

A satellite view of Earth at night, showing the curvature of the planet and the glowing lights of cities and continents. The left side of the image shows the blue and white atmosphere of the Earth, while the right side is dominated by a dense pattern of yellow and orange lights representing urban areas.

Carbon Capture and Storage: The EU Net Zero Industry Act

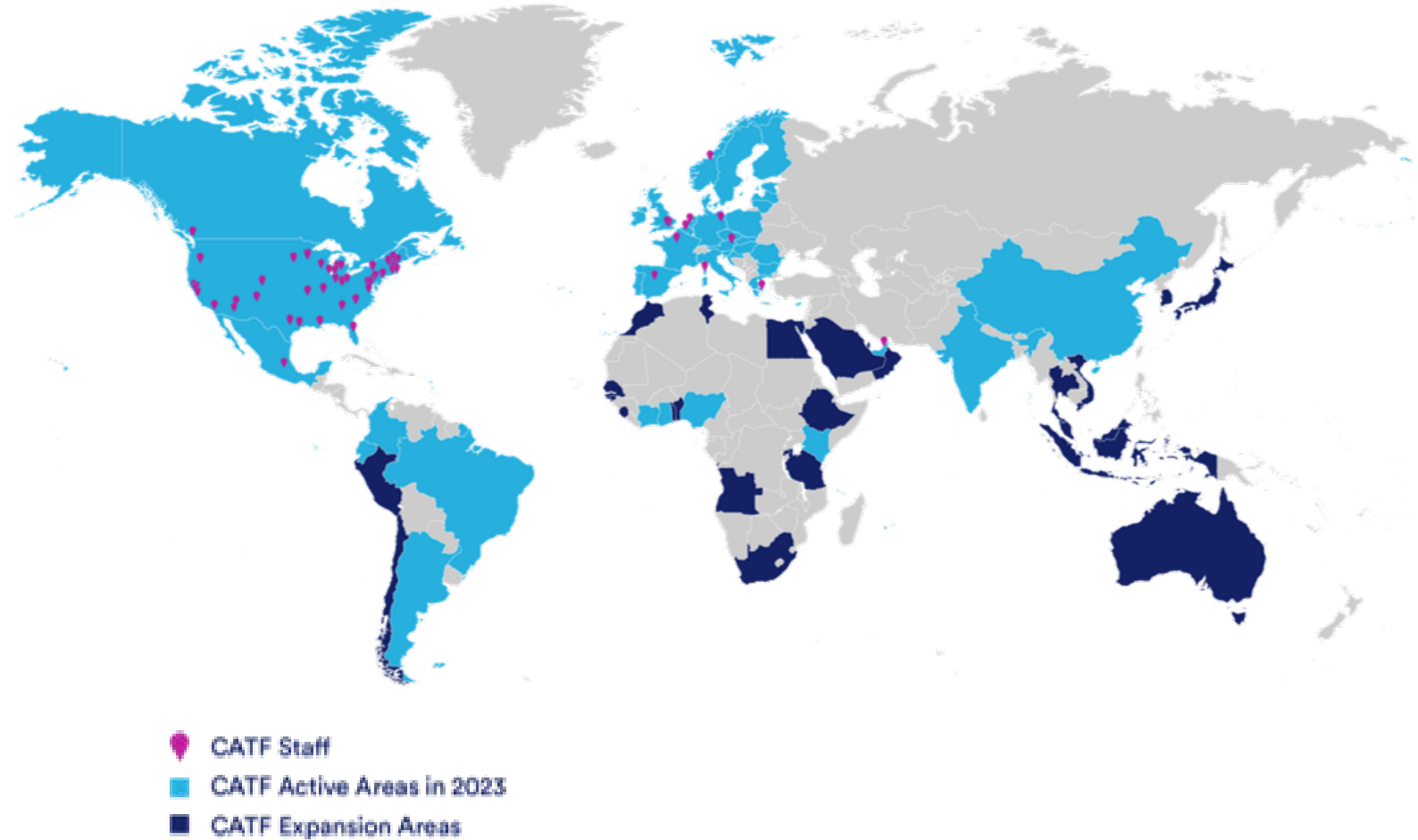
December 11, 2023



CLEAN AIR
TASK FORCE

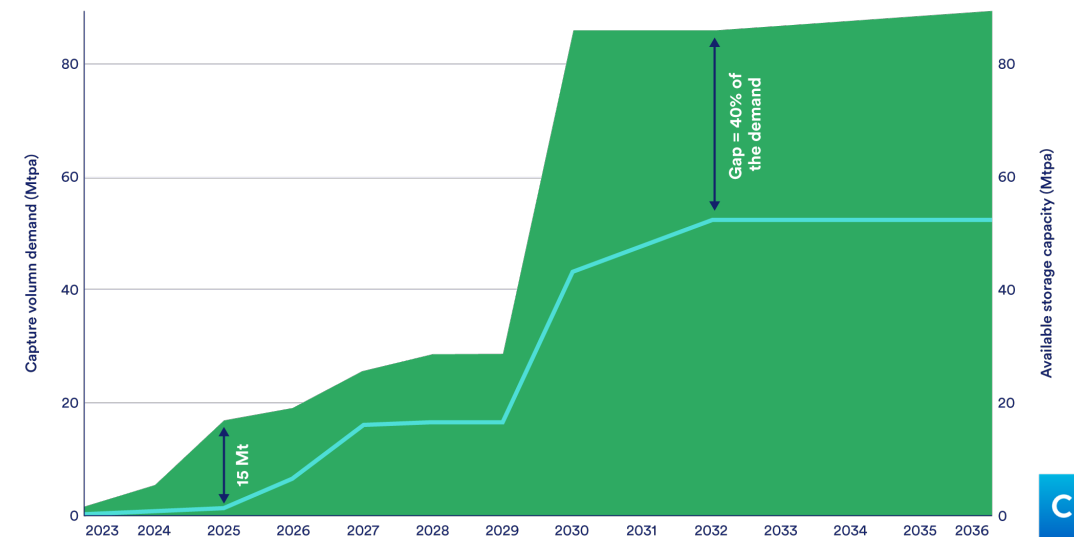
About Clean Air Task Force

- Founded in 1996
- Headquartered in Boston, 160+ global staff
- Funding is philanthropic
- **Our Mission:**
Create an affordable, zero carbon energy system by advocating for pragmatic policies, new business strategies, and advanced technologies.
- **Our Vision:**
Meet the world's rising energy demand in a way that is financially, socially, and environmentally sustainable.



Our work in the EU

- **Priorities:** Coordinated infrastructure build-out and ‘beyond demonstration’ policy
- Highlighting CO₂ storage and funding gaps
- Campaigned for inclusion of CO₂ storage in the TEN-E regulation, and for non-pipeline transport in ‘TEN-T’
- Published ‘[A European Strategy for CCS](#)’ (2022)
- Co-chaired the Commission’s Working Group on ‘[CCS Vision](#)’ - Issue paper released Jan 2023



Developments in Carbon Capture Policy

Net Zero Industry Act

- 50 Mt target for storage capacity in the EU by 2030
- Member States - storage data, assess CCS needs and plan
- Obligations on oil and gas producers – data and storage capacity

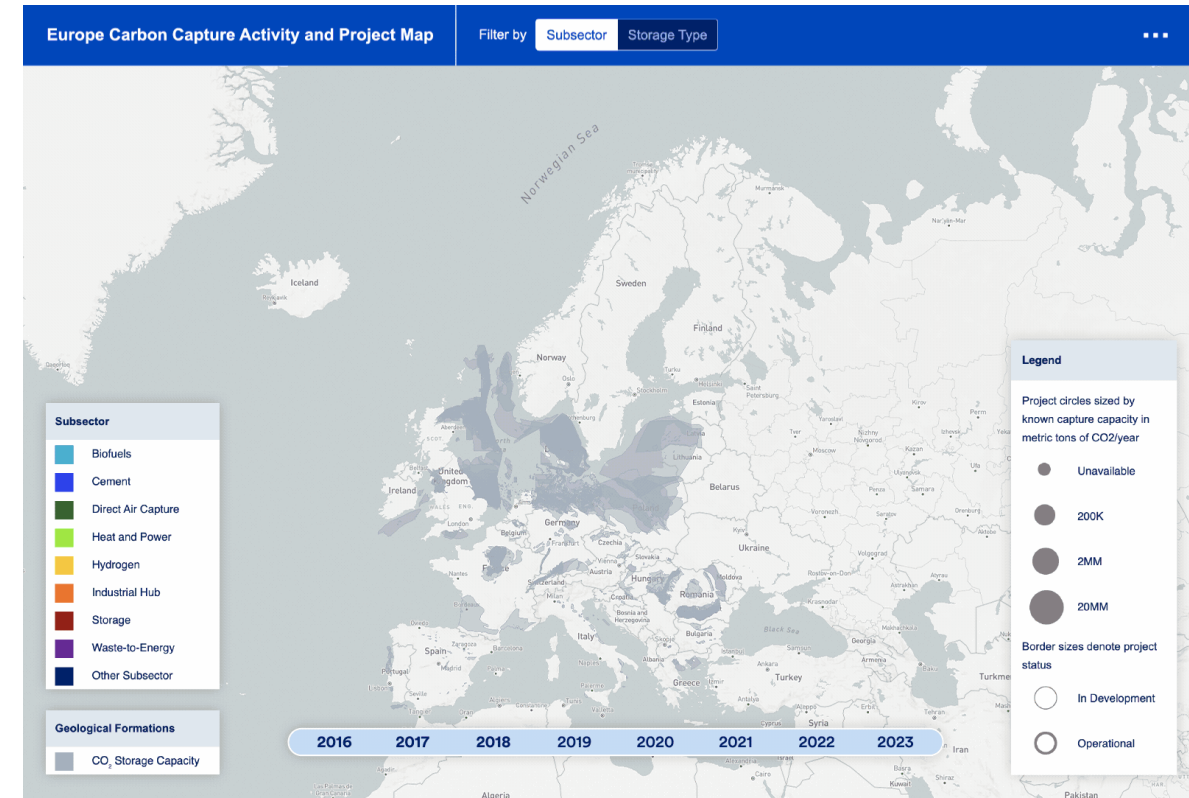
Industrial Carbon Management Strategy (February 2024)

- Targets
- Network planning – based on CO₂ sources and sinks
- Assess regulatory needs for transport and storage
- Political framework to advance carbon capture



How did we get here?

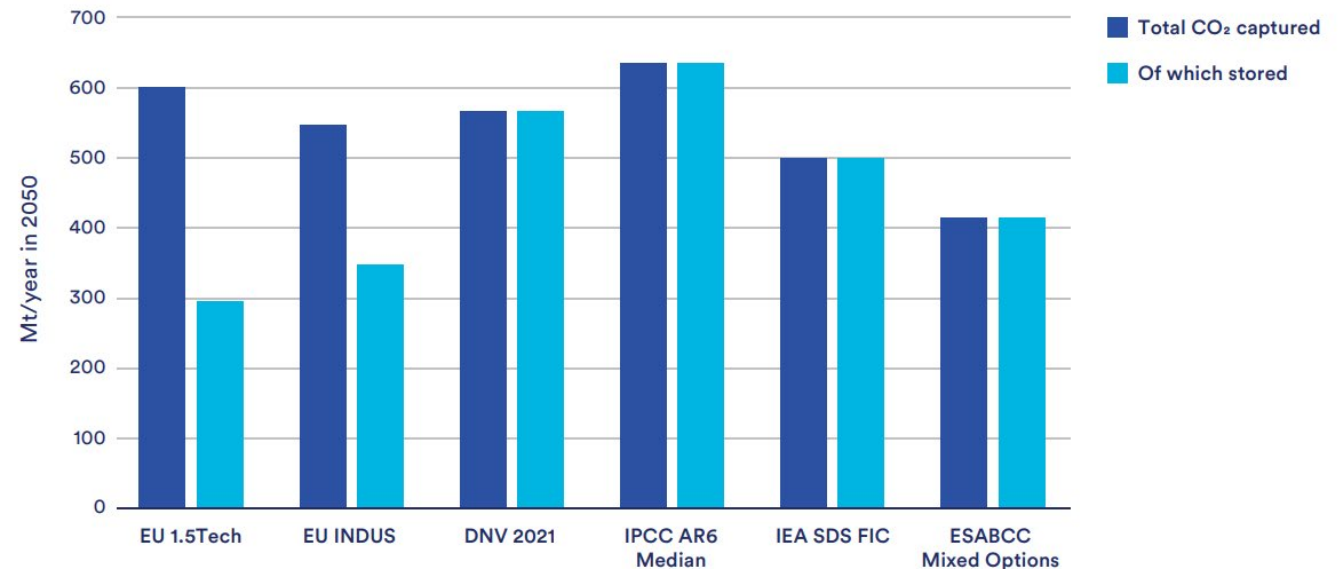
- 12 CCS and 4 CCU projects selected by EU **Innovation Fund**
- Project development confined largely to **North Sea**
- **Carbon removals** provided political cover for CCS
- Position change in **Member States**, e.g. Germany, France
- **US Inflation Reduction Act** prompted sense of urgency in Brussels



Carbon capture – Essential for EU climate goals

- Modelling indicates **at least 300 Mtpa** CO₂ capture and storage capacity by 2050.
- CO₂ storage capacity will also be needed once **net-zero** is reached in order to achieve **net-negative** emissions.
- Delayed action now may require unfeasibly rapid storage development rates to be reached later on.

Figure 1: The annual quantities of CO₂ captured in Europe by 2050, according to decarbonisation scenarios modelled by the Commission (EU only),² DNV,³ the IPCC,⁴ the IEA,⁵ and the European Scientific Advisory Board⁶



Unlocking Europe's CO₂ Storage Potential

CATF's latest flagship report assesses:

- Potential **capacity to geologically store CO₂** in Europe
- Opportunities to **optimise storage resources**
- How **sources and sinks** may interact based on captured CO₂ volumes and available storage capacity in 2035 and 2050.
- **CO₂ transport** the key link to keep costs down and enable CO₂ storage options.



Theoretical CO₂ storage capacity across Europe is estimated to be between **262 and 1520 GtCO₂**

This study identifies 17 countries that could potentially store over 10 GtCO₂

- **Bulgaria** (3-450 GtCO₂)¹ and **Norway** (70-280 GtCO₂)² have the **largest** theoretical storage capacities.
- **Belgium, Austria and Slovenia** have the **smallest** theoretical storage capacities (≤1 GtCO₂) which may be a barrier to CCS in these countries.
- **Finland and Estonia** have **no suitable sedimentary basins** for CO₂ storage.

High and low storage capacity estimates were made for each country

- Estimates were compiled from across the literature.
- These estimates were supplemented with estimates for countries with only one capacity estimate in the literature³.

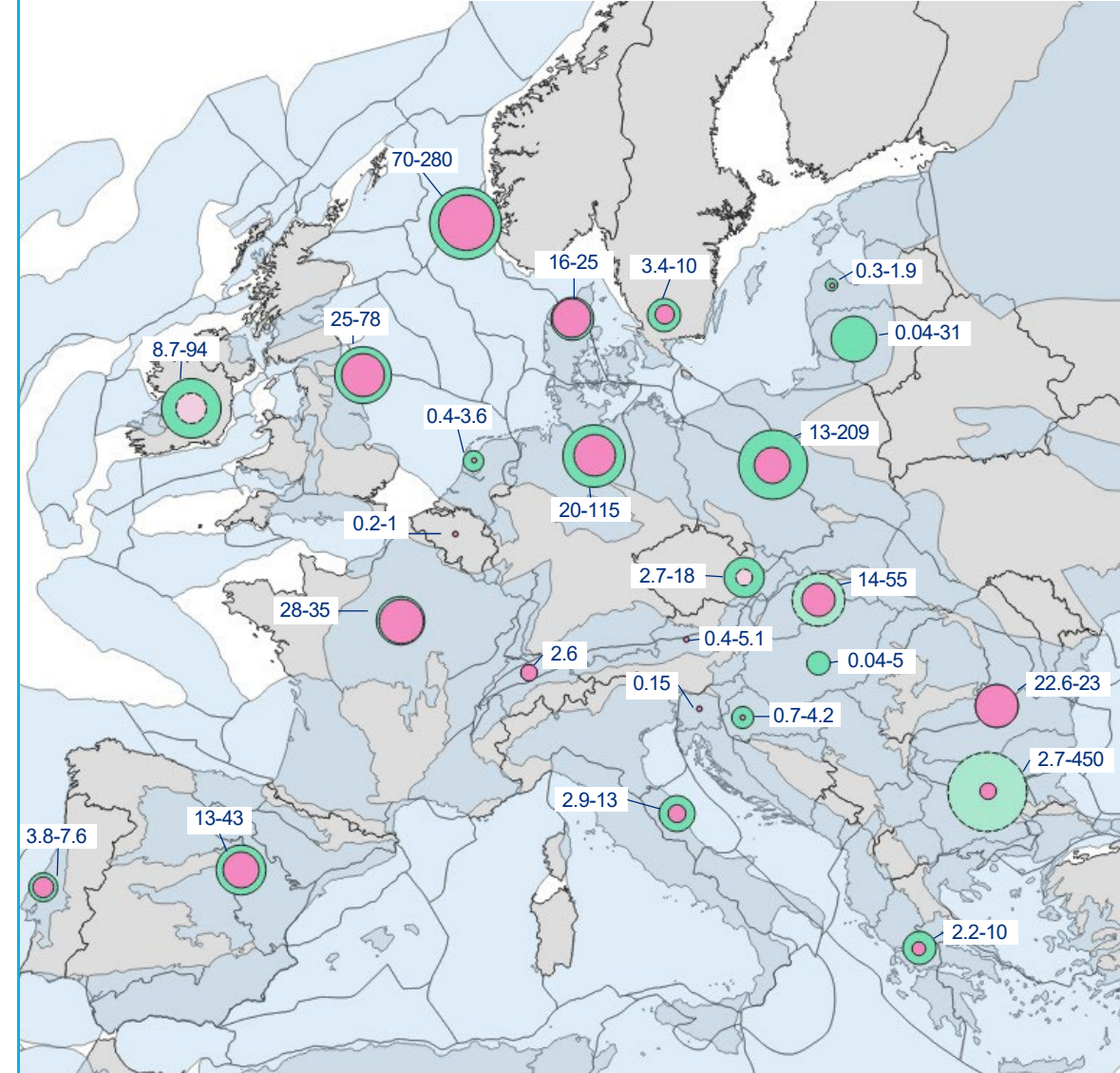
¹Bottom-up estimates were made for Bulgaria's storage capacity (more speculative)

²Storage capacities for Norway are based on published literature (more reliable)

³Bottom-up estimates were made for Ireland (low estimate), Czechia (low estimate), Slovakia (high estimate) and Bulgaria (high estimate)

⁴[Storage Capacity in the West Mediterranean](#)

⁵[CGG Robertson Basins and Plays](#)



Theoretical storage capacity estimates for each country (GtCO₂)

○ = 10 GtCO₂

■ High estimates

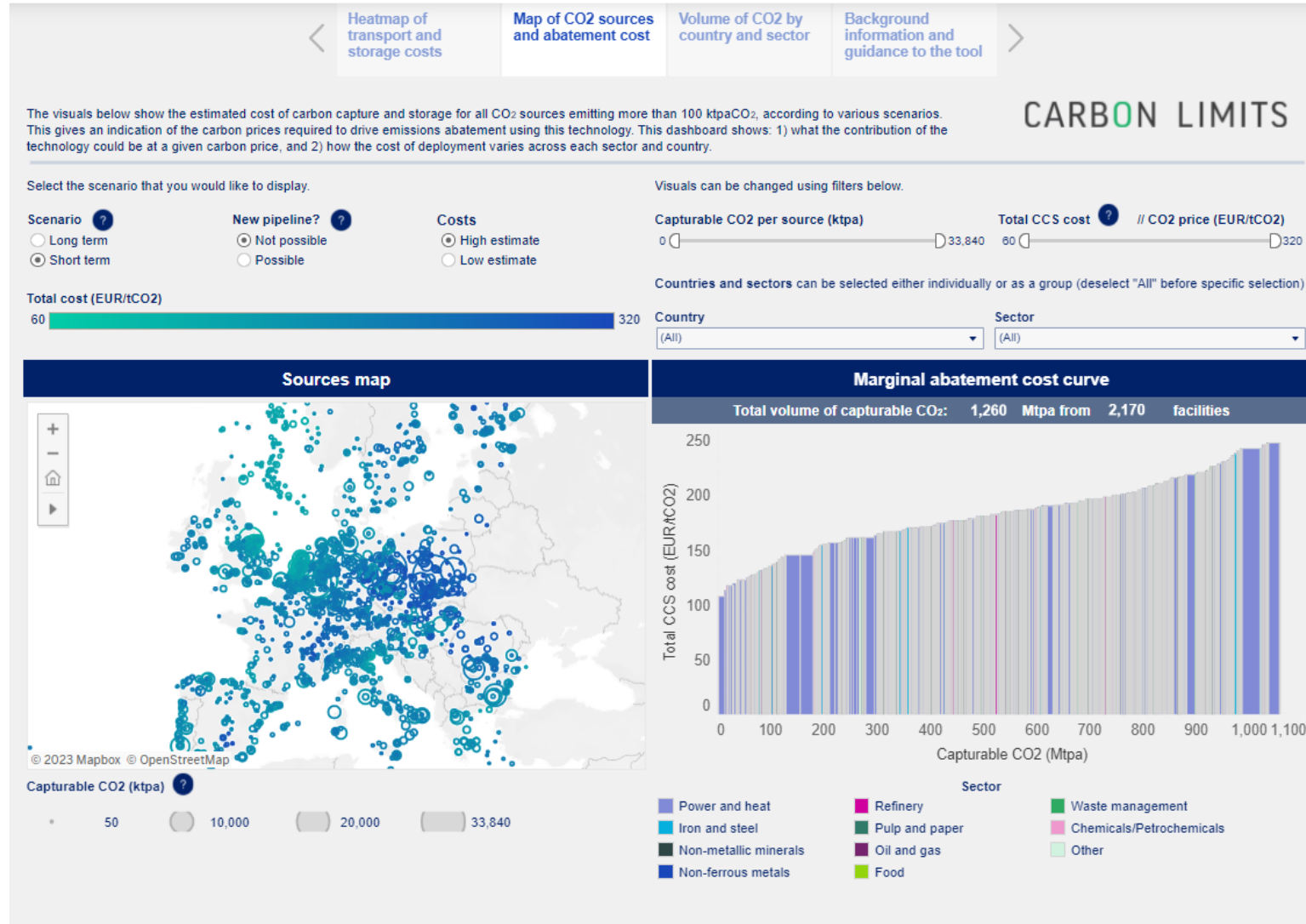
■ Low estimates

■ Sedimentary basins⁵

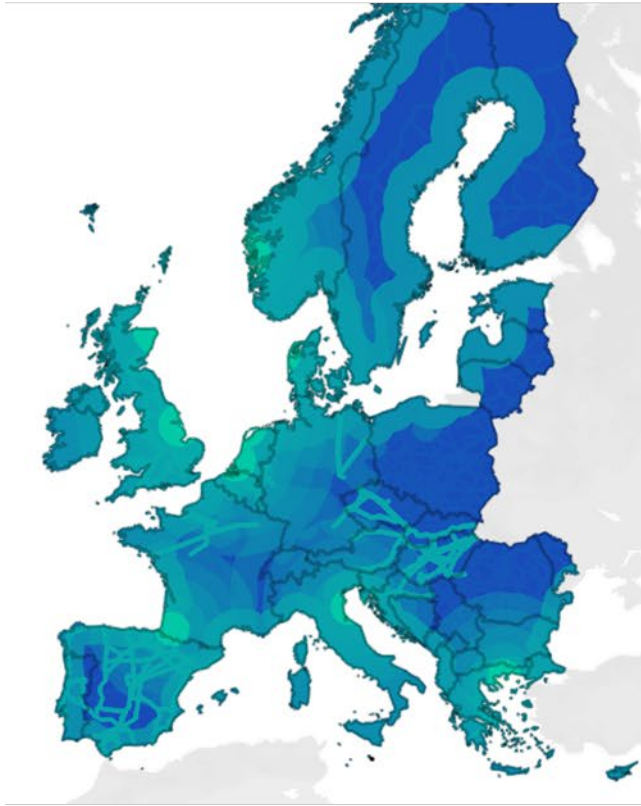
CO₂ Transport Costs

- 2170 facilities mapped
- Planned storage and possible storage considered
- Ship, rail, barge, existing/new pipeline considered
- High and low cost estimates
- Filter for cost, sector, country, CO₂ volume

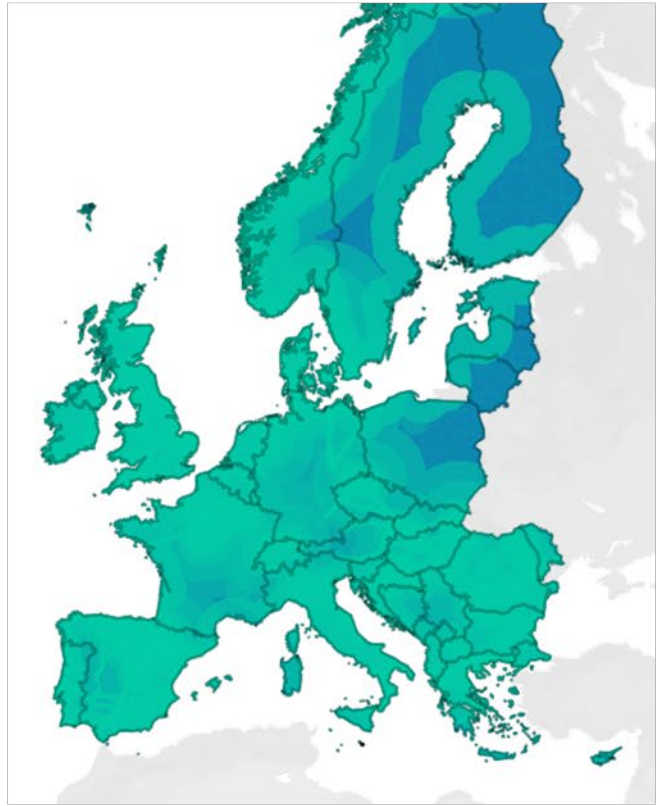
Check out our [CCS Cost Tool](#)



Transport and storage cost (EUR/tCO₂)



Planned storage sites only

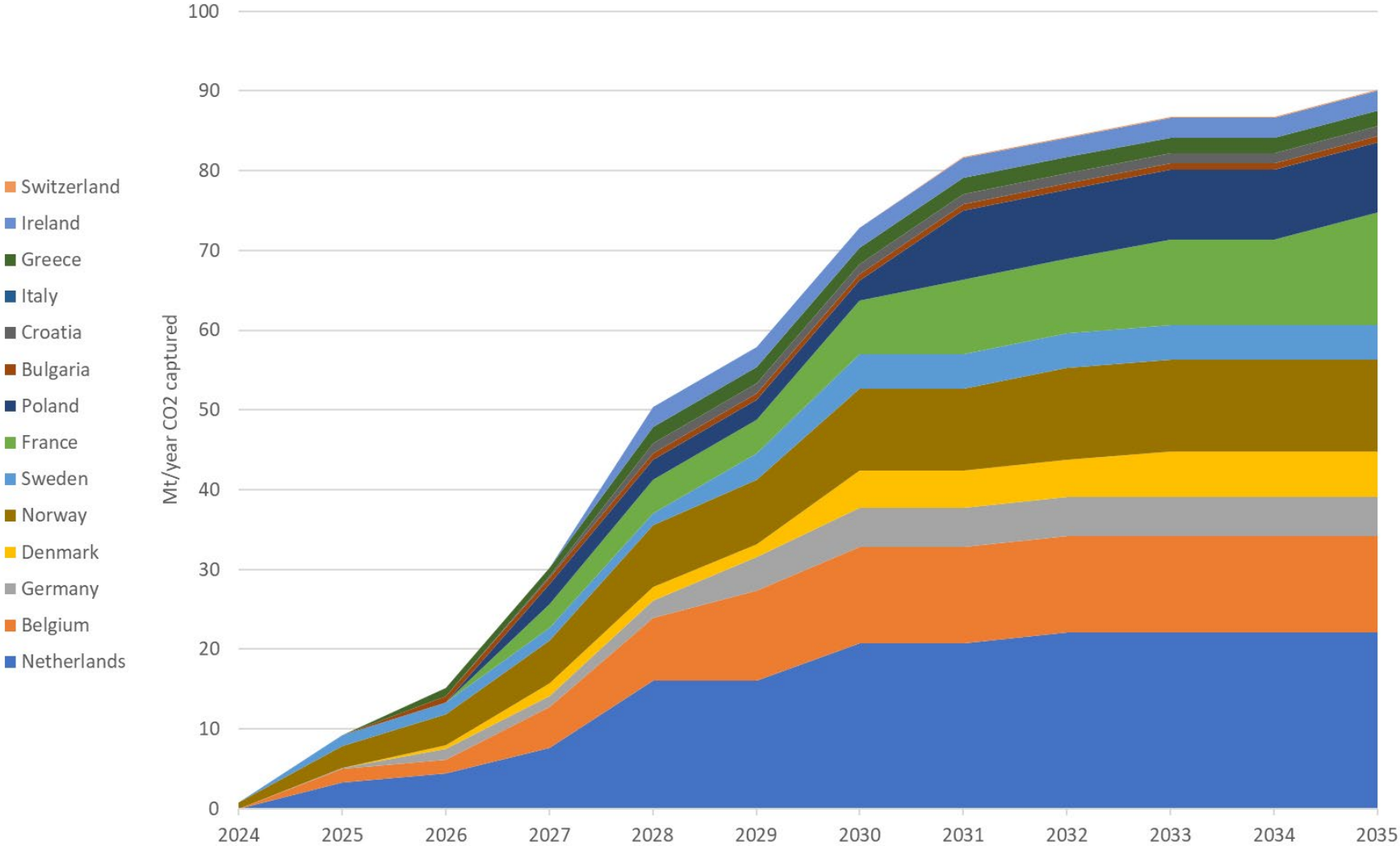


Suitable storage geology considered



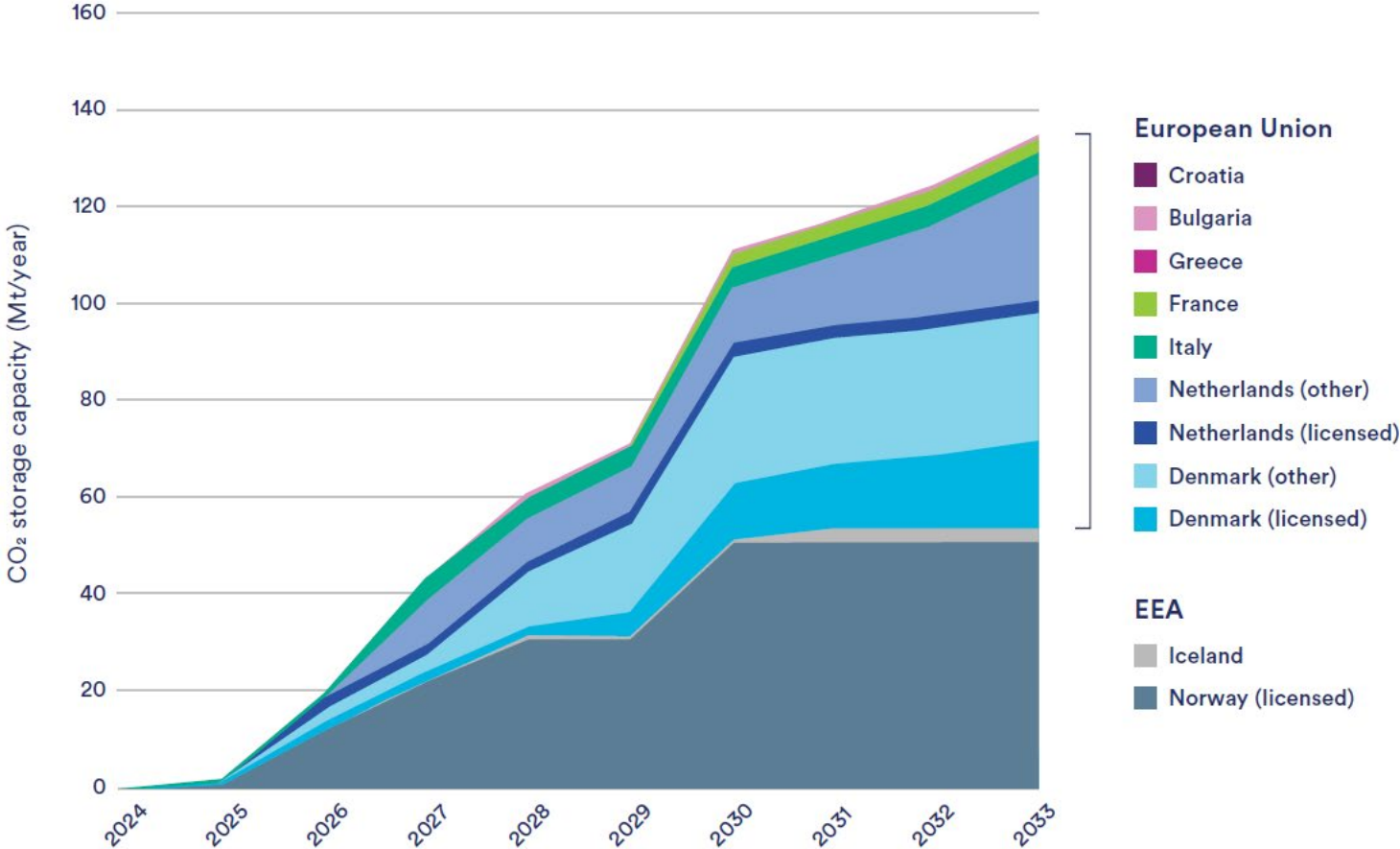
New pipelines also possible

Estimated CO₂ capture volumes

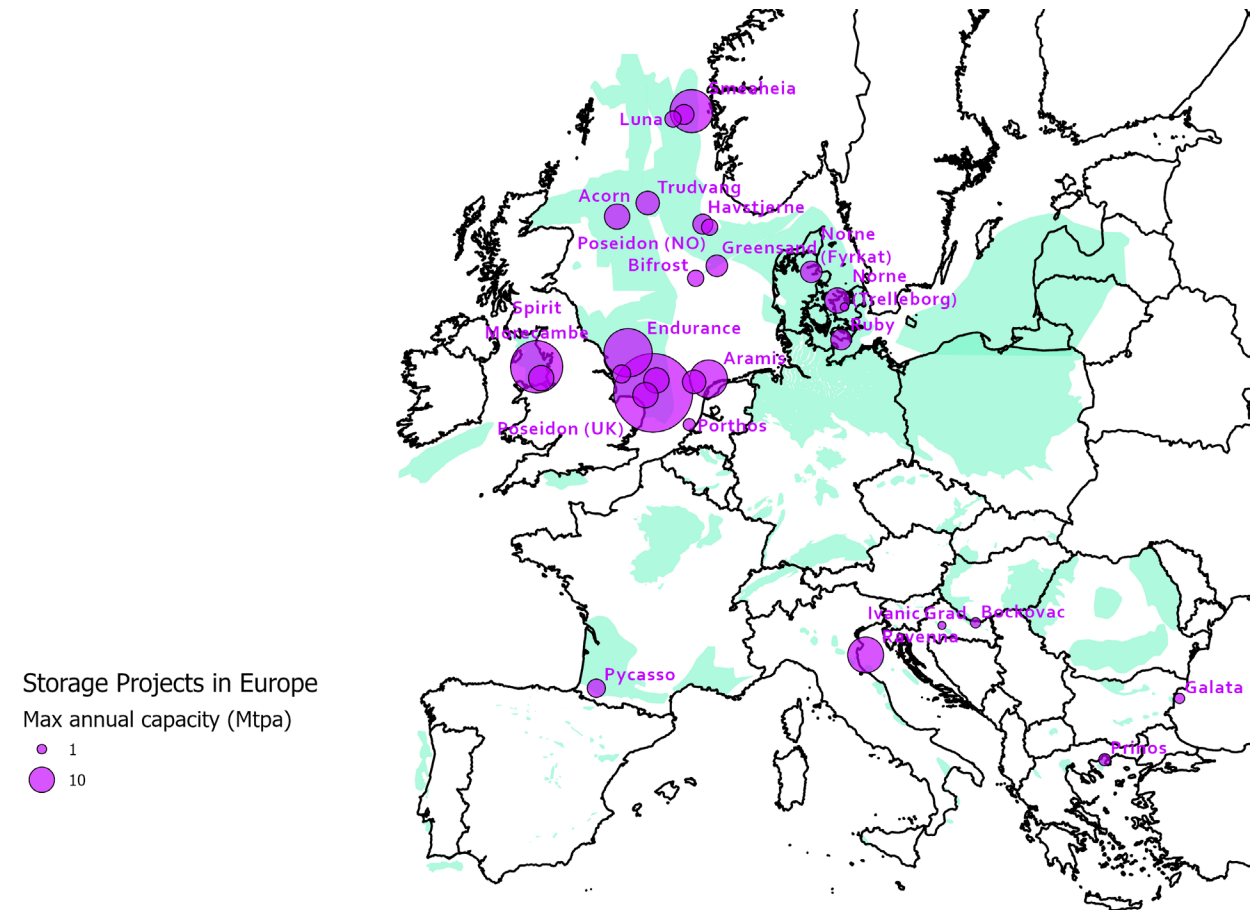
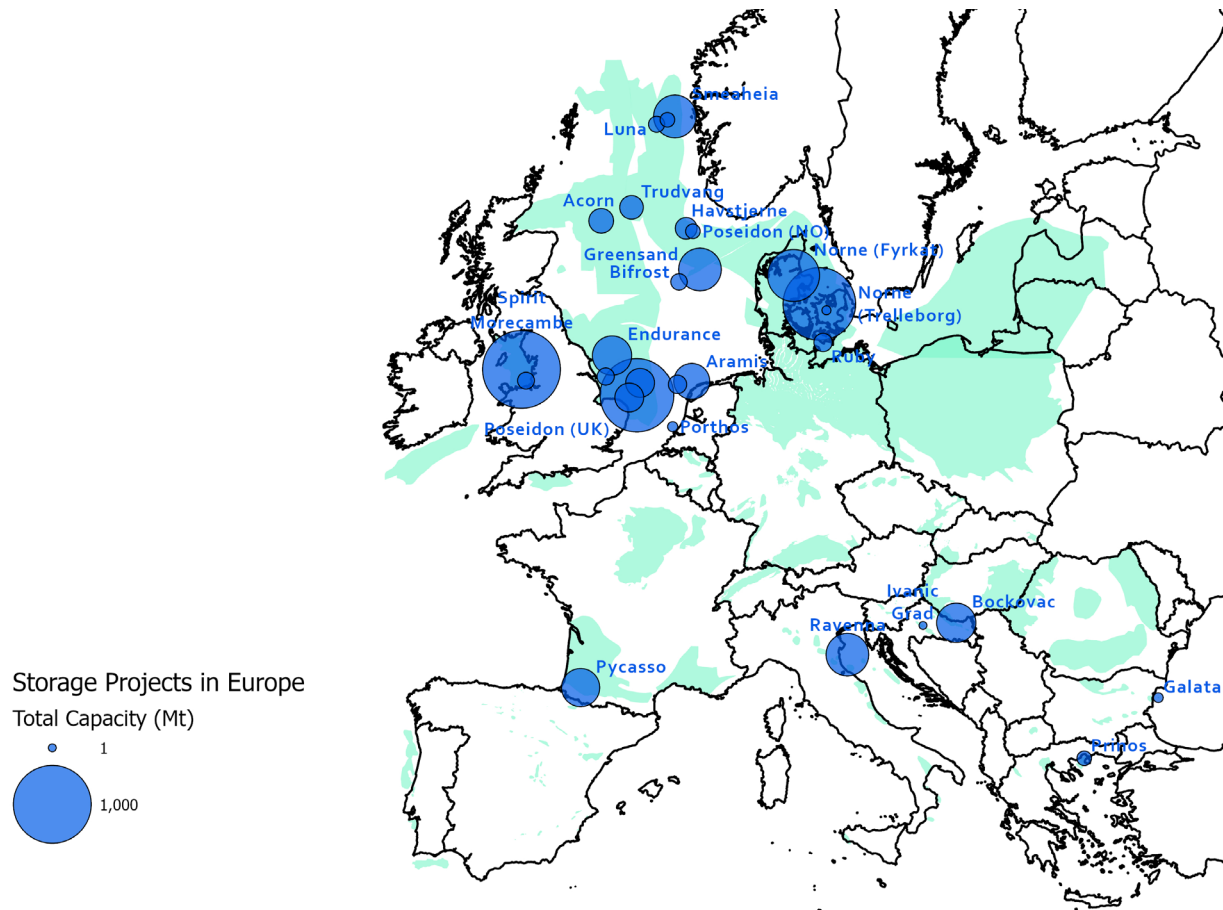


Estimated CO₂ storage volumes

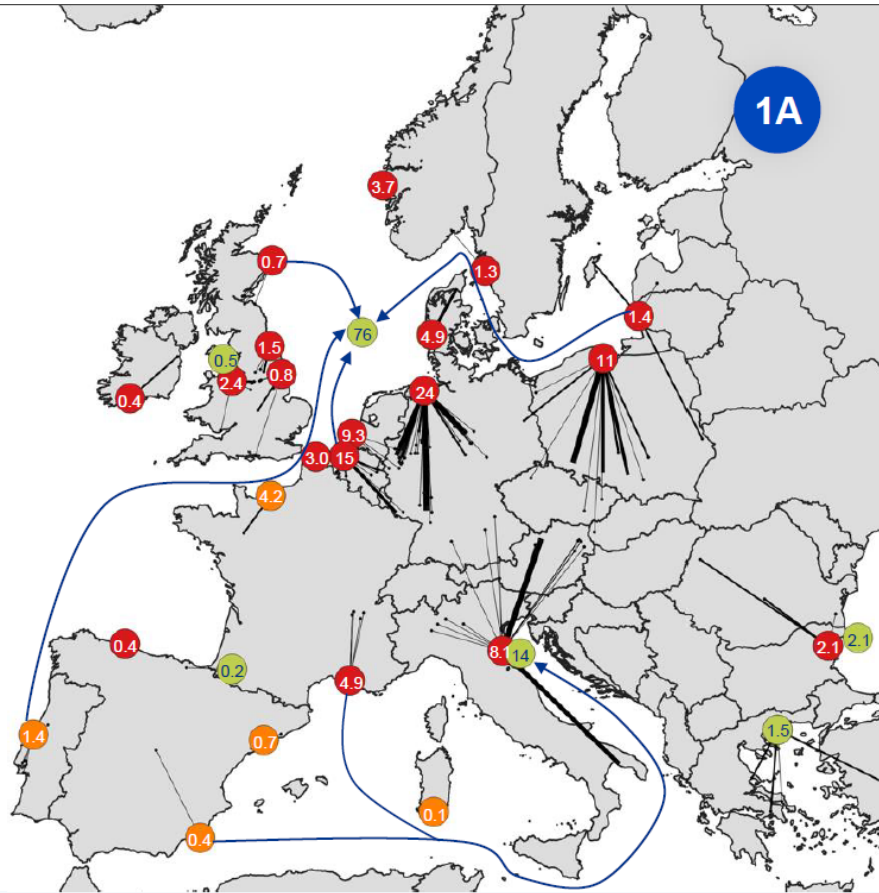
Annual injection capacity provided by currently proposed CO₂ storage projects in the European Economic Area, showing those which have received exploration licences.⁷



Announced CO₂ Storage Projects

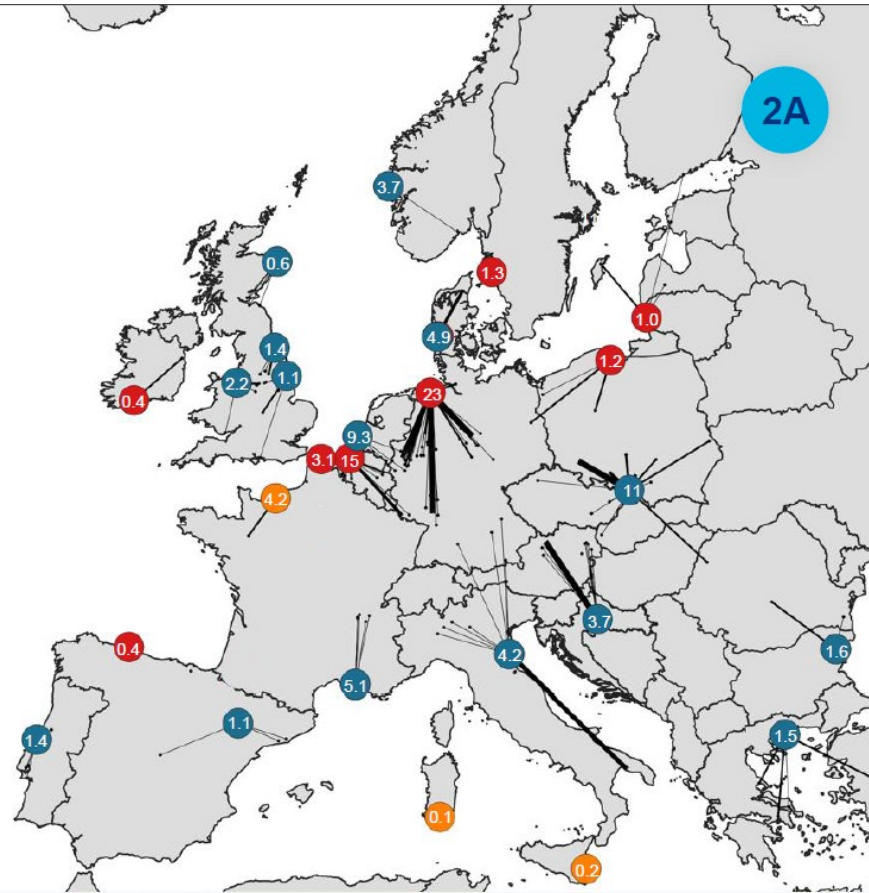


Where will Europe's CO₂ go?



2035 Prioritised CCS / Export

- Announced export locations
- Other export locations
- Priority storage (with capture volumes)
- Straight line distance (not transport routes)
- ➔ Example shipping route



2035 Prioritised CCS / Domestic

- Announced storage
- Announced export locations
- Other export locations
- Straight line distance (not transport routes)

- **Current CCS developments** envisage mainly **CO₂ exports across Europe** (left)
- **CO₂ transport adds significant costs** to emitting industries and taxpayers
- **Developing domestic storage resources** results in large cost reductions (right) leading up to **3x reductions in overall costs**



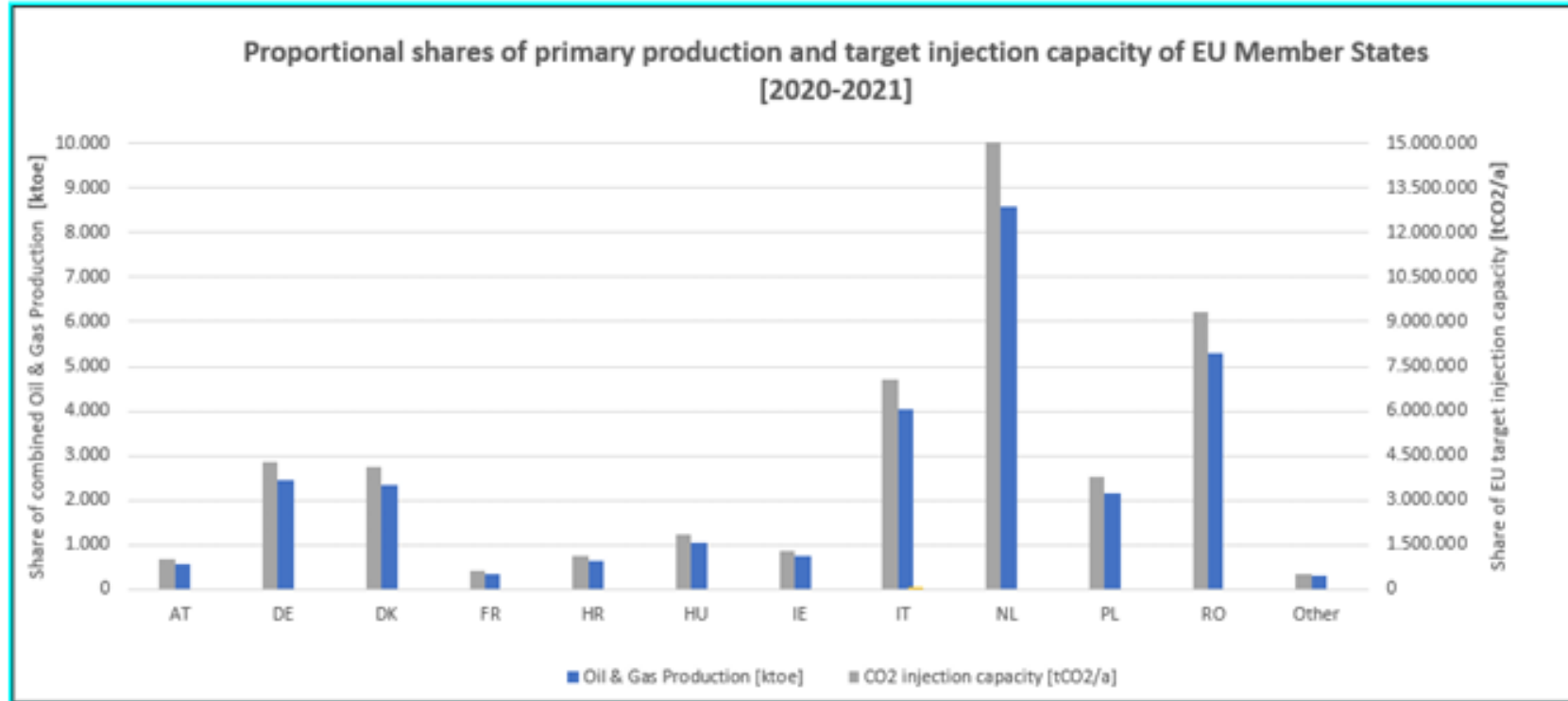
Net-Zero Industry Act

Commission Proposal



- Set an **EU-wide CO2 storage target** of 50 million tons per year by 2030 — the first such target proposed at the EU level
- Expand **European coordination** on CO2 storage through Member States
- Place a **clear responsibility on oil and gas producers** in the EU to store CO2
- Faster **CO2 storage site development** through accelerated permitting

CO₂ Storage Obligation



Source: [Commission staff working document](#)

Net-Zero Industry Act

Parliament Amendments



■ EU CO₂ Storage Target

- Upholds the Commission's proposal for an EU target of 50 million tonnes (Mt) of CO₂ annual injection capacity by 2030.
- Advocates for additional interim storage targets for 2035, 2040, and 2050, with monitoring of progress towards these.

■ Obligation on Oil and Gas producers

- Maintains proposal for an obligation for entities 'selling' oil and gas to meet CO₂ storage targets.
- Includes the imposition of sanctions and penalties for non-compliance.

■ Inclusion of CO₂ Transport Infrastructure

- Expands NZIA's scope to include CO₂ transport infrastructure.
- Calls for Commission and Member States to ensure investment in necessary CO₂ transport, including cross-border infrastructure.

■ CO₂ Market Competitiveness

- Incorporates measures to ensure fair and open access to CO₂ storage.
- Mandates the Commission to establish a regulatory framework for an EU CO₂ market within two years.

Net Zero Industry Act

Council General Approach



■ EU CO₂ Storage Target

- Support for at least 50 million tonnes of EU-wide CO₂ injection capacity by 2030.

■ Obligation on Oil and Gas producers

- Maintains proposal for an obligation for entities 'selling' oil and gas to meet CO₂ storage targets.
- Proposes conditions under which Member States can request exemptions from Commission for domestic operators from their CO₂ injection obligations under certain conditions:
 - Article 18 6a – where the cumulative capacity provided by non-exempted entities exceeds, shown with FID before 2028
 - Article 18 6b – where a 'substantial imbalance' between capture demand & storage capacity is shown by Commission reports before 2029

■ Inclusion of CO₂ Transport Infrastructure

- Expands NZIA's scope to accelerate permitting for CO₂ transport infrastructure

Next Steps for the Net Zero Industry Act

■ Trilogue Negotiations:

- **Aim to conclude by February 9** to align with the Parliamentary March plenary session.
 - Two trilogues expected under the Spanish Presidency before Christmas.
 - Two additional trilogues anticipated under the Belgian Presidency in the New Year.

■ Publication of Final Text:

- **Intended for the Official Journal in June**, subject to timely completion of trilogues.

What the Net Zero Industry Act can help solve

■ Political recognition for carbon capture and storage

- EU target for storage capacity
- CCS as a tool for industrial decarbonisation
- CO₂ storage access as an economic factor

■ Member State action

- Member States have clear mandate to act on CCS – e.g. exploration permits
- NECPs and NZIA provide opportune moment for a fresh start for some Member States

■ Push projects to operation

- Accelerated permitting
- Strategic prioritisation for ‘shovel ready’ projects, particularly those with IF support

What the Net Zero Industry Act does not solve

■ Funding

- Funding gaps still remain, especially at Member State level
- ETS alone not sufficient for investments – price level and stability

■ De-risking of investments

- Cross chain risk' problem remains unresolved

■ CO₂ transport and storage plan

- While some regions are well-studied, many regions in Europe require significant research to bring storage projects to life
- Network development and CO₂ storage plan remains high priority



CLEAN AIR
TASK FORCE