

JORNADA TÉCNICA SOBRE EL HIDRÓGENO VERDE



Oportunidades del hidrógeno para la descarbonización y la industria

Fernando Palacín, Managing Director
director@hidrogenoaragon.org

23 de marzo de
2023





«El Pacto Verde Europeo es nuestra nueva estrategia de crecimiento. Contribuirá a reducir las emisiones, así como a crear puestos de trabajo.»

Ursula von der Leyen, presidenta de la Comisión Europea



«Proponemos una transición verde e integradora para ayudar a mejorar el bienestar de las personas y legar un planeta sano a las generaciones venideras.»

Frans Timmermans, vicepresidente ejecutivo de la Comisión Europea



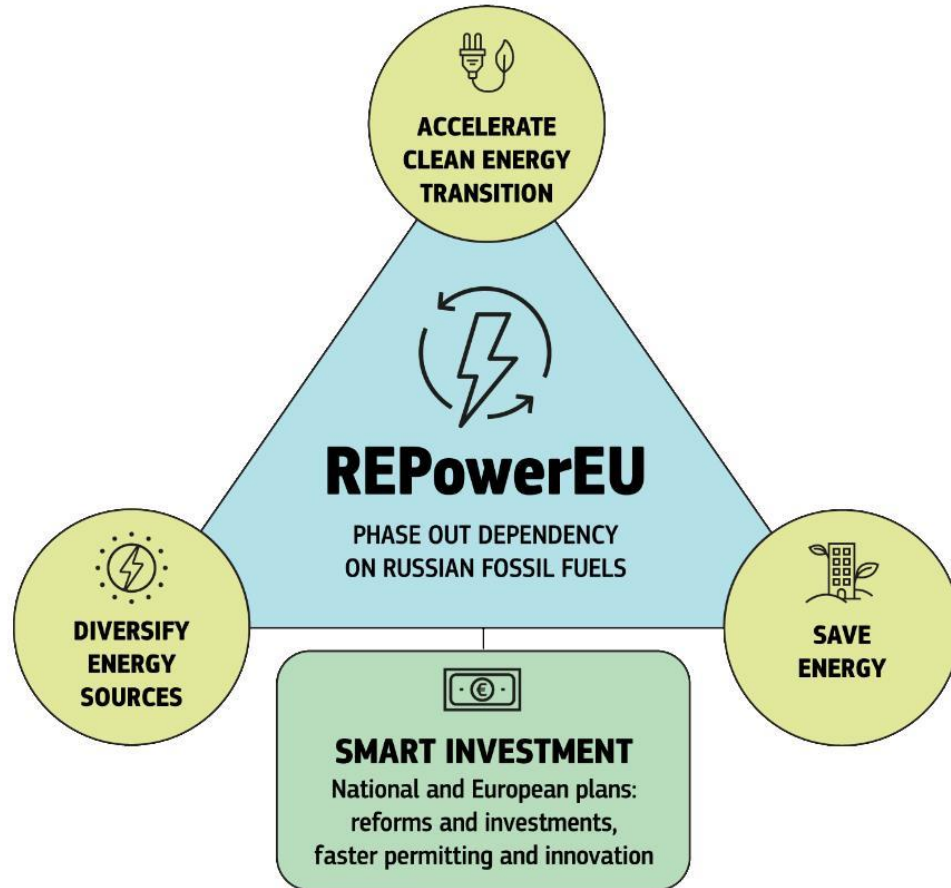
«El Pacto Verde Europeo es nuestra nueva estrategia de crecimiento. Contribuirá a reducir las emisiones, así como a crear puestos de trabajo.»

Ursula von der Leyen, presidenta de la Comisión Europea



«Proponemos una transición verde e integradora para ayudar a mejorar el bienestar de las personas y legar un planeta sano a las generaciones venideras.»

Frans Timmermans, vicepresidente ejecutivo de la Comisión Europea



Setting a target of 10 million tonnes of domestic renewable hydrogen production and 10 million tonnes of imports by 2030, to replace natural gas, coal and oil in hard-to-decarbonise industries and transport sectors.



Brussels, 10.2.2023
C(2023) 1087 final

COMMISSION DELEGATED REGULATION (EU) .../...

of 10.2.2023

supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a Union methodology setting out detailed rules for the production of renewable liquid and gaseous transport fuels of non-biological origin



Brussels, 10.2.2023
C(2023) 1086 final

COMMISSION DELEGATED REGULATION (EU) .../...

of 10.2.2023

supplementing Directive (EU) 2018/2001 of the European Parliament and of the Council by establishing a minimum threshold for greenhouse gas emissions savings of recycled carbon fuels and by specifying a methodology for assessing greenhouse gas emissions savings from renewable liquid and gaseous transport fuels of non-biological origin and from recycled carbon fuels



Brussels, 1.2.2023
COM(2023) 62 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT, THE EUROPEAN COUNCIL, THE COUNCIL, THE EUROPEAN
ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE
REGIONS**

A Green Deal Industrial Plan for the Net-Zero Age

A Green Deal industrial plan for Europe

VDL's presentation in Davos of new EU industrial policy for green tech



European Commission,
1st February 2023

"We just had in the College the adoption of the Communication on the Green Deal Industrial Plan. [...] We see that major economies are stepping up their investment in the net-zero industry – rightly so. [...] We have a very strong starting point as a European Union."

Green Deal Industrial Plan, in 4 pillars:



Speed and access for clean tech

- Clean hydrogen as a strategic sector
- Net-Zero Industry Act
- Synergy with CRMs Act



Boosting investments and financing

- Adaptation and softening state aid rules
- Targeted aid for production facilities in strategic sectors (e.g. tax-breaks)
- Proposal of a Sovereignty Fund



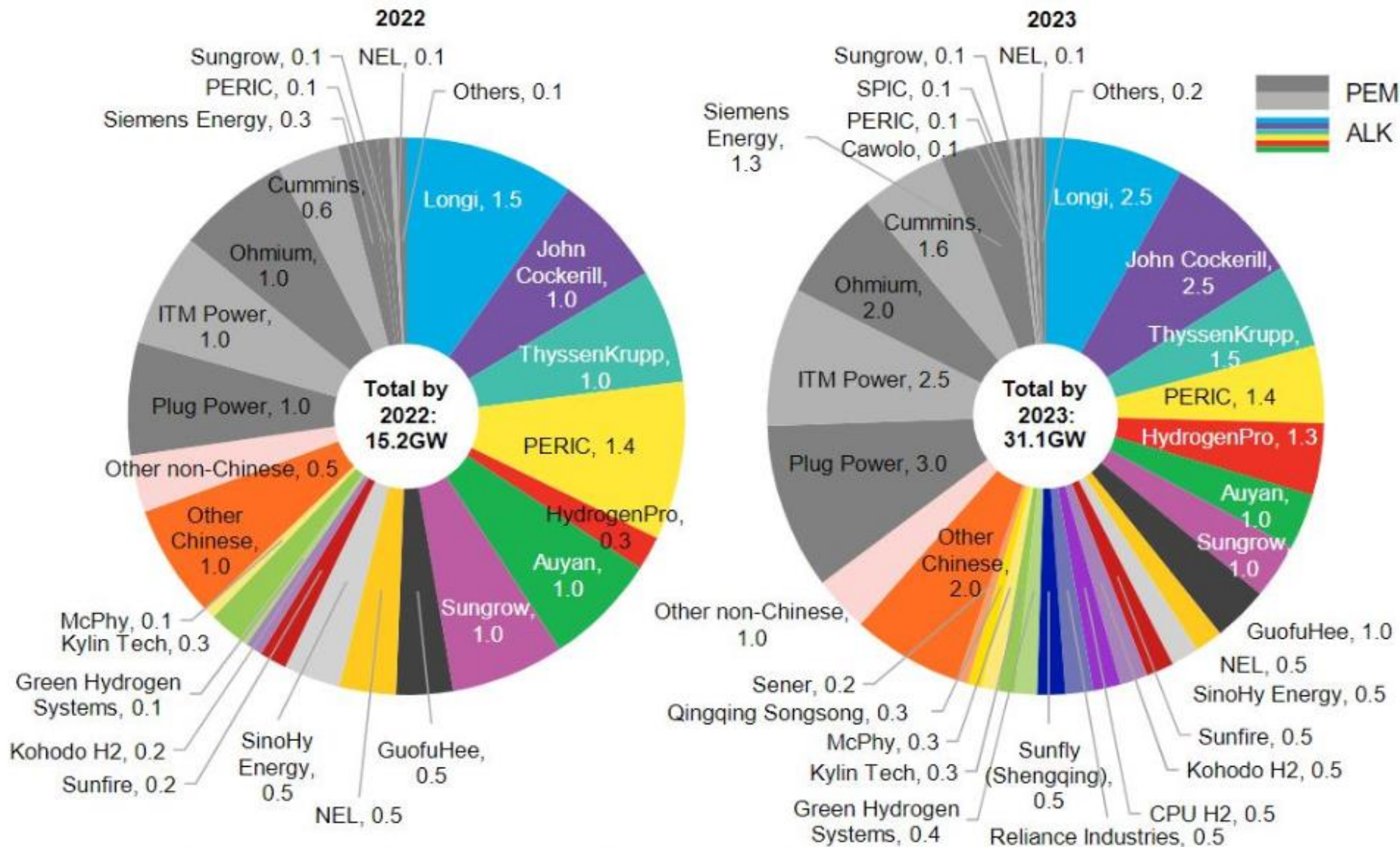
Skills

- Legislative/financial initiatives to be proposed
- EU Year of Skills 2023



Trade

- Ambitious EU trade agenda
- Global agreements to be ratified
- Unfair practices in the Foreign Subsidies Regulation



WHY HYDROGEN IN ARAGON?

- First Wind Farm in Spain installed near Zaragoza (+12.000MW Today)
- 2003: Great energy change approaching
- Reasons to support new hydrogen technologies:
 1. To take advantage of the renewable energy potential
 2. To capitalize on the region's strategic situation
 3. A consolidated industry with sectors that could apply and develop new products
 4. Existence of a high level of involvement in research groups
- 2003: Workshop organized by Government of Aragon
 - Objective: To learn and to discuss about hydrogen as energy vector
 - Results:
 - **Strategy to develop Hydrogen technologies in Aragon**
 - **Foundation for the Development of New Hydrogen Technologies in Aragon**



The Foundation for the development of New Hydrogen Technologies in Aragon is a private, not-for-profit entity, created to promote the use of hydrogen as an energy vector in those fields related to the renewable technologies and the decarbonization of the mobility and the energy sector, including the hydrogen production, transport and its use in fuel cells, in transport applications, distributed energy generation, production of synthetic or alternative fuels



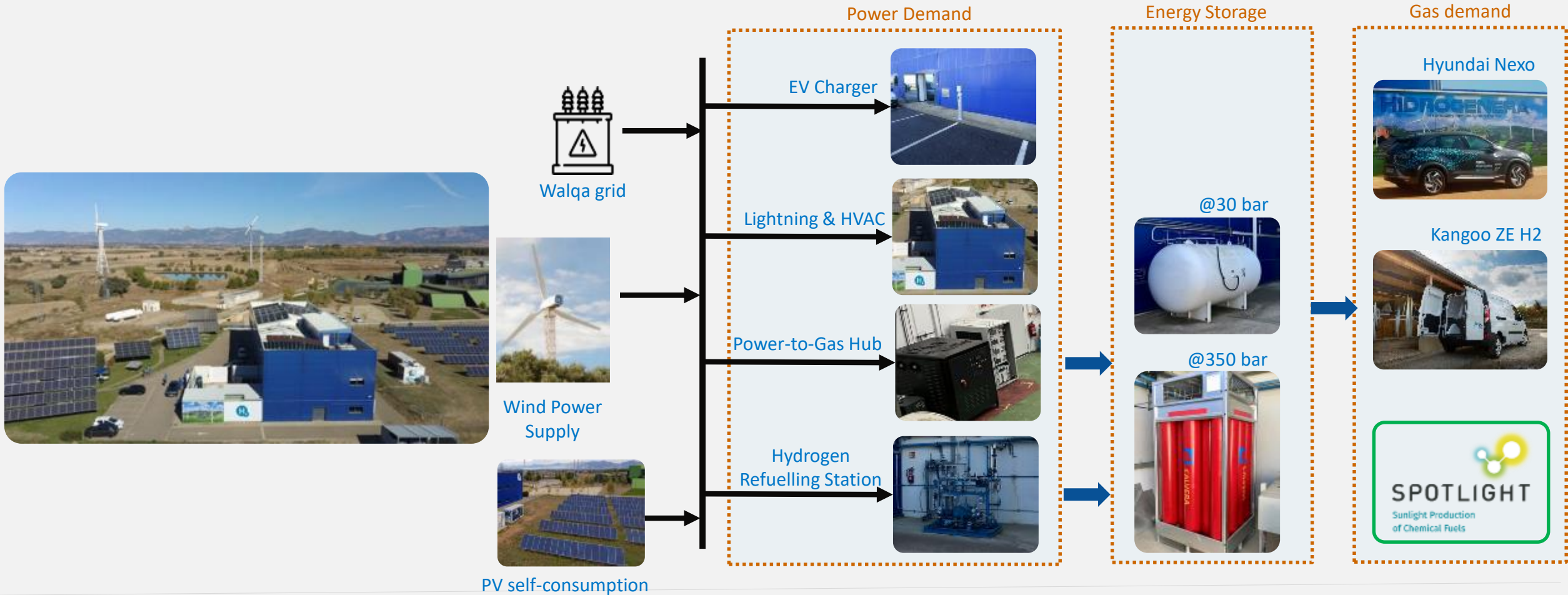
- Agent of the Aragonese R&D&I System
- Key instrument for the promotion of strategic projects related to hydrogen, renewable energies, electric vehicles and energy efficiency.
- Aiming of promoting of research, technological development and industrial adaptation from the community of Aragon.
- Contributing to industrial modernization and improved competitiveness.

Created on december 23rd, 2003

Aragon Hydrogen Foundation



FACILITIES



Colaboration / Association

Experience in Projects



Government of Aragon:



Most successful Spanish entity in the Clean Hydrogen JU:

AIMS OF THE PLAN:

- **GENERALS**

- To have a tool for the identification of opportunities of the new hydrogen technologies
- To identify strategic lines for the region and to establish a time scale and actions plans

- **SPECIFICS**

- To review the state of technology and to define opportunities.
- To identify specific projects for Aragon's SMEs.
- To set across-the-board and general support actions
- To carry out a survey with longer temporary horizons 2020-2050, defining the continuity of the strategic lines drawn



(2007 – 2010)



(2011 – 2015)



(2016 – 2020)

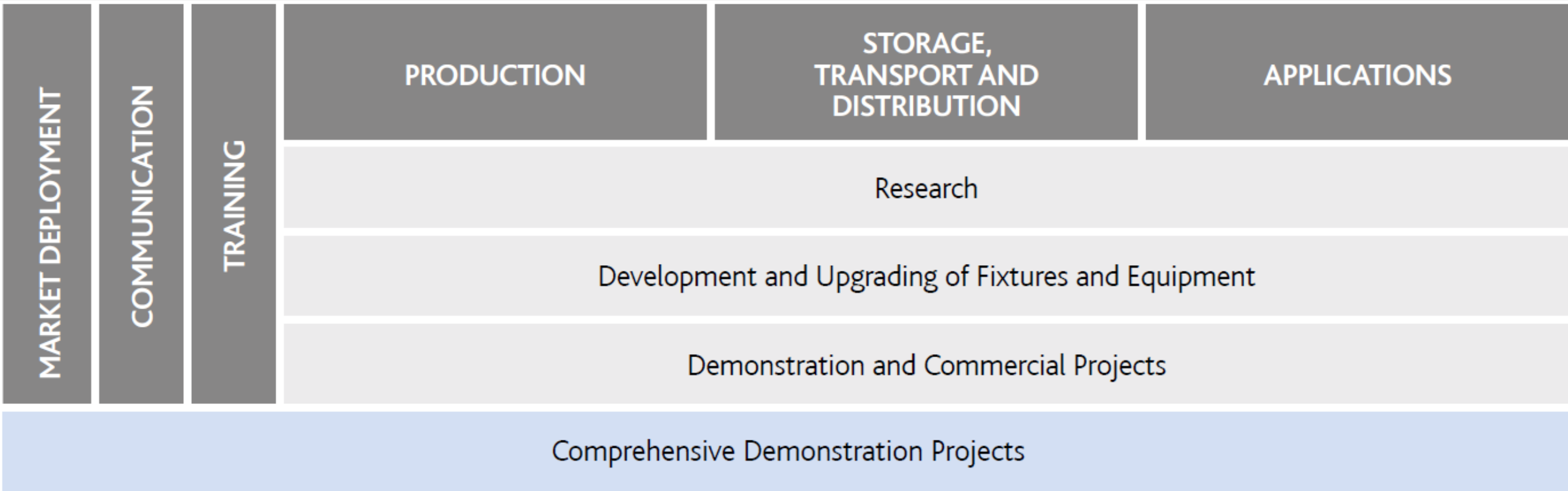


(2021 – 2025)

Hydrogen Master Plan in Aragon 2021 - 2025



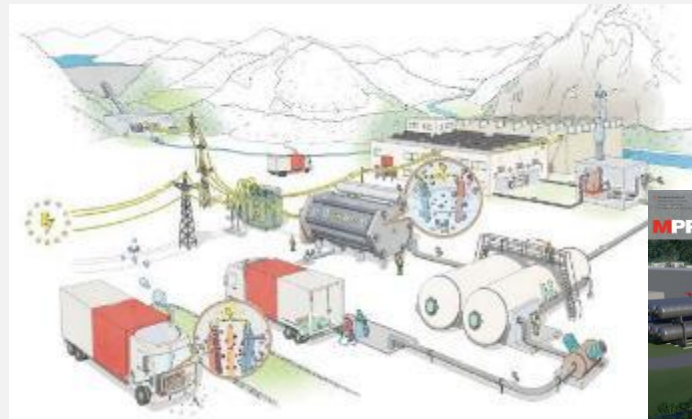
Strategy Lines:



Hydrogen Master Plan in Aragon 2021 - 2025



Strategy Line 1: Production



Hydrogen Master Plan in Aragon 2021 - 2025



Strategy Line 1: Production



www.ely4off.eu

Hydrogen Master Plan in Aragon 2021 - 2025



Strategy Line 2: Storage, Transmission and Distribution



Potential of H₂ injection into the transmission high pressure natural gas grid to decarbonise the gas system and gas uses

Strategy Line 2: Storage, Transmission and Distribution



Deliver public subsurface technical developments for pure hydrogen storage in depleted fields or aquifers.

Provide techno-economic insights on hydrogen underground storage deployment in the Europe-an energy system

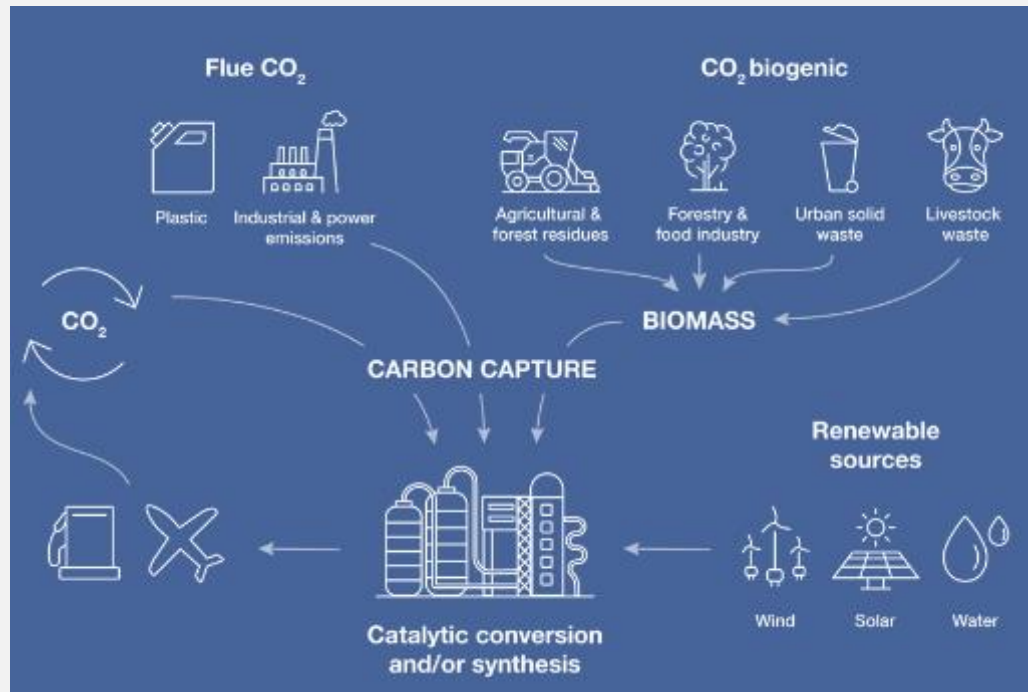
The HyUnder project studies the viability and business models linked to the massive use of underground stored H₂ in order to balance the grid when large amounts of renewable generation are added to the generation mix, analyzing the situation for six different countries



Strategy Line 3: Applications: e-fuels

Air Carbon Recycling for Aviation Fuel Technology

4AirCRAFT combines hybrid catalytic conversion and process intensification to bring out an efficient, precise, flexible and scalable unique technology to direct convert recycled CO₂ into sustainable and clean liquid fuels, thus making flying carbon neutral



Strategy Line 3: Applications: Stationary Applications

The main goal of EVERYWH2ERE project is to develop transportable gensets based on hydrogen technologies, aiming to be a feasible alternative to diesel generators and to be capable of supplying power demand in off-grid temporary events



<https://spotlight-project.eu/>

Strategy Line 3: Applications: Decarbonization Tourism sector

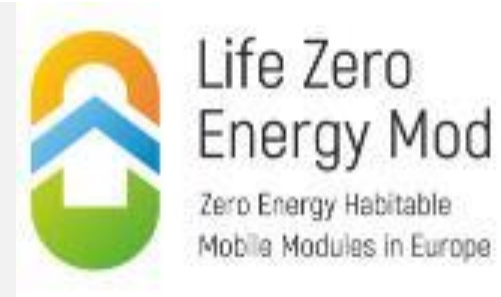
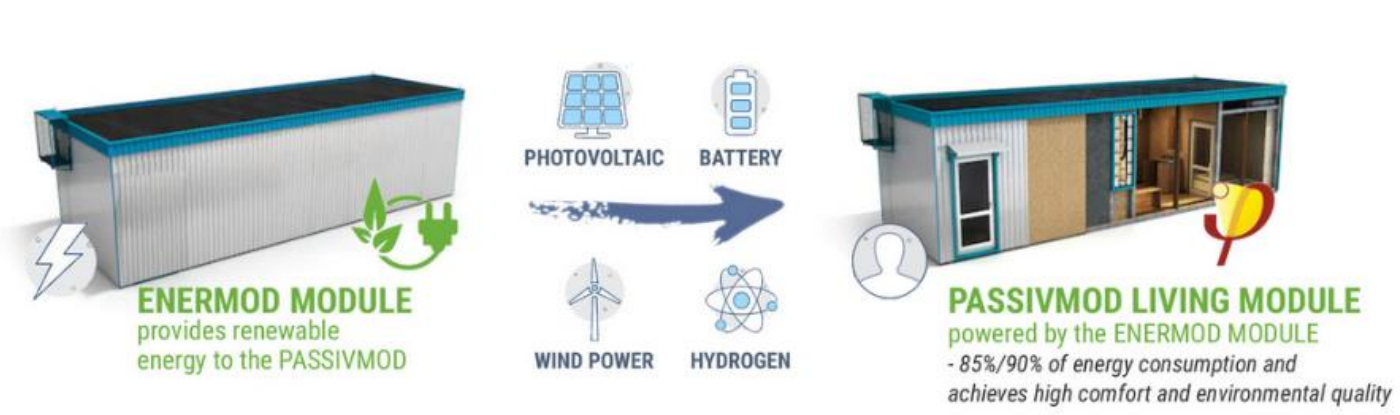
Is a demonstrative project which aims to reduce CO₂ emissions in natural environments acting in huts by implementing novel and original renewable energy based solutions and allowing local authorities having several demo sites to start thinking in the implementation of an action plan in order to contribute to reduce this emissions in all constructions of this type such us huts, hotels in natural parks or in places where nature is the main important part or in other touristic zones in isolated places (e.g. islands)



<http://sustainhuts.eu/es/>

Strategy Line 3: Applications: Isolated Territories Solutions

The main objective of the ZEROENERGYMOD project is the development and demonstration of a modular, robust, easy to install and easy to transport habitable solution based on the Passivhaus standard together with renewable energy generation, which represents an innovative concept of habitable and easy installation zero emissions module.



<http://lifezeroenergymod.eu/en/project/>

Strategy Line 3: Applications: Mobility

The main objective of the Hydrogen Corridor for the Pyrenees Region (H2PiyR) project is the development of a cross-border corridor of refueling stations for hydrogen vehicles connecting Spain, France and Andorra with central and northern Europe, where deployment of infrastructure associated with this type of sustainable mobility without emissions is more advanced



<http://h2piyr.eu/es/inicio/>

Strategy Line 4: Training



The HyPROFESSIONALS project aims to develop training initiatives for technical professionals and to develop a well-trained work-force which will secure the required mid- and long-term availability of human resources for hydrogen technologies

KnowHy intends to create six different specialized courses with one common core module in the field of hydrogen and fuel cells focused on industrial technicians.

The aim of the HyResponder project is to develop and implement a sustainable training of trainers programme on hydrogen safety, especially dedicated to first responders across Europe, improving their skills and resilience, and ensuring proper management and recovery from accidents.

Strategy Line 4: Training



ACADEMIC TRAINING

Inter-University Master in Hydrogen Technologies.



<https://mith.unizar.es/>



ONLINE TRAINING

Quality online training in renewable energy and hydrogen.



<https://www.seas.es/energias-renovables/curso-procesos-hidrogeno-pilas-combustible>



CUSTOMIZED TRAINING

We offer practical training and customized courses.



TECHNICAL VISITS

We bring hydrogen technologies and renewable energies closer together.

Strategy Line 5: Communication



RENMAH HIDRÓGENO 2023

Zaragoza, Spain, 8-10 Feb 2023



Strategy Line 6: Market Deployment



eGHOST will be the first milestone for the development of eco-design criteria in the European hydrogen sector



The main goal is to deliver reference documentation and studies about existing and new recycling and dismantling technologies and strategies applied paving the way for future demonstration actions and advances in legislation.



The main objective in MefHySto is to provide solutions for advanced hydrogen storage technologies in order to achieve the new EU energy target for renewable energy by 2030



The goal of SH2E is to provide a harmonised multi-dimensional framework for the LCSA and prospective benchmarking of FCH systems



The aim of the HyTunnel-CS project is to perform pre-normative research for safety of hydrogen driven vehicles and transport through tunnels and similar confined spaces











HyLAW will identify the legislation and regulations relevant to fuel cell and hydrogen applications and legal barriers to their commercialisation



Hydrogen Master Plan in Aragon 2021 - 2025



Strategy Line 7: Comprehensive Demonstration Projects (Hydrogen Valleys)

2016 - 2022	2020 - 2025	2021 - 2025	2021	2022	2023
 <p>Building Innovative Green Hydrogen systems in an Isolated Territory: a pilot for Europe The start. FHa coordinated the pioneer project which planted the seed of what is now considered a hydrogen valley.</p> <p>The Hydrogen Territories Platform (logo) is devised as an interregional platform that will help participants understand how regions can successfully replicate the BIG HIT project concept of hydrogen-based integrated local energy systems, in their respective territories</p> <p>h2territory.eu</p>	 <p>Hydrogen Energy Applications for Valley Environments in Northern Netherlands</p> <p>heavenn.org</p>	 <p>Deployment of a H2 Ecosystem on the Island of Mallorca</p> <p>greenhysland.eu</p>	 <p>APRIL_The Basque Hydrogen Corridor Association is born</p> <p>www.bh2c.org</p> <hr/>  <p>JUNE_ together with the Department of Industry of the Government of Aragon + 80 projects identified & +2.300M € mobilized in Aragon up to 2035</p>	 <p>APRIL_presentation and signing of a public manifesto of cooperation and endorsement</p> <p>ebroh2corridor.com</p>	 <p>North-Adriatic hydrogen valley</p> <hr/>  <p>Sourcing Hydrogen for Alternative Mobility, Realising Opportunities and Creating KnowHow in Ireland</p> <p>www.gh2.ie</p>

Hydrogen Master Plan in Aragon 2021 - 2025



Strategy Line 7: Comprehensive Demonstration Projects (Hydrogen Valleys)



Strategy Line 7: Comprehensive Demonstration Projects (Hydrogen Valleys): GetHyGA Initiative (Aragon)



TOTAL 1	75	2 334 089 233 €
TOTAL 2	1	750 000 000 €
TOTAL GENERAL	76	3 084 889 233 €

Strategy Line 7: Comprehensive Demonstration Projects (Hydrogen Valleys) : Ebro Hydrogen Corridor



COMMON OBJECTIVE

Sustainable development of the territories

COMMON VISION

Willingness to collaborate Interregional and Multisectoral to undertake the coordinated development of renewable hydrogen with actions throughout the value chain

Supported by the **Synergies and Complementarities** of these Regional initiatives and the SHYNE Project

- ✓ Renewable Resource Availability
- ✓ Industrial Capabilities
- ✓ Technological Capabilities

COMMON GOAL

Lead the deployment of hydrogen in southern Europe, achieve sustainable results that produce social, economic and environmental benefits, favoring the technological and industrial positioning of Spain and the European Union in this future sector.

The Ebro Hydrogen Corridor is the most suitable area to lead the deployment of hydrogen in Southern Europe

Some Examples



Thank you very much for your
attention

Fernando Palacín, Managing Director
director@hidrogenoaragon.org

<https://hidrogenoaragon.org/en/>



FUNDACIÓN PARA EL
DESARROLLO DE LAS NUEVAS
TECNOLOGÍAS DEL HIDRÓGENO
EN ARAGÓN