

EUSALP AG9 ENERGY SERIES 2021

Alpine regions, large scale initiators of hydrogen mobility

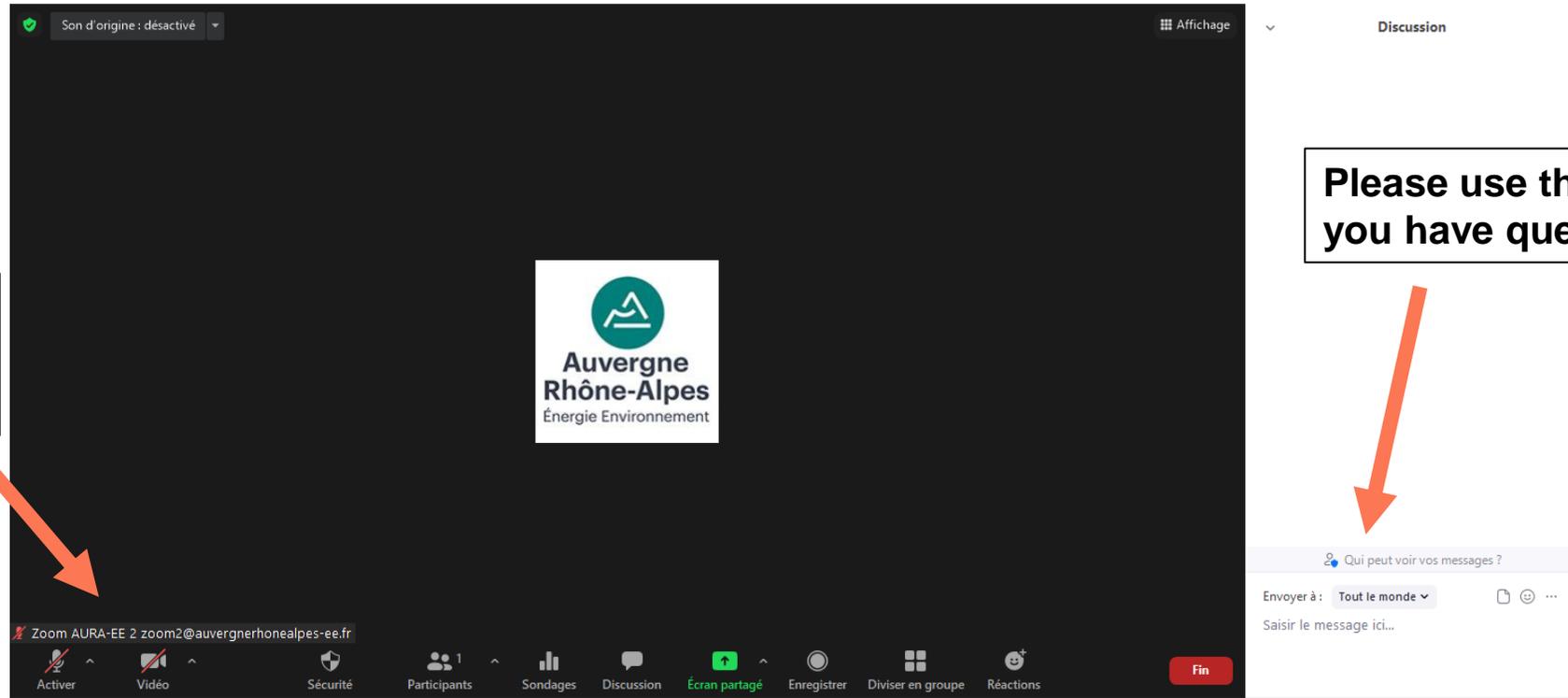
Online event, 18/10/2021



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HOW TO USE ZOOM :



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SAVE THE DATE 5th EUSALP Energy Conference

- 18.10.2021 | 14:00 - 15:30 h | Alpine Regions as Initiators of Hydrogen Mobility (online event)
17.11.2021 | 10:00 - 12:00 h | Local Energy Communities - A Win for All in the Energy Transition (online event)
26.01.2022 | 09:00 - 12:00 h | New European Bauhaus - Perspectives for the Alpine Region. Klimahouse 2022. Bolzano/Bozen, Italy

Join the EUSALP Energy Conference and trigger the change: no energy transition without dialogue.

Stay tuned for further information!



ACTION GROUP 9
To make the Alps a Model Region for Energy Efficiency and Renewable Energy



www.alpine-region.eu

3RD THEMATIC POLICY AREA
"ENVIRONMENT AND ENERGY"

80 million people, 7 countries, 48 regions, mountains and plains
addressing together common challenges and opportunities

The project is co-financed by the European
Regional Development Fund.

AGENDA

Moderator: Patrick Biard, AURA-EE

1. Presentation of the EUSALP Green Hydrogen in the Alps initiative and progress
2. Results of the Alpine hydrogen study
3. European perspectives on policies and funding instruments
4. Discussions



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COOPERATION FRAMEWORK AGREEMENT BETWEEN ALPINE REGIONS

Background for EUSALP elements: proposal from AURA to develop a joint project proposal in order to foster **investments in Heavy Duty Mobility Solutions** across the Alps. (e.g. urban buses, coaches, trucks, snow groomers, refuelling stations, production of green H2...). It will seek funding from the EU.

Signature of a Letter of intent by 9 Regions (AURA, BFC, PACA, Piedmont, Lombardy, Trento, Bolzano, Friuli Venezia Giulia, Baden-Wurtemberg): **political commitment.**

9 questionnaires received from 9 regions



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COOPERATION FRAMEWORK AGREEMENT BETWEEN ALPINE REGIONS

Next steps: confirmation of the perimeter, launching of studies end of 2021, proposals to be submitted to the European calls in 2022,

Possible role for the Fuel Cell Hydrogen Joint Undertaking (FCH-JU), achieving wide spread consensus within industry, policy makers and civil society on a definition of green hydrogen and which is currently preparing EU wide implementation. Possibility for a call on trucks.

Place, Date



Laurent Wauquiez
Laurent Wauquiez
Président Auvergne-Rhône-Alpes



Matteo Mammi
Matteo Mammi, Regional Minister for
Environment, Energy, Research and Innovation

Renaud MUSELIER
Renaud MUSELIER
Président de la Région Bourgogne-Franche-Comté



Enrico CATTANEO
Enrico Cattaneo
Minister for Environment and Climate



Massimiliano Fedriga, il Presidente

(name and function)

Stuttgart, 18.06.2021



Stefan Benzinger
Stefan Benzinger
Director Department 1
Key Tasks, Europe, International
Cooperation



Firmato digitalmente da Arno Kompatscher
Data 27/07/2021 14:20:44

Marie-Guite DUFAY
Marie-Guite DUFAY
Présidente du conseil régional
Bourgogne-Franche-Comté



Firmato digitalmente da: Maurizio Fugatti
Data: 01/07/2021 14:30:47



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GREEN HYDROGEN IN THE ALPS

Foster the cooperation between alpine regions/organizations on Hydrogen

Project ideas being developed:

1. Territorial approach: from green H2 production to local uses: to be further developed
2. **Pre-development assistance for H2 Infrastructure for heavy vehicles**
3. Embedding workshop on hydrogen with interested regions (2021)



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HYDROGEN REGIONAL STRATEGIES IN EUSALP: A STAKEHOLDER PERSPECTIVE ON BARRIERS AND COOPERATION OPPORTUNITIES IN THE TRANSITION TO A H₂-BASED ECONOMY

Preliminary results from the meta-study initiated by EUSALP
Action group 9

Lorenzo Menin, Stefano Piazzzi, Daniele Antolini, Andrea Gasparella, Marco Baratieri

Free University of Bolzano (UNIBZ)

unibz — Freie Universität Bozen
Libera Università di Bolzano
— Università Lieldia de Bulsan



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BACKGROUND TO THE PROJECT

Expert elicitation study engaging EUSALP stakeholders involved in energy policy planning at regional level

Aims:

1. Understand fundamental **hydrogen production and utilization modes** envisaged by stakeholders
2. Investigate perception of fundamental **barriers and opportunities** on the way towards hydrogen development
3. Explore **policy priorities** identified by stakeholders at regional level



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PART 1 – QUESTIONNAIRE

Open questions:

1. Existence and description of **ongoing** hydrogen development **projects**
2. Expectations on most **promising production** pathway
3. Expectations on most **promising utilization** pathway



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PART 1 – QUESTIONNAIRE

Multiple choice and ranking questions:

1. Most important **segments** of hydrogen **supply chain**
2. **Strategic objectives** related to hydrogen development
3. Expected **benefits** of implementation of hydrogen strategy
4. Expected **barriers** to implementation of hydrogen strategy
5. Expected **opportunities** to facilitate the implementation of hydrogen strategy



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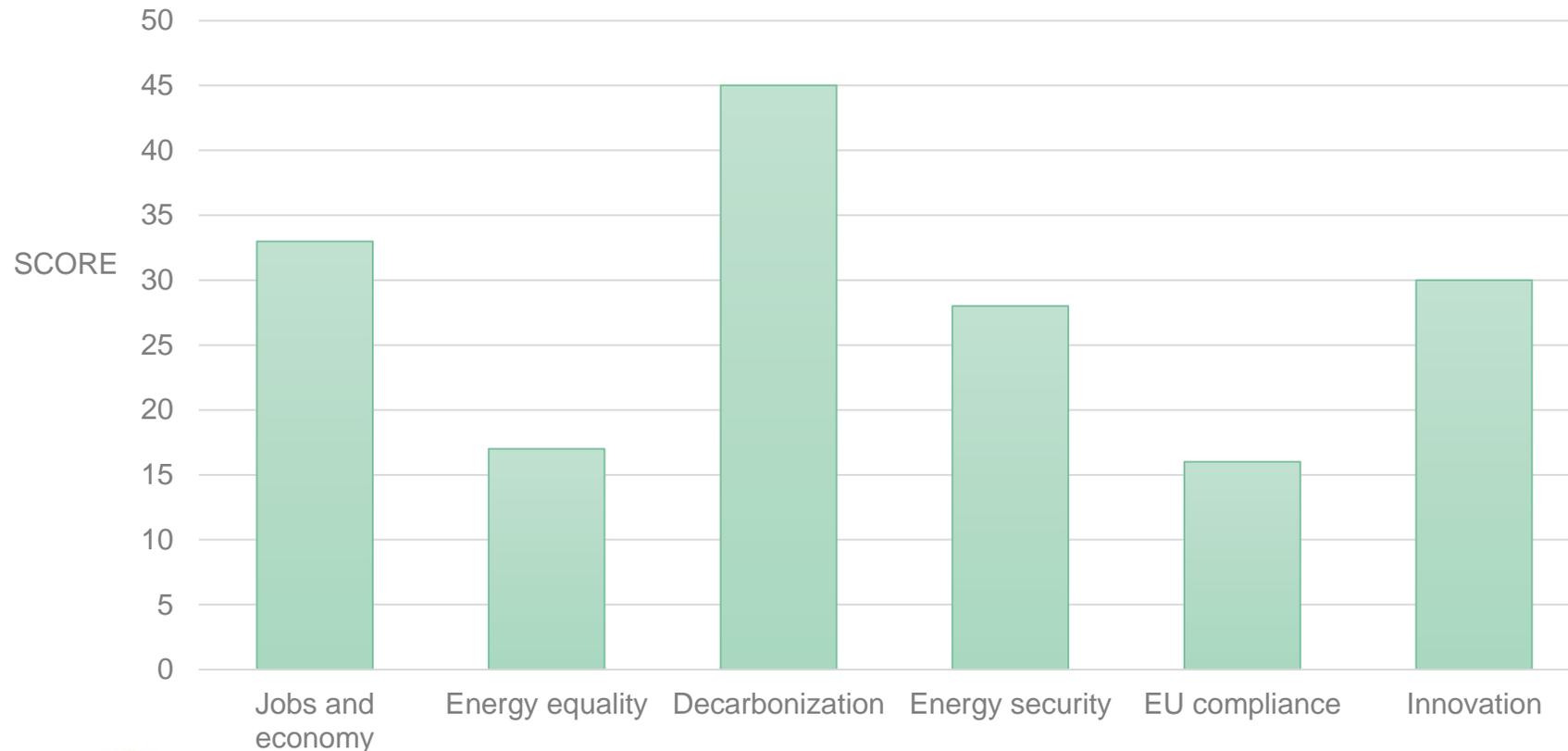


GEOGRAPHY OF QUESTIONNAIRE RESPONSE



- **Austria**
 - Niederösterreich
 - Kärnten
- **France**
 - Rhone-Alpes
- **Germany**
 - Baden-Württemberg
- **Italy**
 - Friuli Venezia Giulia
 - Trento
 - Piemonte
 - Valle d'Aosta

PRELIMINARY RESULTS: STRATEGIC OBJECTIVES

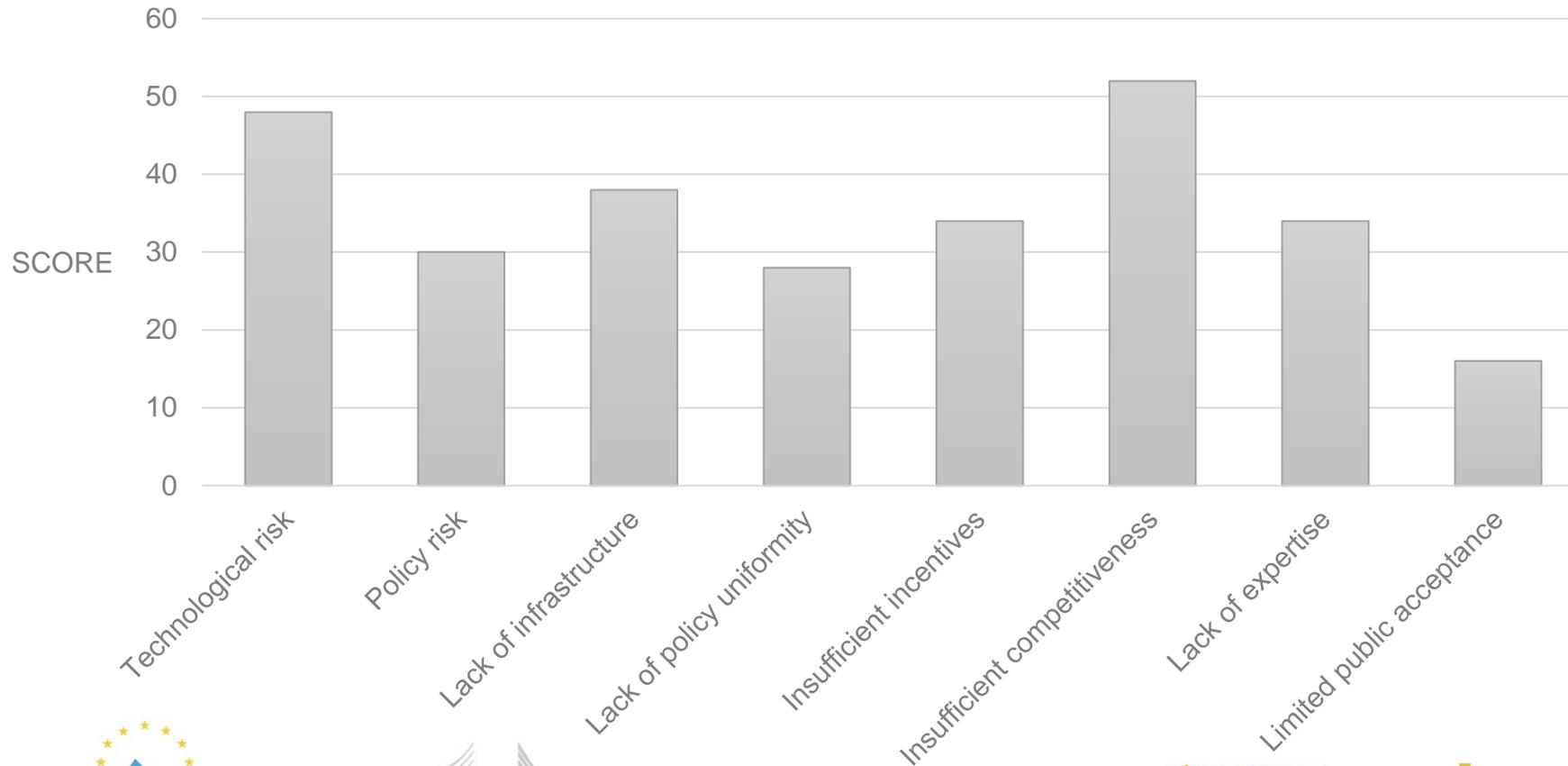


Key

Highest scores indicate highest priorities

Score equals cumulative priority rank attributed by interviewees

PRELIMINARY RESULTS: BARRIERS TO IMPLEMENTATION



Key

Highest scores indicate **greatest barriers**

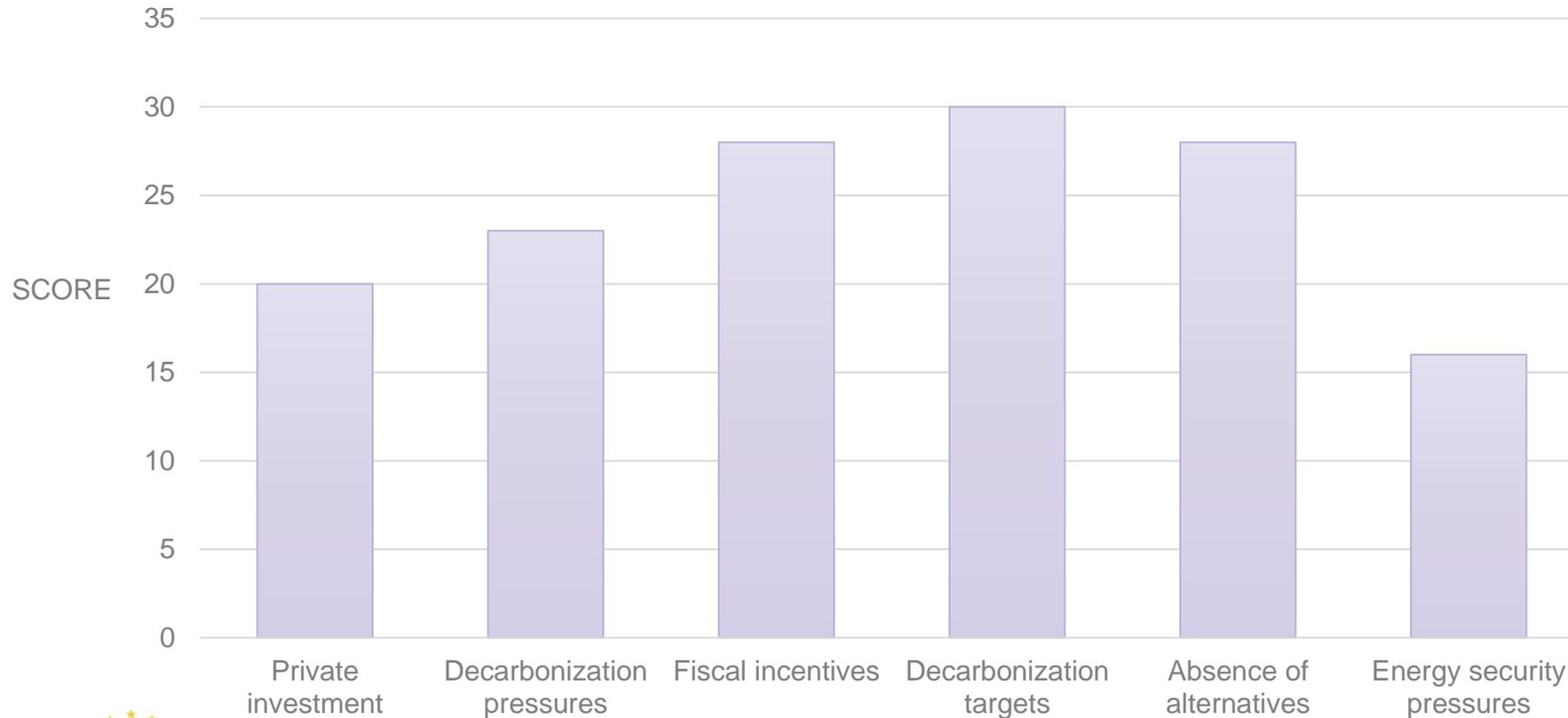
Score equals **cumulative priority rank** attributed by interviewees



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PRELIMINARY RESULTS: OPPORTUNITIES TO ACCELERATE



Key

Highest scores indicate **greatest opportunities**

Score equals **cumulative priority rank** attributed by interviewees



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PRELIMINARY RESULTS: PRODUCTION AND UTILIZATION

Most promising production pathway?

Electrolysis undoubtedly **most cited** option

Blue hydrogen, biogas reforming and biomass also cited

Most promising utilization pathway?

Heavy transportation undoubtedly **most cited** option

Energy storage also cited



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PART 2 – INTERVIEWS

Areas of inquiry:

1. Local **policy** priorities
2. **Infrastructural** challenges and opportunities
3. Energy/feedstock **supply** conditions
4. Understanding of **technologies**, efficiencies, costs, decarbonization potential
5. Details on existing **projects**
6. Case-specific questions based on previous answers (questionnaires) and geo-specific conditions



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INTERVIEWS: TOPICS CLUSTERING

Expected cross-sector benefits

Decarbonization, air quality, and enhancement of industrial competitiveness



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INTERVIEWS: TOPICS CLUSTERING

Road infrastructure focus

Common focus on large **transnational heavy transportation routes**, where **heavy road transportation** is seen as unanswered decarbonization challenge that hydrogen can help solve.

Key barrier and risk identified in **lack of international infrastructural development** and **planning coordination**.



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INTERVIEWS: TOPICS CLUSTERING

Electrolysis as the way forward

Electrolysis is normally considered the most adequate technology by default, although several interviewees pointed to blue hydrogen as a necessary precursor. However, there is awareness of the threat of blue hydrogen to hinder decarbonization.

On occasion, biogas reforming and biomass sources were cited.

Some interviewees see electrolysis and hydrogen as inefficient especially for energy storage, indicating partial skepticism.

INTERVIEWS: TOPICS CLUSTERING

Local industries as transition leaders

Industry is cited most often as the **expected transition leader**, although geo-specific sectors may represent threat to hydrogen development due to **competition for resources** (energy/fuel).

Policy schemes directed towards **industrial uses** are expected to **prevail over user-centric applications**. These mostly include **heavy duty transportation** in several forms, while **use for heat provision** is generally **disregarded**.

Very limited attention is given to other parts of society (individual users, civil society, governmental institutions).



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INTERVIEWS: TOPICS CLUSTERING

Resources and supply chains uncertainty

From the conversations with the stakeholders a clear **lack of information** emerges relatively to the **assessment and planning** of the **local supply capacity** of energy and/or material **resources necessary** to cover the expected hydrogen demands.



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INTERVIEWS: COMMON POLICY PRIORITY AREAS

Expansion of **renewable generation capacity**

Transnational **co-investment and infrastructural coordination**

Sharing of **knowledge and information**

Industrial partnerships

Development of **blue hydrogen at scale**

Planning and implementation of dedicated **electricity transfer across regions**

Planning and implementation of **hydrogen transfer across regions**



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INTERVIEWS: MAJOR INFORMATION GAPS ENCOUNTERED

1. Lack of information on **expected performances** from **different** types of **technologies** along the supply chain
2. Lack of information on technological and infrastructural **alternatives**
3. Lack of information on **local availability of resources** (energy or feedstocks) **necessary to meet** projected hydrogen **demands**



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THANK YOU

Lorenzo Menin, Stefano Piazzi, Daniele Antolini, Andrea Gasparella, Marco Baratieri

For questions, suggestions, or to state your **availability to take part in the questionnaire or interviews** do not hesitate to get in touch at:

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stefano.piazzi@unibz.it

unibz
— Freie Universität Bozen
— Libera Università di Bolzano
— Università Ledia de Bulsan



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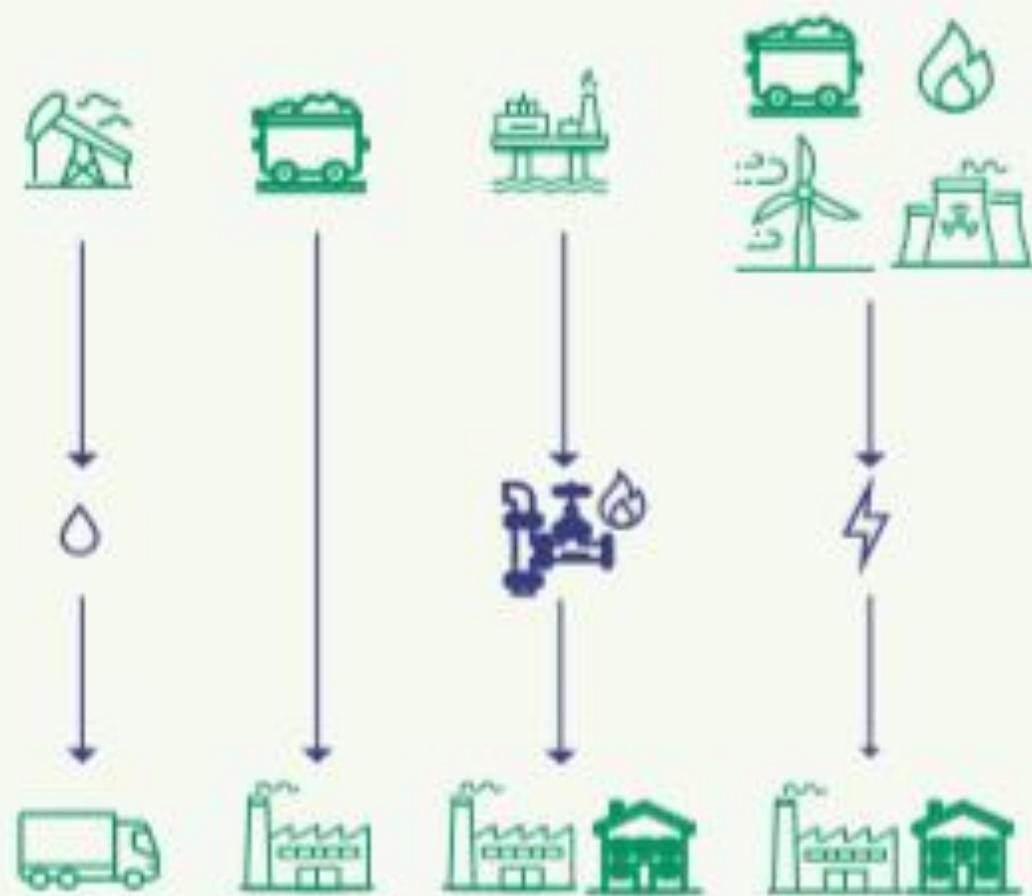


HYDROGEN IN EU POLICIES

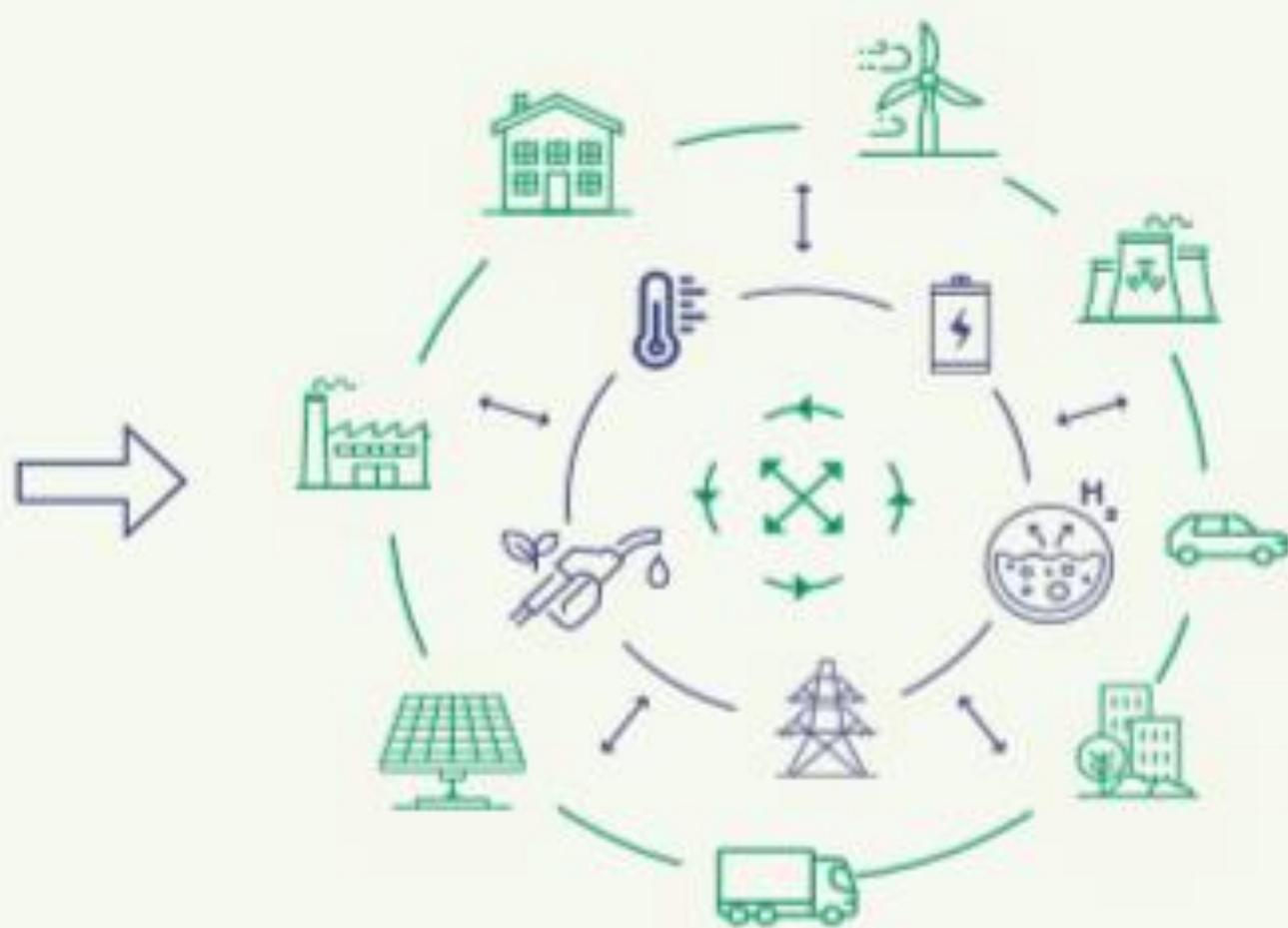
Tomasz Bąk, European Commission

C4 Unit Infrastructure and Regional Cooperation

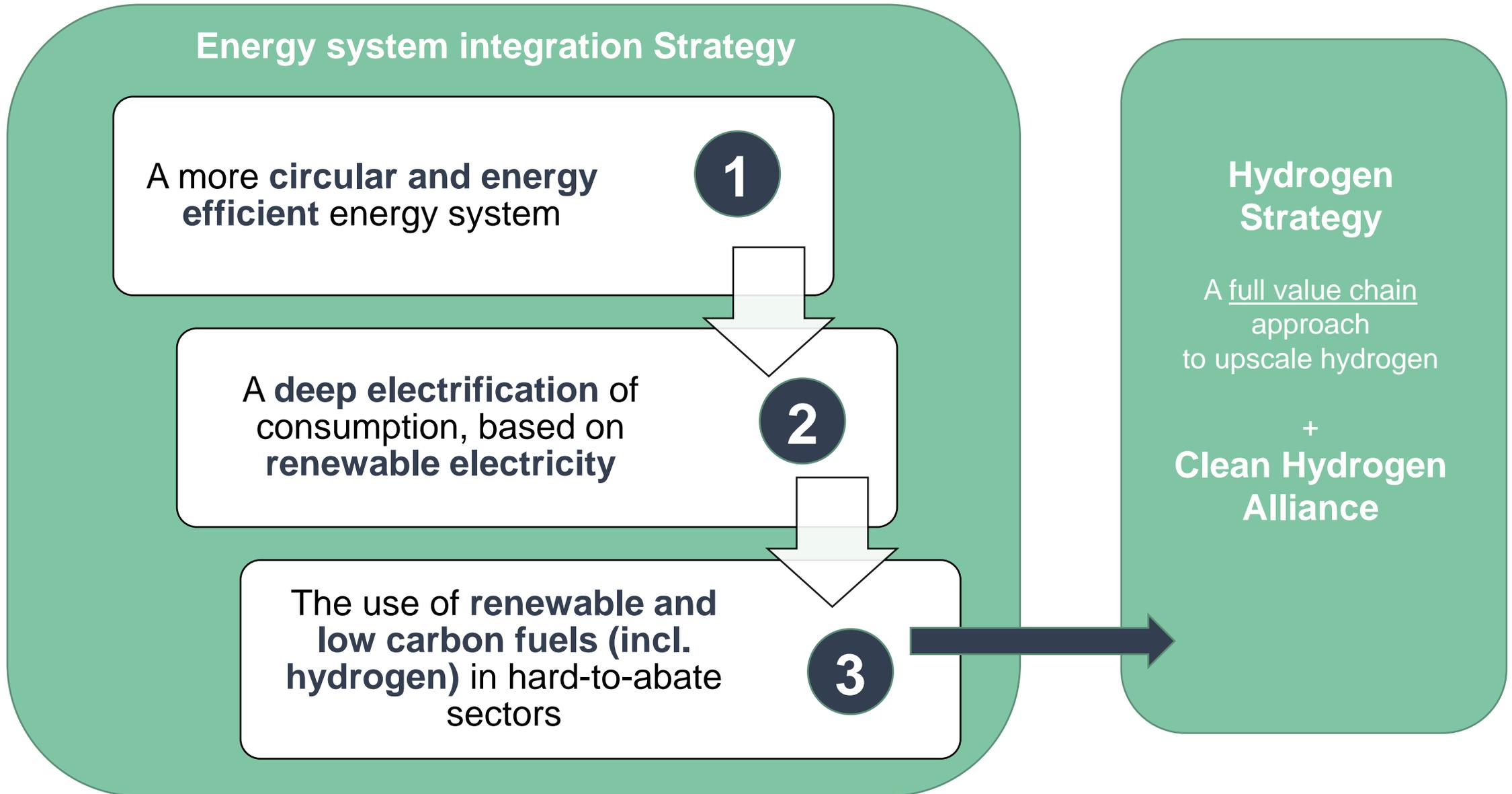
The energy system today : linear and wasteful flows of energy, in one direction only



Future EU integrated energy system : energy flows between users and producers, reducing wasted resources and money



Laying the foundation for a climate-neutral energy system



Why the emphasis on hydrogen?

1. The EU needs to deliver on **climate neutrality** at the least cost, in line with Green Deal ambitions
 2. Hydrogen can be applied to **many areas**
 3. May be produced through a **variety of processes**, with a wide range of emissions
- ➔ opportunity to create jobs, ensure security of supply and industrial leadership

The Hydrogen Strategy – a roadmap to 2050

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

Application areas for hydrogen

Segments

Key subsegments

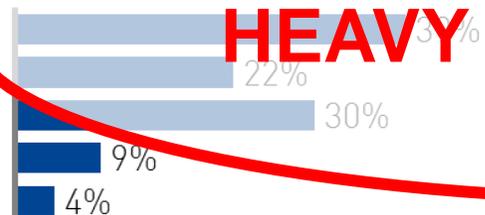
Relative importance by 2050¹

Complementary decarbonization solutions



Transportation

- Large cars (fleets) and taxis
- Trucks and buses
- Light commercial vehicles
- Trains
- Ships and aviation



- Battery electric vehicles
- Plug-in hybrid electric vehicles
- Electrified trains
- Biofuels and CNG/LNG



Heating and power for buildings

- Hydrogen blending for heating
- Pure hydrogen grids for heating



- Electrification of heating via heat pumps
- Energy efficiency measures
- Biogas/biomass



Industry energy

- High-grade heat

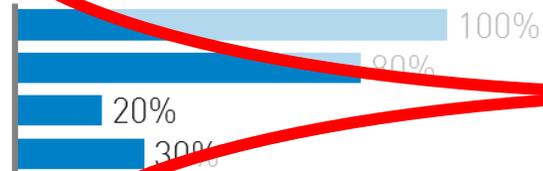


- Demand side and energy efficiency measures
- Electrification
- Biogas/biomass
- Carbon capture



Industry feedstock

- Ultra-low-carbon hydrogen as feedstock for
 - Ammonia, methanol
 - Refining
- Feedstock in steelmaking (DRI)
- Combined with CCU in production of olefins and BTX



- For steel:
 - Coke from biomass
 - CCS on blast furnace
- For CCU:
 - Carbon storage



Power generation

- Power generation from hydrogen
- Flexible power generation from hydrogen



- Biogas
- Post-combustion CCS
- Gate-to-gate

HEAVY DUTY TRANSPORT

INDUSTRY

RENEWABLES INTEGRATION

¹ In transportation: percent of total fleet; in heating and power for buildings: percent of total heating demand; in industry energy: percent of final energy demand; in industry feedstock: percent of total feedstock for production; in power generation: percent of total power generation and percent of power generated from natural gas

Hydrogen - which hydrogen?

Hydrogen may be produced through a variety of processes, with a wide range of emissions:

- 'Renewable hydrogen'
- 'Fossil-based hydrogen'
- 'Fossil-based hydrogen with carbon capture'
- 'Low-carbon hydrogen'
- 'Electricity-based hydrogen'
- Hydrogen-derived synthetic fuels

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

Making it happen – an action plan for the Hydrogen Strategy

Full value chain approach	Actions oriented towards
An investment agenda	<ul style="list-style-type: none">• Create project pipeline through the Clean Hydrogen Alliance• €220-340bln renewable power, €24-42bln electrolysers, €65bln infrastructure
Boosting demand and scale up production	<ul style="list-style-type: none">• Comprehensive terminology and EU-wide certification of hydrogen• Support schemes and CCfD for renewable and low-carbon hydrogen• Demand-side policies in end-use sectors
Develop hydrogen infrastructure and markets	<ul style="list-style-type: none">• Planning of hydrogen transport and storage infrastructure• Rules ensuring competitive markets, enabling infrastructure development (incl. repurposing) whilst retaining integrity of internal gas market
Research and Innovation	<ul style="list-style-type: none">• Clean Hydrogen Partnership established• Scale up electrolysers and develop hydrogen value chain• Continue to support innovative hydrogen technologies
The international dimension	<ul style="list-style-type: none">• International standards, regulation and definitions for hydrogen• Promote cooperation

The Hydrogen Alliance

- Boosting demand and scaling up production
- Developing hydrogen infrastructure and markets
- Research and innovation
- The international dimension

European Clean Hydrogen Alliance

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



TEN-E REVISION – POLICY CONTEXT

Energy infrastructure as a key pillar of EU energy policy to deliver the European Green Deal

TEN-E policy : promote **interconnections** and **interoperability** of national networks & **accelerate** the development of Projects of Common Interest (PCIs)

The revision aims at fully aligning with the 2050 climate neutrality objective

Full alignment of infrastructure with the EGD

Instead of natural gas, focus on infrastructure needed for renewable and low carbon gases:

New and repurposed dedicated **hydrogen networks**

Electrolysers with a cross-border impact

Smart gas grid solutions to integrate renewable and low-carbon gases, such as hydrogen, into existing gas grid

PROJECTS OF MUTUAL INTEREST (PMIS)

Scope extended to projects connecting the EU with third countries (including possible hydrogen projects) given their expected increasing role in achieving the climate objectives.

Conditions:

- **Regulatory alignment** of the neighbouring country with the EU
- Impact on at least **two Member States**
- Mutual benefit, including through contribution to **EU decarbonisation goals**

THE CONNECTING EUROPE FACILITY (CEF) TO EASE THE INVESTMENT CHALLENGES

Assist in better project preparation and minimising risk factors (**grants for studies**)

Decrease the cost of and improve the access to long term financing (**financial instruments**)

Help overcome the funding gap for commercially non-viable, but needed PCIs (**grants for works**)

THE ROLE OF HYDROGEN IN TRANSPORT

Policy context : Sustainable and Smart Mobility Strategy & Alternative Fuels Infrastructure Regulation

Hydrogen identified as one of the **principal alternative fuels** with a potential for long-term oil substitution

- Potential for commercial, rail and heavy duty transport

In order to decarbonize transport, we need to **boost the uptake of zero-emission vehicles, renewable & low-carbon fuels** and related infrastructure.

**THANK YOU FOR YOUR
ATTENTION**

EU possible funds for the EUSALP green hydrogen initiative

Auvergne-Rhône-Alpes 's Brussels office

18/10/2021



La Région
Auvergne-Rhône-Alpes

EU Strategy for Clean Hydrogen 8 July 2020

The EU Hydrogen Strategy will give a boost to **clean hydrogen production in Europe**. Hydrogen can be used as a **feedstock, a fuel** or **an energy carrier and storage**, and has many possible applications which would reduce greenhouse gas emissions across industry, transport, power and buildings sectors.



EU STRATEGY on H2

EU Strategy for Energy System Integration 8 July 2020

provide the framework for the green energy transition.

- **more 'circular' energy system**, with energy efficiency at its core
- greater **direct electrification** of end-use sectors.
- or those sectors where electrification is difficult, the strategy promotes **clean fuels**, including renewable hydrogen

Sustainable and Smart Mobility Strategy 9 December 2020

FIT FOR 55 Regulations

EUROPEAN INITIATIVES ON H2



S3 Hydrogen Valleys partnership (May 2019)

- Launch by AURA and co-lead with 3 others european region
- 55 european regions

<https://s3platform.jrc.ec.europa.eu/hydrogen-valleys>

European Clean Hydrogen Alliance (July 2020)

- **Pipeline of investment projects** aimed at increasing production and supporting demand for clean hydrogen in the EU
- Policy and regulatory measures aimed at ensuring investor safety, facilitating the use of hydrogen, promoting the necessary logistics infrastructure and networks, adapting infrastructure planning tools and supporting investments



**Regional Pillar Hydrogen Europe
(December 2021)**



EU funding for smart and sustainable mobility

...including Hydrogen!

Components	Manufacturing	Infrastructure	Fleets	Clean Fuels	Operations
RRF					
InvestEU					
EIB					
		ERDF - CF			
		CEF			
Horizon EU					
				InnovFund	

Source: EC, march 2021

Next Generation EU (EU recovery plan)

- Highlights **hydrogen as an investment priority** to boost economic growth and resilience, create local jobs and consolidate the EU's global leadership
- **Recovery and Resilience Facility (RRF)**

Grants and loans,
directement management
via national plans

2021-2027
budget:
€672, 5 billion

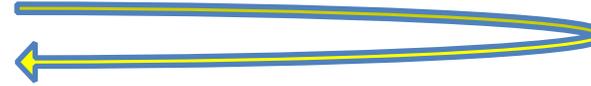
ERDF (EU Cohesion policy)

- Develop renewable energy production capacities (hydrogen), support experimental projects, ...
- Studies

Grants
Shared management
regions Managing
Authority

2021-2027
budget:
ERDF €192,4
billion

EUROPEAN TERRITORIAL COOPERATION



HE partnership

Clean Hydrogen Joint Undertaking

between [Hydrogen Europe](#) & EC

Accelerating the development and deployment of a European value chain for clean hydrogen technologies, thus contributing to the establishment of sustainable, decarbonized and fully integrated energy systems (heavy industries and heavy road transport).

Next call: January 2022

**Only opportunity for funding
R&I projects for Hydrogen with
HORIZON EUROPE**

I3 – Inter-regional Innovation Investment

The I3 WP aims at promoting innovation through Smart Specialization and interregional collaboration. The I3 supports stronger interregional cooperation in investments and makes sustainable connections by linking regional ecosystems in shared smart specialisation areas vital to accelerate market uptake of research results and stimulate innovation.

Strand 1 - Financial and advisory support for investments in interregional innovation projects (strand 2: less developed regions) → [Call for project to be open soon!](#)

European Program to Support Investment in Infrastructure Projects transport, telecommunications and energy.

CEF – transport

Budget: 25, 8 billion€ for 2021 - 2027

Priorities 2021 – 2027:

- Rail and inland navigation – cross-border projects
- Large-scale deployment of alternative fuels infrastructure
- Digitalisation of transport
- Mobility systems through intelligent applications

2 types of support

- **Grants:** 20 % à 50 % of eligible costs for works and studies
- **Loans:**
- 1 à 2 call / year

CEF – 2021 Call Transport: Alternative Fuels infrastructures Facility

Budget: 1,5 billion euros between 2021 and 2023
Necessity of a bank loan

Charging stations:

- (Publicly accessible on-road charging stations for light (150 kW) and heavy (350 kW) vehicles: Unit financing)
- (Electric for public transport, river or sea boats, port vehicles and equipment and airport logistics)
- **H2 refueling stations for heavy and light vehicles, public transport, river or sea boats, port vehicles and crews, rail (30% subsidy)**

Cut-offs: 19 January 2022 - 7 June 2022 - 10 November 2022 - 13 April 2023 - 19 September 2023

[CEF Transport Alternative Fuels virtual info day - Streaming Service of the European Commission \(europa.eu\)](#)

Fleets of vehicles : **EIB (loans)**

DISCUSSIONS



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NEXT EVENTS



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Stay tuned for further information!



www.alpine-region.eu

3RD THEMATIC POLICY AREA
"ENVIRONMENT AND ENERGY"

80 million people, 7 countries, 48 regions, mountains and plains addressing together common challenges and opportunities

The project is co-financed by the European Regional Development Fund.

EUSEW 2021- 26/10 at 11.00:
The key role of European regions in kick-starting and advancing the clean hydrogen economy- Organised by S3 Hydrogen Valleys Partnership



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Thank you!

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