

MARITIME

# Energy Efficiency Design Index and Shipbuilding

## Understanding the timeline

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# EEDI and Shipbuilding - DNV GL

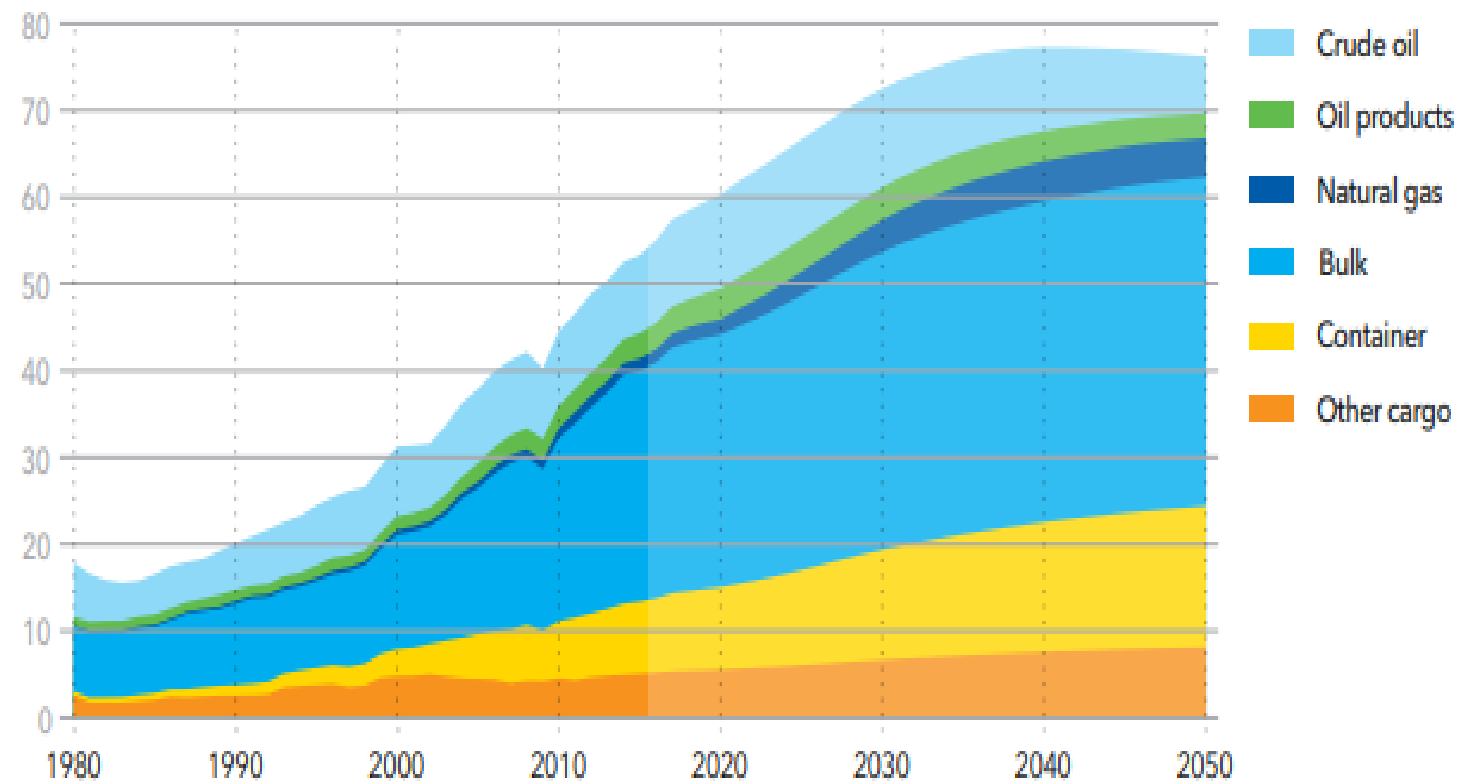


# Energy transition Outlook (DNVGL-Maritime)

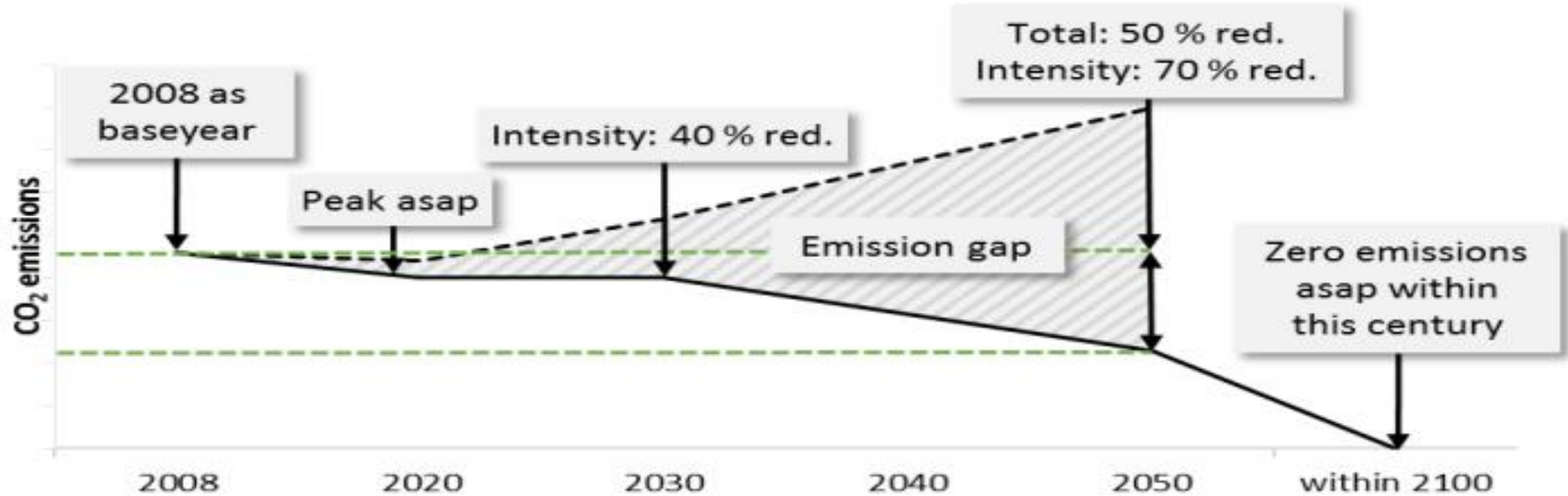
- Trade will not reduce and fleet size will increase by 35% by 2050
- Decrease in the tanker fleet (crude 30% & product 8%)
- Shipbuilding will match regulatory and trade demands
- EEDI phase 2 will shift to phase 3 and possible phase 4 (Fuel consumption per tonne-mile reduce by 30%)
- Introduction of new fuels (LSFO, Hybrid Fuels, Bio-Fuels, LNG, battery Storage, Hydrogen and Nuclear)
- Carbon capture and storage/re-utilization

World seaborne trade in tonne-miles

Units: Tt-nm/yr



# IMO GHG reduction Strategy and workplan



## Short-term 2018 – 2023

- Tighter EEDI & SEEMP
- Energy efficiency indicators
- Speed reduction
- National Action Plans

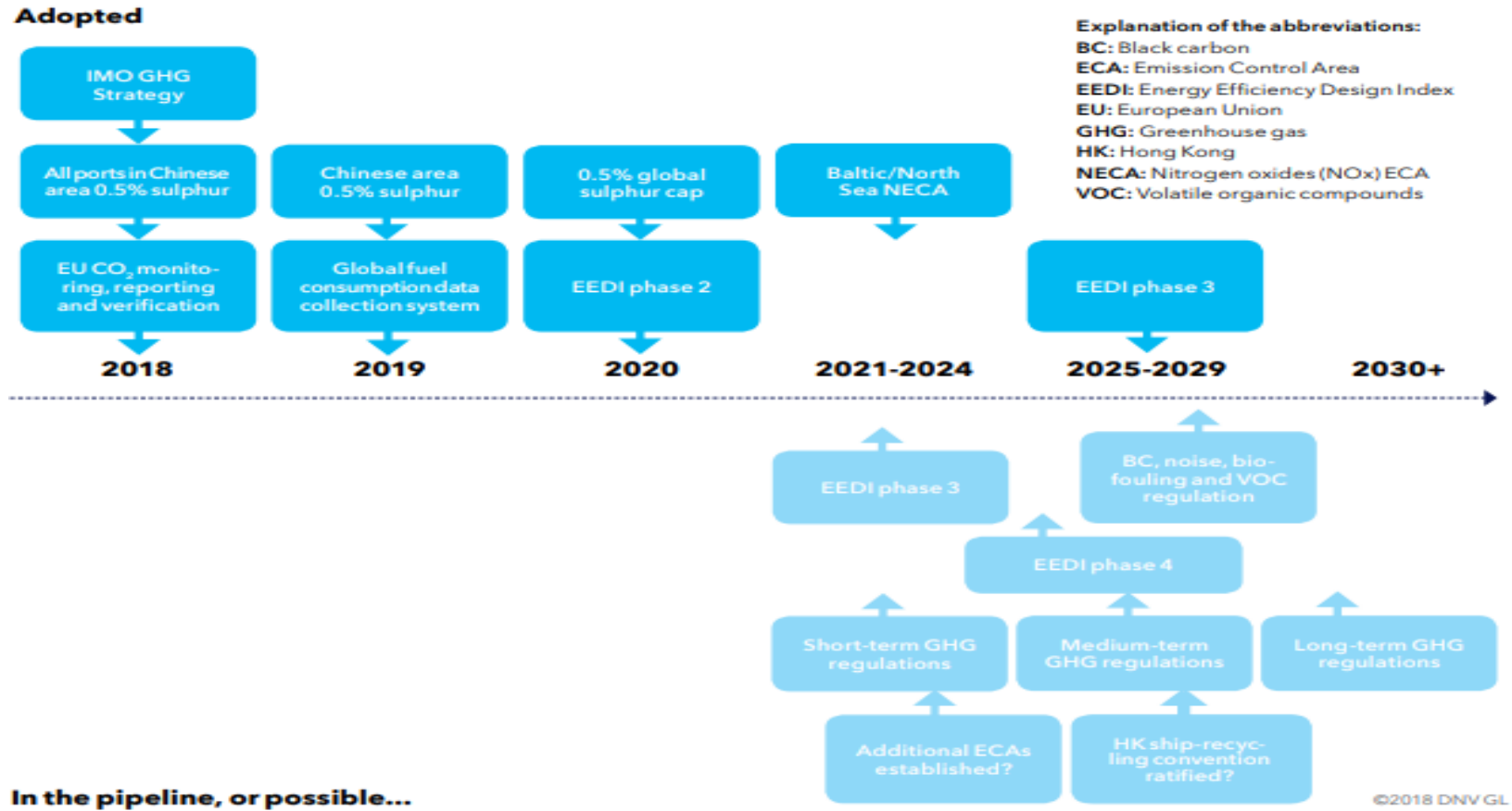
## Mid-term 2023 - 2030

- Energy efficiency measures for new and existing ships, using new indicators
- Carbon pricing / MBM
- Plan for low carbon fuels

## Long-term 2030 →

- Development of carbon neutral / zero carbon fuels
- New/innovative emission reduction mechanisms

# EEDI Timeline



## EEDI for new ships

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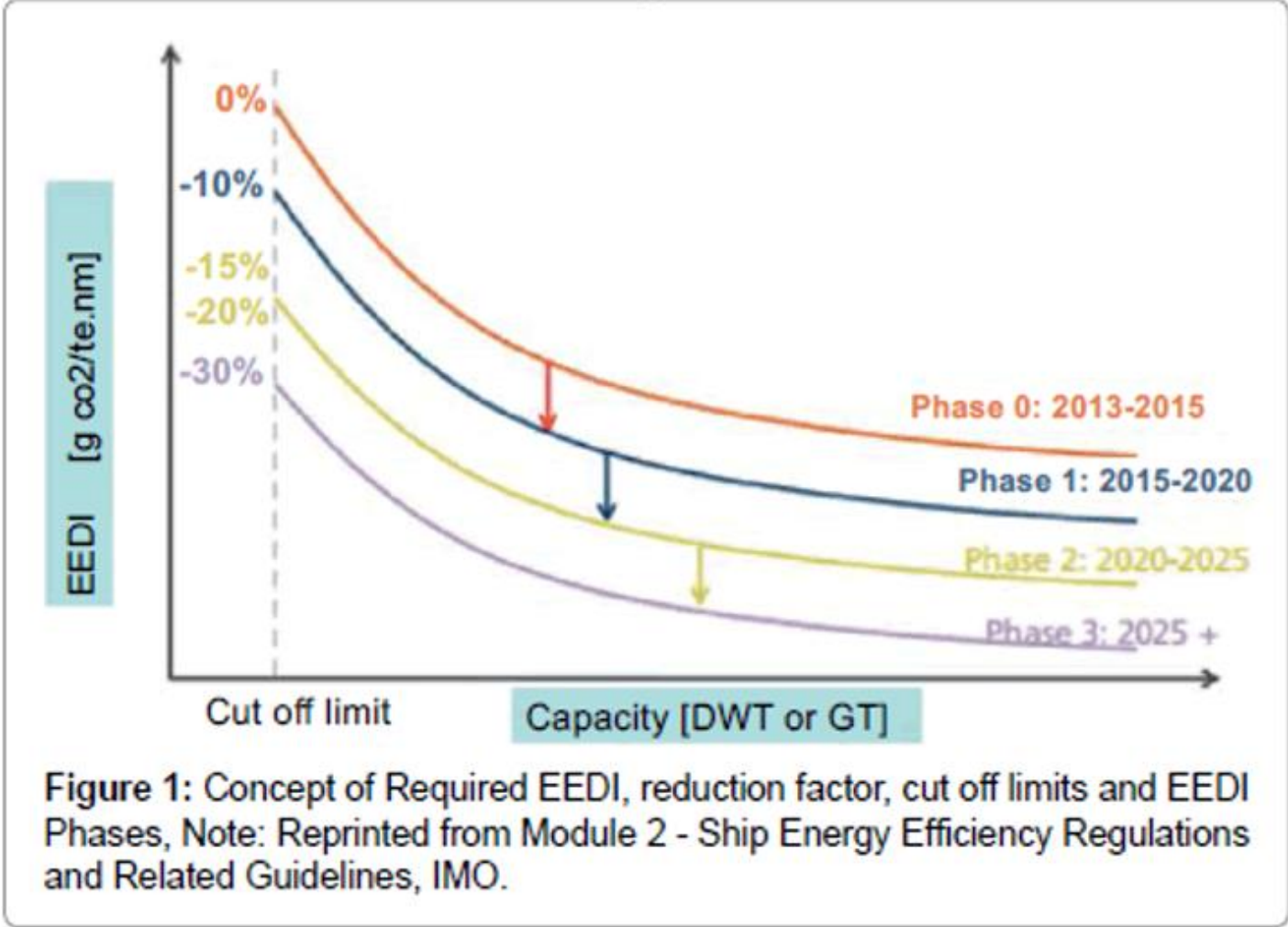
- Calculation guidelines from the IMO 2014 Guidelines on method of calculation for EEDI for new ships.

$$EEDI = \frac{CO_2 \text{ emission}}{\text{Transport work}}$$

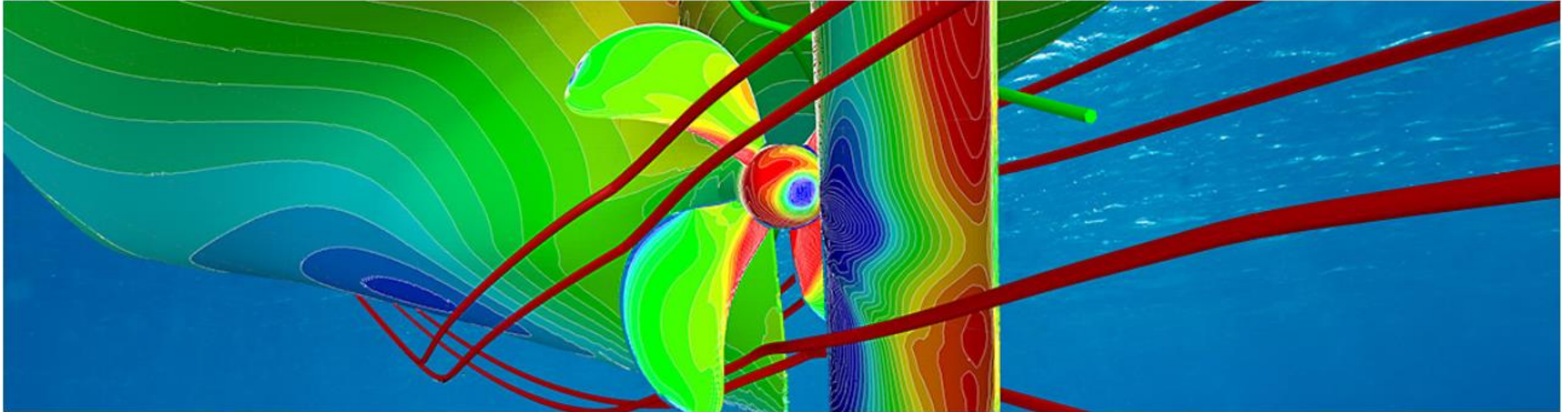
- Fuel Carbon content, fuel consumption and Conversion factor / ship capacity X reference speed
- Engine technical files
- Attained and required index is to be reported



# Phases of EEDI and Reduction factor X



## Shipbuilding and Hull Optimization



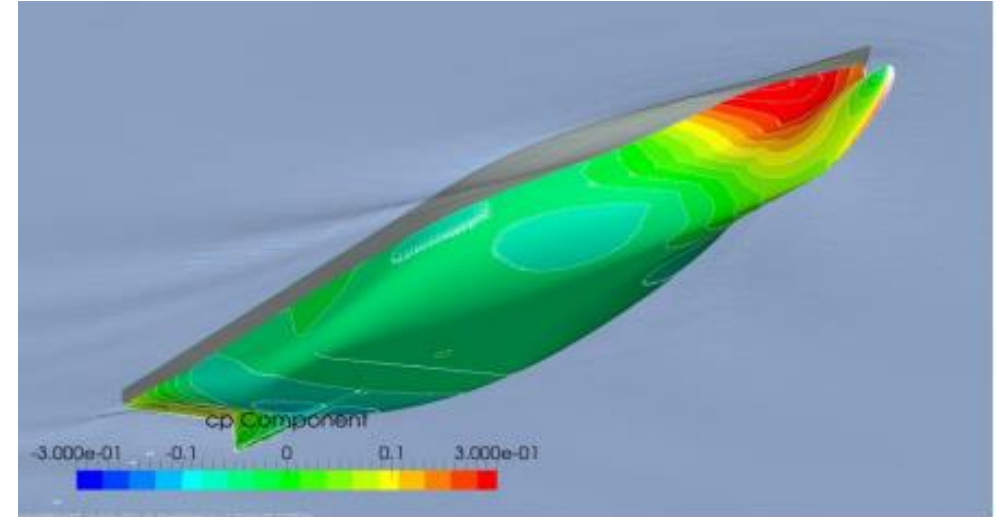
- Asymmetric stern design
- Dedicated Propeller simulation
- Reduce vibration and noise
- Use of Computational fluid Dynamics
- Data analytics from 20,000 hull shape
- Data exchange with existing CAD tools on the market



## Towing Tank test



- Towing tank test confirming the propulsive efficiency
- Equivalent Design Waves confirm Hull structural loads



- New Set of Rules for Ships hull structure

## EEDI (Energy Efficiency Design Index)

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- **Edith** EEDI (Energy Efficiency Design Index) for new ships is the single most important technical measure aimed at promoting the use of more energy efficient equipment and engines. The EEDI requires a minimum energy efficiency level per capacity mile (e.g., tonne mile) for different ship type and size segments.
- It is expected to stimulate continued innovation and technical development of all the components influencing the fuel efficiency of a ship from its design phase. As long as the required energy efficiency level is attained, ship designers and builders are free to use the most cost-efficient solutions for the ship to comply with the regulations. The EEDI provides a specific figure for an individual ship design, expressed in grams of carbon dioxide (CO<sub>2</sub>) per ship's capacity-mile (the smaller the EEDI the more energy efficient ship design) and is calculated by a formula based on the technical design parameters for a given ship.

## EEOI (Energy Efficiency Operational Indicator)

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- **EEOI** The Energy Efficiency Operational Indicator (EEOI) is a monitoring tool for managing ship and fleet efficiency performance over time. The EEOI enables operators to measure the fuel efficiency of a ship in operation and to gauge the effect of any changes in operation, e.g. improved voyage planning and more frequent propeller cleaning, or the introduction of technical measures such as waste heat recovery systems or a new propeller.



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