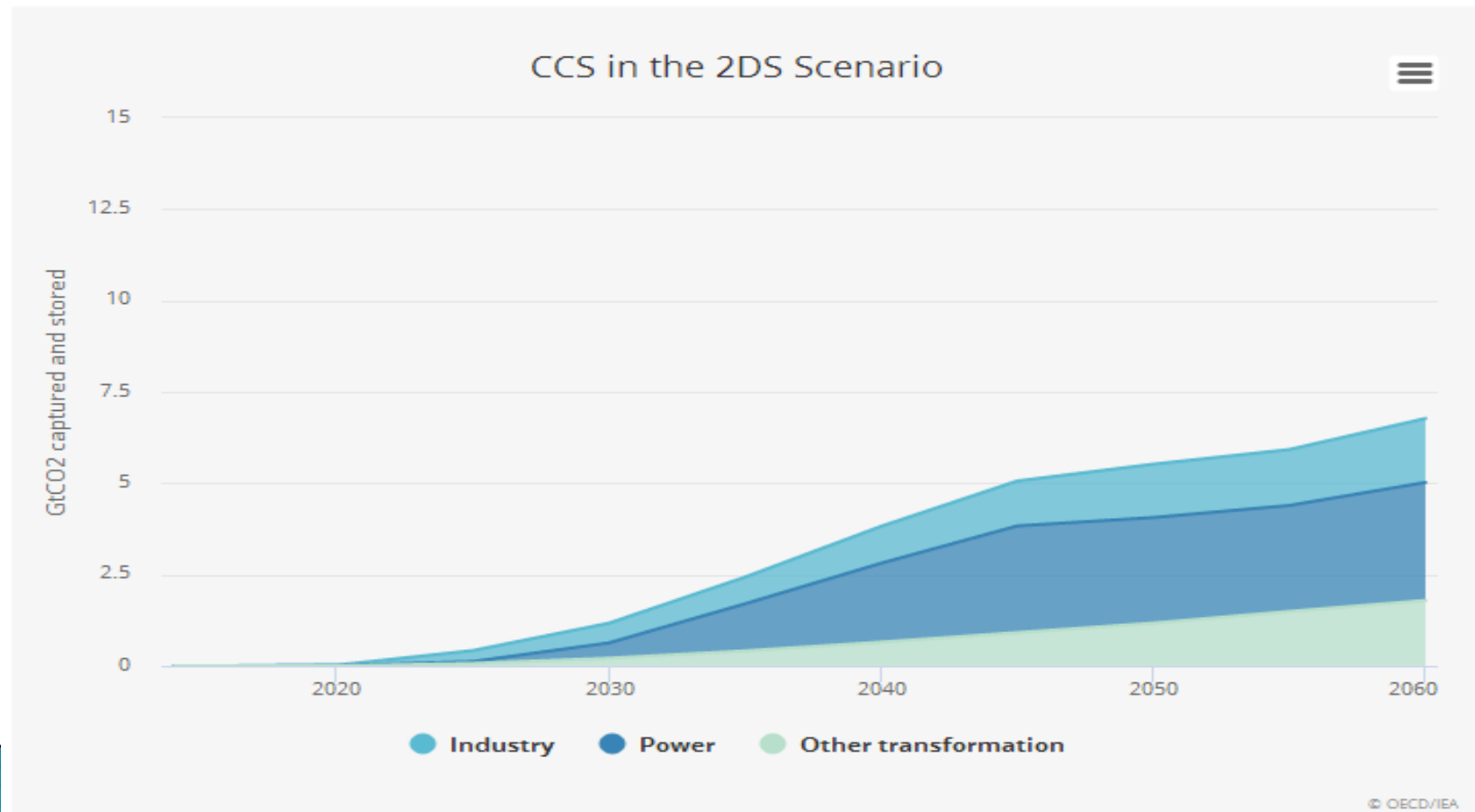


CCS technology in ROMANIA
Oltenia Energy Complex
GETICA-CCS



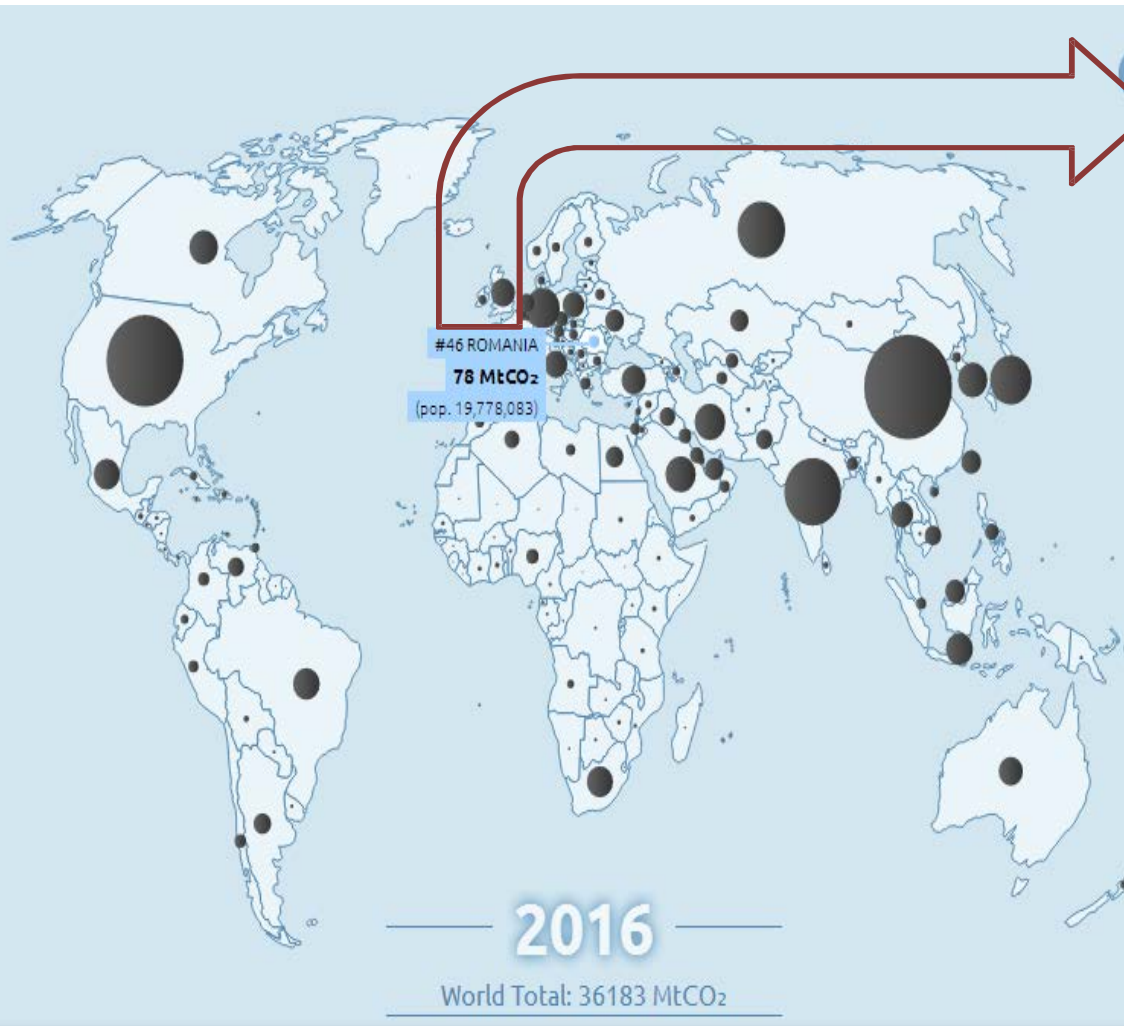
BACKGROUND

- ❑ Carbon capture and storage, or CCS, is a family of technologies and techniques that enable the capture of carbon dioxide (CO₂) from fuel combustion or industrial processes, the transport of CO₂ via ships or pipelines, and its storage underground, in depleted oil and gas fields and deep saline formations.
- ❑ CCS is vital for reducing emissions across the energy system in both the [Energy Technology Perspectives \(ETP\) 2°C Scenario \(2DS\)](#). The potential for CCS to reduce CO₂ emissions is key-factor to ensure that energy use becoming CO₂ emissions-neutral in 2060. Building CO₂ transport and storage infrastructure is critical to unlocking large-scale CCS deployment.



CO2 FOOTPRINT

- ❑ The World total CO2 emissions quantity in 2016 was 36.183 MtCO₂ (www.globalcarbonatlas.org) from which EU-28 3.499 MtCO₂



2016
ROMANIA

#46 country at
global level

78 MtCO₂

from which from coal

24 MtCO₂

CCS can be an
solution

WHY CCS IN ROMANIA ?

Because

- EU targets for 2030 and new EU-ETS Directive 410/2018/EC support the development of CCS technologies on an industrial scale
- **Romania has 22.6 Gt geological storage capacity of CO₂ (18.6 Gt in deep sea saltwater aquifers and 4Gt in depleted oil and gas reservoirs) onshore**
- Romania has over 150 years of history in oil and gas industry, possessing detailed information of national geological studies
- **The introduction of CCS technology ensures the maintaining of fossil fuel and mining power plants, which will have a positive economic and social impact for Romania, while contributing to the country's energy security**

WHY CCS IN ROMANIA ? (cont.)

Because

- **Contributes, by example, to the development of CCS technology in South East Europe on an industrial scale**
- According with Directive EC/410/2018 (EU-ETS) the CCS project can be financed by EU funds.
- **Allows use of geological storage site for future CCS projects at existing or new energy blocks within the CE Oltenia**
- **Characterization of a geological CO2 storage site requires time and financial effort - support from dedicated European funds would contribute to a rapid development of CCS at EU level**
- It assures the transfer of knowledge necessary for the development of this type of technology, considered essential by contributing to the achievement of the national and European CO2 reduction targets

GETICA CCS PROJECT

- The Project was started in 2009 and it was included in the preliminary NER 300 list
- Due to the miss of national political and financial support the project was frozen in 2012

Location	<ul style="list-style-type: none">✓ Oltenia region – the most energy intensive responsible of about 40% of total national CO2 emissions✓ Oltenia Energy Complex - Turceni PP – Unit no.6 (330MW)
Full chain	<ul style="list-style-type: none">✓ CO2 Capture Plant & Compression (1.5Mtpa)✓ CO2 Transport – onshore pipeline✓ CO2 Storage – onshore deep saline aquifers
Sponsor	<p>GETICA CCS Project Company (PC), including:</p> <ul style="list-style-type: none">✓ OLTENIA Energy Complex – future CO2 Capture Plant operator and PC Leader✓ TRANSGAZ, National Company for Natural Gas Transport future CO2 Transport Infrastructure operator and PC Member✓ ROMGAZ, National Company for Natural Gas Exploitation – future CO2 Storage Facility operator and PC Member
Current status	<ul style="list-style-type: none">✓ Feasibility Study and Permitting Reports – final



GETICA CCS - main features

Capture: post-combustion system

- ✓ minimum efficiency: 85%
- ✓ chilled ammonia CO₂ absorption
- ✓ CO₂ reduction > 1.5 mil. tonnes/year



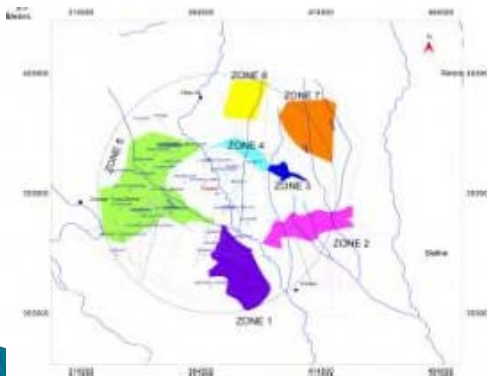
Transport: onshore underground pipeline

- ✓ Length: 40 km
- ✓ DN 350mm (14") / 80÷120 bar / 0÷40°C
- ✓ Flow: max. 238 tCO₂/h, min. 119 tCO₂/h



Storage: onshore deep saline aquifers

- ✓ Two potential storage sites 50 km around Turceni PP
- ✓ Storage capacity >100 mil. tCO₂ each site
- ✓ multi-user storage hub development potential



NATIONAL LEGAL FRAMEWORK - current status

- ✓ GD no.64/2011 and Law no.114/2013 on carbon geological storage
- ✓ Decision no.5/2015 for approving the Procedure on issuing exploration permits for carbon geological storage
- ✓ Law no.114/2013 enforcement rules
- ✓ National CCS responsible institutional entity – NAMR (National Agency for Mineral Resources)

Next steps

- ✓ Accelerating the R&D related projects; examples of ongoing international cooperation:
- ✓ Identification of funding resources
- ✓ GETICA CCS to be nominated as: project of national and regional strategic importance
- ✓ Launching the public awareness campaign
- ✓ Enhancing the institutional capacity and competences
- ✓ Delivering E SIA, FEED and the International Tender documentation
- ✓ Procurement process, permitting, land acquisition, construction, commissioning
- ✓ O&M, monitoring and decommissioning

What should be done?

VIABLE COMMERCIAL FRAMEWORK

- ✓ Ensuring the industry and business sectors' demand and interest for CCS
- ✓ Defining and securing key actors - energy, oil-gas, metallurgical, chemical, cement companies

STIMULATIVE ECONOMIC-FINANCIAL FRAMEWORK

GETICA CCS Demo Project can become economically viable starting from 35-40 Euro/CO₂ certificate

- ✓ Create an attractive financial environment for both businesses and the public
 - Subsidies for implementation
 - Other incentives
 - Compensation for citizens affected by the transport and storage infrastructure
 - Creation of a green investment fund