

Ship Energy Performance Framework

Case Study: Peer Benchmarking

Tier 1: Peer Benchmarking



CASE

A shipowner operating a fleet of bulk carriers is seeking to benchmark the vessels' performance for the year 2024 against industry peers, focusing on ships with a capacity between 79,000 and 85,000 deadweight tonnage (dwt) and built between 2000 and 2023.

METHODOLOGY

The peer group is defined based on Vessel Type, Year Built Range, Capacity Range and Performance Year.

For each peer group, ABS creates histograms, scatter plots and annual trend charts, based on key metrics such as energy use, fuel consumption, CO₂e emissions, annual efficiency ratio (AER), greenhouse gas fuel intensity (GFI), distance traveled, speed and sailing ratio. Histograms include the mean and standard deviation values. Scatter plots include the best-fit equation.

DELIVERABLES

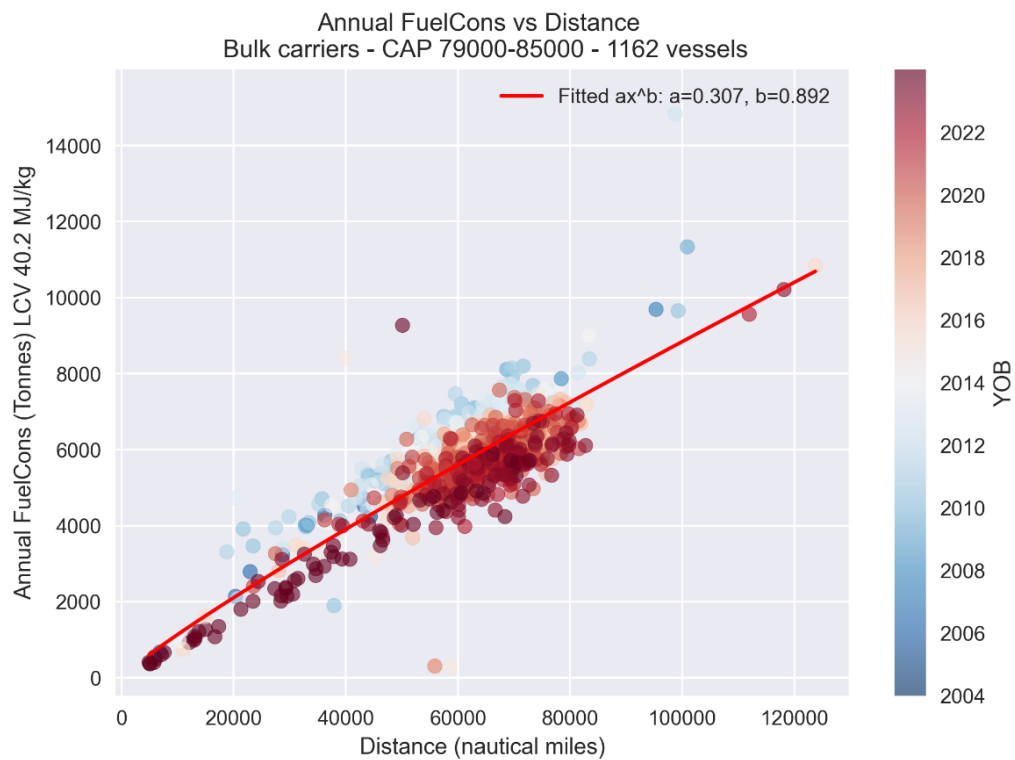
ABS created a peer group consisting of 1,162 vessels.

ABS generated the following graphs.

- Distribution of Daily Tonnes of Fuel Consumption
- Distribution of Daily Tonnes of Fuel Consumption per Capacity Tonne
- Distribution of Daily Tonnes of CO₂e per Capacity Tonne
- Distribution of Annual Tonnes of Fuel Consumption
- Distribution of Annual Tonnes of CO₂e
- Distribution of Annual Energy
- Distribution of AER
- Distribution of GFI
- Distribution of Average Speed
- Distribution of Sailing Ratio
- Plot of Speed vs. Daily Tonnes of Fuel Consumption
- Plot of Speed vs. Daily Tonnes of Fuel Consumption per Capacity Tonne
- Plot of Speed vs. Daily Tonnes CO₂e per Capacity Tonne
- Plot of Speed vs. AER
- Plot of Distance vs. AER
- Plot of Distance vs. Annual Fuel Consumption
- Plot of Sailing Ratio vs. Annual Fuel Consumption

- Plot of Sailing Ratio vs. Distance
- Plot of Nondimensional Power vs. Distance
- Plot of Nondimensional Power vs. Sailing Ratio
- Plot of Nondimensional Power vs. Average Speed
- Evolution of Annual Tonnes CO₂e vs. Year
- Evolution of Energy vs. Year
- Evolution of AER vs. Year
- Evolution of GFI vs. Year
- Evolution of Average Speed vs. Year
- Evolution of Annual Tonnes Fuel Consumption vs. Year
- Evolution of Daily Tonnes Fuel Consumption vs. Year
- Evolution of Daily Tonnes Fuel Consumption per Capacity Tonne vs. Year
- Evolution of Daily Tonnes CO₂e per Capacity Tonne vs. Year
- Evolution of Sailing Ratio
- Evolution of Nondimensional Power

Samples are presented below:



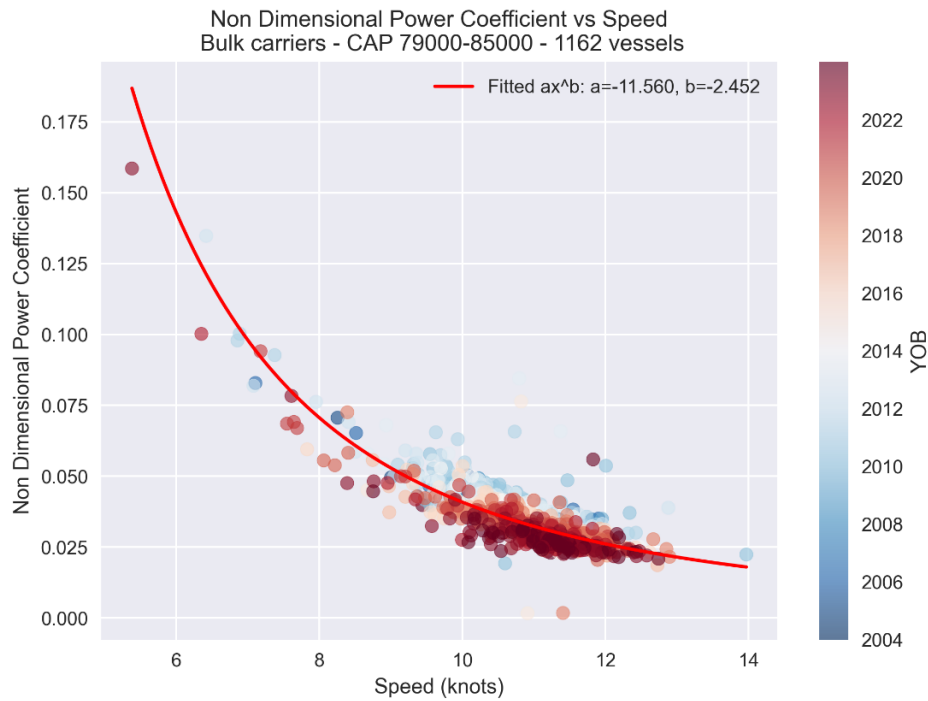


Figure 1: Energy and Emissions Insights (samples).

YOB	Capacity	Distance Travelled	Sailing Ratio	Annual Energy (MJ)	Annual CO2e (tonnes)	AER Attained (gCO2/tonne-nautical mile)	Average Speed (knots)	Annual FuelCons eq (tonnes)	GFI Attained (gCO2e/MJ)
2010	81,466	99,285	0.65	388,043,900	36,060	3.70	10.90	9,653	92.9
2011	79,422	76,306	0.77	290,727,800	27,029	3.70	11.27	7,232	93.0
2013	83,975	69,756	0.74	282,580,500	25,692	3.69	10.69	7,029	90.9
2014	82,134	61,850	0.61	396,104,400	36,777	6.03	11.55	9,853	92.8
2013	81,395	76,242	0.76	613,085,400	56,630	7.62	11.37	15,251	92.4
2016	82,046	63,460	0.66	546,866,800	50,345	8.06	10.94	13,604	92.1
2016	81,791	72,651	0.74	268,246,400	24,901	3.49	11.13	6,673	92.8
2018	81,783	67,574	0.70	354,291,400	32,838	4.95	11.06	8,813	92.7
2021	80,992	69,467	0.70	263,484,800	24,471	3.62	11.37	6,554	92.9
2020	81,795	62,532	0.76	267,354,200	24,849	4.03	9.32	6,651	92.9
2020	80,776	71,407	0.71	263,653,900	24,471	3.53	11.44	6,559	92.8
2022	84,990	61,682	0.79	340,924,500	31,497	5.00	8.95	8,481	92.4

Figure 2: Shipowner's fleet metrics (partial extract).

CONCLUSION AND RECOMMENDATIONS

- Benchmark the performance metrics of owned vessels against peer trends and incorporate the findings into the Annual Sustainability Report.
- Consider the findings to promote the best performers to charterers.
- Identify vessels that warrant further assessment — for instance, are they operating within acceptable deviation from performance reference values or should potential improvements be investigated?

WORLD HEADQUARTERS

1701 City Plaza Drive | Spring, TX 77389 USA

P 1-281-877-6000

ABS-WorldHQ@eagle.org

www.eagle.org



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