ESG DAY 2023

In search of carbon-free opportunities in the subsoil

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The Repsol Commitment
Net Zero Emissions
by 2050

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In October 2015, the European Securities Markets Authority (ESMA) published its Guidelines on Alternative Performance Measures (APMs). The guidelines apply to regulated information published on or after July 3, 2016. With effect from January 1, 2023, Repsol has revised its financial information reporting model. More details about said change and all the information and breakdowns relative to the APMs used in this presentation are available on Repsol´s website.

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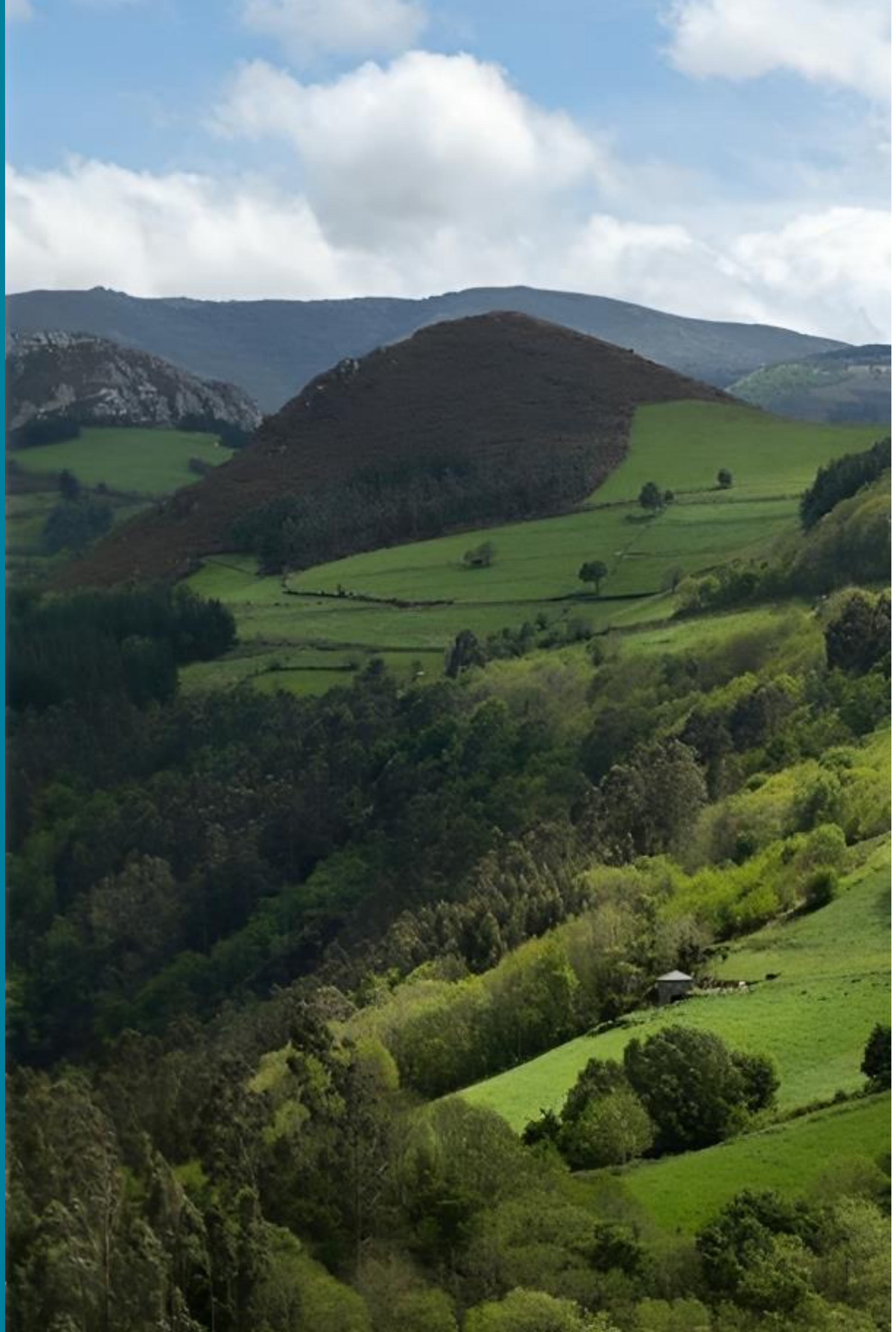

Index

01.

Why and How are we doing this?

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by 2050

01. Geological Low Carbon Solutions – Why?

The development of low carbon business platforms is a priority for Repsol and an opportunity for E&P

Repsol is stepping up the transition through new business platforms across four main pillars

2020-25 | 2025-30 | +2030

Industrial transformation
- Advanced biofuels, biogas and recycling
- Renewable hydrogen
- Synthetic fuels

Renewable generation
- Hybrid plants
- Stationary energy storage

Customer centric businesses
- Low carbon power retail + Energy solutions
- Dual platform advanced mobility

Carbon sinks
- Natural climate solutions
- Carbon Capture Utilization & Storage

E&P can leverage existing capabilities in new low carbon business opportunities to support Repsol's transition strategy

- CCS
- H_2 storage
- Geothermal power
- Geothermal heat

Note: CCS (Carbon Capture and Storage)

Geological Low Carbon Solutions – Why?

An excellent complement to Upstream activities

Among all decarbonization solutions, some are based on the subsurface: CCS, Geothermal and H_2 Storage.

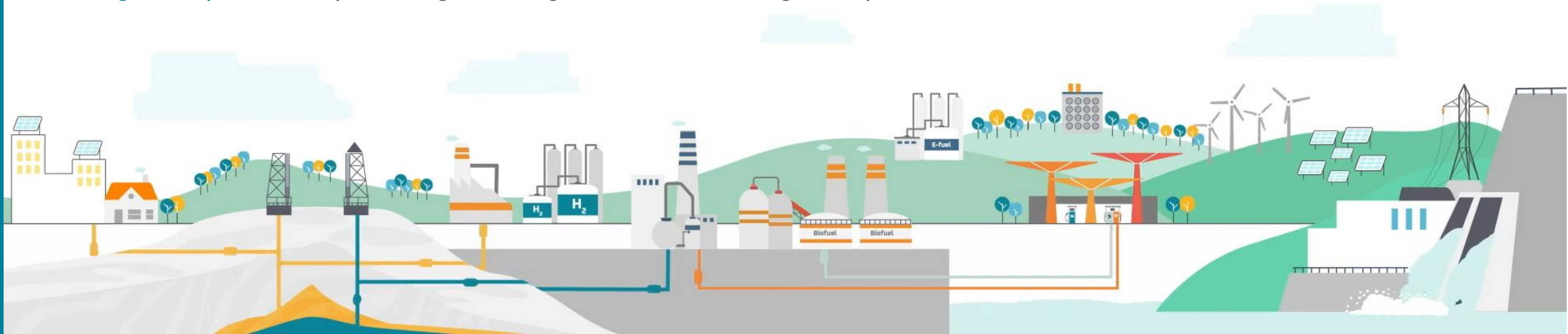
It's in our DNA

These solutions can be applied internationally, require relevant investments in projects with significant risk profiles and are likely to be executed under government contracts.

We have the Right-to-Win

O&G companies have the right capabilities to develop competitive advantages in these contexts.

The Geological Low Carbon Solutions Unit is conceived as a decarbonization tool for Repsol Upstream activities and a strategic complement capable of generating value and sizable growth potential.



Organization evolution within Repsol

2019

Origin

- Sakakemang Discovery.
- Repsol announces Net Zero Commitment by 2050.

2020

First Steps

- General Green Exploration groups created within Exploration Dir.

2021

Differentiation

- Green Exploration in 3 main business lines
- Seismicity and MMV capabilities reinforcement.
- First Geothermal license and MOUs with Key Stakeholders.

2022

Consolidation

- GLCS Direction is created.
- Internal SP for the Unit is created.
- Geothermal and H_2 licenses in Spain.

2023

Plan Execution

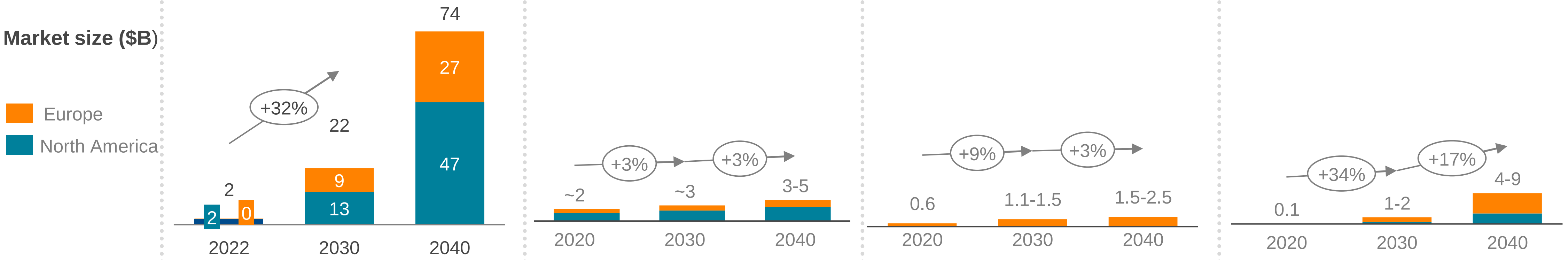
- Team growth and re-skilling.
- Projects pipeline realization.

Strong market growth expected in CCS and Hydrogen Storage, Geothermal growth highly dependent on technological developments

Graphs at different scales

	CCS[1]			Geothermal power[2]			Geothermal heat[3]			Hydrogen storage		
Global ($B)	4	72	345	~7	9-15	13-27	1.7	3-5	4-7	~0.1	~4	~15

Market size ($B)



Main risks & uncertainties

CCS
- Dependency on public incentives
- In some geographies (e.g., EU), doubtful CCS public perception and potential govt. reluctancy in storage permits concession[4]

Geothermal power
- New techs. yet to be proven
- No specific regulatory incentives yet, could change with NZIA[4]
- Uncertain cost competitiveness vs. other renewables

Geothermal heat
- New techs. yet to be proven
- No specific regulatory incentives yet, could change with NZIA[4]
- Lack of distribution networks in core locations

Hydrogen storage
- Dependency on the actual H_2 demand growth and infrastructure development
- Uncertainty on actual large-scale storage needs

1. Includes Carbon capture, transport and sequestration (only sequestration is ~17% of total value); includes EOR in operation; market size in revenues, assuming 65 €/ton for capture, ~95% volume at 5–15 €/ton for transport and ~90% volume at 5–15 €/ton for transport, and ~90% volume at 18 €/ton for storage 2. Market size in revenues, assuming LCOE in geothermal for power generation 56 €/MWh 3. Market size in revenues, assuming LCOE in geothermal for heat production 39 €/MWh 4. Net-Zero Industrial Act could favor CCS and Geothermal development while accelerating permitting processes.

02.

CCS: Ambition and projects

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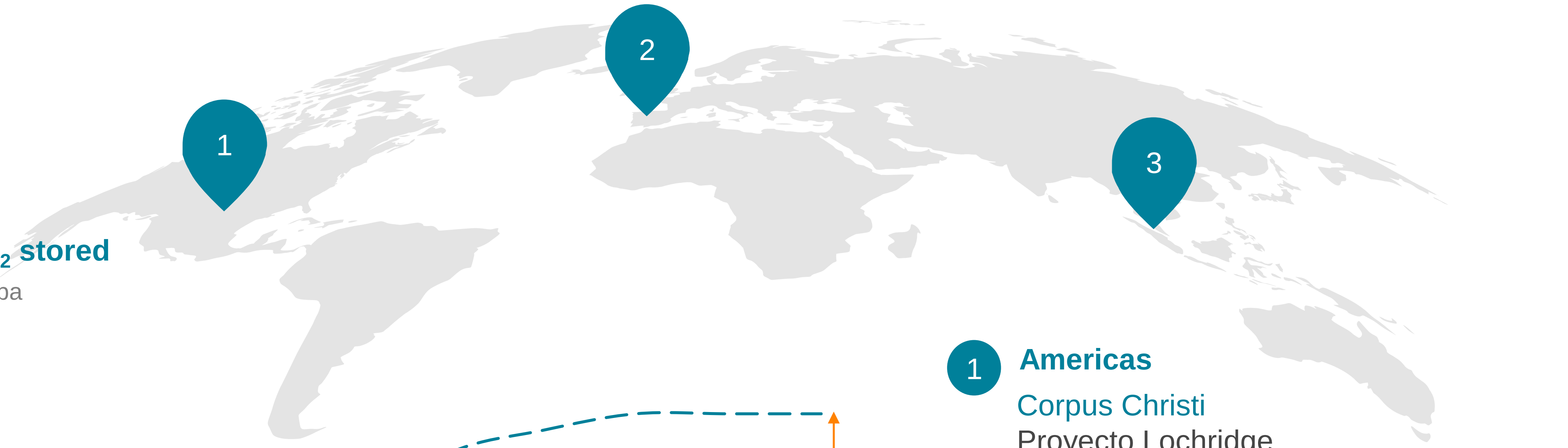
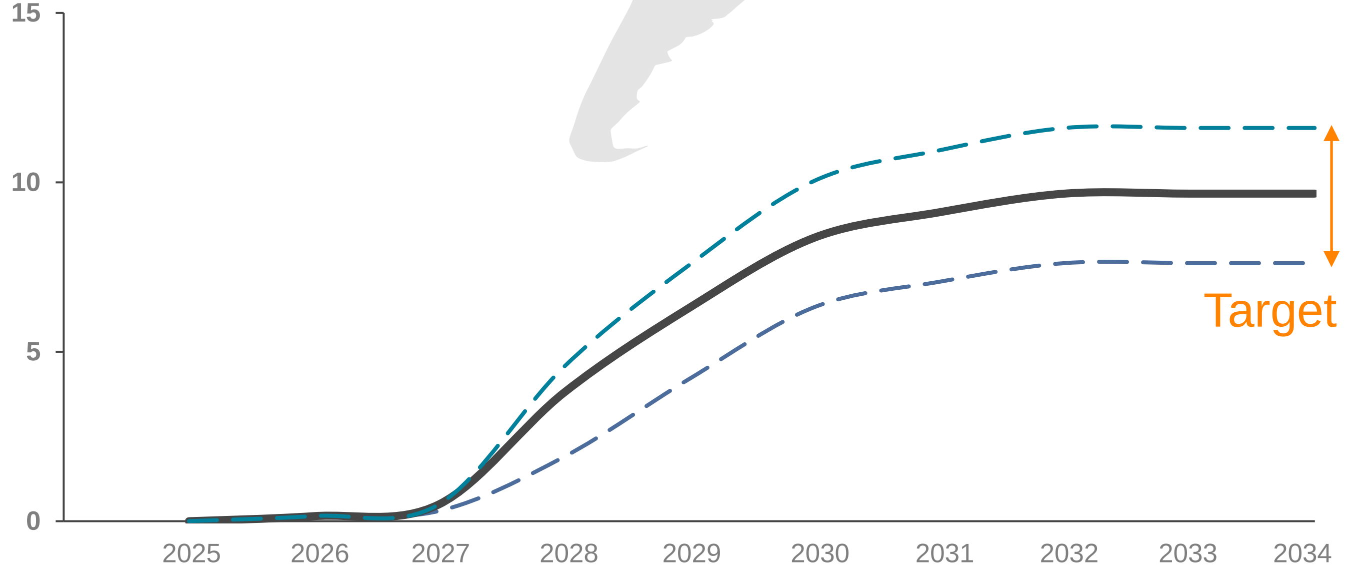
Strategic geographies and storage capacity ambitions



Annual CO_2 stored

Net Risked Mtpa



1. **Americas**
   Corpus Christi
   Proyecto Lochridge
2. **Iberia Hinterland, Southern Europe and North Africa**
   Proyecto Pycasso
   Spain / Portugal
3. **SE Asia**
   Sakakemang – South Sumatra

CCS Gulf Coast USA – Corpus Christi area

Texas 2nd CCS Request for Proposals results announced on August 22nd, 2023.

Repsol led consortium only awardee in Corpus Christi area in two Blocks:

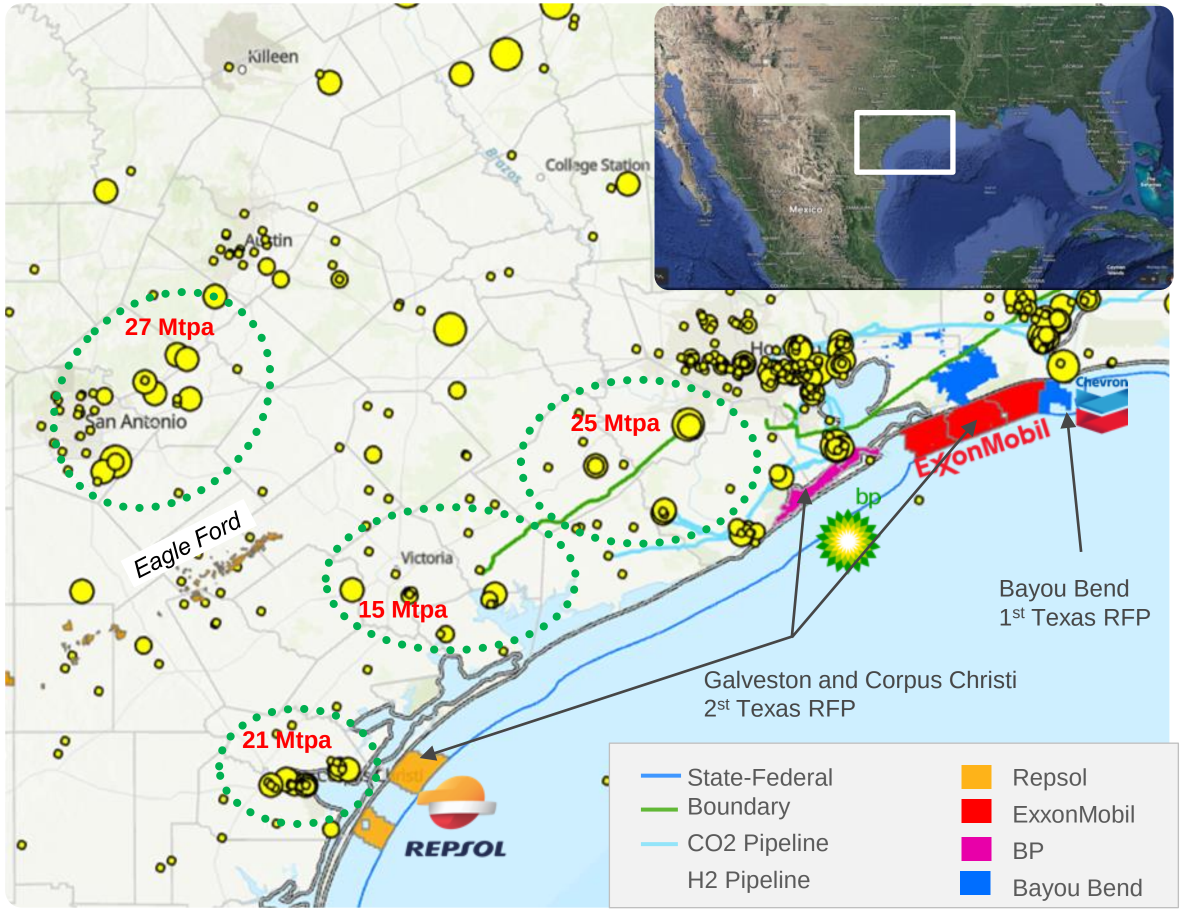
- Port Aransas North
- Mustang Islan

575 km²	>600 Mtons	Access to more than 60 Mtpa of CO_2 emissions in the proximity
Total acreage	Preliminary storage capacity	

Consortium Components

40% Repsol	10% Mitsui
40% CarbonVert	10% Posco

Other awardees in Galveston area: BP (1 block) and ExxonMobil (3 blocks)



Southern Europe – Pycasso Project

Program initiated in 2021 around Avenia that includes 30 institutions and industrials.

Objective

The objective of the program is to study the feasibility of subsurface CO_2 storage and CO_2 valorization options as a decarbonization solution for the industrial activity in SW France and North of Spain.

- 15 Mtons of CO_2 in the area of influence of Pycasso.
- Possibility of use the industrial basin of Lacq for valorization options.
- Sustainable and secure potential of subsurface storage in depleted gas fields.
- Strong alignment between local and national administration, social stakeholders, emitters and potential operators.

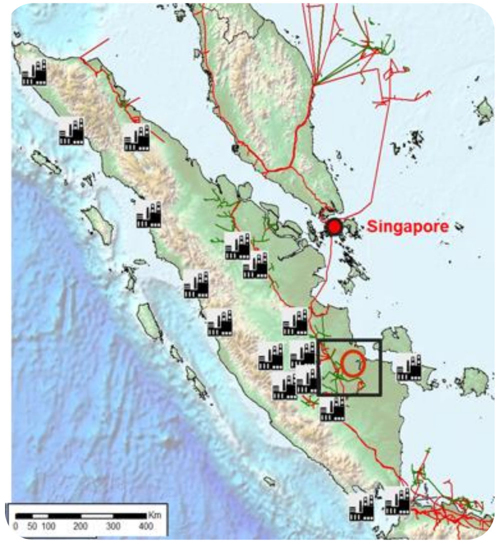
Steering Commitee

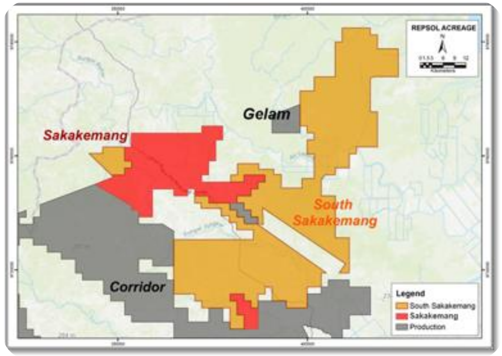
ArcelorMittal, avenia, brgm, CTP, Geostock, IFP Energies nouvelles, LAFARGE, PAU Béarn Pyrénées Communauté d'Agglomération, REPSOL, slb, SOFRESID Engineering, Université de Pau et des Pays de l'Adour, Teréga

Pycasso Project is included in the French ZIBAC initiative (Zone Industriel bas en Carbone) with a 2030 horizon.

Pycasso is referenced in the recently published CCUS French Strategy (June 2023) and has been included in the preliminary list of PCIs of the European Commision. Final evaluation of projects is due at the end of October.

Indonesia – South Sumatra CCS Hub





Phase 1-2 Highlights

- CCS Regulation recently approved (March 2023) recognize CCS activities as cost recovery item.
- POD including CCS in Sakakemang has been submitted to regulator (SKK Migas) in August 2023.
- Phase 1 - Stand Alone facility (~0.5 Mtpa in a total of 12 years). First Injection expected 4Q2027/1Q2028.
- Potential storage upside to expand the project to Corridor depleted fields (additional storage capacity in Gelam and Dayung). Phase 2.
- Available emissions from oil and gas operations in the area could add up to 2 Mtpa.

Phase 2-3 Highlights

- Large Scale CO_2 storage capacity add up to 500 Mtons in unconfined saline aquifers.
- Repsol´s footprint in the area captures most of the identified CO_2 storage capacity.
- Excellent location with direct access to main pipeline infrastructure and close proximity to shore (<40 km) for a future CO_2 maritime terminal if needed.
- Available emissions from coal-power plants and other industries in the area could add up to 6 Mtpa.
- Possible future development into regional hub to capture emissions from Local Industry (Phase 2) and international sources (Phase 3).
- Regulation on CCS for National and International Industry to be issued 4Q2023.

03.

Geothermal Energy

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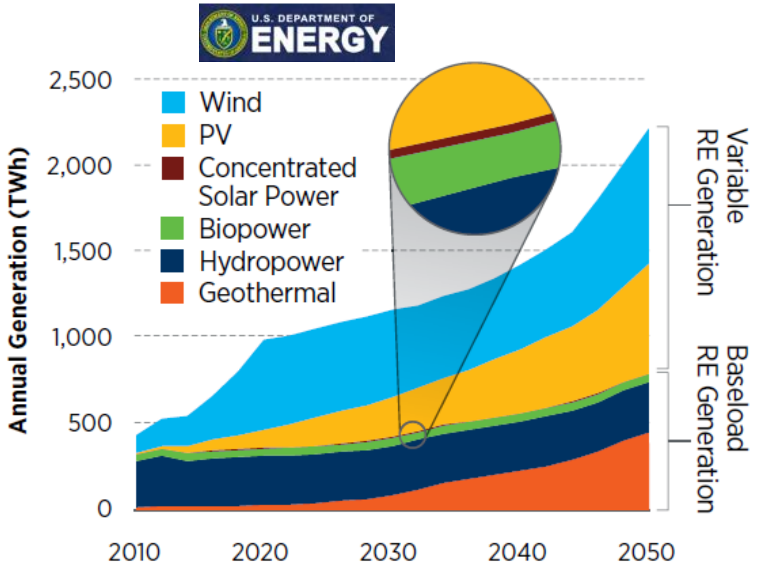
Subsurface continuous and renewable source of energy

Geothermal Highlights

- #1 renewable energy (RE) baseload power for the future: once developed, geothermal supplies electricity 24/7, similar to nuclear and with negligible footprint.
- US Dept of Energy estimates by 2050, Geothermal would account for 8.5% (57% of Baseload RE) of the US power generation. 20X increase
- Renewable: Considered renewable energy because earth heat is unlimited, however some of the current producers liberate considerable amounts of associated CO_2.
- Exploration Risk: geothermal projects require significant investment upfront and are subject to the geological risk of finding very high flows of hot fluids.
- Technology: Binary Cycle power plants, Enhanced Geothermal Systems and Closed Loops, have the potential to expand the activity beyond volcanic geographies. Lithium extraction from fluids is an additional upside.



United States:
*According to DOE forecast, Geothermal power could provide about 57% of the baseload **RE** generation portfolio by 2050 (or 20.4% of all RE generation).*

Geothermal energies – Canary Islands

Geological low carbon solutions

Strategy

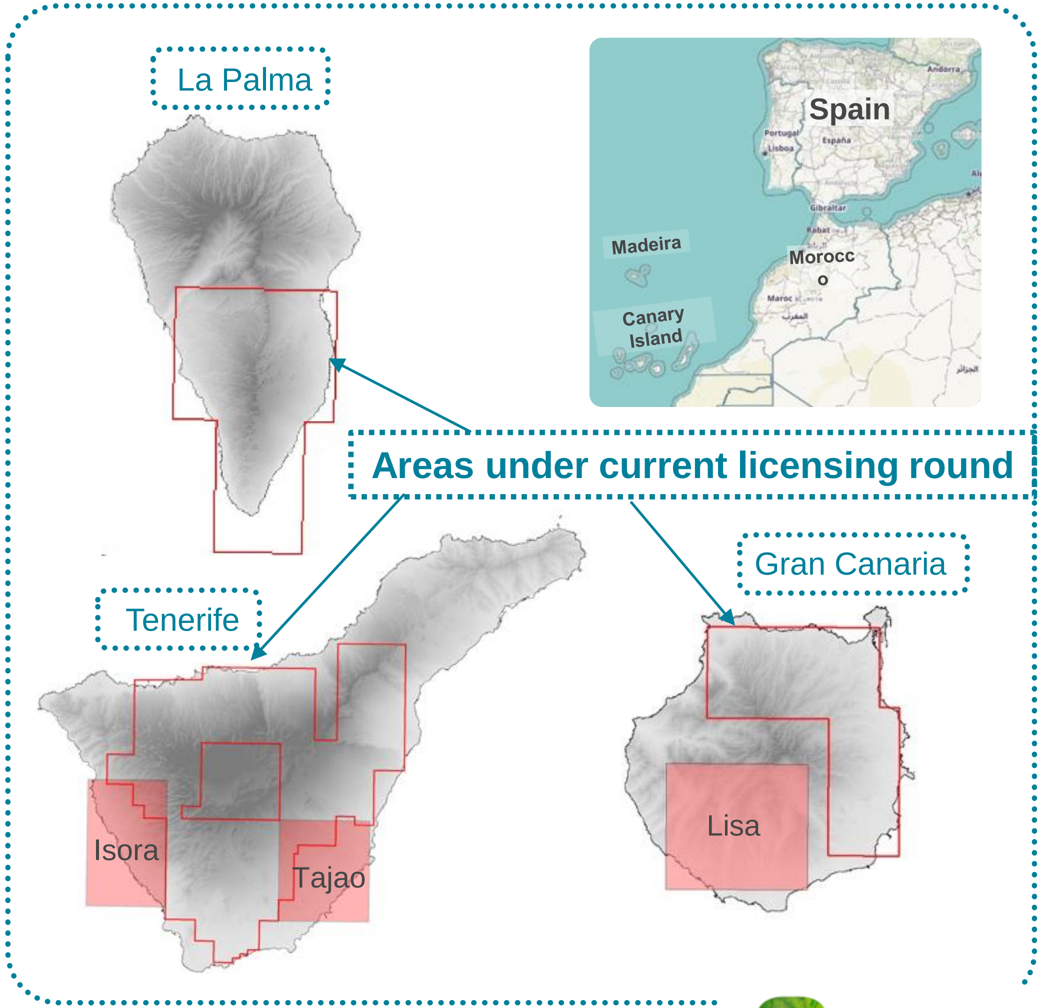
Rationale

- Canary Islands Emissions: Currently most electricity (85%) is derived from fossil fuels, emitting 5 Mtpa of CO_2.
- Renewable energy: Solar and wind potential are limited by space and tourism considerations.
- Electricity Generation Price: Historically high because of isolated and over-dimensioned conventional thermal plants system.

Projects

Milestones

- Licenses: 3 exploration licenses awarded to Repsol (Lisa, Isora and Tajao) , Evaluation licenses under ongoing Bidding Process in Tenerife, Gran Canaria and La Palma.
- Activity: Magnetoteluric Survey completed in Gran Canaria (175 stations), Shallow wells and geophysics programmed for 2023/24, followed by a deep geothermal well in 2025.
- Aspiration: to generate electricity from a first modular plant of 30 MW by 2029. Total project CAPEX ~300M$.



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Geothermal: Eagle Ford – Technology development

Strategy

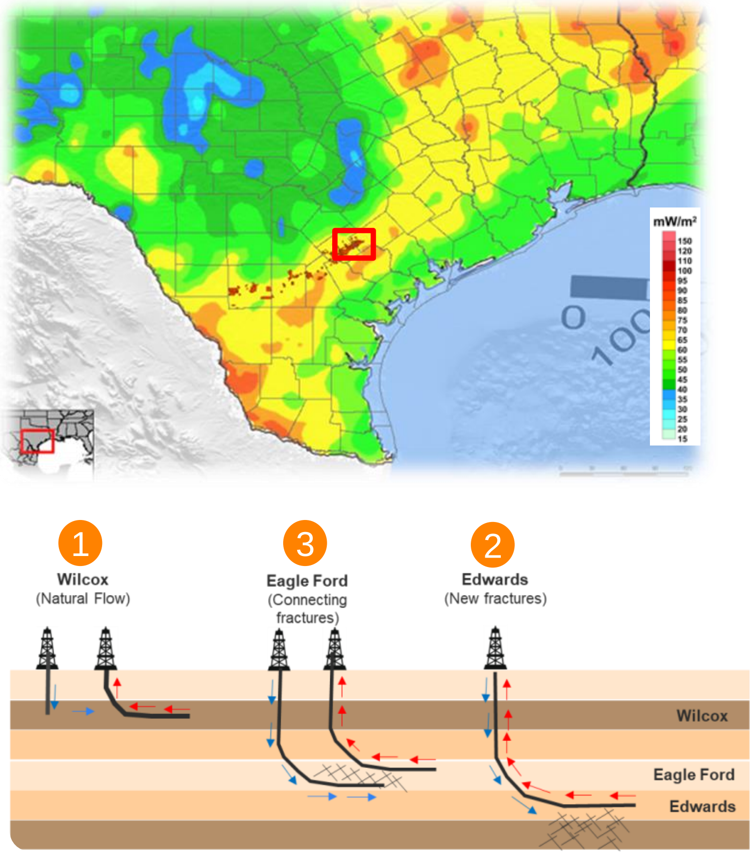
- Replace Oilfield electrical needs with geothermal energy to reduce Scope 2 emissions and take advantage of well synergies.
- South Texas is an optimal location due to regionally high heat flow overlying production and multiple geological targets for water.

Projects

1
- Lower Wilcox Fm. (self – finance)
- Temp: (<=300F)
- Use traditional O&G practices and hydrothermal resource exploitation
- 1st test in June to verify commerciality

2
- Edwards Fm. (Gov. Funds - FOA)
- Temp: >350F
- Hot Tight Rock (EGS techniques)
- Re-Purposing Wells
- FOA application in June

3
- Eagle Ford Fm. (self + Gov. Funds)
- Temp: >300F
- Hot Fractured Rock (EGS techniques)
- Re-Purposing Wells and Fracture Network



04.

H_2 Storage

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04. H_2 Storage

Why H_2 storage?

- Green H_2: the fuel of the future is also the lower mass and radius molecule, storage is challenging, subsurface space is a solution.
- Salt mining: halite represents the better seal for storage integrity and one of the easiest lithologies to mine through dissolution.
- Location: about 10-20% production of green hydrogen will have to be stored next to the transportation network due to intermittent generation.
- Regulation: no specific regulation yet in most countries, most likely similar to Natural Gas storage.
- Technology: proven technology used in mining as well as methane and oil storage for decades. H_2 fast cycling injection/withdrawal to be tested.
- Market forecast: Spain expected to have a 0.4-0.9 Mtpa H_2 storage need by 2040.

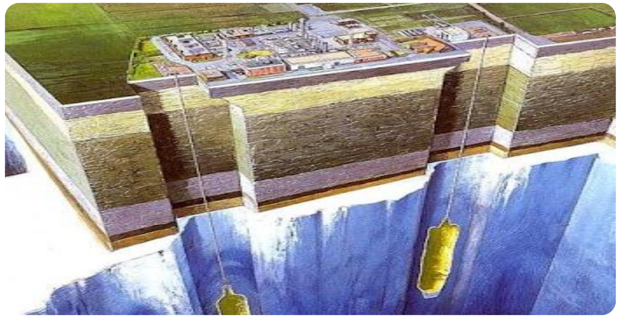
Some numbers as a reference

Net Capacity:
Average Salt Cavern: **3700 tons**
Average cylindrical tank: **0,3 tons**

Standard Cylinder - 90 m^3

NASA Cape Cañaveral - 4,500 m^3

Salt Caverns - 500,000 m^3



THANK YOU

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