Figures from Countdown Explainer

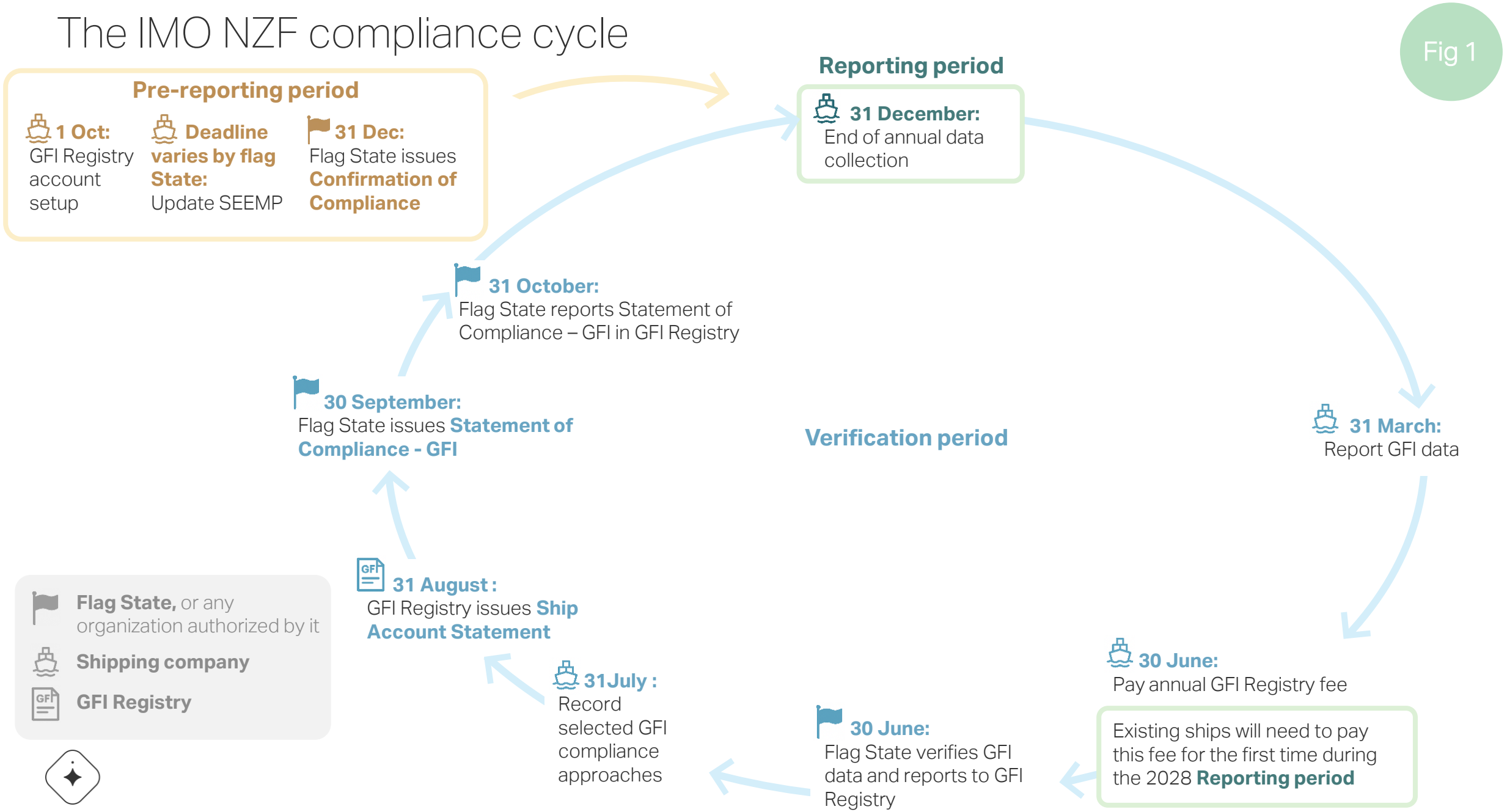
How IMO NZF Compliance Works in Practice

Countdown to IMO NZF
2025

Mærsk Mc-Kinney Møller Center
for Zero Carbon Shipping

The IMO NZF compliance cycle

Fig 1



Information on the annual GFI to be submitted to flag State

Table 1

Section	Details
Identity of the ship	• Ship name • IMO number • Port of registry • Company name and contact details • Calendar year period
Technical characteristics of the ship	• Year of delivery • Ship type • Gross tonnage, net tonnage, deadweight tonnage • Power output (in kW) of main and auxiliary engines over 130 kW

Information related to the annual GFI	• Fuel use by type (in metric tonnes): main engine(s), auxiliary engine(s)/generator(s), fire boiler(s), etc.
	• Methods used for collecting fuel consumption data
	• Power capacity of other energy conversion systems installed on board (in MJ), such as fuel cells, electric battery, wind assisted propulsion system, along with methods used for collecting data
	• Total amount of onshore power supplied (kwh)
	• Reference to the Fuel Lifecycle Label by fuel or energy source type used
	• Attained GFI (gCO_2eq/MJ), including WTW GHG intensity of each fuel type (gCO_2eq/MJ), amount of energy used by fuel/energy type (MJ), total amount of energy used by ship (MJ)
	• Target annual GFI including base target GFI and direct compliance GFI from the regulation
	• GFI compliance balance (tCO_2eq):
	  • For ships in direct compliance, the amount of surplus units the ship is eligible to receive.
	  • For ships with compliance deficit, the compliance deficit for Tier 1 and Tier 2 respectively
	• The amount of surplus units banked from the previous reporting periods (in tCO_2eq)

Information related to uptake of ZNZs	• The list of different ZNZs used, along with the associated emissions (tCO_2eq) per ZNZ

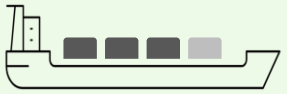
Compliance cycle checklist

Table 2

Period	Document or confirmation
Pre-reporting period	❑ SEEMP updated with GFI-related information ❑ Confirmation of IMO GFI Registry account setup ❑ Confirmation of Compliance issued by flag State
Reporting period	❑ Confirmation of annual fee payment to IMO GFI Registry ❑ Fuel consumption and GFI data (IMO NZF; Appendix XII) ❑ Fuel Lifecycle Label (FLL) and Bunker Delivery Note (BDN)
Verification period	❑ Confirmation of GFI data submitted to flag State ❑ Confirmation that selected GFI compliance approach has been performed ❑ Confirmation of annual fee payment to IMO GFI Registry ❑ Ship Account Statement capturing compliance balance, Surplus Units, and Remedial Unit transactions ❑ Statement of Compliance related to annual GFI issued by flag State (IMO NZF, Appendix XIII) Documents related to Remedial Units or Surplus Units, where applicable: ❑ Remedial Unit proof of payment issued by IMO Net Zero Fund ❑ Surplus Unit transfer confirmation

Scenario 1: Fossil-only in 2028

Fig 2



Case: A 10,000 TEU container vessel

Year:	2028
Operation:	Trans-Pacific ocean route
Fuels used:	HFO, MDO

For 2028, the vessel reports the following consumptions:

Fuel type	Annual fuel consumption	Emissions intensity (gCO_2eq/MJ)	LCV (MJ/g)
HFO	12,000 tonnes	95.48	0.0402
MDO	1,400 tonnes	93.93	0.0427

We have the following GFI targets for Tier 1 and Tier 2 for 2028:

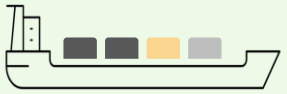
Year	Base target annual GFI (Tier 2)	Direct compliance target annual GFI (Tier 1)
2028	89.57 gCO_2eq/MJ	77.44 gCO_2eq/MJ

Calculations

Unit	***Equation***	***Result***
$Energy_{total}$	$\sum_{j=1}^{J} Energy_j$	542,180,000 MJ
$GFI_{attained}$	$\frac{\sum_{j=1}^{J} EI_j \times Energy_j}{Energy_{total}}$	95.31 gCO2eq/MJ
$Compliance\ Balance$	$(GFI_{attained} - GFI_{Direct\ compliance\ target}) \times Energy_{total}$	9,688 tCO2eq
$Tier\ 1\ Compliance\ Deficit$	$(GFI_{Base\ compliance\ target} - GFI_{Direct\ compliance\ target}) \times Energy_{total}$	6,577 tCO2eq
$Tier\ 2\ Compliance\ Deficit$	$(GFI_{attained} - GFI_{Base\ compliance\ target}) \times Energy_{total}$	3,112 tCO2eq
Cost of RUs	$\boldsymbol{Tier\ 1\ Compliance\ Deficit \times 100 + Tier\ 2\ Compliance\ Deficit \times 380}$	$1,840,082

Scenario 2: Blending with biodiesel in 2028

Fig 3



Case: A 10,000 TEU container vessel

Year: 2028

Operation: Trans-Pacific ocean route

Fuels used: HFO | FAME | MDO

For 2028, the vessel reports the following consumptions:

Fuel type	Annual fuel consumption	Emissions intensity (gCO_2eq/MJ)	LCV (MJ/g)
HFO	10,945 tonnes	95.48	0.0402
FAME	1,142 tonnes	22.12	0.0372
MDO	1,400 tonnes	93.93	0.0427

We have the following GFI targets for Tier 1 and Tier 2 for 2028:

Year	Base target annual GFI (Tier 2)	Direct compliance target annual GFI (Tier 1)
2028	89.57 gCO_2eq/MJ	77.44 gCO_2eq/MJ

Calculations

Unit	Equation	Result
$Energy_{total}$	$\sum_{j=1}^{J} Energy_j$	542,251,400 MJ
$GFI_{attained}$	$\frac{\sum_{j=1}^{J} EI_j \times Energy_j}{Energy_{total}}$	89.56 gCO2eq/MJ
$Compliance\ Balance$	$(GFI_{attained} - GFI_{Direct\ compliance\ target}) \times Energy_{total}$	6,573 tCO2eq
$Tier\ 1\ Compliance\ Deficit$	$(GFI_{Base\ compliance\ target} - GFI_{Direct\ compliance\ target}) \times Energy_{total}$	6,573 tCO2eq
$Tier\ 2\ Compliance\ Deficit$	$(GFI_{attained} - GFI_{Base\ compliance\ target}) \times Energy_{total}$	0 tCO2eq
$Cost\ of\ RUs$	$Tier\ 1\ Compliance\ Deficit \times 100 + Tier\ 2\ Compliance\ Deficit \times 380$	$657,305
$Premium\ of\ Fuel\ Cost$	$Fuel\ Cost\ of\ Scenario\ 2 - Fuel\ Cost\ of\ Scenario\ 1$	$820,777
$Total\ Cost\ of\ Compliance$	$Cost\ of\ RUs + Premium\ of\ Fuel\ Cost$	$1,478,082

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The current series, **Countdown to IMO NZF,** is looks at the historic regulations coming out of the IMO. Find more on the IMO NZF and read previous editions on the Net-Zero Framework homepage.