

BUILDING MOMENTUM  
FOR THE LONG-TERM CCS DEPLOYMENT  
IN THE CEE REGION

# CCS National Roadmap

Latvia

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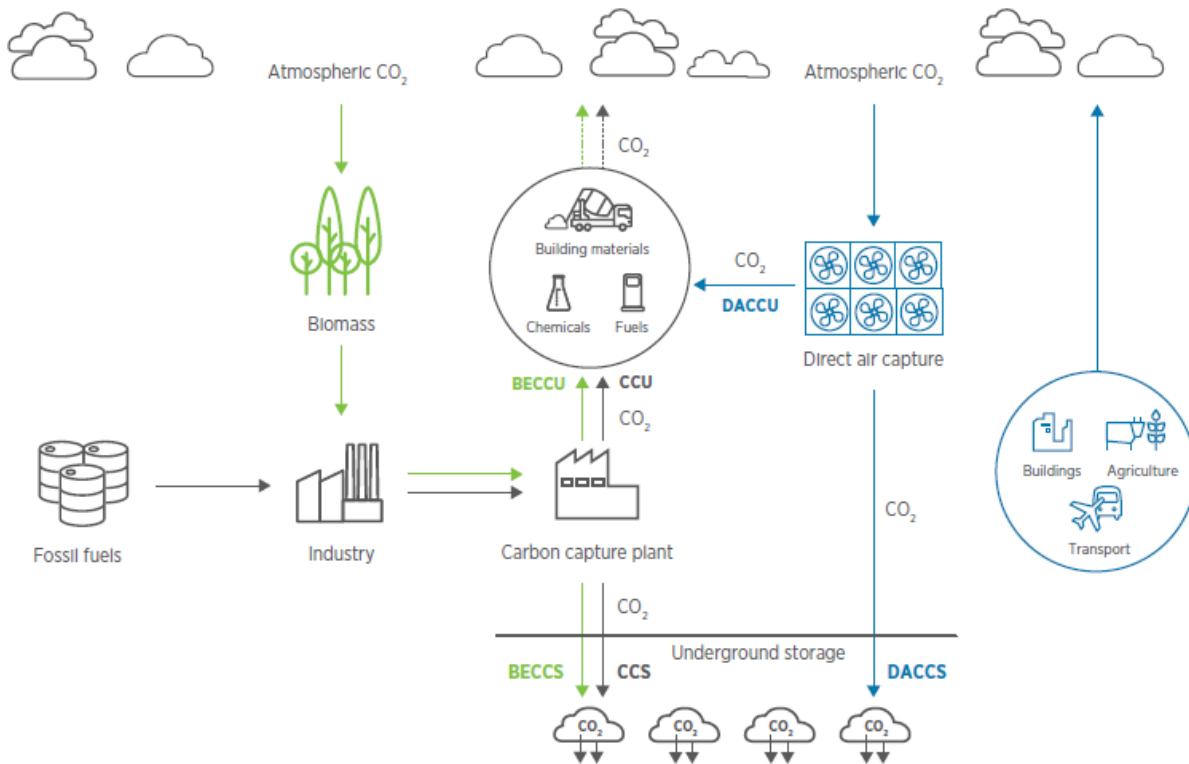
# Chapter 1. Role of CCS in decarbonization pathways

In 2019, the EU launched the European Green Deal to transform the EU into a modern, resource-efficient and competitive economy, cut GHG emissions by at least 55% by 2030 and reach net-zero emissions by 2050. Many 1.5°C compatible scenarios have assessed these targets and shown that a credible but narrow pathway exists and will require the use of all decarbonization tools available. **Renewables and energy efficiency** are key components of that pathway and account for 80% of emissions reductions and provide solutions to many sectors including power, transport and energy-intensive industries. But to reach net-zero renewables and energy efficiency, they **need to be supplemented by CO<sub>2</sub> capture and storage (CCS) and utilization (CCU) and carbon dioxide removal (CDR)** (particularly bioenergy with CCS/CCU (BECCS/BECCU)) **technologies** (Figure 1), in sectors such as power and heat, cement, steel, chemicals production and waste incineration. In addition, to address emissions from other sources as well as historic emissions, direct air capture with storage (DACCS) or utilization (DACCU), can also be deployed. These technologies together can mitigate **20% of global CO<sub>2</sub> emissions**, but to do so, **the scale has to increase significantly** (Figure 2), from the current 0.04 Gt of CO<sub>2</sub> per year to circa 8.5 Gt of CO<sub>2</sub> per year in 2050 (IRENA, 2021).

The benefit of CDR processes is that they remove CO<sub>2</sub> from the atmosphere, they do not simply reduce what was added, and in combination with long-term storage can result in negative emissions. As such they are a critical component of net-zero pathways in the European Green Deal and most recently in line with the Glasgow Climate Pact. There are preconditions to be assessed: biomass for BECCS needs to be sourced sustainably, while DACCS requires access to cheap renewable energy.

All these technologies utilize the same components of the value chain: the CO<sub>2</sub> transport, storage and utilization.

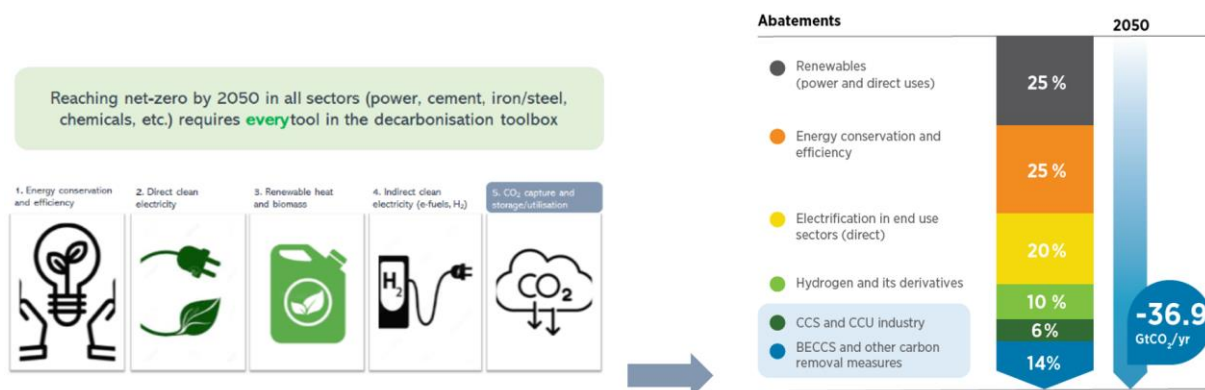
Figure 1: Carbon cycle with the use of CCS/CCU, BECCS/BECCU and DACCS/DACCU technologies<sup>1</sup>



Source: (IRENA, 2021)

<sup>1</sup> [https://irena.org/-/media/Files/IRENA/Agency/Technical-Papers/IRENA\\_Capturing\\_Carbon\\_2021.pdf](https://irena.org/-/media/Files/IRENA/Agency/Technical-Papers/IRENA_Capturing_Carbon_2021.pdf)

Figure 2: Carbon capture and storage as a part of the global decarbonization toolbox<sup>2</sup>



Source: Based on IRENA (2021)

The pace of progress in validating and deploying these technologies across sectors has been slow to date and in many cases with significant costs overruns. There are currently many commercial CCS, CCU and CDR plants globally capturing 40 Mt of CO<sub>2</sub> per year (IRENA, 2021), with many more being developed and an increasing number of pilot and demonstration projects that focus on safety issues, environmental impacts and economic costs, while generating lessons learned to be used to further improve these technologies and bring their costs down.

This current momentum to speed up energy and industrial transition considers these technologies as its necessary component of the transition and **activities at the national and regional levels** may help to **enhance the collective understanding** of the issues surrounding CCS, **build confidence** and **scale up their deployment** to **reduce costs** of these technologies and related infrastructure.

<sup>2</sup> Ibid.

## Chapter 2. Opportunities and barriers for deployment of CCS and its related technologies in Latvia

This chapter outlines the main opportunities and barriers to the deployment of CCS/CCU in Latvia based on the findings from the national report:

- Two major industrial **carbon-intensive sectors** can be distinguished in Latvia – energy production and cement production. The largest CO<sub>2</sub> emitter in the energy sector and among Latvian companies is Latvenergo (production and sale of electricity and heat). In cement production, all emissions are generated by the company Schwenk Latvija. More than half of Latvia's CO<sub>2</sub> emissions at the company level in 2019 were produced by those two largest companies (54% of the total amount of 3775,2 kT).
- **National policy planning documents** (such as Latvia's strategy to achieve climate neutrality by 2050 and National Climate and Energy Plan 2021-2030) do not envisage CCS solutions in Latvia until 2030, considering the high costs and the unassessed environmental impact. CCU also has a minor role, but overall, the potential is regarded as higher than for CCS solutions.
- Currently, the main obstacle affecting CCS development in the **regulatory framework** is the prohibition on the storage of CO<sub>2</sub>. Although Latvia amended existing legislation to implement Directive 2009/31/EC on the geological storage of carbon dioxide, there is still a prohibition on the storage of CO<sub>2</sub> in onshore and offshore geological structures (Law "On Pollution").
- Generally, the stakeholders are relatively well **informed about CCS/CCU possibilities** and know the basic principles. However, most of the stakeholders for whom the introduction of such technologies could be relevant have a reserved position concerning this technology. This is mainly due to the economic aspects regarding the implementation of CCS/CCU technologies, as well as other limiting aspects. The exception is Schwenk Latvija, which is very well informed about this topic and is in favour of developing such technologies and frameworks at the national level.
- Practically **implemented projects** in the field of CCS and CCU in Latvia have not been identified, but there are studies in this field on different issues. There are some pilot projects in the Schwenk Group's cement plants in this field, and there is the possibility of transferring successful examples. Further research and pilot projects are needed to develop CCS/CCU technologies and to get more data on the geology formations and the potential for CCS.
- **The transport infrastructure** is non-existent, and significant investments are required for that. Therefore, the infrastructure and logistics plan should be developed. Further research is necessary to understand the detailed technical specifications.
- Geological conditions potentially allow **storage of CO<sub>2</sub> underground** in Latvia. There are several potential onshore and offshore structures for that. Storage of CO<sub>2</sub> underground, however, has been prohibited in Latvia since 2012.
- During several stakeholder interviews and a workshop, the **option of CCU** was emphasized more than CCS, which was identified as a more optimal option for the CO<sub>2</sub> emission volumes produced in Latvia and would more comply with the circular economy principles.
- Based on currently available information, no definite **public image** has been formed in connection with CCS/CCU technologies, as this sector has not been developed in Latvia so far.
- **The position of stakeholders** can be grouped into two categories:

- Pace-setters – some stakeholders see the potential of CCS/CCU in the near future. For example, Schwenk Latvija is interested in introducing and developing CCS and CCU technologies within the next ten years to achieve both the company and EU goals. "Ventspils nafta" termināls is looking for a new niche and currently is evaluating how oil products and fossil fuels can be replaced in the future (favouring the CCU option). At the same time, Riga Technical University and the University of Latvia have several CCS and CCU research projects/studies conducted and ongoing.
- Fence-sitters – the majority of stakeholders in Latvia. The principal reasons for this position are lack of economic justification, safety concerns of CCS, and the untapped potential of alternative technologies and methods that support decarbonization processes. Also, for some stakeholders, certain positions for or against the CCS and CCU have not yet been taken.

Since the publication of the national report, there have been several **significant developments in the field of CCS/CCU:**

- In Latvia, a new law is being developed in the field of climate (Climate Law), which will also replace the current Law "On Pollution". In the current draft, after the recommendations of industry representatives, it is planned to abolish the current prohibition on the storage of CO<sub>2</sub>. It is also intended that the basic principles for this field will be determined there, and further development of the regulatory framework will be delegated. This law is still being developed and is subject to changes.
- Schwenk Latvia has implemented a CO<sub>2</sub> capture technology pilot project at its cement plant. There are also a few new projects and opportunities at other Schwenk Group's cement plants.
- Interaction between stakeholders is ongoing in various formats, exploring opportunities for cooperation on potential future projects and possible developments in the field.

# Chapter 3. Policy roadmap for the scaled-up deployment of CCS and its related technologies in Latvia

The roadmap provides an overview of various ambitious policy actions along the innovation cycle, from research and development to potential commercialization of these technologies in order to reach climate targets set by the EU and national strategies. While the roadmap aims to create an enabling environment to deploy CCS projects<sup>3</sup>, it increasingly focuses on ways to develop transferable knowledge and skills by national stakeholders (governments, research organizations, academia, private sector) in one or more stages along the carbon capture, transport, storage and utilization chain, and create linkages to gain knowledge and experience from more experienced stakeholders across the globe. It also underlines the importance of cross-border activities and joint regional demonstration projects to increase stakeholder access to funding considering their different geographies.

Each group of actions has a specific name and is divided into single actions that could be done by specific stakeholders within a proposed time frame:

- Short-term – actions to be done from now to 2025;
- Short-term with continuous efforts – done until 2025 but need continuous efforts from the moment of implementation;
- Mid-term – actions to be done between 2025 and 2030;
- Mid-term with continuous efforts – done until 2030 but need continuous efforts from the moment of implementation;
- Long-term – actions to be done after 2030;
- Long-term with continuous efforts – done after 2030 and need continuous efforts from the moment of implementation.

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<sup>3</sup> Given the defined framework of the project "Building momentum for the long-term CCS deployment in the CEE region" where this roadmap has been developed, as well as the larger overall impact of CCS technologies on the achievement of defined climate goals, this roadmap is focused more on CCS, rather than CCU activities. However, the majority of further defined activities in the roadmap can also be attributed to promote specific CCU activities.



## A) Scaling-up RD&D activities and building national knowledge and experience

Key action	No.	Approach	Stakeholders	Timeline
<b>Knowledge platforms</b>	A.1.1	Nominate an individual from the Ministry of Environmental Protection and Regional Development that coordinates the activities of the state regarding the development of CCS.	Ministry of Environmental Protection and Regional Development	Short-term initiative
	A.1.2	Set up a platform/working group to represent key stakeholders involved in CCS development (with the possibility for cooperation at the Baltic level). This platform/working group would ensure the mechanism to discuss current issues and challenges, advance the necessary development and disseminate/accumulate the knowledge in this field. Alternatively, implement the functions of the proposed platform/working group in an existing group, such as one of the National Energy and Climate Council working groups.	Ministry of Environmental Protection and Regional Development or Ministry of Economics (involving other interested stakeholders)	Short-term initiative
	A.1.3	Create a section/separate website in connection with the above-mentioned platform/working group (A.1.2). This place would ensure the information on the development of the CCS sector in Latvia and the surrounding region. It also would serve as a source through which this issue and future opportunities are introduced to other parties.	Ministry of Environmental Protection and Regional Development or Ministry of Economics (involving other main stakeholders)	Short-term initiative
<b>Engagement with international fora</b>	A.2.1	According to the needs/identified future development directions (from activity A.3.1), identify the need for participation in international platforms or broader representation in existing forums. Accordingly – joining or ensuring greater involvement in those forums (e.g., Zero Emissions Platform (ZEP), Carbon Sequestration Leadership Forum (CSLF), IEAGHG, Baltic Carbon Forum (BASRECCS)).	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short to mid-term initiative with continuous efforts

<b>Identifying industrial hubs/clusters/CO2 transport networks</b>	A.3.1	Develop feasibility study/research at the national (potentially Baltic) level. The main objective of which is to determine whether and what role CCS technologies can play in achieving decarbonization goals (whether and under what circumstances these technologies can be used to achieve these goals). As a result, the direction/scenario would be defined for the further usage of CCS technologies at the national level. The main steps for further development will be outlined, and the main problems and possibilities will be identified, including the potential solutions for them.	Ministry of Environmental Protection and Regional Development	Mid-term initiative
<b>Funding and financial support for RD&amp;D projects</b>	A.4.1	Monitor funding opportunities at the EU and international level that could help to develop the necessary activities (e.g., Innovation Fund, Horizon Europe, Connecting Europe Facility (including Projects of Common Interest), EEA and Norway Grants) and disseminate them among interested stakeholders through various channels (seminars, websites etc.).	All the relevant stakeholders in the industry sector and academia, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short-term initiative with continuous efforts
	A.4.2	Examine the possibility of including support for CCS activities in national planning documents outlining the use of EU investments.	Ministry of Environmental Protection and Regional Development, Ministry of Economics and Ministry of Finance (involving other main stakeholders)	Short to mid-term initiative with continuous efforts
	A.4.3	Ensure financing opportunities from the state for research projects in the field of CCS by including this topic in the next National Research Programme framework.	Ministry of Economics in cooperation with the Latvian Council of Science and the Latvian Academy of Sciences	Short to mid-term initiative
	A.4.4	Develop specific financing instruments to support the achievement of the target set in the National Climate and Energy Plan for the period 2021-2027 – devote at least 2% of total R&D investment in the Strategic Energy Technology Plan (SET-Plan) priorities in the field of energy to CCS. <sup>4</sup>	Ministry of Economics (involving other main stakeholders)	Short-term initiative

<sup>4</sup> [https://ec.europa.eu/energy/sites/ener/files/documents/lv\\_final\\_necp\\_main\\_en.pdf](https://ec.europa.eu/energy/sites/ener/files/documents/lv_final_necp_main_en.pdf)

<b>Storage site exploration</b>	A.5.1	Identify the most potential sites for detailed geological surveys (wells) for CO <sub>2</sub> storage. Then, carry out detailed geological surveys at the identified sites.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short to mid-term initiative
	A.5.2	Verify and update previously obtained results from academic research on potential CO <sub>2</sub> storage sites and continue to implement further research.	Academia	Short-term initiative with continuous efforts
<b>Bridging the valley of death</b>	A.6.1	Implement further research projects and pilot projects in the field of CCS (e.g., techno-economic modelling of possible CCS scenarios, experimental CO <sub>2</sub> storage in geological structures, transporting pilot projects and solutions, further feasibility studies for applicable industry players, practical CCS pilot projects demonstrating the whole value chain, calculated estimated benefits for the climate and society, further research into feasible and applicable CCU options considering the local context).	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2) and academia	Short-term initiative with continuous efforts
	A.6.2	Analyze existing experience of implemented and functioning projects / operating models both individually and through various cooperation mechanisms (stakeholder platform/working group, the experience of group companies, etc.).	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short-term initiative with continuous efforts

## B) Policy, standards and regulations

Key action	No.	Approach	Stakeholders	Timeline
<b>Policies</b>	B.1.1	Incorporate the CCS aspects more widely into the planned amendments of Latvia's strategy to achieve climate neutrality, the National Climate and Energy Plan and other relevant existing or new policy-planning documents (including the main development steps, relevant stakeholders, specific financing possibilities etc.) In addition, amendments must reflect on the international and global research findings (IPCC, IEA, IRENA, etc.) where CCS is included in almost each successful decarbonization scenario, as well as local studies and findings (e.g., feasibility study/research from A.3.1).	Ministry of Economics and Ministry of Environmental Protection and Regional Development	Mid to long-term initiative
	B.1.2	Incorporate the CCS aspects in the national decarbonization projections	Ministry of Economics	Short-term initiative
<b>Guidelines and standards</b>	B.2.1	Participate in the ISO Carbon dioxide capture, transportation, and geological storage technical committee (ISO/TC 265) to validate the assumptions about standardizations of technological processes. Latvia can participate there as an observing member or participating member.	Latvian Standard (involving other interested stakeholders)	Mid-term initiative with continuous efforts
<b>Regulatory framework</b>	B.3.1	Abolish the existing prohibition of storage of CO <sub>2</sub> in geological formations, as well as in the water column in the territory of Latvia (Law "On Pollution" <sup>5</sup> ) through the proposed Climate Law, which will replace, among other things, the existing Law "On Pollution". Determine the basic principles for this field, and delegate further development of regulatory framework through separate Cabinet of Ministers regulations (regarding transportation, storage, usage of CO <sub>2</sub> and other aspects) in the Climate Law.	Ministry of Environmental Protection and Regional Development (involving other relevant stakeholders)	Short-term initiative
	B.3.2	Develop the above-mentioned Cabinet of Ministers regulations (involving the main stakeholders in the development process and considering the relevant national and EU-level regulatory framework (e.g., the CCS directive)).	Ministry of Environmental Protection and Regional	Short to mid-term initiative

<sup>5</sup> <https://likumi.lv/ta/en/en/id/6075-on-pollution>

			Development (involving other relevant stakeholders)	
	B.3.3	Latvia should join the London Protocol and ratify its 2009 amendment to article 6, enabling the export of CO <sub>2</sub> streams for the purpose of sequestration in transboundary sub-seabed geological formations. After joining the London Protocol and until the amendment is ratified by the required majority, sign bilateral agreements with the country of potential offshore storage to facilitate provisional export of CO <sub>2</sub> (if evaluated necessary at this stage).	Ministry of Environmental Protection and Regional Development	Mid-term initiative

## C) Stakeholder engagement, cooperation & know-how dissemination

Key action	No.	Approach	Stakeholders	Timeline
<b>International/ regional cooperation</b>	C.1.1	Identify up-to-date information on new CCS projects in the surrounding region and regularly update this information on existing ones (such as Norway's full-scale CCS projects, pilot projects through the SCHWENK group and others), which can provide insight into cooperation opportunities.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short-term initiative with continuous efforts
	C.1.2	Promote cooperation and further communication between the most significant stakeholders in Latvia and the other Baltic States.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short-term initiative with continuous efforts
	C.1.3	Support regional cooperation through regional coordination forums, such as the Three Seas Initiative and the Baltic Sea Region Energy Cooperation.	Representative of Latvia in the Three Seas Initiative and the Baltic Sea Region Energy Cooperation, in cooperation with the relevant stakeholders	Short-term initiative with continuous efforts
	C.1.4	Utilize the communication and initiatives in the Nordic Council of Ministers and its CCUS working group.	Ministry of Economics and The Nordic Council of Ministers' Office in Latvia, in cooperation with the relevant stakeholders	Short-term initiative with continuous efforts

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<b>Stakeholder cooperation towards CO<sub>2</sub> market</b>	C.2.1	Support and organize local and regional events that promote knowledge transfer and further collaboration. Through such events, it would be possible to disseminate information on relevant studies and opportunities and attract external specialists with expertise in this field.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short to mid-term initiative with continuous efforts
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## D) Social aspects and public support

Key action	No.	Approach	Stakeholders	Timeline
<b>Building public support</b>	D.1.1	According to the needs/identified future development directions (activity A.3.1), develop the communication plan to build public support and introduce and educate the public about CCS and its broader context of climate change and energy policy. The communication plan should also define and include the key messages, benefits, risks and potential costs of such solutions.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Mid-term initiative
	D.1.2	Carry out proactive communication activities from industry representatives highlighting the importance of this issue and the wider context of this topic in connection with climate change.	All the relevant industry stakeholders	Short-term initiative with continuous efforts
<b>Building awareness</b>	D.2.1	Before the development of a media communication plan, make the main outputs/information regarding the development of CCS and projects in this field available to the public and other institutions (linkage with the activity A.1.3), highlight the potential and security of the technology, as well as the importance of this technology in mitigating climate change.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short-term initiative with continuous efforts
<b>Improving fairness of the decision-making process</b>	D.3.1	Cooperate with local governments if some kind of CCS-related activities are planned in their territory. Cooperation should be encouraged in the early stages of such activities, if necessary, by developing appropriate compensation mechanisms and involving local communities.	All the relevant stakeholders, in cooperation with the above-mentioned stakeholder platform/working group (A.1.2)	Short-term initiative with continuous efforts



## Chapter 4. Next and immediate steps

One of the main emphases for the advancement of this sector should be **changes and further development of the regulatory framework**. The first steps in this regard for the development of CCS (as well as for the next stage of this project) would be the **nomination of a responsible person from the ministry** and the **creation of the stakeholder working group or platform** on this issue (which also contributes to the promotion of cooperation and knowledge / experience dissemination in general), as well as the **adoption of the Climate Law in a version which abolishes the current prohibition on CO<sub>2</sub> storage**. However, the accomplishment and time frame of those activities depends on the interaction of several factors.

Stakeholders can also implement a number of continuous activities under WP5, such as **monitoring available funding** for further activities, **implementing different studies and pilot projects**, **analyzing the existing experience** of implemented and functioning projects / operating models, **promoting cooperation and further communication** between the most significant stakeholders, **supporting regional cooperation**, etc.

