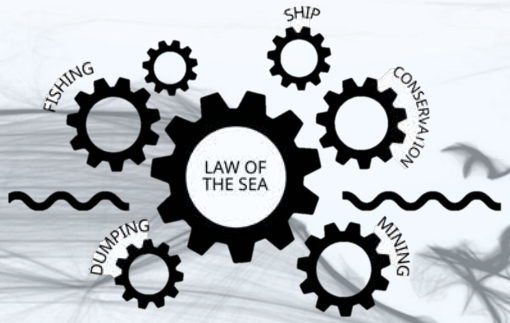

ACOPS
Advisory Committee on Protection of the Sea

The global regulatory landscape of onboard carbon capture and storage (OCCS) or the new scrubbers

CIL Seminar on Ocean Law & Policy – National University of Singapore, Bukit Timah Campus
9 December 2024 – Singapore

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Outline

Context

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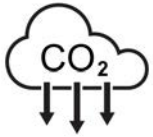
2. The IMO Approach
3. CCS Regulation under the London Convention and its Protocol
4. UNCLOS and the 2024 Advisory Opinion
5. Future prospects

Context



Ambitious targets set by the **2023 IMO GHG Strategy** (MEPC80-17-Add1)

- → reducing CO2 emissions by at least **30% by 2030** (compared to 2008) and **70% by 2040**
- → **peaking GHG** emissions as soon as possible
- → up taking of **zero or net zero GHG** emission technologies to represent at least **5% by 2030**
- → reaching **net-zero** by or close to **2050**

Significant increase in shipping traffic projected though dependent on critical transformations needed

1. What is OCCS

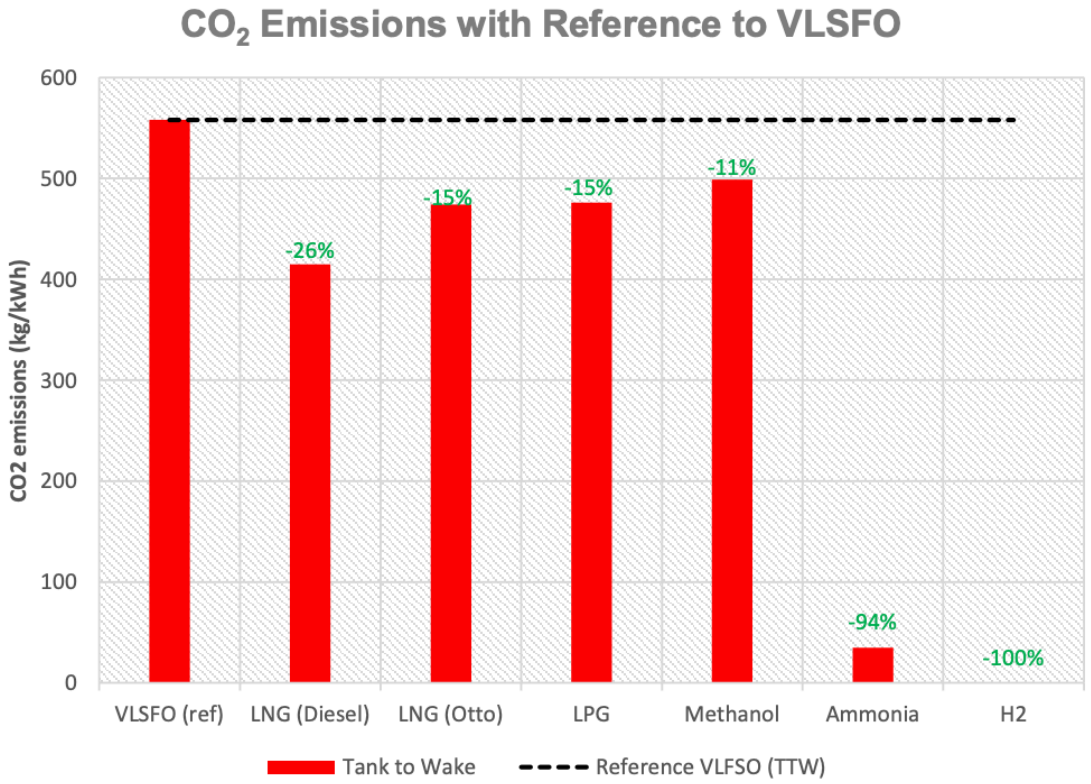
= Onboard Carbon Capture Systems/ and Storage
A range of technologies used to capture CO2 generated on-board vessels during operations for later use, storage or offloading and treatment. It may then be used or sequestered

→ Post-combustion:
removal of CO_2 from exhaust gases by separating it, and storing it onboard for eventual offloading
Many technologies exist or are being developed incl. chemical, physical, cryogenic, membrane-based etc.

→ Pre-combustion:
Separation of the carbon from the fuel to e.g. produce hydrogen and use it in dedicated energy conversion machinery (e.g. fuel cells)

1. What is OCCS

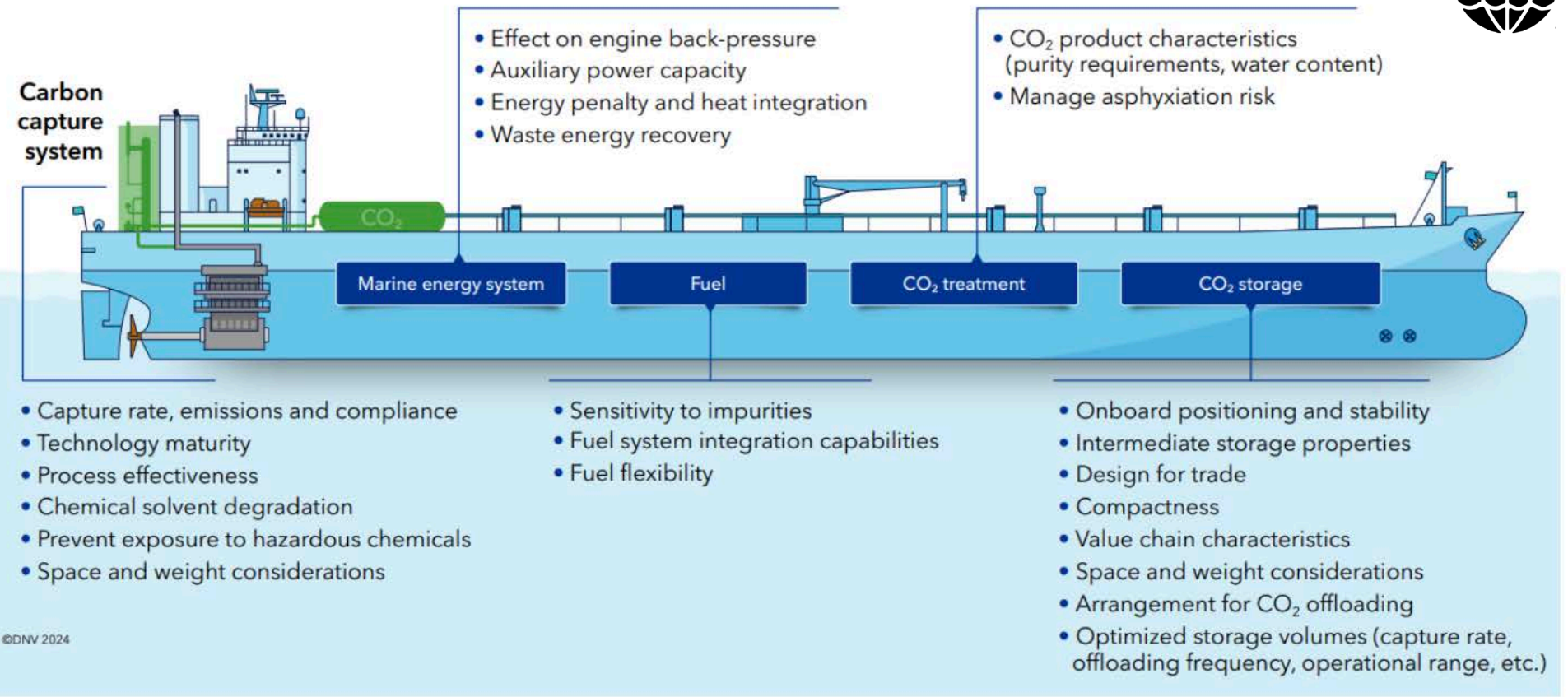
Despite an objective of net zero, most new fuels and technologies still emit CO2 (and small quantities of other GHGs) when used to produce energy and generally throughout their life cycle that starts with extraction.



https://theicct.org/wp-content/uploads/2021/06/Well-to-wake-co2-mar2021-2.pdf

OCCS is commonly viewed as an effective decarbonization measure, allowing continued use of well-established maritime fuels

Key parameters worth investigating when considering onboard carbon capture



Credit: DNV

https://safety4sea.com/dnv-key-considerations-for-onboard-carbon-capture/

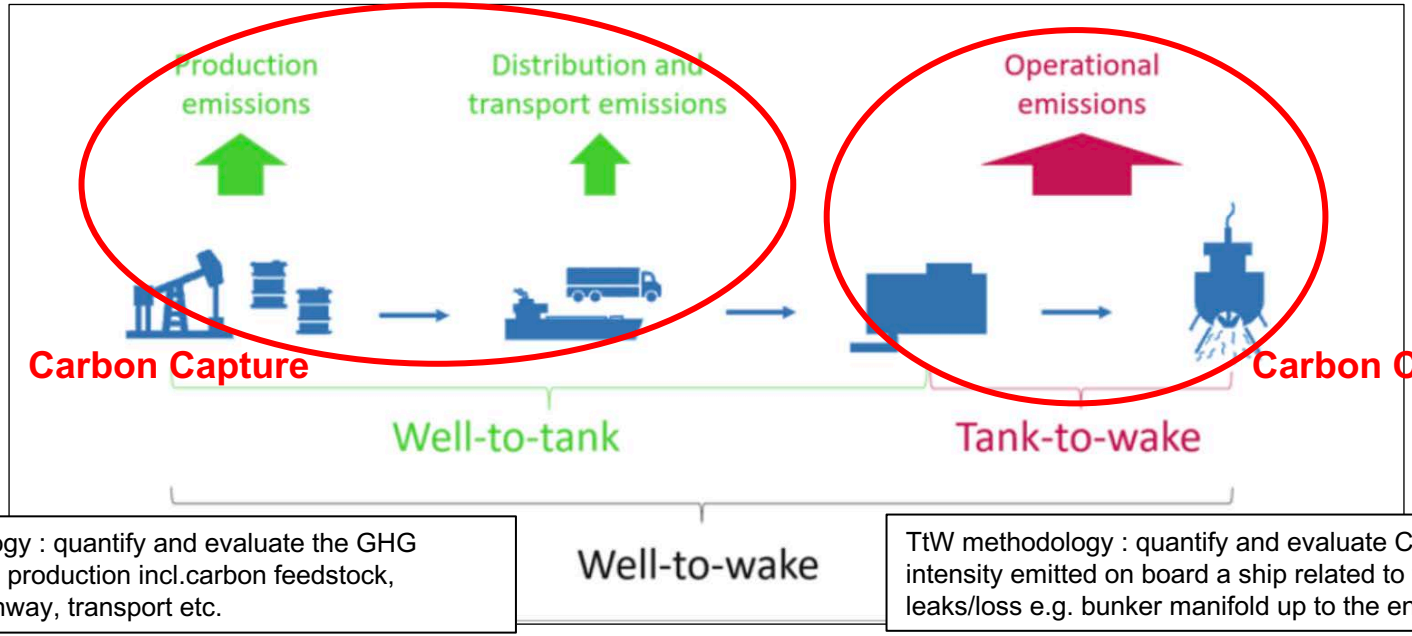
1. What is OCCS

BUT

- Space requirements (200+ to 20-50% space taken by fuel depending on fuel type)
- Water and Energy consumption (⚡ up to 45%)
- limited capture rates
- Port infrastructure and lack of defined pathways for offloading
- Safety concerns linked to the handling of CO2, risks of asphyxiation and toxicity
- Cost
- Waste treatment (water + gas)
- Lack of regulation

2. The IMO Approach

- The IMO GHG Strategy is focused on carbon emission from shipping
- Sophisticated and complex set of mechanisms focused on energy efficiency and carbon intensity with a central use of fuel Life Cycle Assessment (LCA)



WtT methodology : quantify and evaluate the GHG intensity of fuel production incl.carbon feedstock, production pathway, transport etc.

TtW methodology : quantify and evaluate CO2, CH4 and N2O intensity emitted on board a ship related to the fuel usage, incl leaks/loss e.g. bunker manifold up to the energy converter

Res. MEPC.391(81) March 2024

https://greenvoyage2050.imo.org/new-fuels-report-focuses-on-sustainability-and-life-cycle/

2. The IMO Approach

OCCS is …

- Recent in the IMO work on shipping decarbonisation
- Documents presented on the topic at MEPC79 emphasising the need for a holistic approach and careful consideration – item forwarded for consideration at MEPC80
- MEPC80 (July 2023), proposal for

  → a new workstream on OCCS by China, Japan, Liberia, Norway, RO Korea and ASEF (MEPC

  → a regulatory scoping exercise to ensure a robust regulatory framework for its use

  → the development of similar guidelines that 2021 EGCS Guidelines for SO2 w. equivalent approach re.testing, survey and certification incl on quality of discharge water + include in EEDI, EEXI and CII

  → environmental integrity incl respect of LC/LP

2. The IMO Approach

- ISWG-GHG 16 (March 2024) discussed the many submissions made and reported to MEPC 81
- MEPC 81 (Apr 2024) established an ICG

  - to develop a **work plan** on developing a **regulatory framework** for the use of onboard carbon capture systems with the exceptions of matters related to accounting of CO2 captured on board ships on this topic; and,

  - to submit a report to MEPC 83 (Apr 2025)

Accounting for OCCS in workstream on LCA frameworks?

- Points of discussion include the consideration of differences in technologies and approval process, the needs and means for monitoring and traceability and their scope, related questions on mandate (IMO?) for those activities once captured CO2 has been offloaded, etc.

3. CCS Regs under the LC and the LP

Deliberate placement …

… for disposal of waste and other matter

London Convention

Annexes: 1 → Forbidden
2 → Special permit
3 → General permit

London Protocol

Annex 1 identifies waste and matter can be disposed of

… of matter for a purpose other than mere disposal that is contrary to the aims of UNCLOS / LC-LP

3. CCS Regs under the LC and the LP

London Protocol Amendments for CCS and CO_2 Export

2006

Provided the basis for regulation of CO_2 sequestration in sub-seabed geological formation

Applies to all storage including research purpose

(Came into force in 2007)

2009

Enabled export of CO_2 streams for sequestration

(Has not yet entered into force, 11 acceptances as of April 2024)

2019

Allowed provisional application of the 2009 amendment

(8 declarations of provisional application as of April 2024)

2022

First bilateral agreement between Belgium and Denmark notified

From LC/LP Secretariat (IMO) presentation:
https://wwwcdn.imo.org/localresources/en/About/Events/Documents/Science%20Day%20Symposium%202024/1.%20IMO_Juhyun%20Park_Science%20Day%202024.pdf

3. CCS Regs under the LC and the LP

2006 Amendment framed as
a necessary removal of a barrier to CO_2 removal
which has been highlighted in the IPCC report as a necessary solution to decrease CO2 concentration in the atmosphere

BUT

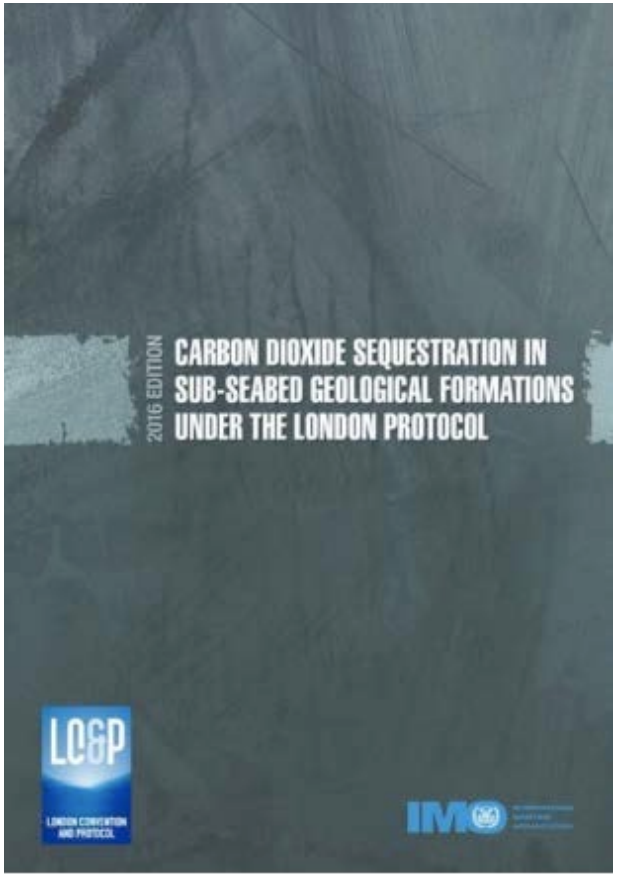
'should not be considered as a substitute to other measures to reduce carbon dioxide emissions, but considered such sequestration as one of a portfolio of options to reduce levels of atmospheric carbon dioxide and as an important interim solution'

3. CCS Regs under the LC and the LP

2012 Specific Guidelines for the Assessment of CO_2 for Disposal into Sub-Seabed Geological Formations - incl.

- CO_2 stream characterization,
- Waste prevention audit and consideration of waste management options,
- Action list (screening – acceptability for dumping),
- Identification and characterization of the sub-seabed geological formation and the surrounding environment,
- Determination of potential impacts,
- Permit issuance and condition,
- Project implementation and compliance monitoring,
- Field monitoring, and
- Mitigation or remediation plan.

https://wwwcdn.imo.org/localresources/en/OurWork/Environment/Documents/2012%20SPECIFIC%20GUIDELINES%20FOR%20THE%20ASSESSMENT%20OF%20CARBON%20DIOXIDE.pdf



3. CCS Regs under the LC and the LP

Status

12 ratifications and 9 provisional applications:
NOR (pa), UK (pa), NL (pa), Iran, Fin, Est, SE (pa), DK (pa), ROK (pa), Be (pa), Sw (pa), Aus (pa)

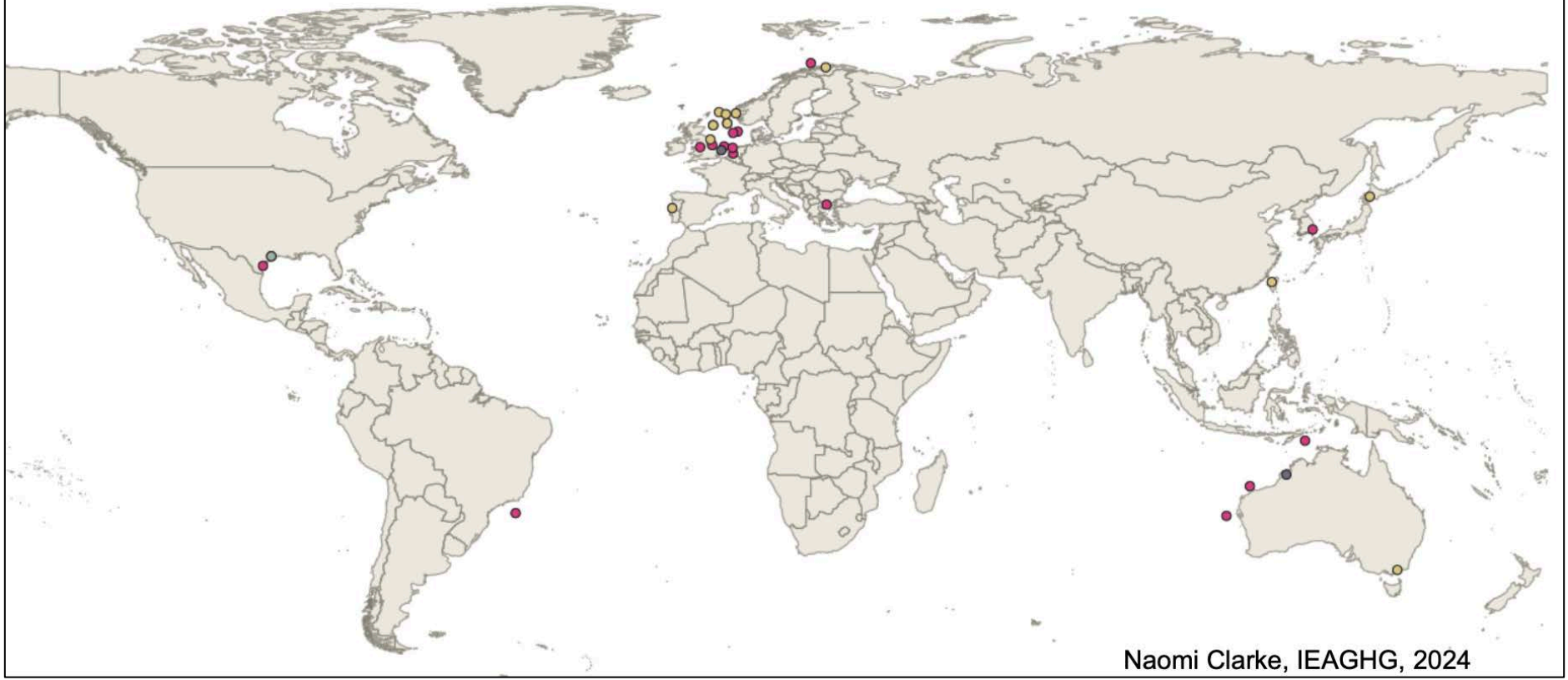
→ Many bilateral agreements on cross-border transports have been declared and more are in the making (e.g. DK with Be, NL, Fr, NOR, SE and UK with Be, DK and NOR)

→ Export to non-Contracting parties also growing and the subject of legal analysis by IEAGHG

However very far from the projections made by the IPCC and IEA

- IEA 2020 Roadmap of 4GT pa of CCS by 2035
- IEA 2023 Credible pathways to 1.5C includes 1.2GT pa by 2030
- IEA Net Zero by 2050 Roadmap: CCUS Project pipeline keeps increasing but still not meeting these purposes
- NDCs to 2030: 23 out of 162 submitted by March 2024
- more in the long-term low GHG-emission development strategies to 2050

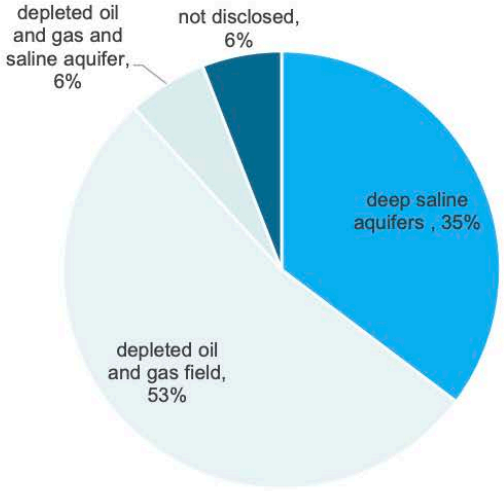
Projects operational or in development (2023)



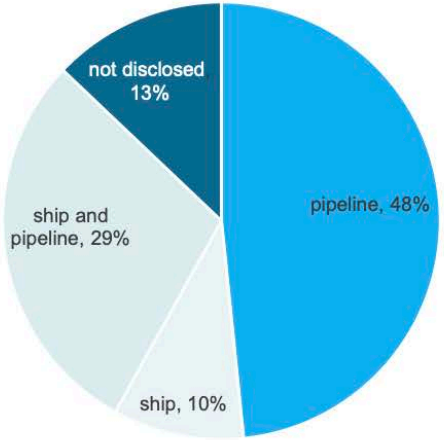
Naomi Clarke, IEAGHG, 2024

Project characteristics (2023)

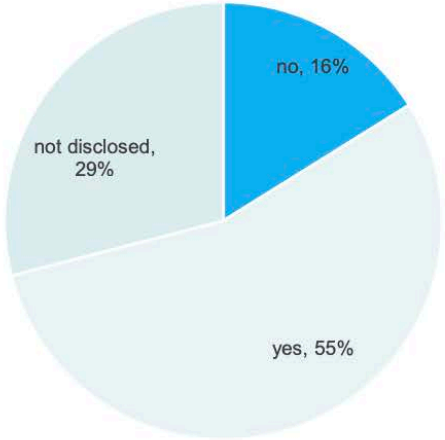
Storage Type (n=32)



Transport (n=32)



Infrastructure Re-Use (n=32)



Naomi Clarke, IEAGHG, 2024

https://www.imo.org/en/About/Events/Pages/Science-Day-2024.aspx

3. CCS Regs under the LC and the LP

On-going study of CCS experiences since 2023 to collect and shared information

→ Survey sent to all LC/LP Parties and responses are publicly available in the report of the CCS ICG (Chairs: Australia-Japan) LC46/6

→ includes questions on the application of the CCS Assessment Guidelines such as

- apportionment of responsibilities

→ Limited experience but willingness for experience sharing by CPs

4. UNCLOS & ITLOS 2024 Advisory Opinion

→ Coastal states (CS) have exclusive jurisdiction over the use of their seabed for CCS in the seabed of their territorial sea and in their continental shelf (UNCLOS Art.2 and 56)

→ Different text in UNCLOS on CS obligations to prevent pollution if the transport of CO2 to a subsea storage reservoir is operated

- **via a pipeline from shore** (Art 207)

  →*Nat'l regulations shall take into account internationally agreed rules, standards, procedures*

- **from a vessel, platform or man-made structure at sea** (Art 208)

  → Nat'l regulations must be *no less effective than international rules, standards and recommended practices and proc.*

→ **But** the situation is still to be read in light of the general obligation to take all the necessary measures against pollution (Art 194) with due diligence

4. UNCLOS & ITLOS 2024 Advisory Opinion

2024 Advisory Opinion submitted by the Commission of Small Island States (COSIS) on climate change and international law

- **Application to obligation under Article 194(1) to take all the measures necessary to prevent reduce and control pollution from any source:**

it requires States to act with "due diligence" in taking necessary measures to prevent, reduce and control marine pollution.

requires a State to put in place a national system, including ***legislation, administrative procedures and an enforcement mechanism necessary to regulate*** *the activities in question,* ***and to exercise adequate vigilance to make such a system function efficiently****, with a view to achieving the intended objective.*

the standard of due diligence varies depending on the particular circumstances to which an obligation of due diligence applies (e.g. risk of harm (probability or foreseeability) and urgency involved increase the standard)

- **The Advisory opinion also clarifies that compliance with the Paris Agreement may not meet obligations under Art 194.1 with respect to the protection of the marine environment**

4. UNCLOS & ITLOS 2024 Advisory Opinion

2024 Advisory Opinion – Cont'd

Recalls also the duties to

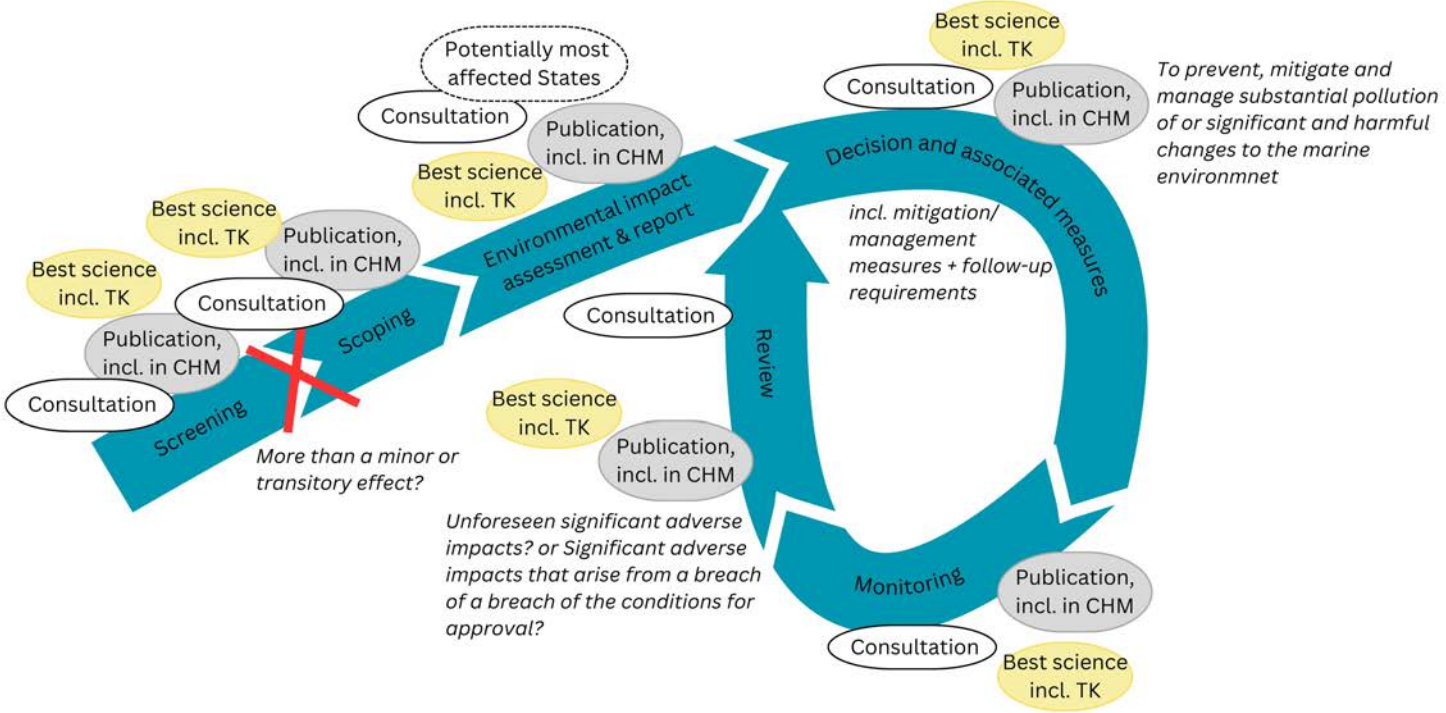
- → not transfer damage or hazards from an area to another or transform one type of pollution into another (Art 195)
- → Prevent pollution resulting from the use of technologies under their jurisdiction or control (Art 196)

4. UNCLOS & ITLOS 2024 Advisory Opinion

2023 BBNJ Agreement of 19 June 2023

- Ratified by 15 countries (but many more have announced working on it - 60 needed for entry into force)
- Already signed by 102 countries
- Many provisions seen as codifying existing international law
- Provisions can also have an interpretive value of language of UNCLOS thereby carrying effects within national jurisdiction too
- Includes a Part on EIA : to prevent, mitigate and manage significant adverse impacts (substantial pollution of /significant and harmful change to the ME)
- Cumulative impacts defined as ***combined and incremental*** *impacts resulting from* ***different activities****, incl. known past and present and reasonably forceable activities, or from the repetitions of similar activities over time, and the consequences of of climate change, ocean acidification and related impacts* [Art.1(6)]
- Implications of this definition if applied through UNCLOS to OCCS?

4. UNCLOS & ITLOS 2024 Advisory Opinion



→ Unnecessary to carry out a screening / EIA of a planned activity if

The assessment conducted according to the requirements under an IFB is equivalent and the results have been taken into account,

Or the process is designed to keep effects below the threshold for EIAs

6. Prospects

Many variables and moving parts:

- Level of ambitions at IMO, scoping and stringency of work plan and regulatory framework in negotiation

- progress in experience building and associated costs and barriers

- development of carbon accounting methodology under the UNFCCC: how to articulate with IMO OCCS regulatory developments and LC/LP

- Political will