



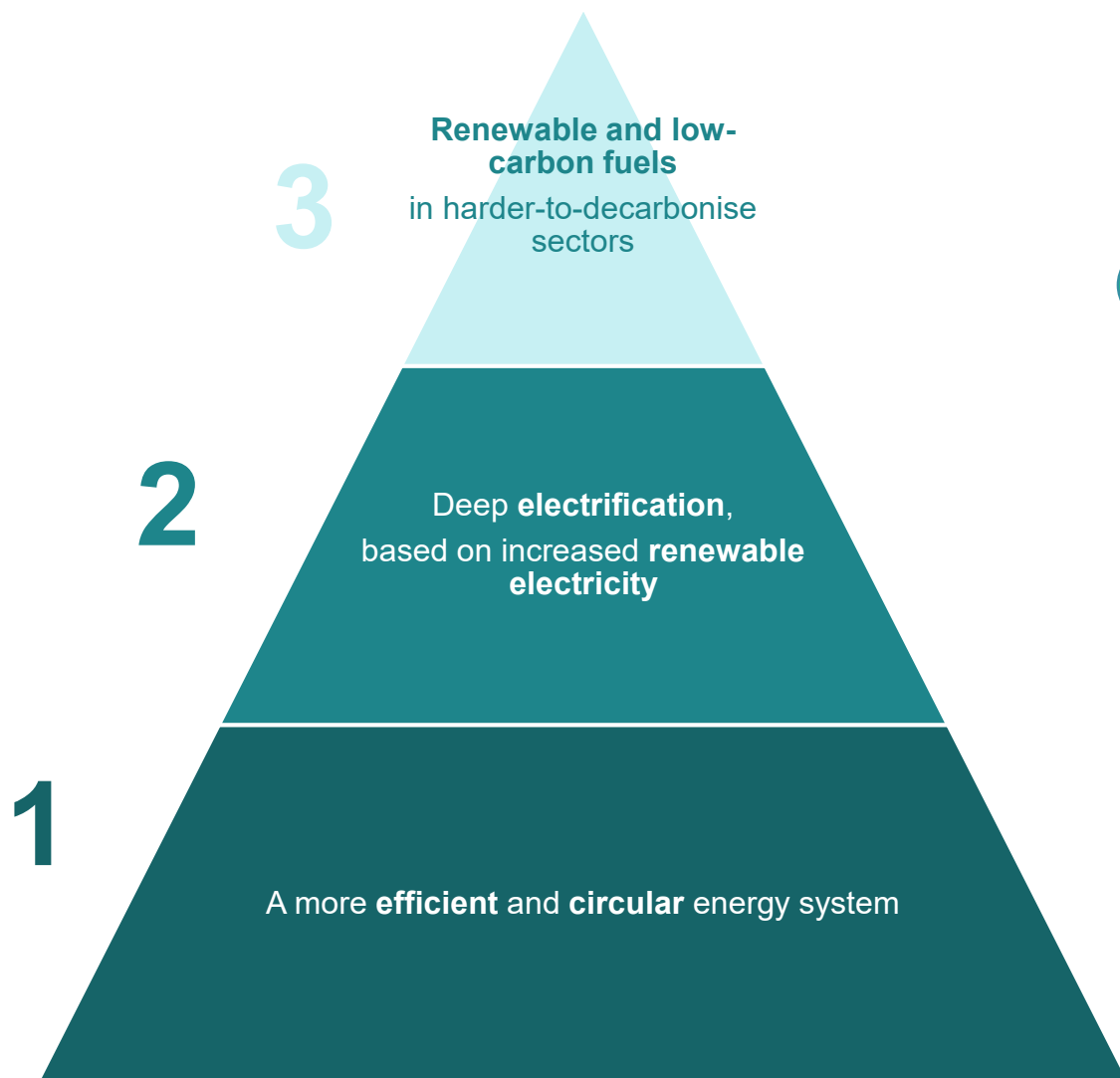
EU Industry Days

All roads lead to low-carbon ammonia: Regional perspective

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Transforming our energy system



2025

- **6 GW** of renewable hydrogen electrolyzers
- Replace **existing hydrogen production**
- Regulation for liquid hydrogen markets
- Planning of hydrogen infrastructure

2030

- **40 GW** of renewable hydrogen electrolyzers
- New applications in **steel and transport**
- Hydrogen for electricity balancing purposes
- Creation of “Hydrogen Valleys”
- Cross-border logistical infrastructure

2050

- Scale-up to **all hard-to-decarbonise sectors**
- Expansion of hydrogen-derived **synthetic fuels**
- EU-wide infrastructure network
- An open international market with € as benchmark

Rationale

- Use clean hydrogen to decarbonise hard to abate industry and transport sectors
- Direct electrification key, but meeting EU climate goals will require clean hydrogen as highly carbon-emitting industries cannot be electrified (steel, cement, chemical processes ...)
- Same rationale for transport sectors requiring high autonomy / energy amounts (maritime, rail, aviation, heavy-duty vehicles)
- Hydrogen as a means to store energy and balance energy systems

Potential

- Hydrogen is expected to account for up to 24% of total energy world demand in 2050
- Current EU production: approx. 9m tons p.a. from gas and coal (grey hydrogen): uses 8-10% of total EU gas consumption & emits 70-100 tons CO₂ p.a. (3-5% of total EU emissions)
- 2030 target: 10m tons p.a. from wind / solar power (green hydrogen) plus X from nuclear power (pink hydrogen) and gas with CCS (blue hydrogen)
- Hydrogen technologies and applications mature for market deployment
- EU industry a global leader in hydrogen technologies and applications

Challenges

- Upstream: Availability of large quantities of renewable electricity
- Downstream: Developing a market for clean hydrogen (chicken-egg problem)
- Technology: Upscaling to market-scale
- Lack of regulatory framework / clarity
- High investment needs (production; infrastructure; offtake)
- Industry and value chains still emerging

Strategy: Regulatory framework

- ✓ Fitfor55 package (July 2021)
 - ✓ Definition, certification, targets renewable hydrogen
- ✓ Hydrogen & Gas package (December 2021)
 - ✓ Definition & certification low-carbon hydrogen
 - ✓ Regulation of hydrogen infrastructure (pipelines, storage, terminals etc.)
 - ✓ Incentives for development of hydrogen infrastructure
- ✓ Delegated Act on Additionality (forthcoming)
 - ✓ Regulation of production of green hydrogen

Strategy: Investments

- ✓ Mobilising EU Funds: Target: **€800m per year** starting 2022
- ✓ **EU Recovery and Resilience Facility: €10bn**
- ✓ Priority to EU **state aid clearance** of hydrogen projects (IPCEI, CEEAG)
- ✓ Co-operation with **EIB and EBRD**
- ✓ Mobilising **private investments**
- ✓ **Hydrogen Public Funding Compass**
https://ec.europa.eu/growth/industry/strategy/hydrogen/funding-guide_en

Strategy: Linked-up Industry / Value Chains

- European Clean Hydrogen Alliance:
 - Objective: create more integrated EU hydrogen ecosystem / facilitate industry / value chain integration
 - 1700 stakeholders (mostly companies) from all parts of value chain
 - Roundtables, working groups, match-making (technical and CEO-levels)
 - Created project pipeline: 750+ projects: includes **30 projects** using clean hydrogen to produce ammonia with a wide geographical spread: AT, BE, FI, FR, DE, IT, LV, NL, NO, PL, PT, SK, ES, SE

Project Pipeline



One of the European Clean Hydrogen Alliance's main objectives is to facilitate investments in clean hydrogen. To this end, the alliance prepared a pipeline of viable investment projects. The project pipeline provides an overview of hydrogen projects, helps create integrated European hydrogen value chains, and profiles projects, including with investors.

The pipeline was unveiled at the third Hydrogen Forum in November 2021. It includes over 750 projects from all parts of the value chain, including

- hydrogen production
- transmission and distribution
- application in industry, transport, energy systems and buildings

Many projects cover hydrogen production and its use in industries such as chemicals, refining, steel, or transport, particularly heavy-duty road transport and maritime transport. The projects are located across Europe, with many set to enter into operation by the end of 2025.

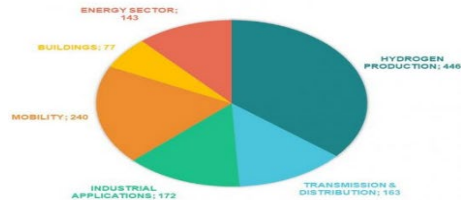


Fig 1: Project pipeline archetypes

Alliance members originally submitted over 1000 projects for the investment pipeline. The Commission services assessed these projects against a set of criteria (EN 10000), including project scope, project size, project maturity and emission reductions. Inclusion in the alliance project pipeline does not entail any direct financial or regulatory advantage. The alliance does not award any financing to projects.

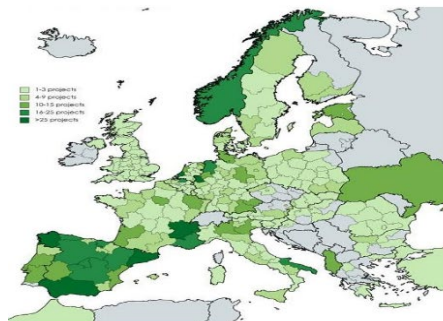


Fig 2: Project pipeline location

Download the complete project pipeline.

Alternatively, you can search for projects by project archetype (type of project), location, promoter, or planned launch date.

Select project

All projects



Searchable online database:

https://ec.europa.eu/growth/industry/strategy/industrial-alliances/european-clean-hydrogen-alliance/project-pipeline_en

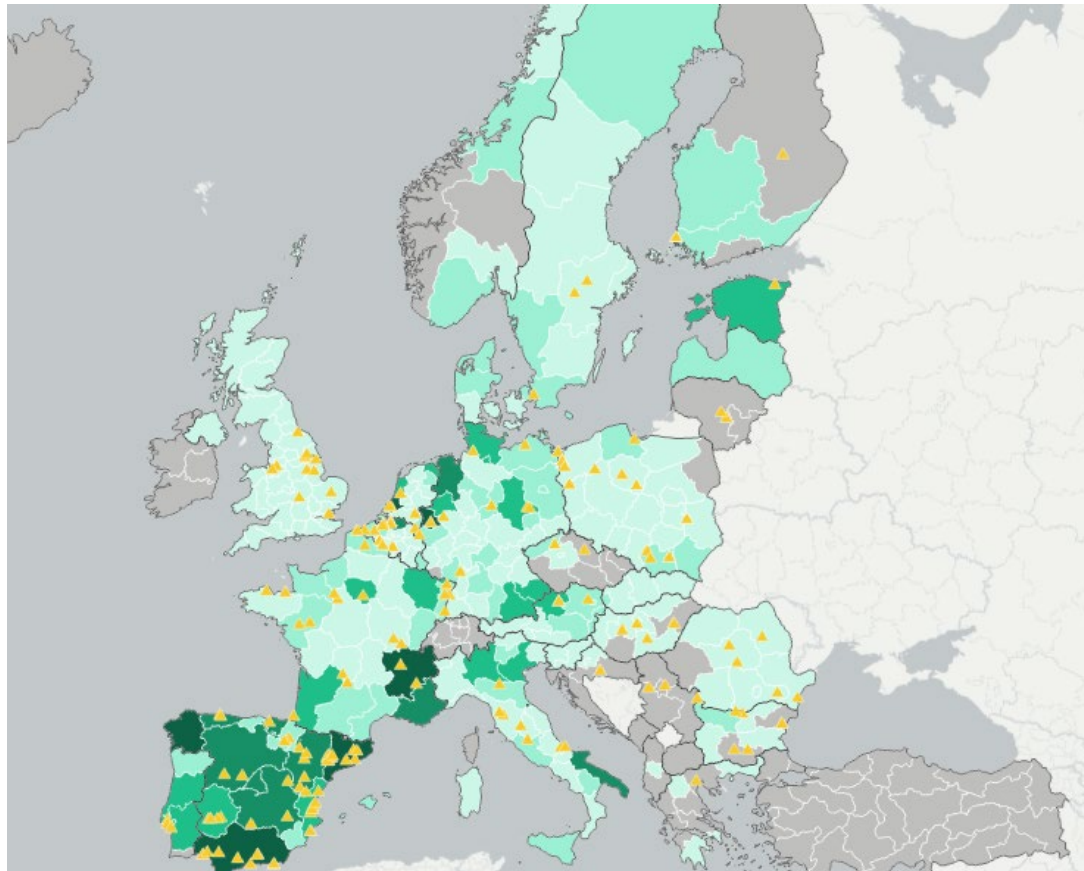
Pipeline includes for each project:

- Name of project
- Company(ies) undertaking the project
- Project archetype (project type)
- Location of project
- Maturity of project (start date)*
- Size of project*

* Available for many projects

Energy & Industry Geography Lab (EIGL)

Fertilizer and hydrogen production facilities



Industrial infrastructure

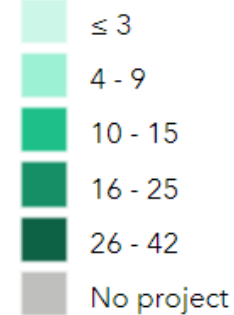
Facilities of the energy-intensive industries (E-PRTR data)

▲ Fertilizers

Future projects and scenarios

Clean technology projects

Clean hydrogen alliance project pipeline (no of projects)



EIGL 2022. Data source: Project pipeline of the European Clean Hydrogen Alliance, European Pollutant Release and Transfer Register (E-PRTR), Eurostat GISCO OSM contributors