Hull Efficiency

Vessel size class specific assessment of the impact of a hull coating upgrade

– a charterer's perspective

Capesize bulker

The business case for high-performance hull coating

One of the most impactful measures to improve the performance of a vessel is increasing the efficiency of its hull. And one of the simplest and most effective ways to achieve this improvement is a high-performance hull coating upgrade.

In this white paper, we will show you the effect of such an upgrade on a 2013-built Capesize dry bulk carrier. We will demonstrate the specific fuel savings, CO2 reductions, and impact on the EU carbon tax and ROI that you as a charterer can expect to see. Additionally, we will highlight specific benefits for vessel owners as well – such as the impact on their CII.

The analysis will enable you to assess the savings potential for your own chartered Capesize bulkers.

Contents

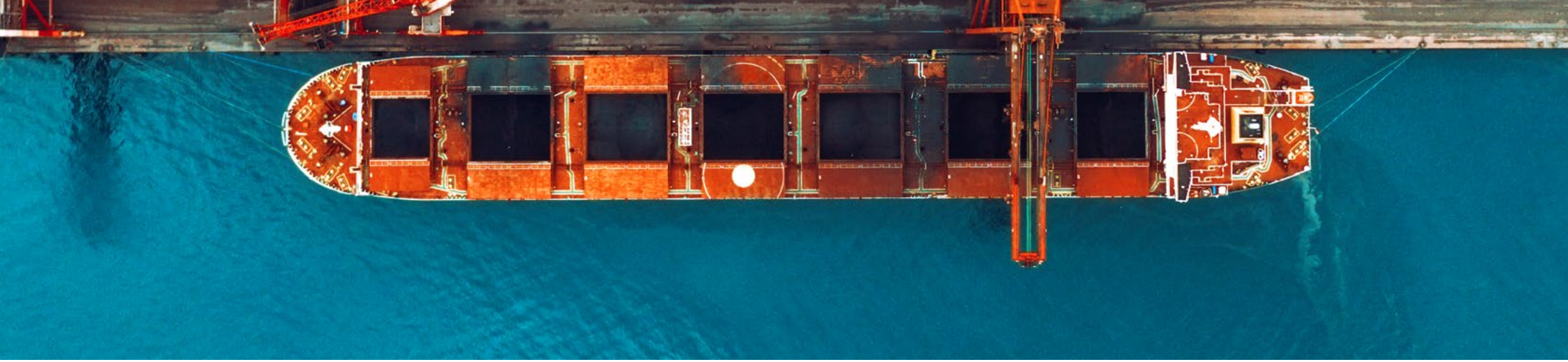
5 indicative pathways

To help charterers and shipowners make a more informed decision on how to improve the energy efficiency of a vessel, Hempel Marine has developed a ship-specific framework for evaluating options.

Our framework offers five distinct pathways to improve hull efficiency. We can assist you in evaluating the impact of any of these.

In the evaluation here we focus on the comparison of the two most obvious and simple measures:

A full blasted hull coated with a high-performance coating with no need for cleaning the next 5 years compared to a market average solution with the need for hull cleaning in the 5-year period until next obligatory dry-docking.



A fact-based approach

The assessment takes all relevant parameters into account.

Based on the specific operational profile of the vessel and a fouling risk assessment analysis, we calculate the impact of the hull coating upgrade on parameters relevant to the charterer as well as the owner of the vessel: CII, Total Cost of Ownership including paint cost, shipyard cost and cleaning cost over service life – as well as the charterer's ROI for any co-investment scenario based on fuel savings and carbon tax savings.

Operational profile analysis

Trade pattern

Fouling risk

Impact on CII

Impact on TCO & ROI

	Elements of Cost	Hempaguard X7 / Globic 9500	Globic 8000	Hempaguard X7 / Globic 9500 VS Globic 8000
Paint	Paint purchasing cost	$750,000	$400,000	$350,000
Repair Yard	Surface preparation cost	$100,000	$40,500	$59,500
	Washing cost	$10,000	$10,000	$0
	Paint application	$130,000	$25,000	$105,000
	Repair Yard Rent	$40,000	$30,000	$10,000
	Off hire cost	$140,000	$105,000	$35,000
Overnight	Diver cost	$0	$28,000	-$28,000
	Extra cost for next DD	$0	$28,000	-$28,000
	Additional fuel consumption (HSFO)	$0	$215,000	-$215,000
	Off Hire cost	$0	$52,500	-$52,500
Fuel	Fuel Cost (HSFO) 5 Years	$24,500,000	$28,700,000	-$4,200,000
	CO2 emission Tons (HSFO) 5 Years	186,600	223,000	-26,400
TCO	Total Cost of Ownership (HSFO) 5 Years	$25,670,000	$29,635,000	-$3,965,000
			Savings over 5 years (HSFO)	$3,965,000
			Payback Period (Months)	13
			Increase in earnings per day (TCE)	$3,000

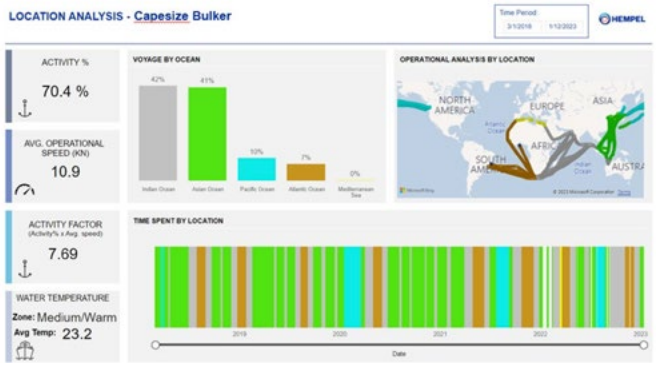
Impact on carbon tax

	2023	2024	2025	2026	2027
Added Power % - Baseline System Globic 8000	2.5%	7.3%	12.1%	16.9%	21.7%
Added Power % - Baseline System Hempaguard X7 / Globic 9500	-4.8%	-2.9%	-0.9%	1.0%	2.9%
CO2 Emissions - Baseline System Globic 8000	40,000	43,000	45,000	47,000	48,000
CO2 Emissions - Upgrade System Hempaguard X7 / Globic 9500	38,000	38,600	39,000	40,000	41,000
Yearly CO2 emission reduction Tons (HSFO)	2,000	4,400	6,000	7,000	**7,000**
% of eligible emissions to be taxed		40%	70%	100%	100%
Yearly Carbon Tax - Baseline System Globic 8000	$ -	$1,200,000	$2,200,000	$3,300,000	$3,500,000
Yearly Carbon Tax - Upgrade System Hempaguard X7 / Globic 9500	$ -	$ 1,100,000	$ 2,000,000	$ 2,900,000	$ 3,000,000
Yearly Carbon Tax Savings		$ 100,000	$ 200,000	$ 400,000	**$ 500,000**

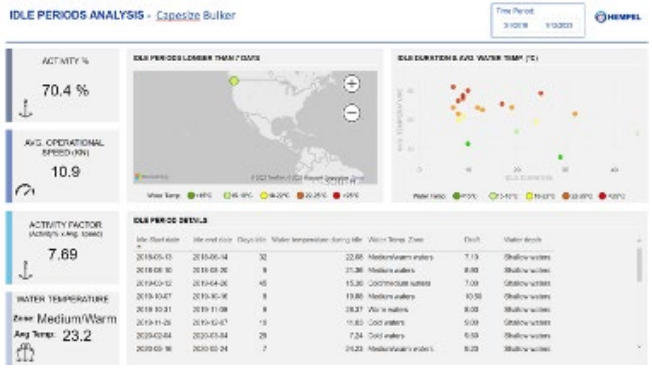
Detailed operational analysis

The validity of the impact assessment is assured through a comprehensive analysis of the vessel's operation. It not only takes speed, activity, and water temperature into account, it also looks at how these factors are interrelated, and how they develop over time.

The analysis includes: A recommended paint system specification for the vessel type in question, Capesize bulker, defined for standardised trade routes. It's based on an investigation of the operational flexibility requirement (i.e. variations in speed, idle periods and time spent in warm waters), the risk of fouling and the risk of mechanical damages due to frequency of canal transits, ice trading, ship to ship operations and berth conditions.



Trade Pattern Analysis
Assesses if the coating specification (i.e. product per hull area, number of coats, dry film thickness) is aligned with the ship-specific trade.



Idle Periods Analysis
Examines the number of idle days in specific water temperatures during the previous service period.

Fouling Risk Analysis
Fouling risk based on coating in use, AIS data (location, idle periods, speeds) fouling pressure at any time and hull event history including cleanings.

Impact on CII

of a high-performance hull coating upgrade

Hull coating upgrade is one of the most effective measures to emissions reduction. Selecting a high-performance hull coating solution can significantly enhance the effect – as demonstrated in the figures below.

CII - 1st year after docking
Hempaguard's out-of-dock-power gain combined with strandard dry dock improvement and full blasting will help in reducing CII – assuming equal NM.

CII - Remaining years in service
Added power with Hempaguard will be significantly lower than with average antifouling. CII wil increase, but at a slower rate resulting in compliant ratings.

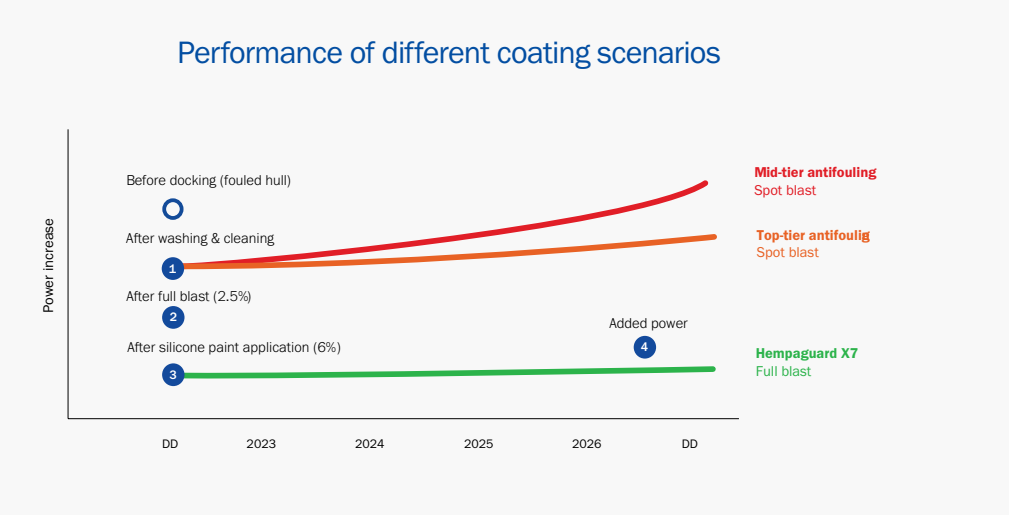


Figure 1

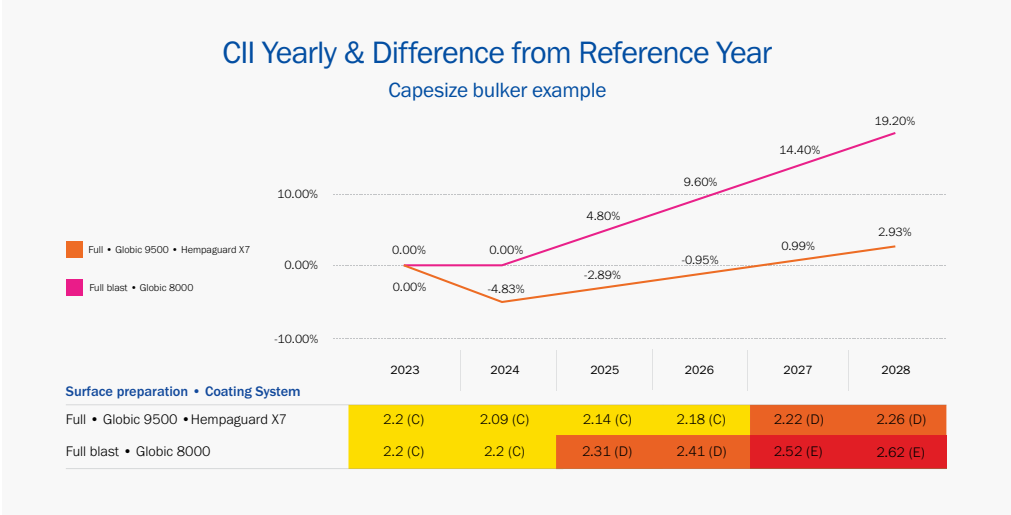


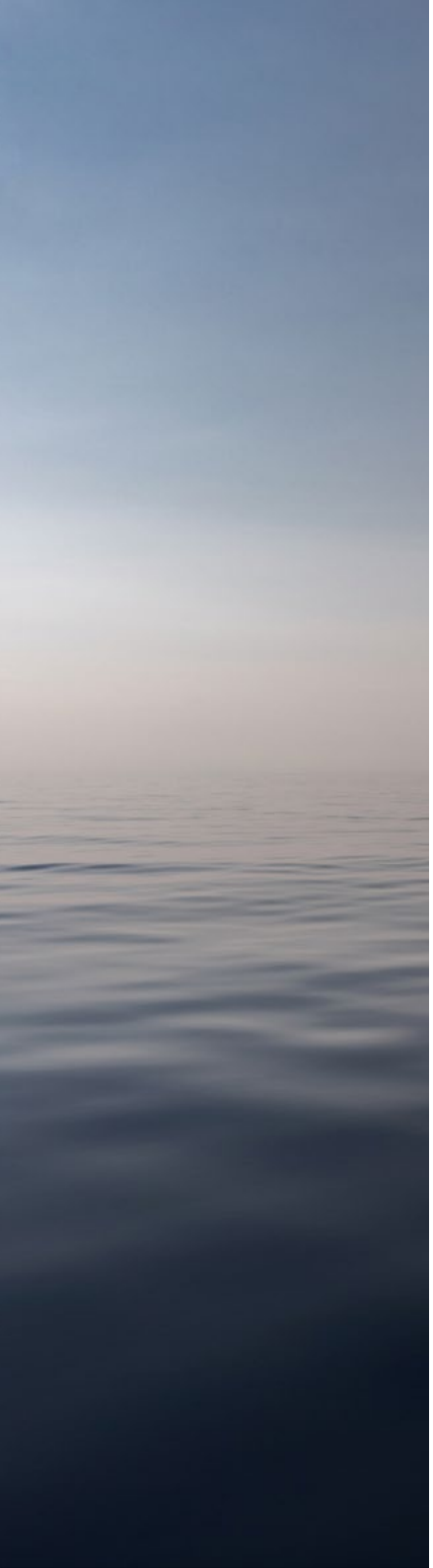
Figure 2

How a coating upgrade improves performance

1. "Standard" dry dock improvement
2. Surface preparation (full blast Vs spot repairs)
3. Out-of-dock power gain from smoothness
4. Added power over time required to mainain same speed

The coating solutions

The 2013-built Capesize bulker was originally coated with Hempel Globic 8000, a a mid-tier conventional antifouling solution. It is compared to the effect of a high-performance silicone-based upgrade with Hempaguard X7 on the flat and the vertical bottom of the vessel and a Globic 9500 upgrade on the boot top.



Impact on total cost and ROI

of a high-performance hull coating upgrade

The economic impact of a high-performance hull-coating upgrade is significant. The resulting savings largely outperforms the higher initial cost.

In the case of this Capesize bulker the total savings over a 5-year docking period amounts to more than 2.8 million dollars – and the investment is paid back in a little more than one year.

Impact of hull coating upgrade | TCO & ROI

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Impact on EU ETS carbon tax

of a high-performance hull coating upgrade

The high-performance hull coating upgrade also significantly reduces CO2-emissions. This leads to a considerable reduction in the carbon tax you need to pay.

EU ETS savings from coating upgrade

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Added Power % - Baseline System Globic 8000	2.5%	7.3%	12.1%	16.9%	21.7%
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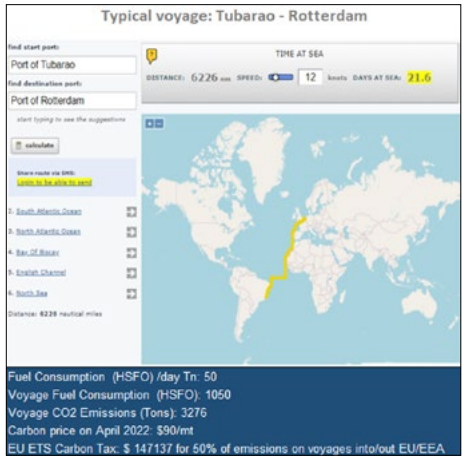

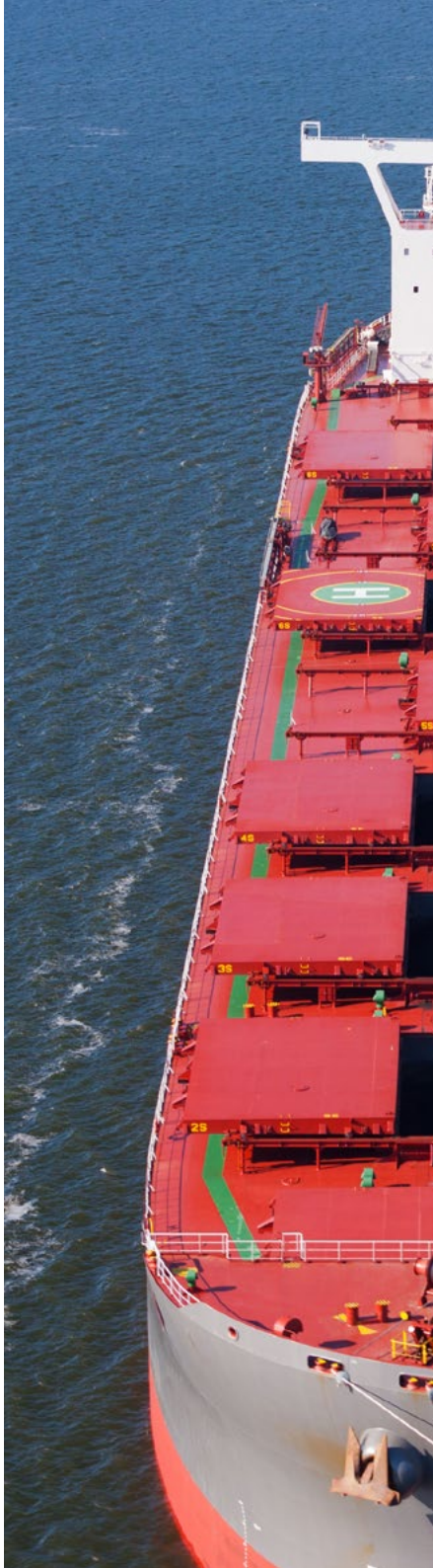

Get an impact assessment of your Capesize bulkers

We hope you have found the introduction to the effect of a high-performance hull coating upgrade in this whitepaper useful.

Please don't hesitate to contact us for an assessment of your specific Capesize bulkers – or vessels in general.

By providing you with the effect on CII, TCO, ROI and carbon tax, we can help you make a better and more well-informed choice of means for decarbonisation and operating freedom.

Book a vessel specific assessment »

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