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AIR POLLUTION PREVENTION

Considerations in support of a proposal under MARPOL Annex VI to reduce Black Carbon emissions from international shipping impacting the Arctic with global climate and health consequences

Submitted by FOEI, WWF, Pacific Environment and CSC

SUMMARY

Executive summary:	This document summarizes findings from a September 2026 report, "On ever thinner ice: Reducing Black Carbon demands urgent action". As the climate crisis worsens and the approach of multiple tipping points portends irreversible runaway changes, reducing the impact of Black Carbon on the Arctic has emerged as an urgent global priority. In July of 2025, Pacific Environment published "On Thin Ice: Why Black Carbon demands urgent action", a report that makes the case for requiring ships operating in and near the Arctic to use "polar fuels" such as cleaner distillate fuels that produce less Black Carbon. The new report – "On ever thinner ice …" – updates developments since then.
Strategic direction, if applicable:	3
Output:	3.3
Action to be taken:	Paragraph 19
Related documents:	MEPC 84/10/3; MEPC 82/5/2, MEPC 82/7/17; PPR 13/6, PPR 13/6/2, PPR 13/6/3 and PPR 12/6/1

Introduction

1 As the climate crisis worsens and the approach of multiple tipping points portends irreversible runaway changes, reducing the impact of Black Carbon (BC) on the Arctic has emerged as an urgent global priority. The Arctic is warming four times faster than the rest of the globe, driven in part by increasing BC (soot) emissions from shipping. The Arctic meltdown and interconnected impacts from pollution and biodiversity loss have profound implications for global weather patterns, ecosystems and sea level rise, as well as for the Indigenous Peoples and wildlife living in and near the Arctic and for climate-vulnerable communities around the world. In a 2025 report, Pacific Environment makes the case for requiring ships operating in and near the Arctic to use "polar fuels" such as cleaner distillate fuels that produce less BC. A proposal to PPR 13 calls for the implementation of a "polar fuels measure" designed to do just that. Following the release of the 2025 report[1], and the submission of document PPR 13/6

[1] On thin ice: Why black carbon demands urgent action | Pacific Environment

(Denmark et al.)[2], "On ever thinner ice: Reducing Black Carbon demands urgent action"[3] presents new evidence establishing the urgency of taking action to reduce BC emissions from ships operating in and near the Arctic. A summary of this new evidence follows.

Climate tipping points alarmingly closer or exceeded

2 The urgency to address short-lived climate pollutants including BC from Arctic shipping grows as tipping points are approached and passed. A metaphor for runaway change, a tipping point is a critical threshold where a small change triggers a large, often irreversible shift in the state of an earth system element. A tipping point occurs when change in part of a system becomes self-perpetuating beyond some threshold – leading to substantial, widespread and often abrupt and irreversible impacts. BC emissions from shipping in and near the Arctic affect several earth systems in danger of approaching a tipping point, including melting and collapse of the Greenland ice sheet and widespread thawing of permafrost. In the last year, the approach of several tipping points has grown closer with sustained temperatures of 1.5°C warmer than pre-industrial levels now at hand.

3 Recent research reports have shown that 1.5°C will soon be exceeded, including the United Nations Environment Programme's (UNEP) *2025 Emissions Gap Report* which found that global average temperatures will likely exceed 1.5°C above pre-industrial levels within the next decade putting humanity "in the danger zone".[4] To stay below that threshold, the world would need to slash annual GHG emissions by 55% compared with 2019 levels by 2035. That report, prepared to inform climate negotiations at the United Nations Framework Convention on Climate Change (UNFCCC) Conference of the Parties 30th session (COP 30), compiles scientific knowledge from 160 scientists in 23 countries. The report found with high confidence that ice sheets are approaching warming tipping points leading to irreversible collapse, locking in long-term multi-metre sea level rise, and that they have been at risk since at least 1°C of global warming. Several more systems (mountain glaciers, boreal forests and the Atlantic Meridional Overturning Circulation system, or AMOC) likely have their tipping point around 2°C of global warming. Crossing these tipping points becomes more likely for each 0.1°C of global warming. Parts of the polar ice sheets may have already crossed tipping points that will eventually commit the world to several metres of irreversible sea level rise affecting hundreds of millions of people (Lenton et al., 2025).[5] Multiple studies and research papers published recently have provided a number of examples of collapsing and retreating ice sheets and glaciers around the globe.[6,7]

4 A slow collapse of the Greenland ice sheet, which could raise global sea level by about 7.4 metres (24 feet), is considered one of the most likely tipping elements in a world more than 1.5°C warmer than pre-industrial times (Phillips, 2025).[5] The "European State of the Climate" 2025 report by the European Centre for Medium-Range Weather Forecasts published recently shows that in 2025 the Greenland ice sheet lost around 139 gigatonnes of ice, and that there was also a significant reduction in snow and ice cover across Europe (including

2 PPR 13-6 - Proposal to establish a fuel measure under MARPOL Annex VI to reduce Black Carbon emissions from international shipping - Clean Arctic Alliance

3 On ever thinner ice: Reducing black carbon demands urgent action | Pacific Environment

4 Emissions Gap Report 2025

5 Relevant articles cited in this document can be found in the report – On ever thinner ice: Reducing black carbon demands urgent action | Pacific Environment.

6 New 3-D Study of the Greenland Ice Sheet Shows Glaciers Falling Apart Faster Than Expected - Inside Climate News

7 Antarctica just saw the fastest glacier collapse ever recorded | ScienceDaily

some parts of the Arctic). Additionally, glaciers in Europe saw a net mass loss, with the most negative mass balances observed in Iceland (C3S/ECMWF and WMO, 2026).[5]

Sea ice loss is weakening the food chain for fish and marine mammals

5 Researchers at the University of Edinburgh and other academic institutions found in a 20-year study that melting sea ice has caused a significant loss of nitrate in Arctic waters, which is triggering damaging changes in the food web and diminishing the health of marine life. Nitrate – a nutrient essential for growth of microscopic plankton which supports the entire Arctic food web – is being stripped from the oceans as a result of the disappearance of sea ice, resulting in greater exposure of shallow Arctic waters to sunlight and intensification of a process known as benthic denitrification. This process reached a tipping point around 2009, when dramatic nitrate reductions were observed. The new study found that less nitrate limits the amount of life the Arctic ecosystem can sustain. As nitrate levels decrease, Arctic ecosystems and the entire food web could be adversely affected, including fish, seabirds, marine mammals and whales (Santos-García et al., 2026).[5]

The Atlantic Meridional Overturning Circulation "Ocean Conveyor Belt" is under threat

6 Land and sea ice losses portend rising sea levels and a weaker AMOC. The AMOC – the Atlantic Meridional Overturning Circulation – is one of the ocean circulation systems being disrupted by climate warming. Glacier melt and sea ice decline are disrupting the AMOC, with cascading effects on weather patterns in the mid-latitudes. The AMOC could be influenced by numerous tipping point systems. According to the "Global Tipping Points Report 2025" report, the AMOC featured in 45% of all assessed tipping point interactions scientists examined (Lenton et al., 2025).[5]

7 The AMOC is already at its slowest point in 1,600 years. Without it, northern Europe would become much colder, and rainfall in Africa and South America would also change drastically, putting food supplies for hundreds of millions of people at risk (Gajbhiye, 2026).[5] Research indicates the AMOC is most likely to pass its tipping point around 2050, with a 95% confidence interval extending from 2025 to 2095. Models show how quickly the AMOC slows down once the tipping point is passed – a disaster unfolding at what some researchers describe as "terrifying speed" (Gross, 2024).[5]

8 Melting glaciers release fresh water. As darkened surfaces absorb more solar radiation, more fresh water runoff from glaciers goes into the oceans. Through dilution, fresher water does not sink as easily, so a weaker current could create a feedback loop, slowing the AMOC circulation further and leading to a shutdown within a century once it begins (Phillips, 2025).[5]

9 Sea ice loss in the Beaufort Sea, north of the Alaskan and Canadian coasts, also may disrupt the AMOC. One of the major ocean currents in the Arctic Ocean's Beaufort Sea, called the Beaufort Gyre, is losing sea ice due to warmer temperatures. By storing or releasing fresh water, it influences the oceanic properties both within the Arctic and the North Atlantic, according to a 2025 study by the University of Gothenburg. Previous research shows that the fresh water content of the Beaufort Sea has increased by 40% over the last two decades (Meyer, 2025).[5] Researchers at the Alfred Wegener Institute in Germany commented that the release of fresh water from the Beaufort Gyre could reach the North Atlantic and possibly negatively impact the AMOC.

Warm-water coral reefs under increasing threat

10 Earth's ecosystem has already crossed the first tipping point – bleaching of coral reefs – setting off global alarms. Warm-water coral reefs experienced the worst bleaching event on

record over 2023-2025 as their thermal tipping point of 1.2°C was crossed, impacting over 80% of reefs worldwide. Losses from the massive bleaching of warm-water coral reefs, which caused unprecedented dieback, cannot be reversed. Stabilizing warming at 1.5°C, even without overshoot, makes functional loss of warm-water coral reefs virtually certain: greater than 99% probability. To retain functional coral reefs at a meaningful scale, global mean warming must return below 1.2°C. Warm-water coral reefs support nearly a billion people and a quarter of all marine life (Lenton et al., 2025).[5]

Positive tipping points give glimmers of hope

11 With global warming soon to overshoot 1.5°C, developing and implementing effective governance strategies and positive tipping points is increasingly urgent and important (Lenton et al., 2025).[5] The *Global Tipping Points Report 2025* emphasizes positive tipping points (see also document MEPC 82/7/17), such as adoption of solar photovoltaic technology and wind power globally, the adoption of electric vehicles, battery storage and heat pumps in leading markets and emerging applications of green hydrogen and green ammonia. The report explores international responses needed to achieve positive tipping points that could counteract global warming's impacts and help restore nature and biodiversity. Positive tipping points are already creating positive transformations across sectors, regions and communities, but accelerated change is required to stabilize and reverse warming. Reducing BC emissions from ships sailing in and near the Arctic is one such step.

International Court of Justice advisory opinion on climate change obligations

12 On 23 July 2025, in a landmark advisory opinion, the International Court of Justice (ICJ) confirmed that international law requires States to prevent significant harm to the climate from fossil fuel emissions and that failure to do so can trigger legal responsibility. On 20 May, 2026, the United Nations General Assembly (UNGA) adopted with a commanding 141 to 8 majority a resolution implementing the advisory opinion (see PPR 13/6/2).

13 Key findings of the ICJ advisory opinion include (Schaugg et al., 2025)[5]:

.1 1.5°C is a legally binding target for limiting the global average temperature increase under the Paris Agreement.

.2 Customary international law imposes binding obligations on States to take preventive and precautionary measures to avoid climate harm, including through the regulation of private actors. Multiple sources of law impose legal duties on States to prevent "transboundary environmental harm", act with precaution and take due diligence measures to reduce GHG emissions and adapt to the adverse impacts of climate change.

.3 While the emission of GHGs is not unlawful, per se, failure to take appropriate measures to prevent foreseeable harm – including through fossil fuel production and consumption, new exploration licences, subsidies or inadequate regulation – can constitute a wrongful act attributable to the State, and States must regulate private actors' emissions as part of their due diligence obligations.

.4 These obligations apply beyond the climate change treaties and are binding across international law, as the human right to a clean, healthy and sustainable environment is essential for the enjoyment of other human rights. States must take measures to guarantee the effective enjoyment of human rights, including via the regulation of activities of the private sector.

.5 With respect to shipping, the ICJ broadly agrees with the International Tribunal for the Law of the Sea (ITLOS) Advisory Opinion on Climate Change and reiterates that anthropogenic GHG emissions constitute pollution of the marine environment. Other law of the sea and related instruments, such as MARPOL Annex VI, may contribute to protecting the climate system.

.6 Both customary international law and climate treaties, such as the United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement, impose binding obligations on States to undertake adaptation measures in line with the best available science. Developed countries have the additional responsibility of helping developing countries meet the costs of adaptation.

.7 Scientific evidence allows emissions to be attributed to individual States, including cumulative historical and current emissions. This enables States harmed by climate change to invoke legal responsibility.

.8 All states have a legal interest in compliance. As such, any State – not only those harmed directly – can invoke responsibility for breaches of climate obligations under customary international law and climate treaties.

.9 Wrongful acts breaching climate obligations "may give rise to the entire panoply of legal consequences provided for under the law of State responsibility including obligations of cessation and non-repetition (consequences that apply irrespective of the existence of harm); consequences requiring full reparation including restitution, compensation and/or satisfaction".

Scope and significance of the ICJ Opinion

14 The unanimous ruling by 15 judges has significant implications for national climate policies and international climate negotiations and opens new pathways for international and domestic litigation against governments. The 15 judges adopted an expansive interpretation of States' obligations, and the opinion largely rejects arguments put forth by major emitters (Duvic-Paoli, 2026).[5]

15 While the opinion focuses on the conduct of States, it also has significant implications for the regulation of energy producers and private emitters (McVey & Savaresi, 2025).[5] The UNGA, which requested the opinion from the ICJ in 2023, moved forward to operationalize it with the resolution adopted in May 2026 (Foster, 2025).[5]

16 Spearheaded again by Vanuatu, draft United Nations resolution proposed in A/80/L.65 attracted 90 co-sponsors. It welcomed the advisory opinion as an "authoritative contribution to the clarification of existing international law" and initiated political follow-up to the ruling. In the resolution, the UNGA requested the Secretary-General to prepare a report in 2027 on ways to advance compliance and scheduled follow-up on the UNGA's 83rd session agenda in 2028 ("UN Initiates Follow-up," 2026).[5] The resolution creates a multilateral framework for addressing dimensions of climate harm that the advisory opinion left for political actors to take forward (Wewerinke-Singh, 2026).[5]

17 Work on cross-sector implementation of the ICJ Advisory Opinion has begun. For example, a joint task force was launched by the Health Diplomacy Institutional Network and the World's Youth for Climate Justice to analyse the opinion's health implications (World's Youth for Climate Justice, 2026).[5]

Conclusion

18 It is essential to reduce Arctic BC emissions from shipping as quickly as possible:

.1 The Arctic's rapid meltdown and deteriorating cooling system are a wake-up call for the future path of the planet, requiring urgent action.

.2 All nations and other entities, such as IMO, are required to act expeditiously with due diligence to reduce climate warming – in line with the ICJ's Advisory Opinion and the UNGA's guidance on climate obligations under international law.

.3 BC emissions from Arctic shipping are accelerating Arctic melting and reducing its reflectivity but currently are not regulated. Therefore, IMO and its Member States must act as soon as possible to adopt a measure, such as the Arctic polar fuel regulation which was submitted to PPR 13 (PPR 13/6), with a wide geographic scope that dramatically cuts BC emissions from shipping in the Arctic.

.4 This must be accomplished urgently. A broad geographic scope must be decided by MEPC and a regulation should be finalized by PPR and forwarded to MEPC for approval and subsequent adoption. The co-sponsors particularly urge Member States to bring forward the discussion of the geographic scope of such a measure as quickly as possible, including, if possible, informal discussions on the margins of MEPC 85.

.5 The worsening climate crisis requires immediate action on all fronts – including maritime shipping.

Action requested of the Committee

19 The Committee is invited to consider the information provided in this document, in particular, as outlined in paragraph 18, the need to establish a sufficiently wide geographic scope for the polar fuel measure proposed in document PPR 13/6, and to provide PPR 14 with the necessary authority to discuss the measure and move a proposed regulation forward to MEPC 86 for approval, and take action as appropriate.