September 2024

GFS penalties are inadequate as a ‘carbon pricing’ mechanism

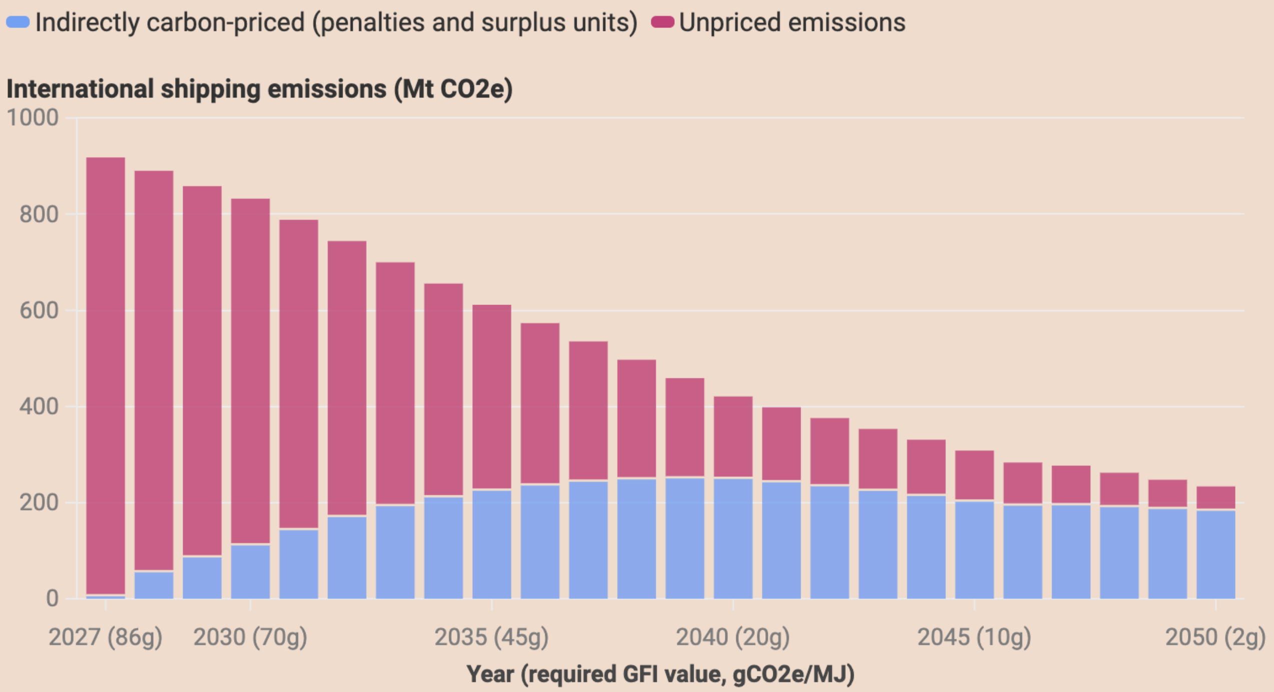
The International Maritime Organisation (IMO) is currently debating a global fuel GHG standard (GFS) to create predictable demand for green fuels, and a levy to apply the *‘polluter pays’* principle to shipping emissions and raise revenues to support a *just and equitable* transition.

In addition to setting minimum fuel/energy GHG intensity (GFI) requirements that will become more stringent over time, the GFS will also include a penalty mechanism allowing ships to *‘pay-to-comply’* (via remedial units - RUs) if they fail to meet the required GFIs. Furthermore, ships over-complying with GFI requirements will be able to generate surplus units (SUs) and sell them to other ships. In this context, China, Brazil, and others argue that GFS penalties and SUs would effectively be an *indirect* carbon price, leaving no need for a stand-alone GHG levy.

T&E analysis shows that even under an ambitious GFS pathway and high RU usage rate, **the vast majority of shipping GHG would escape the ‘polluter-pays’ principle** in the next decades.

GFS penalties are no substitute for a universal GHG levy

Even if half the fleet "pay-to-comply" with GFS, more than 60% of emissions would still escape carbon pricing



Source: T&E (2024) analysis based on IMO proposal ISWG-GHG 17/2/2 • RUs - remedial units = "pay-to-comply". SUs - surplus units. For the purpose of this analysis, share of the fleet paying for RUs denotes share of energy/emissions complying via RUs, as a percentage of the potential maximum. Analysis assumes constant energy used based on T&E 2030 projections. SUs are only provided by ammonia, methanol and hydrogen-capable vessels, based on orderbook data and IEA (2023) projections.

14% Proportion of shipping emissions that would be indirectly carbon-priced in 2030 by SUs or RUs under the EU & Japan's GFS proposal, if 50% of ships choose to "pay-to-comply" using RUs rather than complying directly with the targets in this proposal

T&E analysed the potential uptake of SUs and RUs under the EU & Japan's GFS proposal (ISWG-GHG 17/2/2) to calculate the proportion of emissions that would be indirectly priced by these units, given different GFI values and proportions of ships "paying-to-comply" via RUs.

We assume that ammonia, hydrogen or methanol-capable ships can generate SUs by using e-fuels that comply with the EU's zero and near-zero (ZNZ) fuel emissions criteria (10g CO_2e/MJ). Other ships must either be pooled with SU-claiming ships, comply directly with the GFI, or 'pay-to-comply' by claiming RUs.

The analysis shows that even under the strictest proposed GFI trajectory (the EU's 'striving' GFI values), until 2050 **the majority of emissions are unlikely to be priced by SUs or RUs**.

What's more, a high proportion of emissions are only set to be priced in scenarios where a large proportion of shipping companies 'pay-to-comply' instead of meeting the GFI targets. These scenarios come with higher emissions that will not meet the IMO 2023 Strategy.

The table below shows the proportion of shipping emissions priced by year under the EU & Japan proposal, for each level of compliance. If, for example, 90% of ships comply with the GFI targets and choose not to claim RUs, the majority of shipping emissions will be unpriced up to 2050, escaping the vital principle that polluters should pay for their emissions.

A global GHG levy, in combination with the GFS, is therefore essential to ensure that shipping companies start to bear the cost of their emissions.

Table: Proportion of shipping emissions priced under a GFS alone, based on EU/Japan 'striving' GFI values

		GFI values (gCO_2e/MJ)					
		2027 86.0	**2030** 70.0	**2035** 45.0	**2040** 20.0	**2045** 10.0	**2050** 2.0
Remedial units claimed as % of theoretical maximum	**0%**	0.8%	1.3%	17.9%	18.7%	0.0%	0.0%
	10%	0.8%	4.0%	22.6%	32.5%	28.2%	34.5%
	20%	0.8%	6.6%	26.8%	42.3%	44.0%	53.4%
	30%	0.8%	9.1%	30.6%	49.6%	54.1%	65.2%
	40%	0.8%	11.4%	34.0%	55.3%	61.1%	73.4%
	50%	0.8%	13.6%	37.1%	59.8%	66.2%	79.3%
	60%	0.8%	15.7%	39.9%	63.5%	70.2%	83.9%
	70%	0.8%	17.7%	42.5%	66.5%	73.3%	87.4%
	80%	0.8%	19.6%	44.9%	69.1%	75.8%	90.3%
	90%	0.8%	21.5%	47.0%	71.4%	77.9%	92.7%
	100%	0.8%	23.2%	49.1%	73.3%	79.7%	94.7%

Annex: Methodology

This analysis by T&E is based on details contained in the EU's submission on mid-term measures (ISWG-GHG 17/2/2). We assume that the fleet can be divided into four categories, with a proportion of energy and emissions allocated to each category according to the scenario:

- Ships which can use zero and near-zero (ZNZ) e-fuels, based on projections detailed below. In the analysis, these are the only ships that generate SUs. As biofuels can be used directly in most existing ships, we assume that these fuels do not generate SUs.
- Ships for which emissions are compensated by SUs from the above ZNZ-capable ships. These ships generate emissions above the GFI-compliant level, equivalent to those 'saved' by ZNZ ships, by burning fuel at the 'baseline' level of 91.21g $CO2_e$/MJ[1].
- Ships which comply with the regulation by operating at the required GFI compliance level, for example by blending biofuels.
- Ships which 'pay-to-comply' with the regulation by claiming RUs (remedial units). These ships also operate at 'baseline' fuel emissions intensity.

The proportion of ships able to use ZNZ fuels (with an emissions intensity of 10g CO_2e/MJ) up to 2030 is modelled by estimating the percentage of the fleet that will consist of ammonia, methanol and hydrogen-capable ships in each year up to 2030 (based on Clarksons Research data). It is assumed that fuel consumption by this part of the fleet will be equivalent to its share of total gross tonnage. After 2030, the proportion of the fleet using ZNZ fuels is based on IEA projections of 2035 and 2050 energy consumption by fuel type in shipping[2]. We assume that these ships burn 100% ZNZ fuel throughout the model period in order to generate SUs.

Based on the energy consumption and GHG intensity of each part of the fleet, we calculate total emissions based on a given GFI target, and for a range of compliance scenarios. These compliance scenarios are based on the proportion of ships (calculated as a share of the potential maximum) which 'pay-to-comply' via RUs, given at 10% intervals as in the above table. For simplicity, we assume that SUs and RUs cannot be banked or transferred between years.

The energy consumption of the fleet is assumed to stay constant, at levels projected for 2030 based on previous T&E analysis[3]. This ensures that the final results are based on changes in the GFI level and the 'pay-to-comply' percentage. Demand for shipping is estimated by averaging 'high' and 'low' trade growth scenarios from the IMO 4th Greenhouse Gas Study[4] (OECD_RCP26_G/SSP2_RCP26_L). We assume 20% efficiency savings from 2008 levels.

[1] T&E (2024), https://www.transportenvironment.org/articles/what-the-imo-needs-to-do-to-meet-its-newest-targets
[2] IEA (2023), https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach
[3] T&E (2024)
[4] IMO (2020), Fourth Greenhouse Gas Study 2020

Alex Springer, Senior Analyst
alex.springer@transportenvironmen.org
+44(0)7910157184

Constance Dijkstra, IMO Policy Manager
constance.dijkstra@transportenvironment.org
+32(0)493432771