Economies of Scale from Post Megamax Container Vessels (2022 Version)

Excerpt

Christoph Rasewsky // Hamburg // 09.04.2022

Explanatory Note

About this Study

Increasing vessel sizes are in line with the growth of world economies since decades. Where a few years ago ships with around 20,000 TEU were considered the measure of all things, ships with a nominal capacity of over 24,000 TEU are already being delivered today. This has made it possible to further reduce costs and emissions per container transported and to increase the efficiency of container transport in general.

This study is aimed at shipowners of ultra large container ships and is intended to provide a realistic, comparative insight into the cost structure and savings potential for operating container ships with sizes above the current fleet of Megamax 23 and Megamax 24 from an owner's perspective. It was important that the technology considered is already available on the market and that the corresponding infrastructure exists to such an extent that the ship can be operated under competitive conditions to the existing fleet. In practice, this means that the ships examined could already be ordered from a shipyard today in this form.

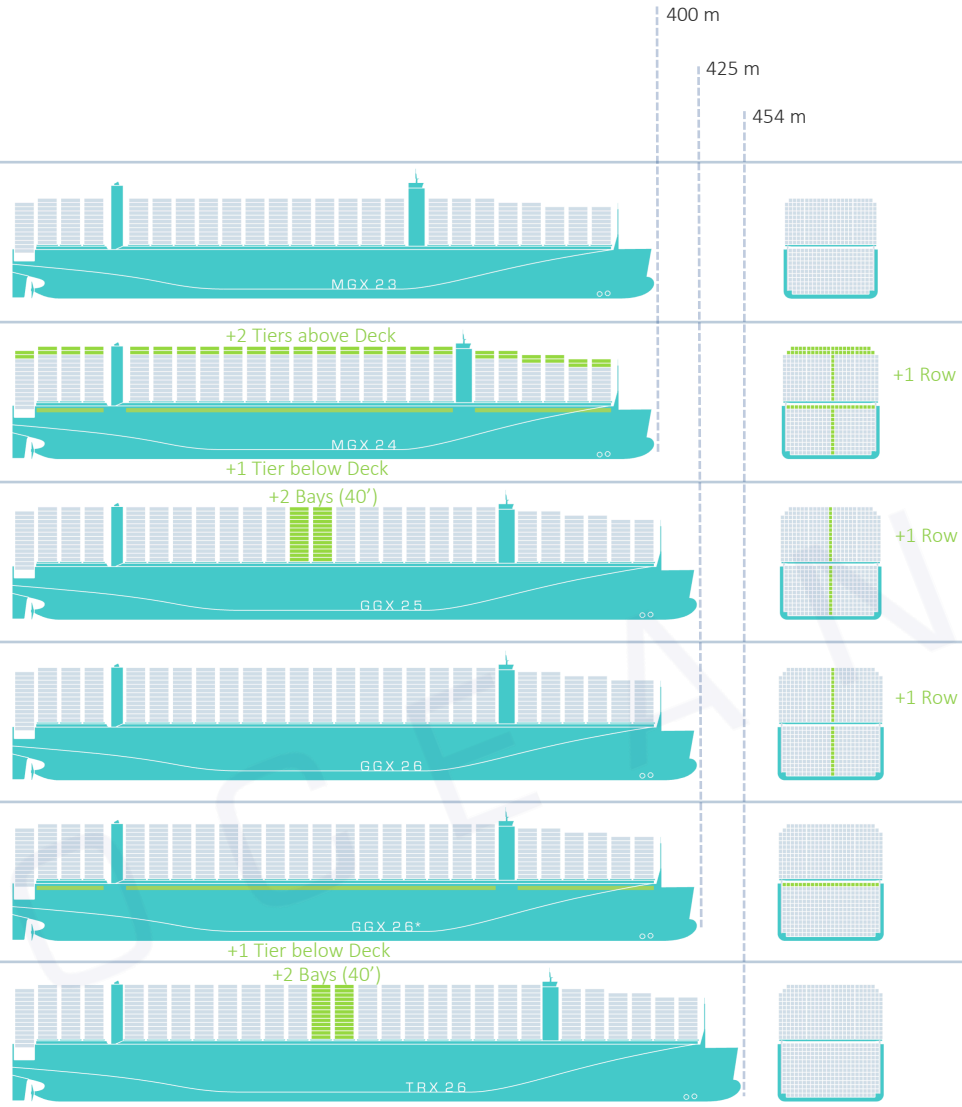
It is clear that some of the port infrastructures are not yet up to the demands of a post-megamax vessel. But the trends in the expansion of port infrastructures clearly show that the ports are adapting to ever larger ships. Nevertheless, some ports are already able to handle larger ships than the Megamax class without restrictions.

By adjusting the vessel main parameters step by step, it becomes clear which potentials can be exploited. The ships are compared ceteris paribus on a classic Europe-Asia trade, whereby the slot costs determined refer to loaded containers and not to nominal slots. Also all parameters included were calculated in such a way that a direct comparison can be made with the fleet in operation.

This 2022 version of the study provides an insight into the economies of scale taking into account the latest price developments on the new building market as well as the currently prevailing price situation on the bunker market.

Explanatory Note

Ship Sizes in Comparison



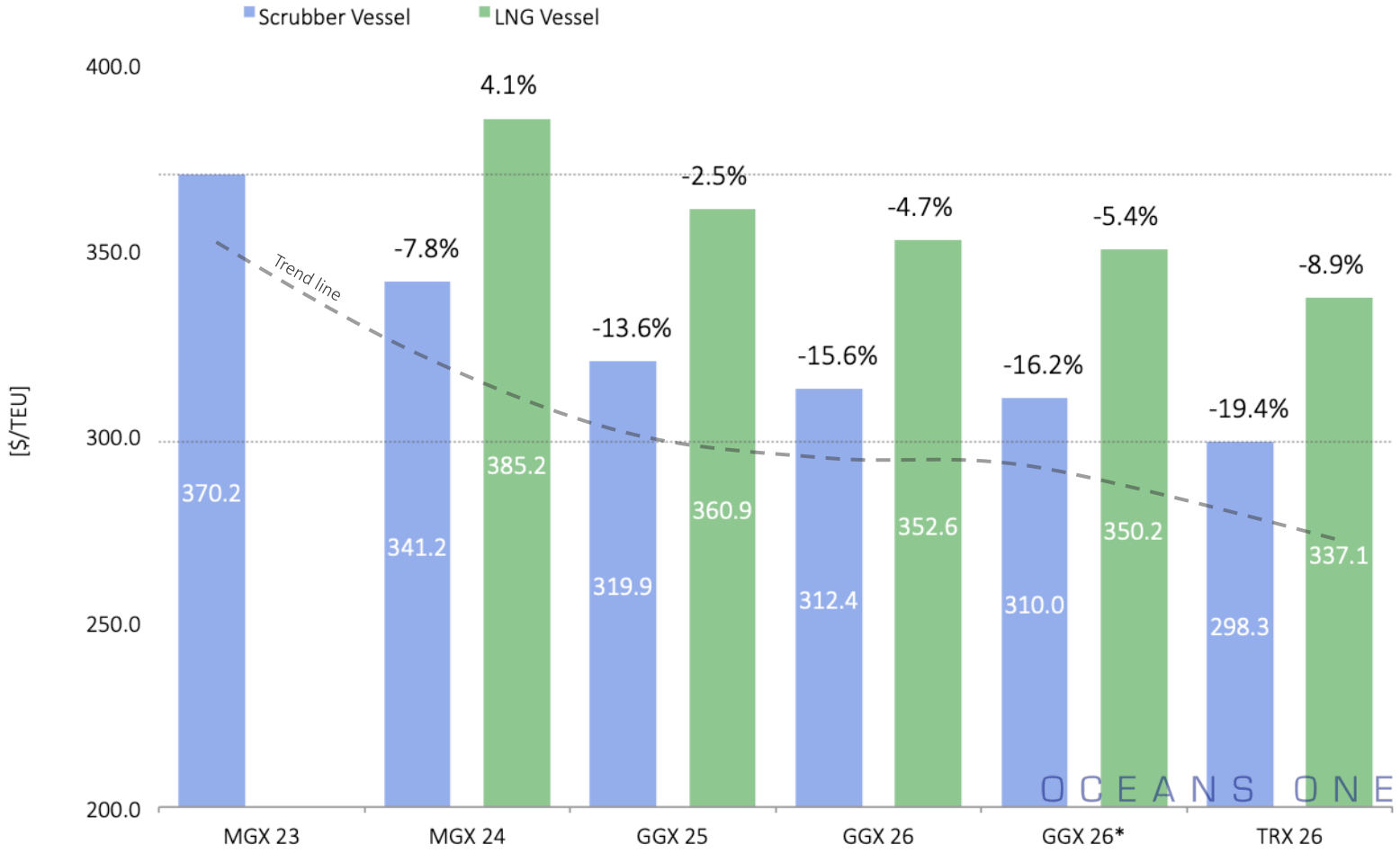
	Container Footprint (Bays (40') x Rows x Tiers)	Dimensional Footprint (Length x Breadth x Depth)	Nominal Container Capacity
MGX 23 MEGAMAX 23	24 x 23 x 22	400 m x 58.5 m x 30.5 m	19,800 TEU (Scrubber) -
MGX 24 MEGAMAX 24	24 x 24 x 25	400 m x 61.2 m x 33.2 m	23,990 TEU (Scrubber) 23,680 TEU (LNG)
GGX 25 GIGAMAX 25	26 x 25 x 25	425 m x 63.3 m x 33.2 m	27,400 TEU (Scrubber) 27,030 TEU (LNG)
GGX 26 GIGAMAX 26	26 x 26 x 25	425 m x 66.1 m x 33.2 m	28,840 TEU (Scrubber) 28,424 TEU (LNG)
GGX 26* GIGAMAX 26*	26 x 26 x 26	425 m x 66.1 m x 36.0 m	29,872 TEU (Scrubber) 29,456 TEU (LNG)
TRX 26 TERRAMAX 26	28 x 26 x 26	454 m x 66.1 m x 36.0 m	32,216 TEU (Scrubber) 31,812 TEU (LNG)

5 Economies of Scale

Economies of Scale for Bunker Costs

Bunker Costs per loaded Container per Round Voyage

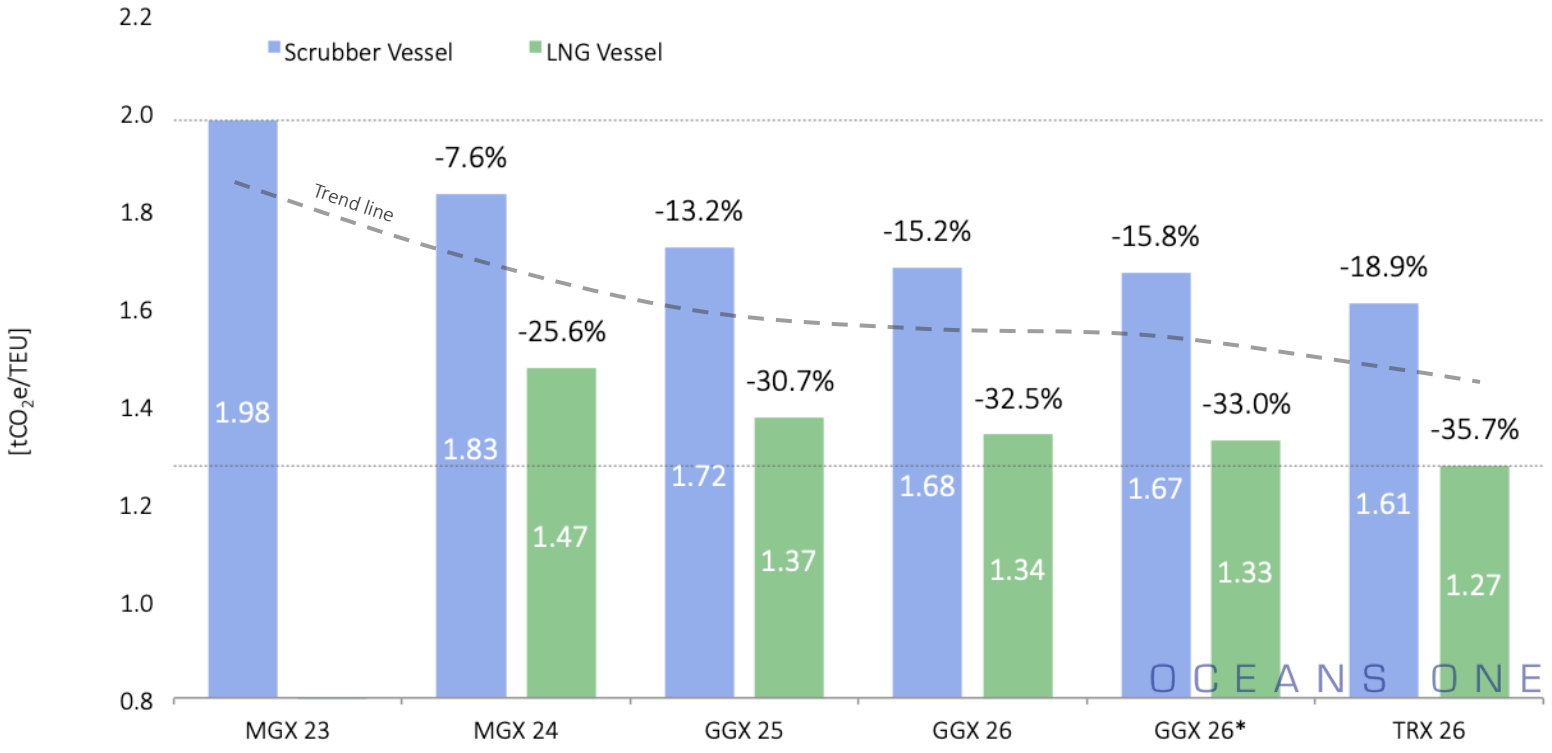
- Bunker costs per loaded TEU on the round voyage (R/V) show a clear regressive trend with increasing ship size.
- The GGX 26* vessel shows a slight upside deviation from the trend that can be explained by the higher LSW and the associated slightly lower payload.
- The maximum bunker cost saving potential is 19.4% from the smallest vessel (MGX 23) to the largest one (TRX 26).
- But even the GGX 26 vessels has a savings potential of 15.6%.
- The higher bunker costs for the LNG vessels also lead to higher bunker costs per loaded container, which are additionally influenced by a slightly lower container intake due to the LNG tank.



7 CO_2 Statement

CO_2 Emissions

Greenhouse Gas Emissions per loaded Container per Round Voyage (incl. Methane Slip(1))



- The economies of scale results in an emission reduction potential of up to 18.9% between a conventional MGX 23 container ship and the TRX 26 ship.
- If the emission reduction resulting from LNG as fuel is also taken into account, there is a CO_2 savings potential of even up to 35.7%.
- Compared to the scrubber vessel, LNG as fuel reduces emissions by about 20% for each vessel type.
- Further savings potential of up to 10% could be gained when optimising the vessel for lowest fuel consumption. Therefore the overall CO_2 saving potential considering LNG as fuel, scale effects and a corresponding optimisation can be around 45%.

As consumption per container decreases, emissions fall accordingly by up to approx. 32.5 % for the GGX 26 ship and even 35.7 % for the TRX 26 ship when scale effects and LNG as fuel are combined.

(1) refers to a gCO_2e/gCH_4 characterisation factor of 30

Get the Full Study

Full Study Content (1/2)

Chapter	Content Slides	Key Insights
1. Explanatory Note	• Ship sizes in Comparison (1/2) (included in this document) • Ship sizes in Comparison (2/2)	• Graphical overview of ship sizes with dimensional Footprints • Tabular Overview of ship sizes in comparison and description of changes
2. Vessel Characteristics	• Key Performance Figures • Main Particulars • Main Engine, Weight Figures & Container Capacities	• Diagrams comparing nominal container intake, deadweight, light ship weight, gross tonnage (LNG & Scrubber) • Table of ships main particulars, engine types, engine de-rating and power output, container capacities below deck an on deck (LNG & Scrubber)
3. Framework Conditions	• Operational Profile & Speed-Draught Profile • Ship Price & Operational Expenditures • Bunker Prices & Operational Conditions	• Description of framework conditions which have been taken into account for this study • Overview of ship prices, bunker prices and LNG price
4. Intermediate Results	• Bunker Consumptions per Round Voyage • Annual Bunker Costs • Annual Vessel Depreciation • Annual Operational Expenditures • Annual System Costs • Haul Capacities	• Complete comparative insight into the cost structure of the different ship sizes (LNG & Scrubber) • Show and compare the system costs for each unit (LNG & Scrubber) • Overview of the transport capacity of the vessels and the average containers transported (LNG & Scrubber)

Get the Full Study

Full Study Content (2/2)

Chapter	Content Slides	Key Insights
5. Economies of Scale	• Economies of Scale for Bunker Costs (included in this document) • Economies of Scale for Depreciation Costs • Economies of Scale for Operational Expenditures	• Insight into the economies of scale of the various costs (OPEX, CAPEX, bunker costs) per container transported on the round trip (LNG & Scrubber)
6. Slot Costs	• Slot Cost Breakdown for Scrubber Vessel • Slot Cost Breakdown for LNG Vessel • Slot Costs for Scrubber Vessel and LNG Vessel	• Comparative breakdown of the slot costs (LNG & Scrubber) • Comparison of slot costs (LNG & Scrubber) • Identification of the lowest slot costs of the vessels compared
7. CO_2 Statement	• Greenhouse Gas Reduction Potential (included in this document) • EEDI	• Overview of potential CO_2-savings from ship size increase as well as CO_2 reduction potential from different fuel choices (LNG vs. Scrubber) • EEDI ranking and CO_2-reduction potentials
8. Conclusion	• Key Learnings • General Upsides and Downsides of Post Megamax Container Vessels	• Summary of the insights from the study and recommendation for the most economical step of ship size increase • Identification of general advantages and disadvantages from larger ships

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Full Study

The full study includes:

- Benchmark of average Megamax vessels against the next generation of container ship sizes
- 22 Content slides (as per description on the previous pages) including 22 diagrams, 6 tables, 3 illustrations
- Based on average operational profile, average cargo profile, average proforma profile, average framework conditions
- Presentation of results via video conference (or on site plus travel expenses)

Key insights:

- Deep insight into the economies of scale of the various costs of operating different vessel sizes in the east-west trade
- Differentiated overview of slot costs for post Megamax container vessels (Spoiler: the most economical vessel is not the TRX 26) and CO_2 reduction potential

Price: EUR 1,450.- w/o VAT (Request full study: info@oceansone.de)

Individual Study

The individual study includes:

- Benchmark of next generation ship sizes against a Megamax vessel out of buyers fleet
- 22 Content slides (as per description on the previous pages) including 22 diagrams, 6 tables, 3 illustrations
- Taking into account individual operational profile, individual cargo profile, individual proforma profile, individual framework conditions and OPEX
- Three different bunker cost scenarios (in coordination with the buyer)
- Complimentary full study (see left side)
- Presentation of results via video conference (or on site plus travel expenses)

Key insights:

- Direct comparison of next generation ship sizes against currently operating fleet from buyer (or fleet under order)
- Identification of savings potential under buyers framework conditions
- Creation of a basis for further investment decisions

Price: EUR 14,500.- w/o VAT (Request individual study: info@oceansone.de)

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