

# **Natural resources, development, energy and CO<sub>2</sub> in European regions**

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*Un desarrollo regional bajo en emisiones de carbono  
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## Background in Europe

- EU Strategic objective (SET Plan)
  - To demonstrate the **commercial viability of carbon capture and storage (CCS) technologies** in an economic environment driven by the emissions trading scheme. In particular, to enable the **cost-competitive deployment of CCS technologies** in coal-fired power plants by 2020-2025.

### Indicative costs (2010-2020)

Technology Objectives	Costs (M€)
1. Proving existing technology (additional costs for CCS only)	8 500 - 13 000
2. Developing more efficient and cost competitive CCS technologies	2 000 - 3 500
<b>Total</b>	<b>10 500 - 16 500</b>

This reflects the total sum of the required public and private investments.

## Natural resources in Europe (<http://www.euracoal.be>)

Number of Employees in the European Coal Industry 2007

	Hard Coal	Lignite	Total
Bulgaria	4,900	8,700	13,600
Czech Republic	12,000	13,100	25,100
Germany	32,800	17,000	49,800
Greece	–	4,700	4,700
Hungary	100	2,750	2,850
Poland	119,300	18,000	137,300
Romania	12,000	14,400	26,400
Slovakia	–	4,350	4,350
Slovenia	–	2,150	2,150
Spain	6,400	-	6,400
UK	5,400	-	5,400
Total	192,900	85,150	278,050

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<http://www.pteco2.es>

- Europe countries/regions with coal resources support the development with R+D projects on CCS
- Also Nordic countries with offshore saline aquifers and depleted oil fields support storage technologies



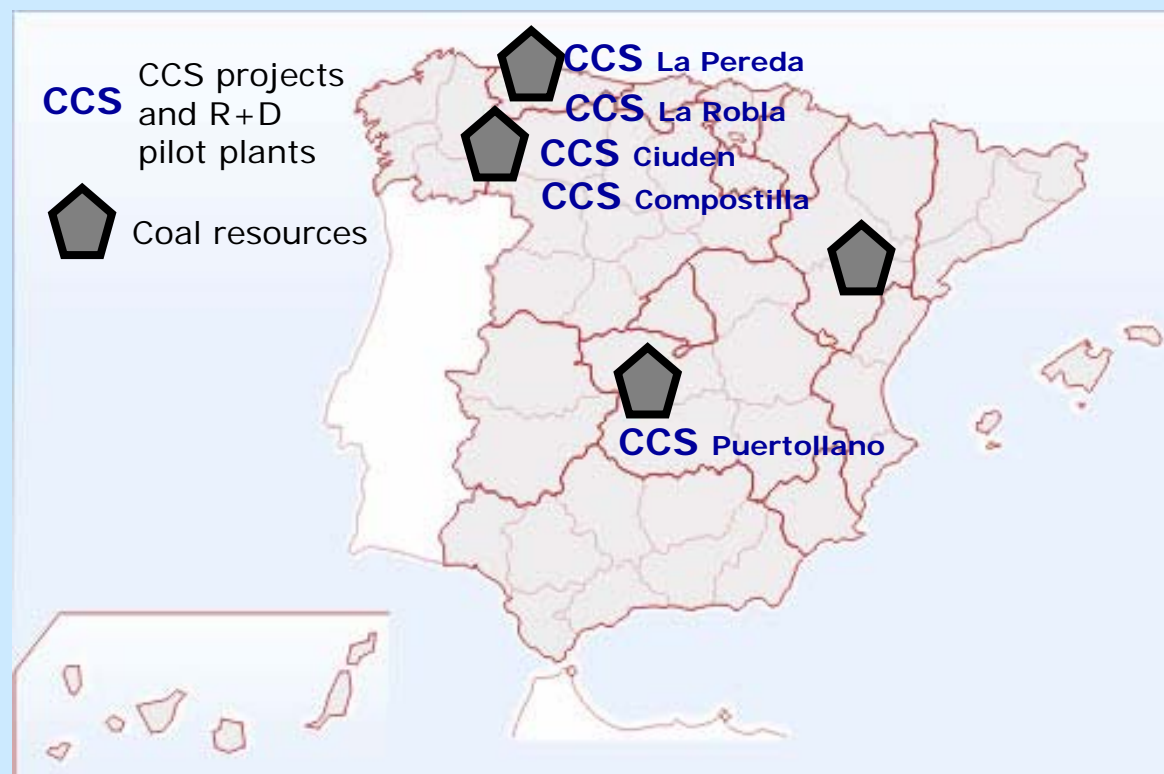
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### Natural Resources, Development, Energy and CO<sub>2</sub> in Spanish regions

- Some Spanish regions with coal resources also support the development with R+D projects on CCS

<http://www.euroaktiv.com>

- There are surely onshore saline aquifers for massive CO<sub>2</sub> storage



## Natural Resources, Development, Energy and CO<sub>2</sub> in Aragón

- Resources and industry
  - Coal reserves of 300 Mt vs. 200 of [anthracite (Bierzo) + bituminous (Puertollano)].
  - Teruel PS (Endesa), 1050 MW<sub>e</sub>
  - Several industrial, large (hundreds of MW energy input) projects by local companies, centered on local coals, incorporating/necessitating/with concern about CCS: Mequinenza, Ariño, Utrillas
- Institutes and research centres skilled in several aspects of CCS:
  - Instituto de Carboquímica (ICB-CSIC)
  - Centro de Investigación de Recursos y Consumos Energéticos (CIRCE)
  - University of Zaragoza: Grupo de fluidodinámica numérica del CPS, Departamento de Geología. Area de Estratigrafía, Departamento de Ciencias de la Tierra. Grupo de Modelización Geoquímica, ...

### Conclusions

- EU's SET Plan highlights **CCS as an essential technology** for reducing CO<sub>2</sub> emissions in a medium-long term.
- European regions with **coal as natural resource** have a strong interest in supporting this technology as a development strategy.
- Several CCS **pilot and demonstration plants** are being started in European regions with support from industry, R&D centers and local government.
- These projects are conceived as a key ingredient of the future **developmental strategy** of these regions.
- As a consequence, local governments **must support and encourage** industry, R&D centers and administration to join themselves in ambitious CCS projects.