Interreg

Co-funded by
the European Union

Alpine Space

Pôle Véhicule du Futur
Solutions pour véhicules & mobilités du futur

H2MA

Output 3.1

Transferability toolbox

for deployment of the H2MA approach in clean
hydrogen mobility across the Alpine space and beyond

Strasbourg, October 2025

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	Strategic Blueprint – Alpine Collaboration Framework
Version	Final
Author/s	PVF
Organization/s responsible	PVF
Delivery period	5, 25-30

IMPRINT

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

- PP1 (LP) Energy Agency of Savinjska, Saleska and Koroska Region (SI)

- PP2 BSC, (SI)

- PP3 EUROMETROPOLE DE STRASBOURG (FR)

- PP4 Lombardy Foundation for the Environment (IT)

- PP5 Cluster Pôle Véhicule du Futur (FR)

- PP6 Turin Metropolitan City (IT)

- PP7 Climate Partner Upper Rhine Valley (DE)

- PP8 4ward Energy Research Ltd (AT) in cooperation with Reiterer & Scherling GmbH

- PP9 Lombardy Region (IT)

- PP10 Codognotto Austria (AT)

- PP11 Italian German Chamber of Commerce Munich-Stuttgart (DE)

Responsible Partner/s for the compilation of this document

- PP5 Cluster Pôle Véhicule du Futur (FR)

LIST OF ABBREVIATIONS

TABLE OF CONTENTS

EXECUTIVE SUMMARY

This document presents the *Transferability Toolbox* developed within Work Package 3 (WP3) of the H2MA project. Its purpose is to consolidate the main methodological, governance, and policy resources created by the partnership into a practical, modular reference that supports the continuation and replication of hydrogen-mobility planning beyond the project's lifetime. The toolbox brings together the key results of five deliverables, noticeably:

- (D3.1.1) *Handbook for hydrogen cooperation*
- (D3.1.2) *Governance model for hydrogen mobility*
- (D3.2.1) *Roadmap for hydrogen valleys*
- (D3.2.2) *Strategic framework for interoperability*
- (D3.2.3) *Policy harmonisation recommendations*

Building on these materials, the document translates lessons learned from the H2MA partnership into six modules that can be used separately or as part of a continuous process:

1. **Implementation and engagement** – methods for initiating and maintaining stakeholder cooperation, based on Local Working Group experience.
2. **Governance and coordination** – a multi-level structure linking local, national, and transnational actors without creating new institutions.
3. **Strategic planning and roadmap** – a phased approach guiding regions from initial mapping to integrated hydrogen-ecosystem development.
4. **Interoperability and integration** – tools for assessing alignment across technical, regulatory, functional, and business dimensions.
5. **Policy and harmonisation guidance** – dialogue formats that support gradual convergence of regulations and procedures.
6. **Business and investment support** – models for public–private cooperation and investment alignment.

Each module incorporates concrete examples from partner regions—including Slovenia, France, Austria, and Italy—illustrating how the approaches were applied in different administrative and market contexts. The toolbox therefore provides both conceptual clarity and operational instruments such as templates, checklists, and dialogue formats that can be adapted to local needs.

The document also complements the *Alpine Collaboration Framework* by supplying the operational means to implement its principles in practice. Whereas the framework outlines how cooperation across the Alpine region should be structured, the toolbox delivers the tools required to make that collaboration functional and replicable.

Designed as an open, evolving resource, the *Transferability Toolbox* encourages progressive learning and adaptation. It allows new regions and partnerships to capitalise on H2MA's experience, to structure their hydrogen-mobility strategies in a coherent way, and to contribute to a broader, interoperable hydrogen ecosystem within the Alpine Space and beyond.

INTRODUCTION

The *Transferability Toolbox* has been developed within Work Package 3 (WP3) of the H2MA project as part of the broader effort to consolidate and transfer the results achieved in hydrogen mobility planning across the Alpine region. Building on the analytical foundations of WP1 and the operational tools produced under WP2, WP3 focuses on ensuring that the knowledge, methodologies, and pilot experiences generated within the partnership can be replicated and adapted beyond the original consortium.

WP3 is structured around two complementary components. **A3.1 – Governance and implementation resources for transferring the H2MA pilot approach and results beyond the partnership** develops the organisational and procedural foundations required to sustain hydrogen-mobility initiatives once project funding ends. It provides the governance models, cooperation formats, and policy resources necessary to structure regional collaboration and maintain alignment among diverse actors. A**3.2 – Supporting the growth of green hydrogen mobility value chains in the Alpine Space** builds upon this base by translating these governance and planning principles into tools that strengthen business ecosystems, policy frameworks, and investment opportunities across the region.

The *Transferability Toolbox* integrates the main outputs from both of these components into a coherent, operational reference document. Its purpose is to organise and refine the methodological, governance, and policy resources produced under WP3, transforming them into a modular set of practical instruments that can be applied by regional and national actors involved in hydrogen mobility.

Rather than prescribing a fixed model, the toolbox captures the methods, templates, and insights tested during H2MA and validated across multiple regional contexts. It is designed to be adaptable and to evolve as new actors, technologies, and policy frameworks emerge. By providing clear and transferable guidance, the document ensures that the collective experience of the H2MA partnership can continue to support the development of coherent, interoperable, and sustainable hydrogen mobility ecosystems throughout the Alpine Space and beyond.

1. SCOPE AND METHODOLOGY

The scope of the toolbox reflects the operational logic of H2MA: building multi-level and cross-sectoral cooperation around hydrogen mobility. The material draws directly from project deliverables, meeting records, and partner feedback collected throughout WP3.1 and WP3.2. These sources were screened for elements that demonstrated practical value— methods, templates, and policy insights that partners had already tested in their regional environments.

Each selected component was reviewed for its relevance, adaptability, and ease of transfer. The compilation process followed three simple criteria:

➢ The tool or method should address a common challenge identified by multiple partners.
➢ It should be usable independently of national frameworks or specific technologies.
➢ It should contribute to bridging the gap between planning, governance, and implementation.

The resulting document is designed as a flexible resource rather than a fixed manual. It allows users to select and adapt modules that fit their own context, encouraging incremental rather than one-size-fits-all adoption. The methodology mirrors the collaborative ethos of the project itself—progressive, iterative, and focused on practical problem-solving.

2. STRUCTURE OF THE TRANSFERABILITY TOOLBOX

The toolbox is divided into six modules, each representing a core dimension of the H2MA approach. Together, they form a continuous process: from engaging stakeholders to designing governance, planning actions, ensuring interoperability, aligning policies, and activating investment.

Module	Main focus	Corresponding deliverable(s)
1. Implementation and engagement	Local working methods and stakeholder processes	D3.1.1
2. Governance and coordination	Multi-level coordination and roles	D3.1.2
3. Strategic planning and roadmap	Phased hydrogen ecosystem development	D3.2.1
4. Interoperability and integration	Technical, regulatory, functional, business alignment	D3.2.2
5. Policy and harmonisation guidance	Regulatory convergence approaches	D3.2.3
6. Business and investment support	PPP formats and investment readiness	Cross-cutting (D3.1.2, D3.2.1, D3.2.2)

The six modules can be applied sequentially or independently. Their combination allows users to follow a clear progression—from initiating cooperation and setting governance to

developing a strategy, aligning standards, and engaging investors. Each module incorporates concrete examples drawn from project experience, ensuring that the guidance remains realistic and grounded in practice rather than theoretical abstraction.

MODULE 1 – IMPLEMENTATION AND ENGAGEMENT

This first module draws upon Deliverable 3.1.1, *Handbook for hydrogen cooperation*, which focused on how to initiate, manage, and maintain effective collaboration among regional and local actors involved in hydrogen mobility. It reflects one of the central lessons of H2MA: that coordination between institutions, businesses, and research entities requires both structure and continuity.

The Local Working Groups (LWGs) established in each partner region became the key instruments for translating analytical work into operational cooperation. They provided a neutral setting where municipalities, transport agencies, infrastructure operators, industrial partners, and innovation clusters could exchange perspectives and define shared objectives. The Handbook captured these experiences, offering practical materials such as stakeholder mapping templates, sample meeting agendas, and progress tracking sheets. These tools are included in the present toolbox because of their proven usefulness in maintaining engagement over time.

The experience of the KSSENA team in Slovenia illustrates how this participatory method functioned in practice. By convening representatives from local authorities, logistics companies, and energy planners, the group identified priority refuelling locations and clarified the relationship between fleet conversion and infrastructure deployment. In France, the regional cluster Tenerrdis applied the same participatory framework to link public transport authorities with technology providers, ensuring that technical discussions were informed by regulatory and operational realities.

The examples show that engagement is most productive when it combines structure and openness: meetings follow a clear agenda and documentation process but remain flexible enough to integrate new participants and topics as regional needs evolve. The methods tested in H2MA helped partners move from exploratory conversations toward concrete planning actions.

This module therefore serves as a reference for regions wishing to replicate such cooperative formats. It demonstrates that meaningful participation does not depend on the size or institutional maturity of a region but on clarity of process and continuity of exchange. The templates and guidance compiled here allow teams to establish a functional cooperation framework quickly, ensuring that strategic, technical, and financial discussions can proceed on a shared and transparent basis.

MODULE 2 – GOVERNANCE AND COORDINATION

This module is informed by the findings and recommendations of Deliverable 3.1.2, *Governance model for hydrogen mobility*, which examined how cooperation in hydrogen development can be effectively structured across multiple administrative levels and sectors. The analysis confirmed that achieving coherence in hydrogen planning requires both vertical coordination—between local, regional, national, and transnational actors—and horizontal collaboration among public authorities, private operators, and research institutions.

The governance model emerging from H2MA is deliberately light and adaptive. Rather than proposing new institutions, it encourages partners to build on existing structures, linking them through a clear but flexible coordination logic. Three main layers of governance were identified: local and regional working formats that anchor projects in their territorial context; national coordination nodes that connect these activities to policy frameworks and funding mechanisms; and a transnational layer that supports information exchange and alignment across borders.

Within this structure, each level retains autonomy but benefits from improved transparency and communication. Local Working Groups, already tested through the *Handbook for hydrogen cooperation*, play a central role in gathering operational input and transmitting it upwards to national partners. National nodes, such as energy agencies or hydrogen associations, consolidate these insights and integrate them into broader strategies. The transnational level—represented through Alpine cooperation platforms and European initiatives—then ensures consistency in cross-border planning and interoperability.

Concrete examples from H2MA demonstrate how this model can function in practice. In South Tyrol, provincial energy and transport planning was directly connected with discussions on the Brenner corridor, linking regional initiatives to national and transnational policy frameworks. In Slovenia, the national hydrogen association effectively acted as a coordination node, bridging regional clusters, research institutions, and ministries. These arrangements were not formalised as new entities but operated through regular exchanges and shared documentation formats, demonstrating that durable governance can emerge from simple, well-defined cooperation routines.

The strength of this governance approach lies in its adaptability. It can be replicated by other regions without extensive restructuring, requiring only that roles, communication channels, and monitoring responsibilities be made explicit from the outset. The templates and examples gathered through H2MA provide a foundation for this replication. They show that consistent coordination, even when informal, is achievable through transparent information flows and a shared understanding of objectives.

In this sense, the governance model functions less as an administrative prescription and more as a framework for partnership management. By clarifying who convenes, who decides, and how results are communicated, it allows diverse actors to work together efficiently while maintaining accountability and flexibility.

MODULE 3 – STRATEGIC PLANNING AND ROADMAP

This module is based on the approach developed in Deliverable 3.2.1, *Roadmap for hydrogen valleys*, which proposed a structured method for planning and sequencing hydrogen ecosystem development. The roadmap was designed to help regional and national actors move from exploratory initiatives toward integrated and self-sustaining systems, while maintaining coherence with broader European and Alpine-level priorities.

The method distinguishes three progressive phases: initiation and mapping, pilot and early deployment, and large-scale integration. Each phase is characterised by a set of enabling conditions—policy readiness, stakeholder engagement, technical maturity, and financing capacity—that determine the appropriate pace and scope of action. This staged approach allows partners to align strategic ambition with realistic implementation capabilities.

In practice, the roadmap was used by project partners to structure regional action plans according to their starting positions. Some regions, such as those in Italy and France, prioritised logistics and industrial applications, using early pilot projects to demonstrate the viability of hydrogen refuelling infrastructure. Others, including Austria and Slovenia, focused first on public mobility and corridor connectivity, recognising the importance of linking regional networks to national and cross-border strategies. Each case applied the same logic of gradual progression, ensuring that infrastructure and governance evolved together rather than independently.

The roadmap process also introduced a series of self-assessment indicators that partners could use to evaluate their progress and identify remaining gaps. These included institutional coordination, data availability, market engagement, and investment leverage. The indicators proved valuable not only for internal monitoring but also for communicating development stages to stakeholders and potential investors.

Lessons drawn from the H2MA experience suggest that roadmap planning is most effective when it is treated as a dynamic instrument rather than a fixed plan. Regular reviews of assumptions and progress allow regions to adapt to shifting market conditions and policy frameworks. The roadmap thereby becomes a tool for maintaining direction without locking actors into rigid sequences or unrealistic milestones.

This module consolidates that approach into a concise methodology that other territories can adapt. It enables regions to identify their current maturity level, plan the next series of achievable actions, and coordinate technical and financial planning in a coherent manner. By aligning governance, infrastructure, and investment considerations, the roadmap method encourages steady, evidence-based advancement of hydrogen mobility ecosystems within the Alpine area and beyond.

MODULE 4 – INTEROPERABILITY AND INTEGRATION

This module is based on the results of Deliverable 3.2.2, *Strategic framework for interoperability*, which examined how hydrogen systems across the Alpine region can operate in a coherent and mutually compatible way. The document introduced a structured approach to assessing interoperability across four dimensions—technical, regulatory, functional, and business—and proposed a self-assessment framework that regional and national stakeholders can apply to identify and address potential gaps.

The analysis conducted under H2MA showed that, while technological standards are largely progressing toward convergence through European and international norms, operational and regulatory conditions often remain fragmented. Refuelling protocols, for example, are well harmonised at 350 and 700 bar, yet certification systems and safety regulations vary across countries, influencing how infrastructure can be deployed or recognised beyond national borders.

Functional interoperability emerged as another key consideration. As hydrogen mobility depends increasingly on digital coordination—particularly for fleet management, refuelling logistics, and data-driven monitoring—partners highlighted the importance of compatible digital tools and shared data management practices. This was especially relevant for cross-border projects, where common information flows are necessary for planning and reporting purposes.

The self-assessment method developed within H2MA proved a practical tool for addressing these challenges. By using a simple checklist, stakeholders could assess the degree of alignment between their local systems and neighbouring frameworks. This diagnostic process not only highlighted where further work was required but also fostered constructive dialogue among technical experts, policymakers, and business operators. It turned complex integration issues into a set of tangible coordination actions.

Examples from partner experiences helped refine this methodology. During the comparison of national approaches, it became clear that while Austria and Germany shared similar permitting standards, other Alpine countries had differing certification and reporting requirements. These findings led to recommendations for creating joint reference tables and mutual recognition procedures, steps that could later facilitate corridor-level interoperability.

The approach developed in H2MA demonstrates that achieving integration across hydrogen systems is as much a matter of governance as of engineering. Technical compatibility alone is insufficient without coordinated procedures and information exchange. The framework captured in this module therefore offers a balanced view—one that recognises the importance of standardisation while providing practical methods for improving cooperation and decision-making.

By encouraging stakeholders to evaluate their systems across the four dimensions of interoperability, regions can anticipate and address barriers before they impede implementation. The approach is adaptable to different institutional settings and maturity levels, making it a useful starting point for any cross-border or multi-stakeholder hydrogen mobility initiative in the Alpine area or similar regions.

MODULE 5 – POLICY AND HARMONISATION GUIDANCE

This module builds on the work conducted under Deliverable 3.2.3, *Policy harmonisation recommendations*, which examined the diversity of national and regional regulations governing hydrogen production, transport, and use within the Alpine region. The objective of the analysis was to identify where differences in permitting, certification, and safety procedures could hinder cross-border cooperation and to outline practical approaches for improving consistency over time.

Across the partner countries, the comparison revealed a shared ambition to accelerate hydrogen mobility, but also a patchwork of administrative processes. While technical standards were already converging through European norms, procedures for authorisation and certification still varied in scope and duration. Some regions required multiple permits for similar infrastructure, others lacked dedicated hydrogen frameworks altogether. These findings underscored that effective harmonisation depends less on formal alignment than on regular communication between administrations.

In response, H2MA partners developed a structured dialogue format to facilitate this exchange. The method is deliberately simple: it begins with identifying specific regulatory differences, continues with the presentation of each country's rationale, and concludes with a record of feasible short-term adjustments or mutual recognitions. This process proved particularly useful where national competences intersected with regional responsibilities, such as in infrastructure siting and operational safety.

Experience from the cooperation between Slovenia and Austria illustrates how this iterative dialogue can function. The two countries' respective authorities and project partners used the format to clarify certification requirements for refuelling stations planned along shared transport corridors. The sessions helped participants understand each other's administrative logic, reducing duplication of documentation and improving coordination for future investments.

The guidance provided through this module does not aim to impose uniform regulation. Instead, it offers a pragmatic framework that regions and countries can adopt to make their policies more transparent and compatible over time. By combining comparative review with regular dialogue, administrations can identify incremental steps toward alignment while maintaining flexibility to adjust to evolving European frameworks such as the Alternative Fuels Infrastructure Regulation (AFIR) and the Trans-European Transport Network (TEN-T).

Ultimately, the policy harmonisation work carried out within H2MA demonstrates that progress in regulatory convergence begins with access to information and trust among competent authorities. The structured exchange method described here, together with the examples and templates available in this toolbox, provides a foundation for sustained cooperation on hydrogen mobility policy within the Alpine macro-region and other comparable settings.

MODULE 6 – BUSINESS AND INVESTMENT SUPPORT

This module brings together the cross-cutting elements of Deliverables 3.1.2, 3.2.1, and 3.2.2 that concern the economic and partnership dimensions of hydrogen mobility. It focuses on how business actors, public authorities, and financial institutions can coordinate their actions to make hydrogen ecosystems viable and scalable. The experiences collected during H2MA underline that the success of regional hydrogen strategies depends not only on technology and policy alignment, but also on the establishment of durable business models and financing structures.

Throughout the project, several partners tested different approaches to public–private collaboration. These arrangements were not limited to investment in refuelling infrastructure but extended to joint project design, data sharing, and risk management. In many cases, regional authorities acted as facilitators, convening industry partners and research institutions to ensure that planned infrastructure matched real demand from fleet operators and industrial users. This collaborative process helped align investment decisions with public mobility objectives and broader decarbonisation goals.

One notable example emerged from the cooperation between logistics operators and regional administrations in Slovenia and France, where the development of refuelling stations was directly tied to fleet conversion schedules. By linking infrastructure planning with private sector timelines, partners avoided underused capacity and demonstrated the feasibility of shared investment models. Similar approaches were also explored in Austria, where local energy agencies worked with private suppliers to structure co-financing arrangements that combined EU and national funds with private capital.

The business and investment materials included in this toolbox summarise these experiences in the form of adaptable models and reference templates. They include outlines for partnership agreements, indicative timelines for investment readiness, and guidance on how to match funding sources to project maturity. The documents also integrate insights from the interoperability framework, highlighting how standardisation and data transparency can reduce perceived risk for investors.

By addressing both governance and market considerations, this module shows that private participation is not an end-stage addition but a central component of the hydrogen value chain from the outset. When business actors are involved early—through structured dialogue, co-design of roadmaps, and clear governance interfaces—projects tend to progress more rapidly and attract diversified financing. The H2MA experience demonstrated that such coordination strengthens not only investment flows but also mutual understanding between public institutions and market operators.

The approach presented here can be adapted to other regions seeking to attract private investment while safeguarding public interest. It provides a practical reference for structuring dialogue between policy and business communities, identifying funding opportunities, and aligning technological development with economic reality. By integrating these financial and

organisational insights into broader governance and planning processes, regions can advance toward mature, self-sustaining hydrogen ecosystems capable of supporting long-term deployment across the Alpine area and beyond.

3. PRACTICAL USE OF THE TOOLBOX

The toolbox has been designed as a practical resource that regions, public authorities, and business actors can adapt according to their institutional context and level of maturity in hydrogen development. It is not intended as a prescriptive manual but as a collection of approaches and materials that have proven effective in the framework of H2MA. The structure of six interconnected modules allows users to select the elements most relevant to their current needs and to build a coherent process step by step.

In practice, the toolbox can be used sequentially or in parts. Regions beginning to explore hydrogen mobility may find value in starting with the engagement and governance modules, which help organise cooperation and clarify roles. Territories that already possess active hydrogen initiatives can apply the roadmap and interoperability tools to coordinate projects and align them with neighbouring systems. More advanced regions can make use of the policy and business-oriented modules to connect their local strategies with national frameworks, funding instruments, and private investment.

Each module includes examples and references derived from partner experiences, illustrating how different territorial contexts adapted similar methods. The intention is to provide sufficient detail for replication while leaving space for flexibility. Templates, checklists, and dialogue formats can be applied directly or adjusted to fit local administrative procedures. By encouraging structured yet adaptable collaboration, the toolbox supports regions in building continuity between strategic planning and concrete implementation.

The materials presented here also complement the Alpine Collaboration Framework developed under H2MA. While the framework defines a long-term structure for cooperation across the macro-region, the toolbox provides the operational means to implement its principles in daily practice. Used together, they form a coherent system: the framework gives direction, and the toolbox offers the tools to act.

Beyond the project partnership, the toolbox may serve as a reference for other European regions facing similar challenges of coordination, interoperability, and investment in hydrogen mobility. Its modular form allows it to evolve over time, incorporating new lessons, technologies, and policy developments as the hydrogen sector matures. The approach encourages learning through use: as more actors apply and adapt these tools, they contribute to the collective improvement of cooperation models within the Alpine region and across Europe.

CONCLUSION

The *Transferability Toolbox* represents the consolidation of H2MA's collective experience in planning, coordinating, and implementing hydrogen mobility initiatives within the Alpine region. Through six interlinked modules, it transforms a diverse set of deliverables into an operational reference that can support regional and national actors in continuing the work initiated under the project. Its structure mirrors the progression of the H2MA process itself—from building cooperation and governance foundations to addressing interoperability, harmonisation, and investment challenges.

The value of the toolbox lies in its practical orientation. Rather than prescribing a single model, it captures tested methods, templates, and dialogue formats that partners have already used and refined. This approach ensures that lessons from H2MA remain accessible and adaptable, enabling other territories to identify relevant components and integrate them into their own strategies. The emphasis on modularity allows each region to advance at its own pace while maintaining coherence with broader European objectives for hydrogen deployment and sustainable mobility.

The document also reinforces the collaborative vision of the *Alpine Collaboration Framework*, providing the practical means to implement it at operational level. Together, the framework and toolbox establish a foundation for long-term cooperation across administrative and sectoral boundaries. Their combined use will support the continuity of dialogue initiated during H2MA and facilitate the emergence of new joint actions and investment opportunities.

Looking ahead, the methods and insights gathered here can continue to serve as a shared reference for actors engaged in advancing hydrogen mobility across the Alpine macro-region. The toolbox aligns naturally with other initiatives currently active in the field—such as AMETHyST and other Alpine or Interreg projects developing hydrogen corridors, regional clusters, and policy cooperation platforms. By maintaining the open and collaborative spirit that characterised H2MA, these synergies can reinforce a common vision of an integrated, interoperable, and sustainable hydrogen ecosystem for the Alpine Space.