Prinos CO2

CO2 Storage project offshore Greece

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Agenda

Prinos CCS: an overview

- History of Prinos oil field
- Prinos CO2 project & timelines
- Challenges & opportunities
- Workflow to development
- Development Plan
- Conclusions

Prinos Oil

Fact sheet

- Discovered in 1973 Prinos-1 (P-1)
- Anticline structure at 2490 – 2770m
- 17 KM offshore close to island of Thasos and Kavala
- 2 platforms: Alpha & beta
- Initially 24 wells (12 from each platform)
- 65 wells total : 12 producing, 3 water injectors, rest are suspended or abandoned
- 4 stacked reservoirs
- RF at around 45% through primary water flooding, Pressure between 3500 to 4000psi
- Good quality Miocene turbiditic sandstone packages
- Undersaturated Oil API 27-30
- High H_2S content converted to Sulphur and sold to a local fertilizer plant
- Production to date ~120MMbbls

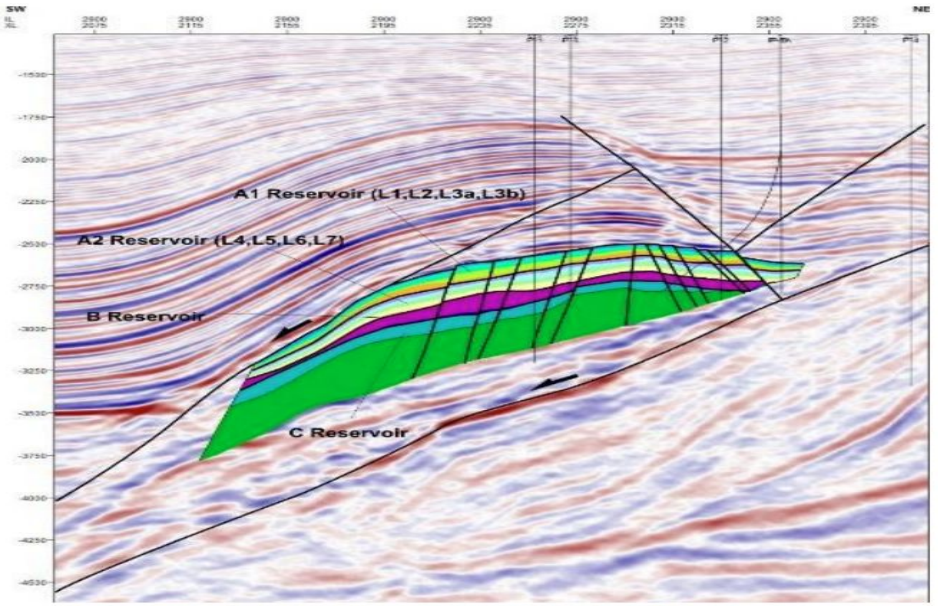

Figure 6: Seismic cross section along the Prinos field.

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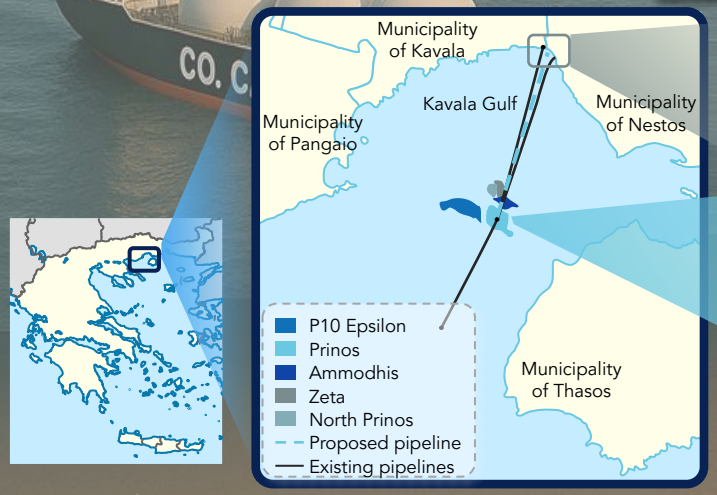
Prinos CO_2 Storage is a Scalable CO_2 Injection and Storage Project Leveraging Existing Onshore and Offshore Infrastructure

Brown field infrastructure to support speedy project delivery	Prinos represents the only known CO_2 storage site in Greece
	Potential injection capacity of around 3 $MtCO_2$/year
	NSAI CPR[1] confirmed 66.4 Mt CO_2 contingent storage capacity (2C)
	The project will be receiving compressed and liquid CO_2 and shall offer long-term permanent storage
Attractive commercial positioning	Prinos CO_2 is included in the 6th Union List of European Projects of Common Interest
	15 MoUs[2] for captured quantities of 6.12 $MtCO_2$/year have been signed with blue-chip counterparties
	4 CO_2 capture projects totalling 3.8 $MtCO_2$/year receive funding of €490 MM by the EU Innovation Fund, so the speedy development of a chain is a reality
	c. €270 MM in grants allocated to the Prinos CO_2 Storage Project from the Greek RRF and the Connecting Europe Facility

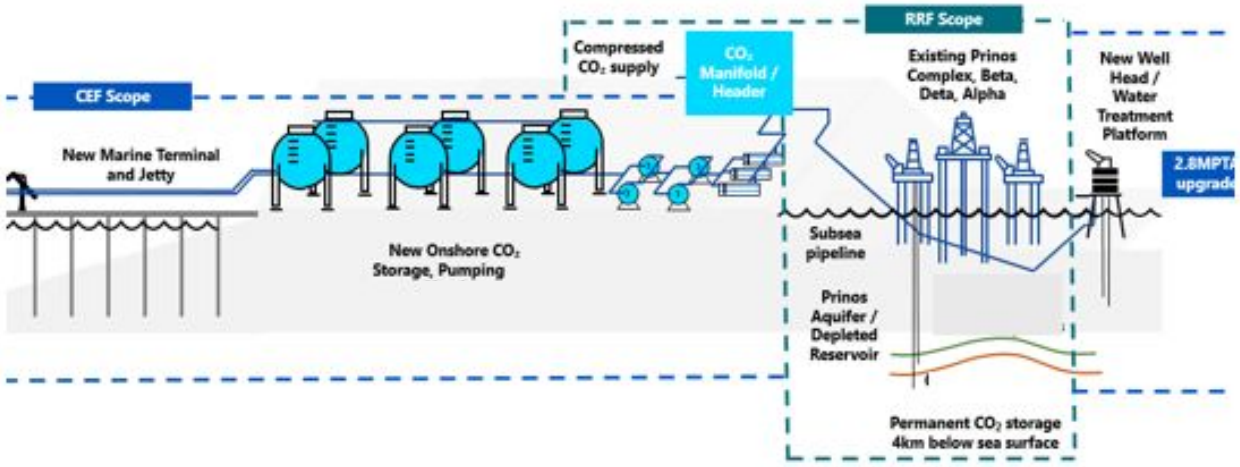


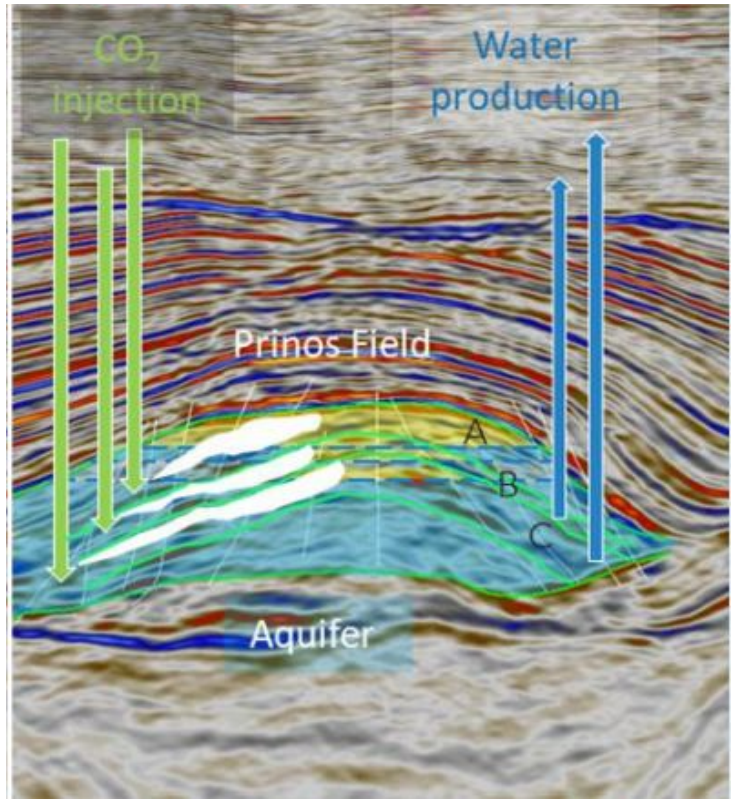
Source: Company Information

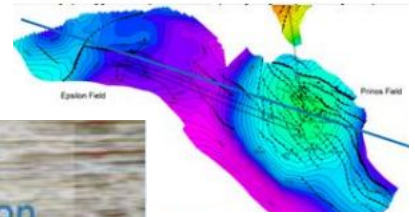
Notes:
1. NSAI CPR = Netherland, Sewell & Associates, Inc. Competent Person Report
2. Non-binding memorandum of understanding, based on EU Projects of Common Interest application

Prinos CO_2 project

- CO_2 storage up to 3 MTPA.
- Injection in aquifer
- Pressure management system with water production from aquifer

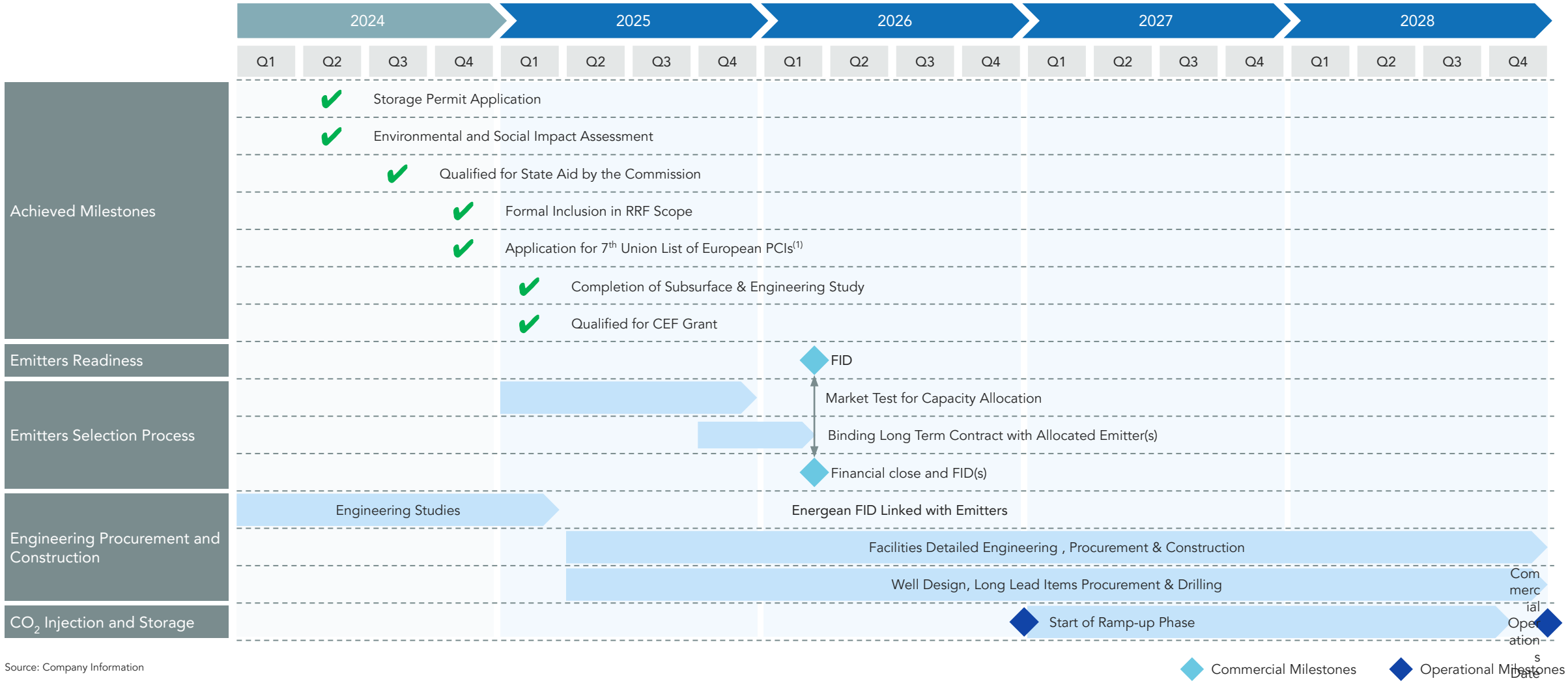






CO2 Project timelines

Ready for commercial scale 2029



Source: Company Information

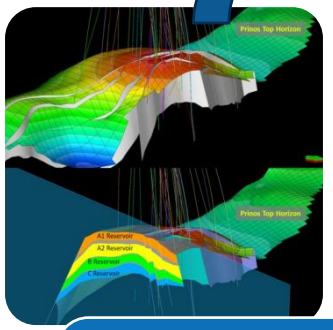
Notes:
1. PCI = European Projects of Common Interest

CCS challenges and opportunities in depleted Oil fields

- Challenges
  - Low oil recovery means HC sweep is likely with CO2
  - Likely by product with oil such as wax, asphaltenes etc.
  - Legacy wells requiring pressure management and monitoring
  - Pressure management requiring water treatment facilities and monitoring of CO2 plume breakthrough
  - Aquifer is not well appraised
- Opportunities
  - Well appraised field with 65wells providing ample data
  - Aquifer leg below oil provides storage capacity
  - Reuse of some infrastructure
  - Higher pressure prevent JT effects and 2 phase issues in well

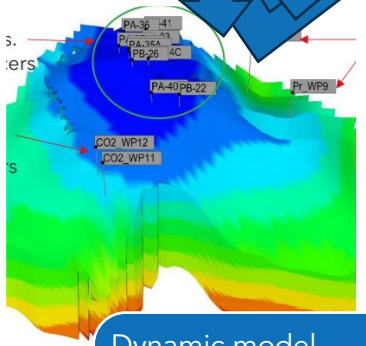
Workflow to development

Full integration across disciplines



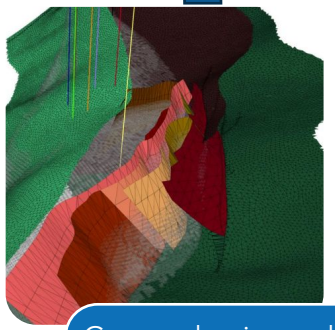
Prinos Static-dynamic model

- Integration of data- seismic, petrophysics , well tests etc.



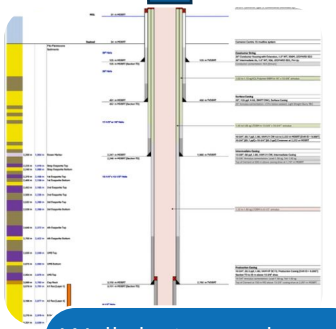
Dynamic model thermal compositional

- Well location optimization for BT
- Well rates and voidage replacement ratios for optimum pressure
- Miscibility, dissolution, dry out



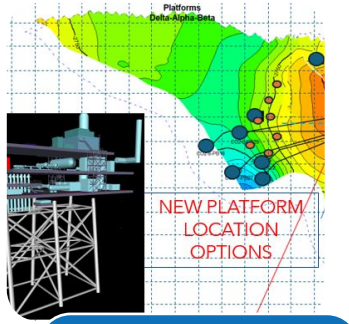
Geomechanics and Geochemistry modelling

- confirm injection pressure limits
- Confirm temperature limits
- Stress evolution
- Frac gradients



Well design and integrity

- Confirm completion design, pressure limits
- Confirm legacy wells compliance and pressure limits
- Confirm water production capacity
- FAS limits



Facilities design

- Water treatment specs and handling facilities
- Co2 and oil breakthrough processing
- Platform and pipeline design
- FAS limits

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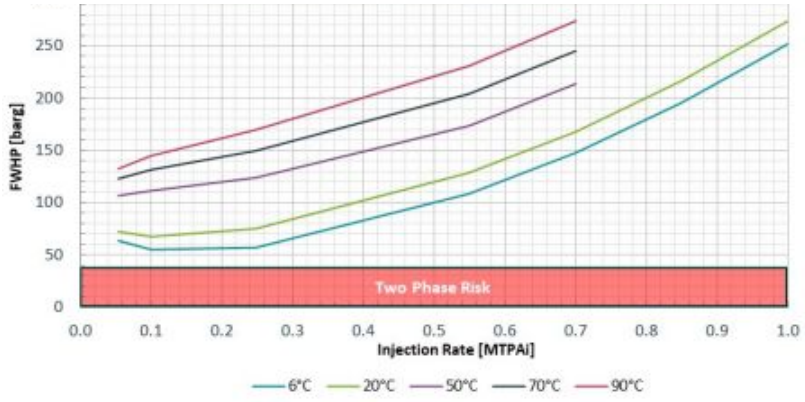
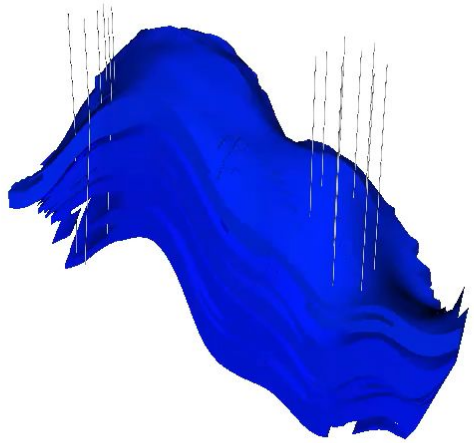
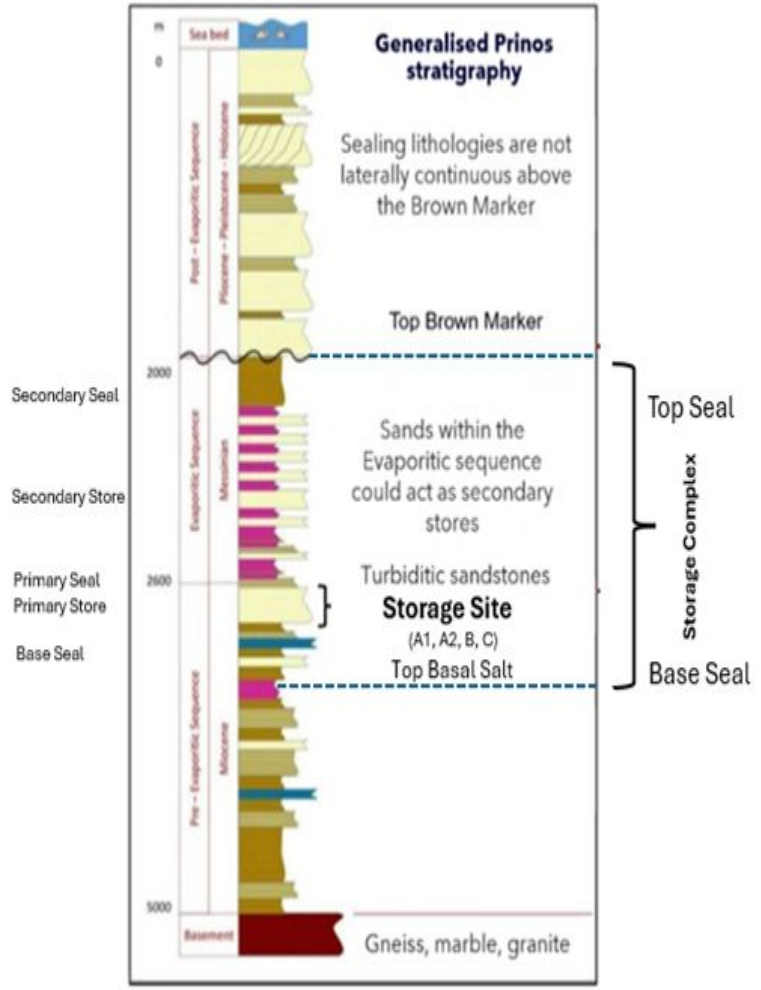
Development plan

- Inject in storage site deepest to shallowest to optimize CO2
- Remain in single phase dense
- Avoid oil leg:
  - To increase CO2 journey time towards producers
  - To minimize plume reaching legacy wells
- optimized perforation intervals in injectors and producers
  - Include interventions to add or plug perforations to manage CO2 BT
- Injection forecasted for volumes of upto 3MTPA for a minimum of 15 years (emitter contracts), CO2 production minimized to less than 3%







Development plan

Managing unknows

Plume propagation

- Function of Permeability, heterogeneity, saturation and relative permeability
- Has direct impact on project duration
- Legacy wells

Pressure management

- Function of pressure build up: field dynamics
- Connectivity plays important role

Containment

- Connectivity through aquifer to other sites
- Vertical migration through manmade paths

- Full Montecarlo uncertainty analysis for all uncertain parameters
- MMV and risk assessment for field to ensure monitoring and correction measures realized
- Work in scenarios and worst cases
- Optimize development plan to keep risks managed
- Extensive data acquisition plan on the first 4 wells – implement any deviations between model and acquired data to update development strategy

Conclusion

- Prinos Field will be converted to a CO2 store operational at commercial scale by 2029
- The development plan includes injection and production from the aquifer to manage pressure and maximize CO2 storage capacity
- The project will be phased and can eventually deliver up to 3MTPA
- The project is in a strategic cluster decarbonizing a large part of SE Europe
- The studies done so far have proven the capacity through integrated approach and careful risk management

Thank you!

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