Maritime
Overview and calculation

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Scope

Possible type of projects

Innovative projects that can demonstrate GHG emission avoidance and that contribute to the reduction of effects of non-CO_2 gases within the defined scope, could be accountable. Examples of such projects:

Projects that reduce energy use per functional unit e.g., MJ per tonne km	Innovative vessels and their components (e.g., new hull designs, energy saving propulsors, power train hull appendage and other hull technologies)
	Wind propulsion technologies and power take-in from propulsors (e.g., Flettner rotors, sail rigs, other wind propulsion devices);
Projects that reduce GHG emissions per energy use, e.g., tCO_2e / MJ	Fuel switch (e.g., use of SAFs, electricity, or synthetic fuels from green hydrogen instead of fossil fuels, biofuels)
	Solutions to reduce GHG emissions from on-board ship systems (e.g., fuel cells for vessels)
	New exhaust cleaning systems
Infrastructure **projects that contribute to the reduction GHG emissions**, e.g., onshore RES power supply to ships	

Projects combining the above and including:

- a modal shift (e.g. a combination or various modes with a higher use of shipping)
- software and systems for ship operations and monitoring (e.g., weather routing software, maintenance optimisation)
- operational measures, (e.g., speed reduction approaches, reductions in waiting time to enter/leave port)

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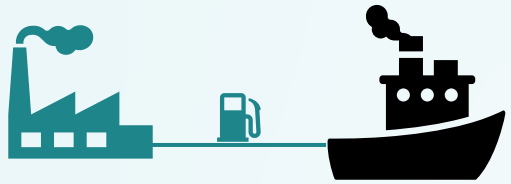
Boundaries: Maritime

Scenario	Emission source	Large and medium scale projects	Small scale projects
Reference	Energy-related GHG emissions present in the reference scenario for the delivery of the same transport services as provided by the innovative project, e.g., direct emissions of climate pollutants from the use of fossil fuels, indirect emissions from the use of methanol, ammonia and hydrogen, both by vessels, vehicles and at port facilities.	Yes	Yes
	Other GHG emissions present in the reference case for the delivery of the same transport services as provided by the innovative project, e.g., fugitive and slipped emissions of all GHGs	Yes	Yes
Project	Energy-related GHG emissions that will occur due to the provision of the reference transport services by the project put in place, e.g., direct emissions of climate pollutants from the use of fossil fuels, indirect emissions from the use of methanol, ammonia and hydrogen, both by vessels, vehicles and at port facilities.	Yes	Yes
	Other GHG emissions that will occur due to the provision of the reference transport services bythe project put in place, e.g., fugitive and slipped emissions of all GHGs	Yes	Yes

Absolute GHG emissions avoidance

Transportation of goods and passengers

$$\Delta GHG_{abs} = \sum_{y=1}^{10} (Ref_y - Proj_y) = \sum_{y=1}^{10} \left(\right.$$



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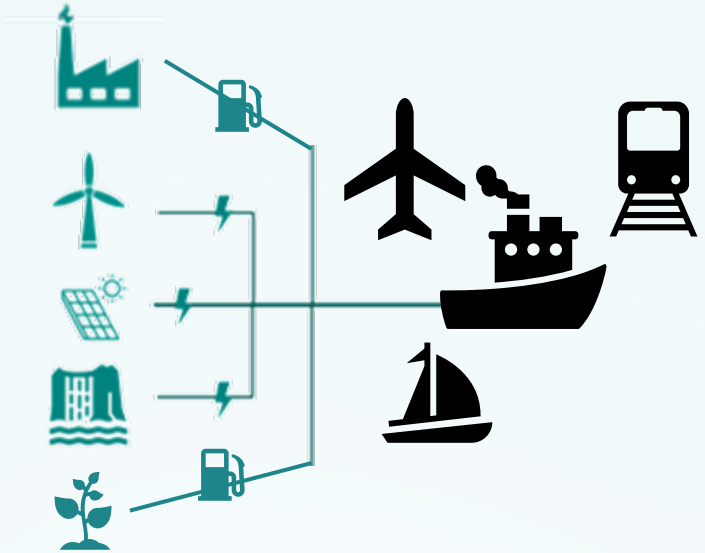

$$\left. \right)$$

$$=$$

$$= \sum_{y=1}^{10} \left(Ref_{energy} + Ref_{other} \right) - \left(Proj_{energy} + Proj_{other} \right)$$

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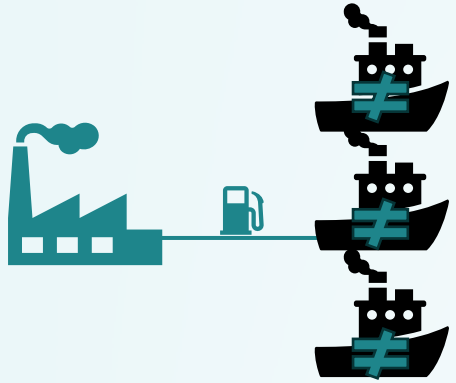
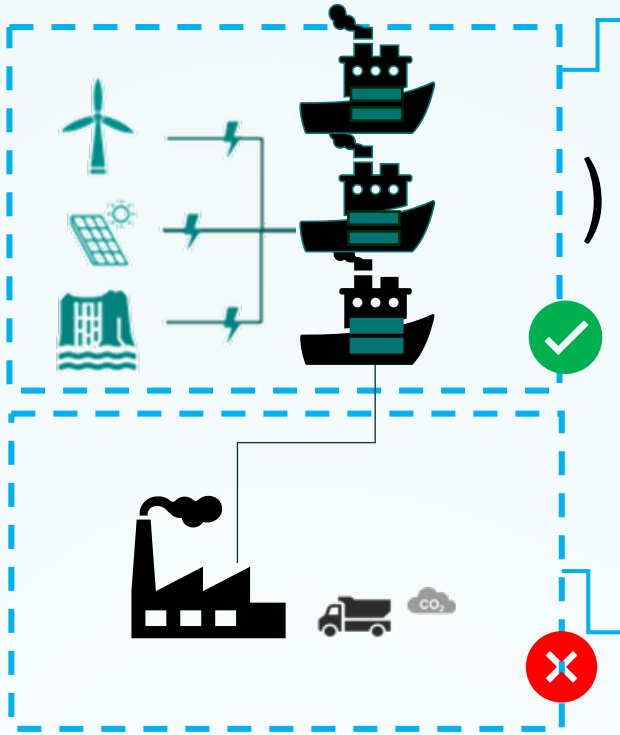
Absolute GHG emissions avoidance

Manufacturing of innovative vessels or their components

$$\Delta GHG_{abs} = \sum_{y=1}^{10} (Ref_y - Proj_y) = \sum_{y=1}^{10}$$





Emissions due to the manufacturing of the innovative aircraft/vessel are out of the scope of GHG avoidance calculations.

GHG avoidance will be equal to the emissions saved by the innovative technology when operating

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Absolute GHG emissions avoidance

Black carbon and other non-Kyoto climate effects

The recent revision of the EU ETS Directive highlights the role of reducing the full climate impact, including black carbon emissions in the maritime sector. Accordingly, these emissions are accounted for in the GHG methodology.

The direct and non-direct climate impacts of black carbon and its importance in the maritime sector are well established, but there is no established GWP for black carbon in existing EU regulations
--> The methodology makes use of the average GWP applied by IMO and ICCT: **GWP_BC = 900 tCO2e/t.**

Potential **climate impacts of other emissions not covered by Kyoto (e.g. sulfur) are less clear** for the maritime sector. The GHG methodology does not cover these but includes the option to include these **under 'Other GHG emission avoidance'** without providing further guidance. Applicants should provide clear explanation and sufficient evidence for their relevance and applied data.

Maritime

Example: Transport of goods and/or passengers

1. Description: Install sail technology on a bulk carrier. Combine with 1/3 reduction in operating speed and weather routing for overall 76% reduction in fuel requirement
2. Classification: Mobility → Maritime → Transportation of goods/services / Methodology: MAR, Section 6
3. Reference: Conventional bulker fuelled with reference maritime fuel

$$\Delta GHG_{abs} = \sum_{y=1}^{10} (Ref_y - Proj_y) = \sum_{y=1}^{10} \left(EF_{mar\ ref\ fuel} * E_{ref,mrf,y} + BC_{ref,y} \right) - \left(EF_{mar\ ref\ fuel} * E_{proj,mrf,y} + BC_{proj,y} \right)$$

$$BC_{ref,y} = \sum_{y=1}^{10} Q_{BCref,\,y} * GWP_{BC}$$

$$BC_{proj,y} = \sum_{y=1}^{10} Q_{BC\ proj,\,y} * GWP_{BC}$$

Values estimated or modeled by the applicant and duly evidenced

4. Data:

- $E_{ref/proj,mrf,y}$ = Annual use of the EU marine reference fuel in the reference/project scenario in year y, in TJ.
- $EF_{mar\ ref\ fuel}$ = GHG emission factor for the use of the EU marine reference fuel in the project scenario in year y, in TJ.
- $Q_{BCref/proj,\,y}$ = Quantity of black carbon emitted from combustion of fuels in the reference/project scenario in year y, in tonnes.
- GWP_{BC} = Global Warming Potential of black carbon in tonnes CO2eq/tonne BC.

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