1: Electrolysis RM2: Other modes of

production

#### SO2: Integration of renewables

- RM3: Role of electrolysis (link with RM1)
- RM4: Large scale storage

#### PILLAR HZ DISTRIBUTION

#### SO3: H2 delivered at low cost

- RM5: Key techno for distribution
   RM6: Transport by road abjor
- RM6: Transport by road, ships, etc
- RM7: transport and storage in liquid carriers
- (see also RM1: H2 in gas grid)

#### 504: Transport infrastructure

RM8 : HRS for multiple applications

#### Manual Transport

#### SO5: Transport vehicles Priorities

RM9 : Technology building blocks

PILLAR HZ END USES

RM12: Truck and large vans (HD)
 RM15: Maritime (Ships & Port)

#### Other new applications

- RM16: Aviation
- RM14: Train
- RM11: Coach

#### SO6: H2 for heat and power (in

#### building and industry)

- RM17: H2 in the gas grid
- RM18: H2 Stationary FC
- RM19: H2 Burners and turbines

#### SO7: H2 decarbonises industry

RM20: H2 in industry

#### SO8: H2 VALLEYS

Integrated H2 ecosystems combining multiple applications. (ports, industrial hubs, cities, etc.)

#### SO10: Cross Cutting

Regulations, Codes, Standards, Training, Safety, etc.

SO9: SUPPLY CHAIN anufacturing & scale





PILLAR H2 PRODUCTION

#### **SO1 Low carbon H2 production**

- 1. Electrolysis
- 2. Other modes of production

## **SO2** Integration of renewables

3. Role of electrolysis in the energy system

PILLAR H2 DISTRIBUTION

#### **SO3 Storage & delivery of H2**

- 4. Large scale storage
- Pipeline transport (grid)
- 6. Liquid carriers
- 7. Non-pipeline transport
- 8. Key technos for distribution

## **SO4** Refuelling infrastructure

9. HRS for multiple applications

#### PILLAR H2 END USES

#### **SO5 Transport vehicles**

- 10. Building blocks
- Trucks & large vans
- 12. Maritime (inc. ports)
- 13. Aviation
- 14. Rail
- 15. Coaches

#### **SO6 Heat & Power**

- 16. Stationery H2 fuel cells
- 17. H2 burners and turbines

## **SO7 Industry**

18. H2 in industry

SO9 Supply Chain Manufacturing & scale-up

Int'l coop.

Knowledge

## **SO8 Hydrogen Valleys**

Integrated H2 ecosystems combining multiple applications (ports, industrial hubs, cities, etc.)

## **S10 Cross-Cutting**

Regulations, Codes, Standards, Recycling, Ecodesign, Training, Safety, social, etc.

GO4: Leverage technical and financial resources

public

and

both private

# Horizon Europe Clean Hydrogen for Europe



GO1: Accelerate the commercial readiness of nearly zero GHG emission hydrogen-based technologies across energy, transport, building and industrial end-uses

Programme design and implementation focused on:

PILLAR HZ PRODUCTION

SO1: Low carbon H2 production

RM1: Electrolysis

GO2: Enable at scale deployment capacity for key parts of the clean hydrogen value chain

# GO3: Ensure a safe and frictionless deployment of Clean Hydrogen technologies

# Communication and dissemination Provide clear data and information to Stakeholders Knowledge Management Address regulatory barriers Embed a culture of

Stakeholder knowledge and acceptance of Clean Hydrogen technology improved

Safety

Regional and

International Cooperation

General Objectives

Tasks

SO = Specific objectives

Problems targeted

- Long-Term, strategic research challenges and research actions (Low TRL)
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#### SOB: H2 VALLEYS

Integrated HZ ecosystems combining multiple applications. (ports, industrial hubs, cities, etc.)

#### SO10: Cross Cutting

Regulations, Codes, Standards, Training, Safety, etc.

Mature clean hydrogen technologies improved / made more competitive against fossil based alternatives Technologies in place to ensure that Clean Hydrogen can be made available, in sufficient quantities and at low cost when and where it is needed

Infrastructure will have the capacity to store, transport and distribute hydrogen at scale

SO9; SUPPLY CHAIN mufacturing & scale

New applications brought to commercial maturity and/or demonstrated safety at all levels

Address

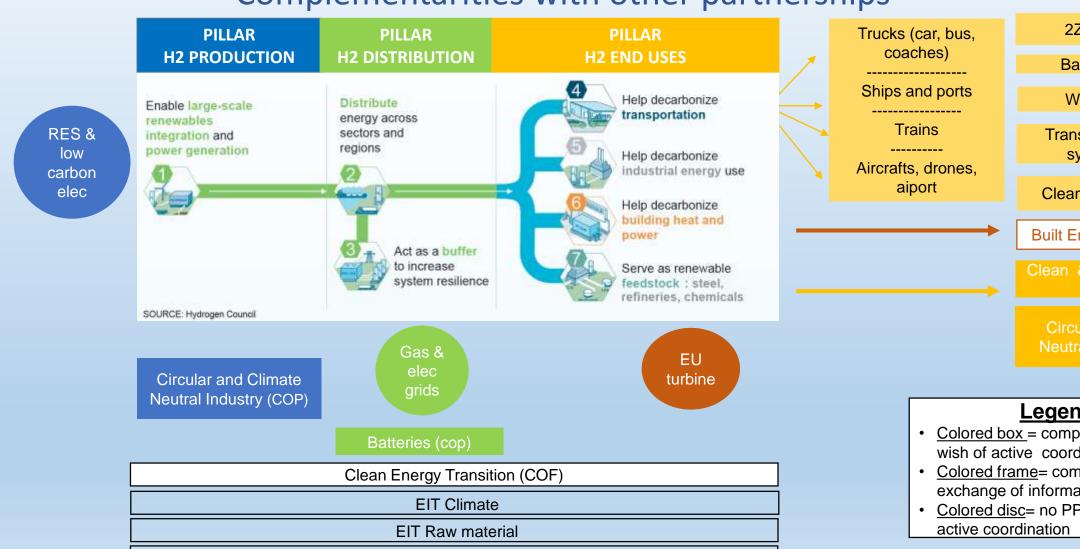
geographical

differences





# Complementarities with other partnerships



**EIT Inno Energy** 

2ZERO (COP)

Batteries (COP)

Waterborne (?)

Transforming EU rail system (IPPP)

Clean Aviation (IPPP)

Built Environment (COP)

Clean & low carbon steel (COP)

Circular and Climate Neutral Industry (COP)

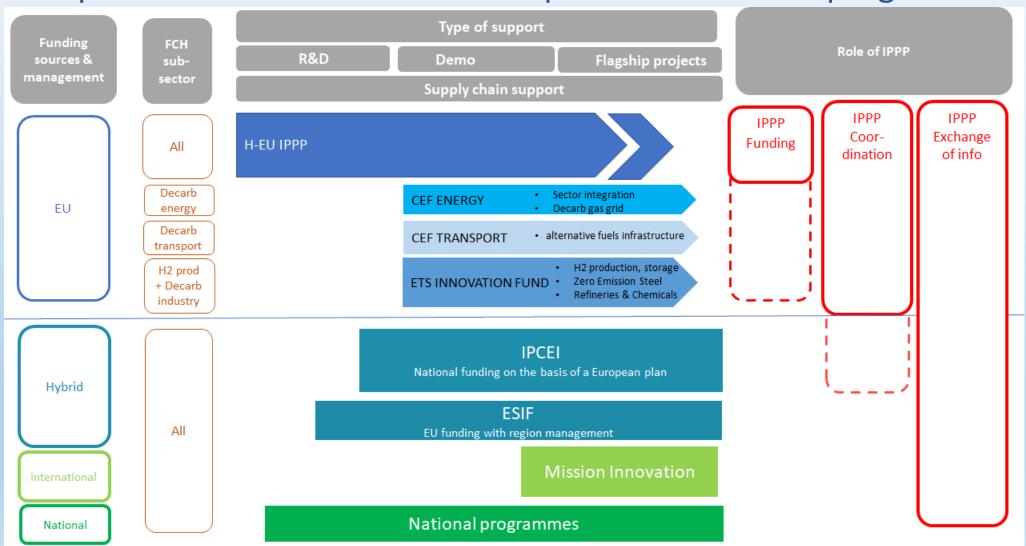
#### Legend

- Colored box = complementarity + wish of active coordination
- Colored <u>frame</u>= complementarity + exchange of information
- Colored disc= no PPP but wish of





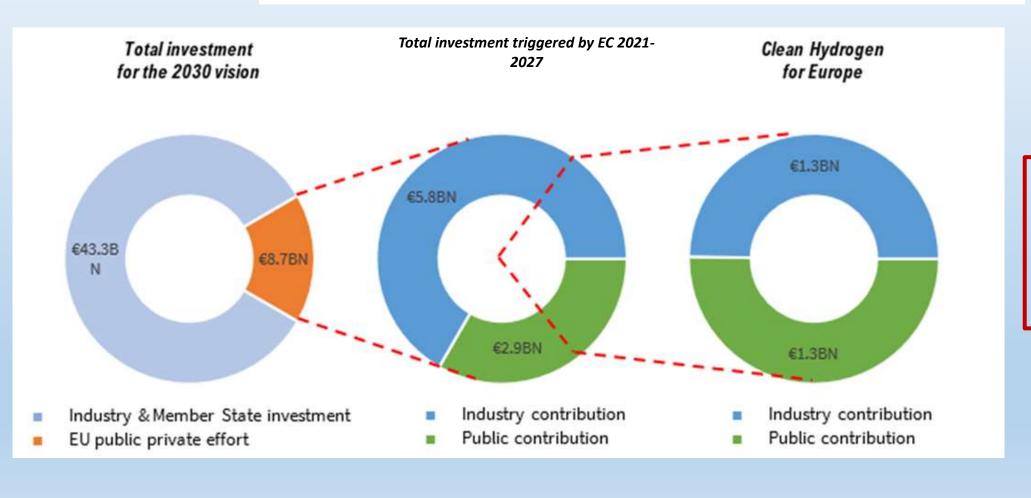
Complementarities with other European and national programmes







# **Budget, impact and private contribution**



**BUDGET** request

Clean H2 for Europe =

2 x FCH 2 JU





## **Funding rate in HEU**

	Industry	Research
RIA	100%	100%
IA	70%	100%



## Funding rate in IPPP Hydrogen

	TRL	Industry	Research
Strategic research challenges	2-3	100%	100%
Research actions	3-6	70%	100%
Innovative actions	5-8	50%	80%
IA Flagship projects	7-8	30%	30%
IA H2 Valleys	7-8	30%	30%
IA Industrialisation actions	5-8	30%	80%
Cross-Cutting	n/a	100%	100%





## Give your opinion on the draft SRIA

www.cleanhydrogenforeurope.eu



ABOUT US





# A new decade starts



Let's make **Hydrogen**a strong part of it!

