



GSEU

GEOLOGICAL SERVICE | **FOR EUROPE**

GEOLOGICAL SERVICE FOR EUROPE'S ROLE IN ADVANCING LARGE SCALE CCS DEPLOYMENT

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OPEN FORUM

03/10/203 – Venice (Italy)



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WHY A GEOLOGICAL SERVICE FOR EUROPE?



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FINANCIAL TIMES
EU sounds alarm on critical raw materials shortages

Forbes
We Have An Energy Storage Problem

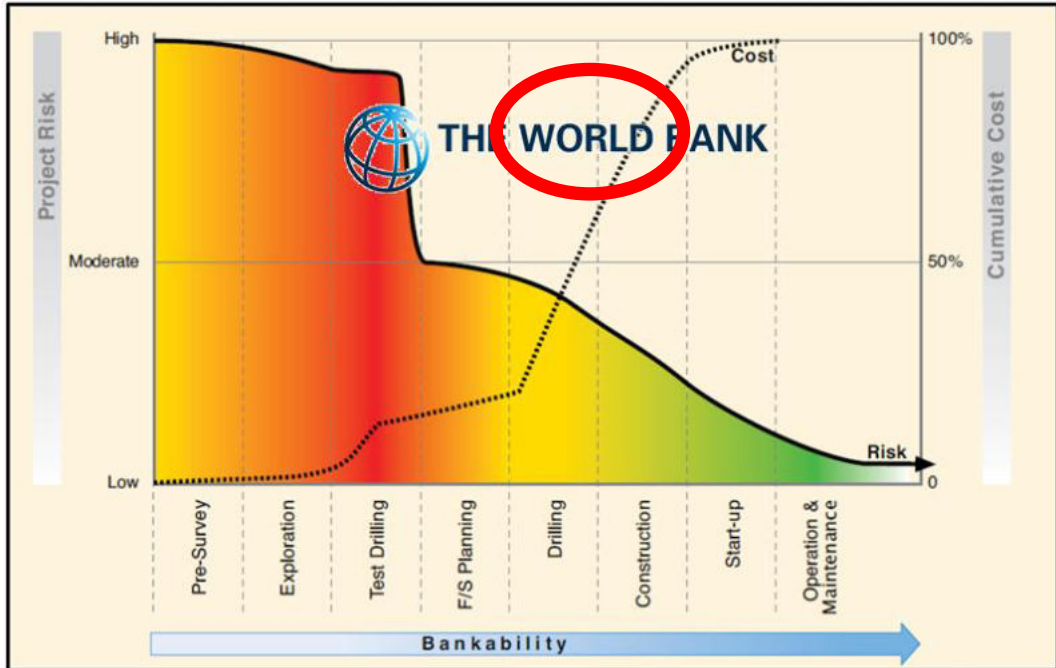
Europe's groundwater – a key resource under pressure

Europe's groundwater — a key resource under pressure

European Environment Agency 



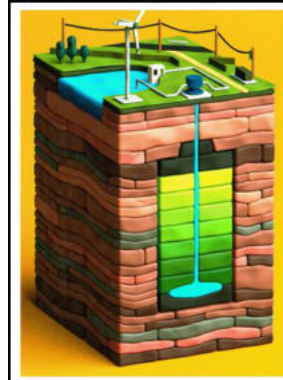
REUTERS



Speeding up renewable energy – bottlenecks and how you resolve them

World Economic Forum

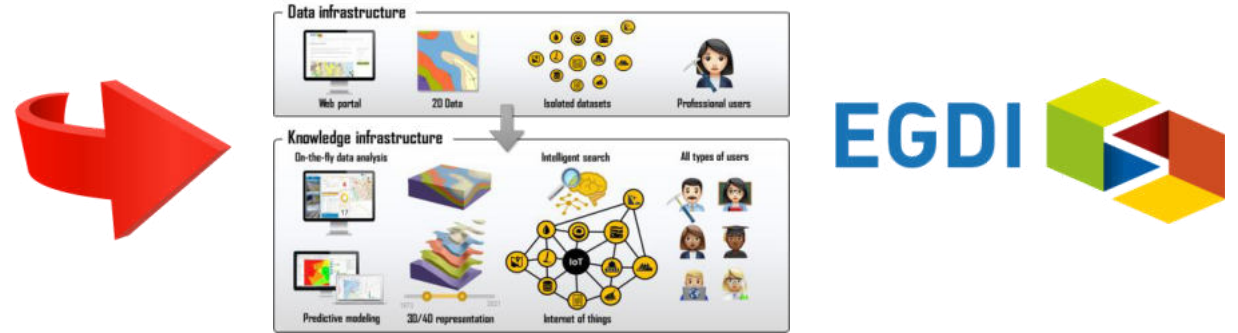
Scaling up renewables is crucial and beyond boosting yearly capacity additions, we also need a build-out of transmission lines grids, storage solutions and technologies that enable system flexibility.



THE NEW YORKER

THE RENEWABLE-ENERGY REVOLUTION WILL NEED RENEWABLE STORAGE

There is a Critical Need for High-Quality Subsurface Data!



Pan-European problems require a pan-EU efforts and solutions!



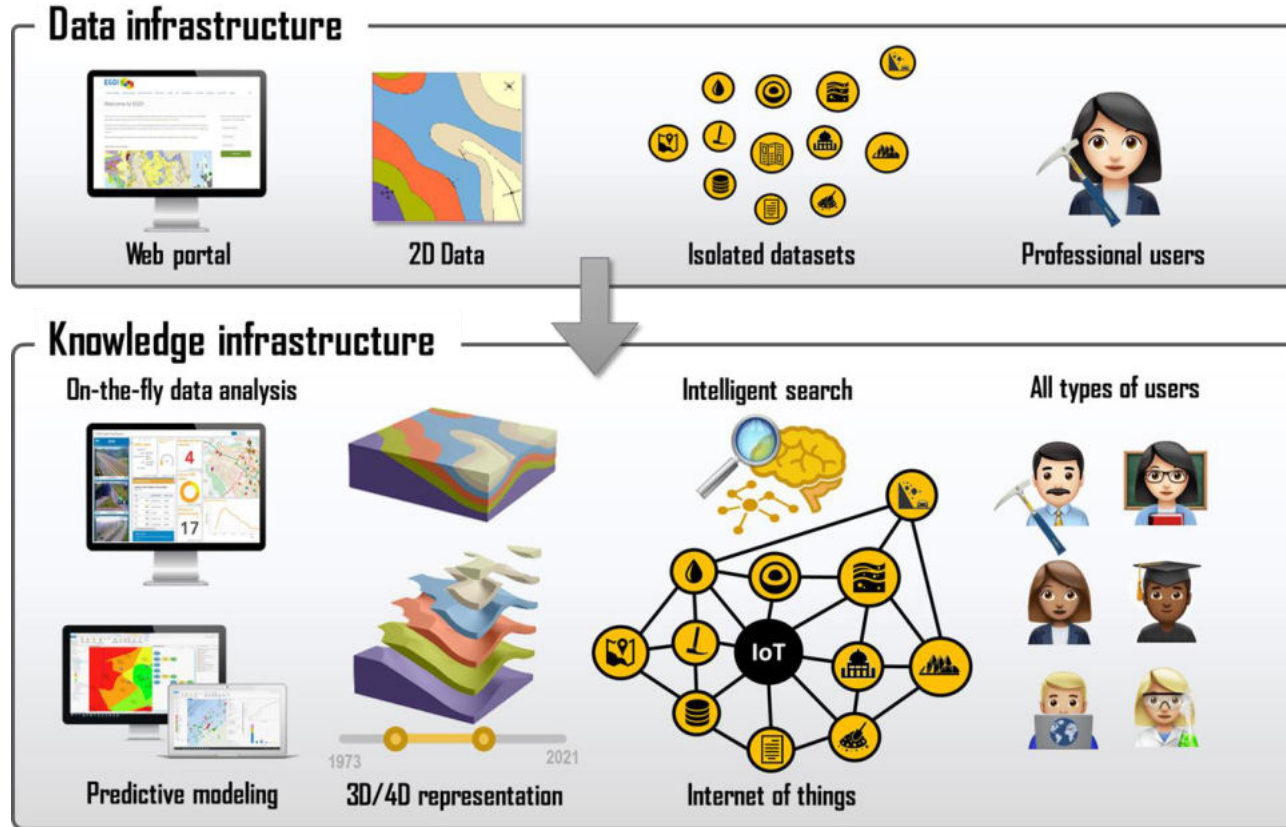


STRUCTURE

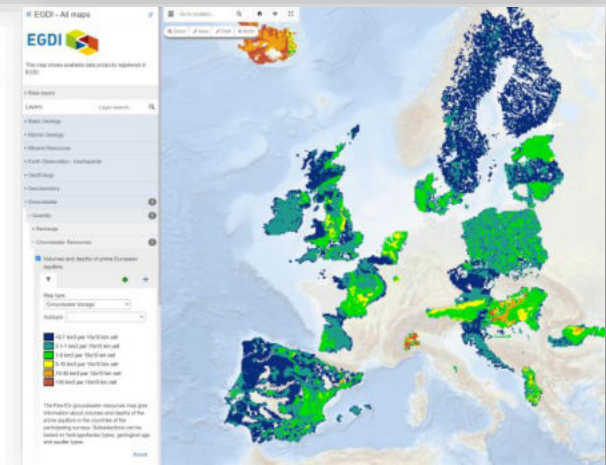
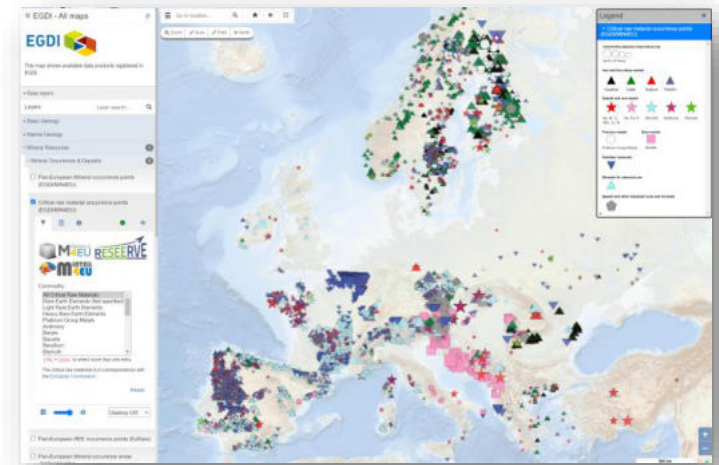




EUROPEAN GEOLOGICAL DATA INFRASTRUCTURE (EGDI)



<https://www.europe-geology.eu/>

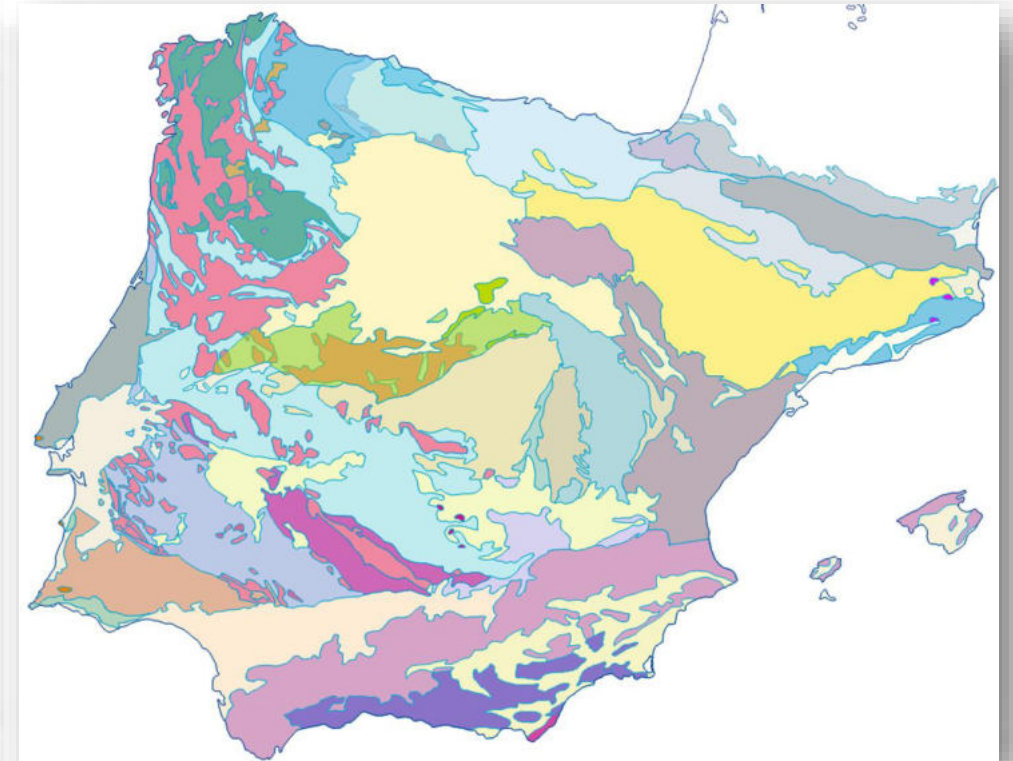
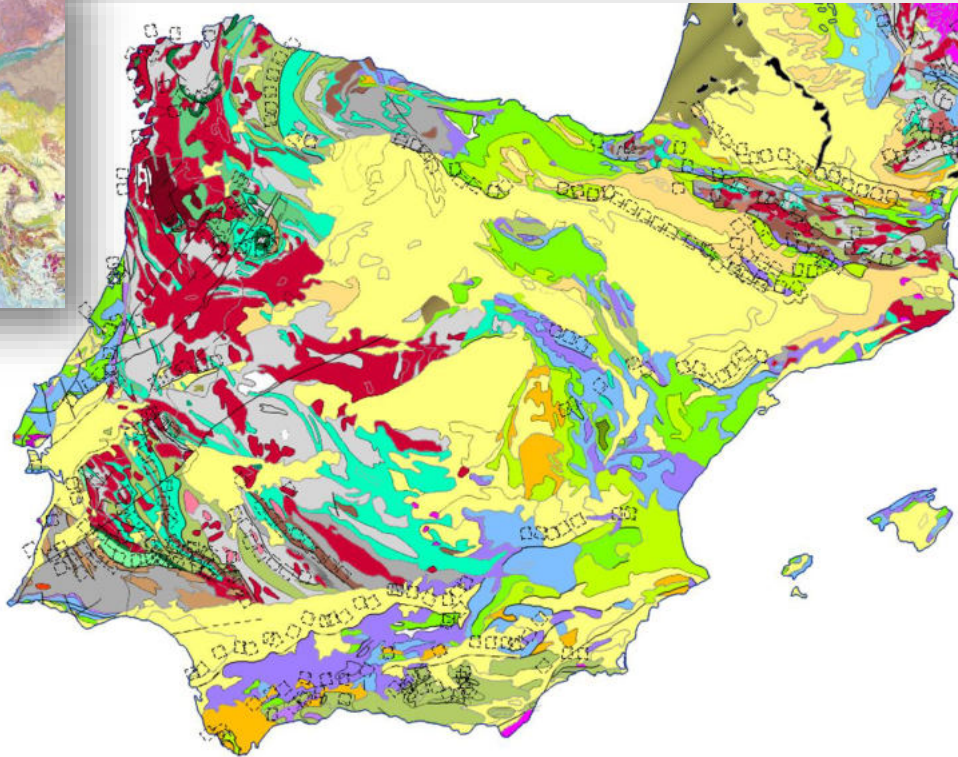




IMPLEMENTATION OF LITHOTECTONIC UNITS TO IGME 5000



IGME 5000



Lithotectonic units provide context for mineral¹ and hydrogeological provinces², and geo energy potential³.

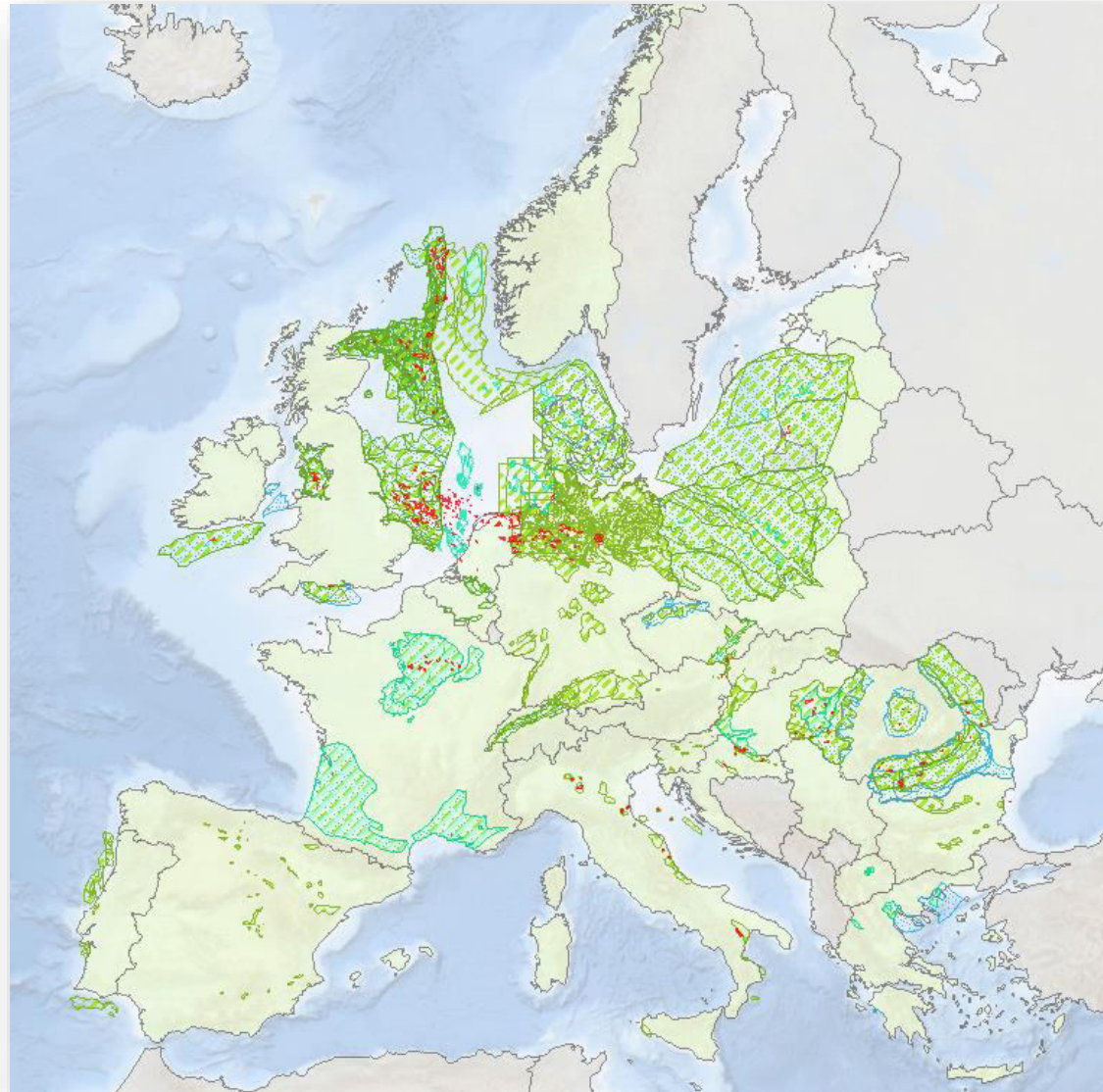
1 – Regions of the crust that are characterized by a concentration of specific types of minerals or mineral deposits.

2 – Regions characterized by specific hydrological and geological conditions that influence the distribution, movement, and availability of groundwater.

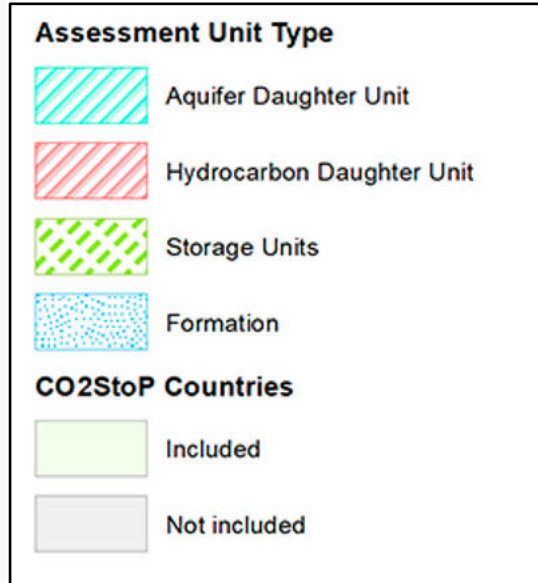
3 – Regions characterized by particular geological formations and subsurface processes that give them high potential for geo energy applications exploitation.



CO₂ STORAGE POTENTIAL IN EUROPE

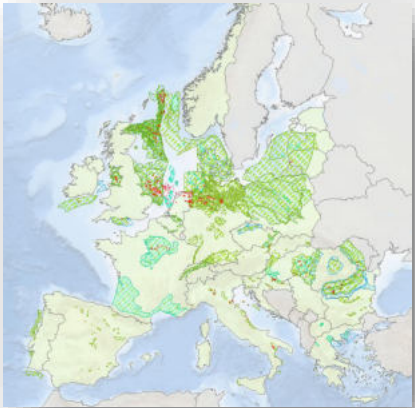


CO₂StoP Map





WHY THESE MAPS ARE IMPORTANT?



🔍 Precision Matters: A detailed map helps us identify the most promising locations for CCS infrastructure deployment.

🌱 Maximizing Impact: By focusing our efforts where CCS has the greatest potential, we can make the most significant impact fast-tracking our transition to a carbon-neutral world.

🏢 Supporting Industry and Innovation: maps and databases provide valuable insights to industries, policymakers, and innovators.

They guide investments, research, and geoscience-based policy decisions.

🌐 Global Collaboration: Open-source maps enable international cooperation, sharing best practices and facilitating the exchange of knowledge and technology.

☑ Tracking Progress: Regular updates allow us to track the progress of carbon capture and storage initiatives.

They help us assess the effectiveness of our actions and adapt our strategies accordingly.



GSEU ONGOING WORK ON CCS



Update new and more detailed information and at unit and local level



Collect and implement data from the countries that were not included in CO₂STOP



Review capacity estimation



Work closely with key stakeholders to align their needs



HOW CAN WE SUPPORT CCS LARGE SCALE DEPLOYMENT?

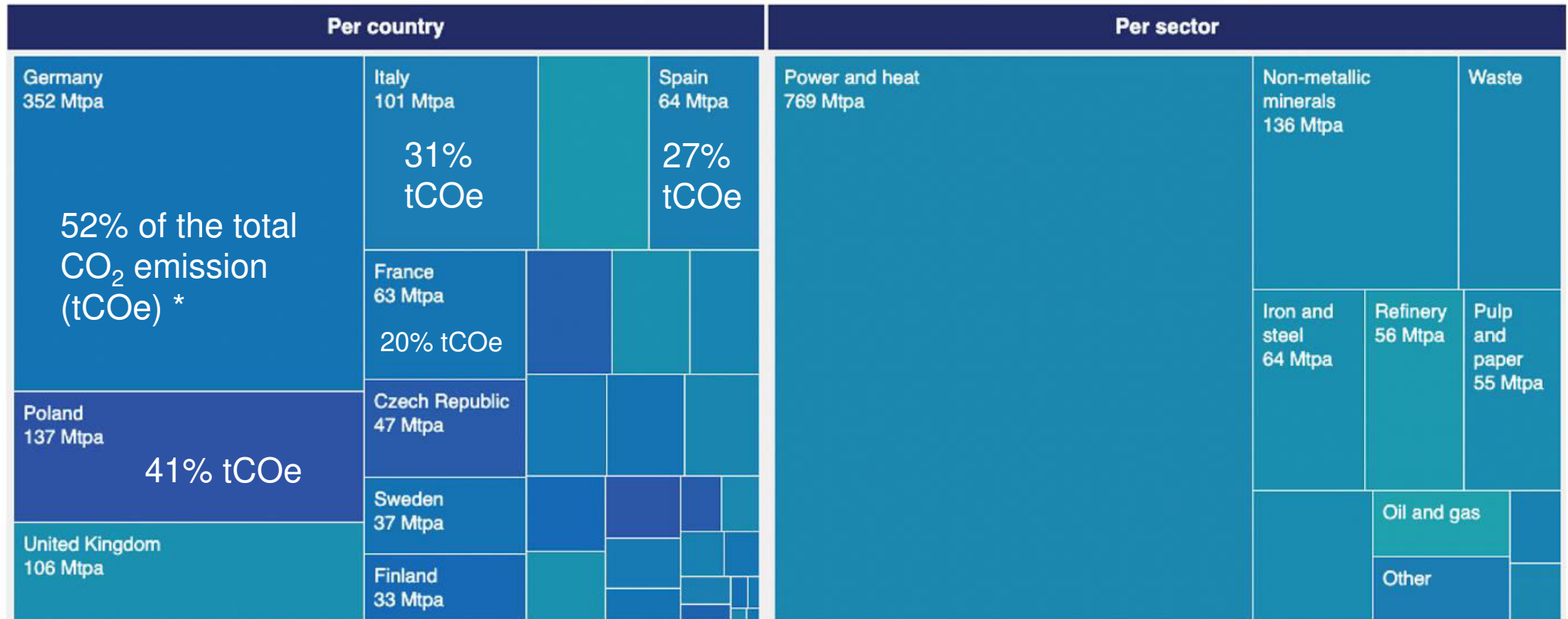


CAPTURABLE CO₂ VOLUME IN EUROPE



Average total cost per country/sector (EUR/tCO₂)

70



13 Source: Clean Air Task Force –<https://www.catf.us/2023/02/mapping-cost-carbon-capture-storage-europe/>
 * Data from “Our World in Data”. The % refers only to the CO₂ emission not to the total green house emissions.



CCS CHALLENGES IN THE EUROPEAN UNION

1. Regulatory and Permitting Challenges
2. Public Acceptance and Opposition
3. Cost and Funding
4. Market Conditions
5. Geological Suitability
6. Infrastructure Development
7. Competition with Renewable Energy
8. Knowledge and Experience Gaps
9. Cross-Border Collaboration
10. Post-Closure Liability
11. Infrastructure Carbon Leakage Concerns
12. Technological Uncertainties & Risks

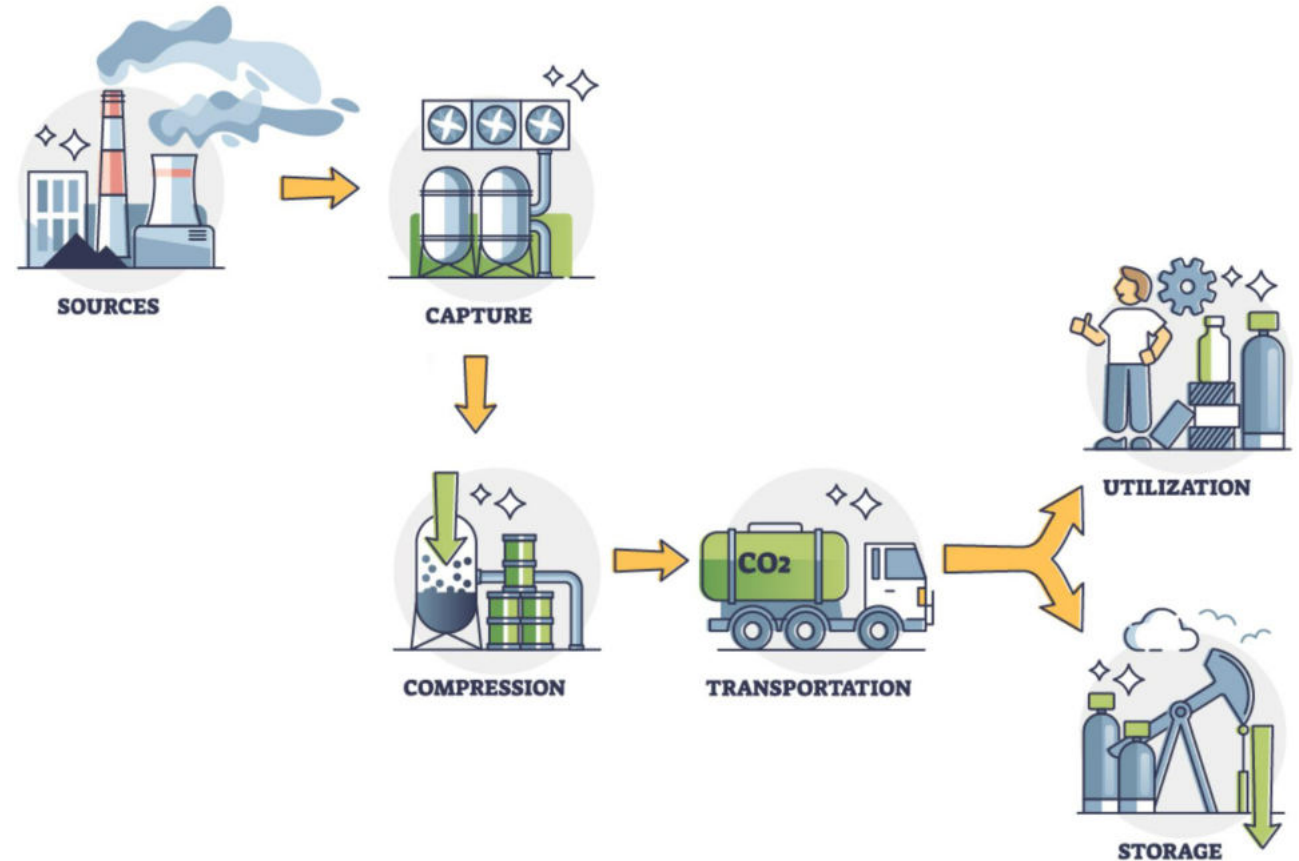


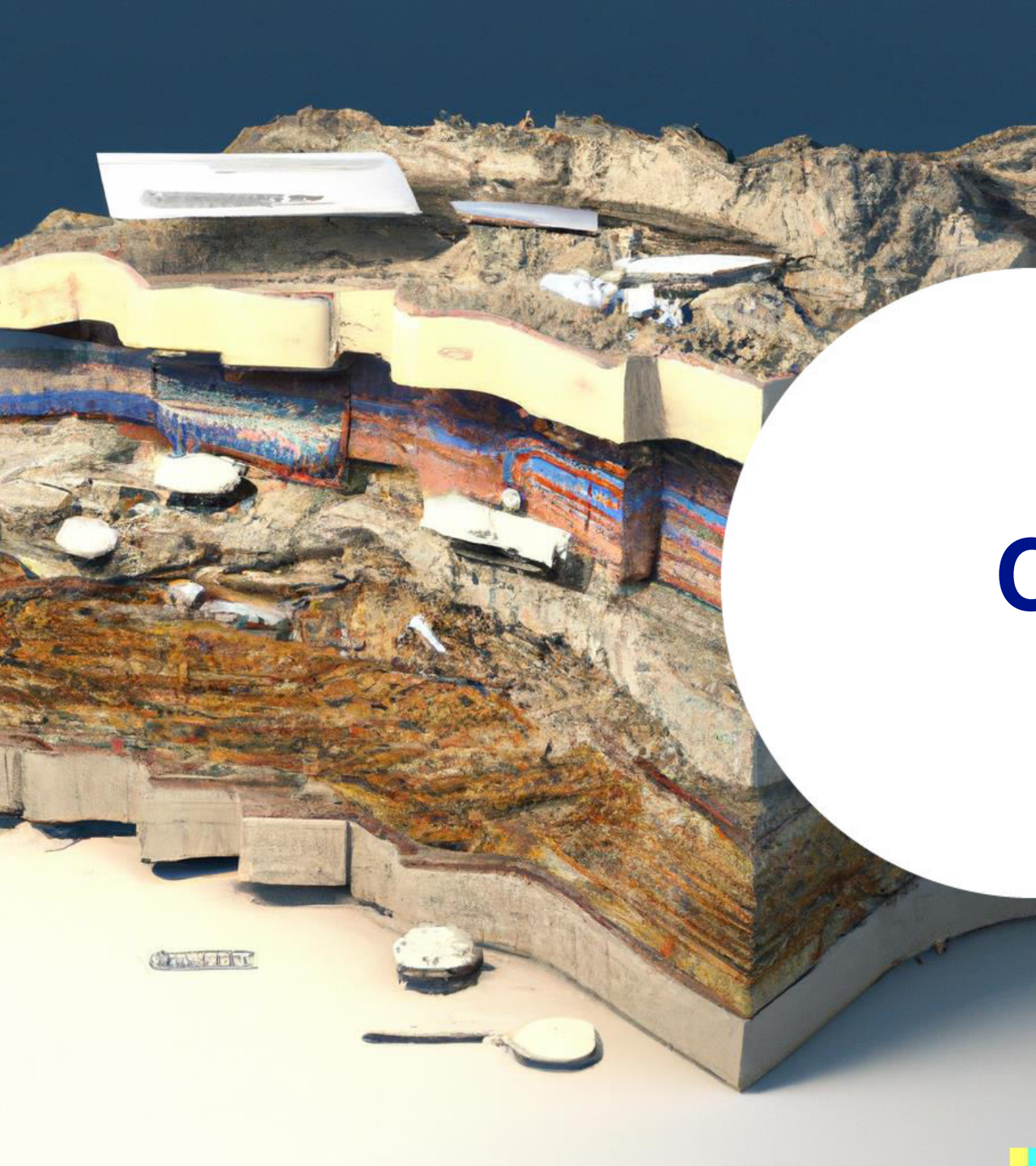
Image Credit: AZO Cleantech





HOW A GEOLOGICAL SERVICE FOR EUROPE CAN HELP?

- 1. Regulatory and Permitting Challenges** → By providing reliable, data-based advice to the regulators
- 2. Public Acceptance and Opposition** → By addressing concerns with science-based fact and advice of an independent not-for-profit organization and public engagement to increase acceptance
3. Cost and Funding
4. Market Conditions
- 5. Geological Suitability** → By preparing harmonized pan-EU databased of CCS potential sites (also to reduce risk and costs)
6. Infrastructure Development
7. Competition with Renewable Energy
- 8. Knowledge and Experience Gaps** → By sharing knowledge between EU countries
- 9. Cross-Border Collaboration** → By exploiting its strong network to support cross border opportunities
10. Post-Closure Liability
11. Infrastructure Carbon Leakage Concerns
12. Technological Uncertainties & Risks



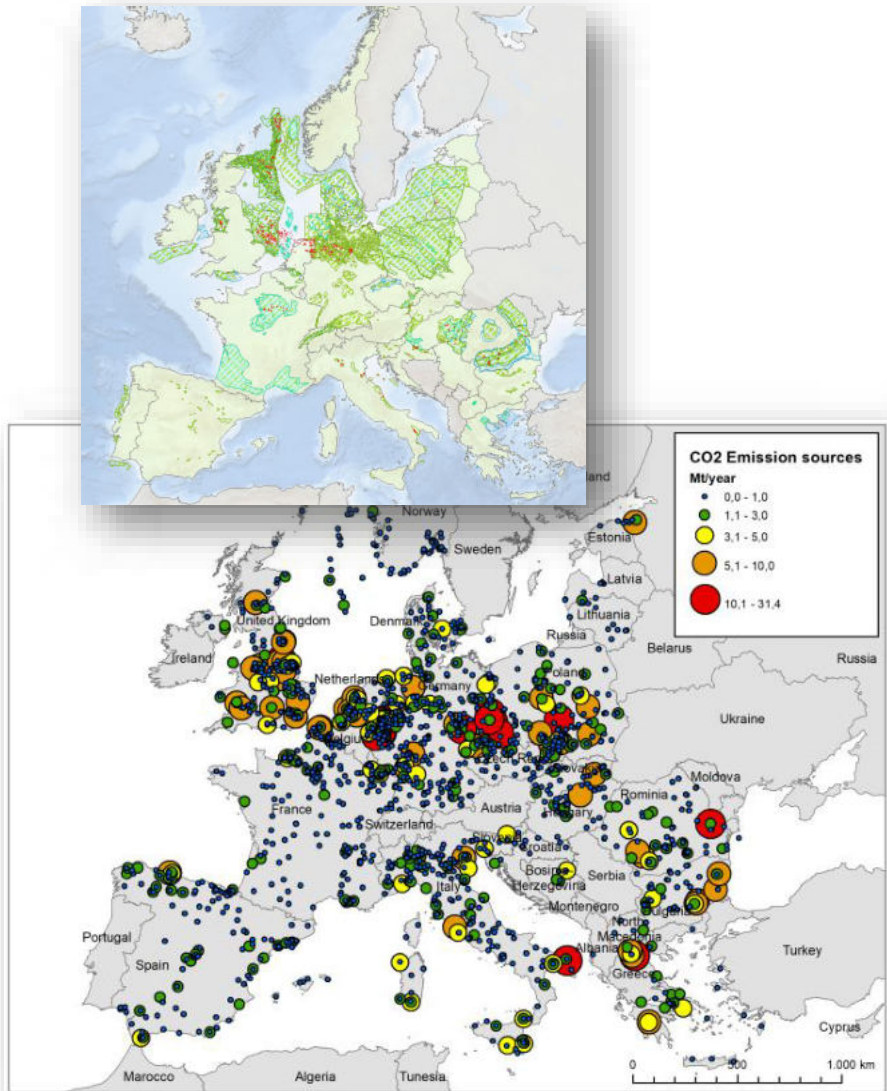
COLLABORATIONS



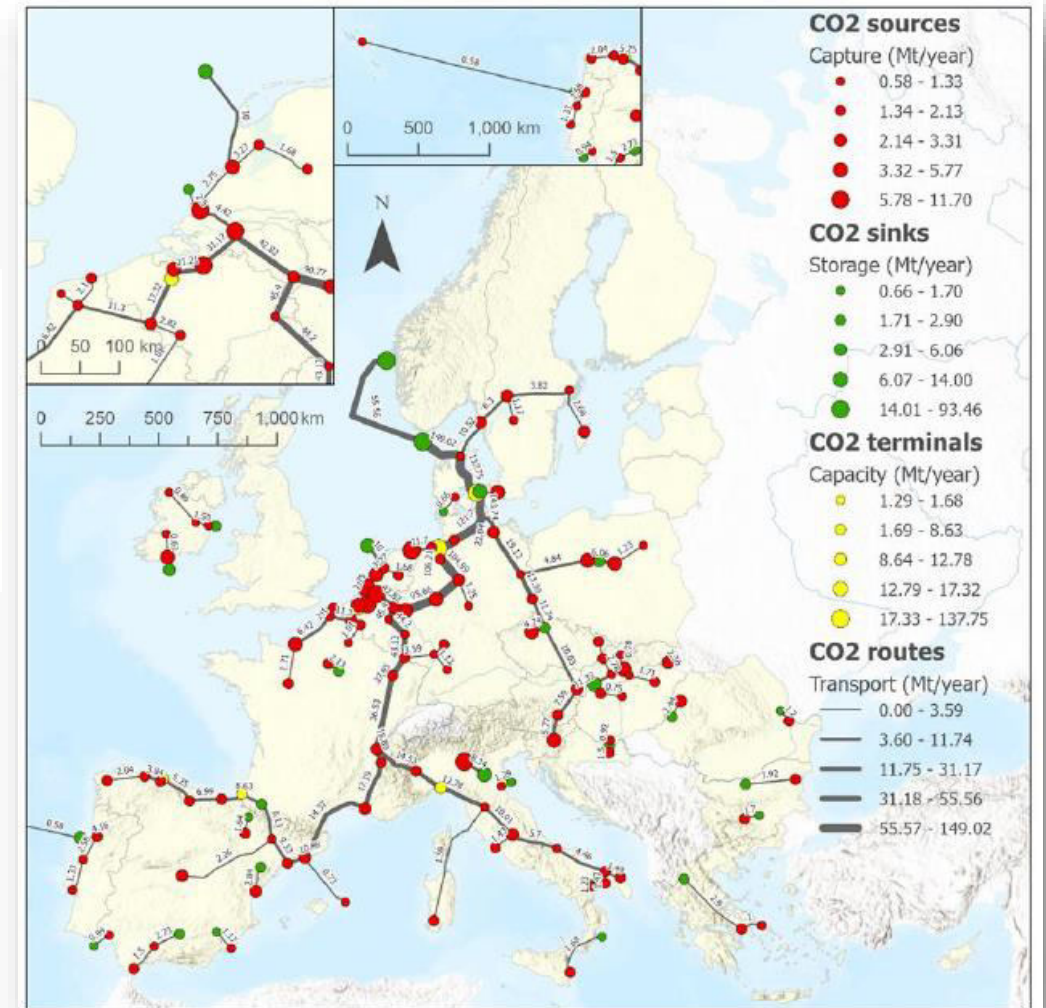
SYNERGIES WITH OTHER PLATFORMS



INPUT TO CREATE AN OPTIMAL CO₂ INFRASTRUCTURE



JRC Study on Optimal CO₂ Infrastructure

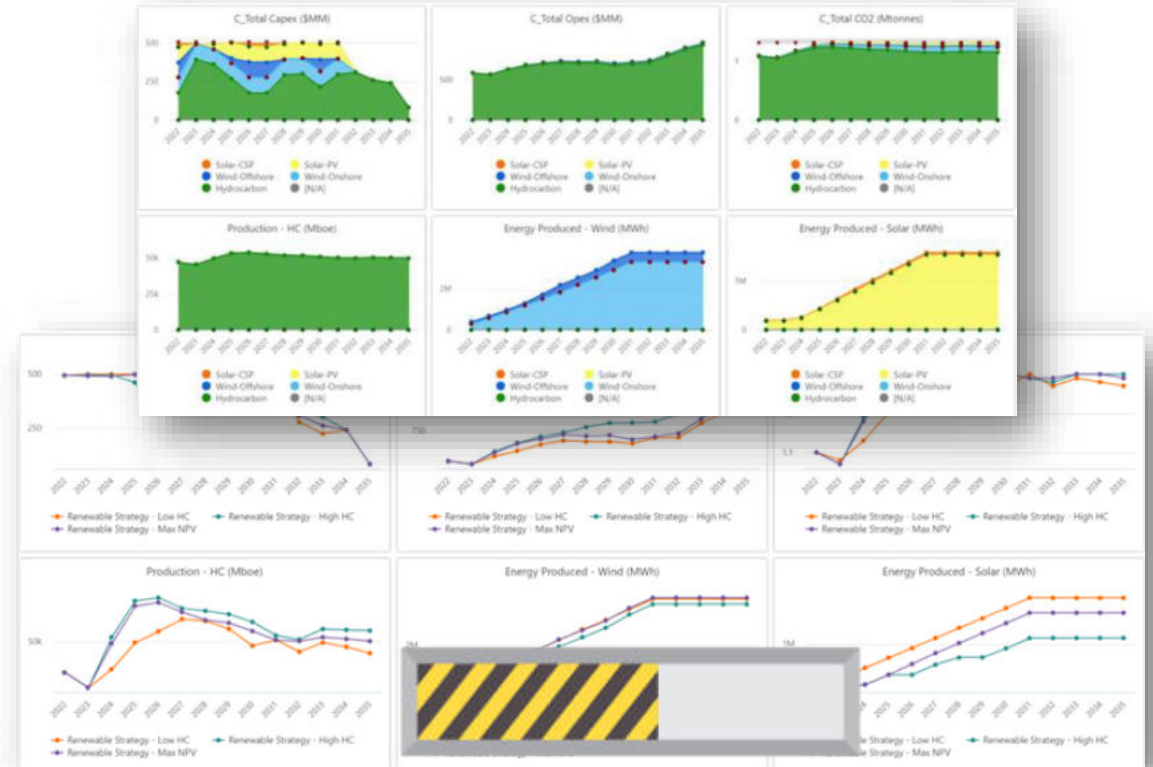
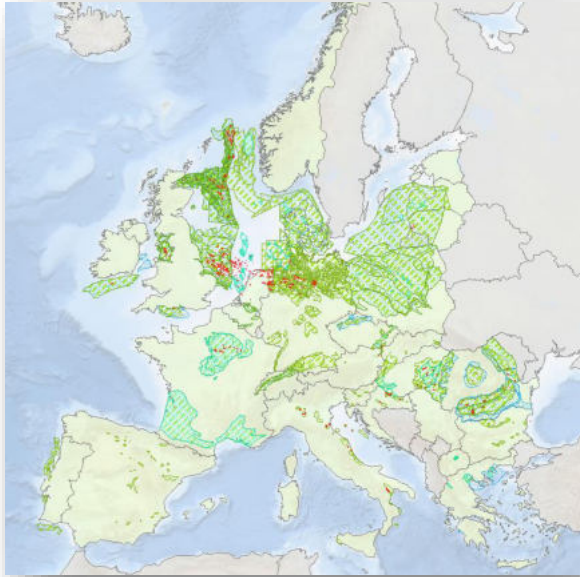




INPUT TO CREATE STRATEGIC EVALUATION OF CCS POTENTIAL



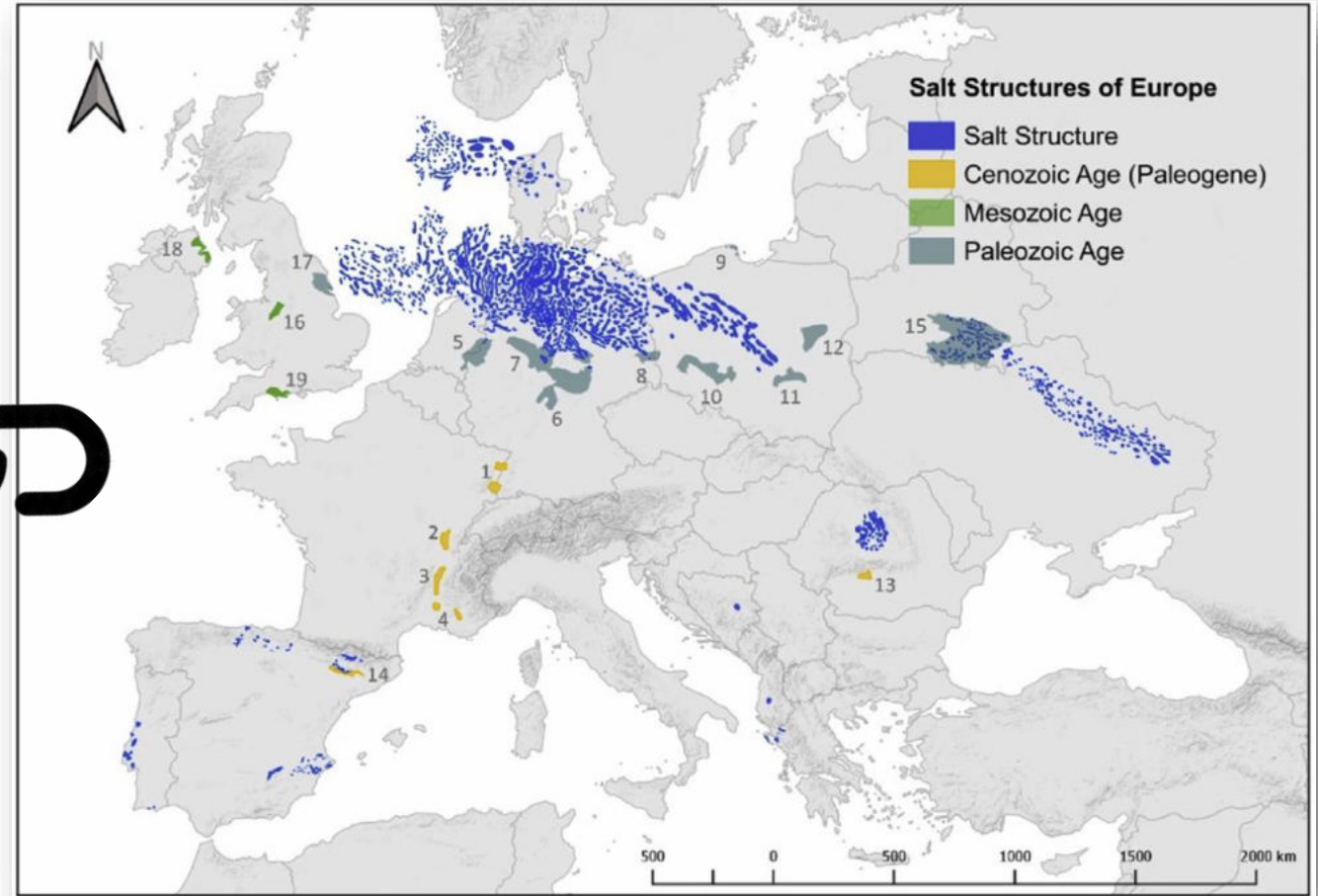
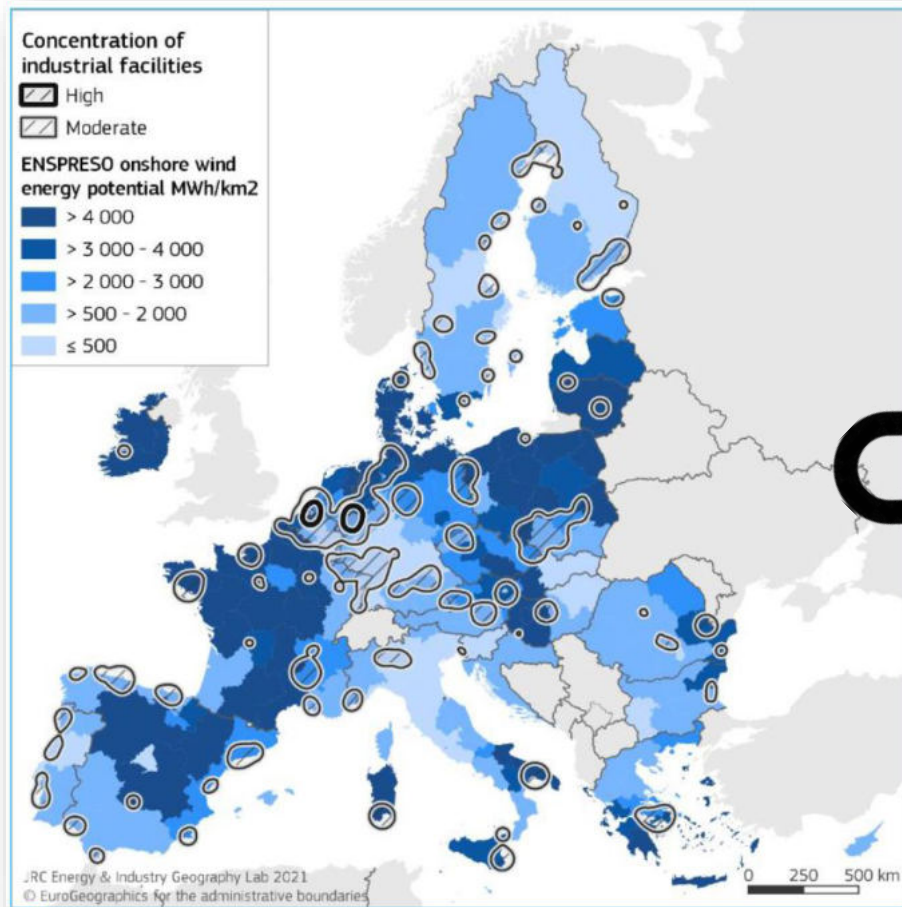
Strategic Evaluation of Carbon Storage Potential



WORK IN PROGRESS



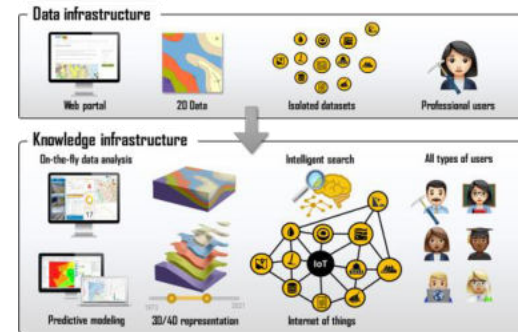
EGDI & JRC ENERGY INDUSTRY GEOGRAPHY LAB





WHY SHARING SUBSURFACE DATA WITH US?

There is a Critical Need for High-Quality Subsurface Data!





SOCIAL RESPONSIBILITY

- ✔ **Environmental and Regulatory Compliance:** Enhancing operators' image and reputation.
- ✔ **Social Responsibility:** Demonstrating corporate social responsibility and commitment.
- ✔ **Stakeholder Engagement:** Fostering positive engagement with local communities, government agencies, environmental organizations, and the public. Building trust and goodwill is beneficial for a social license to operate.

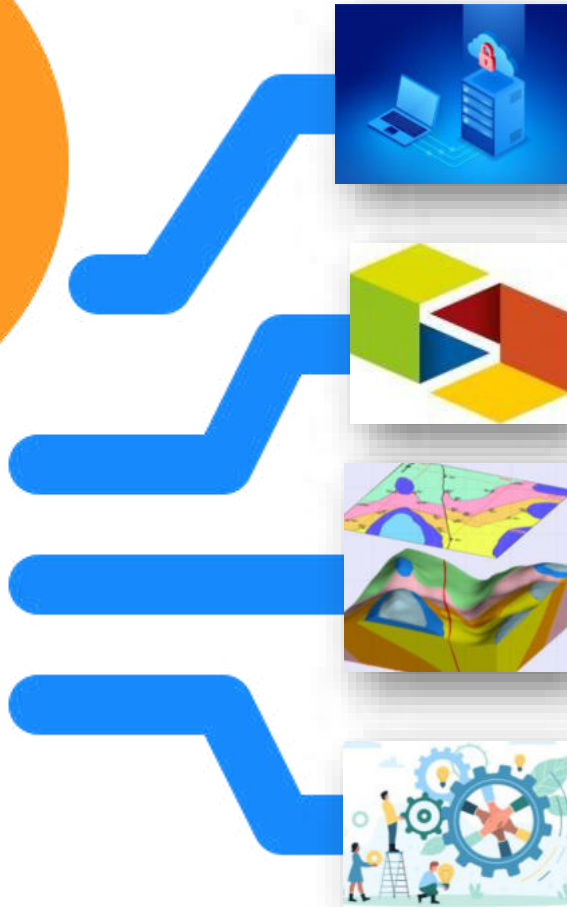


R&I and MARKET BENEFITS

- ✔ **Risk Mitigation:** Gaining better understand geological formations and potential risks.
- ✔ **Research and Development:** Innovations and technological advancements, benefiting the entire industry.
- ✔ **Access to a Wider Knowledge Base:** Access a broader range of geological information, best practices, and research findings. This can lead to improved decision-making and site selection for CCS projects.
- ✔ **Market Expansion:** Operators can use data sharing as an opportunity to diversify their business interests.
- ✔ **International Collaboration:** Foster international cooperation in regions where geological structures cross borders.
- ✔ **Regulatory Support:** Providing data that supports the development of comprehensive regulatory frameworks for CCS can create a more stable and predictable business environment.



KEY TAKE AWAYS



There is a clear need of high-quality data and pan-EU efforts and solutions

We are turning our web platform into a knowledge hub

We are improving our geological CO₂ geological storage maps with new data and standardization

We are connecting with a broad range of stakeholders, and we love to establish more partnerships!



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