



# Transport of CO<sub>2</sub> for Offshore Storage under the London Protocol

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6<sup>th</sup> Offshore Workshop

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## Who are we?

Our internationally recognised name is the IEA Greenhouse Gas R&D Programme (IEAGHG). We are a Technology Collaboration Programme (TCP) and are a part of the International Energy Agency's (IEA's) Energy Technology Network.

## Disclaimer

The IEA Greenhouse Gas R&D Programme (IEAGHG) is organised under the auspices of the International Energy Agency (IEA) but is functionally and legally autonomous. Views, findings and publications of the IEA Greenhouse Gas R&D Programme do not necessarily represent the views or policies of the IEA Secretariat or its individual member countries.

# London Convention and London Protocol



- Marine Treaties - Global agreements regulating disposal of wastes and other matter at sea
- London Convention 1972 (87 countries)
- London Protocol 1996 – ratified March 2006 (53 countries as of Oct 2019) is the more modern treaty
- Annual Meeting of the Contracted Parties + Annual meeting of Scientific Group.
- **London Protocol** – how it works:
  - Prohibition on dumping of all wastes, except for those listed in Annex 1, which need to be permitted under conditions in Annex 2.
- Annex 1: dredged material; sewage sludge; fish waste; vessels and platforms; inert, inorganic geological material; organic material of natural origin; bulky items primarily comprising unarmful materials, from small islands with no access to waste disposal options

# London Protocol and CCS



- Prohibited some CCS project configurations
- CO<sub>2</sub> Geological Storage Assessed by LC Scientific Group 2005/6
- 2006 - Risk Assessment and Management Framework for CO<sub>2</sub>
- **To allow prohibited CCS configurations – Protocol amendment adopted at 28th Consultative Meeting (LP1), 2 Nov 2006** - came into force 10 Feb 2007 to allow disposal in sub-seabed geological formations
- CO<sub>2</sub> Specific Guidelines (2007) - to guide assessment and permitting

# London Protocol Amendment



2006 amendments (LP1.(1))

Allowed to dispose of “CO<sub>2</sub> streams from CO<sub>2</sub> capture processes for sequestration”

“Carbon dioxide streams may only be considered for dumping, if:

- 1 *disposal is into a sub-seabed geological formation; and*
- 2 *they consist **overwhelmingly** of carbon dioxide. They may contain incidental associated substances derived from the source material and the capture and sequestration processes used; and*
- 3 *no wastes or other matter are added for the purpose of disposing of those wastes or other matter.”*



# LP CO<sub>2</sub> Specific Guidelines (2007)

In order to receive a permit must demonstrate:

- CO<sub>2</sub> Stream characterisation (incidental associated substances)
- Site Selection and Characterisation – storage capacity, injectivity, long-term storage integrity, potential migration and leakage pathways, geochemistry, monitoring, mitigation possibilities, operational feasibility
  - Environmental Characterisation and other uses
  - Potential exposure assessment routes
  - Potential exposure effects
  - Risk Assessment
  - Impact Hypothesis
- Monitoring and Risk Management
- Permit Conditions



Draws upon Risk Assessment and Management Framework 2006

# London Protocol Transboundary



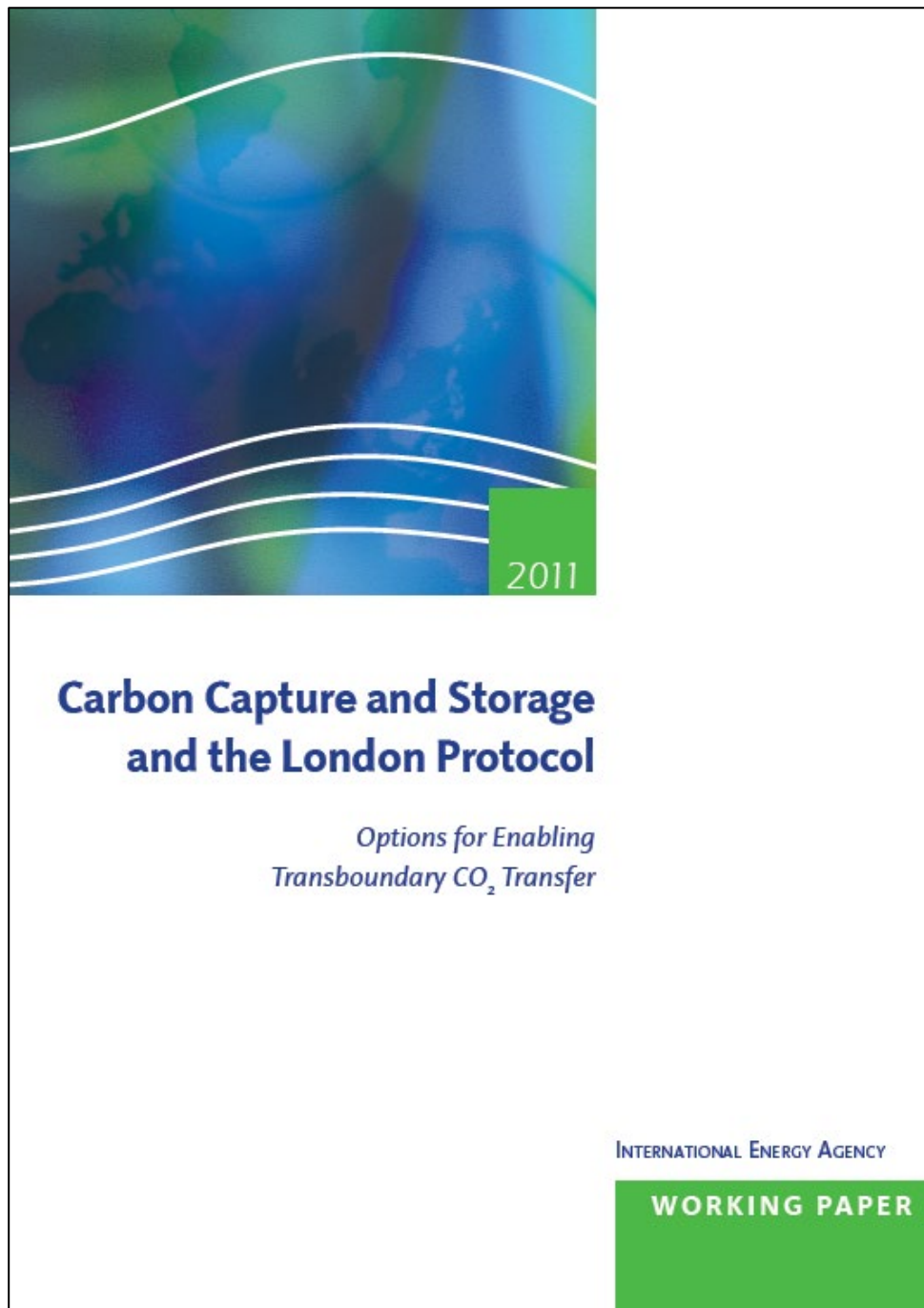
## London Protocol Article 6

### “EXPORT OF WASTES OR OTHER MATTER

*Contracting Parties shall not allow the export of wastes or other matter to other countries for dumping or incineration at sea.”*

- Prohibits transboundary transport of CO<sub>2</sub> for geological storage
- **2009 LP4 (30 Oct 2009) - Amendment proposed by Norway to allow export of CO<sub>2</sub> for storage was adopted by vote.**
- Article 6 , new para 2 : ***‘Export of CO<sub>2</sub> for disposal in accordance with Annex 1 may occur, provided an agreement or arrangement has been entered into by countries concerned’***
- Agreement/arrangement shall include : permitting responsibilities; for export to non-LP Parties then provisions equivalent to LP’s for issuing permits.
- **But, to come into force needs ratification by acceptance by two thirds all Parties ie 36/53**
- Only Norway, UK, Netherlands, Iran, Finland and Estonia accepted in 10 years (Oct 2019)





Options (considering VCLT)

1. Interpretative resolution
2. Provisional application
3. Subsequent agreement through an additional treaty
4. Modification of the operation of relevant aspects of the London Protocol between two or more contracting parties
5. Suspension of the operation of relevant aspects of the London Protocol between two or more contracting parties
6. Conducting CCS through non-contracting parties

IEA 2011



# London Protocol CO<sub>2</sub> Export



- LC41 and LP14 meeting at IMO London, 7<sup>th</sup>-11<sup>th</sup> October 2019
- **Netherlands and Norway proposal to LP14 for “Provisional Application” of export amendment.**
- Drafting Group formed at LP14.
- IEAGHG supported with Information Paper 2019-IP11, and evidence-base in plenary with paper LC41/INF3
- **Success! – Resolution for Provisional Application adopted 11 Oct 2019**



# Resolution LP.5(14) on the Provisional Application of the 2009 Amendment to Article 6 of the London Protocol (2019)



- *1. DECIDES to allow for the provisional application of the 2009 amendment pending its entry into force by those Contracting Parties which have deposited a declaration on provisional application of the 2009 amendment;*
- *2. INVITES Contracting Parties to deposit with the Depositary [IMO] a declaration on provisional application of the 2009 amendment of the London Protocol pending its entry into force;*
- *3. FURTHER RECALLS the obligation to notify the Depositary of agreements or arrangements mentioned in article 6, paragraph 2 of the London Protocol (as amended by resolution LP.3(4));*
- *4. AFFIRMS that the export of carbon dioxide under the provisional application of article 6 of the London Protocol (as amended by resolution LP.3(4)), and in compliance with the requirements of paragraph 2 of the article (as amended by resolution LP.3(4)) will not be in breach of article 6 as in force at the time of the export; and*
- *5. URGES Contracting Parties to consider accepting the amendment to article 6 of the London Protocol adopted through resolution LP.3(4).*

# Export of CO<sub>2</sub> for Offshore Storage is Allowed



- This means that countries can now legally export and import CO<sub>2</sub> for offshore geological storage
- Environmental protection is in place. The guidance documents for permitting offshore storage and for export agreements were revised/finalised for transboundary activities in 2012 (CO<sub>2</sub> Specific Guidelines) and 2013 (Agreements or Arrangements).
- The resolution to allow provisional application of the 2009 amendment is an interim solution, pending sufficient acceptance by Contracting Parties

# Transboundary Guidance



- **CO<sub>2</sub> Specific Guidelines - revised 1 Nov 2012 for transboundary**
- **For subsurface transboundary migration**
- Definition: Transboundary movement of CO<sub>2</sub> streams after injection is defined as movement of CO<sub>2</sub> streams across a national boundary within a transboundary sub-seabed geological formation after the CO<sub>2</sub> streams have been injected. The transboundary sub-seabed geological formations may extend into the jurisdiction of another state or into the high seas. **Transboundary movement of CO<sub>2</sub> streams after injection is not export in the sense of article 6, of the London Protocol.**

# Transboundary Guidance



- **CO<sub>2</sub> Specific Guidelines - revised 1 Nov 2012 for transboundary**
- 1.10 In the case of transboundary sub-seabed geological formations that could be used by more than one country or where sub-seabed geological formations are located in areas where there is the potential for transboundary movement of CO<sub>2</sub> streams after injection **the Contracting Party where the injection occurs should be responsible for the implementation of these Specific Guidelines.**



# Transboundary Guidance



- **CO<sub>2</sub> Specific Guidelines - revised 1 Nov 2012 for transboundary**
- 1.10 (cont) Consent should be sought for the use of the sub-seabed geological formation from all countries with jurisdiction over this sub-seabed geological formation, without prejudice to international law including as reflected in the relevant provisions of UNCLOS. The Contracting Party where the injection occurs should cooperate with other relevant Contracting Parties, other States and other relevant entities, to ensure adequate sharing of information as needed and in accordance with international law, including by way of arrangement or agreement to ensure that these Specific Guidelines are implemented effectively.



# Transboundary Guidance

## Arrangements or Agreements for Export (2013) - 1

- **“Guidance on the Implementation of Article 6.2 on the Export of CO<sub>2</sub> Streams for Disposal in Sub-seabed Geological Formations for the purpose of Sequestration”** . LC 35/15 Annex 6. 2013
- This new Guidance was adopted at the Annual Meeting on 18 October 2013, for use when the export amendment comes into force.
- *“Export of CO<sub>2</sub> ....provided an agreement or arrangement has been entered into by countries concerned”*
- Definitions: “agreement” as a legally binding agreement between States, whereas an “arrangement” between refers to something non-binding, such as a memorandum of understanding”
- Allocation of permitting responsibilities between exporting and receiving countries must be confirmed in advance of export, and notified to the IMO.



# Transboundary Guidance

## Arrangements or Agreements for Export - 2



- **“Guidance on the Implementation of Article 6.2 on the Export of CO<sub>2</sub> Streams for Disposal in Sub-seabed Geological Formations for the purpose of Sequestration” . LC 35/15 Annex 6. 2013**
- Both Parties have to issue permits to meet LP requirements
- Exporting Party to characterize CO<sub>2</sub> stream and share data with receiving Party
- Receiving Party to characterize storage site, assess potential effects, verify monitoring and risk management, and share data with receiving Party
- *“flexibility given between the two States as to the content of their agreement or arrangement, it must be consistent with both the Protocol's provisions and those of applicable international law”*
- *“The optimal roles and responsibilities may become apparent as practical situations are negotiated over time, including which information is best supplied by which party to the transaction. Furthermore, it is likely that developing a final agreement or arrangement will involve a good deal of back and forth cooperation between two Contracting Parties”*

# Transboundary Guidance

## Arrangements or Agreements for Export - 3



- Exports to non-Contracting Parties - full responsibility of the Contracting Party to ensure ***“that the provisions of the agreement or arrangement must at a minimum be equivalent to those contained in the Protocol – including those relating to the issuing of permits and permit condition”*** . This is the means of ensuring the same level of environmental protection is provided for a non-Party storing a Party’s CO<sub>2</sub>.
- In the case of a breach of an agreement or arrangement by a non-Contracting Party, the Contracting Party should ***“engage in consultations to rectify”*** . In the case of a ***“significant ongoing breach”*** the Contracting Party is required to ***“terminate the export”***

# Resolution LP.5(14) on the Provisional Application of the 2009 Amendment to Article 6 of the London Protocol (2019)



## Update :-

- Declarations of Provisional Application received by IMO from: **Norway, Netherlands, Denmark, Korea, Belgium, Sweden** (Apr 2023)
- “Agreements or Arrangements” (as needed by the 2009 Export Amendment) :- 1<sup>st</sup> Arrangement received by IMO: Denmark-Belgium MoU (Sep 2022) (Danish Energy Agency – storage permits and ETS; Flemish Energy & Climate Agency – ETS, Flemish gov - storage permits)
- First export – Belgium to Denmark for Greensands test injection (early 2023)
- **2009 Export amendment needs acceptance by two thirds all Parties ie 36/53**
- Norway, UK, Netherlands, Iran, Finland, Estonia, Korea, Sweden, Denmark, Belgium = **10 total** (Apr 2023)



**MEMORANDUM OF UNDERSTANDING (MoU)**  
**BETWEEN**  
**THE MINISTER FOR ENVIRONMENT OF THE FLEMISH REGION**  
**AND**  
**THE FEDERAL MINISTER FOR THE NORTH SEA OF BELGIUM**  
**AND**  
**THE MINISTER FOR CLIMATE, ENERGY AND UTILITIES OF DENMARK**  
**ON CROSS BORDER TRANSPORTATION OF CO<sub>2</sub> WITH THE PURPOSE OF**  
**PERMANENT GEOLOGICAL STORAGE**

The Minister for Environment of the Flemish Region, the Federal Minister for the North Sea of Belgium, and the Minister for Climate, Energy and Utilities of Denmark (hereinafter referred to individually as a "Participant" and collectively as the "Participants");

Bearing in mind the MoU between the Participants on cooperation on carbon capture utilisation and storage (CCUS), particularly section 2b on the intent of the Participants to consider and prepare a bilateral agreement or arrangement between the Participants enabling cross-border transportation and storage of CO<sub>2</sub>;

Have reached the following understanding:

*Section 1 – Scope*

This MoU is an arrangement in the sense of Article 6 paragraph 2 of the 1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972, as amended by Resolution LP. 3(4). Any definitions used should be understood as they are understood in the context of the London Protocol and applicable European Union law.

This MoU applies to cross border transportation of CO<sub>2</sub> between the Participants with the purpose of permanent geological storage.

*Section 2 – Allocation of permits*

The Participants recognise that all necessary permit responsibilities will be allocated to the relevant authorities of each Participant's country in accordance with the London Protocol. A non-exhaustive list of relevant permitting authorities are as follows;

For Denmark:

- The Danish Energy Agency (Energistyrelsen) is responsible for the issuance of CO<sub>2</sub> storage permits as well as ETS permits:

Danish Energy Agency (Energistyrelsen)  
Carsten Niebuhrs Gade 43  
1577 København V

Tlf: 33 92 67 00  
[ens@ens.dk](mailto:ens@ens.dk)

Danish Energy Agency (Energistyrelsen), Esbjerg  
Niels Bohrs Vej 8D  
6700 Esbjerg

Tlf: 33 92 67 00  
[ens@ens.dk](mailto:ens@ens.dk)

*Paul*

*[Signature]*

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*B*





For Belgium:

- Provincial Executive(s) of the Provincial Council(s) are responsible for the issuance of (amongst other) ETS permits. ETS permits are issued based on an obligatory advice issued by the Flemish Energy and Climate Agency (Vlaams Energie- en Klimaatagentschap), which is also responsible for the implementation of ETS.

Flemish Energy and Climate Agency (Vlaams Energie- en Klimaatagentschap)  
Koning Albert II-laan 20, box 17  
1000 Brussels

Tlf 32 2 553 46 00  
veka@vlaanderen.be

- The Flemish government is responsible for the issuance of CO<sub>2</sub> storage permits.
- The Belgian federal maritime authorities are responsible for determining the technical rules and regulations a seagoing vessel has to comply with when shipping CO<sub>2</sub>.

#### *Section 3 – Arrangements of the Participants*

This MoU does not create any rights and obligations under international law and does not impose any financial obligations on the Participants.

Each Participant intends to conduct the cooperation under this MoU subject to all applicable laws and regulations.

#### *Section 4 – Amendment procedures and mutual understanding*

This MoU may be amended at any time by jointly written consent of the Participants.

At any time, the Participants will consult, at the request of any of them, on any matter relating to this MoU, in the spirit of cooperation, good faith and mutual trust, to resolve quickly any difficulties or misunderstanding that may arise.

The Participants will convene to evaluate the MoU at least once a year, unless they decide not to convene by jointly written consent. The Participants will convene alternatively in Copenhagen and Brussels, or in any other place decided upon by the Participants by jointly written consent.

*Paul E*

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*Section 5 – Final provisions*

This MoU will come into effect upon signature and upon the date of entry into force of the declaration of provisional application of the 2009 Amendment, in accordance with the national rules of both Participants.

This MoU may be terminated by either Participant giving twelve (12) month's written notice to the other Participant. The termination of this MoU will not affect any on-going activities under this MoU, unless otherwise decided by the Participants.

Signed in duplicate in Copenhagen and Brussels on the 26th of September 2022 each in the English language.

*For the Flemish Region:*

*The Minister of Justice and Enforcement,  
Environment, Energy and Tourism*

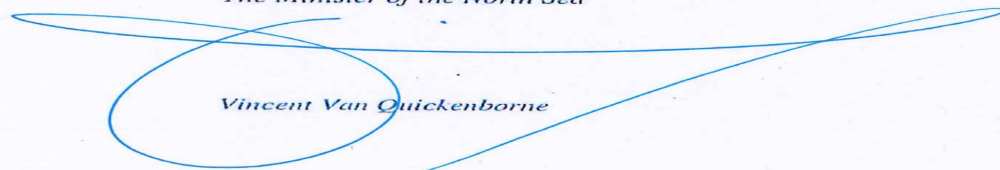
  
*Zuhair Demir*

*The Minister for Climate, Energy and Utilities of  
Denmark*

  
*Dan Jørgensen*

*For the Federal Government:*

*The Minister of the North Sea*

  
*Vincent Van Quickenborne*



# REVIEW OF PROJECT PERMITS UNDER THE LONDON PROTOCOL – AN ASSESSMENT OF THE PROPOSED P18-4 CO<sub>2</sub> STORAGE SITE

**Report: 2016/TR4**

**May 2016**

- Material submitted to National Authority was broadly sufficient to allow compliance assessment
- Compliance assessment indicates overall technical compliance with the CO<sub>2</sub> Specific Guidelines
- Overall, this exercise demonstrated that the requirements of the CO<sub>2</sub> Specific Guidelines are relevant and achievable by national regulators and CCS projects, and that transparency of compliance assessment is possible in ensuring the protection of the marine environment.





- Report describes the background, details and requirements of the provisional application of the CCS export amendment
- Includes the revised “CO<sub>2</sub> Specific Guidelines” (2012)
- Includes the “Guidance on Implementation of Article 6.2 on the Export of CO<sub>2</sub> Streams...” (2013), covering the “Agreements or Arrangements” of responsibilities between Parties



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