Online webinar: Study to support the ramp-up of RFNBO production in the EU

In association with:

Fraunhofer ISI

Artelys

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Opening comments

Agenda

1. Opening comments
   5 min
2. Webinar objectives
   5 min
3. Study overview
   15 min
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   10 min
5. Question and Answer (Slido)
   15 min
6. Conclusions and next steps
   5 min

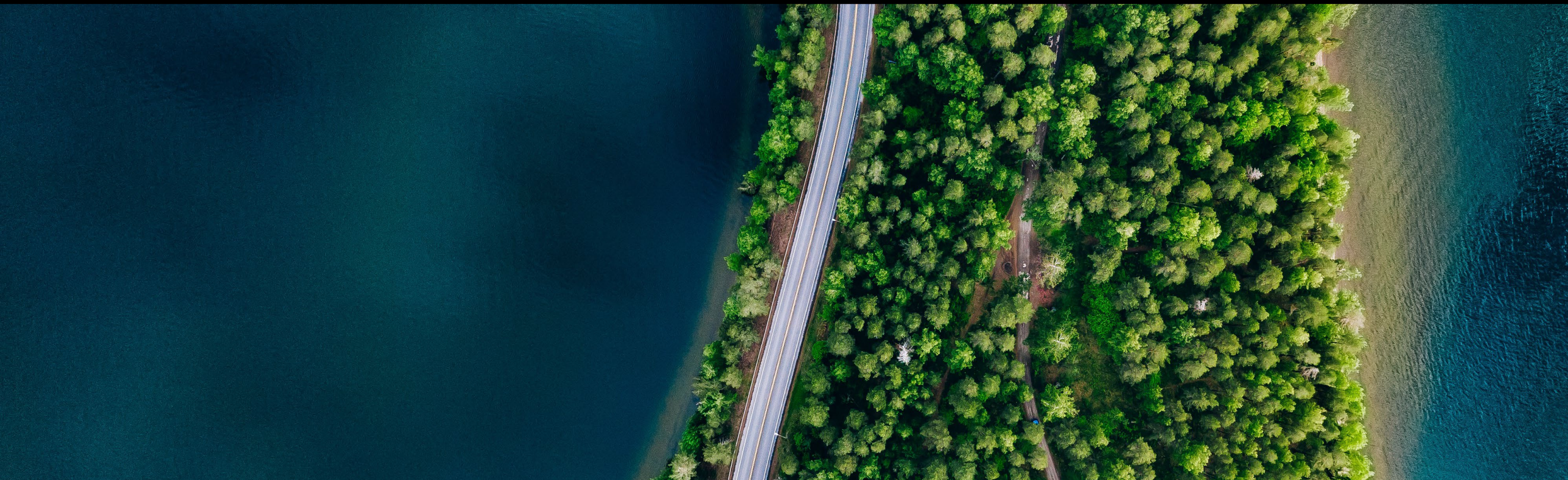
Slido

Join at

slido.com

#H2RFNBO

Webinar objectives



Objectives of this webinar

Study Overview

Introduce the study, including its objectives and overarching methodology.

01

Stakeholder Approach

Outline the stakeholder engagement approach.

02

Participant Engagement

Explain how participants can engage with the study team and contribute to the study.

03

Q&A Platform

Provide a platform for participants to ask questions and seek clarification on the study.

04

Study overview

The challenge at hand: The need for a quick ramp-up of the renewable hydrogen industry while ensuring sustainable production.

Current status

- In 2022, hydrogen accounted for less than 2% of Europe's energy consumption and was primarily used in refineries and to produce chemical products such as fertilisers.
- 96% of this hydrogen was produced with natural gas, resulting in significant amounts of CO_2 emissions.[1]
- The ACER[2] report entitled "European hydrogen markets", sheds light on the main regulatory challenges of the hydrogen markets at EU and national level:
  - **2023: 216 MW** The total installed capacity of electrolysers in Europe in 2023 was 216 MW.
  - **2026: 1.8 GW** Another 1.8 GW of projects expected to become operational by end-2026.
  - **2030: 70 GW** Around 70 GW of projects announced to be operational by 2030, but few are advanced.
  - **42,000 km** of hydrogen pipelines, numerous storage projects and terminals are planned for the next decade, but only 1% has reached final investment decision

EU hydrogen policy

- The Climate Target 2040 Impact Assessment indicates renewable hydrogen consumption of 3-4 MtH_2 by 2030, reflecting RED III RFNBO targets
- Supply-side efforts to support renewable and low-carbon hydrogen, including:
  - The EU Hydrogen Bank: 3rd auction (€1.3 billion)
  - National Auctions-as-a-Service: Spain, Lithuania, Austria, Germany
  - The Innovation Fund: 2025 call (€2.9 billion for manufacturing of clean technologies and decarbonisation projects)
- Demand-side interventions to stimulate uptake:
  - Under the Renewable Energy Directive III, by 2030
    - RFNBOs must supply at least 1% of transport
    - RFNBOs must account for at least 42.5% of all hydrogen used in industry, rising to 60% by 2035.
  - Additional RFNBO mandates apply under the ReFuelEU Aviation and FuelEU Maritime regulations.

1. https://energy.ec.europa.eu/topics/eus-energy-system/hydrogen_en
2. European Union Agency for the Cooperation of Energy Regulators

Study objectives

Anticipated results

- **Improved knowledge of existing hydrogen projects** located in the EU and in third countries.
- Improved **understanding of drivers for the success and failure** of hydrogen projects in the EU.
- **Improved knowledge of the impact of additionality and temporal and geographical correlation** on the production of hydrogen within the EU and third countries.
- **Quantitative insights in the impacts of potential changes of the policy framework**.
- Improved capacity of the European Commission to **identify policy options to improve the regulatory framework** for the production of hydrogen.
- Improved **understanding of hydrogen project's potential to positively contribute towards the energy transition**.

Specifically, the study will address the following criteria

01 Additionality

Related to creating additional renewable electricity sources.

02 Temporal correlation

Related to when the renewable electricity is available.

03 Geographic correlation

Related to where the renewable electricity is from.

Scope of the study

✓
- RFNBO hydrogen
- RFNBOs other than hydrogen (to an extent)
- Electrolytic low-carbon hydrogen (to an extent)

✗
- Other low-carbon hydrogen e.g. blue hydrogen
- Recycled Carbon Fuels (RCFs)

Introduction to the study team

01 **Hydrogen projects database and stakeholder engagement**

- Monitor and identify the key drivers for increasing hydrogen production and barriers hampering the development of hydrogen in the EU through stakeholder engagement.

02 **Project level modelling**

- Develop alternative scenarios associated with different policy interventions.
- Analyse assessment criteria at project level e.g. bankability of projects, environmental effectiveness, economic efficiency

03 **Energy systems level modelling**

- Analyse changes to the RFNBO market uptake using the METIS tool, taking into account infrastructure constraints and system dynamics.
- Assess system-level impacts on additionality, temporal and geographical correlation, production costs, electricity price formation and greenhouse gas emission.

Study methodology

Task 1: Monitoring the ramp-up of hydrogen production and identifying barriers for domestic EU production as well as imports

Objective

- Describe the landscape of renewable hydrogen projects in the EU and imported to the EU.
- Identify the key drivers and barriers for hydrogen development and production.

Method

- Identify the pipeline of renewable hydrogen projects in the EU, as well as relevant projects in third countries that plan to export to the EU.
- Assess the drivers and barriers to scaling up hydrogen production through a literature review and stakeholder engagement.
- Monitor policy developments at Member State level to provide an accurate picture of the enabling environment, including its strengths and potential weaknesses.

Task 2: Assessment of options for the review of the regulatory framework for the production of RFNBOs

Objective

- Identify & assess options for the revision of the regulatory framework to produce RFNBOs in the EU and beyond. Specifically review of the 2023/1184 Delegated Act on RFNBOs in preparation of the legal review scheduled for July 2028 (at the latest).
- Project and system-level modelling will be undertaken to assess the impact of different policy interventions

Method

- **Project level modelling**: Assess how changes in the RED and the corresponding Delegated Acts will change the viability and bankability of individual RFNBO production projects.
- **System modelling**: Project-level changes will be translated into an overall change to the RFNBO market uptake, which will then result in changes to the system-wide scenarios.

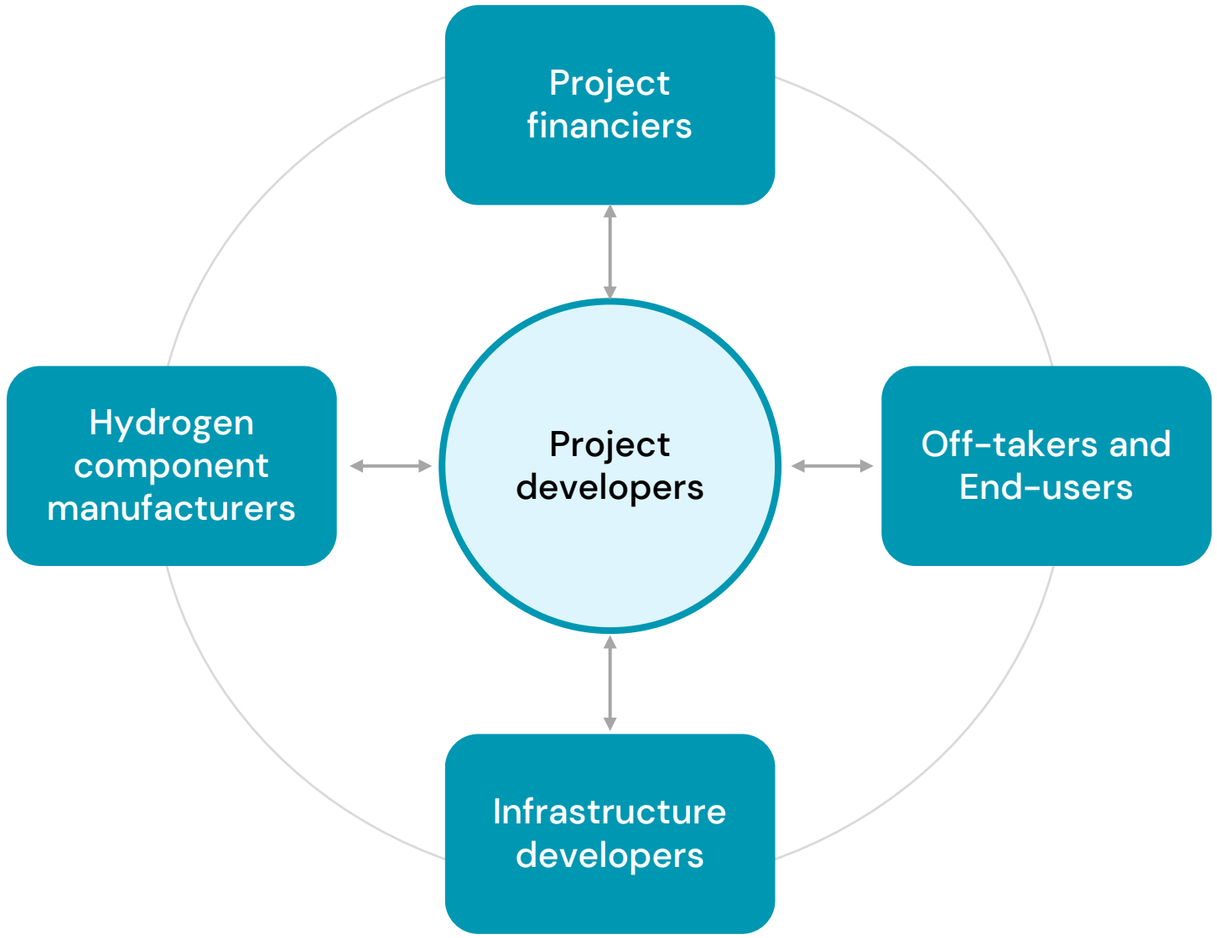
Task 3: Stakeholder engagement

- The study uses a structured engagement process to inform its tasks.
- Its success depends on gathering input from the right sources to build a clear picture of the hydrogen landscape.
- While individual projects are central to the analysis, the study also engages developers, professional bodies, regulators and manufacturers.

Stakeholder engagement approach

Stakeholder overview

Hydrogen project ecosystem of stakeholders



Support ecosystem

- Industry/Trade associations and professional bodies
- Regional and National public bodies and associations
- RFNBO Certification bodies
- Research and development (R&D) institutions

How can you engage with the study?

Stakeholder	Interview	Structured survey	Submit written input via functional mailbox
Industry Associations • *Interviews: Approximately 5-6*	✓		✓
Project developers • *Survey: Approximately 50* • *Interviews: Up to 50*	✓	✓	✓
All **other** i.e. project financiers, infrastructure developers, off-takers			✓

Timeline for engagement

- We anticipate the majority of stakeholder engagement to occur between December 2025 and mid-February 2026.
- Please submit your written inputs via the functional mailbox at your earliest convenience, and before **15 February 2026.**
- Initial insights from the stakeholder engagement will be available in Spring 2026.

Functional mailbox address: hydrogen.ta@icf.com

Focus areas for written contributions to the functional mailbox (I/IV)

General overview

- Overarching drivers for project success and failure
- Differences in the project development ecosystem in Member States
- Electrolytic low carbon hydrogen

01

Feedback on RFNBO criteria

- Temporal correlation
- Geographical correlation
- Additionality

02

Project specific information

- Operational data
- Electricity sourcing strategy
- End-use
- Bankability

03

All feedback will be treated as highly confidential, and will only be used for the purpose of this study

Focus areas for written contributions to the functional mailbox (II/IV)

Overarching drivers for project success and failure

- What are the reasons as to why projects are progressing well (key enablers)
- What are the reasons as to why projects are struggling to move forward? (key barriers)

Differences in the project development ecosystem in Member States

- What are the key differences in project development ecosystems in different Member States?
- Are there any clear enablers and/or blockers?

Electrolytic low carbon hydrogen

- Do you intend to produce electrolytic low-carbon hydrogen in addition to RFNBO hydrogen and how does this impact your project (full-load hours, revenues, …)
- Is the newly introduced option in the Low Carbon Fuel (LCF) Delegated Act to produce hydrogen based on hourly averages of emission intensities relevant and useful?

Focus areas for written contributions to the functional mailbox (III/IV)

Criteria	Focus area for written contribution

01 Temporal correlation
› Renewable fuels must be produced in the same calendar month (until 31 Dec 2029)
› Renewable fuels must be produced in the same one-hour period as the renewable electricity (from 1 Jan 2030)
› The '20 Euro rule' - temporal correlation requirements are always met if the clearing price of electricity is below a certain threshold (below €20/megawatt-hour or 0.36 times of the price of emitting one tonne of CO_2)
	• If problematic, please explain why this rule is problematic and provide a calculation how the rule affects costs.
	• What changes to the rule might be considered, and what impacts would this have on your project?
	• Do you plan to use the 20 Euro rule? What could be done to make it more relevant?
	• Is this rule challenging for your project? If so, provide the exact reason why this is a challenge e.g.
	  ○ Is there not sufficient additional renewable generation capacity available?
	  ○ Is renewable electricity more expensive?
	  ○ Is there an issue of the interpretation of the rule?

02 Geographical correlation › Renewable electricity source is in the same bidding zone as the electrolyser › Renewable electricity source is in a connected bidding zone with equal or higher electricity prices during the relevant period › Renewable electricity source is in an interconnected offshore bidding zone linked to the electrolyser's zone	
03 Additionality › Fuel producers must match the amount of renewable electricity they claim as fully renewable by generating it themselves OR › Fuel producers must match the amount of renewable electricity they claim as fully renewable by purchasing it directly (or via intermediaries) from renewable electricity producers through power purchase agreements (PPAs) › The renewable electricity installation must have started operation no more than 36 months before the associated fuel production facility began operation › The electricity source must not have received operating or investment aid	

Focus areas for written contributions to the functional mailbox (IV/IV)

Operational data

- What stage of development is the project currently in?
- If the project is cancelled, provide the reasons for its cancellation.
- What is the size of the project? (Electrolyser capacity MWel)
- What product(s) does the project produce?
- Does the project aim to produce solely RFNBO or a mix between RFNBOs and low-carbon fuels?

End use

- What industry and off-taker is the intended off-taker/end-consumer of the project?
- Are off-takers/end-consumers willing to pay a higher price for substitutes i.e. low-carbon hydrogen and/or RFNBOs?
- What factors motivate off-takers to pay a premium? What is the price difference compared with business-as-usual alternatives?

Electricity sourcing strategy

- What is the electricity off-take strategy?
- What is the average annual emissions intensity of electricity from the grid over the last two years (2024 and 2025)? (gCO_2eq/kWh)
- What are the expected annual full load hours? (h/yr)

Bankability

- What are the key obstacles for achieving bankability?
- CAPEX (€million)
- OPEX (€million)
- WACCs (%)
- Guaranteed annual production volumes? (kt H_2) and offtake prices? (€/year or €/kgH_2)
- Expected annual production volumes? (kt H_2) and offtake prices? (€/year or €/kgH_2)

Question and Answer (Slido)

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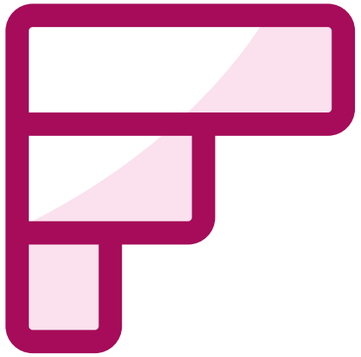
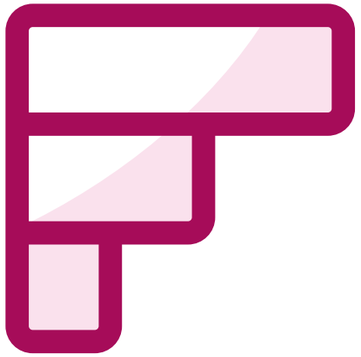


What are the reasons as to why projects are progressing well? (Key enablers)

If you selected 'other', please specify the key enablers as to why projects are progressing well



What are the reasons as to why projects are struggling to move forward? (Key barriers)

If you selected 'other', please specify the key barriers as to why projects are struggling to move forward

Conclusions and next steps

Conclusions and next steps

Conclusions

- The study's success relies on gathering high-quality input from the right stakeholders to build a clear picture of the hydrogen project development landscape.
- While our capacity for direct engagement through interviews and surveys during the study is limited, we encourage you to submit written inputs via the functional mailbox.
- These slides will be shared so you can tailor your contributions to the key focus areas.

Next steps

- Please submit your written inputs as soon as possible, and no later than **15 February 2026.**
- We will follow up with relevant stakeholders through targeted engagement activities, including interviews and a survey between now and 15 February 2026.
- Initial insights from the stakeholder engagement will be available in **Spring 2026.**

Functional mailbox address: hydrogen.ta@icf.com

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