# RISE IN ARCTIC SHIPPING TRAFFIC IS BAD NEWS FOR BLACK CARBON EMISSIONS

## A MELTING ARCTIC OFFERS A SHIPPING SHORTCUT...

## ...BUT ALSO INCREASES THE RISK OF AN ENVIRONMENTAL DISASTER

***Heavy Fuel Oil*** *(HFO) is the leftover residual of the petroleum refining process. It is extremely viscous and virtually impossible to clean up in the case of a spill.*

## HFO COMBUSTION PRODUCES HIGH LEVELS OF HARMFUL BLACK CARBON EMISSIONS

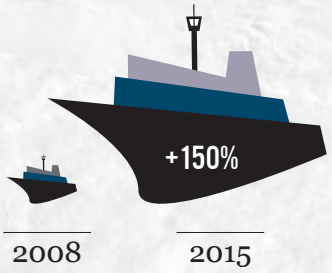
*BC is* **3200 times** *more powerful a climate forcer than CO2 per ton.*

*CO2*

**BLACK CARBON'S WARMING EFFECT IS AT LEAST 3 TIMES HIGHER IN THE ARCTIC**

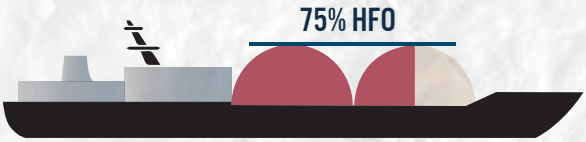
### 1 Arctic shipping is projected to increase as ice-melt is making the Arctic waters more accessible

*Shipping traffic in Alaskan waters has increased dramatically in recent years.*

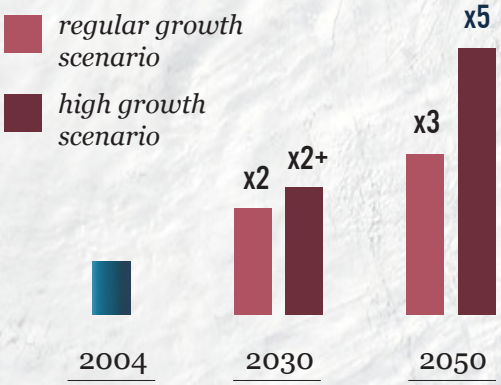



### 2 Arctic waters are fraught with dangers due to variable ice coverage, storms and lack of infrastructure, which can lead to dangerous oil spills

*Most fuel carried by vessels in the region is* ***HFO.***

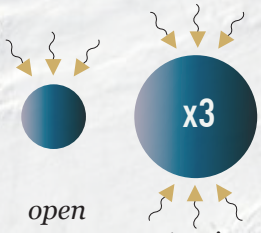



### 3 Black Carbon (BC) emissions in the Arctic are expected to increase with the growth of shipping in the Arctic




### 4 BC deposits on white ice sheets accelerate the melting of snow

*BC particles absorb both incoming radiation from above and reflected radiation from below.*



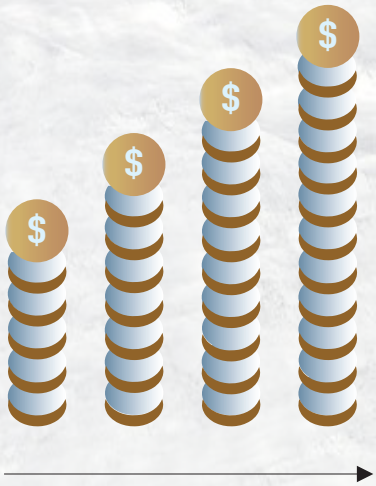
5 **Health risks**

# BLACK CARBON ALSO BRINGS SIGNIFICANT NEGATIVE HEALTH & ECONOMIC IMPACTS

**Economic impact** 6

## Inhalation of BC is dangerous to human health

*HFO combustion pollutants including BC are linked to increased heart and lung disease.*




*Net Present Value to 2200*

USD $2.15 tn

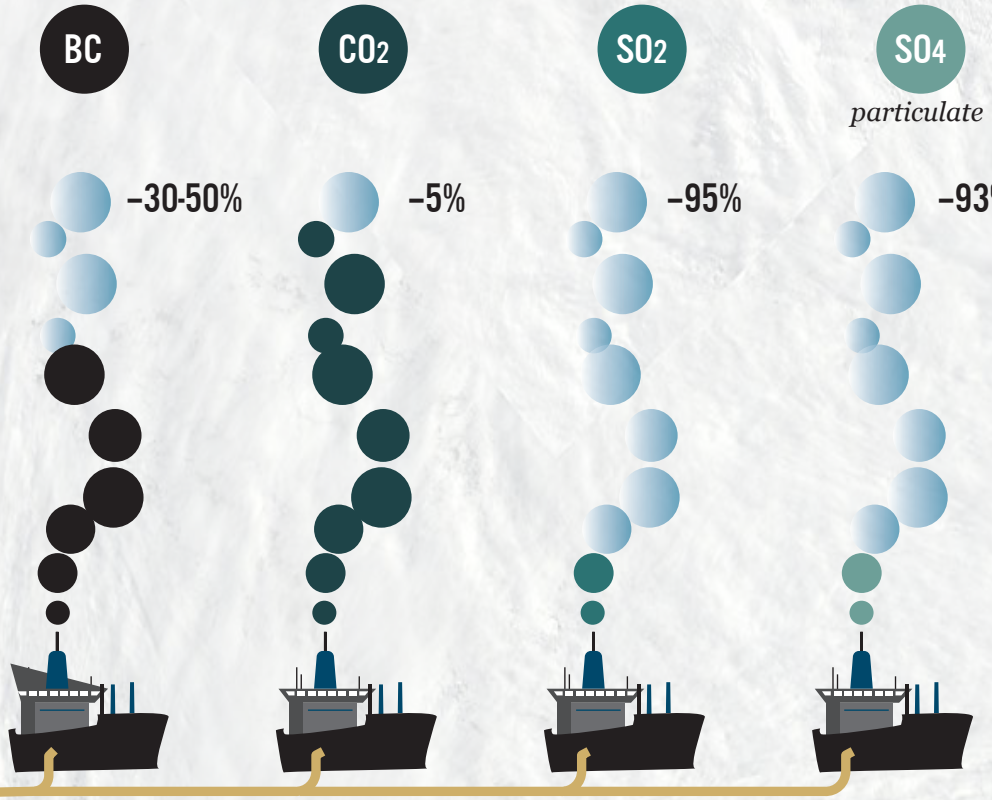
## Expected global economic loss

*Due to increased temperatures and rising sea levels resulting from emissions from future shipping through the Northern Sea Route.*

# BUT SOLUTIONS TO MITIGATE THE RISKS ARE ALREADY AVAILABLE

**A switch from HFO to higher quality fuels would reduce black carbon and other emissions**


*The use of a particulate filter would further reduce black carbon by up to 90%.*




# A BAN ON HFO USE BY SHIPS WILL SIGNIFICANTLY REDUCE BLACK CARBON EMISSIONS IN THE ARCTIC

*James J. Corbett et al., "Arctic shipping emissions inventories and future scenarios.", 2010.*
*Bryan Comer, Xiaoli Mao, Naya Olmer, "Heavy fuel oil use in Arctic shipping in 2015", ICCT working paper.*
*Dmitry Yumashev, Karel van Hussen, Johan Gille, Gail Whiteman, Helen Merrills. Policy Science Roundtable: "Towards a Balanced View of Arctic Shipping", 15 September 2016.*
*Daniel Lack, "The Impacts of an Arctic Shipping HFO Ban on Emissions of Black Carbon", September 2016.*
*Dmitry Yumashev personal communication, 11 January 2017.*

*Produced for the Clean Arctic Alliance www.HFOFreeArctic.org*

*Designer: Margherita Gagliardi*