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HyEfRe

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Deliverable 2.5.2 Strategy for social acceptance increase of hydrogen technologies

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PROJECT DETAILS

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SHORT DESCRIPTION

Sector-coupling is a promising approach to replace fossil fuels with renewables. However, this idea of “electrifying” the entire economy requires the rollout of new technologies and rules. The HyEfRe project helps with this by establishing green hydrogen ecosystems in eight regions. Partners will foster an investment-friendly environment for renewable energy and green hydrogen technologies. They evaluate hydrogen potentials with a new model and develop and test a new tool to calculate ideal parameters for technical plants. Their action plan for policy actors will reduce regulatory barriers impeding a timely expansion of renewables and green hydrogen.

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1. INTRODUCTION

1.1. Hydrogen development in Central Europe

Hydrogen is becoming a central pillar of the European Union's climate and energy strategy, especially in sectors that are difficult to electrify, such as heavy industry, long-distance transport, and heating. The EU Hydrogen Strategy, adopted in 2020, calls for the installation of at least 40 GW of electrolysers and the production of up to 10 million tonnes of renewable hydrogen annually by 2030. Central European countries are expected to contribute to and benefit from this ambition, yet their starting points, institutional capacity, and strategic focus vary considerably.

Germany has taken a leading role through its National Hydrogen Strategy, adopted in 2020. With strong support from both government and industry, Germany is targeting 5 GW of domestic green hydrogen capacity by 2030. Public programmes such as HyLand have supported numerous regional and municipal pilot projects, especially in transport and industry. Germany also pursues international hydrogen import agreements to supplement domestic production.

Poland adopted its Hydrogen Strategy in 2021, setting out clear targets for 2030 including 2 GW of hydrogen capacity and 800–1000 hydrogen buses. The strategy is closely linked to Poland's broader energy transformation, especially in coal-dependent regions. While hydrogen has gained attention in urban transport and industry, the regulatory and infrastructure frameworks are still developing, and public understanding of hydrogen remains limited.

Hungary also approved a National Hydrogen Strategy in 2021, with plans to integrate hydrogen into transportation and industrial applications. However, the rollout has been largely driven by state-owned enterprises, with limited civil society involvement. The first public hydrogen refuelling station opened in Budapest in 2024, and several pilot projects are underway, such as the Aquamarine project focused on blending hydrogen into natural gas systems.

Slovenia stands apart as the only country in the region without a standalone hydrogen strategy. While hydrogen is referenced in the revised National Energy and Climate Plan, implementation is limited. The main driver of hydrogen activity is the North Adriatic Hydrogen Valley (NAHV), a cross-border initiative with Croatia and Italy. Aside from this, Slovenia lacks hydrogen infrastructure and clear institutional support, though pilot activities are planned in the transport sector.

Across the region, hydrogen deployment is most advanced in industrial clusters and urban transport systems. Sectoral priorities differ by country, but key focus areas include decarbonising steel and chemical industries, introducing hydrogen buses and trains, and integrating hydrogen into national gas grids. However, several common barriers persist: **high production costs, insufficient infrastructure, limited public awareness, and a lack of coherent regulation.**

European funding programmes such as Horizon Europe, the Recovery and Resilience Facility, and the Just Transition Fund, play a critical role in supporting hydrogen innovation in the region. However, the ability to absorb and strategically deploy these funds varies. Countries like Germany have strong institutional mechanisms in place, while others struggle with administrative complexity and fragmented planning.

Hydrogen development in Central Europe is therefore marked by uneven progress. While some countries are investing in infrastructure and regulatory frameworks, others remain in a preparatory or experimental phase. Regional cooperation, political commitment, and public engagement will be essential for ensuring that hydrogen technologies can be scaled up in a socially acceptable and economically viable way.

1.2. Social acceptance as a key element

The successful deployment of hydrogen technologies in Central Europe depends not only on technological readiness or policy support, but increasingly on public acceptance. Although hydrogen is gaining visibility within climate and energy policy, its social acceptance remains limited, uneven, and often conditional.

In general, public awareness of hydrogen technologies is growing, but understanding of their applications, especially beyond mobility is still shallow. Many people associate hydrogen primarily with fuel cell vehicles or industrial use**, while their role in heating, energy storage, or grid integration remains poorly understood**. Misconceptions about safety, cost, or efficiency further complicate public perception.

Social acceptance is shaped by a variety of factors. Demographically, younger populations tend to be more receptive, informed, and engaged, particularly through digital media and education. Older generations and rural communities, by contrast, are more sceptical or passive, often due to lower exposure to information or experience with energy transition measures. Differences in education level and professional background also influence how hydrogen is perceived those working in innovative or technical sectors tend to show higher levels of acceptance.

Trust in institutions is a major driver of acceptance. Where governments, municipalities or project developers communicate transparently and involve communities early in the planning process, acceptance tends to increase. Conversely, top-down decision-making, lack of information, or absence of local benefits often leads to hesitation or resistance**. The "Not In My Backyard" (NIMBY) effect is a recurring barrier, especially in connection with visible infrastructure like pipelines or refuelling stations**.

Economic considerations also influence attitudes. In regions undergoing industrial transformation or phasing out fossil fuels, hydrogen can be seen either as a threat to traditional employment or as an opportunity for future-oriented development. Public support is stronger when hydrogen is linked to local job creation, energy security, or cleaner urban environments. On the other hand, concerns about affordability, energy prices, and fair distribution of costs may hinder support if not addressed clearly.

Overall, hydrogen is still a relatively new and abstract concept for many citizens. Without structured public engagement and education, acceptance is likely to remain superficial or limited to specific groups. Integrating citizens meaningfully into decision-making, addressing local concerns, and communicating tangible benefits will be essential to building long-term societal support for hydrogen technologies.

2. SUMMARY OF KEY FINDINGS FROM D 2.5.1

2.1. Analysis of public knowledge and attitudes

Public understanding of hydrogen technologies across Central Europe remains relatively limited and uneven. Although the topic has gained visibility in national and European policy debates, public knowledge often lags behind institutional ambition. This disconnect between strategic planning and societal perception represents a crucial challenge for the successful rollout of hydrogen technologies.

One of the most notable findings is the variation in public awareness levels between countries and regions. In areas where hydrogen-related projects are already visible such as pilot buses in urban public transport awareness tends to be higher, especially among residents who have direct experience with such technologies. However, even in these locations, understanding of hydrogen is frequently confined to its

most immediate application, and there is little recognition of its broader role in energy systems or decarbonisation strategies.

A second consistent pattern is **the low level of knowledge regarding green hydrogen**. While many citizens are aware of the term "hydrogen," few are familiar with the differences between production methods, specifically the environmental advantages of hydrogen produced through electrolysis powered by renewable energy. As a result, there is **confusion between hydrogen as a clean technology and hydrogen that may still be fossil-based**. This weakens the perceived credibility of hydrogen as a sustainable energy solution and **complicates communication efforts aimed at promoting its environmental value.**

Concepts such as sector coupling, seasonal storage, or hydrogen's role in balancing intermittent renewable energy sources are largely absent from public discourse. Hydrogen is often perceived as a future-oriented, experimental solution rather than a concrete and scalable part of the present energy transition. This perception is reinforced by the limited presence of hydrogen infrastructure in everyday life, which makes the technology feel abstract or distant.

Sociodemographic factors further influence levels of awareness and attitude formation. Younger people, particularly those between the ages of **18 and 35, tend to have a more positive and informed view of hydrogen**. They are more likely to engage with digital content, participate in climate-related initiatives, and seek out information on emerging technologies. In contrast, middle-aged and older generations often express more scepticism, especially regarding **the safety, cost, and long-term viability of hydrogen**. These groups typically access information through more traditional channels, such as newspapers and television, where hydrogen coverage is still relatively limited or inconsistent.

In addition to age, other variables such as educational background, professional experience, and geographic location play a significant role. Individuals working in technology-driven sectors, research, or public administration are generally more familiar with hydrogen and tend to support its integration into climate strategies. Conversely**, people employed in traditional or declining industries may perceive hydrogen as a potential threat to job security or regional economic stability**. In rural areas, where access to information may be more restricted and the energy transition often viewed with suspicion, hydrogen-related initiatives may face greater resistance unless accompanied by inclusive communication and clear local benefits.

The data also suggest that public attitudes are not yet firmly established. While there is openness to new technologies, most views remain tentative and can be influenced by how hydrogen is presented and implemented. This malleability presents both a risk and an opportunity. **Without structured engagement and tailored information, public opinion may be shaped by misconceptions or fear of the unknown**. At the same time, with the right tools, messaging, and participatory processes, public support for hydrogen can be strengthened and sustained.

Overall, the findings point to the need for a long-term public engagement strategy that recognises knowledge gaps and targets specific groups with appropriate content, language, and platforms. Increasing public understanding is not merely about providing facts but about embedding hydrogen within a broader narrative of economic transformation, energy security, and environmental responsibility. Only then can hydrogen transition from being a niche policy topic to a socially accepted pillar of the green economy.

2.2. Public and stakeholder engagement

Engagement with the public and key stakeholders is a critical factor in determining whether hydrogen technologies will be successfully implemented and accepted in Central Europe. Despite the growing policy attention and investment in hydrogen, meaningful and inclusive engagement remains limited across the region. Current approaches are often top-down, fragmented, or focused primarily on technical and institutional actors, leaving significant gaps in communication with local communities and civil society.

One of the main challenges is the **lack of established channels through which citizens can become involved in hydrogen-related planning or decision-making**. In most cases, information about hydrogen strategies, infrastructure development, or pilot projects is shared through institutional reports, press releases, or sectoral events, with little effort to translate this information into accessible and relatable formats. Public consultations, if organised at all, tend to be late-stage formalities rather than participatory processes that allow citizens to influence key decisions. Introducing earlier engagement formats such as community workshops or citizen advisory panels could help integrate local perspectives before major decisions are made.

Stakeholder engagement, particularly with municipalities, private sector representatives, and academia, has been more structured. In some countries, hydrogen-related working groups or expert platforms have emerged to support the development of strategies and action plans. These often include energy providers, industrial associations, and research institutions. However, these platforms usually operate at the national level and are not sufficiently integrated with regional or local actors, where many of the most sensitive implementation issues arise especially around infrastructure siting, land use, or community benefits.

The absence of local ownership is a recurring weakness. **When people do not feel that they are part of the process or that their concerns are taken seriously, resistance tends to grow even in cases where general attitudes toward hydrogen are positive**. Moreover, if benefits are perceived as abstract or external, and risks as immediate and local, support can quickly turn into opposition. This imbalance reinforces the importance of **early-stage, site-specific engagement that is built on dialogue**, transparency, and mutual learning.

Private companies, particularly in the industrial and transport sectors, have started to recognise the importance of social license to operate. However, their engagement efforts are often limited to communication rather than collaboration. For example, public announcements of new hydrogen investments or partnerships may be well-publicised, but they rarely include opportunities for dialogue or co-design with affected communities. This approach may satisfy regulatory requirements but does little to build lasting trust.

At the same time, civil society organisations, educational institutions, and local initiatives remain largely underutilised in the hydrogen discourse. These actors have the potential to bridge the gap between technical expertise and community concerns, but they often lack the resources, mandates, or platforms to do so effectively. Strengthening their role could significantly improve both the legitimacy and responsiveness of hydrogen strategies.

In some regions, promising examples of participatory models are beginning to emerge such as hydrogen valleys that include public workshops or city-level projects where local feedback is incorporated into infrastructure planning. These cases demonstrate that engagement is not only feasible but beneficial for identifying local priorities, addressing misinformation, and ensuring the long-term viability of projects. However, such examples remain the exception rather than the rule.

In conclusion, the current state of public and stakeholder engagement in hydrogen development is insufficient to support the scale and pace of transition envisioned by national and European policies. A shift is needed from information dissemination to structured participation. This requires institutional commitment, dedicated resources, and the design of inclusive engagement mechanisms that operate not just at the national, but especially at the local level, where social acceptance will ultimately be tested.

2.3. Technology readiness assessment

The technological readiness of hydrogen systems in Central Europe reflects a growing policy and investment momentum, but with major differences between sectors and countries. While hydrogen is

gaining strategic importance across the region, most applications remain in the early or pilot phase, and full-scale commercial deployment still limited.

In the industrial sector, hydrogen use is most advanced, particularly in refining and chemical production. Grey hydrogen, produced via steam methane reforming, has long been used in these sectors. However, the transition to low-carbon or green hydrogen is only beginning. Although some facilities, such as Germany's Thyssenkrupp or Hungary's MOL refinery have started to integrate green hydrogen into their operations, widespread adoption is still constrained by high production costs, regulatory uncertainty, and the need for additional renewable energy capacity. Pilot projects exist, but they are typically dependent on public subsidies and have not yet reached market maturity.

In the transport sector, readiness is growing, particularly in public mobility systems. Germany leads with over 100 operational hydrogen refuelling stations and a growing number of fuel cell bus fleets. Poland has deployed or tested hydrogen buses in more than twenty cities, and Hungary and Slovenia are initiating pilot projects for public transport. However, technical limitations, limited refuelling infrastructure, and procurement costs remain key barriers to expansion. The uptake in freight or private mobility is still minimal due to infrastructure gaps and lack of vehicle availability.

The energy sector shows the lowest overall readiness for hydrogen integration. In most Central European countries, there are few or no operational green hydrogen production facilities. Grid compatibility issues, lack of large-scale storage solutions, and minimal blending capabilities within gas networks hinder progress. Germany has made significant planning steps with initiatives such as the H_2-Kernnetz and pilot electrolysis sites, but other countries remain at the conceptual or preparatory stage. Slovenia, for example, has no hydrogen-ready gas infrastructure or operating electrolysis capacity, while Hungary has only recently initiated blending trials of up to 2% hydrogen in the natural gas grid.

National strategies have played a role in defining technological priorities and targets, but implementation is uneven. Germany and Poland have clearly defined hydrogen strategies with measurable goals for production capacity, vehicles, and infrastructure. Hungary also has an ambitious roadmap, though its execution is delayed. Slovenia remains without a standalone hydrogen strategy, relying instead on references within broader climate planning documents.

Overall, the region demonstrates technological potential and political commitment, but readiness is highly sector and country specific. The main barriers include high capital expenditure, insufficient infrastructure, regulatory uncertainty, and the need to align hydrogen development with renewable energy expansion. Without addressing these structural challenges, hydrogen will struggle to scale beyond isolated pilots and policy vision statements.

2.4. Perception in individual sectors

Perceptions of hydrogen technologies vary significantly between sectors, depending on their visibility, practical relevance to the public, and the maturity of applications. While general attitudes toward hydrogen are cautiously optimistic, acceptance tends to be stronger in areas where tangible benefits are visible and where the public has prior exposure to related initiatives.

In the transport sector, hydrogen enjoys relatively favourable perception, particularly when associated with clean public transport solutions. Fuel cell buses, which are already operating or being tested in several cities across the region, have contributed to positive attitudes, especially due to their contribution to improving urban air quality and reducing noise pollution. These projects are often publicly funded and linked to broader climate goals, making them more accessible and visible to the general population. However, issues related to refuelling infrastructure availability, high procurement costs, and operational reliability can temper enthusiasm if not clearly addressed.

In contrast, residential applications of hydrogen such as heating or decentralised energy supply are met with more scepticism. In most cases, the public has limited awareness or experience with these use cases. Concerns about safety, cost-effectiveness, and the complexity of integrating hydrogen into existing household systems are common. In countries where hydrogen is virtually absent from residential energy discourse, it is often perceived as unnecessary or too experimental. This perception is reinforced by the lack of pilot projects or demonstration efforts aimed at household or community level use.

The industrial sector benefits from a generally more pragmatic perception. Hydrogen is increasingly seen as a necessary tool for decarbonising emission-intensive industries such as steelmaking, chemicals, and fertiliser production. However, this view is largely driven by industry stakeholders, policymakers, and experts, rather than the general public. Among lay audiences, the role of hydrogen in industrial decarbonisation remains abstract and disconnected from daily life, unless accompanied by narratives linking it to economic renewal, job preservation, or innovation.

In the energy sector, public perception is more ambivalent. While hydrogen is often acknowledged in policy documents as a component of future energy systems, its role as a balancing and storage medium is not well understood by the wider public. In particular, blending hydrogen into gas grids, using it for electricity generation, or storing renewable energy in hydrogen form are concepts rarely communicated in a way that resonates with citizens. Without clear local examples or communication about system level benefits, hydrogen in the energy context tends to remain a vague or peripheral idea in the public mind.

Overall, sectoral perception is closely linked to three factors: the degree of familiarity, the clarity of communicated benefits, and the presence of real-life demonstrations. When hydrogen is presented through concrete, localised, and relatable projects such as city buses or industry decarbonisation plans - it is more likely to be accepted or supported. In sectors where hydrogen remains invisible or highly technical, public understanding and engagement remain limited.

To improve perception across all sectors, future communication efforts must go beyond abstract policy goals and focus on the tangible, everyday implications of hydrogen deployment. This includes explaining how hydrogen technologies can reduce emissions, support job creation, and improve local living conditions, while also addressing concerns about cost, safety, and fairness.

2.5. Identified barriers

The widespread adoption of hydrogen technologies in Central Europe faces several interconnected barriers. These obstacles stem from technical, institutional, economic, and social dimensions, and they must be addressed to ensure that hydrogen can fulfil its role in the clean energy transition. Based on the findings of D.2.5.1, the following categories of barriers are most prominent:

High costs and limited economic viability

Green hydrogen production remains significantly more expensive than conventional energy alternatives. High capital expenditure (CAPEX) for electrolysers, infrastructure, and refuelling stations, as well as operational costs (OPEX), limit the competitiveness of hydrogen without sustained public support or market incentives.

Lack of public awareness and understanding

Many citizens are unfamiliar with the basics of hydrogen technology, its benefits, and its risks. Misconceptions about safety and unclear information contribute to public scepticism or passivity. Without targeted communication, hydrogen remains an abstract or misunderstood concept for most people.

Fragmented and overly technical communication

Hydrogen-related messaging is often fragmented across institutions and presented in expert language. This leads to confusion or disengagement, particularly among non-specialist audiences. Terminology inconsistencies (e.g. “green” vs. “low-carbon” hydrogen) further hinder public understanding.

Regulatory uncertainty and administrative complexity

In many cases, national and regional frameworks lack clear permitting procedures, safety standards, and incentives for hydrogen deployment. This regulatory ambiguity slows down project planning and deters private investment, while also making it difficult to communicate concrete timelines to the public.

Limited stakeholder coordination

Collaboration between public authorities, industry, academia, and civil society is still weak in many countries. Hydrogen initiatives are often developed in silos, without mechanisms for inclusive dialogue or participatory governance. This reduces legitimacy and weakens public trust.

Social resistance at the local level (NIMBY effect)

Even where national support exists, local communities may resist the development of hydrogen infrastructure especially when they feel excluded from decision-making or perceive the risks to outweigh local benefits. This is particularly relevant for storage sites, pipelines, and refuelling stations.

Inequitable access and uneven territorial distribution

Hydrogen development is currently concentrated in urban centres and industrial hubs, leaving peripheral and rural regions behind. Without deliberate inclusion, the benefits of hydrogen may be unevenly distributed, reinforcing regional disparities and limiting acceptance in underserved areas.

These barriers highlight the importance of not only developing the technology and infrastructure for hydrogen, but also building the social, institutional, and communicative frameworks necessary for its acceptance. Addressing these issues requires a coordinated, transparent, and inclusive approach that combines policy action with sustained community engagement.

3. SETTING KEY STRATEGIC OBJECTIVES

To guide the development of effective and socially accepted hydrogen technologies in Central Europe, this chapter defines a set of strategic objectives that address the key challenges identified in the assessment. These objectives provide a clear framework for action and prioritisation, ensuring that public engagement, awareness, transparency, and cooperation remain at the core of the transition.

3.1. Increase public awareness

I. By the end of 2026, promote at least 10 hydrogen-related success stories and pilot projects across Central Europe through media and public events.

- To build stronger public familiarity and confidence in hydrogen technologies, it is essential to make existing initiatives more visible and relatable. By the end of 2026, the strategy aims to promote **at least 10 hydrogen-related success stories and pilot projects** from across Central Europe, highlighting their benefits, challenges, and local impact. These stories will be disseminated through mainstream media, social networks, exhibitions,

and community-based public events. Projects selected for promotion should reflect sectoral diversity (e.g. transport, industry, heating), geographic balance, and real-world outcomes. Preference should be given to initiatives that involve local stakeholders, create employment, or demonstrate measurable environmental benefits.

The goal is to shift hydrogen from an abstract concept to a tangible solution rooted in real people's experiences. Communicating positive examples can strengthen public trust, reduce fear of the unknown, and inspire further community engagement in upcoming projects.

II. **Increase the share of EU citizens who feel rather familiar with hydrogen from 29% (baseline 2023) to at least 45% by the end of 2027, as measured by Eurobarometer or equivalent public surveys, through targeted communication campaigns and public education initiatives.**

- A key objective is to measurably increase the general public's familiarity with hydrogen technologies. According to Eurobarometer data from 2023, only 29% of EU citizens report being somewhat familiar with hydrogen. To foster informed public discourse and enable meaningful participation in the energy transition, this share should rise to **at least 45% by the end of 2027**.

  Achieving this goal will require **coordinated communication campaigns** and public **education initiatives**, tailored to different socio-demographic groups and national contexts. Messaging should focus on explaining hydrogen in practical, accessible terms how it is produced, how it is used, how it contributes to climate goals, and how it affects people's lives. In particular, efforts should clarify the distinction between green, blue, purple and grey hydrogen and address common misconceptions about safety and cost.

  Channels will include **mass media, social media, public transport advertising, and educational outreach in schools, libraries, and community centres**. Materials will be adapted to different literacy levels and translated into national and minority languages where relevant.

  Progress toward this objective will be tracked using recognised public opinion surveys such as **Eurobarometer** or equivalent national polling, with interim evaluations conducted at two-year intervals to adjust campaign strategies as needed.

  This indicator provides a clear and comparable benchmark for assessing the visibility and effectiveness of hydrogen-related communication across the region.

III. **Launch a regionally tailored awareness campaign by Q2-Q4 2026, aimed at three key groups: Residents of small municipalities and rural regions, municipal and regional policy-makers, employees in the transport and logistics sectors.**

- This objective pillar is to ensure that communication efforts are not only broad in reach, but also regionally and socially targeted. **By Q2 to Q4 of 2026**, the strategy aims to **launch a regionally tailored awareness campaign** that addresses the specific informational needs and concerns of three key target groups:

  Residents of small municipalities and rural regions, who may have limited exposure to hydrogen technologies and where local infrastructure projects may provoke uncertainty or resistance. The campaign will focus on tangible community benefits such as cleaner air, local jobs, and energy resilience, using local channels (e.g. municipal newsletters, town halls, rural radio).

Municipal and regional policy-makers, who play a critical role in permitting, planning, and public communication, yet often lack clear guidance or access to neutral, user-friendly information. The campaign will include targeted briefings, toolkits, and region-specific case studies to support evidence-based local decision-making.

Employees in the transport and logistics sectors, who are both implementers and potential ambassadors of hydrogen solutions. Engagement will take the form of workplace seminars, sectoral media content, and visual campaigns in depots, terminals, and service areas.

The campaign will be developed in cooperation with **regional authorities, sectoral organisations, and civil society actors**. Its impact will be evaluated based on reach (number of individuals engaged), relevance (feedback surveys), and behavioural indicators (e.g. participation in follow-up events or consultations).

By tailoring messaging to the real contexts and concerns of specific groups, this campaign seeks to move beyond non-specific promotion and toward localised, inclusive communication that resonates with diverse audiences across Central Europe.

3.2. Citizen participation in decision-making

I. Establish structured citizen engagement processes (e.g. local workshops, advisory panels) in at least 20 hydrogen infrastructure projects by 2028.

- An essential component of building social acceptance is enabling citizens to actively participate in the decisions that affect their communities. To move beyond symbolic consultation and toward meaningful involvement, the strategy sets the objective to establish structured citizen engagement processes in **at least 20 hydrogen infrastructure projects** by **2028**.

  These processes should be integrated into the early planning phases of hydrogen initiatives particularly for projects involving the construction of production sites, refuelling infrastructure, or pipelines. Engagement formats may include local workshops, citizen advisory panels, participatory mapping sessions, or digital consultation platforms. The aim is not only to collect feedback, but to shape project design in response to local concerns and aspirations.

  Projects selected for this requirement should represent a diversity of regional contexts, including urban, semi-urban, and rural settings, as well as different sectors (e.g. transport corridors, industrial zones, community heating systems). Emphasis should be placed on transparency, accessibility, and inclusion ensuring participation from traditionally underrepresented groups such as youth, elderly, and minority communities.

  To support quality and consistency, a common methodology for citizen engagement should be developed, including guidelines on communication, documentation, and integration of public input into decision-making.

  By embedding participatory mechanisms directly into project governance, this measure aims to foster trust, reduce resistance, and improve the long-term viability of hydrogen investments.

II. Ensure community input is formally integrated into planning documents in 100% of new publicly funded hydrogen initiatives starting in 2028

A second key objective is to institutionalise the role of public input in the planning and approval process for hydrogen projects. **Starting in 2028**, all new publicly funded hydrogen

initiatives should be required to formally integrate community input into their official planning documentation.

This means that project developers must not only conduct outreach activities, but also demonstrate how feedback from residents, local organisations, and other stakeholders has been considered and addressed in project design, location choices, impact mitigation, or implementation timelines. Consultation summaries, response matrices, and adjusted plans should be publicly available and included in submissions for permitting and funding.

This requirement should apply across all sectors transport, energy, industry and cover a range of interventions from infrastructure development to pilot applications. By making this integration a mandatory condition for public support, the strategy aims to promote genuine responsiveness and accountability in project governance.

To support implementation, national guidelines should be developed that define minimum standards for engagement quality, reporting formats, and review mechanisms. Oversight can be provided by independent bodies such as regional planning authorities or national hydrogen agencies.

This measure reinforces the principle that social acceptance is not just a communication issue, but a structural requirement that must be embedded in how projects are conceived, assessed, and approved.

3.3. Ensuring effective cooperation between key actors

I. Organise annual stakeholder forums (involving local governments, academia, and private sector) starting in 2027, to ensure regular exchange of knowledge, address emerging challenges, and coordinate implementation efforts.

- Effective cooperation across sectors and governance levels is essential for the successful rollout of hydrogen technologies. To strengthen coordination, knowledge exchange, and collective problem-solving, this strategy sets the objective to **organise annual stakeholder forums** starting in **2027**.

  These forums will serve as structured platforms for dialogue between **local and regional governments**, **academic institutions**, **the private sector**, **and civil society**. Their purpose is:

  - to exchange practical experiences from ongoing hydrogen projects and pilot activities,
  - to jointly identify and address emerging challenges such as regulatory gaps, workforce shortages, or infrastructure bottlenecks,
  - to align local and regional strategies with national and EU-level objectives.

  The forums should be hosted in rotating locations across Central Europe and facilitated by neutral institutions such as regional development agencies, hydrogen clusters, or university-based innovation centres. They may include workshops, thematic working groups, matchmaking sessions, and public-facing panels.

  Outcomes of each forum including recommendations and good practices should be documented and shared with national coordination bodies and EU-level platforms, ensuring that lessons learned inform broader policy development.

Over time, these forums will help to build a strong cross-border community of practice around hydrogen deployment and reinforce mutual trust between actors who may otherwise operate in parallel or isolation.

II. **Create multi-stakeholder working groups that will coordinate the planning, communication and implementation of hydrogen projects starting in 2027, with the active involvement of local communities, industry, academia and government institutions.**

- In addition to periodic regional forums, there is a need **for permanent coordination structures** that can provide continuity, local insight, and operational support throughout the lifecycle of hydrogen initiatives. To that end, the strategy set the **objective to create multi-stakeholder working groups** starting in **2027**.

  These working groups should be established at regional or project-cluster level and include **representatives from local communities**, **private industry**, **academia**, **and relevant government institutions**. Their mandate will be to:

  - coordinate the planning and roll-out of hydrogen infrastructure,
  - advise on public communication strategies and engagement formats,
  - monitor implementation progress and anticipate emerging risks,
  - serve as intermediaries between project developers and the broader public.

  The composition of each group should reflect the local context and ensure **diversity of expertise and perspectives**, including gender balance and participation of youth or minority voices where possible. Their operations should be transparent, with regular public reporting and the option for external observers to attend meetings.

  To support their effectiveness, national hydrogen authorities or funding programmes should provide capacity-building, facilitation training, and technical backstopping. These working groups will serve as a practical mechanism to translate strategic cooperation into everyday governance and build local ownership around hydrogen investments.

3.4. Improving transparency and trust

I. **Ensure that 100% of large-scale hydrogen projects (with budgets exceeding €100 million) publicly release their environmental and social impact assessments at least 3 months prior to the start of public consultations, starting from 2027.**

- Transparency is a cornerstone of public trust in complex infrastructure projects. To improve the credibility and accountability of hydrogen deployment, this strategy sets the objective that **100% of large-scale hydrogen projects:** defined as those with **budgets exceeding EUR 100 million must publicly release their environmental and social impact assessments (ESIAs) at least three months prior to the start of public consultations**, starting from **2027**.

  This advance publication will allow communities, local authorities, NGOs, and other stakeholders to review and assess the potential consequences of proposed projects before participating in official consultation processes. It ensures that dialogue is informed and that

concerns can be raised in a timely manner, rather than after key design decisions have already been made.

The published assessments should include **clear summaries, non-technical language versions, and visual materials** (e.g. maps, diagrams, infographics) to make complex data understandable for non-experts. Accessibility must also be ensured both online and in physical locations (e.g. municipal offices, libraries).

Compliance with this requirement should be monitored by national permitting authorities and linked to project eligibility for public funding or European co-financing. By setting this transparency standard, the strategy aims to institutionalise openness as a basic expectation of large-scale hydrogen development, thereby reinforcing public confidence and legitimacy.

II. **Introduce a standardized public feedback mechanism (both online and in-person) for every environmental and social impact assessment of hydrogen project above €50 million, with a mandatory minimum 30-day public comment period, starting from Q1 2027.**

- To complement early disclosure of impact assessments, this strategy also calls for the introduction of a standardised public feedback mechanism for all hydrogen projects with a budget **exceeding EUR 50 million**, starting in **Q1 2027**. This mechanism must be made available both online and in-person, and accompanied by a **mandatory minimum 30-day** public comment period.

  This measure ensures that citizens, stakeholders, and affected communities have a formal and accessible channel through which to voice concerns, raise questions, or propose alternatives related to project impacts. Feedback should be accepted via dedicated web portals, email, postal submissions, and public hearings, with particular attention to inclusion of underrepresented groups and those with limited digital access.

  To ensure the quality and credibility of the process:

  - Project developers must publish a public response document summarising the input received and explaining how each point was addressed or considered in the final design.
  - All public comments and responses must remain accessible throughout the project lifecycle, including during construction and early operation phases.
  - Facilitation support (e.g. FAQs, help desks, translation services) should be provided for complex or technical documents.

  This standardised process should be embedded in national permitting or funding frameworks and aligned with broader environmental assessment legislation, enabling both procedural consistency and increased transparency. Ultimately, it will strengthen the legitimacy of large-scale hydrogen infrastructure and support a culture of open, inclusive decision-making.

3.5. Investment in education

I. **Establish partnerships with at least 100 universities by 2027 to create hydrogen research and innovation hubs, supported through joint funding schemes, dedicated research grants, student internship programs, and access to pilot testing facilities.**

- To ensure a skilled workforce and support innovation throughout the hydrogen value chain, this strategy sets the objective to establish partnerships with **at least 100 universities** across Central Europe **by 2027**, aimed at creating hydrogen research and innovation hubs.

  These hubs will serve as engines of scientific progress, technology validation, and workforce training. They will be supported through joint funding schemes, dedicated research grants, and public-private partnerships that link academia with energy providers, industry, and government institutions.

  Each hub should provide:

  - targeted hydrogen R&D programmes across disciplines (engineering, chemistry, energy systems, public policy),
  - access to pilot testing facilities (electrolysers, storage systems, mobility labs),
  - opportunities for student internships, applied theses, and field placements in hydrogen-related projects,
  - engagement with local schools, public authorities, and businesses to create broader regional impact.

  These partnerships should be coordinated through national innovation agencies and supported by EU programmes such as Horizon Europe, Interreg, or the Innovation Fund. Special attention should be given to ensuring regional diversity and the inclusion of universities from less industrialised areas.

  By embedding hydrogen into higher education and research infrastructures, this measure will help develop the human capital and technical foundations necessary for a competitive and inclusive hydrogen economy.

II. **Launch upskilling programs for at least 5,000 workers in energy-intensive industries (steel, chemicals, heavy transport) by the end of 2028, with certified training modules co-developed with industry associations and vocational institutions.**

- Key objective is to prepare the current workforce for the transition to a hydrogen-based economy, particularly in sectors that are most affected by decarbonisation. To this end, the strategy aims to launch upskilling programmes for at least 5,000 workers from energy-intensive industries including steelmaking, chemical production, and heavy transport by the **end of 2028**.

  These programmes will offer certified training modules focused on hydrogen safety, system operation, maintenance, and integration with existing industrial processes. Training content will be co-developed with industry associations, vocational education providers, and technical universities, ensuring that curricula are aligned with real market needs and technological developments.

  Delivery formats will include:

  - short-term intensive courses for current employees,
  - on-site training linked to specific demonstration projects,
  - hybrid and e-learning options to increase accessibility.

Where possible, training should be embedded in just transition strategies and supported through public-private funding mechanisms, including EU social and regional development funds.

By proactively addressing the skills gap, this measure will strengthen economic resilience, support social equity in industrial regions, and help position Central Europe as a leader in hydrogen expertise and innovation.

4. PROPOSED MEASURES

Building on the strategic objectives, this chapter outlines specific measures designed to operationalise the goals of the strategy. These proposed actions provide practical guidance for policymakers, project developers, and community actors, ensuring that hydrogen deployment is accompanied by inclusive communication, public engagement, and targeted investment in skills and awareness.

4.1. Increase public awareness

To effectively raise public awareness and understanding of hydrogen technologies, this strategy proposes a set of complementary measures that translate the strategic objectives outlined in section 3.1 into concrete actions. These measures target both broad visibility and specific audience engagement, with a focus on showcasing real-world benefits, correcting misconceptions, and embedding hydrogen in everyday discourse.

I. Promote hydrogen-related success stories and pilot projects

- To build familiarity and public trust, a selection of at least ten successful hydrogen projects will be identified and documented by the end of 2026. These should cover a variety of sectors (e.g. public transport, industrial decarbonisation, energy storage) and regional contexts. The selected cases will be communicated through coordinated campaigns that include short videos, press articles, podcast episodes, and site visits. Campaigns will be supported by national and regional governments, with materials made available to municipalities and educational institutions for local adaptation and reuse.

II. Launch targeted campaigns to raise familiarity from 29% to 45% by 2027

- To reach this measurable awareness goal, a multi-channel communication strategy will be implemented starting in 2026. It will include traditional and digital media content, myth-busting toolkits, and infographics explaining hydrogen production, use, safety, and benefits. Messaging will be adapted by age group, education level, and region. National statistics offices or academic partners will be engaged to conduct baseline and follow-up surveys aligned with Eurobarometer methodology to evaluate progress. Materials will be translated into relevant languages and delivered in accessible formats.

III. Deliver regionally tailored awareness campaigns in 2026

- Between Q2 and Q4 of 2026, regionally adapted campaigns will be deployed targeting three key audiences:

- **Residents of small municipalities and rural areas** throughout, community events, and mobile exhibitions;
- **Municipal and regional policy-makers**, via dedicated briefings, regional seminars;
- **Employees in transport and logistics**, using workplace posters, sectoral media and training centres.

Local NGOs, schools, and chambers of commerce will be invited as multipliers to increase reach and credibility. Regional hydrogen coordinators (where available) will support campaign logistics and monitoring.

All awareness measures will include visual branding aligned with national hydrogen strategies to create consistency and recognisability across all communication formats.

4.2. Citizen participation in decision-making

To foster public ownership, reduce local opposition, and strengthen the democratic legitimacy of hydrogen projects, this strategy proposes a set of measures that embed citizen involvement into both project planning and policy development processes. These actions are aligned with the strategic objectives set out in section 3.2 and aim to create structured, transparent, and inclusive engagement opportunities at multiple levels.

I. Structured citizen engagement in hydrogen projects

- Starting in 2025, public authorities and project developers will be encouraged and for publicly funded projects, required to establish structured citizen engagement formats in all major hydrogen infrastructure developments. These may include moderated local workshops, citizen advisory panels, online forums, or participatory mapping sessions**. By 2028**, at least **20 hydrogen infrastructure projects** across Central Europe should integrate these formats into their planning processes. Engagement will take place in the early design phase and include feedback loops that ensure local concerns are documented, addressed, and publicly responded to.

  Guidelines for quality engagement, including templates, facilitation tools, and inclusion standards, will be developed by national hydrogen agencies or designated bodies and shared across regions.

II. Formal integration of community input into planning

- From **2028 onwards**, all **new publicly funded hydrogen initiatives** must provide formal evidence of how community input has been integrated into planning documentation. This includes publishing a summary of engagement processes, responses to feedback, and adjustments made as a result. This documentation will be submitted alongside environmental or technical project assessments and be reviewed as part of permitting and funding evaluations.

  To facilitate this, a standardised public input annex will be introduced as part of national hydrogen project templates. Local authorities and developers will receive technical assistance in how to compile and communicate this material. The objective is to embed

participation not just as a procedural step, but as a substantive part of project governance.

These measures aim to shift the current practice from reactive consultation toward co-creation, where citizens play a meaningful role in shaping the hydrogen transition from the ground up.

4.3. Ensuring effective cooperation between key actors

The complexity of hydrogen deployment requires strong coordination across government levels, sectors, and stakeholder groups. To support structured cooperation and avoid fragmented implementation, this strategy outlines measures that bring together public authorities, industry, academia, and local communities through institutionalised platforms and dialogue formats.

I. Annual regional stakeholder forums from 2027

- Beginning in **2027**, national or regional governments will organise **annual stakeholder forums** focused on hydrogen development. These events will provide a recurring platform for **municipal and regional governments**, **universities and research institutions**, **the private sector**, **and civil society** to exchange knowledge, present progress, and identify bottlenecks.

  Each forum will include technical workshops, policy dialogues, and collaborative planning sessions. Outputs will be summarised in annual reports that feed into national strategy updates and EU-level coordination efforts. Forums may be hosted on a rotating basis among key hydrogen regions, with support from national hydrogen agencies and European funding where appropriate.

II. Multi-stakeholder working groups for project-level coordination

- At the beginning **2027**, **multi-stakeholder working groups** will be established to support the planning, communication, and implementation of regional hydrogen projects. These groups will include representatives from **local governments**, **hydrogen developers**, **research and training institutions**, **civil society**, **and community members**.

  Their tasks will include:

  - aligning project objectives with local and regional development plans,
  - reviewing and advising on communication strategies,
  - facilitating links between public institutions and private partners,
  - acting as a contact point for public inquiries and concerns.

Participation in these groups will be voluntary but encouraged through funding conditions and policy guidance. National authorities will provide facilitation support and training to ensure balanced representation and productive dialogue.

Together, these cooperation mechanisms aim to foster long-term, trust-based relationships between key actors and prevent siloed project development. They will help align technical ambitions with social and territorial realities, ultimately improving project effectiveness and public legitimacy.

4.4. Improving transparency and trust

Transparency and trust are foundational to public support for new technologies especially when large-scale infrastructure is involved. Hydrogen projects must demonstrate clear environmental and social responsibility, and citizens must have access to relevant information early enough to meaningfully engage. The following measures translate these principles into enforceable standards and operational tools.

I. Early publication of environmental and social impact assessments (ESIAs)

- Starting in **2027**, all **hydrogen projects with budgets exceeding 50 million EUR** will be required to **publicly release their environmental and social impact assessments (ESIAs) at least three months before the start of official public consultations**. This measure applies to both new infrastructure and large-scale retrofits involving hydrogen integration.

  The assessments must be published in non-technical summaries and made available online as well as in physical locations within affected communities (e.g. municipal offices, libraries). Each ESIA should include visual aids (maps, diagrams), risk summaries, mitigation strategies, and contact information for inquiries.

  Compliance with this requirement will be monitored by national permitting authorities and should be linked to eligibility for public or EU co-financing.

II. Standardised feedback mechanisms for large-scale projects

- For projects exceeding **50 million EUR**, developers will also be required starting in **Q1 2027** to implement a **standardised public feedback mechanism**.

  This includes:

  - **A minimum 30-day comment period**,
  - Multi-channel feedback options (online forms, postal submissions, in-person drop-boxes, public hearings),
  - Publication of a **formal response document** summarising all feedback received and explaining how it was addressed.

Communication officers should ensure accessibility for vulnerable populations and provide translation or simplification services where needed. National hydrogen agencies will provide templates and procedural guidelines to ensure consistency across projects and jurisdictions.

Together, these measures aim to normalise open communication as a basic expectation in hydrogen project development reducing suspicion, building legitimacy, and enabling collaborative solutions in response to public concerns.

4.5. Investment in education

A skilled and informed workforce is essential for the long-term sustainability and competitiveness of hydrogen technologies in Central Europe. To avoid bottlenecks in implementation and ensure inclusive access to new opportunities, this strategy promotes a dual focus on higher education and vocational training, aligned with labour market needs and regional development goals.

I. **University partnerships for innovation hubs**

- By **2027**, national and regional authorities will support the creation of **hydrogen research and innovation hubs** through **partnerships with at least 100 universities**.

  These hubs will:

  - Conduct interdisciplinary research (engineering, environmental science, energy policy),
  - Provide access to **pilot testing facilities**,
  - Offer **student internships**, **thesis placements**, and applied innovation projects in cooperation with industry,
  - Host public outreach events and collaborate with schools and municipalities.

  Funding instruments may include joint programmes supported by national R&I agencies, European funds (Horizon Europe, Innovation Fund), and private-sector contributions. Priority will be given to institutions in transition regions or areas with limited innovation capacity.

II. **Upskilling programmes for industrial workforce**

- To ensure a just transition for workers in high-emission sectors, governments together with industry and vocational institutions will launch **certified upskilling programmes targeting at least 5,000 workers in steel, chemical, and heavy transport industries by the end of 2028**.

  Training will cover hydrogen safety, system maintenance, operations, and integration with existing processes. Curricula will be co-designed with industry associations to reflect real-world operational needs and provide recognised qualifications. Programmes will be delivered in hybrid formats (on-site, online, modular), with emphasis on accessibility for workers in coal-intensive or structurally weak regions.

  National hydrogen agencies or transition taskforces will coordinate implementation and ensure alignment with broader workforce development and decarbonisation strategies.

  By combining investment in academic research with practical skill-building, these measures will help position Central Europe as a hub of hydrogen excellence, while supporting regional cohesion and social equity.

5. STRATEGIC RECOMMENDATIONS

To ensure the long-term success and societal acceptance of hydrogen technologies in Central Europe, it is essential to embed the proposed measures within a broader framework of strategic principles and enabling conditions. The following recommendations outline the key governance, communication, and coordination mechanisms that should guide implementation efforts.

5.1. Establish a coherent national communication framework

Effective public communication and engagement require more than isolated campaigns they demand a coherent framework that provides consistency, clarity, and institutional support. Member states should

therefore establish **national hydrogen communication and engagement frameworks** that align messaging, mobilise actors, and enable local implementation.

These frameworks should include:

- **Clear division of responsibilities**: Define the roles of national ministries, regional authorities, hydrogen agencies, and communication bodies in the design, delivery, and evaluation of public outreach efforts.
- **Shared terminology and branding**: Promote consistent use of key terms (e.g. "green hydrogen"), visual identity, and storytelling narratives to prevent confusion and increase recognisability. This should be reflected across public websites, printed materials, media content, and school resources.
- **Support tools for local actors**: Provide municipalities and project developers with ready-to-use toolkits including templates for brochures, posters, presentations, social media content, and FAQs, adaptable to local contexts.
- **National contact points for engagement**: Establish expert teams or liaison officers to assist with communication planning, stakeholder mapping, and crisis response during sensitive project phases (e.g. infrastructure siting).
- **Mechanisms for continuous learning**: Integrate public perception monitoring (e.g. surveys, media analysis, feedback tracking) into communication planning cycles to adjust strategies based on evolving needs and concerns.

This framework should be anchored in national hydrogen strategies and coordinated across sectors (energy, transport, education, innovation) to ensure coherence. It should also be linked to European initiatives (e.g. Clean Hydrogen Partnership, Hydrogen Europe campaigns) to leverage shared resources and increase visibility.

By institutionalising communication and engagement as part of hydrogen governance, governments can reduce fragmentation, build public trust, and empower regional and local actors to lead community-level dialogues with confidence and credibility.

5.2. Promote inclusive decision-making processes

Public participation must become a structural component of hydrogen project governance, not an optional or symbolic gesture, but a standard practice embedded from the earliest stages of project development. To that end, governments should adopt legal, procedural, and funding-based instruments that **institutionalise early-stage community involvement** across all publicly supported hydrogen initiatives.

Key actions to support this include:

- **Integrate participation into project permitting and funding criteria**: Projects applying for public subsidies or national permits should be required to present a public engagement plan and evidence of early consultation (e.g. workshop reports, feedback summaries).
- **Mandate participation in national hydrogen planning processes**: National and regional hydrogen strategies should be co-developed with stakeholder input via citizen assemblies, expert panels, and thematic working groups especially in regions undergoing structural change.
- **Standardise engagement procedures**: Develop national guidelines that define quality criteria for participation such as timing, transparency, diversity of voices, and documentation of feedback. This enables comparability across projects and jurisdictions.

- **Incentivise innovation in democratic engagement**: Launch pilot schemes to test participatory budgeting, digital citizen input platforms, or youth councils in relation to hydrogen infrastructure and funding decisions.

Participation should not be treated as a one-time step, but as a **continuous process** that informs all phases of planning, implementation, and evaluation. This shift requires cultural change within institutions but also clear expectations, frameworks, and accountability mechanisms.

Institutionalising early-stage public participation will help reduce local resistance, improve project quality, and strengthen the democratic legitimacy of hydrogen development in Central Europe.

5.3. Increase transparency and public access to information

Building public trust in hydrogen infrastructure requires clear and reliable access to information particularly regarding environmental and social impacts. However, existing practices vary widely across countries and project types. To ensure consistency, fairness, and legitimacy, member states should adopt **standardised procedures for disclosure and public feedback** across all large-scale hydrogen projects.

The following recommendations form the core of this approach:

- **Set legal requirements for early disclosure**: Environmental and social impact assessments (ESIAs) for publicly supported hydrogen projects especially those exceeding defined thresholds (e.g. €50 million) must be made publicly available at least **three months before the start of formal consultations**.
- **Publish non-technical summaries and accessible formats**: All documentation should be accompanied by clear summaries, visual aids (e.g. maps, diagrams), and translations where necessary to ensure accessibility for non-expert and minority populations.
- **Establish a mandatory feedback mechanism**: For large-scale projects (e.g. over € 100 million), developers should provide **a minimum 30-day open comment period**, accepting input via online portals, local offices, and in-person meetings.
- **Require formal response documentation**: Project proponents must publish a structured reply to public feedback, indicating which concerns have been addressed, what adjustments were made, and why certain inputs could not be incorporated. This builds accountability and transparency.
- **Create public project archives**: Member states should maintain digital and physical archives of public consultation materials, feedback, and responses ensuring long-term access for oversight bodies, researchers, and civil society.

These procedures should be harmonised with national environmental legislation and integrated into funding eligibility rules for EU and national hydrogen programmes. To support implementation, guidance documents and technical assistance should be provided to developers and permitting authorities.

By setting clear standards for impact transparency and response, governments can reduce the information gap between institutions and the public, increase stakeholder confidence, and support more constructive forms of dialogue and deliberation.

5.4. Strengthen cross-sectoral collaboration and coordination

The deployment of hydrogen technologies cuts across multiple domains: energy, transport, environment, innovation, industry, education and requires coordination between institutions operating at different levels of governance. Without coherent alignment, efforts risk fragmentation, duplication, and inefficiencies. To address this, member states should establish robust mechanisms for **multi-level and cross-sectoral coordination**.

Key recommendations include:

- **Establish national hydrogen coordination platforms**: Governments should create permanent platforms or task forces bringing together ministries, regulators, regional authorities, private sector representatives, and civil society organisations. These bodies will coordinate planning, resolve bottlenecks, and monitor implementation progress.
- **Facilitate regular intergovernmental dialogue**: National authorities should support vertical coordination through structured communication with municipalities and regional governments particularly regarding permitting, zoning, and stakeholder engagement in hydrogen infrastructure development.
- **Support regional stakeholder forums** (see 4.3): Annual regional hydrogen forums will serve as decentralized hubs for exchange, problem-solving, and alignment of local initiatives with national strategies.
- **Link hydrogen strategies to existing policy frameworks**: Hydrogen goals should be integrated into relevant national plans such as National Energy and Climate Plans (NECPs), just transition strategies, regional innovation smart specialisation strategies (RIS3), and climate adaptation agendas.
- **Encourage transnational cooperation**: Member states and regions should actively participate in cross-border coordination mechanisms, including hydrogen corridors, joint pilot projects, and data-sharing initiatives supported by EU programmes (e.g. Interreg, Clean Hydrogen Joint Undertaking).

By reinforcing institutional cooperation across policy areas and governance levels, these measures will improve resource efficiency, policy coherence, and implementation effectiveness. Moreover, they will allow local experiences and innovations to feed upward into national and EU decision-making strengthening both bottom-up legitimacy and top-down support.

5.5. Monitor public perception and adapt strategies accordingly

For the measures proposed in this strategy to have lasting effect, they must be supported by capable institutions and robust systems of feedback and evaluation. Social acceptance is not static: it evolves over time and requires ongoing attention, learning, and adaptation. Member states should therefore **prioritise investments in capacity-building** and monitoring systems that underpin implementation across all levels.

Key strategic actions include:

- **Train public sector professionals**: National and regional authorities should provide training programmes for municipal planners, environmental officers, education professionals, and hydrogen project managers. Topics should include stakeholder engagement, science

communication, conflict mediation, and hydrogen-specific regulatory and safety knowledge.

- **Develop monitoring frameworks**: Introduce national systems to track public perception of hydrogen over time, using regular surveys (e.g. modelled on Eurobarometer), media sentiment analysis, and feedback data from consultations. These systems will help evaluate the effectiveness of campaigns and identify emerging concerns early.
- **Evaluate engagement processes**: All large-scale publicly funded hydrogen projects should include a built-in evaluation of their communication and participation activities. This may involve external observers, citizen panels, or partnerships with academic institutions.
- **Support social science research**: Governments should fund research on the social, cultural, and behavioural aspects of hydrogen technologies. This includes studies on risk perception, public trust, equity impacts, and communication strategies essential for refining policy over time.
- **Create learning networks**: Establish national or regional communities of practice networks of municipalities, civil society actors, and developers to share experiences, tools, and lessons learned from hydrogen engagement activities. These networks can be supported by EU programmes or public agencies and hosted by universities or regional innovation hubs.

Through these investments, hydrogen deployment can become not only technologically advanced, but also socially responsive, evidence-based, and institutionally grounded. Capacity and monitoring are not optional support measures they are the foundation of successful and accepted transition

6. CONCLUSIONS

The deployment of hydrogen technologies across Central Europe is gaining political, financial, and industrial momentum. Hydrogen is increasingly recognised as a critical enabler of climate neutrality, sectoral integration, and energy security, particularly in hard-to-abate industries, heavy transport, and energy storage. However, as this strategy and the findings from Deliverable D.2.5.1 make clear, the success of hydrogen is not determined solely by its technical viability or economic competitiveness. Its societal acceptance is equally essential and must be approached as a strategic objective in its own right.

Current evidence indicates that hydrogen remains poorly understood by the general public, with significant disparities in knowledge and perception across regions, age groups, and professions. Awareness is often limited to abstract or technological descriptions, and there is a lack of relatable narratives that connect hydrogen to everyday life, public benefit, or local development. Moreover, in many cases, communities are only informed of hydrogen-related projects once decisions have already been made undermining trust, fuelling resistance, and reinforcing feelings of exclusion. The absence of accessible information, meaningful participation, and transparency exacerbates the risk of social backlash, particularly in regions affected by previous top-down transitions.

This strategy addresses these deficits by proposing an integrated and operational framework for embedding the social dimension into the planning, communication, and governance of hydrogen development. It outlines a multi-level approach based on five core pillars: awareness, participation, cooperation, transparency, and education. These pillars are not abstract principles, they are translated into concrete measures and institutional practices that can be applied at national, regional, and local levels.

Public awareness must be broadened through targeted campaigns that reflect the diverse contexts and values of Central European societies. Communication should be proactive, evidence-based, and tailored not only to inform, but also to empower citizens to engage with and shape hydrogen-related decisions. Likewise,

participation must begin early and be more than a procedural requirement; it must be designed as an inclusive, deliberative process in which communities can articulate their interests, concerns, and aspirations. Project developers, public authorities, and industry actors must recognise that participation enhances, not delays the effectiveness, acceptance, and resilience of hydrogen infrastructure.

Transparency must become a structural norm. Environmental and social impact assessments should not only be made public, but also explained in accessible language and formats. Citizens have the right to understand the implications of hydrogen investments and to provide feedback that is acknowledged and addressed in decision-making processes. Trust is built when institutions are open, responsive, and accountable.

At the same time, capacity-building is indispensable. Local authorities, educators, civil society organisations, and technical institutions must be equipped with the knowledge, skills, and tools to act as facilitators of social acceptance. The development of hydrogen innovation hubs, university partnerships, and certified training programmes will help ensure that the hydrogen transition is not only technologically advanced, but also socially inclusive and economically just.

Finally, all these efforts must be supported by robust monitoring systems. Social acceptance is dynamic shaped by experiences, expectations, and evolving socio-political contexts. Governments must invest in evaluation tools that capture public sentiment, assess the effectiveness of engagement, and identify areas of resistance or misunderstanding. Only through continuous feedback can strategies remain adaptive, relevant, and responsive to public needs.

In conclusion, hydrogen technologies will not succeed on technical merit alone. Their legitimacy and long-term viability depend on trust, transparency, and inclusion. Social acceptance must be treated not as a risk to be managed, but as a value to be co-created. This strategy presents a roadmap for embedding that value into every level of hydrogen policy and practice ensuring that Central Europe’s hydrogen future is not only efficient and competitive, but also fair, participatory, and deeply rooted in the social fabric of its communities.