



Digital, Data Analytics, and Automation: Value Creation Through Digital E&P

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Electronic Fuel Monitoring System (eFMS)

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Introduction

The Marine Logistics team plays a pivotal role in supporting offshore operations by ensuring efficient cargo and passenger movement and managing vessel operations. Chevron Thailand incurs an annual cost of nearly \$80 million on diesel to operate these operations. Recognizing the potential for cost reduction and enhanced fuel efficiency, Chevron Thailand is committed to addressing these challenges.

Challenges:

- Increasing fuel consumption trends due to an expanded project vessel fleet
- Insufficient fuel management controls
- Absence of accurate fuel consumption measurement instruments
- Inadequate data for analyzing fuel consumption efficiency

Chevron Thailand is collaborating with vessel operators on a comprehensive fuel efficiency program across all operating vessels in Thailand. This initiative aims to enhance fuel management through a streamlined and monitored tracking process. By achieving this goal, the management of operational vessels will significantly reduce fuel consumption and carbon emissions.

Methods

Traditional Method



Manual Sounding

These methods have an error margin of +/-5% (manual sounding) and +/- 1% (displacement flow meter)



Temper Proof Flow Meter

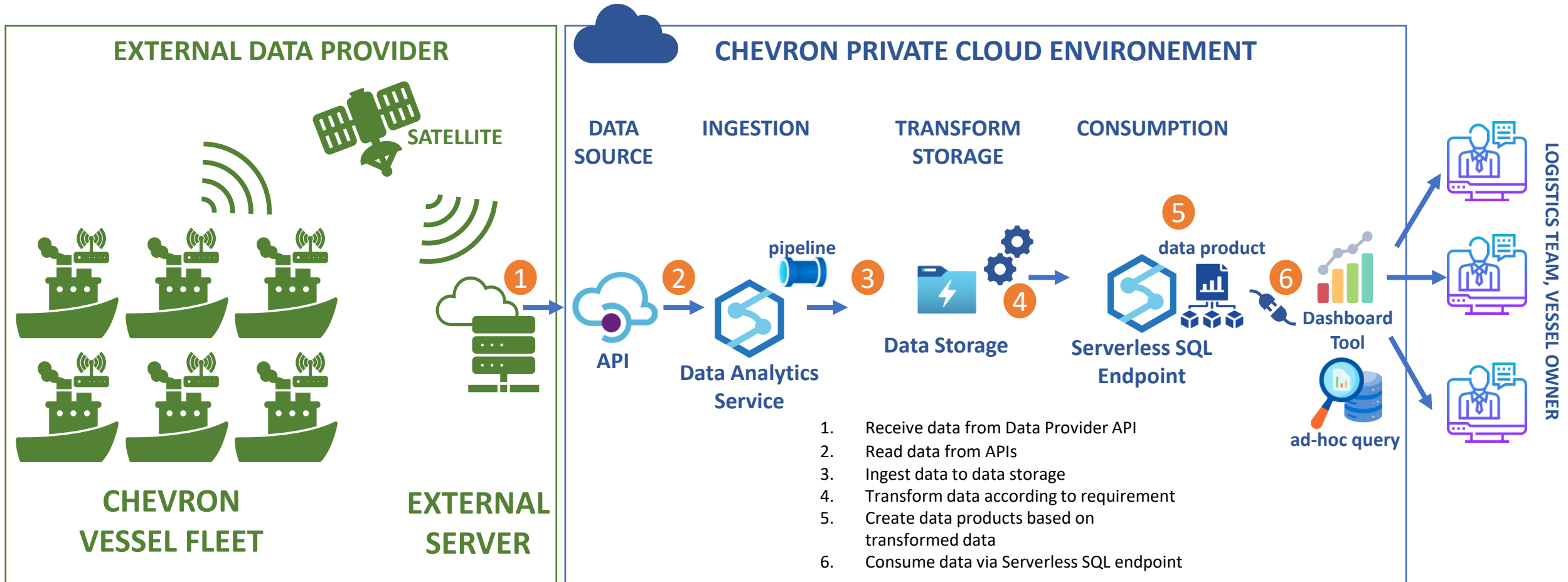
Advance Technology in Fuel Measurement



Electronic Fuel Monitoring System (eFMS)

- Coriolis mass flow meter is installed at engine inlet and outlet to determine real time fuel consumption pattern.
- Accuracy increase up to 0.1% and reliability up to 98 % with ability to automatically alert any abnormal reading.

Data Architecture and Dashboard Design



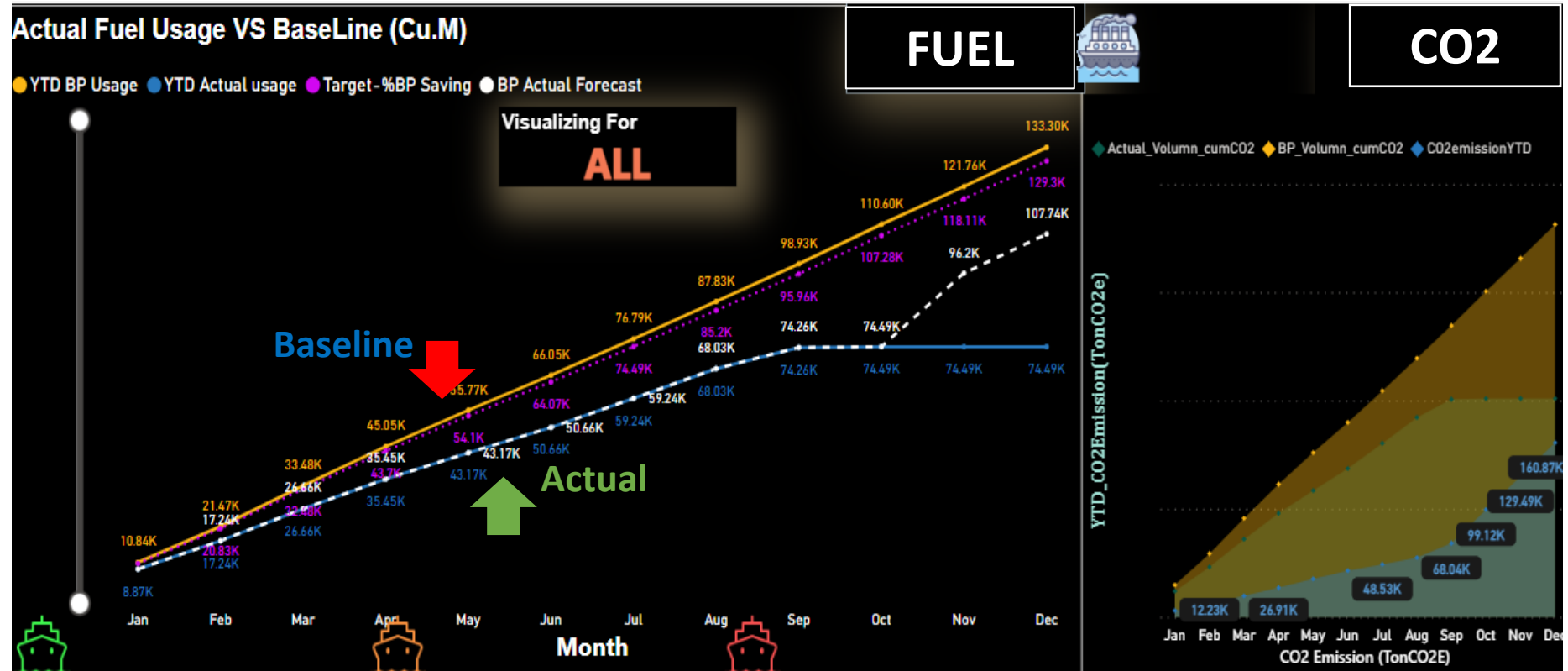
eFMS Dashboard - Actual Fuel Volume Used VS Baseline

The data visualization illustrates the summary of total fuel consumption of the vessel fleet, derived from comprehensive fuel monitoring system.

Forecast Analysis

The forecasted vessel fuel consumption compared to baseline spending, highlighting trends and deviations over time.

This analysis helps identify potential cost savings and efficiency improvements in fuel usage.

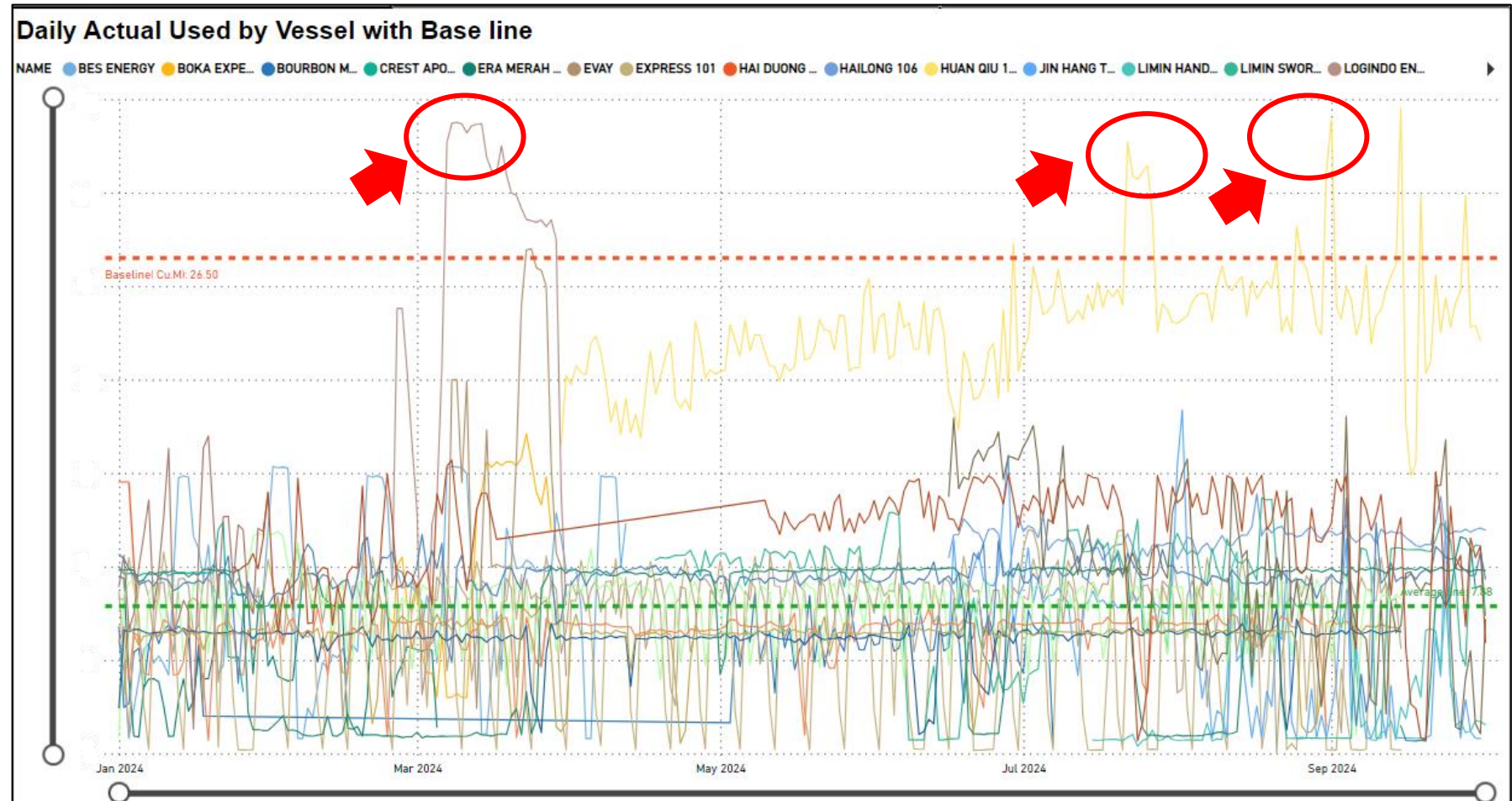


eFMS Dashboard - Daily Fuel Used

Real-Time Insights

Daily Fuel Used Graphs displays the daily fuel usage of the vessel compared to the baseline consumption, highlighting any deviations from expected fuel use.

This analysis helps in monitoring fuel efficiency and identifying the activities during the high consumption to better manage operation such as parking at mooring buoy and turn off engine or increase to optimal speed.



Results and Observations

EFMS BENEFITS

- **Accurate Monitoring:** Precise fuel consumption data with digital mass flow meters.
- **Data Visualization:** Detailed analysis and alerts for anomalous trends with baseline activity consumption KPI
- **Forecast Analysis:** Project usage and identify efficiency opportunities.
- **Real-Time Insights:** Immediate notifications for proactive fuel management.

LOWER CARBON MANAGEMENT

- **Optimized Vessel Planning:** Achieved a 30-40% reduction in total vessel voyages by minimizing distances and improving utilization.
- **Vessel Standby Management:** Reduced standby time, with 30-40% of vessels previously idle now operational.
- **Compliance:** Tracks and reports emissions, aligning with regulations.

OPERATIONAL BENEFITS

- **Operational Savings:** Reduces OPEX costs, cutting down significant fuel expenses.
- **Teamwork Collaboration:** Create sense of Ownership and collaboration among business partners

Lesson Learned

Effective Fuel Management: Implementing the Electronic Fuel Monitoring System (EFMS) and incorporating fuel efficiency into bid specifications have led to significant financial savings and lower carbon emissions.

Collaboration and Ownership: Enhancing business partner engagement and creating a sense of ownership among stakeholders, with clear roles and responsibilities and aligned management expectations, are crucial.

Data Centralization and Visualization: Developing a centralized and visualized dashboard for fuel usage data to provide detailed analysis and alerts users of anomalous consumption trends, which helps in monitoring and improving fuel efficiency.

Workshops and Training: Conducting fuel management workshops for learning and improvement. These workshops help in familiarizing the project team, contractors, and vessel operators with the EFMS and fuel management practices.

Challenges and Areas for Improvement: Insufficient manpower and the lack of a comprehensive fuel management program among vessel operators were identified as challenges.

Continuous Improvement: Setting up KPIs for each vessel and activity, and continuously monitoring and seeking clarification for any observed abnormalities or issues.



Q&A