

MOST-H₂

Novel metal organic framework
adsorbents for efficient storage of hydrogen

SOCIAL ACCEPTANCE OF HYDROGEN AND MOFS

PUBLIC PERCEPTION OF HYDROGEN IN EUROPEAN TRANSPORT
LOAY RADWAN – GREENDELTA

AGENDA

01 Introduction

02 Research Questions and Methodology

03 Public Knowledge of Hydrogen

What does the public actually know?

04 Top Concerns & Trust Builders

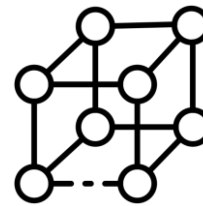
Safety, costs, infrastructure, and what would change minds

05 Key Takeaways

MOST-H2

- Collaboration between 16 partners across Europe to develop and validate an innovative, **low cost cryo-adsorptive hydrogen storage system**
- The main focus is on developing **monolithic Metal-Organic Framework (MOF)** adsorbents with an optimal combination of **volumetric and gravimetric H₂ storage capacity** and a small environmental footprint
- The outcomes will contribute to establishing **hydrogen as a widespread energy carrier**, a key priority for the EU in becoming climate-neutral

OBJECTIVES



New Materials

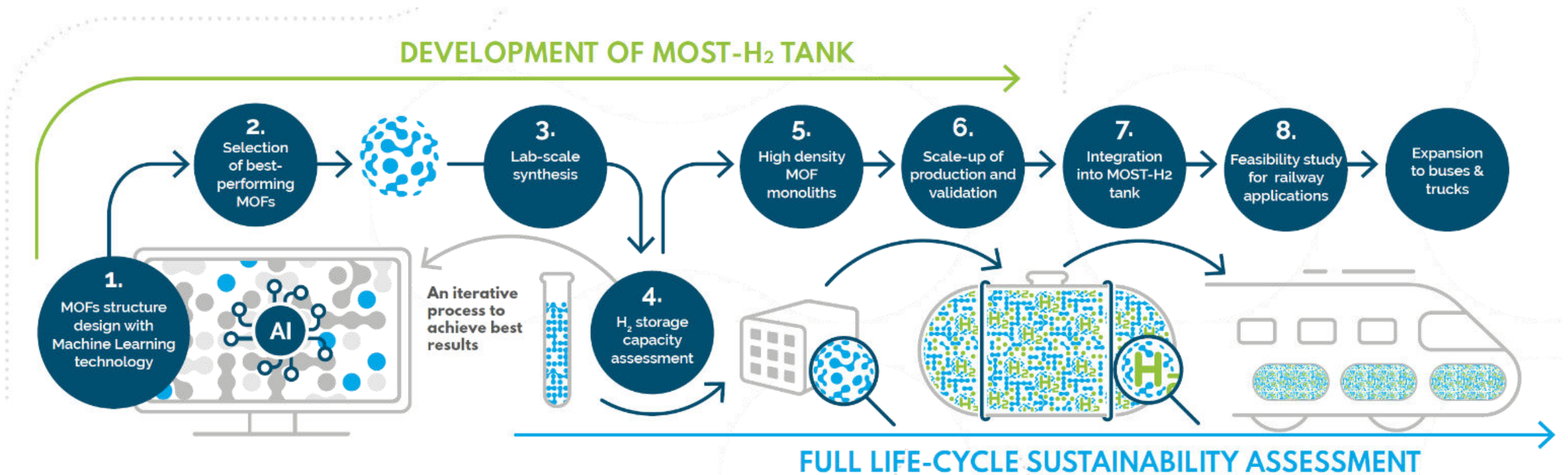


H₂ Storage



Application

MOST-H2



<https://most-h2.eu/>

RESEARCH QUESTIONS

RQ1**Knowledge & awareness**

What is the current level of knowledge and awareness of the general public regarding hydrogen as an energy carrier and its use in transportation?

RQ2**Level of acceptance**

What is the level of acceptance of hydrogen as an energy carrier in transportation applications, specifically in railways and buses?

RQ3**Influencing factors**

What are the key factors influencing the acceptance of or resistance toward, hydrogen and MOF-based storage in transport applications?

RQ4**Building trust**

What additional information or conditions would increase the public trust in hydrogen and MOF storage systems?

METHODOLOGICAL FRAMEWORK



SAMPLE PROFILE

107

respondents

12

countries

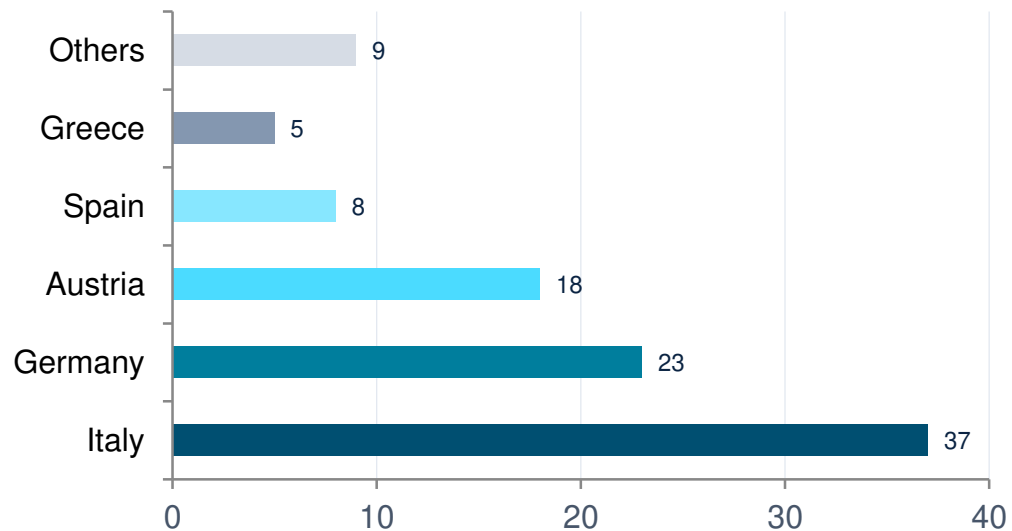
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languages

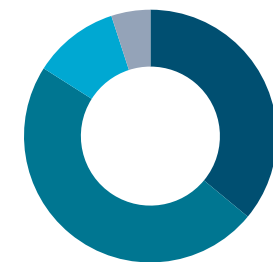
26–45

median age

Country distribution (%)

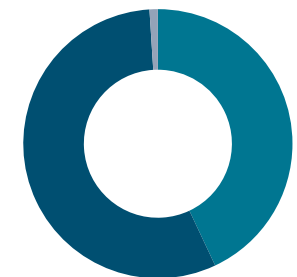


Age groups



■ 18–30 (36%) ■ 31–45 (48%)
■ 46–60 (11%) ■ 60+ (5%)

Education level



■ Doctoral/postgrad ■ University degree
■ Other

KNOWLEDGE & AWARENESS OF HYDROGEN

94.4%

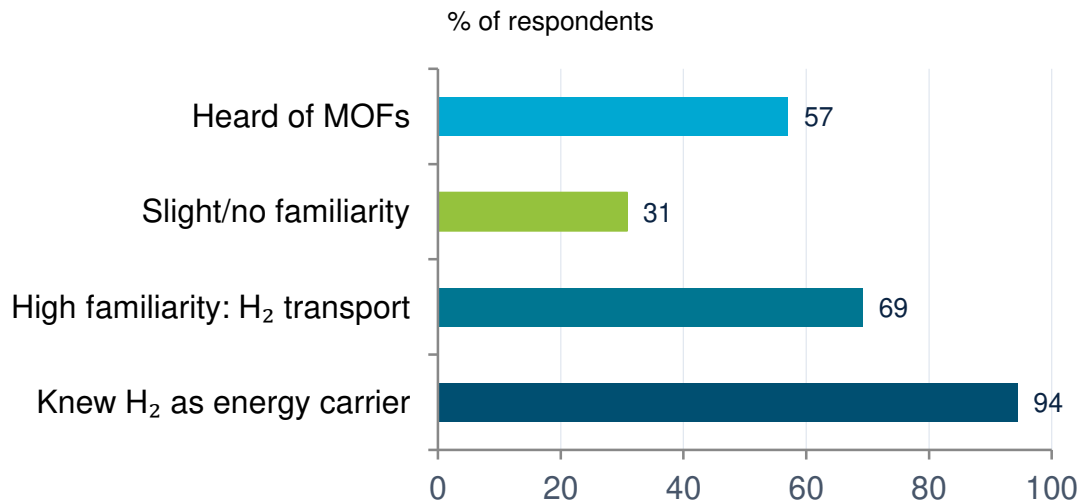
already knew H₂ as an energy carrier

69.2%

highly familiar with H₂ in transport applications

57.0%

had heard of MOFs (Metal-Organic Frameworks)



Compared to general EU public (HyPop/Gallup 2023)

General EU awareness of H₂ as energy source **Our: 94.4%** EU: 70–80%

Familiar with H₂ in transport **Our: 69.2%** EU: 60 - 80%

Note: Sample is highly educated, which likely explains the elevated awareness vs. EU-representative surveys

[homepage - HyPop Project.](#)

[Awareness of Hydrogen Technologies - Survey Report - Clean Hydrogen Partnership](#)

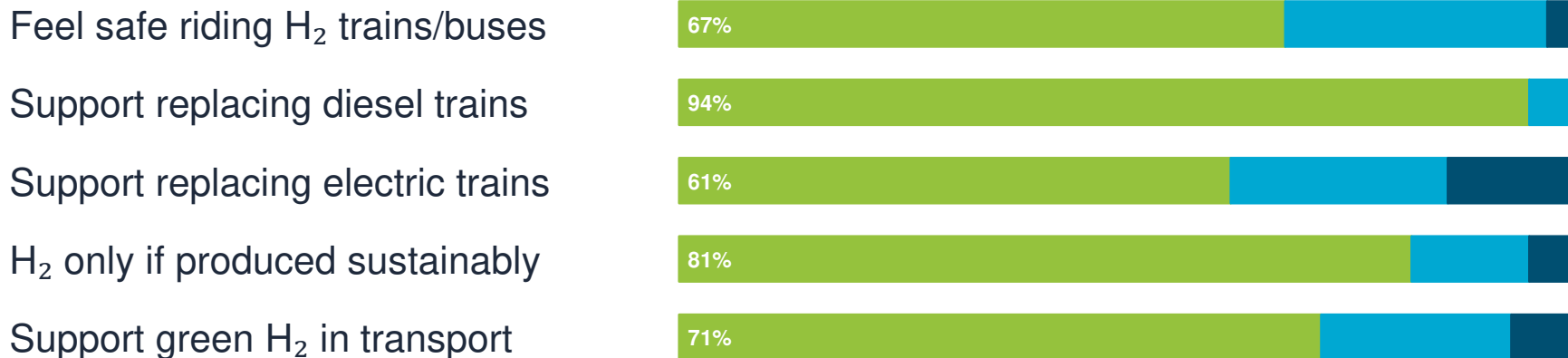
LEVEL OF ACCEPTANCE

83%

fully support the transition to hydrogen-powered trains and buses, including in their own region

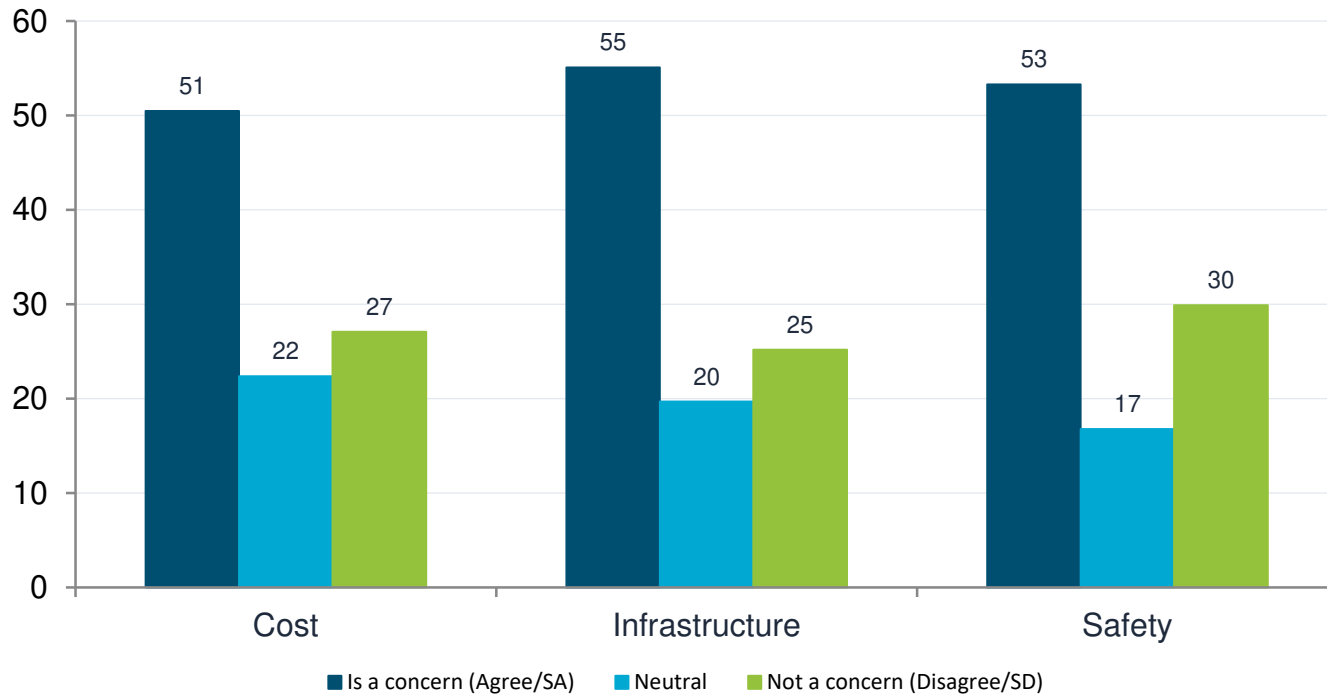
8.4% support, but not locally · 12.1% neutral · only 2.8% oppose

Agreement breakdown by statement (% of respondents) ■ Agree / Strongly Agree ■ Neutral ■ Disagree



TOP CONCERNS & RESISTANCE FACTORS

Key barriers - % of respondents



Infrastructure (55%)

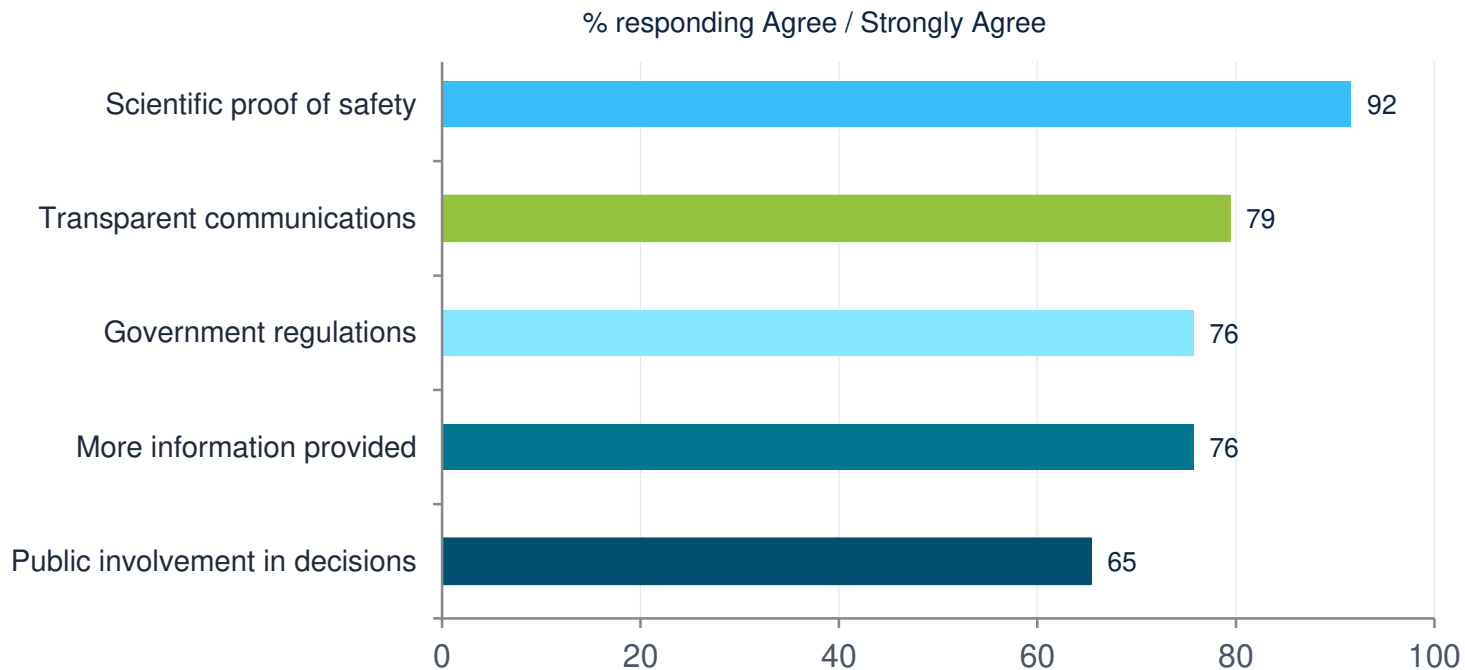
Mirrors real-world friction: Germany's H₂ trains faced supply disruptions in 2022–25 (IEA). Absence of visible refuelling networks amplifies concern.

Safety (53%)

Classic abstract vs. lived ambivalence: 53% flag safety concerns in principle, yet 67% would feel safe actually riding a H₂ train.

Cronbach $\alpha = 0.911$ across the three concern items, they form a highly coherent 'risk perception' construct, confirmed by Factor 2 in the EFA.

WHAT WOULD STRENGTHEN TRUST?



Trust prescription

- Science-backed safety evidence resonates most (91.6%).
- Transparency & government regulation are co-equal levers.
- Public deliberation: valued but lower-ranked (65.4%).

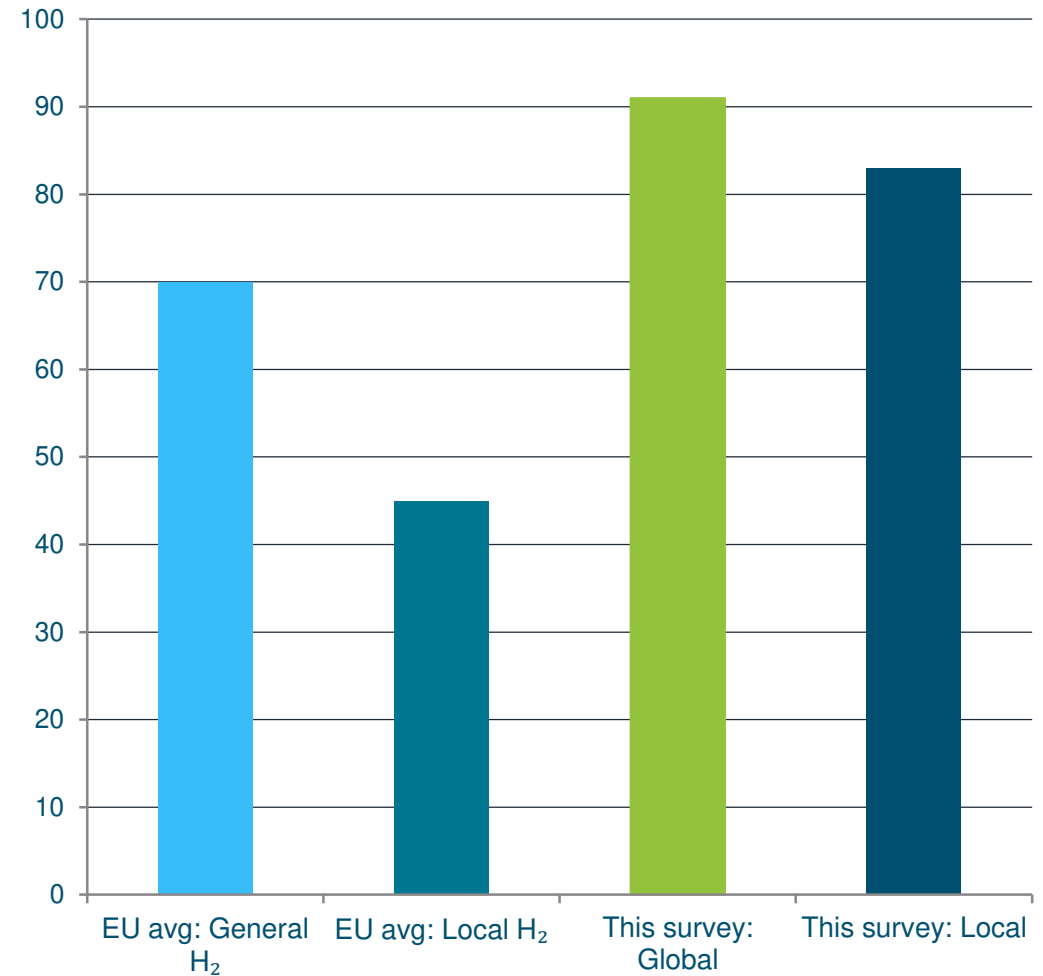
MOF-specific Acceptance factors

- MOFs improve safety & performance — 88%
- MOFs improve reliability — 85%
- MOF cost reduction — 82%

NO NIMBY — THE LOCAL ACCEPTANCE GAP IS LESS SIGNIFICANT

- In most EU hydrogen studies, general support drops sharply when people are asked about local deployment (HyPop 2024; Zaunbrecher et al. 2021).
- Our finding: 83% support H₂ trains in their own region vs 91% globally.

Global vs local acceptance (%)



KEY TAKEAWAYS?

01 Lead with science

91.6% want scientist-endorsed safety proof. Peer-reviewed MOF safety data and real-world H₂ train performance records should anchor all public communications.

02 Prioritise infrastructure narrative

Infrastructure is the #1 concern (**55%**). Transparent comms about H₂ supply chains, will address the biggest single blocker.

03 Launch MOF education campaign

43% hadn't heard of MOFs. yet **87%** support adoption once explained. Targeted campaign linking MOFs to safety & cost is the highest-leverage intervention.

04 Green production is non-negotiable

81% support H₂ only if sustainably produced. Policies must emphasise green H₂ pathways and EU Renewable Hydrogen standards.

THANK YOU FOR YOUR ATTENTION



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