EIC Scaling Club

Market Roadmap
Clean Fuels & Hydrogen

European Innovation Council
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Partners:
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EIC Scaling Club

Introduction and group overview

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Objectives and targets

This report was made through **multiple interactions** with EIC Scaling Club stakeholder members, including scaleup companies, investors, corporates and public institution representatives.

It provides a **snapshot of the stakeholder members' visions and insights** on the state of the clean fuels and hydrogen market in Europe.
It is designed to help professionals, especially entrepreneurs, grasp meaningful insights to help build their scaling strategies.

The following topics were explored by participants:

1. Technology barriers
2. Market barriers
3. Unexploited potential
4. Geography focus
5. Market risks
6. State of competition
7. Funding priority

The report is designed to...

... **Help companies and entrepreneurs assess current market positioning** to define future roadmaps, by comparing with their peers' positions and considering expert insights

And was achieved thanks to...

... **A mix of data-driven inputs in conjunction with qualitative insights** obtained from live surveys, online and onsite workshops as well as dedicated interviews with club members

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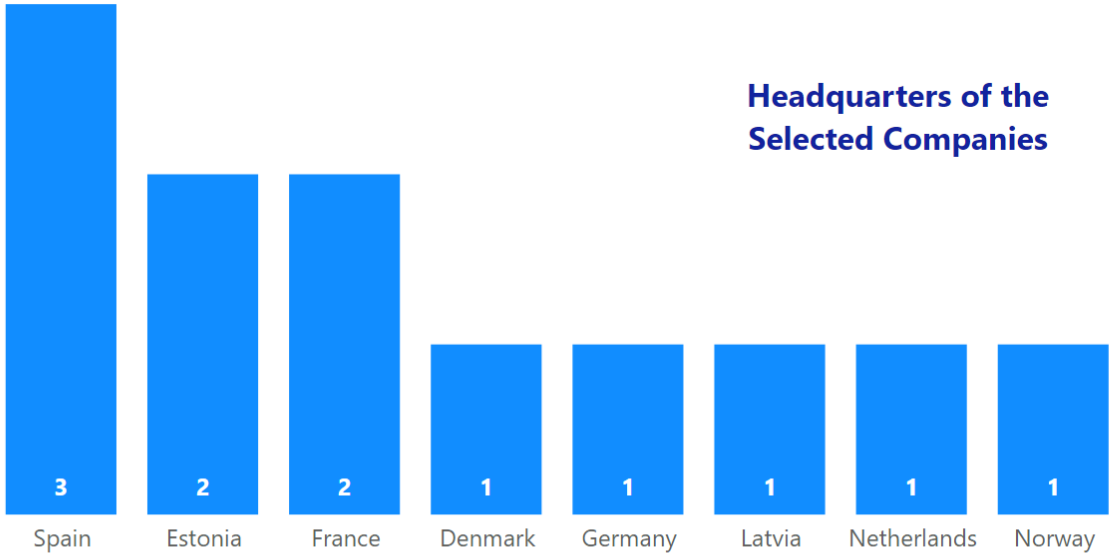
Highlights report – Summary

12

Number of Selected Companies

Headquarters of the Selected Companies



74

Active Investors Backing Companies

Total Amount Raised

375.86M

Average Raised per Company

31.32M

Companies with Women in Executive Positions

8

Number of Employees

643

Members of the Clean Fuels & Hydrogen group

*Referred to as **Stakeholders** in this report*

Investors

- extantia
- INVIEIN CAPITAL
- Voima Ventures

Corporates & Institutions

- EUNICE
- EIT Manufacturing
- Evonik Venture Capital
- İNCİ HOLDİNG
- Innovation Agency LITHUANIA
- Nortegas Renovables
- ORLEN
- snam
- TiLT CAPITAL PARTNERS – Siparex Group
- Tüpraş Ventures
- UKRAINIAN HYDROGEN COUNCIL
- zubi labs
- VEOLIA

Companies

- Battolyser Systems
- JOLT
- Dynelectro
- NACO
- elcogen – Affordable green hydrogen
- Nordic Electrofuel
- H2SITE
- PowerUP ENERGY TECHNOLOGIES
- Hydrogenious LOHC – Carrying the new energy world.
- zeleros
- HSL TECHNOLOGIES – HYDROGEN STORED AS LIQUID
- sakowin GREENenergy

*Please refer to **page 18** for the detailed methodology of the report.*

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Program mentors

Aivars Starikovs
Advisor to the Hydrogen Europe CEO for CEE and WE countries

Audra Shallal
Vice President

Carmen Font
CEO

Christine Funck
Co-Founder & CEO

Christian Weinberger
Senior Adviser

Luba Nikiforova
Executive Director

Luc Grare
Head of Central and Eastern Europe

Maria Trinidad
Member of the Advisory Board

Olivier Bucheli
Executive Chairman

Raphael Schoentgen
Founder & CEO

Theodora Trachana
Partner

Willem-Jeroen Stevens
Managing partner

Companies selected in the Clean Fuels & Hydrogen

Following nominations from stakeholder members for the most promising European scaleups, companies have been selected based on their applications to the program. Various criteria were taken into consideration, including technology maturity, management experience, go-to market strategy, competitive positioning and investment potential. Moreover, geography and gender balance were also considered to guarantee a fair representation of European diversity.

Battolyser Systems	Develops innovative Battolyser® technology that integrates battery storage with electrolysis to produce hydrogen efficiently.
Dynelectro	Development of sustainable energy systems using solid-oxide electrolysis technology.
elcogen Affordable green hydrogen	Innovative clean energy technology platform, dedicated to creating a sustainable future.
H2SITE	Spanish scale-up specializing in high-purity hydrogen separation using palladium-alloy membrane reactors.
Hydrogenious LOHC Carrying the new energy world.	Enabling safe and efficient storage and transport of hydrogen, thereby supporting flexible hydrogen supply chains worldwide.
HSL Technologies Hydrogen Stored as Liquid	Develops a safe, non-toxic liquid silicon-hydride solution enables hydrogen transport and storage using existing infrastructure.
JOLT	Transforming the green hydrogen landscape by designing custom electrodes for electrolyzers.
NACO	At the forefront of advancing Green Hydrogen systems through its cutting-edge nano coatings.
Nordic Electrofuel	Pioneering the production of carbon-neutral e-fuel for aviation and transportation sectors.
PowerUP Energy Technologies	Specializes in hydrogen fuel cell-based solutions for diverse sectors like telecom, defense, and healthcare.
sakowin GREENenergy	Producing decarbonized hydrogen on-site using methane plasmalysis.
zeleros	Electric powertrain and automation innovations for various sectors, driving the future of sustainable mobility.

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EIC Scaling Club

Key results and insights

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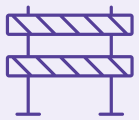
Scalable pilots and targeted partnerships are the keys to Hydrogen Growth

Companies must focus on scalable pilots to substantially address the market drivers and attract investors. By forming strategic partnerships with key industrial players, they could have easier access to European and international markets and accelerate the scalability path of their projects. Effective Public-Private cooperation is recommended to derisk projects.



Infrastructure Bottlenecks, High Costs and Regulatory Complexity are the main market barriers for clean fuels & hydrogen companies in Europe.

Rising demand in sectors like **steel, aviation fuel, and fertilizers** is driving decarbonization efforts globally.

Europe drives demand through regulatory measures that increase fossil fuel costs, while the **U.S. and MENA focus on market-driven** incentives and **cost** efficiencies.

"This cohort showcases **the best European deep tech** start-ups in the field of clean fuels and hydrogen pursuing the most important goal which is **to scale up.**

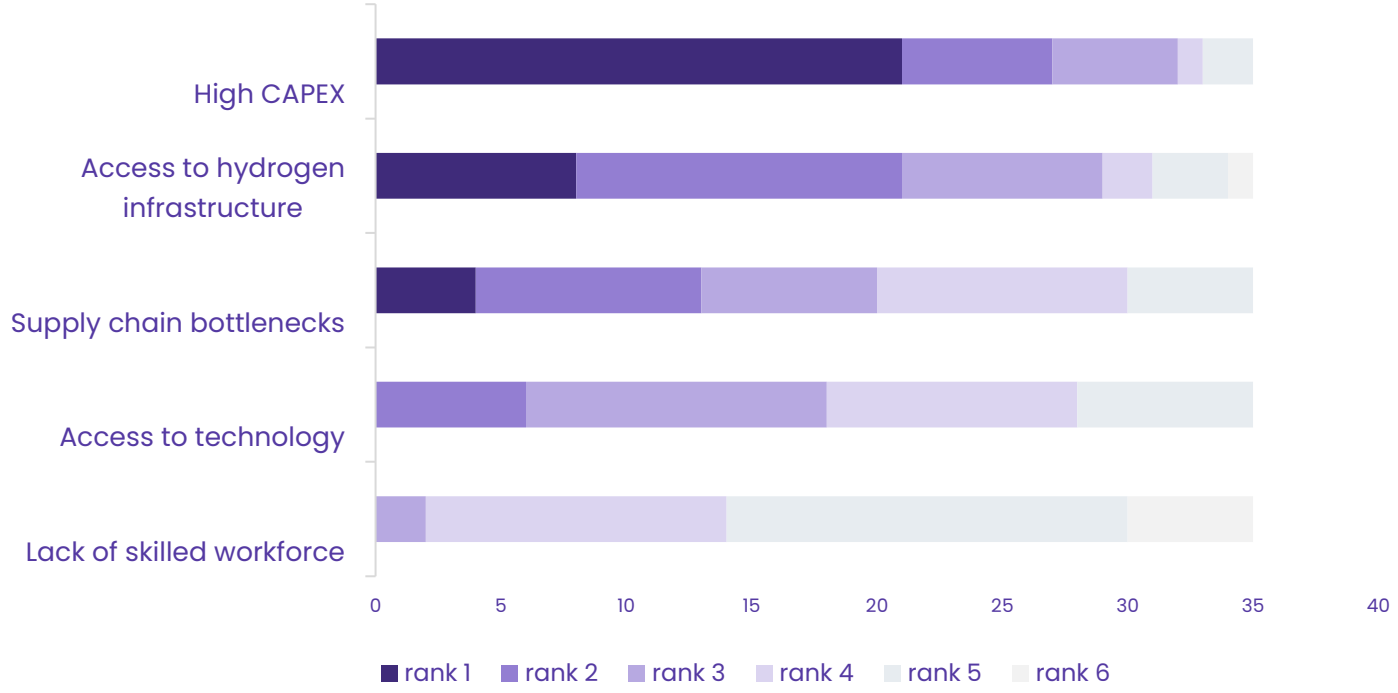
Single projects do not bring the volumes that Europe needs to gain competitiveness and meet production targets. **We are supporting the best innovative solutions** towards competitive hydrogen production and aligned with the main **market drivers, green steel, fertilizer producers and refineries**"

Carmen Font
CEO, Font Corporation

High CAPEX, infrastructure challenges, and the lack of sufficient low-cost renewable electricity are the main barriers to scaling

Cost-competitiveness and the missing hydrogen infrastructure are strong barriers

Main technological barriers
Preference ranking of technological barriers



> While high CAPEX is a challenge, **the real bottleneck lies in OPEX**, with **energy prices in Europe being three times higher** than in the U.S. This hinders **profitability** and **project viability**. Europeans need to focus on being **technology-neutral** and leveraging on different mature scalable solutions like **electrolysis** or **steam CO2 reforming**.

Carmen Font
CEO, Font Corporation

> The industry is stuck in a chicken-and-egg situation: **without infrastructure, demand won't grow**; **and without demand, infrastructure investments remain stalled.** Breaking this cycle is essential to resolving supply chain bottlenecks.

Sune Lilbaek
Dynelectro

** 39 answers collected from live survey questions*

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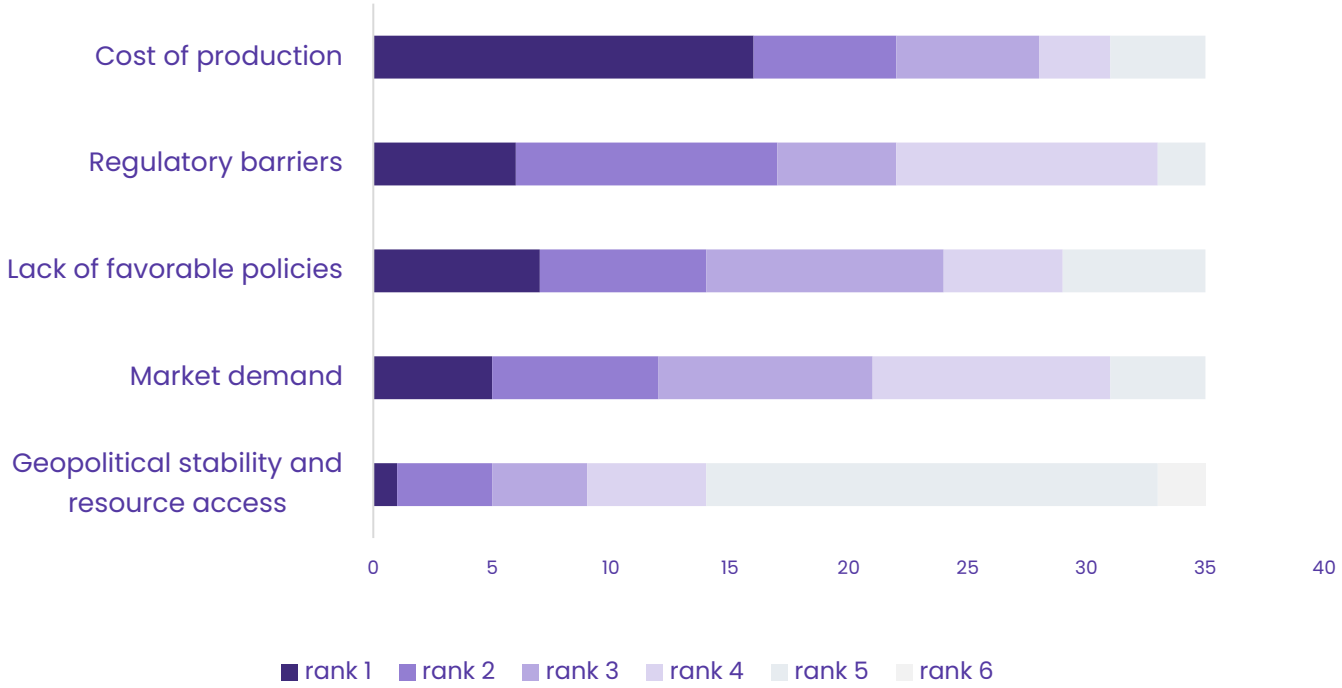
Regulatory barriers as well as a lack of favourable policies and market demand are growing concerns in the market

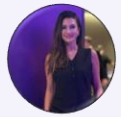
In addition to cost-competitiveness, regulations and market demand also represent barriers to scaling

Main market barriers
Preference ranking of market barriers



** 39 answers collected from live survey questions*

"**High production costs** hinder scaling. **Early subsidies and incentives** can help but need **measurable outcomes**. **Consistent regulations** are key, as **regional disparities** pose challenges. Startups should **collaborate with regulators** to stay aligned and competitive."



Ayse Sen
Lead Consultant, Inci Holding

"The EU is leading in **regulatory alignment**, but startups need to **understand and adapt** to these frameworks early to avoid **delays** and create a smoother **market entry**."

Léa Chauvin
H2Site

"Demand for green H depends on cost reductions, driven by, **LCOE** and **CAPEX for electrolysers and equipment** with up to 90% cuts with large-scale deployment. Scaling in low-LCOE regions and pipeline networks is key."

Christian Weinberger
Senior Advisor, Green Hydrogen

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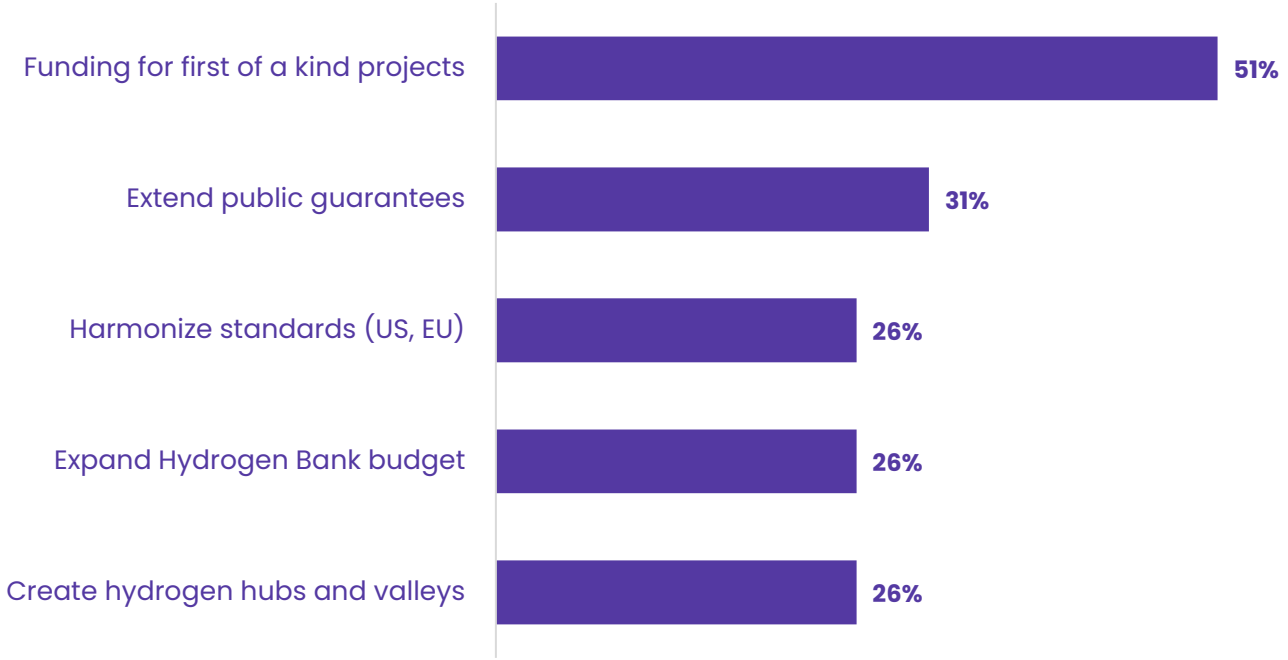
Governments and industries must address high costs, infrastructure gaps, and supply chain bottlenecks.

Regulatory changes required by market actors are directed toward funding mechanisms

Key regulatory changes or government support needed



** 39 answers collected from live survey questions*

> By extending **guarantees**, we ensure that innovative projects don't stall due to **perceived risks**. It's about giving **startups** a fighting chance to prove their **technologies** and **business models**.

Luc Grare
Head of Central and Eastern Europe, Lhyfe

> Certification isn't just a checkbox—it's **a competitive edge**. Meeting standards **like RED II or FuelEU Maritime**, proving compliance, future readiness, and scalability while building trust with investors, customers, and partners.

Olivier Bucheli
Executive Chairman, Adele Hydrogen

> Public **grants** tied to **EU regulations** can validate a startup's projects in the eyes of **private investors**—that's crucial for **scaling**.

Dr. Can Sindirac
Innovation Investment Analysis Manager, Tüpraş

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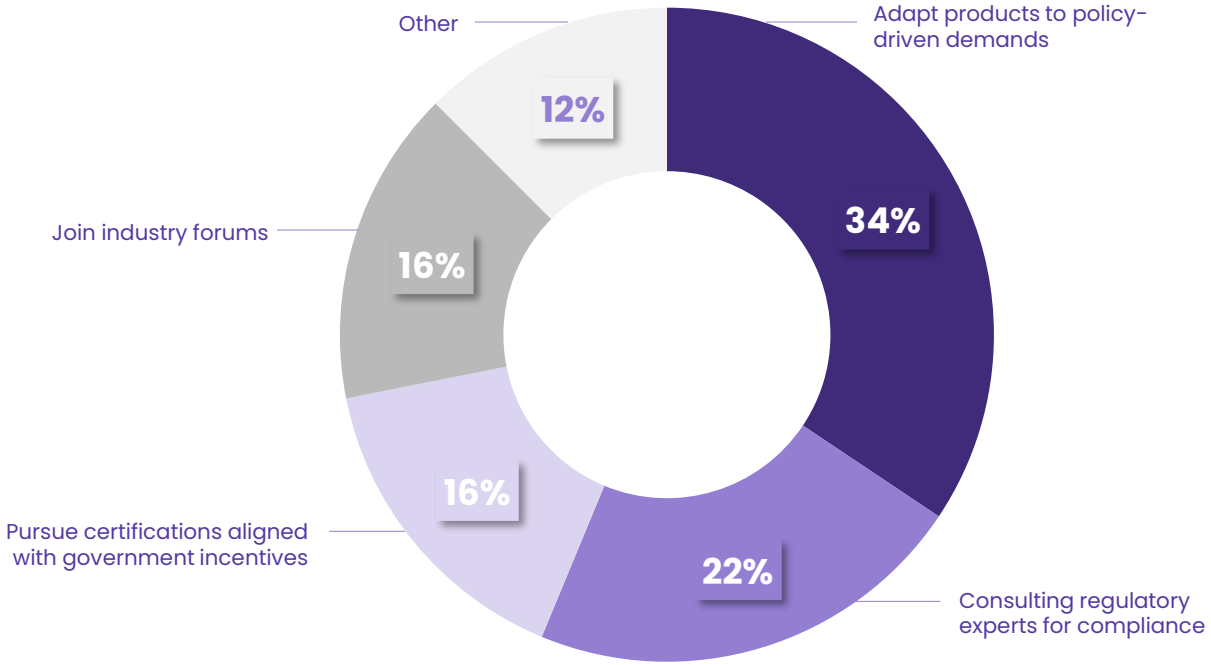
Companies must navigate regulatory challenges to accelerate clean energy adoption

Aligning to evolving policies and regulations is critical

Strategies to leverage existing regulations and policies



> **Obligations to Member States** (such as AFIR and NECP targets for 2030) and **industrial actors such as RED III targets and fleet quota targets** - which include significant penalties if they are not achieved - speak a clear language that the hydrogen transition will move forward continuously and there is no way back.

Christian Weinberger
Senior Advisor, Green Hydrogen

> The EU's decarbonization directives are reshaping industrial demand. **Startups should tailor their solutions**—whether for steel, ammonia, or transportation—to fit within these frameworks. It's not about offering what you can; **it's about providing what's mandated.**

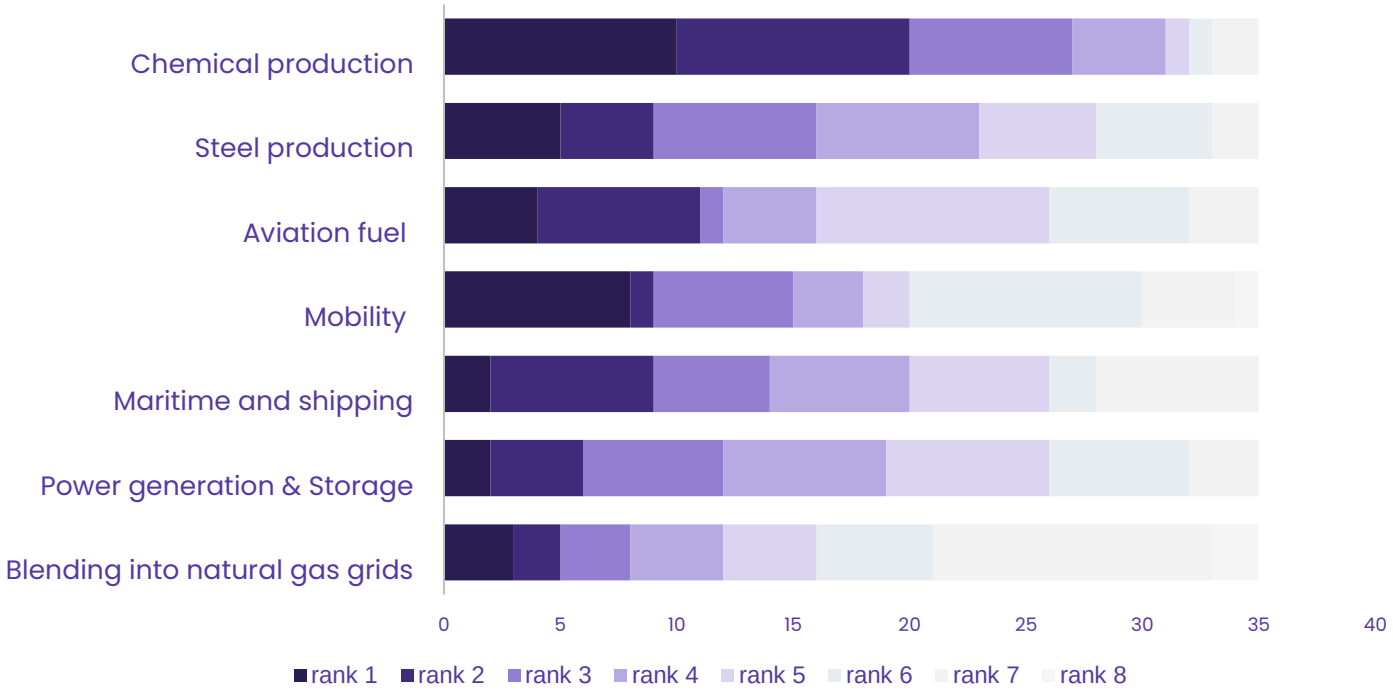
Léa Chauvin
H2Site

** 39 answers collected from live survey questions*

Adapting technologies to industry-specific demand will be crucial to reach the market

Chemical production and steel manufacturing are among the top applications

Most promising applications and industries driving demand
Preference ranking of technological barriers in the market by the participants.



> Hydrogen demand is rising **in the industry (steel, refineries, ammonia & fertilizers)** as a way to decarbonize them. Key challenges include high costs and limited infrastructure, requiring technology, funding, and supply chain developments. **Having an integrated approach across sectors is crucial** to scale adoption and position hydrogen as a low-carbon economy pillar.

Raphael Schoentgen
CEO, Hydrogen Advisors

> **Demand isn't static**—it evolves. Startups need flexible production models to **adapt to shifting priorities in industries** like chemistry and steel.

Dr. Can Sindirac
Innovation Investment Analysis Manager, Tüpraş

** 39 answers collected from live survey questions*

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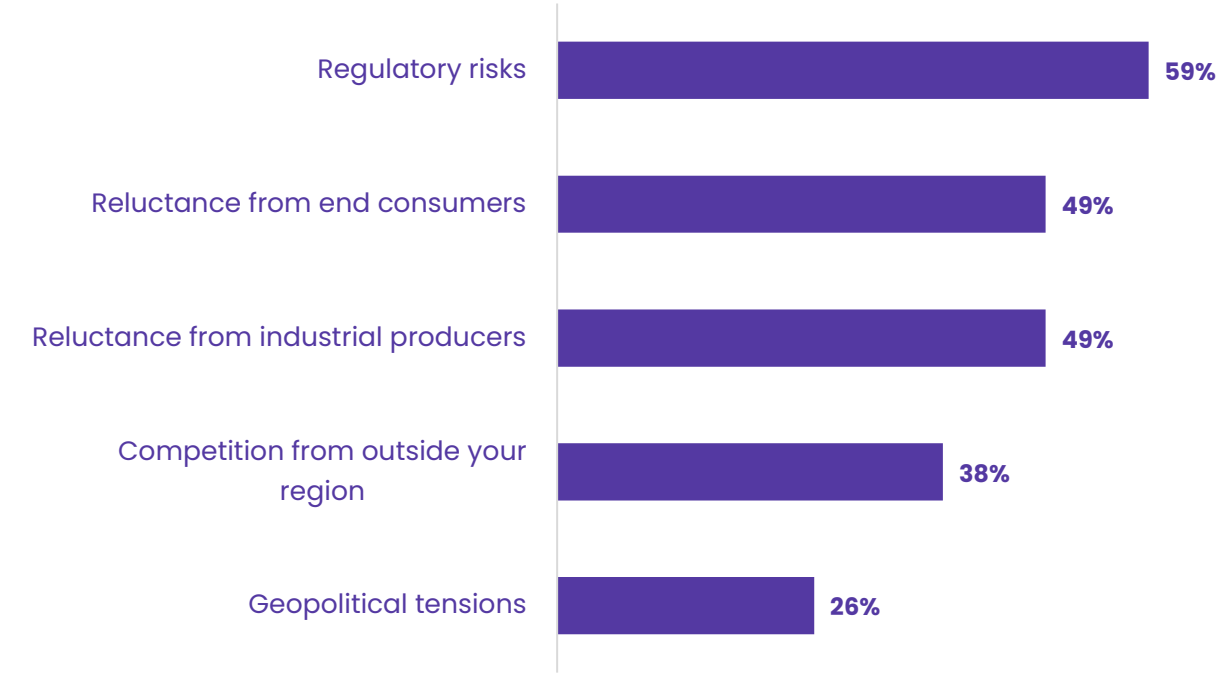
Regulatory challenges and technology credibility toward customers are the biggest threats to Hydrogen startups

Convincing customers and adapting to evolving regulations is driving risks for Hydrogen startups

Main risks for startups



"**Regulatory uncertainty and over complication are both major challenges for emerging technologies in a new industry like hydrogen, delaying progress, discouraging investment, and complicating long-term planning**. This issue is exacerbated by global competition, with regions like the US, China or Australia benefiting from **simpler regulations and substantial subsidies, leaving European companies under pressure to compete**. Geopolitical shifts further complicate matters, as regions like MENA and India may prioritize exports to Asia due to simpler regulatory frameworks. To remain competitive, Europe must address these regulatory and competitive gaps to avoid harming its nascent hydrogen industry, foster innovation and attract investment."

Raphael Schoentgen
CEO, Hydrogen Advisors

** 39 answers collected from live survey questions*

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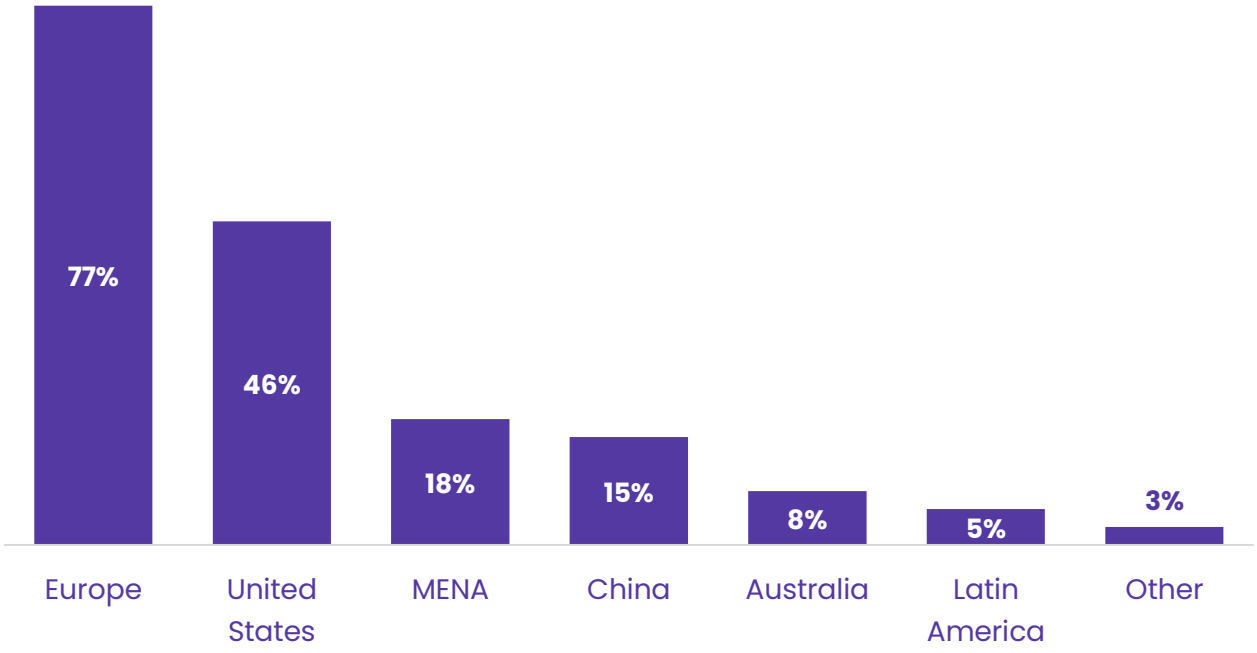
Europe and the US are priority expansion sectors but opportunities are rising in Asia and Mena regions

EU programs like FuelEU Maritime and RED II support compliance in strict market

Most attractive regions to target new customers



** 39 answers collected from live survey questions*

> EU Startups should consider **Middle-East, Asia and the US for access to capital and streamlined regulations**. Europe remains viable, but startups must navigate current complex regulations carefully. When crossing EU borders, start with regions **where policies are simple and encourage early adoption** and scale from there.

Raphael Schoentgen
CEO, Hydrogen Advisors

> **Spain and Portugal** excel in hydrogen with **solar and wind**, while **Northern Europe** utilizes **hydro and geothermal** for green steel. **Scalability** requires **dispatchable renewables**. The **U.S.**, with **low energy costs** and **strong capital markets**, offers ideal scaling for European startups. Startups must target regions with **competitive energy**, **financial support**, and **stable regulations** to stay competitive.

Sebastian Heitmann
Partner, Extantia Capital

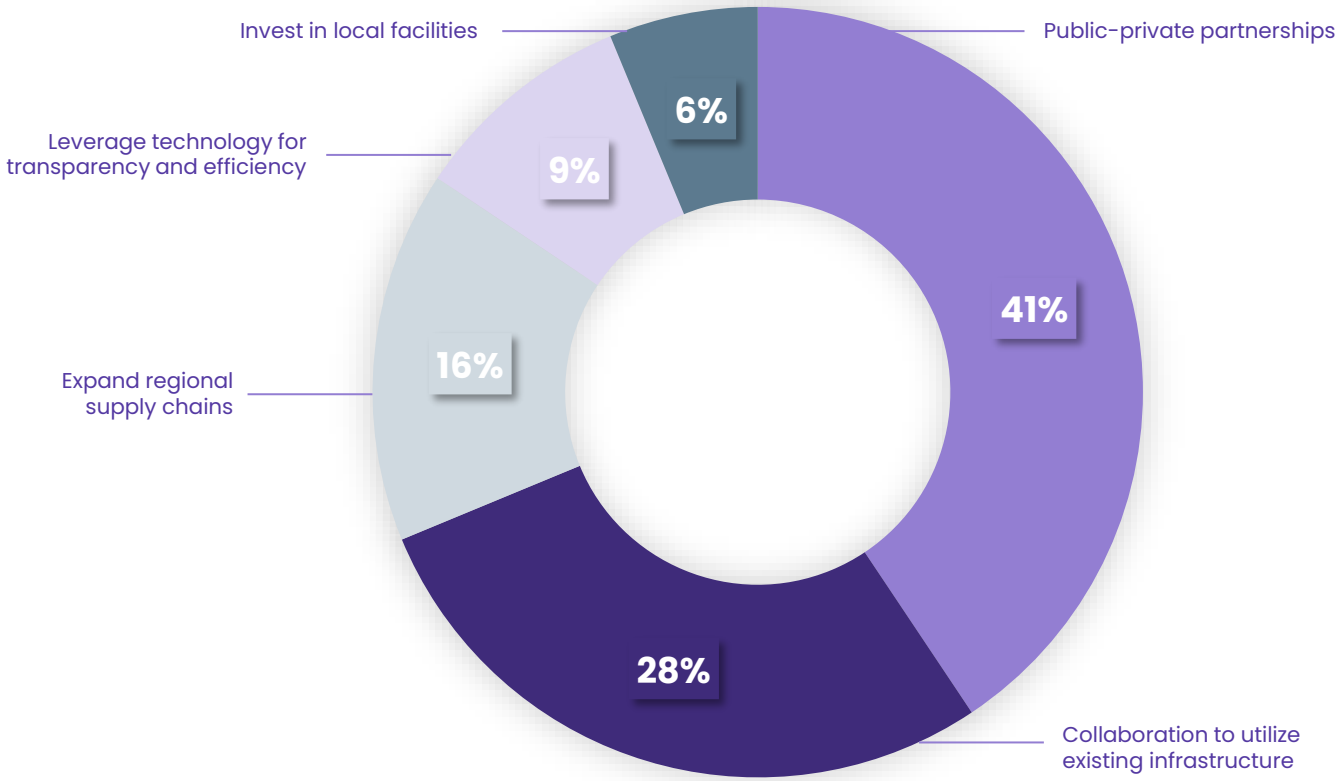
> Europe must embrace alternative energy unlike fossil-fuel-rich nations like the U.S. or Colombia. Hydrogen projects need market demand, which the EU supports through policies like FuelEU Maritime. Unlike the US, the **EU fosters both supply and demand**.

Léa Chauvin
H2Site

Partnerships with industrial and public actors enable technology scaling (1/2)

Public-private partnerships and leveraging the existing infrastructure are the most recommended strategies for technology scaling

Strategies for technology scale



** 39 answers collected from live survey questions*

> **Europe's dependence on imported energy** highlights the need to build - next to local production new receiving and transport infrastructures for hydrogen that will help decarbonise the continent. Such an endeavour is definitely a **joint public/private exercise**. By **partnering with established energy and industrial players**, we can integrate hydrogen production, transport and distribution into current systems, ensuring a seamless transition.

Raphael Schoentgen
CEO, Hydrogen Advisors

> To close the gap with global leaders, **startups must leverage public-private investments to accelerate first-time projects and scale operations**. By aligning with governments and industry players, these collaborations provide critical capital, de-risk early deployment, and drive scalability.

Willem-Jeroen Stevens
Managing partner, Clear Corporate Finance BV

> Integrate your operations into regional hubs where supply chain networks present. **Collaborating with local players ensures scalability and resilience** while meeting demand more effectively.

Christine Funck
Independent Consultant

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Partnerships with industrial and public actors enable technology scaling (2/2)

Stakeholders' recommendations to Hydrogen startups

"Startups should create **integrated solutions** for **industrial hubs**, addressing shared challenges to secure **long-term partnerships** and ecosystem **resilience**."

Spyridon Economou
Director General, Hydrogen Technologies, Eunice Energy Group

"In **hydrogen**, costly **transportation** and **storage** make **ecosystems** vital. For example, **Sweden** builds hydrogen plants near **steel mills** to cut costs. Startups should align models with **cluster needs**."

Pontus Strahlman
General Partner, Voima Ventures

"**Identify your technology niche** to hydrogen solutions partner strategically for rising **demand**. With LCOE as the key cost driver—far outweighing transport costs—location matters. German steel firms struggle with high production costs despite subsidies, while Sweden's low LCOE from hydropower and wind ensures competitiveness."

Christian Weinberger
Senior Advisor, Green Hydrogen

"Collaborate with **established players to bridge resource gaps, access infrastructure, and address supply chain bottlenecks.** Use public funding and joint ventures strategically to scale efficiently while ensuring energy autonomy and minimizing costs."

Mattijs Slee
Battolyser Systems

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Stakeholders' recommendations to Hydrogen startups

Technology and strategic partnerships

"Startups must treat **technology** as a **core product** and **valuable asset**. Owning innovations attracts **investors**, builds **partner trust**, and drives **long-term growth**."

Audra Shalal
Vice President, Corenvest

"**Identify specific industries where your hydrogen solution solves a pressing problem**. By tailoring your approach to their unique challenges—such as decarbonizing logistics or manufacturing—you can build stronger, more actionable partnerships."

Christian Weinberger
Senior Advisor, Green Hydrogen

"To succeed, startups must **focus on the end customer**—those who will pay for their services. Building strong, direct partnerships with industrial clients ensures that your technology is designed to **meet real-world demands with small pilots** addressing real needs, growing into larger collaborations that drive scalability and success."

Luc Grare
Head of Central and Eastern Europe, Lhyfe

Strategic roadmap

"To attract long-term fundings from different sources, startups need a **clear roadmap with milestones** and a focus on showing how funds will be used from R&D to market expansion."

Dr. Can Sindirac
Innovation Investment Analysis Manager, Tüpraş

"Securing long-term funding requires building investor trust through **scalable potential and successful small pilots**. Startups must prove concepts, drive innovation, and address stagination in hydrogen technologies like compressors and electrolyzers."

Luc Grare
Head of Central and Eastern Europe, Lhyfe

"Integrating **technology** with existing systems reduces **client costs** and increases adoption. By complementing rather than replacing legacy infrastructure, startups can **shorten sales cycles** and accelerate **revenue generation**."

Olivier Bucheli
Executive Chairman, Adele Hydrogen

EIC Scaling Club

Methodology, authors and EIC Scaling Club contacts

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Methodology

The research used a **quantitative methodology** based on the approach advocated by the consortium members.

This study was conducted by a combination of **live surveys and open discussions**. The questions and answers were designed in advance through interviews with industry experts to ensure to the right information was grasped. Open-ended responses for additional comments were also available.

The survey was **voluntary and not anonymous**.

4 **Expert interviews**

35 **Respondents to the online survey**

2 **Workshops**

32 **Organizations involved**

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Additional references and reports from the EIC Scaling Club

Go further with these additional reports

IRENA – Green Hydrogen Strategy: A Guide to Design

DOE – Hydrogen Fuel Cell System and Hydrogen Storage Narrative Report 2024

Bird & Bird – International Green Hydrogen Report 2024

Hydrogen Council – Hydrogen Insights 2024

IEA – Global Hydrogen Review 2024

Hydrogen Europe – The Hydrogen Europe Quarterly, Issue Q4 2024

Hydrogen Europe – The European Hydrogen Policy Landscape, April 2024 (Report 02)

H2UB – Mind the Gap: Venture Funding of Hydrogen Start-ups

Munich Hydrogen Summit – Projects, Investments and Financing, 15 October 2024

ECA – The EU's Industrial Policy on Renewable Hydrogen

EIB – Unlocking the Hydrogen Economy

ACER – European Hydrogen Markets 2024 Market Monitoring Report

Market Roadmaps from the EIC Scaling Club

Explore key market roadmaps designed to address emerging challenges and opportunities:

- ***Agri & Food Tech***
- ***Cardiovascular Therapies***
- ***New Space***
- ***Clean Fuels & Hydrogen***
- ***Digital Security & trust***
- ***New Biotech Platforms***
- ***Next-Generation Computing***
- ***Renewable Energies***
- ***Smart Mobility***

Scaling Challenges Roadmap from the EIC Scaling Club

The EIC Scaling Club has produced targeted roadmaps to support companies in overcoming specific growth challenges. These include:

- **Go-to-Market Strategy**
- **Strong Board**
- **Investment Thesis**
- **Lead Investor**

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Partner
Extantia Capital

Luc Grare
Head of Central and Eastern Europe
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Thank you!

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