No. KB24G20031
Date:24 June 2024

# Appendix

## Overview of the application

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| The Company | Mitsui O.S.K. Lines, Ltd. |
| Application contents | Verification of GHG emissions intensity for the fiscal year 2023 |
| GHG emissions intensity | Energy Efficiency Operational Indicator (EEOI) |
| (Applicable period) | April 1, 2023 – March 31, 2024 |
| (Number of applicable vessels) | 762 vessels |
| (Source data) | Datasets in the report entitled "2023 年度 GHG 原単位排出量 ver.5" submitted by the Company on 10 June 2024 (hereinafter referred to as "the GHG emissions datasets") |

## Calculation procedure of GHG emissions

Company-wide average value obtained based on the percentage increase or decrease from the base year (Standard Method)

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| Calculation procedure of GHG emissions intensity | The Company is to calculate GHG emissions intensity using the GHG emissions datasets as follows:<br>$GHG\ emissions\ intensity(gCO_{2e}/ton\text{-}mile) = GHG\ emissions\ intensity_{FY2019}(gCO_{2e}/ton\text{-}mile) \times (1 + Rate\ of\ Change_{FYScope})$<br>• $GHG\ emissions\ intensity_{FY2019}$: GHG emissions intensity value for fiscal year 2019 contained in the GHG emissions datasets<br>• $Rate\ of\ Change_{FYScope}$: Percentage increase or decrease from fiscal year 2019 to applicable period |
| Calculation procedure of percentage increase or decrease from fiscal year 2019 to applicable period | The Company is to calculate percentage increase or decrease from fiscal year 2019 to applicable period using the GHG emissions datasets as follows:<br>$Rate\ of\ Change_{FYScope} = \sum_1^p \left( \left( \frac{Segment\ EEOI_{FYScope}(gCO_{2e}/ton\text{-}mile)}{Segment\ EEOI_{FY2019}(gCO_{2e}/ton\text{-}mile)} - 1 \right) \times \frac{Energy\ Consumption_{FYScope}(J)}{\sum_1^p (Energy\ Consumption_{FYScope}(J))} \right)$<br>• $p$: number of segments<br>• $Segment\ EEOI_{FYScope}$: Annual EEOI average value by segment for applicable period<br>• $Segment\ EEOI_{FY2019}$: Annual EEOI average value by segment for fiscal year 2019 contained in the GHG emissions datasets<br>• $Energy\ Consumption_{FYScope}$: Total energy consumption by segment of applicable period |
| Calculation procedure of annual EEOI average value by segment for applicable period | The Company is to calculate annual EEOI average value by segment for applicable period using the GHG emissions datasets as follows:<br>$Segment\ EEOI_{FYScope}(gCO_{2e}/ton\text{-}mile) = \frac{\sum_1^q (Emissions_{FYScope}(gCO_{2e}))}{\sum_1^q \left( Distance\ sailed_{FYScope}(mile) \times Cargo\ carried_{FYScope}(tonne) \right)}$<br>• $q$: number of voyages by segment<br>• $Emissions_{FYScope}$: Lifecycle GHG emissions for applicable period<br>• $Distance\ sailed_{FYScope}$: Distance data for applicable period contained in the GHG emissions datasets<br>• $Cargo\ carried_{FYScope}$: Cargo weight data for applicable period contained in the GHG emissions datasets |

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| Calculation procedure of lifecycle GHG emissions for applicable period | The Company is to calculate lifecycle GHG emissions of Heavy Fuel Oil and Marine Diesel Oil / Marine Gas Oil for applicable period according to the 2024 Guidelines on life cycle GHG intensity of marine fuels (2024 LCA Guidelines)(Resolution MEPC.391(81)) as follows:<br>$Emissions_{FYScope}(gCO_{2e}) = \sum_{1}^{o}\left(fuel_{FYScope}(g) \times fuel\ emission\ factor\left(\frac{gCO_{2e}}{gfuel}\right)\right)$<br>• $o$ : Type of fuels<br>• $fuel_{FYScope}$ : Fuel consumption data for applicable period contained in the GHG emissions datasets<br>• $fuel\ emision\ factor$ : Initial default emission factors referred to 2024 LCA Guidelines Appendix 2<br><br>The Company is to calculate lifecycle GHG emissions of LNG for applicable period according to the Global Logistics Emissions Council Framework for Logistics Emissions Accounting and Reporting (Ver. 3.0) (GLEC Framework) (as of the end of March 2024) as follows:<br>$Emissions_{FYScope}(gCO_{2e}) = \sum_{1}^{o}\left(fuel_{FYScope}(g) \times fuel\ emission\ factor\left(\frac{gCO_{2e}}{gfuel}\right)\right)$<br>• $o$ : Type of fuels<br>• $fuel_{FYScope}$ : Fuel consumption data for applicable period contained in the GHG emissions datasets<br>• $fuel\ emision\ factor$ : Emission factor referred to GLEC Framework Module 1<br><br>The Company is to calculate lifecycle GHG emissions of Biofuel for applicable period according to the biofuel delivery statement as follows:<br>$Emissions_{FYScope}(gCO_{2e}) = \sum_{1}^{o}\left(fuel_{FYScope}(g) \times fuel\ emission\ factor\left(\frac{gCO_{2e}}{gfuel}\right)\right)$<br>• $o$ : Type of fuels<br>• $fuel_{FYScope}$ : Fuel consumption data for applicable period contained in the GHG emissions datasets<br>• $fuel\ emision\ factor$ : Carbon factor referred to biofuel delivery statement |
| Calculation procedure of total energy consumption by segment for applicable period | The Company is to calculate total energy consumption by segment for applicable period according to the 2022 Guidelines on the method of calculation of the Attained Energy Efficiency Design Index (EEDI) for new ships (Resolution MEPC.364(79)) (IMO EEDI Guideline) as follows:<br>$Energy\ Consumption_{FYScope}(J) = \sum_{1}^{o}\left(fuel_{FYScope}(g) \times Lower\ Calorific\ Value\left(\frac{J}{gfuel}\right)\right)$<br>• $o$ : Type of fuels<br>• $fuel_{FYScope}$ : Fuel consumption data for applicable period contained in the GHG emissions datasets<br>• $Lower\ Calorific\ Value$ : Lower calorific value referred to IMO EEDI Guideline |

## Verification procedure of the GHG emissions datasets and GHG emissions intensity

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| Verification procedure | ➢ Regarding the GHG emissions datasets submitted by the Company, the Society conducts the following for the samples extracted in accordance with the sampling methodology as mentioned below:<br>• Regarding the data on fuel consumption, Distance and cargo weight contained in the GHG emissions datasets, the Society is to verify the consistency with the data on fuel consumption, voyage distance and cargo weight verified under IMO-DCS and EU |

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| | MRV Regulations; and<br>• The Society is to verify the fuel emission factor used by the Company to calculate the GHG emissions.<br>• The society is to verify the lower calorific value used by the Company to calculate the energy consumptions.<br>➢ Regarding the GHG emissions intensity calculated by the Company based on the GHG emissions datasets, the Society is to verify the appropriateness of the calculation procedure. |
| Sampling methodology | The Society is to extract the samples from 762 vessels verified by the Society under IMO-DCS and EU MRV Regulations out of 505 applicable vessels in the descending order of lifecycle GHG emissions, based on the following conditions:<br>• The samples extracted are to account for 50% (381 vessels) or over of 762 applicable vessels; and<br>• The samples extracted are to account for 50% (5,665,604 ton$CO_{2e}$) or over of the total lifecycle GHG emissions(11,331,208 ton $CO_{2e}$) from 762 applicable vessels. |

The appropriateness of the GHG emissions datasets compiled by the Company and the GHG emissions intensity of transportation for the fiscal year 2023 calculated by the Company based on the GHG emissions datasets has been ensured by the Society.

**Standard Method : 11.25 g$CO_{2e}$/ton-mile**

(Reference)

Table: Summary of Mitsui O.S.K. Lines' GHG emissions data for the fiscal year 2023

| Fuel used | Fuel consumption (ton) | Lifecycle GHG emissions (ton$CO_{2e}$) |
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| Heavy Fuel Oil | 2,695,047 ton | 10,344,830 ton$CO_{2e}$ |
| Marine Diesel Oil / Marine Gas Oil | 235,890 ton | 946,129 ton$CO_{2e}$ |
| LNG | 6,455 ton | 31,115 ton$CO_{2e}$ |
| Biofuel | 13,962 ton | 9,135 ton$CO_{2e}$ |