Report on CO_2 capture, storage and transport, in accordance with NZIA art. 21(2)

Spain, 2024

1. Mapping of CO_2 capture projects in progress in Spain or in cooperation with other Member States

In Spain, there have been several CO_2 capture demonstration projects in the past few decades. We should mention the demonstration projects carried out at "*Fundación Ciudad de la Energía*" (CIUDEN), a public trust of the Ministry for the Ecological Transition established in 2006, for CO_2 oxy-combustion and post-combustion capture, including bio-based CHP with carbon capture.

Another relevant demonstration project, carried out between 2019 and 2023, is CO_2IntBio in Garray (Soria, Castilla y León). This project has enjoyed the contribution of the LIFE Programme Climate Change Mitigation of the European Union. The aim of this project was to demonstrate CO_2 capture linked to a biomass power plant through a chemical absorption process based on amines and purification of the captured CO_2 so it could be used as a commercial product for the food and drink industry (carbonation, cooling and packaging) or greenhouses. The project included CO_2 transport by pipeline and liquefied CO_2 transport using trucks. The project achieved a production of 33000 t/year of CO_2 captured from the combustion of 100% renewable biomass.

The following projects in Spain that have signed Innovation Fund grants include carbon capture:

Project name	Coordinator	NUTS-2 Region	Description	IF Call
AggregaCO2	Petronor	País Vasco	Commercial production plant of carbon negative aggregates (manufactured limestone), using captured CO_2 and waste.	2020 Small-scale
Waga 4 World (W4W)	Waga Energy	Cataluña	Upgrade of landfill gas to produce grid-compliant biomethane	2020 Small-scale
Triskelion	Forestal del Atlántico, SA	Galicia	E-Methanol production from captured CO_2 and renewable H_2	2022 Large-scale
Green Meiga	Iberdrola	Galicia	E-Methanol production using CO2 from forestry waste combustion and enzyme-based direct air capture technologies and H_2 produced by electrolysis.	2022 Large-scale

2. Estimation of the corresponding needs for injection and storage capacities, and CO_2 transport in Spain

The needs for CO_2 injection and storage in Spain have been calculated based on the CO_2 emissions in industrial processes (not related to energy use) in the Spanish GHG emissions national inventory (i.e. CO_2 emissions from IPCC processes 2A, 2B and 2C).

Furthermore, we excluded from the calculation CO_2 emissions associated with steel production in blast furnaces (i.e. IPCC processes 2C1b, 2C1d y 2C1f), because the most

promising alternative technology to these manufacturing processes is direct reduced iron (DRI) using green hydrogen, and not capturing emissions from blast furnaces.

The latest data available is from 2022. However, this year is not representative, as the activity of the manufacturing industry fell considerably due to high energy prices following the invasion of Ukraine by the Russian Federation. Therefore, emissions data from 2021 is a better reference to estimate the needs for injection and storage capacities.

Considering all of the above, the needs for CO_2 injection and storage in Spain are currently estimated as **15.5 million tonnes of CO_2 ($MtCO_2$) per year**.

This is a preliminary estimation with a considerable level of uncertainty, stemming from several factors that could increase or reduce the needs, and depends on the time horizon considered.

Factors that may increase CO_2 storage needs are:

- In some industrial sectors, such as cement or lime, process and combustion emissions are often inseparable.
- Some combustion emissions from bio-energy may also be captured (BECCS).
- CO_2 emissions in sectors other than manufacturing may also be captured, including direct air capture.

Factors that may reduce CO_2 storage needs are:

- Some industrial process emissions may be abated otherwise, e.g. new inputs and new materials, chemical process reengineering.
- Some of the captured CO_2 may be used in other processes and will not need to be permanently stored.

3. Mapping of CO_2 storage and CO_2 transport projects in progress in Spain

PERMIT TYPE	STATUS OF PERMITTING	COMPETENT AUTHORITY	COORDINATES (ED50)	PERMIT HOLDER	ADDRESS
Exploration	Requested	**MITERD**	Vertex 1, 5º47'00" y 43º40`00"; Vertex 2 , 5º28'00" y 43º40'00", Vertex 3, 5º28'00" y 43º20'00", Vertex 4, 5º47'00" y 43º20'00"	HULLERAS DEL NORTE, S.A.	Avenida de Galicia, nº 44, 33305 Oviedo
Exploration	Requested	**MITERD**	Vertex 1, 5º28'00" y 43º40`00"; Vertex 2 , 5º09'00" y 43º40'00", Vertex 3, 5º09'00" y 43º20'00", Vertex 4, 5º28'00" y 43º20'00"	HULLERAS DEL NORTE, S.A.	Avenida de Galicia, nº 44, 33305 Oviedo
Exploration	Requested	**MITERD**	Vertex 1, 37º22´00"´y 06º56´00", Vertex 2, 37º22´00"y 06º45´00", Vertex 3,37º20´00" y 06º45´00", Vertex 4, 37º20´00" y 06º38´00", Vertex 5, 37º 22´00"y 06º38´00", Vertex 6 37º22¨00"y 06º33´00", Vertex 7, 37º24´00" y 06º33´00", Vertex 8, 37º24´00" y 06º24´00", Vertex 9, 37º16´'00" y 06º24´00", Vertex 10, 37º16´00" y 06º26´00", Vertex 11, 37º15´00" y 06º26´00", Vertex 12, 37º15´00"y 06º35´00", Vertex 13, 37º11¨00" y 06º35´00", Vertex 14, 37º11100" y 06º38´00", Vertex 15, 37º10´00" y 06º38´00", Vertex 16 37º10´00" y 06º44´00", Vertex 17,37º12´00" y 06º44´00", Vertex 18 37º12´00" y 06º49´00", Vertex 19 37º07´00" y 06º49´00", Vertex 20 37º07´00" y 06º48´00", Vertex 21 37º06´00" y 06º48´00", Vertex 20 37º07´00" y 06º48´00", Vertex 21, 37º06´00" y 06º48´00", Vertex 22 37º06´00" y 06º46´00", Vertex 23 37º05´y 06º46´00", Vertex 24 37º05´00" y 06º47´00", Vertex 25, 37º04´00" y 06º47´00", Vertex 26, 37º04´00"y 06º52´00", Vertex 27, 37º05´00" y 06º52´00", Vertex 28 37º05´00" y 06º56´00"	COMPAÑÍA ESPAÑOLA DE PETROLEOS, S.A.U.	Torre Cepsa Paseo de la Castellana, 259 A, 28046 Madrid
Exploration	Requested	Asturias	Vertex 1, 5º55´00" y 43º20´00"; Vertex 2 , 5º33'00" y 43º20'00", Vertex 3, 5º33'00" y 43º05'00", Vertex 4, 5º55'00" y 43º05'00"	HULLERAS DEL NORTE, S.A.	Avenida de Galicia, nº 44, 33305 Oviedo

Exploration	Requested	Asturias	Vertex 1, 5º57´00" y 43º30`00"; Vertex 2 , 5º47'00" y 43º30'00", Vertex 3, 5º47'00" y 43º20'00", Vertex 4 , 5º57'00" y 43º20'00"	HULLERAS DEL NORTE, S.A.	Avenida de Galicia, nº 44, 33305 Oviedo
Exploration	Authorised	**Castilla y León**	Vertex 1, 5º15´05" y 42º42´00"; Vertex 2 , 4º50'00" y 42º42'00", Vertex 3, 4º50'00" y 42º27'00", Vertex 4, 5º15'00" y 42º42'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Authorised	**Castilla y León**	Vertex 1, 5º15´00" y 42º27´00"; Vertex 2 , 4º50'00" y 42º27'00", Vertex 3, 4º50'00" y 42º13'00", Vertex 4, 5º15'00" y 42º13'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Authorised	**Castilla y León**	Vertex 1, 5º30´00" y 42º34´00"; Vertex 2 , 5º15'00" y 42º34'00", Vertex 3, 5º15'00" y 42º10'00", Vertex 4, 5º30'00" y 42º10'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Castilla y León	Vertex 1, 5º15´00" y 42º13´00"; Vertex 2 , 4º50'00" y 42º13'00", Vertex 3, 4º50'00" y 42º00'00", Vertex 4, 5º15'00" y 42º00'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Castilla y León	Vertex 1, 4º50´00" y 42º35´00"; Vertex 2 , 4º19'00" y 42º35'00", Vertex 3, 4º19'00" y 42º23'00", Vertex 4, 4º50'00" y 42º23'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Castilla y León	Vertex 1, 4º50´00" y 42º23´00"; Vertex 2 , 4º19'00" y 42º23'00", Vertex 3, 4º19'00" y 42º11'00", Vertex 4, 4º50'00" y 42º11'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Castilla y León	Vertex 1, 4º50´00" y 42º11´00"; Vertex 2 , 4º19'00" y 42º11'00", Vertex 3, 4º19'00" y 41º59'00", Vertex 4, 4º50'00" y 41º59'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Andalucía	Vertex 1, 6º18´00" y 37º24´00"; Vertex 2 , 6º04'00" y 37º24'00", Vertex 3, 6º04'00" y 37º02'00", Vertex 4, 6º18'00" y 37º02'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Andalucía	Vertex 1, 6º04´00" y 37º20´00"; Vertex 2 , 6º51 '00" y 37º20'00", Vertex 3, 6º51'00" y 37º02'00", Vertex 4, 6º04'00" y 37º02'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Andalucía	Vertex 1, 5º51´00" y 37º34´00"; Vertex 2 , 5º41 '00" y 37º34'00", Vertex 3, 5º41'00" y 37º12'00", Vertex 4, 5º51'00" y 37º12'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Andalucía	Vertex 1, 5º41´00" y 37º34´00"; Vertex 2 , 5º10 '00" y 37º34'00", Vertex 3, 5º10'00" y 37º23'00", Vertex 4, 5º41'00" y 37º23'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid

Exploration	Requested	Andalucía	Vertex 1, 6º52´00" y 37º20´00"; Vertex 2 , 6º24 '00" y 37º20'00", Vertex 3, 6º24'00" y 37º09'00", Vertex 4, 6º52'00" y 37º09'00"	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	Andalucía	Vertex 1, 6º52´00" y 37º09´00"; Vertex 2 , 6º24 '00" y 37º09'00", Vertex 3, 6º24'00" y 36º51'00", Vertex 4, Linea de costa y 36º51'00", Vertex 5, 6º52'00" y Linea de costa	ENDESA GENERACIÓN,S.A.	C/ Ribera del Loira, 60. 28042 Madrid
Exploration	Requested	**MITERD**	Vertex 1, 1º16´00" y 40º38´00"; Vertex 2 , 1º16'00" y 40º32'00"; Vertex 3, 1º15'00" y 40º32'00"; Vertex 4, 1º15'00" y 40º31'00; Vertex 5, 1º14'00" y 40º31'00; Vertex 6, 1º14'00" y 40º30'00; Vertex 7, 1º13'00" y 40º30'00; Vertex 8, 1º13'00" y 40º29'00; Vertex 9, 1º12'00" y 40º29'00; Vertex 10, 1º12'00" y 40º28'00; Vertex 11, 1º04'00" y 40º28'00; Vertex 12, 1º04'00" y 40º40'00; Vertex 13, 1º09'00" y 40º40'00; Vertex 14, 1º09'00" y 40º45'00; Vertex 15, 1º07´00" y 40º45´00"; Vertex 16, 1º07´00" y 40º50´00"; Vertex 17, 1º09´00" y 40º50´00"; Vertex 18, 1º09´00" y 40º51´00"; Vertex 19, 1º16´00" y 40º51´00"; Vertex 20, 1º16´00" y 40º52´00"; Vertex 21, 1º22´00" y 40º52´00"; Vertex 22, 1º22´00" y 40º44´00"; Vertex 23, 1º21´00" y 40º44´00"; Vertex 24, 1º21º´00" y 40º42´00"; Vertex 25, 1º19´00" y 40º42´00"; Vertex 26, 1º19´00" y 40º38´00"	REPSOL EXPLORACIÓN,S.A.	C/ Mendez Álvaro, 44. 28045 Madrid
Exploration	Requested	**MITERD**	Vertex 1, 6º51´00" y 37º02´00"; Vertex 2 , 6º51'00" y 36º40'00"; Vertex 3, 7º07'00" y 36º40'00"; Vertex 4, 7º07'00" y 37º02'00	REPSOL EXPLORACIÓN,S.A.	C/ Mendez Álvaro, 44. 28045 Madrid

Exploration	Requested	**MITERD**	Vertex 1, 7º07´00" y 36º40´00"; Vertex 2 , 7º04'00" y 36º40'00"; Vertex 3, 7º04'00" y 36º36'00"; Vertex 4, 7º15'00" y 36º36'00; Vertex 5, 7º15'00" y 36º41'00; Vertex 6, 7º16'00" y 36º41'00; Vertex 7, 7º16'00" y 36º43'00; Vertex 8, 7º17'00" y 36º43'00; Vertex 9, 7º17'00" y 36º49'00; Vertex 10, 7º18'00" y 36º49'00; Vertex 11, 7º18'00" y 36º51'00; Vertex 12, 7º19'00" y 36º51'00; Vertex 13, 7º19'00" y 37º01'00; Vertex 14, 7º07'00" y 37º01'00;	REPSOL EXPLORACIÓN,S.A.	C/ Mendez Álvaro, 44. 28045 Madrid

The following CCS projects in Spain have been selected in Innovation Fund calls:

Project name	**Coordinator**	**NUTS-2 Region**	**Description**	**IF Call**	**Status**
TarraCO2	REPSOL EXPLORACIÓN SA	Cataluña	Offshore CO_2 storage in Tarragona, the largest petrochemical cluster in Spain.	IF23 Call – General large-scale	Invited for grant preparation

Status of permitting: injection authorisation requested to the competent authority.

As of December 2024, there are no CO_2 transport projects in progress in Spain.

4. National support measures that have been or will be adopted to prompt CO_2 capture, storage and transport projects, as well as measures relating to the cross-border transport of CO_2

Currently, there are no specific national support measures for CO2 capture, storage and transport projects approved or foreseen in Spain.

However, PERTE Industrial Decarbonisation, an aid scheme funded by the RRF and managed by the Ministry of Industry and Tourism and based on General Block Exemption Regulations rules, includes aid for CCS projects for abatement of direct emissions in industrial installations.

5. National strategy and targets that will be and have been set for the capture of CO_2 by 2030

As of December 2024, no national strategy nor targets have been set by 2030 in Spain.

Spain's NECP foresees that the GHG emissions reduction target for 2030 will be met without CCS deployment. Nevertheless, measure 1.10 of the updated NECP mentions carbon capture, storage and use as relevant technologies for the decarbonisation of industrial sectors.

6. Bilateral and regional cooperation that facilitates the cross-border transport of CO_2

Spain has not signed any bilateral or regional cooperation agreements to facilitate the cross-border transport of CO_2.

7. CO_2 transport projects in progress and an estimation of the necessary future CO_2 transport projects' capacity to match the corresponding capture and storage capacity

There are no CO_2 transport projects in progress in Spain as of December 2024.

Due to the very low development of CO_2 capture and storage projects in Spain, an estimation of the necessary future CO_2 transport projects' capacity and mapping is currently not possible.