

A roadmap for advancing carbon capture and storage in Romania

June 2022

Executive Summary

CCS – a vector for decarbonization in Romania. As an EU Member State, Romania has committed to reach climate neutrality by 2050. While direct electrification and energy efficiency are the most efficient solutions for reducing carbon dioxide (CO₂) emissions, some sectors will require carbon capture and storage (CCS) to avoid their CO₂ emissions entering the atmosphere. In Romania, these sectors, including cement, steel and chemicals, are economically significant, and as such developing CCS projects and the associated value chains in Romania is a strategic priority.

Romania has a number of large industrial emitters, experience in relevant industries (e.g., oil and gas production) and a potentially significant CO₂ storage potential. However, it lacks an adequate regulatory framework and institutional capacity for advancing CCS projects, as well as sufficient coordination for stakeholder engagement and financial incentives. Successful initiatives in Scandinavia and Western Europe show that CCS is feasible – but more remains to be done to make it a reality in Romania.

Key actions required. This roadmap has identified a range of concrete actions, spanning multiple areas, which are required to advance CCS in Romania. Highlights include:

- Conduct an **in-depth national assessment** of CCS potential
- Formulate a **national CCS strategy** linked to relevant decarbonization strategies
- Create a fit-for-purpose **regulatory framework**
- Establish a **stakeholder platform** for knowledge transfer and project implementation
- Create a **public engagement programme** and build **institutional capacity**.

These actions are primarily the responsibility of the Romanian Government and the National Agency for Mineral Resources (NAMR) and would benefit from the establishment of a **dedicated inter-ministerial committee** to oversee the advancement of action on CCS. The Ministries of Environment, Economy and Energy should be involved, as well as responsible authorities, economic operators, academic and research institutions and NGOs.

To enable CCS in Romania, these key actions and others identified in this roadmap must be implemented now. The **long lead times** of regulatory and policy change, as well as CCS projects themselves, mean that timely action is crucial for these technologies to contribute to meeting Romania's 2050 targets. More broadly, **enabling industrial decarbonization** is key to securing a sustainable and competitive future for some of Romania's most important economic sectors.

Opportunities and challenges for CCS in Romania

Romania's CO₂ emissions totalled **77.4 megatonnes** in 2019, with the majority originating in the energy sector (85.5%), followed by industry (13.8%). The main large emitters are concentrated in the Gorj, Galați, Ploiești, Constanța, Târgu Mureș and Bucharest regions. Adopting CCS technologies is an important decarbonization solution for many of Romania's industrial players, including cement, steel, refineries and others.

The geological CO₂ storage capacity of Romania is also **potentially significant**. Estimates of theoretical potential are as high as 22.6 gigatonnes – however more research is needed to refine these estimates and to evaluate technical and economic storage capacity. Detailed estimates exist primarily for depleted hydrocarbon reservoirs, but the bulk of Romania's storage potential is believed to be in saline aquifers, which are less well-characterised.

Romania also **has experience and know-how** on CCS technologies and projects. The Getica demonstration project was a unique good-practice example a decade ago but was abandoned primarily due to a lack of continued government support. Since then, research into CCS has continued at universities and research institutes across Romania.

From a regulatory perspective, Romania has transposed the EU CCS Directive and designated the National Agency for Mineral Resources (NAMR) as the competent authority for CO₂ storage. However, **more work is needed** to reach a fit-for-purpose regulatory framework, including appropriate procedures and institutional capacity for identifying and exploiting CO₂ storage reservoirs. The lack of a coherent national strategy for CCS also generates uncertainty in government support for these technologies.

A roadmap for CCS in Romania

Key actions for advancing CCS in Romania are as follows.

Policy, regulatory framework and the state

- Romania's transposition of the EU CCS Directive (**GEO 64/2011**) must be reviewed and improved in primary and secondary legislation.
- An **inter-ministerial committee** should drive policy and regulatory change for CCS.
- A **clear trilateral CCS strategy** between the Ministries of Economy, Energy, and Environment must be established, based on an updated assessment of national CCS potential.
- **Specific regulations** (e.g., national petroleum law) and procedures should be amended or developed.
- **Standards** for CO₂ transport and storage must be incorporated into national legislation.
- Romania should ratify the **London Protocol**.
- Relevant **decarbonization strategies** should be updated to reflect CCS.
- The Romanian Government should disseminate **existing strategies and communications** on CCS and experts from across political parties should be encouraged to **discuss CCS**.
- The Romanian Government should establish and coordinate **financing frameworks** that CCS projects can access, including disseminating information and supporting applications for EU funding.

- **Relevant authorities** must be aligned.
- Transport and storage should be assigned to a **specific operator**.
- Emerging CCS hubs should encourage horizontal **business opportunities** supported by government.

Research, development, and scaling.

1) Cooperation, knowledge, and capacity

- The **CO₂ storage division** of the NAMR should be provided with the appropriate resources.
- A **national knowledge platform** for CCS should be established by the inter-ministerial committee. Activities should include an institutional **capacity-building** programme and **regional cooperation** efforts.
- An association of **economic operators** for CCS should be established.
- Romanian authorities should be more involved in international CCS platforms, e.g., Zero Emissions Platform.

2) Evaluation of CO₂ storage potential.

- An **updated and in-depth assessment** of Romania's CCS potential should be conducted, including emitters, storage potential, transport and cost-benefit analyses. It should inform the CCS strategy and identify potential hubs.
- Following evaluation, the National Agency for Mineral Resources (NAMR) should **invite applications** for exploration and storage permits.
- Following evaluation, in-depth evaluations of **depleted oil and gas reservoirs** should be conducted.
- While evaluation of hydrocarbon reservoirs is ongoing, the NAMR should direct financing to the evaluation of storage potential of **saline aquifers**.

3) Research projects

- A framework to govern **corporate-research partnerships** for pilot CCS projects is needed.
- Economic operators should approach research institutions and co-opt engineering design firms to project consortia for **EU funding applications**.

Stakeholder engagement, cooperation, and know-how dissemination

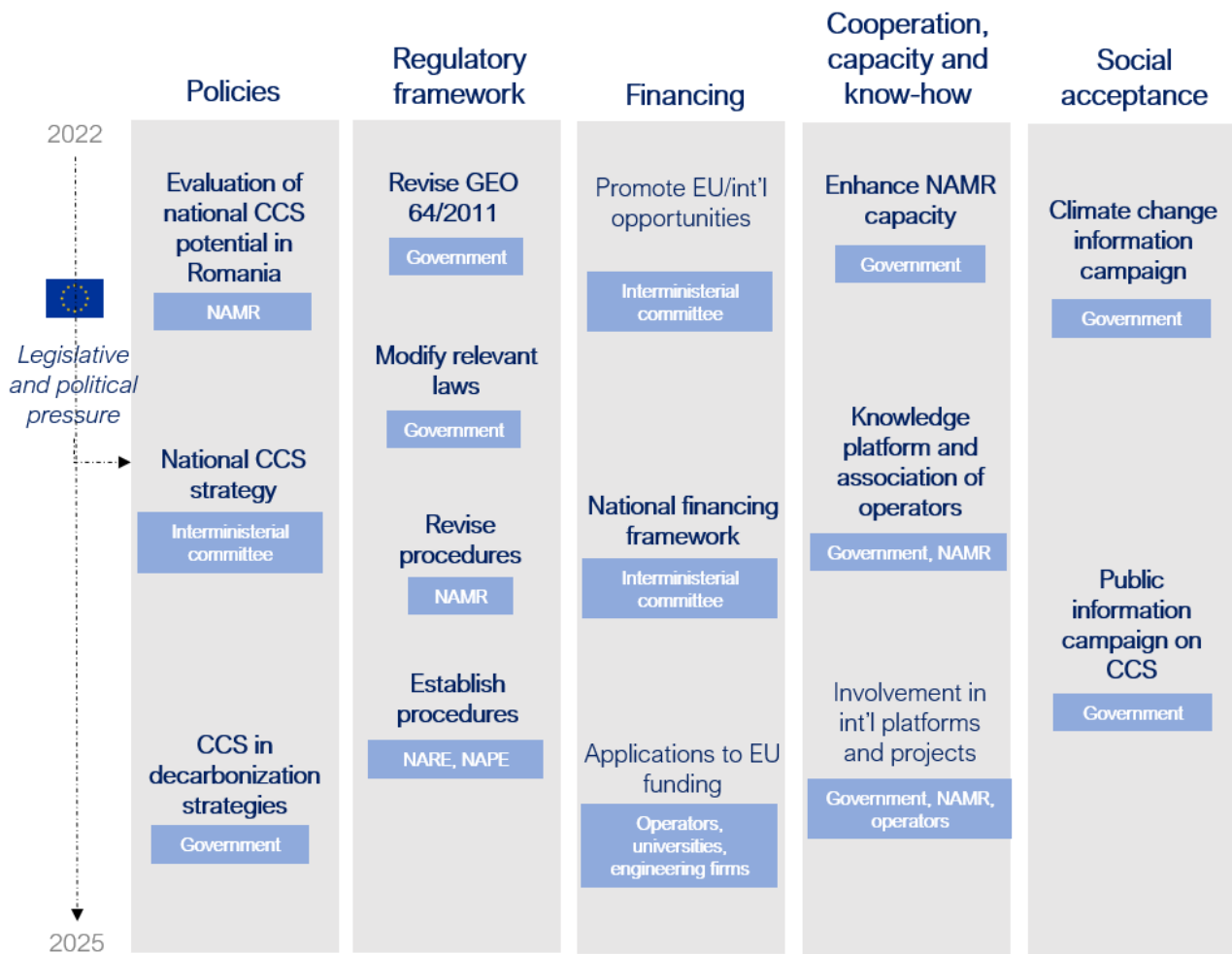
- The Romanian Government must **communicate with stakeholders** on CCS from the start (before exploration permit applications).
- Authorities should engage in and lead **knowledge transfer workshops**.
- **Cross-border project opportunities** should be explored.
- The Government should consider classifying CCS projects as **Projects of Common or Mutual Interest**.
- Petroleum companies should cooperate with the cement, metallurgy, and chemical industries to catalyse the **CO₂ market** and form hubs.

Social aspects and public support

- The Government must implement a **national education and awareness plan** for climate change.
- Subsequently, the Government, with an independent NGO, should deliver a **national CCS education programme** for the public and institutions, as part of broader decarbonisation programmes.
- Policy and regulatory changes for CCS should be **transparent** and encourage **public participation**.
- **Communities** local to potential CCS sites should be engaged early on.

Priority actions to 2025

Research for this roadmap identified the following key actions that must be implemented as a priority in the short-term (by 2025) to advance CCS in Romania.



Action led by **responsible**

NAMR: National Agency for Mineral Resources; RERA: Romanian Energy Regulatory Authority; NEPA: National Environmental Protection Agency; GEO: Government Emergency Ordinance

The CCS roadmap for Romania has been developed as part of the project „Building Momentum for the Long-Term CCS Deployment in the CEE Region” (CCS4CEE), funded by Iceland, Liechtenstein and Norway through the EEA and Norway Grants Fund for Regional Cooperation. A more comprehensive version of this roadmap and an analysis of the context and opportunities for CCS in Romania can be found on the CCS4CEE project website at ccs4cee.eu.