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Alpine Space

H2MA

D.1.6.2

Summary of updates and developments achieved in Alpine space H2 and mobility strategies

Activity 1.6

January, 2024



DOCUMENT CONTROL SHEET

Project reference

Project title	Green Hydrogen Mobility for Alpine Region Transportation
Acronym	H2MA
Programme priority	Carbon neutral and resource sensitive Alpine region
Specific objective	SO 2.1: Promoting energy efficiency and reducing greenhouse gas emissions
Duration	01.11.2022 – 31.10.2025
Project website	https://www.alpine-space.eu/project/h2ma/
Lead partner	KSSENA

Short description

H2MA brings together 11 partners from all 5 Interreg Alpine Space EU countries (SI, IT, DE, FR, AT), to coordinate and accelerate the transnational roll-out of green hydrogen (H2) infrastructure for transport and mobility in the Alpine region. Through the joint development of cooperation mechanisms, strategies, tools, and resources, H2MA will increase the capacities of territorial public authorities and stakeholders to overcome existing barriers and collaboratively plan and pilot test transalpine zero-emission H2 routes.

Document details

Full document's title	Summary of updates and developments achieved in Alpine space H2 and mobility strategies
Version	V1
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Organization/s responsible	Regione Lombardia
Delivery period	2, 7-12

IMPRINT

This document is issued by the consortium formed for the implementation of the **H2MA** project, and made by the following partners:

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- PP2 BSC, Business Support Centre, Ltd, Kranj (SI)
- PP3 EUROMETROPOLE DE STRASBOURG (FR)
- PP4 Lombardy Foundation for the Environment (IT)
- PP5 Cluster Pole Vehicule du Futur (FR)
- PP6 Turin Metropolitan City (IT)
- PP7 Climate Partner Upper Rhine Valley (DE)
- PP8 4ward Energy Research Ltd (AT)
- PP9 Lombardy Region (IT)
- PP10 Codognotto Austria (AT)
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EXECUTIVE SUMMARY

The H2MA project responds to the EU's commitment to carbon neutrality by 2050, emphasizing the role of hydrogen in achieving clean energy goals, particularly in challenging sectors. The project unites 11 partners across Alpine countries to enhance public authorities' capabilities for zero-emission hydrogen routes, focusing on planning, testing, and policy development for hydrogen mobility. H2MA aims to address infrastructure gaps hindering green hydrogen potential, with an initial focus on heavy-duty trucks, public transport, and railways.

The present report, as part of the activity A1.6 of the project, details the changes proposed or included by project partners in their respective regions. Partners from Slovenia submitted detailed recommendations to national decision-makers, mainly emphasizing the need for a comprehensive stand-alone hydrogen strategy. In Austria, partners recommended adapting the existing strategy by defining expansion targets for hydrogen filling station networks and emphasizing the importance of a transnational approach. In France, partners are actively providing recommendations through workshops and newsletters, mainly suggesting the inclusion quantitative targets and the use of the H2MA planning tool. Italian partners, covering Piedmont and Lombardy, have integrated H2MA findings into their respective regional working groups, emphasizing the use of the planning tool. German partners focus on the hydrogen core network, submitting a statement to the Federal Network Agency advocating for pipelines in the France-Switzerland-Germany border region. Overall, the changes proposed by partners reflect a collaborative approach influenced by H2MA, with an emphasis on transnational coordination, quantitative targets, and the effective utilization of the planning tool.

In conclusion, H2MA has fostered collaboration among partners, influencing strategies in varying stages of development. While some regions are developing strategies with H2MA insights, well-established strategies and plans like in the German area benefit indirectly through improved understanding and collaborative updates to existing plans. The quantitative targets and the H2MA planning tool are key outputs influencing partners' statements and proposals.

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1. INTRODUCTION

1.1 H2MA project overview

The EU is committed to carbon neutrality by 2050, driving a shift from fossil fuels to renewable energy. Hydrogen (H₂) is key for clean energy in hard-to-electrify transport and industries. Green hydrogen in particular offers a zero-emission alternative. Alpine countries embrace H₂-powered transport but face infrastructure gaps hindering its full potential. Uneven deployment in the Alps region emphasizes the need for strategic planning and cooperation to establish a comprehensive green H₂ mobility network.

In this context, the H2MA project aims to boost the capabilities of public authorities for transalpine zero-emission H₂ routes. It unites 11 partners from 5 Alpine Space countries to coordinate green H₂ infrastructure expansion. The focus is on joint planning, testing, and policy development for H₂ mobility, aiming for economies of scale. H2MA plans integrated solutions for transnational infrastructure and placement of hydrogen refuelling stations (HRS), emphasizing heavy-duty trucks, public transports and railways initially, with a broader vision for maritime and aviation transport. H2MA seeks to streamline H₂ roll-out plans, connect H₂ production with renewables, and harmonize H₂ Alpine strategies for green mobility.

1.2 Activity 1.6 overview

Within the H2MA project, Activity A1.6 of Work Package 1 (WP1) focuses on providing partners with a systematic approach to incorporate key findings from WP1 into their H₂ mobility strategies within their territories. The results from WP1 include insights into infrastructure and policy gaps in the Alpine region, planning specifications for green H₂ mobility routes, forecasts on the maturity scenarios of green H₂ production and distribution, and the development of a tool for green H₂ mobility planning. As a first output of A1.6, Lombardy Foundation for the Environment (FLA, PP4) has reported (in Deliverable 1.6.1) a synthesis of the existing strategies and outlined an action plan to integrate insights from WP1 into policy planning for H₂ mobility in the Alpine region. Project partners has already proposed updates to existing H₂ strategies and are committed to include further insights resulting from H2MA in future.

The changes proposed or implemented by project partners into detailed policy documents have been collected and synthesized in this report (Deliverable 1.6.2) by Lombardy Region (RL, PP9). The changes are reported for each country/region (Section 2) and then also commented together in the conclusion (Section 3).

2. CHANGES PROPOSED OR INCLUDED

The various regions have initiated or planned different actions in various areas and with different methods, including workshops, simple letters or emails, participation in meetings, and sharing of materials. Below, we discuss them individually by country.

2.1 Slovenia

While the Slovenian National Hydrogen Strategy is not yet officially published, the Energy Agency of Savinjska, Saleska and Koroska Region (KSSENA, PP1) - a key technical partner in the drafting working group and that collaborates with the Ministry of Infrastructure for monitoring and revising the measures of the 2019 Action Plan on Alternative Fuels Infrastructure - identified some issues and provided some suggestions.

In this position, starting from the outcome of the H2MA project, KSSENA, together with the Business Support Centre, Ltd, Kranj (BSC KRANJ, PP2), have submitted a letter with detailed recommendations to the national decision makers responsible for the development of the strategy. The proposition highlights the need for a stand-alone strategic document, which in their opinion shouldn't be a part of a wider National Energy and Climate plan (as it is so far) and suggests the areas or chapters it should cover. This passage can be found in a more comprehensive excerpt of the letter, translated and reported below:

“The hydrogen strategy of the Republic of Slovenia should be formulated as a comprehensive strategic document that presents guidelines and measures for establishing a sustainable framework for the production, distribution and use of hydrogen in the country.

[...] The recommendations for the creation of the hydrogen strategy of the Republic of Slovenia were created as part of the transnational project H2MA implementation. [...] The cooperation of various professional actors with policy makers, the implementation of pilot testing for the introduction of hydrogen technologies, international cooperation and learning from examples of good practices is therefore crucial. [...] The H2MA project is currently in the phase of developing useful tools and materials, in the framework of which the project partners, among other things, are developing an information database based on the GIS system. Analyses of the gaps between the situation in the field, the market situation and the existing strategic political instruments in the partner countries were prepared. All implemented and planned pilot projects, which implement green hydrogen mobility in a practical sense, were listed. [...]”

The proposed recommendations, in particular, point out that the need to develop the hydrogen strategy as a stand-alone and comprehensive document is driven by the revision of the European Directive 2019/94/EU, which will be replaced by a new Alternative Fuels Infrastructure Regulation, the AFIR, being on the verge of its adoption, and which puts the "urban nodes" concept in the forefront. In fact, the letter stresses the importance of pursuing some points, as follows:

“The necessity of developing the Strategy of the Republic of Slovenia for Hydrogen, in the form of an independent strategic document in connection with the revision of Directive 2014/94/EU

and the adoption of the new Regulation on the establishment of infrastructure for alternative fuels (Alternative Fuels Infrastructure Regulation - AFIR). [...]

The integration of the strategic planning of the economy of hydrogen technologies and the associated charging infrastructure and the National Energy and Climate Plan does not make sense.”

The concept’s aim is to meet the need and demand for green hydrogen in the coming decades through a system of hydrogen refueling stations installed at all urban nodes and every 200 km on the TEN-T core networks. The recommendations also promote the implementation of policy legislation on the necessary conditions and permissions for the construction of the green H₂ refueling infrastructure:

“The urgency of developing the RS Strategy for hydrogen, in connection with unclear legislation regarding the necessary permits for the installation of hydrogen charging infrastructure and the further development of detailed technical guidelines for individual areas of the introduction of hydrogen charging infrastructure.”

Finally, the recommendations presented the chapters or areas that the National Hydrogen Strategy should cover, especially in terms of ensuring safety in the use, transport and refuelling of green hydrogen:

“The urgency of developing the Strategy of the Republic of Slovenia for hydrogen, in connection with the components that should necessarily be more precisely addressed as part of the hydrogen economy and the safety aspect.”

2.2 Austria

The Austrian partners 4ward Energy Research Ltd (4ER, PP8) and Codognotto Austria (COD, PP10) starting from the H2MA outcomes prepared a document providing some recommendations for the existing Austrian Hydrogen strategy (unveiled in 2022) and have submitted it to the ministry of Environment (BMK). Below a translated excerpt of the introduction, highlighting among others the urgency of action and the comparison with other countries involved in the H2MA project:

"Based on the findings from the first year of the project, the Austrian partners of the H2MA consortium would like to make the following recommendations for adapting the Austrian hydrogen strategy. [...] Even if the ramp-up of the technology is not expected until after 2030, the course for the development and expansion of the infrastructure must be set now. [...] Germany, Italy and France have concrete targets for the expansion of (refueling) infrastructure on the one hand and vehicle fleets on the other.”

While the document welcomes the systemic approach described in the Austrian Hydrogen Strategy, the partners suggest drawing up an accompanying action plan for the mobility sector as a starting point for investment decisions by the relevant stakeholders. The proposals specifies some points that the action plan would have to include. For example, it underlines the importance to define an expansion target for H₂ filling station network for

transit traffic (e.g., trucks) and the need to define target values for the use cases at different time horizons, such as 2030 and 2050 (also in a transnational context):

"[...] This aspect is also becoming increasingly important with regard to meeting the targets set out in the AFIR Regulation in order to give companies (e.g. in the logistics and freight transport sectors) the security they need to purchase/convert to zero-emission systems. [...] the existing strategy should be adapted to this end and define target values for

- *Number of filling stations*
- *Capacity of filling stations*
- *Maximum distance between filling stations.*

This target values should be defined for several time periods (2030, 2050). [...] A rough timetable for expansion should also be drawn up, taking into account planned road infrastructure projects, and a concept for supplying the filling stations (pipelines, on-site production, etc.) should also be considered. [...]"

They then identify the importance to define transit routes where a clear minimum number of filling stations would be available, in accordance with the strategies of other countries, as largely stressed by the H2MA project:

"Considerations should not be limited to the infrastructure along the TEN-T corridors, but should also take into account other relevant sections of the (highway network) road network in Austria. It is necessary to coordinate with neighboring countries on possible international hydrogen corridors. This is the only way to ensure a sufficiently dense network for journeys with hydrogen vehicles throughout the EU and to support the market ramp-up of hydrogen mobility. [...] the legal and regulatory aspects of the implementation of the AFIR Regulation must be clarified, in particular whether ASFINAG, as the infrastructure operator, is legally obliged to make the necessary investments in the development of the infrastructure [...]"

COD and 4ER bring in the key point of enabling the shift of existing hydrogen refuelling stations towards green hydrogen:

"The hydrogen filling stations currently available in Austria are not supplied with green hydrogen, [confirming the need of an] elaboration of action steps to ensure a supply of green hydrogen even with existing filling station infrastructure. It is therefore recommended that the target also be defined for the use of hydrogen in the mobility sector. [...]"

They also recognize the importance of developing the right expertise and specific skilled workforce:

The H2MA findings also show that the expertise and manpower required to convert existing fleets and to develop and operate the necessary infrastructure are not currently available to the extent required. In order to promote the rapid expansion of hydrogen mobility, suitable (further) training opportunities must be created along the entire value chain. "

They finally suggest incorporating the definition of the legal framework for the hydrogen mobility, reducing the corresponding hurdles in terms of requirements and approvals, and involving relevant stakeholders from business, science, associations, NGOs and policy in the process.

2.3 France

In France several documents for fostering the deployment of hydrogen value-chain (both at local and regional level) are being published. Four plans are possibly being influenced by the outcomes of the H2MA's WP1: (i) the *Strasbourg Climate Plan 2030*, established in 2020, developed by Eurometropole de Strasbourg (EMS, PP3); (ii) the *Bourgogne-Franche-Comté H2 Roadmap*, published in 2019, for which Cluster Pole Vehicule du Futur (PVF, PP5) has been a key contributor; (iii) the *Grand Est H2 2020-2030 Strategy*, where PVF also played a pivotal role in crafting process and the (iv) *Interregional Hydrogen Strategy*, for which a draft plan is currently being initiated among the others by the Municipality of Strasbourg, and the H2MA partners PVF and Climate Partner Upper Rhine Valley (KPO, PP7).

For all of the mentioned strategic plans, the French partners have provided recommendations through different channels. In particular, the need for setting numerical targets, as highlighted by the Activity A1.1 of H2MA, was communicated to stakeholders (through emails) proposing quantitative targets for green hydrogen production and for hydrogen refuelling stations. They also have encouraged the deployment of hydrogen-powered buses as part of the strategy to decarbonise public transport. In particular they have delivered newsletters to companies, universities, local authorities and are organising workshops to be held within the next months to present the feedback of deployment of H₂ buses in other regions.

They finally have planned to present the H2MA tool and encourage its use to local working groups. Through the use of the tool, they expect to help project sponsors to integrate existing international infrastructures (such as the planned hydrogen production plants and transmission pipeline networks) into their choice of HRS sites.

2.4 Italy

The Italian partners of H2MA cover two different administrative areas, Piedmont and Lombardy, with different strategies and plans.

The activities and outputs of the project has been shared and constantly monitored with the working group of the "Regional Hydrogen Strategy" of the Piedmont region in which the Metropolitan City of Turin (CMT – PP6) and its consultant Environment Park Spa participate as permanent member and technical support bodies. The main output driving an impact on the strategies within the region is the H2MA planning tool. Its construction process was shared with the regional working group, integrating it with information on planned investments or investments forecast. A dedicated meeting for presenting the tool to members of the “regional H2 strategy” workgroup is expected to be held by mid-February 2024.

The tool has anyway already been set to be adopted at regional scale to:

- Contribute to definition of action and support measures in the framework of “Sustainable Logistic Plan of the Metropolitan City of Torino” for what concerns hydrogen mobility. This plan will be coordinated and integrated within the regional plan and the other mobility and public transport plan currently under elaboration or under deployment at Metropolitan and Regional scales.
- Contribute to the construction of regional-scale plans, particularly the *Fuel Distribution Network Plan and the Air Quality Plan* for aspects related to supporting the development of sustainable hydrogen-based mobility systems.
- Develop informative actions to economic stakeholders and to the general public on the development of hydrogen mobility in the territory.

Furthermore, CMT is aiming to use the tool for the identification of transnational and interregional actions, also in view of participation in European programmes and projects, with particular reference:

- to the *Hydrogen Valley* calls of EU Horizon program *Hydrogen Europe* on which the Piedmont Region is applying in partnership with local and EU relevant industrial and R&D stakeholders;
- To the identification and implementation of new investments for the production and distribution of hydrogen supported by the *RE-Power EU* program, the *EU Recovery and Resilience Plan* and *National Energy and Climate Plan*;
- To the development of integrated investment plans at the Alpine scale for the application of the *Alternative Fuel Infrastructures regulation (AFIR)*, outlining a scenario ensuring a sufficient number of publicly accessible refuelling points, with common standards, along the logistic and transport corridors crossing the Alpine Space regions, with investments also supported by the calls of the *EU CEF - AFIR* programme.

The Lombardy Region (RL, PP9) and its consultant Fondazione Politecnico di Milano are currently developing the Lombardy’s Regional Hydrogen Strategy, expected in 2024, with a specific focus on the mobility sector and industry. The outcomes of the activities of WP1 are being considered within the process, being the partners involved both in the H2MA project and in the designing of the strategy. A dedicated meeting is being placed in the agenda to present the project and its results also at the political level to the Environment and Climate Assessor.

There are three main points on which the H2MA is supporting the development of the strategy in Lombardy:

- First, the H2MA project has made available information on the strategies of the other regions enabling coordination and contamination. Shortcomings and strengths of other regions’ strategies are regarded as reference while quantitative information is being considered towards a harmonization of policies and standards.

- The importance of setting quantitative targets, highlighted by the activity A1.1, is being accounted through the support of numerical analyses that are helping to define the potential demand and offer.
- The H2MA planning tool is being used to help distributing the quantitative information in space, to define the routes of optimal production, transmission and consumption of hydrogen.

2.5 Germany

The German Federal Government published the National Hydrogen Strategy in 2020. In the same year, the roadmap for Baden-Württemberg and the Bavarian Hydrogen Strategy were published, respectively by the Ministry of the Environment, Climate Protection and the Energy Sector of Baden-Württemberg and by the Bavarian State Government. In 2023, both the National Hydrogen Strategy and the roadmap for Baden-Württemberg were updated. The strategies and roadmaps have therefore already been developed for three years and are regularly updated.

Based on this context, Climate Partner Upper Rhine Valley (KPO, PP7) has not proposed any changes to the mentioned strategies. It has however focused on the *German-hydrogen-core-network*. The draft law considering the core network provides for the transmission system operators (TSOs) to submit an application to the Federal Network Agency with measures for the development of the hydrogen core network once the law comes into force. The hydrogen core network is intended to reach currently known large hydrogen consumption and production regions in Germany and thus connect central hydrogen locations, such as large industrial centers, storage facilities, power plants and import corridors. The core network is to include important hydrogen infrastructures that are to go into operation by 2032.

As the organizational unit of the Trilateral Hydrogen Initiative 3H2, KPO has submitted a statement to the Federal Network Agency on the transmission system operators' draft application for the hydrogen core network. The core statements mentioned here were additionally emphasized by the need for harmonization identified in the H2MA project. In this statement, KPO calls for the addition of further pipelines in the France-Switzerland-Germany border region to the hydrogen core network. The statement is signed by numerous representatives of the districts in the border region, companies, universities, regional associations and chambers of industry and commerce as well as the energy supply companies and network operators. In this way, KPO hopes that the hydrogen pipeline system in Germany will also be built primarily in the border region and that the connection to other neighboring countries along the Alps will also be guaranteed.

3. CONCLUSION

The statements and the changes proposed by the partners, downstream the activities of the H2MA's WP1 has shown the project has fostered a collaborative wave, guiding and influencing regional strategies.

In two cases, Lombardy and Slovenia, the hydrogen strategy is not yet developed but the H2MA project is rather on time to provide significant insights to their development.

At the opposite end, there is the well-established case of Germany and the strategies and plans of Baden-Württemberg and the Bavarian State. For Germany, and in general for all the areas involved by the project, there is anyway an indirect benefit: H2MA has facilitated mutual understanding among the bodies involved, enabling the exchange of plans, strategies, and directions. This has, in turn, empowered the possibility of updating or developing these plans and strategies not in isolated compartments but collaboratively and potentially holistically.

Among the input coming from the activities of WP1, the need for quantitative targets is the most effectively integrated into the statements the H2MA partners addressed to the bodies involved in developing or revising strategies and plans.

The tool has been revealed however to be the most significant and considered output. Even though the time lag between the delivering of the tool and this report did not allow producing results to be directly used into the process, the existence of the tool and its usefulness have been communicated by all the partners to the actors involved in developing or revising the strategies and plans and most of them have already set to adopt it.