



Beyond the Gassnova 2022 Report: Unpacking Key Legal Challenges

A follow-up study to Gassnova's report on Regulatory Lessons Learned from Longship

IOM LAW

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1 Introduction

1.1. Scope of the project and structure of the report

In 2022, Gassnova published a report on the regulatory lessons learned from Longship (the 2022 Report).¹ Longship stands as the pioneering demonstration project for industrial CCS under the Norwegian CCS-specific legislation, expected to start injection in 2025. As the first of its kind, the project brought to light and tested various issues within the existing framework, which might only become apparent during the deployment of a project. In their report, Gassnova highlighted some of the regulatory issues experienced by the parties involved in Longship during the planning and development of the project.

Nearly 3 years have passed since the publication of the 2022 Report, and IOM Law has conducted a follow-up study to further review the regulatory issues outlined by Gassnova. Some issues have been overcome since the report issuance, while others have emerged.

The objective of this report is to assess progress made in resolving these challenges, analyse remaining issues and barriers, and, where appropriate, propose potential solutions moving forward. This report also includes observations regarding legal issues having been identified after the 2022 Report.

Chapter 1 introduces the background of the project, the authors, the Longship project, 2022 Report, and an executive summary. Chapter 2 introduces the regulatory framework for CCS in Norway as a backdrop for the analysis provided in Chapter 3. In Chapter 3, the issues identified by Gassnova are analysed in further detail, and recommendations with regard to solutions are provided to the extent possible. A conclusion is provided in Chapter 4, which also includes new legal and regulatory challenges identified after the issuance of the 2022 Report. A detailed analysis of the new legal and regulatory challenges is outside the project's scope but is briefly introduced to highlight the need for further study.

1.2. Approach and methodology

IOM Law has addressed the issues in this report by using a combination of legal analysis and literature review, stakeholder input via interviews, meetings, and attending webinars and conferences. The interviewees were selected to gain a representative cross-section of relevant actors, representing emitters, transporters, storage operators, financial institutions, NGOs, and other relevant stakeholders. The interviews were treated confidentially to encourage openness.

1.3. About IOM Law

IOM Law is a Norwegian boutique law firm distinguished by its diverse team, with formal legal training from Norway, the United States, the United Kingdom, Denmark, Belgium, Hong Kong, Egypt, and France. Unique in its specialisation, it is the only law firm globally to focus exclusively on carbon removal and carbon reduction technologies. Since its inception, IOM Law has been engaged by public and private clients worldwide to tackle complex legal challenges related to

¹ Gassnova, 'Regulatory Lessons Learned from Longship' (Rev. 01-2022, Doc. No: 21/156-4) (2022 Gassnova Report) <https://gassnova.no/app/uploads/sites/6/2022/07/Regulatory-lessons-learned-from-Longship-FINAL-WEB-1.pdf>

decarbonisation and carbon management, bridge regulatory gaps, and develop legal and regulatory frameworks.

1.4. About Longship

1.4.1. Norwegian CCS development and the Longship project

The 2014 CCS Strategy issued by the Norwegian Government launched the ambition to realise a full-scale CCS demonstration project.² The planning and development of Longship commenced in 2015 with feasibility studies on capture, transport, and storage, showing the benefits of developing a complete value chain.³

Longship builds on Norway's previous CCS experience. For many years, the Norwegian Government has supported research and technology developments related to CCS through, for example, CLIMIT, CCS at Kårstø and Carbon Capture Mongstad (CCM), and Technology Centre Mongstad (TCM), all of which have generated knowledge and experience related to project development, technology, policy, and regulatory frameworks.

The Longship project comprises two emitters planning to capture CO₂ and one transport and storage infrastructure company. The capture sites include Heidelberg Materials' cement plant in Brevik (Heidelberg) and Hafslund Celsio's Klemetsrud waste-to-energy plant (Celsio), both located close to the Oslo fjord in the south-eastern part of Norway. The transport and storage services are operated by the three companies Equinor, Shell, and Total through Northern Lights JV DA - a special-purpose entity established for the demonstration project.⁴ The Norwegian State has accepted that the *“industrial partners will only enter a contractual relationship directly with the state, with no obligations towards the other partners in the CCS chain”*,⁵ and the State will *“carry the risks associated with the operational cooperation between the partners and the potential extra costs incurred from potential delay of any of the sub-projects.”*⁶

The CO₂ captured from Heidelberg will be transported by ship to an intermediate storage facility onshore in Øygarden on the west coast of Norway. The CO₂ from Celsio will first be transported to the Oslo Harbor by truck, then similarly loaded on a ship and transported to Øygarden.⁷ From Øygarden, the commingled CO₂ from both emitters will be transported by pipeline and injected into the Aurora reservoir 2600 meters under the seabed in the Johansen formation.⁸

² Prop 1 S (2014-2015) FOR BUDSJETTÅRET 2015, Norwegian Ministry of Energy <https://www.regjeringen.no/no/dokumenter/Prop-1-S-20142015/id2005418/?ch=1> accessed 27 November 2024 ; <https://gassnova.no/historie> .

³ Norwegian Ministry of Energy, Gassnova, Gassco, 'Mulighetsstudier av fullskala CO₂-håndtering i Norge' (n.d.) <https://gassnova.no/app/uploads/sites/6/2020/05/Mulighetsstudier-av-fullskala-CO2-h%C3%A5ndtering-i-Norge.pdf> accessed 19 December 2024.

⁴ Northern Lights JV DA, 'Nøkkelopplysninger fra Enhetsregisteret' (2021) <https://w2.brreg.no/enhet/sok/detalj.jsp?orgnr=926655779> accessed 10 October 2023 ; Northern Lights, 'Who we are' (n.d.) <https://norlights.com/who-we-are/> accessed 10 October 2023.

⁵ Gassnova, 'Developing Longship: Key Lessons Learned' (Rev. 01 -2020) p. 26. (Gassnova, 'Developing Longship: Key Lessons Learned') <https://gassnova.no/app/uploads/sites/6/2022/06/Gassnova-Developing-Longship-FINAL.pdf>

⁶ Gassnova, 'Developing Longship: Key Lessons Learned' (n 5) p 26.

⁷ Northern Lights, 'About the Longship Project' (n.d.) <https://norlights.com/about-the-longship-project/> accessed 10 October 2023.

⁸ Northern Lights, 'What We Do' [What we do - Northern Lights](https://norlights.com/what-we-do-northern-lights) accessed 10 October 2023.

The capture facility at Heidelberg was completed in December 2024. Heidelberg could report that only minor details remained until the facilities would also be mechanically complete and ready to enter the final stage of testing and commissioning.⁹ Celsio has been in a cost-reduction phase since 2023 but recently announced that construction would continue and that they will remain a part of Longship.¹⁰ The infrastructure of Northern Lights is scheduled to be developed in phases. Phase 1 includes the capacity to transport, inject, and store up to 1.5 million tonnes of CO₂ per year, operating for 25 years.¹¹ Since the issuance of the 2022 Report, Northern Lights has entered into commercial contracts with emitters outside Norway for transportation and storage services (Yara in the Netherlands¹² and Ørsted in Denmark¹³). The storage capacity for phase 1 is, therefore, now full.¹⁴ Northern Lights has stated that they plan to expand the capacity in the next phase with an additional 3.5 million tonnes.¹⁵

On 26 September 2024, Northern Lights held the official opening of the Northern Lights facilities, celebrating that the facilities are complete and ready to receive CO₂.¹⁶ Northern Lights invited inhabitants of Øygarden and the Bergen region to attend and celebrate the milestone. The celebrations were marked with the delivery of the first CO₂ into the facilities.¹⁷

At the time of writing, a permit for injection and storage has not yet been issued for Northern Lights.

1.4.2. Gassnova's regulatory learnings from the Longship project: identified problems

Gassnova is the Norwegian State's enterprise for CCS established in 2005 to promote research, technology, and competence in the use of CCS. Gassnova represents the Norwegian State with a 34% share in TCM,¹⁸ holds the secretariat for the CLIMIT program,¹⁹ and has held important

⁹ Heidelberg Materials 'Mechanical Completion - The last milestone before launch' <https://www.brevikccs.com/en/project-update> accessed 19 December 2024.

¹⁰ Norwegian Government, 'Regjeringa legg til rette for CO₂-fangstprosjektet til Hafslund Celsio' (22. November 2024) <https://www.regjeringen.no/no/aktuelt/regjeringa-legg-til-rette-for-co2-fangstprosjektet-til-hafslund-celsio/id3076046/> accessed 18 December 2024.

¹¹ Norwegian Ministry of Energy, 'Langskip – Fangst og lagring av CO₂' (Chapter 4.2.3) Meld. St. 33 (2019–2020), Regjeringen Solberg <https://www.regjeringen.no/no/dokumenter/meld.-st.-33-20192020/id2765361/> accessed 10 October 2023.

¹² Northern Lights, 'Northern Lights and Yara Sign Binding Agreement on CO₂ Transport and Storage' (20 November 2023) <https://norlights.com/news/northern-lights-and-yara-signs-binding-agreement-on-co2-transport-and-storage/> accessed 10 October 2023.

¹³ Northern Lights, 'Northern Lights Enters into Cross-Border Transport and Storage Agreement with Ørsted' (15 May 2023) <https://norlights.com/news/northern-lights-enters-into-cross-border-transport-and-storage-agreement-with-orsted/> accessed 10 October 2023.

¹⁴ Equinor, 'Viktig skritt for å avkarbonisere Europa' (2022) <https://www.equinor.com/no/nyheter/20220829-viktig-skritt-avkarbonisere-europa> accessed 27 November 2024.

¹⁵ Northern Lights, 'Northern Lights EU funding approved' (12 June 2024) <https://norlights.com/news/northern-lights-eu-funding-approved/> accessed 21 August 2024.

¹⁶ Northern Lights, 'Northern Lights Invites Inhabitants of Øygarden and the Bergen Region to Celebrate the Completion of CO₂ Receiving Facilities' (9 September 2024) <https://norlights.com/news/northern-lights-invites-inhabitants-of-oygarden-and-the-bergen-region-to-celebrate-the-completion-of-co2-receiving-facilities/> accessed 27 November 2024.

¹⁷ Note that this CO₂ is not for injection but other purposes, such as running the facilities.

¹⁸ Norwegian Government, 'Teknologisenteret for CO₂-fangst på Mongstad (TCM)' (29 December 2023) <https://www.regjeringen.no/no/tema/energi/co-handtering/teknologisenteret-for-co2-fangst-pa-mongstad-tcm/id2345604/> accessed 13 August 2024.

¹⁹ Gassnova, 'About Gassnova' <https://gassnova.no/en/about-gassnova> accessed 19 December 2024.

roles in the projects at Kårstø and CCM,²⁰ in addition to being a technical and strategic advisor to the Norwegian Ministry of Energy (MoE) for CCS.²¹ Gassnova contributes to developing the knowledge base for further development of CO₂ management and the implementation of the government's overall policy in the area.²² They have a webpage where they share information and learnings from Longship and other CCS activities.

Gassnova holds a project integrator role for the State in Longship,²³ coordinating and facilitating the development of the value chain, managing interdisciplinary challenges, and facilitating efficient work processes between the partners.

As Longship is the first project tested under the dedicated Norwegian CCS framework,²⁴ there were several regulatory issues, barriers and learnings that were identified as part of planning and developing the value chain. Issues identified pertained to, *inter alia*: State aid and market failure, ETS liability, CCS framework inspired by the framework for petroleum, biogenic CO₂, monitoring, third-party access, financial security, and cross-border transport under the London Protocol.²⁵

1.5. Executive summary

The Longship project plays a pivotal role in testing and advancing the regulatory framework for CCS in Norway, revealing critical gaps and barriers while demonstrating feasibility that sets the stage for broader deployment. As the first project being tried under the dedicated Storage Regulations, Longship brought to light several regulatory issues.

Such issues include challenges related to market failure, with CCS remaining financially unviable without significant state aid due to its high costs and uncertain returns. The project relied on state aid agreements that mitigated financial risks, but future projects will require new and more replicable mechanisms. This report concludes that mechanisms such as reversed auctions and carbon contracts for differences, as proposed by Oslo Economics, are suitable to ensure economic feasibility. It is important to recognise that such state aid represents a necessary but temporary response to address ongoing market failure. In the long term, reliance on state aid must be phased out. Once CCS demonstrates economic viability with a robust business case, the justification for state intervention will diminish, and such mechanisms should be retired.

Amendments to the EU Emissions Trading System and the Monitoring and Reporting Regulation have been made to, *inter alia*, accommodate modes of transport other than pipelines, including shipping. However, the lack of corresponding updates to the CCS Directive, which only considers pipelines, leaves regulatory uncertainty and misalignment. In the short term, these amendments are important and adequate to support project development; however, for the long term, we recommend making corresponding amendments to the CCS Directive to ensure harmonisation and completeness of the EU's CCS framework. By not harmonising *all* the relevant instruments, the regime will remain incomplete and ambiguous. The legal value,

²⁰ Gassnova 'Earlier Norwegian CCS Projects' (n.d) <https://ccsnorway.com/earlier-norwegian-ccs-projects/> accessed 19 December 2024.

²¹ Gassnova, 'About Gassnova' (n 19).

²² Gassnova, 'About Gassnova' (n 19).

²³ Gassnova, 'Developing Longship: Key Lessons Learned' (n 5) p. 17.

²⁴ Lagringsforskriften (FOR-2014-12-05-1517) *Forskrift om utnyttelse av undersjøiske reservoarer på kontinentalsokkelen til lagring av CO₂ og om transport av CO₂ på kontinentalsokkelen*, Ministry of Energy, entry into force 05.12.2024 (Storage Regulations).

²⁵ 2022 Gassnova Report (n 1).

transparency, and predictability of the EU CCS regime are compromised by each deviation between wording and practice. The EU legal framework is complicated and incomprehensible to many stakeholders, implying that each deviation also creates a greater distance to the stakeholders operating under the framework, representing risks and costs for the project developers. The ambiguities increase even further as the EU instruments and their respective amendments are transposed into national frameworks.

The CCS framework in Norway is built on the same model as the regulatory framework for petroleum. This has been beneficial due to the many overlaps that exist between the two industries. However, their distinct risks, market maturity, and financial structures are increasingly being recognised and highlighted. There is a call from industry for further tailoring of regulations that acknowledge these differences. We observe that efforts have already been made to accommodate and mitigate some of the differences. However, some of these differences are considered unfavourable by industry, including the obligation to establish a company under the Company Act to operate a storage licence. We agree that the Storage Regulations and relevant policies could be more enabling and fit for purpose. As a part of this, we stipulate that the CCS regime would benefit from transitioning from the open-door policy for licencing, to regular open licencing rounds announced in advance. This approach may create more certainty, predictability, and flexibility for negotiations, planning, and the drafting of the application, which would be advantageous given the scale of CCS deployment envisioned in Norway and Europe. This may be particularly relevant with the entry into force of the Net Zero Industry Act (NZIA), under which certain oil and gas operators have to meet an allocated contribution of NZIA's injection target. This may result in the need for a number of new licences on the Norwegian Continental shelf and foreign companies wanting to invest in such new licences.

The deployment of Longship also highlighted the lack of incentives for capturing and storing biogenic CO₂, a significant challenge given the growing importance of carbon removal technologies like BECCS. Although mechanisms such as the EU's Carbon Removal Certification Framework offer potential pathways, this report proposes that negative emissions should be included in a common compliance market instead of parallel volunteer markets.

According to the 2022 report, Northern Lights also expressed some uncertainties related to how the demands for monitoring under the Storage Regulations would be enforced. It is important to acknowledge that no framework is perfect until it has been tested through practical application to identify and address gaps and barriers. Even though Sleipner and Snøhvit have provided important learnings to help shape the monitoring framework, there is still room for improvement. Monitoring requirements for CO₂ storage under the Storage Regulations necessitate comprehensive, dynamic monitoring plans throughout a project's lifecycle, balancing safety, environmental protection, and regulatory compliance. These plans are performance-based and developed by operators using best practices, site-specific conditions, and evolving technologies, with approvals required from relevant authorities. Although it is necessary to maintain a performance-based framework with the monitoring plan as a cornerstone, we envision that as the industry and regulators get more experience from projects, there will be further improvements. There are also tools available today that may support predictable monitoring requirements and help develop a solid baseline for monitoring during the site selection and characterisation. The ISO 27914 standard provides a framework for monitoring, emphasising risk management and storage performance, and its adoption in Norway and globally demonstrates its practical utility. While the framework balances flexibility

and rigor, post-closure monitoring obligations present challenges in cost and predictability, highlighting the need for continued learning and standard evolution.

Furthermore, third-party access (TPA) in the Storage Regulations was cited as an example of a provision that posed a potential risk to Northern Lights. The concern and uncertainty were tied to a fear of lack of control over the conditions for this. This report finds that these views are not widely shared across the industry. TPA in Norway and Europe is a well-known and well-established concept central to several other industries and has many important benefits. Operators retain flexibility in determining commercial terms and maintain the right to refuse access under specific conditions, such as capacity limitations or incompatibility with technical specifications. Consequently, it is unlikely that infrastructure owners would have little control over access terms, as long as they adhere to the principles of fairness and reasonableness.

Important to note in this context is that the European Commission is working on a regulatory package for CO₂ transportation which will consider issues such as market and cost structure, cross-border integration and planning, technical harmonisation, TPA, tariff regulation and ownership models. Thus, one can expect several changes to CO₂ transport infrastructure in Europe, which will undoubtedly impact and further facilitate TPA. In addition to this, CCS-specific standards are also being developed by bodies like CEN/TC 474, some of which may have bearing on TPA.

The complexity and cost of the financial security and contribution present a significant barrier to storage site development, particularly for smaller operators. Recent revisions to Guidance Document 4 address some of these challenges by introducing probability-weighted risk assessments and phased financial security according to the amount injected, reflecting industry feedback. Despite these advancements, establishing a storage fund has been identified as a promising solution to reduce costs and uncertainties, enabling broader industry participation. Norwegian authorities are urged to actively facilitate such mechanisms while continuing collaboration with industry to overcome these financial barriers.

The 2022 Report further observed that legal barriers to cross-border CO₂ transport under the London Protocol were addressed with the 2019 resolution. Norway has since concluded bilateral arrangements with several countries. Industry may engage in cross-border value chains with stakeholders in these countries. However, new challenges have arisen, such as defining the level of detail in agreements and arrangements, executing the due diligence obligation when exporting CO₂ to non-Contracting Parties, and addressing multi-country value chains involving transit nations. This report advocates for guidance from the IMO and Contracting Parties to clarify best practices, as this may streamline project deployment and ensure harmonisation and alignment to Article 6.2.

By addressing these challenges, Longship has established a critical precedent, significantly lowering barriers for second movers by identifying practical and legal obstacles. Moreover, the project's findings underscore the importance of continued regulatory adaptation as lessons are learned to support the global deployment of CCS technologies. These lessons will not only benefit future projects in Norway but also contribute to international efforts in combating climate change.

2. Legal and Regulatory Frameworks for CCS

2.1. The CCS legal framework

An adequate and enabling legal framework is vital for the successful deployment of CCS. Operators looking to engage and invest in the industry rely on frameworks that are robust, predictable, and fit for purpose. It is important to recognise, however, that making such a fit-for-purpose framework is rarely accomplished in a single attempt. Often, and especially for emerging industries, one would have to test the frameworks by applying them to projects and, through that application, identify and close gaps and remove barriers.²⁶ Consequently, the policy and regulatory frameworks for CCS have developed significantly in Norway and abroad over the past ten to fifteen years. This evolution has been driven in part by insights and experiences gained from existing CCS projects, such as Sleipner and Snøhvit, cancelled projects, such as CCM, and ongoing developments, such as the Longship project. Project and regulatory development abroad is also part of this knowledge base.

As such, the CCS framework is a dynamic area of law that will continue to evolve over the years to come as more projects are planned, permitted, developed, and become operational. It is important to note that Longship is not the sole driver of the ongoing regulatory development in Norway. At the time of writing, there are 10 active exploration licences on the Norwegian Continental Shelf (NCS), all awarded after the exploitation permit for Northern Lights.²⁷ Additionally, two licences have been awarded on 19. December 2024.²⁸ Longship, along with future CCS projects in Norway, operates under Norwegian regulatory frameworks, heavily influenced by international and EU frameworks.²⁹ Thus, changes in EU law and policy and international law will impact the operational criteria for Norwegian CCS projects.

For demonstration projects, it is not uncommon to deviate from the pre-existing framework to accommodate the necessary technology development and value chain design. In the case of Longship, state aid agreements between the Norwegian government and the industrial partners have established unique criteria, conditions, and liability distribution that differ from the default framework for CCS projects in Norway and Europe.³⁰ The current framework has, therefore, not yet been fully tested for commercial projects. This is a contributing factor to the 2022 Report not being fully representative of all industrial CCS projects being developed in Norway in parallel with Longship. Regardless, Longship has been and will continue to be important for testing the CCS legal framework and has contributed to closing gaps and barriers. Several of these findings will also have consequences outside the Norwegian borders and for cross-border collaboration.

²⁶ I Ombudstvedt and G Koperna, 'Comparing Permitting Regimes for CO₂ Storage, Like Comparing Apples and Oranges?' OGEL 3 (2023) <www.ogel.org/article.asp?key=4091> accessed 10 October 2023.

²⁷ Norwegian Offshore Directorate, 'CO₂ tillatelser' (Faktasider) https://factpages.sodir.no/nb-no/bsns_arr_area/pageview/c02licences/34751726 accessed 22 December 2024.

²⁸ Norwegian Government, 'Tildeler to nye tillatelser for CO₂-lagring på norsk sokkel' (19. December 2024) <https://www.regjeringen.no/no/aktuelt/tildeler-to-nye-tillatelser-for-co2-lagring-pa-norsk-sokkel/id3080148/>

²⁹ Please note that Longship is not directly subject to EU and international law; rather, the Norwegian State is, which has transposed the relevant instruments and provisions into national law to meet their international and EEA obligations. Longship can be said to be indirectly subject to EU and international law, due to the national transposition.

³⁰ Norwegian Ministry of Energy, 'Statsstøtteavtaler til Langskip-prosjektet' (in Norwegian only) <https://www.regjeringen.no/no/tema/energi/co-handtering/f/id2950113/> accessed 20 December 2024.

2.1.1. Public international law

As of today, the most advanced international regulatory instrument regulating offshore CCS activities is the 1996 Protocol (London Protocol or Protocol) to the 1972 Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter (London Convention or Convention).³¹ The London Protocol is a stand-alone agreement that, through several amendments, facilitates and regulates cross-border transportation and offshore storage of CO₂. The Protocol supersedes the London Convention for the States that are party to both instruments and will eventually replace the Convention.³²

The London Protocol seeks to protect the marine environment by introducing a general ban on dumping activities,³³ allowing only for a few exceptions. Annex 1 contains the limited list of wastes or other matter that may be considered for dumping provided a permit has been issued in line with Annex 2. Annex 2 provides an assessment framework for the wastes or other matter that may be considered for dumping and includes, *inter alia*, dump-site selection,³⁴ assessment of potential effects,³⁵ permit and permit conditions.³⁶

The definitions of “sea”³⁷ and “dumping”³⁸ extend to the seabed and the subsoil thereof. Thus, any injection of CO₂ into the sub-seabed would constitute dumping. CO₂ was originally not listed in Annex 1 and was therefore prohibited to store. An amendment introduced in 2006 added CO₂ to Annex 1 with associated criteria. This created the legal basis in international environmental law to regulate offshore storage.³⁹

Norway is a contracting party to both the London Convention and the London Protocol, implying that Norwegian regulators have to adhere to the criteria in the London Protocol for storing CO₂ offshore and engaging in cross-border transportation of CO₂. These requirements are further explained and evaluated in Chapter 3.8.

2.1.2. EU law

While Norway is not a member state of the EU, it is tied to the EU through the European Economic Area (EEA) agreement.⁴⁰ As such, Norway is subject to a large number of legal instruments from the EU, provided the instruments are deemed to have EEA relevance. Directive 2009/31/EC (CCS Directive),⁴¹ Directive 2003/87/EC (ETS Directive, as amended by Directive

³¹ 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, 1046 UNTS, (adopted 7 November 1996, entered into force 24 March 2006) (London Protocol).

³² International Maritime Organization, ‘The London Protocol: What Is It and How to Implement It’ (2014 Edition, IMO Publication) p. 3 ; see also London Protocol, art. 23.

³³ London Protocol, art. 4.

³⁴ London Protocol, Annex 2, 11.

³⁵ London Protocol, Annex 2, 12.

³⁶ London Protocol, Annex 2, 13.

³⁷ London Protocol, art. 1(7)

³⁸ London Protocol, art. 1(4)(.1)

³⁹ International Maritime Organization, ‘Carbon Capture and Sequestration’ <https://www.imo.org/en/OurWork/Environment/Pages/CCS-Default.aspx> accessed 27 November 2023.

⁴⁰ Norway in the European Union, ‘The EEA Agreement’ (26 April 2022) <https://www.norway.no/en/missions/eu/areas-of-cooperation/the-eea-agreement/> accessed 10 October 2023.

⁴¹ Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives

2023/959)⁴², and the Monitoring and Reporting (implementing) Regulation (MRR)⁴³ are cornerstones of the EU CCS regime, and have been considered EEA relevant and implemented in Norwegian law.

An important point to make to understand the difference between EU legal instruments considered in this report is that regulations automatically become binding on the Member States once they are adopted. Comparably, a directive comes with a certain deadline for transposing the instrument, provided for in the directive.⁴⁴ Regulations must be applied in their entirety and leaves no room for deviations by the countries. Meanwhile, directives lay down certain goals that should be achieved, such that it is up to the countries *"to devise their own laws on how to reach these goals."*⁴⁵ It is common to include performance-based and minimum thresholds in directives so that Member States may implement stricter frameworks nationally.⁴⁶ For Norway, neither directives nor regulations become automatically part of the legal framework and will, therefore, have to be adopted and implemented separately.⁴⁷

Moreover, law and policy are often discussed concurrently in the context of CCS. It is important to remember the distinction, as there may be many national or European CCS policies with relevance and targets that are not necessarily implemented with legal force. Policies may generally be explained as goals and objectives set by governments and are not legally binding. A policy may form the reasoning behind regulations (in this context, we are not necessarily referring to EU regulations but rather legal systems more broadly) and thereby have an influence on its interpretation. In the area of CCS, a number of policies have been issued in the last couple of years. In this report, we will comment on the binding legal instruments as well as policies, guiding principles, and the like when appropriate.

2.1.2.1. CCS Directive

The CCS Directive established a framework for environmentally safe geological storage of CO₂.⁴⁸ It includes provisions relating to licensing, storage operations, monitoring and reporting, closure and post-closure obligations, transfer of responsibility, financial security and mechanism, etc., and applies both onshore and offshore. The CCS Directive does not mandate CO₂ storage in the

2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 [2009] OJ L140/114 (Directive 2009/31/EC).

⁴² Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 amending Directive 2003/87/EC of the European Parliament and of the Council of 13 October 2003 establishing a system for greenhouse gas emission allowance trading within the Union and amending Council Directive 96/61/EC, (Directive 2003/87/EC)

⁴³ Commission Implementing Regulation (EU) 2024/2493 of 23 September 2024 amending Implementing Regulation (EU) 2018/2066 as regards updating the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC of the European Parliament and of the Council Note that this report will in the ETS Chapter refer to both the current MRR as referenced, and also the MRR in place prior to the Commission adoption. To differentiate, the version in place prior to the change on 23.9.2024 will be referred to as "MRR pre 23.9.2024", and the current version as adopted by the Commission will simply be referred to as "Commission Implementing Regulation (EU) 2024/2493".

⁴⁴ European Commission, 'Implementing EU Law' (n.d.) https://commission.europa.eu/law/application-eu-law/implementing-eu-law_en accessed 14 April 2024; European Union, 'Types of Legislation' (n.d.) https://european-union.europa.eu/institutions-law-budget/law/types-legislation_en accessed 23 December 2024.

⁴⁵ European Commission, 'Types of EU Law' (n.d.) https://commission.europa.eu/law/law-making-process/types-eu-law_en accessed 13 August 2024.

⁴⁶ EUR-Lex, 'Directive' (n.d.) <https://eur-lex.europa.eu/EN/legal-content/glossary/directive.html> accessed 23 December 2024.

⁴⁷ EFTA Surveillance Authority 'Implementing EEA law into national law' (n.d.) <https://www.eftasurv.int/internal-market/implementing-eea-law-national-law> accessed 20 December 2021

⁴⁸ Directive 2009/31/EC, art. 1.

Member States. It is up to every country to decide whether and where they want to store within their territories.⁴⁹ However, if they decide to store CO₂, it has to be in accordance with the CCS Directive's criteria.

Four Guidance Documents have been developed under the CCS Directive: 1) CO₂ Storage Life Cycle and Risk Management Framework, 2) Characterisation of the Storage Complex, CO₂ Stream Composition, Monitoring and Corrective Measures, 3) Criteria for Transfer of Responsibility to the Competent Authority, 4) Financial Security and Financial Contribution. The Guidance Documents were issued to support the competent authorities and operators in implementing and interpreting the CCS Directive but are not legally binding.⁵⁰ The Guidance Documents were recently updated in 2024.⁵¹

2.1.2.2. ETS Directive

Another key legislative instrument is the ETS Directive, which established the EU Emissions Trading System (ETS).⁵² Under the ETS, Member States are required to ensure that companies emitting greenhouse gases covered by the Directive surrender allowances corresponding to their emissions and pay for those allowances. One emission allowance grants the right to emit one tonne of CO₂ equivalent (CO₂eq.).⁵³

The ETS Directive was amended with the adoption of the CCS Directive to support CCS, and has been amended on several occasions after 2009 as well, to e.g., accommodate new value chains and technologies. Consequently, companies are not required to surrender allowances for CO₂ transferred out of an installation for capture, transport, and geological storage, or permanent chemical binding in a product, creating a clear incentive to capture and store CO₂.⁵⁴ In line with the MRR, the liability for the CO₂ follows the CCS value chain, with the liability transferring as soon as the CO₂ is transferred out of the installation for the purpose of storage⁵⁵ in a storage site permitted under the CCS Directive.⁵⁶ After the point of transfer, the operator gets to keep their corresponding allowances.⁵⁷ Any excess allowances may be sold to emitters having more emissions than available allowances, generating revenues for the original holder. Alternatively, the allowances can be saved for future use.⁵⁸

⁴⁹ Directive 2009/31/EC, art. 4.

⁵⁰ European Commission, 'Guidance' (n.d.) https://single-market-economy.ec.europa.eu/sectors/toys/toy-safety/guidance_en accessed 13 May 2024.

⁵¹ European Commission, 'The European Commission Publishes Revised Guidance Documents to the CCS Directive' (23 July 2024) https://climate.ec.europa.eu/news-your-voice/news/european-commission-publishes-revised-guidance-documents-ccs-directive-2024-07-23_en accessed 13 August 2024.

⁵² Directive 2003/87/EC.

⁵³ European Commission, 'What Is the EU ETS?' (n.d.) https://climate.ec.europa.eu/eu-action/eu-emissions-trading-system-eu-ets/what-eu-ets_en accessed 18 September 2024.

⁵⁴ Directive 2003/87/EC, art. 12.

⁵⁵ Or permanently chemically bound in product, Commission Implementing Regulation (EU) 2024/2493 art. 49a.

⁵⁶ Commission Implementing Regulation (EU) 2024/2493, art. 49.

⁵⁷ European Commission, 'What Is the EU ETS?' (n 53).

⁵⁸ European Commission, 'What Is the EU ETS?' (n 53).

The ETS system is intended to provide the main European-wide financial incentive for CCS deployment.⁵⁹ The effectiveness of the ETS in this regard is dependent on the allowance price and the cost of CCS activities. As of 23 December 2024, the price is €68,04.⁶⁰

2.1.3. Norwegian law

CO₂ has been stored on the Norwegian continental shelf for decades at the Sleipner Vest field (since 1996) and Snøhvit field (since 2008).⁶¹ These projects remove CO₂ from the natural gas stream and store it in sub-seabed geological formations to meet customer and technical requirements for natural gas, but also to gain financial benefits by not having to pay CO₂ tax and surrender ETS allowances for the excess CO₂.⁶² The CO₂ tax was introduced in 1991 for the petroleum industry and is set through the national budget for the following year. The CO₂ tax is stacked on top of the ETS price, which was introduced in Norway in 2005.⁶³ The projects were regulated under the petroleum framework,⁶⁴ as there was no framework for CCS at the time.

Norwegian implementation of the CCS Directive in 2014 introduced a two-track system, continuing the regulation of CO₂ storage in relation to petroleum activities under the petroleum framework while other CO₂ storage activities were regulated through a new framework. Thus, the CCS Directive was implemented into Norwegian law through the new Storage Regulations⁶⁵ and amendments to the existing Petroleum Regulations⁶⁶ and Pollution Regulations.⁶⁷ Pursuant to the Pollution Control Regulations Section 35-16, Snøhvit and Sleipner had to update their licences after the transposition to comply with the amendments.

The Pollution Regulations apply to all forms of CCS and fall under the competence of the Ministry of Climate and Environment.⁶⁸ In contrast, the application of the Storage Regulations and Petroleum Regulations will depend on the activity. The Petroleum Regulations will apply when the activity is linked to petroleum operations (e.g. Sleipner and Snøhvit). If the activity is industrial CCS and is not tied to petroleum operations (e.g. the Longship), the Storage Regulations will apply.

In Norway, the two-track system was justified by the fact that the petroleum framework and the Storage Regulations have different objectives.⁶⁹ When implemented, the State decided that CCS

⁵⁹ European Commission, 'How Is CCS Treated under the EU Emissions Trading System (ETS)?' (2021).

⁶⁰ Sandbag, 'Carbon Price Viewer' (November 2024) <https://sandbag.be/carbon-price-viewer/> accessed 23 December 2024.

⁶¹ Norsk Petroleum, 'Fangst, transport og lagring av CO₂' (2 January 2024) <https://www.norskpetroleum.no/miljo-og-teknologi/fangst-transport-og-lagring-av-co2/> accessed 27 November 2024.

⁶² Meld. St. 9 (2010–2011), 'Fullskala CO₂-håndtering' <https://www.regjeringen.no/no/dokumenter/meld-st-9-20102011/id635116/?ch=4> accessed 27 November 2024, point 4.1.1.

⁶³ Norwegian Petroleum, 'Emissions to Air' (n.d.) <https://www.norskpetroleum.no/en/environment-and-technology/emissions-to-air/> accessed 27 November 2024.

⁶⁴ Inter alia, Petroleumsforskriften (FOR-1997-06-27-653) *Forskrift til lov om petroleumsvirksomhet*, Energidepartementet, in force 01.07.1997, last amended FOR-2023-12-18-2278 from 01.01.2024 (Petroleum Regulations); Petroleumsløven (LOV-1996-11-29-72) *Lov om petroleumsvirksomhet* (Petroleum Act).

⁶⁵ Storage Regulations (n 24).

⁶⁶ Petroleum Regulations (n 64) Chapter 4a.

⁶⁷ Forurensningsforskriften (FOR-2004-06-01-931) *Forskrift om begrenning av forurensning*, Klima- og miljødepartementet, in force 01.07.2004, last amended 2024 (Pollution Regulations).

⁶⁸ Forurensningsloven (LOV-1981-03-13-6) *Lov om vern mot forurensninger og om avfall*, Klima- og miljødepartementet, as amended by LOV-2023-06-16-61 from 1 July 2023, (Pollution Control Act) art 3.

⁶⁹ S.F. Vold, M.M. Roggenkamp and C. Banet, 'CCS Legislation in Norway' (*European Energy Law Report XIII*, Cambridge University Press: 30 April 2020) 381.

ties to petroleum activities should continue to be regulated within the Petroleum Regulation, separate from a CCS regulation for other CCS activities. This was due to, among other things, the differences in relation to e.g., liability, financial matters, and taxation, which were already specifically regulated for petroleum in the Petroleum Regulations.⁷⁰ It was also argued that this allowed for the continuation of the well-functioning cooperation between the different authorities already in place for the petroleum activity.⁷¹ However, the Storage Regulations is influenced by the legislative framework for petroleum activities, as we will explain in Chapter 3.3 below.⁷² The MoE is responsible for the Storage Regulations and the petroleum framework.

3. Gassnova 2022 Report: Unpacking Key Legal Challenges

In this section, the issues raised by Gassnova in their 2022 Report will be presented and summarised in separate sub-chapters. Each sub-chapter is further divided into separate sub-chapters under which Gassnova's observations, our main findings and recommendations, and the more detailed analysis and observations we have made are included.

3.1. Market failure

3.1.1. The 2022 Gassnova Report observations

There are several factors seen as hurdles for attracting investments in CCS activities, and the 2022 Report lists some of these: the low cost of CO₂ emissions, cost, commercial and regulatory uncertainties, and lack of clarity regarding future climate policies.⁷³ Longship also has a cross-chain risk as the parties depend on the other parties executing their obligations. In order to execute Longship, it was therefore considered necessary to provide state aid and include the project integrator role.⁷⁴ The Norwegian Government entered into separate state aid agreements with each of the two capture projects and Northern Lights. The agreements were notified to and approved by the European Free Trade Association (EFTA) Surveillance Authority (ESA) in line with the state aid rules, as Norway is a member of EFTA.⁷⁵

The agreements offer certainty for part of the capital expenditure (CAPEX) and operating cost (OPEX), and equal compensation for capturing CO₂ regardless of the origin of the CO₂ (i.e., fossil or biogenic).⁷⁶ For Longship, the state aid agreements not only took a significant portion of the costs and risks but mitigated the economic disadvantage of biogenic CO₂⁷⁷ and shipping, both of which were outside the ETS at that time.⁷⁸ For Northern Lights, the State covers, *inter alia*, parts

⁷⁰ Vold, Roggenkamp and Banet, *CCS Legislation in Norway* (n 69) 381.

⁷¹ Vold, Roggenkamp and Banet, *CCS Legislation in Norway* (n 69) 381.

⁷² Vold, Roggenkamp and Banet, *CCS Legislation in Norway* (n 69) 383.

⁷³ 2022 Gassnova Report (n 1) p. 25.

⁷⁴ 2022 Gassnova Report (n 1) pp. 6, 23, 26.

⁷⁵ 2022 Gassnova Report (n 1) p. 28.

⁷⁶ 2022 Gassnova Report (n 1) p. 25.

⁷⁷ 2022 Gassnova Report (n 1) pp. 25, 26.

⁷⁸ 2022 Gassnova Report (n 1) p. 32.

of the risk of emissions from the sub-surface storage complex during the Operation Period.⁷⁹ If the operation continues after the Operating Period has ended, the authorities “*shall still carry parts of the costs for liability related to emissions/leakages of CO₂ received from the Capture Projects and disposed of in the storage complex during the Operating Period.*”⁸⁰ The Norwegian authorities are otherwise without liability for any emissions/leakages.⁸¹ The same point applies “*for the period from the shutdown to the transfer of liability.*”⁸²

The 2022 report observes that “[t]he state has no intention to copy these two roles to following CCS projects even though new CCS projects, in most cases, still will not be fully commercial.”⁸³ Indeed, “[t]hese projects have to seek financial support from established or new support mechanisms.”⁸⁴ We have not interpreted the part of Gassnova’s report pertaining to state aid to address a regulatory barrier for CCS deployment as such, but it is an expression of the market failure CCS is still suffering from underlining a continued dependence on state aid to deploy CCS. Therefore, we have raised this issue here to consider the existence and availability of support mechanisms and state aid for new projects.

3.1.2. Main findings and recommendations

Despite its great potential in reducing emissions for both energy and other industries, CCS suffers from market failure due to the fact that emitting CO₂ is relatively inexpensive, c.f. the continued low ETS price. Meanwhile, the cost of developing and deploying the technology to reduce emissions is high. State aid will, therefore, continue to play an important role in mitigating this.

The legal framework for state aid relevant to CCS has changed significantly in the last few years, and it will be important to follow these developments from the EU, which has opened up for added state aid to support and deploy projects. Furthermore, there are also increased funding opportunities from EU schemes that are key to supporting projects and research.

The state aid granted for Longship cannot and should not be replicated. The authorities have also made clear that they will not offer such state aid agreements for other projects, taking the majority of the cost and risk, which was necessary to succeed with the demonstration project. The model chosen for Longship is further ‘human resource’-demanding and not viable from an administrative point of view. However, the CCS market is still not commercially viable on its own, and support in the form of state aid is likely to be needed for large-scale deployment of CCS. The Norwegian authorities are now working on adopting more generic and replicable state aid mechanisms that new projects can rely on. Over time, mechanisms like the ETS might provide adequate incentives to reduce the need for state aid, but such a transition is still some way off. In the interim, careful consideration of financial support mechanisms is required.

⁷⁹ EFTA Surveillance Authority, ‘State Aid – Norway – the Full-Scale CCS Project’ (6 November 2020) <https://www.eftasurv.int/cms/sites/default/files/documents/gopro/COL%20-%20State%20aid%20-%20Norway%20-%20the%20Full-Scale%20CCS%20Project%20-%20Non-conf06.11.202013-50-01.pdf> accessed 27 November 2024. P. 52, paras 244-245.

⁸⁰ EFTA Surveillance Authority, ‘State Aid – Norway – the Full-Scale CCS Project’ (n 79) p. 54, para 247.

⁸¹ EFTA Surveillance Authority, ‘State Aid – Norway – the Full-Scale CCS Project’ (n 79) p. 54.

⁸² EFTA Surveillance Authority, ‘State Aid – Norway – the Full-Scale CCS Project’ (n 79) p. 54.

⁸³ 2022 Gassnova Report (n 1) p. 23.

⁸⁴ 2022 Gassnova Report (n 1) p. 23.

Studies were conducted by Oslo Economics in March 2024 commissioned by the MoE and the Norwegian Environment Agency (NEA), respectively. The two Oslo Economic reports (Virkemidler for industriell karbonfjerning⁸⁵ and Virkemidler for karbonfangst fra industri og avfallsforbrenning⁸⁶) will be considered in greater detail in Chapter 3.4. Reversed auction with a contract for difference-model was identified to be the most socio-economic option in Norway in both instances. Carbon contracts for difference (CCfD) have emerged as the leading policy approach adopted by European states for CCS. We find that the CCfD model is suitable for CCS and could similarly be adopted in Norway in the short term. This model furthers competition, which is a central requirement in the state aid rules. However, as has been identified by our interviewees, smaller actors may struggle to compete in these auctions and may have unfair disadvantages. This issue will be dealt with separately in Chapter 3.4.

3.1.3. The Legal framework and analysis

State aid framework and funding relevant to CCUS

Norwegian state aid must comply with the EEA Agreement's requirements for state aid⁸⁷ which mirror the rules on state aid under the Treaty on the Functioning of the European Union (TFEU).⁸⁸ As a starting point, state aid is generally prohibited if it distorts or threatens to distort competition by favouring certain undertakings or the production of certain goods.⁸⁹ The aid must be compatible with the EEA Agreement to be considered lawful. As a general rule, state aid has to be notified and approved by ESA.⁹⁰

The EU offers a range of instruments and frameworks enabling state aid for CCUS initiatives, aligning with the Green Deal to accelerate the transition to net zero. The 2022 Climate, Environmental Protection, and Energy Aid Guidelines (CEEAG)⁹¹ provide the framework for Member States to support the European Green Deal objectives,⁹² which includes supporting measures reducing or removing CO₂ emissions. CEEAG allows for aid amounts covering up to 100% of the funding gap, where aid awards are based on competitive bidding, and introduces new aid instruments such as Contracts for Difference.⁹³ The Green Deal Industrial Plan (GDIP) provides that the EU state aid rules will become more flexible and simplified to facilitate faster access to funding.⁹⁴ In this pursuit, the Commission, *inter alia*, amended the Temporary Crisis

⁸⁵ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (M-2735. 08 March 2024)

<https://www.miljodirektoratet.no/aktuelt/fagmeldinger/2024/mars-2024/virkemidler-for-industriell-karbonfjerning/> (Oslo Economics, 'Virkemidler for industriell karbonfjerning').

⁸⁶ Oslo Economics, 'Virkemidler for karbonfangst fra industri og avfallsforbrenning' (2024-20, 28 March 2024)

<https://www.regjeringen.no/contentassets/c3cd704376fb43f9ac854934e2e25786/virkemidler-for-co2-handtering-i-industri-og-avfallsforbrenning.pdf.pdf> (Oslo Economics, 'Virkemidler for karbonfangst fra industri og avfallsforbrenning').

⁸⁷ *Agreement on the European Economic Area* [1994] OJ L1/3. (EEA Agreement) Part IV Competition and Other Common Rules, Chapter 2 State Aid.

⁸⁸ *Treaty on the Functioning of the European Union* (Consolidated version) [2008] OJ C115/01 arts. 107-109.

⁸⁹ EEA Agreement (n 87) Chapter 2 State Aid.

⁹⁰ NOU 2024: 7, *Norge og EØS: Utvikling og erfaringer* (2024) <https://www.regjeringen.no/no/dokumenter/nou-2024-7/id3033576/?ch=12> chapter 11.4.3.

⁹¹ European Commission, '2022 Guidelines on State Aid for Climate, Environmental Protection and Energy' [2022] OJ C80/01.

⁹² European Commission, 'Guidelines on State aid for climate, environmental protection and energy 2022' (Press corner Q&A, 27 January 2022). https://ec.europa.eu/commission/presscorner/detail/en/qanda_22_566

⁹³ European Commission, 'Guidelines on State Aid for Climate, Environmental Protection and Energy 2022' Q&A (n 92).

⁹⁴ European Commission, 'Green Deal Industrial Plan' (1 January 2023) <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52023DC0062>

and Transition Framework (TCTF)⁹⁵ and revised the General Block Exemption Regulation (GBER).⁹⁶ The TCTF and GBER, among other things, simplify and facilitate investments by easing approval requirements. For example, state aid rules require prior notification and approval of the aid by the ESA/ the Commission. The GBER, however, declares certain categories of state aid compatible with the TFEU (and EEA Agreement) and, therefore, exempts these categories from prior notification and approval.

Meanwhile, the NZIA⁹⁷ seeks to lighten regulatory and permitting burdens and refers to other parts of the Union framework for financial support to close the gap on market failure, such as the EU Innovation Fund and the Recovery and Resilience Facility. NZIA facilitates state aid flexibility to further clean technology growth and respond to global competition. While this enables faster investments and innovation in key sectors, it also raises challenges related to balancing competitiveness, fairness, and cohesion within the EU.

Important Projects of Common European Interest (IPCEI) support large-scale CCUS initiatives, coordinating EU-wide benefits. IPCEI *“brings together the public and private sectors to undertake large-scale projects, addressing market failure and societal challenges.”*⁹⁸ Eligible IPCEIs must, *inter alia*, demonstrably overcome market failures, involve at least four Member States, and secure significant co-financing.⁹⁹ Where public financing of IPCEIs constitutes state aid, the relevant state aid rules will apply. Norway may participate in the IPCEI on the same terms as other EU countries,¹⁰⁰ as the IPCEI is applicable in all of the EEA.¹⁰¹ ESA will assess Norwegian measures under its guidelines corresponding to the European Commission’s guidelines.¹⁰²

Together, these state aid rules widen the scope of available aid, provide flexibility, and simplify and streamline the granting of aid for promoting CCUS technologies across Europe. Complementing these frameworks, EU funding sources, such as Horizon Europe, deliver substantial financial support to projects throughout Europe, ensuring cohesive progress toward the green transition. Such funding can avoid fragmenting the Singel Market due to varying levels of national support.

Oslo Economics reports

Oslo Economics was commissioned by the MoE and the NEA, respectively, to conduct a study on how the authorities can develop necessary incentives to facilitate investments in CCS. Oslo

⁹⁵ Temporary Crisis and Transition Framework for State Aid measures to support the economy following the aggression against Ukraine by Russia (2023/C 101/3, OJ C 101, 17.3.2023, p. 3) Note later amendments to the TCTF.

⁹⁶ European Commission, ‘Green Deal Industrial Plan’ (n 94) pp. 8-9.

⁹⁷ Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe’s net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724 (Text with EEA relevance) (NZIA).

⁹⁸ Zero Emissions Platform, ‘Harnessing IPCEI Mechanism for CCUS’ <https://zeroemissionsplatform.eu/harnessing-ipcei-mechanism-for-ccus/> accessed 27 November 2024.

⁹⁹ Zero Emissions Platform, ‘Harnessing IPCEI Mechanism for CCUS’ (n 98).

¹⁰⁰ Stortingets utredningsseksjon, ‘Internasjonale prosjekter av felleseuropeisk interesse IPCEI’ (2022317, 2022) <https://www.stortinget.no/globalassets/pdf/utredningsseksjonen/utredningsnotater/2022/notat-om-internasjonale-prosjekter-av-felleseuropeisk-interesse---ipcei-2022317.pdf> (Stortingets utredningsseksjon, ‘IPCEI’) accessed 10 December 2024

¹⁰¹ Stortingets utredningsseksjon, ‘IPCEI’ (n 100) 7.

¹⁰² ESA, ‘ESA Approves Aid for Norwegian Projects Participating in a European Hydrogen Value-Chain Initiative’ (2022) <https://www.eftasurv.int/newsroom/updates/esa-approves-aid-norwegian-projects-participating-european-hydrogen-value-chain> accessed 27 November 2024.

Economics prepared two reports: i) incentives for industrial carbon removal¹⁰³ and ii) incentives for carbon capture from industry and waste incineration,¹⁰⁴ the latter in collaboration with SINTEF Energy.

The assessments in the reports are based on a short-term target to realise CO₂ capture and storage and industrial carbon removal within 2030-2035. The reports' starting points were that there are no real or sufficient incentives to deploy CCS for industry (including waste to energy), or to deploy DACCS or capture from biogenic sources.¹⁰⁵ This comes in addition to an immature market and a lack of transport and infrastructure. In the long term, Oslo Economics considered that financing of carbon removals and carbon capture from industry/waste-to-energy, should be market-based by being included in a more extensive EU ETS. In recognition that financial support and incentives are needed to deploy these technologies with the 2030-2035 timeline in mind, Oslo Economics concluded that a subsidy scheme that treats biogenic and fossil CO₂ equally, where the risk related to the CO₂-price are taken and managed by the State, is the best option.¹⁰⁶ They recommend that the scheme be implemented as auctions where operators compete by bidding on the price necessary to realise carbon capture, including costs associated with transport and storage.¹⁰⁷ The projects that win sign a CfD with the Government, where the "gap" between the bidding price (how much they can capture and store at what price) and the carbon price is subsidised by the government. This is paid out on a rolling basis per ton of CO₂ captured and stored.

Oslo Economics explained that the timeline of deploying projects by 2035 will require significant use of financial incentives and funding.¹⁰⁸ Generally, an ambitious timeline for the deployment of projects will increase costs, risks, and support needs, due to a limited number of mature capture and storage projects.¹⁰⁹

As we will discuss in the next section, the CCfD is the leading policy approach used by countries in the EU.¹¹⁰ In our view, implementing a similar mechanism in Norway would provide significant benefits.

¹⁰³ Unofficial translation of "Virkemidler for industriell karbonfjerning" (n 85)

¹⁰⁴ Unofficial translation of "Virkemidler for karbonfangst fra industri og avfallsforbrenning" (n 86).

¹⁰⁵ Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (10 April 2024 – Ressurser og bærekraft) [Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning | Oslo Economics](#) (Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning')

¹⁰⁶ Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (n 105).

¹⁰⁷ Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (n 105).

¹⁰⁸ Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (n 105).

¹⁰⁹ Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (n 105).

¹¹⁰ Toby Lockwood, 'Designing Carbon Contract for Difference Incentives to Drive the Deployment of CCS in Europe' (Clean Air Task Force, GHGT-17, Calgary 2024) (Lockwood, 'Designing Carbon Contract for Difference Incentives to Drive the Deployment of CCS in Europe').

Carbon Contract for Difference

As observed by Clean Air Task Force, “CCfDs are the leading policy approach being adopted by European states for CCS and other industrial decarbonisation technologies.”¹¹¹ CCfD is a mechanism in which the State may cover the gap between the cost of the project (the offered price) and the reference price for CO₂ emissions (usually the ETS).¹¹² Projects awarded a contract are ensured payment of the difference. This effectively closes the gap and provides the necessary incentive needed to make it equally economical to capture and store CO₂, regardless of its origin. CCfD can take various shapes and forms, with differing project eligibility criteria, selection criteria, payment structure, etc.¹¹³ The benefit of CCfD is that it lowers financial risks and stabilises project cash flow, providing necessary financial incentives and support to deploy CCS.

Examples of countries where CCfD-like models have been used include the Netherlands, Germany, Denmark, France, and Sweden.¹¹⁴ The model varies from country to country with, for example, differing criteria for eligibility, selection, and performance, as well as reference price and payments.¹¹⁵ The reference price is tied to the EU ETS price for the Netherlands’s SDE++, Denmark, and Germany, whereas for France, it is based on a fixed reference carbon price trajectory.¹¹⁶ We refer to the Oslo Economics reports for further reading on implementing CCfD in Norway, and, for example, Clean Air Task Force for further insight on the implementation of CCfD in the abovementioned countries.

Following the revision to the ETS, the Innovation Fund can now support projects through competitive bidding procedures (i.e., auctions),¹¹⁷ which include CCfDs. The auction design and principles are aligned with CEEAG guidelines.¹¹⁸ In this context, the revised ETS defines CCfD (or CCD) as

a contract between the Commission and the producer, selected through a competitive bidding mechanism such as an auction, of a low- or zero-carbon product, and under which the producer is provided with support from the Innovation Fund covering the difference between the winning price, also known as the strike price, on the one hand, and a reference price derived from the average price of allowances, on the other hand.¹¹⁹

¹¹¹ Lockwood, ‘Designing Carbon Contract for Difference Incentives to Drive the Deployment of CCS in Europe’ (n 110).

¹¹² Toby Lockwood, ‘Designing Carbon Contracts for Difference’ (Clean Air Task Force, 12 February 2024) <https://www.catf.us/resource/designing-carbon-contracts-for-difference/> accessed 27 November 2024 (Lockwood, ‘Designing Carbon Contracts for Difference’)

¹¹³ Lockwood, ‘Designing Carbon Contracts for Difference’ (n 112) Lockwood, ‘Designing Carbon Contract for Difference Incentives to Drive the Deployment of CCS in Europe’ (110)

¹¹⁴ Lockwood, ‘Designing Carbon Contracts for Difference’ (112).

¹¹⁵ Lockwood, ‘Designing Carbon Contracts for Difference’ (n 112). ; Lockwood, ‘Designing Carbon Contract for Difference Incentives to Drive the Deployment of CCS in Europe’ (n 110).

¹¹⁶ Lockwood, ‘Designing Carbon Contract for Difference Incentives to Drive the Deployment of CCS in Europe’ (n 110).

¹¹⁷ Roman Doubrava, ‘Innovation Fund Stakeholders Consultation’ (CINEA- Head of Unit Innovation Fund, 13 June 2023) (Doubrava, ‘Innovation Fund Stakeholders Consultation’) https://climate.ec.europa.eu/document/download/d0fa5e33-abf3-4085-b16b-ba819d6354ac_en?filename=event_20230512_overview_en.pdf accessed 27 November 2024.

¹¹⁸ Doubrava, ‘Innovation Fund Stakeholders Consultation’ (n 117).

¹¹⁹ Directive 2003/87/EC, art. 3(ac).

The first EU-wide pilot auction under the Innovation Fund concerns the production of RFNBO hydrogen.¹²⁰ Zero Emissions Platform (ZEP) has observed that “[d]edicated competitive bidding processes should also be launched for low-carbon technologies, including CCS”.¹²¹ ZEP also notes that “the Hydrogen Bank Could support the development of CCS in Europe if its scope is expanded to the production of low-carbon ‘blue’ hydrogen.”¹²² Thus, it is clear that EU institutions are also looking to CCfD as a suitable mechanism to support the deployment of similar industries, and should extend this to cover CCS.

3.2. ETS liability

3.2.1. The 2022 Gassnova Report observations

At the time of the 2022 Report, shipping was not subject to EU ETS, and during the planning phase of Longship, the consequences of this gap were still uncertain. The European Commission stated that the captured CO₂ could not be subtracted before it had been transferred to a pipeline transport network or directly to a storage site.¹²³

The lack of inclusion in the ETS caused uncertainties for the project partners, as the ETS liability would not be transferred when the CO₂ was loaded onto the ship. Instead, the emitters were responsible for the CO₂ until it was injected, which Heidelberg said was an unacceptable risk.¹²⁴ Northern Lights and the State consequently decided to cover the costs related to potential leakages of CO₂ from the ship, according to an agreed cost-sharing ratio, to facilitate the value chain.¹²⁵

3.2.2. Main findings and recommendations

Maritime transport is, as of 2024, part of the ETS, subjecting the ship owner to an obligation to surrender and pay for allowances for emissions from the voyages within the EU and voyages arriving or departing from the EU to a non-EU country.¹²⁶ Therefore, the gap mentioned in the 2022 Report for ship transport has largely been overcome.

Similarly, the MRR has recently been amended, and several key definitions and provisions have been changed to facilitate other modes of transport. However, the absence of comparable

¹²⁰ European Commission, ‘EU Funding for Climate Action: Innovation Fund’ https://climate.ec.europa.eu/eu-action/eu-funding-climate-action/innovation-fund/competitive-bidding_en accessed 27 November 2024; European Commission, ‘Innovation Fund IF24 Auction Terms and Conditions’ (DG CLIMA C2) https://climate.ec.europa.eu/document/download/b996825e-cd36-44c1-895d-a780062f626d_en?filename=policy_funding_innovation_fund_if24_auction_tc_en.pdf accessed 27 November 2024.

¹²¹ Zero Emissions Platform, ‘Public and Private Investments Must Fit CCS Deployment Requirements’ (20 March 2024) <https://zeroemissionsplatform.eu/wp-content/uploads/ZEPs-paper-on-funding-requirements.pdf> accessed 27 November 2024.

¹²² Zero Emissions Platform, ‘Public and Private Investments Must Fit CCS Deployment Requirements’ (n 121).

¹²³ Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 36.

¹²⁴ Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 36.

¹²⁵ Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 36.

¹²⁶ European Commission, ‘FAQ – Maritime Transport in EU Emissions Trading System (ETS)’ (n.d.) https://climate.ec.europa.eu/eu-action/transport/reducing-emissions-shipping-sector/faq-maritime-transport-eu-emissions-trading-system-ets_en accessed 29 October 2024.

revisions to the CCS Directive leaves the framework misaligned and lacking harmonisation, raising concerns about accuracy and legal certainty.

3.2.3. The Legal framework and analysis

The following is not a regulatory analysis of the original regulatory gap identified by Gassnova *per se*, as this issue was subsequently solved. However, it summarises the regulatory amendments made to accommodate maritime transport and makes some observations regarding their completeness, clarity, and predictability.

As a comment to the Northern Lights and the State's decision to cover the costs related to potential leakages of CO₂ from the ship, and as a starting point to the analysis and why this was an issue: Installations subject to ETS cannot by way of contractual negotiations transfer the regulatory ETS responsibility to another party, absolving themselves of the duty to surrender allowances. However, in private agreements, the operator of e.g. a transport infrastructure and storage site may, for example, hold the customer of the transport and storage services (the emitter) financially responsible for leakages occurring in the transport infrastructure or storage facilities irrespective of the regulatory liability, but this does not alter the responsibilities under the legal framework to surrender and pay for allowances. Thus, agreements in the Longship project facilitating reimbursement of costs for potential leakages would not alter the emitters' obligation to surrender and pay for the allowances. Also, the mentioned agreements would now be redundant under the updated ETS Directive and corresponding MRR, as will be explained below.

Maritime transport has been included in the ETS Directive from 2024.¹²⁷ The ETS Directive is applicable as long as at least one of the ports the ship is travelling to or from is within the jurisdiction of a Member State to the EU. The extension of the EU ETS to maritime transport includes half of the emissions from ships performing voyages arriving at a port under the jurisdiction of a Member State from a port outside the jurisdiction of a Member State, half of the emissions from ships performing voyages departing from a port under the jurisdiction of a Member State and arriving at a port outside the jurisdiction of a Member State.¹²⁸ As well as all of the emissions from ships performing voyages arriving at a port under the jurisdiction of a Member State from a port under the jurisdiction of a Member State and all of the emissions within a port under the jurisdiction of a Member State.¹²⁹

EU MRV Maritime Regulation 2015/757¹³⁰ comprises the rules for monitoring, reporting, and verification of GHG emissions from maritime transport activities (emissions from the ship itself). Meanwhile, the MRR applies to the CO₂ being transported as part of a CCS value chain (the cargo). Previously, Article 49 of MRR made clear that the operator of an ETS installation (emitter)

¹²⁷ Directive 2003/87/EC, art. 3ga-gb, c.f. Annex I.

¹²⁸ Directive 2003/87/EC, art. 3ga.

¹²⁹ Directive 2003/87/EC, art. 3ga.

¹³⁰ Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of greenhouse gas emissions from maritime transport, and amending Directive 2009/16/EC.

can subtract emissions if the CO₂ originates from fossil carbon and is transferred out of the installation to i) a capture installation for the purpose of transport and long-term storage¹³¹; ii) a transport network¹³²; or a storage site.¹³³ Alternatively the CO₂ can be chemically bound in a product.¹³⁴ Previously, the phrase ‘transport network’ referred to transport network “*as defined in Article 3(22) of Directive 2009/31/EC*”,¹³⁵ which in turn defines the term as “*the network of pipelines, including associated booster stations, for the transport of CO₂ to the storage site.*”¹³⁶ Thus, originally, neither the MRR nor the CCS Directive had been updated to consolidate and accommodate maritime transport modes in the CCS value chain.

The MRR has recently undergone a revision, and the European Commission adopted the final amended text on September 23rd 2024. The amendment consolidates the language regarding CO₂ transport, which, in line with the amended ETS, has been opened up to account for other transport modalities, thereby closing a regulatory gap;

[a]s CO₂ for geological storage is expected to be transported by a variety of modes, Directive (EU) 2023/959 expanded the scope of the activity ‘transport of greenhouse gases for geological storage’ in Annex I to Directive 2003/87/EC to any transport mode. Therefore, it is necessary to revise the monitoring and reporting provisions related to the CO₂ transport activity to ensure that they are applicable to a CO₂ transport infrastructure based on any transport modes.¹³⁷

Consequently, the new MRR changed the definition of CO₂ transport to “*the transport of CO₂ for geological storage in a storage site permitted under Directive 2009/31/EC*”¹³⁸ which previously only explicitly referred to the use of pipelines in this context. Furthermore, the term ‘transport network’ has been replaced by ‘CO₂ transport infrastructure’, which is defined as “*an infrastructure as defined in Article 3(29) of Regulation (EU) 2024/1735*”.¹³⁹ Article 3(29) of Regulation 2024/1735 defines CO₂ transport infrastructure as

[...] the network of pipelines, including associated booster stations, for the transport of CO₂ to the storage site, as well as any ships, road or rail transport modes, including liquefaction devices and temporary storage facilities if needed, for the transport of CO₂ to the harbour facilities and storage site.

Thus, the MRR has been amended to correspond with the updated scope of the ETS Directive, opening it up to all modes of transport as provided in the definition.¹⁴⁰ However, while the relevant amendments to, *inter alia*, the ETS Directive and the MRR open up for other transport modalities, the CCS Directive remains unchanged. During our interviews, an actor expressed

¹³¹ in a storage site permitted under Directive 2009/31/EC.

¹³² With the purpose of long-term geological storage in a storage site permitted under Directive 2009/31/EC.

¹³³ With the purpose of long-term geological storage in a storage site permitted under Directive 2009/31/EC

¹³⁴ MRR pre 23.9.2024, art. 49(1)(b) ; Commission Implementing Regulation (EU) 2024/2493 art. 49a. The product will need to be listed in the Delegated Regulation.

¹³⁵ MRR pre 23.9.2024, art. 3(63).

¹³⁶ Directive 2009/31, art. 3(22).

¹³⁷ Commission Implementing Regulation (EU) 2024/2493, Preamble para 20.

¹³⁸ Commission Implementing Regulation (EU) 2024/2493, art. 3(55).

¹³⁹ Regulation (EU) 2024/1735 of the European Parliament and of the Council of 13 June 2024 on establishing a framework of measures for strengthening Europe’s net-zero technology manufacturing ecosystem and amending Regulation (EU) 2018/1724.

¹⁴⁰ Commission Implementing Regulation (EU) 2024/2493.

concern that all of the amendments and introductions of new rules pertaining to e.g. transport have “left them guessing” as to how it will be regulated in practice, as it remains unclear how the rules will be interpreted and enforced.

The lack of corresponding updates to the CCS Directive presents shortcomings in terms of accuracy, legal certainty, and completeness. In the short term, we acknowledge that these amendments are important and sufficient to support project development; however, for the long-term, we recommend making corresponding amendments to the CCS Directive to ensure harmonisation and completeness of the EU’s CCS framework. By not harmonising *all* the relevant instruments, the regime will remain incomplete and ambiguous. The legal value, transparency, and predictability of the EU CCS regime are compromised by each deviation between wording and practice. The EU legal framework is complicated and incomprehensible to many stakeholders already, implying that each deviation also creates a greater distance to the stakeholders operating under the framework, representing risks for the project developers. The ambiguities increase even further as the EU instruments and their respective amendments are transposed into national frameworks.

3.3. A CCS framework inspired by the framework for petroleum

3.3.1. The 2022 Gassnova Report observations

The Norwegian framework for CCS builds on many of the same principles as the petroleum framework. However, as the 2022 Report points out, there are important differences between the petroleum and CCS industries’ business models, with CCS having low market maturity, high risk, and low return; and the petroleum sector having high market maturity, high risk, and high return.¹⁴¹ These differences make it challenging for the storage operator to handle risks and make investment decisions.¹⁴² In addition, the objectives of the two industries are generally speaking also diverse. Linked to this, the 2022 Report explains that Northern Lights found that the Storage Regulations “*gave too much uncertainty in their business model.*”¹⁴³ Further, in Northern Lights’ consultation response to the proposed changes to the Company Act, Northern Lights “*pinpoint the differences between the petroleum industry and the CCS industry and argue for a comprehensive review of the legal framework for CCS as a new and upcoming business area.*”¹⁴⁴

3.3.2. Main findings and recommendations

It is often said that the CCS regime in Norway is the result of “copy/paste” of the petroleum regime. Industry and other stakeholders are arguing for a more tailored framework that acknowledges the differences between the two industries to make the CCS legislative framework more fit for purpose. We concur that a more tailor-made framework is needed, recognising the distinct differences in e.g., risk and return, and that there is a need for more

¹⁴¹ Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 7.

¹⁴² Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 7.

¹⁴³ Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 31.

¹⁴⁴ Gassnova, ‘Regulatory Lessons Learned from Longship’ (n 1) p. 30.

clarity on how certain provisions will be implemented in practice. That said, we stipulate that there are, in fact, important distinctions and differences between the frameworks. Examples include liability and post-closure operations, how the joint ventures are set up and regulated, taxes, permitting of infrastructure, and a number of other items. As such, even though there is an overlap in e.g., regulatory authority, model for permitting, the wording of several of the regulatory provisions and a number of other things, we would argue that accommodations to tailor-make the framework for CCS have already, to some extent, been done.

While the permitting models are similar, there is a distinct difference in how the provisions pertaining to announcements of licencing rounds are practiced in the two industries. Here, we argue that the regular, pre-announced licencing rounds, as used in the petroleum sector, should replace the current open-door policy for CCS. This could save resources and allow operators to strategically plan concepts and applications according to a known schedule. The NZIA adds to this need, as certain oil and gas operators have to meet an allocated contribution to the 50 million tons annual injection capacity target, which can be done by, for example, investing in or developing CO₂ storage projects alone or in cooperation. Thus, strategies and investment decisions will need to be made by oil and gas actors all across the EU.¹⁴⁵ Norway has a vast storage capacity on the NDC, and we believe that pre-announced licencing rounds may create more certainty, predictability, and flexibility in e.g., setting a time frame for negotiations and the drafting of the application. This may be particularly relevant when there is a consortium of actors collaborating from different countries seeking to reach their allocated contribution.

Preparing a fit-for-purpose and tailor-made framework from the onset is difficult, and we recognise that Norwegian regulators are proactively making amendments to the existing framework as new learnings are accumulated. The Storage Regulations is being amended, and was initially meant to be presented at the end of 2023. The delay may suggest that the amendment process has been no small feat.

The below highlights some of the differences between the two regimes and sheds light on what should be amended.

3.3.3. The Legal framework and analysis

There are many reasons why the petroleum regime inspired the framework for CCS. One reason is the general similarities between the two industries in terms of how they go through similar development phases and also apply a number of similar technologies and competencies, such as those related to knowledge and experiences of the subsurface and geological/geophysical and seismic interpretations, infrastructure, drilling, as well as the liquefying and transportation of gases, and monitoring activities. Another similarity is that there is a large overlap in stakeholders being involved, with a majority of the companies engaged in storage operations being either former or current oil and gas operators. Because of these similarities, as well as the first CCS projects being related to petroleum projects (Sleipner and Snøhvit), it would seem natural to base the framework for CCS on the petroleum framework.

¹⁴⁵ At the time of writig, it is not clear whether the NZIA will be deemed to be EEA relevant.

In Norway, the first comprehensive Petroleum Act came in 1985,¹⁴⁶ which was amended by the present Petroleum Act in 1996.¹⁴⁷ Many more detailed regulations have been put in place, focusing on e.g., prudent resource management considerations and health, safety, and environmental (HSE) subjects.¹⁴⁸ The learnings and extensive experiences obtained by the various Norwegian ministries and agencies and other public sector bodies overseeing the Norwegian petroleum industry over these 50 + years¹⁴⁹ also offer a vital resource pool for the Longship project. Based on our observations at conferences, numerous actors have noted that the expertise within the Norwegian Offshore Directorate and Gassnova was crucial to the successful development of Longship.

That said, there are also distinct differences between the two industries, and while the CCS framework is based on the petroleum framework, the CCS legislation differs in several ways, some of which are described below.

Differences	
<i>Joint venture v. general partnership</i>	<p>The Norwegian Company Act¹⁵⁰ generally obliges parties to form a company when an economic activity is carried out for the joint account and risk of two or more participants, and at least one of the participants has unlimited personal liability for the total liabilities of the activity.¹⁵¹</p> <p>For licences given under the petroleum legislation, the Company Act contains a special provision releasing such licences from the general obligation, cf. Article 1-1 (4). The model used for the petroleum licences is often referred to as ‘unincorporated joint ventures’ where the companies forming the joint venture continue working together as independent companies, with one of the companies appointed operator. Standard agreements developed by the authorities are used, which explain and steer the governance structure between the companies and contain provisions governing the relationship with the authorities.¹⁵²</p> <p>In 2022, the MoE proposed changing the Company Act’s special provision in Article 1-1 to encompass transportation</p>

¹⁴⁶ Petroleumsloven (LOV-1985-03-22-11) *Lov om petroleumsvirksomhet*, Ministry of Petroleum and Energy, in force 01.07.1985 (Petroleum Act 1985).

¹⁴⁷ Petroleum Act (n 64).

¹⁴⁸ Miljødirektoratet, ‘HMS-forskriftene for petroleumsvirksomheten’ (25 January 2023) (HSE regulations for the petroleum sector) <https://www.miljodirektoratet.no/regelverk/forskrifter/hms-forskriftene-for-petroleumsvirksomheten/> accessed 22 November 2024.

¹⁴⁹ Norwegian Petroleum ‘Norway’s Petroleum History’ <https://www.norskpetroleum.no/en/framework/norways-petroleum-history/> accessed 20 December 2024

¹⁵⁰ Selskapsloven (LOV-1985-06-21-83) *Lov om ansvarlige selskaper og kommandittselskaper*, Ministry of Trade, Industry and Fisheries, in force 01.07.1986 (Company Act).

¹⁵¹ Company Act (n 150) §1-1.

¹⁵² Norwegian Ministry of Energy, ‘Agreement Concerning Petroleum Activities’ <https://www.regjeringen.no/globalassets/upload/oed/vedlegg/konsesjonsverk/k-verk-vedlegg-1-2-eng.pdf> accessed 20 December 2024.

	<p>and storage of CO₂ activities under the Storage Regulations.¹⁵³ This change was never amended, and CO₂ storage is subject to the Company Act.</p> <p>Thus, Northern Lights JV DA is a registered, incorporated General Partnership with Shared Liability (DA) owned by Equinor, Shell, and TotalEnergies.¹⁵⁴</p>
<p>Licencing Rounds</p>	<p>A number of licences, consents, and permits apply to the CCS value chain, and an overview is provided in the 2022 Report (Appendix A). Unlike the practice in the petroleum sector, where regular open licensing rounds are publicly announced, the awarding of CCS exploration licenses is based on an open-door policy.¹⁵⁵ This entails that after receiving an application for an exploration license, the relevant area of the application will be announced by the Norwegian authorities. Following this, companies have the possibility of providing competing applications.</p>
<p>Requirements for pipelines</p>	<p>CO₂ pipelines are regulated by the Norwegian Planning and Building Act.¹⁵⁶ Whereas for petroleum pipelines, the Planning and Building Act Section 1-3 contains a provision stating that pipelines in the sea for the transport of petroleum are exempt.¹⁵⁷ Under the Planning and Building Act, the competent authority can be different municipalities or the state, depending on the area.¹⁵⁸ The MoE is the competent authority for all construction and facilities related to petroleum.¹⁵⁹</p> <p>As explained in the 2022 Report, this implies that the operator needs to secure a zoning plan and building consent for the pipeline from the quay out to one nautical mile offshore from the baseline while petroleum pipes are exempt from this</p>

¹⁵³ Norwegian Government, 'Høring – forslag til endring i selskapsloven – transport og lagring av CO₂ i undersjøiske reservoarer på kontinentalsokkelen' (7 April 2022) <https://www.regjeringen.no/no/dokumenter/horing-forslag-til-endring-i-selskapsloven-transport-og-lagring-av-co2-i-undersjoiske-reservoarer-pa-kontinentalsokkelen/id2907996/?expand=horingsbrev&lastvisited=undefined> accessed 27 November 2024.

¹⁵⁴ Northern Lights, 'Who we are' (n 4).

¹⁵⁵ See e.g. Norwegian Offshore Directorate, 'Invitation to apply for licences pursuant to the CO₂ Storage Regulations for injection and storage of CO₂ on the Norwegian Continental Shelf' <https://www.sodir.no/en/facts/carbon-storage/licences-for-carbon-storage/announcement-2024-round-2/invitation/>

¹⁵⁶ Plan- og bygningsloven (LOV-2008-06-27-71) *Lov om planlegging og byggesaksbehandling*, Ministry of Local Government and Regional Development, entry into force 01.07.2009, 01.07.2010, 01.01.2013. (Planning and Building Act).

¹⁵⁷ Planning and Building Act (n 156).

¹⁵⁸ Planning and Building Act (n 156) Section 1-2.

¹⁵⁹ Petroleum Act (n 64) e.g. Section 4-3 and 4-4.

	<p>requirement.¹⁶⁰ The 2022 Report explains that the result of this is a delay in the process, as this entailed that the Longship project had to apply to two municipalities and make several agreements with stakeholders on crossing pipelines and infrastructure.¹⁶¹</p>
<p>Tax regulations</p>	<p>The Norwegian petroleum industry is subject to the ordinary company tax rate of 22 % plus a special tax rate, resulting in a combined tax rate of 78% for revenues stemming from petroleum operations.¹⁶² To a large extent, petroleum operations are exempted from the duty to pay value added tax for products and services.¹⁶³</p> <p>In comparison, the special tax does not apply to CCS activities separate from oil and gas activities. Thus, the ordinary company tax rate applies, implying 22% taxes on revenues from CCS value chains. For CCS there are certain rules for added value tax. These have been clarified by the Norwegian tax authorities. For instance, transport of CO₂ to and from other countries are exempt from added value tax, as well as storage and disposal on the continental shelf.¹⁶⁴</p>
<p>Liability</p>	<p>The liability regime differs in some instances between the two industries. The most notable example is the transfer of responsibility after decommissioning, where the petroleum production licensee who has decommissioned, plugged, and abandoned the production site has liability for the site in perpetuity.¹⁶⁵ In contrast, for CO₂ storage sites the liability is transferred to the competent authority after 20 years or less.¹⁶⁶</p>

¹⁶⁰ 2022 Gassnova Report (n 1) p. 28.

¹⁶¹ 2022 Gassnova Report (n 1) p. 28.

¹⁶² The Norwegian Tax Administration, 'The Petroleum Regulations' <https://www.skatteetaten.no/en/business-and-organisation/reporting-and-industries/industries-special-regulations/oil-and-gas-exploration-and-petroleum-tax/the-petroleum-tax-office-and-the-petroleum-tax-system/petroleum-tax-regulations/> accessed 20 December 2024

¹⁶³ The Norwegian Tax Administration, 'Value Added Tax Handbook 2024' §6-32

<https://www.skatteetaten.no/rettskilder/type/handboker/merverdiavgiftshandboken/gjeldende/M-6/M-6-32/>

¹⁶⁴ The Norwegian Tax Administration, 'Bindende forhåndsuttalelse: Merverdiavgiftsbehandling i forbindelse med transport og deponering av CO₂. Saksnummer 12/2023' (8 November 2023)

<https://www.skatteetaten.no/rettskilder/type/uttalelser/bfu/merverdiavgiftsbehandling-i-forbindelse-med-transport-og-deponering-av-co2/> accessed 27 November 2024; PwC Norway, 'Viktig avklaring fra Skatteetaten: MVA-behandling av CCS-tjenester' (26 September 2023) <https://www.pwc.no/no/pwc-aktuelt/mva-behandling-av-ccs-tjenester-viktig-avklaring-fra-skatteetaten.html> accessed 27 November 2024.

¹⁶⁵ Petroleum Act (n 64) art. 5-4 , cf. art. 10-7.

¹⁶⁶ Storage Regulations (n 24) Section 5-8.

<p>State participation</p>	<p>The Petroleum Act and Regulations enable state participation in petroleum licences,¹⁶⁷ represented by Petoro. There is a similar mechanism in the Storage Regulations, which provides that the State may participate in the transport and exploitation of subsea reservoirs for the storage of CO₂.¹⁶⁸ However, so far, the State has not practiced this in any of the existing exploration licences granted to date. Other countries have made it a policy to involve the State in these instances. Denmark, for example, has made clear that State-owned company Nordsøfonden will participate in all CO₂ storage permits on behalf of the Danish state with a share of 20%.¹⁶⁹ It remains to be seen whether this is an approach that the Norwegian authorities will follow.</p>
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Given the differences in the two industries explained above, and as experiences with the present CCS regulations are gained, we consider it likely that the mirroring, also referred to as copy/paste approach, will be moved towards more tailor-made modelling. This is in line with comments received during our interview session. Also, in seminars, “the need to keep in mind that CCS is not oil and gas” was often uttered when fit-for-purpose regulations were discussed. There are some clear examples in which copy-paste or adaptation of an oil and gas framework for CCS has proven challenging for the industry.

One of the most convincing examples is the reliance on the HSE regulations for the petroleum industry in the CO₂ Safety Regulations. Stakeholders developing value chains relying on direct injection of CO₂ from a ship have stated that relying on health and safety regulations for oil and gas for a ship transporting CO₂ will increase the costs of planning and constructing the ships. There is more than one reason for this, one of which is the differences between the principles and aims for safety regulations applicable to ships during transportation compared to installations used for oil and gas offshore. According to industry feedback, this will materialise and challenge the value chain as the ship will be classified as a ship during transportation and potentially as an installation when connecting to the injection site.

We have also observed that the industry has not welcomed all the deviations made when implementing the CCS framework. One example is the decision to require the companies operating a licence for storage to establish a company under the Company Act. Feedback from stakeholders in the industry indicates that a number of the companies would have preferred an unincorporated joint venture, and it has been stated that the chosen model for CCS provides some uncertainty and unpredictability compared to petroleum operations. For the joint ventures operating petroleum licences, there is a more comprehensive framework mandated by the regulators, while there for CCS would be more room for negotiations when establishing the

¹⁶⁷ Petroleum Act (n 64) Section 3-6 and Chapter 11, Petroleum Regulations, Section 12 (n 64).

¹⁶⁸ Storage Regulations (n 24) Section 1-7.

¹⁶⁹ Act no 1592 of 28 December 2022 on amendment of Law on Nordsøenheden and Nordsøfonden (unofficial translation) ; Denmark Member State report on Implementation of Directive 2009/31/EC on the geological storage of carbon dioxide (“CCS Directive”), para 1(f).

company agreement. As such, one may expect smaller companies to be disadvantaged when negotiating with the major companies. The fact that the company agreement has to be negotiated may also require more time and resources starting out compared to entering into the Agreement Concerning Petroleum Activities provided by the MoE.

Similar criticism has been observed for the licencing policy. Although the permitting framework, to a large extent, is, in fact, mirroring the permitting framework for petroleum, the two are currently not practiced the same. While petroleum licences are subject to open and pre-announced licencing rounds,¹⁷⁰ exploration licences for CCS have so far been subject to an open-door policy. The policy implies that there are no pre-determined licencing rounds, but that the operators are welcome to submit an application for an identified licence area at any time and that invitation to apply for the licence is published afterwards.¹⁷¹ This implies that the company originally applying for the licence will potentially be at an advantage compared to the competitors considering applying for the same licence – having a head start researching and preparing. Of course, there is a level playing field in the sense that all operators have the opportunity to be the first to submit an application. However, as we will explain, the open-door policy is not ideal, considering that the financial incentives needed to deploy CCS are lacking, combined with the need to scale up CCS. There is a need to enable solutions and methods that are cost-efficient and predictable.

In our opinion, the CCS regime would benefit from transitioning from the open-door policy for licencing, to regular open licencing rounds announced in advance. The current open-door policy initiates an application deadline set to approximately only six weeks after receiving the application,¹⁷² which provides clear limitations. By contrast, pre-announced licensing rounds, which have been opted for in the petroleum sector, could streamline resource allocation and enable operators to plan strategically around known deadlines and target locations. This approach would be advantageous given the scale of CCS deployment envisioned in Norway and Europe. This may be particularly relevant with the entry into force of the NZIA, under which certain oil and gas operators have to meet an allocated contribution to the 50 million tons annual injection target.¹⁷³ To meet this contribution, the entity may, among other things, invest in, or develop, CO₂ storage projects alone or in cooperation,¹⁷⁴ or enter into agreements with third-party storage project developers or investors to fulfil their contribution.¹⁷⁵ At the time of writing, the NZIA has not yet been declared EEA-relevant as far as publicly available information shows.¹⁷⁶ The NCS has significant storage capacity, and foreign EU oil and gas companies and possibly Norwegian companies will likely look to invest or participate in storage projects in Norway to meet their contribution. Having an open-door policy may complicate collaboration and decision-making for EU oil and gas companies seeking to e.g., invest in projects on the NCS.

¹⁷⁰ Norwegian Offshore Directorate, 'Licensing rounds' <https://www.sodir.no/en/facts/production-licences/licensing-rounds/> accessed 20 December 2024.

¹⁷¹ Norwegian Offshore Directorate, 'Invitation' <https://www.sodir.no/en/facts/carbon-storage/licences-for-carbon-storage/announcement-2024-round-1/invitation/> accessed 20 December 2024.

¹⁷² Norwegian Offshore Directorate, 'Announcement 2024, round 1' [Announcement 2024, round 1 - The Norwegian Offshore Directorate](#) accessed 20 December 2024.

¹⁷³ NZIA, art 23.

¹⁷⁴ NZIA, art. 23(5)(a)

¹⁷⁵ NZIA, art. 23(5)(c).

¹⁷⁶ Thus, at this point in time, it is not established whether Norway will be a third country.

A regular open licencing round noticed in advance would foster greater alignment and improve predictability.

With the extensive experience with petroleum operations in Norway combined with the similarities between the industries, building the CCS framework on the petroleum framework from the start seemed the best way forward. From the deviations in the CCS framework compared to the petroleum framework, we also see that there were attempts to tailor-make language and requirements for CCS from the start, although not all the deviations have been beneficial for CCS. We recognise that there have been a number of amendments to the CCS framework since its implementation in 2014, through the implementation of the CO₂ Safety Regulations¹⁷⁷ and the Regulations relating to documentation in connection with storage of CO₂ on the continental shelf.¹⁷⁸ Furthermore, there have been revisions to these regulations,¹⁷⁹ and there is an ongoing revision of the Storage Regulations.¹⁸⁰ Thus, we also recognise that there is an ongoing effort to adopt the framework to the industry as regulatory lessons are learned, business models are developed, and the industry is moving towards commercialisation.

These step-by-step adaptation and regulatory adjustment are necessary. As pointed out earlier in this report, building a perfect and fit-for-purpose framework from day one is nearly impossible. One depends on the industry to grow with the framework and the regulators and private stakeholders to learn from each other and adapt as demonstration projects are being planned, developed, and deployed. Considering the petroleum industry and the development of the framework for petroleum operations, the same can be said to have happened there. As mentioned, the first comprehensive Petroleum Act came in 1985, more than 15 years after petroleum was discovered on the NCS. Up until 1985, regulatory provisions and guidelines came gradually. After 1985, the framework was supplemented and amended, with the major change coming in 1996 with the new Petroleum Act and Regulations. However, also after this point in time, the framework has been subject to many more adjustments, clarifications, case law, guidelines, and standards that, step by step, enable technology development.

¹⁷⁷ Regulations relating to safety and working environment for transport and injection of CO₂ on the continental shelf (last amended 25 February 2020).

¹⁷⁸ Forskrift om dokumentasjon ved lagring av CO₂ på sokkelen (FOR-2017-12-13-2003) *Forskrift om materiale og dokumentasjon ved undersøkelse etter og utnyttelse av undersjøiske reservoarer på kontinentalsokkelen til lagring av CO₂* (Regulations relating to documentation in connection with storage of CO₂ on the shelf).

¹⁷⁹ The Norwegian Petroleum Directorate, 'Consultation – proposed amendments to the Resource Management Regulations and the Regulations relating to documentation in connection with storage of CO₂ on the continental shelf' <https://www.sodir.no/en/regulations/hearing/consultation--proposed-amendments-to-the-resource-management-regulations-and-the-regulations-relating-to-documentation-in-connection-with-storage-of-co-on-the-continental-shelf/> accessed 20 December 2024.

¹⁸⁰ Norwegian Offshore Directorate, Postponed, 'Seminar on safe CO₂ storage' <https://www.sodir.no/en/whats-new/news/general-news/2023/postponed-seminar-on-safe-co2-storage/> accessed 20 December 2024.

3.4. Biogenic CO₂

3.4.1. The 2022 Gassnova Report observations

Longship is aiming at capturing both fossil and biogenic CO₂ (87/13 at Heidelberg and 50/50 at Celsio).¹⁸¹ The 2022 Report notes that at the time of writing, there were no regulatory or policy incentives in Norway or the EU to support the capture and storage of biogenic CO₂, as only fossil CO₂ is included in the ETS. Norway proposed a possible solution allowing CO₂ of biogenic origin to be subtracted on certain conditions in the Longship project, but the proposal was not accepted by the European Commission.¹⁸² The Commission explained that “*there is no legal ground in the ETS Directive that could support this*”¹⁸³ and MRR Article 49(1) “*makes it clear that this is not possible*”.¹⁸⁴

The issue of biogenic CO₂ was addressed through state aid agreements for Longship, which offer equal compensation for biogenic and fossil CO₂ regardless of its status under the ETS.¹⁸⁵ Since the publication of the 2022 Report, the topic has not been fully solved from a regulatory perspective and is still a challenge.

3.4.2. Main findings and recommendations

There is a lack of incentives for storing CO₂ from biogenic sources in Norway. This is needed to support and incentivise carbon removal activities, such as BECCS. In their reports, Oslo Economics suggests that reversed auctions combined with CfD are the most socio-economic option to provide the necessary financial incentive in Norway.¹⁸⁶ From a commercial standpoint, relying on state aid as the foundation for the BECCS business model is unsustainable in the long term, and establishing a regulated, compliance-driven market for carbon removals to ensure a robust and scalable solution will, in our opinion, be the best solution. However, state aid mechanisms will be essential in the short term to address the current market failure and bridge the gap. The proposed reversed auction combined with CfD enables competition and is a model that has been opted for in several other countries.

That said, such auctions may pose challenges for smaller emitters in terms of competitiveness - a concern echoed by some of our interviewees. They propose that reversed duties would be more suitable for this purpose. The reports by Oslo Economics consider this and note that it is possible to include other criteria for allocating support or carrying out separate auctions for specific categories of projects that cannot compete on cost.¹⁸⁷ This will be important to provide equal opportunities to all actors, irrespective of size.

¹⁸¹ 2022 Gassnova (n 1) p. 21

¹⁸² The Norwegian government proposed the following: “The captured CO₂ may – regardless of its origin (fossil or bio) – be subtracted as long as it does not exceed the operator’s total amount of produced fossil CO₂ from the relevant installation. If the operator captures more CO₂ than the total production of fossil CO₂, the captured CO₂ exceeding this number cannot be subtracted.” 2022 Gassnova Report (n 1) 36-37.

¹⁸³ 2022 Gassnova (n 1) p. 37.

¹⁸⁴ 2022 Gassnova (n 1) p. 37.

¹⁸⁵ 2022 Gassnova (n 1) p. 25.

¹⁸⁶ Oslo Economics, ‘Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning’ (n 105).

¹⁸⁷ Oslo Economics, ‘Virkemidler for CO₂ håndtering i industri og avfallsforbrenning’ (n 86) p. 63.

On the EU level, there are also not sufficient incentives for storing biogenic CO₂ as they are not encompassed by the EU ETS, and there is currently no other regulated market providing incentives. The EU Carbon Removal Certification Framework accommodates biogenic CO₂ and potentially enables financial incentives, but this is a preliminary framework relying on voluntary schemes. Its success will depend on, *inter alia*, the methodologies currently being developed. There are also still uncertainties related to its cross-border application.

3.4.3. The Legal framework and analysis

Norway

There are currently no mechanisms in place that provide financial incentives for the capture and storage of biogenic CO₂ in Norway. NEA issued a note in 2023 on carbon removal explaining that *“it can be argued that the incentives for carbon removal should be the same as those for emission reductions”*.¹⁸⁸ The note describes several models for support and considers reversed duties or reversed auctions to be most relevant, emphasising the need for predictability in terms of future revenue streams. NEA defined reversed duties as a scheme in which operators are paid per tonne of CO₂ removed and stored. In a reverse auction, actors compete by needing the least amount of subsidies/support for carbon removal. The Norwegian Parliament responded by requesting the Government to initiate an external review of instruments for pricing negative emissions.¹⁸⁹

Oslo Economics was consequently commissioned by the NEA and the MoE, respectively, to provide such a review. Oslo Economics prepared two reports i) incentives for industrial carbon removal¹⁹⁰, ii) incentives for carbon capture from industry and waste incineration¹⁹¹, the latter in collaboration with SINTEF Energy.

When comparing mechanisms, in both instances, they found that the scheme should be organised as reversed auctions, as it was viewed as the most suitable model from a socio-economic perspective.¹⁹² The scheme would be organised as a series of auctions that can be tailored to, for example, the maturity of projects and ambitions for emission reductions. In the reversed auctions, the actors can compete for funds needed to deploy their project and are awarded contracts for support payments over a certain number of years.¹⁹³ It may cover costs related to transport and storage,¹⁹⁴ and CAPEX and OPEX. To create predictability for the project's future cash flow, the starting point should be that the support is fixed and paid regularly, where the fluctuating CO₂ price is deducted (contract for difference).¹⁹⁵ To avoid

¹⁸⁸ Miljødirektoratet. (2023, March 10). Industriell karbonfjerning - potensial, kostnader og mulige virkemidler [Industrial carbon removal - potential, costs, and possible measures]. (p. 1) (unofficial translation).

¹⁸⁹ Innst.490-S 2022-2023 Parliamentary decision VI, Meld.2 82022, Revised national budget of 2023 of June 14, 2023

¹⁹⁰ Unofficial translation of «Virkemidler for industriell karbonfjerning»

¹⁹¹ Unofficial translation of «Virkemidler for karbonfangst fra industri og avfallsforbrenning»

¹⁹² Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (n 105).

¹⁹³ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p 4. Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 5.

¹⁹⁴ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p 4. Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 5.

¹⁹⁵ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p 4. Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 5.

overcompensation, the revenue generated from sales of carbon credits should also be partly deducted.¹⁹⁶ The successful projects in the reversed auction sign a CfD with the government.¹⁹⁷

Following our interviews, an industry actor expressed concerns about whether reversed auctions are the most suitable option when considering small to medium companies that lack the personnel and resources that larger companies benefit from. While this model facilitates competition, larger companies may be in a better position to prepare and submit plans for these auctions (considering resources and capacity) and may thus have a higher success rate vis-à-vis smaller operators, who may have to be selective when preparing bids. The actor interviewed expressed that reversed duties may be more beneficial for this reason.

In this regard, the reports observe and address that different actors and projects will have different preconditions to compete in auctions where price (cost per ton captured and stored CO₂) is a decisive element. They acknowledge that administrative costs may be a barrier for smaller actors¹⁹⁸ and that, generally, actors will have no guarantee that they will win the bid and receive support, which may impact their decision to mature their projects.¹⁹⁹

They note that it may be possible to include other criteria for allocating support.²⁰⁰ It is also possible to include only selected categories of projects. Thus, separate auctions may be considered for different types of projects to promote capture at facilities or regions that are not expected to be able to compete on price.²⁰¹ However, when categorising different types of auctions, it should be taken into account that Norway is a relatively small country and there are limited amounts of projects that will be mature at the same time.²⁰² This will limit the opportunity to divide the auctions into more narrow project categories without it jeopardising the possibility of achieving actual competition.²⁰³ The desire to target the scheme towards certain sectors, technologies, or geographical areas should, therefore, be weighed against the need to organise auctions where more actors and projects qualify and can participate in the competition.²⁰⁴

In terms of relying on reversed duties, the reports observe that the reversed duties mechanism indeed has the advantage that actors do not have to apply for the scheme, which means there are fewer associated administrative costs and more predictability for future income and revenue streams.²⁰⁵ For reversed duties to work on their own, the rates will need to be high enough to trigger investments in, minimum, the most affordable projects. A reversed duty that only mirrors today's CO₂ price will likely only have a limited impact, the same way that today's carbon pricing of fossil CO₂ does not guarantee profitability for capture projects.²⁰⁶ It may be demanding to

¹⁹⁶ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p 4. Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p 10.

¹⁹⁷ Oslo Economics, 'Auksjonsløsning for tildeling av differansekontrakter kan fremskynde investeringer i CO₂-håndtering og industriell karbonfjerning' (n 105).

¹⁹⁸ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 46.

¹⁹⁹ Oslo economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 46.

²⁰⁰ Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 63 ; Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 11.

²⁰¹ Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 63.

²⁰² Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 11. Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 64.

²⁰³ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 11. Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 64.

²⁰⁴ Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 63.

²⁰⁵ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 46.

²⁰⁶ Oslo Economics, 'Virkemidler for CO₂ håndtering i industri og avfallsforbrenning' (n 86) p. 32.

determine and set a rate that is high enough for it to deploy projects alone and, at the same time, low enough so that the authorities do not overcompensate the industry actors.²⁰⁷

In addition to the abovementioned developments, opportunities may also be found at the EU level. The EU Carbon Removals and Carbon Farming Certification Regulation (otherwise referred to as Carbon Removal Certification Framework, or CRCF)²⁰⁸ accommodates biogenic CO₂ and potentially gives incentives, but this is a preliminary framework relying on voluntary schemes. The actors interviewed mentioned the importance of being able to participate in the voluntary schemes under the CRCF whilst still being able to participate in the potential reversed auctions. The actors expressed concern about being able to effectively harmonise these instruments, especially in cases with a cross-border element, and avoid double claiming.

EU

The CRCF is an EU-wide voluntary framework for certifying carbon removals, carbon farming, and carbon storage in products in the EU.²⁰⁹ It provides rules to recognise certification schemes that demonstrate compliance with the EU framework.²¹⁰ This is done by, *inter alia*, introducing principles regarding additionality, transparency, duration as well as quantification and verification of the removals.²¹¹ The actors seeking to certify carbon removals under the CRCF would have to work to have the selected voluntary schemes recognised by ensuring adherence to the criteria in the CRCF. The CRCF will soon be supplemented with methodologies for each removal activity.²¹² Thus, if successful, the CRCF may facilitate investments in carbon removal technologies, providing incentives to capture biogenic CO₂.

That being said, it may be unfortunate from a commercial perspective that the CRCF is relying on volunteer markets rather than establishing a common compliance market. There are competing methodologies and marketplaces for carbon removals. Several of these schemes may be recognised under CRCF.²¹³ This co-existence of voluntary markets is fragmenting the carbon market space, even with the upcoming methodologies from the EU harmonising the requirements, reducing the number of potential buyers per credit. Also, this may be unfortunate for transparency and public trust in the additionality and quality of the whole market, even if all the individual marketplaces are complying with the CRCF methodologies.

The CRCF makes clear that certified activities can currently only occur within the EU's borders and that carbon removals generated under the CRCF can contribute to the achievement of the Union's NDC and its climate objectives and not to third-party NDCs or international compliance

²⁰⁷ Oslo Economics, 'Virkemidler for industriell karbonfjerning' (n 85) p. 9.

²⁰⁸ Regulation (EU) 2024/3012 of the European Parliament and of the Council of 27 November 2024 establishing a Union certification framework for permanent carbon removals, carbon farming and carbon storage in products (entry into force is expected 26 December 2024). (CRCF)

²⁰⁹ CRCF, art. 1.

²¹⁰ European Commission, 'Carbon Removals and Carbon Farming' https://climate.ec.europa.eu/eu-action/carbon-removals-and-carbon-farming_en accessed 27 November 2024.

²¹¹ CRCF, arts. 1-2., and Chapter 2.

²¹² European Commission, 'Commission Welcomes Political Agreement on EU-Wide Certification Scheme for Carbon Removals' https://ec.europa.eu/commission/presscorner/detail/en/ip_24_885 accessed 14 June 2024.

²¹³ See e.g., Cloverly, 'Carbon Removal in the Voluntary Carbon Market: Scaling Climate Action' <https://cloverly.com/blog/carbon-removal-in-the-voluntary-carbon-market-scaling-climate-action-0d979>, Verra, 'Verified Carbon Standard' <https://verra.org/programs/verified-carbon-standard/>, Puro.earth, 'Certify your carbon removal' <https://puro.earth/> accessed 21 December 2024.

schemes.²¹⁴ This means that the regulation must be incorporated into the EEA Agreement in order for carbon removal activities to be certified in Norway and contribute to Norway's climate targets under the Paris Agreement.²¹⁵

The Norwegian Ministry of Climate and Environment is assessing the Regulation's EEA relevance.²¹⁶ No assessment has yet been completed on how it will be implemented into Norwegian law if incorporated into the EEA Agreement.²¹⁷ In the event of incorporation into the EEA Agreement, it will also have to be considered whether some of the tasks assigned to the Commission for the EEA/EFTA countries should be assigned to ESA.²¹⁸

The European Commission is set to report on how negative emissions can be accounted for under the ETS by 2026.²¹⁹ A review of the suitability of the ETS to cover negative emissions is outside the scope of this paper. However, our initial response to this suggestion is that the cap and trade system under ETS may not be suitable for biogenic CO₂ for several reasons, one of them being the way the cap and trade system is designed, which is an opposite graph to what we want to see with negative emissions. Therefore, the structure and design of the ETS may need to be modified to effectively accommodate carbon removals. Further, mixing these two emissions categories in the same market may cause concerns related to greenwashing and buying carbon removal credits to support fossil emissions. To include biogenic emissions in the ETS system would require a lot of work and consideration from the European Commission. Thus, while we applaud the potential of including carbon removals in a compliance market, the ETS system may not be the most appropriate place. Our observations from seminars and conferences indicate a range of perspectives regarding the inclusion of negative emissions within the ETS. Some participants align with our initial view that the current structure of the ETS is ill-suited for addressing negative emissions. Others contend that, with sufficient amendments, the ETS could be adapted to accommodate negative emissions. Notably, prior to the publication of the CRCF, an industry representative advocated for a compliance-based market and expressed the view that the ETS, in its current form, is unsuitable for carbon removals.²²⁰

As mentioned, industry stakeholders interviewed have raised concerns about the auctions, as well as the CRCF. They have also expressed reservations about whether voluntary markets can provide a viable path forward. Notably, some criticisms of reversed auctions may similarly apply to the CRCF. The current state of the carbon removal market requires significant investments of time and resources from industry stakeholders, which poses challenges, particularly for smaller companies with limited resources. Therefore, it is important to emphasise that both reversed-auction-based state aid schemes and market structures relying on competing voluntary markets

²¹⁴ CRCF, art. 1(2).

²¹⁵ Norwegian Government, 'Sertifiseringsrammeverk for karbonfjerning (CRCF)' (EØS-notatbasen, 05 December 2024).

²¹⁶ Norwegian Government, 'Sertifiseringsrammeverk for karbonfjerning (CRCF)' (EØS-notatbasen, 05 December 2024).

²¹⁷ Norwegian Government, 'Sertifiseringsrammeverk for karbonfjerning (CRCF)' (EØS-notatbasen, 05 December 2024).

²¹⁸ Norwegian Government, 'Sertifiseringsrammeverk for karbonfjerning (CRCF)' (EØS-notatbasen, 05 December 2024).

²¹⁹ Directive 2003/87/EC, art. 30(5).

²²⁰ Horisont Energi, 'How to enable CO₂ capture from bioenergy with storage in Norway' <https://horisontenergi.no/wp-content/uploads/2023/02/2021-German-Norwegian-Energy-Dialogue-26-may-Horisont-Energi.pdf> accessed 21 December 2024.

should be considered interim measures. In the long term, in our opinion, the goal should be the establishment of a unified, compliance-based European market.

3.5. Monitoring

3.5.1. The 2022 Gassnova Report observations

The 2022 report highlights how the monitoring requirements involve long-term commitments.²²¹ Further, “*the need, requirements and time for monitoring can change in the course of a storage project’s life-time*”²²² and represents a potential uncertainty for the storage operators.²²³ The monitoring activities at the storage complex and the injection facilities will be carried out based on a monitoring plan, and such a plan is “*a prerequisite for obtaining the necessary permits for underground injection*”.²²⁴ These monitoring plans are subject to the Storage Regulations²²⁵ and updated plans need to be approved by the MoE.²²⁶ The Northern Lights Storage and Monitoring Plan has been accepted by the NEA and the MoE.²²⁷

3.5.2. Main findings and recommendations

The rules for monitoring follow from the Storage Regulations and are based on the best practices available at the time of design. The requirements for monitoring CO₂ storage sites are both performance-based and dependent on a proposed plan by the operator being approved by the ministries, following a long tradition in Norway for a public-private partnership in deploying important industries. By requiring the operator to establish a monitoring plan using the performance-based framework as a baseline and to update it throughout the project lifecycle in response to findings, technological advancements, and external factors, this approach ensures that monitoring activities remain effective and helps confirm that the CO₂ behaves according to the modelled predictions.

The ISO standard 27914 on geological storage of CO₂ contains recommendations for monitoring, many of which may be employed by the operator to respond to the performance-based framework in the Storage Regulations. One option could be to actively use this standard when developing the monitoring plan according to the permitting requirements. It could further be considered referring to the standard in the permitting requirements. The upcoming updated 27914 standard contains a clause on quantification and verification, which further opens up for using the standard and its monitoring methodology for carbon removals and carbon markets.

3.5.3. The Legal framework and analysis

When discussing monitoring, a useful starting point is looking at why monitoring needs to happen. The purpose of CCS is to eliminate CO₂ emissions to the atmosphere for climate

²²¹ 2022 Gassnova Report (n 1) p. 43.

²²² 2022 Gassnova Report (n 1) p. 43.

²²³ 2022 Gassnova Report (n 1) p. 43.

²²⁴ 2022 Gassnova Report (n 1) p. 43.

²²⁵ Storage Regulations, (n 24) Annex III.

²²⁶ 2022 Gassnova Report (n 1) p. 43.

²²⁷ 2022 Gassnova Report (n 1) p. 45.

purposes.²²⁸ It is therefore important to monitor the amount of CO₂ captured, transported and stored and any potential leakage of CO₂. In addition to supporting the objective of CCS, monitoring activities would be needed to ensure that the surroundings are protected from potential damage. Monitoring would also be necessary to confirm that the CO₂ is permanently contained in the geological formation²²⁹ such that the emitter involved in the activities can demonstrate eligibility under ETS, volunteer carbon markets, or even tax regimes in terms of financial incentives. As a side to this, the amount of CO₂ passing through the system and being injected for storage needs to be monitored to provide quantification data for said incentives, as well as contractual arrangements. Additionally, monitoring would be needed to ensure that the CO₂ stream composition meets both the regulatory²³⁰ and contractual requirements and that the integrity of the infrastructure is not compromised. How the CO₂ plume behaves²³¹ or impacts the storage site is yet another issue in need of monitoring.

As such, there are technical, commercial, policy, and legal justifications and demands for monitoring activities. Several of these ultimately may be traced back to containment. However, the objective of containment is different in each framework. -And so, with different objectives come different technologies. Some of these would require continuous monitoring, while other aspects and activities may be sufficiently monitored if measures for monitoring are implemented and conducted periodically. Thus, the regulators would have to find a balance in the regulatory frameworks so that the requirements and the objectives may all be achieved while still not being overwhelming, confusing, and contra-productive. Further, the need to accommodate technology development and site-specific conditions and nearby activities should be considered.²³² These requirements would have to be balanced against cost which for some of the available technologies is considerable.

Our overall impression is that Norwegian regulators have found a way to balance the frameworks and that the operators, through the dynamic monitoring plans, are given autonomy to plan, develop, and control many of the monitoring activities themselves. The framework may not be perfect but, as commented on in Chapter 3.3, a framework may need to go through a stepwise development, having some projects test out the requirements to identify gaps and hurdles, such that the requirements may be improved. Thus, we consider the current landscape to be a solid starting point for monitoring. Below, we summarise the current status and analyse some elements that may be used for improvement.

The monitoring requirements are provided in the Storage Regulations.²³³ Section 4-5 of the Regulations establishes that if the licensee decides to develop a storage location for injection and storage of CO₂, the licensee must make a plan for development and operation (PDO) of the location and submit it to the Ministry for approval. The PDO shall contain a draft monitoring plan.

²²⁸ European Commission, 'Guidance Document 2: Characterisation of the Storage Complex, CO₂ Stream Composition, Monitoring and Corrective Measures' (July 2024) p. 35 https://climate.ec.europa.eu/eu-action/industrial-carbon-management/designing-and-implementing-industrial-carbon-management-projects_en#paragraph-3536-1-title accessed 29 October 2024.

²²⁹ European Commission, 'Guidance Document 2' (n 228) p. 39.

²³⁰ Storage Regulations (n 24) Section 4-6.

²³¹ Storage Regulations (n 24) Section 5-4.

²³² European Commission, 'Guidance Document 2' (n 228) p. 27.

²³³ Storage Regulations (n 24).

In the application for a licence to inject and store,²³⁴ they need to have a complete monitoring plan²³⁵ (no longer just a preliminary one). This application also needs to be approved.²³⁶ Criteria for establishing and updating the monitoring plan are regulated in Section 5-4 and post-operation plan in Section 5-7. A detailed description of the requirements for the monitoring plan and post-operation plan follows from Annex II. The choice of monitoring techniques shall be based on the best practices available at the time of design.²³⁷ Duties related to monitoring are similarly mirrored and provided in the Pollution Regulations.²³⁸

Although the operator has much autonomy to develop the monitoring plan, the framework provides certain criteria. The baseline for monitoring is formed when the operator is characterising and selecting the site, such that the monitoring plan shall be prepared in accordance with the risk assessment analysis performed when characterising the site, and the data developed during the characterisation activities in relation to the specific characteristics of the site. Also, the monitoring will be done to compare the actual and modelled behaviour of the CO₂.²³⁹ Based on the data collected, the operator shall prepare a monitoring plan for all the main stages of the project, from operational to post-closure. For each phase, the operator needs to specify, *inter alia*:

- Which parameters shall be monitored;
- Applicable monitoring techniques with an explanation of why this was chosen;
- Monitoring locations; and
- Sampling frequency.²⁴⁰

Further guidance and requirements are outlined in the Storage Regulations, which mandate continuous or periodic monitoring of, *inter alia*:

- Diffuse emissions of CO₂ near the injection facility;
- CO₂ volume flow near the injection wellheads;
- CO₂ pressure and temperature near the injection wellheads;
- Chemical analysis of the injection flow; and
- Reservoir temperature and pressure²⁴¹

The criteria are performance-based, such that it is not specified which technology to use when e.g., detecting diffuse emissions. Some stakeholders may want clearer guidance on this. However, knowing that technologies may develop and site-specific elements may impact how best to do this, imposing criteria with more certainty may be difficult.

²³⁴ Storage Regulations (n 24) Section 5-2.

²³⁵ Storage Regulations (n 24) Section 5-4.

²³⁶ Storage Regulations (n 24) Section 5-2 paragraph 1.

²³⁷ Storage Regulations (n 24) Annex II.

²³⁸ Pollution Regulations (n 67) Section 35-9 and Annex II.

²³⁹ Storage Regulations (n 24) Section 5-4.

²⁴⁰ Storage Regulations (n 24) Annex II.

²⁴¹ Storage Regulations (n 24) Annex II.

Recently, Guidance Document 2²⁴² to the CCS Directive has been amended.²⁴³ It provides guidance on, amongst other things, monitoring and corrective measures.²⁴⁴ The Guidance Document provides an overview of some of the technologies and methodologies available to monitor a storage site, such as 3D and 4D seismic,²⁴⁵ tracers,²⁴⁶ measurement,²⁴⁷ pressure devise thermometer and wireline logging.²⁴⁸ However, it neither prescribes nor recommends specific technologies over others. This approach reflects the document's non-binding nature,²⁴⁹ as well as a focus on site-specific characteristics and the changing needs corresponding to the project phases.²⁵⁰

The need, requirements, and time for monitoring would often change in the course of a storage project's lifetime due to changes to the project infrastructure or volumes, information uncovered in earlier monitoring activities, seismic activities, or technology advancements, to mention some elements. Thus, it may be hard for regulators to provide predictability and strict requirements. We also expect that the monitoring technologies will be further developed such that performance-based criteria should be the default to accommodate such technologies.

One concern we have met during discussions with industry is the post-closure monitoring requirements and the combination of performance-based criteria and a potentially unknown period of post-closure responsibilities. This makes monitoring a costly and unpredictable element of the liability regime, which requires financial security. Financial security is addressed separately in Chapter 3.7; therefore, it will not be discussed in detail here. However, from a monitoring plan perspective, there are elements that may help mitigate the uncertainties, both from an operator's perspective and from the regulators' side. As a starting point, the more information available about the storage site prior to operation, the easier it is to determine what elements need to be monitored. Thus, the more solid characterisation and site selection process, the more informed will the operator and regulator be when finalising the monitoring plan. The same applies to the post-closure phase: The longer the project has been in operation and the more data collected, analysed, and disseminated, the stronger the baseline for updating the monitoring plan with the application to cease injections.

In terms of spreading learning and the demonstration effects, we note that monitoring experiences from Sleipner were cited as informing the law i.e., the monitoring provisions in the CCS Directive, and provided recommendations for future projects.²⁵¹ Indeed, the experiences from Sleipner were valuable in the following Snøhvit project. This is a telling example of the value of practical learning from industrial pioneers in the drafting of new regulatory frameworks, as

²⁴² European Commission, 'Guidance Document 2' (n 228).

²⁴³ European Commission. (n.d.). Designing and implementing Industrial Carbon Management projects. Under Guidance documents. Retrieved 29.10.24, from https://climate.ec.europa.eu/eu-action/industrial-carbon-management/designing-and-implementing-industrial-carbon-management-projects_en#paragraph-3536-1-title

²⁴⁴ European Commission, 'Guidance Document 2' (n 228) p. 9.

²⁴⁵ European Commission, 'Guidance Document 2' (n 228) pp. 13, 51.

²⁴⁶ European Commission, 'Guidance Document 2' (n 228) p. 36.

²⁴⁷ European Commission, 'Guidance Document 2' (n 228) p. 42.

²⁴⁸ European Commission, 'Guidance Document 2' (n 228) p. 51.

²⁴⁹ European Commission, 'Guidance Document 2' (n 228) p. 8.

²⁵⁰ European Commission, 'Guidance Document 2' (n 228) p. 51.

²⁵¹ Philip Ringrose, 'CO₂ Storage Project Design and Strategy for Global Scale-Up' (YouTube, 4 June 2020) <https://www.youtube.com/watch?v=ETALqgtagaE> (<https://www.youtube.com/watch?v=ETALqgtagaE> (from 18:50). accessed 27 November 2024.

well as demonstrating and transferring practical learnings and expertise from a first mover to subsequent projects.

The more projects that become operational in Norway and abroad, the more knowledge may be shared and used to update the legal frameworks and permitting requirements for monitoring. It is further useful to implement procedures taking into account learnings from other projects, best practices and standards. One set of such standards exists under the International Organization for Standardization, Technical Committee 265 (ISO/TC 265). ISO/TC 265 has since 2011 developed technical standards and technical reports for CCS and CO₂-EOR.²⁵² A part of the portfolio is ISO:27914, a standard for CO₂ storage operations. The standard provides a framework for site selection and characterisation, which is already tested by projects like Greensand. Greensand had DNV perform a third-party certification of compliance with 27914 for site selection and verification,²⁵³ demonstrating that the standard has operational tools for industry.

Whether these activities under 27914 will indeed strengthen Greensand's position in terms of monitoring in the future remains to be seen. However, the standard also provides a framework for monitoring the storage site, one that Greensand's permitting conditions were also required for the piloting phase to employ.²⁵⁴ DNV certified that the demonstration project was conducted according to 27914.²⁵⁵ Also, in later permitting rounds in Denmark, the 27914 has been included by reference for what seems to be an optional use of the standard for characterisation and site selection for permit applications,²⁵⁶ indicating that Danish regulators have considered the standard useful. There are other examples from outside Europe, demonstrating that the 27914 may be useful for monitoring activities. As an example, in Australia, the 27914 influenced the monitoring plan of the Moomba project.²⁵⁷

The 27914 standard recognises that the primary purposes of monitoring and verification are:

- to assist in managing health, safety, and environmental risks, and
- to assess storage performance.

The monitoring and verification (M&V) activities are an integral part of risk management. The standard is performance-based, as it is important to acknowledge that site-specific geology and project-specific conditions need to be understood within a risk assessment framework to

²⁵² International Organization for Standardization, 'ISO/TC 265 Carbon dioxide capture, transportation, and geological storage' <https://www.iso.org/committee/648607.html> accessed 21 December 2024.

²⁵³ Greensand, 'Appendix 3 – Project Greensand Phase 1, 3rd party certification Statement of Feasibility' <https://eudp.dk/files/media/document/64020-1080%20-%20Project%20Greensand%20Phase%201%20-%20Appendix%203.pdf> accessed 21 December 2024

²⁵⁴ Energistyrelsen, 'Tilladelse til geologisk lagring af CO₂ på under 100 kilotons med henblik på forskning, udvikling eller afprøvning af nye produkter og processer' (Danish) (2022) [pilotlagringstilladelse_project_greensand \(6\).pdf](#)

²⁵⁵ DNV, 'DNV Certifies first CO₂ storage site for flagship Danish Carbon Capture and Storage project' <https://www.dnv.com/news/dnv-certifies-first-co2-storage-site-for-flagship-danish-carbon-capture-and-storage-project/>

²⁵⁶ Energistyrelsen, 'Bilag 3: Vejledende dokumentationskrav til ansøgning' (Danish) (2024), and 'Bilag 2: Vejledende dokumentationskrav til ansøgning' (Danish) (2023) <https://ens.dk/media/562/download> accessed 21 December 2024.

²⁵⁷ Santos, 'Moomba CCS project – Strzelecki and Marabooka Toolachee monitoring and verification plan' https://www.energymining.sa.gov.au/_data/assets/pdf_file/0010/1069813/Moomba-CCS-phase-1a-monitoring-and-verification-plan.pdf accessed 21 December 2024

customise M&V to be most effective. Monitoring refers to all measurement and surveillance activities necessary to ensure safe storage, including activities to:

- assess the integrity of the storage complex, wells, and specific geological features;
- detect loss of containment and assess potential impacts of leakage;
- determine movement and fate of injected CO₂, pressure fields, and formation fluid displacement;
- assess performance and effectiveness of risk control measures (e.g., mitigation, remediation).

The current standard does not consider quantification and verification, but work is currently ongoing to address this. Also, the standard is being updated based on experience made by industrial stakeholders trying to utilise the standard for project development and regulatory compliance. This includes the provisions on monitoring.

3.6. Third-party access

3.6.1. The 2022 Gassnova Report observations

The 2022 Report observes that the storage and transport partners are, on certain conditions, required to give access to their infrastructure (via third-party access). In this context, Northern Lights stipulated that there may be a lack of control over the conditions for such access, making the risk involved uncertain.²⁵⁸ Opposite, the State argues that such access will only be an issue if the storage operator does not need the infrastructure itself, and the use would, in any event, be compensated.²⁵⁹

3.6.2. Main findings and recommendations

Third-party access (TPA) is regulated in the Storage Regulations and ensures access to infrastructure for other actors than the owner. TPA in Norway and in Europe is a well-known and well-established concept central in several other industries and has many important benefits. Although Northern Lights has expressed concerns regarding TPA and a perceived lack of control, our experience, along with feedback from interviews, indicates that these concerns are unlikely to be shared broadly across the CCS industry. Operators retain flexibility in determining commercial terms and maintain the right to refuse access if, for example, a CO₂ provider fails to meet required specifications or if the capacity is full. Consequently, it is unlikely that infrastructure owners would have little control over access terms, as long as they adhere to the principles of fairness and reasonableness.

If it turns out that industry finds TPA to be problematic, there are examples where new infrastructure has been exempted from TPA for a period of time. For example, Directive 2009/73/EC on common rules for the internal market in natural gas provides that new gas

²⁵⁸ 2022 Gassnova Report (n 1) p. 31.

²⁵⁹ 2022 Gassnova Report (n 1) p. 31.

infrastructure and storage facilities may be exempted for a defined period of time from several provisions of the Directive, including the article pertaining to TPA. This Directive is no longer in force and has been repealed by Directive 2024/1788. These exemptions were not included in the new Directive but are precedent demonstrating that such exemptions have previously been allowed. However, it may be challenging to invoke this for CCS. The early-mover argument has to be balanced against the amount of state aid that has been provided to develop the early-mover infrastructure in Europe. When investing substantial taxpayer funds in climate mitigation infrastructure, limiting access for emitters would undermine its purpose. Expanding TPA rights to include as many stakeholders as possible ensures the greatest return on investment and maximises public benefit.

All this being said, the European Commission has expressed that they are working on a regulatory package for CO₂ transport which, among other things, may consider issues such as TPA, tariff regulation, and ownership models. As a result of this, CO₂ transport in the EU could see significant regulatory changes aimed at further harmonising the industry and strengthening a single market. Although we have not seen any statements from the Commission suggesting that unbundling will be included in the current regulatory package, we believe it is likely to be a topic of discussion either in this regulatory process or in the near future.

Further to the regulatory efforts by the European Commission, the Commission is considering how standardisation may be used for CCS frameworks. Standards may become part of the regulatory package or the broader EU CCS regime, and a key addition to the TPA regime. It is also clear from conversations with industry actors that a standard on CO₂ composition is something that the industry is keen to have in place to facilitate shared infrastructure. Such a standard is under development under the European Committee for Standardization Technical Committee 474 (CEN/TC 474). Due to our involvement in both ISO/TC 265 and CEN/TC 474, as well as ongoing efforts in a Working Group on CO₂ standards established by the European Commission, we have found grounds to approach the issue of CO₂ specification with caution, and that overly prescriptive specifications may prevent rather than promote hubs and clusters and TPA.

3.6.3. The Legal framework and analysis

TPA is a term used when actors other than the owner of the infrastructure gain access to said infrastructure. Such access is achieved through negotiation, where access and terms are agreed between the parties concerned, or through regulation (regulated access) where the right to access and terms are set by the authorities. There may also be combinations of the two types of TPA, e.g. the parties themselves agree on access but are unsuccessful in agreeing on the terms and conditions, and the relevant authority is brought in to set the terms. TPA is well known from the petroleum, electricity, and telecom sectors, and such access will generally offer several gains in terms of efficiency due to reduced costs when infrastructure is shared. It may also offer new business opportunities, e.g. possibilities to increase cross-border trade, as well as assisting countries with a lack of suitable geological storage possibilities or capacity to meet their emission reduction goals.

Section 5-12 of the Storage Regulations considers TPA. It provides that

The Ministry may [...] decide that facilities and storage locations [...] which are owned or used by a licensee, can be used by others if this is warranted by the consideration for

efficient operations or social considerations, and the Ministry finds that such use is not an unreasonable impediment for the licensee's own duly substantiated reasonable need for storage or for a party that has already secured a usage right.

Section 5-12 also considers when access may be refused. This includes when there is a lack of capacity. If there is such a refusal due to lack of capacity, Section 5-12 further provides that the MoE can instruct the licensee that owns the facility to improve the capacity provided it is economically justifiable or if the party wishing to use the increased capacity is willing to pay for the necessary increase. Additionally, to use the capacity, the “CO₂ flow to be stored must have specifications that are reasonably certain to be compatible with technical requirements for and the consideration for efficient operation of the facility and the storage location.”²⁶⁰ It follows from this that the operator can refuse access if the CO₂ stream does not meet the specifications set by the operator. As the MoE points out, “*in practice, however, the owner of the facility or storage site in question will offer any free capacity to potential users on commercial terms.*”²⁶¹ The agreement is subject to approval by the MoE.

The MoE has stated that they assume “*there will be little need for the Ministry to make [...] decisions on use of capacity*”²⁶² and because of the experience with TPA in the petroleum sector, the MoE’s experience

is that commercial negotiations in this respect work well, as long as owners of facilities and storage sites have free capacity to offer, it is in their interest to do so. And the parties concerned know from long experience that the terms must be fair and reasonable – otherwise the terms may be overturned by the Ministry.²⁶³

However, lack of experience with such access in an emerging industry like CCS may still pose a challenge, and access may raise issues related to liabilities due to e.g. differences in the CO₂ composition.²⁶⁴ It has also been pointed out by some industrial stakeholders that the initiative to be a first mover may be reduced if other companies wait until others provide the needed infrastructure, and claim access rights to it. However, we believe this argument has to be balanced against the amount of state aid provided for these early-mover infrastructures.

Of interest in terms of ‘protecting first mover interest’ is the provisions in Directive 2009/73/EC²⁶⁵ on common rules for the internal market in natural gas in which Article 36 provides that new gas infrastructure and storage facilities may be exempted for a defined period of time from several provisions, e.g. Articles 32 on TPA, 33 on Access to storage, 34 on upstream pipeline networks, and 9 on Unbundling of transmission systems and system operators.²⁶⁶ This Directive was recently repealed by Directive 2024/1788 on common rules for the internal markets for

²⁶⁰ Storage Regulations (n 24) Section 5-12.

²⁶¹ Norwegian Ministry of Petroleum and Energy (now Ministry of Energy), ‘Case No 89874: Implementation Report under the CCS Directive’ (To ESA) (2023) https://ec.europa.eu/assets/clima/ccs/2023/policy_ccs_country_report_2023_norway_en.pdf accessed 27 November 2024.

²⁶² Ministry of Energy, ‘Case No 89874: Implementation Report under the CCS Directive’ (n 261) p. 5 section 11.

²⁶³ Ministry of Energy, ‘Case No 89874: Implementation Report under the CCS Directive’ (n 261) p. 5 section 11.

²⁶⁴ 2022 Gassnova Report (n 1) p. 31.

²⁶⁵ Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC (Text with EEA relevance) [2009] OJ L211/94.

²⁶⁶ Directive 2009/73/EC (n 265) arts. 32 on TPA, 33 on Access to storage, 34 on upstream pipeline networks, and 9 on Unbundling of transmission systems and system operators, Article 39 has conditions for allowing such exemptions.

renewable gas, natural gas and hydrogen.²⁶⁷ The new Directive does not provide for such an exemption. Nevertheless, the previous Directive 2009/73/EC is precedent that could be relied upon for other industries.

That being said, it may be challenging to invoke this precedent for CCS. The early-mover argument has to be balanced against the amount of state aid that has been provided to develop the early-mover infrastructure in Europe. When allocating large sums of tax-payers money to a selected few industry stakeholders to develop infrastructure for climate change mitigation technologies to reduce Norwegian and European emissions, it would defeat the purpose to limit the number of emitters being allowed to tie into said infrastructure. It would be in the public interest to expand the TPA rights to as many as possible to achieve the biggest possible return on the investment, which again, to a large extent, comes from tax-payers. Also, climate change mitigation measures are urgently needed, implying that delayed access to infrastructure would be unfortunate.

Although Northern Lights has expressed concerns regarding TPA and a perceived lack of control, our experience, along with feedback from interviews, indicates that these concerns are unlikely to be shared broadly across the CCS industry. Industry and the Norwegian authorities have a long-standing relationship with regard to TPA, and infrastructure owners have flexibility in determining the commercial terms. It should always be remembered that if the access results in an unreasonable impediment for the licensee's own duly substantiated reasonable need for storage or for a party that has already secured a usage right, the use of the infrastructure would not be granted. Thus, in reality, it is unlikely that the owner of the infrastructure would have little control over the terms for access, provided the given terms are fair and reasonable.

That said, ongoing developments within the EU could further impact and influence TPA in the context of CCS. Notably, the European Commission adopted the Industrial Carbon Management Strategy on 6 February 2024. This Strategy “*identifies a set of actions to be taken, at EU and national level, to establish a single market for CO₂ in Europe and to create a more attractive environment for investments in industrial carbon management technologies.*”²⁶⁸ Further, the Commission noted that from 2024, they will

initiate preparatory work in view of a proposal for a possible future CO₂ transport regulatory package; it will consider issues including market and cost structure, cross-border integration and planning, technical harmonisation and investment incentives for new infrastructure, third-party access, competent regulatory authorities, tariff regulation and ownership models.²⁶⁹

As a result, CO₂ transport in the EU could see significant regulatory changes which can support deployment in the EU. The wording “ownership models” could further be seen as an indication that discussions regarding unbundling may be part of this effort. Unbundling has happened for other energy and industrial infrastructures in Europe to endorse competitiveness and avoid

²⁶⁷ Directive 2024/1788 of the European Parliament and of the Council on common rules for the internal markets for renewable gas, natural gas, and hydrogen, amending Directive (EU) 2023/1791 and repealing Directive 2009/73/EC.

²⁶⁸ European Commission, ‘Industrial Carbon Management Strategy’ https://energy.ec.europa.eu/topics/carbon-management-and-fossil-fuels/industrial-carbon-management_en#industrial-carbon-management-strategy accessed 28 June 2024.

²⁶⁹ European Commission, ‘Industrial Carbon Management Strategy’ (n 268) p. 10.

distorting monopolies.²⁷⁰ In our opinion, this would be equally relevant and important for CCS. We see a trend with the same few operators being awarded exploration licences, building up a significant market share in this new industry. Although we applaud the progressive investments helping to establish a strong foothold for CCS, it is also concerning in terms of the same stakeholders also developing transportation infrastructure, especially when some of these operators have been granted large portions of state aid to develop the infrastructure. The bundling of transport and storage infrastructures under a limited number of operators can create significant barriers for smaller stakeholders, particularly regarding negotiating power over fees, costs, liabilities, and CO₂ specifications. We have observed contract frameworks in Europe for transport and storage services that impose potentially overwhelming risks and costs on emitters, making it especially challenging for smaller emitters. As a result, these smaller emitters may choose to release CO₂ into the atmosphere rather than capture and store it. Thus, we observe that unbundling would be necessary to ensure that also smaller emitters may abate their emissions on fair terms.

Standards for CCS are also being developed within the EU that may impact future CCS infrastructure. In 2023, CEN established TC 474, focusing on standardisation for CCUS. There are already working groups established under the committee, one of which is working on a project related to CO₂ specifications for pipelines.²⁷¹ It is advisable that industry actors consider participating in the standardisation efforts in Europe, such as CEN/TC 474, which will develop CCUS standards tailored to the needs of European stakeholders.²⁷² The European Commission may issue standardisation requests to CEN/TC 474 for standards and specifications needed for the CCS framework in Europe. This gives the opportunity to influence standards that may become part of the EU CCS regime, ensuring compatibility with one's own project and technology.²⁷³

Further, a working group has been established by the European Commission to consider issues for standardisation, such as CO₂ composition, purity, pressure, and temperature, as well as common guidelines regarding incidental associated substances from the source, capture, or injection process. The working group will not develop standards but provide recommendations to the European Commission on what standards or specifications might be needed and how they may contribute to an interoperable transportation network in Europe. The intention is to support a competitive, integrated EU-wide CO₂ market by striking a balance between safety, reliability, cost-effectiveness, and risks across the CO₂ value chain. The discussions in the working group have indicated that one needs to exercise caution when developing potential specifications for the CO₂ stream as technology and knowledge of the implications of impurities are developing. This work is underway, and the final recommendations have not been submitted to the European Commission at the time of writing.²⁷⁴

²⁷⁰ European Commission, 'Governance of the internal energy market' [Governance of the internal energy market](https://energy.ec.europa.eu/topics/markets-and-consumers/governance-internal-energy-market_en)https://energy.ec.europa.eu/topics/markets-and-consumers/governance-internal-energy-market_en accessed 22 December 2024

²⁷¹ I. Ombudstvedt, L. Østgaard, 'CEN/TC 474; A New Wind for Standardization?' (December 20, 2024). Available at SSRN: <https://ssrn.com/abstract=5065305> or <http://dx.doi.org/10.2139/ssrn.5065305>

²⁷² CEN/CENELEC, 'A new CEN/TC will develop standards for carbon capture, utilization and storage' (11 November 2023) <https://www.cencenelec.eu/news-and-events/news/2023/brief-news/2023-11-30-ccus/>

²⁷³ Ombudstvedt and Østgaard, 'CEN/TC 474; A new wind for standardization?' (n 271).

²⁷⁴ Ombudstvedt and Østgaard, 'CEN/TC 474; A new wind for standardization?' (n 271).

3.7. Financial security

3.7.1. The 2022 Gassnova Report observations

As the 2022 Report points out, the storage operators shall provide two types of financial guarantees: Financial security and a financial contribution.²⁷⁵

As part of the application for the storage permit, proof of financial security is required. This is to ensure that obligations arising from the permit can be met. The financial mechanism is a contribution that must be provided before the transfer of responsibility to the competent authority. This process can be explained as an economic contribution by the operator to cover long-term stewardship of the storage site, covering costs related to monitoring and other costs for ensuring complete and permanent storage.

Due to a lack of experience of how the applicable regulatory framework will be enforced in practice, and the amount and form that is required, financial security is viewed as an uncertainty and risk for storage operators, as explained in the 2022 Report.²⁷⁶ In the case of Northern Lights, the State had to provide risk relief through the state aid agreement and bear some of the costs and risk for potential leakages.²⁷⁷

3.7.2. Main findings and recommendations

We expect the area of financial security to undergo several changes in Norway and in the EU following, among other things, the revised Guidance Document 4 (GD4) and project experience. Financial security is currently seen by the industry as an almost unsurmountable barrier. Without changes, it is not likely that the industry will be able to deploy and develop storage sites in the timeframe that is needed.

The amended GD4 is an important step forward in addressing and overcoming the issues related to financial security. It recognises the low probability of emissions from storage sites, moving away from the previous worst-case scenario. Under the amended GD4, the financial security for covering costs related to uncertain future events should be probability weighted using conservative assumptions. A precautionary approach should nevertheless be taken, so this remains a balancing act. However, these measures alone may not be sufficient. We therefore consider a storage fund as proposed by industry to be one of the most suitable solutions to mitigate the issue, covering decommissioning and post-closure liabilities, akin to what exists in Alberta, Canada. This will, however, require administrative and legislative efforts to establish and enable, if managed by the Norwegian authorities. Nevertheless, it is crucial that Norwegian authorities take an active role in addressing the barrier of financial security, as smaller actors, in particular, may be fully dependent on State involvement through such a fund or other mechanisms. Feedback from interviews and forums highlights this need and further notes the anticipated growth of the insurance market and banking services alongside the carbon management sector. This may also offer some relief to the actors.

²⁷⁵ 2022 Gassnova Report (n 1) p. 31.

²⁷⁶ 2022 Gassnova Report (n 1) p. 31.

²⁷⁷ 2022 Gassnova Report (n 1) p. 31.

3.7.3. The Legal framework and analysis

Norway

Financial security and contribution are addressed in Sections 5-9 and 5-10 of the Storage Regulations. Section 5-9 requires that the operators provide “a guarantee or equivalent to ensure that all obligations arising from the mentioned regulation can be fulfilled”. This security has to be valid and effective when the injection starts. The MoE and the Ministry of Climate and Environment cooperate on determining the financial security.²⁷⁸

In addition to the requirement for financial security, there are also provisions for a financial mechanism in the Storage Regulations.²⁷⁹ The financial mechanism (or contribution) has to be provided before the transfer of responsibility to the competent authority and has to cover, as a minimum, anticipated monitoring costs for 30 years after the transfer.²⁸⁰ The financial security requirements, along with uncertainties about how the rules will be enforced, have been identified as major hurdles for storage operators. This is primarily tied to the amount and form of security required.

NEA has explained that the purpose of requiring financial security is to ensure that the state is not left with the bill for the obligations arising from Chapter 35 of the Pollution Regulations, including costs for aftercare, any purchase of emissions allowances in the event of a leak, etc, should the operator lack the ability to fulfil the obligations itself.²⁸¹

Further, NEA has expressed that money in a bank account or on-demand bank guarantee²⁸² is the best form of financial security.²⁸³ However, they also observe that these forms of security are economically onerous for storage operators and may impact a decision on whether to store CO₂ or buy ETS allowances.²⁸⁴ We add here that during our interviews, it was explained that bank guarantees are generally offered for a limited number of years, and as such not fitting to the number of years security is required by the legislation. For smaller actors in particular, with no security, the guarantee would only be offered for approximately one year at a time.

NEA has explained that in some instances, they may consider a parent company guarantee for financial security.²⁸⁵ Our understanding is that a parent guarantee will have to be accounted for in the general accounts of the company offering it since it represents a financial risk, so that has to be taken into account by the issuer. For smaller companies, this would, therefore, not be feasible or potentially acceptable for the regulators.

The Northern Lights JV DA 2023 Annual report²⁸⁶ offers specific comments related to the issue of financial security. In short, it is commented that the size of the guarantee required is challenging

²⁷⁸ Pollution Regulations (n 67) Section 35-15.

²⁷⁹ Storage Regulations (n 24) Section 5-10.

²⁸⁰ Storage Regulations (n 24) Section 5-10.

²⁸¹ Norwegian Environmental Agency, ‘Nærmere bestemmelser om finansiell sikkerhet for CO₂ lagring’ (2016) Para 5.3 <https://www.miljodirektoratet.no/globalassets/publikasjoner/m521/m521.pdf> accessed 27 November 2024 [In Norwegian - unofficial translation].

²⁸² Translated from pant i sperret bankkonto og on-demand bankgaranti.

²⁸³ Norwegian Environmental Agency, ‘Nærmere bestemmelser om finansiell sikkerhet for CO₂ lagring’ (n 281) p. 7.

²⁸⁴ Norwegian Environmental Agency, ‘Nærmere bestemmelser om finansiell sikkerhet for CO₂ lagring’ (n 281)

²⁸⁵ Norwegian Environmental Agency, ‘Nærmere bestemmelser om finansiell sikkerhet for CO₂ lagring’ (n 281) p. 8.

²⁸⁶ Northern Lights, ‘Annual Report 2023’ (9 April 2024) <https://norlights.com/wp-content/uploads/2024/04/Northern-Lights-4061-SF8-Arsrapport-2023.pdf> accessed 27 November 2024.

and that there is no common industry insurance available, nor is there an industry fund to drive down the cost of the financial guarantee.²⁸⁷ The 2023 report highlights the challenge of the availability of guarantees that can cover 40 + years.²⁸⁸ They stress that the cost of such guarantees can “*potentially drive the tariffs up or limit commercial demand for CCS if there is not a clear framework in place and cost effective solutions to meet the financial guarantee for the operators.*”²⁸⁹

Of particular concern is the ETS liability. This relates to the future risk of ETS price, which will likely be significantly higher than what they are at the point of injection. NEA has observed that it will be challenging to estimate the cost of a potential leak when determining the financial security, both because it is difficult to calculate the size of a potential future leak from a storage that is not intended to ever leak in the first place, and because it is difficult to estimate what the ETS price will be at that future point in time.²⁹⁰

In the 2023 implementation report to the CCS Directive, the MoE expressed that “[t]he issue of financial security is important to the industry, and also to the authorities. This is an issue that should always, in our opinion, be subject to improvement and further discussion.”²⁹¹ As such, it is clear that the Norwegian authorities are continuously working on the issue of financial security.

Guidance Document 4 to the CCS Directive

GD4 on financial security and financial contribution has recently been revised, with the new version being completed in July 2024.²⁹² In the following, the concerns and feedback given during the consultation phase for the new GD4 will be briefly discussed. Here, we will highlight the experienced shortcoming of the previous GD4, and what the industry wished for in the new GD4. We will then assess the new GD4 against the industry’s feedback and concerns and consider whether the new document addresses and implements the concerns experienced.

In Offshore Norway’s feedback during the revision of GD4, they noted that the GD4 “*must be based on current experience showing that emissions from a worst-case scenario from a storage facility are low, and that the probability of such emissions is extremely small*”.²⁹³ As mentioned in our interviews, the worst-case scenario position results in a sum that is too onerous on storage operators and hinders the development and deployment of CCS. Further, they also pointed out that the worst-case scenario is erroneous and that a more accurate risk profile must be used. As such, there appears to be consensus among industry and other stakeholders in this regard. Following industry feedback, the European Commission has now amended this approach in the revised GD4, as explained below.

²⁸⁷ Northern Lights, ‘Annual Report 2023’ (n 286) p. 47.

²⁸⁸ Northern Lights, ‘Annual Report 2023’ (n 286) p. 47.

²⁸⁹ Northern Lights, ‘Annual Report 2023’ (n 286) p 47.

²⁹⁰ Norwegian Environmental Agency, ‘Nærmere bestemmelser om finansiell sikkerhet for CO₂ lagring’ (n 281) para 3.

²⁹¹ Ministry of Energy, ‘Case No 89874: Implementation Report under the CCS Directive’ (n 261).

²⁹² European Commission, ‘Guidance document 4: Financial security and financial contribution’ (2024)

https://climate.ec.europa.eu/document/download/9a6b221d-642e-499e-a5a0-298ce1068b21_en?filename=ccs-implementation_gd4_en.pdf (European Commission, ‘Guidance Document 4’)

²⁹³ Offshore Norway, ‘Input to GD 4: Financial Security (Art. 19) and Financial Mechanism (Art. 20)’ (24th Feb 2023)

<https://www.offshorenorway.no/contentassets/c114142fe7e24fbf84b26695c4f33c2f/ccs/gd4-financial-security-and-mechanism.pdf> (Offshore Norway, ‘Input to GD4’)

Offshore Norway further suggested that because the risk of emission from a storage facility is low, “the guidelines should allow and encourage “capping” the amount set aside for financial security and allowing for a frequent assessment of the amount in accordance with the development of the storage”.²⁹⁴ We recognise that capping the amount set aside will not necessarily comply with the wording of the CCS Directive, as it requires the security to meet “all obligations arising under the permit [...], including closure and post-closure requirements, as well as any obligations arising from inclusion of the storage site under [the ETS Directive].”²⁹⁵ However, there should be more ways to achieve compliance with this requirement beyond a full amount locked in a bank account. To this end, Offshore Norway observed that the GD4 “should include some wording on how FS [financial security] can be covered by “evergreen” financial instruments with short duration”.²⁹⁶

Offshore Norway has several other interesting proposed changes to GD4. Tied to the point above, they suggest that operators should be given the time to build up financial security over the life of the asset,²⁹⁷ as opposed to the full financial security being valid and effective before injection. We refer the reader to their submission for more information about their suggestions.²⁹⁸

Amended Guidance Document 4 2024

The first evident change is the new title of the GD4, which was changed from Financial Security and Financial *Mechanism* to Financial Security and Financial *Contribution*. It has been explained that this was because it more accurately reflects the requirements of Article 20 of the CCS Directive.²⁹⁹ Further, the tone and language in the introductory part of the document have been changed to ensure that the financial instruments are not overly burdensome on the CCS industry.³⁰⁰

The revised GD4 establishes several principles for selecting instruments and determining the amount of financial security. A new principle when selecting financial security instruments, as called upon by the industry, is that

MS [Member State] should avoid imposing FS [financial security] obligations on storage operators before start of the operations that are disproportional to the initial amounts of CO₂ stored. MS may therefore want to consider allowing operators to provide FS in phases.³⁰¹

²⁹⁴ Offshore Norway, ‘Input to GD4’ (n 293) p. 2.

²⁹⁵ Directive 2009/31/EC, art. 19.

²⁹⁶ Offshore Norway, ‘Input to GD4’ (n 293) p. 2.

²⁹⁷ Offshore Norway, ‘Input to GD4’ (n 293) p. 2.

²⁹⁸ Offshore Norway, ‘Input to GD4’ (n 293) p. 2.

²⁹⁹ European Commission, DNV, ‘Workshops on the CCS Directive Guidance Documents - Financial Security and Contribution’ [Video]. YouTube (19 September 2024) <https://www.youtube.com/watch?v=v4ZtwnLLsLM> accessed 27.11.2024

³⁰⁰ European Commission, DNV, ‘Workshops on the CCS Directive Guidance Documents - Financial Security and Contribution’ (n 299).

³⁰¹ Jørg Aarnes (Offshore Norge) and Johnathon Osmond (DNV), ‘Guidance Document 4: Financial Security and Financial Contribution’ (Workshops on the CCS Directive Guidance Documents, Brussels, 19 September 2024) https://climate.ec.europa.eu/document/download/538ccd45-5cb9-48aa-a32f-ee8b5ecc08f0_en?filename=event_20240917_gd4_presentation_en.pdf (Aarnes and Osmond, ‘Guidance Document 4’) slide 6.

This would apply to projects that are being deployed in several phases, where the amount injected would increase according to the phase. The financial security should, therefore, reflect this.

Appendix B of GD4 outlines a non-exhaustive list of various options for financial security instruments. Examples include: Funds (direct deposits) to the Competent Authority; a collectively financed CO₂ fund; an irrevocable trust fund; a parent company guarantee/affiliated company guarantee/self-guarantee; an irrevocable standby letter of credit issued by a bank; an escrow; a pool of pre-purchased EU emission allowances; and insurance products.³⁰² The amount of financial security should be sufficient for the authority to comply with the obligations under the storage permit, but at the same time not hinder investment in the storage site.³⁰³

GD4 introduces a new principle for determining amounts of financial security. It provides that the security for covering costs related to uncertain future events (e.g. low-likelihood risk scenarios) should be probability-weighted using conservative assumptions.³⁰⁴ During the Workshop on the CCS Directive Guidance Documents (GD 4 Financial Security and Contribution) in Brussels on 19 September 2024, it was explained that

the underlying rationale for introducing this is that in many cases there are risks associated with the projects that have a low probability and it would be inappropriately burdensome to operators to set aside a full package for all individual risk events.³⁰⁵

The GD4 recommends using a cost-risk analysis to address uncertainties in the cost estimate.³⁰⁶

Further, it was mentioned in the abovementioned workshop that with time, the financial security allocated to monitoring can be reduced and that the risk will most likely also be reduced.³⁰⁷ Hence, the financial security should be updated throughout the project's life through periodic adjustments.³⁰⁸

The GD4 states that the competent authority may also consider previous experience with regard to the operator's competency, capacity, financial position, geological knowledge of the storage area, and ability to develop and operate storage projects.³⁰⁹

Interviews

During our interviews, an actor emphasised that a change of risk profile in GD4 would be extremely important as it would likely reduce the financial security required. This change of risk profile was since included in the revised GD4. Further, several expressed that a fund may be a

³⁰² European Commission, 'Guidance Document 4' (n 292), Appendix B, p. 35 ; see also Aarnes and Osmond, 'Guidance Document 4' (n 301).

³⁰³ European Commission, 'Guidance Document 4' (n 292) p. 16

³⁰⁴ European Commission, 'Guidance Document 4' (n 292) p. 16 ; Aarnes and Osmond, 'Guidance Document 4' (n 301) slide 9.

³⁰⁵ European Commission, DNV, 'Workshops on the CCS Directive Guidance Documents - Financial Security and Contribution' (n 299).

³⁰⁶ European Commission, 'Guidance Document 4' (n 292) p. 16 ; Aarnes and Osmond, 'Guidance Document 4' (n 301) slide 9.

³⁰⁷ European Commission, DNV, 'Workshops on the CCS Directive Guidance Documents - Financial Security and Contribution' (n 299).

³⁰⁸ European Commission, DNV, 'Workshops on the CCS Directive Guidance Documents - Financial Security and Contribution' (n 299).

³⁰⁹ European Commission, 'Guidance Document 4' (n 292) p. 17.

suitable solution. Altera recently proposed a ‘CO₂ Storage Fund’ that covers decommissioning and post-closure liabilities,³¹⁰ in line with feedback from Offshore Norway and others during the GD4 revision process. A small fee would be allocated for every ton of CO₂ stored to build up the fund.³¹¹

This could be similar to the post-closure stewardship fund (PCSF) in Alberta, Canada. This allows the operators to pay an amount into the fund. This sum will be less than the traditional financial security as the operators pool their money, but the collective fund could be strong enough to cover costs related to all potential liabilities of the project. The PCSF in Alberta is administered by the Department of Energy and “*will help ensure that storage sites are properly maintained over the long term, after operations cease, and to offset the costs of the government’s obligations, particularly in the post-closure period.*”³¹² The operators that have obtained a lease under the Carbon Sequestration Tenure Regulation³¹³ are required to contribute to the fund.³¹⁴ The amount to be paid into the fund is based on a project-specific rate per tonne of CO₂ injected each year.³¹⁵ As of 2023, the Quest project is the only carbon storage project paying into the fund.³¹⁶

The PCSF “*has collected seven annual injection levy payments from the Quest project, and with [Canadian] \$447,000 in revenues generated from the injection levy during 2022-23, the fund is currently [2023] valued at [Canadian] \$2.17 million.*”³¹⁷ The dollar amount corresponds to less than 2,5 MEUR at the time of writing, which corresponds to less than 22.000 ETS allowances with the current CO₂ price. Thus, we recognise that the fund would have to receive payments from multiple projects to obtain the necessary strength to cover major irregularities, surrendering of allowances, and mitigating measures for larger projects. As such, if established, the State may have to support the fund in a transitional phase. However, the proposal would reduce costs and uncertainties for the project operators and potentially enable more projects to pass final investment decisions and obtain storage permits. In the long term, the number of projects would have contributed enough funds for the CO₂ fund to cover all the responsibilities pursuant to the permits.

Additionally, it was commented that financial security could be handled by a new interdepartmental working group. The interdepartmental work group would possibly comprise representatives from the MoE and the Ministry of Climate and Environment and relevant

³¹⁰ Anders C. Melhus, “This week, I had the privilege of addressing the Norwegian Parliament’s Energy and Climate Committee” (LinkedIn, October 2024) https://www.linkedin.com/posts/activity-7252583592176836608-hSQD?utm_source=share&utm_medium=member_desktop (accessed 27 November 2024).

³¹¹ Anders C. Melhus, “This week, I had the privilege of addressing the Norwegian Parliament’s Energy and Climate Committee” (LinkedIn, October 2024) https://www.linkedin.com/posts/activity-7252583592176836608-hSQD?utm_source=share&utm_medium=member_desktop (accessed 27 November 2024).

³¹² Government of Alberta, ‘Annual Report: Energy 2022-2023’ (June 2023) p. 36 <https://open.alberta.ca/dataset/cbd7147b-d304-4e3e-af28-78970c71232c/resource/d277a321-d026-436f-b91b-749ee521a3c7/download/enr-annual-report-2022-2023.pdf> accessed 18.10.2024,

³¹³ Carbon Sequestration Tenure Regulation 68/2011 to the Mines and Mineral Act.

³¹⁴ Government of Alberta, ‘Annual Report: Energy 2022-2023’ (n 312) p. 36.

³¹⁵ Government of Alberta, ‘Annual Report: Energy 2022-2023’ (n 312) p. 36.

³¹⁶ Government of Alberta, ‘Annual Report: Energy 2022-2023’ (n 312) p. 36.

³¹⁷ Government of Alberta, ‘Annual Report: Energy 2022-2023’ (n 312) p. 36.

agencies who have been granted authority on the matter. The hope is that this may streamline communication and provide a single point of contact for industry.

3.8 London Protocol 1996

3.8.1 The 2022 Gassnova Report observations

The 2022 report observed that the issues pertaining to cross-border transportation of CO₂ under the London Protocol have been overcome with the 2019 resolution.³¹⁸ It also mentions the need for agreements or arrangements to be in place if Northern Lights is to enter into commercial agreements with industrial partners outside of Norway.

3.8.2 Main findings and recommendations

At the time of writing, Norway has concluded bilateral arrangements with Denmark, the Netherlands, Belgium, and Sweden, and negotiations are ongoing with several other countries. As such, storage operators in Norway may now enter into commercial agreements with companies in the aforementioned countries for the import and storage of CO₂. For value chains involving other countries, Norway has to enter into similar arrangements or agreements in order to facilitate such projects if that CO₂ comes from another Contracting Party to the London Protocol.

While the barriers of the London Protocol have effectively been overcome, new questions have emerged following practical experiences of implementing the cross-border and storage provisions. These include defining the level of detail in agreements and arrangements, executing the due diligence obligation when exporting CO₂ to non-Contracting Parties, and addressing multi-country value chains involving transit nations. These questions might only truly be answered by national authorities and through state practice. We believe that it would be beneficial if, for example, the Contracting Parties and the IMO developed a guidance document addressing these issues and identifying what would be considered best practices. This could clarify uncertainties, which in turn would streamline project deployment and ensure a harmonised approach to Article 6.2. Several research projects are also currently considering these issues.

3.8.3 The Legal framework and analysis

The topic of CCS within the framework of the London Protocol has been extensively discussed in literature, and this analysis will not revisit its historical development.³¹⁹ Instead, we note that while the barrier under the Protocol related to cross-border transport of CO₂ was effectively removed by the 2019 resolution, new questions have emerged. This sub-chapter will outline these issues, emphasising the need for further research, and briefly consider state practice.

³¹⁸ 2022 Gassnova Report (n 1) p. 8.

³¹⁹ For further reading, see for example: 'Regulatory Frameworks for Cross-border Transportation and Offshore Storage of CO₂ in Europe' by L. Østgaard and I. Ombudstvedt (2023); https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4624764

State practice

All the examples of Article 6.2 arrangements/agreements concluded thus far have been non-legally binding arrangements in the form of Memoranda of Understanding (MoU) between Contracting Parties to the London Protocol that are also either EU/EEA Member States.³²⁰ Article 6.2 is relatively short and provides Contracting Parties with flexibility to determine the preferred legal nature, structure, and content of the document.³²¹ An important requisite, however, is that the arrangements or agreement contains confirmation and allocation of permitting responsibilities consistent with the provisions of the London Protocol and other applicable international law.³²² Based on the examples to date, Article 6.2 is seemingly easily satisfied with the Parties recognising that all necessary permit responsibilities will be allocated to the relevant authorities of each state in accordance with the Protocol.

At the time of writing, MoUs have been concluded between the following Contracting Parties: Belgium-Denmark,³²³ Belgium-the Netherlands,³²⁴ Denmark-France,³²⁵ Denmark-Sweden,³²⁶ Denmark-the Netherlands, Norway-Sweden,³²⁷ Norway-Denmark,³²⁸ Norway-Belgium,³²⁹ and Norway-the Netherlands.³³⁰

It is noteworthy that in the 2023 implementation report to the CCS Directive,³³¹ the MoE noted that the export of CO₂ to Norway would be subject to a bilateral agreement and that the government had approved a model agreement that would form the basis of their negotiations with other countries. They observed that:

[t]hese agreements will address the transfer of responsibility for any leakage or other incidents between Norway and the exporting country along the value chain for the CO₂ to be exported, and to which country obligations to report and monitor CO₂ leakages apply in accordance with EU legislation and international obligations. In addition, the bilateral agreement will form the basis for commercial agreements between Norwegian

³²⁰ At the time of writing, MoUs have been concluded between the following parties: Belgium-Denmark, Belgium-the Netherlands, Denmark-France, Denmark-Sweden, Norway-Sweden, Norway-Denmark, Norway-Belgium, and Norway-the Netherlands.

³²¹ I. Ombudstvedt; L. Wammer Østgaard; P. Prasad "Playing Nice in the Sandbox: How Coordination and Cooperation with International Neighbors Can Fuel Domestic and Global Deployment of Carbon Capture and Storage" OGEL 3 (2023) p. 8 www.ogel.org URL: www.ogel.org/article.asp?key=4093

³²² Ombudstvedt, Østgaard, and Prasad "Playing Nice in the Sandbox: How Coordination and Cooperation with International Neighbors Can Fuel Domestic and Global Deployment of Carbon Capture and Storage" (n 321) ; Resolution LP3(4) on the amendment to article 6 of the London Protocol (Adopted on 30 October 2009).

³²³ <https://www.kefm.dk/Media/638000596525014193/Bilateral%20arrangement%20DK-BE.pdf>

³²⁴ <https://open.overheid.nl/documenten/7a52f7ac-636f-4217-ba2a-59a2c40ccb44/file>

³²⁵ <https://www.kefm.dk/Media/638641513090808646/Bilateral%20aftale%20om%20transport%20af%20CO2%20DK-FR.pdf>

³²⁶ <https://www.government.se/contentassets/5859a16494ee4a2d8de11cdf8ba9d014/mou-cross-border-co2-se-dk-se-final.pdf>

³²⁷ https://www.regjeringen.no/globalassets/departementene/ed/bilder-nyhetsaker/henrik/mou-cross-border-co2-no-se_final.pdf

³²⁸ https://www.regjeringen.no/globalassets/departementene/ed/bilder-nyhetsaker/henrik/mou-cross-border-co2-no-dk_final.pdf

³²⁹ https://www.regjeringen.no/globalassets/departementene/ed/bilder-nyhetsaker/henrik/mou-cross-border-co2-no-be_final.pdf

³³⁰ https://www.regjeringen.no/globalassets/departementene/ed/bilder-nyhetsaker/henrik/mou-cross-border-co2-no-nl_signed-no-nl.pdf

³³¹ Ministry of Energy, 'Case No 89874: Implementation Report under the CCS Directive' (n 261).

companies licenced under the Storage Regulation and companies from the exporting country.³³²

However, as observed, it appears that they have departed from the preferred default of using agreements. Whether the Norwegian government intends to use MoUs in each case going forward or return to the position of an agreement remains to be seen. An agreement under the London Protocol would be the first of its kind.

The MoUs concluded by Norway with Sweden, Belgium, the Netherlands and Denmark, and also between Denmark-Sweden, are similar to the first MoUs concluded between Denmark-Belgium, Belgium-the Netherlands, the Netherlands-Denmark, and France-Denmark. However, there are some new additions. A new section (3) on 'Reporting of CO₂ in National Greenhouse Gas Inventories' has been included. The MoUs also set out a more detailed preamble, accounting for relevant international and regional conventions and instruments to which the parties are bound. Moreover, the Norwegian MoUs and the Denmark-Sweden MoU are the only MoUs that refer to London Protocol Annex 2 and underline that the participants will notify the IMO of the MoU, thus confirming their intention to adhere to the Article 6.2 notification requirement. We consider these elements to be important additions. This also showcases that this is an evolving area of law, and state practice is still under development. The MoUs are the first of their kind, and it is natural that their contents change in the future following learnings and experiences made.

New challenges

New and unresolved questions have arisen regarding the level of detail required to comply with Article 6.2 in arrangements or agreements. Additional uncertainties pertain to broader issues that could or should be addressed in such instruments, beyond the specific mandates of Article 6.2 - such as liability, GHG monitoring, reporting, and accounting. Here, a key consideration is determining which matters are best addressed in bilateral arrangements or agreements and which are more appropriately handled through commercial agreements.

Other uncertainties relate to the due diligence obligation that Contracting Parties have to satisfy when exporting CO₂ to a non-Contracting Party, and what needs to be included in the arrangement or agreement to execute the obligation. It should be noted that States themselves will determine the manner in which they satisfy the obligation, and the IMO, in its secretariat function, will not be able to reject such arrangements or agreements. However, they can offer guidance on how this obligation can best be met to ensure compatibility with the Protocol. We would welcome such guidance addressing these issues and identifying what would be considered best practices. This could clarify uncertainties, which in turn would streamline project deployment and ensure a harmonised approach to Article 6.2.

Another unanswered question relates to a scenario where multiple countries (both Contracting Parties and non-Contracting Parties) are involved in a value chain, some as transit countries, and the need for all of these to be accounted for in the arrangement or agreement. This is a topic that is currently being considered in research projects, which will hopefully clarify the issue.

³³² Ministry of Energy, 'Case No 89874: Implementation Report under the CCS Directive' (n 261) p. 6, para 14.

Furthermore, the European Commission's position on the need for arrangements or agreements under Article 6.2 is noteworthy and should be considered.³³³ The Commission has stated that there is substantial alignment between the London Protocol and the EU CCS regime (the ETS and CCS Directives) and, because of this, Contracting Parties to the London Protocol that are also Member States to the EU (and EEA through the EEA Agreement) do not need to enter into bilateral agreements pursuant to the London Protocol Article 6.2 as the EU CCS framework itself can act as the relevant arrangement.³³⁴ The Commission stipulates that Member States that are party to the London Protocol should conclude additional bilateral arrangements with other EU/EEA countries only on issues that are not covered by the directives.³³⁵ These additional bilateral arrangements should be strictly limited to the residual issues not covered by EU law and not refer to the subject matters covered by EU rules.³³⁶

The Commission position paper has caused confusion for some EU/EEA Member States that are party to the London Protocol and for industry actors regarding what is required to transport CO₂ across borders for offshore storage in satisfaction of the Protocol. Legal clarification on this matter is important to ensure legal certainty for actors and stakeholders.

We are of the opinion that the Contracting Parties to the London Protocol still need to adhere to the Article 6.2 requirements until the Contracting Parties officially decide or accept otherwise. The European Commission cannot negate this obligation for the EU Member States that are party to the Protocol on their behalf. Moreover, the European Union is not a Contracting Party to the Protocol. A Contracting Party to the London Protocol, which is also a Member State of the EU, has individual and separate legal obligations under the two frameworks, under which compliance with one of the frameworks does not automatically imply compliance with the other. Thus, in order to remain in compliance with the London Protocol, we believe it is necessary to conclude an arrangement or agreement under the Protocol and notify the IMO in satisfaction of Article 6.2, also for EU Member States. The Commission's solution may be perfectly acceptable provided the Contracting Parties to the London Protocol accept such a solution; until this time – we recommend adhering to the Article 6.2 criteria.

4. Conclusive remarks

4.1 Observations

The purpose of Longship was to demonstrate the feasibility of a full-chain CCS value chain and share lessons learned along the way. The regulatory and technical learnings from Longship have been invaluable for Norwegian and foreign entities, demonstrating to the world what is possible. In addition to demonstrating feasibility, it also identified and highlighted existing barriers and

³³³ Commission services analysis paper for the Information Exchange Group (IEG) under Directive 2009/31/EC 'The EU legal framework for cross border CO₂ transport and storage in the context of the requirements of the London Protocol' 30.09.2022 (Commission services analysis paper).

³³⁴ Commission services analysis paper (n 333) p. 26, Conclusion.

³³⁵ Commission services analysis paper (n 333) p. 26, Conclusion.

³³⁶ Commission services analysis paper (n 333) pp 7-8, 4: Overview London Protocol requirements in the context of the Legal Framework in the EEA, and p. 26.

showstoppers, most of which are related to policy and regulations. For the Longship partners in particular, many of these were mitigated by the State on a project-specific basis. The problems experienced and identified by Longship, as summed up in the 2022 Report, have now either been overcome or are currently being discussed by Norwegian authorities and within the EU. Thus, Longship was also successful in paving the way for second movers by identifying issues and prompting authorities and stakeholders to identify necessary solutions.

Throughout our work, we have observed significant efforts by regulators, industry, and other stakeholders to bridge gaps in frameworks and build a viable business case for CCS. While legal frameworks originate from regulators, this statement acknowledges the long-standing and well-established tradition of private-public partnerships that have fostered industry development through dialogue and collaboration to find effective solutions.

It also recognises the valuable contributions of stakeholders participating in expert groups within the European Commission, such as those advising on methodologies for carbon removals³³⁷ or the ICM Forum working groups addressing infrastructure, standardisation, and related topics. Additionally, many regulatory updates and developments are undertaken by subcontractors to the European Commission, including work on the CCS Directive Guidance Documents and updating the ETS Directive.³³⁸ Finally, we acknowledge the vital role of standardisation activities under ISO and CEN, which are increasingly shaping permitting processes and the formulation of legal and policy frameworks, further strengthening the foundation for CCS deployment.

4.2 New challenges

In addition to the regulatory issues discussed above, new issues have emerged and become apparent since the issuance of the reports. These were identified through our research and interviews. Some of them have been touched upon during our analysis, as they have been related to the main topics of the report. As an example, industry stakeholders have pointed to challenges related to the regulatory requirement to incorporate the joint venture for companies collaborating to develop a storage site. Also, the applicable HSE regulations for CCS for certain project configurations, such as direct injection, have been identified as challenging. These issues were relevant to consider in relation to the dependence on models from the petroleum framework to regulate CCS. Further, the new questions related to cross-border transportation in the context of the London Protocol warranted brief consideration and introduction as part of our review of the Protocol.

As analysing the additional new issues lies beyond the scope of this study, we briefly identify and summarise some of the remaining issues below to underscore the need for further study:

- The requirement of using the best available technologies (BAT). Several actors argue for a change to “fit-for-purpose technologies”. The BAT requirement follows from, *inter alia*, the CCS Directive but may impose high costs for industry, which poses a challenge for

³³⁷ European Commission, ‘Register of Commission Expert Groups and Other Similar Entities’ [Register of Commission expert groups and other similar entities](#) accessed 22 December 2024.

³³⁸ European Commission, ‘Call for Tenders, Support for 2026 ETS Directive review’ https://climate.ec.europa.eu/funding-opportunities/calls-tenders/support-2026-ets-directive-review_en and ‘Call for Tenders, EU ETS evaluation and 2026 review’ https://climate.ec.europa.eu/funding-opportunities/calls-tenders/eu-ets-evaluation-and-2026-review_en accessed 22 December 2024.

full-scale deployment.

- Certain capture processes may conflict with the Water Framework Directive. Scrubbing of waste gas necessary for carbon capture using amines moves pollutants from air to water. This might come in conflict with the requirements in the Water Framework Directive. This is an area to watch and might be a potential barrier to CO₂ capture projects.
- Industry has identified that rules are needed for the registration and mortgaging of installations in the CCS industry. While the Petroleum Act Chapter 6 regulates the registration and mortgaging of offshore installations in the petroleum industry, the Storage Regulations is silent on this issue.
- There are concerns related to whether and how the NZIA is implemented into Norwegian law, especially with regard to the requirement for oil and gas producers to proportionally contribute to reaching the annual injection target by 2030. This would again give rise to the questions previously discussed in Chapter 3.3 on Developing CCS tailormade regulatory frameworks with regards to what tax regime should be applied. More specifically, whether or not the storage can then be seen to be a part of the oil and gas production, hence falling within the advantageous oil and gas tax regime.
- As more storage sites are being developed, there is a growing concern about how pressure communication would be regulated and solved. This issue would not be limited to two storage sites communicating but also storage sites communicating with other resources, such as oil and gas reservoirs.