

COMPARATIVE ANALYSIS OF CANDIDATE MID-TERM MEASURES**Fact sheet**

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| Name of the candidate measure: | Greenhouse Gas Fuel Standard (GFS) |
| Reference document(s): | ISWG-GHG 15/3/1; ISWG-GHG 13/4/7 and ISWG-GHG 12/3/4 |

1 Feasibility of the proposed candidate measure

| 1.1 Scope and compliance options | |
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| 1.1.1 Substances covered (GHG/CO ₂) | GHG (all greenhouse gases covered by the LCA guidelines) |
| 1.1.2 Phases of GHG emissions covered (WtT / TtW / WtW) | WtW |
| 1.1.3 Acceptable approaches for compliance (e.g. in-sector/out-of-sector offsetting, CCS, etc.) | GHG reductions in the fuel lifecycle resulting in reductions of the GHG intensity of the fuel |
| 1.2 Likelihood to achieve a consistent implementation of the measure | |
| 1.2.1 Provisions to ensure global availability of alternative fuels and technologies | <p>The GFS will create a predictable demand for low- and zero-GHG fuels, which will result in more investments in the production of those fuels and the required bunkering infrastructure. Therefore, it is expected that these fuels will be produced in a large scale worldwide.</p> <p>The Flexibility Compliance Mechanism (FCM) grants Flexible Compliance Units (FCUs) to ships that go beyond the requirements, which will encourage first movers along the shipping value chain which incentivizes even broader uptake and production capacities of greener fuels.</p> |
| 1.2.2 Provisions to limit administrative burden for ships and Administrations | <p>The additional administrative burden of the GFS and FCM is small because they build on the existing data collection system for fuel oil consumption of ships (IMO DCS) and the Guidelines on life cycle GHG intensity of marine fuels (LCA guidelines). The main additional tasks are that ships will need to have an account in the GFS register; that fuel suppliers need to certify the WtT emissions of their fuel; and that Administrations will need to communicate with the GFS register in the context of verification and issuing of Statements of Compliance.</p> |
| 1.3 Compatibility and consistency with existing regimes/regulations | |
| 1.3.1 Consistency with UNFCCC and the Paris Agreement | <p>The GFS with its FCM have been designed to ensure their environmental effect and can therefore be relied upon to set shipping GHG emissions on a 1.5 °C aligned pathway. The required Greenhouse Gas Fuel Intensity (GFI) is reduced gradually over time, thus allowing economies time to adapt gradually and minimising the impacts of the fuel transition on States.</p> |
| 1.3.2 Coordination / overlap with other international, regional and national initiatives | <p>Many national action plans include actions to promote the fuel transition. A GFS would ensure that these actions are taken further and expanded to a global scale.</p> <p>This could also facilitate the establishment of bilateral Green Corridors.</p> |

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| | <p>For instance, the European FuelEU Maritime Regulation shares several building blocks with the GFS and can be expected to have synergies. Moreover, the FuelEU Maritime Regulation contains provisions for a review and alignment in case a GFS is adopted by the IMO.</p> |
| 1.3.3 Compatibility with other IMO regulations | <p>The GFS fits well within the existing MARPOL Framework, as demonstrated by the draft amendments presented in ISWG-GHG 15/3/1.</p> |

2 Effectiveness of the proposed candidate measure

| 2.1 Expected reductions in GHG emissions | |
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| 2.1.1 Levels of GHG reduction with associated timeframe | The GFI reduction pathway can be aligned with the levels of ambition and checkpoints set in the upcoming 2023 IMO Strategy on reduction of GHG emissions by ships, following a Comprehensive Impact Assessment. The GFI reduction pathway can be developed for approval by MEPC 83. |
| 2.1.2 Provisions to avoid unintended outcomes that could increase GHG emissions | The GFS reduces WtW GHG emissions by limiting the GHG intensity of all fuels used by ships and the WtW basis that it cannot result in an increase in emissions in the value chain of those fuels. |
| 2.2 Incentives for first movers | |
| 2.2.1 Provisions for reducing/bridging the price gap between conventional and low-carbon solutions | <p>It is expected that most ships will probably comply by using fuels that have the required GFI. This fuel will probably be more expensive than conventional fuels, and less expensive than zero-GHG fuels as long as the required GFI is higher than zero.</p> <p>Ships that sail on conventional fuels with emissions above the required GFI need to hand in FCUs or Greenhouse Gas Remedial Units (GRUs) to comply. The price of FCUs is related to the marginal abatement costs of low- and zero-GHG fuels, so handing them in bridges the price gap between conventional fuels and fuels with the required GFI.</p> <p>The FCM grants FCUs to ships that go beyond the requirements. When shipping companies realise the value of the FCUs, this reduces the price gap between low- and zero-GHG fuels and fuels with the required GFI.</p> |
| 2.2.2 Provisions to ensure a level playing field | <p>As described in 2.1.1, most ships will probably comply by using fuels that have the required GFI. This fuel will probably be more expensive than conventional fuels, and less expensive than zero-GHG fuels as long as the required GFI is higher than zero.</p> <p>Ships that sail on conventional fuels need to hand in FCUs or GRUs to comply. The prices of FCUs and GRUs are related to the marginal abatement costs of low- and zero-GHG fuels, so handing them in bridges the price gap between conventional fuels and fuels with the required GFI.</p> <p>FCUs are granted to ships that go beyond the requirements. When shipping companies realise the value of the FCUs, this bridges the price gap between low- and zero-GHG fuels and fuels with the required GFI. By this the GFS including its FCM ensures a level playing field between ships that sail on fuels with higher and lower GFI than required.</p> |

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| | <p>The level playing field between shipping companies/operators with large and with small fleet is ensured because the requirements have to be met by each individual ship and because all ships have access to the same compliance options.</p> |
| <p>2.2.3 Provisions to ensure global access to technology</p> | <p>There are no specific provisions in the GFS to ensure access to technology. Technology is expected to be developed and become available where there is a demand as demonstrated in the Organization's availability study. As the GFS will apply to ships sailing anywhere, there will be demand for low- and zero-GHG fuels globally. Moreover, the countries with the lowest production costs for low- and zero-GHG fuels are developing countries.</p> <p>The global access can be further enhanced in a combination of the GFS with a levy, see separate factsheet.</p> |
| <p>2.3 Compatibility of different elements within the basket of measures</p> | |
| <p>2.3.1 Identification where elements of the measure are complementary to each other without overlap or redundancy</p> | <p>The GFS/FCM complements a market-based measure as e.g., a levy in the following ways:</p> <ul style="list-style-type: none"> - The GFS including its FCM ensures that the fuel transition will start, even when the level of a levy does not fully close the price gap between fossil fuels and low- and zero-GHG fuels. - The value of the FCUs is the result of supply and demand. In contrast to the levy or a potential feebate, it responds to variations in fuel prices. This ensures that the price gap is always bridged, irrespective of whether fuel prices are high or low. - A levy incentivises emission reductions through energy efficiency improvements, whereas the GFS mandates emission reductions through reducing the GHG intensity of fuels. |
| <p>2.3.2 Provisions to avoid double accounting, payment, reward or punishment</p> | <p>Accounting of emissions is only done once. The SoC is issued either directly (when the attained GFI is lower than or equal to the required GFI) or after handing in a sufficient amount of FCUs or GRUs (when the attained GFI is higher than the required GFI).</p> <p>In most cases, the GFS does not involve a payment by the ship. Only when the ship relies on FCUs or GRUs for compliance, a payment will need to be made to the register. This payment is related to the amount of emissions above the required GFI and not, as is the case in the levy, for all emissions.</p> <p>A combination of the GFS with a market-based measure can be designed to avoid any double payments across the different elements in the basket. The value of the FCUs and the level of e.g., a levy are interlinked, in a way that their sum bridges the</p> |

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| | <p>price gap between fossil fuels and fuels compatible with the required GHG intensity, but never exceeds it.</p> <p>The GFS/FCM does not punish ships with emissions above the required GFI, it merely requires them to hand in FCUs or GRUs so that the environmental integrity of the measure is not undermined and in order for those ships not to reap an unfair competitive advantage from using conventional (cheaper) fuels and not complying with the MARPOL regulations.</p> <p>The GFS including the FCM recognizes ships that go beyond the requirements by granting them FCUs, which have a value. If a rebate would also be provided to those ships for the fuels that they use, the level of the rebate should be set so that the price gap is bridged by the combination of the levy, rebate and FCU, rather than by the feebate system alone. This would have the advantage that the value of the FCU is variable (and depends on the fuel prices) so that the price gap is bridged regardless of whether fuel prices are higher or lower than expected when the rates of the levy and the rebate were set, i.e. no over- or under-compensation.</p> |
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2.4 Process for development and implementation

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| 2.4.1 Possible legal framework | Draft amendments to MARPOL Annex VI Chapter 4 have been submitted in ISWG-GHG 15/3/1. The same submission also indicates which guidelines may need to be developed. |
| 2.4.2 Expected timeframe for development and implementation | Approval at MEPC 83 at the latest will imply sufficient time for the development of the measure and comprehensive impact assessment. |
| 2.4.3 Mechanisms of accountability and adjustment | 5-year review of measure to see, if it is sufficient to meet the agreed reduction pathway and whether action is needed. |

3 Potential impacts on States of the proposed candidate measure

| 3.1 Initial impact assessment | |
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| 3.1.1 Does the proposal provide a description of impacts on ships and emissions? | Yes, see the Initial Impact Assessment in document ISWG-GHG 12/3/4 (Austria et al.). |
| 3.1.2 8 Impact criteria assessed | Socio-economic progress and development (explicitly); as well as (implicitly) geographic remoteness of and connectivity to main markets; cargo value and type; transport dependency; and transport costs. |
| 3.1.3 Potential positive and negative impacts | Some countries have small positive impacts on GDP stemming from lower imports, import substitution and increased domestic capital accumulation. Some countries have small negative impacts on GDP as a result of higher import prices and lower export revenues. Some countries have positive impacts from the production and export of low- and zero-GHG fuels. |
| 3.1.4 Extent of the impacts on States | For most countries, the negative impacts on GDP would be less than 0.1%. For some countries, the negative impacts would be larger. These countries are characterised by a combination of long trading distances, low income and a high transport dependency. Other States which appear to be at risk are low income countries with a specialized economy focussing on export of a few low-value commodities. Positive impacts from the production and export of low- and zero-GHG fuels are not yet quantified but are expected to be considerable. |
| 3.1.5 Description of methodological tools and data sources used | GTAP modelling (computable general equilibrium model) |
| 3.2 Possible disproportionately negative impacts | |
| 3.2.1 Is the measure likely to result in disproportionately negative impacts on States? | Negative impacts are expected to be limited, however some States could be more impacted than others. Further consideration of disproportionality is needed regardless of the measure. |

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| 3.2.2 Description of how these impacts could be addressed (e.g.: avoided, remedied, mitigated), as appropriate | <p>The GFS with its FCM have been designed to minimise negative impacts on States as much as possible.</p> <p>The required GFI is reduced gradually over time, thus allowing economies time to adapt gradually and minimising the impacts of the fuel transition on States. Depending on how a possible revenue from an economic element, e.g. a levy, in a combination of measures are disbursed it is possible to avoid or mitigate negative impacts on GDP in SIDS and LDC and in some cases even increase GDP.</p> |

Annex 1

The GHG Fuel Standard (GFS) is a technical GHG emissions reduction measure proposed by the EU Member States. The aim of the measure is to ensure a gradual reduction of GHG emissions from shipping until they are phased out in 2050. The GFS can be complementary with any market-based measures.

To ensure that emissions are not transferred to other sectors, the GFS considers the full life-cycle GHG emissions from the fuels combusted and energy used onboard ships. The maximum average GHG intensity of those fuels and energy is gradually decreased over time, from a baseline corresponding to the GHG intensity of fossil fuels, until it reaches zero in 2050. Because the regulation is based on the GHG emission intensity of the fuels and energy used, rather than on absolute consumption figures, there is no need for correction factors to accommodate for different ship types and operational specificities.

During the phase of build-up of zero-emissions fuel supply, such fuels may not be initially available in all ports, potentially making it impossible for certain ships to comply with the GFS requirements. The needs of such ships are catered for with the voluntary flexible compliance mechanism, which provides two alternative means for ship operators to comply with the requirements of the GFS, which do not jeopardize the integrity of the measure:

- The Flexible Compliance Units (FCU) allow operators to exchange over- and under-compliance across ships, both within the same fleet or with other ship operators. In addition to allowing underperforming ships to comply, the FCU will constitute a retribution for the first movers, which invest in zero- or near-zero emission fuels and technologies, helping them to recover the extra costs incurred.
- The GFS Remedial Units (GRU) are compliance units per ton of CO_{2e} supplied by the Organization. The GRUs are an additional safety valve for the rare case where the supply of FCUs would be temporarily insufficient to meet the demand from under-compliant ships. The price of the GRUs must be set at a dissuasive level, exceeding the cost of using compliant fuels, so that ships always have an incentive to target standard means of compliance, i.e. the use of compliant fuels or the FCUs. This will preserve the environmental integrity of the system.

The functioning of the GFS and of its flexible compliance mechanism are presented graphically in Figure 1.

Without the flexible compliance mechanism, all ships would have to comply individually, and would be likely to do so by using the cheapest available options, such as, currently, LNG or biofuels. This would delay the development of e-fuels, which are necessary to achieve the deep cuts in GHG emissions targeted in the mid-to-long term. Furthermore, in the absence of the flexible compliance mechanism, services to ports without low-GHG fuel bunkering facilities could be jeopardized.

Replacing the flexibility mechanism with GRUs only, would also be suboptimal: With their dissuasive price, the GRUs would risk disproportionately increasing the cost of maritime transport to-and-from ports with insufficient bunkering facilities for low-GHG fuels. If, on the contrary, the price of GRUs was set at a lower level (below the cost of using compliant

fuels), the GFS would lose its efficiency in driving decarbonization, as the sector would not have incentives to gradually reduce the average GHG intensity of the fuels used.

The GFS can be combined with a market-based measure like a levy in a basket of measures. This will add an economic incentive to the measure, which will strengthen the transition and improve energy efficiency. As a co-benefit, the levy will generate a revenue, which can be used to strengthen the green transition, in particular in the SIDS and LDCs. The GFS and its flexibility mechanism could also be combined with other market-based measures, such as a feebate.

The combination is designed to avoid any double payments across the different elements in the basket. The value of the FCUs and the level of the levy (as a separate instrument or as part of a feebate mechanism) are interlinked, in a way that their sum bridges the price gap between fossil fuels and fuels compatible with the required GHG intensity, but never exceeds it. Figure 2 shows how this complementarity works in practice with, respectively, a levy and a feebate mechanism. The advantage of the combination of the flexible compliance mechanism with an economic measure, over an economic measure alone, is that that the variable element brought by the value of the FCUs prevents any under- or overcompensation of the early movers. Figure 3 shows how the combination of a levy and of the FCU continue to bridge exactly the price gap between fossil fuels and GFS-compliant fuels (and hence allow avoiding any over- or under-compensation) both in a scenario with high- and low oil prices.

GHG FUEL STANDARD (GFS)

The GFS sets a limit on the average GHG intensity of fuels used by ships, that declines over time, and ships can comply by using compliant fuels. By limiting and reducing the GHG-intensity of fuels, the GFS ensures that shipping decarbonizes.

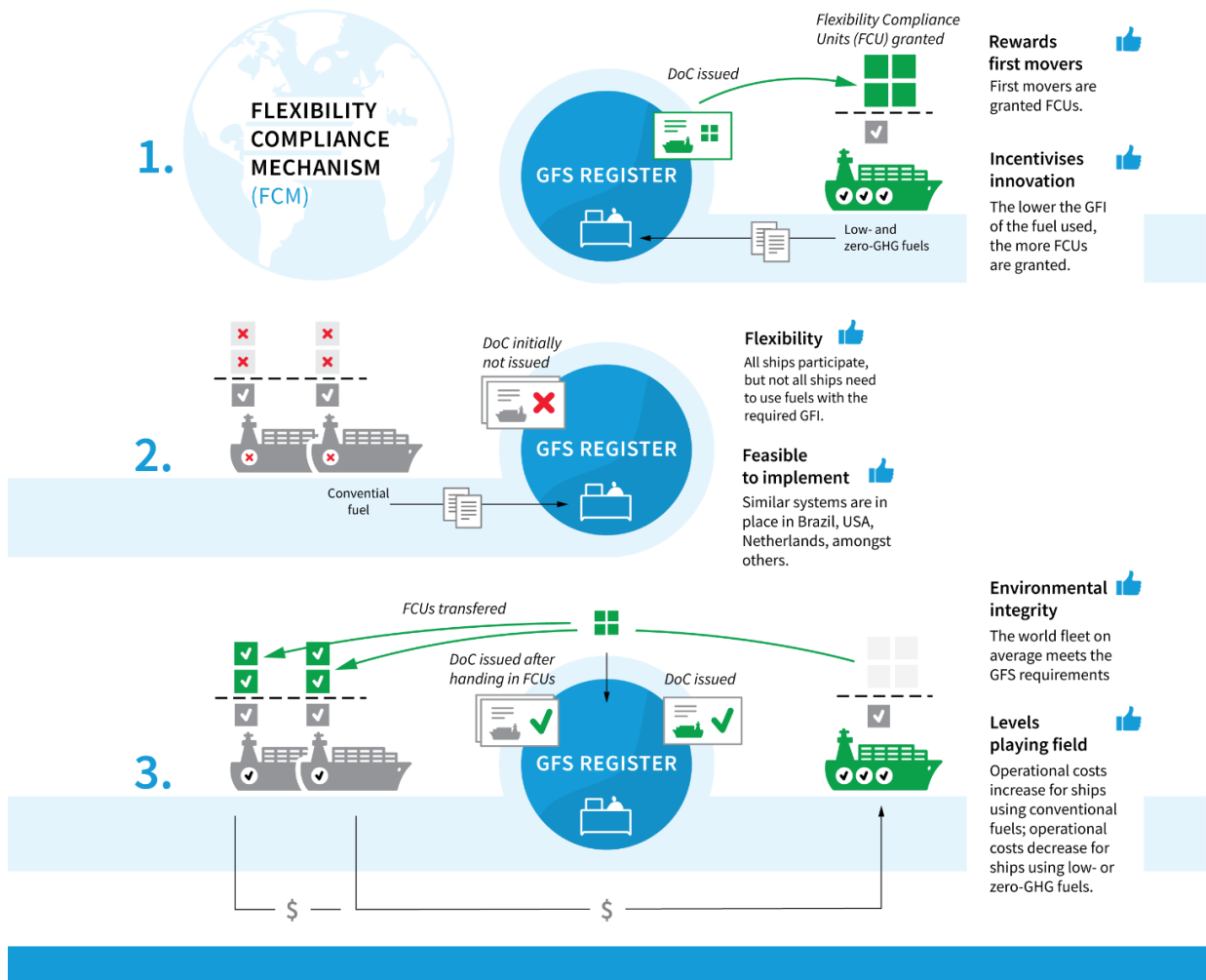
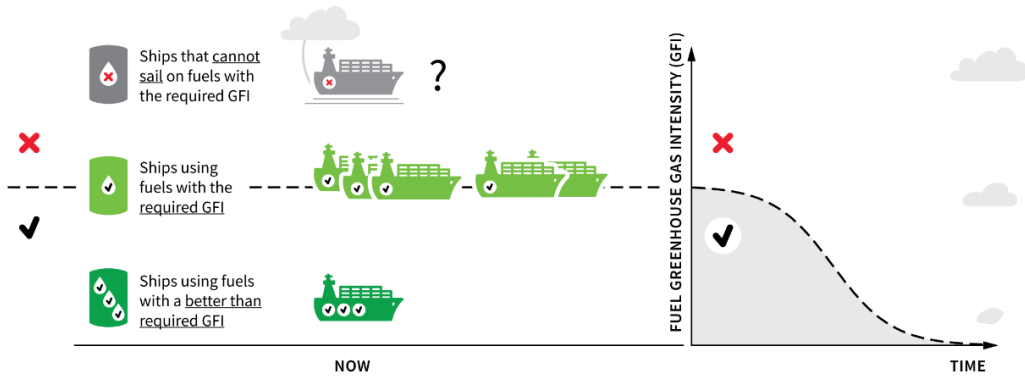


Figure 1: Functioning of the GFS and its Flexible Compliance mechanism

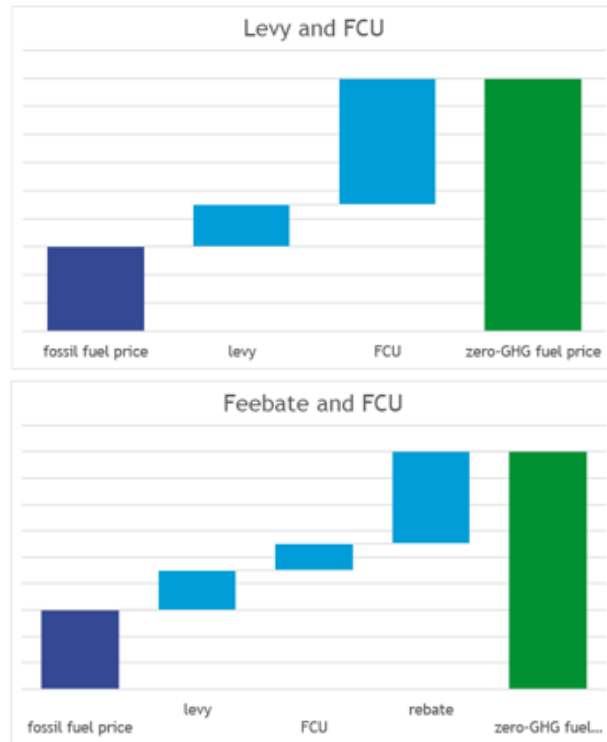


Figure 2: Graphical presentation of how the price gap between fossil and GFS-compliant fuels is bridged by a combination of the flexible compliance mechanism and a levy – respectively as an independent economic measure and as part of a feebate mechanism.

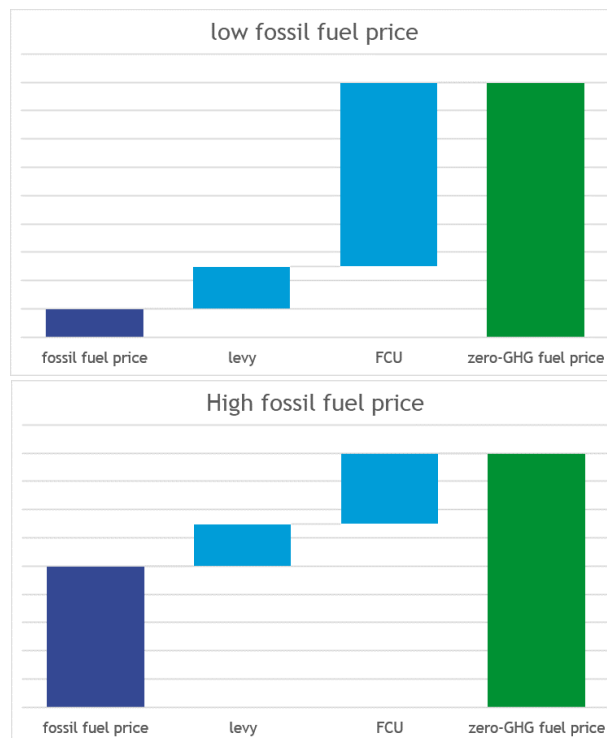


Figure 3: Graphical presentation of how a combination of the flexible compliance mechanism and of a levy ensures adequate compensation for early movers equally in a scenario with high- and low oil prices

