

Prinos, a CO2 storage option for SE. Europe

Dr. Katerina Sardi, Managing Director & Country Manager in Greece

IENE, 14th South East Europe Energy Dialogue, Thessaloniki, 26 May, 2023




ENERGEAN
ETHOS Our World, Our Responsibility

Where we operate

Operations in seven countries – Average production Jan.-Apr. '23 100kboepd (82% gas) – 1.16bboe 2P reserves (84% gas)

UK

- A mixture of production and high-potential appraisal assets

Italy

- Over 50 production, development and exploration licenses.

Egypt

- A mixture of production (Abu Qir) and high-return development (NEA/NI) projects, as well as exploration opportunities

Croatia

- Production and a near-field development project

Greece

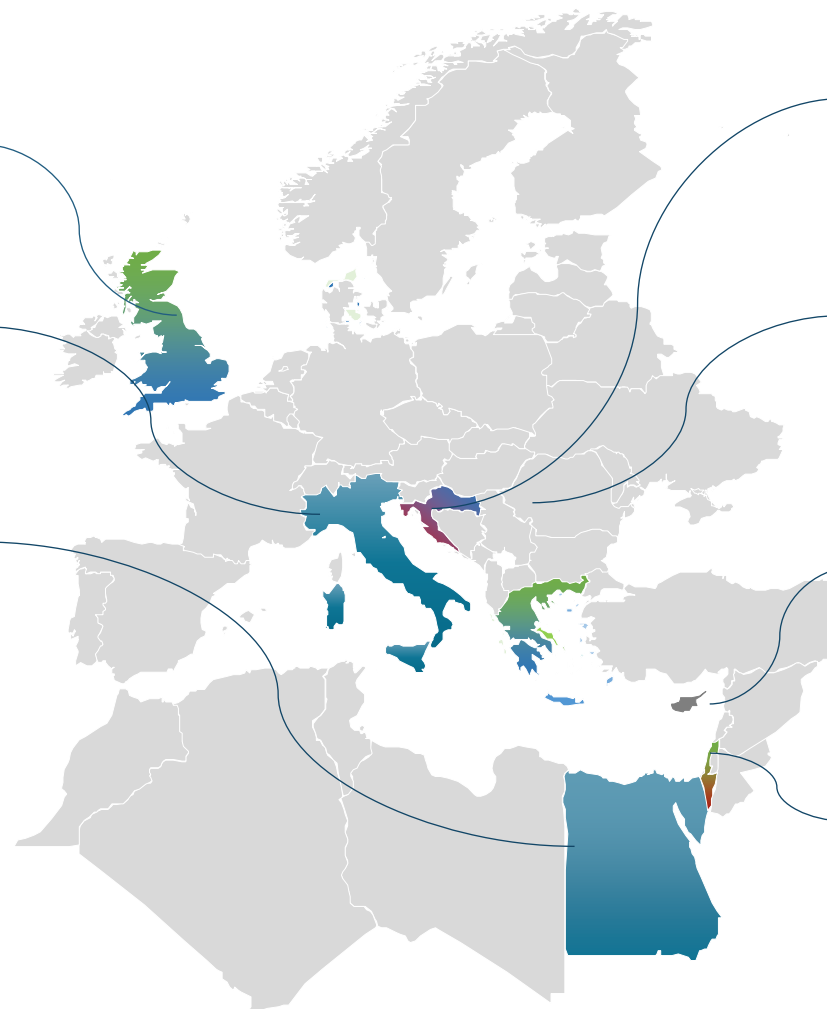
- A mixture of production and high-potential appraisal assets, as well as a CCS project

Cyprus

- Potential long-term gas supply opportunities

Israel

- Our flagship project is the multi-tcf deepwater Karish, Karish North and Tanin gas development. Karish came onstream in October 2022, drilling campaign discovered and de-risked app. 80 BCM of gas



■ Production, Development & Exploration ■ Production

■ Exploration ■ Development

ESG – at the heart of Energean’s operations

Supplying energy for a just transition; committed to net zero by 2050



Energean’s ESG strategy

Provide affordable and reliable energy

For our shareholders and societies in which we operate

Focused on gas

As a catalyst for and foundation of a just transition; displacing coal and diesel-powered energy

Reduce emissions

From our operations; first E&P company committed to net zero by 2050¹

Best in class ESG ratings



Rating: A-



Rating: 39.1
(top 28% of E&Ps)



FTSE4Good

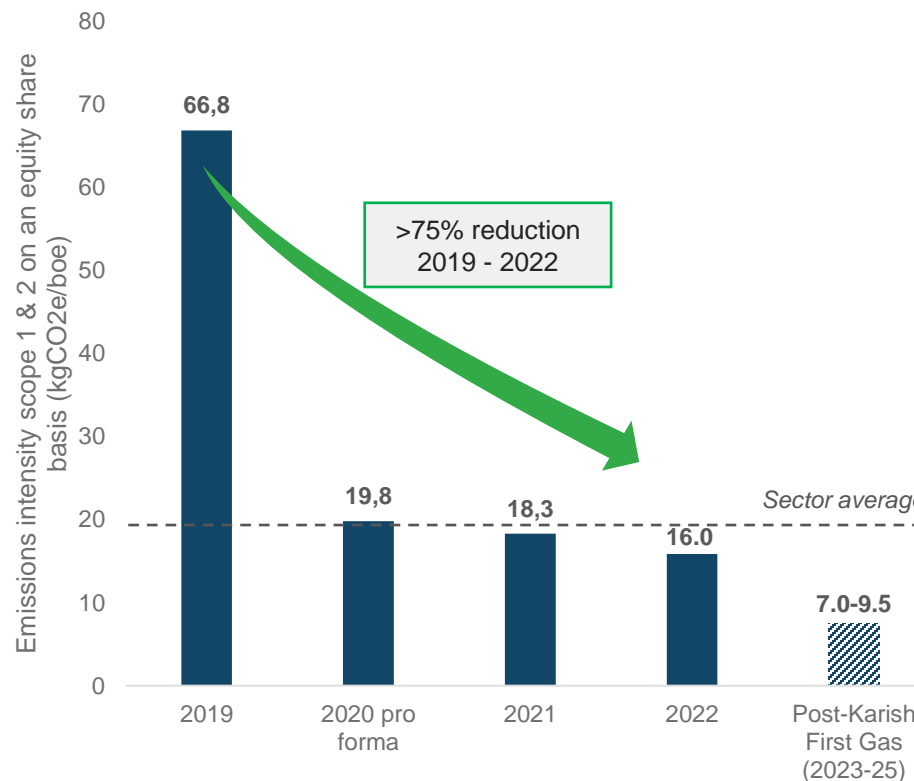
¹ Scope 1 and 2 emissions



Gold

Energean’s Net Zero plan

Reduce	Remove	Neutralise
Reduce absolute emissions through gas switching and asset optimisation	Develop CCUS projects to remove carbon emissions	Invest in natural based solutions to remove no more than 50% of our emissions



Why CO2 storage, why Prinos

A unique opportunity to decarbonise industries in the East Med

'No CCUS, No Green Deal'



Mona Melnvik, Director NCCS, panel debate on CDR

'Without CCS and CCU it will be practically impossible to limit global warming to 1.5 degrees Celsius objective'

Kadri Simson, EU Energy Chief
October 2022

Norway-Germany Collaboration

Equinor and RWE to build hydrogen supply chain for German power plants



German economist and climate minister Robert Habeck (left) alongside Prinos Minister Jonas Gahr Støre

'Putting CO2 under the ground is better than releasing it into the atmosphere. Germany are working on a carbon management strategy to create legislation for such technology by 2023'

Robert Habeck, German Vice Chancellor,
January 2023

A Vision for the EU

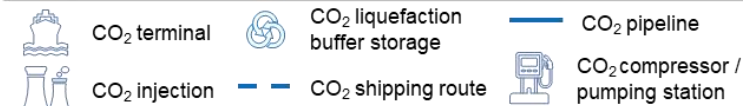


'The next decades will see the greatest industrial transformation of all time, maybe of any time'

Ursula von der Leyen, President of the European Commission
Special Address at the World Economic Forum, Davos
January 2023

"I believe that CCUS has incredible potential in our race to reach climate neutrality. And without carbon capture & storage and carbon capture & usage, it will be practically impossible to limit the global warming to the 1.5°C objective"

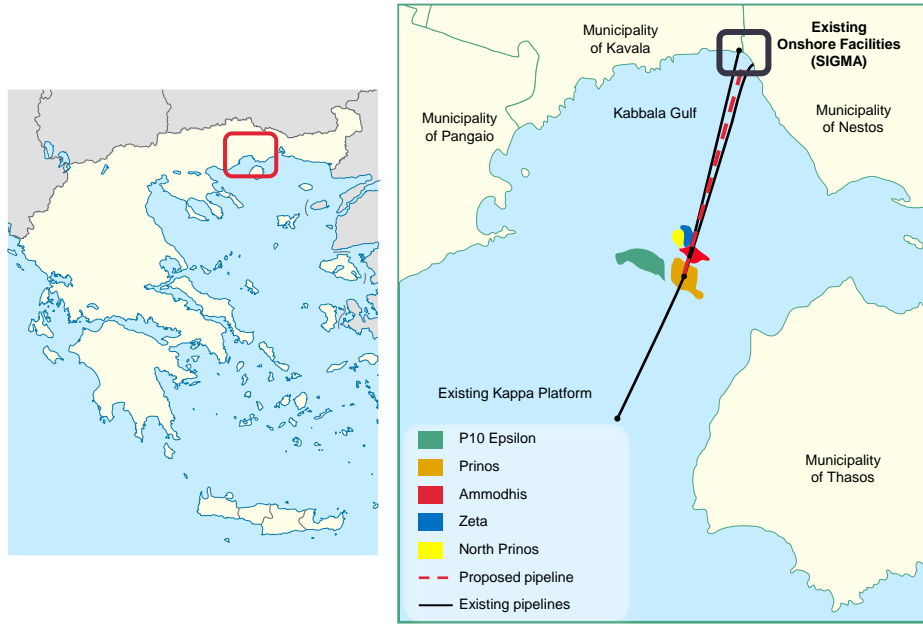
Kadri Simson, EU Energy Commissioner



- Prinos is strategically located to serve large emitters of the region.
- Energean is a highly experienced offshore project developer and operator.
- Deep knowledge of a reservoir that has been producing HC for more than 40 years and has been considered ideal for CO2 storage due to its structure and depth.
- Utilization of existing onshore and offshore infrastructure.
- Operational from Q4 2025 as small-scale project with a capacity of up to 1MT of CO2 per year (the Greek industry produces circa 9 MT per year), option to increase capacity up to 3MT of CO2 per year from Q4 2027.

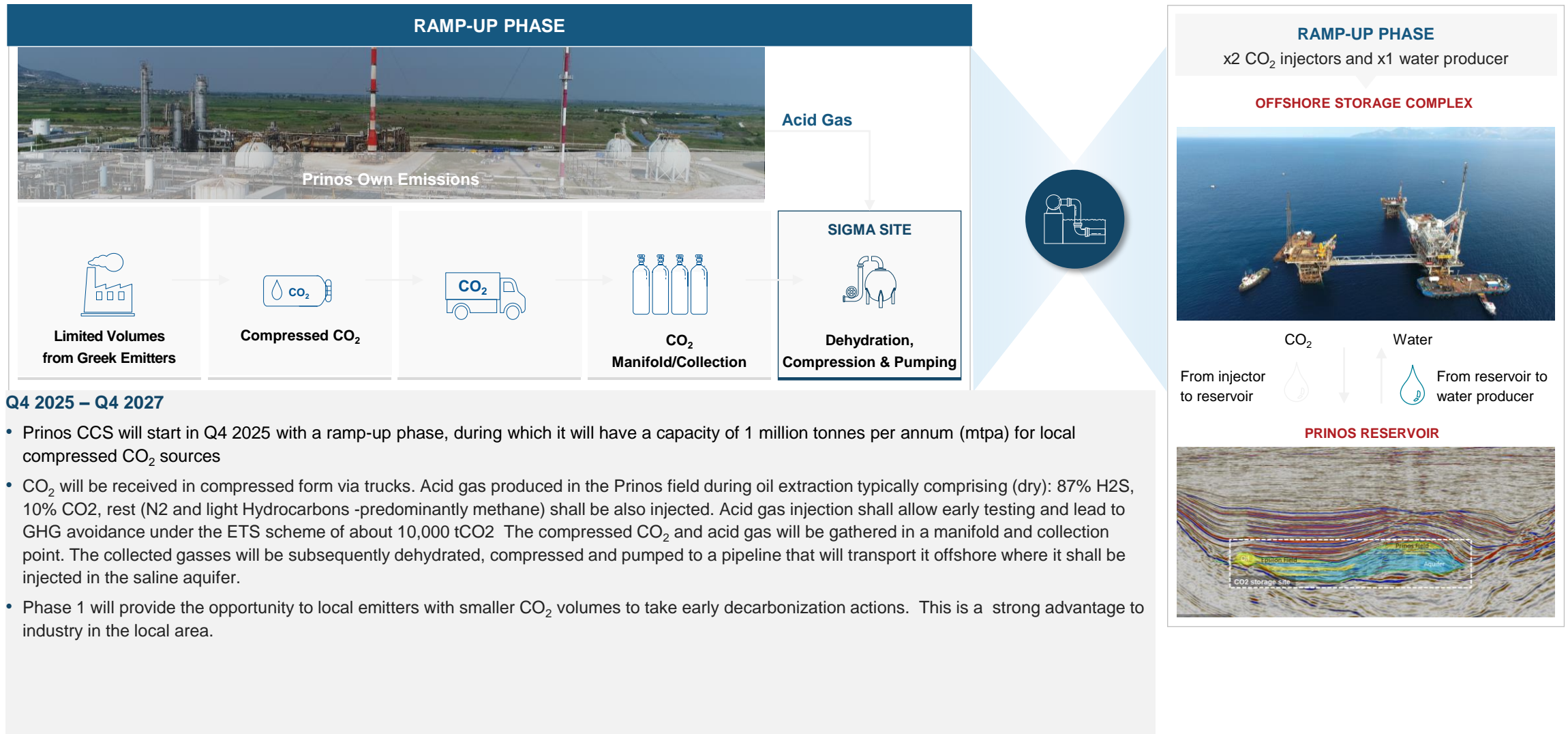
Prinos CO2 Storage

An up to \$1 - billion scalable project, leveraging onshore and offshore existing infrastructure



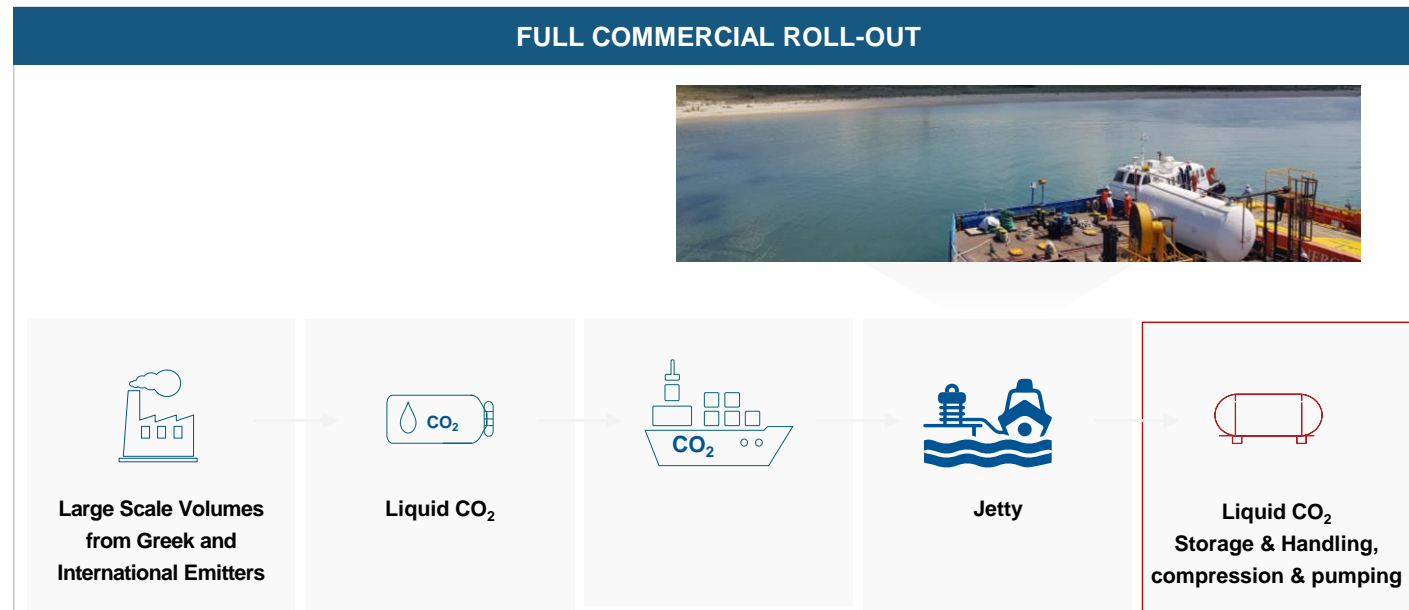
Prinos CO2 Storage will leverage existing facilities and wells

Project to be developed in phases to align with market readiness and demand



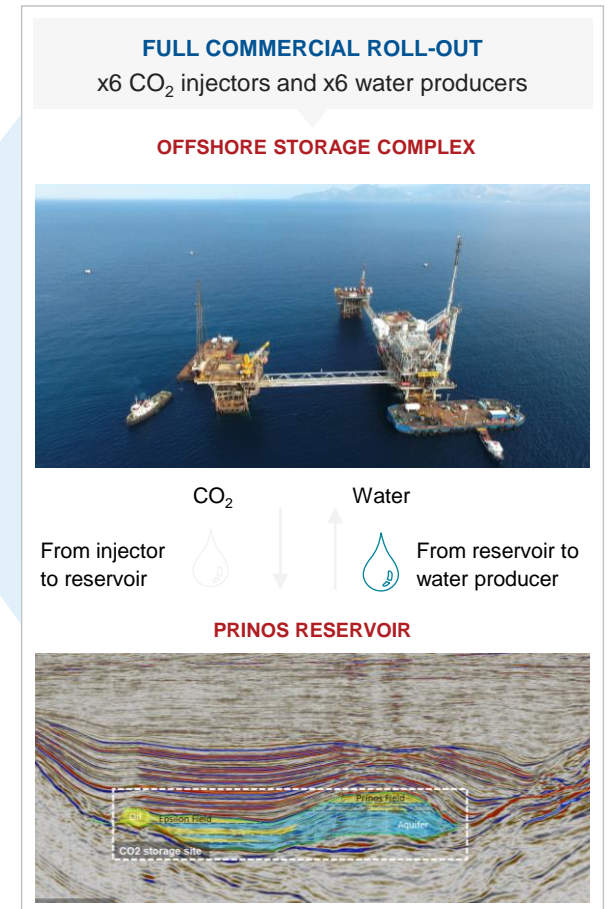
In Phase 2, the facility shall serve distant sources supplying LCO₂CO₂

In full compliance with the DNSH principle, the project has been designed to avoid any Enhanced Oil Recovery and increase in oil production



Q4 2027 – ONWARDS

- In Phase 2, the facilities will be able to accommodate liquid CO₂ volumes with a storage capacity of 2.5 mtpa allowing for the storage of 62.5 MT of CO₂ in 25 years
- The Prinos Sigma Plant will be retrofitted with an offshore offloading terminal to serve carriers in the order of 10.000 Nm³ CO₂ (to be further specified subject to final demand and route optimization). Additional facilities for LCO₂ storage and handling shall be developed to ensure that the CO₂ received will be at conditions suitable for injection
- An additional platform will be added (WHP1, if not added in Phase 1). This new platform will be linked to the existing Beta platform
- Existing water treatment facilities may need to be expanded to accommodate produced water
- Additional wells shall be drilled

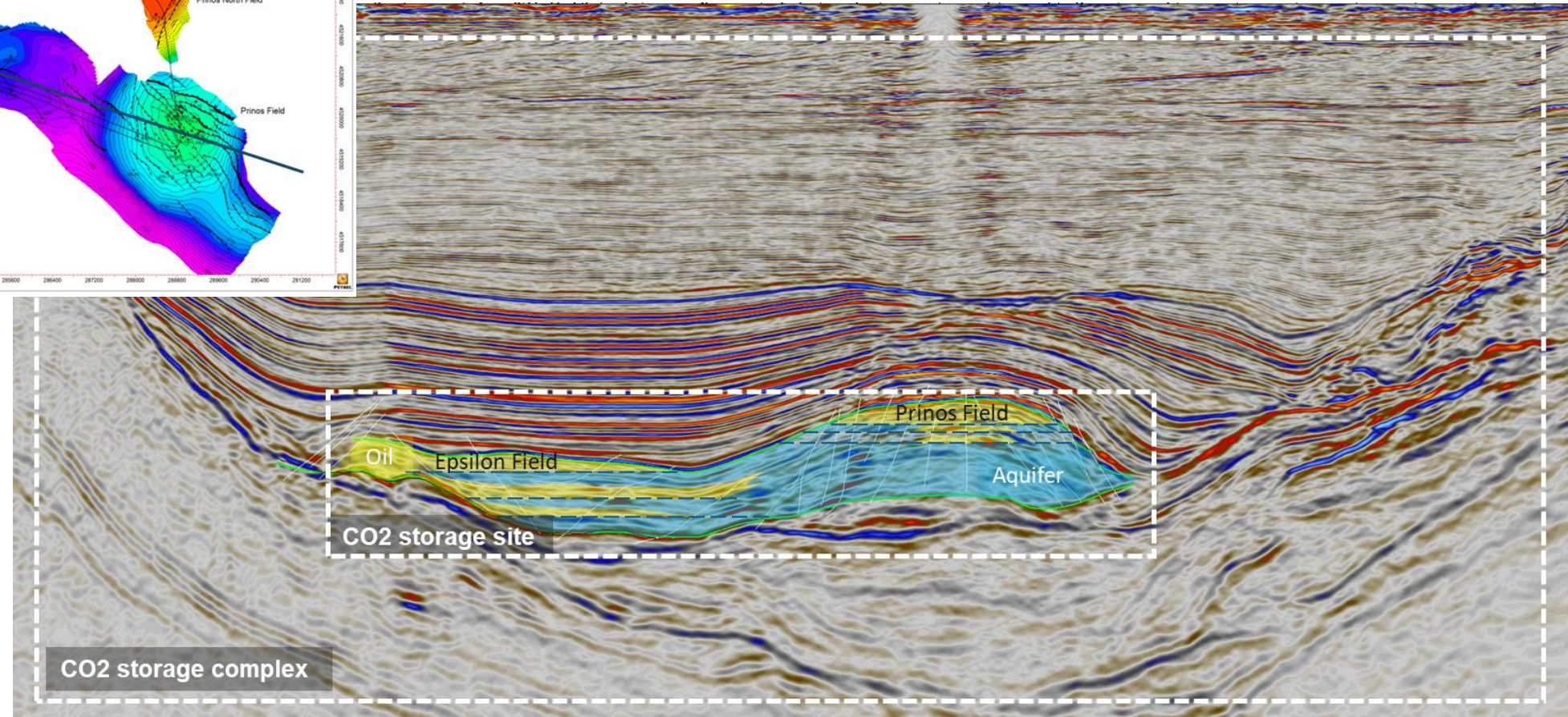
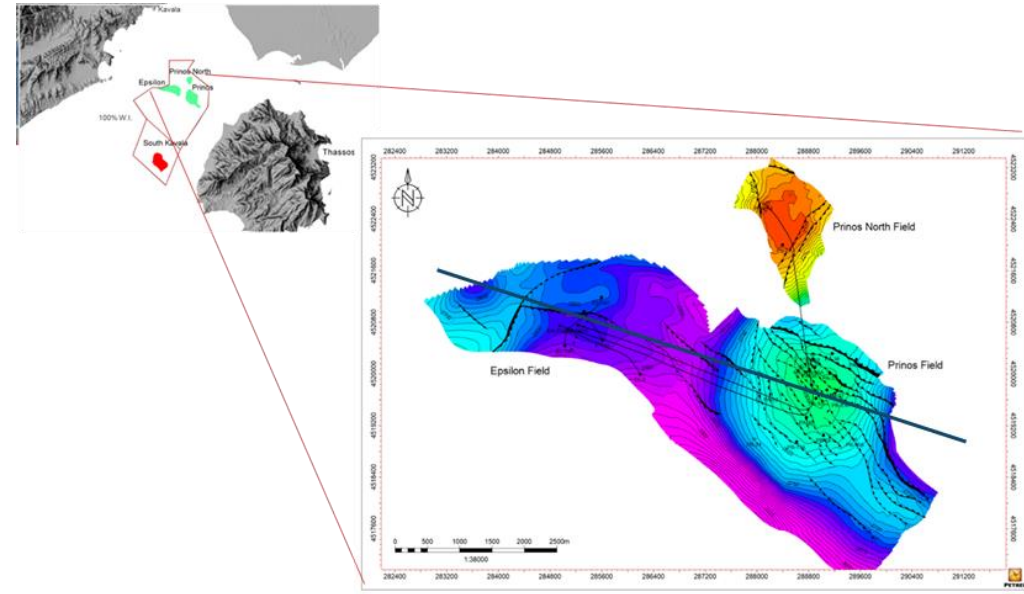


Prinos CO2 Storage

Subsurface storage site

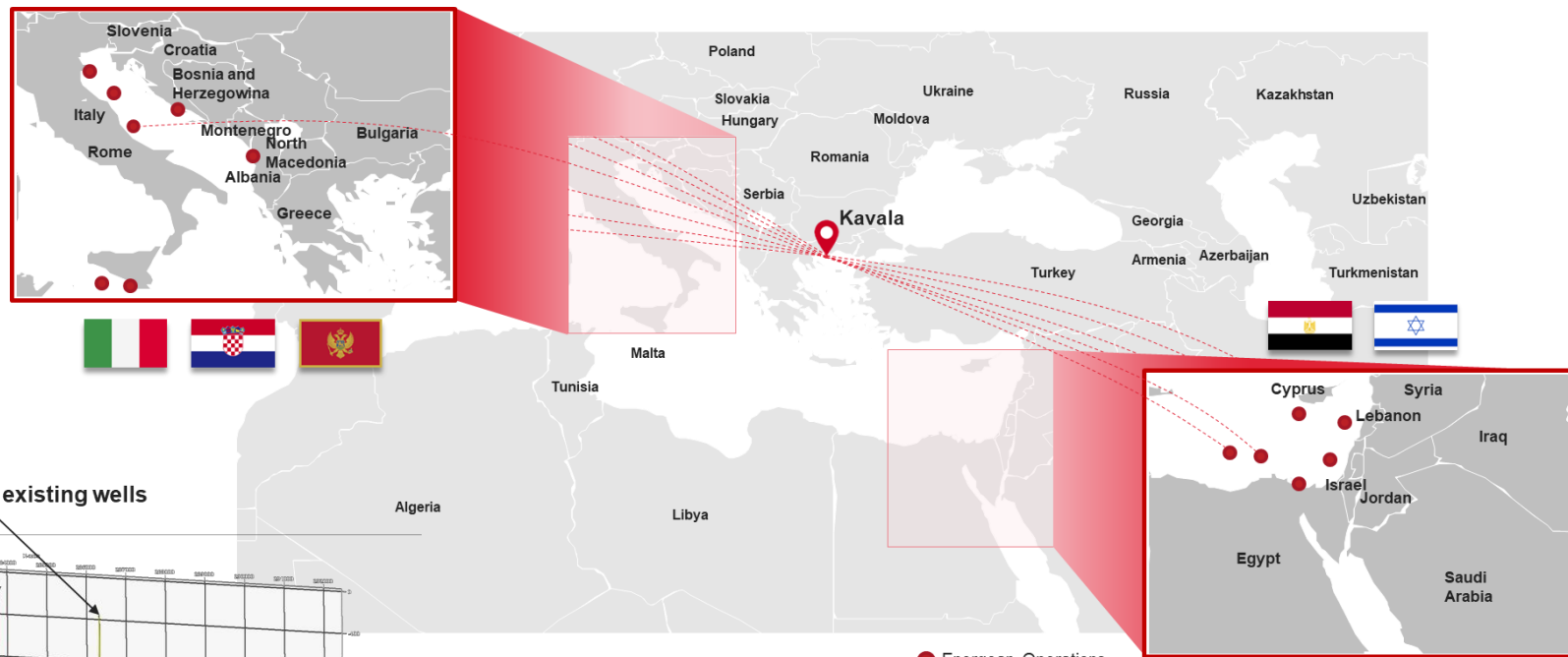
Critical questions to be addressed:

- **Capacity** – will the site store enough CO2 for the project basis?
- **Injectivity** – can CO2 be injected at a rate that is of commercial relevance?
- **Containment** – will the CO2 remain in the storage complex?
- **Monitoring** – can the injected CO2 be observed & verified?

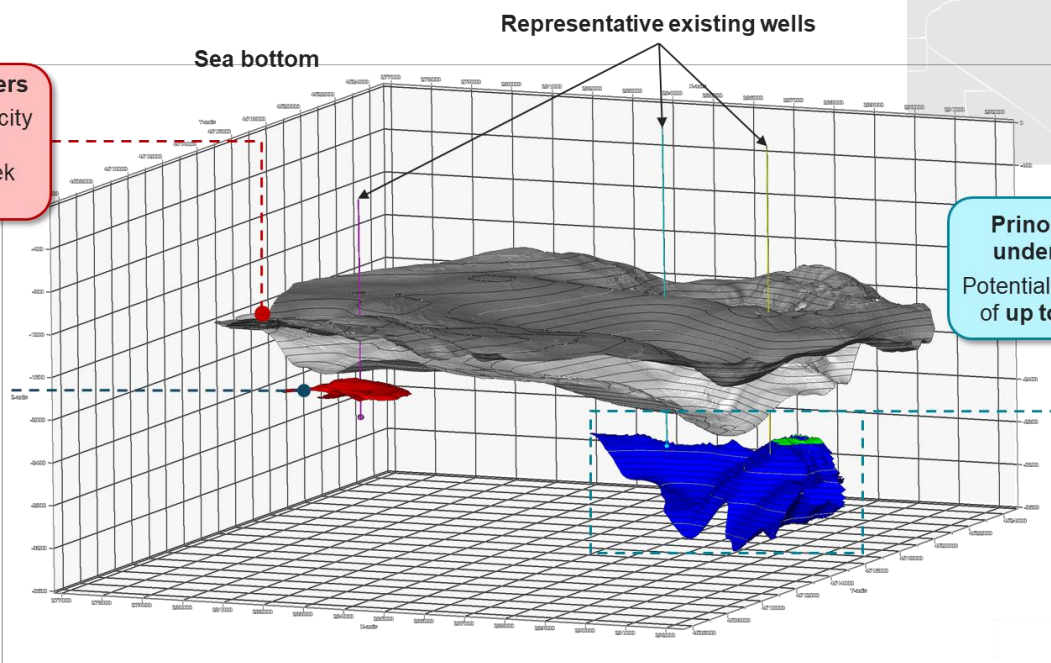


Option for further expansion in SE. Europe

Upside identified within Prinios and surrounding fields, with replicability of CO2 storage projects across upstream portfolio



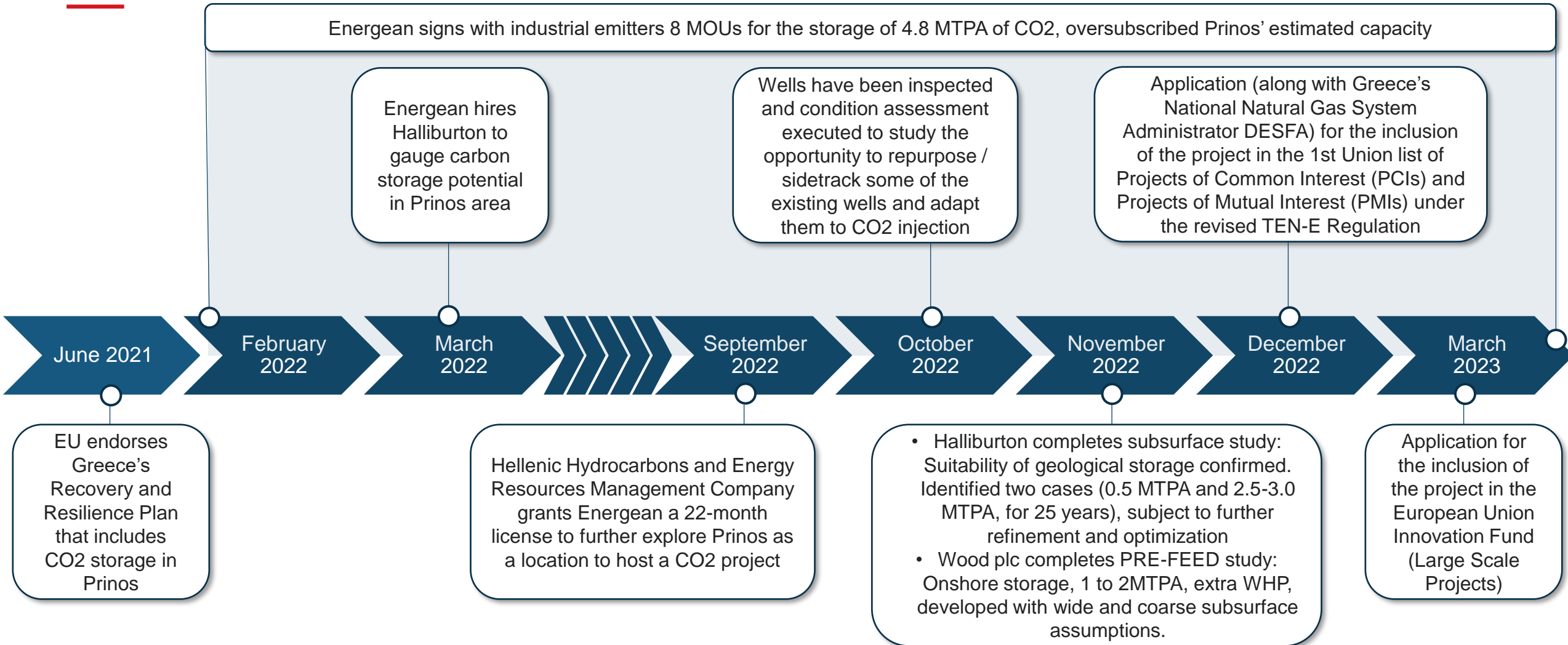
Stacked saline aquifers
Potential storage capacity of 1,350 Mt CO₂⁽¹⁾ identified by the Greek government



Prinos oil field and underlying aquifer
Potential storage capacity of up to 100 Mt CO₂⁽²⁾

Prinos CO2 Storage, progress of the project

Important steps towards implementation



Challenges

CCS is not reverse oil & gas engineering

Technical Challenges

- Different CO₂ fluid characteristics
- Interpolation & Gridding at different scales
- Integration of complicated workflows including geomechanics, geochemistry, geology, reservoir simulation, reservoir and well engineering, surface facilities etc.
- Longer forecasting timescales (thousands years)
- Lack of standardized risk register designed for CCS - Lack of industry standards
- Lack of experience on CCS projects

Legal framework Challenges

- Regulations and legislations allow room for interpretation, increasing uncertainty in assessment and potentially delaying project
- Synchronize EU funds & country's legislation

Commercial Challenges

- Uncertainties in business cases due to current commercial viability
- Long term commitment in the market

European legislation on the geological storage of carbon dioxide has been transposed into Greek legislation (Directive 2009/31/EC)

A specific legal framework for the storage of CO₂ by entities holding a right or licence to explore and exploit hydrocarbons has been adopted by the Greek parliament in July 2022 (Law 4964/2022)

Hydrocarbon licence-holders with necessary geological, geophysical and drilling data on the area they operate have the right to apply for a CO₂ Exploration Licence to continue and conclude the exploration of the area for CO₂ storage

SUPPORT: a key word!

Prinos CCS and the related value chain can serve in establishing a mature landscape for commercial projects



Experience from RES support can offer guidance

Support Schemes in EU MS	RES (electricity)	CCS
Investment support (Grants)	✓	Some
Tax exemptions	✓	✗
Feed in tariffs/Feed in premiums (CfDs)	✓	✗
Quota Obligations, national and EU targets	✓	↗
Long term uptake contracts with state guarantee	✓	✗
Fast track licensing/one-stop shops	✓	✗
Certificates (GOO, ETS)	✓	✓ (but the EU EUA is not a benefit but an obligation)

Adapted from European Commission guidance for the design of renewables support schemes
https://energy.ec.europa.eu/system/files/2014-10/com_2013_public_intervention_swd04_en_1.pdf

State (and also the Commission) should draw on experience from RES support schemes

A long-term commitment in a market not yet mature

Obstacles that we should overcome

- Free allowances to be gradually reduced even in sectors susceptible to carbon leakage in the period 2027-2035.
- There is a notable benefit in acting fast including establishing an east-med CCS chain as part of an overall Mediterranean chain
- **Greece has a unique chance to be at the forefront of the CCS story in the Mediterranean**

Public perception is generally neutral, but the fear of new may lurk. Energean has already been implementing a stakeholders engagement campaign, but the promotion of the project should be considered a part of a wider national strategy

Long-term political consent for the implementation of the chain is required. Long term commitments are essential for project financing. These shall need to be underpinned by appropriate guarantees

Clarity in sharing of responsibilities between authorities : HEREMA is responsible for granting the exploration and storage permits, but who is responsible for the rest of the permitting procedure? There must be a **one stop shop** in the Ministry of Environment and Energy. The Chain is a strategic investment

Clarity in cross border CO2 transport: Greece is not yet a signatory to the London Protocol amendments. Work is needed between EU MS on bilateral basis.

Working Groups with the participation of the State and the stakeholders of the CCS chain should be established

Thank you!



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The Energean logo features a stylized red arc with a small red sphere at its peak, positioned above the word "ENERGEAN" in a white, serif font.