

# Addressing Arctic black carbon emissions from ships at EU level

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# Black carbon

- Produced during the burning of fossil fuels (oil-based fuels)
- A potent short-lived climate pollutant
  - over x3000 greater impact per kg of CO<sub>2</sub> on GWP20 basis
- One-fifth of international shipping's climate impact at GWP 20
  - IMO GHG4 2020
- Contributes to Arctic amplification of climate warming
  - BC absorbs sunlight, heats surrounding atmosphere
  - Dramatically reduces albedo effect when deposited on ice/snow
- Negative impact on human health – ultrafine PM

# The Arctic

- Major climate regulator
- Warming 4x faster than the planet as a whole
- Supports a huge productivity of plant and animal life
- Cultural identity for Indigenous communities
- Losing around 13% Arctic sea ice per decade (since 1979)

# Shipping in the Arctic

- Between 2013 and 2019 shipping in the Arctic increased by 25%
- Total distance sailed increased by 75%
- Increases in fishing vessels, gas tankers, crude oil tankers, offshore supply ships, cruise ships, chemical tankers, passenger ships, general cargo ships, bulk carriers

[THE INCREASE IN ARCTIC SHIPPING 2013-2019 \(pame.is\)](#)

# Arctic Council: BC emissions

**Target: 25 – 33% reduction in BC emissions below 2013 levels by 2025**

EU-funded initiative: Arctic Black Carbon impacting on Climate and Air Pollution (ABC-iCAP)

[AMAP projects | The EU Action on Black Carbon](#)

- Members States on course for 20.4 – 30% reductions by 2025
- Observer States on course for 36 – 56.4% reductions by 2025
- Independent datasets suggest a collective reduction of 20.4 – 21.6% by 2025
- 2013 AMAP; BC emissions north of 60°N more significant than at lower latitudes,
- however most BC deposited in the Arctic comes from above approx. 40°N

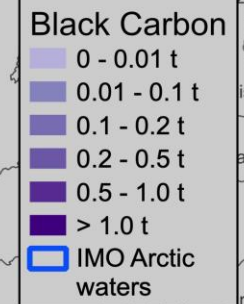
# Geographic versus IMO Arctic waters

Geo. Arctic Boundary - 58.95° N

**Geographic Arctic**  
8,577 vessels  
BC: 1.5 kt\*

**IMO Arctic waters**  
1,866 vessels (22%)  
BC: 413 t (27%)

Year - 2021

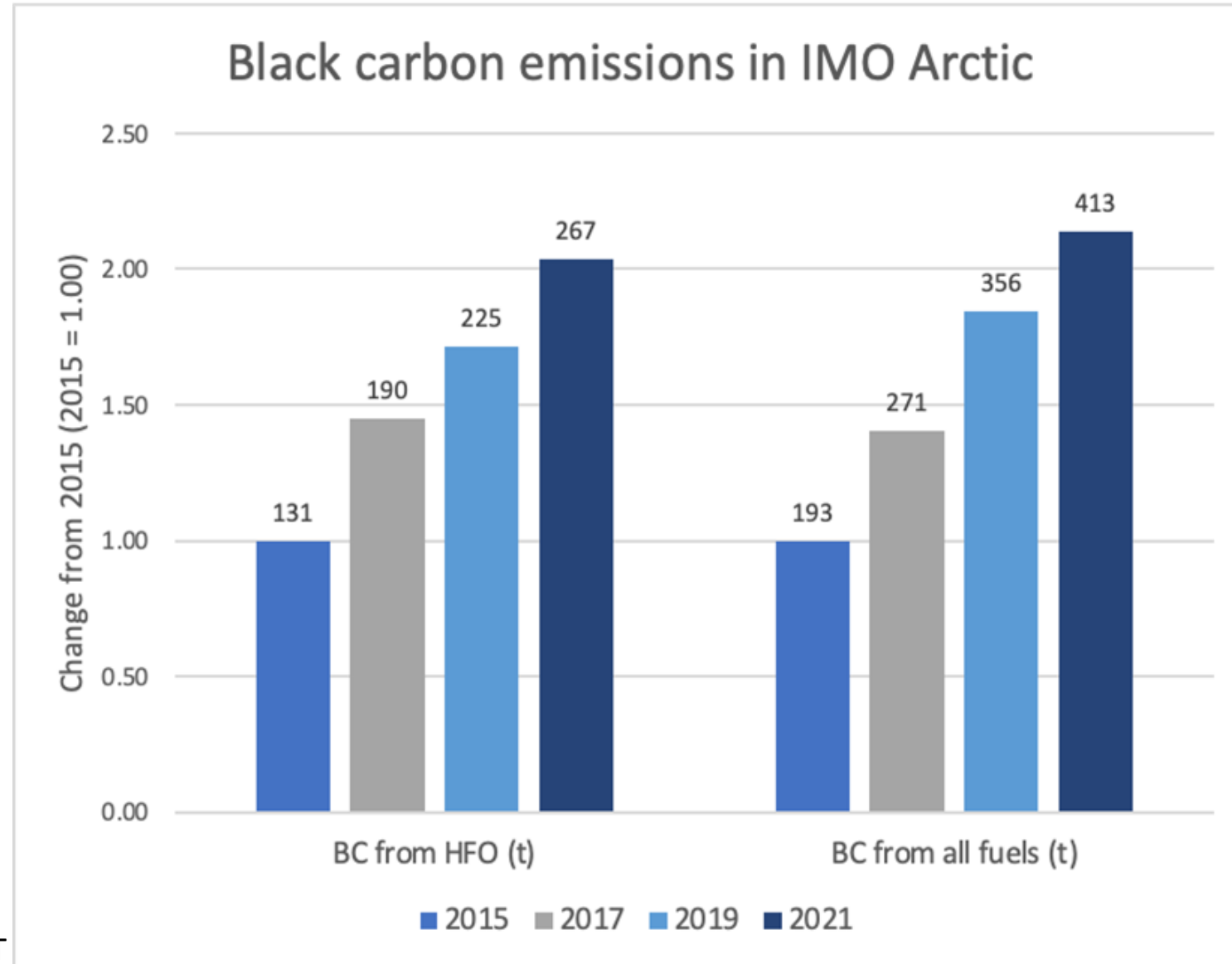


\*excluding shipping in the Baltic Sea

Source: ICCT's SAVE model estimates based on AIS (Spire, 2021) and IHS Markit (S&P Global, 2022)

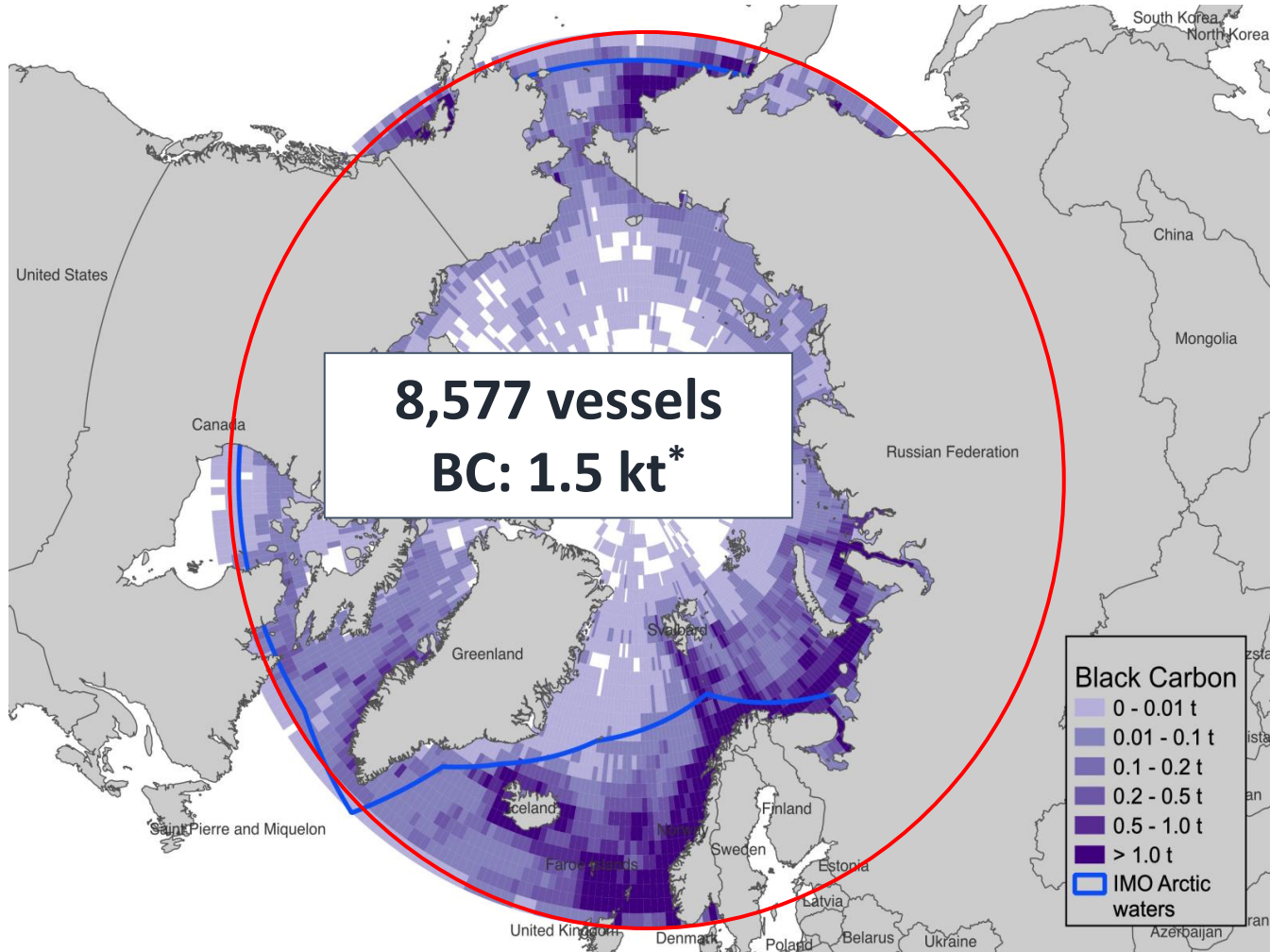
- Global BC emissions grew 8% (2015 -2019)
- Arctic emissions > doubled (2015 – 2021)
- IMO Arctic HFO ban estimated reductions from July 2024 = 5%
- Further reductions are not likely until 2029

Data and charts courtesy of the ICCT

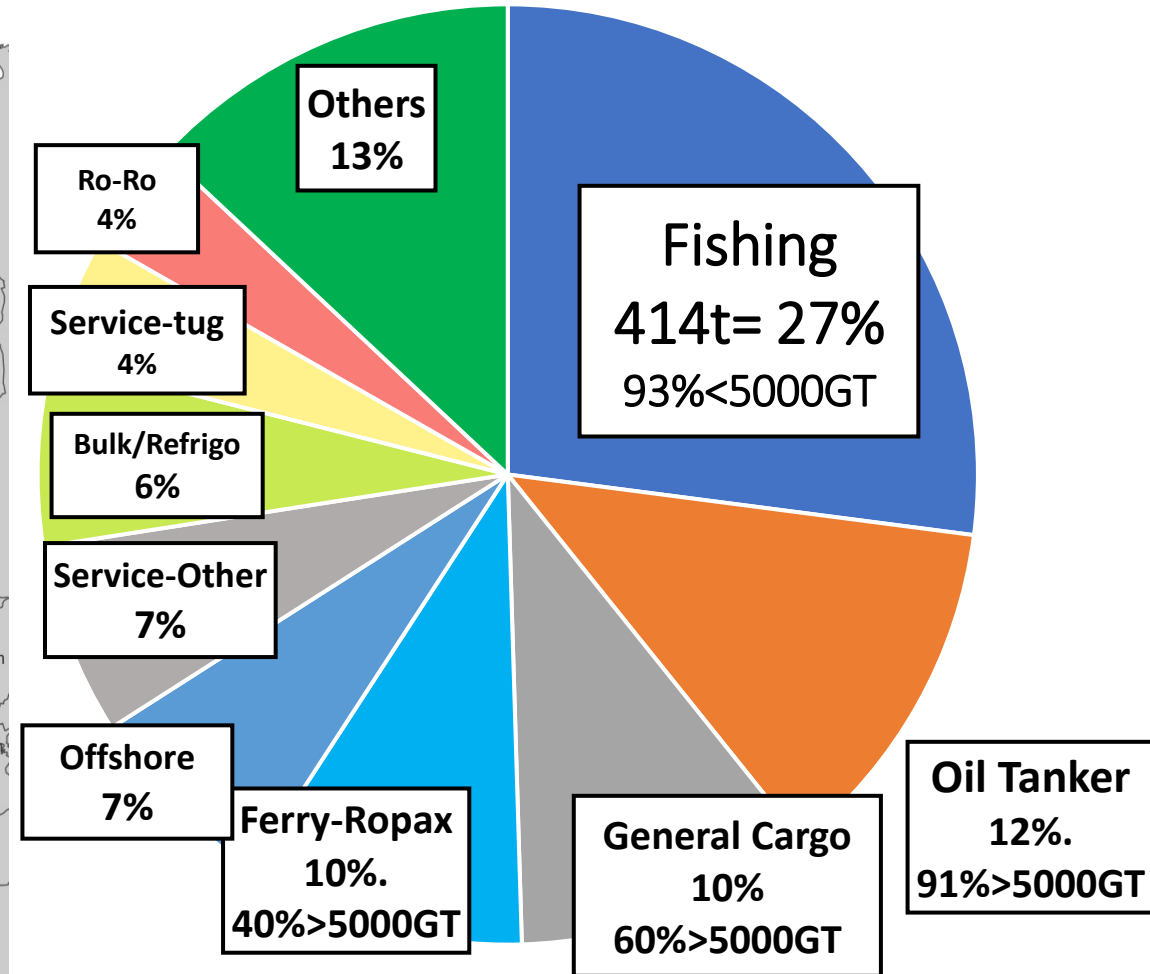


# Geographic Arctic BC emissions 2021

720t BC from ships >5000GT  
44% is EU MRV



## % total BC by Ship Type



\*excluding shipping in the Baltic Sea



# Black carbon at the IMO

- 2007-2010 submissions to IMO to recognise/examine BC as a potent climate forcer in the Arctic
- 2011 IMO PPR work program agreed to reduce impact of ship BC emissions on the Arctic
- 2013 IMO agrees globally accepted Bond et al. definition of BC
- 2016 agreed list of ship BC measurement methods
- 2017 PPR focusses on collating ship abatement measures – list of 41
  - and technical approaches to measure onboard ship BC emissions
- 2018 UNEP called for fast and immediate action on SLCPs
- 2021 MEPC Resolution 342 (77) calls for voluntary switch to distillate or other cleaner fuels in the Arctic
- 2024 IMO Voluntary Guidance agreed on individual Arctic ship BC monitoring/reporting & best abatement practices

# Mitigating ship BC emissions - some issues

Ship BC emissions depend on a variety of engine factors: Load, age, condition, size, 2 or 4 stroke, operating conditions etc.

- IMO 2024 voluntary guidelines addressing this

But also on the fuel used

- Lower sulphur fuel cuts SO<sub>x</sub> induced PM - but this is volatile PM
- Not BC which is non volatile PM

2013 IMO study already recognised that cleaner fuels such as distillates reduce overall BC at rates that will vary according to engine type, age, condition etc

And that overall the average reductions from distillates could be well over 40%

MEPC 342(77) in 2021 called for a voluntary Arctic ship fuel switch to distillates by ships/states

Reluctance may be based on cost versus VLSFO/ULSFO

Even though 85% of Arctic shipping <5000GT use distillates – mainly fishing vessels

# IMO 2022 Short list Arctic BC regulatory measures

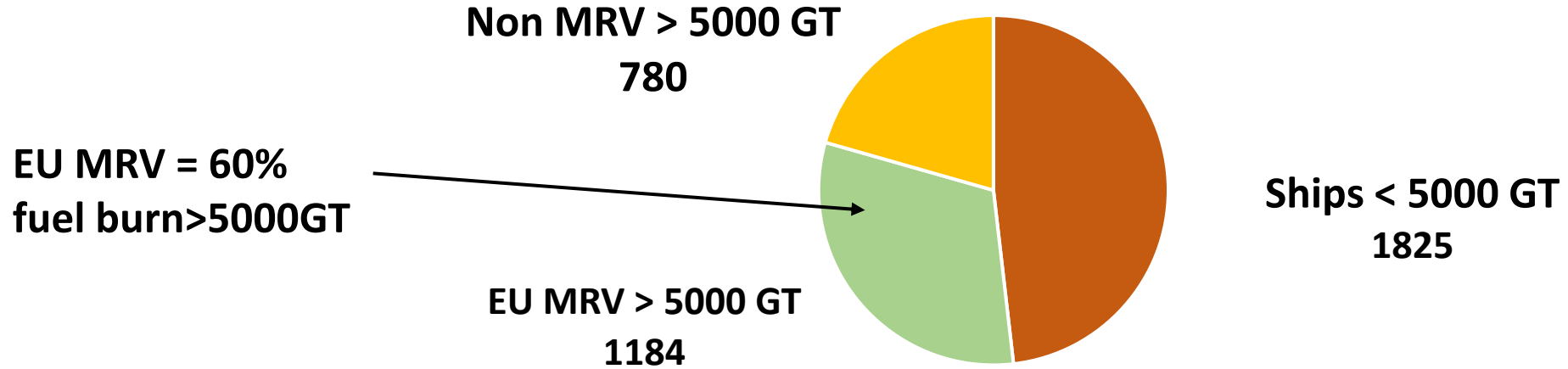
- Switch to distillate fuels
- Fuel standard based on aromatic content
- Black carbon emission control areas
- Engine certification (long-term, new builds)
- Further work on Resolution MEPC 342(77)
- Mandatory installation of black carbon reduction technology

## CAA Priorities

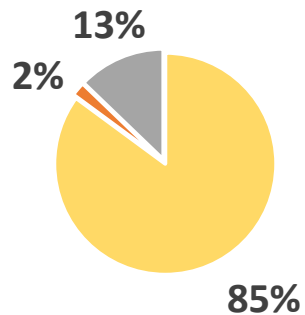
- Distillate switch; <2 years
  - Accelerate adoption/work on DPFs which need clean fuels
- Polar fuel standard; 2-3 years
- BC ECAs in/near Arctic based on polar fuel standard; 2-3 years

# Geographic Arctic Fuel Consumption

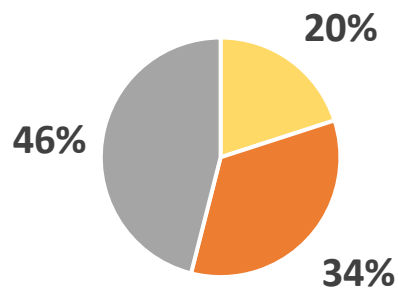
## Ship Category (kT)



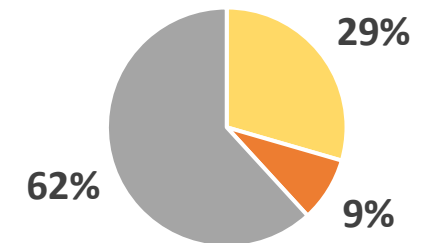
Ships < 5000 GT



EU MRV > 5000 GT



Non MRV > 5000 GT



■ Distillate ■ LNG ■ Residual

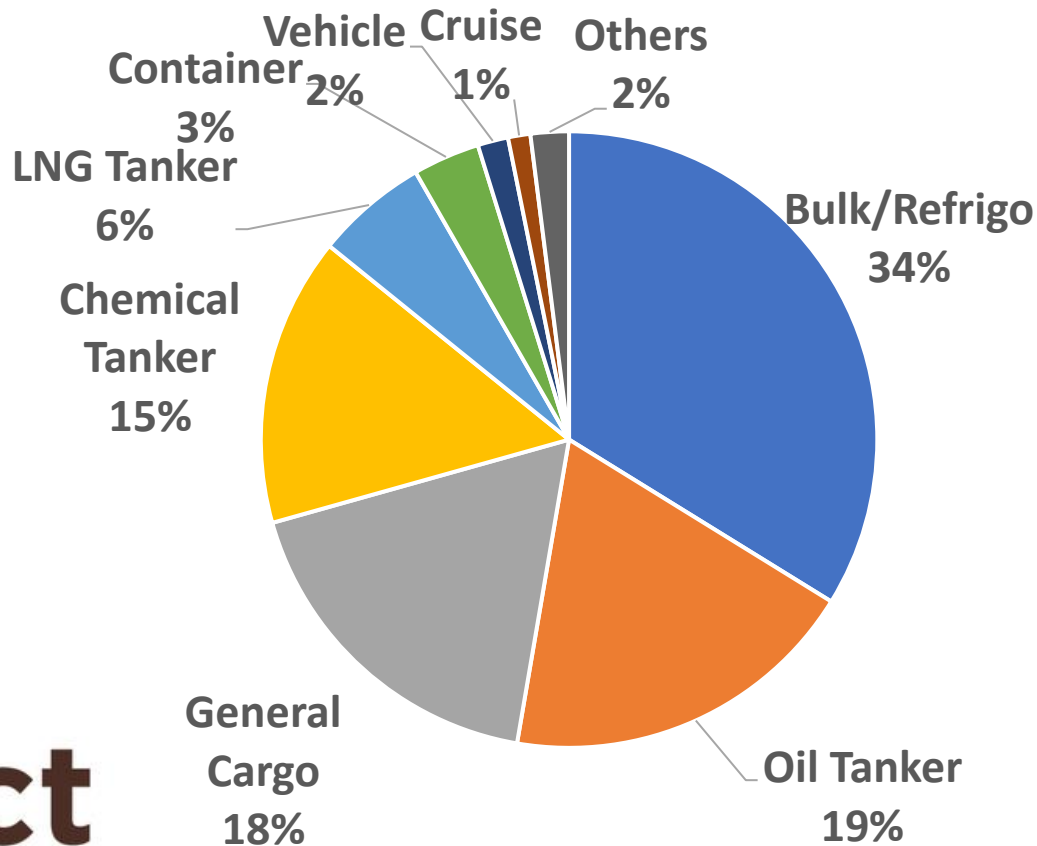
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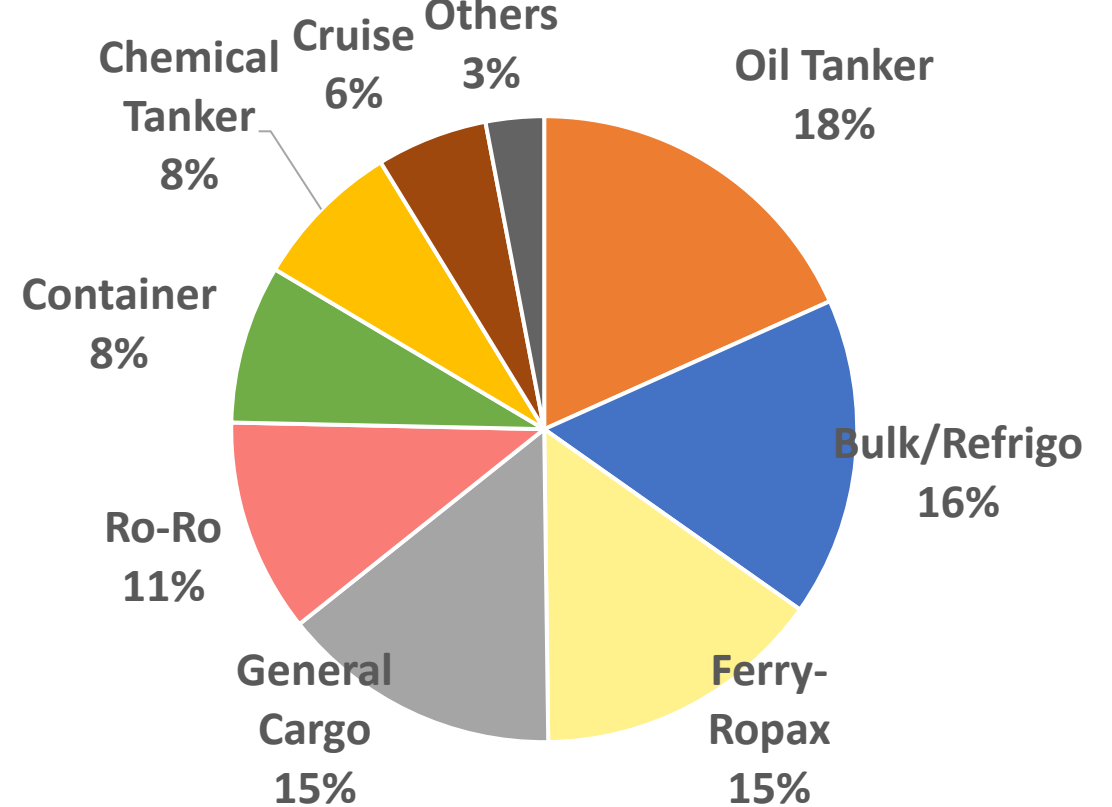
# Geographic Arctic

## EU MRV = 73% of the 3171 ships >5000GT

EU MRV > 5000 GT Ship Count  
Ship Class (%)



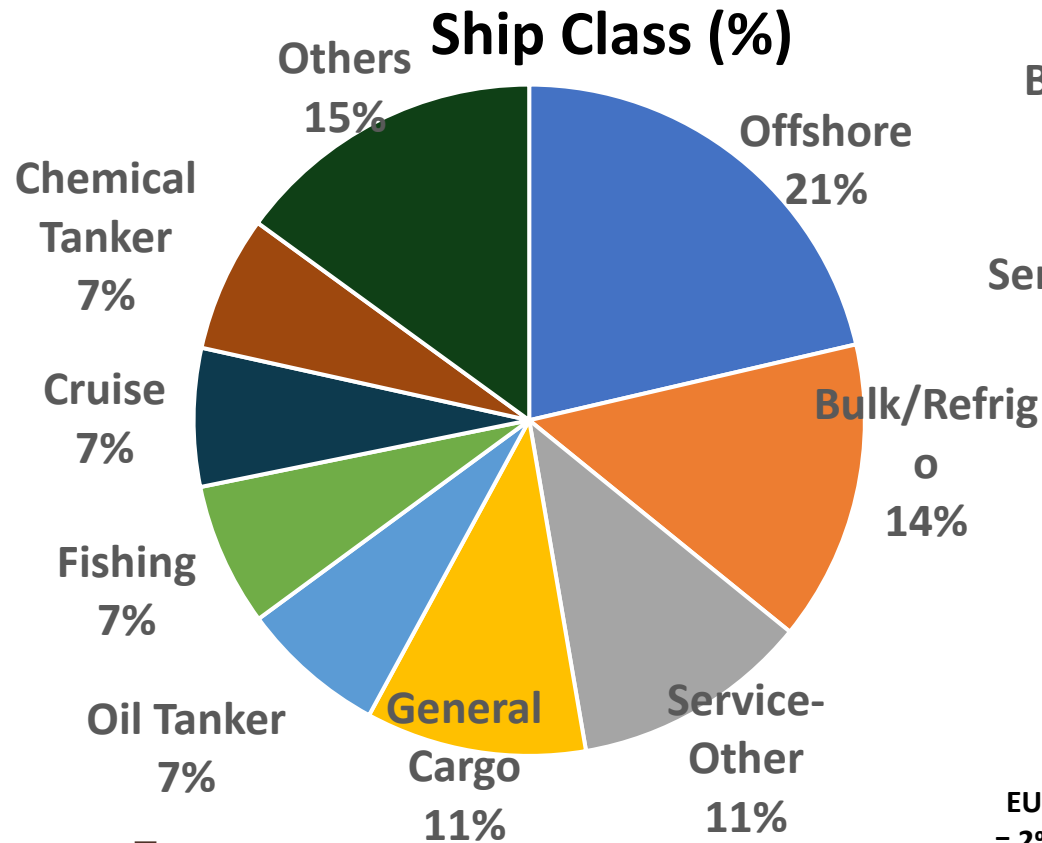
EU MRV > 5000 GT BC Emissions  
Ship Class (%)



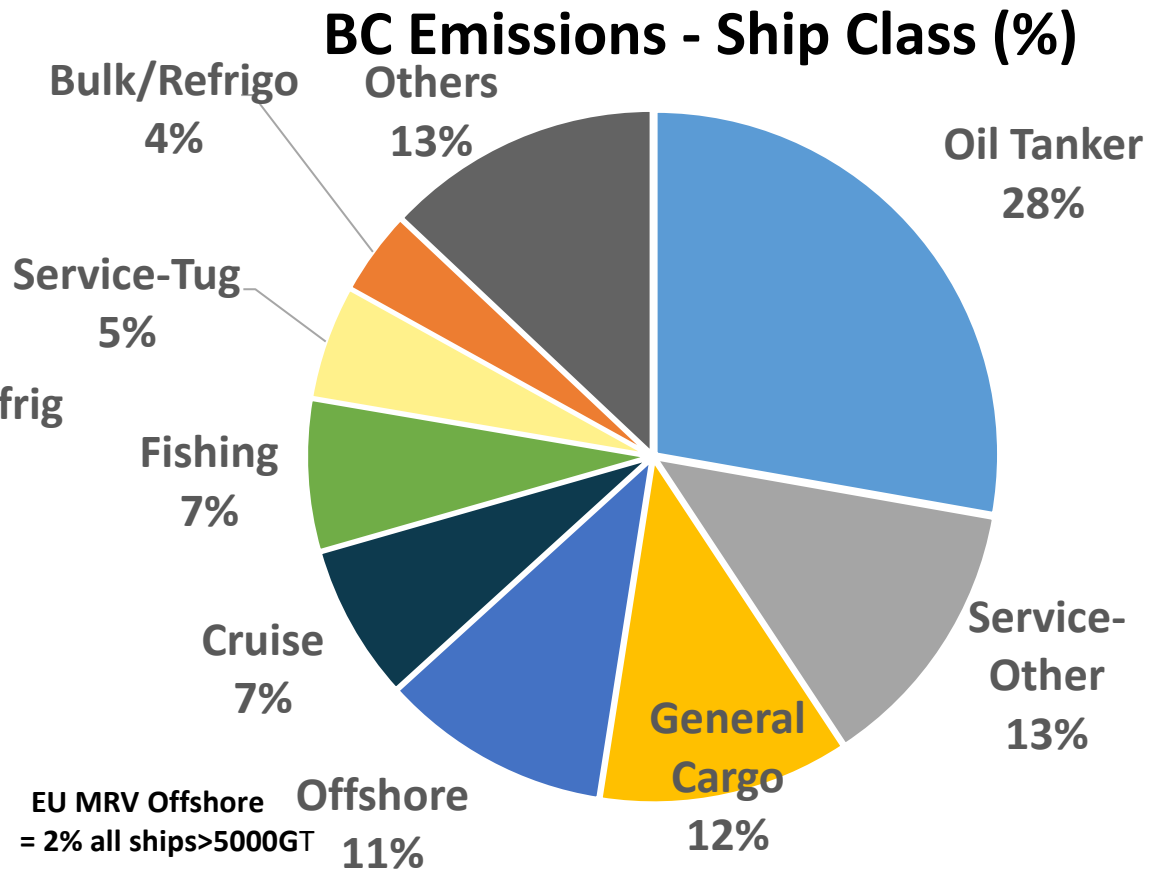
LNG Tanker = <1% BC and #2 CO2 emitter after oil tankers

# Geographic Arctic Ship BC Emissions non EU MRV ships >5000GT

Non MRV > 5000 GT Ship Count



Non MRV > 5000 GT

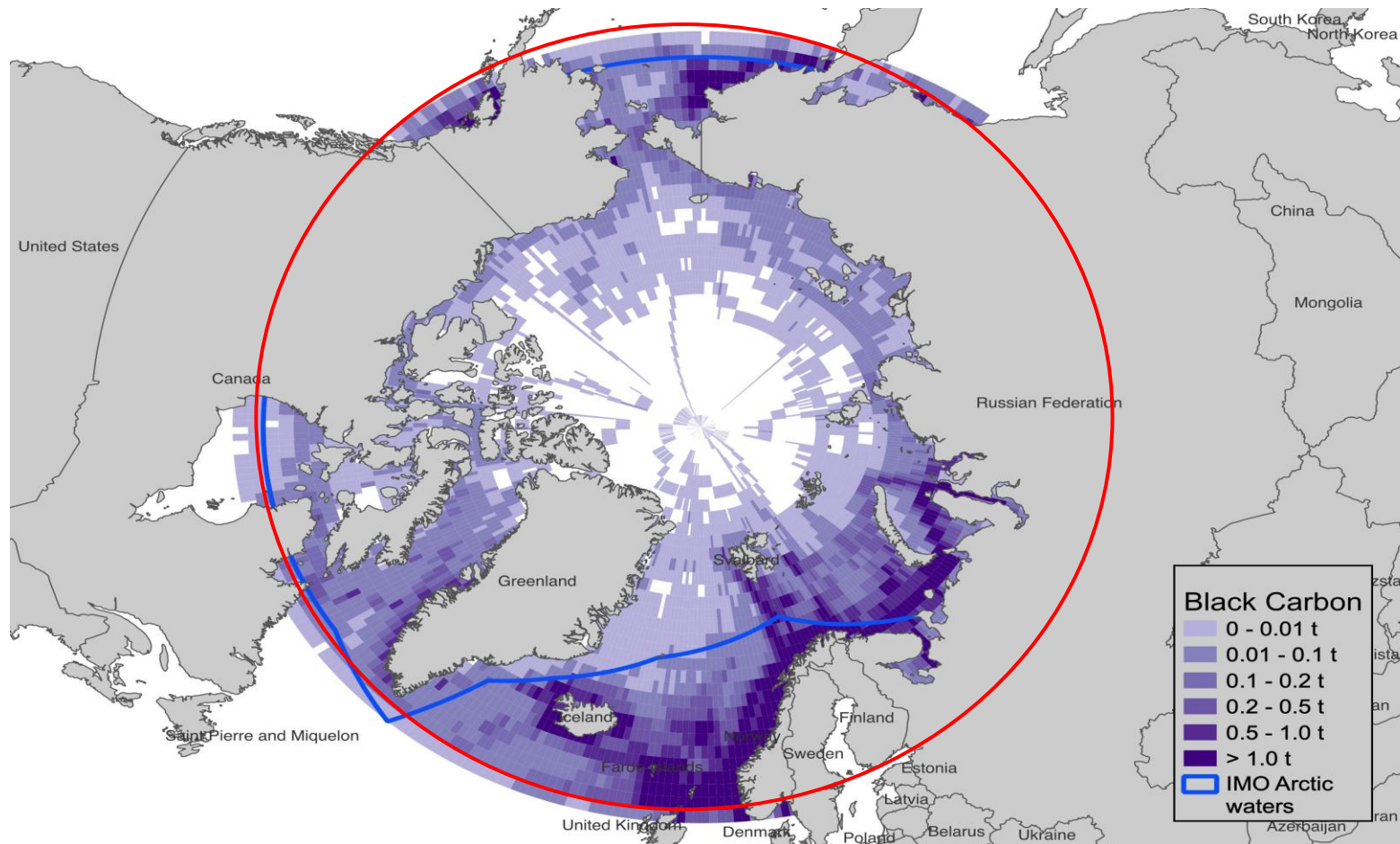


# EU MRV and GeoArctic ship emissions

EU MRV = 27% of all ships

EU MRV = 73% all ships >5000GT

EU MRV = 60% of fuel burn, 44% of BC and 60% of CO2 all ships >5000GT



# Need for an EU Measure(s)

- **Fuel EU Maritime**
  - **Include BC in GHG intensity standard**
  - **All MRV shipping**
  - **Incorporate BC EFs**
- **Port State Control**
  - **Mandatory switch to distillates – all MRV shipping operating in Arctic**
  - **85% of all Arctic shipping <5000GT already use distillates**
- **EU coordination on IMO mandatory regulation**
  - **Start with distillate switch**
  - **Then EU member states also promote polar fuel standard and BC ECAs**





CLEAN ARCTIC  
ALLIANCE

# Thank you



If the **Arctic** is in  
crisis, then our  
planet is in crisis.



Take action for the Arctic Ocean today

<https://cleanarctic.org/arctic-ocean-action/>