# MARIUS

SCANDINAVIAN INSTITUTE OF MARITIME LAW

## Selected master theses 2018

512

# Selected master theses 2018

MarIus nr. 512
Sjørettsfondet
Nordisk institutt for sjørett
Universitetet i Oslo

ISSN: 0332-7868

Sjørettsfondet
University of Oslo
Scandinavian Institute of Maritime Law
P.O. Box 6706 St. Olavs plass 5
N-0130 Oslo
Norway

Phone: 22 85 96 00
E-post: sjorett-adm@jus.uio.no
Internet: www.jus.uio.no/nifs

Editor: Professor dr. juris Trond Solvang –
e-mail: trond.solvang@jus.uio.no

For subscription and single-copy sale, please see Den norske bokbyen
– The Norwegian Booktown
Internet: http://bokbyen.no/en/shop/
E-mail: post@bokbyen.no

Print: 07 Media AS

# Editor's preface

This issue of MarIus contains two highly relevant LLM-master theses selected among those submitted during 2018.

Alice O'Brien's thesis deals with the liability framework for the shipping phase of carbon capture and storage (CCS). It offers a critical study of the liability regime for $CO_2$ leakage during cross-border $CO_2$-shipping activities in the North Sea. It has been written as part of the LLM Maritime Law program, while at the same time forming part of the Institute's research on legal aspects of CCS with the support of the Norwegian CCS Research Centre (NCCS) under the Norwegian research program Centres for Environment-friendly Energy Research (FME) (Grant No. 257579/E20).

Elena Norkina's thesis addresses Arctic port States' competence under the law of the sea to regulate emissions of black carbon from ships. The topic of the thesis falls within the Institute's research on Arctic and the law of the sea. The thesis was written as a part of the LLM Public International Law program at the Law Faculty of the University of Oslo.

Trond Solvang

# Content overview

# The liability framework for the shipping phase of carbon capture and storage:

## A critical study of the liability regime for $CO_2$ leakage during cross-border $CO_2$-shipping activities in the North Sea.

Alice O'Brien

# Innhold

# Summary

Carbon capture and storage (CCS) has been heralded as a vital tool in the global fight against climate change, with a crucial role in tackling $CO_2$ emissions whilst ensuring energy security. Except where infrastructure is located directly above a geological storage site, captured $CO_2$ must be safely transported to the injection reservoir. Accordingly, the transport chain is a central link in the establishment of full-scale CCS facilities and there is a pressing need to ensure the proper regulation of transport options to ensure optimisation of the chain.

This thesis explores the legal challenges with the liability framework which regulates $CO_2$ leakage during cross-border $CO_2$-shipping activities in the North Sea. The aim of this thesis is to bring clarity to rhetoric in this area by identifying and analysing the key instruments applicable to $CO_2$-shipping in respect of loss of cargo within the North Sea. It examines the shortcomings of the liability regime for $CO_2$-shipping and suggests ways in which it may be revised to better account for the particular nature of the CCS value chain. It suggests that entry into force of the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea 2010 would overcome many of the challenges of the current regime by implementing a global, harmonised liability regime. Additionally, it argues that inclusion of shipping within Directive 2009/31/EC and the EU Emissions Trading Scheme is necessary to integrate $CO_2$-shipping into the CCS value chain and incentivise the deployment of $CO_2$-shipping in the North Sea.

**Keywords:** CCS, North Sea, $CO_2$-shipping, cross-border transport, shipowner liability

# Foreword

This thesis was written in completion of a Master of Maritime Law (LL.M) at the Scandinavian Institute of Maritime Law in Oslo, Norway. It is hoped that the conclusions and recommendations offered will provide valuable insight for the successful integration of $CO_2$-shipping into the CCS value chain.

The thesis would not have been possible without the support and guidance of many individuals who extended their assistance throughout its preparation and completion.

I would first like to thank my thesis supervisors, Professor Catherine Banet and Professor Trond Solvang, for their invaluable guidance throughout the year. In particular, I am grateful to Professor Catherine Banet for introducing me to the area of energy law and giving me the opportunity to study such an interesting thesis topic with the Norwegian CCS Research Centre.

Secondly, I would like to express my appreciation to the many academic commentators and industry experts who have contributed to my thesis. I am thankful to those who have taken the time to speak with me over the last ten months and offer thoughts on my research question. In particular, Jan Engel de Boar and Edmund Hughes (International Maritime Organisation); Ruben Larsen and Heidi Seglem (Equinor); Peter Brownsort (Scottish Carbon Capture & Storage); John Patterson and Roderick Paisley (University of Aberdeen); Gerben Dijkstra (Anthony Veder); Viktor Weber (UiO/Norwegian CCS Research Centre) and Viggo Bondi (Norwegian Shipowners' Association). I would also like to thank the International Maritime Organisation for extending an attachment to the Secretariats' Maritime Knowledge Centre for the purposes of my research.

Finally, I wish to thank my family and friends for their endless support and encouragement. I am particularly grateful to my parents for their time and advice during what has been a very challenging year in Norway.

Alice O'Brien

# Abbreviations

| | |
|---|---|
| **CAPEX** | Capital expenditure |
| **CCS** | Carbon capture and storage |
| **CCS Directive** | Directive 2009/31/EC on the geological storage of carbon dioxide |
| **CS** | Continental Shelf |
| **$CO_2$** | Carbon dioxide |
| **EC** | European Commission |
| **EEA** | European Economic Area |
| **EEZ** | Exclusive Economic Zone |
| **EFTA** | European Free Trade Association |
| **ELD** | Environmental Liability Directive |
| **EOR** | Enhanced oil recovery |
| **ETS** | Emissions Trading Scheme |
| **ETS Directive** | Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the community |
| **EU** | European Union |
| **GhG** | Greenhouse gas |
| **GT** | Gross tonnage |
| **HNS** | Hazardous and noxious substances |
| **HNS Convention** | Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances |
| **IEA** | International Energy Agency |
| **IGC** | International Gas Carrier |
| **IMO** | International Maritime Organisation |
| **IPCC** | Intergovernmental Panel on Climate Change |
| **LLMC** | Convention on Limitation of Liability for Maritime Claims |
| **LNG** | Liquified natural gas |
| **MRV** | Monitoring, reporting and verification |

| | |
|---|---|
| **NCCS** | Norwegian Carbon Capture and Storage Research Centre |
| **O&G** | Oil and gas |
| **RSO** | Registered shipowner |
| **SCCS** | Scottish Carbon Capture and Storage |
| **SDR** | Special drawing rights |
| **SOLAS** | International Convention for the Safety of Life at Sea |
| **TS** | Territorial Sea |
| **UN** | United Nations |
| **UNFCCC** | United Nations Framework Convention on Climate Change |

# 1 Introduction

## 1.1 Research context

The UNFCCC heralds climate change as the 'common concern of humankind'; placing binding obligations on the international community to strive for a reduction in GhG emissions.[1] This has initiated a gradual move towards traditional mitigation measures such as the development of renewable energy sources and the improvement of energy efficiency.[2] Additionally, it has encouraged the development of newer technologies such as CCS.

CCS allows the continued use of fossil fuels without emitting high $CO_2$ levels into the atmosphere by capturing $CO_2$ produced from energy generation and industrial processes and permanently storing it in onshore or sub-seabed reservoirs.[3] This could be an important measure to significantly reduce levels of $CO_2$ in the atmosphere.[4] The technology provides mitigation during a transitional period, allowing the continued use of fossil fuels while societies dependence on their use is reduced gradually and large-scale renewable projects are matured. It is therefore a vital tool in the global fight against climate change, playing a crucial role in tackling $CO_2$ emissions whilst ensuring energy security.[5]

---

1 United Nations Framework Convention on Climate Change (adopted 9 May 1992, in force 21 March 1994) UNTS Volume 1771 Number 30822, Preamble; Kyoto Protocol to the UNFCCC (adopted 11 December 1997, in force 16 February 2005) UNTS Volume 2303 Number 30822, Article 3.

2 Wilbert Grevers and Lennart Luten, 'Introduction to the CCS Chain: Technological aspects and safety risks,' in *'Legal Design of Carbon Capture and Storage – Developments in the Netherlands from an International and EU Perspective,'* eds. Martha Roggenkamp and Edwin Woerdman, Volume 10 Energy & Law (Oxford: Intersentia, 2009), 5.

3 ibid.

4 IPCC, *'Special Report on Global Warming of 1.5 °C,'* Summary for Policymakers, approved at First Joint Session of Working Groups I, II and III and accepted by the 48th Session of the IPCC, Incheon, Republic of Korea, 6th October 2018, 31–32.

5 Zero Emissions Platform, '*CCS: an essential technology to reconcile energy security with climate objectives,'* (The Hague: ZEP, 2014), 1, http://www.zeroemissionsplatform.eu/library/publication/247-ccsenergysecurity.html.

There are three key elements to the CCS value chain: capture, transport and storage.[6] In order for CCS to become commercially viable, each element in the chain must link together effectively.[7] Except where infrastructure is located directly above a storage site, captured $CO_2$ must be safely transported from the capture location to the injection reservoir.[8] Accordingly, the transport chain is a central link in the establishment of full-scale CCS facilities.

The two most commercially viable transport options are pipelines and ships.[9] Pipelines have generally been considered the most feasible option as there is already experience in $CO_2$ pipelines, for the purposes of EOR.[10] However, $CO_2$-shipping is an important alternative to pipeline transportation in several circumstances. For example, shipping can promote $CO_2$ storage in the initial phases of CCS, when capture locations are few and at large distances from each other.[11] This is because shipping provides a low-threshold for engagement with storage facilities, by offering a transport option when the volume of $CO_2$ is too low to justify the high CAPEX of pipeline infrastructure.[12] Additionally, $CO_2$-shipping is cost-effective in locations where there are small, disparate injection reservoirs which individually do not justify the long-term commitment

---

6 Andy Raine, 'Transboundary Transportation of $CO_2$ Associated with Carbon Capture and Storage Projects: An Analysis of Issues under International Law,' *Climate Change Law Review* Volume 4 (2008): 355.

7 Rolf de Vos (ed.), *'Linking the Chain: Integrated CATO2 knowledge prepares for the next step in $CO_2$ Capture & Storage,'* WP0.A-D18 (Zutphen: CATO2 onderzoeksprogramma, 2014), 12.

8 IPCC, '*Special Report on CCS,'* prepared by Working Group III (Bert Metz et al. eds.) (Cambridge: Cambridge University Press, 2005), 29.

9 Nils Røkke et al, *'Building Nordic Excellence in CCS NORDICCS – The Nordic CCS Competence Centre,'* (Oslo: SINTEF, 2016), 58.

10 Vos, *'Linking the Chain'*, 82.

11 Filip Neele et al., '$CO_2$ Transport by Ship: The Way Forward in Europe,' *Energy Procedia* Volume 114 (2017): 6824, doi: 10.1016/j.egypro.2017.03.1813.

12 Nils Rydberg and David Langlet, '*CCS in the Baltic Sea region – Bastor 2 Work Package 4 – Legal & Fiscal aspects,'* Elforsk report 14:48 (Stockholm: Elforsk, 2014), 46; Røkke et al., *'Building Nordic Excellence,'* 6; Wim Mallon et al., 'Costs of $CO_2$ transportation infrastructures,' *Energy Procedia* Volume 37 (2013): 2970.

of pipelines.[13] Shipping is also an important option in States with limited storage capabilities because it offers a practical solution for the transport of $CO_2$ to suitable storage sites, thus overcoming the major hurdle of developing long-distance transport systems.[14] This could encourage the development of cross-border transport options and the regular transboundary movement of $CO_2$-ships, which is essential if CCS is to make a significant contribution to climate mitigation efforts.[15] Finally, shipping offers increased flexibility compared to pipelines with regards to the transportation route. This flexibility could allow $CO_2$ to be centrally collected in smaller volumes from individual emission sources, before further transport to storage sites. The sharing of transport facilities in this way reduces the overall cost of $CO_2$ transport and may provide the necessary conditions to accelerate regional CCS infrastructure.[16]

Accordingly, if CCS is to become a full-scale reality, the benefits of $CO_2$-shipping must be integrated into the chain as a transportation option. This envisages the use of ships in transporting $CO_2$, where pipelines are not a commercial or practical possibility.

## 1.2 Research question and importance

In 2005, the IPCC issued a Special Report on CCS identifying that the future of CCS rested on a number of factors, including the development of specific legal and regulatory frameworks.[17] For CCS to reach its potential

[13] Mitsubishi Heavy Industries, *'Ship Transport of* $CO_2$*,'* R&D Programme IEA GhG Report No.PH4/30 (Paris: IEA, 2004), 3–4, 16; Robert de Kler et al., *'Transportation and unloading of* $CO_2$ *by ship – a comparative assessment: WP9 Final Report,'* CCUS-T2013-09-D08, 2016, 5-6.

[14] Røkke et al., *'Building Nordic Excellence,'* 10; SCCS, *'SCCS Recommendations and Conference 2013 Report: Unlocking North Sea* $CO_2$ *Storage for Europe: Practical actions for the next five years'* (Aberdeen: SCCS, 2013), 30; Robert de Kler et al., *'Transportation and unloading of* $CO_2$ *by ship*,' 6, 12; Filip Neele, Hans Haugen and Ragnhild Skagestad, 'Ship transport of $CO_2$ – breaking the $CO_2$-EOR deadlock,' *Energy Procedia* Volume 63 (2014): 2643, doi: 10.1016/j.egypro.2014.11.286.

[15] Vos, *'Linking the Chain,'* 118; Raine, 'Transboundary Transportation,' 355.

[16] Rydberg and Langlet, '*CCS in the Baltic,'* 46.

[17] IPCC, *'Special Report on CSS: Summary for Policymakers,'* A Special Report of Working Group III (Cambridge: Cambridge University Press, 2005), 15; Global CCS Institute/

as a full-scale mitigation option, legal frameworks must be in place to ensure safe and environmentally-sound deployment. This has prompted changes to international and regional laws, including the creation of a tailor-made CCS Directive in the EU.[18] Whilst these regulatory initiatives have removed many of the barriers preventing CCS deployment, they have focused more on pipeline transport than shipping.[19] This stems from widespread practical experience in large-scale $CO_2$ pipeline transport compared to $CO_2$-shipping, which is only existent on a small-scale.[20] To support the deployment of large-scale $CO_2$-shipping, legal and regulatory frameworks need to be developed which integrate shipping within the CCS value chain.

The aim of this thesis is to consider the legal liability regime for damage which can be attributed to leakage of $CO_2$ from the transporting ship's cargo, from the time the ship receives $CO_2$ from the capture facility, to the delivery of $CO_2$ for injection into an offshore sub-seabed reservoir. The question of liability for damages caused by a loss of containment is crucial because the environmental objective of CCS is to reduce the levels of $CO_2$ in the atmosphere and leakage of captured $CO_2$ during transportation should therefore be avoided.[21]

UCL, *'Carbon Capture Use and Storage Legal Resource Net'* (London: Global CCS Institute, 2014), section 1.

18 Directive 2009/31/EC on the geological storage of carbon dioxide; Resolution LP.1(1)) on the amendment to include $CO_2$ sequestration in sub-seabed geological formations in Annex 1 to the London protocol inserting Annex 1(4) 2006; OSPAR Commission Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations.

19 Peter Brownsort, *'Ship transport of* $CO_2$ *for Enhanced Oil Recovery – Literature Survey,'* EOR Joint Industry Project WP15 (Aberdeen: SCCS, 2015), 9, 32; Kim Johnsen et al., 'DNV Recommended Practice: Design and Operation of $CO_2$ Pipelines,' *Energy Procedia* Volume 4 (2011): 3032, doi: 10.1016/j.egypro.2011.02.214.

20 Sarah Forbes and Preeti Verma, *'CCS Guidelines: Guidelines for Carbon Dioxide Capture, Transport, and Storage,'* (Washington DC: World Research Institute, 2008), 43.

21 Martha Roggenkamp, 'Transportation of Carbon Dioxide in the European Union: Some Legal Issues,' in *'Carbon Capture and Storage: Emerging Legal and Regulatory Issues'* eds. Ian Havercroft, Richard Macrory and Richard Stewart (Portland Oregon: Hart Publishing, 2018), 245–246.

Legal liability issues remain critically important for the deployment of shipping-based CCS.[22] To incentivise investment in the shipping phase of CCS, the liability regime applicable to $CO_2$-shipping must provide operators with legislative transparency, clarity and stability.[23] This will ensure stakeholders engaged in CCS can properly quantify their risk exposure. It will also ensure the management and monitoring of activities by States and protect the environmental integrity of the CCS value chain.[24] This encourages public support for the technology by ensuring the safe deployment of CCS whilst providing a clear model for remediating damage.[25]

At present, $CO_2$-shipping liabilities for loss of containment are not specifically regulated within the CCS value chain and therefore, rely on the fragmented application of existing national and EU laws. This is unsatisfactory because it not only fails to ensure the comprehensive regulation of all the types of damages which could arise from $CO_2$-shipping; but the provisions which do apply, lack the clarity necessary to drive investment in $CO_2$-shipping. A more effective liability regime would balance environmental objectives in climate mitigation with the need to ensure that CCS is commercially attractive to investors. This means that the liability regime must protect the environmental integrity of the chain by incentivising the safe carriage of captured $CO_2$ to suitable storage reservoirs. Further, it must impose clearly defined and fair liabilities on operators to incentivise investment in $CO_2$-shipping.[26] Given the flexibility of shipping transportation routes, these liabilities must adequately consider circumstances where $CO_2$ is transported across national boundaries to suitable storage sites or regional CCS infrastructure.

---

22 Global CCS Institute/UCL, *'Legal liability and carbon capture and storage: a comparative perspective,'* (London: Global CCS Institute, 2014), 5.

23 Baker McKenzie, *'Report to the Global CCS Institute on Legal and Regulatory Developments related to Carbon Capture and Storage between November 2010 – June 2011,'* (Global CCS Institute, 2011), 5.

24 Vos, *'Linking the Chain'*, 116–117.

25 ibid.

26 Baker McKenzie, *'Report to the Global CCS,'* 5.

With these considerations in mind, this thesis will critically assess the shortcomings of the liability regime for $CO_2$-shipping in respect of loss of cargo during cross-border transport. The ambition of the thesis is to put forward recommendations that will encourage the adoption of a more effective and balanced legal liability framework which clarifies the potential liabilities of operators, incentivises investment and encourages public support for the deployment of CCS.

## 1.3 Case study: North Sea

The North Sea has been identified as the most logical place to start CCS in the EU because it has the largest storage capabilities.[27] Additionally, it is surrounded by major industrial regions which could supply $CO_2$, has existing O&G infrastructure which could be utilised to reduce the start-up costs of storage and it has experience in offshore industries which could develop the storage sector.[28] It is also surrounded by States such as Norway which support the deployment of large-scale CCS.[29]

Shipping is regarded as a key transportation option to deploy CCS in the North Sea region because of its benefits in linking multiple small-scale emitters with storage sites, whilst avoiding the large investment costs needed for pipelines.[30] Shipping is also the only option for States located within the Baltic Sea region which have limited storage capacity and require the long distance transport of $CO_2$ to the North Sea for storage.[31] For these reasons, the North Sea Basin Task Force expect that $CO_2$ transport solutions will require the establishment of cross-border transport infrastructure within the North Sea.[32] They anticipate that

[27] SCCS, '*SCCS Recommendations*,' 4; Stig Svenningsen, '*What is the North Sea Basin Task Force?*' PowerPoint on behalf of Norwegian Ministry of Petroleum and Energy (London: CCS Association), 6.

[28] SCCS, '*SCCS Recommendations*,' 10–11; Keith Whiriskey, '*North Sea to the Rescue: The commercial and industrial opportunities of* $CO_2$ *storage in the North Sea*,' (Bellona: Norway, 2015), 9.

[29] Whiriskey, '*North Sea to the Rescue*,' 9.

[30] SCCS, '*SCCS Recommendations*,' 29–30.

[31] Røkke et al., '*Building Nordic Excellence*,' 58.

[32] Svenningsen, '*What is the North Sea*,' 7.

cross-border transport will play a central role in storage activities by 2030 by allowing the delivery of $CO_2$ from multiple countries to North Sea storage sites.[33]

Given the importance of the North Sea in deploying CCS in the EU and the important role $CO_2$-shipping is expected to play in cross-border transport activities in the North Sea, it is an ideal case study to examine the liability regime applicable to transboundary $CO_2$-shipping. This thesis will therefore focus on identifying the key liability instruments applicable to circumstances where there is a loss of containment during transboundary $CO_2$-shipping in the North Sea. The thesis does not intend to provide a comprehensive analysis of national laws in the North Sea region, but will consider national laws as a tool to highlight the uncertainties that exist in the liability regime for $CO_2$-shipping activities with a cross-border element. Of greater importance are the rules developed at the EU and IMO levels. These are considered in more detail to highlight the potential inadequacies following the anticipated entry into force of the HNS Convention.[34]

## 1.4 Methodology and scope limitation

The method of legal research was the doctrinal analysis of both primary and secondary library sources such as treaties, legal reports and literature. This required analysis of both the existing regime based on national and EU law as well as an in-depth analysis of the emerging global regime under the HNS Convention. It therefore adopts both a *de lege lata* and *de lege feranda* approach to consider how far the existing and emerging liability regimes contribute to the presence of effective legal frameworks through the CCS value chain. Fieldwork meetings, interviews and pres-

[33] ElementEnergy, *'One North Sea: A study into North Sea cross-border* $CO_2$ *transport and storage – Executive Summary,'* Report on behalf of North Sea Basin Task Force 2010, 18.

[34] International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (adopted 3 May 1996).

entations were also conducted within the maritime and energy industries to develop the research question.[35]

The scope of this thesis is limited to discussion of the liabilities of the shipowner as a result of loss of containment during $CO_2$-shipping. The 'shipowner' could be defined as the RSO, charterer, manager or operator of the ship, depending on the specifics of the transport document. In the start-up phase of CCS, $CO_2$-ships are likely to be purpose built by RSOs to serve long-term contracts with a capture operator.[36] With this in mind, this thesis will limit discussion to the potential liabilities of the RSO engaged in $CO_2$-shipping.

Finally, this thesis broadly defines the term '$CO_2$-shipping' as encompassing all three elements of the shipping phase: loading, transport and unloading. However, individual elements of the $CO_2$-shipping phase will be taken separately when necessary.

## 1.5 Ongoing regulatory uncertainty

This thesis would be incomplete without noting that CCS including the transboundary movement of $CO_2$ are prohibited under Article 6 of the London Protocol.[37] In its current form, the Protocol places a real barrier on the deployment of cross-border CCS and it is essential that its amendment be ratified by the requisite number of States before cross-border $CO_2$-shipping becomes a large-scale reality.[38] In the interim, the IEA have

35 See 'Acknowledgements' for further detail.

36 Gerben Dijkstra (Business Development Manager, Anthony Veder), telephone interview with author 12/01/2018.

37 Protocol to the Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 17 November 1996, in force 24 March 2006); Resolution LP.3(4) on the amendment to Article 6 of the London Protocol inserting Article 6(2) 2009.

38 Tim Dixon, Sean McCoy and Ian Havercroft, 'Legal and Regulatory Developments on CCS,' *International Journal of Greenhouse Gas Control* Volume 40 (2015): 435–436, doi: 10.1016/j.ijggc.2015.05.024; J.M. Brewers, *'Review of International Conventions having Implications for the Storage of Carbon Dioxide in the Ocean and Beneath the Seabed,'* R&D Programme IEA GhG Report PH4/16 (Paris: IEA, 2003), 17.

recommended six options to enable transboundary movement of $CO_2$.[39] This thesis works on the assumption that these options are utilised in the North Sea pending further ratification of the Protocol amendment.

## 1.6 Structure

Beyond the introduction, this thesis comprises five chapters.

Chapter 2 examines the risks of leakage during $CO_2$-shipping and the potential damage as a result of $CO_2$ leakage. It concludes that the potential scale of $CO_2$-shipping within the North Sea, requires the development of an effective liability regime to govern the loss of $CO_2$ during $CO_2$-shipping.

Chapter 3 considers the current regime applicable to circumstances where cargo is lost during $CO_2$-shipping. This includes analysis of the rules governing third-party, environmental damage and GhG emissions liabilities. It suggests there are two inadequacies within the current liability regime which could hinder the deployment of $CO_2$-shipping. Firstly, the lack of harmonisation between Member States in the North Sea in respect of $CO_2$-shipping liabilities and secondly, the failure to properly integrate shipping into the EU's GhG emissions liability framework. The chapter concludes by highlighting there is need for reform of the current regime to promote the deployment of $CO_2$-shipping in the North Sea.

Chapter 4 considers how the current regime could be reformed by the HNS Convention, to better harmonise $CO_2$-shipping liability laws between Member States. It recognises the Convention creates a global liability regime which provides greater certainty for RSOs, investors and victims. Nevertheless, it argues there are limitations of the Convention with regards to its application to CCS, including the risk of continued fragmentation despite its entry into force. The chapter concludes by

[39] Organisation for Economic Co-operation and Development/IEA, *'Working Paper: Carbon Capture and Storage and the London Protocol – Options for Enabling Transboundary* $CO_2$ *Transfer'* (Paris: OECD/IEA, 2011),6; Tom Mikunda and Avelien Haan-Kamminga, *'Overcoming national and European legal barriers to* $CO_2$ *transport and storage in the North Sea,'* CATO2-WP4.1-D0 2013, 18.

suggesting entry into force of the Convention is desirable but that future amendments may be necessary.

Chapter 5 assesses the need for integration of shipping within the EU's CCS framework. It suggests that amendments to the CCS Directive and ETS Directive must be considered to properly hold RSOs accountable for $CO_2$ emissions in the North Sea and incentivise investment in shipping-based CCS.

The final chapter will conclude that there is need for reform of the liability regime to ensure deployment of $CO_2$-shipping in the North Sea. It recommends firstly, entry into force of the HNS Convention to better harmonise liabilities between Member States; and secondly, amendments to the CCS Directive and ETS Directive to ensure the effective integration of $CO_2$ -shipping within the CCS value chain.

# 2 The risks of $CO_2$-shipping

Legal liability frameworks are required to protect against risks posed by the injurious potential of commercial activities. It must therefore be established that $CO_2$-shipping risks causing damage which requires legal protection. This chapter will suggest that the scale of planned CCS projects introducing a shipping phase and the potential magnitude of damage following unintended leakage of $CO_2$, justifies the need for an effective liability regime, in particular in the North Sea region.

## 2.1 Risk of $CO_2$ leakage

$CO_2$ exists in three phases: gaseous, liquid or solid (dry ice). Economically viable large-scale $CO_2$-shipping will mandate transportation of $CO_2$ in the liquid phase for increased density and volume reduction.[40] The recommended conditions to transport in the liquid phase are pressures above atmospheric (0.7 MPa) and low temperatures up to -50°C.[41] Although much higher pressures (up to 4.5 MPa) are feasible when temperatures are increased.[42] Technical capabilities to construct large-scale $CO_2$-ships exist today, with existing $CO_2$-ships being semi-refrigerated to ensure cargo remains liquid during transportation.[43] Liquid $CO_2$ is categorised as a harmful, non-toxic and non-flammable substance under IMO clas-

40 Grevers and Luten, *'Introduction to the CCS,'* 8.

41 Mitsubishi Heavy Industries, *'Ship Transport,'* 20.

42 Gassnova/Gassco, *'Feasibility study for full-scale CCS in Norway,'* English translation (Ministry of Petroleum and Energy, 2016), 12, 24.

43 Ragnhild Skagestad et al., *'Ship transport of* $CO_2$ *Status and Technology Gaps,'* SINTEF Tel-Tek Report No.2214090 (Porsgrunn: Gassnova, 2014), 7–9; Global CCS Institute/ WorleyParsons, *'Strategic analysis of the global status of carbon capture and storage. Report 1: status of carbon capture and storage projects globally,'* (Global CCS Institute, 2009), C-7.

sifications.[44] SOLAS makes the IGC Code mandatory for $CO_2$-ships.[45] The Code prescribes design, construction and equipment standards for ships carrying liquefied $CO_2$ to minimise risks of transportation. $CO_2$-ships are constructed using similar technology to existing LNG carriers, with modern LNG carriers reaching more than 200,000 $m^3$ capacity.[46] Feasibility studies on $CO_2$-shipping have so far considered tankers carrying up to 50,000 tonnes of liquid $CO_2$.[47] If the carriage of these quantities is realised, there is potential for mass leakage of $CO_2$ from cargo holds.

Maritime accidents as a result of human error are the most common source of cargo leakage.[48] Collisions and groundings caused by factors such as insufficient communication or fatigue may lead to rupture of the cargo tank.[49] Extensive safety procedures and high levels of crew training on LNG tankers has proved effective in reducing the occurrence of maritime accidents, with no major incidents to date.[50] Although large-scale $CO_2$-ships are predicted to have similar safety projections to LNG, the human element of shipping always risks accidents in port or at sea.[51] Fugitive emissions occur as a result of unintended, physical leakage of cargo during transportation. Inadequate tanker construction may lead to cracking of the hold or irregular leakage through valves when subject to the extreme pressures and temperatures required for transporting liquid

44 UN Recommendations on the Transport of Dangerous Goods Model Regulations 19th Edition 2015; International Maritime Dangerous Goods Code (IMO, 2018 Edition), Class 2.2.

45 SOLAS (adopted 1 November 1974, in force 25 May 1980) Volume 1184/1185 Number 18961, Chapter VII; Resolution MSC. 5(48) on the adoption of the IGC Code, 1983; International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk 1983 (IMO, 2016 Edition).

46 IPCC, '*Special Report on CCS*,' 186.

47 Mitsubishi Heavy Industries, *'Ship Transport'*, 19.

48 IPCC, '*Special Report on CCS*,' 188.

49 Stipe Galic, Zvonimir Lusic and Ivica Skoko, 'The Role and Importance of Safety in Maritime Transportation,' *International Maritime Science Conference Book of Proceedings* (2014): 192, 198, https://bib.irb.hr/datoteka/700720.imsc2014.pdf.

50 IPCC, '*Special Report on CCS*,' 188.

51 Dik Gregory and Paul Shanahan, '*The Human Element: A guide to human behaviour in the shipping industry*' (London: The Stationery Office, 2010), 1–3.

gases. Standards for tanker design and structure, repair operations and early leak detection minimise the risk of fugitive emissions but will not remove the possibility entirely.[52] Operational leakages of cargo may also occur during transportation as a result of losses during intermediate storage, loading/unloading or evaporation during transportation.[53] This is a particular concern with regards to the risks of direct injection of $CO_2$ from a ship during unloading operations at offshore storage structures, which has not yet been fully tested.[54] There is therefore always the risk of $CO_2$ leakage from cargo holds as a result of maritime accidents, fugitive emissions and operational leakages during $CO_2$ loading, transportation and unloading operations.

## 2.2 Potential harms of $CO_2$ leakage

$CO_2$ leakage may be caused by slow gradual releases (fugitive emissions) or large sudden releases (maritime accidents) and the effects of the leakage will differ accordingly.[55] A change in temperature or pressure may alter the density of $CO_2$ and could result in a change of phase to gas or dry ice.[56] At atmospheric pressures, $CO_2$ is denser than air and may accumulate in low-lying areas (particularly if there is no air movement).[57] This presents asphyxiation risks due to air displacement which may stop the ships engines and in worst case, lead to death or unconsciousness of persons in the vicinity. $CO_2$ interactions with the sea in large-quantities are not yet fully understood but may lead to increased temperature differences, inducing strong currents and challenging navigational conditions.[58]

---

52 IMO, *'Carbon Dioxide Sequestration in Sub-Seabed Geological Formations under the London Protocol'* (London: IMO, 2016), 37.

53 Ragnhild Skagestad et al., '$CO_2$ transport from sources to storage in the Skagerrak/Kattegat region,' *Energy Procedia* Volume 4 (2011): 3016–3023, doi: 10.1016/j.egypro.2011.02.212.

54 Gassnova/Gassco, *'Feasibility study'* 34, 38, 45.

55 IMO, *'Carbon Dioxide Sequestration,'* 27.

56 Forbes and Verma, *'CCS Guidelines,'* 44.

57 ibid, 49.

58 Viktor Weber and Michael Tsimplis, 'The UK liability framework for the transport of $CO_2$ for offshore CCS operations,' *International Journal of Marine and Coastal Law*

Release of highly pressurised $CO_2$ also carries the risk of explosion and frostbite injuries.[59] Impurities in the captured $CO_2$ stream and the subsequent presence of other gases may also alter the expected consequences of leakages at sea.[60] The UK Marine Accident Investigation Branch revealed that the unintentional release of $CO_2$ from marine fire-extinguishing systems caused 72 deaths and 145 injuries between 1975 and 2000.[61] The 1986 Lake Nyos disaster killed over 1,700 people and 3,500 livestock when $CO_2$ escaped and displaced air within 25 kilometres.[62] Survivors were left with injuries such as paralysis, lesions and respiratory problems and inhabitants of the area were forced to evacuate.[63] It is therefore foreseeable that large releases of $CO_2$ in port or at sea could similarly lead to third-party damages such as loss of life, personal injury and property damage.

Additionally, $CO_2$ leakage may cause changes in ocean chemistry and induce localised ocean acidification; affecting marine ecosystems, corals and fisheries as well as local populations dependent on them.[64] Contributions to climate change and related indirect impacts of GhG emissions can also not be overlooked. Large releases of $CO_2$ from ships may have a profound effect on the climate due to its properties as a GhG.[65] This is particularly relevant given CCS is intended as a climate mitigation technology. The unintended leakage of $CO_2$ from cargo holds

*Volume* 32(a) (2017): 154, doi: 10.1163/15718085-12341419.

59 Weber and Tsimplis, 'The UK liability framework,' 154.

60 Global CCS Institute/Anthony Veder/Vopak, '*Knowledge sharing report. $CO_2$ liquid logistics shipping concept (LLSC): overall supply chain optimization*' (Global CCS Institute, 2011), 20.

61 Peter Harper, *'Assessment of the major hazard potential of carbon dioxide*' (Merseyside: UK Health and Safety Executive, 2011), 3.

62 George Kling et al., 'The 1986 Lake Nyos Gas Disaster in Cameroon, West Africa,' *Science* Volume 236 Issue 4798 (1987): 169, doi: 10.1126/science.236.4798.

63 ibid, 174.

64 Adna Pop, 'The EU Legal Liability Framework for Carbon Capture and Storage: Managing the Risk of Leakage While Encouraging Investment,' *Aberdeen Student Law Review* Volume 6 (2016): 39, https://www.abdn.ac.uk/law/documents/ASLR_Vol6_Dec15_32-56_Pop.pdf; IMO, *'Carbon Dioxide Sequestration,'* 26, 36.

65 Rieks Boekholt, *'Regulation of liability and safety in ship transport of $CO_2$ – a comparative analysis,'* CATO2-WP4.1-D11 2013, 36.

during $CO_2$-shipping could therefore present major hazards to both the localised and global environment.

## 2.3 The projected scale of $CO_2$-shipping in the North Sea

With the potential harms of $CO_2$-shipping in mind, any incident causing third-party, environmental or climate damage could provide grounds for liability of the RSO. Nevertheless, the risk of $CO_2$ leakage and the potential magnitude of damage only justifies consideration where the projected scale of $CO_2$-shipping is significant. $CO_2$-shipping has predominantly been used in the food and beverage industries, with only four small-scale ships in operation until 2005.[66] The risk of damage due to leakage was therefore relatively small and there was no pressing need to adopt a comprehensive liability regime for $CO_2$-ships. However, new developments such as the adoption of the 2015 Paris Agreement and the publication of the IPCC's 2018 Special Report indicate the need for larger recourse to mitigation strategies such as large-scale CCS.[67] This means that the quantity of $CO_2$ being transported for CCS will likely increase and with it, the potential magnitude of damage as a result of leakage during transportation. Specifically, this is relevant in the North Sea, where large-scale $CO_2$-shipping is expected to play a central role in planned CCS activities.[68]

The Norwegian Government aims to realise a full-scale CCS chain by 2022, by shipping $CO_2$ from capture facilities in Eastern Norway to receiving terminals located in Western Norway for onward pipeline transportation to the North Sea.[69] Additionally, the Rotterdam Climate

66 IPCC, '*Special Report on CCS*,' 186.

67 Paris Agreement (adopted 12 December 2015, in force 4 November 2016) UNTS Number 54113, 1; IPCC, *'Special Report on Global Warming of 1.5 °C,'* Chapter 2: Mitigation, pathways compatible with 1.5°C in the context of sustainable development, 55; Weber and Tsimplis, 'The UK liability framework,' 140.

68 Global CCS Institute/Anthony Veder/Vopak, '*Knowledge sharing report'*, 20.

69 Heidi Seglem and Ruben Larsen (Legal Department, Equinor), personal meeting with author (Oslo: Equinor Oslo, 08/03/2018); Equinor, 'Statoil, Shell and Total enter $CO_2$ storage partnership,' last modified 04/10/2017, https://www.equinor.com/en/news/statoil-shell-total-co2-storage-partnership.html.

Initiative's Liquid Logistic Shipping Concept envisages the use of ships to transport $CO_2$ between the Port of Rotterdam and empty O&G reserves in the North Sea for storage.[70] This project will require the establishment of cross-border shipping networks between a number of offshore storage facilities. Shipping is identified as the primary option for decarbonisation efforts in Wales with $CO_2$-shipment to Scotland, Teeside or Norway for future storage.[71] It has also been suggested that States situated in the Baltic Sea region without storage capabilities, such as Finland and Estonia, will require large-scale shipping solutions to transport captured $CO_2$ to the North Sea for suitable storage sites.[72] Sweden have also identified shipping as a prerequisite to the commercial viability of CCS in the Baltics.[73] Maersk planned to transport $CO_2$ by ship from two Finnish power plants to the North Sea for EOR and storage.[74] Additionally, the Nordic CCS Competence Centre concluded that $CO_2$-shipping is the most cost-effective option in 80% of Nordic CCS cases, both for transport between individual sources, and to and from potential clusters/onshore hubs to collect $CO_2$ from various sources.[75] The Centre have proposed the shipping of $CO_2$ from three central Danish power plants to the North

---

70 Global CCS Institute/Anthony Veder/Vopak, *'Knowledge sharing report,'* 12–13; Wim van Sluis, '*CCS in Rotterdam – a network approach: A business case for CCS in Rotterdam,' (*Rotterdam: RCI, 2012); Rotterdam Climate Initiative, '$CO_2$ *Capture, transport and storage in Rotterdam: Report 2009,'* (Schiedam: DCMR Environmental Protection Agency, 2009), Annex III.

71 UKCCS Research Centre, *'Delivering Cost Effective CCS in the 2020s: an overview of possible developments in Wales and areas linked to Welsh CCS activities via shipping. A Chatham House Rule Meeting Report'* (Sheffield: UKCCSRC, 2016), 2–3, 12–13.

72 Jan Kjärstada et al., 'Ship transport—A low cost and low risk $CO_2$ transport option in the Nordic countries,' *International Journal of Greenhouse Gas Control* Volume 54 (2016): 169, doi: 10.1016/j.ijggc.2016.08.024; Nicklas Nordbäck et al., '*CGS Baltic seed project (S81): Project substance report,'* Baltic Carbon Forum Task Force on Geological Storage 2017, 9, 13, http://bcforum.net/content/CGSBalticSeedProject_SubstanceReport_2017.pdf

73 Rydberg and Langlet, '*CCS in the Baltic,'* 46.

74 Mikko Iso-Tryykäri et al., 'FINNCAP – Meri-Pori CCS demonstration project,' *Energy Procedia* Volume 4 (2011): 5600; Maersk, *'Sustainability Report – Setting the Course,'* (Copenhagen: A.P. Moller-Maersk Group, 2010), 40.

75 Røkke et al., *'Building Nordic Excellence,'* 9, 11.

Sea for EOR and storage.[76] It is therefore clear that $CO_2$-shipping within the North Sea will play a central role in the deployment of CCS for both surrounding and distance States.

Given the injurious potential of $CO_2$ leakage and the projected scale of shipping-based CCS in the North Sea, the establishment of an effective liability regime must be a priority for legislators.

[76] Marit Mazzetti, 'NORDICCS CCS Roadmap – Technical Report D1.2.1301,' *Energy Procedia* Volume 51 (2013): 3.

# 3 The current regime: A case for reform

At the global level, there is no existing regime which regulates liabilities arising from $CO_2$ leakage during $CO_2$-shipping. The imposition of liability for damage arising from $CO_2$ leakage in the North Sea therefore relies on a combination of national and EU laws: national civil liability rules, the ELD and the LLMC.[77]

This chapter will consider the existing regime for third-party, environmental damage and GhG emissions liabilities arising from $CO_2$-shipping incidents. It will suggest that the current regime is inconsistent and fragmented across Member States and lacks the clarity needed to encourage deployment of $CO_2$-shipping. Additionally, it will find that $CO_2$-shipping is not properly integrated into the liability instruments applicable to CCS in the North Sea. This is evidenced by the exclusion of shipping from the CCS Directive and the EU ETS. With these considerations in mind, it will argue there is need for reform of the existing regime to provide a clearer and more harmonised liability regime which better considers the integration of $CO_2$-shipping into CCS value chains.

## 3.1 Inconsistencies in third-party liabilities

Any third-party claims in the North Sea for personal injury, property damage or economic loss resulting from $CO_2$-shipping incidents are governed by national civil liability rules.[78]

In the majority of States surrounding the North Sea, civil liability arising from a shipping incident is based on fault, meaning any act or omission breaching a tortious obligation will result in liability where conduct falls below the expected duty of care.[79] Fault can be defined by

---

77 Boekholt, *'Regulation of liability,'* 15.

78 Peter Wetterstein, 'Carriage of Hazardous Cargoes by Sea – The HNS Convention,' *Georgia Journal of International and Comparative Law* Volume 26 Number 3 (1997): 597, https://digitalcommons.law.uga.edu/gjicl/vol26/iss3/4.

79 DLA Piper, '*Study on EU Member States' national civil liability regimes in relation to rail accidents between Railway Undertakings and Infrastructure Managers in so far as*

differing concepts such as intention, negligence or gross negligence, and the standard of proof can vary depending on the type of jurisdiction.[80] For example, English common law imposes liability where there is a breach of a 'reasonable' duty of care.[81] In contrast, Dutch national law is regulated by the Dutch Civil Code which requires a broader assessment of evidence to determine whether the five cumulative conditions are met, including the requirement for imputability.[82] Most national systems impose a condition for a causal link between the breach of duty and the damage suffered.[83] However, causation theories differ between Member States, with Belgium requiring merely a link between the act or omission, Denmark requiring the link be 'adequate' and Germany requiring the link be 'relevant' to the damage suffered.[84]

Given the infancy of large-scale $CO_2$-shipping, there has not yet been any case where claims for third-party liabilities have arisen in the North Sea.[85] It is therefore difficult to assess how these principles will be applied in practice. Nevertheless, the imposition of liability on an RSO will be dependent on the functioning of the national courts where the incident takes place. In an international industry such as shipping, different national laws across shipping routes risks unpredictable liabilities for RSOs engaged in $CO_2$-shipping. This makes it challenging and costly for RSOs to assess their potential legal liabilities during cross-border transport. Similarly, it will have a detrimental impact on victims of $CO_2$-shipping incidents by creating fragmented standards for compensation.

*they may present a barrier to the internal market,'* Final report 2010, 63.

80 ibid, 54.

81 British Institute International and Comparative Law, 'Introduction to English Tort Law,' last accessed 04/09/2018, https://www.biicl.org/files/763_introduction_to_english_tort_law.pdf.

82 EC, *'Study on Analysis of integrating the ELD into 11 national legal frameworks: Final Report,'* 2014.1174 (Brussels: EU, 2013), 82, doi: 10.2779/69062; Global CCS Institute, *'ROAD CCS permitting process: special report on getting a CCS project permitted'* (Global CCS Institute, 2014), 60–61.

83 DLA Piper, '*Study on EU Member States,'* 56.

84 ibid, 10.

85 Global CCS Institute/UCL, *'Legal liability,'* 17.

Notably, the shipowner can limit compensation claims relating to personal injury or property damage in accordance with the 1976 LLMC, as amended by the 1996 Protocol and 2012 Resolution.[86] In the EU, Member States are obliged to obtain compulsory insurance up to the applicable limits of the LLMC.[87] This ensures victims of $CO_2$-shipping incidents can recover compensation through the RSOs P&I insurer whilst allowing RSOs to quantify their maximum liabilities for third-party damage claims. Nevertheless, the LLMC is solely a limitation instrument and does not ensure consistency in the standards for the imposition of liability across Member States. It therefore fails to ensure the evaluation of third-party claims on a level-playing field. This risks lack of foreseeability and certainty regarding the outcome of third-party claims and may jeopardise public support for large-scale $CO_2$-shipping.[88]

## 3.2 Fragmented transposition of the ELD

Environmental damage liability in the North Sea is specifically governed by the ELD.[89] The ELD is an EU public liability instrument, imposing liabilities on operators of economic activities to ensure environmental precautions and remedies for environmental damages. It does not make possible private claims for compensation as a consequence of environmental damage or the threat of such damage.[90] The operator is defined as the person controlling any economic activity 'to whom decisive economic

86 Convention on Limitation of Liability for Maritime Claims (adopted 19 November 1976, in force 1 December 1986) UNTC Volume 1456 Number 24635, 221; Protocol to the Convention on Limitation of Liability for Maritime Claims (adopted 2 May 1996, in force 13 May 2004), Articles 1, 2(1), 5, 6; Resolution LEG.5(99) on amendments to the limitation amounts set out in article 3 of the 1996 Protocol 2012.

87 Directive 2009/20/EC on the insurance of shipowners for maritime claims; Resolution A.898(21) of the IMO Assembly on Guidelines on Shipowners' Responsibilities in Respect of Maritime Claims 1999.

88 Wetterstein, 'Carriage of Hazardous Cargoes', 596.

89 Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage, Articles 2(1), (2), (6); EC, *'Study on Analysis of integrating the ELD,'* 105–115.

90 ELD, Article 3(3); Grant Lawrence, *'Environmental Liability Directive: A Short Overview'* EC (Brussels: EU, 2006), 1.

power over the technical functioning of such activity has been delegated, including permit holders and persons registering the activity'.[91] The RSO can therefore be held liable for environmental damage occurring as a result of an incident during $CO_2$-shipping.

The ELD establishes two distinct liability regimes based on the polluter pays principle.[92] The first provides for strict liability for damage to land, water, protected species and natural habitat where the operator undertakes activities listed in Annex III.[93] The second applies to activities falling out with the scope of Annex III and imposes liability on operators for damage to protected species and natural habitats based on their fault or negligence. It therefore becomes essential to determine whether $CO_2$-shipping falls within the strict or fault-based liability regime. Annex III includes provision for transport by sea as defined in Directive 93/75/EEC concerning minimum requirements for vessels bound for or leaving Community ports and carrying dangerous or polluting goods.[94] $CO_2$ is categorised as a dangerous good under this Directive and accordingly, $CO_2$-shipping falls within Annex III and the strict liability regime.[95] This means RSOs will be under the strict obligation to take all immediate steps to prevent environmental damage causing or threatening significant adverse effects and bear the costs of any required preventive or remedial measures.[96] These claims can be limited in accordance with the LLMC.

The ELD is designed to implement a minimum threshold for liability by complementing existing national laws where they are broader and

---

91 ELD, Article 2(6), 2(7); EC, '*Environmental Liability Directive, Protecting Europe's Natural Resources Brochure*' (Brussels: EU, 2013), 6.

92 ELD, Article 3; Lawrence, *'Environmental Liability Directive,'* 2.

93 Directive 1979/409/EEC on the conservation of wild birds as amended by Directive 2009/147/EC; Directive 1992/43/EEC on the conservation of natural habitats and of wild fauna; Directive 2000/60/EC establishing a framework for the Community action in the field of water policy.

94 Repealed by Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system.

95 Directive 93/75/EEC, Article 2(c) and Directive 2002/59/EC, Article 3(g) classify $CO_2$ as a dangerous good in accordance with Chapter 19 of the IGC Code; Weber and Tsimplis, 'The UK liability framework', 150.

96 ELD, Articles 2(1), 5(1), 6(1), 8(1).

more stringent than the Directive itself.[97] Transposition of the ELD into national law has varied considerably across Member States, leading to a patchwork of liability systems for environmental damage in the North Sea.[98] The scope of application of the ELD is limited in respect of EEA States as the rules regarding damage to protected species and natural habitats do not apply in accordance with the EEA Agreement.[99] This means that liability rules protecting biodiversity in Norway could vary substantially from other North Sea States. It has also emerged that many States continue to apply existing domestic law due to difficulties in interpreting the thresholds, exceptions and options of the ELD.[100] This means national law may impose liabilities for types of environmental damage not covered by the ELD.[101] For example, England have extended the scope of the liability regime to nationally protected biodiversity.[102] The imprecise wording of the ELD has led to crucial differences in the transposition of its provisions, including the interpretation of the 'significance' trigger for liability.[103] There has also been fragmentation with regards to the availability of optional defences to environmental damage liability. The ELD allows Member States to unilaterally exempt the RSO where permit conditions are fully complied with or the state of scientific and technical knowledge proves the activity was not likely to cause environmental damage.[104] The availability of these defences varies between States, with Germany transposing the defences as defences to costs yet the UK interpreting them as defences to liability.[105] Accordingly,

---

97 ibid, Article 16; Global CCS Institute/UCL, '*Carbon Capture Use and Storage,*' section 1.1.

98 EC, '*Study on Analysis of integrating the ELD,*' 5.

99 Agreement on the EEA, Annex 20, para 1i.

100 EC, '*Report on environmental liability with regard to the prevention and remedying of environmental damage*' COM(2016) 204 final (Brussels: EU, 2016), 5.

101 ibid, 2.

102 EC, '*Study on Analysis of integrating the ELD,* 47, 49.

103 ibid, 8, 12–13.

104 ELD, Articles 8(3), 8(4); Pop, 'The EU Legal Liability,' 47.

105 UK Government, '*Environmental Liability Directive 2004/35/EC- UK report to the European Commission on the experience gained in the application of the Directive,*' (Brussels: EC, 2013), para 21; EC, '*Study on Analysis of integrating the ELD,*' 12, 52–53, 88–89.

the availability of remediation for environmental damage may be delayed or less likely in States which allow defences to liability.[106]

These divergences pose a barrier to the successful harmonisation of environmental damage liabilities. The failure to secure harmonised implementation of the ELD risks continued fragmentation for environmental damage claims. Differences in the requirements for liability between Member States is important because it means RSOs are more likely to be liable in some States than in others.[107] These regulatory uncertainties make it difficult and costly for RSOs to quantify risk exposure where activities have a cross-border dimension. Further, the imposition of strict liability for environmental damages departs from the fault-based standards for third-party liabilities. This creates fragmentation between the various heads of liability for $CO_2$-shipping incidents in the North Sea, with different standards for different types of damage arising from the same incident. It is also unsatisfactory that more serious claims such as loss of life are subject to less stringent standards than public environmental damage claims. There is therefore not only a need to align the standards for claims under the ELD but also, reduce fragmentation between the standards for third-party damage claims with those arising from environmental damage.

## 3.3 Exclusion of shipping from the EU's GhG emissions liability framework

### 3.3.1 GhG emissions liability under the EU ETS

Emissions trading is a key tool for combatting climate change and enabling cost-effective emissions reduction.[108] The ETS Directive established the first and largest carbon market for regulating the trading of GhG

[106] UK House of Commons Environment, Food and Rural Affairs Committee, *'Implementation of the Environmental Liability Directive Sixth Report of Session 2006–07,'* (London: The Stationery Office, 2007), 20–21.

[107] EC, *'Study on Analysis of integrating the ELD,'* 82.

[108] EC, 'EU Emissions Trading System (EU ETS),' last accessed 05/10/2018, https://ec.europa.eu/clima/policies/ets_en.

emission allowances in the EU.[109] The scheme operates under a cap-and-trade principle where there is a cap on the total number of GhG emissions allowed from specified installations. The operators of installations identified in Annex I of the Directive must obtain a permit from their competent national authority which allocates the installation an annual number of emission allowances. At the end of each year, operators must then surrender these emission allowances to cover their emissions for that year. One emission allowance, determined by the market price at the time, must be surrendered for every ton of GhG emitted from an Annex I installation. To protect the environmental integrity of the system, operators are obliged to adhere to strict procedures requiring operators to monitor and report all GhG emissions from the covered installation.[110] Operators emitting more than their emissions allowance may take measures to reduce their annual emissions or may purchase additional allowances on the carbon market from operators with surplus allowances.[111] The carbon market creates a value for GhGs, dependent on the quantity of allowances, which can be traded between operators. This administrative system imposing an obligation to surrender allowances for the annual GHG emissions of an installation has been termed 'GhG emissions liability'. Failure to surrender the accurate number of emission allowances at the end of the year leads to the imposition of fines. Where activities fall out with the scope of Annex I, no emissions permit is needed and emission allowances do not need to be surrendered.

---

[109] Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community, amending Council Directive 96/61/EC as amended by Directive 2009/29/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

[110] Decision 2010/345/EU amending Decision 2007/589/EC as regards the inclusion of monitoring and reporting guidelines for greenhouse gas emissions from the capture, transport and geological storage of carbon dioxide.

[111] Nigel Bankes and Martha Roggenkamp, 'Legal aspects of carbon capture and storage'. In *'Beyond the Carbon Economy: Energy Law in Transition'* eds. Donald Zillman and Catherine Redgwell (Oxford: Oxford University Press, 2008), 373.

### 3.3.2 Inclusion of CCS in the EU ETS

In 2013, each element of the CCS chain was included in the list of installations identified in Annex I of the ETS Directive.[112] Any $CO_2$ captured from an Annex I installation and transported for permanent storage in verified storage sites will be considered not emitted. Capture operators engaging in CCS will therefore not need to surrender emission allowances for any successfully stored $CO_2$. This acts as an economic incentive to engage in CCS activities. Operators of capture, transport and storage installations are required to obtain an emissions permit and comply with MRV obligations. If any $CO_2$ escapes into the atmosphere during CCS, the holder of the permit will be required to surrender emission allowances for the emitted $CO_2$ at the end of the compliance cycle.[113] This includes any $CO_2$ not permanently stored in the storage site as well as $CO_2$ emitted during operation of the CCS chain. A prerequisite to inclusion in the ETS is that activities conform to the CCS Directive. CCS activities not complying with the Directive will not be eligible under the ETS and operators of GhG emitting Annex I installations will remain liable to surrender emission allowances for permanently stored $CO_2$. This acts as an incentive to comply with the requirements of the Directive.

### 3.3.3 Exclusion of shipping as a transportation option

The CCS Directive defines the transport phase of CCS as 'the network of pipelines, including associated booster stations, for the transport of $CO_2$ to the storage site'.[114] This definition is important because it does not mention the possibility of shipping $CO_2$ between the capture facility and storage site. The CCS Directive therefore excludes the possibility of ship transportation falling within the remit of the EU ETS as $CO_2$-shipping is

[112] Laetitia Birkeland et al., *'Improving the Regulatory Framework, optimizing organization of the CCS value chain and financial incentives for* $CO_2$*-EOR in Europe,'* Bellona ECCO project 2010, 6.

[113] Rieks Boekholt, *'Overview of regulatory uncertainties with regard to offshore CCS'* CATO2-WP4.1-D10 2013, 33.

[114] CCS Directive, Article 3(22).

not an identified installation falling within Annex I.[115] Shipping is also not expressly covered by the Monitoring and Reporting or Accreditation and Verification Regulations.[116] This is because when the CCS Directive was drafted, the parties had not envisaged large-scale $CO_2$-shipping.[117]

Exclusion of shipping means operators engaged in $CO_2$-shipping for the purposes of CCS would interrupt the MRV obligations and break the value chain of CCS endorsed by the CCS Directive.[118] It follows that transport operators engaging in $CO_2$-shipping for CCS would not be required to obtain an emissions permit, comply with MRV procedures or surrender allowances for GhG emissions.[119] This means there is no GhG emissions liability imposed on RSOs for leakage of $CO_2$ during ship transportation. This has wide implications for the successful deployment of $CO_2$-shipping as a transportation option in CCS. Where the MRV obligations are not met, the EU ETS will not allow capture operators to claim $CO_2$ was successfully stored. This is because the quantity of $CO_2$ emitted from installations during operation of the CCS chain cannot be verified.[120] Operators would remain liable to subtract emission allowances for $CO_2$ permanently stored because the CCS activities would not conform to the requirements of the CCS Directive. Any $CO_2$ transferred to a ship for storage will be added to the capture and storage installations total annual $CO_2$ emissions.[121]

Article 49(1)(c) of the Monitoring and Reporting Regulation allows operators to subtract emissions where they are transferred out of an

115 Marijn Holwerda, 'Carbon capture and storage' in *'Essential EU Climate Law'* eds. Edwin Woerdman and Martha Roggenkamp (Cheltenham: Edward Elgar Publishing, 2015), 196.

116 Regulation No.601/2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC; Regulation No.600/2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC.

117 Boekholt, *'Overview of regulatory uncertainties,'* 33.

118 Global CCS Institute/Bech-Bruhn, *'EOR/CCS 360-degree legal review,'* (Global CCS Institute, 2011), 10–11.

119 Boekholt, *'Regulation of liability and safety,'* 50.

120 Rydberg and Langlet, '*CCS in the Baltic*,' 47; Global CCS Institute/Bech-Bruhn, *'EOR/CCS,'* 2.

121 Global CCS Institute/Bech-Bruhn, *'EOR/CCS,'* 11.

Annex I installation to a storage site permitted under the CCS Directive. This could be regarded as allowing the operator to subtract $CO_2$ regardless of the means of transportation, provided it is transferred to a suitable storage site.[122] However, this logic would act contrary to the EU's system of MRV, which states 'all parts of the installation [...] shall be included in the emissions permit and accounted for in the associated monitoring plan'.[123] Given shipping is not covered by the MRV Regulations or the EU ETS, it is irreconcilable that Article 49 would allow the subtraction of $CO_2$ where shipping is the chosen transport option.[124] The exclusion of shipping from the CCS Directive and EU ETS therefore negates the commercial incentive for engaging in CCS and fails to ensure the environmental integrity of the value chain.[125] This could prevent the development of shipping-based CCS in the North Sea.

## 3.4 The need for reform

In light of the above considerations, there is need for reform of the existing regime for $CO_2$-shipping liability. There are two inadequacies in the current regime that must be revised to encourage full-scale deployment of cross-border $CO_2$-shipping in the North Sea.

Firstly, the current regime for third-party and environmental liabilities remains fragmented. Further steps are required to harmonise these liabilities and establish a level-playing field between RSOs in the North Sea.[126] It is desirable to have a more harmonised and simplified legal framework for the various heads of liability in cross-border $CO_2$-shipping. Unified liability rules regulated on a global basis may drive investment

[122] Rydberg and Langlet, '*CCS in the Baltic,*' 47–48.

[123] Regulation No.601/2012, Annex IV, 21(A).

[124] Rydberg and Langlet, '*CCS in the Baltic,*' 47–48.

[125] ibid, 72; Norwegian Shipowners' Association, *'Think Ocean: Maritime Outlook Report 2018,'* (Oslo: Norwegian Shipowners' Association, 2018), 29.

[126] EC, *'Report on environmental liability,* 2

in cross-border $CO_2$-shipping by providing consistent liabilities for RSOs and ensuring predictable compensation for victims.

Secondly, existing EU frameworks governing CCS activities fail to acknowledge the role of shipping within the value chain. Exclusion of shipping from the GhG emissions liability regime could prove detrimental to the large-scale deployment of $CO_2$-shipping. Where there is no GhG emissions liability for $CO_2$ leakages during transport, there is no economic incentive under the EU ETS for engaging in the activity. Protecting the environmental integrity of CCS through the imposition of adequate MRV obligations is also crucial to ensuring public support for large-scale CCS deployment. There is therefore a need for shipping to be better integrated into the existing legal frameworks for CCS in the North Sea through the inclusion of shipping within the CCS Directive and EU ETS.

# 4 Towards global harmonisation

The current regime for damage arising from $CO_2$-shipping incidents in the North Sea creates a fragmented and unpredictable system of liability, with compensation contingent on the legal rules applicable in the jurisdiction the incident occurred.[127] This is an unsatisfactory position because it creates fragmentation between the standards imposed on RSOs across North Sea States. It is therefore desirable that a global liability regime replace the existing regime to ensure greater cross-border certainty.

The HNS Convention was drafted to fill the gap in the global regime for liability and compensation. The Convention regulates non-contractual liability for incidents involving the carriage of HNS by sea and is based on the well tested model for oil pollution liability.[128] Liquid $CO_2$ falls within the definition of an HNS by virtue of the IGC Code.[129] Its provisions therefore have direct implications for incidents involving the cross-border carriage of $CO_2$ in bulk by ship in the North Sea.

The Convention faced barriers to entry into force stemming from onerous reporting obligations on States prior to ratification and difficulties of identifying the diverse range of HNS cargoes.[130] This led to negotiations of a 2010 Protocol to amend the contentious aspects of the Convention and encourage speedy ratification.[131] Although the requirements for entry into force are yet to be satisfied, it is anticipated they will be in

127 Global CCS Institute/UCL, '*Carbon Capture Use and Storage,*' section 3.

128 IMO, '*Facilitation of the Entry into Force and Harmonised Interpretation of the HNS Protocol 2010: Understanding the HNS Convention. Submitted by Canada,*' LEG 102/3/1 (London: IMO, 2015), 2; International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (adopted 18 December 1971, in force 16 October 1978) UNTS Volume 1110 Number 17146, 57; International Convention on Civil Liability for Oil Pollution Damage (adopted 27 November 1992, in force 30 May 1996) UNTS Volume 973, Number 14097, 3.

129 HNS Convention, Article 1(5)(a)(v); Resolution MSC.220(82) of the Maritime Safety Committee on the addition of $CO_2$ to Ch. 19 of the IGC Code 2006.

130 Rosalie Balkin, *'The HNS Protocol,'* IMO Legal Affairs and External Relations Division (London: IMO, 2010), 4.

131 Adopted 30 April 2010; Viggo Bondi, '*Shipowners' Perspective on the 2010 HNS Convention,*' ICS Presentation for Workshop on the HNS Convention (London: IMO, 2018), 4.

the near future.[132] Ratification remains high on the agenda of the IMO Legal Committee and the EU Council has been vocal in encouraging all Member States to ratify the Convention.[133]

When the Convention enters into force, it will replace the existing regime in the North Sea for $CO_2$-shipping liabilities for third-party and environmental damages (national civil liability rules, the ELD and the LLMC).[134] With this in mind, it is necessary to explore whether the HNS Convention can overcome the challenges faced by the current regime. This chapter will consider each tier of liability under the Convention and suggest that entry into force would provide greater certainty to RSOs by globally harmonising the liability rules for $CO_2$-shipping. However, it will also suggest that there are limitations of the Convention in addressing circumstances where $CO_2$ is transported for the purposes of storage. It will conclude that the failure of the Convention to account for CCS activities may fail to provide the certainty required for deployment of cross-border $CO_2$-shipping in the North Sea.

## 4.1 2010 HNS Convention

The HNS Convention implements a two-tiered liability model for damage arising from the carriage of $CO_2$ at sea. The first-tier channels strict liability to the RSO for loss or damage to persons, property and the environment, including loss of profits and the costs of reasonable reinstatement measures.[135] This means the RSO of a $CO_2$-ship will be liable for damage caused by the hazardous nature of $CO_2$, regardless of fault on the part of the RSO, ship or crew. No liability will attach to the RSO where

[132] HNS Convention, Article 46, entry into force requires ratification by at least twelve States, including four States each with not less than 2 million units of gross tonnage, and having received during the preceding calendar year a total quantity of at least 40 million tonnes of contributing cargo for the general account; Boekholt, *'Regulation of liability and safety,'* 37.

[133] IMO, '*Report on the Work of its 105th Session,'* LEG 105/14 (London, IMO: 2018), 4, 8; Council Decision on the ratification and accession by Member States, in the interest of the EU, to the HNS Protocol of 2010. 2015/0135 (NLE). Brussels, 2015.

[134] ELD, Annex IV; Weber and Tsimplis, 'The UK liability framework', 148.

[135] HNS Convention, Articles 1(3), 1(6), 7.

any of the predetermined exemptions are met, including where damage resulted from the personal act or omission of another, committed with intent or recklessness with the knowledge such damage would result.[136]

Where no exemption is applicable, the RSO must constitute a compensation fund for a sum representing their limit of liability. Calculation of damages do not necessarily correspond to the amount of damage caused by the incident but are determined by the tonnage of the ship, up to a maximum of 100 million SDR for the carriage of bulk $CO_2$.[137] All non-contractual claims for damages are channelled towards this compensation fund and the RSO cannot be pursued on other legal grounds.[138] RSOs engaged in $CO_2$-shipping must obtain an insurance certificate or financial security up to their limitation value and the Convention allows direct action against the P&I insurer.[139] Funds will be distributed among the claimants in proportion to the amounts of their established claims, with loss of life and personal injury claims having priority.[140]

The second-tier of liability is engaged if the shipowner has insufficient funds to compensate, the shipowner is exempted or where damage exceeds the owner's limitation of liability.[141] Victims can look to the HNS Fund to provide compensation for damage up to a limit of 250 million SDR (including tier one compensation).[142] There is a general account divided into two sectors: bulk solids and other substances.[143] There are also separate accounts for oil, LNG and LPG.[144] Receivers importing over a specified quantity of HNS within the accounts are obliged to make initial and annual contributions to the Fund to meet the compensation costs of

136 ibid, Articles 7(2), 7(3).

137 ibid, Article 9(a); International Convention on Tonnage Measurement of Ships 1969 (adopted 23 June 1969, in force 18 July 1982) UNTS Volume 1291 Number 21264, 3.

138 HNS Convention, Articles 7(4), 10(1).

139 ibid, Article 12.

140 ibid, Article 11.

141 ibid, Article 14(1).

142 ibid, Articles 14(5), 24.

143 ibid, Article 16(1).

144 ibid, Article 16(2).

incidents arising within its sector.[145] The precise contributions payable are set on the basis of the quantities of HNS received by the contributing cargoes in the preceding year.[146]

This two-tiered system of liability simplifies the existing liability regime for North Sea $CO_2$-shipping incidents by harmonising the rules applicable to a broad range of claims. The channelling of strict liability to the RSO and the limitation of liability expediates the establishment and quantification of liability. It creates a consistent liability regime for $CO_2$-shipping, without the need for lengthy wrangling.[147] This makes it possible for RSOs operating cross-border CCS activities in the North Sea to properly quantify their risk exposure. The requirement for mandatory insurance, the availability of direct action and the fair prioritisation of the most serious claims ensures prompt and predictable compensation for victims of $CO_2$-shipping incidents.

Additionally, the Fund creates a balanced regime through the shared liability of RSOs and the HNS industry. By imposing liability on the receivers of $CO_2$ based on their import quantities, the Fund ensures the equitable apportionment of liability between stakeholders involved in $CO_2$-shipping. The Fund also ensures the availability of prompt and adequate financial compensation to victims of damage arising from $CO_2$-shipping incidents beyond what would otherwise be recoverable.[148]

The HNS Convention therefore creates a high level of certainty for victims, RSOs and other stakeholders, allowing them to coordinate contracts, risk assessments and insurance in compliance with this regime.[149] It provides legislative stability for investors and may encourage the deployment of $CO_2$-shipping.

---

145 ibid, Articles 16(3), 17(1).

146 ibid, Article 17(3).

147 IOPC Funds, '*Compensation Matters – Consistent Application of 1992 Conventions: Submitted by the International Chamber of Shipping and the International Group of P&I Associations*,' IOPC/APR17/4/6 (London: IMO, 2017), 2.

148 ibid, 2–3.

149 ibid.

## 4.2 Limitations of the Convention

Although the HNS Convention brings value to the harmonisation of the current regime for $CO_2$-shipping liabilities in the North Sea, there is also need for the Convention to be scrutinised in its application to the specific circumstances of CCS. The Convention will only bring a valuable contribution to the deployment of CCS where it is carefully tailored to the characteristics of the value chain.[150] Evidently, the Convention was not drafted with CCS in mind and there are difficulties in applying its provisions to these circumstances. These include the potential for continued application of the existing liability regime, the reasonableness of imposing a strict liability standard and the difficulties of applying the Fund model to the unique contractual relationships in the CCS value chain.

### 4.2.1 Risk of continued fragmentation after entry into force

A key aim of the Convention is to replace the disparity in the national and regional approaches to liability with a global, harmonised and better integrated liability regime. However, the complex scope of the HNS Convention may fail to entirely remove the existing liability regime for $CO_2$-shipping incidents in the North Sea. This risks the possibility of continued disparity between Member States.

Application of the Convention depends on the type of damage suffered, the jurisdictional zone in which damage occurred and whether the ship is registered by a State Party.[151] Where the HNS incident occurred in the TS, any damage within the scope of the Convention is recoverable. Where the incident occurred within the EEZ (or equivalent area), environmental damages are recoverable but personal injury and property damage claims are only recoverable where the ship is registered by a State Party. Where the incident occurred on the High Seas, all damages are

[150] Pop, 'The EU Legal Liability,' 41.

[151] IMO, *'An Overview of the International Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances By Sea, 2010 (The 2010 HNS Convention),'* LEG 98/4/1 (London: IMO, 2011), 2.

recoverable provided the ship is registered by a State Party. The costs of preventative measures are recoverable wherever taken.

The complex geographical scope of the Convention means there may be circumstances where the rules and obligations of the HNS Convention do not apply. This will depend on the specific circumstances of the case; however, it risks the imposition of different liability regimes for damages arising from the same incident in the North Sea. For example, third-party damages arising from an incident in the EEZ of a non-State Party would not fall within the remit of the Convention. Any third-party liabilities would therefore be decided by the application of national civil liability laws in the jurisdiction where the incident occurred. This means that unless the HNS Convention is widely ratified, it will not entirely replace the existing liability regime for third-party damages.

Additionally, the HNS Convention applies from the period of time commencing when $CO_2$ 'enter[s] any part of the ship's equipment, on loading, to the time it ceases to be present in any part of the ships equipment, on discharge'.[152] Damage occurring before $CO_2$ is on board the ship will therefore not be covered by the HNS Convention, even where the RSO is responsible for the cargo prior to loading.[153] In contrast, the ELD applies to the entire duration of occupational activities, from the moment the transport operator gains decisive economic power until that control extinguishes or passes to another.[154] The liability period of the ELD is therefore longer than the Convention where the RSO has control over operations prior to the cargo entering the ships equipment.[155]

The ELD states it will not apply to environmental damage arising from an incident in respect of which liability falls within the scope of the HNS Convention.[156] The question is whether the ELD applies where the incident falls out with the scope of the Convention. The absence of wording expressly stating the ELD will apply in certain circumstances

[152] HNS Convention, Article 1(9).
[153] Weber and Tsimplis, 'The UK liability framework,' 162.
[154] ELD, Article 2(6).
[155] Weber and Tsimplis, 'The UK liability framework', 162.
[156] Article 4(2); Weber and Tsimplis, 'The UK liability framework', 152.

indicates the drafters may not have intended its continued application. However, the complex scope of the Convention leaves open the possibility of the ELD applying after entry into force of the Convention.[157] Although this ensures environmental accountability of operators throughout the value chain, by providing a fall-back liability regime for circumstances where the HNS Convention does not apply, it may fail to entirely remove the application of the ELD as intended.[158] Fragmentation with regards to the transposition of the ELD in Member States adds another layer of complexity to the liability regime for $CO_2$-shipping as the scope of national instruments may extend environmental damage liability beyond the intended scope of the Convention.

Given the benefits of regulating the maritime industry on a global level, it is unsatisfactory that national civil liability rules, the ELD and the LLMC may continue to apply to damage claims arising from a $CO_2$-ship after entry into force of the Convention. It will fail to ensure consistency in liability standards during cross-border shipping in the North Sea and retain the implications of fragmentation in the current regime. As entry into force of the Convention nears, the EC should provide guidance on the application of national laws and the ELD to HNS incidents at sea. Specifically, they should ensure that application of the existing liability regime is removed where incidents fall wholly or partly under the scope of the HNS Convention. This will ensure RSOs can quantify their risk prior to engaging in CCS and encourage early investment in large-scale $CO_2$-shipping. Guidance could also advocate aligning the liability periods of the RSO through contractual arrangements in which the port operator assumes legal responsibility for cargo until it enters the ship's equipment.

### 4.2.2 Reasonableness of imposing strict liability on RSOs

The Convention aims to remove inconsistencies in the current regime with regards to the diversity of liability thresholds. Although this brings

[157] Boekholt, *'Regulation of liability,'* 37–38.

[158] UK Government, '*Environmental Liability Directive*,' para 35.

greater uniformity, it may not be appropriate to impose strict liability where the purpose of transportation is CCS.

Exposure to strict liability for damage caused by $CO_2$-shipping will be a consideration for RSOs engaging in CCS, particularly as the HNS Convention may impose higher limits of liability than the LLMC.[159] However, it must be questioned whether the imposition of strict liability is fair considering the social value of CCS. It has been heralded as a vital technology to prevent climate change and its adverse consequences. Additionally, deployment of CCS in the North Sea has been actively encouraged by the EU as a means of achieving emissions reduction targets under the UNFCCC.[160] It is therefore arguable whether operators engaging in CCS should be subject to potentially large liabilities where there is no fault on their part. This is particularly relevant given that large-scale CCS is not yet commercially viable and the activities are not merely conducted for pure commercial gain.[161] In fact, many CCS projects are backed by economic support from North Sea State governments.[162] The Convention provides for only limited exemption to strict liability and does not consider circumstances where the activity was carried out for the public good. The imposition of strict liability in CCS therefore creates an unfair apportionment of responsibilities between the public and private sphere given the inevitable risks associated with deploying

[159] New LLMC limits came into force in 8th June 2015 in accordance with the 2012 Resolution; See IMO, 'Convention on Limitation of Liability for Maritime Claims (LLMC),' last accessed 05/09/2018, http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/Convention-on-Limitation-of-Liability-for-Maritime-Claims-(LLMC).aspx.

[160] EC, *'Communication from the Commission to the European Parliament, Council and European Economic and Social Committee on the Future of Carbon Capture and Storage in Europe'* COM(2013) 180 final (Brussels: EU, 2013), 11–12.

[161] Forbes and Verma, 'CCS Guidelines,' 8.

[162] Norwegian Ministry of Petroleum and Energy, *'The Norwegian Government continues with the planning of a demonstration project for $CO_2$ capture, transport and storage'* Press Release No.025/2018, proposed funding of 280 million NOK for Norwegian CCS demonstration projects.

climate mitigation technologies.[163] This will remain true during the early investment stages where full-scale value chains are not yet proven.[164]

The maritime industry has a long history of operating under strict but limited liability standards for shipping incidents. This system provides certainty within the industry through the use of insurance providers and the provision of security guarantees. Liability based on fault is highly dependent on the specific circumstances of the case such as the jurisdiction where the incident occurred, the foreseeability of the damage and whether the RSO failed to take adequate safety precautions or properly instruct their crew.[165] Removing the strict liability standard of the HNS Convention and reverting to a fault-based regime may therefore provide less certainty with regards to cross-border $CO_2$-shipping and may disincentivise investment in shipping-based CCS.

An alternative solution could be the inclusion of indemnity provisions in the charterparty which allow the RSO to seek recourse action against the charterer; who may be in a stronger financial position. The Convention does not rule out the possibility of recourse action against charterers of HNS ships.[166] Where a vessel is chartered for the purposes of CCS, the charterer is likely to be the capture operator or perhaps, the North Sea State providing funding for the project. The availability of indemnity would depend on the provisions of the charterparty, a product of commercial negotiation between the charterer and RSO. Analysis of existing standardised charterparties applicable to LNG transport indicates that the triggering of indemnity would require fault on the part of the capture operator.[167] However, it is possible that charterparties developed for $CO_2$-shipping would allow recourse action against the capture operator regardless of fault, to better balance the commercial

[163] Pop, 'The EU Legal Liability,' 48.

[164] IEA, *'Five keys to unlock CCS investment'* (Paris: IEA, 2018), 13.

[165] Global CCS Institute, *'ROAD CCS,'* 61; Global CCS Institute/UCL, *'Legal liability,'* 24.

[166] HNS Convention Article 7(6) and 18; Chris Hendriks, M.J. Mace and Rogier Coenraads, '*Impacts of EU and International Law on the Implementation of Carbon Capture and Geological Storage in the EU,*' Order of the EC (London/Utrecht: ECOFYS and FIELD, 2005), 121.

[167] ShellLNGTime 1 Charter Party (London: Shell, 2015), clause 29(a).

risk. This may be necessary at least in the short-term until large-scale $CO_2$-shipping becomes a viable commercial enterprise.

### 4.2.3 Duty to cross-subsidise liabilities for other types of cargo

The second-tier of liability depends on the rules and procedures required by the HNS Fund. However, there are several difficulties in applying these rules due to the unique contractual relationships involved in CCS.

During negotiation of the Convention it became clear that constituting one account within the Fund would disadvantage industries which transport large volumes of HNS cargo by sea.[168] In view that high volume cargoes would not necessarily be more hazardous, it would be unfair to oblige these industries to cross-subsidise liabilities arising from HNS carried in lower volumes.[169] The LNG industry also maintained that, given their exceptional safety record, the sector should not be expected to make contributions for liabilities incurred by more dangerous cargoes.[170] This led to the formation of separate accounts within the Fund. At the time of drafting, large-scale $CO_2$ transportation was not envisaged by the Convention and there is no separate $CO_2$ account.[171] This means second-tier compensation claims arising from $CO_2$-shipping will fall to the general account ('other HNS' sector). Receivers importing over 20,000 tonnes of bulk $CO_2$ transported by ship are required to make contributions to the general account on the basis of the quantity of total $CO_2$ received in the preceding year.[172] Feasibility studies for $CO_2$-shipping envisage the carriage of up to 50,000 tonnes of $CO_2$ per voyage.[173] Accordingly, large-scale receivers of $CO_2$ for the purposes of storage could be obliged to make large contributions to the Fund. This could have detrimental effects to dissemination of CCS technology which is not yet commercially viable.

168 Balkin, '*The HNS Protocol,*' 6–7.
169 ibid, 7.
170 ibid.
171 Boekholt, *'Regulation of liability,'* 55.
172 HNS Convention, Article 18(1).
173 Mitsubishi Heavy Industries, *'Ship Transport'*, 19.

It may also seem unfair to require high contributions from $CO_2$-shipping considering safety records are projected to be similar to the LNG industry. In fact, risks of $CO_2$-shipping are not seen as significant compared to LNG because $CO_2$ is not combustible.[174] The $CO_2$-shipping industry therefore has strong merits to argue for the inclusion of an additional separate $CO_2$ account.[175] This would better protect the CCS industry from liabilities to the Fund by ensuring $CO_2$ receivers are only faced with claims resulting from incidents involving their sector.

For the Fund to operate effectively, each sector must be able to sustain their separate account through sufficient contributions from the industry. Until specified thresholds of contributing cargo are met, all claims will be managed out of the general account to ensure the sector has the capacity to compensate claims arising from contributing cargo.[176] Given the predicted growth of CCS, it is feasible that large-scale $CO_2$-shipping could support any compensation claims arising from the industry. This would support the amendment of the Convention through the establishment of a separate $CO_2$ account ahead of large-scale CCS.

Nevertheless, the division of the Fund into four accounts was organised in accordance with the character traits of each substance. HNS listed within the general account therefore have coherent chemical traits which are distinguished from LNG, LPG and oil cargoes. It could be argued that if $CO_2$ is not significantly, characteristically different from the other substances in the general account there is no real justification for the inclusion of a separate $CO_2$ account.[177] Whilst this may be true, it fails to properly protect stakeholders disseminating climate mitigation technologies which are not yet commercially viable. There is clearly justification for the inclusion of a separate $CO_2$ account where the purpose of transportation is CCS. Notwithstanding there would need to be debate on whether a new account would apply only to receivers of $CO_2$ for the

174 ibid, 8.

175 Boekholt, *'Regulation of liability,'* 47, 51.

176 HNS Convention, Article 19(1); Weber and Tsimplis, 'The UK liability framework,' 164.

177 Jan Engel de Boar (Senior Legal Officer, Legal Affairs and External Relations Division of the IMO), personal interview with author (London: IMO headquarters, 14/09/2018).

purposes of storage, or whether it would also include $CO_2$ received for other purposes. There may also be a need for caution in the creation of a new account on the grounds of climate mitigation as it may open the door to other substances within the general account, such as hydrogen, arguing for separate accounts in the future.

### 4.2.4 Unsatisfactory definition of 'receivers' in offshore storage activities

When applying the principles of the Fund to CCS, it is not clear who the receiver of $CO_2$ is for the purposes of contributing to the general account. To ensure equity in the sharing of liability, there may be a need to separately define the receiver when transport is carried out for the purposes of storage.

Receivers are defined as 'the person who physically receives contributing cargo which is discharged in the ports or terminals of a State Party'.[178] In offshore CCS, the person physically receiving $CO_2$ from the RSO is the operator of the offshore structure receiving $CO_2$ for injection; as offshore structures fall within the meaning of 'ports and terminals'.[179] In accordance with the Convention, the storage operator would therefore be liable to make contributions to the Fund for the quantity of $CO_2$ received.[180] Even if damage as a result of $CO_2$ incidents at sea is unlikely or nominal, storage operators would remain liable to the general account for incidents involving other hazardous contributing cargo. It may therefore be unfair to impose such liabilities on storage operators for liabilities incurred during $CO_2$-shipping activities. This is particularly relevant given storage operators do not have the same interest in receiving HNS cargo as a stakeholder in the HNS industry. The Convention aims to share liability between RSOs and the HNS industry but was not drafted to account for circumstances where the receiver has no commercial use for the

[178] HNS Convention, Article 1(4).

[179] Boar, personal interview with author, 14/09/2018.

[180] It is less clear who the receiver would be where $CO_2$ is directly injected into the storage reservoir.

delivered substance (beyond their contractual obligations). It is therefore arguable whether storage operators engaging in CCS are 'receivers' within the meaning of the Convention. Given the vast quantities of $CO_2$ that could be transported on ships for storage, the obligation to make large contributions to the general account may disincentivise the involvement of offshore operators in storage activities.[181] It may also encourage storage operators to favour pipeline transportation to the injection facility as there would be no equivalent liability under the pipeline regime.

The creation of a separate account for $CO_2$ incidents applicable only to CCS activities may provide a justifiable compromise to offshore storage operators, ensuring their liabilities to the Fund are confined to incidents involving $CO_2$. Alternatively, it may be more equitable to hold another party operating within the chain liable for contributions to the Fund. In considering the incentive for CCS in the North Sea, the capture operator has the economic interest in $CO_2$ being received as they do not have to surrender emission allowances to the EU ETS for permanently stored $CO_2$. With this in mind, it would perhaps be desirable for the capture operator to be liable for contributions to the Fund where transportation is for CCS. This may be deemed fairer than requiring the physical receiver at the injection facility to be liable under the shipping regime. It would also remove the possibility of storage operators favouring one transportation method over another.

There are three possible ways to channel liability to the Fund towards the capture operator. Firstly, the Convention states that where the physical receiver acts as an agent for another, the principal can be regarded as the receiver where they are disclosed to the Fund.[182] It is therefore possible for the storage operator to be regarded as an agent acting on behalf of the capture operator for the purposes of receiving $CO_2$.[183] However, this option proves difficult in practice as there is no third-party relationship and the storage operator will have a conflict of interest as a result of

181 Boekholt, '*Regulation of liability,*' 49–50.

182 HNS Convention, Article 1(4).

183 Transport Canada, '*Presentation by Canada – Comparison of the HNS Convention with other regimes,*' Workshop on HNS Convention (London, IMO: 2018), 6.

the storage contract with the capture operator. The law of agency could therefore make it difficult to establish a principal-agent relationship.

Secondly, the Convention allows national jurisdictions to impose unilateral definitions for the purposes of identifying the receiver; provided total contributing cargo received according to the national law is 'substantially the same' as that which would have been received under the Convention. Given the quantity of $CO_2$ received would be equivalent to that received by the storage operator, national laws could define the capture operator as the receiver where the purpose of $CO_2$-shipping is CCS. This option would allow individual States to channel liability towards the capture operator but would fail to ensure consistency in the application of the Convention to cross-border activities. It would result in fragmentation between North Sea States and fail to provide guarantees to storage operators operating in a number of jurisdictions that they will not be liable to make contributions.

The most convincing argument for channelling liability towards the capture operator stems from the definition of receiver in the LNG account. The LNG account allows the physical receiver of contributing cargo to direct liability towards the titleholder of transported cargo immediately after discharge.[184] This modified approach was introduced to ensure protection for the unique contractual arrangements in place within the LNG transport industry. The option is therefore particularly relevant considering large quantities of $CO_2$ are anticipated to be transported on similar contractual terms to LNG.[185] Application of this provision to the transportation of $CO_2$ would allow the capture operator (the titleholder of $CO_2$) to be regarded as the receiver for the purpose of contributions to the Fund.[186] This would require prior contractual agreement between the capture and storage operators, where the capture operator assumes responsibility to the Fund and the storage operator informs the relevant State Party of such agreement.[187] It may also open the

184 HNS Convention, Article 19(1)*bis*(b).

185 Balkin, *'The HNS Protocol,'* 7.

186 Boekholt, *'Regulation of liability,'* 40.

187 HNS Convention, Article 19(1)*bis*(b), 19(1)*bis*(c), 19(1)*bis*(d).

door to burden-sharing arrangements between the capture and storage operators with regards to contributions to the Fund.

### 4.2.5 Method of calculating contributions fails to account for leakages during injection

Under the HNS Convention, State Parties are subject to onerous obligations to MRV the quantities of $CO_2$ transported by ship.[188] However, the obligations raise important legal questions regarding what method of calculating received $CO_2$ would be used for the purpose of assessing contributions to the Fund.[189]

Contributions based on the amount of $CO_2$ received at the offshore structure, after unloading but prior to storage, would conform to normal practice under the Convention by ensuring operational leakages are deducted from final calculations of received cargo. However, this methodology fails to account for leakages during the injection process. This risks potential for discrepancies between the quantity of contributing cargo under the HNS Convention and the quantity of $CO_2$ reported as stored under the EU ETS. For example, the receiver is liable to the Fund for the total amount of $CO_2$ received at the offshore platform. They are also liable for any $CO_2$ leakage during the injection process through their obligation to surrender emission allowances for $CO_2$ not successfully stored. This creates the unsatisfactory position of the receiver being liable to pay contributions for the receipt of $CO_2$ not successfully stored and with no commercial value under the EU ETS. Although the loss of $CO_2$ during injection may simply be a part of the capture operators' commercial risk, the position may lead to operators favouring pipeline transport and stall the deployment of large-scale $CO_2$-shipping.[190]

It may be desirable for calculations to be assimilated with MRV procedures under the EU ETS. The calculation of contributing cargo could be based on the number of emission allowances retained as a result

[188] ibid, Article 21.

[189] Weber and Tsimplis, 'The UK liability framework,' 165.

[190] Boar, personal interview with author, 14/09/2018.

of successful storage. It would follow that one ton of $CO_2$ stored would provide the operator with one additional emission allowance, as well as one ton of contributing cargo. This would ensure the operator is only liable to the Fund for the amount of $CO_2$ successfully stored. Careful guidance for the calculation of received $CO_2$ would have to be formulated for Member States. Additionally, the Fund would have to establish differing calculation methods where the purpose of $CO_2$-shipping is not for CCS and the receiver does not receive benefit under the EU ETS. This would create a complicated system for calculating contributions for $CO_2$-shipping. In particular, it would require harmonisation between the global HNS Fund and the regional EU ETS.[191] Nevertheless, it could be a workable scenario as coordination would ensure efficiency and reduce the administrative burden of the Convention by allowing values monitored through one system to be applicable in the other.

### 4.2.6 Absence of GhG emissions liability

The HNS Convention does not impose liability for the release of $CO_2$ into the atmosphere. This is because the HNS Convention categorises $CO_2$ as a hazardous substance and does not recognise its GhG characteristics.

The transportation of $CO_2$ is unique compared to other HNS cargoes because $CO_2$ leakage contributes to climate change and its adverse consequences. At the time of drafting the 1996 HNS Convention, climate change was not widely recognised as a matter of pressing concern in the maritime industry. There was therefore no justification for including provisions on GhG emissions liability for $CO_2$-shipping. More recently, the IMO has recognised the need to regulate GhG emissions from ships through their work on low-carbon shipping.[192] Their initial strategy for GhG emissions from the shipping industry focuses on reduction strategies

[191] HNS Convention, Article 15.

[192] Resolution MEPC.304(72) on the initial IMO strategy on reduction of GhG emissions from ships 2018, in '*Note by the IMO to the UNFCCC Talanoa Dialogue: Adoption of the initial IMO strategy on reduction of GhG emissions from ships and existing IMO activity related to reducing emissions in the shipping sector*' (London, IMO: 2018), Annex I.

for emissions from the ship and its ancillary functions.[193] It does not regulate leakage of $CO_2$ from cargo holds. This leaves a significant gap in the international liability regime for harms arising from $CO_2$-shipping incidents.[194] In the context of CCS, it must be questioned whether this is a satisfactory position given it is intended as a climate mitigation technology. Any leakage of captured $CO_2$ contradicts the ultimate objective of transportation and jeopardises the environmental integrity of the CCS value chain.

With this in mind, there may be a need for the HNS Convention to broaden the definition of 'damage' to account for the unique harm posed by the carriage of $CO_2$. Although this would impose an additional layer of liability on RSOs engaged in $CO_2$-shipping, it would do so only where the activities are linked directly to CCS.[195] The inclusion of climate damage from $CO_2$ cargoes within the definition of damage would remove concerns regarding the exclusion of shipping from the EU ETS.[196] If liabilities for loss of $CO_2$ cargoes are accounted for under the HNS Convention and other $CO_2$ emissions are addressed by the IMO's emissions reduction strategy, there would be full emissions accountability of the shipping phase in CCS. In turn, there would be strong justification for retaining the economic incentive of CCS under the EU ETS where shipping is utilised.

Despite the attractiveness of this option, there are practical challenges to imposing liability for GhG leakage at an international level which could prove critical. $CO_2$ leakages have a cumulative effect on climate change but specific emissions cannot be directly attributed to harm.[197] Where there is no ETS, there is difficulty in quantifying liability for GhG emissions because there are no emission permits, allowances or carbon markets to dictate the price of carbon. It is therefore unclear exactly

[193] IMO, 'Low carbon shipping and air pollution control,' last accessed 04/10/2018, http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx.

[194] Boekholt, *'Regulation of liability,'* 47, 49–50.

[195] Mikunda and Haan-Kamminga, *'Overcoming national and European,'* 18.

[196] Pop, 'The EU Legal Liability,' 48–49.

[197] Jutta Brunnee et al., 'Overview of legal issues relevant to climate change' in *'Climate Change Liability'* eds. Richard Lord et al. (Cambridge: Cambridge University Press, 2012), 23.

how the imposition of GhG emissions liability would work in practice. Nevertheless, in the long-term, there may need to be a global push for the extension of the IMO's emissions reduction strategy to cover GhG emissions where the source of leakage is cargo. Of course, given the slow pace of development at the IMO level, this option is unlikely to be achievable before the establishment of large-scale $CO_2$-shipping in the North Sea.[198]

## 4.3 Towards an adequate future liability regime

The HNS Convention promotes the adoption of harmonised global rules for determining questions of liability for damages caused by $CO_2$-shipping incidents.[199] Channelling of liability to the RSO, compulsory insurance requirements up to the liability limitation, the possibility for direct action and the constitution of the Fund introduce an effective framework to ensure adequate compensation is awarded to victims of such incidents. The imposition of strict liability also ensures a level-playing field for the international shipping industry and removes much of the fragmentation present in the current regime. This ensures the imposition of predictable and consistent liabilities on RSOs in cross-border $CO_2$-shipping, allowing risk exposure to be properly quantified.

However, the HNS Convention was not drafted with $CO_2$-shipping in mind and therefore cannot provide the flawless liability regime necessary to encourage shipping-based CCS. There is need for greater clarity with regards to the Conventions application to CCS activities. In particular, there is a need to clarify the interaction between the Convention and the ELD in respect of $CO_2$-shipping incidents arising in the North Sea. It is also necessary to close the gap in international law with regards to GhG emissions liability where the source of leakage is cargo. The Convention

198 Edie.net, 'International Maritime Organisation 'too slow' on emissions strategy,' published 04/04/2018, https://www.edie.net/news/6/International-Maritime-Organisation--too-slow--on-emissions-strategy-/.

199 IOPC Funds, *'IOPC Funds' Strategic Plan: Note by the Director,'* IOPC/OCT17/7/4 (London: IMO, 2017), 1.

has experienced four amendment cycles since its origins in 1984.[200] It is therefore unlikely that States will be willing to make amendments to the 2010 version prior to its entry into force.[201] Proposals to amend would likely undermine the Convention and stall its ratification. Caution should therefore be erred in recommending amendments given its valuable contribution to the unification of liability laws.

Additionally, many of the limitations of the Convention's application to CCS activities may be better understood following entry into force of the Convention. Lack of real experience of cross-border $CO_2$-shipping makes it difficult to anticipate the precise challenges that may be encountered by RSOs.[202] The International P&I Association reported that between January 2002–2010, 192 HNS incidents were reported with 189 of these falling under the RSO's limit of liability.[203] Of the three remaining incidents, only one would have fallen to the Fund as two of the incidents occurred in jurisdictions unlikely to accede to the Convention (Brazil and the US).[204] This indicates that very few cases involving HNS are likely to require recourse to the second-tier of liability. Limitations regarding application of the Fund procedures to CCS-specific circumstances are, therefore, perhaps more theoretical than practical. Only after the establishment of shipping-based CCS in the North Sea, can the magnitude of the limitations be fully assessed through feedback from the CCS industry. If in practice real barriers emerge, amendments could be considered to better protect the commercial viability of such a socially valuable technology. This may include the creation of a separate $CO_2$ account within the Fund or the harmonisation of rules for MRV obligations under the Convention and the EU ETS. In the interim, many of the issues may be solved through the drafting of charterparties which carefully balance the commercial interests of stakeholders. It is also clear that once CCS becomes commercially viable, $CO_2$-shipping will be conducted for profit

200 Diplomatic Conference on HNS (London: 1984).

201 Boar, personal interview with author, 14/09/2018.

202 Dixon, McCoy and Havercroft, 'Legal and Regulatory Developments,' 445.

203 Steamship Mutual, '*P&I Club experience of HNS incidents,*' Workshop on the HNS Convention (London, IMO: 2018), 6.

204 ibid.

and there would perhaps be less need to protect the industry from the implications of the HNS Convention.

As long as the Convention is not in force, its provisions remain ineffective.[205] It is therefore necessary that the HNS Convention enters into force to bring certainty to the liability regime, before cross-border $CO_2$-shipping becomes a reality in the North Sea. There has been recent traction following the 105th Legal Committee Session Meeting (April 2018) which led to ratifications by Denmark and Canada. Preparations from Japan and South Korea indicate they will accede to the Convention in the near future and this will likely be followed by Sweden, Finland, the Netherlands and Germany.[206] Many of these States have prepared the documents necessary for accession but require more time to prepare the industry for the implications of ratification.[207] The UK has shown very little interest in ratification of the HNS Convention, indicating that ratification by certain States is not a priority. It is therefore important that widespread ratification of the Convention continue to be encouraged by the IMO and the EU.

[205] Boekholt, *'Regulation of liability,'* 2, 52.

[206] Boar, personal interview with author, 14/09/2018.

[207] ibid.

# 5 Integration of shipping within the CCS value chain

The HNS Convention provides a valuable contribution to the cross-border $CO_2$-shipping liability regime in the North Sea. However, the Convention cannot alone address the inadequacies of the current liability regime for cross-border $CO_2$-shipping. Despite evidence that shipping will be necessary to deploy CCS in the North Sea, existing EU frameworks fail to acknowledge the role of shipping within the CCS value chain. The exclusion of shipping from the CCS Directive means that $CO_2$ delivered from a ship for storage will not count as verified under the EU ETS.[208] There is therefore no GhG emissions liability imposed on RSOs for leakage of cargo during $CO_2$-shipping and no economic incentive for engaging in shipping-based CCS. This remains a real barrier to the deployment of $CO_2$-shipping in the North Sea and could hinder the development of CCS in countries reliant on long-distance transport options. It is therefore essential that $CO_2$-shipping be included in the CCS Directive and EU ETS to ensure the integration of shipping within the CCS value chain. This would also ensure the environmental integrity of $CO_2$-shipping activities by overcoming the gap in the international regime regarding GhG emissions liability for loss of cargo.

This chapter will consider the options for inclusion of shipping within the CCS Directive and EU ETS. It suggests that amendments to the CCS Directive and ETS Directive must be considered as a priority to ensure a balanced liability regime for cross-border $CO_2$-shipping in the North Sea. However, it will also identify several challenges which must be overcome to allow inclusion of $CO_2$-shipping within the EU ETS. It will conclude that inclusion of shipping within the CCS Directive and EU ETS is an effective option for ensuring the integration of $CO_2$-shipping within the CCS value chain.

[208] Global CCS Institute/Bech-Bruhn, '*EOR/CCS,*' 25.

## 5.1 Options for inclusion within the CCS Directive and ETS Directive

The inclusion of $CO_2$-shipping could be done on an ad hoc basis, through the use of the opt-in option of the ETS Directive, or through formal amendments to the CCS Directive and ETS Directive.

Under Article 24 of the ETS Directive, Member States may apply for the EC's approval to unilaterally include activities not listed in Annex I. However, it is questionable whether inclusion of shipping by the EC would be binding on other Member States in which the ship traverses for the purposes of CCS.[209] The case-by-case basis of including shipping within the EU ETS is untested and will not create the necessary conditions for long-term investment in cross-border CCS projects.[210] This is particularly relevant for the Baltic States which will be heavily reliant on the flexibility of shipping for long-distance transportation to the North Sea.[211] It is therefore suggested that the CCS Directive and ETS Directive be considered for amendments in order to explicitly incorporate $CO_2$-shipping where the purpose of transport is CCS.[212] This would provide a clear market signal with regards to the future of $CO_2$-shipping in the North Sea by formerly integrating $CO_2$-shipping into the CCS value chain. In turn, it may encourage a higher use of $CO_2$-shipping in CCS projects than the existing Article 24 opt-in inclusion process.[213]

In 2015, the EC concluded the CCS Directive was fit for purpose and there are no plans to review the Directive.[214] Nevertheless, there is a clear case for amendment of the CCS Directive to allow $CO_2$-shipping to develop as a commercially viable alternative to pipeline transport. The

---

209 Global CCS Institute/Bech-Bruhn, '*EOR/CCS,*' 25–26; Rydberg and Langlet, *'CCS in the Baltic,'* 72.

210 Triple/RICARDO-AEA/TNO, '*Support to the review of Directive 2009/31/EC on the geological storage of carbon dioxide (CCS Directive): Final deliverable*' (Rotterdam: Trinomics, 2015), 127.

211 Rydberg and Langlet, *'CCS in the Baltic,'* 48.

212 Boekholt, *'Regulation of liability,'* 52.

213 Triple/RICARDO-AEA/TNO, '*Support to the review,*' 128.

214 EC, '*Report on review of Directive 2009/31/EC on the geological storage of carbon dioxide,*' COM(2015) 576 final (Brussels: EU, 2015), 6.

Directive does therefore not appear to be fit for purpose and amendment must be a priority for legislators.[215]

## 5.2 Challenges to inclusion within the EU ETS

### 5.2.1 Opposition from the international maritime industry

Opposition from the international maritime industry due to the commercially sensitive nature of information required by MRV systems has thus far prevented shipping being included in the EU ETS.[216] The European Parliament proposed the inclusion of shipping in the EU ETS from 2023 unless the IMO introduced a system for GhG emissions liability by 2021.[217] Under the proposals, $CO_2$ emissions from ships arriving at or departing from ports within the EU would be subject to ETS permits and allocated allowances.[218] This move was heavily criticised by the maritime industry for impeding the work of the IMO in developing a climate mitigation strategy for shipping.[219] Since publication of the IMO emissions reduction strategy, there is concern that any further proposals to include shipping within the EU ETS would undermine (and overlap) the developing global regime by polarising debate.[220] However, there is

---

215 Rydberg and Langlet, *'CCS in the Baltic,'* 48.

216 Edmund Hughes (Head of Air Pollution and Energy Efficiency, IMO Marine Environment Division). Personal interview with author (London: IMO headquarters, 17/08/2018); Per Kågeson, *'Linking* $CO_2$ *Emissions from International Shipping to the EU ETS'* Commissioned by the Federal Environment Agency, Germany (Stockholm: Nature Associates, 2007), 25, 26–27; World Maritime News, 'ICS, ESPO against Inclusion of Shipping in EU ETS,' published 16/02/2017, https://worldmaritimenews.com/archives/212959/ics-espo-against-inclusion-of-shipping-in-eu-ets/.

217 Eva Grey, 'Shipping emissions: EU vs IMO?' Ship Technology, published 06/03/2017, https://www.ship-technology.com/features/featureshipping-emissions-eu-vs-imo-5753670/.

218 ibid.

219 World Maritime News, 'Shipping Should Not Be Included in EU Emissions Trading System?,' published 25/10/2017, https://worldmaritimenews.com/archives/233317/shipping-should-not-be-included-in-eu-emissions-trading-system/.

220 MarineLog, 'ICS: $CO_2$ roadmap under fire from some NGOs,' last accessed 12/10/2018, https://www.marinelog.com/index.php?option=com_k2&view=item&id=23732:ics-co2-roadmap-under-fire-from-some-ngos&Itemid=257.

perhaps a distinction between the inclusion of shipping for the purposes of CCS and the inclusion of all commercial shipping operations. The EU ETS does not currently impose liabilities on the operators of all pipeline systems; rather, the pipe must be used to transport $CO_2$ for the purposes of CCS.[221] It follows that the inclusion of shipping in the CCS Directive would not necessarily lead to the inclusion of all shipping operations in the EU ETS. Rather, the scope of GhG emissions liability under the EU ETS could be extended solely to ships transporting $CO_2$ for the purposes of storage in accordance with the CCS Directive.

### 5.2.2 Construction of emission permits and surrendering of allowances

In order for $CO_2$-shipping to be effectively integrated into the CCS value chain, RSOs would need to obtain an emissions permit from a Member State and they would be obliged to surrender allowances to that State for any leakages during transport. Under the EU ETS, operators are liable to surrender allowances to the State in which the Annex I installation is located. However, ships differ from other Annex I installations because they are not fixed structures and therefore move between jurisdictions.[222] Ships are subject to the jurisdiction of the flag State which may not be involved in CCS activities and may not be a member of the EU. This raises the question of whether it is the flag State or the Member State exporting $CO_2$ for storage who must report emissions to the EU ETS. It is also apparent that a flag State not falling within the scope of the EU ETS would not be eligible to apply for emission permits. One solution may be that shipping operators are liable to surrender emission allowances in the State which is exporting $CO_2$ for storage.[223] In practice, the RSO would require an emissions permit from the exporting Member State. Notably, requirements for pipeline transportation permits require the routes and functions of the pipeline to be predetermined during the active period of

221 Roggenkamp, 'Transportation of Carbon Dioxide,' 246.
222 Rydberg and Langlet, *'CCS in the Baltic,'* 48.
223 Birkeland et al., *'Improving the Regulatory Framework,'* 6.

the permit. Emissions permits for ships would need to allow for greater flexibility to ensure ship transportation can be reactive to the needs of cross-border CCS projects.

### 5.2.3 Overlap with the global GhG emissions reduction strategy

The presence of adequate MRV systems is not only a precondition to integrating $CO_2$-shipping within the EU ETS, it is also critical to quantifying the operator's GhG emissions liability.[224] It would therefore be necessary for MRV regulations to be developed to allow inclusion of shipping within the EU ETS.[225]

The CCS Directive states that the transportation phase of CCS includes all ancillary plants functionally connected to the pipeline transport network.[226] Pipeline operators are liable to surrender emissions from 'any process functionally connected to the transport network, fugitive emissions, vented emissions and emissions from leakage incidents.'[227] This ensures accountability for the full life-cycle of $CO_2$ emissions from capture installation to post-injection. If these principles are applied to $CO_2$-shipping, the ancillary functions of the ship would be encompassed by the MRV regulations.[228] These principles would overlap with the IMO's emissions reduction strategy which includes $CO_2$ emissions from the operation of ships. To better secure acceptance of the inclusion of $CO_2$-shipping within the EU ETS, it is necessary that the EU not extend

---

[224] EC, '*Impact Assessment: Accompanying document to the Proposal for a Directive amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system,*' Staff Working Document COM(2008) 16 final (Brussels: EU, 2008), 49–50.

[225] Røkke et al., *'Building Nordic Excellence,'* 28; Nordbäck et al., '*CGS Baltic seed project,*' 51.

[226] CCS Directive, Article 3(22).

[227] Regulation (EU) No.601/2012, Annex IV, 22(A).

[228] Lauri Kujanpää and Sebastian Teir, 'Implications of the new EU maritime emission monitoring regulation on ship transportation of $CO_2$,' *Energy Procedia* Volume 114 (2017): 7416, doi: 10.1016/j.egypro.2017.03.1871.7416.

its remit into areas regulated by the IMO. This means MRV regulations should be limited to leakage of $CO_2$ from the cargo of the ship.

The EC has already adopted MRV rules for shipping despite its absence from Annex I of the ETS Directive. From January 2018, Regulation 2015/757 requires ships over 5000 GT calling at any EU/EFTA port, to monitor the port of departure and arrival, amount of fuel consumed, $CO_2$ emitted, and total transport work.[229] Accordingly, a system is already in place to monitor the weight and type of cargo carried on board ships, as well as the quantity of $CO_2$ emitted.[230] It may be possible for the generated results to be used as a means of quantifying GhG emissions liability for $CO_2$-ships used in CCS projects.[231] The Regulation could be used to verify the amount of cargo delivered for storage at the loading port and received at the unloading facility.[232] The European Sustainable Shipping Forum have developed technical rules for monitoring the quantities of cargo carried by ships included in Regulation 2015/757. These could be used to ensure best practices and accuracy in the methods of quantifying the amount of $CO_2$ received and delivered by $CO_2$-ships.[233] These rules are only applicable to the largest ships; however, the quantities envisaged for large-scale $CO_2$-shipping would likely meet this requirement. Where smaller ships are used, MRV regulations would need to be extended to ensure consistency across shipping-based CCS projects. This would ensure full environmental integrity of the CCS value chain by requiring RSOs to be liable to the EU ETS for any loss of cargo during $CO_2$-shipping,

---

229 Regulation 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, amending Directive 2009/16/EC, Article 6 (3), 9(1) and Annex II; DNV-GL, 'EU MRV Regulation,' last accessed 04/10/2018, https://www.dnvgl.com/maritime/eu-mrv-regulation/index.html; DNV-GL, 'Preparing for the MRV regulation,' published 14/09/2016, https://www.dnvgl.com/news/preparing-for-the-mrv-regulation-revised-version--75297.

230 European Sustainable Shipping Forum, '*Final report on the work of the MRV sub-group on Shipping MRV Monitoring,*' (Brussels: EU, 2016), 5; EC Implementing Regulation 2016/1928 on determination of cargo carried for categories of ships other than passenger, ro-ro and container ships pursuant to Regulation 2015/757.

231 Kujanpää and Teir, 'Implications of the new,' 7419.

232 Regulation 2015/757, Article 6(h)(ii).

233 Kujanpää and Teir, 'Implications of the new,' 7421.

as well as liability under the IMO's global regime for other sources of $CO_2$-shipping emissions.

### 5.2.4 Insurance implications

Integration of shipping within the EU ETS introduces an unquantifiable level of liability for RSOs as there is inherent uncertainty in the price of emission allowances on the market during the compliance cycle.[234] An RSO contracting to transport $CO_2$ will be liable to pay for any leakage of cargo. There is a risk the value of $CO_2$ during transportation changes and effects the RSOs liability exposure, altering the commercial balance of the transport document.[235] At present, there exists no type of insurance that would cover RSOs for this type of liability as there are difficulties in quantifying leakage risk.[236] During the start-up phase of large-scale $CO_2$-shipping, these uncertainties could lead to uninsurability or high insurance premiums for RSOs which may discourage investment. It is therefore imperative that a proper insurance framework be developed for circumstances where shipping is included in CCS projects.[237]

## 5.3 An effective option for integrating shipping within the CCS value chain

It is clear that there are challenges to integrating $CO_2$-shipping into the EU ETS; however, these challenges can be overcome through carefully defining the scope of inclusion and the content of MRV regulations, as well as the establishment of an insurance framework for GhG emissions liability.

Ultimately, the EU must facilitate the integration of shipping within the CCS value chain by establishing a business case for shipping-based

234 Mikunda and Haan-Kamminga, *'Overcoming national and European*,' 19.

235 Pop, 'The EU Legal Liability' 48–49.

236 Vos, *'Linking the Chain',* 116–117.

237 This requires greater stability of the carbon price. See EU measures to this end: EC, 'Market Stability Reserve,' last accessed 11/10/2018, https://ec.europa.eu/clima/policies/ets/reform_en.

CCS. This is best achieved by formal amendments to the CCS Directive and ETS Directive which will send strong market signals to investors that shipping is an integral transport option for deploying CCS in the EU. Additionally, it would protect the environmental objective of CCS by imposing GhG emissions liability for $CO_2$ leakage from a ships' cargo during the transport phase of CCS. The inclusion of $CO_2$-shipping within the EU ETS will therefore create a more balanced liability regime for cross-border $CO_2$-shipping in the North Sea and allow it to develop as a viable alternative to pipeline transport.

# 6 Conclusions and recommendations

An effective legal liability regime for $CO_2$-shipping in the North Sea would balance the environmental objective of CCS in reducing $CO_2$ levels in the atmosphere with the need to ensure activities throughout the value chain are commercially attractive to investors. The current regime for $CO_2$-shipping liability in the North Sea fails to achieve this balance for two reasons. Firstly, it creates inconsistencies and fragmentation with regards to the standards of liability during cross-border transportation in the North Sea. This uncertainty disincentivises investment in cross-border $CO_2$-shipping because it is challenging and costly for RSOs to quantify their risk exposure. Secondly, existing EU frameworks applicable to CCS fail to acknowledge the potential role of shipping within the value chain. Exclusion of shipping from the CCS Directive and EU ETS means that there is no GhG emissions liability for loss of captured $CO_2$ during $CO_2$-shipping. This not only fails to properly protect the environmental integrity of the chain by not accounting for $CO_2$ emissions from the ship's cargo, it also means there is no economic incentive for shipping-based CCS in the North Sea. This could prove detrimental to the large-scale deployment of $CO_2$-shipping.

In light of these inadequacies, there is need for reform of the current regime for cross-border $CO_2$-shipping in the North Sea. Entry into force of the HNS Convention would bring greater clarity to liabilities for cross-border $CO_2$-shipping by reducing fragmentation between North Sea States through the global harmonisation of standards. This not only incentivises investment in large-scale $CO_2$-shipping but ensures adequate compensation is awarded to victims of such incidents. Of course, it is acknowledged that the Convention may not establish a flawless regime for $CO_2$-shipping liability where the purpose of transportation is $CO_2$ storage. In particular, it may be necessary to consider the formation of a separate $CO_2$ account to ensure the CCS industry do not have to cross-subsidise incidents arising in other sectors. It may also be desirable for liabilities to the Fund to be directed towards the capture operator to ensure storage

operators do not favour pipeline transportation. Nevertheless, given the infancy of full-scale CCS, the precise consequences of the Convention may be better assessed when there is practical experience of large-scale $CO_2$-shipping. This is important because the exact consequences of large-scale $CO_2$ leakage and the magnitude of potential liabilities are unknown. There is great confidence within the sector, with safety records projected to be similar to the LNG industry. If these results transpire, many of the concerns regarding application of the Convention to $CO_2$ storage will be removed. With this in mind, it is important that the IMO and EU continue to put pressure on States to ratify the Convention, particularly States situated around the North Sea which have shown no signs of ratifying.

Additionally, the EU must seek to integrate shipping within the CCS value chain. A failure to impose GhG emissions liability for $CO_2$ leakage during the transport phase of CCS, including those from a ships' cargo, fails to protect both the environmental and commercial objectives of CCS. As a matter of priority, the CCS Directive and ETS Directive must be amended to impose liability for loss of containment of $CO_2$ during the shipping phase of CCS. This will ensure the comprehensive regulation of all the types of damages which could arise from $CO_2$ leakages and establish an economic incentive for $CO_2$-shipping in the North Sea. It will therefore create a more effective liability regime for $CO_2$-shipping by ensuring the environmental integrity of the CCS value chain, whilst encouraging investment in shipping-based CCS.

The IPCC's 2018 Report highlighted that 'the decisions we make today are critical in ensuring a safe and sustainable world for everyone'.[238] If shipping-based CCS is to play a role in the global fight against climate change then the legal liability framework proposed should be implemented as a matter of urgency.

[238] IPCC Press Release, 'Summary for Policymakers of IPCC Special Report on Global Warming of 1.5°C' 2018/24/PR, last accessed 29/10/2018, http://ipcc.ch/pdf/session48/pr_181008_P48_spm_en.pdf, 2.

# 7 List of references

## Treaties

International Convention on Tonnage Measurement of Ships 1969 (adopted 23 June 1969, entered into force 18 July 1982) UNTS Volume 1291 Number 21264, 3.

International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (adopted 18 December 1971, entered into force 16 October 1978) UNTS Volume 1110 Number 17146, 57.

International Convention for the Safety of Life at Sea (adopted 1 November 1974, entered into force 25 May 1980) Volume 1184/1185 Number 18961, 2.

Convention on Limitation of Liability for Maritime Claims (adopted 19 November 1976, entered into force 1 December 1986) UNTC Volume 1456 Number 24635, 221.

United Nations Framework Convention on Climate Change (adopted 9 May 1992, entered into force 21 March 1994) UNTS Volume 1771 Number 30822, 107.

Convention for the Protection of the Marine Environment of the North-East Atlantic (adopted 2 September 1992, entered into force 25 March 1998) UNTS Volume 2354 Number 42279, 67.

International Convention on Civil Liability for Oil Pollution Damage (adopted 27 November 1992, entered into force 30 May 1996) UNTS Volume 973, Number 14097, 3.

Protocol to the Convention on Limitation of Liability for Maritime Claims (adopted 2 May 1996, entered into force 13 May 2004).

International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (adopted 3 May 1996).

Protocol to the Convention on Prevention of Marine Pollution by Dumping of Wastes and Other Matter (adopted 17 November 1996, entered into force 24 March 2006).

Kyoto Protocol to the United Nations Framework Convention on Climate Change (adopted 11 December 1997, entered into force 16 February 2005) UNTS Volume 2303 Number 30822, 162.

Protocol to the International Convention on Liability and Compensation for Damage in Connection with the Carriage of Hazardous and Noxious Substances by Sea (adopted 30 April 2010).

Paris Agreement (adopted 12 December 2015, entered into force 4 November 2016) UNTS Number 54113, 1.

## IMO Resolutions

Resolution MSC. 5(48) on the adoption of the IGC Code 1983.

Resolution A.898(21) of the IMO Assembly on Guidelines on Shipowners' Responsibilities in Respect of Maritime Claims 1999.

Resolution MSC.220(82) on the addition of $CO_2$ to Ch. 19 of the IGC Code 2006.

Resolution LP.1(1)) on the amendment to include $CO_2$ sequestration in sub-seabed geological formations in Annex 1 to the London protocol inserting Annex 1(4) 2006.

Resolution LP.3(4) on the amendment to Article 6 of the London Protocol inserting Article 6(2) 2009.

Resolution LEG.5(99) on amendments to the limitation amounts set out in article 3 of the 1996 Protocol 2012.

Resolution MEPC.304(72) on the initial IMO strategy on reduction of GhG emissions from ships 2018.

## Commission Decisions

OSPAR Commission Decision 2007/2 on the Storage of Carbon Dioxide Streams in Geological Formations.

## EU legislation

Agreement on the European Economic Area

Directive 1979/409/EEC on the conservation of wild birds as amended by Directive 2009/147/EC.

Directive 1992/43/EEC on the conservation of natural habitats and of wild fauna and flora.

Directive 93/75/EEC concerning minimum requirements for vessels bound for or leaving Community ports and carrying dangerous or polluting goods.

Directive 2000/60/EC establishing a framework for the Community action in the field of water policy.

Directive 2002/59/EC establishing a Community vessel traffic monitoring and information system and repealing Council Directive 93/75/EEC.

Directive 2003/87/EC establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC as amended by Directive 2009/29/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community.

Directive 2004/35/CE on environmental liability with regard to the prevention and remedying of environmental damage.

Directive 2009/31/EC on the geological storage of carbon dioxide.

Directive 2009/20/EC on the insurance of shipowners for maritime claims.

Commission Decision 2010/345/EU amending Decision 2007/589/EC as regards the inclusion of monitoring and reporting guidelines for greenhouse gas emissions from the capture, transport and geological storage of carbon dioxide.

Commission Regulation (EU) No 600/2012 on the verification of greenhouse gas emission reports and tonne-kilometre reports and the accreditation of verifiers pursuant to Directive 2003/87/EC.

Commission Regulation (EU) No 601/2012 on the monitoring and reporting of greenhouse gas emissions pursuant to Directive 2003/87/EC.

Commission Regulation 2015/757 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC.

Council Decision on the ratification and accession by Member States, in the interest of the European Union, to the HNS Protocol of 2010. 2015/0135 (NLE). Brussels, 2015.

Commission Implementing Regulation (EU) 2016/1928 on determination of cargo carried for categories of ships other than passenger, ro-ro and container ships pursuant to

## Industry codes

International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk 1983. IMO, 2016 Edition.

United Nations Recommendations on the Transport of Dangerous Goods – Model Regulations 19th Edition 2015.

International Maritime Dangerous Goods Code. IMO, 2018 Edition.

## Standardised charterparties

ShellLNGTime 1 Charter Party, Version 1.1. London: Shell, 2015.

## Articles

Bradshaw, Carrie. 'The New Directive on the Geological Storage of Carbon Dioxide'. *Environmental Law Review* Volume 11 (2009): 196–203. doi: 10.1350/enlr.2009.11.3.057.

Dixon, Tim, Sean McCoy and Ian Havercroft. 'Legal and Regulatory Developments on CCS'. *International Journal of Greenhouse Gas Control Volume* 40 (2015): 431–448. doi: 10.1016/j.ijggc.2015.05.024.

Galic, Stipe, Zvonimir Lusic and Ivica Skoko. 'The Role and Importance of Safety in Maritime Transportation'. *International Maritime Science Conference Book of Proceedings* (2014): 186–200. https://bib.irb.hr/datoteka/700720.imsc2014.pdf.

Johnsen, Kim et al. 'DNV Recommended Practice: Design and Operation of $CO_2$ Pipelines'. *Energy Procedia* Volume 4 (2011) 3032–3039. doi: 10.1016/j.egypro.2011.02.214.

Kjärstada, Jan et al. 'Ship transport—A low cost and low risk $CO_2$ transport option in the Nordic countries'. *International Journal of Greenhouse Gas Control* Volume 54 (2016): 168–184. doi: 10.1016/j.ijggc.2016.08.024.

Kling, George et al. 'The 1986 Lake Nyos Gas Disaster in Cameroon, West Africa'. *Science* Volume 236 Issue 4798 (1987): 169–175. doi: 10.1126/science.236.4798.169.

Kujanpää, Lauri and Sebastian Teir. 'Implications of the new EU maritime emission monitoring regulation on ship transportation of $CO_2$'. *Energy Procedia* Volume 114 (2017): 7415–7421. doi: 10.1016/j.egypro.2017.03.1871.

Iso-Tryykäri, Mikko et al. 'FINNCAP – Meri-Pori CCS demonstration project'. *Energy Procedia* Volume 4 (2011): 5599–5606.

Mallon, Wim et al. 'Costs of $CO_2$ transportation infrastructures'. *Energy Procedia* Volume 37 (2013): 2969 – 2980.

Mazzetti, Marit. 'NORDICCS CCS Roadmap – Technical Report D1.2.1301,' *Energy Procedia* Volume 51 (2013): 1–13.

Neele, Filip et al. '$CO_2$ Transport by Ship: The Way Forward in Europe'. *Energy Procedia* Volume 114 (2017): 6824–6834. doi: 10.1016/j.egypro.2017.03.1813.

Neele, Filip, Hans Haugen and Ragnhild Skagestad. 'Ship transport of $CO_2$ – breaking the $CO_2$-EOR deadlock'. *Energy Procedia* Volume 63 (2014): 2638–2644. doi: 10.1016/j.egypro.2014.11.286.

Pop, Adna. 'The EU Legal Liability Framework for Carbon Capture and Storage: Managing the Risk of Leakage While Encouraging Investment'. *Aberdeen Student Law Review* Volume 6 (2016): 32–56. https://www.abdn.ac.uk/law/documents/ASLR_Vol6_Dec15_32-56_Pop.pdf.

Raine, Andy. 'Transboundary Transportation of $CO_2$ Associated with Carbon Capture and Storage Projects: An Analysis of Issues under International Law'. *Climate Change Law Review* Volume 4 (2008): 353–365.

Skagestad, Ragnhild et al. '$CO_2$ transport from sources to storage in the Skagerrak/Kattegat region'. *Energy Procedia* Volume 4 (2011): 3016–3023. doi: 10.1016/j.egypro.2011.02.212.

Weber, Viktor and Michael Tsimplis. 'The UK liability framework for the transport of $CO_2$ for offshore CCS operations'. *International Journal of Marine and Coastal Law* Volume 32(a) (2017): 138–172. doi: 10.1163/15718085-12341419.

Wetterstein, Peter. 'Carriage of Hazardous Cargoes by Sea – The HNS Convention'. *Georgia Journal of International and Comparative Law* Volume 26 Number 3 (1997): 595–614. https://digitalcommons.law.uga.edu/gjicl/vol26/iss3/4.

## Books

Bankes, Nigel and Martha Roggenkamp. 'Legal aspects of carbon capture and storage'. In *'Beyond the Carbon Economy: Energy Law in Transition'* eds. Donald Zillman and Catherine Redgwell. Oxford: Oxford University Press, 2008.

Brunnee, Jutta et al. 'Overview of legal issues relevant to climate change'. In *'Climate Change Liability'* eds. Richard Lord et al. Cambridge: Cambridge University Press, 2012.

Gregory, Dik and Paul Shanahan. *'The Human Element: A guide to human behaviour in the shipping industry'*. London: The Stationery Office, 2010.

Grevers, Wilbert and Lennart Luten. 'Introduction to the CCS Chain: Technological aspects and safety risks'. In *'Legal Design of Carbon Capture and Storage – Developments in the Netherlands from an International and EU Perspective'* Volume 10 of Energy & Law eds. Martha Roggenkamp and Edwin Woerdman. Oxford: Intersentia, 2009.

Holwerda, Marijn. 'Carbon capture and storage'. In *'Essential EU Climate Law'* eds. Edwin Woerdman and Martha Roggenkamp. Cheltenham: Edward Elgar Publishing, 2015.

Roggenkamp, Martha. 'Transportation of Carbon Dioxide in the European Union: Some Legal Issues'. In *'Carbon Capture and Storage: Emerging Legal and Regulatory Issues'* eds. Ian Havercroft, Richard Macrory and Richard Stewart. Portland Oregon: Hart Publishing, 2018.

Vos, Rolf de, (ed.) *'Linking the Chain: Integrated CATO2 knowledge prepares for the next step in $CO_2$ Capture & Storage'*. WP0.A-D18. Zutphen: CATO2 onderzoeksprogramma, 2014.

## Policy documents

European Commission. '*Impact Assessment: Accompanying document to the Proposal for a Directive amending Directive 2003/87/EC so as to improve and extend the EU greenhouse gas emission allowance trading system'*. Staff Working Document COM(2008) 16 final. Brussels: EU, 2008.

———. '*Environmental Liability Directive, Protecting Europe's Natural Resources Brochure'* Brussels: EU, 2013.

———. *'Study on Analysis of integrating the ELD into 11 national legal frameworks: Final Report'*. 2014.1174. Brussels: EU, 2013. doi: 10.2779/69062.

———. *'Communication from the Commission to the European Parliament, Council and European Economic and Social Committee on the Future of Carbon Capture and Storage in Europe'*. COM(2013) 180 final. Brussels: EU, 2013.

———. *'Report on review of Directive 2009/31/EC on the geological storage of carbon dioxide'*. COM(2015) 576 final. Brussels: EU, 2015.

———. *'Report on environmental liability with regard to the prevention and remedying of environmental damage'*. COM(2016) 204 final. Brussels: EU, 2016.

———. European Sustainable Shipping Forum. *'Final report on the work of the MRV sub-group on Shipping MRV Monitoring'*. Brussels: EU, 2016.

International Energy Agency. *'Five keys to unlock CCS investment'*. Paris: IEA, 2018.

International Maritime Organisation. *'An Overview of the International Convention on Liability and Compensation for Damage in connection with the Carriage of Hazardous and Noxious Substances By Sea, 2010 (The 2010 HNS Convention)'*. LEG 98/4/1. London: IMO, 2011.

———. *'Facilitation of the Entry into Force and Harmonised Interpretation of the HNS Protocol 2010: Understanding the HNS Convention. Submitted by Canada'*. LEG 102/3/1. London: IMO, 2015.

———. *'Carbon Dioxide Sequestration in Sub-Seabed Geological Formations under the London Protocol'*. London: IMO, 2016.

———. *'Report on the Work of its 105th Session'*. LEG 105/14. London, IMO: 2018.

———. 'Note by the IMO to the UNFCCC Talanoa Dialogue: Adoption of the initial IMO strategy on reduction of GhG emissions from ships and existing IMO activity related to reducing emissions in the shipping sector.' London, IMO: 2018.

IOPC Funds. 'Compensation Matters – *Consistent Application of 1992 Conventions: Submitted by the International Chamber of Shipping and the International Group of P&I Associations*'. IOPC/APR17/4/6. London: IMO, 2017.

———. *'IOPC Funds' Strategic Plan: Note by the Director'*. IOPC/OCT17/7/4. London: IMO, 2017.

Norwegian Ministry of Petroleum and Energy. '*The Norwegian Government continues with the planning of a demonstration project for $CO_2$ capture, transport and storage*'. Press Release No 025/2018.

Transport Canada. *'Presentation by Canada – Comparison of the HNS Convention with other regimes'*. Workshop on the HNS Convention. London, IMO: 2018.

UK Government. *'Environmental Liability Directive 2004/35/EC- UK report to the European Commission on the experience gained in the application of the Directive'*. Brussels: EU, 2013.

UK House of Commons Environment, Food and Rural Affairs Committee. '*Implementation of the Environmental Liability Directive Sixth Report of Session 2006–07'*. London: The Stationery Office, 2007.

## Reports

Baker McKenzie. *'Report to the Global CCS Institute on Legal and Regulatory Developments related to Carbon Capture and Storage between November 2010 – June 2011'*. Global CCS Institute, 2011.

Balkin, Rosalie. *'The HNS Protocol'*. IMO Legal Affairs and External Relations Division. London: IMO, 2010.

Birkeland, Laetitia et al. *'Improving the Regulatory Framework, optimizing organization of the CCS value chain and financial incentives for $CO_2$-EOR in Europe'*. ECCO project. Oslo: Bellona, 2010.

Boekholt, Rieks. *'Overview of regulatory uncertainties with regard to offshore CCS'*. CATO2-WP4.1-D10, 2013.

———. *'Regulation of liability and safety in ship transport of $CO_2$ – a comparative analysis'*. CATO2-WP4.1-D11, 2013.

Bondi, Viggo. *'Shipowners' Perspective on the 2010 HNS Convention'*. ICS Presentation for Workshop on the HNS Convention. London: IMO, 2018.

Brewers, J.M., *'Review of International Conventions having Implications for the Storage of Carbon Dioxide in the Ocean and Beneath the Seabed'*. R&D Programme International Energy Agency Greenhouse Gases Report PH4/16. Paris: IEA, 2003.

Brownsort, Peter, '*Ship transport of $CO_2$ for Enhanced Oil Recovery – Literature Survey*'. Enhanced Oil Recovery Joint Industry Project WP15. Aberdeen: Scottish CCS, 2015.

Department of Economic Development, Jobs, Transport and Resources and Global CCS Institute. '*The CarbonNet Project: developing a business model for a CCS hub network'* State of Victoria: Global CCS Institute, 2015.

DLA Piper. '*Study on EU Member States' national civil liability regimes in relation to rail accidents between Railway Undertakings and Infrastructure Managers in so far as they may present a barrier to the internal market'*. Final report. DLA Piper, 2010.

ElementEnergy. '*One North Sea: A study into North Sea cross-border $CO_2$ transport and storage – Executive Summary'*. Report on behalf of North Sea Basin Task Force, 2010.

Forbes, Sarah and Preeti Verma. *'CCS Guidelines: Guidelines for Carbon Dioxide Capture, Transport, and Storage'*. Washington DC: World Research Institute, 2008.

Gassnova/Gassco. *'Feasibility study for full-scale CCS in Norway'* English translation. Ministry of Petroleum and Energy, 2016.

Global CCS Institute. *'ROAD CCS permitting process: special report on getting a CCS project permitted'.* Global CCS Institute, 2014.

Global CCS Institute and Bech-Bruhn. *'EOR/CCS 360-degree legal review'.* Global CCS Institute, 2011.

Global CCS Institute and UCL. *'Legal liability and carbon capture and storage: a comparative perspective'.* London: Global CCS Institute, 2014.

———. *'Carbon Capture Use and Storage Legal Resource Net'.* London: Global CCS Institute, 2014.

Global CCS Institute and WorleyParsons, *'Strategic analysis of the global status of carbon capture and storage. Report 1: status of carbon capture and storage projects globally'.* Global CCS Institute, 2009.

Global CCS Institute, Anthony Veder and Vopak. *'Knowledge sharing report. $CO_2$ liquid logistics shipping concept (LLSC): overall supply chain optimization'* Global CCS Institute, 2011.

Harper, Peter. *'Assessment of the major hazard potential of carbon dioxide'.* Merseyside: UK Health and Safety Executive, 2011.

Hendriks, Chris, M.J. Mace and Rogier Coenraads. *'Impacts of EU and International Law on the Implementation of Carbon Capture and Geological Storage in the EU'.* Order of the European Commission. London/Utrecht: ECOFYS and FIELD 2005.

International Group of P&I Associations. *'IMO Conference on the Revision of the HNS Convention: Consideration of a Draft Protocol to the HNS Convention'.* LEG/CONF.17/6. London: IMO, 2010.

Intergovernmental Panel on Climate Change. *'Special Report on CCS'.* Prepared by Working Group III (Bert Metz et al. eds.). Cambridge: Cambridge University Press, 2005.

———. *'Special Report on CSS: Summary for Policymakers'*. A Special Report of Working Group III. Cambridge: Cambridge University Press, 2005.

———. *'Special Report on Global Warming of 1.5 °C'*. Approved at the First Joint Session of Working Groups I, II and III and accepted by the 48th Session of the IPCC, Incheon, Republic of Korea, 6th October 2018.

Kågeson, Per. '*Linking $CO_2$ Emissions from International Shipping to the EU ETS*' Commissioned by the Federal Environment Agency, Germany. Stockholm: Nature Associates, 2007.

Kler, Robert de, et al. '*Transportation and unloading of $CO_2$ by ship – a comparative assessment: WP9 Final Report'*. CCUS-T2013-09-D08. CATO2, 2016.

Lawrence, Grant. *'Environmental Liability Directive: A Short Overview'* European Commission. Brussels: EU, 2006.

Maersk. '*Sustainability Report – Setting the Course'*. Copenhagen: A.P. Moller-Maersk Group, 2010.

Mitsubishi Heavy Industries. *'Ship Transport of $CO_2$'*. R&D Programme International Energy Agency Greenhouse Gases Report No. PH4/30. Paris: IEA, 2004.

Mikunda, Tom and Avelien Haan-Kamminga. *'Overcoming national and European legal barriers to $CO_2$ transport and storage in the North Sea'*. CATO2-WP4.1-D0, 2013.

Nordbäck, Nicklas et al. '*CGS Baltic seed project (S81): Project substance report'*. Baltic Carbon Forum Task Force on Geological Storage, 2017. http://bcforum.net/content/CGSBalticSeedProject_SubstanceReport_2017.pdf.

Norwegian Shipowners' Association. *'Think Ocean: Maritime Outlook Report 2018'*. Oslo: Norwegian Shipowners' Association, 2018.

Organisation for Economic Co-operation and Development and International Energy Agency. *'Working Paper: Carbon Capture and Storage and the London Protocol – Options for Enabling Transboundary $CO_2$ Transfer'*. Paris: OECD/IEA, 2011.

Røkke, Nils A. et al. *'Building Nordic Excellence in CCS NORDICCS – The Nordic CCS Competence Centre'.* Oslo: SINTEF, 2016.

Rotterdam Climate Initiative. *'$CO_2$ Capture, transport and storage in Rotterdam: Report 2009'.* Schiedam: DCMR Environmental Protection Agency, 2009.

Rydberg, Nils and David Langlet. '*CCS in the Baltic Sea region – Bastor 2 Work Package 4 – Legal & Fiscal aspects*'. Elforsk report 14:48. Stockholm: Elforsk, 2014.

Scottish CCS. '*SCCS Recommendations and Conference 2013 Report: Unlocking North Sea $CO_2$ Storage for Europe: Practical actions for the next five years*' Aberdeen: Scottish CCS, 2013.

Skagestad, Ragnhild et al. '*Ship transport of $CO_2$ Status and Technology Gaps*' SINTEF Tel-Tek Report no. 2214090. Porsgrunn: Gassnova, 2014.

Sluis, Wim van. *'CCS in Rotterdam – a network approach: A business case for CCS in Rotterdam'.* Rotterdam: Rotterdam Climate Initiative, 2012.

Steamship Mutual. *'P&I Club experience of HNS incidents'.* Workshop on the HNS Convention. London: IMO, 2018.

Stig Svenningsen. '*What is the North Sea Basin Task Force?*' PowerPoint on behalf of Norwegian Ministry of Petroleum and Energy. London: CCS Association.

Triple, RICARDO-AEA and TNO. *'Support to the review of Directive 2009/31/EC on the geological storage of carbon dioxide (CCS Directive): Final deliverable'.* Rotterdam: Trinomics, 2015.

UK CCS Research Centre. *'Delivering Cost Effective CCS in the 2020s: an overview of possible developments in Wales and areas linked to Welsh CCS activities via shipping. A Chatham House Rule Meeting Report'.* Sheffield: UKCCSRC, 2016.

Whiriskey, Keith. *'North Sea to the Rescue: The commercial and industrial opportunities of $CO_2$ storage in the North Sea'.* Bellona: Norway, 2015.

Zero Emissions Platform, '*CCS: an essential technology to reconcile energy security with climate objectives*'. The Hague: ZEP, 2014. http://www.zeroemissionsplatform.eu/library/publication/247-cc-senergysecurity.html.

## Online resources

British Institute of International and Comparative Law. 'Introduction to English Tort Law'. Last accessed 04/09/2018. https://www.biicl.org/files/763_introduction_to_english_tort_law.pdf.

DNV GL Maritime. 'Preparing for the MRV regulation (revised version)'. Published 14/09/2016. https://www.dnvgl.com/news/preparing-for-the-mrv-regulation-revised-version--75297.

DNV GL Maritime. 'EU MRV Regulation'. Last accessed 04/10/2018. https://www.dnvgl.com/maritime/eu-mrv-regulation/index.html.

Edie.net. 'International Maritime Organisation 'too slow' on emissions strategy'. Published 04/04/2018. https://www.edie.net/news/6/International-Maritime-Organisation--too-slow--on-emissions-strategy-/.

European Commission. 'EU Emissions Trading System (EU ETS)'. Last accessed 05/10/2018. https://ec.europa.eu/clima/policies/ets_en.

———. 'Market Stability Reserve'. Last accessed 11/10/2018. https://ec.europa.eu/clima/policies/ets/reform_en.

———. 'Implementation of the CCS Directive.' Last accessed 05/10/2018. https://ec.europa.eu/clima/policies/lowcarbon/ccs/implementation_en#tab-0-1.

Equinor. 'Statoil, Shell and Total enter $CO_2$ storage partnership'. Last modified 04/10/2017. https://www.equinor.com/en/news/statoil-shell-total-co2-storage-partnership.html.

Grey, Eva. 'Shipping emissions: EU vs IMO?' Ship Technology. Published 06/03/2017. https://www.ship-technology.com/features/featureshipping-emissions-eu-vs-imo-5753670/.

IMO. 'Low carbon shipping and air pollution control'. Last accessed 04/10/2018. http://www.imo.org/en/MediaCentre/HotTopics/GHG/Pages/default.aspx.

———. 'Convention on Limitation of Liability for Maritime Claims (LLMC)'. Last accessed 05/09/2018. http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/Convention-on-Limitation-of-Liability-for-Maritime-Claims-(LLMC).aspx.

IPCC Press Release. 'Summary for Policymakers of IPCC Special Report on Global Warming of 1.5ºC' 2018/24/PR. Last accessed 29/10/2018. http://ipcc.ch/pdf/session48/pr_181008_P48_spm_en.pdf

MarineLog. 'ICS: $CO_2$ roadmap under fire from some NGOs'. Last accessed 12/10/2018. https://www.marinelog.com/index.php?option=com_k2&view=item&id=23732:ics-co2-roadmap-under-fire-from-some-ngos&Itemid=257.

World Maritime News. 'ICS, ESPO against Inclusion of Shipping in EU ETS.' Published 16/02/2017. https://worldmaritimenews.com/archives/212959/ics-espo-against-inclusion-of-shipping-in-eu-ets/.

———. 'Shipping Should Not Be Included in EU Emissions Trading System?,' published 25/10/2018, https://worldmaritimenews.com/archives/233317/shipping-should-not-be-included-in-eu-emissions-trading-system/.

# Arctic Port State Jurisdiction over Black Carbon Emissions from International Shipping

Elena Norkina

# Foreword

This thesis was submitted as a completion of the LL.M degree in Public International Law at the University of Oslo. This work explores the jurisdictional limits of Arctic Port States in relation to the regulation of the black carbon emissions coming from the international shipping. The thesis is published as it was submitted with the exception to minor changes in grammar and punctuation. No other changes concerning the main text have been made.

I would like to express my very great appreciation, first and foremost, to my supervisor, Alla Pozdnakova at the University of Oslo, for her continuous support and for her patient guidance. I would have never been able to write this work without her thorough assistance.

Furthermore, I would like to thank my family for supporting and keeping faith in me. Special thanks to my sister who can always find proper words to cheer me up.

I also want to thank my friends who helped me a lot and encouraged me to keep on working.

Elena Norkina

# List of Abbreviations

| | |
|---|---|
| **BC** | Black Carbon |
| **CCH** | Common Concern of Humankind |
| **CDEM** | Construction, Design, Equipment, Manning |
| **$CH_4$** | Methane |
| **CS** | Coastal State |
| **CSJ** | Coastal State Jurisdiction |
| **$CO_2$** | Carbon dioxide |
| **COP** | Conference of the Parties |
| **FOC** | Flag of Convenience |
| **FS** | Flag State |
| **FSJ** | Flag State Jurisdiction |
| **GAIRAS** | Generally Accepted International Rules and Standards |
| **GHG** | Greenhouse Gas |
| **HFO** | Heavy Fuel Oil |
| **ICCL** | International Climate Change Law |
| **ICJ** | International Court of Justice |
| **IMO** | International Maritime Organization |
| **LOSC** | Law of the Sea Convention |
| **LOS** | Law of the Sea |
| **MARPOL** | The International Convention for the Prevention of Pollution from Ships |
| **MEPC** | Marine Environment Protection Committee |
| **MRV** | Monitoring, Reporting, Verification |
| **NSR** | Northern Sea Route |
| **NWP** | Northwest Passage |
| **PS** | Port State |
| **PSC** | Port State Control |
| **PSJ** | Port State Jurisdiction |
| **SLCP** | Short-lived climate pollutants |
| **SOLAS** | International Convention for the Safety of Life at Sea |

| | |
|---|---|
| **UN** | United Nations |
| **UNCLOS** | United Nations Convention on the Law of the Sea |
| **UNCLOS III** | United Nations Conference on law of the Sea |
| **UNFCCC** | United Nations Framework Convention on Climate Change |
| **VCLT** | Vienna Convention on the Law of Treaties |

# Chapter 1. Introduction

## 1.1 The dark side of climate change in the Arctic: the purpose of the research

We do face a global environmental crisis today. The effects of climate change are evident everywhere on the Planet, but the Arctic region is the one that is the most affected by global warming. According to the studies undertaken by Arctic Council working groups the region has significantly got warmed recently, and «the magnitude of temperature increase in the Arctic is twice as large as the global increase».[1]

Carbon dioxide ($CO_2$), methane ($CH_4$) and other greenhouse gases (GHG) have been seen as the major danger to the climate. However, it is important to address the impact caused by black carbon (BC) which is recognized as a second major contributor to global warming after $CO_2$. After being released from burning of coal, wood and diesel fuel, small soot particles travel around the globe. A significant part of them ends up in the Arctic darkening its ice sheet and causing the whole chain of unfortunate events.

The Arctic plays a crucial role in the Earth's climate. Arctic sea ice reflects about 80 % of the sunlight, therefore, it «helps to stabilize global temperatures».[2] Yet, the Arctic region is becoming ice-free very fast. Shipping activity in the Arctic has increased recently and prognoses show even greater rise in the future. As the more vessels navigate the Arctic, the more heavy fuel oil is burnt and more BC is released. That leads to the acceleration of ice melting which opens waters to the greater number of vessels. In this way, it causes a disastrous effect on climate. It

---

1 Arctic Council, 'Environment and Climate' (*Arctic Council* 13 May 2015) <https://www.arctic-council.org/index.php/en/our-work/environment-and-climate> accessed 21 April 2018

2 T. L. Brewer, *Arctic Black Carbon from Shipping: A Club Approach to Climate-and-Trade Governance (*Issue Paper No. 4; Global Economic Policy and Institutions Series; International Centre for Trade and Sustainable Development 2015), viii

is a matter of common concern to find a fast solution to this issue since climate change knows no borders.

Climate change and its adverse effects have been defined as a Common Concern of Humankind[3] (CCH). The comprehensive framework for combating climate change has been developed within the UN system. Yet, it has traditionally focused on GHG emissions, whereas less attention has been paid to the BC issue.

This thesis will examine the scope and limitations of Port State jurisdiction (PSJ) regarding BC emissions from ships in the Arctic. The following questions will be discussed:

1) A general regime of air pollution regulation under LOS legal instruments and the scope of States obligations to control air pollution from ships.
2) Whether the existing LOS framework provides sufficient basis for Arctic PSJ to regulate BC emissions from vessels? To what degree the scope of PSJ expands and whether Port States can impose more stringent regulations than those already imposed by international law.
3) Can the emerging concept of «the Arctic a Common Concern of Humankind» serve as justification for the assertion of a broader PSJ of Arctic States, since the idea behind the concept is the protection of common interest?

## 1.2 Defining Black Carbon and its effects

BC or soot is «the product of incomplete combustion of organic fuels»[4], which comes in a shape of small dark particles emitted by different

[3] UN General Assembly, *United Nations Framework Convention on Climate Change : resolution / adopted by the General Assembly*, 20 January 1994, A/RES/48/189, available at: http://www.refworld.org/docid/3b00f2770.html [accessed 21 November 2018], Preamble, (hereinafter UNFCC)

[4] IMO, *Investigation of appropriate control measures (abatement technologies) to reduce Black Carbon emissions from international shipping* (Air Pollution and Energy Efficiency Studies, IMO Publications 2015),1

sources.[5] This work will focus on the BC emissions from ships. BC is a part of heavy fuel oil (HFO) which is widely used in the international shipping industry. HFO is a residual fuel which «consists of the bottom-of-the-barrel leftovers from the oil refining process»[6] and contains a great variety of heavy metal impurities.

The detailed definition of BC was proposed to the International Maritime Organization (IMO) by the Institute of Marine Engineering, Science and Technology:[7]

> «Black Carbon is strongly light absorbing carbonaceous material emitted as solid particulate matter created through incomplete combustion of carbon-based fuels. BC contains more than 80% carbon by mass, a high fraction of which is sp2-bonded carbon, and when emitted forms aggregates of primary spherules between 20 and 50 nm in aerodynamic diameter. BC absorbs solar radiation across all visible wavelengths and freshly emitted BC has a mass absorption efficiency of 5 m2g–1 at the mid-visible wavelength of 550 nm. The strength of this light absorption varies with the composition, shape, size distribution, and mixing state of the particle».[8]

IMO defines BC as «a distinct type of carbonaceous material, formed only in flames during combustion of carbon-based fuels»[9], but more often a word 'soot' is used.

This complex definition addresses several important features. First, BC is a result of «combustion processes of carbon-based fuels», and, second, it has strong absorption capabilities.

Despite all the 'dark' sides of BC, there is good news. BC is defined as a short-lived climate pollutant (SLCP) which means that unlike $CO_2$ it does not stay long in the atmosphere. The average lifetime of BC varies from a

---

5 B. Comer, N. Olmer, X. Mao, B. Roy, D. Rutherford, Prevalence of heavy fuel oil and black carbon in Arctic Shipping, 2015 to 2025, *International Council on Clean Transportation Report* 2017, 3

6 ibid 2

7 IMO (n 4) 1

8 IMO (n 4) 1

9 Brewer (n 2) 3

couple of weeks to several decades.[10] However, due to its strong absorption capability, this rather short lifetime frame is enough to accelerate the Arctic ice sheet melting. Yet, it is believed that the immediate reduction of BC emissions will have an equally immediate effect on climate change deterrence. Recent studies suggest that the warming processes can be slowed down by 0.6 degrees by the mid-century[11] which can become a significant input to the global warming problem solution.

## 1.3 Jurisdiction and jurisdictional principles under international law

As this work explores jurisdictional limits of Arctic Port States (PS), it is necessary to give a brief overview of jurisdiction and jurisdictional principles employed in further discussion.

The 'jurisdiction' is a sovereign power to «regulate or otherwise impact upon people, property, and circumstances».[12] As a product of international law, the scope of jurisdiction is subject to limitations imposed by international law itself. Jurisdiction is exercised on the basis of certain principles serving as «links between the state exercising jurisdiction and the regulated activity».[13]

PS primary exercise their jurisdiction on a territorial basis as ports usually lie within their internal waters. In the *North Sea Continental Shelf* cases (1969) ICJ developed so-called 'the land dominates the sea' concept which means that in any case «the land is the legal source of the power»[14] of a State. Hence, territorial principle foresees that States are

[10] Center for Climate and Energy Solutions (*What is Black Carbon?* April 2010) <https://www.c2es.org/site/assets/uploads/2010/04/what-is-black-carbon.pdf> accessed 3 June 2018

[11] Center for Climate and Energy Solutions (*Short-lived Climate Pollutants*) <https://www.c2es.org/content/short-lived-climate-pollutants/> accessed 3 June 2018

[12] M.N. Shaw, *International Law* (7th edn, CUP 2014) 469; M. Akehurst, 'Jurisdiction in International Law' (1972) 46 Brit YB Int'l L, 145

[13] Sophia Kopela, 'Port-State Jurisdiction, Extraterritoriality, and the Protection of Global Commons' (2016) Ocean Development & International Law, 47:2, 89-130, 91

[14] North Sea Continental Shelf, Judgment, I.C.J. Reports 1969, p. 3. para. 96

free to exercise sovereign powers within territorial waters unless there is an explicit international legal rule imposing limitations to such power.

Jurisdiction can be also exercised extraterritorially. Extraterritorial jurisdiction presumes «that despite the jurisdictional link, the regulated activity has taken place outside State's territory».[15] For justification of a State's actions concerning activities taking place outside the borders of that State, principles or links of extra-territorial jurisdiction are employed.

International law developed five jurisdictional links for extraterritoriality. For the purpose of this work, only one extraterritorial link will be discussed.

Effects doctrine is rather controversial but the most suitable jurisdictional link in the context of BC emissions extraterritorial regulation. It is applicable to cases where an offense has started outside the borders of a State but was «at least partially completed within the State's territory».[16]

The essence of the doctrine was defined in *US v. Aluminum Co. of America* which relates to antitrust law but can be applied in more general terms:

> «any state may impose liabilities, even upon persons not within its allegiance, for conduct outside its borders that has consequences within its borders which the state reprehends».[17]

This doctrine was slightly modified with time by the requirements of intention and substantiality of the effects.[18] Effects test is now balanced by 'a jurisdictional rule of reason' which requires to consider interests of all other nations and the nature of the relationship between them and the State.[19]

---

15 Kopela (n 13) 92

16 Peter Behrens, *The Extraterritorial reach of EU competition Law revisited. The 'effects doctrine' before the ECJ*, (Discussion Paper No 3/16 2016), 5

17 United States v. Aluminum Co. of America, 148 F.2d 416 (1945) p 443

18 Shaw (n 12) 500

19 ibid

## 1.4 Legal method and sources

This work analyzes applicable international legal sources and other relevant sources regulating air pollution from vessels, and the contribution of BC to global warming. According to Article 38 ICJ Statute, the primary sources include international conventions, international custom, the general principles of law, and judicial decisions and scholarly work as subsidiary sources.

The work will be based on the analysis of both primary and subsidiary sources. Analysis of primary sources will include the Law of the Sea Convention 1982[20] (LOSC), International Convention for the Prevention of Pollution from Ships (MARPOL)[21] and Polar Code[22] provisions. This thesis significantly relies on scholarly work on issues existing within the Law of the Sea (LOS) and International Climate Change Law (ICCL) fields. As a matter of fact, the research question combines these two legal regimes, which creates a limitation to the discussion to a certain extent.

There is no reference in LOSC 1982 to UNFCCC,[23] yet, it has been recognized that «climate change creates new challenges for the Law of the Sea».[24] Although, climate change was left aside during UNCLOS III, yet, it is argued that LOSC 1982 indirectly applies to climate change. Precisely, provisions contained in Part XII «Protection and Preservation of the marine environment» are relevant to this area, as LOSC imposes

[20] UN General Assembly, *Convention on the Law of the Sea*, 10 December 1982, available at: <https://www.refworld.org/docid/3dd8fd1b4.html> accessed 22 November 2018 (hereinafter UNCLOS)

[21] International Maritime Organization (IMO) International Convention for the Prevention of Pollution from Ships MARPOL 73/78 12 ILM 1319 (1973); TIAS No. 10,561; 34 UST 3407;1340 UNTS 184 <http://www.imo.org/en/about/conventions/listofconventions/pages/international-convention-for-the-prevention-of-pollution-from-ships-(marpol).aspx> accessed 22 November 2018 (hereinafter MARPOL)

[22] International Code For Ships Operating In Polar Waters (Polar Code) Res MSC.385(94) (adopted on 21 November 2014) Res MEPC.265(68) (adopted on 15 May 2015) MEPC 68/21/Add.1 (hereinafter Polar Code)

[23] Bleuenn Guilloux, Romain Schumm, Which International Law for Climate and Ocean? (ocean-climate.org) 80 <http://www.ocean-climate.org/wp-content/uploads/2017/03/international-law-161024_ScientificNotes_Oct2016_BD_ppp-14.pdf> accessed 4 September 2018

[24] ibid

a general obligation to protect and preserve the marine environment.[25] Articles 194 (3)(a) and 212 (1) LOSC provide a regime for vessel-source pollution from and through the atmosphere. Broad definition of pollution given in Article 1(4) LOSC allows to include any pollutant if it harms or likely to harm the marine environment. Also, the openness and flexibility of the definition permit to include new pollutants source, including BC, causing harmful effect on the marine environment.

Moreover, in accordance with method of interpretation defined in Article 31 Vienna Convention on the law of Treaties (VCLT) «a treaty shall be interpreted in good faith in accordance with the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose». In this regard UNCLOS recognizes that «the problems of ocean space are closely interrelated and need to be considered as a whole»[26] while the Preamble of Paris Agreement, which is a part of the UNFCCC, now recognizes «the importance of ensuring the integrity of all ecosystems, including oceans».[27] Even though this reference is broad and not further elaborated, the interaction between two legal regimes has been acknowledged by States.

International law is a dynamic evolving system, therefore, as Boyle noted UNCLOS does not need to be interpreted as «a static instrument, cast in stone somewhere around 1982».[28] Evolutionary interpretation is permissible, yet, it has to be in line with the object and purpose of the UNCLOS and UNFCCC. In this relation, the supplementary means of interpretation defined in Article 32 VCLT can be helpful to understand the genuine meaning of the Conventions.

Another limitation to this work comes from the absence of BC emissions from ships regulation to date.

---

25 Guilloux, Schumm (n 23) 79

26 UNCLOS Preamble

27 Paris Agreement 2015 FCCC/CP/2015/L.9/Rev.1 Preamble

28 Alan Boyle, 'Further Development of the Law of the Sea Convention: Mechanisms for Change' (2005) International and Comparative Law Quarterly, pp. 563–584, 568

MARPOL, as the major 'tool' for controlling incidental vessel-source pollution, does not refer to BC at all. Noteworthy, its Annex VI Prevention of the Air Pollution from Ships is optional.

Recently adopted Polar Code, while prescribing navigation standards for Arctic shipping, does not address atmosphere pollution from vessels. In relation to HFO, regulation 1.1 states that «ships are encouraged to apply regulation 43 of MARPOL Annex I when operating in Arctic waters».[29] Under this Regulation, HFO was banned from Antarctica in 2011 with the exception to vessels engaged in «securing safety of ships or in search and rescue operations».[30]

Recently two initiatives were undertaken on international and regional levels. The former initiative relates to the proposal to ban HFO from the Arctic which was addressed during the IMO MEPC 72nd session.[31]

Arctic Council's latest initiative to tackle BC emissions was undertaken during the ministerial meeting in Fairbanks, the USA in May 2017. Arctic States acknowledged the common concern regarding global warming and highlighted a need for «global action to reduce both long-lived greenhouse gases and short-lived climate pollutants».[32] Arctic Council Framework comprises a flexible approach to BC problem «due to its ability to rapidly change the focus of its work in accordance with priorities».[33]

The general ICCL regime will not be examined within this work since the discussion is limited to BC emissions from ships. Yet, there will be a recourse to ICCL concept 'Climate change as a Common Concern of Humankind'. The idea is to employ this concept to justify Arctic Port

---

29 Polar Code Part II-B A.G.1, 1.1.

30 International Maritime Organization (IMO), *International Convention for the Safety of Life At Sea*, 1 November 1974, 1184 UNTS 3, available at: <https://www.refworld.org/docid/46920bf32.html> , Chapter 9 Regulation 43 (1)

31 Marine Environment Protection Committee (MEPC), 72nd session, 9–13 April 2018 <http://www.imo.org/en/mediacentre/meetingsummaries/mepc/pages/mepc-72nd-session.aspx> accessed on 12.10.2018

32 Arctic Council, 2017, Fairbanks Declaration. 16 pp. note 23

33 D. Shapovalova, 'The Effectiveness of the Regulatory Regime for Black Carbon Mitigation in the Arctic Arctic Review on Law and Politics'(2016) Vol. 7 No. 2 pp. 136–151, 145

States extraterritorial jurisdiction over BC emissions from ships which trigger global warming in the region. E.J. Molenaar, C. Ryngaert, H. Ringbom and S. Kopela, in particular, discuss the applicability of this concept as a jurisdictional basis of PSJ. This work will significantly rely on the relatively new approach to extraterritorial PSJ over protection of global commons developed by S. Kopela.

This work recourses to judicial decisions as they are helpful to clarify some aspects of the discussion. On the other hand, some courts and tribunals have different authority and examine particular cases within a certain context. Hence, judicial decisions provide guidance to a certain degree but they do not always create a unilateral approach.

National legislation of some of the Arctic States will be also briefly analyzed alongside the supplementary sources related to different fields such as policy frameworks and statistical reports from the shipping industry.

The further discussion will start with the general overview of States obligations to regulate air pollution from vessels. Further, it will explain why Arctic PS can play a more significant role in the regulation of BC emissions from international shipping.

# Chapter 2. States obligations to control air emissions from ships: regulation of Black Carbon emissions from ships

## 2.1 Introduction

Ships can pollute the oceans in many ways.[34] Shipping is responsible for oil spills, chemical emissions, noise pollution and so on.

Due to the changing ice conditions in the Arctic, the overall increase is expected in activities linked to petroleum extraction, freight shipping, tourism, and circumpolar transition shipping.[35]

IMO Arctic covers the area from the north of 60° limited by a line from Greenland; the south at 58° – the north of Iceland, southern shore of Jan Mayen – Bjørnøya – Cap Kanin Nos.[36] The Geographical Arctic is determined by the line of latitude of 66.5°north of the Equator within the Arctic Circle.[37]

The major shipping route in the Arctic Ocean is the Northeast Passage, which includes Northern Sea Route, Northwest Passage, and Transpolar Passage.[38] These routes connect Asian, North American and European markets and reduce both the distance and fuel consumption in compar-

[34] Willy Østreng,Karl Magnus Eger, Brit Fløistad, Arnfinn Jørgensen-Dahl, Lars Lothe, Morten Mejlænder-Larsen, Tor Wergeland, *Shipping in Arctic Waters: A comparison of the Northeast, Northwest and Trans Polar Passages* (Springer – Praxis Books in Geophysical Science, 2013) 150

[35] Norges Rederiforbund, 'High North – High Stakes Maritime opportunities in the Arctic' <https://rederi.no/globalassets/dokumenter/alle/rapporter/maritime_opportunities_in_the_arctic.pdf> 8 accessed 9 September 2018

[36] The IMO Polar Code in force, beginning 1 January 2017: How to comply (*DNV GL* 21 December 2016) <https://www.dnvgl.com/news/the-imo-polar-code-in-force-beginning-1-january-2017-how-to-comply-83230> accessed 16 September 2018

[37] Jeannie Evers, Emdash Editing, Arctic (*National Geographic Education* 2016) <https://www.nationalgeographic.org/encyclopedia/arctic/> accessed 12 September 2018

[38] Østreng, Eger, Fløistad, Jørgensen-Dahl, Lothe, Mejlænder-Larsen, Wergeland (n 34) 11

ison with traditional Suez and Panama routes.[39] Moreover, the Arctic region is becoming a new tourist destination. In 2015 nine different flag cruise ships brought tourists to the Arctic and the number is expected to increase in near future. In 2016 the luxury cruise line *Crystal Serenity* made a historic voyage through Northwest Passage, proclaiming a new era for tourism in Arctic waters.[40]

Despite the economic opportunities, numbers show that in 2015 the vast majority of cruise ships navigating Arctic waters operated on HFO, which resulted in BC emissions. HFO has been estimated as the most consumed marine fuel both in Geographic (59%) and IMO Arctic (57%).[41] Noteworthy, the majority of vessels which operated on HFO sailed under non-Arctic States flags. Current shipping activities are responsible for about 5% of overall BC emissions in the Arctic, however, the number is expected to increase by 2030 and «quadruple by 2050 given current projections»[42].

Due to the lack of specific regulations on BC matter, the chapter will discuss the general regime of FS obligations to regulate air pollution from vessels. Unlike Coastal State (CS) and PS, a jurisdiction of Flag States (FS) is plenary,[43] so the role of FS on controlling air emissions from ships is central in LOS regime. However, the efficiency of FSJ is debatable, hence, it leaves a room to consider other ways to address air emissions issue.

---

39 Aldo Chircop, 'Sustainable Arctic Shipping – Are Current International Rules for Polar Shipping Sufficient?'(2016 ) Climate Change: Adapting to a Changing Arctic Ocean The Journal of Ocean Technology, Vol. 11, No. 3, 41

40 Thomas Nilsen, 'Be prepared, mass tourism is coming like lemmings' (*Barents Observer* 6 October 2016) <https://thebarentsobserver.com/en/industry-and-energy/2016/10/be-prepared-mass-tourism-coming-lemmings> accessed 26 August 2018

41 Comer, Olmer, Mao, Roy, Rutherford (n 5) 22

42 AMAP, 2015. Summary for Policy-makers: Arctic Climate Issues 2015. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. pp16, 7 <http://www.hfofreearctic.org/hrf_faq/shipping-arctic-expected-increase/#_ftn1> accessed on 23.08.2018

43 Daniel Bodansky, 'Protecting the Marine Environment from Vessel-Source Pollution: UNCLOS III and Beyond' (1991)18 Ecology L. Q. 719, 741

## 2.2 Flag States obligations to control air emissions from ships

### 2.2.1 General obligation to protect and preserve the marine environment

Prior to UNCLOS III jurisdiction of FS «was generally exclusive beyond the territorial sea».[44] Traditionally only FS could prescribe standards and requirement for vessels on the high seas and undertake enforcement measures.[45] Modern LOS regime retains the primacy of FS. FS are required by LOSC to «prevent, reduce, and control vessel-source pollution»,[46] whereas CS and PS right to prescribe and enforce vessel-source pollution standards is limited and has optional character.[47]

All States are under the general obligation to protect and preserve the marine environment as established in Article 192 LOSC. In this regard, States shall take all measures necessary to prevent, reduce and control pollution of the marine environment from any source.[48] Those measures are non-circumscriptive but they shall be «designed to minimize to the fullest possible extent»[49] any pollution coming from land-based sources, vessels, offshore installations, including pollution «from or through the atmosphere».[50] However, such measures shall not lead to «unjustifiable interference with activities carried out by other States»[51] as they exercise their rights and performing their duties under LOSC.

So FS due to their primacy over CS and PS are under a general duty «not to pollute marine environment and must not condone the actions of nations to do so».[52]

---

44 Bodansky (n 43) 741

45 ibid

46 Bodansky (n 43) 741

47 Article 211 (2),(4), (5), Article 217(1) UNCLOS

48 Article 194 (1) UNCLOS

49 Article 194(3) UNCLOS

50 Article 194 (3) (b) UNCLOS

51 Article 194(4) UNCLOS

52 C. Joyner, 'The International Ocean Regime at the New Millennium: a Survey of the Contemporary Legal Order' (2000) 43, Ocean and Coastal Management 163, 192

In this regard Article 92(1) LOSC affirms that FS have a primary responsibility to exercise prescriptive and enforcement jurisdiction over the vessels flying its flag.[53] FS must register and grant nationality to its vessels. This obligation creates a genuine link between a vessel and a State, so a vessel acquire a right to sail under the flag of that State.[54]

LOSC prescribes that «every State shall effectively exercise its jurisdiction and control in administrative, technical and social matters over ships flying its flag».[55] So FS assumes jurisdiction under domestic law over vessels flying its flag as well as over master of the ship and a crew.[56] Such jurisdiction and control include measures relating to vessels registration, safety measures including «construction, equipment, and seaworthiness of ships». Noteworthy, that scholars submit that measures defined under Article 94(3) are non-exhaustive due to the wording used in the Article.[57] LOSC requires such measures to be in conformity with «generally accepted international regulations, procedures and practices and to take any steps which may be necessary to secure their observance».[58]

### 2.2.2 The obligation of Flag States to prescribe measures for the prevention of air emissions from vessels

Article 211(2) LOSC requires FS to «adopt laws and regulations for the prevention, reduction, and control of pollution of the marine environment from vessels flying their flag or of their registry».[59] Article 211 (2) does not limit the scope of prescriptive powers of FS, so FS can prescribe

---

53 Anders Grønstad Friisk, 'Arctic Coastal State Jurisdiction in an Era of Climate Change, Vessel-Source Oil Pollution and International Shipping in Norwegian and Russian Arctic Waters' (2014) FNI Report 12/2014, 8

54 Article 91 UNCLOS

55 Article 94 (1) UNCLOS

56 Article 94 (2) UNCLOS

57 Tamo Zwinge, 'Duties of Flag States to Implement and Enforce International Standards and Regulations – And Measures to Counter Their Failure to Do So' (2011) Journal of International Business and Law: Vol. 10: Iss. 2, Article 5, 301

58 Article 94 (5) UNCLOS

59 Article 211(2) UNCLOS

specific construction, design, equipment, manning (CDEM) standards and further enforce them on the high seas.[60]

Such laws and regulations are required to have «at least <..> the same effect as that of generally accepted international rules and standards» (GAIRAS). By using the wording «at least», LOSC established that GAIRAS constitute a minimum for FS which implies the right of FS to prescribe stricter laws and regulations. This right is a matter of choice of FS. At the same time, national laws have to stay in line and not contradict with GAIRAS. As Lowe and Churchill stated:

> «While each State remains free in theory to apply its own legal standards relating to such matters as seaworthiness and crew qualifications to ships flying its flag . . . there would be chaos if these standards varied widely or were incompatible».[61]

Regarding air pollution, Article 212 LOSC obliges FS to «adopt laws and regulations to prevent, reduce and control pollution of the marine environment from or through the atmosphere, applicable to the air space under their sovereignty and to vessels flying their flag or vessels or aircraft of their registry». Such wide discretion to prescribe laws and regulations on air pollution from vessels is not limited to GAIRAS only. Yet, it is balanced by the requirement to take into account international rules, standards, «and recommended practices and procedures and the safety of air navigation»,[62] so such regulations will not contradict international rules and standards.

When it comes to vessel-source pollution, MARPOL constitutes «applicable international rules and standards, established through the competent international organization».[63] Article 1 MARPOL obliges all States:

60 Bodansky (n 43) 741
61 Zwinge (n 57) 302
62 Article 212 (1) UNCLOS
63 Article 211 (1) UNCLOS

> «to give effect to the provisions of the present Convention and those Annexes thereto by which they are bound, in order to prevent the pollution of the marine environment…».

As soon as a State becomes a party to MARPOL, «it is that State's responsibility to create and enact domestic legislation which will implement the convention rules».[64] This Article contains the obligation of a general nature, so States have wide discretion in defining the scope of their national laws. Since Annex VI is optional, its implementation widely relies on FS desire to regulate air emissions from vessels. As MARPOL constitutes a minimum for FS, States can go beyond GAIRAS and prescribe stricter standards. Limited State practice shows that some national legislation contains extensive rules, whereas the majority of States do not go further MARPOL provisions.[65] However, despite FS can require vessels under their flag comply with stricter rules, FS cannot enforce such rules against foreign vessels unless they are recognized as GAIRAS by IMO.[66]

### 2.2.3 The obligation of Flag States to enforce measures for the prevention of air emissions from vessels

The predominance of FS enforcement jurisdiction has been well-recognized,[67] since «the major pollution Conventions are <…> based primarily on Flag State enforcement».[68]

---

64 Mark Szepes, 'MARPOL 73/78: The Challenges of Regulating Vessel-Source Oil Pollution' (2013) Manchester Student Law Review Vol 2:73, 84

65 The Protection of the Seas (Pollution Prevention Act) 1983, Australia; Marine Environment Protection Law of the Peoples' Republic of China 1982, China.

66 R. Churchill, A.V. Lowe, *The Law of the Sea*, (3d edition Manchester University Press 1999), 346

67 David Anderson, 'The Roles of Flag States, Port States, Coastal States and International Organisations in the Enforcement of International Rules and Standards Governing the Safety of Navigation and the Prevention of Pollution from Ships under the UN Convention on the Law of the Sea and Other International Agreements' (1998) 2 Sing. J. Int'l & Comp. L. 557, 561

68 A. V. Lowe, 'The Enforcement of Marine Pollution Regulations', (1975) 12 San Diego L. Rev. 624, 632

As a consequence of prescriptive jurisdiction, LOSC provides FS with enforcement powers in order to fulfil their obligations. Ehlers noticed that the mere existence of international rules and standards is not sufficient, as the effectiveness of their enforcement depends on the ensurance of vessels' compliance with international laws and standards.[69] The role to observe this compliance is imposed on FS. Article 217(1) LOSC obliges FS to:

> «…ensure compliance by vessels flying their flag or of their registry with applicable international rules and standards, established through the competent international organization or general diplomatic conference, and with their laws and regulations adopted in accordance with this Convention for the prevention, reduction and control of pollution of the marine environment from vessels…».

Due to the primacy of FS over CS and PS jurisdiction, FS are required to ensure effective enforcement of rules and regulations «irrespective of where a violation occurs».[70] As MARPOL and its Annex VI contain specified requirements for vessels, FS are required to «ensure that vessels flying their flag or of their registry carry on board certificates required by and issued pursuant to international rules and standards».[71]

Under Annex VI every ship of 400 tonnage and above are subject to initial, periodical, intermediate and renewal surveys aimed to ensure «equipment, systems, fittings, arrangements, and material fully comply with the applicable requirements».[72] Hence, FS are obliged to ensure that systems or equipment of States' vessels work properly and no deliberate emissions of ozone-depleting substances occur during the operation of vessels.[73] Regulation 13 requires FS to ascertain that exhaust cleansing systems of diesel engines meet the requirements of technical standards

---

69 Prof. Dr. Dr. h.c. Peter Ehlers, Enforcement of International Maritime Law Instruments, Institute for the Law of the Sea and Maritime Law, Hamburg University <http://www.traceca-org.org/fileadmin/fm-dam/TAREP/68ta/1/Enforcement_Ehlers.pdf> accessed 5 October 2018

70 Article 217 (1) UNCLOS

71 Article 217(3) UNCLOS

72 MARPOL Annex VI Regulation 5

73 MARPOL Annex VI Regulation 12

established by Annex VI.[74] In relation to sulphur oxides, Regulation 14(a) obliges FS to assure that «the sulphur content of any fuel oil used on board ships shall not exceed 4.5% m/m» and any further changes shall be made in accordance with guidelines adopted by IMO.[75]

If a vessel under the State's flag or registry does not comply with GAIRAS requirements, including CDEM standards, FS shall take all measures to prevent such ship from sailing until the cause is eliminated.[76] In case of violation of required laws and standards, FS are obliged to investigate and institute proceeding over such violation irrespective of the location of the violation.[77]

## 2.3 Challenges to Flag State jurisdiction

The issue of substandard shipping and the consequences of marine pollution accidents have questioned the efficiency of FSJ.[78] As D. Bodansky noticed «in discussions concerning flag state jurisdiction, the question has not been its permissibility but rather its adequacy».[79]

As soon as standards acquire a level of GAIRAS, LOSC requires FS to give effect to such provisions, hence, to implement and enforce them through their national laws. BC emissions from shipping so far remain unregulated and necessary CDEM standards are absent. Thus, FS have no legal obligation to adopt specific requirements for vessels' engines in order to reduce BC emissions or replace HFO with «greener» fuels. Another issue is that some FS either fail to duly perform their duties or simply have no incentives to act diligently. In this relation, Flag of Convenience (FOC) constitutes a certain problem when it comes to enforcement efficiency as they can be reluctant or not able to enforce international standards adequately.[80]

---

74 MARPOL Annex VI Regulation 13(a), (b)

75 MARPOL Annex VI Regulation 14 (b)

76 Article 217(2) UNCLOS

77 Article 217(4) UNCLOS

78 Yaodong Yu, Yue Zhao & Yen-Chiang Chang, 'Challenges to the Primary Jurisdiction of Flag States Over Ships', (2018) Ocean Development & International Law, 49:1, 85–102, 87

79 Bodansky (n 43) 737

80 Bodansky (n 43) 743

FS reluctance has already led to many marine disasters like Argo-Merchant, Amoco-Cadiz and Deepwater Horizon. Although, effects of air pollution are not immediate and rather unseen in comparison with oil pollution, studies confirm its transboundary negative effects on the marine environment.[81]

Once the international community realized that it might be «unreasonable and ineffective to rely solely of FS»,[82] the discussion on the role of PSJ and PSC has evolved. PSJ has been traditionally seen as complementary to FSJ, however, some scholars highlight that recently PS put pressure on the shipping sector in order to enhance vessels' compliance with international standards.[83] LOSC preserves freedom of navigation by balancing interests of FS, CS, and PS, whereas evolving regime for the marine environment protection gives CS and PS more freedom of action.[84] Despite FSJ retain primacy, scholars noticed that it is «more practical to allow coastal and port states to also act as defenders of the marine environment»[85] and, thus, to provide them with greater discretion. So, it is argued that PS can act for the interests of the international society to protect the marine environment effectively because the mere reliance on FSJ can «weaken international marine protection».[86]

In the light of the aforementioned, the next chapter will examine the role of PSJ in relation to BC emissions from shipping in the Arctic. As it was said before, BC emissions are an unregulated area, so the discussion will be focused on the possibility of Arctic PS to fill this gap by expanding their jurisdictional boundaries.

---

81 Douglas Martins, 'Air Pollution and the Ocean. Study measures impacts of nitrogen deposition on coastal waters' (*Penn State News*, October 06, 2014) <https://news.psu.edu/story/329095/2014/10/06/research/air-pollution-and-ocean> accessed 29 November 2018

82 Yu, Zhao, Chang (n 78) 91

83 Zwinge (n 57) 310

84 Yu, Zhao, Chang (n 78) 94

85 ibid

86 Yu, Zhao, Chang (n 78) 91

# Chapter 3. Arctic Port State jurisdiction: to what extent can Arctic Port States regulate Black Carbon emissions from vessels?

## 3.1 Introduction

BC emissions are primarily connected with technical characteristics of vessels, precisely, with the type of engine a vessel has. In the Arctic, the majority of vessels use engines which operate on HFO. Usually, ships engines are tuned for the optimal maximum efficiency when the least amount of fuel is produced and the least amount of BC is emitted.[87] If engines operate outside the tuned load, the situation is vice-versa. Vessels' speed is determined by many factors but when it comes to the Arctic, the most obvious factors are low visibility and complicated ice conditions. That precludes vessels from operating on the optimal engine load mode. Hence, in order to emit less BC, the engine load has to be re-tuned/re-rated in accordance with the Arctic highly variable sailing conditions.

Also, vessels operating on HFO fuels usually use 2-stroke engines which lead to increasing number of BC emissions. Studies show that if vessels use greener fuels and replace 4-stroke engines to 2-stroke engines, it is likely to result in reduction in BC emissions by 75–80%.[88]

So generally, «BC emissions in the Arctic will be dependent on the speed and engine load, fuel type and whether the engines can be optimally tuned or de-rated for the variable loads encountered»[89]. In other words, these requirements are purely technical in nature and fall within CDEM measures. CDEM standards contained «in many legally

87 Daniel Lack, *The Impacts of Arctic Shipping Operations on Black Carbon Emissions,* (Transport Emissions: Air Quality and Climate Consulting, Queensland,Australia, 2016), 5

88 Comer, Olmer, Mao, Roy, Rutherford (n 5) 39

89 Lack (n 87) 9

binding IMO instruments»[90] refer to maritime safety and protection of the marine environment.

That leads to the question, whether Arctic PS can incite foreign vessels to replace diesel fuels with greener fuels or re-tune their engines, so they will not produce BC at all or at least significantly less. This chapter will discuss the scope and limitations of Arctic PSJ in order to answer whether Arctic PS can regulate BC emissions from international navigation.

The second paragraph will consider the general competence of CS to regulate navigation within maritime zones under their jurisdiction with a special attention to CDEM regulations.

The third paragraph is devoted to the main question of the chapter. The scope of prescriptive and enforcement jurisdiction of PS will be examined alongside with the right to impose more stringent CDEM regulations than those imposed by international law. Further, the extraterritorial effect of both prescriptive and enforcement jurisdiction of PS will be also analyzed. Finally, limitations to PS jurisdictional powers will be explored.

## 3.2 Arctic Coastal States jurisdiction over Territorial Sea and Exclusive Economic Zone

Canada, Denmark, Norway, the USA, and Russia are recognized as Arctic Five due to their coastal frontage in the Arctic Ocean. Except for the USA, all Arctic States are the parties to the LOSC 1982. LOSC divides seas into maritime zones where States exercise jurisdiction or jurisdictional rights. This paragraph will address a general scope of jurisdictional rights Arctic CS may exercise within their territorial waters and EEZ.

The sovereignty of Arctic CS covers internal waters and territorial sea as defined under Article 2 (1) UNCLOS:

[90] E.J. Molenaar, 'Status and Reform of International Arctic Shipping Law', in Elizabeth Tedsen, Sandra Cavalieri, R. Andreas Kraemer (eds.), *Arctic Marine Governance: Opportunities for Transatlantic Cooperation* (Springer Science & Business Media 2013) 142

> «The sovereignty of a coastal State extends, beyond its land territory and internal waters and, in the case of an archipelagic State, its archipelagic waters, to an adjacent belt of sea, described as the territorial sea».

Internal waters are situated on the landward side of the baselines, while the territorial sea is measured from their outer limit. According to LOSC, territorial sea can be established up to the limit of 12 n.m.[91] In 2003, Norway extended its territorial sea from 4 n.m. to 12 n.m., including waters surrounding Svalbard and Jan Mayen.[92] The same path was followed by Denmark in 1999, however, the limits of Greenland's territorial haven't been changed. Canada likewise changed its territorial sea from 3 n.m. to 12 n.m. in 1970.[93] The US extended its territorial sea from 3 to 12 n.m. in 1988 which stays in line with the LOSC provisions.[94] Russia established the status of internal waters and the 12 n.m. limits of the territorial sea under the Federal Act of 17 July 1998.[95]

Despite both internal waters and territorial sea are fall under CS sovereignty, there is a limitation to the regime of territorial waters which is the right of innocent passage granted to «ships of all States, whether coastal or land-locked».[96]

The right of innocent passage is balanced by the right of CS to regulate passage through territorial waters. CS can adopt laws and regulations applicable to different aspects of navigation safety, protection of marine environment, scientific research. Such laws have to be duly-published and non-discriminatory. Foreign vessels are obliged to comply with those rules. Yet, Article 21(2) LOSC specifies that such laws and regulations shall not cover «the design, construction manning or equipment of foreign ships unless they are giving effect to generally accepted international rules

---

91 Article 3 UNCLOS

92 Østreng, Eger, Fløistad, Jørgensen-Dahl, Lothe, Mejlænder-Larsen, Wergeland (n 34) 250

93 ibid 263

94 Østreng, Eger, Fløistad, Jørgensen-Dahl, Lothe, Mejlænder-Larsen, Wergeland (n 34) 266

95 ibid 251

96 Article 17 UNCLOS

or standards»[97]. Thus, CS can only implement internationally accepted CDEM measures. Bearing in mind that BC emissions are not regulated on the international level, Arctic CS may not impose national BC-related CDEM standards. Meanwhile, Article 21 LOSC refers to the navigation in the territorial sea, which is different from navigation in internal waters where PS possess absolute sovereignty.[98]

Article 211(4) LOSC provides CS with a right to prescribe stricter national standards[99] «for the prevention, reduction and control of marine pollution from foreign vessels, including vessels exercising the right of innocent passage».[100] This right is also limited by the obligation not to hamper innocent passage unless there is an exception established by LOSC.[101] «Hampering» is not forbidden if it is consistent with LOSC. Nevertheless, as Molenaar suggests «any kind of Coastal State regulation can be regarded impairing,<…>, and offers no more guidance than hampering».[102]

Passage shall be exercised in conformity with LOSC and other international legal rules,[103] otherwise, it can be considered prejudicial. «Any act of willful and serious pollution»[104] conflicting with LOSC falls under prejudicial passage. Though, the degree of required intent of such acts is not clear enough. So, if a vessel simply operates on HFO, it is hard to establish its deliberate intent to pollute CS marine environment. CS can prevent any non-innocent passage and «take the necessary steps to prevent any breach of the conditions to which admission of those ships to internal waters or such a call is subject».[105]

---

97 Article 21 (2) UNCLOS

98 Churchill, 'Port State Jurisdiction Relating to the Safety of Shipping and Pollution from Ships—What Degree of Extra-territoriality?' (2016) The International Journal of Marine and Coastal Law, Volume 31,Issue 3, pp 442 – 469, 451

99 Friisk (n 53) 9

100 Article 211 (4) UNCLOS

101 Article 24(1) LOSC; Article 211(4) UNCLOS

102 Erik Jaap Molenaar, *Coastal State Jurisdiction Over Vessel-Source Pollution*, (Kluwer Law International 1998) 202

103 Article 19 (1) UNCLOS

104 Article 19 (2) (h) UNCLOS

105 Article 25 (2) UNCLOS

In case of violations of CS rules and standards or «applicable international legal rules for the prevention, reduction and control of pollution from vessels»,[106] that CS can undertake physical inspection of such a vessel and institute proceedings, including detention.

The sovereignty of the Arctic CS does not exceed the limits of the territorial sea where CS have wide prescriptive and enforcement powers. Meanwhile, CS retain certain jurisdictional rights within EEZ.

Article 55 LOSC defines EEZ as «an area beyond and adjacent to the territorial sea» which shall not exceed 200 n.m. measured from baselines.[107] EEZ is neither a part of the high seas nor a subject to the sovereignty of CS but a subject to a special legal regime established by LOSC. Article 56 grants CS sovereign rights for «exploring and exploiting, conserving and managing the natural resources»[108] in their EEZ. The other States «enjoy freedoms of navigation and overflight and of the laying of submarine cables and pipelines, and other internationally lawful uses of the sea related to these freedoms».[109]

Article 234 LOSC is an important provision in Arctic shipping regulation. Article 234 grants Arctic CS right «to adopt and enforce non-discriminatory laws and regulations «for the prevention, reduction and control of marine pollution from vessels in ice-covered areas». Such laws and regulations must be non-discriminatory and «have due regard to navigation and the protection and preservation of the marine environment».[110] As the area of application is limited to EEZ only, there is a fair question regarding the interpretation of the EEZ limits. Some scholars submit that territorial sea is excluded from the limits of EEZ, hence, laws and regulations adopted in accordance with Article 234 are inapplicable there.[111] Another point of view foresees that the application

[106] Article 220 (2) UNCLOS
[107] Arctic 57 UNCLOS
[108] Article 56 (1) (a) UNCLOS
[109] Article 58 (1) UNCLOS
[110] Article 234 UNCLOS
[111] McRae, Goundrey

of Article 234 covers all the maritime zones within 200 n.m. measured from baselines.[112]

In case of the narrow interpretation, CS cannot prescribe rules within EEZ which are inapplicable in the territorial sea,[113] so national CDEM inconsistent with international standards cannot be applied within EEZ. The broader interpretation suggests that CS can prescribe stricter national requirements within the 200 n.m. measured from the baselines, including CDEM standards.

Several Arctic States employ Article 234 to regulate navigation in EEZ. Precisely, Russia solely regulated «shipping along the NSR on the basis of LOSC, Article 234 and domestic legislation»[114] before the adoption of Polar Code. Shipping in the NWP was primarily regulated under Canadian domestic legislation until the Polar Code provisions were incorporated in newly adopted Arctic Shipping Safety and Pollution Prevention Regulations. Regulations go slightly further as Canada included certain national modifications on the top of the Polar Code provisions.[115]

The basis for enforcement measures within EEZ is stipulated in Article 220. If there are clear grounds to believe that violation occurred within EEZ, CS may require a vessel to give necessary information or undertake physical inspection if a vessel refuses to provide information or provides false information. If there is clear objective evidence that violation took place, CS may institute proceedings, including detention of a vessel.[116]

---

112 Pharand, Molenaar

113 Tore Henriksen, *Norway and Arctic Marine shipping*, Fram Centre Report Series No.2, 2015, 52

114 Østreng, Eger, Fløistad, Jørgensen-Dahl, Lothe, Mejlænder-Larsen, Wergeland (n 34) 182

115 Arctic Shipping Safety and Pollution Prevention Regulations (SOR/2017-286), 'While the safety provisions of the Polar Code do not apply to fishing vessels, pleasure craft, and vessels without a mechanical means of propulsion, the Canadian modifications […]apply to vessels of 300 gross tonnage or more, including fishing vessels, pleasure craft, and vessels without a mechanical means of propulsion'. <https://www.tc.gc.ca/eng/marinesafety/bulletins-2018-05-eng.htm> accessed 4 October 2018

116 Article 220 (6) UNCLOS

Overall, the allocation of CSJ is based on the principle «the closer one gets to the shore, the more authority a coastal nation has».[117] So, most of the Arctic States prescriptive and enforcement powers are concentrated within internal waters where States act in a capacity of PS. The following paragraph will explore the scope and limits of Arctic PSJ.

## 3.3 Arctic Port State jurisdiction

### 3.3.1 Prescriptive jurisdiction of Arctic Port States

Legislative or prescriptive jurisdiction refers to the State's power to «make binding laws within its territory».[118] Thus, it relates to the limits of the right of a state to impose national legal obligations upon persons or events within its borders. The supremacy of a state to prescribe laws within its territory is a well-established principle in international law. However, such national laws and regulations cannot be contrary to international law.

In order to regulate BC emissions from ships in the Arctic Ocean, Arctic PS need to adopt specified CDEM standards. Since BC emissions from ships remain unregulated so far, such PS requirements will deviate from the internationally accepted standard. The question is whether PS can adopt such requirements and if they can go beyond the internationally accepted standards.

#### 3.3.1.1 Whether Arctic Port States can prescribe specified national CDEM measures that go further than internationally accepted standards

Maritime ports are usually located within internal waters, hence, they fall under full sovereignty of PS. Article 8 LOSC defines internal waters as «waters on the landward side of the baseline of the territorial sea»[119]. They cover «different kinds of natural waters or artificial waterways of

[117] 'Primer on Ocean Jurisdictions: Drawing Lines in the Water An Ocean' (*Blueprint for the 21 Century*) <https://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/03a_primer.pdf> accessed 18 October 2018

[118] Shaw (n 12) 472

[119] Article 8 UNCLOS

a state»[120], such as «lakes, rivers, bays, gulfs, estuaries, creeks, ports and canals»[121].

The regime of internal waters is mainly crystalized through the court practice. In *ARA Libertad case* between Ghana and Argentina, the Court agreed with Ghana's position that:

> «The coastal state enjoys full territorial sovereignty over internal waters, and any foreign vessel that is located in internal waters is subject to the legislative, administrative, judicial and jurisdictional powers of the coastal State».[122]

Ports are presumed to be open to foreign vessels due to the unspoken rule of international trade relations.[123] As it was held in *Saudi-Arabia v. Aramco* arbitration:

> «According to a great principle of public international law, the ports of every state must be open to foreign merchant vessels and can only be closed when the vital interests of the states so require».[124]

On the other hand, there is no «legal obligation upon States to keep their ports open to any ship».[125] Case law also confirms this position, as ICJ held in *Nicaragua v. USA* case «by virtue of its sovereignty, the coastal state may regulate access to its ports».[126]

---

120 Rainer Lagoni, "Internal Waters," in Rudolf Berhardt (ed) *Encylopedia of Public International Law II,* (Heidelberg, 1995): 1034–1036, 1034

121 Haijiang Yang, *Jurisdiction of the Coastal State over Foreign Merchant Ships in Internal Waters and the Territorial Sea* (Springer 2006), 47

122 ITLOS, The Ara Libertad Case (Argentina v. Ghana), Written Statement of the Republic of Ghana, 28 November 2012, para 13

123 Louise de La Fayette, 'Access to Ports in International Law' (1996) 11 Int'l J. Marine & Coastal L. 1, 10

124 Saudi-Arabia v Arabian American Oil Company (ARAMCO) 1963 27 IRL para 117

125 de La Fayette (n 123) 10

126 Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America); Merits, International Court of Justice (ICJ), 27 June 1986, para 213

In this relation, LOSC gives quite wide discretion for CS to regulate access to their ports under certain conditions. First, Article 25(2) LOSC makes clear that if a vessel calling at the port does not meet certain requirements a CS «has the right to take the necessary steps to prevent any breach of the conditions to which admission of those ships to internal waters or such a call is subject».[127] The scope of «conditions» mentioned in the Article is not further elaborated in the Convention which makes it unclear if they are limited to GAIRAS only.[128] If they are not limited to GAIRAS, PS can adopt specified CDEM requirements for foreign vessels.

Secondly, Article 211(3) LOSC further confirms the prescriptive powers of PS:

> «States which establish *particular requirements* for the prevention, reduction and control of pollution of the marine environment as a condition for the entry of foreign vessels into their ports or internal waters or for a call at their off-shore terminals shall give due publicity to such requirements and shall communicate them to the competent international organization».

The wording «particularly requirements» does not necessarily limit such requirements to LOSC provisions. Moreover, Molenaar argues that they may vary from internationally accepted.[129] The only condition established by LOSC is that a PS has to give due publicity of such requirements and report to a responsible international organization.

Additionally, the voluntary character of entry into ports shows freedom of choice of a foreign vessel to either comply with those conditions or not to and, thus, lose the right for entry.[130]

---

127 Article 25 (2) UNCLOS

128 Churchill (n 109) 450

129 Erik J. Molenaar, Erik, 'Port State Jurisdiction: Toward Comprehensive, Mandatory and Global Coverage' (2007) Ocean development & International Law, Taylor & Francis, 230–231

130 Air Transport Association of America and others v Secretary of State for Energy and Climate Change, Case C-366/10, 6 October 2011, para 125 (hereinafter ATA case)

State practice also confirms the right to adopt unilateral CDEM measures.[131] The US OPA 90 required foreign vessels to have double hull or «a double containment system determined by the Secretary of Transportation to be as effective as a double hull for the prevention of a discharge of oil».[132] EU Regulation (EC) No 417/2002 also requires that «transport of heavy grades oil to or from EU ports would occur only by double-hull oil tankers».[133]

So far, it can be said that Articles 25(2) and 211(3) LOSC constitute a solid base for PS to prescribe rules and regulations including specific CDEM standards, unless there is an explicit provision in international law prohibiting or limiting PS to do so.[134] Additionally, some scholars submit that Article 218 LOSC contains implicit prescriptive powers of PS in order to make their enforcement powers operative. Ho Sam Bang submits that prescriptive jurisdiction of PS under Article 218 is explicit due to the «implicit broad powers of PS to prescribe under Articles 25(2) and 211(3)».[135]

As PSJ is territorial in nature, it follows that PS have rather unlimited powers to prescribe unilateral standards. Some scholars support this view arguing that if there were an intention to limit PSJ, the limitation would be explicitly stated,[136] whereas others argue that there are no residual powers of PS.[137] On the other hand, Boyle argues that «no provisions […] allow PS to set its own national standards on any of these matters, but nor do they prohibit it from doing so».[138] So, as Ringbom noticed, the

---

131 Douglas C. Wolcott, James M. Coleman, *Double-Hull Tanker Legislation, An Assessment of Oil Pollution Act of 1990, Marine Board, Commission on Engineering and Technical Systems*, (National Research Council National Academy Press Washington, D.C.1998) vi e-book <https://www.nap.edu/read/5798/chapter/1#vi> accessed 10 November 2018

132 OPA 90, Section 4115 (c)(2)

133 Molenaar (n 129) 199

134 Churchill (n 98) 446.

135 Ho-Sam Bang, 'Port State Jurisdiction and Article 218 of the UN Convention on the Law of Sea'(2009) 40 J. Mar. L. & Com. 291, 301

136 Henriksen (n 113) 29

137 ibid

138 Alan Boyle, 'EU Unilateralism and the Law of the Sea', (2006) The International Journal of Marine and Coastal Law, vol. 21, no. 1, 24

existence of such right of PSJ is uncontroversial, but the scope is defined by «the limitations to this right».[139] Therefore, the scope of PSJ shall be examined from two points of view.

#### 3.3.1.2 The first point of view: unilateral measures of Arctic Port States cannot exceed GAIRAS

Scholars refer to Article 219 LOSC as a general limitation to PSJ when it comes seaworthiness of a vessel. Molenaar states that «seaworthiness» relates to CDEM standards,[140] as it refers to the physical condition of a vessel.

Article 219 states that PS undertake all necessary measures if a foreign vessel is in «violation of applicable international rules and standards» while present in the port of that State. Hence, it can be seen as a maximum for prescriptive jurisdiction of PS, which means that specified CDEM measures have to be in line with GAIRAS. Article 218 LOSC similarly refers to applicable international rules and standards subsequently limiting the prescriptive scope of PS. Henriksen states that the term «applicable» resorts to GAIRAS and to legal rules «that are directly operational in the relationship between the port State and the flag State».[141] Hence, PS cannot define the illegality of discharges unless they are recognised as illegal under GAIRAS.[142]

In both cases, PSJ will not conflict with LOSC and related instruments. Moreover, in this particular case, it is seen as assistance to FSJ,[143] rather than infringement.

IMO legal instruments, as «generally accepted rules and regulations», provide a base for PSJ to prescribe CDEM standards. Article 5(4) MARPOL presumes that parties shall apply the MARPOL requirements «as may be necessary to ensure that no more favourable treatment is

---

139 Henrik Ringbom, The maritime Safety Policy and International Law, Martinus Nijhoff: Leiden, 2008, p 204 quoted from Henriksen (n 113) 28

140 Molenaar (n 102) *Coastal State Jurisdiction over Vessel-Source Pollution*, 189

141 Henriksen (n 113) 35

142 ibid

143 Henriksen (n 113) 31

given»[144] to non-parties vessels. Clearly, to provide the equal treatment to both MARPOL parties and non-parties States' vessels, PS have to give effect to MARPOL requirements. The same logic is expressed in Article 1 SOLAS which obliges States «to promulgate all laws, decrees orders and regulations and to take all steps which may be necessary to give the present Convention full and complete effect». Churchill argues that these provisions confirm the right of PS to adopt necessary legislation, including CDEM standards, as long as they are aimed to give effect to the existing standards.[145] Additionally, MARPOL 73/78 explicitly states that nothing in the Convention shall prejudice «the nature and extent of coastal and flag State jurisdiction».[146] Therefore, the jurisdictional interests remain balanced.

Vessels navigating Arctic waters are required to apply Polar Code. The problem is that the Polar Code mandatory CDEM standards do not address air emissions and the the use of HFO in general. The only reference to HFO contained in Part II-B[147] can hardly create an obligation for Arctic PS to ban vessels operating on HFO.

So, from the first point of view, acceptance of IMO instruments limits the scope of PS jurisdiction to the provisions contained in such instruments. Obviously, Arctic PS cannot adopt national standards which will violate obligations under IMO instruments.[148] Therefore, Arctic PS have to stay in line with GAIRAS in prescribing national CDEM relating to BC emissions.

#### 3.3.1.3 The second point of view: unilateral measures of Arctic Port States can go beyond GAIRAS

By virtue of Articles 25(2) and 211(3), PS are granted wide discretion to prescribe conditions for entry into their internal waters as these Articles do not explicitly contain any restrictions to such a right.

144 MARPOL Article 5(4)

145 Churchill (n 98) 449

146 MARPOL 73/78 Article 9 (2)

147 «ships are encouraged to apply regulation 43 of MARPOL Annex I when operating in Arctic waters», Polar Code Part II-B Additional guidance to chapter 1, 1.1

148 Henriksen (n 113) 32

Since PS enjoy full sovereignty over their internal waters and ports, CIL recognises their residual territorial jurisdiction, which means that «international law allows PS to take more stringent measures than provided in international agreements».[149] Though, prohibition to impose stricter measures might be embedded in such agreements itself.[150] Molenaar states that IMO instruments do not limit PSJ because they are «more about setting technical standards than regulating jurisdiction of states».[151] This argument can be supported by MARPOL drafting history which clarifies that MARPOL gives priority to UNCLOS.[152]

Some of the IMO instruments clearly confirm residual jurisdiction of PS. Anti-Fouling Convention foresees that States may take «more stringent measures with respect to the reduction or elimination of adverse effects of anti-fouling systems on the environment».[153] The similar statement is expressed in Ballast Water Convention in Article 2(3). Both provisions provide States with a right to exceed the Conventions provisions in order to undertake measures necessary for the protection of the marine environment. These measures have to be «consistent with international law».[154] Such a requirement suggests that measures have to be reasonable but they are not necessarily restricted to IMO provisions only.

Also, as MARPOL Conventions are subject to future amendments in accordance with the progressive development of LOS, in some cases States have a right to decide not to be bound by such amendments.[155] It gives a certain degree of flexibility to deviate from some international rules.

---

149 Cedric Ryngaert, Henrik Ringbom, 'Introduction: Port State Jurisdiction: Challenges and Potentials', (2016) Brill Nijfhoff, The International Journal of Marine and Coastal Law 3, 379–394, 382

150 Regulation 15(1) of Annex VI MARPOL

151 Molenaar (n 102) *Coastal State Jurisdiction Over Vessel-Source Pollution, 110–115*

152 ibid 111

153 AFS Convention article 1(3)

154 AFS Convention Article 1(3), Ballast Water Convention 2(3)

155 Erik Jaap Molenaar, Residual Jurisdiction under IMO Conventions, in Henrik Ringbom (ed) *Competing Norms in the Law of Marine Environmental Protection,* (International Environmental Law & Policy Series, Kluwer Law International 1997) 203

The exception occurs when such rules are mandatory and, therefore, do not foresee any deviations.[156]

Residual jurisdiction of Arctic PS may be also based on Article 234 LOSC. The very essence of Article 234 is that it does not simply empowers CS to prevent vessel-source pollution, but it also broadens States' authority, «because it includes both preventative and responsive measures».[157] According to the broad interpretation, Article 234 applies to all maritime zones within 200 n.m. including internal waters where Arctic States perform as PS. The narrow interpretation makes less sense since Arctic CS will be provided with broader jurisdiction within EEZ than in the territorial sea.[158] So, «if Article 234 is applicable, the coastal State is competent to unilaterally adopt a wide range of measures to regulate international shipping».[159] Henriksen stated that measures adopted on the basis of Article 234 LOSC can be either stricter than existing GAIRAS or they can derive from legal instruments «that are not part of any international instrument adopted by IMO».[160] In the former case, Arctic PS can proceed from Polar Code provisions and fill the existing gaps in BC and HFO regulation. As an amendment to MARPOL, Polar Code provisions do not prevail over Article 234 and 211(4) LOSC.[161] So, Polar Code provisions do not restrict the regulatory scope of Arctic States. In this regard, stricter regulations may be based on Article 234 LOSC and 211(4) LOSC.

In the latter case, these measures will be unilaterally «developed by the coastal State, particular tailored for the concrete area».[162] As Article 234 is of limited geographical application, it is considered *lex specialis,*

156 MARPOL Protocols

157 Stanley P. Fields,'Article 234 of the United Nations Convention on the Law of the Sea: The Overlooked Linchpin for Achieving Safety and Security in the U.S. Arctic?' (2016) Harvard National Security Journal Vol. 7, 88

158 Henriksen (n 113) 52

159 ibid 53

160 Henriksen (n 113) 53

161 MARPOL Article 9(2)

162 Henriksen (n 113) 53

precisely in relation to Article 211 LOSC.[163] Under the *lex specialis derogat legi generali* doctrine, Article 234 overrides general LOSC provisions.

However, application of Article 234 shall have due regard to international navigation and must be conducted in accordance with the general regime established by LOSC 1982. Additionally, laws and regulations adopted on the basis of Article 234 shall be non-discriminatory and reasonable as they must be based on the best scientific data available at a time.[164]

Generally, state practice observed above confirms that States deviate from provisions established in IMO instruments and adopt stricter regulations. In case of the the US OPA, the requirement for double-hull and the double bottom was adopted before this requirement was envisaged in MARPOL. Major Arctic States, Russia and Canada, have adopted more stringent discharge standards than those included in MARPOL justifying them on the basis of Article 234.[165]

Therefore, as long as the requirements of Article 234 are met, Arctic PS may prescribe specified CDEM requirements concerning the engine and fuel type on the basis of Arctic clause.

#### 3.3.1.4 Whether national CDEM requirements have the extraterritorial effect

It is argued that imposition of CDEM standards by PS may have an extraterritorial effect.[166] The basic reasoning behind this statement is that CDEM measures have static nature, hence, they remain the same throughout the whole voyage.[167] However, scholars tend to define it

---

163 Myron H. Nordquist, Shabtai Rosenne, Satya N. Nandan, *United Nations Convention on the Law of the Sea, 1982: A Commentary* (Martinus Nijhoff Publishers 1985) 393

164 Article 234 LOSC

165 Henriksen (n 113) 35

166 Churchill (n 98) 454

167 Erik Molenaar, 'Port and Coastal States' in Donald Rothwell, Alex Oude Elferink, Karen Scott, and Tim Stephens (eds), *The Oxford Handbook of the Law of the Sea* (Oxford Handbooks Online 2016) <http://www.oxfordhandbooks.com/view/10.1093/law/9780198715481.001.0001/oxfordhb-9780198715481-e-13> accessed 13 June 2018

as rather an extended territorial jurisdiction than the extraterritorial jurisdiction of a PS.[168]

When PS prescribe CDEM standards as conditions for access to its ports, PS influence shipping activities in areas beyond their territorial domain.[169] The legality of imposing CDEM standards as entry conditions will be justified by territorial sovereignty over internal waters and the voluntary entry of a foreign vessel into ports. In the *EU Aircraft Emissions case* CJEU held that national law covered foreign aircrafts voluntary landing in EU airports, meanwhile, they could choose alternative route instead of "operate a commercial air route" using EU airports.[170] The same logic works for CDEM standards covering BC emissions from vessels.

National requirements to provide information and monitoring foreign vessels activities outside States' maritime zones have extraterritorial dimension and likewise applicable to the port access. For example, EU Regulation 2015/757 requires persons responsible for the vessel to monitor and report $CO_2$ emissions during their voyages and to provide a certificate for the inspection by PS authorities. So if the requested information is a condition for the vessel to access a port, then it has a certain extraterritorial effect.

S. Kopela argues that, alike static CDEM standards, such requirements change their nature from static to non-static acquiring non-incidental extraterritorial element, since vessels have to collect information extraterritorially and provide information when vessels enter a port.[171] Therefore, if Arctic PS require foreign vessels collect information concerning the level of BC emissions as a part of CDEM requirements, it will entail the extraterritorial effect.

Concerning implicit prescriptive powers of PS under Article 218, LOSC Churchill argues that such jurisdiction «would clearly be extra-territorial».[172] So, it will make it possible for PS to exercise jurisdiction on

168 J. Scott
169 Kopela (n 13) 94
170 ATA case para 127
171 Kopela (n 13) p 97
172 Churchill (n 98) 461

the high seas and within the maritime zones of another State if the requirements of Article 218 are met.

Overall, if due to the absence of international uniformed standards on BC matter Arctic PS establish national BC standards for foreign vessels as pollution control strategies including stricter CDEM requirements, they will be likely to have extraterritorial effect on international shipping.

When unilateral CDEM will stay in line with GAIRAS, their «extra-territorial effects are not problematic».[173] If they go beyond GAIRAS, Arctic PS might need more sufficient legal basis for jurisdiction. As residual fuels like HFO produce BC causing transboundary air pollution, scholars suggest to justify a broader jurisdiction on the basis of effects doctrine.[174]

State practice confirms that effects doctrine can be successfully applied to cases involving transboundary air pollution. The case about GHG emissions from aviation and their effect beyond the borders of the EU was examined in *ATA* case.[175] As it was accurately noted by AG Kokott in her opinion on this case:

> «air pollution knows no boundaries and that greenhouse gases contribute towards climate change worldwide irrespective of where they are emitted; they can have effects on the environment and climate in every State and association of States»[176]

Unilateral measures of California, concerning air pollution regulation from vessels, were challenged in *PMSA v. Goldstene case.* Since 2008 California requires foreign vessels to use cleaner marine fuels within its waters and 24 n.m. of its baseline and additionally imposes reporting requirements on ships.[177] In assessing the legitimacy of California's

[173] Henriksen (n 113) 31

[174] Kopela (n 13) p 103

[175] Under Directive 2008/101/EC all aircrafts were obliged to «monitor, report and verify their emissions, and to surrender allowances against those emissions».

[176] Opinion Kokott AG; Air Transport Association of America and ors v Secretary of State for Energy and Climate Change, Case C-366/10, 6 October 2011, para 154

[177] Final Regulation Order, Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Base-

measures, the Court ruled that «California may enact reasonable regulations to monitor and control extraterritorial conduct substantially affecting its territory».[178] Hence, the Court confirmed the possibility of employing effects test to the national requirements aimed to regulate activities extraterritorially.

Likewise GHG, BC, as PM elements, targets airspace and, thus, cannot be restricted to territorial borders of a single State. Arctic shipping greatly contributes to the level of BC in the region[179] resulting in a negative impact on air quality and human health within the Arctic States.[180] Air pollution can lead to premature deaths, «mainly caused by the inhalation of particulate matter»,[181] to which BC is a component. Apart from effects on human health, BC negatively impacts ecosystems, affects visibility and reduces agricultural productivity.[182] Therefore, a nexus between BC emissions from vessels operating outside Arctic States' maritime zones and negative consequences within their borders may create an extraterritorial jurisdictional link based on effects.

### 3.3.2 Enforcement jurisdiction of Arctic Port States

Enforcement jurisdiction deals with the «capacity of the State to act within the borders of another State».[183] *Lotus* judgement established the main rule of enforcement jurisdiction that jurisdiction cannot be exercised in the territory of another State if that State didn't consent to

line. <https://www.arb.ca.gov/regact/2011/ogv11/ogvfro13.pdf> accessed 3 September 2018

178 Pacific Merchant Shipping Asso v. James Goldstene, et al, No. 09-17765 (9th Cir. 2011) para 1170

179 Comer, Olmer (n 5) v

180 The Arctic Institute, 'How Black Carbon Affects the Arctic?' <https://www.thearctic-institute.org/wp-content/uploads/2016/04/TAI-Infographic-Blackcarbon.pdf?x62767>

181 Renee Cho, 'The Damaging Effects of Black Carbon' (*State of the Planet/Earth Institute*, March 22, 2016) <https://blogs.ei.columbia.edu/2016/03/22/the-damaging-effects-of-black-carbon/>

182 ibid

183 Shaw (n 12) 473

that. The exception is possible by «virtue of a permissive rule derived from international custom or from a convention».[184]

The authority of States to enact and enforce laws and regulations reducing vessel-source marine pollution has been recognised as «an effective contribution to international regime to prevent marine pollution».[185] Following subparagraphs will analyse the general scope and limitations to enforcement powers of Arctic PS. Furthermore, the possible extraterritoriality of enforcement Arctic PSJ will be discussed in the light of the effects doctrine as an applicable jurisdictional link.

#### 3.3.2.1 Arctic States in-port jurisdiction

PS can undertake enforcement measures in relation to violations occurring within their maritime zones. Article 219 provides PS with a right to take administrative measures to prevent a vessel from leaving a port, if such a vessel violates «applicable international rules and standards relating to seaworthiness». Yet, Article 219 obliges PS to permit vessels to leave a port after the cause of the violation is removed.

Article 220(1) LOSC covers violations occurred within territorial sea or EEZ of PS. In this regard, PS may initiate proceedings against a foreign vessel voluntary present in any of State's port facilities if there is a good reason to believe that such vessel deemed to violate laws of that State adopted in accordance with LOSC or international laws and regulations concerning marine environment protection.[186] A State can undertake physical inspections in relation to violations, request information about the vessel and its voyage and take other necessary measures including detention.

The application of the Article is not limited to GAIRAS and provides PS with broader enforcement scope. Additionally, Article 220(1) refers to «any violation of rules and standards for the prevention, reduction and control of pollution from vessels», so it is not restricted to discharge

---

184 PCIJ, SS Lotus, PCIJ Reports, Series A, No. 10, (1927) paras 18–19

185 Ted L. McDorman, 'Port State Enforcement: A Comment on Article 218 of the 1982 Law of the Sea Convention' (1997) 28 J. Mar. L. & Com. 305, 306

186 Article 220 (2) UNCLOS

standards only. If under Arctic States' national laws vessels are required to monitor BC emissions throughout the voyage, violations of such requirements will be subject to Arctic PS enforcement. However, Article 220(1) does not cover CDEM standards.

Violations of discharge standards are covered by Article 218 LOSC which is «the port State enforcement provision».[187] Article 218 covers discharges occurred either on the high seas, maritime zones of another State or if that States maritime zones will be affected by pollution.

If discharges occurred on the high seas, EEZ, territorial sea or internal waters of another State and a vessel is present in a port of PS, PS may «undertake investigations and, where the evidence so warrants, institute proceedings» in relation to such violations. Proceedings cannot be instituted unless it is requested by CS, FS or an injured State. The requirement for PS enforcement is that the vessel has to be *voluntary* present in a port, which excludes vessels «by virtue of an emergency or distress in the port».[188] Article limits applicable discharge rules to GAIRAS, so Polar Code provisions fall within discharge violations established under the Article.

Despite foreign vessels fall under the sovereignty of PS while present in port, PS cannot enforce their national laws and regulations in relation to discharges occurred on the high seas. Article 218 explicitly limits applicable discharge law to GAIRAS. Hence, MARPOL and Polar Code in relation to Arctic waters constitute sources for enforcement powers of PS in relation to pollution discharges from vessels. Moreover, the proceedings cannot be instituted unless it is requested by CS, FS or injured State. Article 218(4) states that «the records of the investigation carried out by a port State pursuant to this article» shall be either transmitted or suspended at the request of a CS or FS. So, in this case, PS acts on behalf of a third State.

The question arises when Arctic PS adopted stricter discharge rules in accordance with Article 234 LOSC and requested another Arctic PS to institute proceedings against a foreign vessel in relation to violations

[187] McDorman (n 185) 307

[188] Bang (n 135) 300

of first State's rules. Henriksen submits that it is not possible for the second State to institute proceedings upon the first State's request due to the limitations imposed by Article 218. If stricter discharge standards acquire the level of GAIRAS, then this limitation will be lifted.

When discharges occur within maritime zones of another State but «violation has caused or is likely to cause pollution in the internal waters, territorial sea or exclusive economic zone» of a PS, such State may initiate proceedings against foreign vessel voluntary present in its port.[189] This type of jurisdiction is argued to have the extraterritorial effect which will be discussed below.

All these measures are based on territoriality of the offence, hence, despite the incidental or non-incidental extraterritorial effect of national static standards, enforcement jurisdiction of PS is territorial. Additionally, LOSC balances enforcement powers of PS beyond their maritime zones by imposing certain limitations.

First, Article 218 limits enforcement measures to GAIRAS, hence, Arctic PS cannot enforce nationally established stricter standards unless they acquire the status of GAIRAS.

Second, LOSC foresees safeguard provisions restricting enforcement powers of PS. Article 231 obliges States exercising enforcement over foreign vessel «promptly notify the flag State and any other State concerned» about measures undertaken. Article 225 obliges States «not endanger the safety of navigation or otherwise create any hazard to a vessel» and avoid other adverse consequences while exercising enforcement jurisdiction. Article 226(1) obliges States exercising enforcement under Articles 218, 220, 216 not to «delay a foreign vessel longer than is essential for purposes of the investigations».

#### 3.3.2.2 Arctic Port State Control: ensuring compliance with Polar Code requirements

Overall Arctic PS include over 20 port facilities. The majority of ports and terminals are located along the Arctic coast of Russia, followed by a

[189] Article 218 (2) UNCLOS

less amount of Norway ports, the US and Canada ports, with only one Arctic port both in Greenland and Iceland.

Norway, Canada, Russia, Denmark are the members of the Paris Memorandum of Understanding (PMoU) alongside with Iceland, Finland, Sweden which represent Arctic region in general. The US is a part of the separate US Coast Guard system. According to the IMO definition, «Port State Control (PSC) is the inspection of foreign ships in national ports to verify that the condition of the ship and its equipment comply with the requirements of international regulations and that the ship is manned and operated in compliance with these rules».[190]

Inspections of PSC officers are limited to the examination of required certificates[191] unless «there are clear grounds for believing that the condition of the ship or its equipment does not correspond substantially with the particulars of that certificate».[192]

One of the inspection themes included in PMoU is the Polar Code requirements which are mandatory for vessels navigating in the Arctic and Antarctic waters. The compliance requirements are divided into two categories: safety measures (Part I-A) and pollution prevention measures (Part I-B). The mandatory character is reflected through the obligation to have a valid Polar Ship Certificate on board.

Polar Ship Certificate is issued after an initial or renewal survey in order to establish if the ship complies with the Polar Code's requirements. As established by paragraph 1.3.7 «Polar Ship Certificate validity, survey dates and endorsements shall be harmonized with the relevant SOLAS certificates».[193] Vessels are divided into three categories in accordance with their ice class and operations capabilities. The scale moves from A-class ships which can perform all-year operations, to B and C class ships respectively with more humble ice operational capabilities.

---

[190] IMO Port State Control (Knowledge Center) <http://www.imo.org/en/OurWork/MSAS/Pages/PortStateControl.aspx> accessed 28 October 2018

[191] Article 216(1) (a) UNCLOS

[192] MARPOL Article 5(2)

[193] Polar Code 1.3, 1.3.6

Record of equipment, which includes equipment on life-saving appliances, navigational and communicational equipment, shall also be present for PSC checking.

Moreover, the Polar Code requires to have Polar Water Operational Manual (PWOM) on board which is also subject to PSC checking. PWOM contains technical information about the vessel's capabilities and establishes risk-based procedures in event of unlikely circumstances.

Concerning the Part I-B, in relation to oil pollution prevention vessels shall have onboard Oil Record Books, manuals and either oil pollution emergency plan or marine pollution emergency plan.[194] In relation to control of pollution by NLS in bulk, Cargo Record Books, the manual and shipboard marine pollution emergency plan are required to be on board. Additionally, International Pollution Prevention Certificate for the Carriage of NLS in Bulk or Certificate of Fitness is necessary for category A and B ships constructed after 1 January 2017.

Garbage Record Book, Garbage Management Plan, and respective placards are also subject to PSC under the Polar Code.

Polar Code does not replace MARPOL requirements, so all the documentation to be checked by PSC have to be issued in accordance with the MARPOL requirements established in Annexes I-V.

#### 3.3.2.3 Whether enforcement jurisdiction of Arctic Port States have the extraterritorial effect

Right to exercise jurisdiction over activities outside maritime zones of a PS must either arise from the treaty or customary law or from «the assertion that the activities in question had an 'effect' on the local State».[195]

When it comes to static requirements, their application is territorial. Thus, non-compliance with national CDEM standards detected within a port results in enforcement measures of a PS which have territorial character.

Meanwhile, it is argued that some of the PS measures under Article 218 have extraterritorial application. Article 218 (1) LOSC established enforcement

[194] Polar Code Part II-A 1.1, 1.1.4

[195] McDorman (n 185) 314

competence of PS over foreign vessels voluntary present in its port in relation to discharges occurred on the high seas or within the maritime zones of another State. So, if discharges take place within waters of another State PS may initiate a proceeding only upon a request from the FS, CS or a damaged State. Hence, PS still acts on behalf of a third State. Yet, if «the violation has caused or is likely to cause pollution»[196] in the waters of the PS, PS acts on its own behalf and may institute proceeding against a foreign vessel over discharges occurred outside its national waters. Henriksen supports this view, highlighting that PS jurisdiction over such discharges is limited to «violating rules and standards of MARPOL Annexes under Article 218».[197] Hence, Article 218 LOSC limits enforcement powers of PS to GAIRAS, unless national rules and standards acquire the status of GAIRAS it is not possible to enforce national HFO standards. McDormand comes up with the argument that Article 218 is an exhaustive code for PS enforcement, so a degree «of extra-territorial jurisdiction based on effects is warranted»[198] in order to preserve jurisdictional balance established by LOSC. This view is also supported by the fact that the major pollution conventions are primarily rested on FS enforcement, while recognizing CS jurisdiction and PS right to exercise enforcement measures within their ports.[199] Therefore, the allocation of jurisdiction remains balanced.

However, some scholars submit that effects doctrine does not fit here, since «there is no requirement that the discharge giving rise to enforcement authority have an effect in the port State»[200]. Another point of view is that enforcement measures of PS do not fit any jurisdictional basis.[201] The reasoning here is that the role of PS under the meaning of Article 218 is supplementary, so, only if FS or CS do not act, PS has to act on the behalf of the whole international community. McDorman suggests

196 Article 218 (2) UNCLOS
197 Henriksen (n 113) 35
198 McDorman (n 185) 321
199 Lowe p.632
200 McDorman (n 185) 318
201 ibid

that base for extraterritorial jurisdiction of PS is «the international community's desire to supplement traditional enforcement jurisdiction (FS) over activities (pollution discharges) that can have detrimental effects over the community's shared area (the high seas)».[202]

Overall, States commitment to LOSC «circumscribe a port State's ability to take enforcement action against foreign vessels voluntarily in port» when they violated discharge standards outside maritime zones of PS. Generally, scholars agree that enforcement jurisdiction of PS is predominantly territorial but its extraterritorial potential is, nevertheless, recognized.[203]

### 3.3.3 Limitations to Port State jurisdiction

Prescriptive and enforcement powers of PS are subject to certain limitations first and foremost imposed by LOSC itself.

Starting with the right to regulate access to ports, the most explicit limitation relates to the ship in distress. This rule has a customary nature and rooted in the considerations of humanity.[204] The situation of *force majeure* is enshrined in Article 39 (1)(c) and Article 98 LOSC which obliges States to render assistance in situations of danger and distress of foreign vessels. Further, a ship in need of assistance shall be provided necessary help including the Place or Port of Refugee assistance.

Further, the scope of PSJ is subject to the general principle of non-discrimination. LOSC prescribes that entry conditions into ports and regulations of navigation in territorial waters and beyond shall be non-discriminatory.[205] Precisely in relation to the protection and preservation of the marine environment, Article 227 LOSC requires that:

---

202 McDorman (n 185) 319

203 Churchill p 468

204 A. Chircop, 'Ships in Distress, Environmental Threats to Coastal States, a Place of Refuge: New Directions for an Ancient Regime?' (2002) 33 ODIL 207, 212

205 Articles 25(3), 26(2) 227, 234 UNCLOS

> «In exercising their rights and performing their duties under this Part, States shall not discriminate in form or in fact against vessels of any other State».

Another limitation is connected with the abuse of rights principle which is «best evaluated in light of the balancing of conflicting rights».[206]

LOSC preserves a balance of jurisdictional rights of PS and FS.[207] Due to the primacy of FS over marine pollution control, FSJ limits PSJ since the latter is a subsidiary form of the former and, PS enforcement may be still protested by FS.[208] In this regard, LOSC requires PS to comply with the requests of FS or CS regarding investigations of the violations or the records transmission.[209]

Additionally, Article 300 LOSC imposes a general obligation on all States to fulfill their obligations in a good faith and exercise their jurisdiction, rights and freedoms in a manner which would not constitute an abuse of rights.[210]

The principle of proportionality has also been considered as a general limitation to PSJ.[211] Despite it is not explicitly defined in LOSC, it is still present as a general concept. The principle of proportionality requires measures undertaken by a PS to be objective and «not exceed what is necessary».[212] Therefore, all the measures undertaken by Arctic PS have to be reasonable.

The second block of limitations does not directly relate to the LOS but comes from other legal fields.[213] Precisely, WTO law imposes a range of restrictions to PSJ.

---

206 Molenaar (n 129) 210
207 Ryngaert, Ringbom (n 149) 386
208 ibid
209 Article 218 (3), (4) UNCLOS
210 Article 300 UNCLOS
211 M. Bevan, *Port State Jurisdiction and Regulation of Merchant Shipping,* Springer 2014, 12
212 Bevan (n 211) 13
213 Churchill, Ringbom, Ryngaert

First of all, despite the right of PS to regulate access to their ports, such right may be indirectly granted for ships of WTO members engaged in international trade in accordance with GATT.[214]

GATT prohibits any restrictions except «duties, taxes or other charges,..or other measures» imposed on importing or exporting goods.[215] In this relation GATT panel in Colombia case discussed whether a port of entry measures could fall under the meaning of Article XI. The Panel concluded that port measures cannot be classified as «quotas, import or export licenses», but they fit in other measures category.[216] In *Japan – Semi-Conductors*, the GATT panel stated that Article XI (1) covers any «measure instituted or maintained by a contracting party which restricted the exportation or sale for export of products»[217] and ports entry requirements could fall under the residual category of "other measure».[218] Concerning CDEM measures Churchill supports this view as CDEM can constitute restrictions and may be challenged under Article XI(1).[219]

Alike LOSC, the central restriction imposed by GATT is a requirement of non-discrimination. Yet, this requirement is applicable to the goods imported by vessels or other means of transport. Hence, there is a question whether PS CDEM standards and technical national requirements fall under these restrictions.

Article I GATT makes clear that importing States (PS) shall refrain from discrimination between other WTO members. Article I refers to the Most Favourable Treatment principle which acknowledges that any preferences provided to one Member, must be provided to all other Members. Churchill states that since unilateral CDEM measures of PS refer to the physical characteristics of a vessel, they do not constitute discrimination

214 Churchill (n 98) 447

215 The General Agreement on Tariffs and Trade, 1867 UNTS 187; 33 ILM 1153 (1994), (hereinafter GATT) Article XI

216 Colombia case WT/DS366/R 7.225

217 GATT Panel Report, Japan – Semi-Conductors, Report of the Panel adopted on 4 May 1988 (L/6309 - 35S/116) para 106

218 Colombia case WT/DS366/R 7.228

219 Churchill (n 98) 452

on the nationality grounds and, thus, permissible.[220] However, Article III GATT prohibits to use internal measures to discriminate between domestic and imported products. So Arctic PS have to equally apply national CDEM standards to both domestic and foreign vessels.

Article V forbids to employ trade measures which may impact transit of goods between Members except for the standard custom policies. Article V(2) explicitly prohibits discrimination on the basis of «the flag of vessels, the place of origin, departure, entry, exit or destination, or on any circumstances relating to the ownership of goods».[221] CDEM measures do not target freedom of transit of goods directly, however, they may affect the transit of goods indirectly when a vessel is denied access on the grounds of non-compliance with national CDEM.

Yet, scholars consider that GATT restrictions can be lifted by the exceptions embedded in Article XX which do not restrict international trade or «constitute a means of arbitrary or unjustifiable discrimination between countries».[222] Under Article XX (b), (g) PS national measures can be found consistent with GATT provisions if they are aimed «to protect human, animal or plant life or health» or «relating to the conservation of exhaustible natural resources».[223] Hence, as long as Arctic PS CDEM standards are aimed to reduce or eliminate BC emissions because of their negative impact on life and environment, such standards fall under Article XX(b),(g) exception and, thus, permissible.

[220] Churchill (n 98) 452
[221] GATT Article V(2)
[222] GATT Article XX
[223] GATT Article XX (b), (g);

# Chapter 4. «The Arctic as a Common Concern of Humankind»: can the Common Concern of Humankind concept create a sufficient jurisdictional link for Arctic Port States to justify their extraterritorial jurisdiction?

## 4.1 Introduction: Climate change as a Common Concern of Humankind

Traditional extraterritorial links, precisely, effects doctrine, in theory provide Arctic PS with a right to regulate navigation beyond their maritime zones. At the same time, effects doctrine is a controversial basis because the required «effects» are hard to establish in the context of BC emissions. In some cases, stronger evidence of such effects is needed to justify the expansion of Arctic PSJ. BC emissions play twofold negative impact as they pollute the atmosphere and contribute to climate change.[224] Climate change is a universally recognized problem and the effects of changing climate are observed both globally and within the Arctic region. Therefore, climate change can possibly create a broader jurisdictional basis for Arctic PS. As climate change has been recognized as a Common Concern of Humankind (CCH), the following chapter will assess the possibility of the application of the CCH concept to the Arctic Ocean and its potential as a jurisdictional basis.

The Preamble of the UNFCCC acknowledged that «change in the Earth's climate and its adverse effects are a common concern of humankind».[225] Although the concept formally appeared in 1990s, it is argued that CCH was not new since it has been applied to other fields like human rights, humanitarian relief and international labour relations, which «are

[224] Shapovalova (n 33) 137
[225] UNFCCC Preamble

now recognized as obligations *erga omnes*, owed by all the States to the international community».[226]

CCH is based on a common interest to «protect humanity and global environment from harm»,[227] and presumes the «involvement of all the members of international community».[228] The main element of CCH is a «commonality» of the matter which means «belonging to the community at large»[229] as well as «inherently shared concern».[230] The temporal aspect of CCH suggests that the concern has a long-lasting nature and results from the actions of many actors. Additionally, reference to «humankind» highlights a wide spatiotemporal effect as it covers both present and future generations.

Despite CCH is a new concept, it arguably «may legitimize the exercise of extraterritorial jurisdiction».[231] Jurisdictional principles are based on the «ascertainment of jurisdictional links and conflicting interests».[232] That means that each link has to be reasonable and legitimate, so States' rights remain balanced.[233] The chapter is aimed to assess the potential of CCH as a jurisdictional link. The discussion will begin with the question of applicability of the concept to the Arctic global warming issue. Further, the chapter will try to answer the question of whether the CCH concept can create an extraterritorial jurisdictional link for Arctic States to regulate BC emissions from vessels beyond their maritime zones?

---

226 David Hunter, James Salzman, and Durwood Zaelke, *International Environmental Law and Policy*, (2nd ed. Foundation Press. 2002), 397

227 Nadia Sanchez Castillo-Winckels 'Why "Common Concern of Humankind" Should Return to theWork of the International Law Commission on the Atmosphere?' (2016) The Georgetown Envtl.Law Rview Vol. 29:131, 147

228 Jimena Murillo, 'Common Concern of Humankind and Its Implications in International Environmental Law' (2008) 5 Macquarie J. Int'l & Comp. Envtl. L. 133, 140

229 Webster dictionary <https://www.merriam-webster.com> accessed 7 October 2018

230 Th. Cottier, Ph. Aerni, B. Karapinar, S. Matteotti, J. de Sépibus, A. Shingal, 'The principle of Common Concern and Climate Change' (2014) Archiv des Völkerrechts Bd. 52, S. 293–324, 301

231 Ringbom, Ryngaert, Lowe, Kopela in Kopela (n 13) 109

232 Kopela (n 13) 108

233 ibid

## 4.2 Arctic Port State jurisdiction on the basis of the «Arctic as a Common Concern of Humankind» concept

### 4.2.1 What makes the Arctic a Common Concern of Humankind?

The Arctic as an area of common interest is no longer restricted by purely economic interests of the international community. Environmental common interest has prevailed over the economic interests due to the changes occurring both in the region and outside Arctic's borders. The Arctic alone is not a subject to the CCH regime. Climate change and its adverse effects taking place within the region make it a subject to CCH.

As WWF noted, «climate change is amplified in Polar Regions».[234] That means that the Arctic serves as an intensifier of climate change, dramatically increasing the speed of global warming. The major issue is connected with the ice sheet melting. Arctic sea-ice is unique because it serves as an enormous ice reflector located at the top of the Earth[235] performing as «the air conditioner of the world».[236]

As a result of «incomplete combustion of fossil fuel and biomass»,[237] BC strongly affect Arctic ability to stabilize global temperatures. When compared with $CO_2$, BC warming effect on climate is 460–1500 times stronger.[238]

Generally, BC has two negative effects contributing to climate change. After BC is emitted it spreads around into the air and its particles settle on glaciers and snow caps. BC dark colour absorbs the sunlight and

---

234 WWF, 'The Effects of Climate Change' <https://www.wwf.org.uk/effectsofclimatechange> accessed 17 September 2018

235 WWF, 'The Arctic' <https://www.wwf.org.uk/where-we-work/places/arctic> accessed 17 September 2018

236 Manuel Pulgar-Vidal, 'Five surprising effects of Arctic climate change' (*Medium Corporation* April 3, 2017) <https://medium.com/@WWF/five-surprising-effects-of-arctic-climate-change-e78bb270dbe1> accessed 17 September 2018

237 CCAC, 'Black Carbon' <http://www.ccacoalition.org/en/slcps/black-carbon> accessed 19 September 2018

238 ibid

prevents it from being reflected. So, BC deposits reduce so called albedo effect which snow mere possesses by its nature as a light-coloured surface. Arctic snow and glacier surfaces covered with dark-coloured BC particles lose their high albedo, and the solar radiation is, therefore, absorbed by the oceans, which in the end causes Earth's surface warming.[239] Darkened Arctic glaciers are melting much faster than it has been predicted. Freshwater from the glaciers flow into the Arctic Ocean which leads to changes in the global climate and is likely to result in a higher amount of precipitations, extreme weather conditions, sea level rise, and negative effects on wildlife and human life worldwide.[240]

Hence, Arctic global warming and its adverse effects form a global concern which meets the CCH criteria of commonality and entails common interest to solve this issue since every State is affected.

### 4.2.2 Whether the Common Concern of Humankind concept has the potential to create the jurisdictional link for Arctic Port States

Generally, scholars agree that CCH does not create any legal obligations for States.[241] Yet, some scholars argue that normative content can be deducted from the concept itself.[242]

First, the element of commonality envisaged in the concept entails a general obligation to cooperate. In the case law, the principle of cooperation was discussed in the *Gabcikovo Nagymaros Project* case where the Court defined the «concept of community of interest»[243] and

[239] Norwegian Polar Institute, 'Albedo Effect' <http://www.npolar.no/en/facts/albedo-effect.html> accessed 19 September 2018

[240] Alina Bradford, Stephanie Pappas, 'Effects of Global Warming' (*Livescience,* August 12, 2017) <https://www.livescience.com/37057-global-warming-effects.html> accessed 19 September 2018

[241] D.Hunter, J. Salzman, D.Zaelke, J. Murillo

[242] Cottier, Aerni, Karapinar, Matteotti, Sépibus, Shingal (n 230) 314

[243] Chinthaka Mendis,Sovereignty vs. trans-boundary environmental harm: The evolving International law obligations and the Sethusamuduram Ship Channel Project *(United Nations / Nippon Foundation Fellow* 2006) <http://www.un.org/depts/los/nippon/unnff_programme_home/fellows_pages/fellows_papers/mendis_0607_sri_lanka.pdf> accessed 27 June 2018

emphasized the importance of cooperation among states in relation to the shared problem. The common interest lies at the heart of the CCH concept. Hence, in order to sustain the common interest, the international community has to take on an obligation to act due care and cooperate with each other for the best of the whole of humanity. So, generally, the interrelation between CCH and the obligation to protect the global environment «may modify jurisdictional boundaries in assuming enhanced and shared responsibilities among states».[244]

Secondly, it is believed that CCH may «serve as a foundation to define, legitimize and assess domestic measures».[245] If so, States need a jurisdictional link to justify such actions. S.Kopela suggests that traditional extraterritorial links are inadequate when it comes to the protection of global commons such as climate since it is not a subject to any boundaries even though the «aspects of jurisdictional principles were found relevant».[246] The effects doctrine has the most potential amid the existing extraterritorial jurisdictional links, whereas scholars highlight the difficulty to identify effects within States' borders with certainty when it comes to climate change. As Mayer submits «using effects to justify jurisdiction for climate change will be problematic due to lack of direct impacts».[247]

Yet, scholars generally agree that the essence of the CCH is the common interest in the protection of a global common which is the climate in this case.[248] In this regard, Ryngaert suggests new jurisdictional link based on international interest,[249] where a State acts on behalf of the whole community to fulfill the common goal. This link seems to be the most reasonable in application to BC effect on the Arctic region.

---

244 Cottier, Aerni, Karapinar, Matteotti, Sépibus, Shingal (n 230) 302
245 Cottier, Aerni, Karapinar, Matteotti, Sépibus, Shingal (n 230) 302
246 Kopela (n 13) 112
247 Kopela (n 13) 107
248 Kopela (n 13) 107
249 Kopela (n 13) 108

### 4.2.3 Whether the Common Concern of Humankind concept justifies extraterritorial unilateral actions of Arctic Port States

Extraterritorial jurisdiction has to meet the requirement of reasonableness. Further, the rights of third States have to be balanced against the extraterritorial unilateral rights of the regulating States.[250] The requirement of reasonableness includes assessment of certain elements.

First, «the extent to which the activity takes place within the regulating State»[251] or the effect which such activity has on regulating State must be assessed.[252]

Second, the character of the activity and importance of its regulation to regulating States and to the international community shall be analyzed. Furthermore, the extent to which other States regulate that issue and the degree of international will to regulate such activities also matters.[253]

Finally, the likelihood of conflict with regulations by other States must be evaluated.[254]

Concerning the first point, Arctic shipping activities have recently increased, causing the growth in BC emissions from ships. That leads to global warming acceleration. The effects of BC emissions are seen within the borders of Arctic States[255] and outside the Arctic region as «consequences of Arctic warming have worldwide implications».[256]

The second requirement is also satisfied. Despite BC emissions fall short of the international regulation of atmospheric emitters, certain steps to address the issue have been undertaken by IMO, EU, and the Arctic States.[257] UNFCCC declared climate change as CCH and called

---

250 Cedric Ryngaert, *Jurisdiction in International Law* (2nd ed. OUP, 2015), 186–187

251 Restatement of the Law Third / The Foreign Relations Law of the United States, 1987, para 403 (2) (a) (hereinafter U.S. Third Restatement)

252 ibid (b)

253 U.S. Third Restatement (n 251) para 403 (c,e,f,g)

254 ibid (h)

255 Susan Joy Hassol, ACIA, *Impacts of Warming Arctic: Arctic Climate Impact Assessment* (CUP 2004) 18

256 ibid 36

257 Arctic Council, 2017, Fairbanks Declaration. 16 pp. note 23

States for cooperation. Hence, there is both national and international desire to regulate BC emissions in the Arctic.

Finally, the rights and interests of other States are balanced by the common interest, since it is a matter of the whole international community.[258] Due to the transboundary effects of environmental damages and the widely-recognised obligation to protect the environment «all States can be held to have a legal interest in their protection; they are obligations *erga omnes*».[259]

Hence, in order to sustain the common interest States have to take on an obligation to act due care and cooperate «for the greater interests of humanity and planetary welfare».[260]

The balance between the sovereignty of regulating States and the third States can be deducted from the general idea of the CCH concept. The concept adds an additional burden on sovereign states in the form of shared responsibility towards the shared problem. So, presumably, jurisdictional boundaries will be modified due to the emerging common responsibilities towards a shared concern.[261] Some scholars suggest that the CCH concept has a complementary character to the «principles of self-determination and of permanent sovereignty over natural resources».[262] Bowman argues that shared interests have an additional character, so they are «superimposed onto state sovereignty».[263] Sholtz states that the CCH has a «greening» effect on exercising of permanent sovereignty over natural resources.[264] Generally, scholars agree that the sovereignty will not remain the same, but the common interest should exclude a conflict between States.

---

258 Kopela (n 13) 109

259 Barcelona Traction, Light and Power Company, Limited, Judgment, I.C.J. Reports 1970, p. 3. p 32, para 33

260 Gabcikovo-Nagymaros Project (HungarylSlovakia), Judgment, 1. C.J. Reports 1997, p. 7. Separate Opinion of Vice-President Weeramantry, para 118

261 Cottier, Aerni, Karapinar, Matteotti, Sépibus, Shingal (n 230) 302

262 ibid 315

263 Sanchez Castillo-Winckels (n 227)135

264 Sanchez Castillo-Winckels (n 227) 135

Further, in order to exercise extraterritorial jurisdiction on the basis of CCH concept, Arctic PS must have an «interest and a link with the regulated activities».[265]

Arctic States are required to have their own legal interest in regulating BC emissions from vessels in Arctic waters. The WTO Appellate Body in the *Shrimp-Turtle case* highlighted «contemporary concerns of the community of nations about the protection and conservation of the environment».[266] Despite the final decision, it generally recognized the legitimate interest of the US to protect species outside national jurisdiction[267] because of the «sufficient nexus between the migratory and endangered marine populations involved and the US».[268]

As the environmental stewards of the region, Arctic States are responsible to protect the Arctic «through the use of control or dominion, based on some values for the benefit of someone».[269] The benefit receiver in this regard is the international community. Hence, Arctic PS, as a part of the global community and as Arctic stewards, have a reasonable legal interest in regulating BC emissions for a common benefit. Denial of such a right can be seen as «depriving them of the right to protect their environmental interests».[270]

Furthermore, the exercise of jurisdiction must be effective, so the activity is «regulated by a state with a close jurisdictional link».[271] In assessing effectiveness, scholars refer to the so-called substantive approach which states that the better law shall be chosen on the basis of substantive content regardless of the territorial link.[272] In this regard, failure of FS to regulate activities on the high seas speaks in favour of PSJ as a more

---

265 Kopela (n 13) 105

266 WTO Appellate Body Report on United States – Import Prohibition of Certain Shrimp and Shrimp Products, WTO Doc. WT/DS58/AB/R (Oct. 12, 1998), para 36

267 ibid

268 WTO Doc. WT/DS58/AB/R (n 226) para 133

269 Tore Henriksen, 'The Arctic Ocean, Environmental Stewardship, and the Law of the Sea' (2016) 6 UC Irvine L. Rev. 61, 63

270 Kopela (n 13) 110

271 ibid 109

272 Kopela (n 13) 110

effective, safer, cost-effective measure.[273] So, generally, jurisdiction on the basis of the CCH meets the necessary requirements for extraterritorial application.

[273] S.A.Hagan, 'Too big to tackle? The persistent problem of pirate fishing and the new focus on port state measures' (2014) 37 Suffolk Transnational Law Review, 129

# Chapter 5. Conclusions

The issue of BC emissions from vessels can be solved by the means of using cleaner fuels, constructing eco-friendly hybrid vessels, replacing engines, or simply by HFO banning from the Arctic. However, when it goes from the theoretical considerations to an actual application, the balance of jurisdictional capabilities of FS, CS, and PS established by LOSC creates certain obstacles for a single State to unilaterally regulate international navigation.

This work attempted to answer two main questions. The first question explored Arctic PS jurisdictional competence to regulate BC emissions from ships navigating Arctic waters, both within maritime zones of Arctic States and beyond. The second question examined the applicability of the ICCL concept of «climate change as CCH» to the Arctic global warming in order to assess its potential as an extraterritorial jurisdictional basis for Arctic PS.

The first part of the discussion mainly focused on the scope and limits of national CDEM measures which can be a 'tool' to regulate BC emissions from vessels. The assessment of the regulatory potential of national CDEM standards leads to the following conclusions.

First, as ports are located within internal waters of Arctic PS, PS can exercise both prescriptive and enforcement jurisdiction over foreign vessels entering their ports. As Churchill and Lowe noted, «by entering foreign ports and other internal waters, ships put themselves within the territorial sovereignty of the coastal State».[274] Consequently, foreign vessels have to comply with national regulations including CDEM standards as long as they are willing to call at the ports of Arctic States.

T. Henriksen noticed «there are no clear limits as to how far the port State may rely on the territorial principle in adopting unilateral CDEM rules and standards».[275] Yet, Articles 25(2) and 211(3) LOSC provide Arctic

[274] R. Churchill & A. Lowe, *The Law of the Sea* (rev. ed. 1988, Manchester University Press) 55, and V.D. Degan, 'Internal Waters' (1986) 17 Netherlands Y.B. Int'l L. 3, 54–55.

[275] Henriksen (n 113) 93

PS with wide discretion to prescribe national requirements including CDEM standards. Moreover, Arctic PS can go beyond existing international rules and regulations due to their residual jurisdiction. Adherence to Article 234 LOSC significantly broadens Arctic PSJ, as LOSC overrides IMO instruments. Hence, MARPOL and Polar Code provisions do not constitute maximum for prescriptive jurisdiction of Arctic PS.

However, CDEM measures are still subject to general limitations imposed by international law, certain constraints contained in LOS instruments and GATT WTO since ports comprise a significant part of the international trade chain.

National CDEM measures are territorial in nature, despite their extraterritorial element. Indeed, the static nature of CDEM measures entails extraterritorial effect since they remain the same throughout the whole voyage.

Article 218 LOSC covers situations involving pollution discharges from vessels, so it is inapplicable to BC emissions. Yet, it can apply to HFO discharges since there is a direct connection between a vessel operating on HFO and BC emissions. In that case, implicit prescriptive jurisdiction based on Article 218 LOSC is extraterritorial in nature, but there is not enough State practice to assess it fully. Generally speaking, enforcement PSJ is territorial and it cannot exceed the limits of prescriptive Arctic PSJ.

Generally, territoriality does not provide Arctic PS with a sufficient basis to regulate BC emissions beyond maritime zones of Arctic States. Despite national CDEM measures entail extraterritorial effect, it is rather incidental. In this relation, extraterritorial jurisdiction based on effects has a greater potential, yet, scholars generally agree that it might be hard to assess the effects when it comes to climate.

The second part of the discussion was devoted to the CCH concept and its application as a jurisdictional basis for justification of extraterritorial regulation of BC emissions from ships.

The extraterritorial jurisdiction on the basis of CCH concept is per se a modified effects doctrine but common interest broadens and justifies its application.

The common interest lies at the heart of the CCH concept. As it is aimed to achieve the common goal, it does not foresee the establishment of the exclusive jurisdiction of Arctic PS over the BC matter.

The application of the concept of CCH to global warming in the Arctic meets the general criteria of reasonableness and necessity required for the extraterritorial jurisdiction. Additionally, it meets the specific CCH criteria, precisely, the legitimate interest of Arctic States to regulate BC emissions beyond their maritime zones and effectiveness due to their coastal proximity.

Overall, it can be concluded that jurisdiction on the basis of CCH can fill the existing gaps in the regulation of the BC emissions from ships.

ICCL explicitly recognizes climate change as a CCH and makes emphasis on States cooperation to tackle the adverse effects of climate change. Cottier stated that «common concern as a principle instigating both cooperation and unilateral action in a dialectical process».[276] So, Arctic PS unilateral measures, performing as an instrument aimed to enhance the efficiency of collective measures, can motivate the international community for further cooperation. Future regional cooperation of Arctic PS was not discussed within this work, but it seems to be a logical solution for the regulation of BC emissions from vessels. It can be submitted that pure Arctic regional approach, including an alternative PSC system, can be considered a reasonable solution to maintain the Arctic region in the best possible way in the light of climate change.

[276] Cottier, Aerni, Karapinar, Matteotti, Sépibus, Shingal (n 230) 296

# Table of reference

## International Legal Instruments

United Nations Convention on the Law of the Sea 1982 (adopted 10 December 1982, entered into force 16 November 1994) 1833 UNTS 397

International Convention for the Prevention of Pollution from Ships 1973 (adopted 2 November 1973, entered into force 20 October 1983) 1340 UNTS 184 amended by Protocol of 1978 Relating to the International Convention for the Prevention of Pollution from Ships (adopted 17 February 1978, entered into force 2 October 1983) 1340 UNTS 61 MARPOL 73/78

International Code For Ships Operating In Polar Waters (Polar Code) 2017, Res MSC.385(94) (adopted on 21 November 2014) Res MEPC.265(68) (adopted on 15 May 2015) MEPC 68/21/Add.1, entered into force 1 January 2017

International Convention for the Safety of Life At Sea 1974, (adopted 1 November 1974, entered into force 25 May 1980) 1184 UNTS 278

International Convention on the Control of Harmful Anti-fouling Systems on Ships 2001 (adopted 5 October 2001, entered into force17 September 2008) IMO Doc. AFS/CONF/26

International Convention for the Control and Management of Ships' Ballast Water and Sediments, 13 February 2004, 30 I.L.M. 1455 (1991). Not in force, IMO Doc. BWM/CONF/36, of 16 February 2004

United Nations Framework Convention on Climate Change 1992 (adopted 9 May 1992, entered into force 21 march 1994) 1771 UNTS 107

Paris Agreement 2015 (signed 22 April, entered into force 4 November 2016) FCCC/CP/2015/10/Add.1

Vienna Convention on the Law of Treaties (adopted on 23 May 1969, entered into force 27 January 1980) 1155 UNTS 331

General Agreement on Tariffs and Trade 1947 (adopted 30 October 1947, entered into force 1 January 1948) 55 UNTS 194 (1947 GATT)

General Agreement on Tariffs and Trade (15 April 1994) LT/UR/A-1A/1/GATT/1 (GATT)

## European Legal Instruments

Directive 2008/101/EC of the European Parliament and of the Council of 19 November 2008 amending Directive 2003/87/EC so as to include aviation activities in the scheme for greenhouse gas emission allowance trading within the Community OJ L 8

Regulation (EU) 2015/757 of the European Parliament and of the Council of 29 April 2015 on the monitoring, reporting and verification of carbon dioxide emissions from maritime transport, and amending Directive 2009/16/EC, *OJ* L 123/55

Regulation (EC) No 417/2002 of the European Parliament and of the Council of 18 February 2002 on the accelerated phasing-in of double hull or equivalent design requirements for single hull oil tankers and repealing Council Regulation (EC) No 2978/94, OJ L 64, 7.3.2002

## Arctic Council instruments

Fairbanks Declaration 2017, Declaration of the Foreign Ministers of the Arctic States at the 10th Ministerial meeting of the Arctic Council, held in Fairbanks, Alaska, 10–11 May, 2017

Iqaluit Declaration 2015, The Ninth Ministerial Meeting of the Arctic Council. April 24, 2015. Iqaluit, Yukon, Canada

## Domestic legislation

### Canada

Arctic Waters Pollution Prevention Act (R.S.C., 1985, c. A-12)

Canada Shipping Act, 2001 (S.C. 2001, c. 26)

Arctic Shipping Safety and Pollution Prevention Regulations (SOR/2017-286)

### The Russian Federation

Federal Law on amendments to specific legislative acts of the Russian Federation related to governmental regulations of merchant shipping in the water area of the Northern Sea Route, 2012, The Federal Law of July 28, 2012, N 132-FZ

### United States of America

The Oil Pollution Act (OPA) of 1990 33 U.S.C. §2701 et seq. (1990)

Fuel Sulfur and Other Operational Requirements for Ocean-going Vessels within California Waters and 24 Nautical Miles of the California Baseline, 13 CCR, section 2299.2. (2008)

Restatement (Third) Foreign Relations Law § 1 (Am. Law Inst. 1987)

### Australia

The Protection of the Seas (Pollution Prevention Act), No. 41, 1983, Australia; Protection of the Sea Legislation Amendment Act 2018, No. 40, 2018

## China

Marine Environment Protection Law of the Peoples' Republic of China 1982, China (Adopted at the 24th Meeting of the Standing Committee of the Fifth National People's Congress on August 23, 1982; promulgated by Order No.26 of the President of the People's Republic of China on December 25, 1999)

# Judicial decisions

## International Court of Justice

Barcelona Traction, Light and Power Company, Limited, Judgment, I.C.J. Reports 1970, p. 3

Case Concerning Military and Paramilitary Activities In and Against Nicaragua (Nicaragua v. United States of America); Merits, International Court of Justice (ICJ), 27 June 1986

Gabcikovo-Nagymaros Project (HungarylSlovakia), Judgment, 1.C.J. Reports 1997, p. 7 Separate Opinion of Vice-President Weeramantry

North Sea Continental Shelf, Judgment, I.C.J. Reports 1969, p. 3

PCIJ, SS Lotus, PCIJ Reports, Series A, No. 10, (1927)

## EU Court of Justice

Air Transport Association of America and ors v Secretary of State for Energy and Climate Change, Case C-366/10, 6 October 2011

Opinion Kokott AG; Air Transport Association of America and ors v Secretary of State for Energy and Climate Change, Case C-366/10, 6 October 2011

### ITLOS

ITLOS, The Ara Libertad Case (Argentina v. Ghana), Written Statement of the Republic of Ghana, 28 November 2012

### WTO-Dispute Settlement Body

WTO Appellate Body Report on United States – Import Prohibition of Certain Shrimp and Shrimp Products, WTO Doc. WT/DS58/AB/R (Oct. 12, 1998)

GATT Panel Report, Japan – Semi-Conductors, Report of the Panel adopted on 4 May 1988 (L/6309 - 35S/116)

### Cases from national jurisdictions

Pacific Merchant Shipping Asso v. James Goldstene, et al, No. 09-17765 (9th Cir. 2011)

United States v. Aluminum Co. of America, 148 F.2d 416 (1945)

Saudi-Arabia v Arabian American Oil Company (ARAMCO) 1963 27 IRL

## Books

Bevan, M., *Port State Jurisdiction and Regulation of International Merchant Shipping,* (Springer 2014)

Churchill, R., Lowe, A. *The Law of the Sea* (rev. ed. 1988, Manchester University Press)

Hassol, S.J., *Impacts of Warming Arctic: Arctic Climate Impact Assessment* (Cambridge University Press 2004)

Hunter, D., James Salzman, J., Zaelke, D., *International Environmental Law and Policy*, (2nd ed. Foundation Press. 2002)

Nordquist, M.H., Rosenne, S., Satya N. Nandan, S.N., *United Nations Convention on the Law of the Sea, 1982: A Commentary* (Martinus Nijhoff Publishers 1985)

Ringbom, H., *The maritime Safety Policy and International Law*, Martinus Nijhoff: Leiden, 2008, (e-book, Brill Online)

Rothwell, D.R., Stephens, T., *International Law of the Sea*, (Hart Publishing 2016)

Ryngaert, C., *Jurisdiction in International Law* (2nd ed. Oxford University Press 2015)

Shaw, M.N., *International law* (7th Edition Cambridge University Press 2014)

Tedsen, E., Cavalieri, S., Kraemer, R.A., *Arctic Marine Governance: Opportunities for Transatlantic Cooperation* (Springer Science & Business Media 2013)

Wolcott, D.C., Coleman,J.M., *Double-Hull Tanker Legislation, An Assessment of Oil Pollution Act of 1990, Marine Board, Commission on Engineering and Technical Systems*, (National Research Council National Academy Press Washington, D.C.1998) (e-book)

Yang, H., *Jurisdiction of the Coastal State over Foreign Merchant Ships in Internal Waters and the Territorial Sea* (Springer 2006)

Østreng, W., Eger, K.M., Fløistad, B., Jørgensen-Dahl, A., Lothe, L., Mejlaender-Larsen, M., Wergeland, T.W, *Shipping in Arctic Waters: A comparison of the Northeast, Northwest and Trans Polar Passages* (Springer – Praxis Books in Geophysical Science, 2013)

## Chapters in books

Evans, M. D., 'The Law of the Sea' *in* M.Evans (ed.), *International law*, (2d Edition, Oxford University Press, 2006);

Lagoni, R., 'Internal Waters' in Rudolf Berhardt (ed) *Encylopedia of Public International Law II,* (Heidelberg, 1995);

Molenaar, E.J., 'Residual Jurisdiction under IMO Conventions' in Henrik Ringbom (ed) *Competing Norms in the Law of Marine Environmental Protection,* (Kluwer Law International 1997);

Molenaar, E. J., 'Port and Coastal States' in Donald Rothwell, Alex Oude Elferink, Karen Scott, and Tim Stephens (eds), *The Oxford Handbook of the Law of the Sea* (Oxford Handbooks Online 2016)

## Journal Articles

Akehurst, M, 'Jurisdiction in International Law' (1972) 46 Brit YB Int'l L

Anderson,D., 'The Roles of Flag States, Port States, Coastal States and International Organisations in the Enforcement of International Rules and Standards Governing the Safety of Navigation and the Prevention of Pollution from Ships under the UN Convention on the Law of the Sea and Other International Agreements' (1998) 2 Sing. J. Int'l & Comp. L.

Bang, H.S., 'Port State Jurisdiction and Article 218 of the UN Convention on the Law of Sea' (2009) 40 J. Mar. L. & Com.

Bodansky, D., 'What's in a Concept? Global Public Goods, International Law, and Legitimacy' (2012) EJIL 23, 651–668

Boyle,A., 'Further Development of the Law of the Sea Convention: Mechanisms for Change' (2005) International and Comparative Law Quarterly, pp. 563–584

Boyle,A., 'EU Unilateralism and the Law of the Sea' (2006) The International Journal of Marine and Coastal Law, vol. 21:1, pp. 15–31

Castillo-Winckels, N.S., 'Why "Common Concern of Humankind" Should Return to theWork of the International Law Commission on the Atmosphere (2016) The Georgetown Envtl.Law Review [Vol. 29:131]

Chircop,A., 'Sustainable Arctic Shipping. Are Current International Rules for Polar Shipping Sufficient?' (2016) The Journal of Ocean Technology, Vol. 11, No. 3

Chircop, A., 'Ships in Distress, Environmental Threats to Coastal States, a Place of Refuge: New Directions for an Ancient Regime?' (2002) 33 ODIL 207

Churchill, R., 'Port State Jurisdiction Relating to the Safety of Shipping and Pollution from Ships—What Degree of Extra-territoriality?' (2016) The International Journal of Marine and Coastal Law 31 Brill Nijhoff, 442–469

Cottier,T., Aerni,P., Karapinar,B., Matteotti,S., Sépibus,J., Shingal,A., 'The Principle of Common Concern and Climate Change' (2014) Archiv des Völkerrechts, Abhandlungen, Mohr Siebeck

Degan, V.D., 'Internal Waters' (1986) 17 Netherlands Y.B. Int'l L. 3

Fields, S.P., 'Article 234 of the United Nations Convention on the Law of the Sea: The Overlooked Linchpin for Achieving Safety and Security in the U.S. Arctic?' (2016) Harvard National Security Journal / Vol. 7

Henriksen, T., 'The Arctic Ocean, Environmental Stewardship, and the Law of the Sea' (2016) 6 UC Irvine L. Rev. 61

Kopela, S., 'Port-State Jurisdiction, Extraterritoriality, and the Protection of Global Commons' (2016) Ocean Development & International Law, 47:2, 89–130

LaFayette, L., 'Access to Ports in International Law, The International Journal of Marine and Coastal Law' (1996) Vol 11, No 1, Kluwer Law International

Lowe, A.V., The Enforcement of Marine Pollution Regulations (1975) 12 San Diego L. Rev. 624–643

McDorman, T.L., 'Port State Enforcement: A Comment on Article 218 of the 1982 Law of the Sea Convention' (1997) Journal of Maritime Law and Commerce, Vol. 28, No. 2, April

Murillo, J., 'Common Concern of Humankind and Its Implications in International Environmental Law' (2008) 5 Macquarie J. Int'l & Comp. Envtl. L.

Ringbom,H., Ryngaert,C., 'Introduction: Port State Jurisdiction: Challenges and Potential (2016) The International Journal of Marine and Coastal Law 31, Brill Nijhoff, 379–394

Scott, J., 'Extraterritoriality and territorial extension in EU law' (2014) Vol. 62 American Journal of Comparative Law 87–125

Shapovalova, D., 'The Effectiveness of the Regulatory Regime for Black Carbon Mitigation in the Arctic Arctic Review on Law and Politics'(2016) Vol. 7 No. 2 pp. 136–151

Szepes,M., 'MARPOL 73/78: The Challenges of Regulating Vessel-Source Oil Pollution' (2013) Manchester Student Law Review Vol 2:73

Yu,Y., Zhao.,Y., Chang,Y-C., 'Challenges to the Primary Jurisdiction of Flag States Over Ships', (2018) Ocean Development & International Law, 49:1, 85–102

Zwinge,T., 'Duties of Flag States to Implement and Enforce International Standards and Regulations – And Measures to Counter Their Failure to Do So' (2011) Journal of International Business and Law: Vol. 10: Iss. 2, Article 5

## Reports

Brewer, T.L., *Arctic Black Carbon from Shipping: A Club Approach to Climate-and-Trade Governance* (Issue Paper No. 4; Global Economic Policy and Institutions Series; International Centre for Trade and Sustainable Development 2015)

Comer, B., Olmer, N., Mao,X., Roy, Rutherford, D., *Prevalence of heavy fuel oil and black carbon in Arctic Shipping, 2015 to 2025*, International Council on Clean Transportation Report 2017

Friisk, A.G., *Arctic Coastal State Jurisdiction in an Era of Climate Change,*

Vessel-Source Oil Pollution and International Shipping in Norwegian and Russian Arctic Waters' (2014) FNI Report 12/2014

Henriksen,T., *Norway and Arctic Marine shipping*, Fram Centre Report Series No.2, 2015

Lack, D., *The Impacts of Arctic Shipping Operations on Black Carbon Emissions*, (Transport Emissions: Air Quality and Climate Consulting, Queensland,Australia, 2016)

IMO, *Investigation of appropriate control measures (abatement technologies) to reduce Black Carbon emissions from international shipping* (Air Pollution and Energy Efficiency Studies, IMO Publications 2015)

## Websites and Blogs

Chinthaka Mendis,Sovereignty vs. trans-boundary environmental harm: The evolving International law obligations and the Sethusamuduram Ship Channel Project *(United Nations / Nippon Foundation Fellow* 2006) <http://www.un.org/depts/los/nippon/unnff_programme_home/fellows_pages/fellows_papers/mendis_0607_sri_lanka.pdf> accessed 27 June 2018

Alina Bradford, Stephanie Pappas, 'Effects of Global Warming' (*Livescience,* August 12, 2017) <https://www.livescience.com/37057-global-warming-effects.html> accessed 19 September 2018

Norwegian Polar Institute, 'Albedo Effect' <http://www.npolar.no/en/facts/albedo-effect.html> accessed 19 September 2018

CCAC, 'Black Carbon' <http://www.ccacoalition.org/en/slcps/black-carbon> accessed 19 September 2018

Manuel Pulgar-Vidal, 'Five surprising effects of Arctic climate change' (*Medium Corporation* April 3, 2017) <https://medium.com/@WWF/five-surprising-effects-of-arctic-climate-change-e78bb270d-be1> accessed 17 September 2018

WWF, 'The Arctic' <https://www.wwf.org.uk/where-we-work/places/arctic> accessed 17 September 2018

WWF, 'The Effects of Climate Change' <https://www.wwf.org.uk/effectsofclimatechange> accessed 17 September 2018

Webster dictionary <https://www.merriam-webster.com> accessed 7 October 2018

IMO Port State Control (Knowledge Center) <http://www.imo.org/en/OurWork/MSAS/Pages/PortStateControl.aspx> accessed 28 October 2018

Renee Cho, 'The Damaging Effects of Black Carbon' (*State of the Planet/Earth Institute*, March 22, 2016) <https://blogs.ei.columbia.edu/2016/03/22/the-damaging-effects-of-black-carbon/>

The Arctic Institute, 'How Black Carbon Affects the Arctic?' <https://www.thearcticinstitute.org/wp-content/uploads/2016/04/TAI-Infographic-Blackcarbon.pdf?x62767>

Final Regulation Order, Fuel Sulfur and Other Operational Requirements for Ocean-Going Vessels Within California Waters and 24 Nautical Miles of the California Baseline. <https://www.arb.ca.gov/regact/2011/ogv11/ogvfro13.pdf> accessed 3 September 2018

'Primer on Ocean Jurisdictions: Drawing Lines in the Water An Ocean' (*Blueprint for the 21 Century*) <https://govinfo.library.unt.edu/oceancommission/documents/full_color_rpt/03a_primer.pdf> accessed 18 October 2018

Douglas Martins, 'Air Pollution and the Ocean. Study measures impacts of nitrogen deposition on coastal waters' (*Penn State News*, October 06, 2014) <https://news.psu.edu/story/329095/2014/10/06/research/air-pollution-and-ocean> accessed 29 November 2018

Prof. Dr. Dr. h.c. Peter Ehlers, Enforcement of International Maritime Law Instruments, Institute for the Law of the Sea and Maritime Law, Hamburg University <http://www.traceca-org.org/fileadmin/fm-dam/TAREP/68ta/1/Enforcement_Ehlers.pdf> accessed 5 October 2018

AMAP, 2015. Summary for Policy-makers: Arctic Climate Issues 2015. Arctic Monitoring and Assessment Programme (AMAP), Oslo, Norway. pp16, 7 <http://www.hfofreearctic.org/hrf_faq/shipping-arctic-expected-increase/#_ftn1> accessed on 23.08.2018

Norges Rederiforbund, 'High North – High Stakes Maritime opportunities in the Arctic' <https://rederi.no/globalassets/dokumenter/alle/rapporter/maritime_opportunities_in_the_arctic.pdf> 8 accessed 9 September 2018

Jeannie Evers, Emdash Editing, Arctic (*National Geographic Education* 2016) <https://www.nationalgeographic.org/encyclopedia/arctic/> accessed 12 September 2018

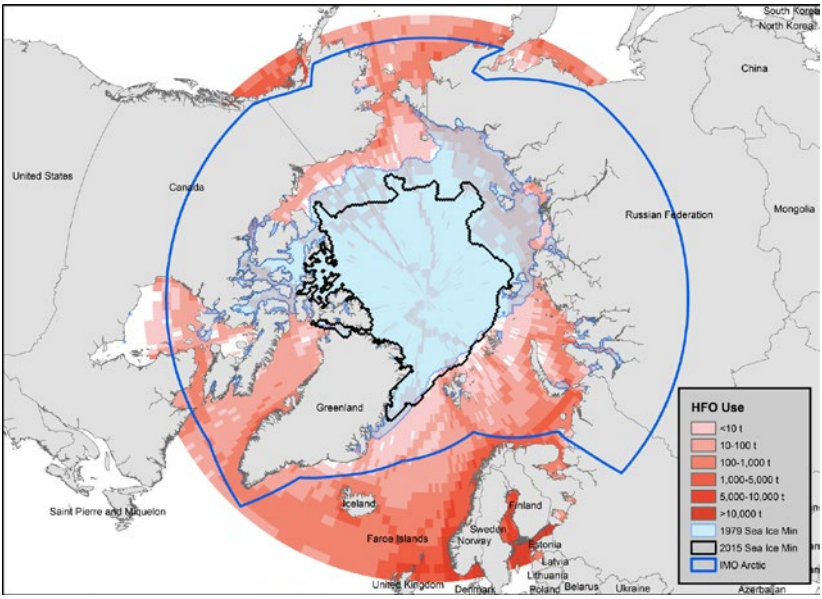
The IMO Polar Code in force, beginning 1 January 2017: How to comply (*DNV GL* 21 December 2016) <https://www.dnvgl.com/news/the-imo-polar-code-in-force-beginning-1-january-2017-how-to-comply-83230> accessed 16 September 2018

Marine Environment Protection Committee (MEPC), 72nd session, 9–13 April 2018 <http://www.imo.org/en/mediacentre/meetingsummaries/mepc/pages/mepc-72nd-session.aspx> accessed on 12.10.2018

Arctic Council, 'Environment and Climate' (*Arctic Council* 13 May 2015) <https://www.arctic-council.org/index.php/en/our-work/environment-and-climate> accessed 21 April 2018

# Annex I

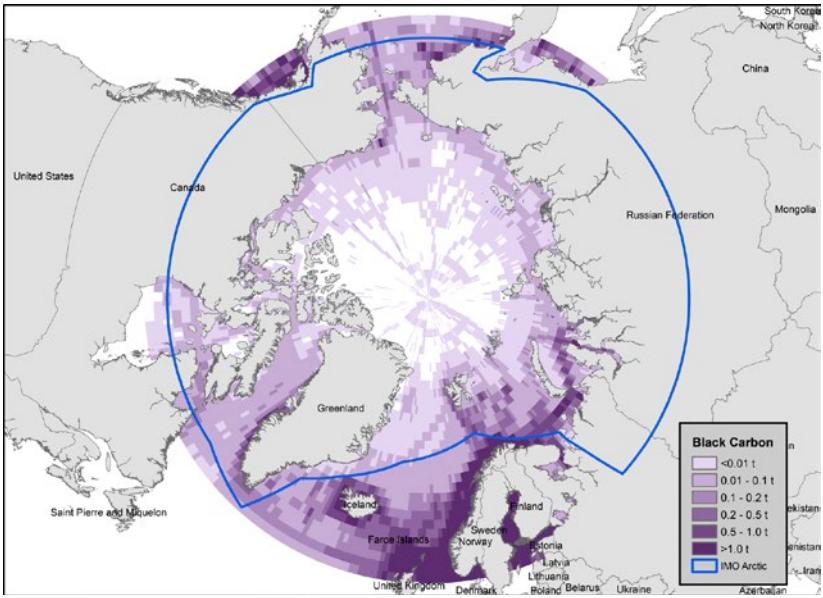
Figure illustrating amount of HFO (tonnes) used in the Arctic, 2015, with minimum sea extents.[277]




[277] Comer, Olmer, Mao X., Roy B. Rutherford (n 12) v

# Annex II

Figure illustrating amount of BC emissions (tonnes) in the Arctic, 2015.[278]




[278] Comer, Olmer, Mao X., Roy B. Rutherford (n 12) vi

THE SCANDINAVIAN INSTITUTE OF MARITIME LAW is a part of the University of Oslo and hosts the faculty's Centre for European Law. It is also a part of the cooperation between Denmark, Finland, Iceland, Norway and Sweden through the Nordic Council of Ministers. The Institute offers one master programme and several graduate courses.

The core research areas of the Institute are maritime and other transport law as well as petroleum and energy law, but the members of the Institute also engage in teaching and research in general commercial law.

In MARIUS, issued at irregular intervals, articles are published in the Nordic languages or English.

ISSN: 0332-7868


07 Media