ENOS WP6 WORKSHOP

ESFG: ADVANCED TECHNIQUES FOR SITE CHARACTERIZATION

"MAIN ACHIEVEMENTS USING LIGHT DRILLING APPLIED TO HONTOMÍN SITE CHARACTERIZATION, TECHNOLOGICAL GAPS DETECTED AND FUTURE WORKS"

PRE-13TH CO2GEONET OPEN FORUM

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Outline

- Workshop target
- Hontomín TDP
- Well drilling
- Main achievements
- Existing gaps
- Future works

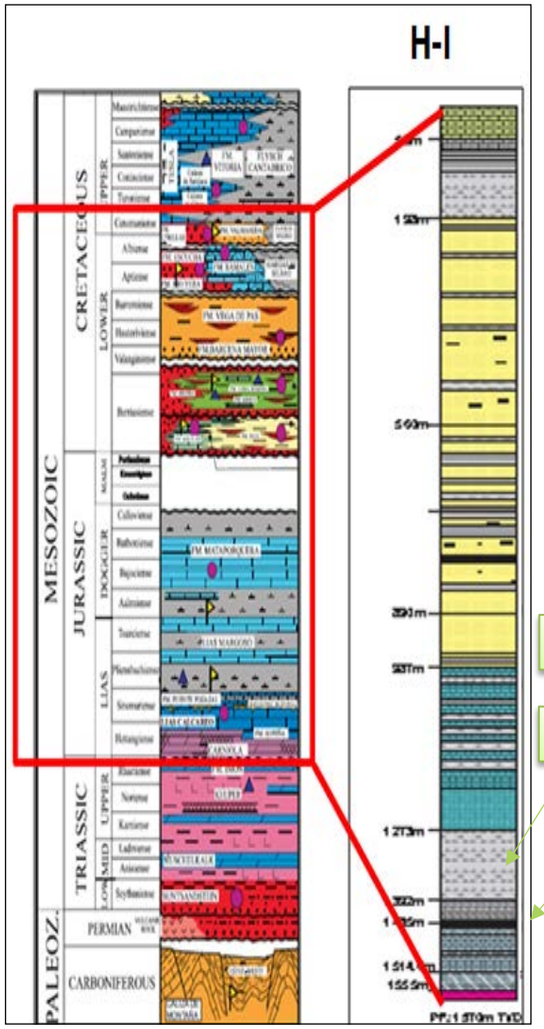
Workshop target

“Sharing experiences and discussion on research and technology developments on advanced techniques for site characterisation”

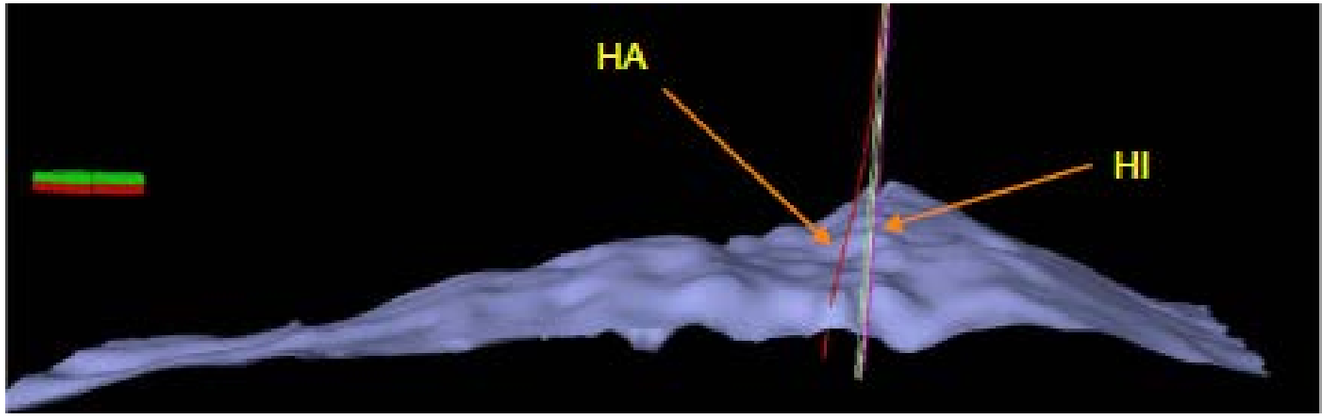
Hontomín Technology Development Plant

Unique onshore injection site in the EU, **recognized by the European Parliament as a key test facility** (*E.P. Resolution 2014*)

Hontomín TDP

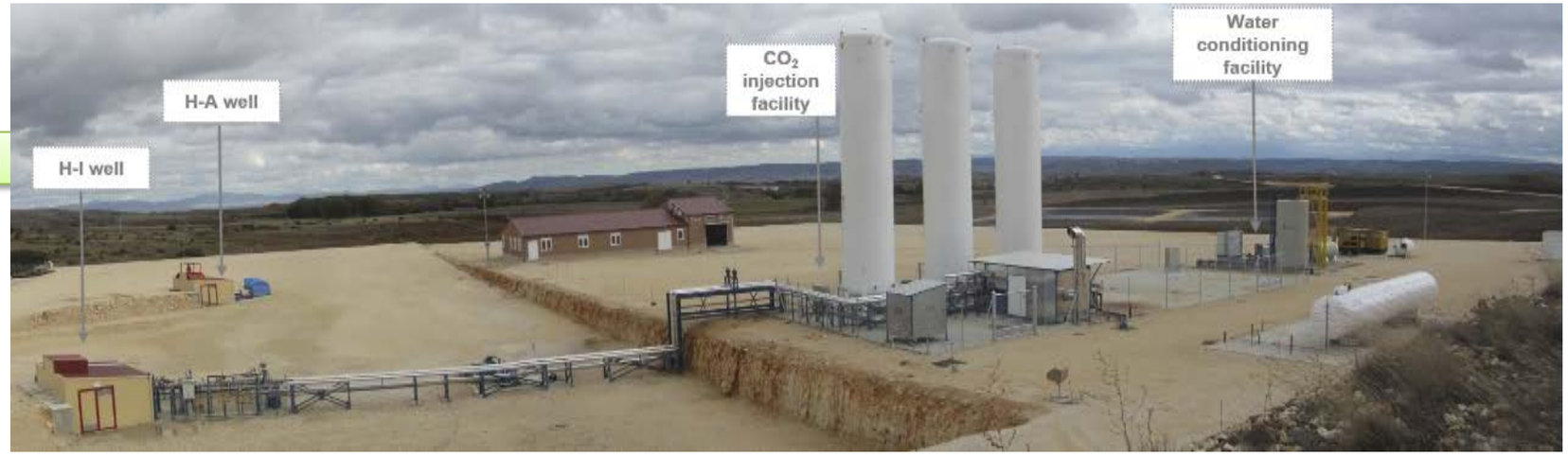


Deep saline aquifer
Seal-Marly Lias
Reservoir-Sopeña Fm
Fractured carbonates
with low matrix porosity



Seal-Marly Lias

Reservoir-Sopeña Fm



Well drilling

Drilling works are probably the activity that most impact on site exploration viability since it is a complex and expensive technique

Borehole drilling using O&G industry standard rigs reduces the number of wells during the exploration phase and the amount of available data

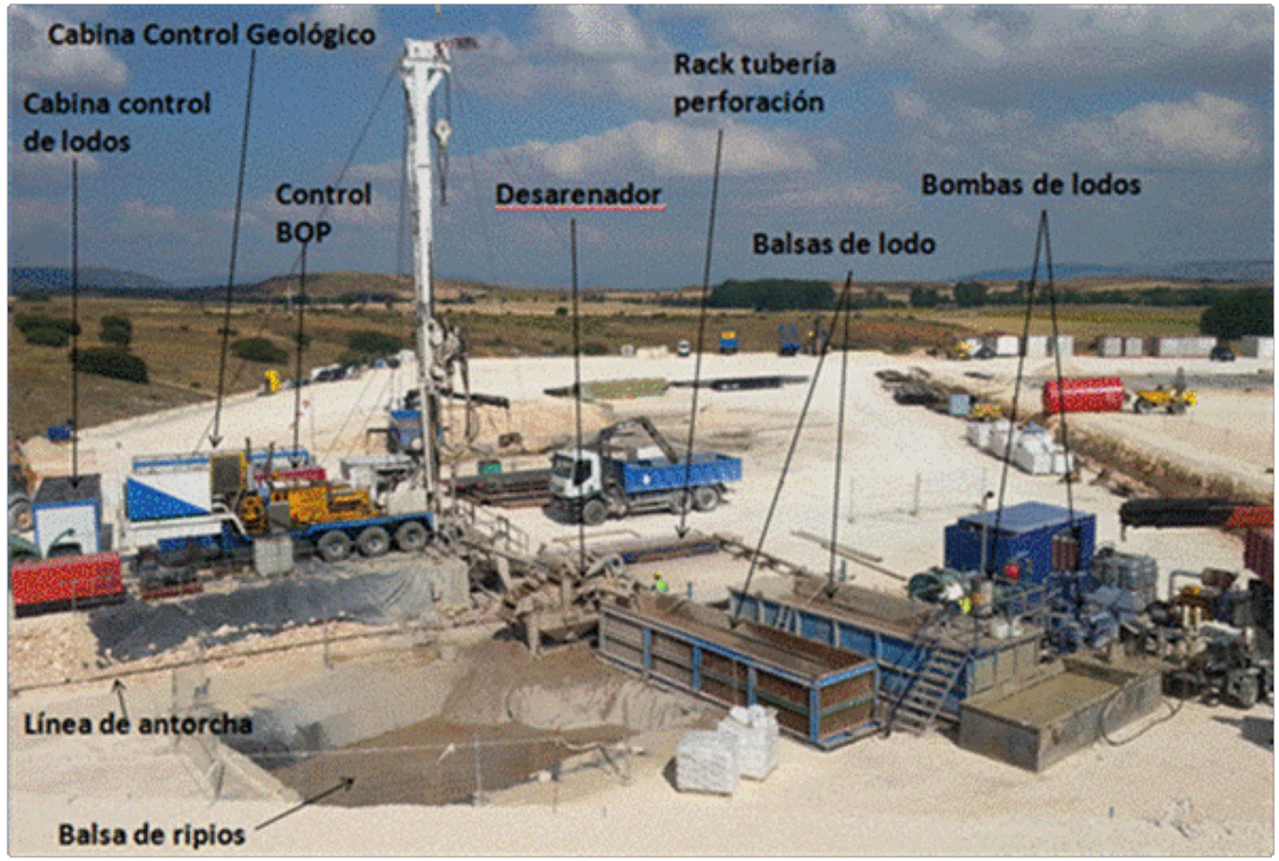
CO_2 geological storage focused on waste removal requires low cost drilling techniques

The use of mining rigs (light drilling) and the achievements gained at Hontomín, is the first step for a coming technology development, giving solutions to the detected gaps

Project ENOS address this challenge on task 2.3 “Low cost drilling”

Well drilling

Mining Technique



Drilling Rig: SEGOQUI 2000

- Mast height: 15,5 m
- Engine power: 300 H.P.
- Maximum torque: 4000 kgm
- Rotary table opening: 150 mm
- Cilinder hoisting load: 50 t
- Winch load: 60 t
- Total load (cylinder+winch): 110 t
- Maximum push load: 20 t
- Maximum speed: 120 rpm
- Drill pipe: φ 140, 152 mm L 6 m
- Rig mounted on truck 8 x 8

Auxiliar Equipment

- 2 Compressor Atlas Copco XRVS 455, 25 bar and 25 m^3/minute
- 1 Booster HURRICANE M 41C-870, 60 bar and 50 m^3/minute
- Mud pump GARDNER-DENVER Mod 7 ¼”x14” x10” and 5”x10”
- Mud pump EMSCO F-500. Triplex Mud Pumps (API-7K) 500 HP
- Screen and double cyclone MODELCO model MD 190 D 200 m^3/hour
- 2 mud pools. Total capacity 75 m^3
- Electricity generator: 25 kVA for lighting
- Mud logging cabin

Well drilling

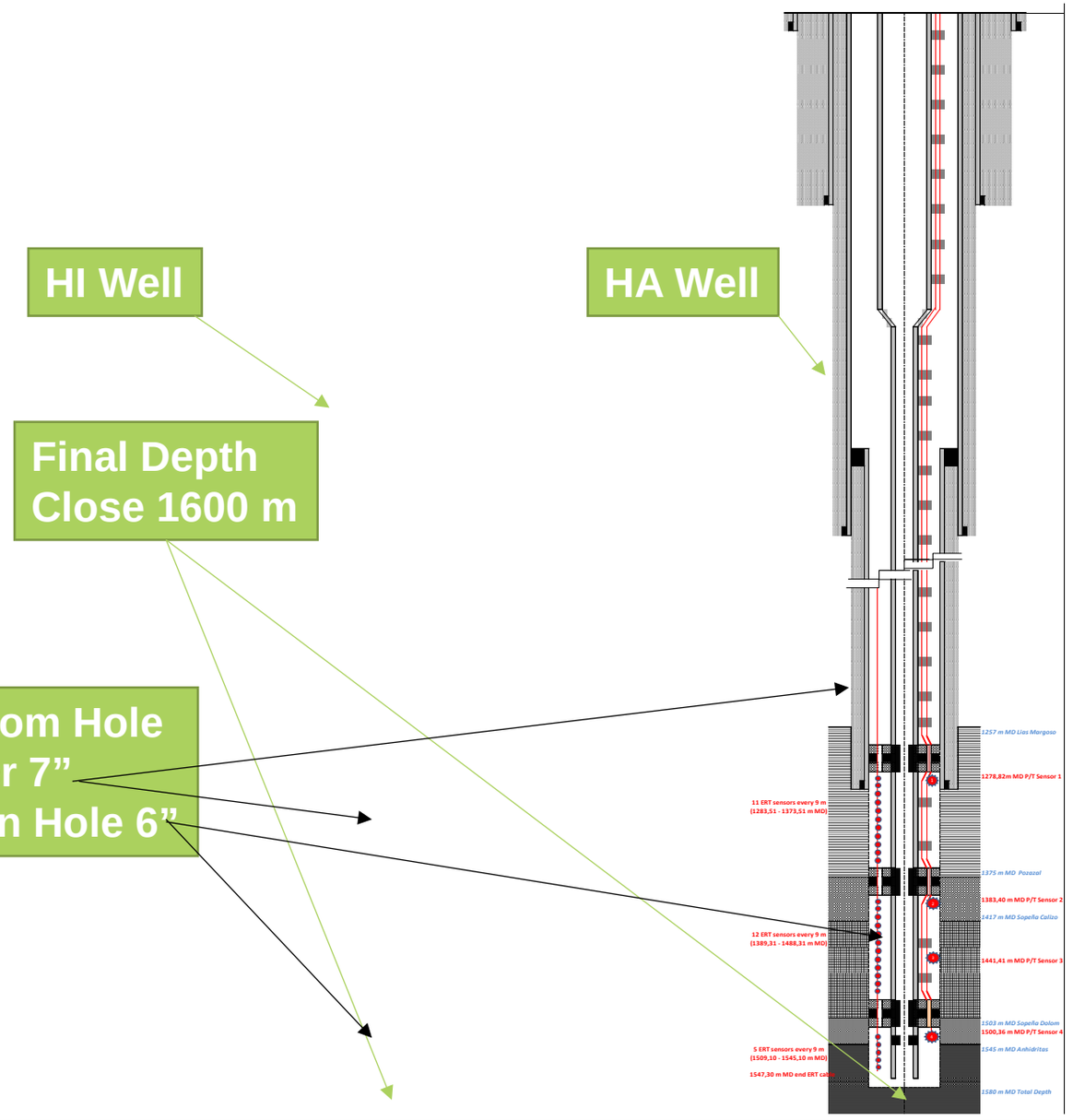
Monitoring

HI

- U Tube sampling system (1459 m depth).
- SILIXA Distributed Temperature System (DTS) and Distributed Acoustic Sensing System (DAS) (along the tubing, 1465 m depth).
- 2 P/T sensors (1434 and 1459 m depth).
- 6 ERT (from 1500 to 1540 m depth).

HA

- 4 P/T sensors (1279, 1383, 1441 and 1500 m depth).
- 11 ERT sensors (from 1283 to 1373 m depth).
- 12 ERT sensors (from 1389 to 1488 m depth).
- 5 ERT sensors (from 1509 to 1545 m depth).



Main achievements

- Safe and efficient operation conducted during Hontomín site exploration
- Reach the depth of 1600 m with drilling diameters of 8 1/2” and 6” respectively, which had not achieved before with this type of rig
- Well completion and deep monitoring adequate to the planned targets
- Cost efficiency of up to 60% comparing to traditional drilling costs from O&G industry

Existing gaps

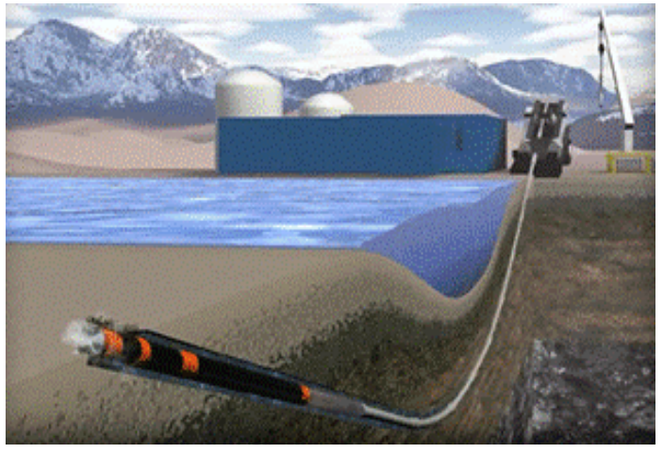
- **Gaps related with the operation efficiency and safety**
  - Rig geometry and dimensions
  - Operation parameters (i.e. ROP, Push, Load capacity, Mud pumping)

- **Gaps related with the completion and monitoring installation**
  - Drilled borehole diameter

- **Gaps related with the rig instrumentation and operation control**
  - Well drilling control (caliper, gyroscope)

- **Directed drilling**

- **Training needs**



Future works

ENOS WP2 Task 2.3 “Low cost drilling”

- Give solutions to technological gaps and a basic design of a light drilling rig to reach the depth of 2.500 m, with well completion capability adequate to install the required deep monitoring
- Associated engineering studies in order to provide and effective and safe solution to support well drilling in Sulcis site (Sardinia, Italy) characterization.

Partners

GOBIERNO DE ESPAÑA
MINISTERIO DE ENERGÍA, TURISMO Y AGENDA DIGITAL
ciudad de la energía

SOTACARBO
SUSTAINABLE ENERGY RESEARCH CENTRE

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HERRENKNECHT VERTICAL

Thank you for the attention

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ENOS

Enabling Onshore CO_2 Storage

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