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Legal Considerations on the Regulation of Use and Carriage of Heavy Fuel Oil in the Arctic Ocean

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List of Abbreviations

AMSA	Arctic Marine Shipping Assessment
Art. / Arts.	Article / Articles
ASTM	American Society for Testing and Materials International
CDEM	Construction, Design, Equipment and Manning
ECA	Emission Control Area
EGCS	Exhaust Gas Cleaning System
EEZ	Exclusive Economic Zone
EU	European Union
GAIRS	Generally Accepted International Rules and Standards
HFO	Heavy Fuel Oil
IMO	International Maritime Organization
ISO	International Organization for Standardization
kg/m^3	Kilogram per Cubic Meter
LNG	Liquified Natural Gas
LOSC	Law of the Sea Convention
m/m	Mass by Mass
MARPOL	International Convention for the Prevention of Pollution from Ships
MDO	Marine Diesel Oil
MEPC	Marine Environment Protection Committee
MGO	Marine Gas Oil
n.m.	Nautical Mile(s)
p. / pp.	page / pages
PAME	Protection of the Arctic Marine Environment Working Group
para. / paras.	Paragraph / paragraphs
PPR	Pollution Prevention and Response Sub-Committee
SOLAS	International Convention for the Safety of Life at Sea
STCW	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
VCLT	Vienna Convention on the Law of Treaties
USA	United States of America

Part I: Introduction

1. The Need to Regulate Heavy Fuel Oil Use and Carriage in the Arctic

It is a well-known fact that the Arctic environment is particularly vulnerable to the effects of climate change. In addition to rising temperatures caused by global warming that lead to ice-melting, the Arctic is vulnerable to "feedback loops" arising out of the delicate balance between frozen and liquid water.[1] The highly reflective sea-ice that melts is turned into heat-absorbing open ocean waters, that lead to further rise in temperature.[2] Rising temperatures also result in the release of methane, a greenhouse gas, from permafrost regions and coastal sediments into the atmosphere.[3]

However, that very same rise in temperature results in the opening of previously ice-covered navigational routes, a fact that did not remain unnoticed by States and the maritime industry. The Arctic Ocean faces a steady boost to navigation that facilitates transfer of goods, mineral resources and people.[4]

A significant number of vessels that are currently navigating in or through Arctic waters use or carry heavy fuel oil (HFO). HFO is a general term used to describe a number of inexpensive but highly pollutant fuels. Specifically, the International Convention for the Prevention of Pollution from Ships (MARPOL)[5] Annex I, Chapter 9 Regulation 43 defines HFO as "1) crude oils having a density at 15℃ higher than 900 kg/m^3; 2) oils, other than crude oils, having a density at 15℃ higher than 900 kg/m^3 or a kinematic viscosity at 50℃ higher than 180 mm^2/s; or 3) bitumen, tar and their emulsions".[6] HFO under this definition includes residual marine fuel or mixtures containing mainly residual fuel and some distillate fuel.[7] These kinds of fuels may be also called by different names, such as "heavy diesel oil", "residual fuel", "bunker", or just "fuel oil", or other.[8] However, different definitions exist and may be based on different characteristics, such is the content of specific substances found in the fuel.

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[1] Byers M., *International Law and the Arctic*, Cambridge University Press (2013), p. 2.
[2] *Ibid.*
[3] Macko S., "Changes in the Arctic Environment", in Nordquist M., Heidar T. and Norton Moore J. *Changes in the Arctic Environment and the Law of the Sea*, Martinus Nijhoff Publishers (2010) p. 110-111.
[4] Deggim H., "The International Code for Ships Operating in Polar Waters (Polar Code)", in Hildebrand L. et al. (eds.) *Sustainable Shipping in a Changing Arctic*, Springer (2018) p. 16.
[5] International Convention for the Prevention of Pollution from Ships as modified by the Protocol of 1978 [MARPOL] (signed 17 February 1978, entered into force 2 October 1983), 1340 *UNTS* 61 and 1341 *UNTS* 3.
[6] MARPOL Annex I, Chapter 9, Reg. 43.
[7] PAME, "Heavy Fuel in the Arctic (Phase I)", Report No./DNV Reg No.: 2011-0053/ 12RJ7IW-4 Rev 00, 18 January 2011, available at <https://www.pame.is/document-library/shipping-documents/heavy-fuel-oil-documents>, last accessed 14 September 2020, p. 5.
[8] *Ibid.*

HFO poses several serious threats to the vulnerable Arctic marine environment. As is the case with most diesel fuel oils, HFO produces noxious airborne emissions such as sulphur oxides (SO_x) and nitrous oxides (NO_x).[9] Especially sulphur oxides are known to be harmful to human health, causing respiratory symptoms, lung disease and asthma.[10] They also lead to acid rain, and contribute to the acidification of the oceans.[11]

Additionally, HFO is hard to degrade and long lasting and, consequently, difficult to clean after an oil spill.[12] A possible HFO spill would have an adverse impact on the health and food security of vulnerable Arctic communities.[13]

It also produces ozone-depleting substances and greenhouse gases such as carbon dioxide, methane and nitrous oxide that contribute to the greenhouse effect and climate change.[14] Finally, and importantly for the Arctic, HFO emits more black carbon, a black material formed through the incomplete combustion of fuel oil or coal.[15] Black carbon is absorbed by snow and ice present in the Arctic Ocean, thus contributing to the feedback loops described before.[16] It also has detrimental effects on human health that can affect the Arctic coastal communities.[17]

Considerate of the dangers posed by the use of HFO, the International Maritime Organization (IMO) has taken steps in order to regulate its use and carriage in the Arctic Ocean. The International Code for Ships Operating in Polar Waters (Polar Code)[18] includes a recommendation for ships to not use HFO when sailing in the Arctic, while MARPOL Annex VI, Chapter 3, Regulation 14 (Sulphur Oxides Regulation)[19] has set a meticulous regime in order to decrease the content of sulphur found in any fuel, including high-sulphur HFO, worldwide. Furthermore, IMO is currently considering a ban to the use and carriage of it in the Arctic Ocean. The work to formulate this new regulation is currently undertaken by IMO's Marine Environmental Protection Committee (MEPC) and its sub-committee on

[9] Sun Z. "International Regulation of heavy fuel oil use by vessels in Arctic waters", 34 *Marine and Coastal Law* 513 (2019), p. 516.
[10] Fanø J. J., *Enforcing International Maritime Legislation on Air Pollution through UNCLOS*, Hart Publishing (2019), p. 3.
[11] IMO, Media Center, "Sulphur 2020 – cutting Sulphur oxide emissions", available at <http://www.imo.org/en/MediaCentre/HotTopics/Pages/Sulphur-2020.aspx>, last accessed 14 September 2020.
[12] Sun, *supra* n. 9, p. 517.
[13] *Ibid.* p. 518.
[14] *Ibid.* p. 516.
[15] *Ibid.* p. 517.
[16] Boone L., "Development of an Environmental Chapter in the Polar Code: Introducing a New Player – Black Carbon", 4 *Yearbook of Polar Law* 541 (2012), p. 547
[17] *Ibid.*, p. 550.
[18] IMO Doc. MSC 385(94) - MEPC 68/21/Add.1, Annex 10, "International Code for Ships Operating in Polar Waters" [Polar Code].
[19] MARPOL Annex VI, Chapter 3, Reg. 14.

Pollution Prevention and Response (PPR). A draft amendment was produced by the PPR on 13 December 2019 and was accepted to be submitted in the MPEC for further consideration.[20] However, this ban will not be enforced until at least 2024 and for some vessels until 2029,[21] while it is not sure whether this new ban will adequately address the dangers posed by the use and carriage of HFO in the Arctic.[22]

2. Objectives and Research Questions

This Thesis aims to analyze the recent efforts that take place in order to regulate the use and carriage of HFO by vessels navigating in or through the Arctic Ocean. It first examines the legal regime that can lead or has led to a multilateral regulation of HFO use and carriage. Secondly, it examines the legal bases for unilateral regulation and presents the examples of Norway and Iceland that have both adopted specific national rules for the use and carriage of HFO in waters under their jurisdiction.

In doing so, the Thesis attempts to answer the following research questions:

- What multilateral legal bases can Arctic States use in order to regulate the use and carriage of HFO?
- What is the scope and limits of State jurisdiction to prescribe and enforce legislation on HFO use and carriage in the Arctic Ocean?
    - Specifically, what are the limits for States that are willing to go beyond the generally accepted international rules and standards that are today in place?
- Is it lawful for Arctic coastal States to unilaterally adopt and enforce regulations on the use and carriage of HFO in the waters under their jurisdiction?
    - Specifically, are the regulations adopted by Iceland and Norway in accordance with international law?
- What are the legal advantages and constraints that stem from multilateral and unilateral action for the regulation of HFO use and carriage in the Arctic Ocean?

[20] IMO Sub-committee on Pollution, Prevention and Response, 7th Session, Agenda item 14, "Draft language for a ban of use and carriage of heavy fuel oil as fuel by ships in Arctic waters", (13 December 2019).
[21] IMO, Media Center, Sub-committee on Pollution Prevention and Response (PPR), 17-21 February 2020, available at <http://www.imo.org/en/MediaCentre/MeetingSummaries/PPR/Pages/PPR-7th-Session.aspx>, last accessed 14 September 2020.
[22] For a detailed discussion of the proposed ban see Part II/2.3 of this Thesis.

3. Delimitation of Scope

This Thesis focuses on the regulation of HFO use and carriage in the Arctic Ocean. Thus, the main applicable international rules that are to be discussed are the United Nations Convention on the Law of the Sea (LOSC)[23] and MARPOL. In the context of MARPOL, the Thesis will discuss Annexes I and VI, including the related regulations on sulphur and the Polar Code. International Conventions that regulate other facets of international shipping that could have an incidental impact on the use and carriage of HFO, especially in a possible case of oil spill (such as the Oil Pollution Preparedness, Response and Cooperation Convention or the 1969 Civil Liability Convention), albeit important, are not discussed since they are not mainly concerned with the regulation of types of fuels such as HFO.

A number of Arctic Council documents will be discussed since they provide technical considerations that Arctic States may take into account when regulating HFO use and carriage, albeit these documents are not legally binding.

National laws and regulations of the Arctic coastal States will be discussed as far as they are related to the objectives of the Thesis. Especially the legislation of Iceland and Norway will be comprehensively discussed since these two States have taken measures to regulate HFO use and carriage.

The Thesis does not discuss the regulation of warships and government ships operated for non-commercial purposes.[24]

The Thesis will mainly use the technical definition of "Arctic Waters" that is provided for in MARPOL and the Polar Code,[25] but will also include the waters under Icelandic jurisdiction due to the importance of Iceland as an actor in the region and the fact that it has taken action to regulate HFO use and carriage.

[23] United Nations Law of the Sea Convention [LOSC] (signed 10 December 1982, entered into force 16 November 1994), 1833 *UNTS* 3.
[24] Warships and government ships are however expected to comply voluntarily with the laws and regulations of the coastal States. See McDorman T., "Sovereign immune Vessels: Immunities, Responsibilities and Exceptions", in Ringbom H., (ed.), *Jurisdiction over Ships: Post-UNCLOS Developments in the Law of the Sea*, Brill (2015), pp. 95-96.
[25] MARPOL 73/78 Annex I, Reg. 1.11.7 and 46.2, Annex II, Reg. 13.8.1 and 21.2, Annex IV, Reg. 17.2 and 17.3, and Annex V, Reg. 1.14.7 and 13.2.

4. Methodology and Sources

Regarding the methodology, the Thesis utilizes mainly the doctrinal methodology in order to discuss the different jurisdictional bases on which a regulation of HFO use and carriage in the Arctic Ocean can be based. Specifically, the Thesis will examine the international legal framework that is today in place and can facilitate the regulation of HFO use and carriage in the Arctic Ocean. It will also analyze the jurisdiction of flag States, coastal States and port States, and the different ways a State may regulate HFO use and carriage, depending on its role.

In this vein, the Thesis also provides case studies of the State practices of Iceland and Norway on the regulation of HFO use and carriage. Importantly, these case studies are not the main focus of the Thesis. In order for the Thesis to concretize its finding, it departs from the existing examples of Iceland and Norway, but it also includes several hypotheses to cover all the issues that arise in relation with HFO use and carriage. The case studies are, thus, used as a starting point to discuss the applicable rules that may be utilized in the regulation of HFO use and carriage.

Given the objective of the Thesis the relevant sources that are to be utilized are stipulated in article 38 of the Statute of the International Court of Justice.[26] Especially regarding the interpretation of the relevant treaties, the Thesis applies the rules of interpretation that are set out in articles 31-33 of the Vienna Convention on the Law of Treaties (VCLT).[27]

5. Case Studies of Iceland and Norway

To this date, only Iceland and Norway have taken unilateral measures targeting specifically the use and carriage of HFO in the Arctic. These national regulations raise considerations on their legality and the limits of the States' jurisdiction on this matter, especially on whether they are, and can, go beyond the international legal framework that is today in place. Moreover, the respective national regulations differ significantly in the way they regulate the use and carriage of HFO.

The Ilulissat Declaration that was issued by Norway, Denmark, Russia, Canada and the US in 2008 excluded Iceland (along with Finland and Sweden) from the, self-proclaimed,

[26] Statute of the International Court of Justice, Annex to the UN Charter (signed 26 June 1945, entered into force 25 October 1945) 1 *UNTS* XVI.
[27] Vienna Convention on the Law of Treaties [VCLT] (signed 23 May 1969, entered into force 27 January 1980), 1155 *UNTS* 331.

Arctic Coastal States.[28] However, Iceland, Finland, Sweden and the Arctic Council's permanent participants heavily contested this declaration. Iceland's strategy is focused on the Arctic and its actions are significant in the process of regional decision making.[29] the Icelandic waters are a main navigational route where the highest concentration of maritime traffic is found, along with the waters off Norway, the Barents Sea, the southwest coast of Greenland and the Bering Sea.[30] This fact, along with Iceland's established will to protect and preserve the marine environment under its jurisdiction,[31] explains how it has decided to adopt a stringent legislation on the regulation of HFO and makes the examination of its State practice paramount for the issues at hand.

In December 2019, Iceland adopted the Regulation 1084/2019[32] which amended the Regulation 124/2015 on the Sulphur Content of specific liquid Fuels.[33] This recent amendment aims to tighten fuel requirements, specifically the content of sulphur, which effectively ban the use of HFO in the territorial sea of Iceland. The regulation is intended to promote improved air quality in harbours and coastal areas and conforms with the government's coalition agreement and climate action plan.[34]

Norway has introduced a ban on use and carriage of HFO only in the territorial sea of Svalbard Archipelago and in the protected areas it has established around it. The ban is based on the Svalbard Environmental Protection Act[35] which was amended to provide a legal basis for it.[36] In accordance with Art. 82 (a) of the Svalbard Environmental Protection Act the Ministry for the Climate and the Environment "may lay down regulations on requirements for fuel quality for ships calling at Svalbard's territorial waters." Based on this provision, Arts. 4

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[28] Henriksen T. "Norway, Denmark (in respect of Greenland) and Iceland", in Beckman R. et al. (eds.) *Governance of Arctic Shipping*, Brill Nijhoff (2017), p. 256.
[29] *Ibid.*
[30] *Ibid.* p. 249.
[31] *Ibid.*
[32] Iceland, Regulation no. 1084/2019 on 3rd Amendment to Regulation no. 124/2015 on the sulfur content of specific liquid fuels (Reglugerð um (3.) breytingu á reglugerð nr. 124/2015 um brennisteinsinnihald í tilteknu fljótandi eldsneyti) [English translation provided by the author], available at <https://www.reglugerd.is/reglugerdir/eftir-raduneytum/umhverfis--og-audlindaraduneyti/nr/21722>, last accessed 14 September 2020.
[33] Iceland, Regulation no. 124/2015 on the sulfur content of specific liquid fuels (Reglugerð um brennisteinsinnihald í tilteknu fljótandi eldsneyti) [English translation provided by the author], available at <https://www.reglugerd.is/reglugerdir/allar/nr/124-2015>, last accessed 14 September 2020.
[34] Iceland, Press Release, "Regulation banning the use of heavy fuel oil in the territorial sea of Iceland" (6 December 2019), available at <https://www.government.is/diplomatic-missions/embassy-article/2019/12/06/Regulation-banning-the-use-of-heavy-fuel-oil-in-the-territorial-sea-of-Iceland/>, last accessed 14 September 2020.
[35] Svalbard Environmental Protection Act of 15 June 2001 (Lov om miljøvern på Svalbard (svalbardmiljøloven)) [English translation provided by the author], available at <https://lovdata.no/dokument/NL/lov/2001-06-15-79>, last accessed 14 September 2020.
[36] Henriksen, *supra* n. 28, p. 271.

and 16 of the Regulations on the National Parks of Svalbard[37] have been amended as to ban the use and carriage of "fuel other than the quality DMA in accordance with ISO 8217 Fuel Standard."

As it was already noted, these two case studies are used to analyze and evaluate the different ways HFO use and carriage may be regulated by the Arctic States.

[37] Regulations on the national parks Sør-Spitsbergen, Forlandet and Nordvest-Spitsbergen, on the nature reserves Nordaust-Svalbard and Søraust-Svalbard, and on the nature reserves for birds on Svalbard of 1 May 2014 (Forskrift om nasjonalparkene Sør-Spitsbergen, Forlandet og Nordvest-Spitsbergen, om naturreservatene Nordaust-Svalbard og Søraust-Svalbard, og om naturreservatene for fugl på Svalbard) [English translation provided by the author], available at <https://lovdata.no/dokument/SF/forskrift/2014-04-04-377>, last accessed 14 September 2020.

Part II: The International Framework applicable on the Regulation of HFO Use and Carriage

This Part examines the international legal framework that is applicable in the regulation of HFO use and carriage. It begins with a presentation of the general regime that is set out by LOSC regarding the protection and preservation of the marine environment and the mechanisms that LOSC utilizes towards that goal. Secondly, it examines the regime set out by IMO, specifically the Polar Code and the Sulphur Oxides Regulation. It also provides for a discussion of the negotiations that are currently taking place within IMO in order to introduce a ban on HFO use and carriage in the Arctic. Finally, it makes a brief analysis of the work of the Arctic Council on the matter of HFO use and carriage as a regional actor in the Arctic.

The international community has long recognized that the environmental dangers posed by international shipping, including but not limited to the effects of HFO on the marine environment, warrant the adoption of a specific international regime tackling these issues necessary.[38] Hence, States have ventured to create international rules to protect and preserve the marine environment and mitigate these threats. This is also in accordance with the States' duty to cooperate, a fundamental principle in the protection and preservation of the marine environment set out both in customary and treaty-based international law. [39]

1. The United Nations Convention on the Law of the Sea

LOSC is the principal international convention that covers nearly all matters of international law of the sea, including the protection and preservation of the marine environment and matters of navigation. The applicability of LOSC in the Arctic is today unquestionable. Both the Preamble to the LOSC, as well as the provision of Art. 234, which regulates coastal State jurisdiction on ice-covered areas, confirm this. Furthermore, the Arctic coastal States have acknowledged this fact in the 2008 Ilulissat Declaration.[40]

LOSC does not contain any specific provisions on the regulation of fuel use by vessels. As a result, there is a need to base such regulations on the general framework provided for by the LOSC provisions. Primarily, LOSC follows a "zonal approach" that

[38] Harrison J., *Saving the Oceans through Law: The International Legal Framework for the Protection of the Marine Environment*, Oxford University Press (2017), p. 114

[39] Rio Declaration on Environment and Development, UNDoc.A/CONF.151/26/Rev.l.-6 (1992), Principle 27; Declaration of the United Nations Conference on the Human Environment (Stockholm Declaration), UN Doc.A/CONF.48/14/Rev.1. – 6, 15, 17 (1972), Principle 24; *Request for Advisory Opinion submitted by the Sub-Regional Fisheries Commission*, Advisory Opinion, 2 April 2015, ITLOS Rep. 2015, p. 4, para. 140; *Delimitation of the Maritime Boundary in the Atlantic Ocean* (Ghana / Côte d'Ivoire), Provisional Measures, Order of 25 April 2015, ITLOS Rep 2015, p. 146, para. 73.

[40] Ilulissat Declaration (adopted 28 May 2008), 48 *ILM* 382 (2009).

divides the ocean into a number of jurisdictional zones, which include the internal waters, territorial seas, the contiguous zone, the exclusive economic zone (EEZ), archipelagic waters, the continental shelf, the high seas and the Area.[41] Simultaneously, it allocates jurisdiction in accordance with the functions of the State in the maritime context, differentiating between the function of a State as a coastal State, a flag State or a port State.[42]

The general provisions contained in Part XII LOSC regarding the protection and preservation of the marine environment are an exception to this allocation of functional jurisdiction, since they are applicable to all States, irrespective of whether they act as flag, coastal or port States.[43] The main general provisions with regards to the protection and preservation of the marine environment are Arts. 192 and 194 LOSC. Art. 192 sets out a general obligation of due diligence upon all States to protect and preserve the marine environment, without making any distinction between marine spaces under and beyond national jurisdiction.[44] Art. 194 further informs the content of Art. 192, stipulating in more detail the nature of the measures that States are to take in order to fulfill their general obligation. These provisions focus mainly on unilateral acts by the States, except for Art. 194 para. 1, according to which States are under the obligation to "take, individually or *jointly* as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source […]". The more specific provisions of Part XII, however, impose obligations and duties upon States based on their functional jurisdiction as coastal, flag or port States.

The general LOSC provisions, irrespective of whether they incorporate an allocation of functional jurisdiction upon States, are framed in a way that does not wish to regulate detailed issues. LOSC is characterized as a framework Convention which does not regulate activities, rights and responsibilities in a detailed manner, but makes use of such general provisions.[45] The main way it does so in the context of navigation and the protection and preservation of the marine environment is by utilizing "rules of reference", *i.e.* provisions that instead of regulating an activity, they instead reference a more detailed or technical rule. The common reference utilized by LOSC is to "generally accepted international rules and standards (GAIRS)" that are enacted by international organizations and the relevant

[41] Tanaka Y., *The International Law of the Sea*, Cambridge University Press (2012), p.
[42] Gavouneli M., *Functional Jurisdiction in the Law of the Sea*, Martinus Nijhoff (2008), p. 33.
[43] *Ibid.*
[44] Tanaka, *supra* n. 41, p. 263; *South China Sea Arbitration* (Republic of the Philippines v. People's Republic of China) Award of 12 July 2016 on the Merits, PCA Case Nº 2013–19, paras. 941 and 959.
[45] Koh T., "A Constitution for the Oceans", in Nordquist M. (series ed.), *United Nations Convention on the Law of the Sea 1982: A Commentary*, Volume 1, Martinus Nijhoff, (1985), pp. 11-16.

industries.[46] As Redgwell notes, the incorporation of references to GAIRS in LOSC is "inherently evolutionary in character, fostering a dynamic interpretation of the relevant LOSC provisions".[47] GAIRS, in this respect, concern both the prescriptive and enforcement jurisdiction of States and are set as a mandatory minimum for flag States and a facultative maximum for coastal States, thus securing the primacy of such international rules over national legislation.[48]

Consequently, the regulation of the use and carriage of specific fuels, such as HFO, in a specific geographical area, such as the Arctic, relies heavily on the general LOSC provisions and the reference to GAIRS or the competent international organization. The necessary technical provisions are laid down in the regulatory Conventions adopted by IMO, which provide for specific and detailed obligations for the contracting parties.[49] It is accepted that the "competent international organization" in matters of shipping, such as the one discussed currently, is the IMO.[50]

2. The International Maritime Organization Regime

In order for IMO to fulfill its purpose it adopts two kinds of instruments: resolutions and recommendations adopted by its General Assembly or its committees and international treaties. [51] As a general rule, coastal State prescriptive jurisdiction cannot be more stringent than GAIRS. They establish a minimum standard for flag states and a maximum standard for coastal states. [52] The GAIRS produced by IMO are often technical and aimed directly at ships.[53] However, due to the nature of the IMO Conventions, as well as the LOSC provisions that refer to GAIRS, they have to be implemented through the legislation of member-States, a fact that results in the harmonization of the legal framework.[54]

The most important of these IMO treaties, in the context of the protection and preservation of the marine environment, is MARPOL, which deals with vessel-sourced

[46] See Redgwell C., "Mind the Gaps in the GAIRS: The Role of other Instruments in LOSC Regime Implementation in the offshore Energy Sector", in Bankes N. and Trevisanut S. (eds.), *Energy from the Sea*, Brill Nijhoff (2011).
[47] *Ibid.* p. 45; See also Boyle A., "Further Development of the Law of the Sea Convention: Mechanisms for Change" 54 *International and Comparative Law Quarterly* 563 (2005), p. 569.
[48] International Law Association (ILA), Final Report of the Committee on coastal State Jurisdiction relating to marine Pollution, London Conference (2000), pp. 31-32.
[49] Ringbom H., "The EU Maritime Safety Policy and International Law", Martinus Nijhoff (2008), p. 20
[50] IMO Doc. LEG/MISC.8, "Implications of the United Nations Convention on the Law of the Sea on the International Maritime Organization", 30 January 2014, p. 7.
[51] Sun Z. and Beckman R., "The Development of the Polar Code and Challenges to its Implementation", in Zou K. (ed.) *Global Commons and the Law of the Sea*, Brill Nijhoff (2018), p. 308.
[52] Boone L., "International Regulation of Polar Shipping", in Molenaar E. et al (eds.) *The Law of the Sea and the Polar Regions*, Martinus Nijhoff (2013), p. 195.
[53] Harrison, *supra* n. 38, p. 117.
[54] *Ibid.*

pollution.[55] It places limitations on ships discharging oil and noxious substances at sea, regulates garbage and sewage from ships, and ship-sourced air pollution. As of today, 159 States have ratified it and all Arctic coastal States are parties to it.[56] MARPOL Annexes I, II are compulsory upon all State-parties to MARPOL, while Annexes III, IV, V and VI are optional and their ratification status differs.[57]

In the context of HFO regulation, MARPOL Annex I and Annex VI are of importance. MARPOL Annex I deals with oil pollution from vessels and is principally aimed at tankers carrying oil as cargo, albeit it covers pollution from bunker oil as well.[58] It imposes, amongst others, a number of construction, design, equipment and manning (CDEM) requirements on vessels, the most important of which is the prohibition of single-hull oil tankers.[59] Importantly, the definition of HFO provided for is included in MARPOL Annex I Reg. 43 that was adopted by MEPC in March 2010. It prohibits the carriage of HFO both in bulk as cargo or as fuel in the waters surrounding Antarctica.[60] MARPOL Annex I Reg. 43 entered into force on 1 August 2011 and was further amended in 2014 in order to ban the use of HFO as ballast in the same area.[61]

MARPOL Annex VI on the other hand regulates air pollution from ships.[62] To date, it is ratified by 98 States representing 96,76% of world shipping by gross tonnage.[63] It has introduced incremental standards for noxious substances and emissions such as Sulphur oxides and regulations on vessel energy efficiency.[64] Additionally, MARPOL Annex VI allows for the establishment of Emissions Control Areas (ECAs) which are utilized as area-based management tools that impose lower limits on the sulphur content of fuel that may be used in these areas.[65]

Many of the MARPOL regulations are prospective in nature, *i.e.* they do not apply to existing and operational vessels but rather apply to vessels that are to be constructed on or after the day the regulation enters into force.[66]

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[55] Tanaka, *supra* n. 41, pp. 276-277.
[56] IMO, Status of IMO Treaties, available at <http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx>, last accessed 14 September 2020.
[57] See Harrison, *supra* n. 38, pp. 121-124.
[58] *Ibid.* p. 121.
[59] *Ibid.*
[60] MARPOL Annex I, Chapter 9, Reg. 43.
[61] Deggim, *supra* n. 4, p. 33.
[62] Harrison, *supra* n. 38, p. 124.
[63] IMO, Status of IMO Treaties, *supra* n 56.
[64] Harrison, *supra* n. 38, p. 124 and p. 261-262.
[65] *Ibid.*, p. 126.
[66] *Ibid.*, p. 124.

MARPOL, like many other IMO Conventions, provides for a tacit acceptance procedure with regards to amendments. It contains provisions enabling the adoption of amendments to its annexes that make them not susceptible to lengthy amendment procedures. Thus it is adaptive and kept current with developments in science, technology and in the shipping industry.[67]

According to Art. 16 MARPOL an amendment to an Annex shall be deemed to have been accepted at the end of a period of no less than ten months at the time of its adoption, unless within that period a certain number of objections from the Parties have been communicated to the IMO Secretariat. After that time, the amendment enters into force six months after its acceptance and is binding upon all the Parties, with the exception of the contracting States that objected to it.[68] The Polar Code and the Sulphur Oxides Regulation that are to be discussed below are such examples of amendments that followed this procedure. Since they entered into force, they became applicable to every State-party to MARPOL and the relevant Annexes. Moreover, the current IMO negotiations on a ban of HFO use and carriage in the Arctic will utilize this method in order to amend MARPOL Annex I, Chapter 9, Reg. 43 and the Polar Code.

2.2. The Polar Code

After lengthy negotiations and the adoption of a number of non-binding Guidelines for navigation in polar waters,[69] IMO managed to adopt a binding instrument on the matter. The Maritime Safety Committee and the MEPC adopted the draft Polar Code in 2014 and 2015.[70] The Polar Code functions as an amendment to not only MARPOL, but also the International Convention for the Safety of Lives at Sea (SOLAS)[71] and the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW).[72] The mandatory Code became effective on 1 January 2017 with respect to MARPOL and SOLAS while the provisions related to the STCW became effective on 1 July 2018.[73]

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[67] Sun and Beckman, *supra* n. 51, pp. 311-312.
[68] MARPOL, Art. 16.
[69] See IMO Doc. MSC/ Circ.1056– MEPC/ Circ.399, "Guidelines for Ships Operating in Arctic Ice-Covered Waters" (2002) and IMO Doc. A26/Res.1024, "Guidelines for Ships Operating in Polar Waters" (2009).
[70] For a detailed presentation of the procedure of adopting the Polar Code see Roach J., "A Note to make the Polar Code Mandatory" in Lalonde S. and McDorman T. (eds.) *International Law and Politics of the Arctic Ocean* Brill Nijhoff (2015), pp. 128-135.
[71] International Convention for the Safety of Lives at Sea [SOLAS] (signed 1 November 1974, entered into force 25 May 1980), 1184 *UNTS* 278.
[72] International Convention on Standards of Training, Certification and Watchkeeping for Seafarers [STCW] (signed 7 July 1978, entered into force 28 April 1984), 1361 *UNTS* 2.
[73] Williams L., "An Ocean between Us: The Implications of Inconsistencies between the Navigational Laws of Coastal Arctic Council Nations and the United Nations Convention on the Law of the Sea for Arctic

The Polar Code has been developed "to supplement existing IMO instruments in order to increase the safety of ships' operation and mitigate the impact on the people and environment in the remote, vulnerable and potentially harsh polar waters".[74] It applies to both Arctic waters and the waters surrounding Antarctica[75] and it utilizes a risk-based approach in determining scope and to adopt a holistic approach in reducing identified risks.[76]

The Polar Code is structured into an Introduction and two separate Parts regarding safety measures (Part I) and pollution prevention measures (Part II), which are in turn implemented in SOLAS and MARPOL.[77] The Introduction contains mandatory provisions applicable to both parts.[78] Both Parts contain mandatory provisions (Parts I-A and II-A) and "Additional Guidance" provisions (Parts I-B and II-B) which function as recommendations for ships navigating the waters covered by the Polar Code.[79] Both Part I and Part II include CDEM requirements.

The Polar Code does not contain a provision similar to that of MARPOL Annex I, Chapter 9, Reg. 43 that bans the use and carriage of HFO in Antarctica. Instead, it includes only a recommendation in Part II-B that encourages ships to apply MARPOL Annex I, Chapter 9, Reg. 43 when operating in Arctic waters.[80]

The question that arises in that instant is whether this recommendation can be regarded as GAIRS in the context of the relevant LOSC provisions, such as Art. 21 para. 2 or Art. 211 LOSC. The mandatory provisions of the Polar Code are to be regarded as GAIRS in the context of Arctic navigation and in accordance with those provisions, even though the more specific provision of Art. 234 LOSC does not mention GAIRS.[81] However, it is not clear whether a non-mandatory recommendation such as the one relevant to the HFO use in the Arctic waters can attain such status and be utilized by the Arctic States to regulate HFO use and carriage.

Navigation", 70 *Vanderbilt Law Review* 379 (2017), p. 392-393; IMO, Media Center, Shipping in Polar Waters, available at <http://www.imo.org/en/mediacentre/hottopics/polar/pages/default.aspx>, last accessed 14 September 2020.

[74] Polar Code, Preamble (1).

[75] Polar Code, Preamble (6).

[76] Polar Code, Preamble (7).

[77] Roach J., "The Polar Code and its Adequacy", in Beckman R. et al. (eds.) *Governance of Arctic Shipping*, Brill Nijhoff (2017), p. 146.

[78] Polar Code, Introduction, (4).

[79] Rothwell D., *Arctic Ocean Shipping: Navigation, Security and Sovereignty in the North American Arctic,* Brill (2018), p. 20.

[80] *Ibid.*; Polar Code, Part II-B, 1, 1.1.

[81] For the analysis of Art. 234 and its relevance on the subject matter see Part III/2.3 of this Thesis.

For a rule to be regarded as GAIRS it does not have to have attained the status of a rule of customary international law, nor it should be binding upon all the States concerned.[82] This is understood by taking into consideration the object and purpose of the inclusion of such rules of reference in the LOSC provisions, in accordance with Art. 31 VCLT. According to the International Law Association (ILA) the inclusion of rules of reference ensures that "certain rules and standards which would not otherwise be legally binding would become so by means of this rule of reference".[83] If the GAIRS were to be restrictedly defined as rules of customary international law or as binding upon the concerned State parties, they would be applicable *erga omnes* or *erga omnes partes* and their inclusion in the LOSC provisions would be obsolete.[84] ILA concludes that the important factor in order to determine whether a rule can be considered GAIRS and be used as a rule of reference appears to be the practice of States, irrespective of what form the rule might have been expressed.[85] These forms may vary from binding treaties to non-binding documents, or "an agreement which at the time of adoption was rejected by a certain number of states but later on nevertheless became acceptable to all as reflected in state practice, a resolution of an international organization" *et al.*[86]

However, this rationale cannot lead to the conclusion that the HFO related recommendation included in the Polar Code can be regarded as binding upon the parties to the LOSC by virtue of its characterization as GAIRS. In this instance the GAIRS to be taken into account is the Polar Code as a whole, including the non-mandatory recommendation on HFO use and carriage. If the recommendation was to be regarded as binding on the LOSC State Parties by virtue of a rule of reference, it would defeat the object and purpose of the Polar Code, which intended for this provision to be non-mandatory. Of course, the recommendation remains relevant in the regulation of HFO use and carriage in the Arctic as part of the Polar Code, but no State could regard it as GAIRS upon which it would base national legislation in order to ban the use and carriage of HFO.

Nevertheless, since the adoption of the Polar Code, IMO has taken some steps towards a more strict and comprehensive regulation of HFO, including but not limited to the Arctic Ocean. In connection to this work that is currently being undertaken by MEPC and the

[82] For a detailed discussion on this, see ILA, *supra* n. 48, pp. 33-38.
[83] *Ibid.*, p. 37.
[84] *Ibid.*, p. 37. For the opposite opinion see van Reenen, W., "Rules of Reference in the New Convention on the Law of the Sea, in Particular in Connection with the Pollution of the Sea by Oil from Tankers", 12 *Netherlands Yearbook of International Law* 3 (1981), pp. 11-12.
[85] ILA, *idid*. p. 37-38
[86] *Ibid.* p. 38.

competent sub-committees, MEPC on October 2016 decided that on 1st January 2020, a significant reduction in the sulphur content of the fuel oil used by ships sailing worldwide would be implemented.[87]

2.2. The Sulphur Oxides Regulation

IMO trying to reduce the harmful impacts of worldwide shipping decided to adopt a regulation that targets the emissions produced by regulating the content of sulphur within the fuel. It has adopted the MARPOL Annex VI, Chapter 3, Regulation 14, (hereinafter: the Sulphur Oxides Regulation), which aims to significantly reduce the amount of sulphur oxide (SO_x) emissions from ships using or carrying, amongst others, HFO.[88] The vast majority of HFO-type fuels have high concentration of sulphur which is detrimental for both the environment and human health.[89] The Sulphur Oxides Regulation was first introduced in 1997 and entered into force in 2005. When it first entered into force, it set the maximum sulphur content limit at 4,5% m/m at a global level, while simultaneously it set the limit at 1,5% m/m for sulphur ECAs.[90] The regulation was further amended in 2008 and entered into force in 2010. It reduced the worldwide sulphur cap to 3.5% m/m, effective from 1 January 2012 and the sulphur limits applicable in sulphur ECAs to 1.0% m/m, beginning on 1 July 2010 and further to 0.10% m/m, effective from 1 January 2015.[91] The Sulphur Oxides Regulation further set the 1st January 2020 as the date when the Sulphur content of any fuel oil used on board shill shall not exceed the limit of 0,50% m/m.

Specifically, SO_x and particulate matter emission controls apply to all fuel oil, as defined in MARPOL Annex VI Reg. 2.9, and to combustion equipment and devices onboard, such as boilers and inert gas generators. As it is clear from the different limits set, the Sulphur Oxides Regulation differentiates between controls applicable in sulphur ECAs established to limit the emission of SO_x and particulate matter and those applicable outside such areas. In

[87] Deggim, *supra* n. 4, p. 33.
[88] MARPOL Annex VI, Chapter 3, Reg. 14; see also IMO, Media Center on Sulphur 2020, *supra* n. 11.
[89] Fanø J. J., "Enforcement of the 2020 Sulphur Limit for marine Fuels: Restrictions and Possibilities for Port States to impose Fines under UNCLOS", 28 *Review of European, Comparative and International Environmental law* 278 (2019), p. 278.
[90] Ringbom H., "Enforcement of the Sulphur in Fuel Requirements: Same, Same but Different", *Scandinavian Institute of Maritime Law Yearbook* (2016), available at <https://www.duo.uio.no/handle/10852/61600>, last accessed 14 September 2020, pp. 3-4; The sulphur ECAs are the Baltic Sea area, defined in MARPOL Annex I, the North Sea area, defined in MARPOL Annex V, the North American area, defined in Appendix VII of MARPOL Annex VI and the United States Caribbean Sea area, defined in Appendix VII of MARPOL Annex VI.
[91] Ringbom (2016), *ibid.*

these sulphur ECAs the limit is set to 0,10% m/m instead of 0,50% m/m which is the general limit outside these areas.

In practice, the sulphur limit amounts to a requirement for ships to stop using HFO which may be low sulphur (0.50%-1.5%) or high sulphur (>1.5%).[92] The set limit can be met either by using blended fuel oil that is low in sulphur content or different fuels such as liquefied natural gas or biofuels, which may contain low or zero sulphur.[93] Importantly, vessels are able to limit the air pollutants by installing exhaust gas cleaning systems (EGCS), also known as "scrubbers", that are designed to remove sulphur oxides from the ship's engine and boiler exhaust gases. Flag States may accept this as an alternative means to meet the set requirements. Consequently, a ship equipped with an EGCS can still use HFO, since the SO_x emissions will be reduced to a level equivalent to the required limit.[94] However, several States have set regulations in place that significantly limit or prohibit the discharge of wash water from the use of open-loop scrubbers in the waters under their jurisdiction, thus limiting their applicability in those areas.[95]

Along with these measures a "carriage ban" was introduced for the first time on 1st March 2020. The carriage of non-compliant fuel oil for combustion purposes for propulsion or operation on board a ship is prohibited, unless the ship has an EGCS installed. The carriage ban works as an additional measure with the aim of consistent implementation and compliance with the regulations. At the same time, this breakthrough provides for a means of effective enforcement by States, particularly port State control.[96] As Fanø notes, violations of sulphur regulations are usually detected by drawing fuel samples from a ship's fuel tank.[97] However, this method sometimes proves ineffective since large commercial vessels often have several fuel tanks on board, that they can switch between during a voyage, thus avoiding detection of violations.[98] With the carriage ban now in force, the regulations on sulphur content are strengthened since a ship will not be able to carry tanks with fuel that has different sulphur content, unless it has installed an approved EGCS.[99] However, the EGCS exception can also be viewed as an important drawback to the regulation. It is difficult to prove whether

[92] *Ibid.*, p. 4.
[93] IMO, Media Center on Sulphur 2020, *supra* n. 11.
[94] *Ibid.*
[95] For an indicative list of States that have adopted such regulations see Damgaard J., "List of Jurisdictions restricting or banning Scrubber wash Water Discharges", Britannia P&I, available at <https://britanniapandi.com/blog/2020/01/27/list-of-jurisdictions-restricting-or-banning-scrubber-wash-water-discharges/>, last accessed 14 September 2020.
[96] IMO, Media Center on Sulphur 2020, *supra* n. 11.
[97] Fanø, *supra* n. 89, p. 280.
[98] *Ibid*. p. 281.
[99] *Ibid.*

the EGCS is used continuously or not during a vessel's voyage. It also ensures that HFO will still be an option in the market for shipowners that opt for the installment of EGCS in their ships instead of transitioning to cleaner fuels. For the time being, the EGCS exception can at least be seen as a balancing act between the interests of the various parties in the dialogue surrounding the regulation of HFO use, while its long-term effects are to be determined in the future.

2.3. Current IMO negotiation on the proposed ban of HFO use and carriage in the Arctic Ocean

The dangers posed by the use of HFO specifically in the Arctic have not been ignored by the international community. IMO, taking into account the need for a more comprehensive legal regime on this matter, is currently considering a ban to the use and carriage of HFO specifically in the Arctic Ocean that will go beyond the prerequisites set by the Polar Code and the Sulphur Oxides Regulation. The ban will be introduced as an amendment in MARPOL Annex I and the Polar Code, following the tacit amendment procedure discussed before. As it was already noted, the work to formulate this new provision is currently undertaken by IMO's MEPC and the PPR sub-committee. A draft document was submitted to the PPR by Denmark, Finland, France, Germany, Iceland, Netherlands, New Zealand, Norway, Spain, Sweden and the US on 13 December 2019[100] and, along with agreed amendments, it will be submitted to the Marine Environment Protection Committee with a view to approval and circulation for future adoption.[101]

The PPR in its 6th session agreed that it will utilize the definition of HFO provided for in MARPOL Annex I, Chapter 9, Reg. 43.[102] Moreover, the co-sponsors of the draft submitted that MARPOL Annex I, Chapter 9, Reg. 43 is to be amended as to replace the phrase "Antarctic area" with "Polar Waters", in order to be applicable in the waters covered by the Polar Code.[103] Amending MARPOL Annex I, Chapter 9, Reg. 43 would consolidate the proposed Arctic ban with the existing ban applicable in the waters around Antarctica with which "it shares various common definitions and a common purpose".[104] In addition, the co-

[100] IMO, PPR, Draft Language on the HFO ban, *supra* n. 20.
[101] IMO, Media Center on the HFO ban, *supra* n. 21.
[102] IMO, PPR, Draft Language on the HFO ban, *supra* n. 20, para. 2.
[103] *Ibid*. para. 3.
[104] *Ibid*. para. 4.

sponsors recommend the Polar Code is also to be amended in order to conform to the proposed amendment of MARPOL Annex I, Chapter 9, Reg. 43.[105]

The proposed amendment, albeit promising, has been reluctantly accepted by Canada, a major actor in the Arctic Ocean. Specifically, Canada has recently expressed its support for the ban but, at the same time, it has suggested a modification that would push the implementation date to 2024, and for some vessels to 2029.[106] The proposed modification is accepted and thus the ban will be significantly delayed. Russia on the other hand, as another major actor that facilitates navigation in the Arctic through the Northern Sea Route, has not expressed its support for the proposed ban yet and has pointed out a number of important, mainly economic, considerations relating to it.[107]

An important consideration posed by both countries is the effect of the proposed HFO ban on Arctic communities, including the communities of the indigenous peoples. Canada noted that the impact assessment it conducted concluded that "an HFO ban and the higher price of fuels to be used in the place of HFO, if unmitigated, could result in negative social and economic impacts on northern communities, including Indigenous and Inuit peoples who depend on shipping for basic supplies and natural resource developments for employment and economic prosperity".[108]

Furthermore, according to the Russian impact assessment, the majority of indigenous communities are highly dependent on the shipment of goods by ships that use, amongst other HFO. A possible increase of shipping costs would "inevitably and dramatically" affect the economic condition of the native communities,[109] and would have "an extremely negative impact on the fuel sector, production and distribution of heat and electricity, as well as on the mining industry and relevant enterprises".[110]

However, according to a document submitted by the environmental organizations FOEI, WWF and Pacific Environment to the PPR on 12 December 2019, indigenous peoples have expressed their support for an HFO ban and also their concerns on the discussion in the PPR on the basis that the ban should be implemented quicker and more effectively.[111] It notes

[105] *Ibid.*
[106] IMO, Sub-committee on Pollution, Prevention and Response, 7th Session, "Canada's considerations and position on the ban on the use and carriage of heavy fuel oil by ships operating in the Arctic at PPR 7", 17 to 21 February 2020.
[107] IMO, Sub-committee on Pollution, Prevention and Response, 7th Session, Agenda item 14, "Impact Assessment Report submitted by the Russian Federation", 13 December 2019.
[108] IMO, PPR, Canada's considerations, *supra* n. 106, p. 1.
[109] IMO, PPR, Russia's Impact Assessment, *supra* n. 107, p. 33.
[110] *Ibid.* p. 29.
[111] IMO Sub-committee on Pollution, Prevention and Response, 7th Session, Agenda item 14, "Arctic Indigenous Support for the Ban of Heavy Fuel Oil in the Arctic", 12 December 2019.

that several indigenous communities and organizations have called for a ban of HFO in the Arctic and have expressed support for Indigenous representation at IMO due to the threat of oil spills from vessels that navigate in the area.[112] It is clear that the considerations on the impact of an HFO ban on the indigenous populations of the Arctic should be taken into account, whether they are concerned with the economic or the environmental impact on the communities.

According to the accepted draft document and its amendments, that were proposed mainly by Canada, the ban on the use and carriage of HFO in the Arctic will be introduced on and after 1 July 2024, in order to provide for a transition period to better understand and mitigate any negative impacts of the ban on Arctic communities and economies.[113] However, a number of important exceptions and waivers have been included that will push the implementation of the new ban further in the future, or will serve as loopholes for some ships. First of all, vessels that already comply with MARPOL Annex I Reg. 12A or with the Polar Code Part II-A, Chapter 1 Reg. 1.2.1 would need to comply with the HFO ban on and after 1 July 2029, and not 2024 as other vessels.[114] Moreover, ships that are engaged in securing the safety of ships, or in search and rescue operations, and ships dedicated to oil spill preparedness and response would be exempted from the ban.[115] Finally, a State party to MARPOL with a coastline bordering Arctic waters may temporarily waive the requirements for ships flying its flag while operating in waters subject to that State's sovereignty or jurisdiction, up to 1 July 2029.[116]

These exemptions and waivers, as well as the timeframe for the proposed ban, may significantly diminish its importance for the protection and preservation of the Arctic marine environment. However, it is not certain whether the States concerned would otherwise agree to a ban if those conditions were not accepted. For the time being, but also for the foreseeable future, it is safe to assume that a complete ban of HFO use and carriage in the Arctic will not be imposed by IMO, but it will include such exemptive provisions.

[112] *Ibid*. paras. 4 and 10 where these organizations and their representatives are listed.
[113] IMO, Media Center on the HFO ban, *supra* n. 21; IMO, PPR, Canada's considerations, *supra* n. 106, p. 1
[114] IMO, PPR, Draft Language on the HFO ban, *supra* n. 20, para. 3.4.
[115] IMO, Media Center on the HFO ban, *supra* n. 21.
[116] *Ibid.*

3. Cooperation within the Arctic Council

Apart from the work that is done under the auspices of IMO, the Arctic States cooperate within the Arctic Council system. The Arctic Council is not an organization with an international legal personality different from the legal personality of its member States.[117] It was established in 1996 as a high-level forum under the auspices of which a number of Arctic-related issues would be discussed.[118] The function of the Arctic Council as an inter-governmental forum established by a non-legally binding instrument, means that it does not have the competence to adopt legally binding instruments.[119] Nevertheless, this does not diminish its importance of promoting cooperation between the Arctic States.[120] Its member States can negotiate agreements under its auspices that may be materialized in international treaties.

The Arctic Council's working groups can compose reports and propose measures that the member States are encouraged to implement.[121] In this vein, the working group on the Protection of the Arctic Marine Environment (PAME) has produced an important document regarding merchant shipping.[122] The Arctic Marine Shipping Assessment (AMSA)[123] refers to the challenges that ships navigating the Arctic Ocean may encounter and the environmental issues the region is facing. It underlines that the Arctic coastal States should anticipate greater marine access and longer navigation seasons as a consequence of melting sea ice, even though that will not render marine activities less difficult or dangerous.[124]

Building upon AMSA, PAME agreed to carry out a project to identify the environmental risks related to the use and carriage of HFO in the Arctic. The project commenced in March 2010 and continued until 2016. The PAME project was divided in three phases: Phase I objectives were to (a) identify known risks associated with use or carriage of HFO within the Arctic marine transportation system, (b) consider potential risk mitigation

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[117] Takei Y., "The Role of the Arctic Council from an International Law Perspective: Past, Present and Future", 6 *The Yearbook of Polar Law* 349 (2015), p. 354.
[118] *Ibid.*, p. 350; see also Declaration on the Establishment of the Arctic Council, (19 September 1996), available at <https://oaarchive.arctic-council.org/bitstream/handle/11374/85/EDOCS-1752-v2-ACMMCA00_Ottawa_1996_Founding_Declaration.PDF?sequence=5&isAllowed=y>, last accessed 14 September 2020.
[119] Molenaar E., "Current and Prospective Roles of the Arctic Council System within the Context of the Law of the Sea", 27 *The International Journal of Marine and Coastal Law* 553 (2012), p. 571.
[120] Takei, *supra* n. 117, p. 356.
[121] McDorman T., "The Safety of Navigation in the Arctic Ocean and the role of Coast Guards", 2 *Korean Journal of International and Comparative Law* 27 (2014), p. 36.
[122] Molenaar (2012), *supra* n. 119, p. 593.
[123] PAME, Arctic Marine Shipping Assessment of 2009 (AMSA), available at <www.arctic.noaa.gov/detect/documents/AMSA_2009_Report_2nd_print.pdf>, last accessed 14 September 2020.
[124] *Ibid.*, p. 4.

strategies, (c) examine the current state of the marine transportation industry in the Arctic region and its reliance on HFO, including forecasting trends related to commercial shipping and trade expansion and the implementation of recent or anticipated standards and (d) summarize the status of international regulations regarding the use or carriage of HFOs by vessels.[125] Phase I utilized data provided only by a satellite and for that reason it focused on a very short period of four months.[126] Phase II utilized available data regarding a full year of ship traffic and had a greater scope of objectives.[127] Phase III, which was divided in two parts, described the effect of HFO releases on the marine environment in the Arctic and "near Arctic",[128] as well as the possible hazards for engines and fuel systems using HFO in cold climates.[129] A correlated report titled "Alternative Fuels in the Arctic" was also produced on 27 February 2019 by PAME, WWF and Norway with the goal to assess alternative fuels and technologies for potential arctic use that could "significantly reduce emissions and impacts, as well as risk associated with the use and carriage of HFO.[130]

As stated above, the Arctic Council cannot impose legal obligations on its member States. It also avoids producing documents that would be seen as GAIRS, except when the States cooperating within it choose to negotiate for a binding treaty.[131] However the technical reports such as those produced by PAME can be utilized by the Arctic States when they set out their priorities and strategies regarding the issues that they wish to address. Especially concerning issues of navigation and the protection and preservation of the marine environment, the Arctic Council has encouraged the establishment of active cooperation with IMO on the development of relevant measures to regulate shipping activities in Arctic waters.[132]

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[125] PAME, Phase I, *supra* n. 7, p. 3.
[126] *Ibid.*, p. 6.
[127] PAME, "Heavy Fuel in the Arctic (Phase II)" DNV Doc. No./Report No.: 2013-1542-16G8ZQC-5/1, 13 December 2013, available at <https://www.pame.is/document-library/shipping-documents/heavy-fuel-oil-documents>, last accessed 14 September 2020, p. 5.
[128] PAME, "HFO Project Phase III(a), Heavy Fuel Oil and other Fuel Releases from Shipping in the Arctic and Near Arctic", final version/corr., by USA, Finland, Russian Federation, Kingdom of Denmark, Norway and Iceland, available at <https://www.pame.is/document-library/shipping-documents/heavy-fuel-oil-documents>, last accessed 14 September 2020, p. 3.
[129] PAME, "Possible Hazards for Engines and Fuel Systems using HFO in cold Climate", Norwegian Maritime Authority/ Sjøfartsdirektoratet Report (30 March 2016), available at <https://www.pame.is/document-library/shipping-documents/heavy-fuel-oil-documents>, last accessed 14 September 2020, p. 4.
[130] PAME, "Alternative Fuels in the Arctic", Report No.: 2019-0226, Rev. 0, 27 February 2019, available at <https://www.pame.is/document-library/shipping-documents/heavy-fuel-oil-documents>, last accessed 14 September 2020, p. 1.
[131] A noteworthy treaty negotiated under the auspices of the Arctic Council is the Agreement on Cooperation on marine Oil Pollution, Preparedness and Response in the Arctic.
[132] Nordtveit E. "Arctic Council Update" in Nordquist M. et al. (eds.) *Freedom of Navigation and Globalization*, Brill Nijhoff (2015), p. 143.

Part III: Unilateral Opportunities for the Regulation of HFO Use and Carriage in accordance with the State Jurisdiction conferred to by LOSC

This Part concerns itself with the unilateral regulation of HFO use and carriage and whether such regulations are in accordance with the jurisdiction conferred to States by LOSC. In this end, it examines the State practices of Iceland and Norway under the prism of their jurisdiction as flag States, coastal States and port States. Having these case-studies as a starting point, it provides for the applicable international rules that can be utilized by all the Arctic States that would wish to regulate HFO use and carriage. For this reason, it includes an analysis of Art. 234 LOSC, even though the State practice of Iceland and Norway does not make use of it.

1. Flag State Jurisdiction

Each State's jurisdiction over ships that fly its flag is not in principle limited by international law, taking into account the minimum requirements set out by it, including those provided for in the LOSC.[133]

Specifically, Arts. 94 para. 5 and 211 para. 2 LOSC require that ships shall comply with set GAIRS on maritime safety and environmental protection. As it was already shown, the MARPOL provisions described before (including the Polar Code and the Sulphur Oxides Regulation) are such GAIRS directed to ships flying the flags of MARPOL State parties. As a result, flag State jurisdiction is the principal vehicle through which such GAIRS are implemented.

Art. 217 LOSC provides for detailed obligations for flag States that stipulate the way they are to enforce environmental regulations.[134] According to this provision, flag States are obligated to effectively enforce GAIRS, including the Sulphur Oxides Regulation.

Therefore, GAIRS are referenced by LOSC to constitute the minimum requirements a flag State may impose on its ships. As a result, flag States have to impose upon ships flying their flags the Sulphur Oxides Regulation. The recommendation not to use HFO in the Arctic is, as already noted, non-mandatory, but it is to be taken into account by vessels navigating the Arctic. Flag States are also free to go beyond these standards. Since HFO is not, at the moment, regulated as such by LOSC and IMO in respect to the Arctic Waters, flag States are

[133] Ringbom (2016), *supra* n. 90, p. 9
[134] Fanø, *supra* n. 89, p. 283.

under no obligation to put forth restrictions on its use and carriage. It is thus left in the coastal and port States' devices to regulate its use and carriage in the waters under their jurisdiction.

Finally, Art. 212 provides for the prescriptive jurisdiction of States 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". This legislation shall be prescribed "taking into account" GAIRS. In the same vein, Art. 222 on the enforcement jurisdiction of States with respect to pollution from or through the atmosphere makes reference to GAIRS. However, it must be noted that these two provisions are more concerned with the regulation of pollution caused by air traffic and are usually not seen as relevant for governing the extent of States' jurisdiction with respect to MARPOL's air emissions and fuel quality requirements, a fact also supported by their drafting history.[135] Additionally, MARPOL Annex VI Regulation 11 para. 6 specifically ties the relevant MARPOL rules to the jurisdictional regime established by LOSC regarding vessel-sourced pollution rather than pollution from or through the atmosphere by providing for the *mutatis mutandis* application of Annex VI to the rules concerning the prevention, reduction or control of pollution of the marine environment from ships.[136]

The Icelandic legislation is not clear on whether it is applicable on Icelandic vessels that navigate outside the maritime zones under the jurisdiction of it. Specifically, the legislation indicates that its applicability is based on the territorial jurisdiction enjoyed by Iceland and not its jurisdiction as a flag State.[137] Similarly, the Norwegian legislation is applicable to all vessels, irrespective of the flag they fly, that enter the specified areas around Svalbard.[138] These provisions indicate that the regulations are applicable to Icelandic and Norwegian ships and, as far as these vessels are concerned, they can go beyond the set GAIRS that are found in the Sulphur Oxides Regulation. They are also able to make the HFO recommendation included in the Polar Code mandatory to the ships flying their flags, but, to date, have not done so.

Of course, not only the Arctic States can regulate HFO use and carriage in their capacity as flag States. The exclusive jurisdiction of the flag State can be utilized by every State whose ships travel in or through the Arctic. However, to date, no State has expressed such will to regulate HFO use and carriage in the Arctic.

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[135] Nordquist M., Rosenne S. and Yankov A., (eds.), *United Nations Convention on the Law of the Sea 1982: A Commentary*, Martinus Nijhoff, (1985), Volume IV, pp. 208-213; Ringbom (2016), *supra* n. 90, p. 8; Fanø *supra* n. 89, p. 283.
[136] Ringbom (2016) *ibid.*, p. 9.
[137] Iceland, Regulation n. 124/2015, *supra* n. 33, Art. 4.
[138] Norway, Regulation on Svalbard's National Parks, Chapter 1 para. 4 and Chapter 2 para. 16.

2. Coastal State Jurisdiction

2.1 Coastal State Jurisdiction in the Territorial Sea

The territorial sea is the marine space under the sovereignty of the coastal State up to a limit not exceeding 12 nm measured from the baselines, including the seabed, its subsoil and the airspace over it. Coastal States may regulate activities and take enforcement actions in their territorial seas subject to the LOSC and other rules of international law.[139] The sovereignty of the coastal State is, however, largely reconciled by the right of innocent passage enjoyed by foreign-flagged vessels, as stipulated in Arts. 17-26 LOSC. In order for the passage to be innocent it has to be continuous and expeditious[140] and not prejudicial to the peace, good order or security of the coastal State.[141] Art. 19 para. 2 LOSC lists a number of instances when the passage shall not be considered innocent.

Art. 21 LOSC sets out the capacity of the coastal State to exercise its prescriptive jurisdiction on foreign-flagged vessels. According to lit. (f) of this provision, the coastal State may adopt laws and regulations relating to innocent passage through the territorial sea, in respect of "the preservation of the environment of the coastal State and the prevention, reduction and control of pollution thereof". However, para. 2 of the same provision states that "such laws and regulations shall not apply to the design, construction, manning or equipment of foreign ships unless they are giving effect to generally accepted international rules or standards." This provision is mirrored in Art. 211 para. 4 LOSC, according to which coastal State's laws and regulations for the prevention, reduction and control of marine pollution from foreign vessels shall, in accordance with Part II, section 3 LOSC, not hamper the innocent passage of foreign vessels.

With regards to the enforcement jurisdiction of the coastal State in the territorial sea, Arts. 27 and 220 para. 2 allow the coastal State to undertake actions against foreign-flagged vessels, including physical inspection of the vessel relating to the violation "where there are clear grounds for believing that the vessel navigating in the territorial sea has, during its passage therein, violated laws and regulations of that State" and, "where the evidence so warrants, to institute proceedings, including detention of the vessel, in accordance with its laws". However, the enforcement jurisdiction of the coastal State on the territorial sea

[139] Noyes J., "The Territorial Sea and Contiguous Zone", in Rothwell D. et al. (eds.) *The Oxford Handbook of the Law of the Sea* Oxford University Press (2015), p. 91.
[140] LOSC Article 18 para. 2.
[141] LOSC Article 19 para. 1.

depends on the legality of prescriptive jurisdiction and must be in line with the obligation not to hamper the right of innocent passage enjoyed by foreign-flagged vessels.[142]

These provisions are of paramount importance since they lay out the rights of coastal States in their territorial sea and their limits. Importantly, they connect the laws and regulations of the coastal State to GAIRS. As it was described before, the IMO has yet to take action to regulate HFO use and carriage in the Arctic Waters. As a result, there are no GAIRS in place regarding the regulation of HFO as such.

Molenaar identifies three methods available to coastal States in order to unilaterally combat vessel-source pollution: the setting of discharge or emission standards, the setting of CDEM standards, and the setting of navigational standards.[143]

Navigational standards and measures usually include routeing measures, ship reporting systems, vessel traffic services etc. A possible such standard that would affect the use and carriage of HFO in the Arctic would be to designate specific areas that vessels using or carrying HFO would not be allowed to navigate. However, to date, neither Iceland and Norway, nor any other Arctic State, have taken measures that would set navigational standards.

Consequently, in order to assess whether a unilateral regulation on HFO use and carriage is prescribed and enforced in accordance with the relevant LOSC provisions, it is necessary to examine how such a regulation may be prescribed and what aspects of HFO use and carriage it is targeting. Since HFO is a general term, under which a number of different fuels can fall, whether a coastal State's legislation sets discharge/emission standards, CDEM standards or a measure that falls outside these categories depends on the nature of the legislation and the way it is framed.

The relevant legislation of both Iceland and Norway is applicable in the respective territorial seas of the two States. For Iceland, it is applicable in the whole breadth of its territorial sea, including the internal waters and ports, while for Norway it is focused on specific areas that form a large part of its territorial sea surrounding the Svalbard Archipelago.

[142] LOSC Art. 24 para. 1 and Art. 220 para. 2 which states that the enforcement jurisdiction of the coastal State is "without prejudice to the application of the relevant provisions of Part II, section 3"; Kopela S., "Making Ships cleaner: Reducing Air Pollution from international Shipping", 26 *Review of European, Comparative and International Environmental Law* 231 (2017), p. 239.
[143] Kopela (2017), *ibid.*; Molenaar E., *Coastal State Jurisdiction over Vessel-Source Pollution*, Kluwer Law International (1998), p. 21.

2.1.1 Legal Considerations on the HFO Regulation in the Icelandic Legislation

As it was already noted, the recently amended Icelandic Regulation on the Sulphur Content of specific liquid Fuels intends to effectively ban the use of HFO in the territorial sea of Iceland by limiting the sulphur content of liquid fuel. Even though the Icelandic legislation is setting emission standards, Iceland has decided to promote it as targeting HFO as such.[144] However, it is evident that the new legislation does not ban HFO use and carriage based on MARPOL Annex I, Chapter 9, Reg. 43 definition, but follows the logic behind the Sulphur Oxides Regulation. It also uses a different definition of HFO (called "black oil" or "*Svartolía*") which is based on the distillation of the fuel following the ASTM D86 method.[145] The different definition can be explained since HFO is, as already stated, a general term used to describe a number of residual products.[146] However, this definition along with the following provisions indicate that the focus of the Icelandic legislation is on the sulphur content of the fuel, rather than its other technical characteristics.

According to the recent amendment in the Icelandic legislation "Sulphur content in marine fuels, including black oil (*i.e.* HFO) used or intended for use in ships or boats in Iceland within Icelandic territorial waters and intrinsically shall not exceed 0.1% m/m excluding fuels for ships using approved methods to reduce emissions."[147]. The 0.1% m/m limit is the same as in sulphur ECAs. This provision is intended to apply to all ships, regardless of the flag they fly, including ships embarking on their journey outside the European Economic Area.[148] As a result, the sulphur limit set out by the Icelandic legislation is smaller than the limit imposed by the Sulphur Oxides Regulation, which is set at 0,50% m/m.

The issue that arises in this instant is whether Iceland is in position to set stricter limits than those set out by the competent international organization. This issue arises with respect to the application of the regulation in the territorial sea, since Iceland has the right to impose the standards it sees fit in its internal waters and ports without having to abide by international standards.

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[144] Iceland, Press Release of 6 December 2019, *supra* n. 34.
[145] Iceland, Regulation no. 124/2015, *supra* n. 33, Art. 3 para. 15; The ASTM D86 method is defined in para. 2 of the same provision as "A method prescribed by the *American Society for Testing and Materials* in its 1976 publication on the definitions and specifications of standards for petroleum products and lubricants, as amended". For the ASTM D86 method see American Society for Testing and Materials International, "Standard Test Method for Distillation of Petroleum Products and Liquid Fuels at Atmospheric Pressure", available at <https://www.astm.org/Standards/D86>, last accessed 14 September 2020.
[146] MARPOL Annex I, Chapter 9, Reg. 43; See also PAME, Alternative Fuels in the Arctic, *supra* n. 130.
[147] Iceland, Regulation no. 1084/2019, *supra* n. 32, Art. 2.
[148] *Ibid.*

Emission standards are perceived to be similar to discharge standards and not to CDEM standards in the way they are referred to in Art. 21 para. 2.[149] CDEM standards are the same throughout a ship's voyage, while emissions can be different depending on the fuel used in different parts of the journey. Even more so, emissions of harmful substances, such as sulphur, can fall under the definition of pollution which is provided for in Art. 1, para. 1 (4) LOSC. As such, they may be regulated by the coastal State on the basis of Art. 21 para. 1 (f) and 211 para. 4 LOSC. Molenaar notes that specifically Art. 21 para. 1(f) allows a coastal State to set unilateral emission standards even if they could have an incidental effect of the CDEM of a foreign flagged ship.[150] However, regulations that are targeting specifically emission standards and not the content of fuel in order to set an emission standard, may prove difficult to be enforced. Violations are to be detected during a voyage using devices such as sniffers which measure the content of emissions in a ship's exhaust gas.[151]

An easier approach to regulate emissions is by adopting regulation that sets specified fuel contents, a violation of which can be detected by examining fuel samples either during the voyage or when the ship calls at port.[152] That way, the vessel will be complying with the emission standards set out by the coastal State since it would only be allowed to use specific kinds of fuel.

The Sulphur Oxides Regulation is a typical example of a setting of emission standards by regulating fuel content that is to be considered GAIRS. Every coastal State, and not only the Arctic littoral States, are now in position to prescribe laws in accordance with the regulation that will limit the sulphur content of fuel or require vessels to install an EGCS if they wish to continue using HFO. However, it is necessary to assess whether standards that are related to the content of fuels apply to the CDEM of foreign ships or not, in order for a States to go beyond the Sulphur Oxides Regulation and prescribe stricter standards.

According to Molenaar, the regulation of the content of fuel is different from an emission standard and should be considered as an equipment standard "as it concerns a requirement to ensure that an emission standard is met".[153] However, Kopela correctly points out that a legislation that regulates content or quality of fuel does not necessarily prescribe

[149] Kopela (2017), *supra* n. 142, p. 239.
[150] Molenaar (1998), *supra* n. 143, p. 502.
[151] Fanø, *supra* n. 89, p. 281.
[152] *Ibid.* See also Molenaar (1998), *supra* n. 143, p. 22.
[153] Molenaar (1998), *ibid.*, p. 67.

CDEM standards, nor can fuel itself be regarded as equipment.[154] As a result, if a regulation only sets standards on quality of fuel without prescribing special CDEM standards (that could still be utilized by the ship owner as a means for enhancing cost-effectiveness and flexibility in the implementation), such a regulation should not be considered as applying to the CDEM of vessels.[155] In the same manner, a study commissioned by the EU argues that Art. 21 para. 2 should be narrowly interpreted since it functions as an exception to the general principle of coastal State sovereignty in its territorial sea.[156] Following that argumentation, a regulation that goes beyond the limits set out by the Sulphur Oxides Regulation should be considered to be in accordance with the relevant LOSC provisions, even if it includes provisions on the installment of EGCSs as an alternative means for vessels to comply with it.

Consequently, the Icelandic legislation is deemed to be in accordance with the relevant LOSC provisions even though it is stricter than the IMO's Sulphur Oxides regulation, since it does not prescribe CDEM standards but rather fuel content standards. In addition, Art. 13 of the Regulation states that "The ship shall not be required to deviate from its intended voyage or to be unnecessarily delayed", thus safeguarding the right of innocent passage enjoyed by all vessels.

In the same manner, the Icelandic legislation states that ships may continue using HFO if they adhere to use approved emission abatement methods to reduce the release of sulphur dioxide, that include exhaust systems.[157] The installation of an EGCS indeed sets an equipment requirement but is not prescribed as mandatory for the navigation of vessels. Instead, it is provided for as a supplementary measure to facilitate the navigation of vessels that wish to continue using high sulphur HFO.

Regarding the enforcement jurisdiction of Iceland, Art. 13 of the Regulation provides for a number of measures that can be taken during the control of vessels which include supervision of the equipment and taking samples from ships, tanks and oil depots for further analysis. If a ship does not meet the standards set by the Icelandic legislation, the competent authority, which is the Environment and Food Agency, may require the master to submit a report regarding the measures taken in order to comply with the rules and to provide proof

[154] Kopela (2017), *supra* n. 142, p. 239; See also Ringbom (2008), *supra* n. 49, p. 433, who, however, reaches the conclusion that "it is probably safer to consider fuel quality requirements as being analogous to CDEM standards".
[155] Kopela (2017), *ibid.*
[156] BMT, Murray Fenton Edon Liddiard Vince Limited, "Study on the Economic, Legal Environmental and Practical Implications of a European Union System to Reduce Ship Emissions of SO_2 and NO_x" No 3623, (August 2000), Appendix 4, para 70.
[157] Iceland, Regulation no. 124/2014, *supra* n. 33, Art. 12, Annex I and Annex II. The other two approved methods are the use of biofuels and the use of mixture of marine fuels.

that an attempt was made to purchase fuel for the ship, in accordance with the requirements of the regulation, and in accordance with the ship's sea plan, and, provided that the fuel was not available for purchase, that an attempt was made to supply such fuel.[158] Otherwise, according to the following provision, the competent authorities may take coercive measures or impose sanctions due to the violation. Even if it is not stated explicitly, the nature of the measures listed in Art. 13 of the Icelandic legislation indicates that the enforcement acts are to be taken by virtue of port State jurisdiction since they would be practically difficult to commence while a ship is sailing through the territorial sea.

Finally, the Icelandic legislation does not make a mention of the regulation of carriage of HFO. Therefore, it is safe to assume that the legislation follows the IMO regulation on a carriage ban for fuels which the sulphur limit exceeds 0,50% m/m and not the more stringent limit set out by Iceland on 0,1% m/m.

2.1.2 Legal Considerations on the HFO Regulation in the Norwegian Legislation

The relevant Norwegian legislation is not as far-reaching as the Icelandic one in the sense that it does not regulate the use of HFO in every part of the Norwegian territorial sea, but rather on specific protected areas surrounding Svalbard. That can be partially explained since a large part of Norway's territorial sea is already a sulphur ECA. Nevertheless, Art. 4 of the Regulations on the National Parks of Svalbard limits the ban on the "national parks" which are defined in the corresponding provisions of Arts. 12 and 13 and the map of Appendix 1 of the Regulations. As a result, the ban applies to ships entering and navigating these areas, excluding some small navigational routes.[159]

The second, and most important, difference is the fact that the Norwegian legislation utilizes a definition of HFO that does not refer specifically to the contents of the fuel. Rather, according to Arts. 4 and 16 of the Regulation, "Ships entering at national parks/reserves shall not use or carry on board fuel other than the quality DMA in accordance with ISO 8217 Fuel Standard".

The ISO 8217 Specification classifies fuels not only based on their sulphur content, but includes different technical test methods, such as density, oxidation stability, total

[158] Iceland, Regulation no. 124/2015, *supra* n. 33, Art. 13.
[159] Knudsen H., "No heavy fuel oil at Svalbard – A legal Ban?" 31 *Ocean Yearbook* 80 (2017), p. 87; See also PAME, Phase I, *supra* n. 7, p. 46.

sediment, lubricity, vanadium and sodium content *et al*.[160] The PAME Reports on HFO and on Alternative Fuels in the Arctic can be of relevance in this case since they provide a broader analysis of the definition of HFO in accordance with ISO 8217 Fuel Standards. The drafters of the reports note that HFO under the definition provided for in the MARPOL Annex I, Chapter 9, Reg. 43, that classifies fuels as HFO based on their density or kinematic viscosity at a certain temperature, includes residual marine fuel or mixtures containing mainly residual fuel and some distillate fuel such as intermediate fuel oil, corresponding to certain qualities, under the ISO 8217 Specification of Marine Fuel.[161] As a result, a regulation based on that or a similar definition, cannot be strictly regarded as setting emission standards, but rather as regulating the use of a fuel as such, even though the practical effects of such a definition are similar.

Consequently, the question that arises is whether the Norwegian legislation that prescribes the use of DMA-grade fuel in the protected areas of the territorial sea surrounding Svalbard applies to the CDEM of foreign-flagged vessels without giving effect to GAIRS.

As it was noted fuel itself can hardly be characterized as being a part of the equipment of a vessel.[162] Consequently, it is again imperative to examine whether such a regulation would otherwise impact the CDEM of a ship without giving effect to GAIRS in a way that would hamper the right of innocent passage enjoyed by foreign flagged vessels. In a case that such a regulation prescribes the use of certain fuels, such as LNG, biofuels *et al.*, instead of HFO, that would warrant a radical change of the ship's equipment necessary. It is apparent that such a regulation should be considered as being in contravention to the relevant LOSC provisions.

However, the same conclusion cannot be easily reached in the case of a regulation that simply bans the use of HFO based on a technical definition without prescribing certain measures that are to be implemented. Such a legislation would leave room for the industry to use distillate fuels that would not fall under the definition of HFO but still will not warrant the adjustment of vessels for the use and carriage of even lighter fuels, such as hybrid fuels, LNG, biofuel etc.The PAME Report notes that, in accordance with that definition, products that do not exceed specifications set by MARPOL Annex I, Chapter 9, Reg. 43 will typically include distillate fuels - in this report referred to as marine gas oil (MGO) and marine diesel oil

[160] See International Organization for Standardization (ISO), ISO 8217:2012(en) Petroleum products—Fuels (class F)—Specifications of marine fuels, available at <https://www.iso.org/obp/ui/#iso:std:iso:8217:ed-6:v1:en>, last accessed 14 September 2020.
[161] PAME, Phase I, *supra* n. 7, p. 5.
[162] Kopela (2017), *supra* n. 142, p. 239.

(MDO), or just distillates, normally corresponding to qualities within the DM(X, A, Z, B) of ISO 8217 and are considered lighter.[163] The PAME Report on Alternative Fuels in the Arctic indicates the kind of converter technology needed for vessels to navigate in certain fuels that were investigated therein.[164] In accordance with these findings, vessels can rely on internal combustion engines when using HFO, MDO/MGO, and low sulphur hybrids.[165]

However, the Norwegian legislation does not leave great leeway to shipowners to choose between these lighter fuels, but instead specifically prescribes the use of only DMA-grade fuel in accordance with ISO 8217 Fuel Standard. Some adjustments will be warranted necessary to the engines and tanks of vessels that today use HFO in order to use only the lighter distillate fuel. Using fuels with too low viscosity into machinery not designed for such may lead to technical problems.[166] Whether such adjustments are to be viewed as analogous to CDEM standards, and thus cannot go beyond GAIRS, depends on the extent that they are required and on whether they would result in hampering the right of innocent passage enjoyed by foreign flagged vessels. Henriksen, reviewing the Svalbard Environmental Protection Act notes that it is "doubtful" whether a regulation the Norwegian ban of HFO "would be consistent with the right of coastal States to regulate innocent passage through the territorial sea".[167] Nevertheless, to date, no State has contested the Norwegian legislation either in IMO or otherwise. This author agrees with the assertions noted earlier that the use of equipment or the modification of existing equipment that facilitates compliance with such standards shall be viewed as incidental.[168] As a result, adjustments to already existing internal combustion engines should not be regarded as setting CDEM requirements. Of course, shipowners still have the choice to make alteration to the CDEM of their vessels if they wish to use lighter fuels such as hybrid fuels, LNG, biofuel etc., but that should come as a voluntary choice, in the same manner as the installation of an EGCS is voluntary in the case of the Sulphur Oxides Regulation.

A final note is due to the ban of HFO carriage imposed by the Norwegian legislation. This carriage ban also goes beyond set GAIRS since it bans vessels that carry any other fuel

[163] PAME Phase I, *supra* n. 7, pp. 4-5.
[164] PAME, Alternative Fuels in the Arctic, *supra* n. 130, p. 37, Table 5.1; See also WWF Canada, "Phasing Out the Use and Carriage for Use of Heavy Fuel Oil in the Canadian Arctic: Impacts to Northern Communities" (2018), available at <https://d2akrl9rvxl3z3.cloudfront.net/downloads/wwf_hfo_phase_out_impacts_final_reduced.pdf>, last accessed 14 September 2020, p. 3.
[165] PAME Alternative Fuels in the Arctic, *ibid*.
[166] PAME Phase I, *supra* n. 7, p. 8.
[167] Henriksen, *supra* n. 28, p. 271; See also Knudsen, *supra* n. 159, p. 97, who supports that the norwegian legislation sets CDEM Standards.
[168] Kopela (2017), *supra* n. 142, p. 239; BMT Study *supra* n. 156.

than the one prescribed. Indeed, a carriage ban is an effective way of implementing relevant regulations and making sure that vessels will comply with them and not use different kinds of fuels during their voyage. However, this ban is based merely on the assumption that vessels would change between the fuels used and carried in the course of a travel. A unilateral carriage ban on the territorial sea of a State that does not adhere or goes beyond GAIRS set by IMO, including the Sulphur Oxides Regulation, may not be regarded as being in accordance with the relevant LOSC provisions for that reason. It will probably hamper the innocent passage enjoyed by vessels that wish to pass through a territorial sea carrying but not using non-compliant fuel. Even foreign nuclear-powered ships and ships carrying nuclear or other inherently dangerous or noxious substances can still exercise the right of innocent passage subject to Art. 23 LOSC, irrespective of the dangers posed to the marine environment by the carriage of such substances. A total carriage ban of HFO going beyond GAIRS would be based on a mere assumption and would be in contravention with the purpose and function of LOSC as is stipulated in the relevant provisions. Consequently, a carriage ban may be implemented only in the case it gives effect to GAIRS as to not deny foreign-flagged vessels the right of innocent passage which is enjoyed by ships of all States.

2.2 Coastal State Jurisdiction in the Exclusive Economic Zone

The prescriptive and enforcement jurisdiction of the coastal State is even more narrow in the EEZ. The coastal State does not have full sovereignty in the EEZ, it enjoys however a number of sovereign rights and jurisdiction, making the EEZ a *sui generis* zone, subject to a distinct jurisdictional framework to both the territorial sea and the high seas.[169] This fact makes it particularly difficult for coastal States to adopt unilateral measures that would affect the navigational rights enjoyed by third States in their EEZs.

The coastal State also enjoys jurisdiction regarding, amongst others, the protection and preservation of the marine environment. According to Art. 56 para. 2, the coastal State shall have due regard to the rights and duties of other States and shall act in a manner compatible with the provisions of the LOSC when exercising its rights and performing its duties in the EEZ.

According to Art. 211 para. 5, the coastal State can "adopt laws and regulations for the prevention, reduction and control of pollution from vessels conforming to and giving effect to generally accepted international rules and standards established through the competent

[169] Tanaka, *supra* n. 41, p. 126; Evans M. "The Law of the Sea", in Evans M. (ed.) *International Law*, 4th edition, Oxford University Press (2014), p. 673.

international organization". The wording of this provision makes it clear that the jurisdiction of the coastal State is severely restrained since it can only conform and give effect to GAIRS in every aspect of the regulation of vessel activities in the EEZ, without the CDEM prerequisite that is set for the territorial sea.[170]

The enforcement powers of the coastal State are also restrained and linked to GAIRS, as the wording of Art. 220 para. 3 suggests. Moreover, the coastal State has to meet a high threshold in order to take actions against vessels and it must follow a burdensome procedure set out in Art. 220. The "default rule" is that the coastal State may only require the vessel to give certain information such as its identity and port of registry, while physical inspection of the vessel is not allowed in cases of violations of laws and regulations of the coastal State.[171] According to paras. 5 and 6 of the same provision, a coastal State will be able to conduct a physical inspection and institute proceedings against a vessel in violation of applicable rules unless the violation results, according to objective evidence, in a discharge.[172]

As a result, no State will be in position to regulate use and carriage of HFO until IMO adopts such a regulation and is given the status of GAIRS. For the time being, Arctic coastal States may implement the Sulphur Oxides Regulation in their EEZ in order to impose restrictions on emissions that are connected to the use and carriage of HFO by vessels.

Iceland has declared an EEZ where it enjoys sovereign rights and jurisdiction. It has set the sulphur limit on its EEZ on 0.50% m/m, which is applicable to all ships, irrespective of the flag they fly.[173] This limit is in accordance with the Sulphur Oxides Regulation and the relevant LOSC provisions regarding the coastal State's rights and duties in its EEZ.

Norway, on the other hand, is not in position to do so regarding Svalbard, since it has not declared an EEZ off Svalbard Archipelago but rather a Fisheries Protective Zone.[174] Furthermore, there is a lingering question on whether Norway can declare an EEZ in Svalbard due to the conditions set out by the 1920 Spitsbergen/Svalbard Treaty.[175]

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[170] Kopela (2017), *supra* n. 142, p. 239.
[171] Hamamoto "Article 220", in Proelss A. (ed.), *The United Nations Convention on the Law of the Sea: A Commentary*, Hart Publishing (2017), p. 1509.
[172] Hamamoto *ibid.*, p. 1510
[173] Iceland, Regulation no. 1084/2019, *supra* n. 32, Art. 2.
[174] Henriksen, *supra* n. 28, p. 253.
[175] Treaty Concerning the Archipelago of Spitsbergen (adopted 9 February 1920, entered into force 14 August 1925) 2 *LNTS* 7; For the discussion on whether Norway is able to declare an EEZ in Svalbard see Pedersen T. and Henriksen T., "Svalbard's Maritime Zones: The End of legal Uncertainty?" 24 *The International Journal of Marine and Coastal Law* 141 (2009) and Molenaar E., "Fisheries Regulation in the Maritime Zones of Svalbard" 27 *The International Journal of Marine and Coastal Law* 3 (2012), pp. 7-26.

2.3 Coastal State Jurisdiction by virtue of Article 234 LOSC

Art. 234 LOSC is the sole provision of Section 8 of Part XII, often referred to as "the Arctic exception" since it is the only LOSC provision specifically applicable in the Arctic.[176] It was negotiated between Canada, the USSR and the US and is building upon the theme of rare and fragile ecosystems of Art. 194 para. 5 LOSC[177] while also considered *lex specialis* to Art. 211 paras. 5 and 6.[178]

Art. 234 could be used as a basis for the regulation of HFO use and carriage in the Arctic. Its interpretation is troubling academics since LOSC's adoption. The powers it confers to the coastal State are unambiguously broader than the powers the coastal States have in non ice-covered areas. However, Iceland and Norway, as the only States that have adopted relevant legislation on HFO have not -and, as it will be examined, could not have- based their national laws on Art. 234 LOSC.

According to the wording of the provision, Art. 234 LOSC is applicable in "ice-covered areas". The mentioning of "severe climatic conditions" and the temporal requirement "for most of the year" in the wording of the provision imply that its application does not require ice-coverage throughout all year. Since ice conditions are not predictable, it should suffice that the general features of the climate be taken into account, as long as the presence of ice is not incidental or for a small amount of time.[179]

This fact means that Art. 234 cannot be applied in the whole breadth of the Arctic Waters, at least not in the way they are defined by the Polar Code, but only to those areas "where particularly severe climatic conditions and the presence of ice covering such areas for most of the year create obstructions or exceptional hazards to navigation." The exact locations where the ice conditions warrant for the application of Art. 234 are to be set by the Arctic coastal States that can base their legislation upon it. Moreover, these ice-covered locations are diminishing as time passes, due to the continuous shrinking of ice-coverage attributable to climate change.

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[176] Nordquist, Rosenne and Yankov, *supra* n. 135, Volume IV, p. 393; Franckx E. and Boone L., "Article 234" in Proelss A. (ed.), *The United Nations Convention on the Law of the Sea: A Commentary*, Hart Publishing (2017), p. 1570.

[177] Nordquist, Rosenne and Yankov, *ibid.*, Volume IV, p. 393.

[178] *Ibid.*; Chircop A. *et al*, "Course Convergence? Comparative Perspectives on the Governance of Navigation and Shipping in Canadian and Russian Arctic Waters", 28 *Ocean Yearbook* 291 (2014), p. 299.

[179] Nordquist, Rosenne and Yankov, *ibid.*, p. 397; See also Bartenstein K., "The 'Arctic Exception' in the Law of the Sea Convention: A Contribution to safer Navigation in the Northwest Passage?", 42 *Ocean Development and International Law* 22 (2011), p. 31, where the author notes that a different interpretation would require the coastal State to adopt a "a twin set of measures applying to the Arctic, one for the ice-free moments and another for the rest of the year" a procedure that would be burdensome to both the coastal State and third States.

Iceland is not considered an Arctic coastal State by the "Arctic Five" that issued the 2008 Ilulissat Declaration, a decision that was however criticized by Iceland along with Sweden, Finland and the Arctic Council's permanent participants.[180] Nevertheless, Iceland is not able to base its legislation on Art. 234 since the waters under its jurisdiction cannot be described as "ice-covered" for most of the year. The Polar Code is also not applicable to Icelandic waters, since they do not fall under the definition of Arctic Waters that the Polar Code utilizes.[181]

Norway on the other hand has yet to take an official position concerning the interpretation of Article 234 and its legislation does not refer specifically to "ice-covered areas" since the waters surrounding its mainland are not ice-covered.[182] Moreover, it is not clear whether Norway is in position to implement Art. 234 in the waters surrounding the Svalbard Archipelago. As it was noted earlier, Norway has not declared an EEZ off Svalbard Archipelago but rather a Fisheries Protective Zone.[183] The measures a State may take in accordance with Art. 234 LOSC can be prescribed in its EEZ. Whether these measures can also be applied in the whole breadth of the EEZ measured from the baselines, and thus including the territorial sea of the coastal State, is a matter of controversy that will be addressed in the following pages. Nevertheless, suffice to say that to suggest that an Arctic State can rely on Art. 234 to prescribe and enforce regulations in its territorial sea and not in its EEZ (especially as is the case with Norway and Svalbard where no EEZ has even been declared) would be in total contravention with the wording of the provision. Molenaar, however, notes that Norway would today be entitled to exercise jurisdiction pursuant to Art. 234 in relation to Svalbard, subject to the Spitsbergen Treaty, [184] without however entering the discussion regarding the interpretation of the provision. Nevertheless, Norway does not base its HFO regulation on Art. 234, avoiding thus the question regarding its application on the waters surrounding Svalbard.

The above considerations mean than in the context of the jurisdiction conferred to the coastal State by virtue of Art. 234, Iceland and Norway do not and cannot base their legislation on HFO use and carriage on said provision. This warrants the brief examination of the practice of the rest of the Arctic coastal States necessary, in order to assess whether they

[180] Molenaar E., "The Arctic, the Arctic Council and the Law of the Sea", in Beckman R. et al. (eds.) *Governance of Arctic Shipping*, Brill Nijhoff (2017), p. 60.
[181] Henriksen, *supra n.* 28, p. 257.
[182] *Ibid.*
[183] *Ibid.*, p. 253.
[184] Molenaar E., "Options for regional Regulation of Merchant Shipping outside IMO, with particular Reference to the Arctic Region", 45 *Ocean Development and International Law* 272 (2014), p. 277.

can regulate HFO use and carriage in the ice-covered areas in the waters under their jurisdiction if they decide to do so.

The USA is notably not a member of the LOSC. Its views and practice regarding the application of Art. 234 have been described as inconsistent,[185] even if it views LOSC Part XII as customary law, including Article 234.[186] It has not adopted specific legislation on "ice-covered areas" or a similar term, but it contains special provisions about shipping in the Alaskan Prince William Sound and Cook Inlet south of the Aleutian Islands, areas that may be ice-covered sometimes through a year.[187]

Denmark, acting on behalf of Greenland, does not rely on Art. 234 LOSC in the regulation of its maritime zones.[188] Nevertheless, Denmark's Arctic Strategy notes that it "[…] will consider implementing non-discriminatory regional safety and environmental rules for navigation in the Arctic in consultation with the other Arctic states and taking into account international law, including the Convention on the Law of the Sea provisions regarding navigation in ice-covered waters".[189] Hartman observes that this statement refers to Art. 234 LOSC, [190] but, since then, Denmark has not taken any steps in that direction, nor has it stated in which parts of the Greenlandic waters such a legislation would apply.

So far, only Canada and the Russian Federation have adopted legislation that is explicitly based upon Art. 234.[191] Both States favor a broad interpretation of the provision. Canada on the one hand had adopted legislation on the protection of its ice-covered sea areas even before the adoption of the LOSC and viewed the inclusion of Art. 234 in the provisions of LOSC as a validation of its legislation. Similarly, Russia bases its legislation on Art. 234. However, the legislation of both Canada and Russia have been contested mainly by the USA.

The legislation of these two States do not include provisions that regulate HFO use and carriage. However, the analysis of the provision and whether it can be used to regulate HFO use and carriage, and to what extent, remains relevant to the issue at hand, since Art. 234 LOSC is the sole LOSC provision explicitly applicable in the Arctic. In the hypothetical

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[185] Fields S., "Article 234 of the United Nations Convention on the Law of the Sea: The overlooked Linchpin for achieving Safety and Security in the US Arctic?" 7 *Harvard National Security Journal* 55 (2016), p. 74.
[186] *Ibid.*
[187] Brubaker D., "The Arctic – Navigational Issues under International Law of the Sea", 2 *The Yearbook of Polar Law* 7 (2010), p. 64; See also USA, Oil Pollution Act (OPA), 33 *USC* 2701 (1990), V and VIII.
[188] Hartman J., "Regulating Shipping in the Arctic Ocean: An Analysis of State Practice", 49 *Ocean Development and International Law* 276 (2018), p. 287.
[189] Kingdom of Denmark Strategy for the Arctic 2011–2020, available at <https://www.arctic-council.org/index.php/en/our-work2/8-news-and-events/60-denmarks-arctic-strategy>, last accessed 14 September 2020, p. 18.
[190] Hartman, *supra* n. 188, p. 287.
[191] For a general discussion on the legislation of these two States see *ibid.* pp. 284-287 and Franckx and Boone *supra* n. 176, p. 1580-1584.

scenario that a State such as Canada or Russia wished to regulate HFO in the ice-covered areas of the waters under their jurisdiction, they would probably choose to rely on this provision to prescribe and enforce the relevant measures.[192] Still, a meticulous interpretation of the conditions attached to applying the provision falls out of the scope of this Thesis.[193] It rather focuses on whether coastal States may utilize Art. 234 in order to regulate HFO use and carriage in the waters under their jurisdiction.

As of the territorial application of Art. 234, the provision states that it shall apply "within the limits of the EEZ", provided that the ice conditions described exist. As it was already noted, the *ratione loci* application of the provision, specifically whether the "limits of the EEZ" means only the outer limits or the inner limits too, is an issue of controversy.

If one is to apply a strict grammatical interpretation to the provision, they will arrive to the conclusion that Art. 234 is only applicable only on the EEZ, *i.e.* from the outer limit of the territorial sea to the outer 200 n.m. outer limit of the EEZ.[194] On this matter, Franckx and Boone suggest that a "broader interpretation conflicts with Art. 55, which recognizes an inner limit of the EEZ and therefore expands the ordinary meaning of 'within the limits of the exclusive economic zone'".[195] They also add that the intention of the negotiators was not clearly established on this matter,[196] even if the *Virginia Commentary* suggests that this expression was deliberate and results in a broader interpretation.[197]

However, the interpretation offered by Franckx and Boone cannot be supported by a teleological point of view, in light of the object and purpose of LOSC, in accordance with Art. 31 para. 1 VCLT. It stands to reason that Art. 234 allocates prescriptive and enforcement powers to the coastal State, in order to adequately protect the fragile Arctic marine environment. This jurisdiction is broader than the powers conferred to the coastal State by virtue of other LOSC provisions. Bartenstein correctly suggests that whether Art. 234 applies to the territorial sea depends on the actual powers that Art. 234 confers to the coastal State. If these powers are indeed more far reaching than those reconciled by the innocent passage

[192] It must be noted that this is strictly a hypothetical scenario, especially considering the fact that both States pushed for exceptions, waivers and a larger timeframe in the currently negotiated HFO ban in the Arctic.
[193] For the discussion around the interpretation around Art. 234 LOSC see Bartenstein *supra* n. 179, Franckx and Boone *supra* n. 176, McRae D. and Goundrey D., "Environmental Jurisdiction in Arctic Waters: The Extent of Article 234," 16 *University of British Columbia Law Review* 197 (1982) and Pharand D., "The Arctic Waters and the Northwest Passage: A Final Revisit", 38 *Ocean Development and International Law* 3 (2007).
[194] This interpretation is supported in Roach J., "Arctic Navigation: Recent Developments", in Nordquist M. et al., *Challenges of the Changing Arctic*, Brill Nijhoff (2016), p. 228 and in Franckx and Boone, *supra* n. 176, p. 1575-1576.
[195] Franckx and Boone *ibid.*.
[196] *Ibid.*
[197] Nordquist, Rosenne and Yankov, *supra* n. 135, Volume IV, p. 397; This is also acknowledged in Franckx and Boone, *ibid.*, p. 1576, n. 61.

regime, it would seem logical that Art. 234 can be applied on the territorial sea.[198] Specifically, it is argued that in order to adequately protect and preserve the fragile Arctic marine environment, Arctic coastal States should be able to impose CDEM requirements on foreign-flagged vessels that aim not only to the protection of the marine environment, but also to the safety of navigation.[199] This is also supported by taking into account that the Polar Code, which is to be considered a relevant rule of international law in accordance with Art. 31 para. 3 (c) VCLT, sets mainly CDEM standards in order to protect the polar environments, albeit these standards are to be imposed primarily by the flag States.

If the literal interpretation of the provision is accepted, that would mean that the Arctic coastal States would be able to impose CDEM requirements in the EEZ without having to refer to GAIRS, since there is no such requirement in Art. 234.[200] On the contrary, Art. 234 only requires that the adopted measures to show due regard to navigation and to be "based on the best available scientific evidence". At the same time, the coastal States would still be required to refer to GAIRS if they wish to adopt CDEM requirements in their territorial sea by virtue of Art. 21 para. 2 LOSC. That would mean that the Arctic coastal States would have greater prescriptive and enforcement jurisdiction in their EEZs than in their territorial seas. It is obvious that such an interpretation is in contradiction with the object and purpose of LOSC and its remaining provisions.

Following the aforementioned, two important conclusions are made. First, that Art. 234 is applicable in the whole breadth of the EEZ, that is from the baselines to the 200 n.m. outer limit. Secondly, that Art. 234 confers to the coastal State the power to adopt and enforce rules and regulations on, amongst others, CDEM standards, without having to refer to GAIRS. Regulations on emissions standards would also be permissible, even more so since the Sulphur Oxides Regulation is considered GAIRS, even though there is not such a requirement in the wording of Art. 234.

As a result, the question of whether a regulation on HFO usage would set an emission/discharge standard, regulate the content of fuel or apply to the CDEM of vessels becomes moot when Art. 234 applies. The Arctic coastal States with ice-covered EEZs would be in position to impose and enforce a HFO regulation, as long as the other requirements of Art. 234 are met. Specifically that such a regulation shall not be discriminatory and "shall have due regard to navigation and the protection and preservation of the marine environment

[198] Bartenstein, *supra* n. 179, p. 30.
[199] *Ibid*. p. 43; Franckx and Boone, *supra* n. 176, p. 1575.
[200] See also Gavouneli *supra* n. 42, p. 71 who observes that "there is a conspicuous absence of any further reference to the 'competent international organisation' or the world community at large".

based on the best available scientific evidence", thus striking a balance between the navigational rights that third States still enjoy in ice-covered areas and the need to protect and preserve this fragile environment.

3. Port State Jurisdiction

The State enjoys full sovereignty in its ports and internal waters, which form part of its territory. The regime of internal waters is a direct consequence of the recognition of the legitimacy of straight baselines.[201] According to Art. 8 para. 1 LOSC the internal waters are "those waters which lie landward of the baseline from which the territorial sea is measured". Art. 2 LOSC provides that the coastal State enjoys full sovereignty in its internal waters. This sovereignty encompasses prescriptive and enforcement jurisdiction, subject only to the limitations imposed under international law.[202] Unlike the territorial sea, the right of innocent passage does not apply in the internal waters of a coastal State, unless in the case of Art. 8 para. 2 LOSC.

The port on the other hand is not specifically defined in LOSC. Arts. 11 and 12 hint that a port includes, amongst others, the outermost permanent harbor works and roadsteads that extend beyond the outer limit of the territorial sea, provided they are normally used for the loading, unloading, and anchoring of ships.[203]

The important distinction between port State jurisdiction and coastal State jurisdiction is the fact that the foreign-flagged vessels do not enjoy navigational rights therein, nor a right of access to ports.[204] Instead, when they are allowed to call at port, they voluntarily submit themselves to the jurisdiction of the port State.[205]

Violations of national laws and regulations that occurred in the internal waters or a port of a State are indeed covered by the State' territorial jurisdiction.[206] It is apparent that all foreign vessels within internal waters and anchoring at ports of a coastal State are subject to the criminal and civil laws and regulations of this State, except for sovereign immune

[201] Rothwell D. and Stephens T., *The International Law of the Sea*, 2nd edition, Hart Publishing (2016), p. 53; See also *Anglo-Norwegian Fisheries Case* (UK v. Norway), Judgment, ICJ Rep. 1951, p. 116, p. 133.
[202] Tanaka, *supra* n. 41, p. 78.
[203] Molenaar E.,"Port and Coastal States", in Rothwell D. et al. (eds.) *The Oxford Handbook of the Law of the Sea* Oxford University Press (2015), p. 280.
[204] An exception to this rule is a situation where a ship calls at port due to distress or *force majeure*, *ibid.*, p. 284.
[205] *Ibid.*, p. 280.
[206] Kopela S., "Port-State Jurisdiction, Extraterritoriality, and the Protection of global Commons", 47 *Ocean Development and International Law* 89 (2016), p. 93

vessels.[207] However, port States commonly do not exercise jurisdiction with respect to affairs that are deemed as "internal" to the ship and that do not affect the interests of the port State.[208]

Based on this legal regime, LOSC has provided for a number of specific rights and obligations to the port State regarding the enforcement jurisdiction relating to the protection and preservation of the marine environment.[209] In the same vein, LOSC does not set forth significant limitations to port State jurisdiction.[210] Instead, such limitations stem mostly from general principles regarding State jurisdiction, as well as other regimes of international law, such as international trade law.[211]

Consequently, as State's ports and internal waters are considered part of its territory, the State enjoys wide discretion in exercising this jurisdiction.[212] This includes the entitlement of the port State to set entry to port requirements in order to accept or deny access to its ports to vessels which it considers do not comply with its laws and regulations.[213] In addition, the port State may also prescribe conditions for leaving a port. These conditions for entering or leaving the port may include mandatory disposal of waste or the compliance with certain, unilaterally imposed, requirements, including requirements applicable to the CDEM of foreign-flagged vessels.[214]

Port States can thus regulate entry into their ports by prescribing requirements that aim to the prevention, reduction and control of pollution, in accordance with Art. 211 para. 3 LOSC. These entry into ports requirements are not linked to GAIRS by the wording of the provision and, subsequently, can go beyond them, as long as they are given due publicity and are communicated to the competent international organization, which would normally be IMO. These conditions are based on the territorial jurisdiction of the State. Nevertheless, as already noted, this wide discretion of port State jurisdiction is limited by possible treaty commitments, such as those imposed by trade agreements, and by the application of general

[207] Lowe V., "The Right of Entry into Maritime Ports in International Law", 14 *San Diego Law Review* 597 (1977), p. 622.
[208] Molenaar (2015), *supra* n. 203, p. 285.
[209] Gavouneli, *supra* n. 42, p. 44
[210] Ryngaert C. and Ringbom H., "Introduction: Port State Jurisdiction: Challenges and Potential", 31 *The International Journal of Marine and Coastal Law* 379 (2016), pp. 381 and 386-388.
[211] *Ibid.* See also Molenaar E., " Port State Jurisdiction: toward comprehensive, mandatory and global Coverage" 38 *Ocean Development and International Law* 225 (2007), p. 237-239.
[212] *Case Concerning Military and Paramilitary Activities in and against Nicaragua* (Nicaragua v. USA), Judgment, ICJ Rep. 1986, p. 14, para. 213.
[213] Molenaar (2015), *supra* n. 203, p. 285.
[214] *Ibid*., p. 287; See also *The M/V "Louisa" Case* (Saint Vincent and the Grenadines v. Spain), Judgment, ITLOS Rep. 2013, p. 4, para. 109.

international law, such as the principles of non-discrimination and the prohibition of abuse of rights.[215]

Consequently, States can regulate HFO use and carriage by prescribing certain limitations for vessels as conditions to enter (or leave) the port. If these regulations are in accordance with Art. 211 para. 3 LOSC, general international law and with the possible specific obligations of the prescribing State, then they shall be viewed as lawful. Especially for the Arctic, where ports that can facilitate large or many vessels are few, such entry requirements could be viewed as the optimal way to regulate HFO use and carriage. However, the two States that today regulate HFO use and carriage in the Arctic, Iceland and Norway, have not chosen to take this path, even though their legislation is applicable in their ports and internal waters. Iceland has not prescribed the applicable standards as entry requirements for Icelandic ports. Similarly, Norway has not included any provisions specifically in relation to port entry conditions regarding the ban of HFO use and carriage in the waters around Svalbard.

However, both the Icelandic and the Norwegian legislations on HFO are applicable in the internal waters and ports of Iceland and Svalbard respectively. They do not contain specific provisions regarding measures they are to take by Iceland and Norway respectively in their capacity as port States, implying that the same provisions applicable in the territorial seas of the two States are also applicable in the internal waters and ports.

Nevertheless, the applicability of the measures that are primarily prescribed for the territorial sea in the ports and internal waters of the two States raise important questions. Especially in case that either of these two States, or a third one, choose to impose specific HFO-related obligations on foreign-flagged vessels, the further analysis of the limits of port State jurisdiction is deemed imperative.

As is the case for the territorial sea, the prescriptive and enforcement jurisdiction of the port State regarding regulations on HFO depends, apart from the aforementioned limitations, on the way the legislation is framed, *i.e.* if it sets emission standards or content of fuel requirements or it applies to the CDEM of ships, emission standards, or none of the two.

If an HFO regulation does not target neither CDEM standards nor emission standards but is rather based on the technical characteristics of the fuel, then it should be considered as permissible in accordance with the argument presented in Part III/2.1 of this Thesis.

[215] Ringbom (2016), *supra* n. 90, pp. 12-13.

The prescription and enforcement of legislation regarding CDEM standards, either as entry requirements or as applicable when a vessel calls at port, that go beyond GAIRS, raises a great controversy regarding their extraterritorial application.[216]

CDEM standards are typically considered "static" standards, since the level of non-compliance with such standards is uniform throughout a vessel's voyage, including when it calls at port, as well as the maritime zones the ship traversers during its voyage.[217] It is apparent that a failure to comply with CDEM standards could have adverse effects on the environment of a State's ports or internal waters.[218] As a result, a violation of a CDEM requirement that is prescribed as applicable only in the ports of a State can be based on the territorial jurisdiction the State enjoys therein, despite the extraterritorial effect that these measures may have.[219] A port State is thus in position to "avoid" the implications posed by the GAIRS prerequisite found in the territorial sea regime.

In this vein, port States may adopt and enforce regulations that require the use and carriage of certain types of fuel with certain characteristics on board.[220] Such a requirement would be static, uniform throughout the ship's voyage. A violation of such a regulation would be commenced in the port of the State, and thus the exercise of jurisdiction can be also based on the territorial jurisdiction of the State.

On the other hand, a port State does not always have the same discretion on the regulation of activities such as discharges/emissions. Discharge/emission standards target the "behavior" of a vessel,[221] so it is important to differentiate where exactly the violation took place. Of course, if the behavior amounts to a violation that actually takes place within the internal waters or the port of the State, then the port State is able to exercise its jurisdiction. However, the territorial jurisdiction of the port State cannot provide for the prescription and enforcement of regulations over activities that bear no relation to the State's territory - including all the maritime zones under its jurisdiction.[222] In this vein, the behavior of a vessel is to be defined in geographical terms. As a result, the port State cannot prescribe and enforce laws and regulations on discharge and emissions standards that go beyond GAIRS with regard

[216] Kopela (2016), *supra* n. 206, p. 94.
[217] Molenaar (2015) *supra* n. 203, pp. 287-288; Ringbom (2008), *supra* n. 49, p. 329
[218] Ryngaert and Ringbom, *supra* n. 210, p. 383.
[219] Molenaar (2015), *supra* n. 203; See also Molenaar (2007), *supra* n. 211, p. 230; Kopela (2017), *supra* n. 142, p. 240; Marten B., "Port State Jurisdiction, international Conventions and Extraterritoriality: An expansive Interpretation", in Ringbom H. (ed.), *Jurisdiction over Ships: Post-UNCLOS Developments in the Law of the Sea*, Brill (2015), pp. 106-107.
[220] Kopela (2017), *ibid*., p. 240.
[221] Molenaar (2015), *supra* n. 203, p. 288.
[222] Ryngaert and Ringbom, *supra* n. 210, p. 383.

to such activities that occur entirely out of its territory, *i.e.* on the high seas or waters under the jurisdiction of third States. [223]

In this vein, Art. 218 LOSC provides for an even more extended enforcement jurisdiction of the port State, since it allows it to undertake investigations and, where the evidence so warrants, institute proceedings in respect of any discharge from that vessel outside the internal waters, territorial sea or EEZ of that State in violation of applicable GAIRS. There is a lingering question on whether the term "discharge" used in Art. 218 LOSC can also cover emissions. As it was noted before, MARPOL Annex VI Regulation 11 para. 6 states that the relevant LOSC rules on prevention, reduction and control of pollution of the marine environment from ships apply *mutatis mutandis* to the rules set out in MARPOL Annex VI.[224] This provision means that for those States that are parties to MARPOL Annex VI discharges of ships will also include emissions, *i.e.* air pollution.[225] Fanø, by basing his interpretation on the ordinary meaning of the words "discharge" and "emission", arrives to the conclusion that, in accordance with Art. 31 para. 1 VCLT and the ordinary meaning of the words used, Art. 218 covers emissions from ships. These conclusions can also be supported by virtue of Art. 31 para. 3 (c) VCLT: MAPROL Annex VI is to be taken into account as a relevant rule of international law applicable in the relations between the (hypothetical) parties when interpreting the meaning of the term discharge. Consequently, this provision is to be considered as covering the requirements set out by the Sulphur Oxides Regulation, by conferring extraterritorial jurisdiction to the port State over such violations. It must be also noted that this enforcement jurisdiction can only result in a monetary sanction in accordance with Art. 230 para. 1 LOSC, while the port State is under the obligation to notify the flag State in accordance with Art. 231 LOSC.[226] Nevertheless, especially regarding enforcement measures that may include detention of the vessel or the imposition of fines, these considerations suggest that there is a need of caution, especially in cases of purely regional requirements, such as an HFO regulation applicable in the Arctic. As Ringbom notes, "the appropriateness of using detentions for enforcing compliance with regional requirements is not self-evident".[227]

However, as it is clear from the wording of the provision, Art. 218 LOSC does not allow for the enforcement of nationally prescribed rules that would go beyond GAIRS,

[223] *Ibid.*
[224] MARPOL Annex VI, Reg. 11, para. 6.
[225] Molenaar (1998), *supra* n. 143, p. 506; see also Ringbom (2016), *supra* n. 90, p. 14; Fanø *supra* n. 89, p. 281.
[226] Fanø, *supra* n. 10, p. 264.
[227] Ringbom (2008), *supra* n. 49, p. 344; Kopela (2016), *supra* n. 206, p. 96.

irrespective of what they regulate. As a result, every possible national legislation on HFO that goes beyond the Sulphur Oxides Regulation cannot be enforced by the port State if a violation occurs outside the territory of the State.

A final note must be made regarding the port State jurisdiction regarding violations that took place out of the port of the State but on its territorial sea or EEZ. Port States can take enforcement action for violations of their national legislation in these waters in accordance with Art. 220 para. 1 LOSC. This enforcement jurisdiction depends on the legality of the prescribed measures that are adopted in the territorial sea and EEZ of the State.[228] Specifically, it allows for the institution of proceedings in respect of "any violation of its laws and regulations adopted in accordance with this Convention or applicable international rules and standards for the prevention, reduction and control of pollution from vessels". The term "applicable" that is used in this provision instead of the term "generally accepted", appears to be in relation with the actors that are involved in the situation described in the provision.[229] Thus, the "applicability" of such rules is to be determined *ad hoc*. Nevertheless, ILA notes that the applicable rules would normally include GAIRS, since they potentially cover a broader set of rules that.[230] The use of the word "or" means that the measures prescribed are not necessarily adopted in conformity with these applicable rules but could be in conformity only with the specific LOSC provisions. If an HFO regulation is indeed in accordance with the relevant LOSC provisions, the port State may enforce it when foreign-flagged vessels voluntarily call at its ports. This port-State jurisdiction is characterized by Molenaar as a "quasi-territorial jurisdiction", since it provides for the extended jurisdiction of the State to violations that take place in maritime zones where it enjoys sovereignty or sovereign rights.[231] As the title of Art. 220 LOSC implies, these assertions are justified on the basis of this functional jurisdiction insofar as the port State also acts as a coastal State and has prescribed laws and regulations over the certain activities it has the capacity to do so within its territorial sea and EEZ.[232]

Conclusively, the Arctic port States have many ways in their disposal to successfully regulate the use and carriage of HFO in the Arctic. It is apparent that the best option for an Arctic State to impose a regulation of HFO use and carriage is to prescribe it as an entry requirement for its ports. That way, it will be in position to go beyond the set GAIRS and

[228] Kopela (2017), *supra* n. 142, p. 239.
[229] ILA, *supra* n. 48, p. 40.
[230] *Ibid*. p. 42.
[231] Molenaar (2007), *supra* n. 211, p. 228.
[232] Ryngaert and Ringbom, *supra* n. 210, p. 383.

avoid the legal challenges that are laid down if it prescribes such a regulation only by virtue of its coastal State jurisdiction. Furthermore, such a regulation could affect the entire voyage of foreign-flagged vessels in a lawful way that would significantly decrease the use and carriage of HFO in the Arctic.

However, due to the fact that a large number of vessels currently navigating the Arctic use HFO, the Arctic port States do not seem willing to impose such strict requirements for entry to their ports.

Part IV: Conclusions

This part offers the concluding remarks of the Thesis.

This Thesis sought to examine four research questions: 1) What multilateral legal bases can Arctic States use in order to regulate the use and carriage of HFO? 2) What is the scope and limits of State jurisdiction to prescribe and enforce legislation on HFO use and carriage in the Arctic Ocean? Specifically, what are the limits for States that are willing to go beyond the generally accepted international rules and standards that are today in place? 3) Is it lawful for Arctic coastal States to unilaterally adopt and enforce regulations on the use and carriage of HFO in the waters under their jurisdiction? Specifically, are the regulations adopted by Iceland and Norway in accordance with international law? And finally, 4) what are the legal advantages and constraints that stem from multilateral and unilateral action for the regulation of HFO use and carriage in the Arctic Ocean?

It is apparent that there is a complex international legal regime in place that can be utilized by States in order to regulate HFO use and carriage in the Arctic Ocean. This legal regime has the general LOSC provisions as its cornerstone, while MARPOL Annex I and Annex VI provide for more elaborate rules. However, this framework does not regulate HFO use and carriage in a way that is specifically tailored to this issue but, rather, it regulates related issues, such as the content of sulphur in the fuel. The Sulphur Oxides Regulation is today the most comprehensive tool to regulate HFO use and carriage. However, the fact that it focuses on emissions of sulphur means that other dangers posed by the use of HFO in the Arctic Ocean, such as the possibility of an oil spill, the emission of black carbon and other substances, remain significantly unregulated, apart from the general provisions found in LOSC and MARPOL. At the same time, the Polar Code only includes a non-mandatory recommendation for vessels to refrain from using HFO in the Arctic. As it is clear from the current negotiations that are currently undertaken in IMO, a comprehensive international legal framework specifically on HFO use and carriage in the Arctic Ocean will not be in place until 2024, and for some vessels until 2029. Even then, the proposed ban will probably still leave great leeway for States and vessels to continue using HFO in the Arctic Ocean.

Consequently, States that are willing to regulate HFO use and carriage in a more comprehensive way are to rely on their own devices to do so. They are nevertheless limited by the international legal framework that seeks to strike a balance between the need to protect and preserve the marine environment and the navigational rights enjoyed by all States. In this

instant, flag States have the greatest capacity to regulate HFO use and carriage by the vessels flying their flags. However, to this day no flag State has undertaken such a task.

Coastal States on the other hand can regulate HFO use and carriage in the waters under their jurisdiction but are significantly limited by the LOSC references to GAIRS. The territorial sea regime ties regulations that apply to CDEM of ships to GAIRS. As a result, it is easier for coastal States to regulate content of fuel or emission standards, where they can go beyond GAIRS, since no such prerequisite exists in the relevant LOSC provisions.

Thus, Arctic coastal States are able to regulate HFO use and carriage as long as the uphold their obligations provided for in international law. Especially the States that can base their legislation on Art. 234 LOSC -mainly Canada and Russia- can utilize Art. 234 LOSC, which does not include a prerequisite to abide to GAIRS. However, neither of these States have expressed an intention to regulate HFO in the waters under their jurisdiction. Instead, both States have been reluctant to support the IMO work on the proposed HFO ban in the Arctic Ocean.

Finally, port States are able to comprehensively regulate use and carriage of HFO by relying on their territorial jurisdiction and the fact that vessels voluntarily call at port, submitting themselves to the port State's jurisdiction. Port States are able to effectively regulate activities that take place within their ports and internal waters, including static requirements that remain uniform throughout the ship's voyage, including in areas that fall outside of the port State's jurisdiction. Port States can thus prescribe regulations for vessels to not carry or use HFO while at port, a regulation that would have a permissible extraterritorial. Furthermore, the Arctic port States are in position to set entry conditions that could apply on the regulation of HFO, thus successfully and comprehensively regulate its use and carriage in the Arctic Ocean for all the ships that would wish to call at these ports.

Hence, the Arctic States can indeed regulate the use and carriage of HFO acting as flag States, coastal States or port States. Each of these functional jurisdictions has its own limitations and potential, so it is up to the State to decide for the optimal way it is to regulate HFO use and carriage – if it wills to do so.

Iceland's and Norway's legislation indeed focus on the regulation of HFO in waters under their jurisdiction. For Iceland, it applies to its ports, internal waters, territorial sea and EEZ, while for Norway on specific parts of its internal waters and territorial sea surrounding Svalbard. Whether the respective legislations of the two States are in accordance with the relevant LOSC and MARPOL provisions can be an issue of controversy. This author is of the opinion that both regulations are generally in accordance with international law of the sea,

even if, in some cases, they go beyond GAIRS. The reason for this is the fact that they do not apply to the CDEM of foreign flagged vessels but rather they have an incidental effect on them that is to be regarded as lawful. However, Iceland and Norway have not set such regulations for the use and carriage of HFO as setting entry requirements for their ports. This can be seen as a drawback, since it limits their capacity to comprehensively regulate HFO use and carriage.

As it is clear from the research undertaken, a regulation of HFO use and carriage can be adequately facilitated by both a multilateral and a unilateral process. The international community has the capacity to regulate HFO use and carriage in a comprehensive way; it has done so with many other issues, including the regulation of the content of sulphur. In the same manner, concerned States can regulate HFO use and carriage by their vessels or in the waters under their jurisdiction, as long as they uphold their international obligations. What is evidently lacking today is the will to regulate this issue in a sufficient way to protect the fragile environment of the Arctic and the Arctic communities.

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