



European Clean Hydrogen Alliance Project pipeline

RLCF Alliance RT3
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Jyri Ylkanen, DG GROW I.1

European Clean Hydrogen Alliance

- Set up in July 2020 with adoption of Hydrogen Strategy
- Brings together 1600 hydrogen stakeholders: industry, civil society etc.
- Six roundtables focussing on different value chain segments (production; transmission & distribution; industry offtake etc) & working groups on permitting and standardisation
- Issues report on barriers to large-scale hydrogen deployment (October 2021)
- Published pipeline of over 750 projects that its members are undertaking to roll out hydrogen on large scale by 2030, update in progress
- Organised European electrolyser summit & joint declaration (May 2022)

Rationale

- Use clean hydrogen to decarbonise hard to abate industry and transport sectors
- Use hydrogen to replace consumption of (Russian) natural gas
- Hydrogen as a means to store energy and balance energy systems
- Direct electrification where possible, 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)

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. in EU 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: Policy & 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)
- ✓ REPowerEU
 - ✓ Ambitious targets for clean hydrogen (10+10mt) and electrolyser capacity (80GW output)
- ✓ 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

Main Features of Project Pipeline, first batch

- ✓ **Size:** 750+ projects; estimated 52 GW electrolyser capacity (2030)
- ✓ **Dynamism:** almost 600 projects are planned to enter into operation by 2025
- ✓ **Focus:** in 87% of hydrogen production projects are electrolysers potentially producing clean hydrogen
- ✓ **Coverage:** projects cover all identified types and applications, especially in mobility, industry and energy sectors
- ✓ **Scope:** projects located in all but 2 Member States, plus neighbouring countries

Promoting Projects in Pipeline

- Facilitating hydrogen clusters
 - Networking (public project list, B2Match platform with project and networking opportunities, etc.)
 - Presenting projects in “matchmaking” events for Alliance members.
 - Various forms of events: Based on region/location, a project, a sector, etc.
- Targeted support to accelerate deployment in focus regions.
- Co-operating with EIB and EBRD
- Working with private investors in Hydrogen Alliance

Learnings

- Identify the purpose of the pipeline and set criteria: will attract the right projects
 - Purpose – collaboration, data collection, investor relations, etc.
 - Criteria – relevant for sector. For example in ECHA criteria were CO2 emissions threshold, alliance membership, location, etc.
- Reflect on the use of data:
 - Number of projects vs. purpose
 - Data confidentiality vs. functionality
- If needed: Some input data set as mandatory, for the purposes of reliable reporting/analysis.

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.

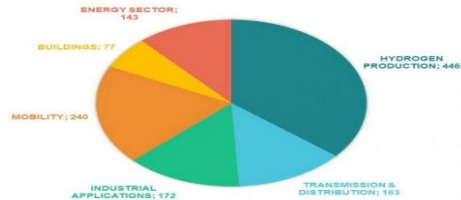


Fig 1: Project pipeline archetypes

Alliance members originally submitted over 1000 projects for the investment pipeline. The Commission services assessed these projects against a set of criteria (see [1]), 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.

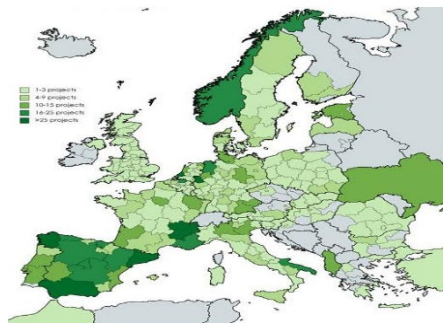


Fig 2: Project pipeline location

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

Thank you



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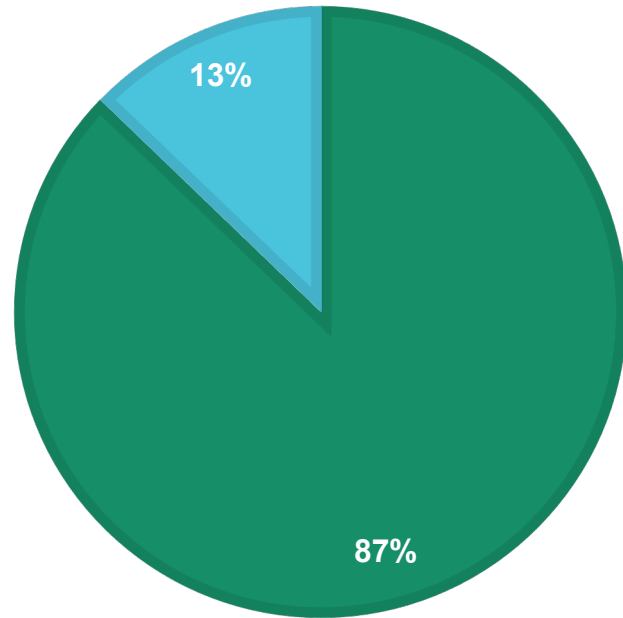
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Back-up Slides

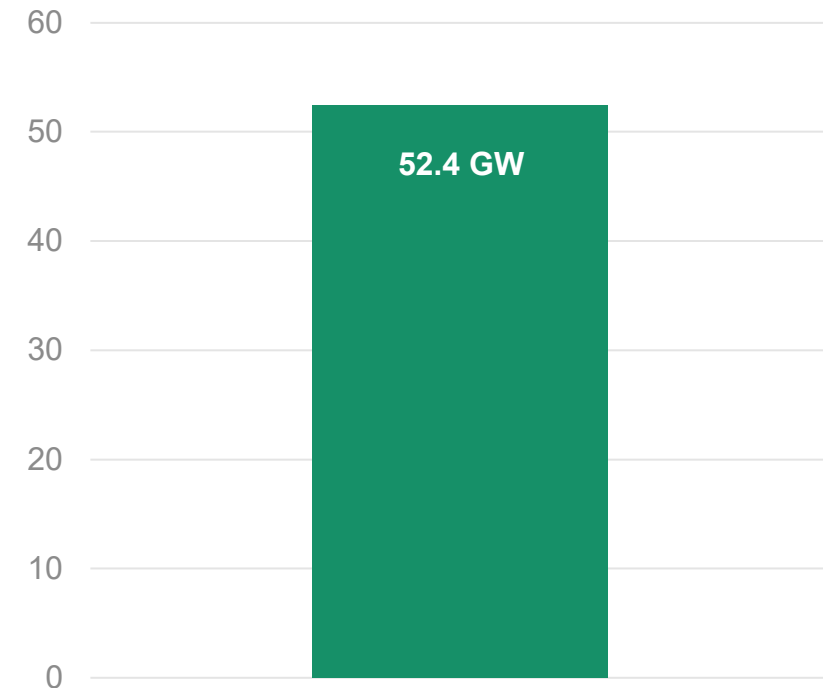
Hydrogen Production: Type & Quantity

HYDROGEN PRODUCTION
(NUMBER OF PROJECTS)



■ Electrolysis ■ Other

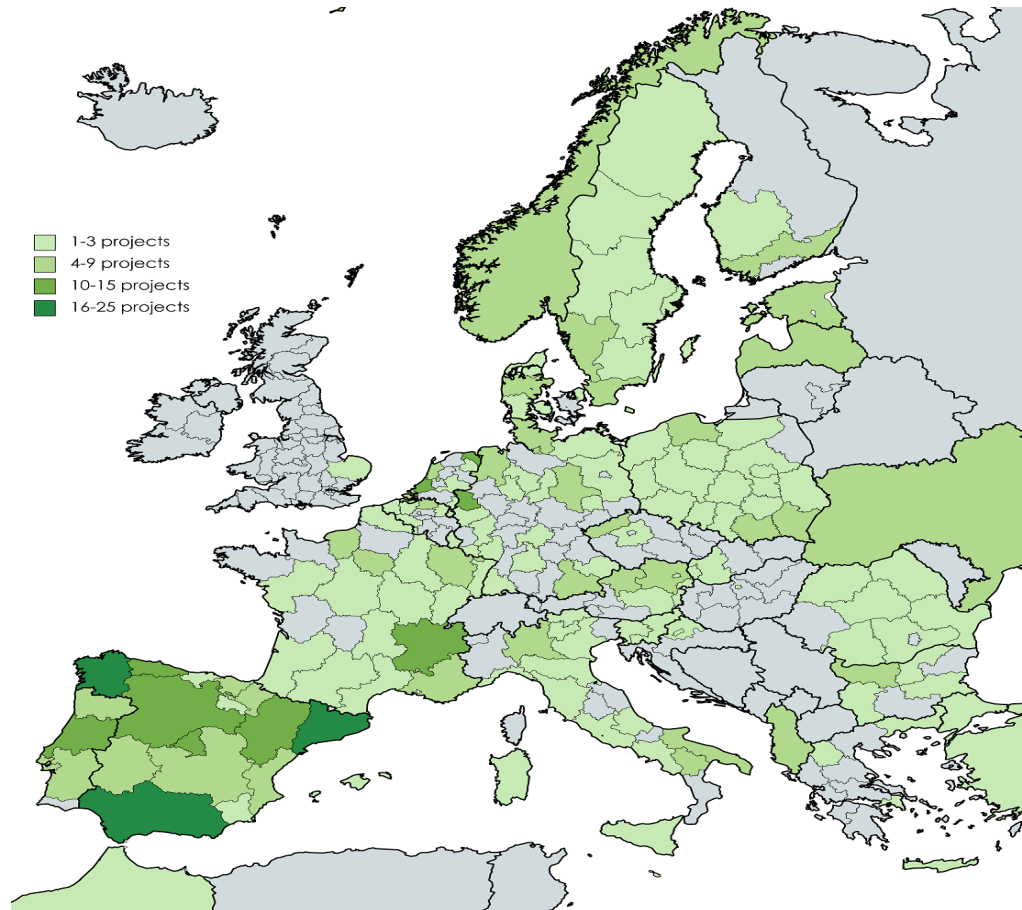
HYDROGEN PRODUCTION
(ELECTROLYSIS CAPACITY)



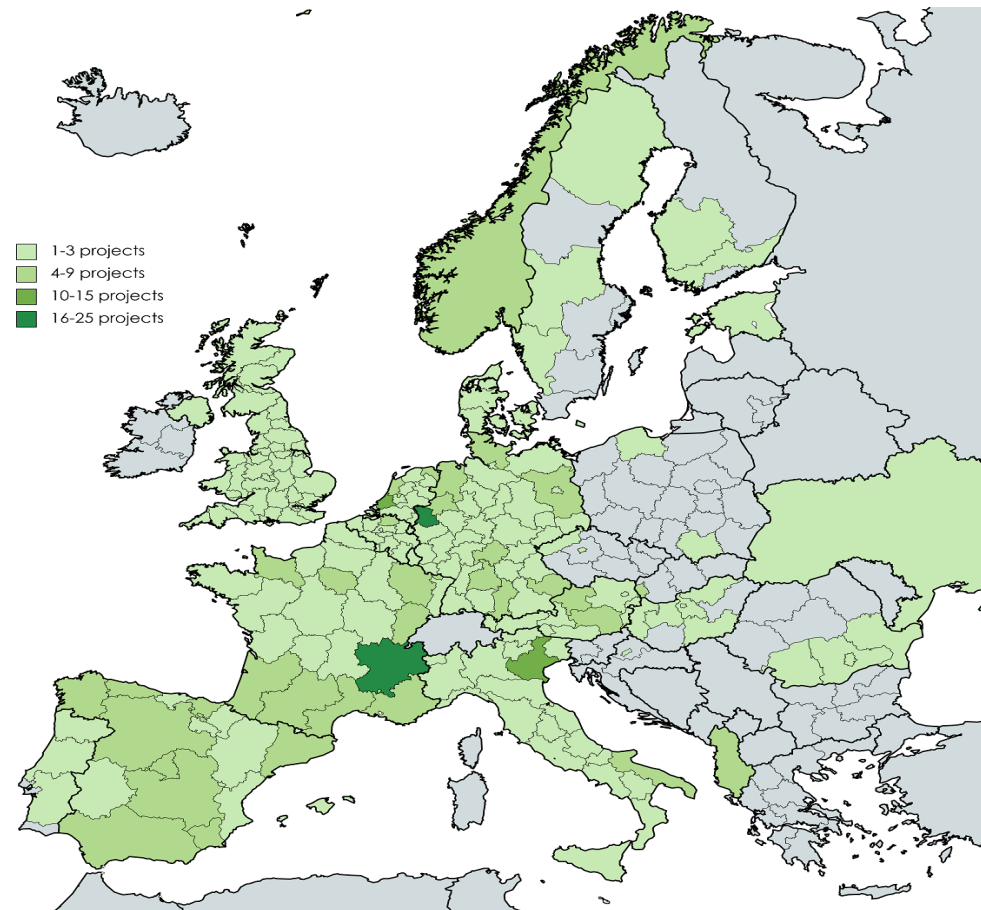
■ Estimated capacity (GW)

Hydrogen Transmission

Comparing hydrogen production & consumption locations

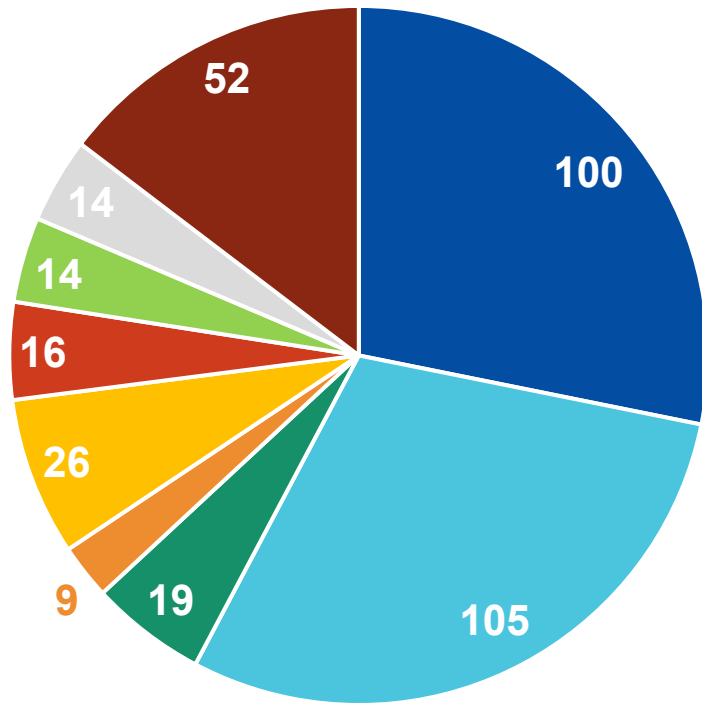


Hydrogen production



Hydrogen consumption

Project Pipeline: Hydrogen Mobility Application



- Land road vehicle fleet deployment
- FC regional passenger trains or locomotives
- Maritime applications
- Aviation applications
- Equipment/vehicles manufacturing

- Publicly accessible HRS network
- H2 inland waterway
- H2 ready maritime and inland ports
- H2 hubs at airport

- Large number of projects focusing on land transport. Heavy and light duty plus busses. HRS important in this regard.
- Focus on manufacturing and deployment of heavy and light duty vehicles plus busses. Plus building the required refueling network.
- Maritime and aviation projects key given limited decarbonisation alternatives

Project Pipeline: Result of Assessment

1037

- Genuine projects submitted by Alliance members:

41

- Projects merged, cancelled or postponed since project collection

97

- Projects rejected on basis of assessment by Commission against criteria:

899

- Number of projects eligible for inclusion in pipeline

130

- No consent of project promoter for inclusion in public project list

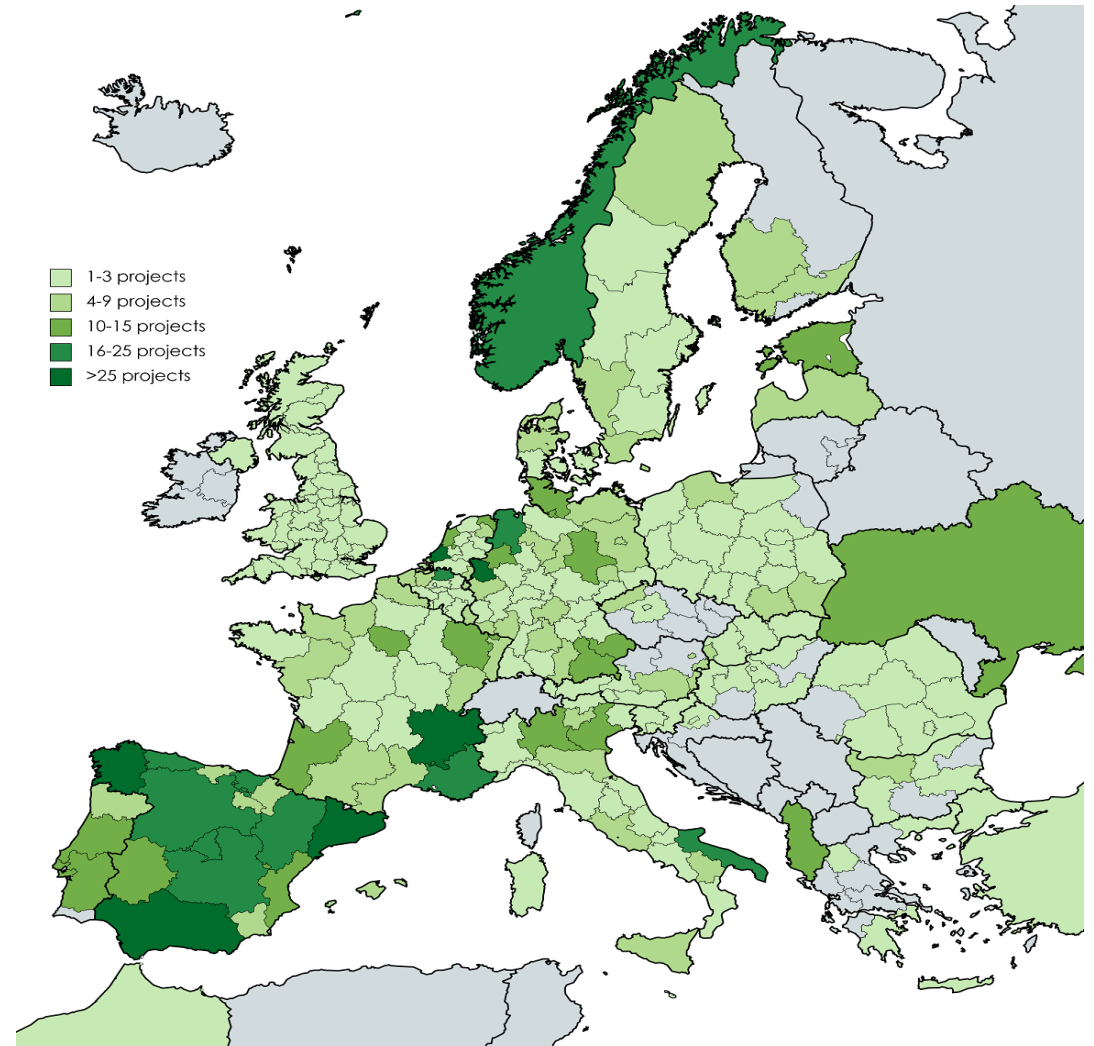
769

- Final number of projects in project pipeline

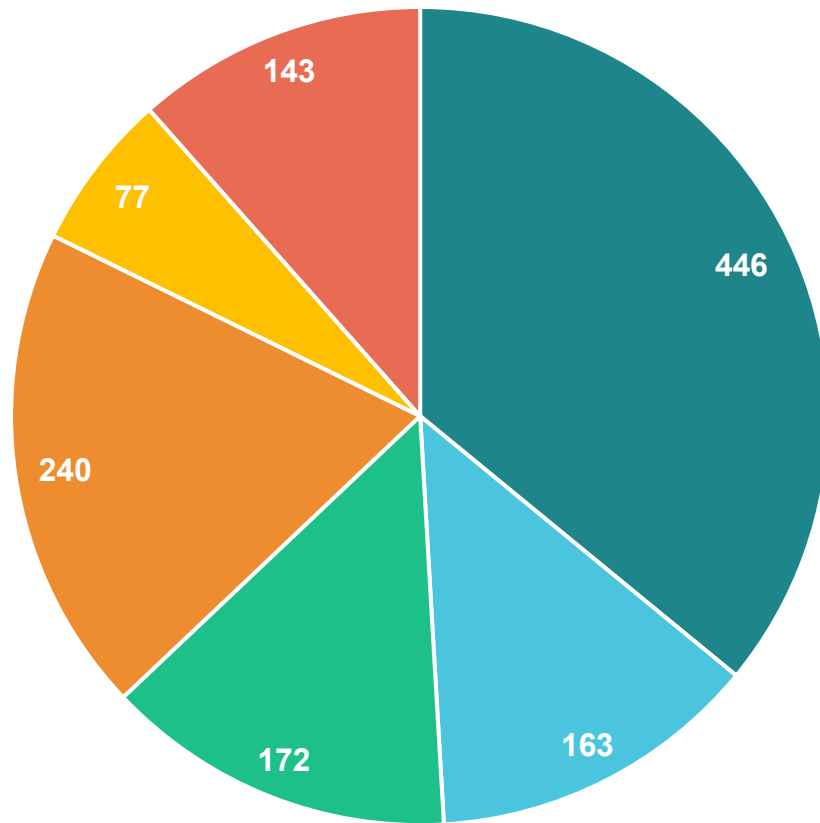
Location of projects

Countries with large number of projects:

- Spain: 337
- Germany: 299
- France: 180
- Netherlands: 151
- Italy: 120
- Portugal: 88
- Belgium: 73
- Sweden: 65



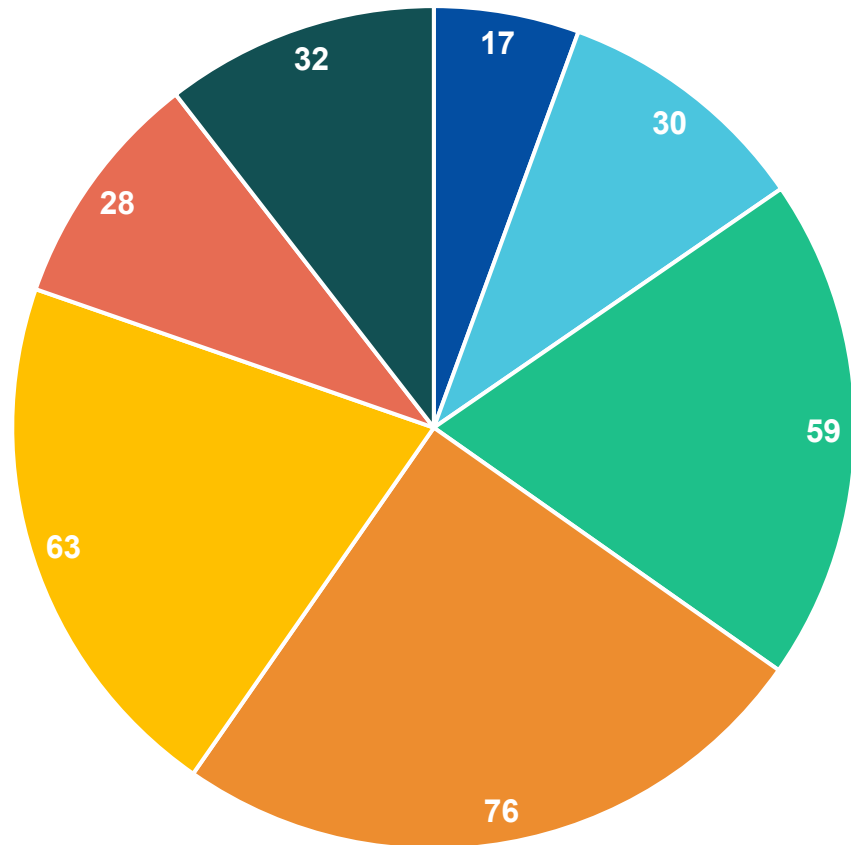
Project categories (archetypes)



- HYDROGEN PRODUCTION
- INDUSTRIAL APPLICATIONS
- BUILDINGS APPLICATIONS
- TRANSMISSION & DISTRIBUTION
- MOBILITY APPLICATIONS
- ENERGY SECTOR

- Projects cover **all hydrogen value-chain**
- **Single largest category is hydrogen production:** corresponds to initial need to ramp up production.
- Similar number of projects in **hydrogen end-use** in mobility, industry and buildings.
- Important number of projects also on **infrastructure and energy sector.**

Project Maturity



Starting year for the projects' first phases:

- 305 projects provided information on start date
- **60% of projects** planned to start **by 2024**
- **80% of projects** planned to start **by 2025**