Port Optimization for GHG Emissions Reductions

Brendan Curtis, Chief Commercial Officer
OMC International

Shipping contributes:

- 1b tonnes GHG emissions
- 3% of global GHG emissions
- 20% increase in CO_2 emissions from 2013 to 2023

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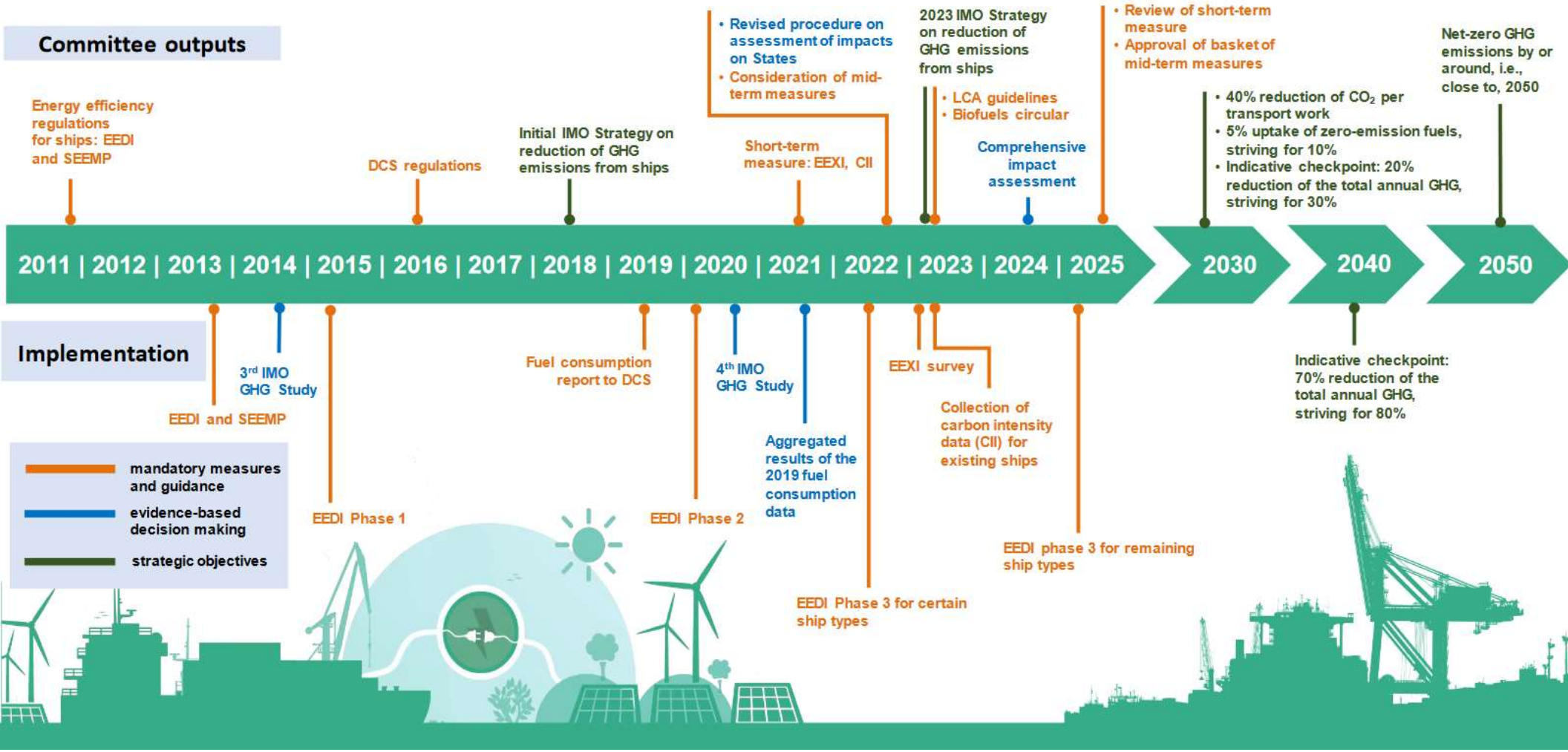
SUSTAINABLE DEVELOPMENT GOALS

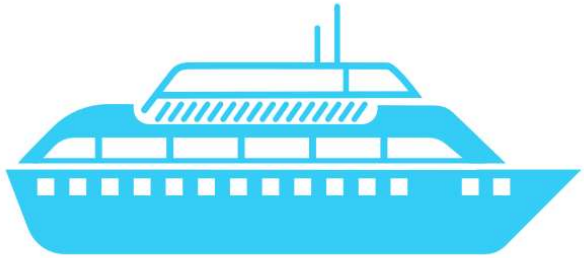
Addressing climate change

Over a decade of **regulatory action** to cut GHG emissions from shipping



EEDI

ENERGY EFFICIENCY DESIGN INDEX IMPROVING THE TECHNICAL PERFORMANCE OF NEW BUILD SHIPS



1

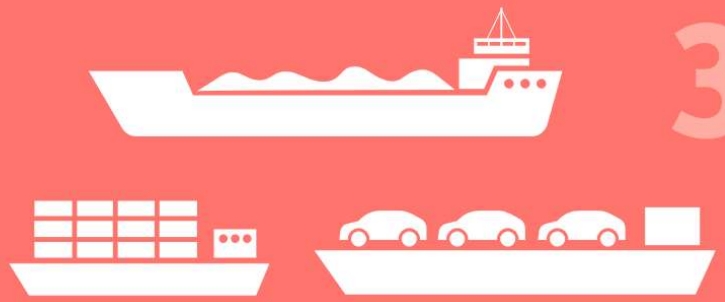
Ships which are **designed and constructed today** must be **MORE ENERGY EFFICIENT** than the baseline, thus reducing their carbon intensity

2

Performance targets are increasingly stringent over time, thus **INCENTIVIZING INNOVATION** in ship design

3

There are **DIFFERENT GOALS FOR DIFFERENT TYPES OF SHIPS,** recognizing the specificities of different types of ships

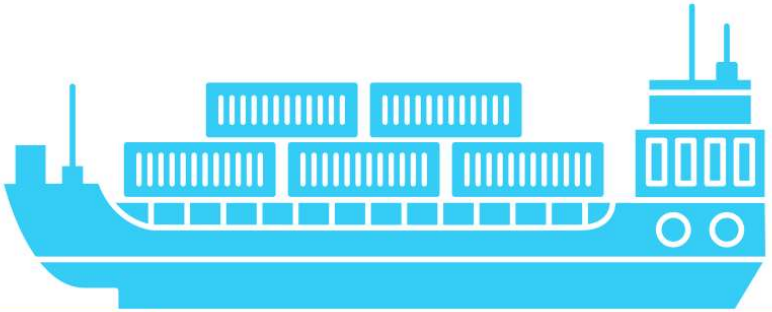


4

For example, **THE LARGEST CONTAINER SHIPS (>200,000 DWT)** built after 1 April 2022 **must be 50% more efficient** than the baseline

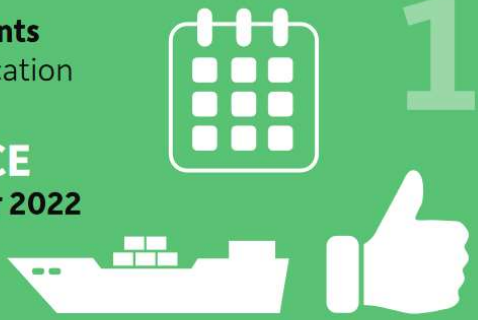
EEXI

ENERGY EFFICIENCY EXISTING SHIPS INDEX IMPROVING THE TECHNICAL PERFORMANCE OF EXISTING SHIPS



1

The requirements for EEXI certification **ENTERED INTO FORCE on 1 November 2022**



2

All ships are required to calculate their **Attained Energy Efficiency EXISTING SHIP INDEX (EEXI)**

3

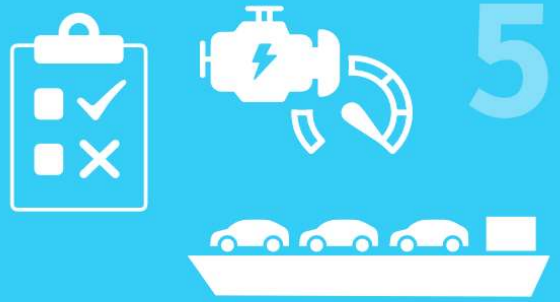
The EEXI is a **ONE-TIME CERTIFICATION** for existing ships targeting design parameters

4

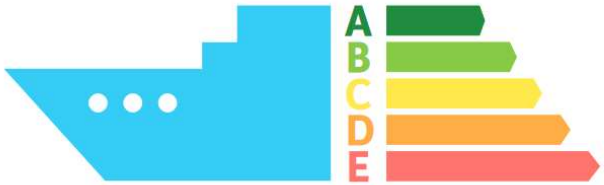
There are a variety of technical means to **IMPROVE THE CARBON INTENSITY** of existing ships and **achieve the Required EEXI**

5

A review clause requires IMO to REVIEW THE EFFECTIVENESS of the implementation of the EEXI requirements, by 1 January 2026 at the latest, and, if necessary, **develop and adopt further amendments**



CARBON INTENSITY INDICATOR (CII RATING)



IMPROVING THE OPERATIONAL PERFORMANCE OF EXISTING SHIPS

1

Each year, **ships of 5,000 gross tonnage and above collect and report fuel consumption data.** On the basis of this data,

A CARBON INTENSITY RATING IS ASSIGNED TO THE SHIP, FROM A TO E

2

There are a variety of operational means to

IMPROVE THE CARBON INTENSITY OF EXISTING SHIPS

and achieve the Required CII, e.g.:

- Ship speed optimization
- Weather routing
- Just-in-time arrival
- Trim, draft, and ballast optimization

3

Poorly rated ships **have to implement**

A PLAN OF CORRECTIVE ACTIONS,

and the company is regularly audited incentives may be provided to best rated (A/B) ships

4

The requirements for CII rating

ENTERED INTO EFFECT

on 1 January 2023

Paradox of the CII

"...by trying to correct the CII we inherently consume more fuel and produce more carbon emissions. This is the opposite of what the IMO intended when it introduced the CII to improve a ship's carbon efficiency."
Stolt-Nielsen Tankers

"The CII requirement may increase carbon emissions of some ships in some situations."

BIMCO

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Paradox of the CII

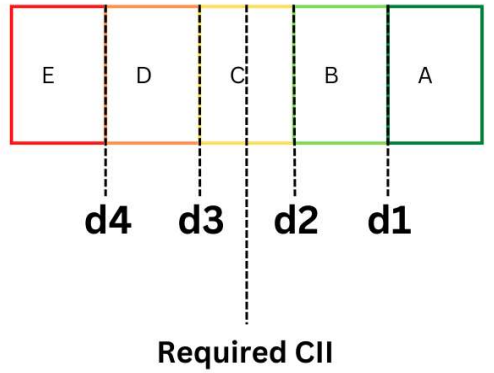
Reference CII is the baseline against which the **Required CII** is determined.

Required CII is the benchmark for the year.

Attained CII $= \dfrac{CO_2\ emission\ in\ grams}{DWT\ x\ Distance\ Travelled\ in\ Nautical\ Miles}$

CII Rating $= \dfrac{Attained\ CII}{Required\ CII}$

Grades:



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United Nations Policy Recommendations

"Gather the low hanging fruit by leveraging technologies in shipping that improve operational efficiency, fuel saving and energy efficiency and promote digital solutions that accelerate shipping decarbonization."
UNCTAD Review of Maritime Transport 2023

"Digital transformation helps improve port performance"

"Digitalization can enable decarbonization"

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Port Optimization & Risk Management

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DUKC® | BERTHALERT | PORTWEATHER | TRANSITANALYST

Expertise

- Ship Dynamics
- Port & Pilotage Operations
- Environmental Modelling & Processes
- Environmental Forecast Assimilation
- Real-time Data Processing
- Cloud Computing & SaaS
- Machine Learning & AI
- Big Data & Analytics
- Sensors & IoT

Services

- Full scale ship motion measurements
- Mooring Studies
- Mooring Design
- Channel Design & Dredge Optimisation
- Ship Manoeuvring Simulations
- Dynamic Port Capacity Modelling
- iHeave2

DUKC®:

- Digital twin of the port
- High resolution bathymetric data
- Advanced hydrodynamic models to determine vessel motions
- AI enhanced environmental forecasting
- Real-time environmental and vessel data feeds

DUKC® modernizes the transit planning process resulting in:

- Increased cargos
- Reduced delays
- Enhanced safety
- GHG emissions reductions

Case Study 1

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Bulk Export Terminal

33 millon tonnes per annum

Capesize Vessels

DUKC® Benefits

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Avge draft without DUKC® 16.90m

Avge draft with DUKC® 18.06m

Increased throughput by 4.4% without increasing emissions.

Increased sailing windows by 23 hours.

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CO_2 Reduction Results: 140,000 tonnes

70,260,229 kilograms of coal burned

27,240 homes' electricity use for 1 year

52,058,709 litres of diesel

2,314,912 seedlings grown for 10 years

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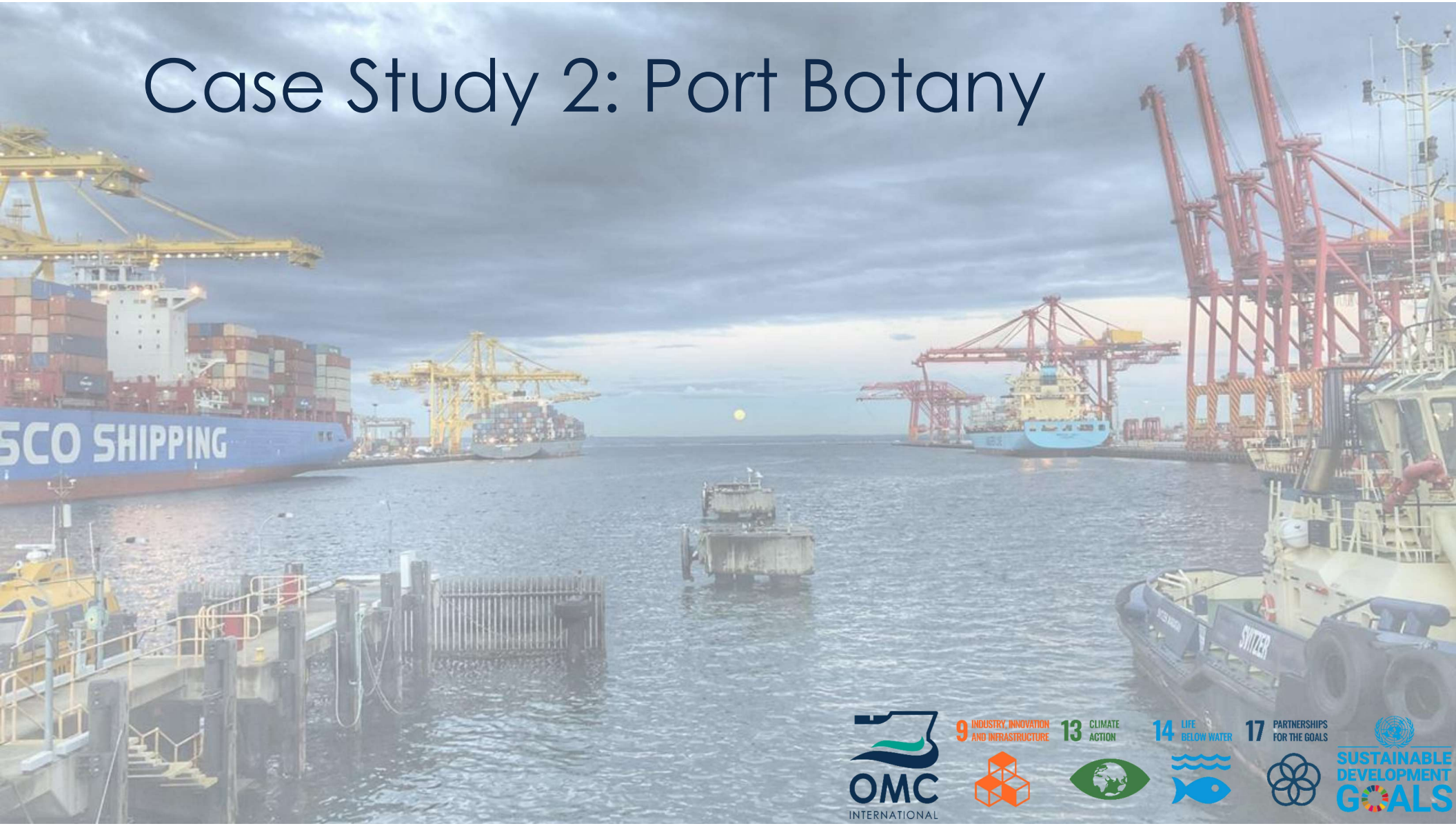
Case Study 2: Port Botany



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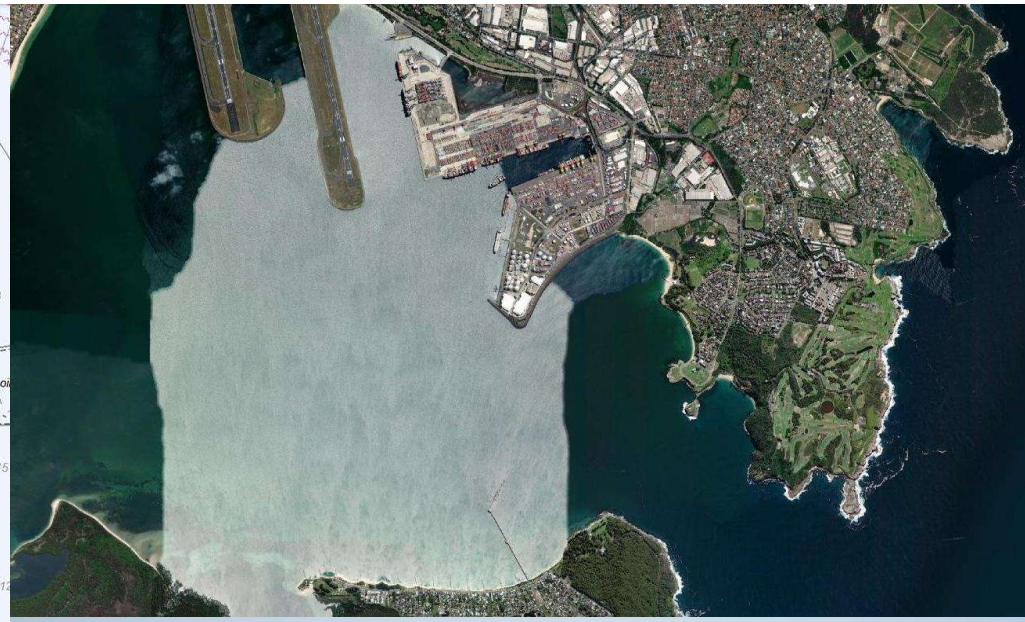

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Handles
2.5M TEU
every year

Contributes
$3.7B
to NSW Gross State Product every year

Supports
25,000
jobs

Nearly half
42%
of all goods in a Sydney household are imported in containers via Port Botany

Port Botany currently handles for New South Wales:

99.6% of containers

100% of bitumen

98% of LPG

90% of bulk chemicals

30% of refined petroleum fuels

15% of aviation fuel

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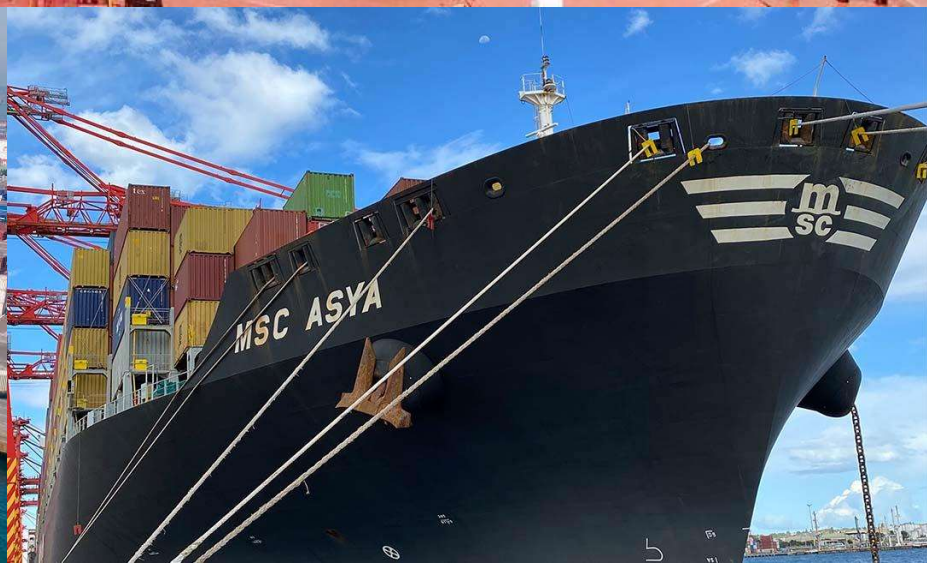
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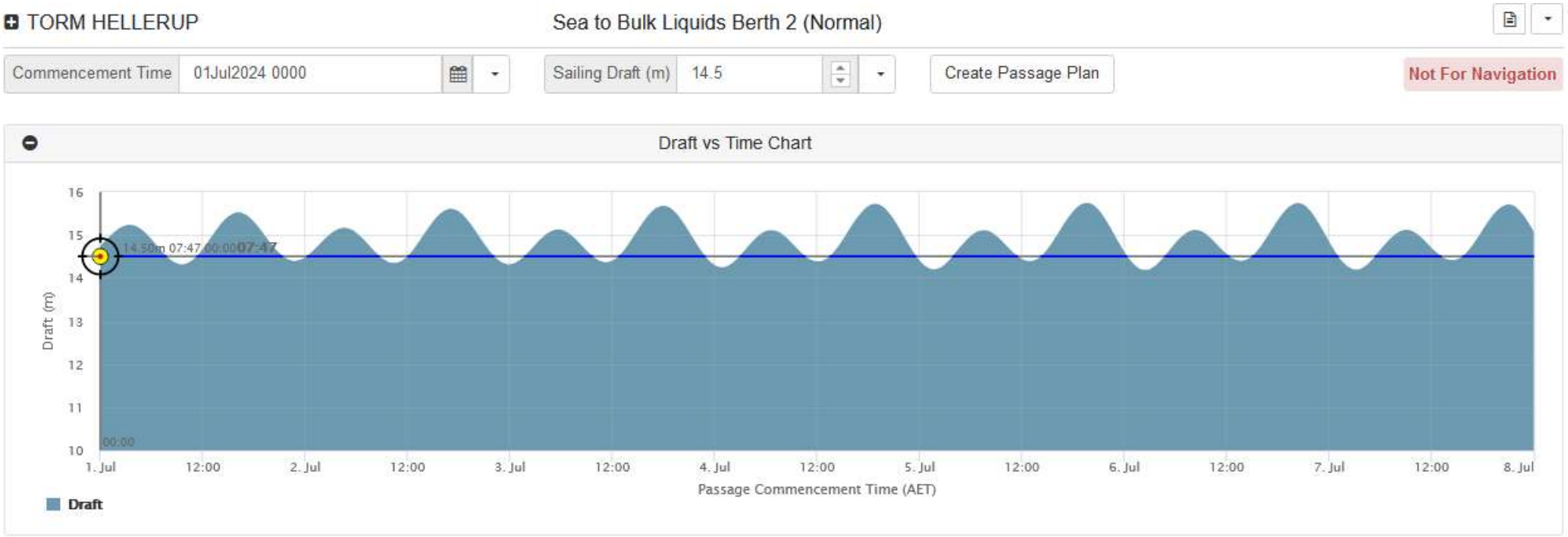

Long range Voyage Planning in DUKC® allows shippers and terminals to optimise future arrivals.

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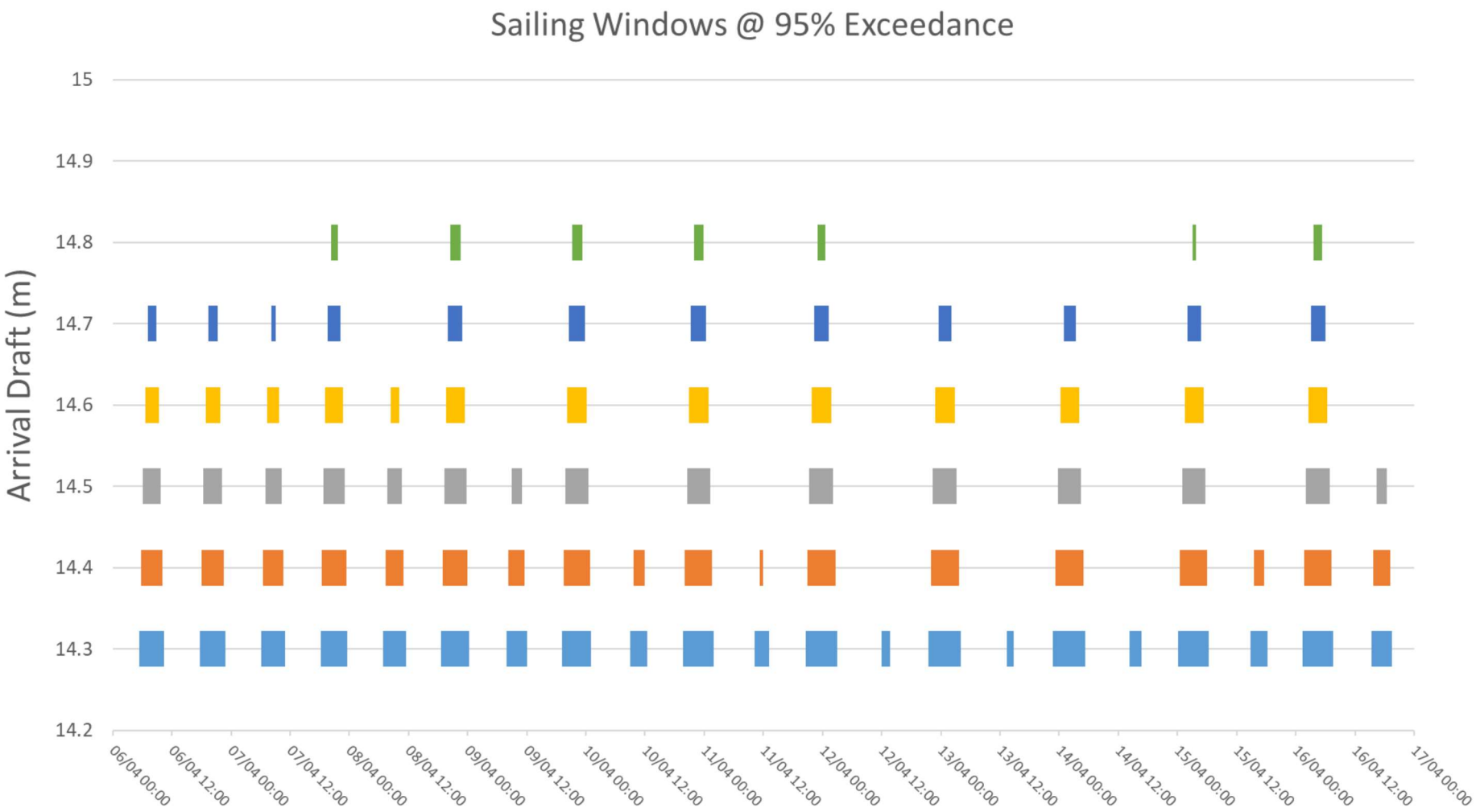

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Increasing arrival drafts has delivered a real reduction in tonne-km CO_2 emissions equivalent to a CII reduction of 11%.

Conclusions

Proven technologies are allowing ports & shippers to achieve CO_2 emissions reductions immediately & cost effectively.

Benefits are available for ports of all types and sizes.

Ports already have access to much of the required data.

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