Vessel Performance Report - 2023

A Comparative Analysis of Vessel 1 and Vessel 2

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1. Executive Summary

This report presents a detailed comparative analysis of **Vessel 1** and **Vessel 2** for 2023. Key performance indicators (KPIs) such as propulsion power, fuel flow rates, diesel generator power, and HVAC power consumption are analyzed. Overall, Vessel 1 demonstrated more stable performance across most KPIs, while Vessel 2 exhibited more variability, particularly in fuel flow rates and diesel generator power. The individual KPI analysis sections highlight trends, spikes, and operational anomalies.

# 2. Key Performance Indicators (KPIs) Analysis

2.1 Propulsion Power (MW)
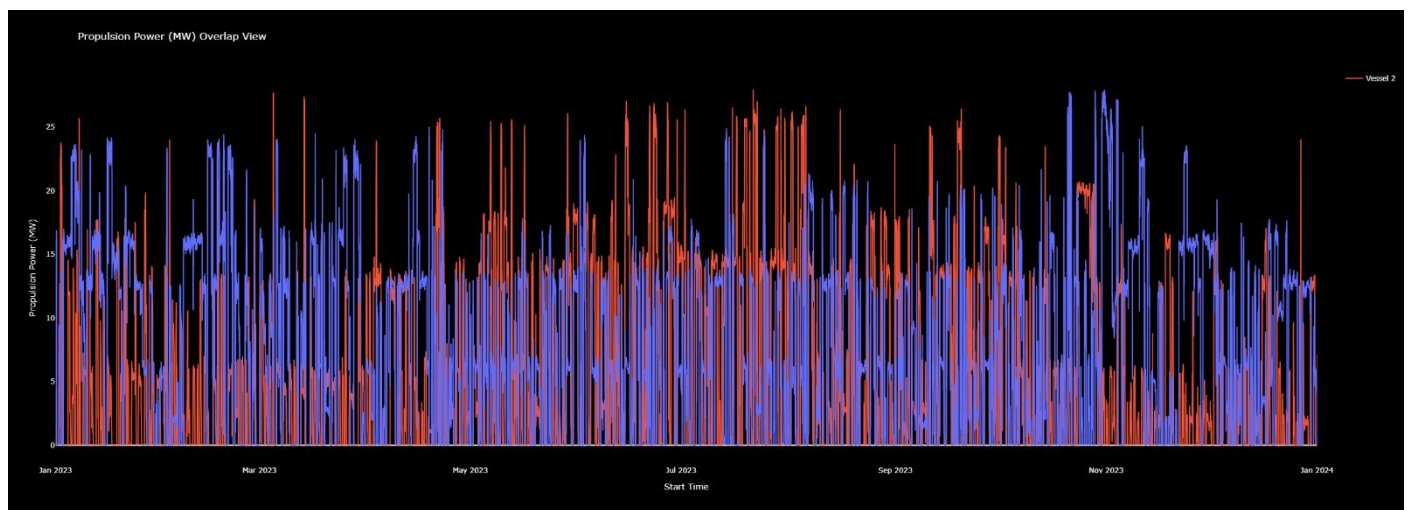
Narrative:

In 2023, both Vessel 1 and Vessel 2 show fluctuations in propulsion power but with distinct patterns. Vessel 2 displays more volatility, with frequent spikes exceeding 25 MW, especially from July to December, indicating irregular performance. In contrast, Vessel 1 maintains a more stable power output, with fewer extreme peaks and a smoother trend throughout the year. Both vessels experience lower power outputs in the first quarter, suggesting possible low demand or downtime. The data hints at performance optimization for Vessel 1, while Vessel 2's irregularities during mid-year may warrant further investigation.

2.2 Speed Over Ground (knots)
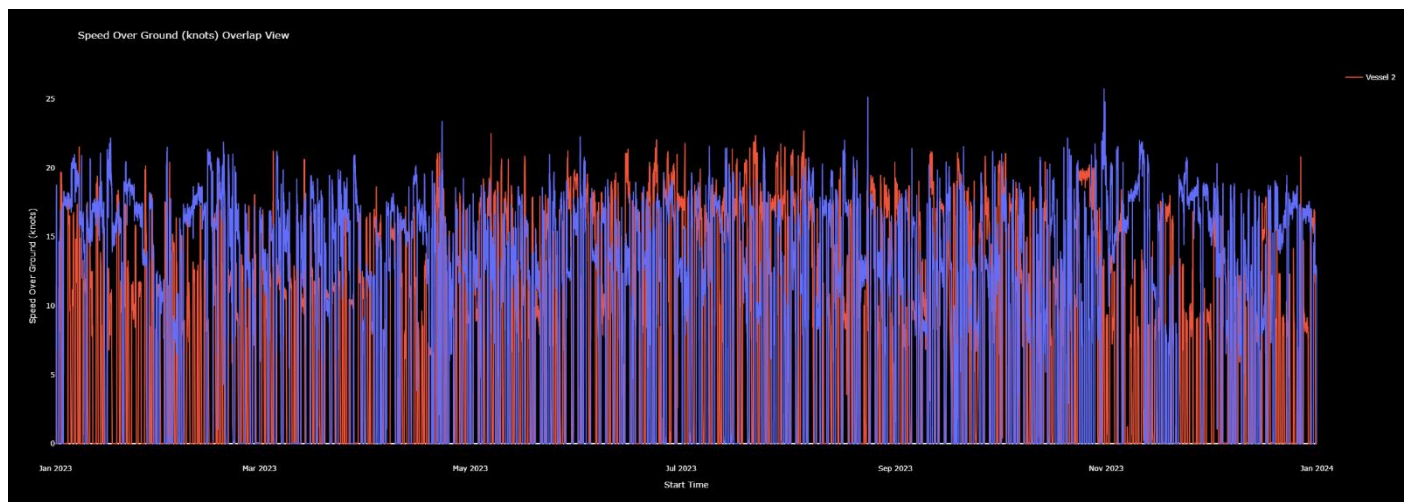
Narrative:

In 2023, Vessels 1 and 2 operated at speeds between 10 and 20 knots, fluctuating throughout the year. Both vessels experienced occasional dips below 10 knots, potentially signaling low-speed operations or maintenance. Vessel 2 showed more volatile speed behavior, especially from July to November, with frequent rapid decelerations, suggesting variable operational conditions. In contrast, Vessel 1 maintained consistent speed performance with fewer sharp drops. Both vessels reached peak speeds near 20 knots regularly, indicating they were operational for most of the year.

2.3 Total HVAC Power Consumption (MW)
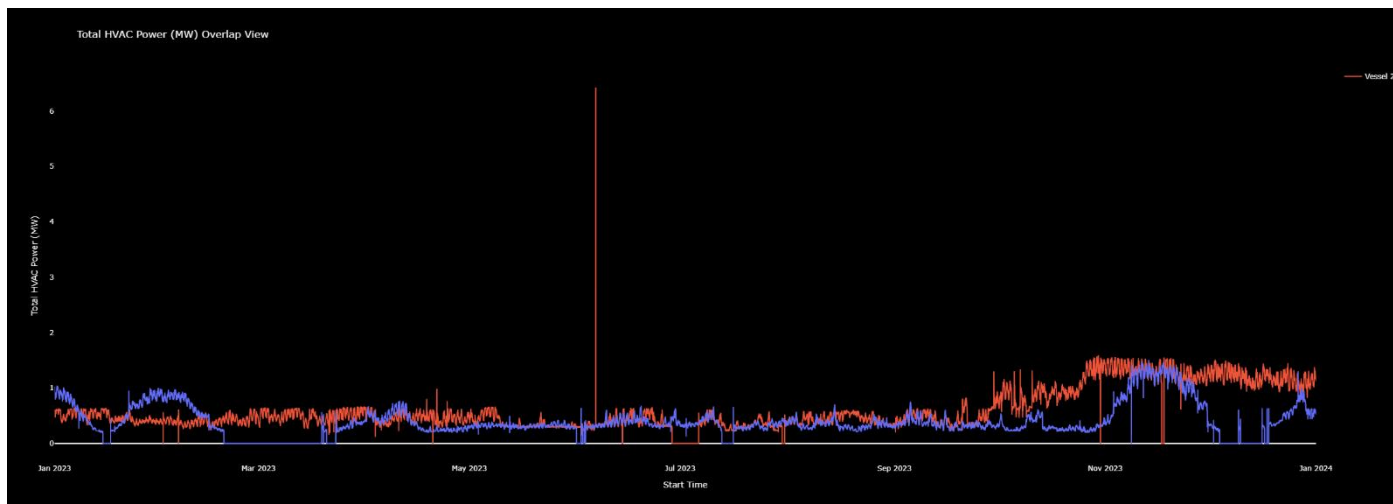
Narrative:

In 2023, the Total HVAC Power consumption for Vessels 1 and 2 shows distinct operational differences, particularly in the latter half of the year. Both vessels maintain low HVAC consumption, under 1 MW, for most of the year. However, Vessel 2 experiences a notable power surge of over 6 MW in July, likely due to an operational anomaly or maintenance. From September onward, both vessels see an increase in HVAC demand, with Vessel 1 showing steady rises, often surpassing 1.5 MW, while Vessel 2 maintains more consistent peaks. The early months (January to March) reflect minimal HVAC usage, possibly due to lower operational needs or cooler weather. Vessel 2's mid-year spike deviates significantly from its baseline and may require further investigation.

2.4 Total Diesel Generator Power (MW)
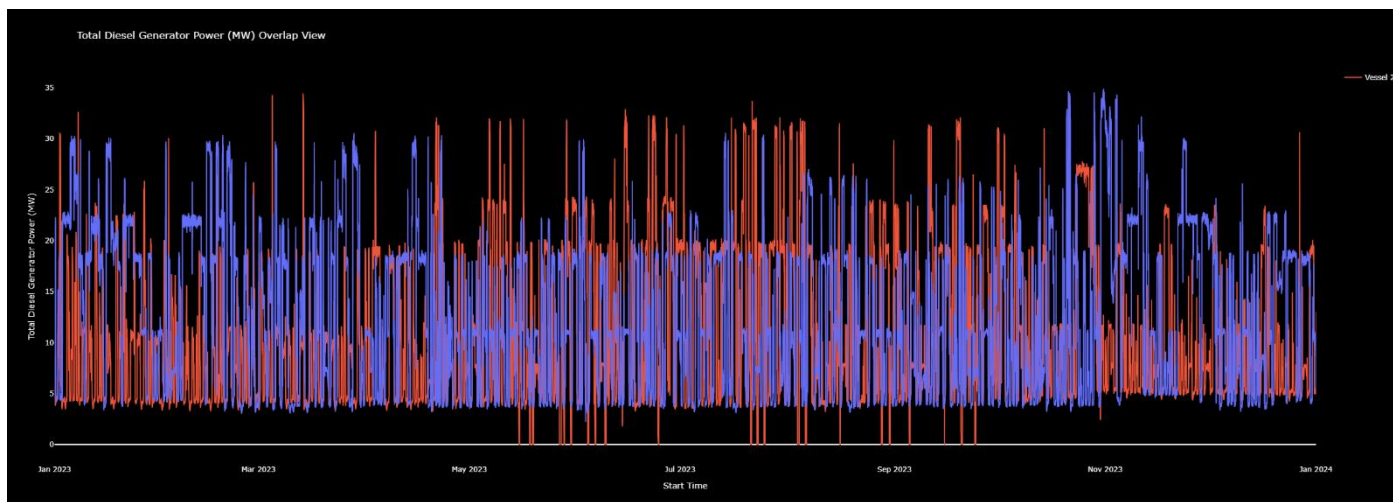
Narrative:

In 2023, the Total Diesel Generator Power for Vessels 1 and 2 fluctuated frequently, with both vessels regularly peaking near 30 MW. Vessel 1 exhibited a more stable performance, with fewer sharp variations, while Vessel 2 displayed more pronounced fluctuations, especially between July and November. Both vessels experienced increased power usage from May to September, likely reflecting higher operational demands. However, Vessel 2 showed more irregular spikes, occasionally exceeding 30 MW, indicating potential load regulation issues. In contrast, Vessel 1 maintained a consistent profile with fewer deviations, suggesting that Vessel 2's volatile power demand warrants further investigation.
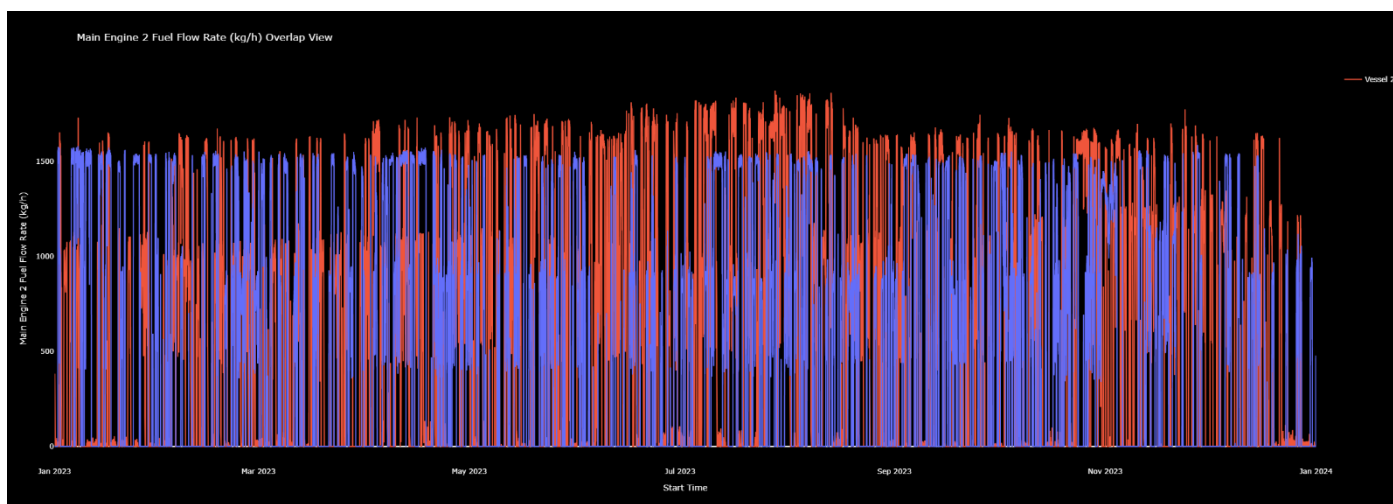
2.5 Main Engine 1 Fuel Flow Rate (kg/h)
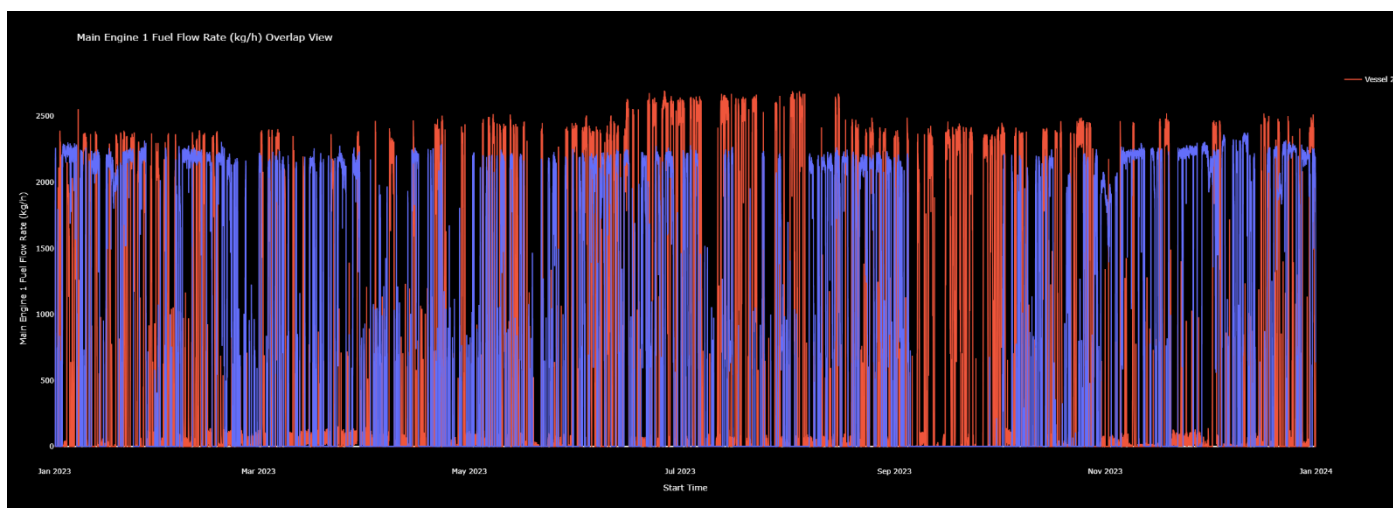
Narrative:

In 2023, the Main Engine 1 Fuel Flow Rate for Vessels 1 and 2 fluctuated between 1,500 kg/h and 2,000 kg/h during active periods, reflecting high-intensity operations. Both vessels exhibited dense clusters of fuel flow data above 1,000 kg/h for much of the year. Vessel 2 displayed higher variability, with more frequent spikes above 2,000 kg/h, particularly from July to December. In contrast, Vessel 1 maintained a more stable fuel flow pattern, especially in the latter half of the year, with fewer extreme peaks. Periods of reduced fuel flow, particularly in April and October, indicate possible low-demand or maintenance windows. Vessel 2's spikes suggest more intense operations, while Vessel 1 had a more balanced fuel consumption profile.
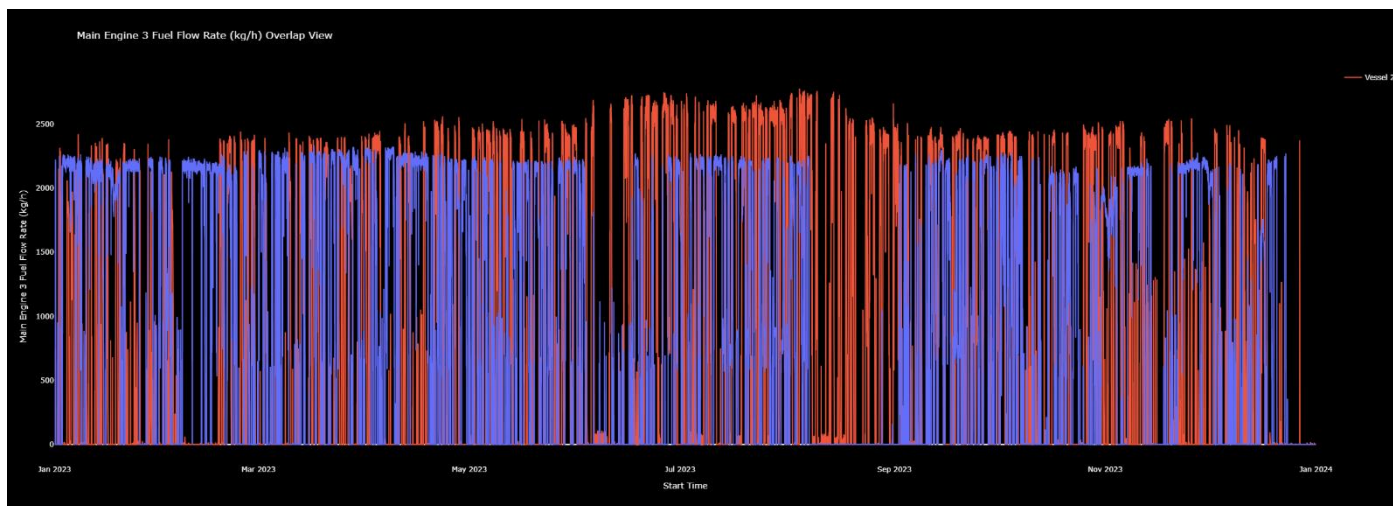
2.6 Main Engine 2 Fuel Flow Rate (kg/h)

Narrative:

In 2023, Vessels 1 and 2 exhibited frequent fluctuations in Main Engine 2 Fuel Flow Rates, ranging between 1,000 kg/h and 1,500 kg/h, with similar operational patterns. Vessel 2 displayed more pronounced peaks and variability, especially from May to August, occasionally exceeding 1,500 kg/h. Both vessels experienced regular periods of reduced fuel flow, particularly around April and October, where consumption dipped below 500 kg/h, likely due to reduced demand or maintenance. Vessel 2 showed more frequent transitions between high and low consumption, reflecting more dynamic operations, while Vessel 1 maintained a more stable profile. Despite these differences, both vessels had aligned operational trends throughout the year.
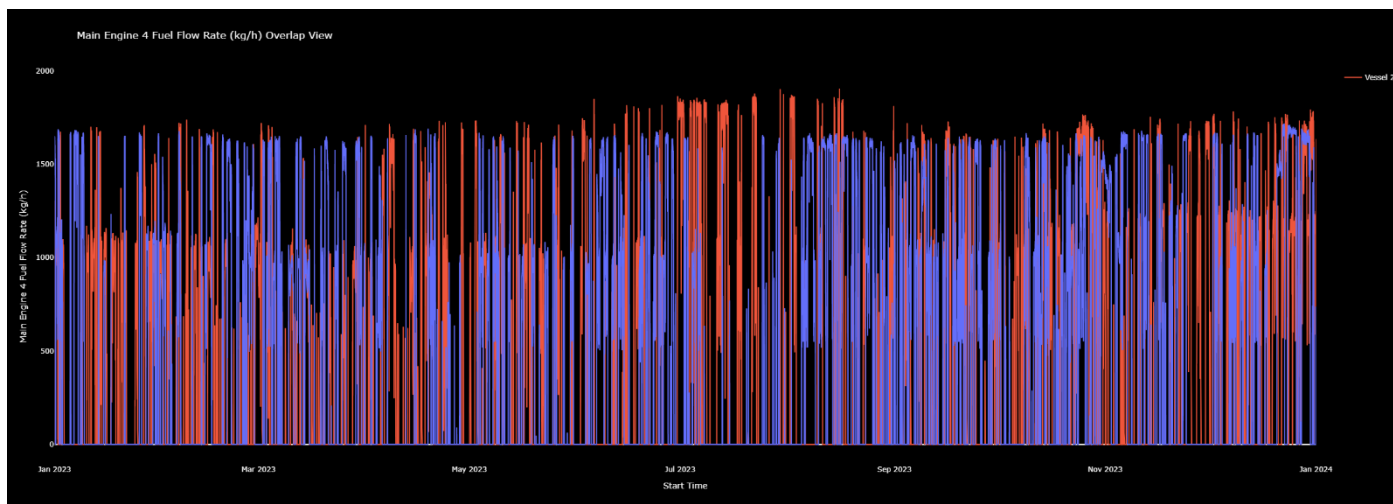
2.7 Main Engine 3 Fuel Flow Rate (kg/h)

Narrative:

In 2023, Main Engine 3 Fuel Flow Rates for Vessel 1 and Vessel 2 show consistent operation, with fuel consumption typically between 1,500 kg/h and 2,000 kg/h during peak activity. Both vessels experience fluctuations, especially from July to December, with Vessel 2 displaying more significant variability and frequent spikes above 2,000 kg/h. Notable dips below 500 kg/h occur around April and October, suggesting reduced demand or maintenance periods. Vessel 2's more frequent transitions between high and low fuel flow indicate dynamic operational phases, while Vessel 1 maintains a steadier, more balanced fuel consumption profile. Both vessels show similar fuel load demands, with high activity mid-year (May to September).

2.8 Main Engine 4 Fuel Flow Rate (kg/h)

Narrative:

In 2023, the Main Engine 4 Fuel Flow Rate for Vessel 1 and Vessel 2 generally ranged between 1,000 kg/h and 1,500 kg/h, with frequent shifts in fuel flow. Vessel 2 exhibited more significant variability, with regular spikes surpassing 1,500 kg/h between July and October. In contrast, Vessel 1 maintained a more balanced and consistent fuel consumption pattern, with fewer extreme variations. Both vessels experienced periods of reduced fuel flow around April and October, where rates dropped below 500 kg/h, likely indicating lower operational activity or maintenance. Both vessels operated under similar fuel load conditions, with no significant deviations in fuel demand trends.

3. Comparative Summary

In this section, you can summarize the critical comparisons between Vessel 1 and Vessel 2.

- **Vessel 1** generally maintained more stable performance across most KPIs, with fewer spikes in fuel flow and power consumption.
- **Vessel 2** showed higher variability in diesel generator power and fuel flow, particularly during the year's second half.
- Significant anomalies were observed in **Vessel 2's** HVAC power consumption, likely indicating operational irregularities.
- Both vessels experienced lower operational activity during **April** and **October**, as indicated by fuel flow and power drops.

4. Conclusion

In 2023, both Vessel 1 and Vessel 2 demonstrated similar operational patterns across key performance indicators, though notable differences emerged in instability and variability. Vessel 1 consistently showed smoother propulsion power, fuel flow, and diesel generator usage trends, indicating more controlled and stable operations. Vessel 2, on the other hand, exhibited more volatility, with frequent power spikes and fluctuating fuel flow rates, particularly in the second half of the year. These variations suggest the need for closer monitoring of Vessel 2 to address potential inefficiencies. Overall, while both vessels performed efficiently, targeted improvements, particularly for Vessel 2, could further optimize their operational performance in the future.