**Revised draft Project Proposal**

**Black carbon and methane mitigation measures from shipping in the Arctic**

**Fuel and Exhaust Gas Treatment for Marine Diesel Engines**

**Submitted by Iceland (draft version 26 Nov 2018)**

# Project Title: Black carbon and methane mitigation measures from shipping in the Arctic: Fuel and Exhaust Gas Treatment for Marine Diesel Engines

# Summary

Iceland has conducted research on exhaust gas cleaning and water-in-fuel emulsification and now seeks to expand this work within PAME. The aim of this project is to compare methods of fuel and exhaust gas treatment to find the best way forward to reduce the amount of harmful gases emitted by vessel engines with the goal to write a summary report with recommendations to the Arctic Council and identify common challenges and results within the Arctic Council Member States. Observers are also encouraged to participate.

To date, PAME has undertaken a number of projects that relate to Heavy Fuel Oil (HFO) use and carriage by ships in the Arctic. One aspect of concern in using HFO is the release of air pollutants, such as carbon dioxide (CO2) and black carbon – the second largest contributor, after CO2, to human induced climate change (Bond et al., 2013) from all sources. Black Carbon emitted in the Arctic warms Arctic surface temperatures nearly five times more than Black Carbon emitted in mid latitudes (Bond et al., 2013). It is therefore of specific interest and importance to the Arctic region to examine emission control measures.

A great majority of engines used for vessel propulsion are driven by fossil diesel oil. Smaller vessels and smaller engines are generally powered by Marine Diesel Oil (MDO). For larger engines, Heavy Fuel Oil (HFO) is the fossil diesel used as it has greater viscosity than the former. HFO is less refined and cheaper than MDO and is therefore the favored choice among owners of larger vessels. The combustion of any type of fossil diesel creates numerous exhaust gases which are harmful to the environment and human health.

The summary report will be supplemented with an online resource of the information collected for this project.

The project and its result serve as shipping-specific input from PAME on mitigation measures for shipping in the Arctic, which may contribute to the ongoing work within the EGBMC, IMO’s PPR Committee, and serve as a basis for future projects within PAME. Special attention will be given to the work within IMO to not duplicate its work.

# Background

The 2017 Summary of Progress and Recommendations Report by the EGBCM identified emission abatement technologies as one of the possible ways of achieving the goal of reducing emissions in the Arctic[[1]](#footnote-1). The EGBCM also concluded that Arctic shipping currently accounts for about 5 percent of black carbon emissions within the Arctic and that, absent emission controls, shipping emissions within the Arctic could double by 2030 under some projections of Arctic vessel traffic.[[2]](#footnote-2)

Efforts have been undertaken to respond, such as the 2020 global sulphur limit regulation, and the current discussion within the IMO to ban the use and carriage of HFO in the Arctic. Iceland is fully aware of the work within the IMO on this topic and is one of the countries which proposed the HFO ban in the Arctic, and participates fully in work within the IMO, including the Marine Environment Protection Committee (MEPC), the Maritime Safety Committee (MSC) and the sub-committee on Pollution Prevention and Response (PPR). The intent of this project is to supplement and contribute to the ongoing work within IMO on this topic, and project leads will ensure that IMO’s work will not be duplicated.

This project will give full consideration to the work of the newly appointed working group within IMO’s sub-committee on Pollution Prevention and Response (PPR) i.e. to *“identify candidate control measures to reduce the impact on the Arctic of Black Carbon emissions from international shipping” and to “assess the feasibility, safety, availability and effectiveness of the identified candidate control measures, with a view to finalization of the investigation of appropriate control measures at PPR 6.* Iceland is willing to host a workshop for the project going forward to advance and further streamline its work.

# Rationale

In support of this project, reference is made to:

The Arctic Council Task Force on Short-Lived Climate Forcers “Recommendations to Reduce Black Carbon and Methane Emissions to Slow Arctic Climate Change” (2013)[[3]](#footnote-3):

* IMO’s sub-committee on pollution prevention and response (PPR) comment that it has “noted the need for Black Carbon (BC) measurement studies to gain experience with the application of the definition and measurement methods, invited interested Member Governments and international organizations to initiate, on a voluntary basis, BC measurement studies to collect data. At the same time, information of different potential options to reduce BC is gathered.”[[4]](#footnote-4)
* The Summary of Progress and Recommendations Report submitted by the Expert Group on Black Carbon and Methane (EGBCM) to the Fairbanks Ministerial meeting in Fairbanks 2017.
* Fairbanks Ministerial declaration, (paragraph 24) i.e. “*Adopt the first Pan-Arctic report on collective progress to reduce black carbon and methane emissions by the Arctic States and numerous Observer States and its recommendations……”*
* Report to the MEPC from the sub-committee on Pollution Prevention and Response, dated 23 March 2018.
* Greenhouse Gas Emissions from Global Shipping, 2013-2015, published by the ICCT in October 2017.
* Black Carbon Emissions and Fuel Use in Global Shipping published by the ICCT in December 2017.
* PPR 5/INF.7 – Update to the investigation of appropriate control measures (abatement technologies) to reduce Black Carbon emissions from international shipping, submitted to PPR 5 and dated 29 November 2017.
* Communication between PAME and ACAP, AMAP and EGBCM on black carbon, sent July 2018. In their reply to PAME, EGBCM stated that no efforts have yet been made to *“dig deeply into shipping as this could potentially lead to a duplication of work.”* Furthermore, the EGBCM stated that they were *“interested to hear of the progress in PAME and […] happy to continue with a dialogue.”*

# Key Objective

The objective of this project is to compare methods of fuel and exhaust gas treatment to find the best way forward to reduce the amount of harmful gases emitted by vessel engines with the aim to strengthen harmonization, dialogue and cooperation between the Arctic Council member states and Arctic Council Observers on research on possible means by which to reduce the amount of harmful gases emitted by vessel engines.

# Scope

* The project falls under AMSA recommendation II(H) which states: “*That the Arctic states decide to support the development of improved practices and innovative technologies for ships in port and at sea to help reduce current and future emissions of greenhouse gases (GHGs), Nitrogen Oxides (NOx) Sulfur Oxides (SOx) and Particulate Matter (PM) taking into account the relevant IMO regulations."*
* The project will seek to gather information from all available sources, including governmental authorities, the maritime industry and indigenous and local communities throughout the Arctic.
* The project can utilize data from the ASTD database on emissions from ships
* Synergies with the work of IMO will be ensured
* The project will have relevance to PAME’s shipping work, including HFO
* The project will feed into discussions by experts from the member states and observers to work together on the best ways to reduce harmful emissions by ships

# Main Components and Implementation

This project will require a nomination of an expert from each of the member states, permanent participants and observers of the Arctic Council. A workshop is scheduled for September 2019, back-to-back with PAME-II 2019. One of the background documents for this project is a study conducted by the Icelandic Transport Authority on this topic: [here](https://www.samgongustofa.is/media/siglingar/skyrslur/GasCleaning-Bernodusson-2018.pdf).

Any local research, data or knowledge will be valuable to the final outcome, as the project will seek to collect a varied and extensive overview.

***Timeline and Major Milestones***

* February 2019: PAME-I 2019 meeting approval and confirmation of project leads for inclusion into the 2019-2021 Work Plan.
* May 2019 – September 2019: Undertake information gathering from publicly available sources and Arctic Council member states.
* September 2019: Half or whole day workshop, back-to-back with PAME-II 2019.
* September 2019-February 2020: Continue information gathering and compilation.
* February 2020: Provide update to PAME-I 2020 on project status, including an outline of the report and a list of information sources.
* February 2020 – September 2020: Continue information gathering, compile and synthesize information received by 1 June and begin drafting report.
* September 2020: Submit a draft report to PAME-II 2020 and invite review and comment by 15 November 2020.
* November 2020 – February 2021: Revise draft report in light of comments received.
* February 2021: Final draft submitted to PAME-I 2021 for approval and submission to SAOs and Ministerial.
* March 2021: Present any revisions to SAOs.
* May 2021: Finalize report for Ministerial.

# Indicative Budget

Consistent with the overall Arctic Council approach, the development of this project will be financed through voluntary contributions and in-kind support from member governments. Financial contributions may be sought from other sources as well, such as the Nordic Council of Ministers.

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| **Item/activity** | **Budget (USD/in-kind)** |
| Project management, coordination, consultation and outreach | 50.000 |
| External expert(s) | 15.000 |
| Workshop | 30.000 |
| Editing, final layout and printing | 10.000 |
| **Estimated Total:** | **105.000** |

# Main outcomes

The final product will be a written summary report and an online resource containing an overview of different ongoing research projects, preferably with information related to methodology, technical execution, necessary equipment and key measurements. It will serve as shipping-specific input from PAME on mitigation measures for shipping in the Arctic, which may contribute to the ongoing work within the EGBMC, IMO’s PPR Committee, and serve as a basis for future related projects within PAME.

# Project Team Structure/Lead Countries

* Leads: Iceland (Jon Bernodusson, Icelandic Transport Authority; Anna Margret Bjornsdottir, Icelandic Transport Authority); Others?
* Each Arctic Council member government and Permanent Participants’ organization to appoint a project team member.
* Collaboration, inputs and synergies will be important, in particular with the EGBCM, IMO and the industry, as relevant.
* The PAME Secretariat will provide administrative and project assistance.
* Other Arctic Council working groups will be consulted accordingly.

1. Expert Group on Black Carbon and Methane (EGBCM), *Summary of Progress and Recommendations*, pp. 17. (link to the full report is [here](https://oaarchive.arctic-council.org/bitstream/handle/11374/1936/EDOCS-4319-v1-ACMMUS10_FAIRBANKS_2017_EGBCM-report-complete-with-covers-and-colophon-letter-size.pdf?sequence=5&isAllowed=y) [↑](#footnote-ref-1)
2. Ibid. [↑](#footnote-ref-2)
3. <https://oaarchive.arctic-council.org/bitstream/handle/11374/80/MM08_ACTF_SLCFsFinalSummaryReport_English_5-13-2013%20%283%29.pdf?sequence=1&isAllowed=y> [↑](#footnote-ref-3)
4. <https://pame.is/images/05_Protectec_Area/2018/Other/PPR_5-7-2_-_Black_Carbon_emission_measurement_results_for_4-stroke_marine_diesel_enginesusing_various_Finland.pdf> [↑](#footnote-ref-4)