

Zero-Emissions Shipping:

A Pragmatic Pathway for Arctic and Global Decarbonization



CLEAN ARCTIC
ALLIANCE



1

Why Focus on Arctic Shipping?

Growth in Arctic shipping is BAD NEWS and the result of a destabilised Arctic environment

The Arctic is warming **3x faster** than the rest of our planet



The overall **thickness**, volume and age of sea ice has **decreased by 80%** since 1979.



The post-winter **sea ice** volume in **April 2021** was the **lowest** since records began in 2010.

In 2021, **rain - not snow** - fell for the first time at the **Greenland Summit Station**.



In 2020, the **highest temperature ever** was recorded in the **Arctic at 38° C (100° F)**.

What happens in the Arctic doesn't stay in the Arctic.



Ice sheets, melting glaciers and thermal expansion across the planet are already projected to **raise sea levels between 1 – 2m by 2100**, even if global heating can be restricted to no more than 1.5° C.



The **shipping industry** must rapidly **reduce CO₂ and black carbon emissions** and their effect on the Arctic.

Reversing the loss of the Arctic ice sheet, glaciers and sea ice **is critical** to the future of Arctic wildlife, communities and the planet.

2

What's at Stake Globally?

30%

Emission reduction
by 2030

80%

Emission reduction
by 2040

100%

Emission reduction
by 2050

2

What's at Stake Globally?

3

Hierarchy for Transition to Zero Emissions

Energy Efficiency - A First Practical

Step:

Optimised ship operations and retrofitting

Retrofitting existing ships with **wind assist technology** can mean up to **30% saved in fossil fuel consumption**.

Use dry-docking time during maintenance and cleaning to retrofit vessels with wind assist technology.

Fuel savings for:

- Underwater cleaning with capture** (6% - 10% on BAU voyage)
 - Quick & efficient
 - Minimal downtime for vessel
- Dry-docking** (15% - 18%)
 - Thorough maintenance
 - Longer downtime but deeper cleaning

Vessel efficiency

Scheduling and route choices

Plans for an efficient voyage include weather routing and monitoring.

Vessel operations

The wind averages in all regions are 9-10 knots or above, with the Baltic sea, Indian Ocean, North Atlantic, North Pacific, North Sea and Southern Ocean all averaging 15 knots + or above

Vessel deployment

Maximise efficiency by ensuring more vessels sail at full capacity.

Blue speed

Reductions in speed of **20%** means decrease in **lethal whale collision hazard of 67%** in European waters.

speed **-20%** → **-67%** whale strikes

Port optimisation


Just-in time arrivals and synchronised departure schedules could lower **absolute CO₂ emissions** by up to **14%**.

Reduction in port delays

absolute CO₂ emissions reduction **-14%**

Proper bunkering facilities

Integration of **zero-emission fuel bunkering** in port infrastructure will increase the overall efficiency.



Addressing Challenges of New Fuels:



The Role of an Equitable Emissions Levy:





To transition the shipping industry successfully to zero carbon, we need:

Stronger and enforceable **CII requirements**



A global **GHG fuel standard** transitioning away from polluting fuels to carbon neutrality



An ambitious **carbon levy** for a low-cost transition



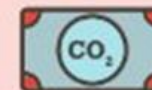
Carbon Intensity Indicator (CII)

- ▶ Maximising ship efficiency to minimise fuel consumption;
- ▶ Overcoming barriers to adopt new tech and practices;
- ▶ Reducing ships' speed to provide important ocean health co-benefits.



Global Fuel Standard (GFS)

- ▶ Ensuring the uptake of readily-available wind technologies;
- ▶ Making sure zero-emission fuels are available when needed.



Levy

- ▶ Incentivising clean shipping;
- ▶ Reducing the cost gap between old polluting fuels and zero-emission fuels;
- ▶ Distributing the revenue gained towards a just & equitable transition.

Thank you

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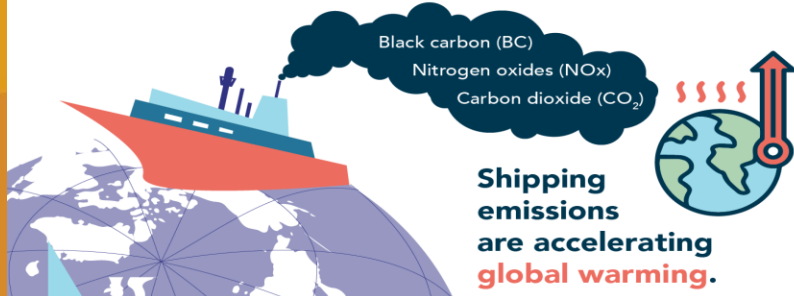
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Liquefied Natural Gas (LNG) is a threat to the Arctic



Shipping emissions are accelerating global warming.

On route to shipping decarbonisation...

In an effort to reduce black carbon and greenhouse gas (GHG) emissions, shipping is looking to move away from oil based fuels.

However some alternatives including Liquefied Natural Gas (LNG), are still fossil fuels.



...but LNG must not be part of the solution.

LNG is predominantly made up of methane, a short-lived climate forcer more potent than CO₂.



The Arctic is warming 4 times faster than the global average!



Methane is a dangerously potent greenhouse gas (CH₄).

It has a warming effect up to **80 times** more powerful than CO₂ over a 20 year period (GWP20).

Emissions from LNG-fueled ships grew by **150%** between 2012 to 2018.

The pathway of methane emissions from LNG fuel



When burned by ships, LNG releases methane and other pollutants into the atmosphere.



Additionally, the process of extracting, processing, and transporting of LNG results in methane leakage. These activities can also cause significant environmental impacts including habitat destruction, water pollution, and climate heating.

Global heating is speeding the Arctic permafrost thaw

The fragile Arctic permafrost ecosystem already under threat from global heating could be reaching a global tipping point.

- Arctic terrestrial permafrost contains 2x carbon as in the atmosphere.
- As the Arctic heats up, shallow permafrost starts to thaw.
- Thawing permafrost releases CO₂ and CH₄ into the atmosphere.
- Released CO₂ and CH₄ add to the global burden of GHGs - speeding global warming.
- Burning LNG as fuel adds to the acceleration of Arctic permafrost thaw and a potential and irreversible tipping point being reached.

