HyPOP

D3.4

Guidelines for public engagement on H2 technologies' implementation

Under review

The project is supported by the Clean Hydrogen Partnership and its members.

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Clean Hydrogen Partnership. Neither the European Union nor the Clean Hydrogen Partnership can be held responsible for them.

www.hypop-project.eu

info@hypop-project.eu

#HYPOPPROJECT

D3.4	Guidelines for public engagement on H2 technologies' implementation
DELIVERABLE TYPE	Report
MONTH AND DATE OF DELIVERABLE	Month 28
WORK PACKAGE	WP 3
LEADER	IMI
DISSEMINATION LEVEL	Public
AUTHORS	Daniela Martin Dr Fanie van Rooyen
PROGRAMME	HORIZON EUROPE
GRANT AGREEMENT	101111933
START	June 2023
DURATION	28 months

Contributors

NAME	ORGANISATION
Daniela Martin	IMI
Dr Fanie van Rooyen	IMI

Peer Reviews

NAME	ORGANISATION
Diego Iribarren	IME
Miroslava Tzekova	BH2C
Marianna Franchino	ENVI
Ilaria Schiavi	ENVI

Revision History

VERSION	DATE	REVIEWER	VERSION NOTES
1	04/09/2025	Diego Iribarren (IMDEA)	Small amendments suggested
2	05/09/2025	Ilaria Schiavi (ENVI)	No additional comments
3	08/09/2025	Miroslava Tzekova (BH2C)	No additional comments

Partners' short names

ENVI	Parco Scientifico Tecnologico Per L'ambiente Environment Park Torino Spa
IMI	Institute for Methods Innovation
IME	Fundación IMDEA Energía
APRE	Agenzia per la Promozione della Ricerca Europea
CNH2	Centro Nacional Del Hidrógeno
RIGP	Regionalna Izba Gospodarcza Pomorza
CLUSTER TWEED	Cluster Tweed
BH2C	Balkanski Vodoroden Klaster

Index of contents

Index of tables

1. Introduction

These guidelines are a practical tool for designing and delivering hydrogen-related projects that are trusted by local communities and backed by meaningful public engagement. They are written for people involved in project delivery, policy, and communication; municipal officers, EU project coordinators, NGOs, and industrial actors responsible for outreach and compliance.

The guidance is grounded in real experience and tested methods. It draws on four main sources: a state-of-the-art review and EU-wide public opinion survey on hydrogen awareness[1], an analysis of public engagement with H_2 via social media channels across the EU27[2], a series of national workshops and international webinars involving citizens and professionals[3], and a social life-cycle assessment examining the societal impacts of hydrogen production and use[4]. Together, these provide a rich evidence base on what people want to know, what concerns they have, and what builds or breaks public trust.

The guidelines start with eight core principles that reflect what the evidence shows about good public engagement, including clarity, inclusiveness and responsiveness. These principles are then translated into practical steps: how to plan engagement activities, how to adapt materials for different audiences, how to run inclusive sessions, and how to monitor what's working. Ready-to-use templates and tools are provided throughout.

Each section is designed to be used on its own or as part of a full engagement process, from first planning workshop to final evaluation. Everything here is meant to be useful, usable, and grounded in what actually works.

[1] Deliverables 1.2 and 1.3 synthesise more than 30 peer-reviewed studies and a pan-EU sentiment survey to isolate drivers of acceptance such as perceived safety, cost fairness and trust in institutions.

[2] Deliverable 1.4 offers a snapshot of current social media engagement with hydrogen technology in the EU27 and a roadmap for shaping future public-facing interactions and dialogues around hydrogen energy.

[3] Reported in Deliverable 3.3, these events engaged 177 citizens and 52 professional stakeholders across six Member States, capturing real-time hopes, fears and information needs through polls, breakout tasks and scenario testing.

[4] Deliverable 3.1 quantifies social hotspots in two illustrative hydrogen value chains (on-site electrolysis in a hydrogen refuelling station at a bus depot and fuel-cell bus operation), underscoring why transparent risk communication and gender-sensitive outreach are critical for legitimacy.

2. Public engagement in the context of hydrogen technologies

Public engagement in hydrogen is more than communication. It is a two-way, co-creative process that involves people and local stakeholders throughout the planning, design and roll-out of new technologies. Its purpose is to build trust, surface local knowledge, and make implementation smoother and more legitimate.

Done well, public engagement reduces friction, avoids permitting surprises, and strengthens project design by capturing insights early. It also builds confidence by showing transparent trade-offs and follow-through on commitments. When engagement is weak or late, projects risk opposition, redesigns, and loss of trust that can be costly and hard to recover from.

This approach is not just good practice; it also matches EU policy guidance. Current frameworks (European Commission, 2023, 2024a, 2024b) emphasise early, regular and meaningful dialogue, citizen-centred innovation, and participatory decision-making across the energy transition. Horizon Europe Missions similarly require climate-related actions to mobilise all relevant actors, citizens included, and adopt participatory approaches. Readers working in EU programmes will find the language and expectations familiar here, but with added tools to make them practical on the ground.

2.1 Why public engagement matters for hydrogen implementation

Hydrogen projects have tangible impacts on daily life. They change what people see and experience: new refuelling stations or storage depots may appear, traffic patterns can shift, and new jobs may be created. Engagement is what determines whether these changes unfold smoothly or meet resistance. It is meant to build trust, strengthen design, and keep timelines on track. When neglected or left too late, it inevitably leads to opposition, appeals, redesigns, or misinformation.

Safety and trust

Within this context, perceived safety is just as important as technical safety. Accidents elsewhere, or even rumours, can quickly undermine local support if people feel fearful or uninformed. Engagement should therefore include open conversations that explain risks and safeguards in plain language, show evidence of testing and standards, and involve trusted local voices such as emergency responders and technical experts. Communities judge projects not only on the facts, but on how honestly and clearly those facts are shared.

Siting decisions and local acceptance

Support for hydrogen in principle does not always translate into acceptance when a facility is proposed nearby. Concerns about noise, traffic, visual impact and emergency response are common, and if they are not addressed early, they can fuel formal objections and delays. Engagement should begin long before permit applications, should involve co-designing of practical mitigations with affected communities, and should show how feedback influences the design. Even when outcomes are difficult, people are more likely to accept them if the process is open and fair. Closing the loop

after every activity with a short "you said / we did / what stays the same and why" update helps reinforce legitimacy.

Visible co-benefits

Hydrogen can bring cleaner air, new skills and business opportunities, but these benefits are not always initially obvious to local communities. Engagement should highlight concrete examples: pathways into skilled maintenance jobs, SME opportunities in supply chains, or partnerships with training providers. Using social impact indicators such as fair pay or local development contributions alongside technical metrics shows that benefits and burdens are being shared fairly. Quick polls and surveys can help track sentiment and adjust activities. Keeping co-benefits visible and evidence-based is essential for maintaining support beyond a single consultation.

In short, weak engagement tends to bring:

- delays at permitting
- costly redesigns
- persistent safety rumours
- perceptions of "tick-box" consultation
- missed opportunities to anchor local jobs and training

Strong engagement instead leads to:

- faster and clearer decisions
- designs that reflect local context
- higher community acceptance
- trusted messengers
- visible pathways to local benefits

2.2 Key drivers and barriers

Evidence from HYPOP activities highlights the factors that most strongly influence whether hydrogen projects gain or lose public acceptance. Practitioners can use these insights to shape engagement strategies, reinforcing drivers and proactively addressing barriers.

Table 1: Key drivers of public acceptance

Driver	What the evidence shows	What this means for practice
Climate and decarbonisation mandate	Citizens see hydrogen as a realistic pathway to cut CO_2 in hard-to-abate sectors like steel and freight.	Link your project explicitly to climate targets and explain its contribution to decarbonisation.
Jobs, skills and new value chains	People expect roles in electrolyser manufacturing, logistics and e-fuels to create high-skill jobs.	Show clear pathways into local employment, skills development, and SME opportunities.
Cleaner mobility and air-quality gains	Urban residents associate hydrogen buses and rail with cleaner city air.	Demonstrate tangible local benefits for air quality and health.
Renewable integration and grid balance	Using surplus renewable energy for electrolysers is seen as smart and efficient.	Connect projects to renewable integration and energy security goals.
Trust-building and governance	High trust in political and scientific actors boosts acceptance; low trust fuels NIMBY responses.	Use trusted local messengers, transparent and well-grounded decision-making, and consistent updates.
Preference for genuinely green hydrogen	A large majority of stakeholders prefer renewable-based hydrogen, even at higher cost.	Be specific about the energy source and avoid exaggerated "green" claims.

Table 2: Key barriers to public acceptance

Barrier	What the evidence shows	What this means for practice
Cost competitiveness	Stakeholders worry high costs undermine long-term viability.	Acknowledge cost concerns openly and explain price pathways or support mechanisms.
Infrastructure gaps	Lack of pipelines, import terminals and stations is seen as a bottleneck.	Be realistic about timelines and show how infrastructure development is coordinated.
Safety perceptions	Concerns about flammability and storage hazards persist.	Communicate risks transparently and involve first responders in demonstrations and discussions.
Water use	People worry hydrogen production could strain freshwater resources.	Provide clear data on water sourcing, efficiency measures and safeguards.
Policy fragmentation	Divergent rules across countries create uncertainty.	Emphasise alignment with EU frameworks and clarify the regulatory pathway.
Local acceptance and trust deficit	Younger groups show stronger NIMBY tendencies when trust is low.	Build trust early through transparency and youth-focused outreach.

Taken together, these drivers and barriers show why engagement must be deliberate and well-designed from the get-go. The next section sets out eight guiding principles to help practitioners put this into practice.

3. Guiding principles for effective engagement

Over time, a set of practices has proven especially important for building trust, inclusion, and impact in hydrogen-related projects. Think of these eight principles as the foundation of good engagement. They can also work as a checklist when planning or reviewing your own activities.

1 Be transparent and honest about both benefits and limits

Being open about what hydrogen can and cannot deliver is essential. Trust grows when communities see the full picture (benefits, costs, risks, and uncertainties) rather than a polished sales pitch. The main pitfall is over-promising or glossing over challenges, which quickly undermines credibility. A good test is whether you are sharing trade-offs clearly and answering difficult questions without deflecting.

2 Tailor your message to the audience and the context

Messages resonate most when they reflect local realities and people's daily lives. Adapting language, examples, and data to the specific audience makes communication more relevant and persuasive. The risk is falling back on generic information that feels distant or abstract. To check yourself, ask whether your examples and references could be swapped into another context without anyone noticing; if so, they may need to be more locally grounded.

3 Design for inclusion and gender sensitivity

Hydrogen can feel like a specialist or technical topic, so active steps are needed to make sure everyone has the chance to participate. Women, in particular, often have lower levels of familiarity, so balancing participation and designing activities that welcome a range of voices is important. Assuming that a simple open invitation guarantees inclusion is a common mistake. Check whether your recruitment and facilitation actively bring in missing perspectives.

4 Engage early and keep engaging throughout the project lifecycle

Engagement should start before plans are fixed and continue at key milestones such as feasibility, design, permitting, operation, and even decommissioning. Early dialogue prevents the impression that decisions are already set in stone, and returning at regular intervals shows that input is valued. Treating engagement as a single event is the main trap to avoid. A practical test is whether your project plan includes clear points for stakeholders to be brought back in and given a chance to influence outcomes.

5 Use evidence-based storytelling

Facts and figures are important, but they rarely change minds on their own. Linking data to everyday stories, relatable examples, or visuals makes information easier to understand and remember. The risk comes from oversimplifying or letting anecdotes replace the evidence. To stay balanced, check whether each story you share has solid data and procedures behind

it and whether your data is presented in ways people can connect to real life.

6 Make it a two-way dialogue

People want to be heard, not just spoken to. Engagement should create space for questions, contributions, and joint problem-solving, which builds both understanding and trust. Falling back into one-way presentations is the easiest mistake to make, especially when time is tight. A simple check is whether your activity includes real moments for interaction such as breakout discussions, live polling, or collaborative tasks that give participants a genuine role.

7 Put safety first and communicate risks proactively

Safety is usually the first thing people worry about, and avoiding the topic only feeds uncertainty. Explaining protocols, demonstrating measures, and being clear about how risks are managed across the whole system helps build confidence. The danger lies in offering vague reassurances that do not address concrete concerns. Before any engagement, ask yourself if you have explained safety both at the local level and along the wider supply chain, including worker welfare.

8 Monitor, evaluate, and adapt

Every engagement activity is a chance to learn and improve. Gathering feedback from participants, observing what worked well, and reflecting on gaps allows you to refine your approach over time. The main pitfall is treating evaluation as a box-ticking exercise instead of a genuine learning process. A practical check is whether you can point to at least one change you made in response to feedback from a previous activity.

Following these eight core principles will ensure you are on the right track when it comes to hydrogen public engagement. For ease of reference you can print these eight principles as a checklist. At every project gate, ask: Have we done the basics? Are all those who will be affected, adequately informed? What did we hear? What did we change? What will we do next?

4. The public engagement toolkit: Step-by-step process

4.1 Planning public engagement for hydrogen implementation

Rolling out hydrogen depends as much on dialogue and co-creation as on technical excellence. This section provides a planning framework to help teams move beyond ad-hoc communications and build an evidence-based, impact-oriented strategy.

a) Stakeholder analysis using t*he 3i framework*

The first step is to understand who matters, what they care about, how they might influence outcomes, and how they will be affected. The *3i framework*[5] (Interest, Influence, Impact) provides a simple way to classify stakeholders and anticipate where support, concerns or resistance may emerge. This makes it easier to plan meaningful interactions rather than one-size-fits-all messaging.

How to use the *3i framework*
(start with the template in Table 3)

1. List all relevant groups (citizens, NGOs, industry, policymakers, etc.).
2. Note their interests (what they value, fear, or hope for).
3. Judge their influence (capacity to block, enable, or reshape outcomes).
4. Assess the potential impact on them (how strongly they will be affected).
5. Add notes on how best to engage with this group.

[5] Reed, M. S., Jensen, E. A., Noles, S., Conneely, D., Kendall, H., Raley, M., Tarrant, A., Oakley, N., Hinson, C., Hoare, V., Marshall, K., & Pugliese, L. (2025). *Analyzing who is relevant to engage in environmental decision-making processes by interests, influence and impact: The 3i framework*. Journal of Environmental Management, 373, 123437. https://doi.org/10.1016/j.jenvman.2024.123437

Table 3: 3i analysis template

Stakeholder	Interest	Influence	Impact	Other relevant information	Contact
Name of organisation or group	What are they likely to be interested in, with regard to this research?	How might they have power to block or facilitate impacts from the research?	How might they directly benefit from or be negatively impacted by the research?	What else should you know about engaging with this party?	Who can you contact to reach out to this group? (for internal purposes; ensure GDPR compliance)
Write the name here	*Describe their likely interest in the research*	*Describe how they might influence your impact*	*Describe the benefits or negative impacts you would expect*	*Provide any other details here*	*If shared externally, do not provide names or contact details for the relevant party (GDPR). Rather provide YOUR name instead.*

You can use Table 4 as inspiration for the kinds of stakeholder categories typically relevant in hydrogen projects.

Table 4: Example oĒ H₂ stakeholder types classiĒied using the 3i Ēramework

Stakeholder cluster	Interest	Influence	Impact
Policy-makers and permitting authorities (EU, national, local)	Climate targets, safety, public value, electoral benefits	Very high (laws, budgets)	Enable or slow infrastructure roll-out
Industry and operators (OEMs, producers, utilities, logistics firms)	Market growth, return on investment, regulatory certainty	High (capital investment, innovation capacity)	Deployment pace and scale
First responders and safety bodies	Risk mitigation, clear protocols, training	High (licensing, emergency response)	Public trust, insurance costs
Local citizens and end-users (residents, commuters, consumers)	Clean air, affordable mobility and energy, jobs, place identity	Medium to strong (voting power, "social licence", NIMBY dynamics)	Adoption, behavioural change, advocacy or resistance
Civil society and NGOs	Climate ambition, fairness, biodiversity protection	Medium (agenda-setting, watchdog role)	Legitimacy, scrutiny, coalition building
Investors and finance community	Risk-adjusted returns, ESG performance	Medium (capital allocation)	Project bankability

Stakeholder cluster	Interest	Influence	Impact
Academia and training organisations	Research excellence, skills pipelines, funding	Medium	Evidence base, knowledge transfer
Media and influencers	Newsworthiness, audience engagement	Variable	Narrative framing, amplification (positive or negative)

b) Contextual analysis

Every engagement plan needs to fit its local setting. A contextual scan helps identify opportunities and potential blockers across the regulatory, infrastructural, cultural, and economic environment. This step avoids generic engagement and ensures messages feel relevant. Table 5 provides some basic contextual factors to consider when planning public engagement (PE) within the hydrogen sector.

Table 5: Contextual considerations for hydrogen engagement

Dimension	Key considerations	Practical planning cues
Policy and regulatory	EU Hydrogen Strategy, Renewable Energy Directive (RED III), national H_2 roadmaps, local zoning & safety codes	Align engagement timelines with policy milestones; involve regulators early
Infrastructure readiness	Density of existing Hydrogen Refuelling Stations (HRS), grid capacity, logistics corridors, pilot projects	Use existing "lighthouse" sites as anchors for storytelling; shift from vision to evidence as assets are built
Socio-cultural	Local knowledge gaps, trust in institutions, community identity, gender gaps in familiarity	Tailor spokespeople and language; address safety myths directly
Economic	Potential for jobs, competitiveness, just transition issues	Provide clear local cost–benefit stories and pathways to training or SME participation

Remember that context evolves fast (e.g., new national policies or local controversies). Update scans regularly, at least once per year.

c) Defining purpose, SMART objectives and expected outcomes

Public engagement can easily drift into tokenism if it is not tied to a clear purpose. A good way to avoid this is to set SMART objectives: goals that are *Specific*, *Measurable*, *Achievable*, *Relevant*, *and Time-bound*. SMART objectives help teams clarify what exactly they want to achieve, how progress will be measured, and by when. They also make it easier to show success to funders, regulators, and communities.

Think of SMART objectives as a bridge between activity and impact: instead of saying "we want people to understand hydrogen safety," a SMART objective spells out what change is expected, in whom, by how much, and by when.

Table 6: Examples of SMART objectives for H_2 public engagement

SMART objective	Why it works
By 30 June 2026, raise the share of residents in the three pilot municipalities who agree that 'hydrogen technologies are as safe as conventional energy when proper precautions are in place' from the EU-survey baseline of 60% to 80%, as verified by the Clean Hydrogen Partnership awareness survey.	**Specific:** Focuses on safety perceptions in defined municipalities. **Measurable:** Uses survey data with clear baseline and target. **Achievable:** 20-point gain aligns with other community-energy campaigns. **Relevant:** Directly supports risk-communication goals. **Time-bound:** Deadline of 30 June 2026.
By 31 December 2025, engage at least 300 unique stakeholders—including ≥40% women and ≥20% youth (under 30)—in two co-creation workshops and one living-lab demonstration, documenting at least three user-led design modifications to the hydrogen refuelling station accepted by the engineering team.	**Specific:** Names events, participation targets and outputs. **Measurable:** Counts people and concrete design modifications. **Achievable:** Participation levels exceed current benchmarks. **Relevant:** Links to inclusivity and design-quality objectives. **Time-bound:** End-date fixed at December 2025.
From Q1 2025 to Q4 2026, maintain a rolling quarterly average of ≥75% positive or neutral sentiment across a minimum of 200 social-media mentions tagged #HydrogenHubCity, tracked with Brandwatch sentiment analytics.	**Specific:** Focuses on online sentiment for a defined hashtag. **Measurable:** Combines percentage threshold with minimum sample size. **Achievable:** Consistent with campaigns that kept opposition low. **Relevant:** Directly supports the social-licence goal. **Time-bound:** Explicit two-year window.

Tips for using SMART objectives in practice

- Start with the core challenge you need to address (safety, acceptance, inclusivity, visibility, etc.).
- Phrase your objective as a change you want to see, not just an activity you want to run.
- Use data you already have (surveys, polls, participation rates) to set baselines and decide what a realistic improvement looks like.
- Always add a deadline to turn a general aspiration into a commitment.
- Review your SMART objectives every six months to check whether they remain realistic as the project and its context evolve.

d) Impact framing using a theory of change

A Theory of Change (ToC) makes the causal logic of an engagement programme explicit. By mapping Inputs → Activities → Outputs → Outcomes → Impacts, project teams can test assumptions, monitor progress and adapt quickly when conditions shift.

How to build a Theory of Change
(using the template in Table 7)

1. Define the problem you want to solve.
2. Identify the audience you need to reach.
3. Decide the best entry point.
4. Set the sequence of activities.
5. Define measurable effects.
6. Spell out wider benefits.
7. Anchor the long-term change you are working towards.
8. List assumptions that must hold true.

Table 7: Template for building a Theory of Change

What is the problem you are trying to solve?	Who is your key audience?	What is the entry point to reaching your audience?	What steps are needed to bring about change?	What is the measurable effect of your work?	What are the wider benefits of your work?	What is the long-term change you see as your goal?
Key assumptions:						

To show how this template works in practice, Table 8 offers a full worked example for hydrogen public engagement.

Table 8: Example of a Theory of Change for a hydrogen bus depot project

What is the problem you are trying to solve?	Who is your key audience?	What is the entry point to reaching your audience?	What steps are needed to bring about change?	What is the measurable effect of your work?	What are the wider benefits of your work?	What is the long-term change you see as your goal?
Local residents are sceptical about safety and doubtful of community benefits.	Residents near depot site, bus drivers, first responders, local SMEs.	Addressing concerns about traffic, safety, and jobs.	Stakeholder mapping → safety demo day with firefighters * co-design workshop on traffic routing → info campaign on job/training pathways.	≥20% increase in residents who agree hydrogen buses are safe (pre/post surveys). Three co-created design changes adopted.	Safer and more acceptable project design; visible local job opportunities.	Increased public trust in hydrogen transport; smoother rollout of further depots.
Key assumptions: *Political continuity, sustained funding, transparent safety data, engaged local media.*						

Keep in mind that a ToC is not static. Revisit it after each engagement cycle to update assumptions, refine steps, and record what actually worked.

e) Audience profiles and targeted communications

Different groups of people will care about different aspects of hydrogen. A "one size fits all" message risks missing the mark. Audience profiling helps you think about who you're speaking to, what motivates them, what concerns them, and how best to reach them.

Below are four simplified audience types that often come up in hydrogen engagement, based on the HYPOP evidence base. These are not strict categories, but starting points to help you design tailored communication that feels relevant and credible.

Table 9: Example audience profiles and communication tips

Profile	What motivates them	What worries them	What works best
Eco-conscious tech enthusiast (25-45, urban)	Climate action, innovation, leadership in green tech.	Greenwashing or hype without proof.	Share data-rich visuals, cutting-edge demos (e.g., XR experiences), LinkedIn or professional networks.
Informed optimist (50+, small-town)	Local jobs, energy independence, community pride.	Grid reliability, stability of supply.	Local press articles, town-hall Q&A sessions with engineers, case-study videos of nearby projects.
Cautious sceptic (35-55, suburban)	Family safety, affordability, avoiding disruption.	Explosivity risks, rising bills.	Myth-busting reels, open safety demonstrations with first responders, easy-to-use cost calculators.
Pragmatic realist (40-60, vocational)	Business continuity, saving money, clear ROI.	Downtime, disruption to current operations.	Hands-on trials with buses or forklifts, short fact-sheets on Return on Investment (ROI), peer-to-peer testimonials.

How to use audience profiles in practice

- Pick the 2–3 audience groups most relevant to your project instead of trying to cover everyone at once.
- Pair each audience with trusted local voices (engineers, SMEs, first responders, local leaders). Remember that sometimes *who says it* matters more than *what is said*.
- Use local examples and stories. A small-town audience won't connect with global supply chain benefits, but they will with a nearby hydrogen bus route.
- Try out messages with a pilot group (through a poll, short interview, or workshop exercise) before rolling them out widely.

f) Selecting fit-for-purpose engagement approaches

No single activity will reach every audience or answer every question. The best plans combine formats, mixing depth (e.g., a small co-creation workshop) with reach (e.g., a social-media campaign). The table below works as a menu of options. Each format has strengths and trade-offs. Your job is to pick the mix that fits your context, resources, and goals.

Table 10: Engagement formats - when to use them and what to watch out for

Approach	When it works well	Benefits	Watch-outs
Co-creation workshop	Early in project design, when input can still shape outcomes.	Builds ownership, surfaces local insights, enables rapid prototyping.	Needs skilled facilitation; risk of fatigue if sessions run too long.
Living-lab demonstration	When you can show technology in action at pilot or demo sites.	Makes hydrogen tangible; attracts media attention; builds confidence.	Expensive to run; requires permits and strong safety planning.
Social-media sprint	To raise quick awareness or reach younger groups.	Rapid visibility, measurable analytics, strong youth appeal.	Requires creative assets and moderation; short shelf-life.
Pop-up H_2 experience (mobile exhibit or XR booth)	At festivals, shopping centres, or transport hubs.	Reaches non-technical audiences; delivers a sensory, memorable experience.	Logistics heavy; short dwell-time with each visitor.
Stakeholder round-table	To align narratives among decision-makers and technical actors.	Builds coalitions, fosters shared framing.	Dominant voices can crowd out others; requires strong preparation.
Hackathon / datathon	When open data can drive new tools, apps, or solutions.	Crowdsources innovation, engages students and young professionals.	Needs follow-up funding/resources; IP ownership can be tricky.
Safety drill and open-house	For communities near refuelling stations or depots.	Demonstrates preparedness, builds trust, involves first responders.	Requires heavy coordination; may raise anxiety if not framed carefully.
Storytelling media partnership (mini-series, podcast, feature article)	When you need to sustain public interest over time.	Creates a longer-term narrative, reaches broad audiences.	Costly; limited editorial control if media partner leads the story.

How to choose formats

- Balance reach and depth. For example, a single town-hall may reach many people but with limited interaction, while a workshop gives richer dialogue but fewer participants. Use both where possible.
- Match the format to the audience. For example, digital channels usually work best for younger groups, while face-to-face Q&A is more effective for sceptical or cautious groups.
- Think in sequence. For example, use lighter formats (infographics, short videos) to spark curiosity, then follow up with deeper engagement (living-labs, co-creation sessions).
- Be realistic about resources. For example, high-cost formats like XR demos or living-labs can be powerful but should be complemented by lower-cost tools for continuity.

4.2 Develop products and materials

Engagement materials should do three things at once: give participants the information they need (and no more), build trust through transparency, and remove barriers to participation. This section offers practical guidance on how to design and adapt resources so they are clear, accessible and inclusive.

a) Participant information sheet and consent forms

These documents are the ethical foundation of any engagement process. They explain why data are collected, how they will be used, and what rights participants retain. To build confidence and encourage participation, keep in mind the following practices:

- Be clear about intent. State what the activity is about, what it involves, and what participants can expect. Include GDPR compliance, data storage, and media consent.
- Use a professional but approachable tone. Plain language in a question-and-answer format works well, with each item followed by an "I consent / I do not consent" tick box.
- Be specific about data use. Seek consent separately for each intended use of data or media.
- Be considerate with the timing of provided materials. Share the sheet at least one week before the event and again on the day, giving people enough time to absorb the material and space to ask questions.
- Ensure digital accessibility. Offer screen-reader-friendly PDFs and an HTML version that conforms to WCAG 2.2 AA (e.g., form fields with programmatic labels and visible focus indicators).

Keeping these simple guidelines in mind will help to ensure participants feel comfortable with what they have signed up for, which in turn will allow for more informed and dynamic participation.

b) Content formats

Different materials work best in different settings. The table below outlines common options, when they are most useful, and design tips for accessibility.

Table 11: Content formats for H_2 public engagement

Format	When to use	Design tips
Factsheet (≤ 2 pp.)	Pre-engagement primer for policymakers, journalists or cautious stakeholders. Post-engagement take-home resource.	One core message per page. Use short headings and a lead paragraph explaining "Why it matters". Add QR codes for more resources. Ensure reading order is logical for screen readers. Provide alt-text for visuals. Export as tagged PDF or HTML.
Infographic	Social-media campaigns, workshop ice-breakers, or quick handouts.	Stay within project colour palette and maintain high contrast. Limit to 5–7 data points with simple charts. Add short plain-language headlines. Provide long descriptions or tables. Test legibility on mobile screens.
Short explainer video (≤ 90 s)	To raise awareness quickly, especially among younger audiences or those with limited time.	Write a concise script that follows problem → solution → next step. Add captions and transcripts. Avoid visual overload. Ensure strong text contrast. Host on accessible platforms.
XR demo	At site visits or exhibitions where participants can experience a hydrogen facility.	Provide a fallback option such as a 3D model on a tablet. Limit interactions to five steps with a skip option. Include tutorial overlays with captions. Optimise for lower-spec devices. Collect basic analytics to refine design.
Hybrid slide deck	For webinars or briefings that mix polls with static content.	Use a 16:9 layout with high-contrast colours. Write slide titles as clear statements. Keep text concise. Insert polls or chat prompts every 7–10 slides. Add alt-text to images and export as accessible PDF.

c) Accessibility

Accessibility should be planned from the start. Inclusive design ensures broader participation and prevents marginalised groups from being excluded. Keep the following in mind:

- Adopt ISO 24495-1 (2023) principles for plain language: clear purpose, logical structure, familiar words, short sentences. The European Commission's *Clear Writing for Europe*

resource offers practical check-lists.

- All digital outputs should meet WCAG 2.2 level AA for contrast, keyboard navigation, focus appearance, and new criteria such as *Dragging Movements* and *Accessible Authentication*.

- Provide appropriate, descriptive alternative text for every graphic; for complex charts, supply a data table or long description. Video and audio must carry accurate captions (and, where feasible, sign-language overlays).

- Collect access needs during registration (e.g., captioning, screen-reader-compatible slides) to ensure inclusive participation. Follow up individually to confirm arrangements.

In short, combining sound consent processes, varied content formats and robust accessibility standards makes engagement materials transparent, practical and inclusive. This creates the conditions for meaningful dialogue about hydrogen technologies.

4.3 Implementing hydrogen public engagement activities

This section turns the strategic principles introduced earlier into a practical guide for putting engagement plans into action. Each part explains why the step matters and offers tools, tables or checklists that can be applied directly.

a) Logistics for in-person and virtual engagement

Good logistics are what make the difference between a smooth workshop and one that fails due to preventable issues such as late starts, missing interpreters or broken equipment. Planning tasks against time, venue and people frees organisers to focus on dialogue quality rather than housekeeping.

Table 12 lists practical tips based on HYPOP experience. Treat the final column as a living checklist and adapt deadlines to local circumstances.

Table 12: Practical tips for H_2 engagement logistics

Planning element	HYPOP experience	Practical guidance
Scheduling	Recruitment of participants, facilitators and speakers must start well in advance, along with any necessary translation of workshop materials.	• *12-8 weeks out:* secure venue/platform, draft multilingual invitations, open registration. • *8-4 weeks:* circulate fact sheets; send reminder invitations, confirm technical experts and translators. • *< 4 weeks:* test facilitation flow, finalise materials and translations, test platform.

Tools testing	All tools must be tested thoroughly before the event.	• *For in-person events*, test the physical audio-visual systems.
		• *For online events:*
		  ○ Test the video calling platform.
		  ○ Enter the meeting room early (5-15 mins) with speakers.
		  ○ Set breakout-room recording permissions.
		  ○ Assign co-hosts as backup facilitators.

Encouraging participation	Active involvement increases learning and trust.	• *For in-person events:* use neutral venues, limit numbers to around 50, display safety posters, and allow time for peer discussion. • *For virtual events:* encourage cameras on, use breakouts, live polls and captioning. • *For hybrid events:* ensure both groups have equal access to polls, Q&A and materials.
Facilitator preparation	Facilitators must be ready for tough questions.	• Anticipate predictable questions, such as comparisons between hydrogen and electric batteries, and prepare evidence-based answers. • Make clear that hydrogen is part of a broader renewable energy mix. • Use simple analogies when helpful, for example comparing hydrogen to champagne: still expensive, best for certain uses.
Expert inputs	Technical voices increase credibility.	• Involve at least one expert from a local hydrogen project to answer questions. • Connect discussion to real-world examples.

Planning element	HYPOP experience	Practical guidance
Preparing materials	Clear take-home resources help participants become advocates.	• Share slide decks after events. • Use infographics for complex topics. • Provide fact sheets on local projects and national strategy. • Translate materials into relevant local languages.
Accessibility	Make sure every participant can contribute.	• Recruit diverse participants. • Provide captioning and translated materials. • Design visuals to be colour-blind-friendly and videos with captions.

b) Facilitation tips

Even the best logistics cannot prevent disengagement if facilitation is weak. Moderators need to encourage participation, handle misinformation and protect minority voices. The following practices are useful:

1. Start with a round-robin introduction and a short prompt such as "one word you associate with hydrogen" to build rapport and surface preconceptions.
2. Display a safe-space charter, restating that the workshop is not a sales pitch but an exploration of hydrogen's role in the wider energy mix. Reassure participants about data protection and their rights.
3. Use inclusive moderation techniques such as speaker stacking, anonymous Q-cards or polls for sensitive issues, and rotating rapporteurs in breakout groups.
4. Prepare short, evidence-based responses to common questions and misconceptions (see Table 13) and use them to steer discussion back into dialogue rather than lecturing.

Table 13: Common questions and short responses

Question/Misconception	Response hook
Is hydrogen just competing with electric batteries?	Show the use-case matrix: batteries are better for short trips under 100 km, while hydrogen is suited to long-haul heavy duty transport cycles.
Hydrogen is unsafe or explosive.	Compare ignition properties with petrol, highlight fast vertical dispersion, and reference EU H_2 Safety Panel data.
Grey hydrogen negates climate gains.	Explain the colour spectrum of hydrogen and highlight that EU targets aimed at renewable and green hydrogen.

Facilitators can research these questions and memorise the hooks or print them on cue-cards for easy reference. When the question surfaces, provide the fact, then pivot back to participant dialogue rather than mere lecturing. The goal is empowerment, not one-way correction. Try to think of every difficult question the audience might pose in order to research it (or ask an expert) before the workshop date.

c) Safety protocols and risk communication

Perceived risk is one of the strongest drivers of opposition. Transparent safety measures and credible marshals help to put people's minds at ease, turning fear into informed caution. Table 14 summarises recommended preventive safety actions across phases of engagement.

Table 14: Safety actions for different phases of engagement

Phase	Risk-communication action	Rationale / reference
Before site visit or demo	• Conduct Hazard and Operability (HAZOP) walkthrough (safe routes, gas sensors if demo equipment present, etc.). • Issue "no ignition sources" brief.	Aligns with ISO 31000 and builds trust.
During site visit or demo	• Nominate an independent safety marshal. • Require PPE (Personal Protective Equipment) within 3 m of pressurised kit.	Creates clear accountability.
Virtual events	Share a safety fact card and EU H_2 Safety Panel infographic.	Keeps safety visible online and digitally accessible.
Speaker presentations (in-person or virtual)	Encourage use of the Concern–Evidence–Explanation pattern.	Matches best practice in other high-risk sectors.

d) Live monitoring of activities

Real-time data allows facilitators to adapt on the spot and provides evidence for later evaluation. Assign a person to track attendance, engagement and sentiment during events. Thresholds can help decide when to intervene. Table 15 provides some useful tools and metrics to consider.

Table 15: Tools and metrics for live data monitoring

Tool	Metric	Example trigger
Sign-in sheet or platform CSV	Registrations vs attendance	If attendance is below 70% of registrations, follow up by email.
Registration analytics	Participant diversity (gender, nationality, age, etc.)	If gaps appear, expand outreach before the next activity.
Start/end polls and chat notes	Sentiment pulse	If 20% or more responses are negative, bring in an expert to address concerns.
Questions asked	Engagement intensity	If responses drop below 0.3 per person per minute, add an energiser activity.
Social media tracking	Reach of event hashtag or mentions	If below benchmark, cross-post via partner accounts.
Pre/post quiz (5 items)	Knowledge gain	An increase of 20 percent or more shows meaningful learning.

Using these tools and metrics will help facilitators stay informed on how to best adapt the presentation or activity as things develop.

4.4 Analyse and report

Systematic analysis of public engagement data, followed by timely reporting, closes the feedback loop between organisers and participants, shows accountability to funders, partners and stakeholders, and helps improve future activities. This section explains how data can be captured and analysed, and how findings can be reported back to different audiences in ways that are both accessible and useful.

a) Capturing and analysing data

Measurement should tell you both *what changed* and *why*. The most reliable way to achieve this is by pairing quantitative tools with qualitative material.

- Use mirrored pre- and post-event questions to measure shifts in knowledge or attitudes.

- Collect rich artefacts from co-creation tasks such as whiteboards, Padlets, or short exercises. These show how people reasoned and where misunderstandings remain.

- Keep surveys short by mixing simple scales with a few open-ended prompts such as "What still worries you?" or "What changed your mind today?"

- Where possible, use anonymised identifiers to match individual responses across surveys while remaining GDPR-compliant.

- During events, run quick pulse polls to track shifts and use them as discussion prompts.

For analysis:

- Report basic descriptives such as frequencies, means and distributions.

- When samples are large enough, use paired tests to show measurable change; when they are not, use effect sizes or confidence intervals.

- For qualitative data, use at least two coders to theme responses and record agreement levels.

- Align quantitative results with quotes or artefacts so findings explain both the scale and the reasoning behind change.

A simple measurement flow works well for most events:

- *Before the event*. Run a baseline survey at registration.

- *During the event*. *U*se two or three short polls.

- *After the event*. Repeat the baseline items and add a few questions about usefulness and learning.

- *Synthesis*. Merge results, theme the qualitative material, and publish a summary of what changed and why.

When deeper evidence is needed, add tools such as Most Significant Change interviews, light-touch sentiment analysis of social media, or outcome harvesting to track longer-term influence.

b) Reporting back to stakeholders

Reporting should happen quickly and at multiple levels so participants feel their contribution mattered.

- Within the same week, send a short note to attendees with thanks, responses to noted unanswered questions, and key resources such as slide decks and fact sheets.

- Within ten working days, prepare a two- to three-page brief for partners and hosts, summarising what participants valued, what concerns remain, and what will be done differently next time.

- Publish a short public update on the project website with the same "you said, we will" structure, and update FAQs with any new questions.

- Reserve press releases for real milestones such as project launches or major decisions. Link them back to public summaries for transparency.

- Keep a technical reporting dossier updated after each activity, including methods, anonymised data, and figures. This helps satisfy funders and auditors without waiting until the end of the project.

Tracking reporting effectiveness is also important. Check open and click-through rates on emails, assess whether participant questions were resolved, and ask partners whether findings informed their decisions. Different stakeholders will also require or prefer different formats of reporting. Table 17 provides some tips for presenting results to various relevant groups.

Table 17: Tips for presenting engagement results to different audiences

Audience	Preferred format	Focus of messages
Citizens and civil-society groups	Plain-language brief, infographic, or short video	What changed in understanding, opportunities for next engagement, and contact details.
Policy-makers and regulators	Two-page policy brief or webinar debrief	Public concerns on safety and cost, evidence of knowledge gains, and recommendations aligned with policy timelines.
Industry and project developers	Slide deck with sentiment charts and KPI dashboard	Which groups are most supportive or opposed, key concerns, barriers to infrastructure, and collaboration opportunities.
Academia and peer projects	Open-access paper or repository	Method transparency, transferable indicators, and evidence-based takeaways.

Other options include interactive dashboards, community noticeboards or local radio, joint press releases with municipal partners, and town-hall feedback sessions where preliminary findings are sense-checked with participants.

Robust analysis and reporting transform engagement from a one-off event into part of an iterative learning cycle. By combining quantitative evidence with qualitative insights and tailoring reporting to different audiences, hydrogen initiatives can demonstrate accountability, strengthen trust and build a stronger foundation for future dialogue.

4.5 Evaluate and refine

After each round of public engagement activities, project teams should pause, examine the collected evidence and anecdotes, and use what they learn to refine and improve the next phase. This section outlines how to evaluate processes, update the ToC, and translate findings into practical improvements.

a) Process evaluation – what worked, what did not, and why

Process evaluation focuses on how engagement was carried out, not just on its outcomes. It looks at whether activities reached the intended audience, whether participation was equitable, and whether the quality of dialogue was high enough.

To do this:

- Collect both quantitative indicators such as attendance, survey results and demographics, and qualitative material such as facilitator notes, open-ended feedback and real-time polls.
- Compare results across different events to identify consistent strengths (for example, co-creation tasks often generate higher satisfaction) and recurring barriers (such as low participation from specific groups).
- Use mixed methods to interpret findings, so numbers show where change happened and qualitative evidence explains how and why.

This approach helps identify transferable practices that can be reused and context-specific challenges that need new solutions.

b) Updating the Theory of Change

A ToC only adds value if it evolves with the evidence. Evaluation results should be used to test assumptions, add new insights and refine the causal pathway.

For example:

- Re-examine assumptions such as whether more knowledge automatically increases trust. Evidence may show that sustained interaction with credible local voices matters more.

- Add new steps if needed, such as emphasising relationship-building as an interim outcome.

- Adjust indicators so they capture what actually drives change (e.g. number of trained local champions or frequency of peer-to-peer dialogue).

Treating the ToC as a living document aligns with good practice in developmental evaluation and ensures engagement strategies remain evidence-responsive.

c) Improving future engagement

Refinement should flow directly from evaluation and ToC updates. Common priorities include:

- *Broader reach*. If some groups are under-represented, design new recruitment routes such as vocational schools, youth platforms or community associations.

- *Deeper dialogue*. If participants respond best to interactive activities, make hands-on or creative formats the default, supported by concise briefings.

- *Closing the loop*. Always publish a short "you said, we did" update so participants can see how their input influenced decisions. This strengthens reciprocity and builds trust.

Evaluation is not about ticking boxes but about building adaptive learning into the engagement cycle. Each round of activities should become sharper, fairer and more impactful than the last. By embedding reflection into everyday practice, hydrogen initiatives can shift from information campaigns to genuine co-creation of the energy transition.

5. Resources

This section brings together practical tools, background evidence and contact points to support the design and delivery of engagement activities. All resources listed here are either drawn from HYPOP deliverables or aligned with established EU toolkits and academic research. They are intended to be adapted and reused in local contexts.

5.1 Templates and checklists

- Stakeholder (*3i framework*) analysis template
- Theory of Change template
- Risk management (Table 8, page 30)
- Consent form template (page 53)
- Pre/post survey questions bank (pages 54-59)

5.2 Engagement and communication toolkits

- EU Clean Hydrogen Partnership communication toolkit
- European Commission "Clear Writing" guidelines
- UNESCO toolkit on science communication and public engagement
- OECD Observatory of Public Sector Innovation (OPSI) engagement methods library
- Engage4Energy guidelines for citizens, developers and policymakers on public engagement in energy infrastructure projects
- Collective Impact Forum – Community engagement toolkit
- AEIDL Public Engagement Toolkit
- BetterEvaluation — Stakeholder Engagement Toolkit
- COMPILE Toolkit: Stakeholder Engagement Guide for Energy Communities

5.3 Evidence base and further reading

The following deliverables provide the empirical foundation for this guidance:

- D1.2: State-of-the-Art analysis of public perceptions and reactions to hydrogen and fuel cell technologies
- D1.3: Identification of the main individual-level determinants of public understanding and acceptance of FCH technologies
- D1.4: Analysis of public engagement with H2 via social media channels across the EU27
- D3.2: Public information and engagement strategy
- D3.3: Report on public engagement activities

References

BetterEvaluation. (n.d.). *Stakeholder engagement toolkit*. Retrieved August 20, 2025, from https://www.betterevaluation.org/tools-resources/stakeholder-engagement-toolkit

Clean Hydrogen Joint Undertaking. (n.d.). *FCH JU projects—Communication & dissemination (communication guidance/toolkit)*. Retrieved August 20, 2025, from https://www.clean-hydrogen.europa.eu/fchju-projects-communication-dissemination_en

Clean Hydrogen Joint Undertaking. (2023, July 6). *Awareness of hydrogen technologies: Survey report*. Clean Hydrogen Partnership. https://www.clean-hydrogen.europa.eu/media/publications/awareness-hydrogen-technologies-survey-report_en

Clean Hydrogen Joint Undertaking. (2024, November 15). *Programme Review Report 2024*. Clean Hydrogen Partnership. https://www.clean-hydrogen.europa.eu/media/news/check-out-2024-programme-review-report-2024-11-15_en

COMPILE project. (2022, June). *COMPILE Toolkit: Stakeholder engagement guide for energy communities* (PDF). https://energycommunityplatform.eu/wp-content/uploads/2022/06/COMPILE-Toolkit-Stakeholder-Engagement-Guide.pdf

European Commission. (n.d.). *Clear writing for Europe*. Directorate-General for Translation. Retrieved August 20, 2025. https://commission.europa.eu/about/departments-and-executive-agencies/translation/clear-writing-europe_en?utm_source=chatgpt.com

European Commission. (2023). *A Pact for Engagement*. https://energy.ec.europa.eu/system/files/2023-11/Pact%20for%20Engagement%202023.pdf

European Commission. (2024a). *Horizon Europe support for citizen engagement*. https://european-research-area.ec.europa.eu/horizon-europe-support-citizen-engagement

European Commission. (2024b). *Public acceptance and stakeholder engagement: 10 Guiding Principles for early public engagement for energy infrastructure projects*. https://energy.ec.europa.eu/topics/infrastructure/public-acceptance-and-stakeholder-engagement_en

HYPOP Consortium D1.2. (2024). *State-of-the-art analysis of public perceptions and reactions to hydrogen and fuel cell technologies* (Deliverable D1.2). HYPOP Project, Horizon Europe (Grant Agreement No. 101111933). European Commission. Retrieved from https://www.hypop-project.eu/wp-content/uploads/2024/07/D1.2.pdf

HYPOP Consortium D1.3. (2024). *Identification of the main individual-level determinants of public understanding and acceptance of FCH technologies* (Deliverable D1.3). HYPOP Project, Horizon Europe (Grant Agreement No. 101111933). European Commission. Retrieved from https://www.hypop-project.eu/wp-content/uploads/2024/07/D1.3.pdf

HYPOP Consortium D1.4. (2024). *Analysis of public engagement with H_2 via social media channels across the EU27* (Deliverable D1.4). HYPOP Project, Horizon Europe (Grant Agreement No. 101111933). European Commission. Retrieved from https://www.hypop-project.eu/wp-content/uploads/2024/07/D1.4.pdf

HYPOP Consortium D3.1. (2025). *S-LCA of two selected hydrogen systems and set of indicators for citizenship* (Deliverable D3.1). HYPOP Project, Horizon Europe (Grant Agreement No. 101111933). European Commission. Retrieved from https://www.hypop-project.eu/results/ (public deliverables uploaded via Zenodo)

HYPOP Consortium D3.2. (2024). *Public information and engagement strategy* (Deliverable D3.2). HYPOP Project, Horizon Europe (Grant Agreement No. 101111933). European Commission. Retrieved from https://www.hypop-project.eu/wp-content/uploads/2025/03/HYPOP-D3.2_Public-information-and-engagement-strategy_FINAL.docx.pdf

HYPOP Consortium D3.3. (2025). *Report on public engagement activities* (Deliverable D3.3). HYPOP Project, Horizon Europe (Grant Agreement No. 101111933). European Commission. Retrieved from https://www.hypop-project.eu/wp-content/uploads/2025/07/HYPOP-D3.3-Report-on-public-engagement-activities.pdf

International Organization for Standardization. (2018). *ISO 31000:2018—Risk management: Guidelines*. https://www.iso.org/standard/65694.html

International Organization for Standardization. (2023). ISO 24495-1:2023 *Plain language—Part 1: Governing principles and guidelines*. ISO. https://cdn.standards.iteh.ai/samples/78907/d194fac21d6a45f38bfcfec9657f7498/ISO-24495-1-2023.pdf?utm_source=chatgpt.com

Reed, M. S., Jensen, E. A., Noles, S., Conneely, D., Kendall, H., Raley, M., Tarrant, A., Oakley, N., Hinson, C., Hoare, V., Marshall, K., & Pugliese, L. (2025). *Analyzing who is relevant to engage in environmental decision-making processes by interests, influence and impact: The 3i framework*. Journal of Environmental Management, 373, 123437. https://doi.org/10.1016/j.jenvman.2024.123437

World Wide Web Consortium (W3C). (2023, October 5). *Web Content Accessibility Guidelines (WCAG) 2.2* (W3C Recommendation). W3C Web Accessibility Initiative. https://www.w3.org/TR/WCAG22/?utm_source=chatgpt.com

HyPOP

www.hypop-project.eu

info@hypop-project.eu

#HYPOPPROJECT

Let's make the hydrogen revolution

ENVIRONMENT PARK

IMI Institute for Methods Innovation

institute IMdea energy

APRE

Hidrógeno

REGIONALNA IZBA GOSPODARCZA POMORZA

TWEED

BALKAN HYDROGEN CLUSTER

Clean Hydrogen Partnership

Co-funded by the European Union