AMETHyST

Recommendations and policy principles for green hydrogen in the Alpine Space

Interreg Alpine Space

Co-funded by the European Union

AMETHyST

CONTENTS

EXECUTIVE SUMMARY

The energy transition is a cornerstone of achieving net-zero emission targets in the European Union (EU). This transition entails, amongst others, a shift from fossil fuels to renewable energy, enhanced energy efficiency, and the electrification of hard-to-abate sectors. Green hydrogen can play a pivotal role in these contexts, offering solutions for energy storage, energy system flexibility, and decarbonization in sectors where direct electrification is unfeasible.

At the European level, the Hydrogen Strategy (COM/2020/301 final) and the REPowerEU initiative establish ambitious targets: at least 40 GW of renewable hydrogen electrolysers and up to 10 million tons of renewable hydrogen production shall be installed by 2030 within the EU. These legal frameworks, alongside the European Climate Law (EU 2021/1119) and the Fit for 55 package, set a binding legal framework to reduce emissions by at least 55% until 2030. Complementary national and regional hydrogen strategies, including the implementation of small and large hydrogen valleys, are emerging as demonstration hubs for production, distribution, and consumption across various application sectors in industry, mobility, and energy.

The Alpine Space holds particular strategic relevance in the context of European hydrogen policy implementation and technical testing. With a high incidence of renewable energy in the power grid, heavy industries in the Alpine forelands that represent amongst the most productive European areas, and its role as a European transport corridor that connects the South and the North, the region is well-positioned to pioneer green hydrogen deployment. Pilot projects and regional initiatives are already testing a variety of green hydrogen technologies, building small and large hydrogen valleys, and advancing cross-border infrastructure such as the Hydrogen Backbone. As such, the Alpine Space has the potential to become a living laboratory for hydrogen-based energy storage and industrial decarbonization, aligning regional innovation with EU climate goals.

GREEN HYDROGEN

Hydrogen produced without CO_2 emissions from clean and renewable electricity, such as wind, solar, or hydroelectric power, resulting in zero carbon emissions.

Source:
SkHyline Online Glossary

Despite this momentum, significant barriers remain in the green hydrogen sector: high production and transport costs, limited or lack of necessary infrastructure, governance and legislative gaps, and the need for public acceptance of the hydrogen technologies. Addressing these challenges requires large-scale investment, more coherent regulatory frameworks, and effective coordination along the hydrogen value chain and the involved actors.

Within the EU Alpine Space project AMETHyST several activities have been pursued to collect detailed information on the gaps and evidence how these gaps could be tackled. In this context, three key fields of intervention have been identified:

1. **Promoting regional policy planning and hydrogen strategies** – encouraging regions to develop tailored strategies aligned with energy efficiency, renewable additionality, and decarbonization priorities.

2. **Ensuring coordination between national and regional strategies** – establishing governance mechanisms and support structures to align local, regional, and national initiatives.

3. **Fostering transnational and transregional cooperation** – strengthening collaboration across the Alpine region to harmonize standards, pool resources, and accelerate infrastructure development.

The policy guidelines have been developed based on the EU Alpine Space AMETHyST project, expert interviews, and interregional exchanges as well as desk research. They provide practical recommendations for decision-makers at the local, regional and national levels, emphasizing multi-level governance, public-private partnership, knowledge exchange, and citizen involvement.

By advancing these interventions, the Alpine Space could position itself as a frontrunner in green hydrogen, supporting Europe's decarbonization agenda, ensuring industrial competitiveness, and contributing to the EU`s climate neutrality goal to be achieved by 2050.

1 INTRODUCTION

THE ROLE OF GREEN HYDROGEN IN THE ENERGY TRANSITION

The energy transition is a mayor pillar to achieve the net-zero emission policy goals within the EU. The transition of the energy sector encompasses a switch from fossil fuels to renewable energy sources, the enhancement of energy efficiency and energy savings as well as the electrification of hard-to-abate sectors.

Green hydrogen technology could play an important role in decarbonizing the energy system. It offers energy supply opportunities in contexts that cannot be connected to the electricity supply system. As a storage medium, hydrogen could play a crucial role in the future expansion of the renewable energy system. It can store large amounts of surplus energy and supply it to the power grid when needed. Hydrogen is therefore a technology that has the possibility to stabilise the energy system and make it more flexible at the same time.

With its hydrogen strategy, the European Union aims to establish a European hydrogen market that will support the transformation of the European energy market. The **European hydrogen strategy** and the **REPowerEU** define the role of hydrogen in the decarbonization of the European Union's energy consumption. The European hydrogen strategy sets the strategic goal of installing at least 40 GW of electrolysers for renewable hydrogen and producing up to 10 million tons of renewable hydrogen in the EU by 2030.

The transition to cleaner energy forms is a crucial prerequisite for climate neutrality. Within this context, a series of regulatory interventions by the European Union, contained in the **Fit for 55 package**, are developed to increase the share of renewable energy by 2030, among which hydrogen shall play an important role. The European Climate Law makes the EU's goal of reducing emissions by at least 55% by 2030 a legal obligation.

HARD-TO-ABATE SECTORS

Industries that rely on processes or energy sources that are difficult to decarbonize with current technologies, due to technological limitations or high energy requirements.
These sectors include cement, steel, chemicals, paper, glass, and contribute significantly to global greenhouse gas (GHG) emissions, because they face challenges in adopting low-carbon alternatives.

Source:
SkHyline Online Glossary

Beyond the strategic outline at EU level, various countries have adopted, or are in the process of elaborating and adopting **national strategies**. Below the national level, some regions have their own regional strategies or roadmaps for supporting the implementation of hydrogen projects and the growth of hydrogen ecosystems and value chains. Regional strategies frequently coincide with **European large and small hydrogen valleys**.

»Hydrogen Valleys are hydrogen ecosystems that cover a specific geography ranging from local or regional focus (e.g. industrial cluster, ports, airports, etc.) to specific national or international regions (e.g. cross border hydrogen corridors)190. Hydrogen Valleys showcase the versatility of hydrogen by supplying several sectors in their geography such as mobility, industry and energy end uses. They are ecosystems or clusters where various final applications share a common hydrogen supply infrastructure. Across their geographic scope, Hydrogen Valleys cover multiple steps in the hydrogen value chain, ranging from hydrogen production (and often even dedicated renewables production) to the subsequent storage of hydrogen and distribution to off-takers.«[1]

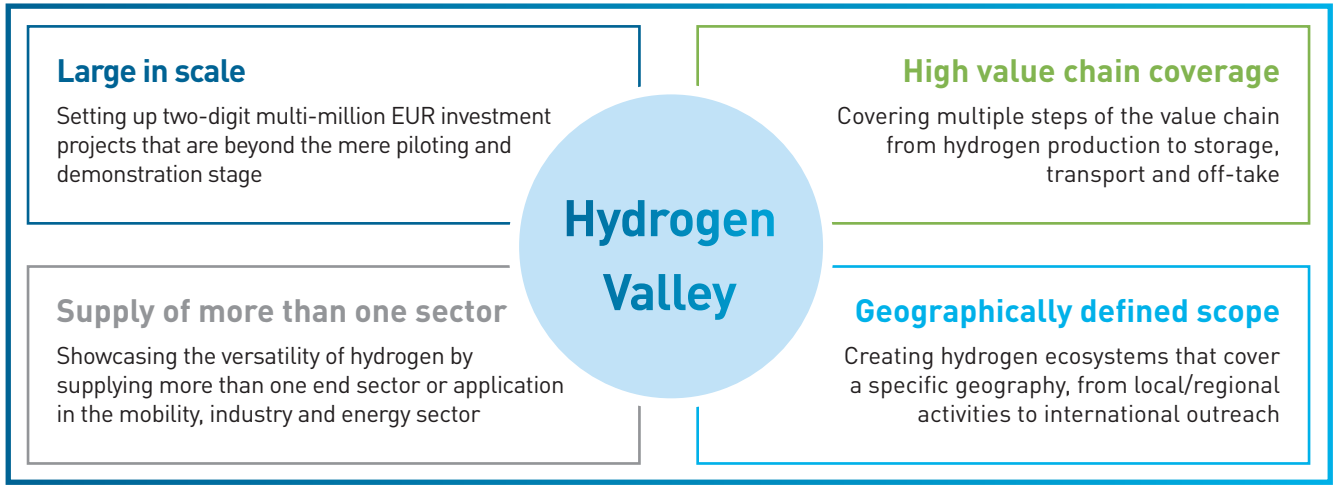


Figure 1: What makes a Hydrogen Valley[2]

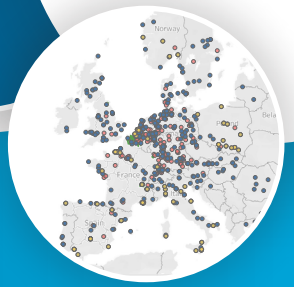
[1] Source: European Commission, Hydrogen Valleys: https://www.clean-hydrogen.europa.eu/get-involved/hydrogen-valleys_en, last accessed: 18.09.2025.

[2] European Commission, https://www.clean-hydrogen.europa.eu/get-involved/hydrogen-valleys_en, last accessed: 18.09.2025.

RECOMMENDED PUBLICATION

For deeper knowledge on H_2 policies in the European Union, get familiar with this report: European Hydrogen Observatory: The European hydrogen policy landscape, 2024.

An overview of national hydrogen strategies in Europe and their accompanying regulations is available at the **European Hydrogen Observatory interactive dashboard.**



At the time of writing of these guidelines, the following Hydrogen valleys are active (Source: Clean Hydrogen Partnership):

Large-scale Hydrogen Valleys (>4,000 t/yr)		
HEAVENN	Netherlands	Integrated valley with production, storage, distribution and multiple end-uses.
NAHV (North Adriatic Hydrogen Valley)	Italy / Slovenia / Croatia	Cross-border valley linking production and uses across three territories.
BalticSeaH2	Finland / Estonia	Hydrogen corridor/valley to scale production, storage and multi-sector uses.
IMAGHyNE	France	Regional valley to produce and use large volumes of hydrogen in industry and energy.
HI2 Valley	Austria	Industrial inland valley targeting heavy-industry decarbonisation, mobility and energy.
CyLH2Valley	Spain	Large regional hydrogen valley integrating industry, mobility and energy uses.
Small-scale Hydrogen Valleys (>500 t/yr)		
BIG-HIT	UK	Early pioneer hydrogen territory for island energy systems and transport (ended).
GreenHysland	Spain	Island hydrogen ecosystem for mobility, energy and refuelling.
TRIERES	Greece	Regional demonstration valley in the Corinthia area.
CRAVE-H2	Greece	Crete hydrogen valley linking renewables, production and local uses.
SH2AMROCK	Ireland	Regional hydrogen valley for mobility and local industry.
TH2ICINO	Italy	Micro hydrogen economies demonstration across replicable use cases.
LuxHyVal	Luxembourg	Small regional hydrogen ecosystem and infrastructure build-out.
HYSouthMarmara	Türkiye	Regional hydrogen valley for industry and mobility.
ZAHYR	Bulgaria	Hydrogen valley centred on the Stara Zagora industrial/energy cluster.
CONVEY	Denmark	Port-focused hydrogen valley linking production and maritime/port uses.
AdvancedH2Valley	France	Regional project for production and multi-sector hydrogen use.
H2tALENT	Portugal	Valley in Alentejo region aimed at regional hydrogen deployment.
HySPARK	Poland	Central Poland hydrogen valley for regional supply and integration.
EASTGATEH2V	Slovakia	Košice regional hydrogen valley project.
Hyceland	Iceland	Hydrogen valley leveraging Icelandic renewables for production and uses.

At the macroregional level, the Alpine Space territory holds strategic importance: it supplies substantial renewable electricity—primarily from hydropower, and increasingly also from solar and wind—while, at the same time, hosting several hard-to-abate industries (e.g. metallurgical and chemical plants, automative sector, paper mills, cement plants) that will increasingly rely on hydrogen applications to meet their CO_2 emissions targets as set out by Regulation (EU) 2023/959 for the ETS-sector, Effort-Sharing Regulation (ESR) for the non-ETS-sectors (Regulation (EU) 2018/842).

Various pilot projects across the Alps are now producing green hydrogen and are testing innovative technologies. Several regional and local governments are advancing standalone initiatives or aiming to implement small or large EU hydrogen valleys that integrate production, storage, distribution, and end-use applications.

Due to the importance of regions in implementing hydrogen pilots and in managing hydrogen valley initiatives, the Alpine Space has favourable prospects to be further developed as a collaboration area in which the European, national and subnational levels in the context of green hydrogen get increasingly interlinked.

Visit the SKHYLINE Platform for more details on H_2 pilot projects, small andlarge H_2 valleys in the Alpine Space:

METHODOLOGICAL NOTE

1. The present policy guidelines and recommentations are targeted primarily at local, regional and national decision-makers within the Alpine Space. They build on the lessons learnt from the implementation of the Alpine Space AMETHyST activities. The **mapping and analysis of existing hydrogen strategies, policies and initiatives** in combination with a desk research of existing expert literature on hydrogen governance as well as technical issues related to green hydrogen deployment,;

2. The organisation and implementation of fourtransnational **expert discussion tables and best practice study visits** as part of the inter-regional exchange programme (events organised during the years 2023-2025 in Innsbruck (AT), Ljubljana (SI), Bolzano (IT) and Paluzza (IT) involving a variety of key stakeholders, regional and national policy makers, H_2 implementation projects, H_2 valley platforms, energy agencies as well as science and research;Input **gathered through the** AMETHyST Online Expert Survey: »Enhanced Governance for Green Hydrogen in the Alps«.[3]

The **barriers and gaps** identified in the green hydrogen sector, and the resulting **fields of intervention** and recommendations for public policy are the subject of the present document.

Figure 2: Best practice visit with GKN Hydrogen in Brunico/Bruneck (I), 13 June 2024

Figure 3: Expert discussion table in Innsbruck, 4 October 2023, Energy Agency South Tyrol – CasaClima.

[3] The results of the survey can be retrieved in the annex of this document.

BARRIERS AND GAPS TO IMPLEMENT GREEN HYDROGEN PROJECTS

Establishing green hydrogen projects is highly complex. To roll-out green hydrogen projects, several barriers need to be overcome. Within the AMETHyST project, an expert survey was conducted to gain a deeper insight about existing barriers in the field of green hydrogen.

These barriers include the high costs for the production and the transport of green hydrogen, the lack of transport infrastructures and the need for establishing multi-level governance that support hydrogen projects, as well as lack of expertise within administrations as well as the lack of political attention to support H_2 pilot projects.

Large sums of investment need to be raised and deployed in a targeted manner, structures need to be created to bring together and coordinate players along the entire hydrogen value chain. Regulations and standards need to be put in place to facilitate the implementation of green hydrogen projects. At the same time, the implementation of the hydrogen projects will only be successful if the population accepts the technology. Accordingly, also soft measures need to be taken to communicate its opportunities and risks in an understandable way.

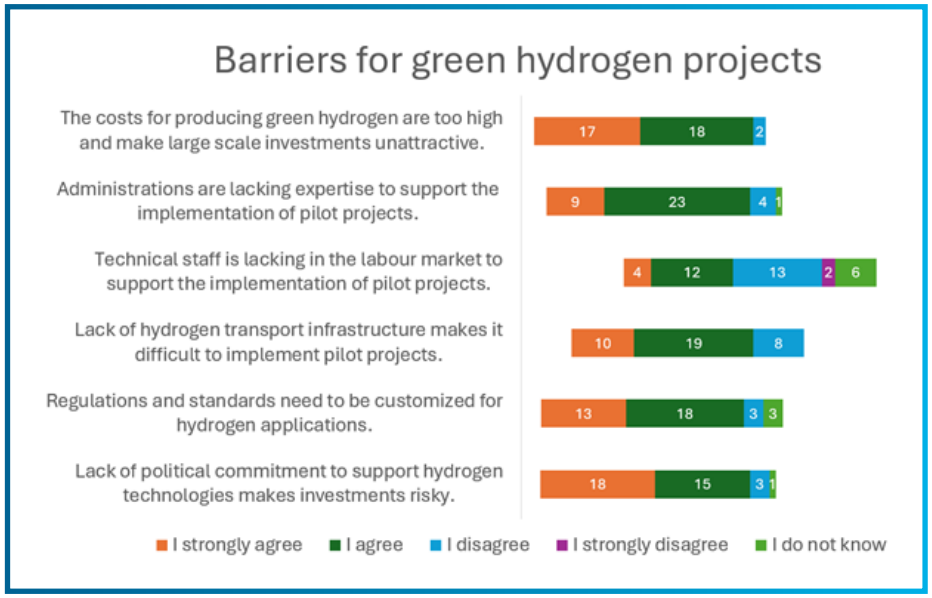
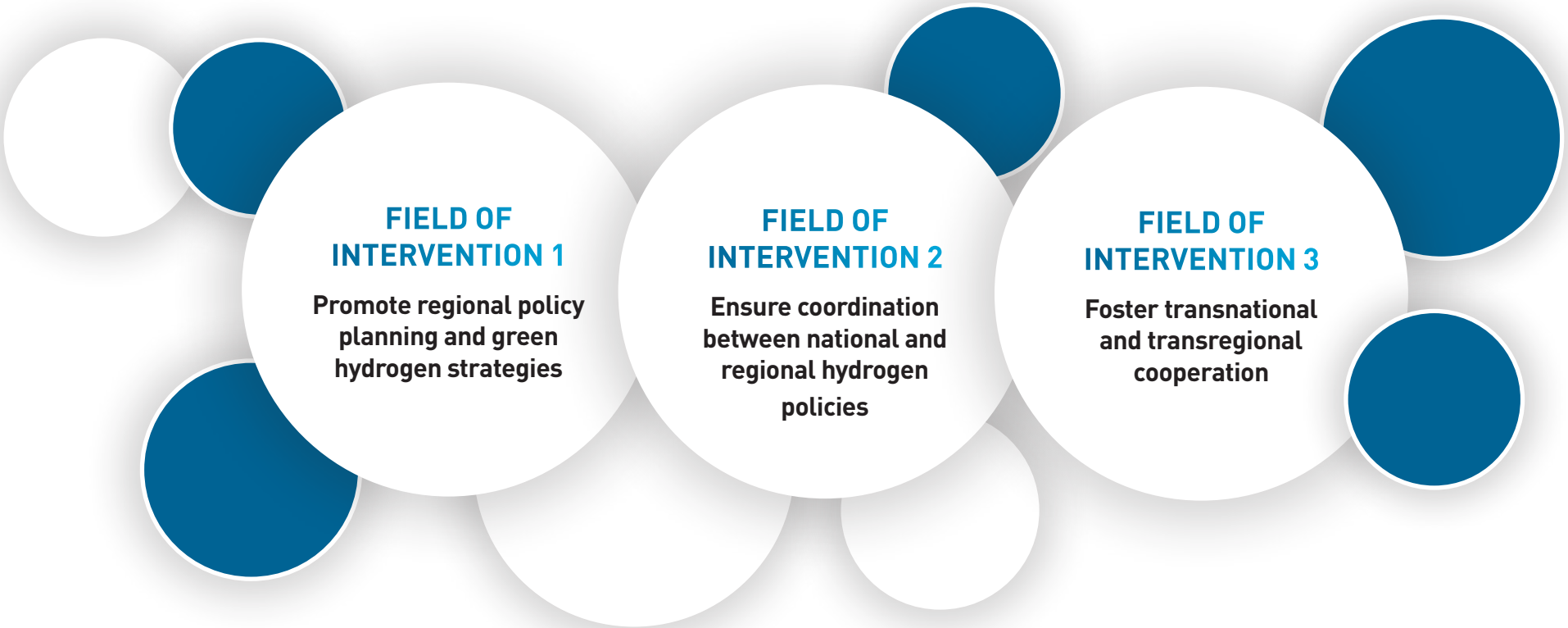


Figure 4: Barriers for green hydrogen projects

FIELDS OF INTERVENTION

Robust governance plays a key role when it comes to the establishment of a resilient and climate-neutral hydrogen economy that helps to sustainably overcome the aformentioned barriers and gaps. An integrated multi-level policy approach is necessary to roll-out green hydrogen in the Alps more efficiently. Based on the inputs gathered in the frame of the Amethyst project, three fields of intervention were identified that need to be further shaped strategically to facilitate the expansion of green hydrogen projects in the Alpine region:



2 PROMOTE REGIONAL POLICY PLANNING AND GREEN HYDROGEN STRATEGIES

Not all regions within the Alpine Space have the same conditions or needs for initiating hydrogen projects. While initiating hydrogen infrastructure projects can be economically advantageous for regional development, the economic advantages should also match with **place-based specific factors as well as climate and energy policy goals**. Factors favouring hydrogen technology applications include, for example, the morphological advantages for the excess production of electricity from renewable energy sources in mountainous areas, which will have to be absorbed and buffered in the future to guarantee grid stability and energy security. Also, the characteristics of the regional economy is crucial: hard-to-abate industries will increasingly rely on hydrogen technology in the future in order to achieve their CO_2 emission reduction targets.

Accordingly, regions or local administrations that intend to implement green hydrogen projects, should do so within a strategic policy and economic framework, ideally by adopting a hydrogen strategy, in order to avoid, unintended negative effects such as stranded assets or even a reduction in the CO_2 reduction path, which can arise from the increased energy input for hydrogen production. The following intervention logic and principles gathered shall inspire local and regional policy makers and decision-makers to develop an own green hydrogen strategy **with the goal to support the creation of a sustainable Green Hydrogen Economy in the Alpine Space**.

INTERVENTION LOGIC: FROM VISION TO STRATEGY

For the development of a local or a regional hydrogen strategy, the IRENA methodology for green hydrogen policy making is recommended. This intervention methodology was originally created as a guide for the drafting process of national hydrogen strategies. However, it can also be adapted - to a large extent – at subnational levels. The following steps to formulate a local or regional green hydrogen strategy are based on the recommendations developed by IRENA:

STEP 1: Vision document

In this document, the regional or local administration addresses the fundamental questions and assumptions for its hydrogen ambitions. According to the IRENA methodology, the document shall answer questions regarding the underlying motivations and objectives to implement and pursue a regional H_2 strategy. It is recommended that public-private partnership consultations are a incorporated into the process.

STEP 2: Roadmap

While the roadmap is being developed, a clear plan is put together to show what actions are needed to better understand the potential of hydrogen in the region. The roadmap highlights the main areas where hydrogen can be used and lists the first steps needed to start local projects. Public and private partners keep working together, and their cooperation grows as pilot projects are launched and supported by local authorities.

STEP 3: Strategy

The regional hydrogen strategy is a key policy document. It sets the main targets and goals for green hydrogen and aligns them with other policies, especially energy and climate goals. It also outlines the laws and tools needed to achieve these hydrogen goals.

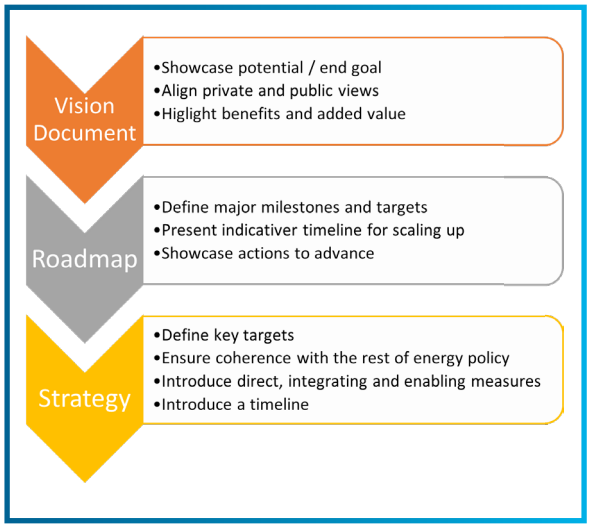


Figure 5: Steps to formulate a local / regional green hydrogen strategy (IRENA methodology)

POLICY PRINCIPLES

One of the challenges in creating hydrogen strategies is to align them with ambitious climate and energy targets of 'net-zero CO_2 emissions' while also leaving room for innovation and pilot projects to drive the development of a hydrogen market. The following policy principles are intended to enable administrations to align their hydrogen projects with the 'net-zero CO_2 emissions' target.

1. "ENERGY EFFICIENCY FIRST"

The growth of hydrogen should follow the energy policy principle of "Energy Efficiency First." This means that improving energy efficiency comes first in all key areas, such as buildings, transport, households, industry, and the wider economy. Making energy use more efficient is essential for the long-term goal of producing green hydrogen.

2. ADDITIONALITY OF RENEWABLE ENERGY SOURCES

To keep energy affordable for people and businesses, it is important to follow the principle of renewable energy additionality. This means green hydrogen should only be made from extra renewable energy and must not compete with other energy users.

3. DECARBONIZATION POTENTIAL

Green hydrogen will likely remain a scarce energy source for the next several decades. Therefore, its deployment should always be weighed against alternative solutions that can also reduce emissions. For instance, if direct electrification using renewable power combined with energy efficiency measures is technically feasible and more cost-effective, it should be preferred over hydrogen. Research indicates that direct electrification often offers a greater potential for reducing CO_2 emissions. Consequently, green hydrogen should primarily be used in sectors that cannot be electrified directly or where it enables substantial CO_2 reductions compared to other solutions.

RECOMMENDED STUDY

Energy and greenhouse gases life cycle assessment of electric and hydrogen buses: A real-world case study in Bolzano, Italy. Gianluca Grazieschi, Alyona Zubaryeva, Wolfram Sparber. Eurac Research – Institute for Renewable Energy

4. PUBLIC-PRIVATE PARTNERSHIPS AND COLLABORATIVE MODELS

When planning local or regional hydrogen priorities, roadmaps, and strategies, it's best to do this as a public-private partnership with all important local stakeholders. This should include local producers and users of green hydrogen, network and infrastructure operators, as well as science and research. Working in a broader partnership helps set realistic goals for local and regional hydrogen projects and build complete hydrogen value chains.

BEST PRACTICE

A Hydrogen Council made up of representatives from business, science, civil society and local authorities accompanies the implementation of the hydrogen roadmap in the German state of Baden-Württemberg. Its task is to elaborate recommendations for the implementation of the hydrogen roadmap.

For further information:
https://www.plattform-h2bw.de

5. MULTI-LEVEL GOVERNANCE AND COOPERATION

Local and regional hydrogen targets shall be coordinated with the political objectives of the multi-level governance settings, especially at national and transregional level to counteract mismatches between demand and supply in the green hydrogen market and to make green hydrogen marketable compared to non-climate-neutral hydrogen. In this context, it is particularly important to determine whether the establishment of locally closed hydrogen value chains is the best option. Creating strategic collaborations across administrative boundaries is needed to connect production sites, industrial users, and trans-European corridors. Cross-border cooperation can address the challenge of harmonizing regulations and elaborate shared investment strategies to build a more cohesive green hydrogen ecosystem.

6. IMPLEMENTATION OF STEERING INSTRUMENTS FOR GREEN HYDROGEN

It is important to avoid situations where using non-green hydrogen creates habits or dependencies that slow down the energy transition. Local and regional policy and administrative measures should be promoted and implemented to support the growth of the green hydrogen economy. For example, public procurement can encourage the use of green hydrogen by setting minimum sustainability standards in contracts and purchases. This helps increase demand for green hydrogen and supports its entry into the market.

7. POLICY ALIGNMENT

Local and regional hydrogen targets for production, transport and end use must be integrated into the local and regional energy and climate plans and policies. The main focus should be on the **expansion of regional green energy** and the **promotion of energy efficiency** in all sectors to cover the additional demand for green electricity for the production of hydrogen and at the same time be able to comply with defined CO_2 reduction paths that are determined by the regional energy and climate policy.

8. FOLLOW-UP MONITORING

The impact of hydrogen as an energy vector on the local and regional energy supply and investment costs shall be monitored in order to avoid stranded assets and thus make the ramp-up of the hydrogen economy as socially sustainable as possible. To this end, data sets need to be aggregated that demonstrate the production and end use of green hydrogen distributed by the different sectors. At the same time, it should be assessed whether accompanying laws, regulations and incentives that were put in place delivered the expected policy goals or not. The policy instruments need accordingly adjustments over time.

9. COMMUNICATION AND ACCEPTANCE

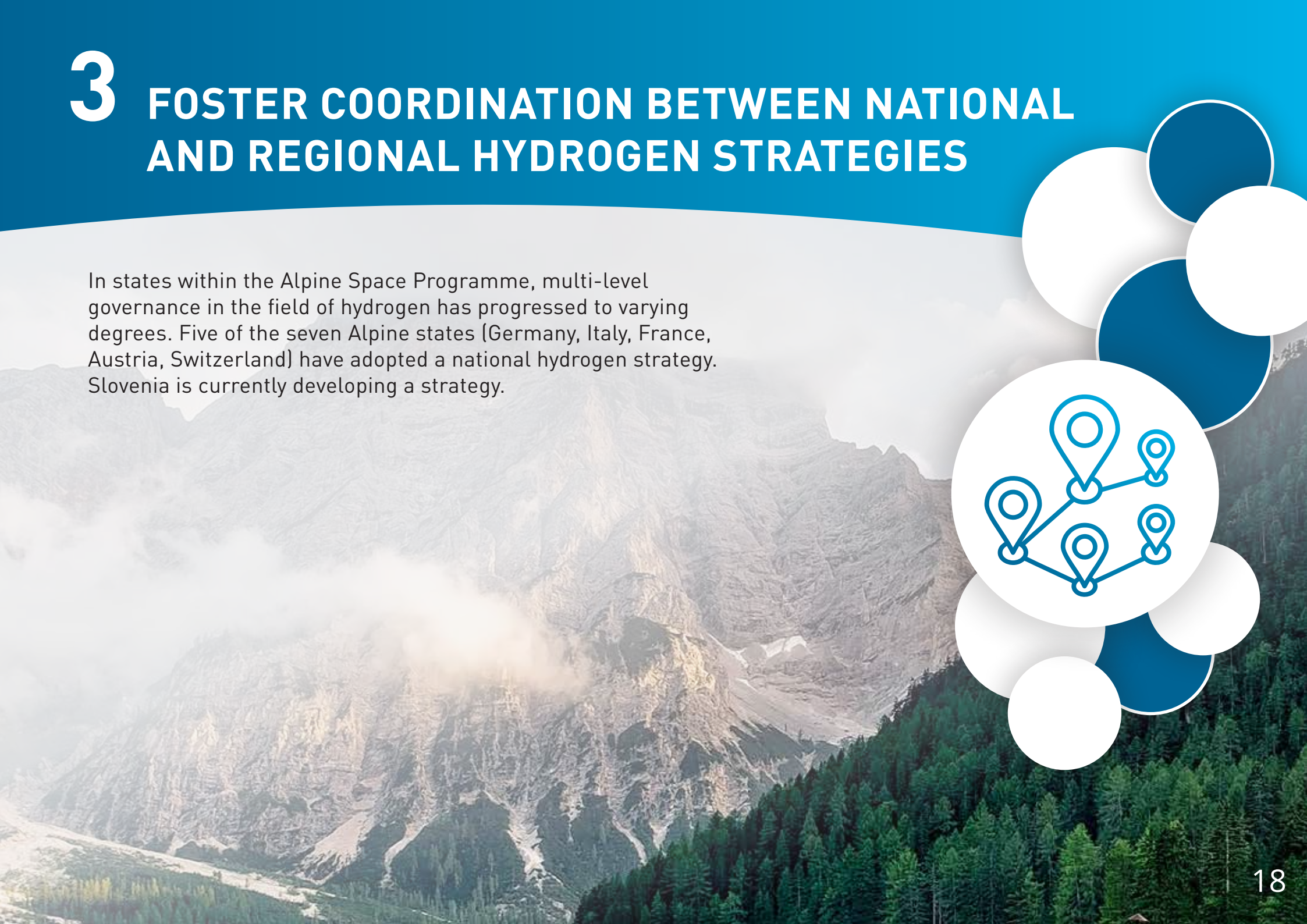
To create social acceptance and understanding for hydrogen technology, the advantages and disadvantages as well as existing risks of hydrogen applications shall be transparently disclosed to the public. In this context, also political objectives shall be presented in a comprehensible manner to raise awareness and acceptance of the citizens vis-à-vis hydrogen policy. This is especially advisable due to the high financial commitment vis-à-vis the establishment of pilot projects.

10. IMPROVE KNOWLEDGE AND SKILLS

As a technology of the future, the topic of hydrogen must find its way into the areas of education, training and further education to be able to meet the increased demand for skilled labour that will accompany the roll-out of hydrogen technologies in the coming decades.

3 FOSTER COORDINATION BETWEEN NATIONAL AND REGIONAL HYDROGEN STRATEGIES

In states within the Alpine Space Programme, multi-level governance in the field of hydrogen has progressed to varying degrees. Five of the seven Alpine states (Germany, Italy, France, Austria, Switzerland) have adopted a national hydrogen strategy. Slovenia is currently developing a strategy.



Country	Implementation status	Year of publication	Document
Austria	Strategy published	2022 Implementation report available	Bundesministerium für Klimaschutz, Umwelt, Energie, Mobilität, Innovation und Technologie: Wasserstoffstrategie für Österreich, 2022. Executive Summary: German / English language
France	Strategy published	2020 / (updated in 2023) Strategy undergoing a reviewing process	Ministère de la Transition écologique: Strategie nationale pour pour le developpement de l`hydrogene decarbone en France, 2023.
Germany	Strategy published	2020 / (updated 2023)	Bundesministerium für Wirtschaft und Energie: Die Nationale Wasserstoffstrategie, 2020. Bundesministerium für Wirtschaft und Klimaschutz: Fortschreibung der Nationalen Wasserstoffstrategie, 2023. Federal Ministry for Economic Affairs and Energy: The National Hydrogen Strategy, 2023
Italy	Draft guidelines for a national strategy. **Update:** National strategy published after finalisation of the present report in November 2024	2020	Ministero dello sviluppo economico: Strategia Nazionale Idrogeno Linee Guida Preliminari, 2020. Italian National Hydrogen Strategy: https://www.mase.gov.it/comunicati/idrogeno-presentata-la-strategia-nazionale-piu-scenari-la-sua-diffusione
Liechtenstein	-	-	-
Slovenia	-	-	-
Switzerland	Strategy published	2024	Bundesrat: Wasserstoffstrategie für die Schweiz, https://www.newsd.admin.ch/newsd/message/attachments/91122.pdf

At the same time, individual roadmaps and strategies have been adopted by regional governments and at local level, hydrogen valleys have been established and pilot projects launched by private and public-private partnerships. In this context, it will be important to establish governance structures that are able to connect decision makers and stakeholders at the various levels to better steer the roll-out of hydrogen policies in the long run. Therefore, it is suggested that proactive bottom-up and top-down approaches shall be initiated from the corresponding levels.

CONNECT REGIONAL AMBITION WITH NATIONAL STRATEGIES

One of the challenges will be to combine local and regional efforts in the field of hydrogen with national strategies and to set up a governance system that link various strategies and objectives in the multi-level governance system. In this context, regional roadmaps and strategies shall be aligned to national strategies.

GOOD PRACTICE

HYLAND

The HyLand initiative ("Hydrogen Regions in Germany") was launched in 2019 by the Federal Ministry for Digital and Transport (BMDV) and is managed by the federally-owned NOW GmbH. It supports regions across Germany in the initiation, planning, and implementation of hydrogen projects, linking them to the goals of the national hydrogen strategy. Since its launch in 2021, around 60 regions have received support in developing and implementing H_2 concepts.

ESTABLISHING NATIONAL SUPPORT STRUCTURES

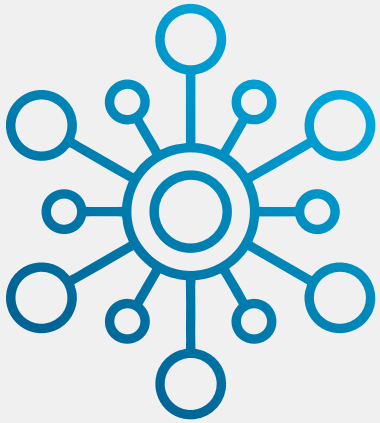
The creation of support structures, such as one-stop shops and national stakeholder platforms, which drive the implementation of the national hydrogen strategy forward in a coordinated manner, is advantageous for the development of local and regional hydrogen value chains. One of the tasks of these support structures is to facilitate the flow of information and expertise in the multi-level governance system, thereby fuelling the realisation of hydrogen projects. These support structures serve as contact points for funding measures, laws and regulations, as a knowledge transfer instrument by passing on studies and carrying out further training measures; they network stakeholders from industry, science and research; work as mediators between companies in the hydrogen sector and act as a reporting centre for regulatory gaps and legal hurdles in the hydrogen economy that need to be closed or removed by national legislation in order to make the implementation of hydrogen projects easier.

GOOD PRACTICE

NATIONAL ONE-STOP-SHOP FOR H_2 FUNDING OPPORTUNITIES

To provide support to the various players in the hydrogen sector, the German government has created a 'one-stop shop' that serves as a first point of contact. It provides general information on the topic of hydrogen as well as on the goals and measures of the National Hydrogen Strategy. Also, it contains an overview of all the federal government's funding instruments that are intended to support and promote the rapid market ramp-up of hydrogen technologies at national, European and international level. A contact centre offers the opportunity to contact experienced funding experts by phone or email to find the right funding options for projects.

https://www.bmwk.de/Redaktion/DE/Wasserstoff/home.html



4 FOSTER TRANSREGIONAL AND CROSS-BORDER COOPERATION

In the early-stage hydrogen economy, cross-border and transregional cooperation is vital to ensure interoperability and coordination of H_2 infrastructures, create a market of producers and consumers and support economies of scale. The regions within the Alpine Space in particular have ample scope for cooperation, given that many of them face similar challenges connected to transformative processes in mobility and energy transition. They shall engage in stronger cooperation at the levels of technology, industry, science & research and policy.

It is recommended to set up joint expert working groups to:

- **PROMOTE NETWORKING AND KNOWLEDGE EXCHANGE:** Encourage the sharing of best practices and lessons learned from ongoing hydrogen projects across the Alpine Space, ensuring that experiences and challenges are addressed collectively. Focus on defining and promoting good practices in areas like financing mechanisms, hydrogen governance, and cross-border infrastructure development. Existing knowledge platforms such as SKHYLINE Platform should be strategically pursued further, in order to collect and communicate good practices in the Alps thereby fostering the exchange of knowledge.
- **SET UP A MONITORING FRAMEWORK:** Develop a comprehensive system for monitoring and reviewing hydrogen projects across the Alps, with the aim of identifying successful implementation strategies, financial models, and governance practices.
- **ADDRESS POLICY GAPS:** Regularly identify and address gaps in current policies, particularly in the areas of cross-border mobility and hydrogen infrastructure. This can include standard-setting for technical and regulatory frameworks.
- **COORDINATE PUBLIC FUNDS AND FACILITATE APPLICATION:** Establish a centralized mechanism for coordinating funding allocations to support common infrastructure projects in the Alpine space. Develop a streamlined process to help stakeholders from the Alpine region apply for EU funding under the Multiannual Financial Framework (MFF) 2028+.
- **PROMOTE COLLABORATIVE INFRASTRUCTURE:** Encourage joint ventures between multiple Alpine regions to develop large-scale hydrogen infrastructure projects, maximizing resources and sharing expertise. For example, by networking small and large Hydrogen Valleys.

- **REGULAR POLICY DIALOGUES:** Create regular policy dialogue fora to engage local and regional key stakeholders/main implementers in the review and development of hydrogen policies at the EU level. Use existing policy review platforms like public consultation mechanisms to influence policy decisions related to hydrogen and mobility.
- **DEVELOP COMMON STANDARDS:** Work towards establishing shared technical, regulatory, and operational standards for hydrogen technologies across the Alpine region to ensure seamless integration of hydrogen infrastructure and mobility solutions.
- **ALIGN NATIONAL AND REGIONAL STRATEGIES:** Encourage alignment of national and regional hydrogen strategies to facilitate cross-border cooperation and interoperability within the Alpine Space.
- **ENSURE SUSTAINABILITY:** Integrate sustainability principles into all hydrogen-related projects and policies, ensuring that they contribute to the long-term goals of climate neutrality and energy transition in the Alpine region.
- **LONG-TERM POLICY FRAMEWORK:** Advocate for the creation of a long-term policy framework for hydrogen development that provides stability, incentives, and clarity for investors, industry players, and consumers in the region.
- **INCREASE PUBLIC ENGAGEMENT AND INVOLVE LOCAL COMMUNITIES:** Raise awareness among the general public and key stakeholders about the benefits and challenges of hydrogen technologies, fostering broader acceptance of new projects and infrastructure. Ensure that local communities are engaged early in the planning stages of hydrogen projects to address concerns and gain public support.

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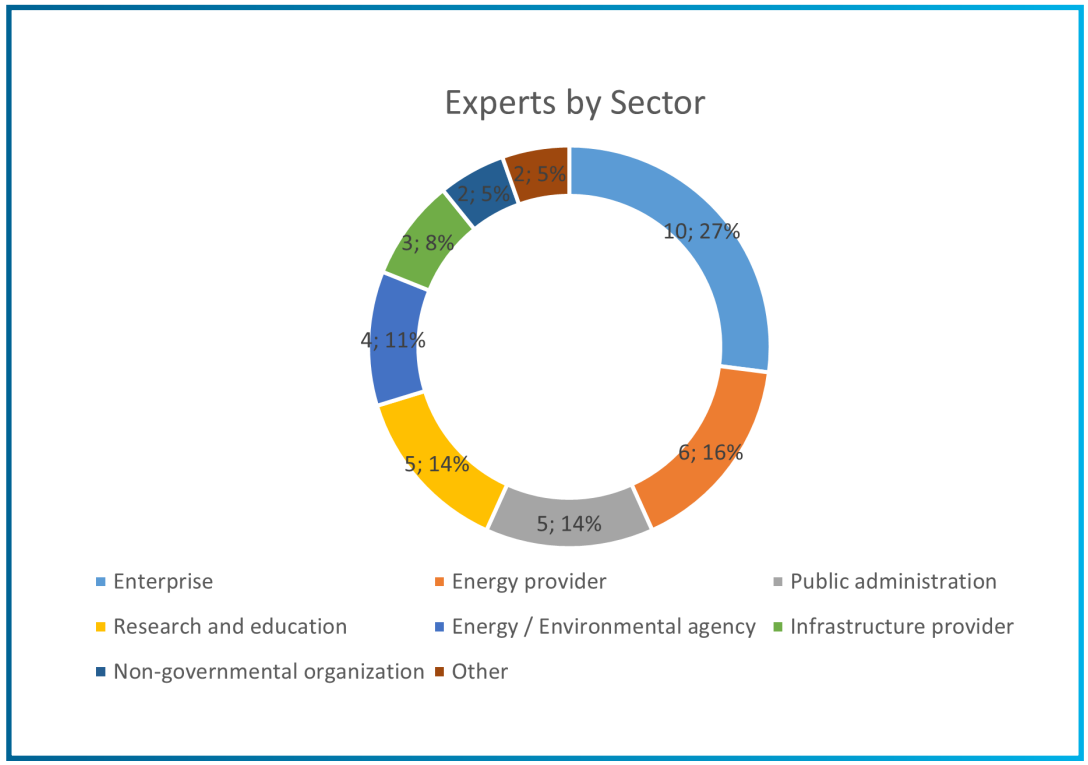
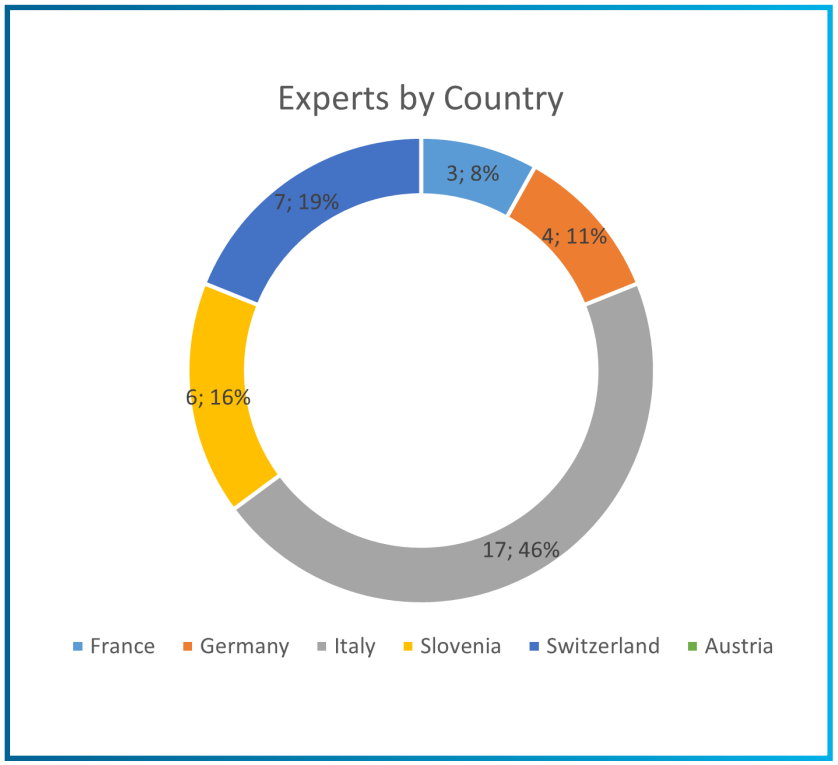
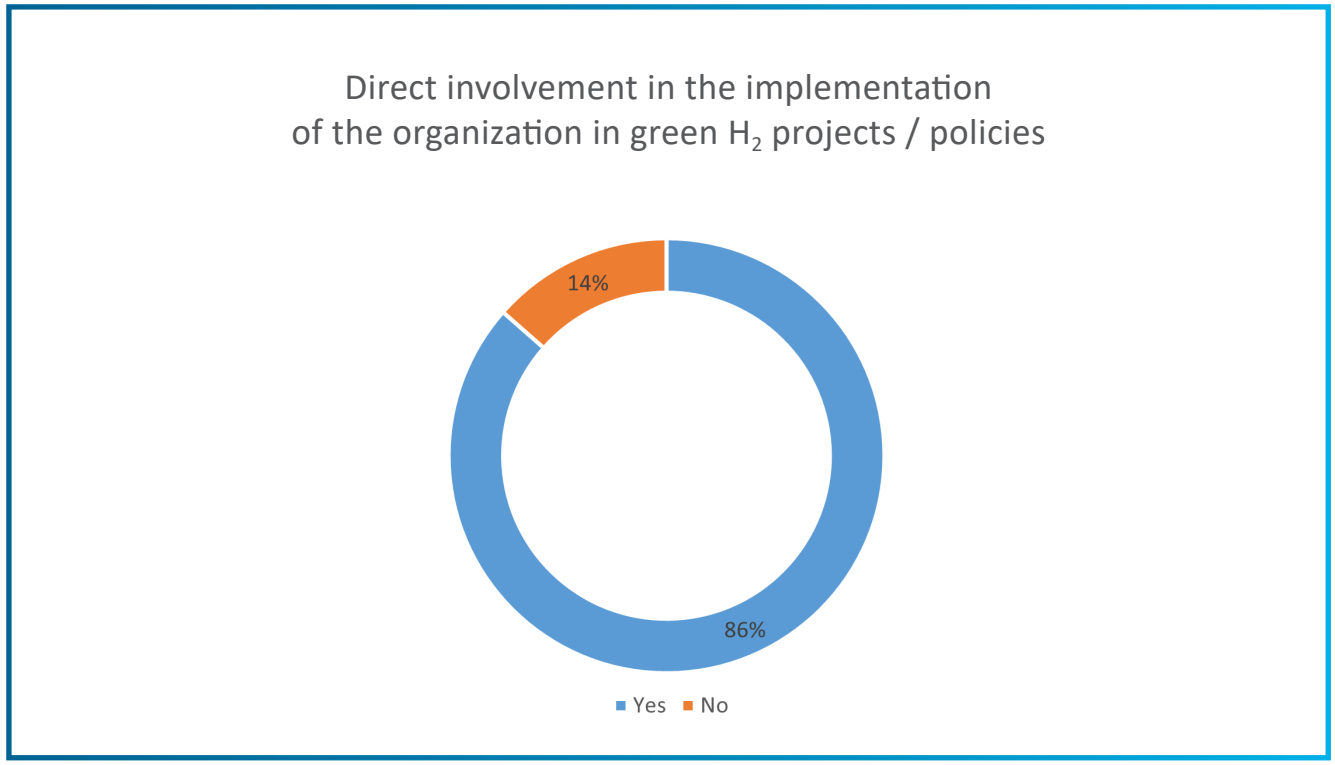
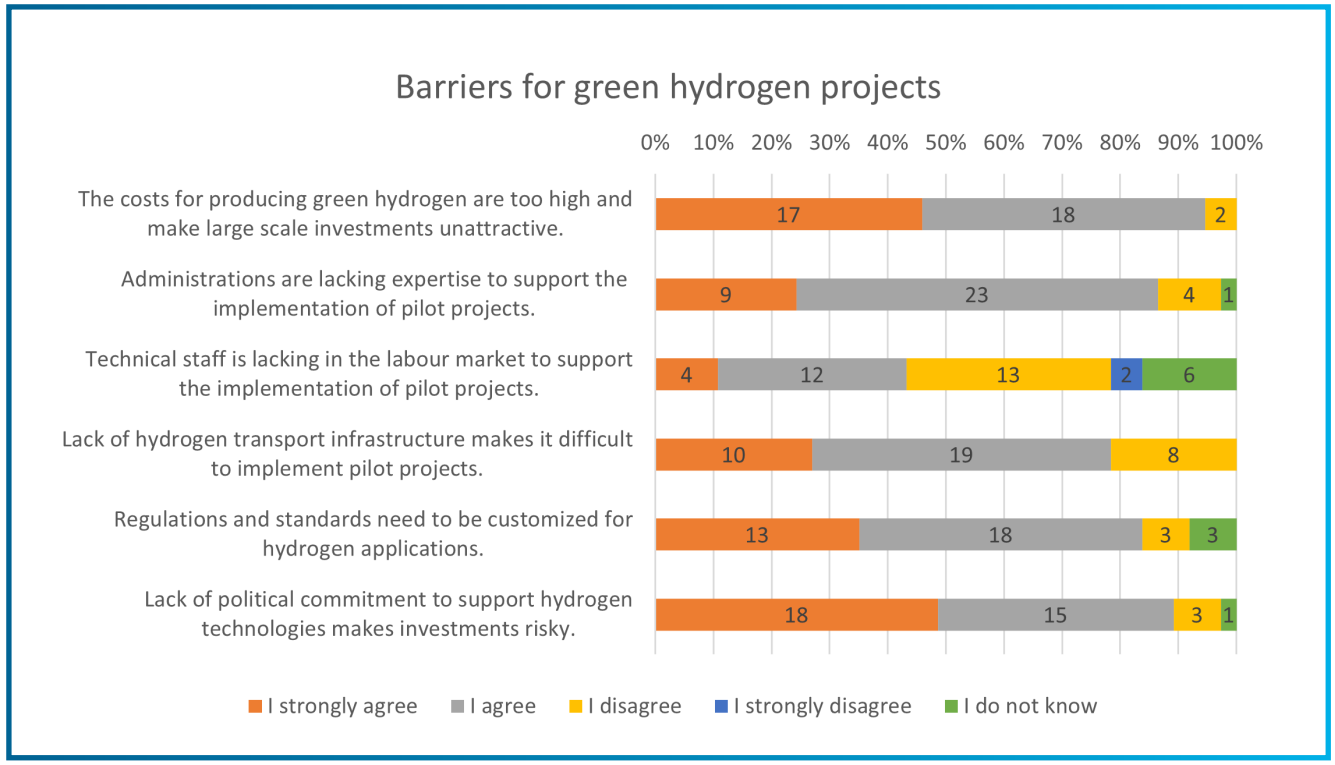
6 ANNEX 1

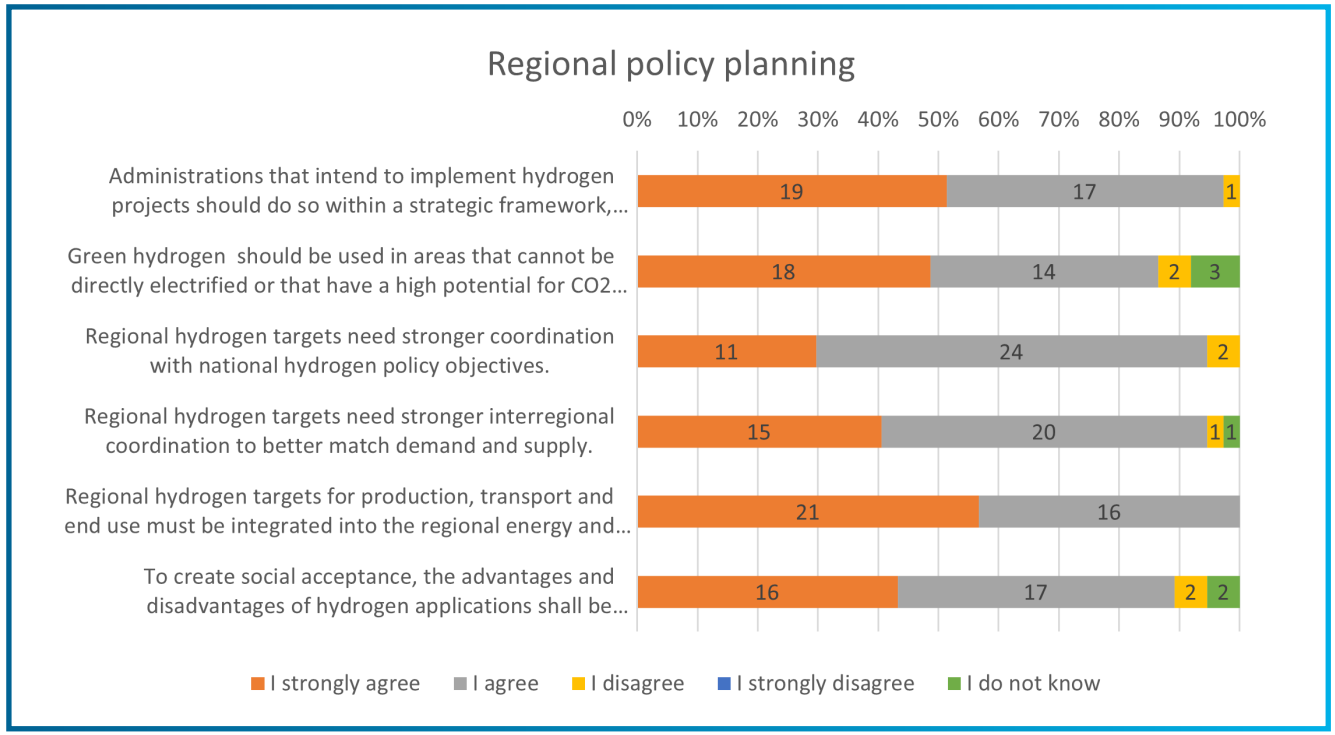
Results of the AMETHyST Expert Survey : “Enhanced Governance for Green Hydrogen in the Alps”

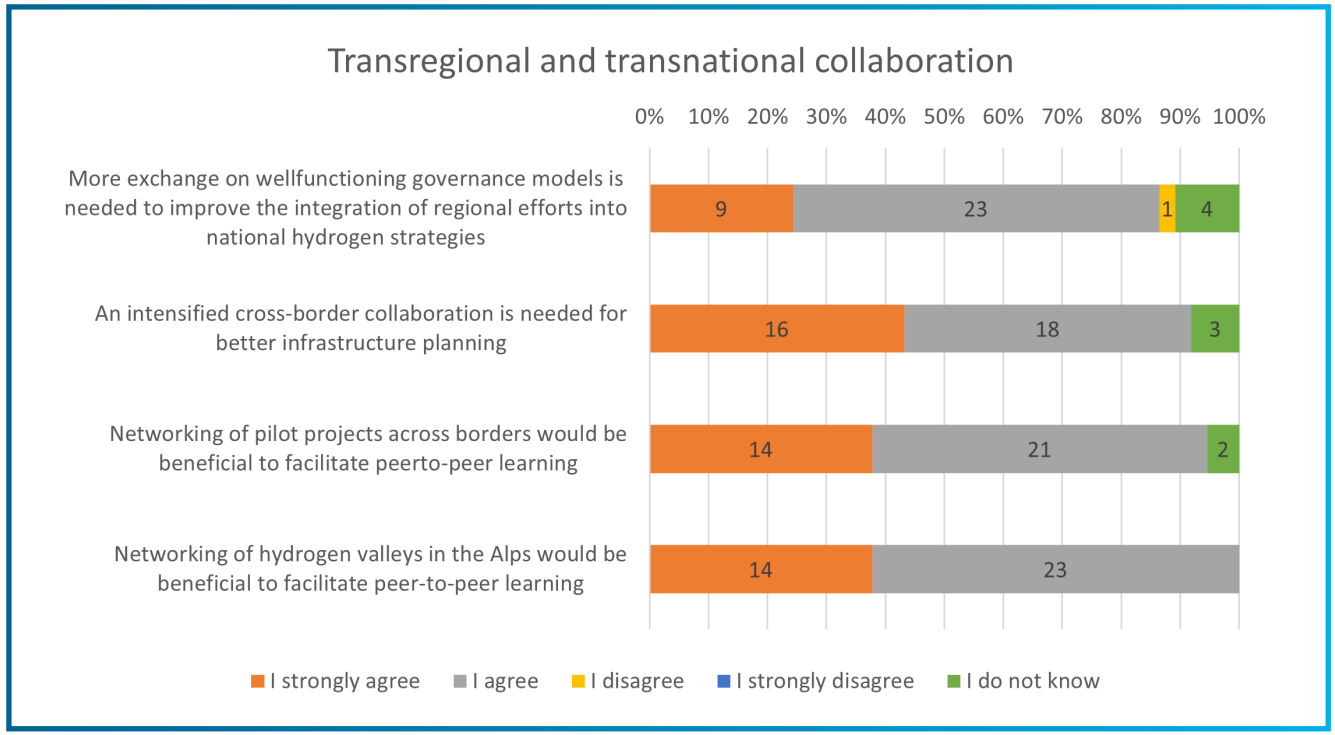





Direct involvement in the implementation
of the organization in green H_2 projects / policies
14%
86%
Yes
No


Barriers for green hydrogen projects
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
The costs for producing green hydrogen are too high and make large scale investments unattractive.
17
18
2
Administrations are lacking expertise to support the implementation of pilot projects.
9
23
4
1
Technical staff is lacking in the labour market to support the implementation of pilot projects.
4
12
13
2
6
Lack of hydrogen transport infrastructure makes it difficult to implement pilot projects.
10
19
8
Regulations and standards need to be customized for hydrogen applications.
13
18
3
3
Lack of political commitment to support hydrogen technologies makes investments risky.
18
15
3
1
I strongly agree
I agree
I disagree
I strongly disagree
I do not know


Regional policy planning
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%
Administrations that intend to implement hydrogen projects should do so within a strategic framework,...
19
17
1
Green hydrogen should be used in areas that cannot be directly electrified or that have a high potential for CO2...
18
14
2
3
Regional hydrogen targets need stronger coordination with national hydrogen policy objectives.
11
24
2
Regional hydrogen targets need stronger interregional coordination to better match demand and supply.
15
20
1
1
Regional hydrogen targets for production, transport and end use must be integrated into the regional energy and...
21
16
To create social acceptance, the advantages and disadvantages of hydrogen applications shall be...
16
17
2
2
I strongly agree
I agree
I disagree
I strongly disagree
I do not know


Transregional and transnational collaboration
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
More exchange on wellfunctioning governance models is needed to improve the integration of regional efforts into national hydrogen strategies
9
23
1
4
An intensified cross-border collaboration is needed for better infrastructure planning
16
18
3
Networking of pilot projects across borders would be beneficial to facilitate peerto-peer learning
14
21
2
Networking of hydrogen valleys in the Alps would be beneficial to facilitate peer-to-peer learning
14
23
I strongly agree
I agree
I disagree
I strongly disagree
I do not know

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