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Guidance for Agreements to Transport CO_2 Across National Boundaries Under the London Protocol

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IEAGHG

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To ensure the quality and technical integrity of the research undertaken by IEAGHG each study is managed by an appointed IEAGHG manager. The report is also reviewed by a panel of independent technical experts before its release.

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Report Overview:

Guidance for Agreements to Transport CO_2 Across National Boundaries Under the London Protocol

Introduction

This study provides practical guidance on the agreements needed for such arrangements, in the form of a guidance handbook. It sets out a process to support Parties in developing agreements for cross-border CO_2 transport under the London Protocol, acting as a neutral handbook rather than a policy prescription, able to be utilised across all regions. This work was undertaken by IOM Law on behalf of IEAGHG.

Key Messages

- The London Protocol provides the international legal basis for offshore carbon capture and storage (CCS), with the 2006 amendment allowing sub-seabed storage, the 2009 amendment creating an export exemption, and the 2019 resolution enabling its provisional application.

- Implementation of the 2009 amendment requires national frameworks, including legislation, permitting, monitoring, and compliance systems. Public and political support are critical to progress.
- Agreements under Article 6.2 are essential for cross-border transport and storage of CO_2, confirming permitting responsibilities between Parties and requiring full equivalence with the Protocol when non-Parties are involved.
- Emerging state practice shows a preference for non-binding Memorandum of Understanding (MoUs), especially in Europe, but these must still uphold Protocol standards. More detailed provisions may be needed for monitoring, reporting and verification (MRV), liability and carbon market participation.
- Industry plays a catalytic role in advancing cross-border CCS, often initiating projects and agreements before government-to-government (G2G) agreements.
- Commercial agreements must address liability, CO_2 quality, monitoring, and long-term revenue security to ensure bankable projects.

Scope

The London Protocol, an International Maritime Organization (IMO) treaty, is currently the most advanced international regulatory framework addressing offshore geological storage of CO_2 and establishes criteria for cross-border transportation. Nevertheless, certain questions remain, including how to implement the 2009 amendment, how to establish the required agreements or arrangements under it, specific considerations when exporting to non-Contracting Parties, and the commercial considerations as private stakeholders develop projects with cross-border elements.

This work seeks to provide information on addressing the aforementioned issues.

Conclusions

History of the London Protocol

Adopted in 1972, the London Convention was among the first global treaties to prevent marine pollution by dumping. It used a "black and grey list" system of prohibitions and permits. The 1996 London Protocol, in force since 2006, strengthened protection by introducing a general ban on dumping with limited exceptions. It is intended to replace the Convention; as of April 2025, there are 87 Parties to the Convention and 55 to the Protocol.

The Protocol originally prohibited offshore CCS but has since been amended:

- 2006 amendment: Allowed CO_2 storage in sub-seabed formations under strict conditions, establishing the first international legal basis for CCS.
- 2009 amendment: Created an exception to the export ban, permitting cross-border CO_2 transport for storage subject to agreements between Parties. Not yet in force (12 ratifications as of April 2025).

- 2019 resolution: Enabled provisional application of the 2009 amendment, allowing Parties that declare to the IMO to proceed with cross-border CCS. Fifteen countries had done so by the end of 2025.

Implementation of the 2009 Amendment

Parties are not required to accept the 2009 amendment, but they may provisionally apply the amendment without having ratified it. However, they must still meet its criteria through national systems, policies, and regulations. In practice, all Parties that have provisionally applied the amendment have also ratified it. Chapter four of the report sets out the steps for implementation.

Parties should already have implemented the 2006 amendment permitting CO_2 storage in sub-seabed formations. To apply the 2009 amendment, governments may need to update legislation, policies, and administrative systems (e.g. permitting, monitoring, compliance, taxation). Public acceptance is also key, as opposition has resulted in bans in national legislation and can delay or block CCS projects.

Non-Parties can engage in cross-border CCS bilaterally, but when working with a Party, must meet the Protocol's requirements for storage. The exporting Party must ensure the receiving State's framework meets Protocol standards. Many non-Parties are aligning their CCS rules with the Protocol to streamline cooperation and demonstrate best practice.

For countries considering accession, a cost–benefit analysis is essential. Benefits include technical cooperation, influence over amendments, and stronger pollution controls. Costs may involve establishing or adapting permitting systems and authorities. New Parties automatically join the Protocol "as amended," meaning they are bound by amendments already in force (e.g. the 2006 CCS amendment). Accepting the 2009 amendment on accession is recommended for those intending to participate in cross-border CCS.

Arrangements & Agreements for Cross-Border Transport of CO_2

The 2009 amendment (Article 6.2) allows CO_2 export for offshore storage if an agreement or arrangement is in place between countries. It states:

> *[…] the export of carbon dioxide streams for disposal in accordance with annex 1 may occur, provided that an agreement or arrangement has been entered into by the countries concerned. Such an agreement or arrangement shall include:*
>
> *.1 confirmation and allocation of permitting responsibilities between the exporting and receiving countries, consistent with the provisions of this Protocol and other applicable international law; and*
>
> *.2 in the case of export to non-Contracting Parties, provisions at a minimum equivalent to those contained in this Protocol, including those relating to the issuance of permits and permit conditions for complying with the provisions of annex 2, to ensure that the agreement or arrangement does not derogate from the obligations of Contracting Parties under this Protocol to protect and preserve the marine environment.*
>
> *A Contracting Party entering into such an agreement or arrangement shall notify it to the Organization.*

Agreements are legally binding (e.g. treaties, Memorandum of Agreement (MOAs)); arrangements are non-binding (e.g. Memorandum of Understanding (MoUs)). Flexibility exists, but all must uphold Protocol standards. Guidance on the implementation of Article 6.2 on the export of CO_2 streams for disposal in sub-seabed geological formations for the purpose of sequestration (Guidance on the implementation of Article 6.2) was developed to assist the Contracting Parties in interpreting the new provision.

So far, only non-binding MoUs between European Parties (e.g. Denmark–Belgium, Belgium–Netherlands, Denmark–Netherlands, France–Denmark, Norway with several States) have been concluded. These follow a simple "standard" structure confirming permit responsibilities, enabling projects like Greensand. Later MoUs added provisions on greenhouse gas (GHG) reporting and IMO notification. This reflects emerging good practice, though liability and monitoring remain largely left to commercial contracts. Looking forward, transboundary shipment will also underpin the growth of CCS in the Asia-Pacific region and volumes of CO_2 / distances covered will be significant.

In the EU/EEA, the CCS and ETS Directives already create a common legal framework, which the European Commission considers an "arrangement" under Article 6.2. Bilateral MoUs within this framework cover only residual issues not already governed by EU law.

Two main scenarios exist:

1. *Export and import between two Contracting Parties*:

Article 6.2 requires that agreements allocate permitting responsibilities between exporting and receiving countries, consistent with the Protocol and international law. In practice, this has been met by listing the relevant authorities and permits for each country.

While Article 6.2 does not prescribe how Parties must demonstrate compliance with Annex 2, guidance highlights that CO_2 export is transaction-based, making information-sharing and documentation important. Beyond the minimum requirements, Parties may also wish to address issues such as MRV, GHG inventories, carbon market participation, and liability.

Liability can include civil, administrative, environmental, and GHG emissions liability. Previous studies recommend agreements also cover emission reduction ownership, regulatory jurisdiction during transport, and responsibilities in case of leakage. In regions without common frameworks (e.g. Asia-Pacific), such provisions could help fill regulatory gaps and align practice with international standards. Contractual agreements can provide support alongside legal agreements, particularly where export involves a Contracting Party and a non-Contracting Party, complementing regulatory requirements. Contractual arrangements could precede formal intergovernmental agreements in cases where export occurred to a non-contracting party, thereby providing a structure aligned with the London Protocol's intent.

The study examines two theoretical case studies of CCS value-chains between 1) Japan (export) and Australia (import), and 2) Spain (export) and Egypt (import). These countries were selected due to their different geographical locations, which may prompt different considerations.

2. *Between a Contracting Party and a non-Contracting Party, where the CO_2 is stored in the sub-seabed of a non-Contracting Party*:

The London Protocol cannot impose obligations directly on non-Contracting Parties. However, if a Contracting Party exports CO_2 for storage in a non-Party, it must ensure the receiving State has a framework equivalent to the Protocol. Otherwise, the exporting Party would not comply with Article 6.2. The arrangement or agreement therefore functions both as due diligence and as proof that minimum standards are met.

Such instruments should include provisions on:

1. subjecting storage activities to permits or authorisation;
2. ensuring permitting procedures comply with Annex 2;
3. addressing avoidance of dumping and CO_2 stream composition; and
4. any additional relevant criteria.

These elements may be incorporated directly or by reference to national law or annexes, provided they are demonstrably equivalent to the Protocol. The agreement may also explicitly confirm that the non-Party has a regulatory framework aligned with the Protocol and undertakes to store CO_2 accordingly.

Both binding agreements (e.g. treaties) and non-binding arrangements (e.g. MoUs) can be used. Binding agreements allow breaches to be treated under international law, while non-binding arrangements rely on provisions for suspension or termination if obligations are not met. In either case, dispute resolution mechanisms are recommended. Guidance under Article 6.2 specifies that, in the event of a breach by a non-Party, the Contracting Party should first engage in consultations. If the breach is significant and ongoing, the export must be terminated. Unlike Party-to-Party agreements, which only need to confirm permitting responsibilities, Party-to-non-Party agreements must demonstrate full equivalence with the Protocol's standards, making them more detailed and demanding.

Theoretical case studies considered for this scenario note that Australia and Canada are Contracting Parties to the Protocol, and Timor-Leste and the U.S. are not. Australia has indicated that it intends to develop strategies for engaging with non-Contracting Parties.

Commercial Projects Crossing Borders

Commercial projects often drive progress on cross-border CCS. Industry may need to initiate negotiations and present business cases to governments, which can catalyse bilateral or multilateral arrangements under the 2009 amendment. Typical contracts in a CCS value chain include service, offtake, joint operating, and infrastructure agreements, with recent projects favouring service agreements that incorporate third-party access.

Industry initiatives frequently precede G2G agreements. Examples include Yara–Northern Lights (NL–NO, 2023) and Project Greensand (DK–BE, 2022), where commercial agreements came before formal state arrangements. Similar dynamics are seen in Australia–Timor-Leste (Bayu-Undan).

Cross-border CCS raises liability and regulatory considerations. Agreements must define when and where liability transfers, accounting for differences in carbon markets, reporting, and environmental rules across jurisdictions. Agreements should:

- specify CO_2 stream composition (often stricter than legal minimums),
- include conditions tied to geological storage site suitability and monitoring,
- ensure alignment with Annex 2 requirements on safe storage and reporting,
- address financial and liability implications of emissions, leaks, or impurities,
- consider third-party access and infrastructure sharing, including tariffs and priority rights.

Long-term transportation and storage agreements are critical for investment security and project bankability, regardless of whether CO_2 crosses borders.

The handbook provides a list of key provisions, in detail, for commercial agreements, and a draft contract template giving examples of clauses to be included in a transportation and storage agreement under the London Protocol, and a list of resources available and guidance documents issued under the London Protocol to support safe geological storage in compliance and national implementation of the Protocol (including IEAGHG report 2021-TR02 "*Exporting CO_2 for Offshore Storage – The London Protocol Export Amendment and Associated Guidelines and Guidance*").

Expert Review

This work was reviewed by eight independent expert reviewers. The work was received well, with many reviewers noting that this is a helpful, topical output that has been well researched. It was recognised that this work can add a lot of value for countries looking to establish bilateral agreements or arrangements under the London Protocol. Reviewers found the use of case studies and examples useful.

Some areas needed expanding slightly for clarity, such as introductions on relevant guidelines introduced within the study. It was recommended that more detail be added to the history of the London Protocol and the content of the protocol and amendments. There were some notes on general proofreading before publication. All expert comments were reviewed by IEAGHG and the contractors, and actioned within the report where appropriate.

Recommendations

- The contractors recommend that national frameworks are strengthened, cross-border agreements developed are robust, industry initiatives are leveraged, and that liability and investment security are addressed in agreements.
- Future work could investigate opportunities for CCUS pathways within other frameworks under the IMO.

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Content

1. Executive Summary

The 1996 London Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention) is a stand-alone agreement that supersedes the London Convention for the states that are party to both instruments, and will eventually replace it. As of September 2025, there are 56 parties to the Protocol. The London Protocol was not drafted with CCS in mind, and initially prohibited the storage of CO_2 offshore. However, through several amendments, the London Protocol has become the most advanced international regulatory instrument regulating cross-border transportation and offshore storage of CO_2.

The Protocol prohibits the export of waste and other matter for dumping in its Article 6. This effectively prohibited the export of CO_2 to other countries for offshore storage. In 2009, an amendment was made to the article. The 2009 amendment introduced a second paragraph to Article 6 (Article 6.2), exempting CO_2 streams from the ban and introducing criteria for such export to occur. This includes the conclusion of an arrangement or agreement between the Parties concerned in satisfaction of the details provided in Article 6.2. To accept and give effect to the 2009 amendment, it may be necessary to amend or introduce national frameworks and policies. The approach to achieving this will depend on the legal traditions and systems of the respective country and legislative processes. To date, this is the only exception to the export prohibition. The amendment is not yet in force.

In 2019, after 10 years with little progress in reaching the required number of acceptances for entry into force, the interim solution of provisional application was proposed and given effect through a resolution. To provisionally apply the amendment, the Contracting Parties must deposit a declaration of provisional application with the International Maritime Organization. Thus, provided the Parties have deposited such a declaration, the 2009 amendment will be in effect for the Parties concerned.

The 2009 amendment allows for the export of CO_2 to both Contracting and non-Contracting Parties, provided it is carried out under an agreement or arrangement. At the time of writing, state practice has predominantly involved arrangements between Contracting Parties that are member states of the European Union and the European Economic Area. A key consideration in evaluating these arrangements is that these countries operate within a shared legal framework for CO_2 storage and participate in a common carbon market. This context is important when drawing lessons or identifying global best practices for future cross-border arrangements. In June 2025, Switzerland and Norway concluded the world's first agreement under Article 6.2 of the London Protocol and Article 6 of the Paris Agreement. This agreement marks a pioneering step, making use of existing mechanisms under the Paris Agreement in the context of CCUS and CDR while meeting the requirements of the London Protocol. This may set an example for other countries to follow and learn from.

If a Contracting Party intends to export CO_2 for storage to a non-Contracting Party, the Contracting Party needs to undertake appropriate due diligence to determine that the legal and regulatory framework of the receiving State satisfies, at a minimum, the requirements set forth in the London Protocol. The aim is to ensure that Contracting Parties do not circumvent the environmental protection standards imposed by the London Protocol. Further, the agreement or arrangement needs to reflect the criteria of the London Protocol for CO_2 storage. This report provides examples of how this can be done. It may be worth considering including references or provisions in the agreements or arrangements beyond the minimum criteria of Article 6.2, relating to issues such as greenhouse gas inventories and potentially carbon market mechanisms.

Several countries currently developing national frameworks for CCS are using the London Protocol as a foundation. While current or future Contracting Parties have a duty to implement the provisions at a national level, there is an increasing trend of non-Contracting Parties, who may never accede to the London Protocol, aligning their CCS frameworks with the rules and standards set forth in the London Protocol. It can, therefore, be said that the London Protocol, to an increasing degree, represents globally accepted standards and best practices for offshore CCS. Alignment with the London Protocol also enables non-Contracting Parties to receive CO_2 from Contracting Parties, thereby streamlining project development and the due diligence processes for the Contracting Party.

With a growing state practice under the London Protocol for cross-border collaboration, there is also a commercial industry developing in parallel. Sometimes, such commercial agreements precede the bilateral negotiations between the countries and can indeed incentivise the authorities to deposit a declaration of provisional application and conclude the necessary arrangement or agreement. Industry may need to be proactive and present a business case to their national authorities to showcase the benefits of enabling this industry.

2. Introduction

2.1. The London Protocol

The 1996 Protocol (London Protocol or Protocol) to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention or Convention) is a comprehensive global framework for protecting the marine environment from dumping activities. It is currently the most advanced international regulatory framework addressing offshore geological storage of CO_2 and establishes criteria for cross-border transportation. Following a 2019 resolution to provisionally apply an amendment from 2009, Contracting Parties to the London Protocol may engage in cross-border value chains for offshore storage provided certain criteria are met, thereby unlocking a barrier to large-scale carbon capture and storage (CCS) deployment. Since then, cross-border commercial projects have been initiated, and Contracting Parties are progressively developing and refining practices to operationalise the cross-border mechanism.

Nevertheless, certain questions remain, including how to implement the 2009 amendment, how to establish the required agreements or arrangements under it, specific considerations when exporting to non-Contracting Parties, and the commercial considerations as private stakeholders develop projects with cross-border elements. This handbook provides information to address these issues.

2.2. Structure of the handbook and how to use it

This handbook is intended for a wide audience, ranging from policymakers and regulators to project owners and developers, relating to the application of the 2009 amendment. The guidance is neutral without explicit advocacy or policy prescription, so it can be utilised across all regions. The handbook is divided into the following chapters:

Chapter 3: London Convention and its 1996 Protocol

This part of the handbook provides an introduction to the London Protocol, its history, and current status. It is intended for those less familiar with the background and the barriers to sub-seabed geological storage of CO_2 and cross-border transportation related to such storage. Thus, the chapter provides a brief introduction and backdrop for the topics discussed in later chapters.

Chapter 4: Implementation of the 2009 amendment to the London Protocol

As the 2009 amendment has not yet received the required number of formal acceptances to enter into force,[1] Contracting Parties may rely on the provisional application mechanism enabled by the 2019 resolution. This mechanism serves as an interim solution until sufficient acceptances are secured for the amendment's entry into force. In this context, Chapter 4 offers guidance on accepting the 2009 amendment and integrating its framework into national law. The guidance is relevant for both Contracting and non-Contracting Parties.

Chapter 5: Arrangements and agreements for cross-border transport of CO_2

Article 6.2 of the London Protocol stipulates that Contracting Parties wishing to export CO_2 for sub-seabed storage in another country must establish an agreement or arrangement with the importing country. The Protocol allows some flexibility in how compliance is achieved. Chapter 5 offers guidance on forming such agreements and arrangements between Contracting Parties and

[1] As of September 2025, 14 out of 56 Contracting Parties have accepted the amendment. To enter into force, it needs to be accepted by 2/3 of the Parties.

between a Contracting Party and a non-Contracting Party. Further, it briefly addresses the scenario where CO_2 is exported from a non-Contracting Party to a Contracting Party. Additionally, the chapter summarises current State practice, which is designed to be read independently of the preceding chapters.

All of the arrangements or agreements entered into pursuant to the London Protocol per September 2025 are between Contracting Parties that are also part of the EU single market, implying that the State practice described in this chapter may not be fully representative or replicable for countries in other regions. Chapter 5 is thus intended to provide recommendations for cross-border collaboration also outside of Europe, both between two Contracting Parties and between a Contracting and a non-Contracting Party. Case studies have been included, which are chosen based on criteria such as the geographical location and membership status to the London Protocol to ensure a global representation. The intention is to highlight how topics in arrangements and agreements may vary depending on, for example, the region in question.

Chapter 6: Commercial projects crossing borders

The final chapter of the handbook is aimed at stakeholders intending to enter into commercial agreements for transportation and sub-seabed geological storage pursuant to the London Protocol. In Chapter 6, the handbook highlights some considerations when negotiating a cross-border contract for CCS. Some examples of provisions, a draft contractual template, are provided.

3. London Convention and its 1996 Protocol

3.1. History

The London Convention[2] was adopted in 1972 and entered into force in 1975. The Convention is one of the first global conventions to protect the marine environment from human activities.[3] It seeks to promote the effective control of all sources of marine pollution and to take all practicable steps to prevent pollution of the sea by dumping of wastes and other matter.[4] The London Convention regulates dumping through what is often referred to as the 'black and grey list' approach, where the wastes and other matter listed in the black list (Annex I) are prohibited to dump[5] and the wastes and other matter listed in the grey list (Annex II) may be dumped with a prior special permit.[6] All other wastes or other matter not listed in Annex I or II may be dumped with a general permit.[7]

Recognising the need for a more precautionary and preventative approach, the Contracting Parties undertook a review of the London Convention. The review resulted in the 1996 London Protocol,[8] which provides more stringent protection of the marine environment from pollution caused by dumping. Entering into force in 2006, the Protocol departs from its predecessor's black and grey list approach and implements a general ban on dumping, permitting only a narrowly

[2] Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Convention)
[3] International Maritime Organization. "Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter." https://www.imo.org/en/OurWork/Environment/Pages/London-Convention-Protocol.aspx (accessed November 25, 2024).
[4] London Convention, Article II.
[5] London Convention, Article IV(1)(a).
[6] London Convention, Article IV(1)(b).
[7] London Convention, Article IV(1)(c).
[8] 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 (London Protocol).

defined set of exceptions as provided in Annex 1.[9] To be considered for dumping, a permit has to be issued in advance and comply with the provisions of Annex 2 "Assessment of waste or other matter that may be considered for dumping".[10]

The London Protocol is a stand-alone agreement that supersedes the London Convention for the States that are Party to both instruments.[11] The London Protocol will eventually replace the London Convention.[12] As of September 2025, there are 87 Contracting Parties to the London Convention and 56 Contracting Parties to the Protocol.[13]

FIGURE 1: ILLUSTRATION OF CONTRACTING PARTIES

3.2. The London Protocol and CCS

The London Protocol was not drafted with CCS in mind, and initially prohibited the storage of CO_2 offshore. However, through several amendments, the London Protocol has later become the most advanced regulatory instrument regulating cross-border transportation and offshore storage of CO_2.[14] The following sub-chapters will explain what the barriers were and how these have subsequently been overcome.

3.2.1. 2006 amendment

The definitions of "sea"[15] and "dumping"[16] extend to the seabed and the subsoil thereof. Thus, any injection of CO_2 into the sub-seabed would constitute dumping. CO_2 was originally not listed in Annex 1 and was therefore not exempted. Offshore CCS was therefore prohibited under the Protocol. In 2006, an amendment was introduced to add CO_2 streams from CO_2 capture

[9] London Protocol, Article 4.1.1.
[10] London Protocol, Article. 4.1.2.
[11] London Protocol, Article 23.
[12] International Maritime Organization. *The London Protocol: What it is and how to implement it*. 2014 Edition. January 2014. DOI: https://doi.org/10.62454/K533E. p. 3. This will occur when the Contracting Parties to the Convention that are not yet parties to the Protocol become parties to it.
[13] International Maritime Organization. "46th Consultative Meeting of Contracting Parties to the London Convention and the 19th Meeting of Contracting Parties to the London Protocol (LC 46/LP 19)." https://www.imo.org/en/MediaCentre/MeetingSummaries/Pages/LC-46-LP-19.aspx (accessed April 30, 2025).
[14] International Maritime Organization. "46th Consultative Meeting of Contracting Parties to the London Convention and the 19th Meeting of Contracting Parties to the London Protocol (LC 46/LP 19)." https://www.imo.org/en/MediaCentre/MeetingSummaries/Pages/LC-46-LP-19.aspx (accessed April 30, 2025).
[15] London Protocol, Article 1(7)
[16] London Protocol, Article 1(4)(.1)

processes for storage to Annex 1,[17] making it an exception to the ban on dumping.[18] Under the exception, CO_2 streams may be considered for dumping (i.e., storage) if disposal is into a sub-seabed geological formation,[19] the streams consist overwhelmingly of carbon dioxide,[20] and no other wastes or other matter are added for the purpose of disposing of those wastes or other matter.[21] The amendment entered into force 100 days after its adoption, on 10 February 2007.[22] This amendment created a legal basis in international environmental law to allow CO_2 storage in sub-seabed geological formations.[23]

The Specific Guidelines for the Assessment of Carbon Dioxide Streams for Disposal into Sub-Seabed Geological Formations (CO_2 Sequestration Guidelines) were created to provide non-binding recommendations to Annex 2 of the London Protocol.[24] These guidelines address CO_2 stream composition and characterisation, and outline and elaborate on risk assessment procedures and site selection criteria to mitigate potential leakage and environmental impacts.[25]

3.2.2. 2009 amendment

Article 6 of the London Protocol establishes a general ban on all export of wastes and other matter for dumping at sea.[26] This effectively prohibited the export of CO_2 to other countries for offshore storage, which may be necessary for large-scale deployment of CCS, particularly for those countries with no or limited storage resources or where storage is otherwise prohibited. In 2009, an amendment was made to Article 6 to allow for the export of CO_2 streams for offshore storage.[27] To date, this is the only exception to the export prohibition of Article 6. The 2009 amendment introduced a second paragraph to Article 6 (Article 6.2), exempting CO_2 streams from the ban, introducing criteria for such export to occur. This includes the conclusion of an arrangement or agreement between the Parties concerned in satisfaction of the details provided in Article 6.2. The Contracting Parties have developed a guidance document, as introduced and elaborated on in Chapter 4, in relation to Article 6.2 compliance.

The 2009 amendment has not been formally accepted by 2/3 of the Contracting Parties and is, therefore, not yet in force.[28] Thus, as more countries become Parties to the London Protocol, the

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[17] London Protocol, Annex 1, 1.8.
[18] Resolution LP.1(1) on the Amendment to include CO_2 Sequestration in Sub-Seabed Geological Formations in Annex 1 to the London Protocol (2006), point 4 in Annex 1. https://wwwcdn.imo.org/localresources/en/KnowledgeCentre/IndexofIMOResolutions/LCLPDocuments/LP.1(1).pdf
[19] London Protocol, Annex 1, 4.1.
[20] London Protocol, Annex 1, 4.2. Note that they may contain incidental associated substances derived from the source material and the capture and sequestration processes used.
[21] London Protocol, Annex 1, 4.3.
[22] London Protocol, Article 22(4). International Maritime Organization. "Revised Guidance on the National Implementation of the London Protocol (LC 39/16/Add.1, Annex 7)." https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Revised%20Guidance%20on%20National%20Implementation%20LP_Manuscript%20as%20approved%20at%20LC39.pdf (accessed April 30, 2025). p. 45.
[23] International Maritime Organization, "The London Protocol and London Convention"' https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/London%20Protocol%20Climate%20Change%20Leaflet%202019%20_FINAL_online%20version.pdf (accessed December 5, 2024)
[24] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations*, adopted November 2, 2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf (accessed April 11, 2025).
[25] International Maritime Organization, Carbon Dioxide Sequestration in Sub-Seabed Geological Formations under the London Protocol, 2016 Edition (January 2016), p. 22, DOI: https://doi.org/10.62454/K546E.
[26] London Protocol, Article 6. And incineration.
[27] International Maritime Organization, *Resolution LP.3(4) on the Amendment to Article 6 of the London Protocol* (2009).
[28] London Protocol, Article 21.

number of required acceptances increases. New Contracting Parties should consider whether to accept amendments that have not yet entered into force when they become parties.[29] As of September 2025, 14 Contracting Parties have accepted the 2009 amendment: Australia, Belgium, Croatia, Denmark, Estonia, Finland, Iran (Islamic Republic of), Netherlands (Kingdom of the), Norway, Republic of Korea, Spain, Sweden, Switzerland and United Kingdom.

3.2.3. 2019 resolution

After 10 years with little progress in reaching the required number of acceptances for entry into force, Norway and the Netherlands proposed the interim solution of provisional application.[30] In short, a treaty or part of a treaty can be applied provisionally pending its entry into force if the treaty itself so provides[31] or if the negotiating parties in some other manner agree.[32] In the context of the 2009 amendment, the provisional application was agreed upon by the negotiating Parties and given effect through the 2019 resolution.[33] To enable the mechanism, Contracting Parties must deposit a declaration of provisional application with the Secretariat (the International Maritime Organization (IMO)). Thus, provided the Parties have deposited a declaration of provisional application, the 2009 amendment will be in effect for the Parties concerned. As of September 2025, 11 Contracting Parties have deposited a declaration of provisional application: Australia, Belgium, Denmark, Finland, Netherlands (Kingdom of the), Norway, Republic of Korea, Spain, Sweden, Switzerland and United Kingdom.

Provisional application entails, at its core, that a State agrees to apply certain provisions on a legally binding basis before its formal entry into force.[34] A failure to comply with the 2009 amendment criteria via provisional application would therefore lead to a situation of non-compliance with Article 6.2 under the London Protocol. Provisional application differs from formal entry into force, as it is intended to be a temporary measure pending entry into force.[35]

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[29] International Maritime Organization. "Revised Guidance on the National Implementation of the London Protocol (LC 39/16/Add.1, Annex 7)." https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Revised%20Guidance%20on%20National%20Implementation%20LP_Manuscript%20as%20approved%20at%20LC39.pdf (accessed April 30, 2025).p. 10, para 25.

[30] International Maritime Organization, *Resolution LP.5(14) on the Provisional Application of the 2009 Amendment to Article 6 of the London Protocol*, adopted October 11, 2019.

[31] The Vienna Convention on the Law of Treaties, Vienna 23 May 1969 (VCLT), Article 25(1)(a).

[32] VCLT, Art 25(1)(b) ; As pointed out by the IEA, "*The VCLT does not specify whether provisional application may apply to an amendment to a treaty. However, the ILC Commentaries provide that part of a treaty may be brought into force to meet the immediate needs of parties and do not exclude amendments from the application of Article 25* [VCLT]" International Energy Agency, *Carbon Capture and Storage and the London Protocol: Options for Enabling Transboundary CO2 Transfer*, working paper (2011), p. 17, https://iea.blob.core.windows.net/assets/a0a0ee83-6842-4c28-b64d-a01df895bee8/CCS_London_Protocol.pdf.

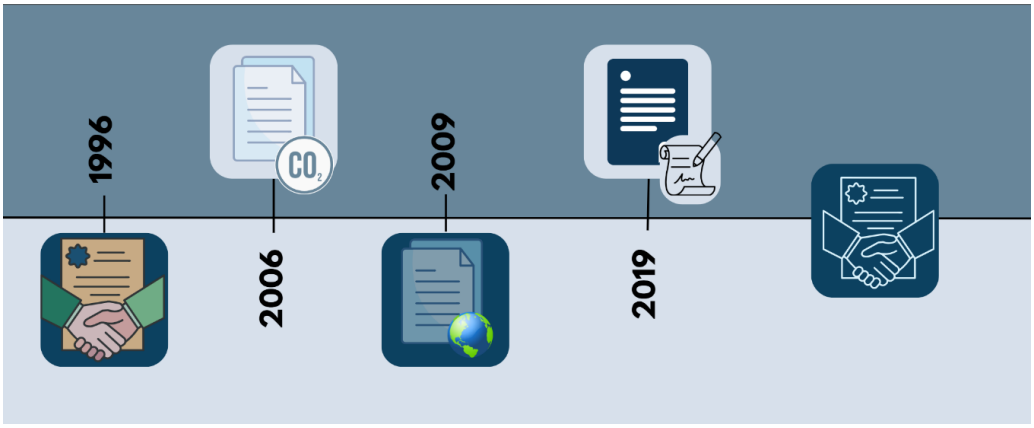
[33] International Maritime Organization. *Resolution LP.5(14) on the Provisional Application of the 2009 Amendment to Article 6 of the London Protocol*. Adopted October 11, 2019.

[34] International Law Commission. *Yearbook of the International Law Commission 2018: Chapter VII Provisional Application of Treaties, Guideline 6 Legal Effect of Provisional Application*. p. 149. https://legal.un.org/ilc/reports/2018/english/chp7.pdf (ILC, Guide to Provisional Application of Treaties 2018) ; see also United States. "Comments by the United States on the International Law Commission's Draft Guide to Provisional Application of Treaties as Adopted by the Commission on First Reading in 2019." December 15, 2019. https://legal.un.org/ilc/sessions/72/pdfs/english/pat_usa.pdf (commentary 6:5).

[35] Provisional application is, in principle, different from entry into force, "as provisional application is not intended to give rise to the whole range of rights and obligations that derive from the consent by a State to be bound by a treaty or a part of a treaty" (ILC Commentaries, Guideline 6, Commentary 5 available here Chapter VII - Yearbook of the International Law Commission 2018 - Volume II (Part Two)). Indeed, the ILC Commentaries explain that "[t]he formulation that provisional application 'produces a legally binding obligation to apply the treaty or a part thereof as if the treaty were in force' does not imply that provisional application has the same legal effect as entry into force." (Guideline 6, Commentary 5). However, "[t]he breach of an obligation arising under a treaty or a part of a treaty that is provisionally applied entails international responsibility in accordance with the applicable rules of international law." (Guideline 8).

Accordingly, the authors advocate for the formal acceptance and entry into force of the 2009 amendment, as it, among other things, reflects a stronger and more permanent legal commitment and enhances legal certainty.

FIGURE 2: HISTORY OF THE LONDON PROTOCOL AND CCS



4. Implementation of the 2009 amendment to the London Protocol

4.1. Criteria

Contracting Parties are not required to accept the 2009 amendment to provisionally apply it, though this is favourable, as explained above. To provisionally apply the amendment, the Contracting Parties must nevertheless adhere to the criteria provided in the amendment. Thus, this triggers the need to have national systems, policies, and regulations in place that implement and regulate this as if the amendment were accepted. To date, all the Parties that have deposited a declaration of provisional application have also accepted the 2009 amendment.

This chapter provides steps to implement the 2009 amendment, with national examples.

4.2. Roadmap for Contracting Parties

The Protocol's provisions should already have been implemented into national systems for Contracting Parties. The 2006 amendment allowing CO_2 storage in sub-seabed geological formations is in force and provides, along with associated guidance documents, the minimum requirements and criteria that must be met before CO_2 can be stored.

Government support will be needed to accept the 2009 amendment and/or to deposit a declaration of provisional application. Whether or not there is support in government will also depend on public perception and acceptability. If communities oppose CCS, it is less likely that politicians will champion the cause. Indeed, public opposition to CCS has previously stopped CCS projects[36] and resulted in bans in national legislation.[37] As such, it is advisable for both public and private stakeholders in the CCS value chain to engage with communities early on to establish support. This may allow for more seamless project deployment when exporting to or importing from other countries.

To accept and give effect to the 2009 amendment, it may be necessary to amend or introduce national frameworks and policies. The approach to achieving this will depend on the legal traditions and systems of the respective country and legislative processes. The Revised Guidance on the National Implementation of the London Protocol does, however, recommend implementing Article 6.2 through binding norms.[38] At the 46th Consultative Meeting of Contracting Parties to the London Convention and the 19th Meeting of Contracting Parties to the London Protocol, which took place 28 October - 1 November 2024 (LC 46/LP 19), the delegations of, among others, Finland, France, Germany, and Japan expressed that internal procedures and legislative processes were ongoing to transpose and accept the 2009 amendment.[39] Japan

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[36] E.g. Barendrecht, see Limousin, Lorelei. "CCS Communication: Lessons Learnt from Barendrecht." Bellona. November 11, 2010. https://bellona.org/news/ccs/2010-11-ccs-communication-lessons-learnt-from-barendrecht.

[37] For example, storage was permitted in Lithuania but a ban was introduced in 2019 due to, inter alia, opposition and lobbying by agriculture industry. See Shogenova, Alla. "Carbon Neutral Baltic States: Do We Have CCUS Among Accepted Options?" BC Forum. https://bcforum.net/presentations2020/02.01%20-%20Alla%20Shogenova,%20Carbon%20Neutral%20Baltic%20States%20-%20Do%20We%20Have%20CCUS%20Among%20Accepted%20Options.pdf (accessed April 30, 2025). Slide 25

[38] International Maritime Organization. *Revised Guidance on the National Implementation of the London Protocol*, LC 39/16/Add.1, Annex 7, p. 15, 47.

[39] International Maritime Organization. *LC 46/17*. Paras 2.10, 2.11 and 2.13. https://climate.law.columbia.edu/sites/default/files/content/LC%2046-17.pdf.

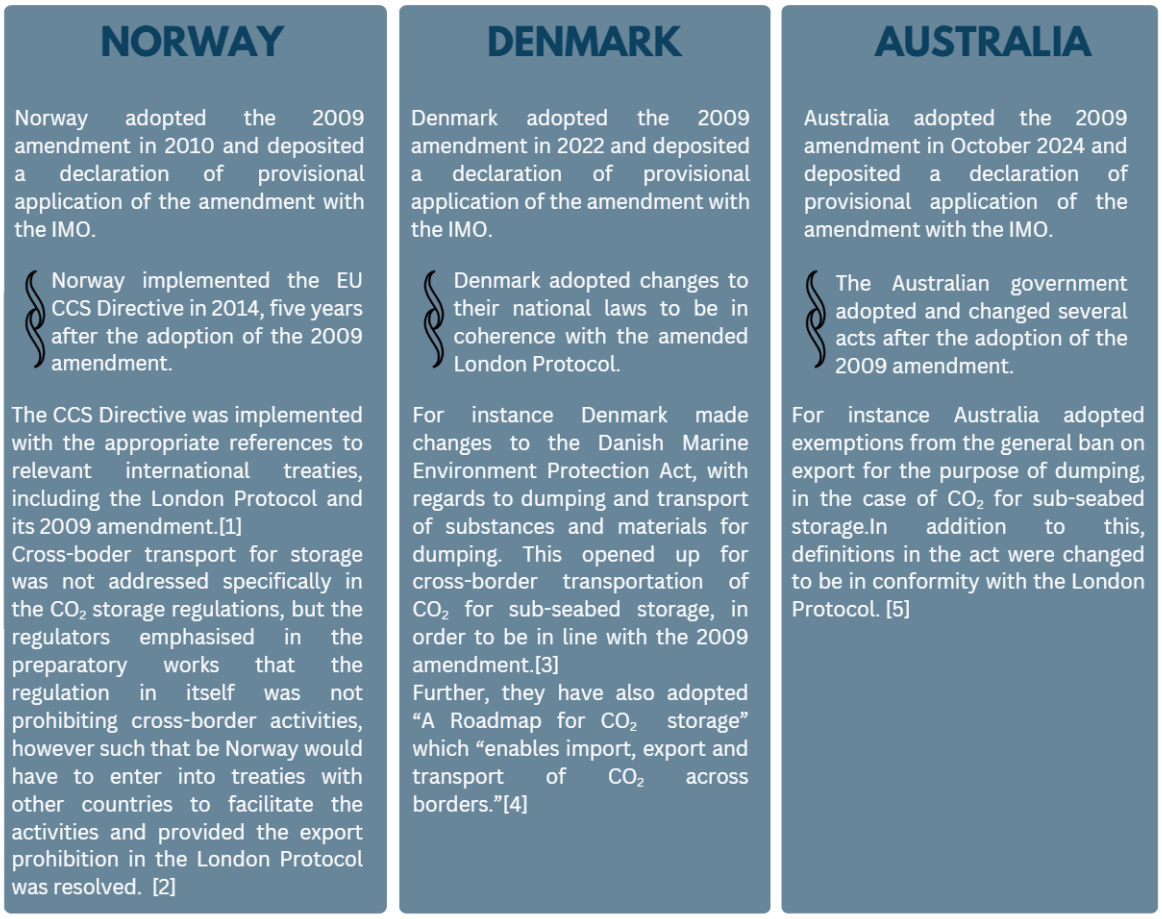
observed that it would deposit the instruments of acceptance once the process was concluded.[40] For France, the delegation informed that the administrative procedure was completed in July 2024, and the parliamentary procedure was expected to conclude in 2025.[41] The delegation of Finland recalled that it had accepted the amendment in 2017 and was now "preparing a governmental proposal for the provisional application of the 2009 amendment and for amending the related national law."[42]

Administrative procedures and systems may need to be further amended to account for e.g., applications, assessment, permitting, monitoring, and compliance mechanisms to recognise nationally captured CO_2 being stored abroad, or CO_2 being imported. Further, there may be additional and new considerations relating to, inter alia, the taxation of such activities. For instance, in 2023, the Norwegian Tax Administration issued a binding ruling[43] at the request of Northern Lights to clarify the value-added tax (VAT) treatment of CCS transport and storage services.[44] The ruling addressed the need for clarity on VAT application to CO_2 transport and storage as part of establishing a new cross-border market for CCS services.[45] It concluded that cross-border CO_2 transport and storage on the Norwegian Continental Shelf are exempt from VAT.[46]

The following figure shows additional examples of how certain countries have made changes to their national framework to account for the 2009 amendment, using Norway, Denmark, and Australia as examples.

[40] International Maritime Organization. LC 46/17. Para 2.13.
[41] International Maritime Organization. LC 46/17 para 2.10. https://climate.law.columbia.edu/sites/default/files/content/LC%2046-17.pdf.
[42] International Maritime Organization. LC 46/17. Para 2.15. https://climate.law.columbia.edu/sites/default/files/content/LC%2046-17.pdf.
[43] Skatteetaten. "Merverdiavgiftsbehandling i forbindelse med transport og deponering av CO2" (Value Added Tax Treatment in Connection with the Transport and Storage of CO2). Published November 8, 2023. Issued September 12, 2023. Accessed April 30, 2025. https://www.skatteetaten.no/rettskilder/type/uttalelser/bfu/merverdiavgiftsbehandling-i-forbindelse-med-transport-og-deponering-av-co2/.
[44] Northern Lights. "Breakthrough on VAT for CCS Services." December 6, 2023. Accessed April 30, 2025. https://norlights.com/news/breakthrough-on-vat-for-ccs-services/.
[45] Northern Lights. "Breakthrough on VAT for CCS Services." December 6, 2023. Accessed April 30, 2025. https://norlights.com/news/breakthrough-on-vat-for-ccs-services/.
[46] Northern Lights. "Breakthrough on VAT for CCS Services." December 6, 2023. Accessed April 30, 2025. https://norlights.com/news/breakthrough-on-vat-for-ccs-services/.

FIGURE 3: NATIONAL IMPLEMENTATION OF THE 2009 AMENDMENT



[1]The Norwegian Storage Regulation § 1-5 [2] PRE-2014-12-05-1517, PRE-2014-12-05-1518 Implementation of the EU Storage Directive: Regulation on the utilization of sub-seabed reservoirs on the continental shelf for the storage of CO2 and on the transport of CO2 on the continental shelf, and Regulation amending Regulation No. 653 of June 27, 1997, concerning petroleum activities. Royal Resolution. Minister Tord Lien.
[4] LBK nr 1032 af 25/06/2023 [4] Climate, Energy, and Utilities Committee. (2021). A Roadmap for CO2 storage. [5] Section 15 (2) A in Environment Protection (Sea Dumping) Amendment (Using New Technologies to Fight Climate Change) Act 2023

4.3 Roadmap for non-Contracting Parties

Non-Contracting Parties may engage in cross-border transport and sub-seabed geological storage of CO_2 with other non-Contracting Parties, without limitation or influence by the London Protocol. Therefore, there is no requirement to adhere to or accept the 2009 amendment or deposit a declaration of provisional application. Non-Contracting Parties may also want to engage in cross-border CCS with Contracting Parties, where CO_2 is exported for storage in offshore reservoirs of a Contracting Party. The requirements of the 2009 amendment would not be applicable in this scenario. While not mandatory under the London Protocol, the Contracting Party may still require some form of bilateral instrument, which can e.g., provide assurances related to the CO_2 stream composition and cover issues such as national GHG inventory and accounting. To comply with the requirements of the London Protocol, the Contracting Party must store the imported CO_2 in accordance with the Protocol's provisions and may require specific information from the non-Contracting Party to fulfil these obligations. Nevertheless, this remains a bilateral issue between the countries concerned, separate from the Protocol.

A Contracting Party may want to export CO_2 for storage in a non-Contracting Party. Such collaboration is usually influenced by commercial opportunities presented by industry. If a

Contracting Party intends to export CO_2 for storage to a non-Contracting Party, the Contracting Party needs to undertake appropriate due diligence to ascertain that the legal and regulatory framework of the receiving State satisfies, at a minimum, the requirements set forth under the London Protocol. This issue is considered further in 5.3.2.

Several countries currently developing national frameworks for CCS are using the London Protocol as a foundation. While current or future Contracting Parties have a duty to implement the provisions at a national level, there is an increasing trend of non-Contracting Parties, who may not have an intention to accede to the London Protocol, aligning their CCS frameworks with the rules and standards provided by the London Protocol. It can, therefore, be said that the London Protocol, to an increasing degree, represents globally accepted standards and best practices for offshore CCS. Alignment with the London Protocol also enables non-Contracting Parties to receive CO_2 from Contracting Parties, thereby streamlining the due diligence process and project development. For non-Contracting Parties aspiring to become storage destinations for CO_2 from Parties to the London Protocol, there is an incentive to accede to the Protocol, accept and implement the 2009 amendment and deposit a declaration of provisional application, as this would remove the need for a due diligence process altogether.

Before becoming a Party to the London Protocol, it is important to carefully consider the associated benefits, costs, and broader implications of becoming a Contracting Party. This national analysis may be time-consuming, but critical to gain the necessary political support. There are a number of benefits associated with being a Contracting Party to the London Protocol. As identified and articulated by the IMO, these may include, for example, access to technical cooperation and support and opportunities to shape amendments to address emerging marine pollution issues under the Protocol.[47]

Contracting Parties to the Protocol "are required to have domestic law and an appropriate administrative system in place to enable them to meet the obligations defined in the Protocol."[48] Preparation of the legislation should be initiated well in advance of acceding to the London Protocol as the Protocol enters into force 30 days after the State has expressed its consent to be bound.[49] States planning to become Contracting Parties to the Protocol should review their national laws to determine whether existing provisions effectively implement the Protocol's requirements.[50] If gaps are identified, amendments or repeals may be necessary to ensure

[47]Derived from: International Maritime Organization. "Benefits of Being a Party to the London Protocol." https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Benefits%20LP.pdf. Accessed April 30, 2025. ; and International Maritime Organization. "The London Convention and Protocol: Their Role and Contribution to Protection of the Marine Environment." https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/22780LDC%20Leaflet%20without%2040%20Anniv%20logo2012Web1.pdf. Accessed April 30, 2025.

[48] International Maritime Organization. *The London Protocol: What it is and how to implement it*. 2014 Edition. January 2014. p. 17. DOI: https://doi.org/10.62454/K533E.

[49] London Protocol, Articles 24-25.

[50] International Maritime Organization. "Revised Guidance on the National Implementation of the London Protocol (LC 39/16/Add.1, Annex 7)." p. 8, para 15. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Revised%20Guidance%20on%20National%20Implementation%20LP_Manuscript%20as%20approved%20at%20LC39.pdf (accessed April 30, 2025)

compliance.[51] For clarity and coherence, consolidating the applicable rules into a unified framework may also be advisable.[52]

FIGURE 4: SOLOMON ISLANDS EXAMPLE

An example that underlines the above is the recent ratification of the London Protocol by the Solomon Islands in 2024. It was explained that as a small island developing state, "its maritime sector was of vital importance and that it faced significant challenges, particularly in respect to capacity-building to prevent marine pollution." As explained by its delegation present at the LC 46/LP 19, an oil spill incident in 2019 highlighted the country's vulnerability to marine pollution, prompting the government to prioritise the protection of the marine environment. This resulted in the approval and ratification of the London Protocol as well as several other conventions related to pollution prevention and response. The delegation stated that it would review its domestic laws to reflect the Protocol obligations and further expressed its commitment to collaborate with international entities to build the necessary capacity.

IMO, Report of the forty-sixth consultative meeting and the nineteenth meeting of contracting parties' (Forty-sixth consultative meeting of Contracting Parties to the London Convention & Nineteenth meeting of contracting parties to the London Protocol, 24 October – 1 November 2024) (22 November 2024) para 2.6.

New Contracting Parties automatically become a Party to the London Protocol as amended.[53] As amended means any amendment to the Protocol that has entered into force according to the rules provided in the Protocol.[54] Thus, as the 2006 amendment has entered into force, new Contracting Partes will be subject to those provisions.[55] Only if/when the 2009 amendment enters into force will new Contracting Parties become a Party to the Protocol as amended by the 2009 amendment.[56] New Contracting Parties interested in international collaboration on CCS should consider accepting the 2009 amendment at the time of accession. The figure below summarises the process of becoming a Contracting Party to the London Protocol.

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[51] International Maritime Organization. "Revised Guidance on the National Implementation of the London Protocol (LC 39/16/Add.1, Annex 7)." p. 8, para 15. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Revised%20Guidance%20on%20National%20Implementation%20LP_Manuscript%20as%20approved%20at%20LC39.pdf (accessed April 30, 2025)

[52] International Maritime Organization. "Revised Guidance on the National Implementation of the London Protocol (LC 39/16/Add.1, Annex 7)." p. 8, para 15. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Revised%20Guidance%20on%20National%20Implementation%20LP_Manuscript%20as%20approved%20at%20LC39.pdf (accessed April 30, 2025)

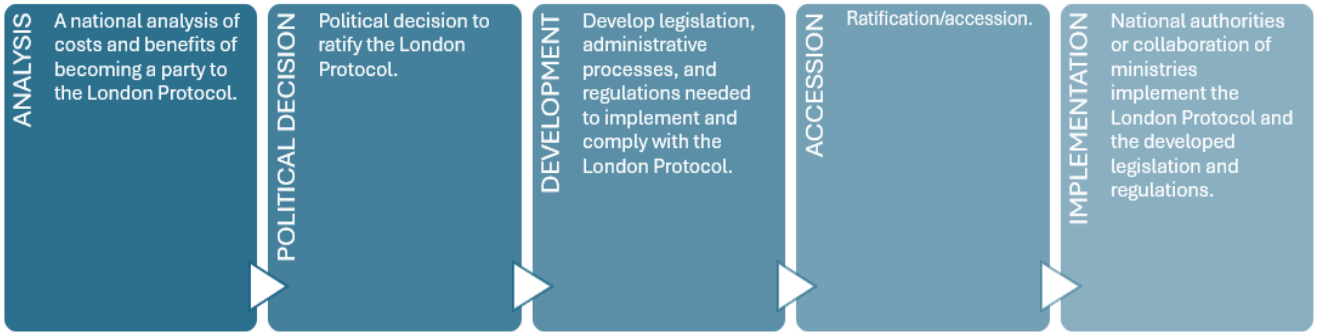
[53] Per Article 21(5); when the amendments have been accepted by the required number of Contracting Parties and is in force ; see Revised guidance doc LC 39/16/Add.1, annex 1.

[54] London Protocol, Articles 21-22.

[55] International Maritime Organization. "Revised Guidance on the National Implementation of the London Protocol (LC 39/16/Add.1, Annex 7)." P. 45. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Revised%20Guidance%20on%20National%20Implementation%20LP_Manuscript%20as%20approved%20at%20LC39.pdf (accessed April 30, 2025).

[56] London Protocol, Article 21(5).

FIGURE 5: THE PROCESS OF BECOMING A CONTRACTING PARTY



The cost-benefit analysis is a natural starting point of the accession process. It will feed into the political decision and set a baseline for which frameworks and processes would be needed to comply with the provisions of the Protocol. The cost will vary depending on the extent of dumping activities, meaning that extensive pre-existing dumping activities may imply higher costs as these may have to be reorganised or re-regulated to comply with the London Protocol requirements. IMO has identified "administering a national permit or licensing system with procedures that comply with the articles and annexes of the London Protocol"[57] as a potential cost that may occur in becoming a party to the Protocol. Here also lies the potential for having to establish a new permitting authority or recruit and train new staff to employ a branch of an existing permitting authority. Also, as is often the case, more than one permitting authority may be involved, and there is a need to establish ways to collaborate and channels to communicate and keep records. This may be organised in several ways, either by having individual agencies responsible for individual dumping activities, one agency responsible for everything, or there might be an overlap with one responsible agency and multiple agencies co-signing to ensure subject matter expertise.

Acceding to the London Protocol offers clear advantages in regulating marine pollution and dumping, which can translate into indirect and direct economic benefits.[58] As noted earlier, countries also gain access to technical cooperation and support, as well as opportunities to shape global policy. Governments may consider accession and its benefits based on consultation with a broad range of affected stakeholders.

[57] International Maritime Organization. "The London Convention and Protocol: Their Role and Contribution to Protection of the Marine Environment." https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/22780LDC%20Leaflet%20without%2040%20Anniv%20logo2012Web1.pdf. Accessed April 30, 2025.

[58] International Maritime Organization. "Benefits of Being a Party to the London Protocol." https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Benefits%20LP.pdf. Accessed April 30, 2025.

5. Arrangements and agreements for cross-border transport of CO_2

5.1. London Protocol criteria

The 2009 amendment provides the following criteria in Article 6.2:

> *[...] the export of carbon dioxide streams for disposal in accordance with annex 1 may occur, provided that an agreement or arrangement has been entered into by the countries concerned. Such an agreement or arrangement shall include:*
>
> *.1 confirmation and allocation of permitting responsibilities between the exporting and receiving countries, consistent with the provisions of this Protocol and other applicable international law; and*
>
> *.2 in the case of export to non-Contracting Parties, provisions at a minimum equivalent to those contained in this Protocol, including those relating to the issuance of permits and permit conditions for complying with the provisions of annex 2, to ensure that the agreement or arrangement does not derogate from the obligations of Contracting Parties under this Protocol to protect and preserve the marine environment.*
>
> *A Contracting Party entering into such an agreement or arrangement shall notify it to the Organization.*

The wording in the new paragraph is short and leaves room for interpretation with regard to the exact content of the arrangement or agreement. This has resulted in discussions among the Contracting Parties, non-Contracting Parties, and industry as to the level of detail required to satisfy the requirements.[59] Guidance on the implementation of Article 6.2 on the export of CO_2 streams for disposal in sub-seabed geological formations for the purpose of sequestration (Guidance on the implementation of Article 6.2) was developed to assist the Contracting Parties in interpreting the new provision.[60] Actual state practice, however, is likely to be the most effective tool in addressing some of these uncertainties.[61]

The aforementioned Guidance on the implementation of Article 6.2 defines 'agreement' as a legally binding instrument between States, which can take the form of, for example, a memorandum of agreement or a treaty. In contrast, an 'arrangement' is not legally binding and

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[59] I. Ombudstvedt, L. Østgaard, and 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), https://www.ogel.org/article.asp?key=4093.

[60] For details pertaining to the development of the guidelines, and countries involved, please see International Maritime Organization, "Report of the Thirty-Fifth Consultative Meeting and the Eighth Meeting of Contracting Parties," October 2013, accessed April 29, 2025, p. 16-17, https://www.umweltbundesamt.de/sites/default/files/medien/381/dokumente/london_protocol_-_lc_35-15_-_report_of_the_thirty-fifth_consultative_meeting_and_the_eight_meeting_of_the_contracting_parties.pdf. ; International Maritime Organization. *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013). https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025.

[61] I. Ombudstvedt, L. Østgaard, and 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), https://www.ogel.org/article.asp?key=4093.

may take the form of a memorandum of understanding (MoU).[62] This handbook adheres to the same definitions. This offers States some flexibility as to the preferred shape, content, and legal nature of the document.[63] An important prerequisite, however, is that the arrangement or agreement contains confirmation and allocation of permitting responsibilities consistent with the provisions of the London Protocol and other applicable international law "such as customary international law of the sea, the United Nations Convention on the Law of the Sea and relevant regional agreements."[64]

It should be noted that depending on the export scenario, "there could be several countries involved, and therefore the agreement or arrangement would need to reflect the appropriate permitting responsibilities of each."[65] Interpreting this statement in the context of Article 6.2 and the purpose and objectives of the London Protocol, indicates that a situation in which CO_2 is transported from country A via country B to be stored in country C may require all three countries to be signatories to the agreement or arrangement in certain circumstances. The box below provides a fictional example:

FIGURE 6: EXPORT SCENARIO INVOLVING MULTIPLE COUNTRIES

[62] International Maritime Organization. *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013). Para 3.2. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025.

[63] I. Ombudstvedt, L. Østgaard, and 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), https://www.ogel.org/article.asp?key=4093.

[64] International Maritime Organization. *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013). Para 3.5. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025.

[65] International Maritime Organization. *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013). Article 3.5.1.2. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025.

5.2. State practice

Before examining the existing arrangements and arrangements under Article 6.2, it is important to clarify the distinction between a general instrument of collaboration (which can, for example, be a letter of intent, memorandum of cooperation (MoC), or MoU) and a London Protocol arrangement. Numerous MoUs, MoCs, and similar instruments have been concluded globally, expressing the intent of States to collaborate in the field of cross-border CCS, which may set the scene for a later arrangement or agreement under the London Protocol.[66] The terminology can be confusing, as one might mistake such a MoU for a London Protocol MoU. However, in all cases to date, Contracting Parties to the London Protocol have specified in their arrangements that they are concluded under Article 6.2, making it easy to differentiate and identify when an arrangement facilitates cross-border transport under the London Protocol.

5.2.1. Regional context

At the time of writing, the only arrangements and agreements concluded under Article 6.2 have been between Contracting Parties to the London Protocol in Europe.[67] This is notable when considering state practice and best practices for such instruments. Countries that are part of the EU and the EEA participate in a single market governed by the four freedoms: free movement of goods, people, services, and capital, effectively eliminating internal borders. EU laws apply to all Member States and, when deemed EEA relevant, are incorporated into the EEA Agreement to extend their application to the European Free Trade Association (EFTA) countries Norway, Iceland, and Liechtenstein. The EEA Agreement therefore "brings together the EU Member States and the three EEA EFTA States [...] in a single market".[68] While Switzerland is an EFTA state, it is not part of the EU or EEA. It does, however, have access to the EU single market through several bilateral agreements.[69]

For the purpose of CCS, the EU/EEA countries share a common legal framework that covers, inter alia, criteria for storage, permitting, emission trading, environmental protection and liability. Directive 2009/31[70] (CCS Directive) and Directive 2003/87[71] (ETS Directive) cover some of these issues. The CCS Directive established a legal framework for the environmentally safe geological storage of CO_2[72] and the ETS Directive established the Emission Trading System. Under the ETS cap and trade system, emission allowances do not need to be surrendered and paid for when CO_2 is transferred out of an installation for capture, transport, and geological storage pursuant to the CCS Directive within the EU/EEA, or utilised in such a way that they have become permanently chemically bound in a product.[73] The CCS and ETS Directives are agnostic in terms of offshore or

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[66] Such an example may be the Aalborg Declaration. https://www.kefm.dk/Media/638641513877792088/Aalborg%20declaration.pdf

[67] The EEA consists of the Member States of the EU and three countries of the EFTA states Iceland, Liechtenstein and Norway; excluding Switzerland.

[68] European Free Trade Association, "EEA & Relations with the EU," https://www.efta.int/eea (accessed April 30, 2025)

[69] European Free Trade Association, "Swiss/EU Agreement on statistics" https://www.efta.int/statistical-cooperation/statistical-cooperation/swisseu-agreement-statistics

[70] European Parliament and Council, *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 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006* (CCS Directive))

[71] CCS Directive; European Parliament and Council, *Directive (EU) 2023/959 of the European Parliament and of the Council of 10 May 2023 Amending Directive 2003/87/EC Establishing a System for Greenhouse Gas Emission Allowance Trading within the Union and Decision (EU) 2015/1814 Concerning the Establishment and Operation of a Market Stability Reserve for the Union Greenhouse Gas Emission Trading System* (ETS Directive).

[72] CCS Directive, Article 1(1).

[73] ETS Directive, Article 12

onshore storage, and whether the CO_2 is stored in the same country where it is captured, as long as the CO_2 is captured and stored within the EU/EEA. As Switzerland has linked its emission trading system to the EU ETS,[74] this would therefore also apply to Switzerland.

In this context, the European Commission observed in an analysis paper from 2022 that "[t]here is substantial alignment between the requirement of the London Protocol and the legal framework in place in the EEA for cross-border CCS between EU Member States and EEA countries." [75] The significance of the common European framework was interpreted by the European Commission to imply that the framework "can act as a relevant 'arrangement' between the Parties in the meaning of Art. 6(2) of the London Protocol."[76]

The EEA Agreement "and the incorporation of the two directives [i.e., the CCS and ETS Directives] concerned in the EEA legal regime provides the necessary arrangement with EEA partners."[77] The Commission expresses that

> Member States that are party to the London protocol could conclude additional bilateral arrangements with other EU Member States and EEA partner countries only on issues that are not covered by the directives. These additional bilateral arrangements should be strictly limited to the residual issues not covered by EU law and they should not refer to the subject matters covered by EU rules.

In this context, it is further stated

> The EU Member States parties to the London Protocol should notify the IMO, in accordance with the amended Article 6(2) of the Protocol, that EU law and, in particular Directive 2009/31 and Directive 2003/87, are part of the relevant arrangements for these exchanges between EU Member States, jointly with any additional bilateral arrangements concluded among MS [Member States] on matters not contemplated by the two EU directives. A similar notification must take place with respect to the EEA treaty as part of the relevant arrangement between EU Member States parties to the London Protocol and EEA countries[78]

From a public international law perspective, EU Member States that are also Contracting Parties to the London Protocol remain subject to distinct and parallel obligations under each regime. Transposition of the EU CCS Directive does not in itself guarantee compliance with the Protocol,

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[74] Council of the EU, 'Linking of Switzerland to the EU emissions trading system – entry into force 1 January 2020' (Press release, 9 December 2019) accessed 19.09.2025 https://www.consilium.europa.eu/en/press/press-releases/2019/12/09/linking-of-switzerland-to-the-eu-emissions-trading-system-entry-into-force-on-1-january-2020/

[75] European Commission, "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,'" September 30, 2022 , https://climate.ec.europa.eu/document/download/dfbbc90c-071e-4088-ada2-7af467084b30_en?filename=EU-London_Protocol_Analysis_paper_final0930.pdf&prefLang=lt.

[76] European Commission, "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,'" September 30, 2022, p. 26, https://climate.ec.europa.eu/document/download/dfbbc90c-071e-4088-ada2-7af467084b30_en?filename=EU-London_Protocol_Analysis_paper_final0930.pdf&prefLang=lt.

[77] European Commission, "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,'" September 30, 2022, https://climate.ec.europa.eu/document/download/dfbbc90c-071e-4088-ada2-7af467084b30_en?filename=EU-London_Protocol_Analysis_paper_final0930.pdf&prefLang=lt.

[78] European Commission, "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,'" September 30, 2022, p. 26, footnote 18. https://climate.ec.europa.eu/document/download/dfbbc90c-071e-4088-ada2-7af467084b30_en?filename=EU-London_Protocol_Analysis_paper_final0930.pdf&prefLang=lt.

nor does adherence to the Protocol necessarily satisfy EU requirements. While all the Member States have transposed the CCS Directive, having had a duty to do so, it does not necessarily mean that the Member States have developed robust mechanisms to regulate storage in practice. Such processes must be developed on a national basis, all of which can take time.[79]

The Commission has thus proposed an alternative approach to meeting Article 6.2, which is, as of yet, not legally binding on any of the EU Member States that are Contracting Parties to the London Protocol. More steps may need to be taken before it potentially becomes effective and binding. The Commission is working on a regulatory package for CO_2 transportation, which will, among other things, consider issues including market and cost structure, cross-border integration and planning, technical harmonisation, and third-party access, etc.[80] With cross-border integration and planning on the agenda, it will be important to monitor any developments related to bilateral arrangements and agreements under this regulatory framework.[81]

5.2.2. Existing arrangements and agreements

The world's first arrangement concluded under Article 6.2 was between Denmark and Belgium in September 2022.[82] The arrangement is a MoU (DK-BE MoU) and is relatively short, containing only five Sections: 1) Scope, 2) Allocation of permits, 3) Arrangements of the Participants, 4) Amendment procedures and mutual understanding, and 5) Final Provisions. This arrangement enabled the demonstration project Greensand. The first injection of Belgian CO_2 on the Danish continental shelf was 08 March 2023, marking the world's first cross-border offshore CO_2 storage[83] The London Protocol does not require separate arrangements or agreements per project. As such, the MoU would facilitate future commercial phases of Greensand or other cross-border CCS projects between the two countries.

Section 2 makes it clear that "the Participants recognize that all necessary permit responsibilities will be allocated to the relevant authorities of each Participant's country in accordance with the London Protocol" and provides a non-exhaustive list of relevant permitting authorities. This appears to satisfy the Article 6.2 requirements for confirmation and allocation of permitting responsibilities. Thus, the Article 6.2 requirements are seemingly easy to satisfy.

In June 2023, Belgium and the Netherlands also concluded an MoU under Article 6.2 (BE-NL MoU). While there are some small differences between the BE-NL and DK-BE MoUs,[84] the MoUs are overall highly similar with respect to structure, language and content. Further, a MoU was concluded between Denmark and the Netherlands (DK-NL MoU) on the 16th of October 2023. The

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[79] L. Østgaard and I. Ombudstvedt, "Regulatory Frameworks for Cross-border Transportation and Offshore Storage of CO2 in Europe" (November 6, 2023), available at SSRN: https://ssrn.com/abstract=4624764 or http://dx.doi.org/10.2139/ssrn.4624764.

[80] "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." European Commission, *Industrial Carbon Management Strategy,* Strasbourg, February 6, 2024, COM(2024) 62 final, p. 10, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52024DC0062.

[81] The framework is expected to be completed in 2026.

[82] Belgium and Denmark, *Memorandum of Understanding between Belgium and Denmark,* https://www.kefm.dk/Media/638000596525014193/Bilateral%20arrangement%20DK-BE.pdf. Note: A new MoU was notified in 2023, which supersedes the MoU from 2022.

[83] Greensand Future, "INEOS Led Greensand to Become the First Full Scale CO2 Storage Facility in EU to Help Mitigate Climate Change," October 12, 2024, https://greensandfuture.com/news/ineos-led-greensand-to-become-the-first-full-scale-co2-storage-facility-in-eu-to.

[84] For example, Section 5 of the DK-BE MoU provides for termination by either party giving 12 months written notice, whereas the BE-NL Section 5 provides for 3 months prior written notice.

DK-NL MoU shares the same structure and comprises the same sections as the aforementioned MoUs, with some adjustments.

The similarities between these MoUs suggest that their contents and scope are viewed as good practice by the participating States, indicating the emergence of a 'standard' arrangement format for cross-border transportation of CO_2 under Article 6.2 in Europe.[85] The implication of having such a format is that future cross-border projects that require an arrangement under the London Protocol could be streamlined. Contracting Parties using this format could save time drafting a new arrangement and adjust the scope and sections as needed.[86] However, whether MoUs remain the preferred approach going forward, given the complexity of issues such as liabilities and monitoring, reporting, and verification (MRV), remains to be seen.

France and Denmark also concluded an MoU for the purpose of Article 6.2 in March 2024 (FR-DK MoU). This MoU is also very similar to the BE-NL, DK-NL, and DK-BE MoUs, which supports the argument made above that the existing MoUs are considered good practice – at least in Europe. On 15 April 2024, Norway concluded MoUs with Sweden, Belgium, the Netherlands, and Denmark.[87] Sweden and Denmark also entered into an MoU on the same date.[88] These MoUs are overall highly similar to the aforementioned MoUs, but with some important new additions. In all the new MoUs concluded in April, a new Section 3 on *Reporting of CO_2 in National Greenhouse Gas Inventories* has been included. Moreover, the MoUs also set out a more detailed preamble, accounting for relevant international and regional conventions and instruments to which the Parties are bound. Finally, these MoUs refer to Annex 2 of the Protocol and provide that the participants will notify the IMO of the MoU. Highlighting compliance with Annex 2 and the notification requirement, which may otherwise have simply been implied in the previous MoUs, are important points of clarification in terms of compliance with the Protocol and the 2009 amendment. Norway also concluded an arrangement with France on 23 June 2025 (NO-FR) and Finland on 4 September 2025, which follows the same structure and content as the ones concluded in April 2024. A distinction with the NO-FR arrangement is that it is referred to as an "administrative arrangement" as opposed to an MoU. Most recently, Finland also concluded an MoU with Denmark on 5 September 2025.[89] Based on the existing arrangements, the Contracting Parties are leaving several topics and issues to be addressed in commercial contracts.

State practice is still under development and may be subject to changes in the years to come. Being the first of their kind, these arrangements are likely to evolve, as countries revise existing arrangements or establish new ones in response to emerging insights and best practices. Thus, this is an evolving area of law where best practices are yet to be fully established and cemented.

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[85] I. Ombudstvedt, L. Østgaard, and 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): 10, https://www.ogel.org/article.asp?key=4093.

[86] Honegger, M., Oh, S., Schmitt, F., Poralla, M., Ombudstvedt, I., Ostgaard, L., Viguier, R., Palfi, E., Bell, R., Evensen, D., Chalmers, H., Karimi, F., and Dahlberg, U. "Making CCU and CCS Hubs and Clusters Happen: Overcoming Non-Technical Challenges," *Perspectives Climate Research* on behalf of the CCUS ZEN Project (Freiburg i.B., Germany, January 2024), p. 39, https://doi.org/10.5281/zenodo.14393506.

[87] Norwegian Ministry of Energy, "Five Northern European Countries Conclude International Arrangements on Transport and Storage of Carbon Across Borders," April 18, 2024, https://www.regjeringen.no/no/aktuelt/five-northern-european-countries-conclude-international-arrange-ments-on-transport-and-storage-of-carbon-across-borders/id3035286/.

[88] Norwegian Ministry of Energy, "Five Northern European Countries Conclude International Arrangements on Transport and Storage of Carbon Across Borders," April 18, 2024, https://www.regjeringen.no/no/aktuelt/five-northern-european-countries-conclude-international-arrange-ments-on-transport-and-storage-of-carbon-across-borders/id3035286/.

[89] This arrangement differs from the ones concluded with Norway and Sweden in that there is no section on Reporting CO_2 in National GHG inventories.

Indeed, a noteworthy recent development is the conclusion of an agreement between Switzerland and Norway, signed on 17 June 2025. This is both an agreement in the sense of Article 6.2 of the London Protocol and a cooperation agreement for the purpose of Article 6 of the Paris Agreement. [90] The agreement thus establishes a framework for the transfer of mitigation outcomes between Switzerland and Norway under Article 6 of the Paris Agreement representing carbon dioxide removal (CDR) with permanent storage of CO_2. [91] It establishes that the Internationally Transferred Mitigation Outcomes can be used towards nationally determined contributions (NDCs) achievement or for Other International Mitigation Purposes.[92] It contains important provisions on, inter alia, monitoring, verification and examination, as well as reporting and accounting under the Paris Agreement. This agreement marks a pioneering step, making use of existing mechanisms under the Paris Agreement in the CCS and CDR space while meeting the requirements of the London Protocol. It may set an important example for other countries to follow and learn from.

5.3. Guidance for national authorities

All the examples of Article 6.2 arrangements and agreements discussed in Chapter 5.2.2 are between Contracting Parties to the London Protocol and European countries. While there are several ongoing discussions between both Contracting Parties and non-Contracting Parties on cross-border CCS projects, no Article 6.2 arrangement or agreement between a Contracting Party exporting to a non-Contracting Party has been developed to date.

This chapter will consider two scenarios: i) export and import between two Contracting Parties, and ii) between a Contracting Party and a non-Contracting Party, where the CO_2 is stored in the sub-seabed of a non-Contracting Party. It will further consider what other elements may be considered in these instruments, going beyond the minimum criteria of Article 6.2. There may not be a one-size-fits-all for arrangements and agreements globally, as there will be country- or region-specific particularities that may need to be accounted for in these instruments.

5.3.1. Contracting Party to Contracting Party

Article 6.2 provides that the arrangement or agreement shall contain confirmation and allocation of the permitting responsibilities between the exporting and receiving countries, consistent with the provisions of the Protocol and other applicable international law. In all cases to date, these criteria have been satisfied by the inclusion of a provision to this effect, providing an overview of the relevant authorities and permits for each of the countries.

Contracting Parties are required to adhere to Annex 2, and Article 6.2 does not draw up criteria for the Contracting Parties to demonstrate in the agreement or arrangement how they will ensure compliance with Annex 2 to the Protocol. However, the Guidance on the implementation of Article 6.2 highlights that the export of CO_2 is transaction-based, such that “the considerations on allocation of responsibility and sharing of information, and on the documentation in an agreement or arrangement of how each element of annex 2 will be complied with are also

[90] Paris Agreement to the United Nations Framework Convention on Climate Change, Dec. 12, 2015, T.I.A.S. No. 16-1104.
[91] Agreement between the Kingdom of Norway and the Swiss Confederation on cross-border cooperation on Carbon Capture, Utilisation and Storage and Carbon Dioxide (17 June 2025) Article 3.
[92] Ibid.

relevant" [93] between two Contracting Parties. Thus, some of the guidance drawn up 5.3.2 regarding export from a Contracting Party to a non-Contracting Party may be relevant.

Ensuring a streamlined cross-border effort on aspects such as monitoring and reporting may become increasingly important moving forward, with the need to satisfy, e.g., NDCs under the Paris Agreement while having emerging financial incentives for CCS through various carbon markets, taxes, and credit mechanisms, many of which come with distinct criteria for monitoring, reporting, and verification (MRV). The growing potential for carbon removals, as well as the increased recognition of hubs and clusters involving multiple emission sources of different industries and national origins may further emphasise that arrangements or agreements between Contracting Parties may benefit from addressing some of the aforementioned issues to enable and streamline full-scale cross-border CCS. It should be noted that these issues go beyond the minimum requirement of the London Protocol, and could therefore also be handled under other international instruments, such as the Paris Agreement framework and the United Nations Framework Convention on Climate Change regime. However, as demonstrated by Norway and Switzerland, these issues can indeed be addressed in a single instrument – one that meets the London Protocol requirements and also establishes a cooperation agreement under Article 6 of the Paris Agreement.

FIGURE 7: RELATIONSHIP BETWEEN THE LONDON PROTOCOL AND THE PARIS AGREEMENT

Relationship between the London Protocol and the Paris Agreement

The London Protocol and the Paris Agreement exist as individual frameworks. While the Paris Agreement aims primarily to strengthen the global response to the threat of climate change, the London Protocol aims to protect and preserve the marine environment from pollution. However, the preamble of the 2006 amendment indicates that climate change is one of the reasons for allowing the storage of CO_2 in sub-seabed geological formations. This goal is reiterated in the 2009 amendment, which also underlines the need to deploy CCS to achieve the Paris Agreement's climate targets.

In this particular field, the London Protocol, specifically the 2009 amendment, can be a vehicle to achieve climate targets set by the Paris Agreement by supporting and facilitating the trading mechanisms under the Paris Agreement by enabling cross-border transport. On the other side, the Paris Agreement by establishing climate goals, makes it more attractive for countries to engage in CCS, which in turn might trigger the application of the transport and storage provisions of the Protocol for more countries.

Thus, in addition to the minimum criteria in Article 6.2, several other issues may be considered for inclusion in an agreement or arrangement, though this is not strictly needed for compliance. Such issues include: reporting CO_2 in national GHG inventories; any existing carbon

[93] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration,* LC 35/15, Annex 1, 2013. In Export to non-Contracting Parties (article 6.2.2.2), 3.6.3. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025.

markets/pricing schemes that the parties participate in and associated MRV and certification for meeting the requirements of that market or scheme; liabilities; and consequences in cases of failure to comply.

The term 'liability' is broad and can encompass a variety of distinct liabilities. According to a report published by the CCS Institute,[94] these liabilities may broadly be divided into civil liability, administrative and environmental liability, and GHG emissions liability for CCS. We refer the reader to that report for further reading on the scope and applicability of these liabilities, to avoid duplication. Asia Natural Gas & Energy Association (ANGEA) has also conducted a study[95] providing recommendations for bilateral and commercial agreements for cross-border CCS in Asia Pacific. Two main elements are considered: emission reduction certification and cross-border operations. Recommendations for agreement on ownership rights to the emission reductions and regulatory jurisdiction during CO_2 transportation and associated liabilities are provided. Among other things, it provides options for rights to emission reductions to be claimed towards NDCs and options for handover of emission accountability, as well as responsibilities of project parties and countries in case of leakages.

It is stated that "APAC countries [...] do not have common regional regulatory framework, standards, emissions accounting rules, or financial mechanisms to encourage cross-border CCS"[96] which underscores the authors' earlier observations on state practice within the EU/EEA, which need to be kept in mind when defining best practices and assessing potential for replication in other regions. ANGEA highlights key issues that, while not specific to any one framework, could help inform the development of arrangements or agreements under the London Protocol, also in other regions. The authors refer to the ANGEA report for further information on these issues.

5.3.1.1 Case studies (Contracting Parties – Contracting Parties)[97]

This sub-chapter provides two case studies of CCS value-chains between 1) Japan (export) and Australia (import), and 2) Spain (export) and Egypt (import). These countries were selected due to their different geographical locations, which may prompt different considerations. For instance, export from an EU Member State to a non-EU country and the applicability/limitations of the EU framework. The case studies comprise a selection of relevant issues for consideration; the lists are by no means exhaustive. Some also go beyond the minimum requirements of the Protocol, while others are also otherwise implied through national implementation. The majority of the proposed sections can be replicated in both scenarios. It should be noted that Australia and Spain are, as of September 2025, the only countries that have accepted the 2009 amendment and deposited a declaration of provisional application. Japan and Egypt have not accepted the 2009 amendment or deposited a declaration of provisional application. Thus, they cannot engage in cross-border transport of CO_2 until they have deposited a declaration of provisional

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[94] Ian Havercroft, *Thought Leadership: Lessons and Perceptions: Adopting a Commercial Approach to CCS Liability* (2019; Global CCS Institute), Table 2: Forms of legal liability for CCS operations, https://www.globalccsinstitute.com/wp-content/uploads/2019/08/Adopting-a-Commercial-Appraoch-to-CCS-Liability_Thought-Leadership_August-2019.pdf.

[95] Asia Natural Gas & Energy Association (ANGEA), *Accelerating Cross-Border CCS in Asia Pacific – Recommendations for Bilateral and Commercial Agreements* (2024), https://angeassociation.com/wp-content/uploads/2024/12/ANGEA-Cross-border-CCS-Study_final1.pdf.

[96] Asia Natural Gas & Energy Association (ANGEA), Cross-border CCS study, Q&A 'Why was this study requires?' https://angeassociation.com/policy-areas/cross-border-carbon-study/

[97] The following are assumptions made by the authors and may not accurately reflect the identities or roles of the individuals involved. They are included solely to illustrate that multiple levels of governance may be engaged. The case study also does not list all necessary permits.

application. Moreover, Egypt does not have a legal framework for CCS in place. Thus, irrespective of Egypt's status as a Contracting Party, exporting to Egypt for offshore storage may be challenging. These are intended as theoretical exercises.

FIGURE 8: CASE STUDY CONTRACTING PARTY TO CONTRACTING PARTY

Japan (export) and Australia (import)	Spain (export) and Egypt (import)
Preamble Recognising relevant international or regional instruments to which the parties are bound.	
This could be, if relevant, instruments such as Japan–Australia Partnership on Decarbonisation through Technology from 2021, which establishes a bilateral framework for the development and deployment of, inter alia, CCS.[98]	This could be, if relevant, instruments such as the 1995 Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean, and its 1976 Dumping Protocol, to which both Egypt and Spain are Parties. The Convention and the Dumping Protocol have provisions relevant to CCS,[99] which may require additional considerations.
Scope Confirmation that the instrument is an arrangement or agreement in the sense of Article 6.2 of the London Protocol, as amended by Resolution LP .3(4) Further confirmation may be desired underlining that the arrangement/agreement applies to cross-border transportation of CO_2 between the territories of the Participants with the purpose of permanent geological storage.	
Allocation of permits Confirmation that necessary permitting procedures for the activities are in place and the permits can be granted by the competent authorities of the Participants to safeguard the provisions of the London Protocol Annex 2, and other applicable international law. Identification and summary of relevant national permitting authorities for each country and contact details.	
Japan may have permitting responsibilities related to CO_2 capture, whereas Australia, the importer, may have those related to storage. In Japan, national authorities, as well as local governments, and e.g., the prefectural	Spain may have permitting responsibilities related to CO_2 capture, whereas Egypt, the importer, may have those related to storage.

[98] Australian Government, "Australia's International Climate and Clean Energy Partnerships," last updated February 20, 2025, https://www.dcceew.gov.au/climate-change/international-climate-action/international-partnerships#japan (accessed April 29, 2025).
[99] Lena Østgaard and Ingvild Ombudstvedt, Regulatory Frameworks for Cross-border Transportation and Offshore Storage of CO2 in Europe (November 2023), https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4624764

governor or city mayors, may need to be included in the process depending on the location and age of the emissions facilities and the infrastructure needed.[100] The Australian system of government grants both "the Commonwealth and state governments jurisdiction to regulate Carbon Capture and Storage activities."[101] The Commonwealth Government is responsible for offshore activities greater than three nautical miles from the mainland, whereas activities conducted within three nautical miles remain the responsibility of the respective territory or state.[102]	In Spain, the comunidades autónomas[103] have legislative and enforcement powers, such that they may both develop and enforce their own environmental legislation.[104] Thus, which comunidades autónomas is the origin of the emissions may impact the permitting authorities being identified and included in the bilateral negotiations and agreement or arrangement. In Egypt, there is currently no comprehensive framework to store CO_2 offshore. The authors refrain from speculating which agencies would ultimately be involved.
Reporting of CO_2 in National Greenhouse Gas Inventories The national GHG inventories and reporting of cross-border value chains depend on identifying the rights to emission reductions, which may be defined within both the bilateral and commercial agreements. The Participants to report in their national GHG inventories and other relevant submissions to the UNFCCC in accordance with the 2006 IPCC Guidelines, and further refinements or iterations for the reporting in the national greenhouse gas inventories as agreed under the UNFCCC or additional guidance established by the IPCC.	
Potential bilateral treatment of carbon credits, ETS and other policy incentives for CCS Carbon markets and policies do not necessarily mirror the inventories or NDCs. To prevent any double claiming or issuance of credits by multiple parties, the instrument could recognise the existence of national carbon credit systems or schemes, and potential criteria for eligibility cross-border CCS. This section may depend on the existence of previous bilateral agreements or policies between States relating to such instruments or markets.	

[100] Enrico Botta and Sho Yamasaki, Policies, regulatory framework and enforcement for air quality management: the case of Japan – environmental working paper N°156 (2020) https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/03/policies-regulatory-framework-and-enforcement-for-air-quality-management-the-case-of-japan_147e781b/b2de0bc1-en.pdf, c.f. Ministry of Land, Infrastructure, Transport, and Tourism, List of Permit Administration Agencies, https://www.mlit.go.jp/sogoseisaku/1_6_hf_000043.html

[101] Global CCS Institute, 'Carbon Capture and Storage Hub Study' (Alex Zapantis, prepared for the Government of the Northern Territory of Australia, November 2020) 18.; Environmental Protection (Sea Dumping) Act 1981; the Offshore Petroleum and Greenhouse Gas Storage Act (in the process of being amended, see https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=s1346 (25.11.22).

[102] Patricia Larkin, William Leiss and Daniel Krewski, 'Risk Assessment and management frameworks for carbon capture and geological storage: a global perspective' (Int. J. Risk Assessment and Management, Vol. 22, Nos. 3/4, 2019) 2.2.

[103] local autonomous regions

[104] Clifford Chance, Q&A on Environmental Law in Spain, https://www.cliffordchance.com/content/dam/cliffordchance/briefings/2012/12/qa-on-environmental-law-in-spain.pdf

Currently, there is no joint carbon market or scheme for Japan and Australia. Until such joint market is agreed or developed, the agreement or arrangement could potentially refer to volunteer market mechanisms if relevant.[105]	Spain is subject to the EU ETS. Under the ETS, companies are not required to surrender allowances for fossil CO_2 transferred out of an installation for capture, transport, and geological storage under the CCS Directive, creating a clear incentive to capture and store CO_2. The CCS Directive pertains to storage in the EU/EEA only; thus, storage in Egypt would fall outside the scope of the CCS Directive. It follows from this that the conditions in the ETS cannot be met, as the CO_2 has to be stored in a storage site permitted under that Directive. As such, the Spanish emitter would have to surrender allowances for that CO_2. However, Spain may potentially facilitate financial incentives for a value chain outside the ETS through other means.
MRV Details pertaining to permitting requirements for MRV pursuant to the Specific Guidelines Section 8.[106] An international technical standard, such as ISO 27914 Carbon dioxide capture, transportation and geological storage — Geological storage, may be referenced as a benchmark.	
Exchange of information The parties may want to include a provision on exchange of information and reporting intervals relating to the issuance of permits, GHG inventories, administrative and compliance procedures, etc.	
Amendment procedures and mutual understanding Parties may wish to agree on intervals to convene to evaluate the arrangement or agreement.	
Dispute resolution and failure to comply Options in case there is a failure by one of the parties to adhere to the terms.	
Final provisions This may include details related to the arrangement or agreement's entry into force and termination. It may also include confirmation that the participants will notify the IMO of the arrangement or agreement.	

[105] The JCM may be relevant in this regard: Joint Crediting Mechanism (JCM), "Overview of the Joint Crediting Mechanism (JCM)," accessed April 29, 2025, https://gec.jp/jcm/about/.

[106] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2, 2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf.

5.3.2. Contracting Party to non-Contracting Party

The obligations set out in the London Protocol cannot be imposed on the non-Contracting Party directly.[107] However, if a non-Contracting Party intends to receive CO_2 from a Contracting Party, it will indirectly be subject to aspects of the Protocol, such as having a framework for offshore CCS that aligns with the Protocol, ensured through the arrangement or agreement with the Contracting Party. Otherwise, the Contracting Party will not be in compliance with Article 6.2. It is the Contracting Party who must ensure that the arrangement or agreement includes provisions that, at a minimum, are equivalent to those set out in the London Protocol, including those pertaining to the issuance of permits and permit conditions in compliance with Annex 2.[108]

This requirement ensures that the provisions and standards set out in the Protocol are always met by its Contracting Parties, so they may not export CO_2 for storage into a jurisdiction with little or no framework for CCS. The London Protocol does not dictate how the due diligence should be executed. The result, however, must be that the Contracting Party is satisfied that the non-Contracting Party has a framework in place that offers the same level of environmental protection as the London Protocol, and that relevant permits are issued. The agreement or arrangement functions as a tool in and a result of the due diligence process.

The requirement that the arrangement or agreement needs to include provisions that, at a minimum are equivalent to those set out in the Protocol is an important distinction from the agreements and arrangements between two Contracting Parties. Given the focus of Article 6.2 to "ensure that the agreement or arrangement does not derogate from the obligations of Contracting Parties under this Protocol", the requirement to include provisions equivalent to the London Protocol indicates a literal interpretation such that the instrument should contain language as to how the receiving country intends to meet the obligations. In the Guidance on the implementation of Article 6.2, it is indicated that the term *"equivalent"* could be interpreted to imply "equal or corresponding import, meaning, or significance: chiefly of words and expressions."[109] The Guidance on the implementation of Article 6.2 provides details on articles in the London Protocol that are relevant for the agreement or arrangement to ensure compliance. The focus is on articles 4, 9.2. and 9.3 on permitting,[110] which feeds into a recommendation to include provisions on:

1. An obligation to subject the storage activities to permits or authorisation from the State
2. Requirements for the receiving State to adopt measures in their permitting procedures to ensure compliance with Annex 2
3. Considerations related to the avoidance of dumping, and the CO_2 streams composition

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[107] General principle of international law. See VCLT 1155 UNTS 331, Article 34.

[108] International Maritime Organization, *Resolution LP.3(4) on the Amendment to Article 6 of the London Protocol* (2009), preambular para. 11.

[109] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration,* LC 35/15, Annex 1, 2013, – Export to non-Contracting Parties (article 6.2.2.2), https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025. Section 5.14.1.

[110] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration,* LC 35/15, Annex 1, 2013, – Export to non-Contracting Parties (article 6.2.2.2), https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025. Section 5.15

4. Potential additional criteria, also focusing on the CO_2 stream composition.[111]

It is further indicated that each element of Annex 2 should be addressed when drafting the provisions. The CO_2 Sequestration Guidelines[112] may be used to aid the process. Thus, in addition to the generic issues addressed for the Contracting Party to Contracting Party scenario, the agreement or arrangement would benefit from explicitly addressing issues such as those described in the table below.

TABLE 1: ANNEX 2 ISSUES TO BE ADDRESSED

CO_2 stream criteria and characterisation	Annex 1 determines that only streams overwhelmingly consisting of CO_2 are eligible for storage and that "no wastes or other matter" may be added for dumping purposes.[113] The CO_2 Sequestration Guidelines can support the CO_2 stream characterisation.[114] However, the wording of the agreement or arrangement may be relatively brief to meet the "equivalent" requirement for the CO_2 stream composition, and the Guidelines may potentially be used by the receiving country for the internal legislative and permitting process to ensure the private stakeholders are supported in their endeavours pursuant to the Protocol criteria. In this provision, it would be appropriate to include language pertaining to the exporting country's responsibility to ensure the CO_2 delivered is compliant upon delivery, and the receiving country's right and authority to order a stop in the importing activities if the CO_2 stream delivered is not compliant with the agreement or arrangement. In this instance, there may be a breach of arrangement or agreement. There should be a separate section covering this situation. Consequently, the receiving country should, based on the requirements related to the CO_2 stream, implement a monitoring and compliance regime under which the CO_2 is characterised and continuously monitored after receiving the volumes. An additional element worth considering for the Contracting Party is ensuring in the agreement or arrangement that the receiving country safeguards that nothing is added to the CO_2 streams stemming from the Contracting Party, either in terms of commingling it with non-compliant CO_2 or by using the CO_2 stream as a carrier for wastes or other matter the receiving country wants to dump.

[111] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration,* LC 35/15, Annex 1, 2013, – Export to non-Contracting Parties (article 6.2.2.2), Section 5.16. https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx. Accessed April 30, 2025. Section 5.15

[112] Also referred to as Specific guidance in the table below

[113] London Protocol, Annex 1, Article 4.

[114] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2, 2012, Section 4.18-4.19.

Site selection and characterisation	Ensuring that the CO_2 is retained safely in the geological formation is crucial.[115] Annex 2 contains requirements relating to the documentation of the physical, chemical, and biological characteristics of the storage site (dump site).[116] The Contracting Party needs to "assure itself that the provisions of section 6 of the Specific Guidelines of selection and assessment of a storage site are reflected in the agreement or arrangement".[117] The Specific Guidelines section 6 contains provisions on this issue as required in Article 11 of Annex 2 and elaborates on characterisation of both the geological formation itself and what elements need to be considered and characterised to ensure an appropriate site selection.[118] The Specific Guidelines further provide criteria for characterisation of the surrounding marine environment,[119] potential exposure to organisms of the CO_2 if leaked, and leakage pathways.[120] The Contracting Party is advised against exporting CO_2 to a non-Contracting Party unless it is sufficiently ensured that the receiving country has a sufficiently rigorous site selection process. This assurance may be established through the agreement or arrangement, confirming compliance with the requirements of Section 6. Appendix 1 of 'Risk Assessment and Management Framework for CO_2 Sequestration in Sub-seabed Geological Structures (RAMF)' contains a list of information for site selection and characterisation,[121] which may be included by reference as criteria for these activities. Requirements for third-party audit may be considered.
Potential effects (Impact assessment)	Annex 2 requires that the "potential effects on human health, living resources, amenities and other legitimate uses of the sea" are considered for dumping activities, and there is guidance on how to approach risk assessment and

[115] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2, 2012, Section 6.1.

[116] London Protocol, Annex 2, Article 11.

[117] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013), accessed April 30, 2025, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx, section 5.22.

[118] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013), accessed April 30, 2025, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx, section 6.2

[119] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013), accessed April 30,
2025, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx, section 6.3

[120] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2,
2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf.

[121]International Maritime Organization, *Risk Assessment and Management Framework for CO2 Sequestration in Sub-Seabed Geological Structures (CS-SSGS)* (Source LC/SG-CO2 1/7, Annex
3), https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/CO2SEQUESTRATIONRAMF2006.doc

	management, which includes impact assessment activities, both in Annex 2[122] and in the Specific Guidelines.[123] The data and assessments coming out of the characterisation activities referred to above in this table will feed into this. A Contracting Party needs to ensure itself that an assessment of the potential effects of the activities is made prior to exporting the CO_2 to a non-Contracting Party. Section 7 of the Specific Guidelines should be taken into consideration to reflect the mandatory assessment when drafting the agreement or arrangement.[124] Section 7 covers a more detailed assessment of effects relating to potential leakages from transportation and storage activities,[125] and reference is made to RAMF for more details and guidance.[126] The Specific Guidelines further elaborate on requirements for the risk assessment, assessing the likelihood of exposure and the effect of these occurring over time and at different phases of the project.[127] Finally, the Specific Guidelines draw up requirements for an Impact Hypothesis, pulling together the data from the characterisation activities for both the CO_2 stream and storage site, and the effects assessment as a foundation for a decision to grant or deny a permit and to establish monitoring programs.
Monitoring and mitigation	Annex 2 requires compliance monitoring and field monitoring to ensure permitting obligations are met and that the storage site behaves according to the assumptions made during the site selection and characterisation process.[128] As such, a

[122] Annex 2, articles 12-15

[123] Specific guidelines for the assessment of carbon dioxide streams for disposal into sub-seabed geological formations, Part 4.2.35-4.2.49

[124] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013), accessed April 30,
2025, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx, section 5.23
International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2,
2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf, section 7.2 et seq.

[126] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2,
2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf, section 7.6

[127] International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2,
2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf, section 7.7 et seq.

[128] Specific guidelines for the assessment of carbon dioxide streams for disposal into sub-seabed geological formations, Part 8 https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf International Maritime Organization, *Specific Guidelines for the Assessment of Carbon Dioxide for Disposal into Sub-Seabed Geological Formations,* LC 34/15, Annex 8, adopted November 2,
2012, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf.Specific guidelines for the assessment of carbon

	Contracting Party needs to ensure that the receiving non-Contracting Party complies. The Specific Guidelines have separate provisions (Section 8) on this, which the Contracting Party is advised to take into consideration when drafting.
Permit and permit conditions	Annex 2 further requires that the activities shall be subject to permits or national approval and that the permits provide conditions for the CO_2 stream, the geological formation intended for the storage site, the injection method, and monitoring and reporting requirements. This ensures that the mandated framework for characterisation, site selection, effects assessment, and monitoring is imposed on the private parties conducting the activities. The Contracting Party may potentially request the right to see the permits issued. Generally, the exchange of such information is helpful for reporting purposes.
Non-compliance	Rights and obligations relating to a situation of non-compliance (this is explored more in the text below).

Inclusion of the above and a description of how the receiving country will comply with these would contribute to the avoidance of misinterpretations and further assist the due diligence process.[129] It would not be practical to include all the language in all of the guidelines and provisions in an agreement or arrangement, as some of these more detailed provisions may be included by reference or annexes either as it is or as implemented into national frameworks, as long as the provisions in the agreement or arrangement may be said to be "equivalent" to the provisions of the Protocol.

The instrument may also explicitly provide that the non-Contracting Party has a regulatory framework in place that aligns with the Protocol and include a clause whereby the non-Contracting Party agrees to store the CO_2 according to the provisions of the Protocol.

A legally binding agreement (such as a treaty) may be used, in which failure to comply with the Protocol (the articles imposing this) could be met with a series of reactions under international law, as this could constitute a treaty breach.[130][131] Naturally, it is more advantageous and preferable, and indeed likely, for such issues to be resolved through dialogue before resorting to these alternatives. A section on dispute resolution and failure to comply is recommended.

A non-binding instrument could equally be used, and it will be important to include provisions on situations of non-compliance with the terms of the arrangement. An arrangement that explicitly underlines that it is not a treaty excludes the possibility of responding via the Vienna Convention

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dioxide streams for disposal into sub-seabed geological formations, Part 8
https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf

[129] As the recipient country would have to provide information for the drafting regarding the content of the framework, how it is implemented, and what checks and balances are in place to ensure the sub-seabed geological storage.

[130] Such responses include the suspension or termination of treaties under the law of treaties (VCLT). See: B. Simma and C.J. Tams, "Reacting against Treaty Breaches," in *The Oxford Guide to Treaties*, 2nd ed. Duncan B. Hollis (Oxford: Oxford University Press, 2020), 568-94.

[131] A subsequent breach of a term would not lead to a situation of non-compliance with the London Protocol for the Contracting Party, but rather be a matter of breach between the two states. This is because the arrangement or agreement, on the face of it, satisfied the Article 6.2 requirements upon its conclusion. The Contracting Party has complied with its obligation under Article 6.2.

on the Law of Treaties (VCLT). However, the States are still free to include a provision pertaining to, for example, the right to suspend or terminate the export and/or arrangement following a breach, but this will not be governed by the VCLT. Also here is a section on dispute resolution recommended.

This is consistent with the Guidance on Article 6.2 which provides that "[i]n case of a breach of an agreement or arrangement by a non-Contracting Party, the Contracting Party should engage in consultations to rectify any such breach and to consider whether the agreement or arrangement should be terminated."[132] Moreover, "[i]n the case of a significant ongoing breach by the non-Contracting Party, the Contracting Party should terminate the export."[133]

5.3.2.1 Case studies (Contracting Parties – non-Contracting Parties)[134]

There are other elements outside the minimum requirements of the London Protocol that may be considered for inclusion in the arrangement or agreement. The elements considered in the Contracting Party to Contracting Party scenario in Section 5.3.1 above will also apply in this instance, such as reporting of CO_2 in national GHG inventories, and the existence of potential trading and credit schemes.

Australia and Canada are Contracting Parties to the Protocol, and Timor-Leste and the U.S. are not. Australia has indicated that it intends to develop strategies for engaging with non-Contracting Parties.[135]

It is important to note that the following are example provisions that could be relevant in scenarios where CO_2 is exported from a Contracting Party to a non-Contracting Party. These examples are illustrative rather than exhaustive. Also here are the countries selected to account for different regions and particularities.

FIGURE 9: CASE STUDY CONTRACTING PARTY TO NON-CONTRACTING PARTY

Australia (export) and Timor-Leste (import)	Canada (export) and U.S. (import)
Preamble Recognising relevant international or regional instruments to which the parties are bound.	
This could be instruments such as the 2018 Treaty Between Australia and the Democratic	This could be instruments such as the Memorandum between the Department of

[132] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013), accessed April 30, 2025, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx, Section 3.6.2.4.

[133] International Maritime Organization, *Guidance on the Implementation of Article 6.2 on the Export of CO2 Streams for Disposal in Sub-Seabed Geological Formations for the Purpose of Sequestration* (LC 35/15, Annex 1, 2013), accessed April 30, 2025, https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/Rev%20Guidance%20for%20National%20Implementation_as%20approved%20by%20gov%20bodies%202017.docx, section 3.6.2.4.

[134] The following are assumptions made by the authors and may not accurately reflect the identities or roles of the individuals involved. They are included solely

[135] International Maritime Organization (IMO). *CO2 Sequestration in Sub-Seabed Geological Formations: Report of the Correspondence Group on Experiences with the Carbon Dioxide Streams Assessment Guidelines*. LC46/6, July 26, 2024. Page 14. Sharing these strategies with stakeholders and other Contracting Parties would provide valuable opportunities to disseminate insights

Republic of Timor-Leste Establishing their Maritime Boundaries in the Timor Sea[136], if relevant.	Natural Resources of Canada and the Department of Energy of the United States of America Concerning Cooperation on Energy,[137] if relevant.
Scope Confirmation that the instrument is an arrangement or agreement in the sense of Article 6.2 of the London Protocol, as amended by Resolution LP .3(4)	
Further confirmation may be desired underlining that the arrangement/agreement applies to cross-border transportation of CO_2 between the territories of the Participants with the purpose of permanent geological storage in Timor-Leste, a non-Contracting Party to the Protocol.	Further confirmation may be desired underlining that the arrangement/agreement applies to cross-border transportation of CO_2 between the territories of the Participants with the purpose of permanent geological storage in the U.S., a non-Contracting Party to the Protocol.
Confirmation A section may be included in which the non-Contracting Party accepts that the CO_2 will be stored according to the provisions of the Protocol.	
Allocation of permits Confirmation that necessary permitting procedures for the activities are in place and the permits can be granted by the competent authorities of the Participants to safeguard the provisions of the London Protocol Annex 2, and other applicable international law. It may be underlined that the permits shall provide conditions for the CO_2 stream, the geological formation intended for the storage site, the injection method, and monitoring and reporting requirements. This ensures that the mandated framework for characterisation, site selection, effects assessment and monitoring is imposed on the private parties conducting the activities. Identification and summary of relevant national permitting authorities for each country and contact details. It should be noted that the relevant exporting e.g., State, Province, or Territory, may need to be included in the arrangement or agreement. This is similar to, for example, Flanders being included in the MoU between Belgium and Denmark. A reference to Article 9.4 may be included, ensuring that relevant information in Article 9 is reported as required.	
In addition to national permitting authorities in Timor-Leste, the Australian State and Territory governments, as well as the Federal Government, will likely be involved in the permitting. The Australian system of	Both the U.S. and Canada have relevant national and State/Territory/Provincial regulators and permitting agencies that may need to be recognised in the arrangement or agreement. Thus, depending on which

[136] Centre for International Law (CIL), *Treaty Between Australia and the Democratic Republic of Timor-Leste Establishing Their Maritime Boundaries in the Timor Sea*, signed 6 March 2018, entered into force 30 August 2019, https://cil.nus.edu.sg/wp-content/uploads/2019/02/2018-Timor-Sea-Treaty.pdf.

[137] Natural Resources Canada. "Memorandum of Understanding." Accessed April 30, 2025. https://natural-resources.canada.ca/energy-sources/memorandum-understanding.

government grants both the Commonwealth and the state governments jurisdiction to regulate CCS activities.[138] The Commonwealth Government is responsible for offshore activities greater than three nautical miles from the mainland, whereas activities conducted within three nautical miles or onshore remain the responsibility of the respective territory or state.[139]	Canadian Province or Territory is the exporting Province or Territory, this may have to be identified and involved in the negotiations and final bilateral instrument. Similar would apply to the U.S. state that would store the CO_2. Multiple states and provinces/territories may be involved depending on the scenario. Thus, for the U.S.-Canadian bilateral collaboration, one might need multiple agreements or arrangements if new value chains in different locations move forward in the future depending on the State/Province/Territory involved, or the existing instrument could already account for such scenarios or be amended accordingly. If the CO_2 is intended to be stored offshore in the U.S., the distance from shore would determine which permitting agencies need to be involved. The Underground Injection Control (UIC) Class VI Rule[140] applies onshore and in State waters, while the Outer Continental Shelf Lands Act (OCSLA)[141] applies to leases, easements, or rights of way for carbon storage in sub-seabed geologic formations in Federal waters.[142] The permitting authority of injection wells under the UIC Class VI lies with the U.S. Environmental Protection Agency, unless the State in question has obtained Primacy, while the permitting authority under the OCSLA lies with the Department of the Interior and the Bureau of Ocean Energy Management (BOEM).[143]
CO_2 stream composition Confirmation that the CO_2 streams to be delivered will overwhelmingly consist of CO_2, and further that the CO_2 injected will be in compliance with Annex 1. Thus, the arrangement or agreement may further provide that the CO_2 delivered is not to be commingled in such a manner that it will no longer overwhelmingly consist of CO_2, and that no wastes or other	

[138] Global CCS Institute, 'Carbon Capture and Storage Hub Study' (Alex Zapantis, prepared for the Government of the Northern Territory of Australia, November 2020) 18.; Environmental Protection (Sea Dumping) Act 1981; the Offshore Petroleum and Greenhouse Gas Storage Act (in the process of being amended, see https://www.aph.gov.au/Parliamentary_Business/Bills_Legislation/Bills_Search_Results/Result?bId=s1346 (25.11.22).
[139] Global CCS Institute, 'Carbon Capture and Storage Hub Study' (Alex Zapantis, prepared for the Government of the Northern Territory of Australia, November 2020) 18.
[140] 40 CFR §§144-146
[141] 43 U.S.C. 1331 et seq
[142] 43 U.S.C. §1337(E)
[143] BOEM and BSEE (Bureau of Safety and Environmental Enforcement) are currently working on promulgating regulations for offshore storage of CO_2 pursuant to the OCSLA.

matter are added for the purpose of disposing of those wastes or other matter. The receiving country should, based on the requirements related to the CO_2 stream, implement a monitoring and compliance regime under which the CO_2 is characterised and monitored after receiving the volumes.	
The current lack of a comprehensive framework for CO_2 storage in Timor-Leste implies that this issue may require the criteria of Annex 1 to be provided in the arrangement or agreement.	For the U.S, the OCSLA defines a CO_2 stream as CO_2 that "consists overwhelmingly of CO_2 plus incidental associated substances derived from the source material or capture process; and, any substances added to the stream for the purpose of enabling or improving the injection process." Further, it is emphasised that the CO_2 stream "does not include additional waste or other matter added to the carbon dioxide stream for the purpose of disposal".[144] Thus, for storage in Federal waters, the agreement or arrangement may potentially satisfy the Annex 1 requirements by referencing the OCSLA. If the storage is intended for State waters, the agreement or arrangement would potentially require more efforts drawing up the criteria. The UIC Class VI rule does not contain a similar requirement for the CO_2 stream.
Site selection and characterisation Ensuring a rigorous site selection process in line with Annex 2 and relevant Guidance Documents. This relates to the documentation of, inter alia, the physical, chemical, and biological characteristics of the storage site, and characterisation of the surrounding marine environment	
The current lack of a comprehensive framework for CO_2 storage in Timor-Leste implies these activities may require the criteria of Annex 2 for site selection and characterisation to be spelled out or referenced in the arrangement or agreement.	Depending on whether the storage would be planned for State or Federal waters, there may already be a comprehensive framework in place for site selection and characterisation. The UIC Class VI framework contains detailed criteria with regard to these activities, and the U.S. EPA has promulgated guidelines.[145] Thus, the due diligence on these issues may, to a large extent, be benchmarked against an existing framework There is currently no finalised comprehensive framework for these activities under the OCSLA, implying that more efforts may be

[144] Pub. L. No. 117-58, § 40307, c.f. 43 U.S.C. 1331(r)

[145] U.S. EPA, Geologic Sequestration of Carbon Dioxide, Underground Injection Control (UIC) Program Class VI Well site Characterization Guidance (2013) https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13004.pdf

	needed to develop criteria for this in the arrangement or agreement.
Potential effects (impact assessment) An impact assessment must be concluded in line with Annex 2 and relevant Guidelines. This section may provide details on how this is to be ensured. A framework for impact assessments is present in most countries, irrespective of the London Protocol. A reference to this framework may be included and may, to a certain extent, comply with the requirements in Annex 2. However, as elaborated in the table above, the CO_2 Sequestration Guidelines would be useful to mitigate gaps.	
Reporting of CO_2 in National Greenhouse Gas Inventories National GHG inventories and reporting of cross-border value chains depend on identifying the rights to emission reductions, which may be defined within bilateral and commercial agreements. The Participants to report in their national greenhouse gas inventories and other relevant submissions to the UNFCCC in accordance with the 2006 IPCC Guidelines, and further refinements or iterations for the reporting in the national greenhouse gas inventories as agreed under the UNFCCC or additional guidance established by the IPCC.	
MRV The agreement or arrangement may address how MRV is to be regulated and enforced. As elaborated on in the table above, details pertaining to MRV under the CO_2 Sequestration Guidelines Section 8 may be used in the bilateral agreement or arrangement. An international technical standard, such as ISO 27914 Carbon dioxide capture, transportation and geological storage — Geological storage, may also be referenced as a benchmark and potentially be included as a required part of the permit.	
The current lack of a comprehensive framework for CO_2 storage in Timor-Leste implies these activities may require the criteria of Annex 2 for site selection and characterisation to be spelled out in the arrangement or agreement.	Depending on whether the storage would be planned for State or Federal waters, there may already be a comprehensive framework in place for site selection and characterisation. The UIC Class VI framework contains detailed criteria for these activities, and the U.S. EPA has promulgated guidelines.[146] Thus, the due diligence on these issues may be benchmarked against an existing framework. There is currently no finalised comprehensive framework for these activities under the OCSLA, implying more efforts may be needed to develop criteria for this in the agreement or arrangement.

[146] U.S. EPA, Geologic Sequestration of Carbon Dioxide, Underground Injection Control (UIC) Program Class VI Well Testing and Monitoring Guidance (2013) https://www.epa.gov/sites/default/files/2015-07/documents/epa816r13001.pdf

Amendment procedures and mutual understanding Parties may wish to agree on intervals to convene to evaluate the instrument.
Dispute resolution and failure to comply Options in case there is a failure by one of the parties to adhere to the terms.
Final provisions This may include details related to the entry into force of the arrangement or agreement and termination. May include confirmation that the participants will notify the IMO of the arrangement or agreement.

6. Commercial projects crossing borders

6.1. Introduction

This part of the handbook provides recommendations for industry regarding the process related to the 2009 amendment and thus bilateral or multilateral agreements or arrangements, and the commercial agreements subject to the national implementation of the 2009 amendment and bilateral or multilateral instruments. The purpose of this chapter is to provide examples of how commercial agreements interact with government-to-government (G2G) negotiations, and to emphasise that the industry may need to initiate planning and negotiations prior to the negotiations coming into place. Approaching national governments and sharing information about viable commercial cross-border value chains may further incentivise or catalyse G2G negotiations for agreements or arrangements with the relevant countries.

Several types of contracts may be involved in a CCS value chain. These may include, inter alia, service agreements, offtake agreements, access and land use agreements, third-party access (infrastructure) agreements, tie-in agreements, joint operating agreements, company agreements, and State aid agreements. This handbook focuses on transportation and storage agreements. The authors have observed that a service agreement approach has been used more frequently for recent cross-border transport and storage agreements, and provisions for third-party access or shared infrastructure are often included.

6.2. The 2009 amendment and bilateral agreement – a place for industry?

Oftentimes, a push for acceptance of the 2009 amendment may not start in government, but is rather a result of proposed commercial projects by industry actors. Indeed, industry and stakeholders wishing to engage in transboundary movement and storage of CO_2 may need to be proactive and present a business case to their national authorities to showcase the benefits of enabling this industry, which may include revenue streams, new jobs, contribution to climate targets, etc. Prioritising time and resources towards negotiating and signing an arrangement or agreement with other countries may not happen unless the government is aware of potential projects.

There are several examples of commercial agreements and arrangements being negotiated and signed prior to the G2G arrangements and agreements. One such example is the Dutch Yara and Norwegian Northern Lights negotiating and signing a commercial agreement for cross-border collaboration and storage of Dutch CO_2 on the Norwegian Continental Shelf in 2023, one year before the arrangement between the Netherlands and Norway was signed.[147] Similarly, the Danish project Greensand had worked on developing the project and negotiating commercial agreements within the consortium for a time prior to the arrangement being signed between Denmark and Belgium in 2022.[148][149] Another example may be found in the case of cross-border activities involving Timor-Leste and Australia. In 2023, the Australian operator Santos signed an MoU with Timor Gap for the exploration of partnership opportunities in the prospective Bayu-

[147] Equinor. "Important Step to Decarbonise Europe." Last modified August 29, 2022. Accessed April 30, 2025. https://www.equinor.com/news/20220829-important-step-to-decarbonise-europe.

[148] Project Greensand. "Hvad Er Project Greensand." Accessed April 30, 2025. https://pilot.greensandfuture.com/hvad-er-project-greensand.

[149] It should be noted for the Yara and Northern Lights example, and Project Greensand, these actors are located in the EU/EEA and therefore benefit from shared frameworks and systems.

Undan CCS project on the Timor-Leste Continental Shelf. [150] No bilateral agreement or arrangement is in place between the respective governments yet, but the commercial activities are important drivers for such future instruments.[151]

6.3. Contractual considerations and cross-border elements

When CO_2 moves through the CCS chain, starting at the emission point and ending up in a storage site, the CO_2 may pass several tie-in or transfer points. The CO_2 may be handled by several stakeholders and modes of transportation. Regulating who is responsible for potential leakages or accidents along the chain and exactly when, where, and how the liability passes is highly important. This is true regardless of whether or not the CO_2 crosses a border. However, if CO_2 crosses a border, the consequences of potential leakages or accidents may differ in terms of, for example, carbon market penalties and reporting of such incidents, and environmental or climate regulations, responsibility, and duties. As such, a clear linkage between the incident, the liability and the consequences thereof may be considered differently for cross-border agreements. Further, the documentation requirements for the emitter capturing and storing CO_2 to either avoid penalties, obtain benefits, or even be allowed to report CO_2 avoided or removed may differ from one jurisdiction to another, resulting in potentially differing contractual arrangements depending on the country of origin of the CO_2.

An important element to consider is the regulatory v. contractual liabilities, which do not always need to mirror each other. A company may not contract out of a regulatory liability the company is subject to, such as reporting emissions or surrendering and paying for emissions allowances or taxes. However, the contract may contain provisions related to reimbursement to compensate for such liability between the parties. For example, the customer of transportation and storage services reimburses the costs of such reporting and payment for specific scenarios.

Regardless of whether the CO_2 crosses a border, the stakeholders involved need to determine and specify the CO_2 stream composition. Oftentimes, to protect the integrity of the infrastructure, the transport and storage operators will have stricter requirements than requirements under the legal framework. Also, national requirements may vary. However, for CO_2 exported by an emitter located in a Contracting Party to the London Protocol, it is important to document that the CO_2 stream overwhelmingly consists of CO_2 and that this is also enforced in the commercial activities pursuant to permitting requirements.

Similar to the criteria related to the CO_2 stream composition, Contracting Parties should ensure that the CO_2 is stored in an appropriate geological formation, implying that for an emitter to obtain a permit to export CO_2 for storage, there should be explicit terms in the export permit dictating the minimum criteria for the storage site. Consequently, there may be a need for the operator to include information about the geological formation such that the emitter may document compliance with the permit conditions, especially if the storage operator is operating in a non-Contracting Party.

Further to the Annex 2 requirements, the Contracting Party is mandated to ensure monitoring of the storage site and mitigating measures if there is a leak, implying that in order to ensure national

[150] Santos. "Santos Signs MOU with Timor GAP for Bayu-Undan CCS." Oil & Gas Journal, February 8, 2024. Accessed April 30, 2025. https://www.ogj.com/energy-transition/article/14297412/santos-signs-mou-with-timor-gap-for-bayu-undan-ccs.

[151] Communication with national authorities may be important during these processes, whereby the authorities might support and/or offer reassurances that the necessary G2G processes will occur

emitters are disposing of the CO_2 according to the Protocol's requirements, there may be criteria in the export permit for the emitter to obtain monitoring reports from the storage operator, to confirm the CO_2 is stored safely, long-term. In addition, depending on the requirements of the carbon markets, credits or allowances applicable for the emitter, such monitoring reports may also contribute to demonstrate eligibility for such credits, allowances or other financial incentives for the CO_2 captured, exported and stored.

The sharing of transport and storage infrastructure can reduce costs and obtain higher margins. Consequently, operators of infrastructure are to an increasing degree planning for open access, implying third-parties may be allowed to tie into the infrastructure, regardless of whether such third-party access is mandated by law. Third-party access may have multiple implications for the contract between the parties, and it would be advisable to include provisions such as priority rights to capacity for competing volumes, transfer of reserved capacity between the third-parties, liabilities in case of impurities, intermittency, or incidents, quantification and verification principles for commingled streams. These terms may be impacted by regulatory requirements. In all of the countries operating in the EU/EEA, third-party access may be mandated by regulators, and criteria for tariffs and access to infrastructure may be imposed as part of that.

Another important consideration for transportation and storage agreements is that they provide a long-term revenue stream and predictability in the value chain. This is needed to support bankability and investment decisions. This long-term commitment may be equally important for the emitter as the storage operator, as both have to make large investments to commence the activities. This consideration will not change as the project crosses a border.

Below is a list of topics that should be considered for commercial transport and storage service agreements. These topics are included in a draft contract template provided in Annex 1. There would not necessarily be a one-size-fits-all, as national differences may come into play.[152]

TABLE 2: KEY PROVISIONS FOR COMMERCIAL AGREEMENTS

Key provisions for transport and storage service agreements	
Topics	Observations and recommendations
Emission reductions and financial incentives	The parties need to identify who is entitled to reductions and removals created in the value chain, as well as identify which legal framework or voluntary standard applies to the reductions or removals. This should include rules for potential reversals in case of leaks and allocation of responsibility between multiple users of the infrastructure. The methodology needs to be referenced and potentially attached to the agreement. The relationship between the reduction or removal and potential financial incentives needs to be drawn up and allocated.
Fees and payment	Contract price, which may be set up in a number of different ways, depending on the services rendered. It may comprise fixed and variable costs, and the contract should identify the services rendered and the measurement and pricing point for clarity.
Shared infrastructure (if relevant)	In cases of value chains with shared infrastructure, provisions for distribution of rights and obligations between both the customer

[152] As such, the table should be considered the complete set of terms for cross-border commercial contracts and it should be considered that regional or pre-existing treaties between the host nations or specific value chain configurations or company structures would impact the contents.

	and service provider, as well as between the customer and other customers should be described. Situations of excess capacity, competing volumes, nomination and redistribution of capacity should be considered, alongside considerations related to costs and liabilities. Liabilities for impurities and intermittency should be considered in particular.
Transfer of liability (CO_2 leakage) and risk of loss	The parties may want to clarify liability at designated transfer points across the value chain in the case of CO_2 leakage. A part of this would be to regulate who bears the risk of loss throughout the value chain, including transport through international waters or other states' waters. This might be affected by national standards.
CO_2 composition/ CO_2 stream criteria/CO_2 purity specifications	Agree on a set standard gas composition/impurities allowed in the gas stream. It may be relevant to use international technical standards to set the baseline, if available.
CO_2 pressure, temperature, flow volume, and safeguarding system	Set standards for pressure, temperature, flow volume and safeguarding, and provisions for non-compliant CO_2. It may be relevant to use international technical standards to set the baseline, if available.
Monitoring, reporting, and verification	E.g., fiscal metering,[153] who will be responsible for the measurements, how and where the measurements will take place. Further, a monitoring and measurement methodology should be described, with reference to a potential standard or framework for compliance with the requirements for reductions, removals, or incentives. The monitoring activities should comprise monitoring for potential leakages and irregularities, as well as CO_2 composition, pressure, and temperature. Language regarding verification of the CO_2 being safely stored long-term may be included with specific documentation requirements. Clauses for data sharing and the sharing and reporting of monitoring results along the value chain should be included. This would include language on the responsibility for reporting of emissions data, and may be particularly relevant if the entities involved are in different jurisdictions with varying legal frameworks for documentation, record keeping, and transparency.
Permitting	Information about the permitting requirements for operation and future decommissioning of the storage site and what standards and regulations the operator would be bound by.
Taxes	For cross-border activities, there are often specific rules regarding revenue taxes and value-added tax. The applicable duties for the parties in this regard should be accounted for in the contract.
Default and remedies	The parties should agree on what constitutes a default, such as failure to deliver or receive, loss of volumes, delivery of off-spec CO_2, failure to pay, etc. Further, the parties should agree on the procedures for notification of defaults, the right to remedy them, and what consequences a default may have, which may include

[153] The IEAGHG is conducting a study on fiscal metering, which may support both national authorities and commercial actors in ensuring accurate measurements for process control, detecting leaks, and verifying quantities.

	compensation, the right to refuse CO_2 volumes, and suspension or termination.
Dispute resolution	A dispute resolution should be agreed upon, addressing issues related to the commercial terms of the contract and the project.

Annex 1 – Draft contract template

Below are examples of clauses to be included in a transportation and storage agreement. The draft is not exhaustive, and the exact content may differ depending on the countries of origin of the exporter and importer, as well as the applicable infrastructure and services provided. Further, it is important to emphasise that the contents may differ depending on whether this is a single-source, single-sink agreement or an open-access infrastructure, serving a number of emitters tying into the infrastructure from different jurisdictions. Also, the financial incentives or markets the stakeholders are operating under will impact the content and framework of the agreement. Additionally, who is responsible for organising the transport and whether the transport mode is owned or commissioned by the responsible party may influence the contents of the agreement. Some of the clauses below may be superfluous if the transportation and storage activities are combined in the same contract.

Preamble	Introduction of the parties and starting point of the agreement.
Scope and background	A high-level description of the value chain.
Definitions and interpretations	This part may draw up a number of elements in addition to the definitions themselves, such as: i. Interpretative rules concerning the text, headings, numberings, and precedence determination between preamble, clauses, and annexes etc. ii. What currency is being used, variations and exchange. iii. What time zone is considered applicable for the activities under the contract.
Duration	Beyond defining a starting date of the contract, this clause may define potential: i. Start date for services ii. Tie-in dates for infrastructure or capture facilities
Fees	In a transport and storage service agreement, there may be many elements making up the total fees, depending on the fee structure chosen, the available transport infrastructure and the services rendered. It would consist of a mixture of fixed and variable prices. Some examples are: i. A fixed price per ton transported and stored ii. A fixed or variable price for utilities and services iii. Under what circumstances reimbursement would be triggered iv. Take or pay fees v. Capacity exceedance fee

	vi. Penalties vii. Taxes, including value-added tax It may also be relevant in this clause to include information about the measurement and pricing point, in order to create a predictable way to calculate the fees.
Invoicing and payment	This clause may regulate matters such as: i. The payment intervals ii. What is considered a late payment iii. When the customer may withhold payment and for how long iv. How to address payment disputes
Transport services	The transport activities need to be drawn up. Depending on the transport mode, there may be variations to the: i. Obligation to perform ii. Receival Point iii. Delivery Point
Registered transport capacity (pipeline)	The customer will have a certain agreed capacity registered, which may be impacted by several aspects, resulting in the final capacity or volume reserved or used: i. Registered transport capacity ii. Nomination[154]/ reservation/ confirmed transport capacity iii. Intermittency, annual quantity, shortfalls and makeup iv. Take or pay v. Transferrable transport capacity
Registered transport capacity (ship)	The customer will have a certain agreed capacity registered, but would need to agree on aspects such as: i. Loading schedule ii. LCO_2 carrier, loading terminal, and loading port iii. Laytime, delay, and demurrage iv. Take or pay v. Provide or pay vi. Annual Quantity, Shortfalls and Make-up vii. Transferrable transport capacity
Registered storage capacity	The customer will have a certain capacity request, which may be impacted by several aspects, resulting in the final capacity or volume reserved or used: i. Registered storage capacity

[154] A nomination in respect of a quantity of CO_2 (t) to be delivered in any [Hour/Day/Week etc.]

	ii. Nomination[155]/ confirmed storage capacity iii. Intermittency iv. Take or pay v. Transferrable storage capacity
CO_2 acceptance criteria	Appropriate details for the CO_2 acceptance criteria may be provided in an annex. However, some overarching principles and reference to the annex(es) should be included in the main body of the contract, regulating aspects such as: i. The purity specifications ii. CO_2 pressure, temperature and flow iii. Volume determinations iv. Non-conforming CO_2 and the consequences of such, namely the requirements for notification, the right of the operator to either accept or reject the volumes, redeliveries or release.
CO_2 ownership and risk	This clause should regulate aspects such as: i. Who owns the CO_2 ii. Description of transfer points for ownership iii. The risk of loss of CO_2
Third-party access	To the extent the operator is opening its infrastructure to more than one customer, it would be important to acknowledge issues such as: i. Rights of both the operator and customer ii. Obligations of both the operator and customer iii. How to treat excess capacity iv. Regulation of competing volumes and priorities between such* v. Potential shut-down for tie-in operations vi. Costs and expenses* vii. Reimbursements* viii. Indemnification* ix. Communication** x. Confidentiality** *These are provisions intended to protect the existing customers such that new customers are not given capacity in the infrastructure at the expense of the pre-existing ones.

[155] A nomination in respect of a quantity of CO_2 (t) to be delivered in any [Hour/Day/Week etc.]

	**These may also be covered by "miscellaneous" below.
CO_2 market requirements	For the emitter, the motivation to capture and store CO_2 is often driven by financial incentives found in CO_2 taxes, credits, or allowances, either in a regulated or voluntary market. As such, the contract should recognise the chosen methodology and the reporting criteria to ensure compliance. This may be supplemented by including the detailed methodology in an annex.
Measurement, monitoring, and verification	Both for transport and storage, measurement, monitoring, and verification of CO_2 flows, energy flows, and CO_2 emissions (fugitive leaks) are important. These activities count towards emissions reductions and reporting, permit requirements, and potential financial incentives, and the provisions should cover issues such as: i. Monitoring activities and intervals ii. Meter stations (placement and function) iii. Calibration and testing of equipment iv. Equipment out of service v. Testing of the CO_2 stream vi. Volume determination/quantification vii. Uncertainty of measurements viii. Verification ix. Reporting These activities would benefit from detailed regulations in annexes, drawing up e.g., the placement of the metering stations, providing methodology and rules for monitoring, quantification and verification. In bilateral collaboration, technical standards such as the ISO 27914 Carbon dioxide capture, transportation and geological storage — Geological storage may provide an example of methodology for monitoring methodology and activities.
Maintenance	The stakeholders should draw up a clause providing predictability regarding maintenance, such that there are criteria for: i. Maintenance notice ii. Maintenance hours iii. Maintenance factors
Outages	Similarly, outages may occur and the parties should have a predictable regime for this, regulating:

	i. Outage notices/notification requirements ii. Outage hours iii. Outage factors iv. Responsibilities
Operating guidelines and customer's access to data	This may be a comprehensive clause, regulating issues such as: i. The customer's reserved transport and storage capacity ii. The customers transported and stored volumes (actual) iii. Information regarding all customer's registered capacity iv. Availability v. Near real-time physical flow vi. Technical minimal flow vii. Technical ramp rate viii. Certain historic data
Warranties and representations	Crossing borders, clarifying both mutual and individual warranties and representations become even more important.
Default and remedies	Some defaults and remedies may be regulated earlier in the contract, in relation to specific issues in the contract. However, some or all of the remedies may be gathered here and regulate what constitutes a default, such as: i. Failure to deliver CO_2 ii. Failure to comply with the CO_2 acceptance criteria iii. Failure to receive CO_2 iv. Failure to pay v. Bankruptcy Further, both procedures and remedies may be provided and include matters such as: i. Notice as precondition to remedies ii. Right to cure defaults iii. Remedies (including compensation for CO_2 losses, where necessary) iv. Remedies v. Reasonableness vi. Termination and suspension
Liabilities	The liabilities may include liabilities for: i. Facilities ii. Loss of CO_2 iii. Third-parties (both those tying into the infrastructure and others) iv. Environmental damage

	Depending on the contractual structure, this might be the appropriate place to include the measures, such as i. Indemnification ii. Damages iii. Right to restart
Force Majeure	What constitutes force majeure and the consequences thereof need to be clarified.
Insurance	The insurance clause should cover both the issue of what is covered, as well as criteria for using the insurance.
Miscellaneous	The contents of this clause may vary depending on contractual traditions, but some examples of the content normally seen in such clauses are: i. Confidentiality ii. Exchange of information between the parties iii. Notification responsibilities related to e.g., loss, liabilities, incidents, etc. iv. Representation towards third parties v. Amendments to the contract vi. Assignment of rights under the agreement vii. Compliance with applicable laws viii. Permit duties of the contract parties, including reporting obligations ix. Changes in law
Applicable law and dispute resolution	Identifying which legal regime applies to the activities under the contract, and also how the parties will resolve disputes needs to be regulated. A neutral jurisdiction or arbitration may be elected for the dispute resolution to strike a balance between the parties.

Annex 2 – Resources Available

Several guidance documents and resources have been issued to support the environmentally safe storage of CO_2 in compliance with the Protocol as well as national implementation of the Protocol. Some key documents are:

1. Risk Assessment and Management Framework for CO_2 Sequestration in Sub-seabed Geological Structures (2006)
2. Specific Guidelines for Assessment of Carbon Dioxide Streams for Disposal into Sub-seabed Geological Formations (2012)
3. Guidance on the implementation of Article 6.2 on the Export of Carbon Dioxide Streams for Disposal in Sub-seabed Geological Formations for the Purpose of Sequestration (2012)
4. Booklet: Revised Guidance on National Implementation of the London Protocol (2018 Edition)
5. Booklet: Carbon Dioxide Sequestration in Sub-seabed Geological Formations under the London Protocol (2016 edition)
6. Booklet: The London Protocol: What it is and how to implement it (2014 Edition)
7. IEAGHG, "Exporting CO_2 for Offshore Storage – The London Protocol's Export Amendment and Associated Guidelines and Guidance", 2021-TR02, April 2021

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