

# The Deteriorating Arctic and the Impact of the Shipping Industry

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On September 28, 2018, Maersk<sup>1</sup> announced that its commercial cargo liner—the *Venta Maersk*—arrived safely in St. Petersburg, Russia, after departing from Russia’s Pacific port of Vladivostok. It had traversed the Northern Sea Route.<sup>2</sup> Record-low volume of ice in the Bering Sea in the 2017-2018 ice season was one of the key factors that made this journey possible.<sup>3</sup> The previously unnavigable waters with hundreds of miles of ice sheets have now been broken down to mere chunks of ice, floating in the ocean.<sup>4</sup> This is a significant event for the shipping industry and climate change studies: it highlights the extent and pace at which the Arctic sea ice is melting, paving the way to increased activity on the Northern Sea Route.

The Northern Sea Route spans more than 4,000 kilometers,<sup>5</sup> from Novaya Zemlya (a Russian archipelago in the Arctic Ocean), runs along Siberia, and finally connects with the Bering Strait. This route runs across the northern coastline of Russia and lies entirely in Russia’s exclusive economic zone (EEZ).

Several sections of the Northern Sea Route were previously passable only by powerful icebreakers. Today, commercial liners are able to easily forge their way with

assistance from icebreakers only in certain stretches.<sup>6</sup> This increased shipping activity has the potential to adversely impact marine life, increase local pollution levels, speed up the melting of ice sheets, and severely damage the Arctic ecosystem.

Over the past three decades, the older thick ice in the Arctic has declined by more than 95%, and surface temperatures there have been rising at twice the rate compared with the rest of the world.<sup>7</sup> 2018 was the second warmest year since 1900, with temperatures reaching 1.7 degrees Celsius (°C) above the long-term average.<sup>8</sup> It is not merely the surface area of ice that matters, but the volume of ice that plays a larger role in ensuring the stability and permanence of the Arctic. According to an analysis by scientists at the University of Washington, the volume of ice measured in September 2018 was about 78% lower than the levels recorded in September 1979.<sup>9</sup>

A stable Arctic is crucial for several other reasons. For example, the white Arctic ice sheets play a major role in keeping the temperature of the earth balanced by reflecting a large portion of sunlight back into space. Once the top layers of the Arctic ice sheets that contain the relatively newer white ice melt, the older darker ice that is mixed with soil and other sediments is exposed to the sun. The white ice that acts as a reflector of the sun’s heat no longer exists and exposes the more heat-absorbing darker ice and ocean beneath.<sup>10</sup> As a result, more heat is absorbed by the darker oceans instead of getting reflected back into space—thereby increasing the rate at which the ice melts.

1. UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT (UNCTAD), REVIEW OF MARITIME TRANSPORT 2018, at 32 U.N. Doc. UNCTAD/RMT/2018, U.N. Sales No. E.18.II.D.5 (2018) (Maersk is the world’s largest commercial shipping company with a fleet size of more than 700 ships).
2. Stine Jacobsen, *Maersk Sends First Container Ship Through Arctic Route*, REUTERS, Aug. 24, 2018, <https://www.reuters.com/article/us-arctic-shipping-maersk/maersk-sends-first-container-ship-through-arctic-route-idUSKCN1L91BR>.
3. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, ARCTIC REPORT CARD 2018 (E. Osborne et al. eds., 2018), available at [https://arctic.noaa.gov/Portals/7/ArcticReportCard/Documents/ArcticReportCard\\_full\\_report2018.pdf](https://arctic.noaa.gov/Portals/7/ArcticReportCard/Documents/ArcticReportCard_full_report2018.pdf).
4. Mark C. Serreze et al., *The Arctic’s Sea Ice Cover: Trends, Variability, Predictability, and Comparisons to the Antarctic*, 1436 ANNALS N.Y. ACAD. SCI. 36-53 (2018).
5. Protection of the Arctic Marine Environment, *Northern Sea Route Shipping Statistics*, <https://www.pame.is/index.php/projects/arctic-marine-shipping/older-projects/northern-sea-route-shipping-statistics> (last visited July 23, 2019).

6. Maria Gallucci, *As the Arctic Melts, the Northern Sea Route Opens for Business*, WIRED, Sept. 26, 2018, <https://www.wired.com/story/as-the-arctic-melts-the-fabled-northwest-passage-opens-for-cargo-ships/>.
7. NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION, *supra* note 3.
8. *Id.*
9. Chris Mooney, *The Arctic Ocean Has Lost 95 Percent of Its Oldest Ice—A Startling Sign of What’s to Come*, WASH. POST, Dec. 11, 2018, <https://www.washingtonpost.com/energy-environment/2018/12/11/arctic-is-even-worse-shape-than-you-realize/>.
10. *Id.*

This phenomenon is referred to as a “feedback loop” and risks accelerating global warming.<sup>11</sup>

About one-quarter of the landmass in the Northern Hemisphere contains thick layers of soil, rock, and sand that are held together by ice and stay frozen year-round.<sup>12</sup> This icy mass called *permafrost* contains about 1,700 billion tons of organic matter, including plant and animal remains.<sup>13</sup> In such waterlogged, low-oxygen environments, microbes produce methane (CH<sub>4</sub>), which is stored within the thick icy layers of the permafrost. As the permafrost thaws, huge amounts of CH<sub>4</sub> and carbon dioxide (CO<sub>2</sub>), previously contained within the permafrost, are released into the atmosphere.<sup>14</sup>

Climate models predict that by 2100 the permafrost cover near the surface is likely to decrease by 37% to 81%.<sup>15</sup> On the current trajectory of a 3°C increase by 2100, melting permafrost is expected to discharge up to 280 gigatons of carbon and about three gigatons of CH<sub>4</sub>, which has a warming potential about 25 times greater than current CO<sub>2</sub> emissions.<sup>16</sup> A destabilized Arctic is estimated to cost about \$70 trillion by 2100 on a global scale.<sup>17</sup>

In this Comment, we begin by discussing the impact of the shipping industry on climate change, with a special focus on the Arctic region. We then explore the various international environmental law principles that aim to minimize environmental degradation and their applicability to the Arctic. We also discuss various international agreements that are specifically drafted to deal with the environmental impact caused by shipping activity. Finally, we offer possible solutions to deal with the deteriorating condition of the Arctic by examining the plans put forward by various international bodies to reduce emissions, thereby limiting the effects of climate change.

## I. Impact of the Shipping Industry on the Arctic Region

### A. Arctic Haze—Nitrogen Dioxide and Sulfur Dioxide Emissions

Arctic haze is a phenomenon induced by local anthropogenic air pollution that causes a reddish-brown haze in the air. The burning of coal releases a mixture of sulfur and carbon into the air that gives the haze its reddish color.<sup>18</sup> Today’s ships are powered by high-carbon fuel, more commonly known as bunker fuel, which is by far the most polluting fuel variant used in commercial operation.<sup>19</sup> It is the heaviest residual oil that is left over during the distillation process after lighter hydrocarbons such as gasoline, diesel, and other fuels are extracted. This also makes bunker fuel one of the cheapest options available.<sup>20</sup> Bunker fuel also contains the highest amount of impurities: It is largely made of very long hydrocarbon chains that release copious amounts of sulfur dioxide (SO<sub>2</sub>), CO<sub>2</sub>, and particulate matter when burnt.<sup>21</sup> These emissions not only cause Arctic haze and other visual distortions in the Arctic, but significantly speed up the global warming process. Currently, emissions from the shipping and aviation industries are underregulated, which raises concerns about the potential damage these emissions can cause to the environment.<sup>22</sup> Every year, the shipping and tourism industries emit about one billion tons of CO<sub>2</sub> into the atmosphere, which equates to almost 2.5% of annual global carbon emissions.<sup>23</sup> Though some may argue that this is a small number, a report by the European Parliament in 2015 suggests that emissions from shipping could reach 17% of global emissions by 2050, if not regulated.<sup>24</sup>

Despite their massive carbon footprint, the shipping industry and the aviation industry have not been included in targets to reduce carbon emissions under the Paris Climate Agreement of 2015.<sup>25</sup> Heavy lobbying by the shipping

11. Dennis Dimick, *Soot and Dirt Is Melting Snow and Ice Around the World*, NAT’L GEOGRAPHIC, June 10, 2014, <https://news.nationalgeographic.com/news/2014/06/140610-connecting-dots-dust-soot-snow-ice-climate-change-dimick/>.

12. Thomas Schneider von Deimling, *What Is Permafrost and How Does It Relate to Climate Change?*, GUARDIAN, Mar. 5, 2012, <https://www.theguardian.com/environment/2012/mar/05/permafrost-climate-carbon-emissions>.

13. Alister Doyle & Regan Doherty, *Melting Permafrost a New Peril in Global Warming: U.N.*, REUTERS, Nov. 27, 2012, <https://www.reuters.com/article/us-climate-permafrost/melting-permafrost-a-new-peril-in-global-warming-u-n-idUSBRE8AQ0LW20121127>.

14. *Id.*

15. INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE, CLIMATE CHANGE 2014: SYNTHESIS REPORT 12 (R.K. Pachauri et al. eds., 2014), available at [https://www.ipcc.ch/site/assets/uploads/2018/02/SYR\\_AR5\\_FINAL\\_full.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/SYR_AR5_FINAL_full.pdf).

16. Edward A.G. Schuur & Benjamin Abbott, *High Risk of Permafrost Thaw*, 480 NATURE 32-33 (2011), available at <https://www.nature.com/articles/480032a>.

17. Mia Landauer & Sirku Juhola, *Loss and Damage in the Rapidly Changing Arctic*, in LOSS AND DAMAGE FROM CLIMATE CHANGE 425-47 (R. Mechler et al. eds., Springer 2019), available at [https://link.springer.com/chapter/10.1007/978-3-319-72026-5\\_18](https://link.springer.com/chapter/10.1007/978-3-319-72026-5_18).

18. David Phillips, *Arctic Haze*, CANADIAN ENCYCLOPEDIA, Dec. 15, 2013, <https://www.thecanadianencyclopedia.ca/en/article/arctic-haze>.

19. Mikhail Sofiev et al., *Cleaner Fuels for Ships Provide Public Health Benefits With Climate Tradeoffs*, 9 NATURE COMM. 1 (2018), available at <https://www.nature.com/articles/s41467-017-02774-9#ref-link-section-d1456e583>.

20. U.S. Energy Information Administration, *Crude Oil Distillation and the Definition of Refinery Capacity*, TODAY IN ENERGY, July 5, 2012, <https://www.eia.gov/todayinenergy/detail.php?id=6970>.

21. John Vidal, *The World’s Largest Cruise Ship and Its Supersized Pollution Problem*, GUARDIAN, May 21, 2016, <https://www.theguardian.com/environment/2016/may/21/the-worlds-largest-cruise-ship-and-its-supersized-pollution-problem>.

22. Olaf Merk, *Climate Change: Is Shipping Finally on Board?*, OECD OBSERVER, Dec. 2017, available at [http://oecdobserver.org/news/fullstory.php/aid/6014/Climate\\_change:\\_Is\\_shipping\\_finally\\_on\\_board\\_.html](http://oecdobserver.org/news/fullstory.php/aid/6014/Climate_change:_Is_shipping_finally_on_board_.html).

23. INTERNATIONAL MARITIME ORGANIZATION (IMO), THIRD IMO GREENHOUSE GAS STUDY 2014, at 58 (2015).

24. Andy Rowell, *How the Shipping Industry Bought a Pass on Emissions*, ECOWATCH, Oct. 24, 2017, <https://www.ecowatch.com/paris-agreement-shipping-industry-2500715626.html>.

25. *Shipping Aviation and Paris*, UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE, May 18, 2016, <https://unfccc.int/news/shipping-aviation-and-paris>.

industry over the years has allowed it to self-regulate.<sup>26</sup> Due to the global and transoceanic nature of the movement of ships, industry experts were able to argue that the industry's nondomestic nature does not allow it to fall under the national emission schemes. This puts decision-makers in a tough spot in determining which nation to hold responsible.

Urgent regulation and investment into clean and renewable sources of energy are key to reducing the carbon footprint of the shipping industry. If emissions from the sea are not contained, efforts to reduce emissions in cars and other modes of transport will be canceled out by rising shipping emissions.<sup>27</sup> Given the global trend and the opening up of the Arctic Sea Route, emissions from ships are forecast to skyrocket. Reports from the International Maritime Organization (IMO) suggest that carbon emissions from the shipping industry could shoot up as much as 250% by 2050.<sup>28</sup> As the population grows, the demand for goods and services is only expected to rise. Opening up new routes such as the Arctic Sea Route will only increase the frequency and amount of goods being transported. Thus, it becomes especially critical that the shipping industry is regulated going forward.

According to a study conducted by a consortium of scientists and industry experts across the globe, nearly all cargo ships must be carbon-neutral by 2050 to keep global warming well below the 2°C terrestrial temperature target set by the Paris Climate Agreement. Achieving this target would require the introduction of zero emission ships by as early as 2030.<sup>29</sup>

The current self-regulatory model adopted by the industry has not propelled or incentivized companies to invest much in developing cleaner technologies. For the shipping industry to adopt cleaner technologies, low-carbon, low-sulfur, and cleaner natural gas alternatives must be economical and cost efficient. To undertake a complete overhaul of ships and incorporate cleaner engines, the industry would require management from national governments.

Besides the government, incentives from various players within the industry also play a crucial role. For example, the governing body of the Panama Canal has started incentivizing companies to invest in cleaner fuel alternatives by giving priority to those cleaner ships. Such policies by bodies that govern heavily congested shipping paths such as the Panama Canal go a long way in changing the mindset of companies that otherwise would not care much about the harmful impacts of shipping emissions.<sup>30</sup>

## B. *International Convention for the Prevention of Pollution From Ships and Emission Control Areas*

The International Convention for the Prevention of Pollution From Ships (MARPOL) is a protocol that applies to all operators and owners of vessels, and aims to regulate various aspects of their operation.<sup>31</sup> Annex I includes special areas that have heightened standards to prevent pollution from oil; Annex II from noxious liquid substances; Annex IV from sewage; Annex V from garbage; and Annex VI, which tackles air pollution from SO<sub>2</sub> and nitrogen dioxide (NO<sub>2</sub>) released from ships.<sup>32</sup>

In 2014, nitrogen oxide (NO<sub>x</sub>) (as NO<sub>2</sub>) and sulfur oxide (SO<sub>x</sub>) (as SO<sub>2</sub>) emissions from all global shipping represented about 15% and 13%, respectively, of the total emissions from anthropogenic sources.<sup>33</sup> By 2023, the total NO<sub>x</sub> from international shipping around Europe is expected to surpass the total from all the land-based emissions by the European Union Member states.<sup>34</sup>

Annex VI of MARPOL envisages stricter limits for ships near and around specific coastal areas of the United States, Canada, the U.S. Caribbean territory, Europe, the Baltic Sea, and the North Sea. These areas have been designated as emission control areas (ECAs) and have stricter controls over SO<sub>x</sub>, NO<sub>x</sub>, and particulate matter emissions from marine vessels.<sup>35</sup> The initial limit for sulfur emissions in 1997 was set at 1.5% for marine fuels but has subsequently been revised to a strengthened limit of 0.1% from January 1, 2015.<sup>36</sup>

These zones under Annex VI were initially set up over concerns about the hazards posed by air pollution from the shipping industry to local coastal communities. The Baltic Sea was the first area to be designated as an ECA in 2006, followed by the North Sea in 2007. Surprisingly, the water bodies in the Arctic have not been included in any of the annexes under MARPOL. Shipping routes across the Arctic primarily span over the Kara Sea, the Bering Strait, the Norwegian Sea, the Laptev Sea, the East Siberian Sea, the Chukchi Sea, the Bering Sea, and the Arctic Ocean.

One of the reasons why these seas were not included in the annexes to MARPOL could be due to the fact that these routes were usually unnavigable during a major part of the year. In the past, Arctic shipping routes were not the most popular routes for several reasons, including the high costs of icebreakers, unmapped waters, large areas of sea ice, and other geographical hindrances. Even today, several parts of

26. Rowell, *supra* note 26.

27. Eoin Bannon, *Ships and Planes Will Wipe Out Half the Emissions Savings to Be Made by Cars and Trucks—Study*, TRANSPORT & ENV'T, Dec. 6, 2016, <https://www.transportenvironment.org/press/ships-and-planes-will-wipe-out-half-emissions-savings-be-made-cars-and-trucks—study>.

28. IMO, *supra* note 25, at 4.

29. LLOYD'S REGISTER, *LOW CARBON PATHWAYS 2050* (2016), *available at* <https://www.lr.org/en/insights/sustainability/low-carbon-pathways/>.

30. *Report: 28 of 100 World's Largest Ports Offer Incentives for Green Ships*, WORLD MAR. NEWS, Apr. 18, 2018, <https://worldmaritimeneeds.com/archives/249836/report-28-of-100-worlds-largest-ports-offer-incentives-for-green-ships/>.

31. International Convention for the Prevention of Pollution From Ships, Nov. 2, 1973, as modified by the 1978 Protocol, 34 U.S.T. 3407, 1340 U.N.T.S. 184 [hereinafter MARPOL].

32. *Id.*

33. IMO, *supra* note 25, at 2 (“Annually, international shipping is estimated to produce approximately 18.6 million and 10.6 million tonnes of NO<sub>x</sub> (as NO<sub>2</sub>) and SO<sub>x</sub> (as SO<sub>2</sub>) respectively.”).

34. Air Pollution and Climate Secretariat, *Air Pollution From Ships*, <http://www.airclim.org/air-pollution-ships> (last updated Apr. 12, 2019).

35. MARPOL, *supra* note 33, Annex VI.

36. IMO, *Prevention of Air Pollution From Ships*, <http://www.imo.org/en/OurWork/Environment/PollutionPrevention/AirPollution/Pages/Air-Pollution.aspx> (last visited July 23, 2019).

the Arctic are navigable only with the help of icebreakers for only about two months of the year. However, with rising global temperatures and melting sea ice paving the way for increased activity in the region, it is imperative that the water bodies in the Arctic be protected and included in the specially protected areas under MARPOL.<sup>37</sup>

In 2019, Arctic sea ice hit a new record low for January. In March, temperatures soared 30 degrees Fahrenheit above the average in the Bering Strait. This trend is only expected to continue in the coming years. The *Venta Maersk* became the world's first shipping container to complete its voyage using the northern shipping route and has paved the way for more voyages over this newly accessible route.<sup>38</sup> If we put the economic viability of the northern shipping route aside, the mere possibility of ships passing through the Arctic, which was previously impossible, should trouble conservationists. With the advancement of technology and the manufacture of more "ice class" ships, the traffic over Arctic shipping routes is bound to increase.<sup>39</sup>

MARPOL, however, does not provide for sanctions for potential violations of the Convention. Instead, it provides for a self-regulatory mechanism for flag and port states to enforce. MARPOL also does not stipulate any fines and has left penalties up to the discretion of individual states.<sup>40</sup> This mechanism needs to be strengthened to ensure stricter supervision by an international organization such as the IMO. Ensuring a minimum penalty and even a temporary suspension of shipping licenses is something that can be thought of for the future.

## I. Including Arctic Waters Under the Annexes of MARPOL

To designate the Arctic Ocean and various other seas under the Northern Sea Route as an ECA, Parties to Annex VI must approve it.<sup>41</sup> An application to designate a sea area under Annex VI can be submitted by any of the 174 Members of the IMO but is subject to ratification by the Member states of Annex VI. Once designated, enforcement of the MARPOL standards becomes a key factor, for which it is essential to clearly demarcate territorial claims in the Arctic as sanctions are individually enforced by flag and port nations.<sup>42</sup>

Though most parts of the Northern Sea Route fall within the EEZ of Russia, other areas of the Arctic above Russia's EEZ extending to Canada and Greenland have not been clearly demarcated as the territorial waters of any one particular state. There are ongoing disputes among Arctic nations to determine the exclusive economic and territorial rights over Arctic waters and landmasses. It is important to settle these disputes to have a clear picture of which nation is responsible for domestic enforcement of treaties.

## C. Greenhouse Gas Emissions and Their Impact

Apart from NO<sub>2</sub>, SO<sub>2</sub>, and particulate matter emissions, CO<sub>2</sub> emissions play a more direct role in greenhouse gas (GHG) emissions. According to a study published in April 2019, the current levels of CO<sub>2</sub> in the atmosphere are so high that such levels were seen only about three million years ago when sea levels were almost 20 meters higher, foreshadowing the potential temperature and sea-level rise in the coming years.<sup>43</sup> Presently, the concentration of CO<sub>2</sub> in the air is about 410 parts per million (ppm) and is on an upward trend, which is significantly higher than the level of 350 ppm that is required to keep the earth from overheating.<sup>44</sup>

Even at the high levels of CO<sub>2</sub> about three million years ago, the temperature did not exceed pre-industrial levels by more than 2°C. Looking at the current trajectory, models show that the temperature is bound to advance by more than 4°C by 2100.<sup>45</sup> The last time the concentration of CO<sub>2</sub> was this high, trees grew on Antarctica, much of Greenland was ice-free, and the average temperatures on the continent were about 14°C warmer.<sup>46</sup> At the current pace at which the earth is heating, the sea levels are expected to rise by about one to two meters by the end of this century.

In 2012, GHG emissions from international shipping accounted for about 3% of anthropogenic CO<sub>2</sub> emissions.<sup>47</sup> It is estimated that such emissions could grow between 50% and 250% by 2050.<sup>48</sup> Of all the shipping vessels at sea, oil tankers, container ships, and bulk carriers consume the highest amounts of fuel. Collectively, they emit more than 500 million tons of CO<sub>2</sub>, which is about 63% of the total CO<sub>2</sub> emissions from vessels at sea.<sup>49</sup> In the coming years, it is expected that the demand from unitized

37. Nathanael Melia et al., *Sea Ice Decline and 21st Century Trans-Arctic Shipping Routes*, 43 GEOPHYSICAL RES. LETTERS 9720-28 (2016), available at <https://agupubs.onlinelibrary.wiley.com/doi/full/10.1002/2016GL069315>.

38. *Venta Maersk Makes History as It Crosses Northern Sea*, WORLD MAR. NEWS, Sept. 19, 2018, <https://worldmaritimeneews.com/archives/260865/venta-maersk-makes-history-as-it-crosses-northern-sea-route/>.

39. DANISH SHIP FINANCE, SHIPPING MARKET REVIEW 45 (2016) (global seaborne container trade, which accounts for more than 60% of all seaborne trade, is growing steadily at a compound annual growth rate of about 4.7% between 2016 and 2019 and is expected to continue this upward trend), available at <https://www.shipfinance.dk/media/1649/shipping-market-review-december-2016.pdf>.

40. IMO, FREQUENTLY ASKED QUESTIONS: THE 2020 GLOBAL SULPHUR LIMIT 3 (2019), available at <http://www.imo.org/en/MediaCentre/HotTopics/GHG/Documents/2020%20sulphur%20limit%20FAQ%202019.pdf>.

41. MARPOL, *supra* note 33, Annex VI, app. IV.

42. IMO, *supra* note 42, at 3.

43. Matteo Willeit et al., *Mid-Pleistocene Transition in Glacial Cycles Explained by Declining CO<sub>2</sub> and Regolith Removal*, 5 SCI. ADVANCES eaav7337 (2019), <https://advances.sciencemag.org/content/5/4/eaav7337>.

44. *Id.*

45. Isabelle Gerretsen, *CO<sub>2</sub> Levels at Highest for 3 Million Years—When Seas Were 20 Meters Higher*, CNN, Apr. 4, 2019, <https://edition.cnn.com/2019/04/04/health/co2-levels-global-warming-climate-intl/index.html>.

46. *Id.*

47. NAYA OLMER ET AL., INTERNATIONAL COUNCIL ON CLEAN TRANSPORTATION, GREENHOUSE GAS EMISSIONS FROM GLOBAL SHIPPING, 2013-2015 (2017), available at [https://www.theicct.org/sites/default/files/publications/Global-shipping-GHG-emissions-2013-2015\\_ICCT-Report\\_17102017\\_vF.pdf](https://www.theicct.org/sites/default/files/publications/Global-shipping-GHG-emissions-2013-2015_ICCT-Report_17102017_vF.pdf).

48. IMO, *supra* note 25, at 4.

49. *Id.* at 43-45.

cargoes will rapidly increase and have an impact on overall GHG emissions.

### I. Downward Trend in Emissions Post-2008 Leading Up to 2012

The period after the 2008 global financial setback was a difficult one and led to a significant decrease in the overall shipping activity in the world. The setback cost the industry close to \$22 billion.<sup>50</sup> The only way for the shipping industry to turn profits and sail through those trying times was to cut operating costs, such as fuel costs. This was made possible primarily due to the wide adoption of the practice of “slow steaming.” Slow steaming is the practice of operating cargo ships and other large container ships at sail speeds significantly lower than their maximum operational speed limits.

Within one year of adopting slow steaming, Maersk, the world’s largest shipping company, swung a \$639 million profit in the first quarter of 2010 as opposed to \$373 million in the first quarter of the preceding year.<sup>51</sup> All this was attributed to a 9% reduction in fuel expenses by using slow steaming. Hence, it also logically follows that lower fuel consumption also produces lower emissions. This allowed the emissions during the period of 2008 to 2012 to stay relatively stable. The resulting short-term downward trend has often been cited by the shipping industry to get out of strict regulations on emissions and other pollution controls.<sup>52</sup>

However, though slow steaming is profitable, it significantly increases the time it takes to traverse oceans. For example, a slow freighter may take close to 15 days to cross the Pacific Ocean, which would otherwise take only about 10-11 days.<sup>53</sup> This significantly drives up the time it takes to transport goods, and shipping companies can only make a limited number of trips using their existing fleet. Since 2012, the global shipping industry has seen a steady rise in activity as the economic and trade-related activities across the world are on an upward trend.

In the short term, the United Nations Conference on Trade and Development (UNCTAD) predicts a 3.8% yearly increase in seaborne trade for the period between 2018 and 2023.<sup>54</sup> By 2030, the global sea trade is expected to double, mainly caused by an increased demand for goods in Asia.<sup>55</sup> This uptick in global shipping could cause the

conversion of these latent emissions into actual emissions, which could cause a significant rise in GHG emissions in the period leading up to 2030.<sup>56</sup>

Thus, one must be careful not to be misled by the low emissions in the recent past, which were partly due to low global demand and slow steaming. If the total capacity of the steam liners were to be used, total emissions would be a lot higher.<sup>57</sup> A worst-case scenario of CO<sub>2</sub> emissions by 2050 shows a projected figure of about 2,800 million tons of CO<sub>2</sub> being emitted by the shipping industry, as compared to about 840 million tons of CO<sub>2</sub> being emitted in 2018.<sup>58</sup> This calls for robust measures to deal with this increased level of emissions in the future on an international level. One needs to keep in mind that international treaties and laws are only enforceable domestically.

## II. Legal Safeguards

### A. Domestic Enforcement of International Laws

International law is not self-enforcing. All international environmental law treaties are voluntarily accepted by Member states, who individually undertake enforcement commitments. If there is a violation of a treaty, only a state can be sued in its capacity as a Member to the treaty and not private parties. Hence, enforcement of international commitments is ultimately dependent on domestic enforcement. Individual states must take positive steps to frame laws and give effect to them by imposing sanctions on violators.

One such way is by setting a cap on carbon emissions for each year and periodically reviewing these caps. This can also work as an incentive to countries: if they produce less carbon than they are allowed to, they can sell their unused carbon units to a country that is exceeding its maximum allowed carbon units.<sup>59</sup> This provides a monetary incentive for countries to produce less carbon. The carbon trading system can also be applied on a domestic level by setting caps on carbon emissions for various industries and for companies within an industry as well. This can work as a great incentive if the cap is strictly enforced. Further, if there is a cap on the amount of carbon that can be put in the air, companies will have to look for alternative sources of clean energy and upgrade their technologies at a faster rate.

This system of emissions trading was first brought into existence by the Kyoto Protocol.<sup>60</sup> The system did not take off as expected because of lax thresholds set by individual states. The overall aim of reducing the carbon footprint was therefore not met.

50. Ronald D. White, *Ocean Shipping Lines Cut Speed to Save Fuel Costs*, L.A. TIMES, July 10, 2010, <http://articles.latimes.com/2010/jul/31/business/la-fi-slow-sailing-20100731>.

51. A.P. MOLLER-MAERSK A/S, ANNUAL REPORT 2010 (2011), available at [https://investor.maersk.com/system/files/encrypted/nasdaq\\_kms/assets/2013/02/21/4-43-54/100154\\_AR2010\\_UK.pdf](https://investor.maersk.com/system/files/encrypted/nasdaq_kms/assets/2013/02/21/4-43-54/100154_AR2010_UK.pdf).

52. INFLUENCEMAP, CORPORATE CAPTURE OF THE INTERNATIONAL MARITIME ORGANIZATION: HOW THE SHIPPING SECTOR LOBBIES TO STAY OUT OF THE PARIS AGREEMENT (2017), available at [https://influencemap.org/site/data/000/302/Shipping\\_Report\\_October\\_2017.pdf](https://influencemap.org/site/data/000/302/Shipping_Report_October_2017.pdf).

53. White, *supra* note 52.

54. UNCTAD, *supra* note 1, at 15.

55. CARSTEN ØRTS HANSEN ET AL., CBS MARITIME, ARCTIC SHIPPING: COMMERCIAL OPPORTUNITIES AND CHALLENGES (2016).

56. IMO, *supra* note 25, at 13.

57. *Id.* at 4.

58. *Id.* at 20.

59. Kyoto Protocol to the United Nations Framework Convention on Climate Change art. 17, Dec. 11, 1997, 37 I.L.M. 22 [hereinafter Kyoto Protocol].

60. *Id.*

Demarcating the Arctic region or parts of it as territories of nations poses a risk of its own. On one side, we know that international law can only be enforced by a Member state through its domestic law. However, giving a nation control over a water body would give it unfettered authority over such area.<sup>61</sup> So, the ultimate implementation of international obligations would depend entirely on the will of the country to domestically enforce its international obligations. As a result, a country may or may not choose to conserve the seas that it controls and may in turn choose to exploit them for their natural resources.

On the other hand, if a body of water is left as a part of the high seas without being demarcated as the exclusive territory of a particular country, there is the risk of exposing it to exploitation by nations that have the political and financial will to do so. Left ungoverned, the high seas are likely to be exploited, as we have seen when the United States and Japan wanted to extract manganese nodules from the deep seabed.<sup>62</sup>

## I. Territorial Claims in the Arctic

Implementation of territorial claims is easier when one country clearly owns and controls the resources of a particular region or territory. When it comes to the Arctic region, the situation becomes a lot more complicated: the region is largely unexplored and there are several ongoing disputes concerning the extent of national ownership of the continental shelves and the water column above. With the Arctic expected to be ice-free in the near future, one may expect a multiplicity of claims over the newly accessible resources, including land, shipping routes, natural gas, and other minerals. Not only should countries refrain from accelerating the rate of deterioration by exploiting newly accessible regions, but should make an active effort to help conserve the Arctic. Broadly, the entire issue boils down to whether countries should be allowed to profit from the global climate change that they helped to cause.

Barring the high seas, the Arctic nations of Canada, Denmark (via Greenland), Iceland, Norway, Russia, Sweden, and the United States control the regions in the Arctic. The Northern Sea Route, which runs along the Russian coast, lies entirely in Arctic waters and within Russia's EEZ. This is an example of a shipping route that is entirely under the control of one nation. Therefore, the enforceability of the environmental regulations becomes more likely, and there is a higher level of accountability.

Analogous to the Northern Sea Route, the Northwest Passage spans across the northern coast of North America and along the Canadian Arctic Archipelago. This route, which connects Europe to the Pacific Ocean through the Arctic Ocean, has been the subject of numerous legal dis-

putes concerning the status of these waters. The dispute revolves around the divergent interpretations of the United Nations Convention on the Law of the Sea (UNCLOS)<sup>63</sup> on the classification of waterways. While Canada claims that the Northwest Passage is part of its historic internal waters, China and the United States argue that it is an international strait (i.e., an area of the high seas that is open for the peaceful use by a vessel from any state).<sup>64</sup>

In the past, Canada has enacted various environmental regulations like the Arctic Waters Pollution Prevention Act that established its dominance in the region.<sup>65</sup> The Act is aimed at preventing pollution in the Canadian Arctic waters by prohibiting the deposit of any waste in the Arctic Ocean.<sup>66</sup> The Act also provides for punishment for any violation of the provisions stated under the Act. Local pollution prevention officers are tasked with the duty of enforcing the Act.<sup>67</sup>

This sort of domestic regulation is crucial in internalizing international commitments to protect the environment. Article 234 of UNCLOS further recognizes the right of coastal states to protect their waters within the limits of the EEZ from pollution of the marine environment.<sup>68</sup> Such forms of protection for territorial waters can be the key to protecting the Arctic as well. By designating more coastal areas as ECAs and enforcing stricter restrictions on emissions, the Arctic can be protected from the ill effects of increased shipping activity to a large extent. Countries must have a clear picture of the water bodies they govern and take appropriate measures to keep them from being polluted.

With tensions among Arctic countries rising over the control of Arctic resources, the region may soon turn militarized; countries like Russia may increase their military presence in strategic locations. Russia has cited several reports that put the value of the minerals in the Arctic at about \$290 billion a year.<sup>69</sup> Areas like the New Siberian Islands are already seeing increased activity, with Russia establishing the Northern Clover military base on Kotelnny Island.<sup>70</sup> The facility seems to have the capacity to house more than 250 servicemen and stocked with enough supplies for an entire year, making it completely self-sufficient. Over the past year, Russia has made its Arctic ambitions manifest.

63. UNCLOS, *supra* note 63, art. 34, 35, and 38, at 32-33.

64. Danita Catherine Burke, *The Northwest Passage Dispute*, OXFORD RES. GROUP, Feb. 26, 2018, <https://www.oxfordresearchgroup.org.uk/blog/the-northwest-passage-dispute>.

65. Arctic Waters Pollution Prevention Act, R.S.C. 1970, c. A-12.

66. *Id.*

67. Burke, *supra* note 66.

68. UNCLOS, *supra* note 63, art. 234 at 113.

69. Tanya O'Garra, *Economic Value of Ecosystem Services, Minerals, and Oil in a Melting Arctic: A Preliminary Assessment*, 24 ECOSYSTEM SERVICES 180-86 (2017), available at <https://www.sciencedirect.com/science/article/pii/S2212041616301309>.

70. Mary Ilyushina & Frederik Pleitgen, *Inside the Military Base at the Heart of Putin's Arctic Ambitions*, CNN, Apr. 5, 2019, <https://edition.cnn.com/2019/04/04/europe/russia-arctic-kotelny-island-military-base/index.html>.

61. United Nations Convention on the Law of the Sea art. 56, Dec. 10, 1982, 1833 U.N.T.S. 397 [hereinafter UNCLOS].

62. Jon Letman, *The Race Is On to Mine the Deep Sea—But Scientists Are Wary*, NAT'L GEOGRAPHIC, Aug. 29, 2018, <https://www.nationalgeographic.com/environment/2018/08/news-race-to-mine-deep-sea-drones-seafloor-environmental-impact/>.

Currently, there is no treaty in place to regulate or limit military presence across the Arctic. With the melting of ice, new disputes are bound to arise: countries are likely to try to renegotiate treaties to incorporate new boundaries and claims of land. For example, Russia has claimed an extended continental shelf that extends almost as far as the North Pole, along the Lomonosov Ridge.<sup>71</sup> Though this claim does not extend beyond Russia's Arctic sector and does not clash with any other country's claims, it shows that countries are eager to claim territory as far as possible to further their national interests. If Russia's claims under Article 76 of UNCLOS<sup>72</sup> succeed, it could give Russia the right to explore and exploit the newly discovered natural resources, including oil, natural gas, mineral reserves, and marine species.<sup>73</sup>

It is important for Russia to enact protective legislation to ensure that the increased shipping activity on the Northeast Passage does not adversely impact the Arctic ecosystem. Measures may include caps on GHG, NO<sub>2</sub>, and SO<sub>2</sub> emissions, fuel mixture guidelines, and waste disposal guidelines.

## 2. Governance of the Arctic Region

Arctic cooperation and politics are governed to some extent by the Arctic Council, which is a body consisting of the eight Arctic nations and organizations that represent the indigenous people of the Arctic region. Apart from these Member states, the Council also consists of 13 observers<sup>74</sup> that are invited to sit in on its meetings. They can also take part and contribute to the various projects undertaken by the Council by engaging in the Council's working groups. Though these observer nations are allowed to attend the meetings, the decisions are exclusively taken by the permanent Member states.<sup>75</sup>

### B. Applicability of the "Polluter-Pays" Principle

Imposing financial penalties on polluting shipping companies is one possible way of deterring the use of dirty fuels to power ships. The *polluter-pays principle* is an internationally accepted norm that has been widely adopted by several countries in tackling polluting entities. This principle requires polluters to internalize their pollution costs by installing clean technology or by imposing fines on emissions. This principle was initially introduced by the Organisation for Economic Co-operation and Development (OECD) in 1972<sup>76</sup> to allocate the costs of pollution without burdening governments. The principle is also mirrored

in Principle 16 of the Rio Declaration on Environment and Development of 1992.<sup>77</sup>

Under the 1972 and 1974 OECD recommendations, a polluter must bear the "costs of pollution prevention and control measures."<sup>78</sup> Over the years, the principle has evolved and has been applied to include a wide range of costs, including administrative costs, costs of damage, and accidental pollution costs.<sup>79</sup> These polluter payments can be used to rehabilitate the environment and promote other initiatives to reduce emissions while deterring companies from polluting.

However, identifying who exactly the polluter is in the transportation industry becomes tricky as multiple parties can be deemed polluters: (a) the manufacturers of ships; and (b) the shipping companies that use the ships for their business. This gives lawmakers more room to penalize the manufacturers as well as the shipping companies.<sup>80</sup> However, the allocation of responsibility of pollution is decided on a case-by-case basis, keeping economic and administrative efficiency in mind.

Another principle that has been widely accepted is the *user-pays principle*. This is a slightly modified version of the polluter-pays principle that directly penalizes the agent or rather the user of a good or service that results in pollution (i.e., the shipping companies in this case).<sup>81</sup> Such methods may include a higher tax or any other deterrent that disincentivizes the ultimate user from consuming a product.

Though either of the two principles may be adopted, we believe that a user-pays principle would be more efficient in dealing with the issue of shipping emissions for several reasons. First, penalizing the manufacturers without providing an alternative to shipping companies would merely stifle global trade and wreak havoc worldwide. Second, by taxing the agents, which are shipping companies in this case, the demand for cleaner alternatives would organically grow and thus push manufacturers to invest in cleaner technologies. Third, this also allows for shipping companies to make a voluntary decision to shift to cleaner alternatives as opposed to using older ships that would attract a heavy tax on their use.

A similar approach has been taken worldwide with respect to the consumption of plastic bags. Instead of penalizing the manufacturers, governments have imposed additional costs for customers requiring plastic bags at stores.<sup>82</sup> This automatically stifles the demand at

[oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD\(92\)81&docLanguage=En](http://oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(92)81&docLanguage=En).

77. Rio Declaration on Environment and Development, U.N. Conference on Environment and Development, Annex I, U.N. Doc. A/CONF.151/26 (Vol. I), 31 I.L.M. 874 (1992).

78. OECD, *supra* note 78.

79. *Id.*

80. *Id.*

81. European Environment Agency, *User-Pays Principle*, <https://www.eea.europa.eu/help/glossary/eea-glossary/user-pays-principle> (last visited July 23, 2019).

82. Shehab Khan, *Single-Use Plastic Bag Sales Fall 86% Since Introduction of 5p Charge*, INDEPENDENT, July 28, 2018, <https://www.independent.co.uk/news/uk/home-news/plastic-bag-charge-pay-single-use-environment-recycling-a8467061.html>.

71. Ekaterina Piskunova, *Russia in the Arctic: What's Lurking Behind the Flag?*, 65 INT'L J. 851-64 (2010), available at [https://www.jstor.org/stable/25762044?seq=1#metadata\\_info\\_tab\\_contents](https://www.jstor.org/stable/25762044?seq=1#metadata_info_tab_contents).

72. UNCLOS, *supra* note 63, art. 76, at 49.

73. *Id.* art. 77, at 51.

74. Arctic Council, *Observers*, <https://www.arctic-council.org/index.php/en/about-us/arctic-council/observers> (last updated May 23, 2019).

75. *Id.*

76. OECD, THE POLLUTER-PAYS PRINCIPLE: OECD ANALYSES AND RECOMMENDATIONS, No. OCDE/GD(92)81 (1992), available at [http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD\(92\)81&docLanguage=En](http://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=OCDE/GD(92)81&docLanguage=En).

the root and slowly reduces the production by manufacturers as well.

Imposing such a tax on shipping companies seems to be the only way to ensure that zero emission ships become a reality. International organizations such as the IMO have the reach and the means to impose such financial penalties on an industrywide level. With more than 174 Members, the IMO has taken initiatives to make the shipping industry more compliant with international environmental obligations in the past as well.<sup>83</sup> For example, the sulfur 2020 target of the IMO aims to cut SO<sub>2</sub> emissions from the current 3.5% to 0.5%, effective January 1, 2020. This is a significant reduction in allowed SO<sub>2</sub> emissions from the initial 1997 limit of 4.5%, which did not prove very effective.<sup>84</sup>

### C. *High Seas, the Common Heritage of Humankind, and the Law of the Seas Treaty*

Article 3 of UNCLOS defines the territorial sea to include the area up to 12 nautical miles from a state's coastline. Such state would have the right to fully utilize all of the resources in that area and have complete autonomy over regulating the area. Beyond the territorial seas, UNCLOS provides for EEZs that allow coastal states to claim the sovereign right to explore and exploit natural resources up to 200 nautical miles from the coastline.<sup>85</sup> Special provisions deal with coastal states under Part VI of UNCLOS, which allows coastal Arctic states to claim an extended sovereign right over underwater continental shelves that are natural prolongations of their territory up to 200 nautical miles from their coast.<sup>86</sup> Individual states may administer these areas and frame laws to control the passage of ships, emission levels, and even the extraction of resources.

However, beyond these territorial seas and EEZs lie the vast majority of water bodies on the planet, namely the *high seas*, also referred to as the open ocean. The high seas make up more than two-thirds of the world's global oceans<sup>87</sup> and harbor more than 95% of occupied habitat on earth.<sup>88</sup> Save for a few provisions under UNCLOS, the high seas are largely unregulated. The current frameworks regulating the high seas are riddled with loopholes and without effective conservation strategies. In 2018, after 10 years of discussion, the United Nations has encouraged Member states

to launch negotiations for an international agreement to fill gaps in ocean conservation.<sup>89</sup>

Apart from treaties, international environmental law principles have also been used in the past to conserve the vast open oceans. One such principle holds that seas are the *common heritage of humankind*. Common heritage of humankind is a principle of international law that holds that common areas and elements of nature and culture should be held in trust by the current generation for future generations and be protected from exploitation by individual nation states or corporations.<sup>90</sup> The principle is reflected in Article 136 of UNCLOS and has also been adopted by the Antarctic Treaty of 1959.<sup>91</sup> Until the emergence of this principle of international law, the general trend was that whichever country had the political and financial will to exploit the waters beyond national territories could reap the benefits of common global resources such as natural gas, marine animals, and shipping routes. It is critical that we recognize the ice sheets and the marine ecosystem of the Arctic in the same manner as the Antarctic Treaty protects the vast resources of Antarctica.<sup>92</sup>

International waters have long been designated as common heritage, and the obligation to protect our marine environment is also evinced under Article 145 of UNCLOS.<sup>93</sup> Article 145 prescribes that necessary measures should be taken to ensure effective protection of the marine environment and to afford protection from human activities that may pollute it. Though the Arctic region has not been explicitly designated as a common heritage by any international treaty, it is time to afford special protection to the vast expanse in the northern territories, in light of the fast-changing landscape.

Even if the territorial claims of nations to extend their continental shelves do not succeed and the region is left the way it is, there is a need to take positive action to protect the region from countries taking advantage of the common areas in the region. Countries without access or claims to the Arctic must also take an initiative to protect the region. This has been done in the past in the dispute relating to the mining of manganese nodules in the deep seabed. When the United States and Japan were looking to extract manganese nodules, a group of developing countries—the Group of 77—raised the argument that the deep seabed is part of the global commons and is thus the common heritage of humankind.<sup>94</sup> Hence, any gain arising from such extraction is to be shared by all countries.<sup>95</sup> Part XI of UNCLOS deals with the seabed, ocean floor, and subsoil

83. IMO, *Introduction to IMO*, <http://www.imo.org/en/About/Pages/Default.aspx> (last visited July 23, 2019).

84. Air Pollution and Climate Secretariat, *supra* note 36.

85. UNCLOS, *supra* note 63, art. 57, at 40.

86. *Id.* pt. VI, at 49-53.

87. International Union for Conservation of Nature, *High Seas*, <https://www.iucn.org/commissions/world-commission-protected-areas/our-work/high-seas> (last visited July 23, 2019).

88. UNITED NATIONS, THE CONSERVATION AND SUSTAINABLE USE OF MARINE BIOLOGICAL DIVERSITY OF AREAS BEYOND NATIONAL JURISDICTION (2017), available at [https://www.un.org/depts/los/global\\_reporting/8th\\_adhoc\\_2017/Technical\\_Abstract\\_on\\_the\\_Conservation\\_and\\_Sustainable\\_Use\\_of\\_marine\\_Biological\\_Diversity\\_of\\_Areas\\_Beyond\\_National\\_Jurisdiction.pdf](https://www.un.org/depts/los/global_reporting/8th_adhoc_2017/Technical_Abstract_on_the_Conservation_and_Sustainable_Use_of_marine_Biological_Diversity_of_Areas_Beyond_National_Jurisdiction.pdf).

89. Thalif Deen, *UN Begins Talks on World's First Treaty to Regulate High Seas*, INTER PRESS SERVICE, Sept. 7, 2018, <http://www.ipnews.net/2018/09/un-begins-talks-worlds-first-treaty-regulate-high-seas/>.

90. UNCLOS, *supra* note 63, art. 136, at 67.

91. Antarctic Treaty, Dec. 1, 1959, 12 U.S.T. 794, 402 U.N.T.S. 71.

92. Zou Keyuan, *The Common Heritage of Mankind and the Antarctic Treaty System*, 38(2) NETH. INT'L L. REV. 173-98 (1991).

93. UNCLOS, *supra* note 63, art. 145, at 70.

94. Donald C. Watt, *The Law of the Sea Conference and the Deep-Sea Mining Issue: The Need for an Agreement*, 58 INT'L AFF. 78, 85 (1981/1982), available at [https://www.jstor.org/stable/2618276?seq=4#metadata\\_info\\_tab\\_contents](https://www.jstor.org/stable/2618276?seq=4#metadata_info_tab_contents).

95. UNCLOS, *supra* note 63, art. 140, at 68.



beyond the limits of national jurisdiction. Under that part, Article 136 declares the area and the resources under it as “common heritage of mankind.”<sup>96</sup>

Similarly, in light of the rising global temperatures, there is a pressing need to declare the Arctic region, which is beyond currently identifiable national territorial boundaries, as the common heritage of humankind. Time and again, this principle has proven to be one of the most effective ways to fend off territorial claims from aggressive Arctic nations. This principle goes a long way in checking unfettered state sovereignty and laissez-faire freedom.<sup>97</sup> This also helps prevent the ever-expanding claims of nations to newly accessible areas of the high seas.

### III. Going Forward

The problem, however, does not stop with the rise in CO<sub>2</sub> emissions. Most other emissions increase in parallel with CO<sub>2</sub> emissions. For example, as the share of liquefied natural gas (LNG) increases, CH<sub>4</sub> emissions are expected to rise sharply.<sup>98</sup> Thus, there is a need for regulation of and a cap on carbon emissions.

The IMO’s third GHG report, after analyzing 16 possible scenarios of the future of GHG emissions, concluded that the average emissions increase by 2030 is about 29%, and about 95% by 2050, compared with 2012 emissions.<sup>99</sup> However, some scenarios have higher growth predictions, such as those projecting high economic growth and/or high fossil fuel consumption.<sup>100</sup> In all cases with high fossil fuel consumption, the mere change of fuel mix has only a limited impact on reducing GHG emissions as compared to switching over to renewable sources.<sup>101</sup>

The projections also predict that if the share of LNG in the fuel mix increases, the amount of CH<sub>4</sub> being produced will be significantly higher than in other scenarios.<sup>102</sup> It then becomes imperative for cleaner technologies that do not use high amounts of LNG to enter the market and become the dominant fuel. However, new technologies are not that easy to incorporate. It may take far too long for breakthrough technologies to be implemented and become financially feasible for widespread adoption. For example, earlier, it was thought that a change in the fuel mix could have an impact on reducing GHG emissions, but recent studies have shown that even modeled improvements with significant savings in energy do not materially reduce the emissions.<sup>103</sup>

On the other hand, regulatory and market-driven improvements in efficiency cause a downward trend in GHG

emissions.<sup>104</sup> Thus, it is important to have regulations set and enforced strictly to regulate CO<sub>2</sub> emissions in the future.

More specifically, ice-free Arctic waters could mean a significant increase in trade activity in the northern regions. Though the mere opening up of the route may not cause the demand for shipping to rise, the increased activity in the Arctic would cause local pollution, higher GHG emissions, and further diminish the ice sheets that harbor life in the region. Regular physical disruption of the ice sheets could speed up the melting of the ice as well. The general driving factor for increased emissions is the rising demand for maritime transport. With the primary interest of governments being employment and improving living standards, the need for natural resources is expected to drive up the demand for international shipping by 2030.<sup>105</sup>

#### A. IMO’s Plan for the Future

With all this expected increase in international shipping, the Arctic region needs to be protected from the harmful effects of pollution and GHG emissions. The IMO has committed to reduce GHG emissions in years leading up to 2023 and eventually phase out GHG emissions completely.<sup>106</sup> In April 2018, during the 72d Marine Environment Protection Committee (MEPC) conference, the IMO adopted an initial strategy to reduce emissions from ships by at least 50% by 2050 compared to 2008 levels. The strategy includes a framework for Member states to achieve low-carbon-intensity shipping in a phased manner through voluntary cooperation between the port and shipping sectors.<sup>107</sup> Collaboration methods may include the provision of onshore power supply from renewable sources, efficient bunkering of low- and zero-carbon alternatives, and incentives to promote low- and zero-carbon shipping.

The MEPC 74 session held in May 2019 discussed ways to implement the initial strategy in line with the Paris Climate Agreement and the United Nations 2030 Agenda for Sustainable Development. It approved amendments to the initial strategy to strengthen mandatory energy-efficiency requirements for new ships and also developed a procedure to assess the impact of such newly adopted measures.<sup>108</sup> Amendments to MARPOL Annex VI approved for adoption in 2020 include enhanced Energy Efficiency Design Index (EEDI)<sup>109</sup> requirements for several types of ships,

96. *Id.* art. 136, at 67.

97. Scott J. Shackelford, *The Tragedy of the Common Heritage of Mankind*, 27 STAN. ENVTL. L.J. 101 (2008), available at <https://ssrn.com/abstract=1407332>.

98. IMO, *supra* note 25, at 143.

99. *Id.* at 140.

100. All business-as-usual scenarios predict a 50% to 250% increase by 2050. *See id.*

101. *Id.* at 4.

102. *Id.* at 143.

103. *Id.* at 142.

104. *Id.* at 4.

105. LLOYD’S REGISTER ET AL., GLOBAL MARINE TRENDS 2030, at 27 (2013), available at <http://www.futureautics.com/wp-content/uploads/2013/10/GlobalMarineTrends2030Report.pdf>.

106. Press Release, IMO, UN Body Adopts Climate Change Strategy for Shipping (Apr. 13, 2018), <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/06GHGInitialstrategy.aspx>.

107. *Id.*

108. Press Release, IMO, UN Agency Pushes Forward on Shipping Emissions Reduction (May 20, 2019), <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/11-MEPC-74-GHG.aspx>.

109. IMO, *Energy Efficiency Measures* (EEDI is a technical measure that aims at ensuring ships use less polluting engines and equipment. EEDI was made mandatory for all ships at MEPC 62 through amendments to Annex VI of MARPOL.), <http://www.imo.org/en/OurWork/Environment/Pollution->

including gas carriers, general cargo ships, and LNG carriers from 2022.<sup>110</sup>

The MEPC 74 agreed on the terms of reference for the fourth GHG study, which is expected to set standards in line with the Paris Climate Agreement, aiming to keep the global temperature rise below 2°C above pre-industrial levels.<sup>111</sup> Though the Paris Climate Agreement does not include international shipping in its mandate, the IMO is committed to the cause. The fourth GHG study will specifically focus on the emission patterns of ships above 100 gigatons plying international routes between 2012 and 2018, along with details on carbon intensity for the same period.<sup>112</sup> With 2008 set as the base year, the report will also predict scenarios for global shipping between 2018 and 2050, which will allow industry regulators to frame technical, legal, and operational requirements accordingly. Work on the report is scheduled to commence by fall 2019 and is expected to be finalized by fall 2020 when it will be presented in MEPC 76.<sup>113</sup>

The MEPC 74 has also agreed to set up a voluntary multi-donor trust fund to ensure that adequate financial resources are available to support the implementation of GHG reduction strategies. The fund money will be used to propel technical cooperation and capacity-building activities that are essential in achieving the targets set by the IMO.

The MEPC 74 further discussed concrete short-term proposals, including higher efficiency requirements, cleaner fuel composition, and other operational measures. In the mid- and long term, low- and zero-carbon fuels are being considered as potential replacements for bunker fuel. The IMO strategy will be revised in 2023 to include mandatory norms based on emerging trends. The committee also settled on the terms of agreement for the sixth and seventh intersessional working groups scheduled to meet in November 2019 and March 2020, respectively. Broadly, the current focus is on improving the overall efficiency of

ships with a view to completely phase out carbon-based fuels in the near future. To achieve the initial targets set by the IMO, emissions need to peak as soon as possible and subsequently decline.<sup>114</sup>

#### IV. Conclusion

In 2019, the doomsday clock has never been closer to midnight since 1953, when the United States and the Soviet Union started testing thermonuclear devices.<sup>115</sup> The threat of hydrogen bombs was such that scientists across the globe feared the destruction of the world as we know it. Today, the world faces a larger and imminent threat to the survival of the human race due to climate change. Preserving peace amongst nations and preventing the outbreak of nuclear war may have been achieved, but here we are in 2019, when the doomsday clock has circled back to two minutes before midnight, the closest in history.<sup>116</sup>

The dangers of global warming are yet to be seen by many parts of the world. If we do not work toward lowering emissions today, earth may not exist as we know it as soon as 2100. The Arctic is clearly a region that is vulnerable to global warming and climate change. We must endeavor to protect and maintain its geography and ecology.

In our view, it is possible to save the earth from destruction only if nations take their respective international obligations seriously and frame and enforce domestic action. Despite the existence of UNCLOS and other treaties that govern the seas, wide-scale exploitation and power struggles continue unabated. Cooperative international action must aim to resolve disputes and work together to protect the Arctic from further degradation and aim to recover the lost ice cover. We have less than 20 years to stop the earth from heating up to a point of no return. We ask all stakeholders to come together, cooperate, and partake in this global endeavor to preserve the Arctic region.

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Prevention/AirPollution/Pages/Technical-and-Operational-Measures.aspx (last visited July 23, 2019).

110. *Id.*

111. *Id.*

112. Press Release, IMO, Next Steps to Deliver IMO GHG Strategy (Oct. 22, 2018), <http://www.imo.org/en/MediaCentre/PressBriefings/Pages/18-MEPC-GHGprogramme.aspx>.

113. Press Release, *supra* note 110.

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114. *Id.*

115. Eugene Rabinowitch, *The Narrowing Way*, 9 BULL. ATOM. SCIENTISTS 294-95 (1953), available at <https://thebulletin.org/sites/default/files/1953%20Clock%20Statement%201.pdf>.

116. *Id.*