

Appendix

Overview of the application

The Company	Mitsui O.S.K. Lines, Ltd.
Application contents	Verification of GHG emissions intensity for the fiscal year 2022
GHG emissions intensity	Energy Efficiency Operational Indicator (EEOI)
(Applicable period)	April 1, 2022 – March 31, 2023
(Number of applicable vessels)	778 vessels
(Source data)	Datasets in the report entitled “FY2022 Summary of all EEOI data ver 7” submitted by the Company on 19 June 2023 (hereinafter referred to as “the GHG emissions datasets”)

Calculation procedure of GHG emissions

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

Calculation procedure of GHG emissions intensity	<p>The Company is to calculate GHG emissions intensity using the GHG emissions datasets as follows:</p> $GHG\ emissions\ intensity(gCO_2e/ton-mile) = GHG\ emissions\ intensity_{FY2019}(gCO_2e/ton-mile) \times (1 + Rate\ of\ Change_{FYScope})$ <ul style="list-style-type: none"> $GHG\ emissions\ intensity_{FY2019}$: GHG emissions intensity value for fiscal year 2019 contained in the GHG emissions datasets $Rate\ of\ Change_{FYScope}$: 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	<p>The Company is to calculate percentage increase or decrease from fiscal year 2019 to applicable period using the GHG emissions datasets as follows:</p> $Rate\ of\ Change_{FYScope} = \sum_1^p \left(\left(\frac{Segment\ EEOI_{FYScope}(gCO_2e/ton-mile)}{Segment\ EEOI_{FY2019}(gCO_2e/ton-mile)} - 1 \right) \times \frac{Energy\ Consumption_{FYScope}(J)}{\sum_1^p (Energy\ Consumption_{FYScope}(J))} \right)$ <ul style="list-style-type: none"> p: number of segments $Segment\ EEOI_{FYScope}$: Annual EEOI average value by segment for applicable period $Segment\ EEOI_{FY2019}$: Annual EEOI average value by segment for fiscal year 2019 contained in the GHG emissions datasets $Energy\ Consumption_{FYScope}$: Total energy consumption by segment of applicable period
Calculation procedure of annual EEOI average value by segment for applicable period	<p>The Company is to calculate annual EEOI average value by segment for applicable period using the GHG emissions datasets as follows:</p> $Segment\ EEOI_{FYScope}(gCO_2e/ton-mile) = \frac{\sum_1^q (Emissions_{FYScope}(gCO_2e))}{\sum_1^q (Distance\ sailed_{FYScope}(mile) \times Cargo\ carried_{FYScope}(tonne))}$ <ul style="list-style-type: none"> q: number of voyages by segment $Emissions_{FYScope}$: Lifecycle GHG emissions for applicable period $Distance\ sailed_{FYScope}$: Distance data for applicable period contained in the GHG emissions datasets $Cargo\ carried_{FYScope}$: Cargo weight data for applicable period contained in the GHG emissions datasets

Calculation procedure of lifecycle GHG emissions for applicable period	<p>The Company is to calculate lifecycle GHG emissions for applicable period according to the Global Logistics Emissions Council Framework for Logistics Emissions Accounting and Reporting (Ver. 2.0) (GLEC Framework) as follows:</p> $Emissions_{FYScope}(gCO_{2e}) = \sum_1^o \left(fuel_{FYScope}(g) \times fuel\ emission\ factor \left(\frac{gCO_{2e}}{g_{fuel}} \right) \right)$ <ul style="list-style-type: none"> • o: Type of fuels • $fuel_{FYScope}$: Fuel consumption data for applicable period contained in the GHG emissions datasets • $fuel\ emission\ factor$: Fuel emission factor referred to GLEC Framework Module 1
Calculation procedure of total energy consumption by segment for applicable period	<p>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:</p> $Energy\ Consumption_{FYScope}(J) = \sum_1^o \left(fuel_{FYScope}(g) \times Lower\ Calorific\ Value \left(\frac{J}{g_{fuel}} \right) \right)$ <ul style="list-style-type: none"> • o: Type of fuels • $fuel_{FYScope}$: Fuel consumption data for applicable period contained in the GHG emissions datasets • $Lower\ Calorific\ Value$: Lower calorific value referred to IMO EEDI Guideline

2. Company-wide average value obtained by weighting the EEOI of each voyage by the ton-miles of the same voyage (Reference Method)

Calculation procedure of GHG emissions intensity	<p>The Company is to calculate GHG emissions intensity using the GHG emissions datasets as follows:</p> $GHG\ emissions\ intensity(gCO_{2e}/ton-mile) = \sum_1^n \left(EEOI(gCO_{2e}/ton-mile) \times \frac{Distance\ sailed(mile) \times Cargo\ carried(tonne)}{\sum_1^n (Distance\ sailed(mile) \times Cargo\ carried(tonne))} \right)$ <ul style="list-style-type: none"> • n: number of voyages • $EEOI$: GHG emissions per ton-miles • $Distance\ sailed$: Distance data contained in the GHG emissions datasets • $Cargo\ carried$: Cargo weight data contained in the GHG emissions dataset
Calculation procedure of GHG emissions per ton-miles	<p>The Company is to calculate GHG emissions intensity by segment of applicable period using the GHG emissions datasets as follows:</p> $EEOI(gCO_{2e}/ton-mile) = \frac{Emissions(gCO_{2e})}{Distance\ sailed(mile) \times Cargo\ carried(tonne)}$ <ul style="list-style-type: none"> • $Emissions$: Life cycle GHG emissions • $Distance\ sailed$: Distance data contained in the GHG emissions datasets • $Cargo\ carried$: Cargo weight data contained in the GHG emissions dataset
Calculation procedure of lifecycle GHG emissions	<p>The Company is to calculate lifecycle GHG emissions according to the Global Logistics Emissions Council Framework for Logistics Emissions Accounting and Reporting (Ver. 2.0) (GLEC Framework) as follows:</p> $Emissions(gCO_{2e}) = \sum_1^o \left(fuel(g) \times fuel\ emission\ factor \left(\frac{gCO_{2e}}{g_{fuel}} \right) \right)$ <ul style="list-style-type: none"> • o: Type of fuels • $fuel$: Fuel consumption data of applicable period contained in the GHG emissions datasets • $fuel\ emission\ factor$: Fuel emission factor referred to GLEC Framework Module 1

Verification procedure of the GHG emissions datasets and GHG emissions intensity

Verification procedure	<p>➤ 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:</p> <ul style="list-style-type: none"> 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 MRV Regulations; and The Society is to verify the fuel emission factor used by the Company to calculate the GHG emissions. The society is to verify the lower calorific value used by the Company to calculate the energy consumptions. <p>➤ 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.</p>
Sampling methodology	<p>The Society is to extract the samples from 778 vessels verified by the Society under IMO-DCS and EU MRV Regulations out of 518 applicable vessels in the descending order of lifecycle GHG emissions, based on the following conditions:</p> <ul style="list-style-type: none"> The samples extracted are to account for 50% (389 vessels) or over of 778 applicable vessels; and The samples extracted are to account for 50% (5,149,024 tonCO_{2e}) or over of the total lifecycle GHG emissions(10,298,049 ton CO_{2e}) from 778 applicable vessels.

The appropriateness of the GHG emissions datasets compiled by the Company and the GHG emissions intensity of transportation for the fiscal year 2022 calculated by the Company based on the GHG emissions datasets has been ensured by the Society.

1. Standard Method	:	10.32 gCO_{2e}/ton-mile
2. Reference Method	:	10.81 gCO_{2e}/ton-mile

(Reference)

Table: Summary of Mitsui O.S.K. Lines' GHG emissions data for the fiscal year 2022

Fuel used	Fuel consumption (ton)	Lifecycle GHG emissions (tonCO _{2e})
Heavy Fuel Oil	2,724,600 ton	9,290,887 tonCO _{2e}
Marine Diesel Oil / Marine Gas Oil	213,652 ton	837,514 tonCO _{2e}
LNG	44,773 ton	163,423 tonCO _{2e}
Biofuel	8,747 ton	6,225 tonCO _{2e}