# CARGO HEATING MANAGEMENT SERVICE

# Annual Report

# 2018

Blue Water

Professional Marine Solutions

CHM

Reliance
Industries Limited

# Foreword

Blue Water is pleased to submit the *Annual Report 2018 for* Cargo Heating Management Service.

Nothing could possibly demonstrate better than our "cargo heating management service" that how operational efficiency on tankers can be phenomenally enhanced by deploying innovative approach for planning and monitoring of just one single operation onboard, i.e., Cargo Heating operation.

Over 36798 MT Bunker Savings were achieved in the year 2018 on 662 heated cargo voyages, managed by Blue Water for its esteemed clients. Even in the backdrop of low fuel prices, the savings exceed $16007130. Today, when the world appears determined and invests fortune on new technologies to address climate change, Blue Water is proud to state that in the year 2018, over 114441.2 MT $CO_2$ reduction in harmful stag emissions was achieved by our innovative cargo heating management service.

The cost of Bunker Savings realized through Cargo Heating Management Service in the backdrop of low fuel prices is certainly commendable; especially when the entire world is striving to reduce green house gas emissions by investing a fortune on new technologies.

*We cannot thank our clients enough for bestowing their trust in our services and allowing us contribute towards making our planet a bit greener.*

Blue Water team extends its heartfelt gratitude to our prized customers and look forward to working jointly on more cost effective and environmental friendly initiatives.

Sincerely,

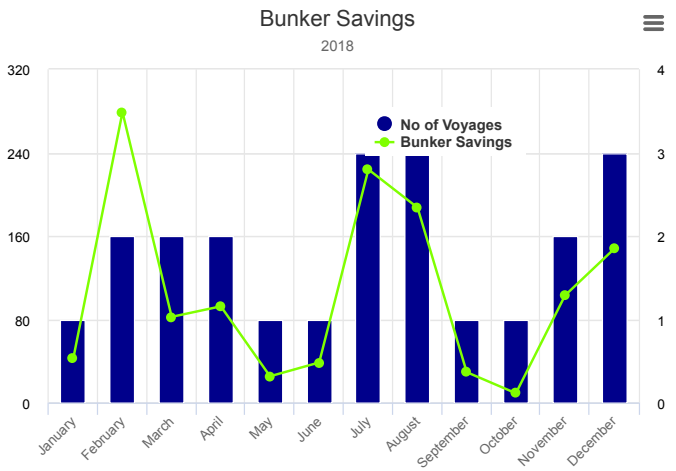
**Kumaresh Gupta**

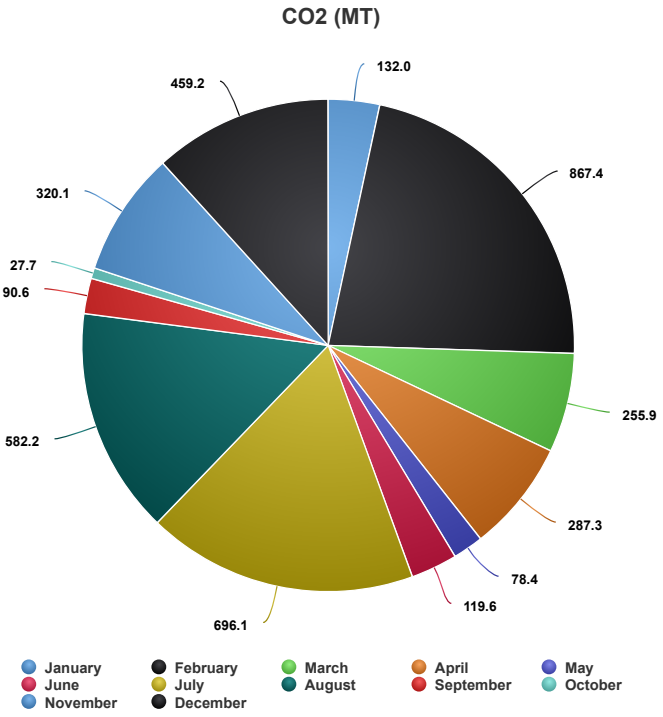
(Managing Director)

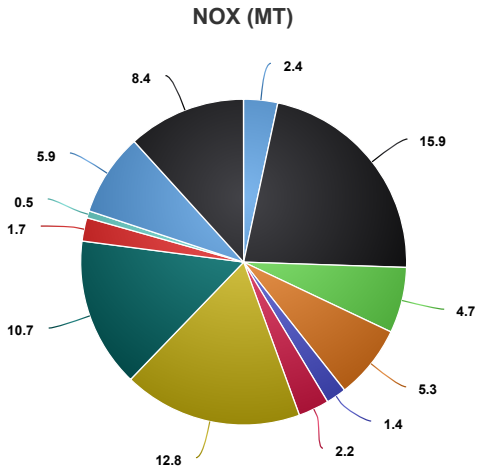
# **Reliance** Highlights **2018 Vs 2017**

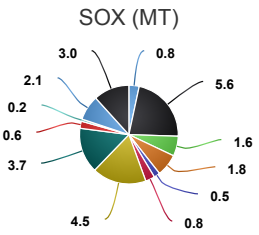
| No.Of Voyages | Total Savings (MT) | FOC (MT) | | | Cargo Qty. (MT) | Emission Reduction | | |
|---|---|---|---|---|---|---|---|---|
| | | Actual | Proj | Variance | | $CO_2$ | $NO_x$ | $SO_x$ |
| 22 | 1259.3 | 3992.7 | 3624.0 | 368.7 | 2554678.4 | 3916.5 | 71.8 | 25.2 |
| 100.0 % | 89.7 % | 113.0 % | 111.9 % | 125.3 % | 163.6 % | | | |

| Month | Voyages | Actual FOC (MT) | Bunker Savings (MT) |
|---|---|---|---|
| January | 1 | 199.50 | 42.45 |
| February | 2 | 363.00 | 278.92 |
| March | 2 | 544.15 | 82.28 |
| April | 2 | 340.50 | 92.37 |
| May | 1 | 97.10 | 25.20 |
| June | 1 | 94.40 | 38.45 |
| July | 3 | 609.50 | 223.83 |
| August | 3 | 876.00 | 187.22 |
| September | 1 | 57.60 | 29.13 |
| October | 1 | 126.80 | 8.91 |
| November | 2 | 248.05 | 102.92 |
| December | 3 | 436.10 | 147.64 |
| **Total** | 22 | 3992.7 | 1259.3 |





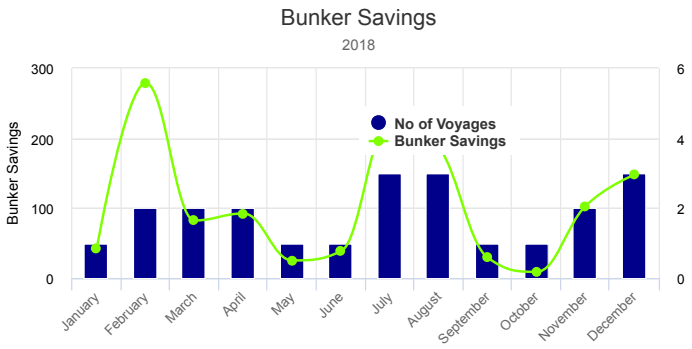



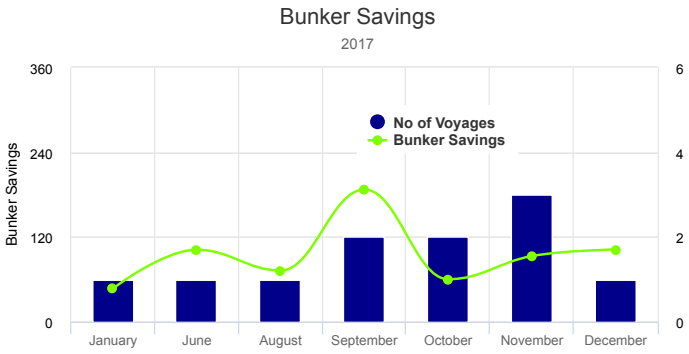




| Month | $CO_2$ | NOX | SOX |
|---|---|---|---|
| January-18 | **132.0** | **2.4** | **0.8** |
| February-18 | **867.4** | **15.9** | **5.6** |
| March-18 | **255.9** | **4.7** | **1.6** |
| April-18 | **287.3** | **5.3** | **1.8** |
| May-18 | **78.4** | **1.4** | **0.5** |
| June-18 | **119.6** | **2.2** | **0.8** |
| July-18 | **696.1** | **12.8** | **4.5** |
| August-18 | **582.2** | **10.7** | **3.7** |
| September-18 | **90.6** | **1.7** | **0.6** |
| October-18 | **27.7** | **0.5** | **0.2** |
| November-18 | **320.1** | **5.9** | **2.1** |
| December-18 | **459.2** | **8.4** | **3.0** |
| **Total** | **3916.5** | **71.9** | **25.2** |

| 2018 | | | | | |
|---|---|---|---|---|---|
| Month | Voyages | Cargo Qty (MT) | Bunker Savings (MT) | Average Bunker Price ($) | Monetary Savings ($) |
| January | 1 | 89818.0 | 42.5 | 394.0 | 16745.0 |
| February | 2 | 229897.0 | 278.9 | 380.0 | 105982.0 |
| March | 2 | 363850.0 | 82.3 | 379.0 | 31191.7 |
| April | 2 | 193479.0 | 92.4 | 404.0 | 37329.6 |
| May | 1 | 86890.5 | 25.2 | 442.0 | 11138.4 |
| June | 1 | 83562.0 | 38.5 | 458.0 | 17633.0 |
| July | 3 | 307440.3 | 223.8 | 455.3 | 101896.1 |
| August | 3 | 552338.0 | 187.2 | 469.5 | 87890.4 |
| September | 1 | 91950.0 | 29.1 | 491.5 | 14302.7 |
| October | 1 | 87254.5 | 8.9 | 507.6 | 4517.6 |
| November | 2 | 208040.2 | 102.9 | 447.3 | 46027.2 |
| December | 3 | 260158.9 | 147.6 | 392.0 | 57859.2 |
| **Total** | **22** | **2554678.4** | **1259.3** | **435.0** | **532512.9** |

| 2017 | | | | | |
|---|---|---|---|---|---|
| Month | Voyages | Cargo Qty (MT) | Bunker Savings (MT) | Average Bunker Price ($) | Monetary Savings ($) |
| January | 1 | 92237.0 | 47.2 | 345.8 | 16321.8 |
| June | 1 | 77251.0 | 101.9 | 310.5 | 31640.0 |
| August | 1 | 89407.0 | 72.5 | 311.0 | 22547.5 |
| September | 2 | 174714.0 | 187.1 | 310.5 | 58094.6 |
| October | 2 | 181776.0 | 60.1 | 315.5 | 18961.6 |
| November | 3 | 264233.0 | 93.0 | 311.0 | 28923.0 |
| December | 1 | 89566.0 | 102.2 | 310.5 | 31733.1 |
| **Total** | **11** | **969184.0** | **664.0** | **316.4** | **208221.6** |



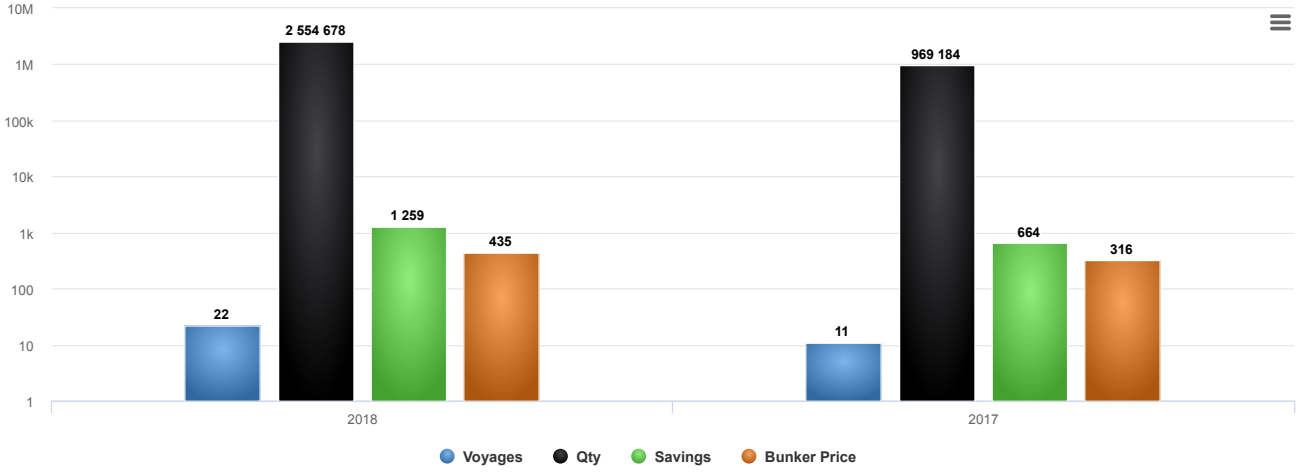




Figure 1

We observe 100% increase in the number of voyages enrolled under Blue Water Cargo Heating Management Service corresponding to which the bunker savings have increased by 89.7%.

It shows an encouraging trend and a general consensus amongst the vessel staff towards the acceptance and compliance to the cargo heating plan for cargo heating operations onboard their vessels.

## Annual Performance Summary 2018

A total of **22** heated cargo voyages for **Reliance** were handled by **Blue Water cargo heating optimization service** in the year **2018**. A brief synopsis of these voyages has been depicted in the **Table 1** below

| Month | No.of Voyages | Total Bunker Consumed (MT) | | | Bunker Savings (MT) | S'pore Bunker (USD/MT) | Net Savings USD |
|---|---|---|---|---|---|---|---|
| | | Actual | Target | Benchmark | | | |
| January-18 | 1 | 199.5 | 195.5 | 242.0 | 42.5 | 394.0 | 16745.0 |
| February-18 | 2 | 363.0 | 338.2 | 641.9 | 278.9 | 380.0 | 105982.0 |
| March-18 | 2 | 544.2 | 468.4 | 626.4 | 82.3 | 379.0 | 31191.7 |
| April-18 | 2 | 340.5 | 259.7 | 432.9 | 92.4 | 404.0 | 37329.6 |
| May-18 | 1 | 97.1 | 74.8 | 122.3 | 25.2 | 442.0 | 11138.4 |
| June-18 | 1 | 94.4 | 76.9 | 132.9 | 38.5 | 458.0 | 17633.0 |
| July-18 | 3 | 609.5 | 551.1 | 833.3 | 223.8 | 455.3 | 101896.1 |
| August-18 | 3 | 876.0 | 863.7 | 1063.2 | 187.2 | 469.5 | 87890.4 |
| September-18 | 1 | 57.6 | 57.5 | 86.7 | 29.1 | 491.5 | 14302.7 |
| October-18 | 1 | 126.8 | 93.1 | 135.7 | 8.9 | 507.6 | 4517.6 |
| November-18 | 2 | 248.1 | 235.6 | 351.0 | 102.9 | 447.3 | 46027.2 |
| December-18 | 3 | 436.1 | 409.5 | 583.7 | 147.6 | 392.0 | 57859.2 |
| Total | 22 | 3992.8 | 3624.0 | 5252.0 | 1259.3 | 435.0 | 532512.9 |

Table 1

**Actual Bunker Cons. On Maintaining Cargo Temp 3161.2 MT**

**Bunker Consumption To Heat Up 831.5 MT**

**Total Bunker Consumed On Cargo Heating 3992.7 MT**

**Giving Us An Average Bunker Consumption Per Day To Maintain Cargo Temp 5.0 MT**

## Annual Performance Trends

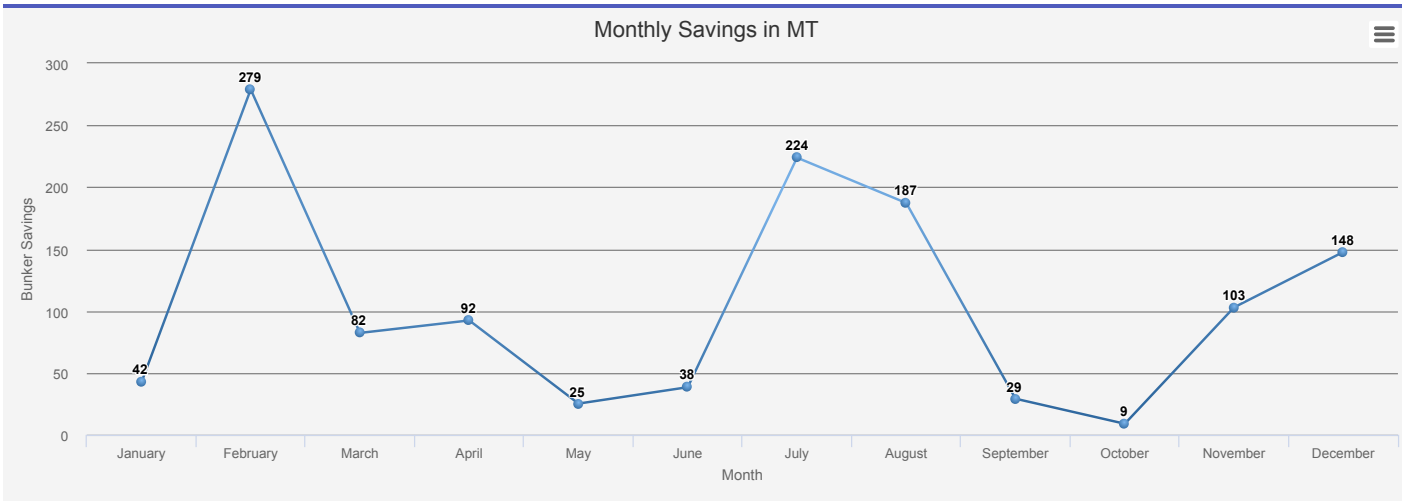



Figure 2

**Figure 3** Depicts comparison between **Actual, Projected and Benchmark Bunker consumption** for maintaining cargo temp which is well below Benchmark cons throughout the year.

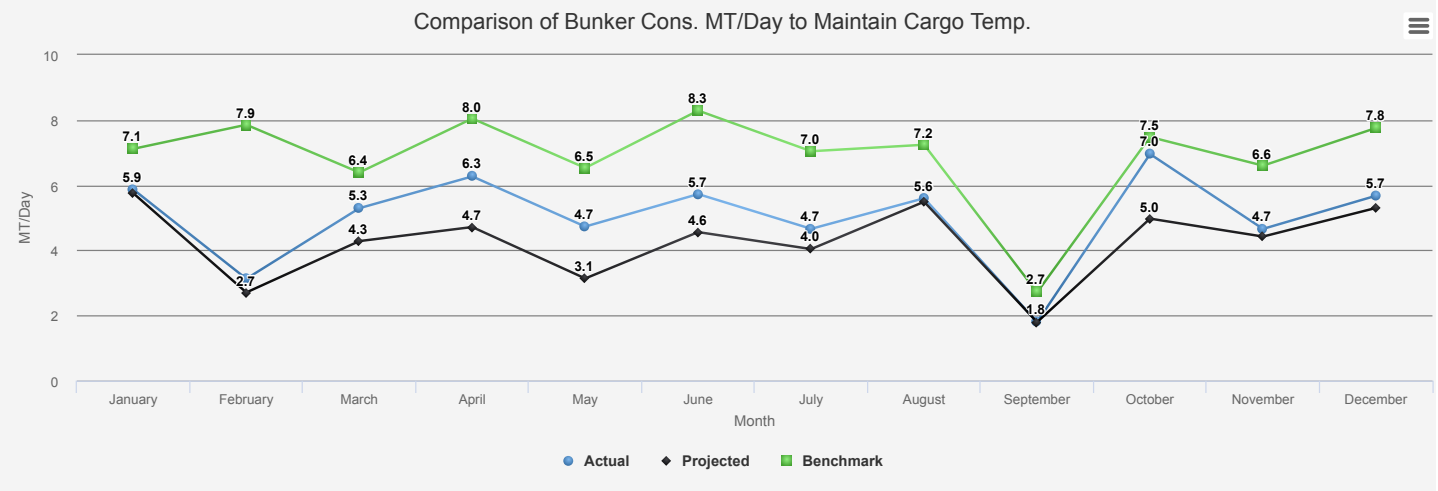



Figure 3

**Figure 4** Depicts the Bunker consumption to heat up on a monthly basis.

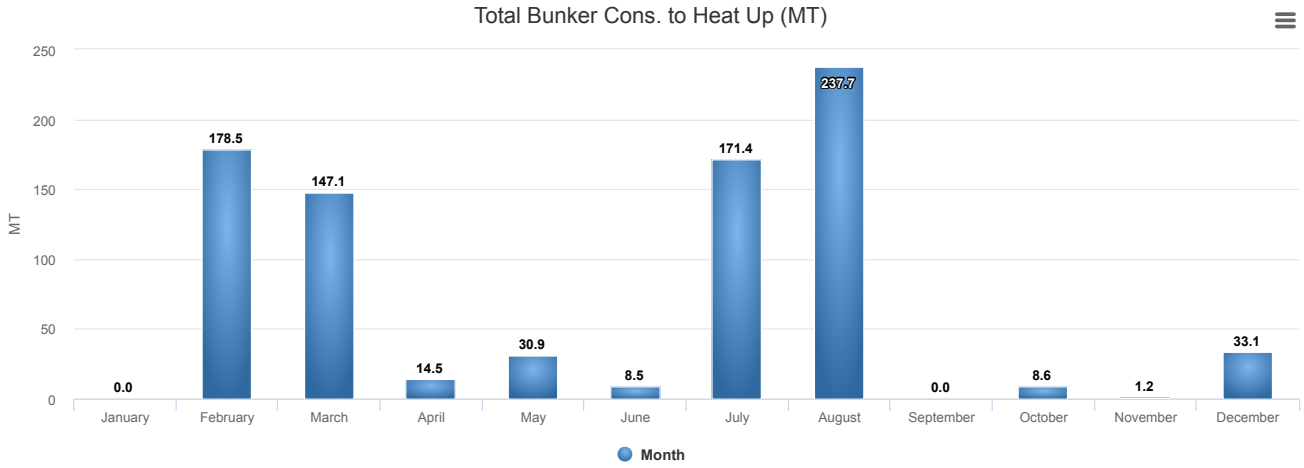


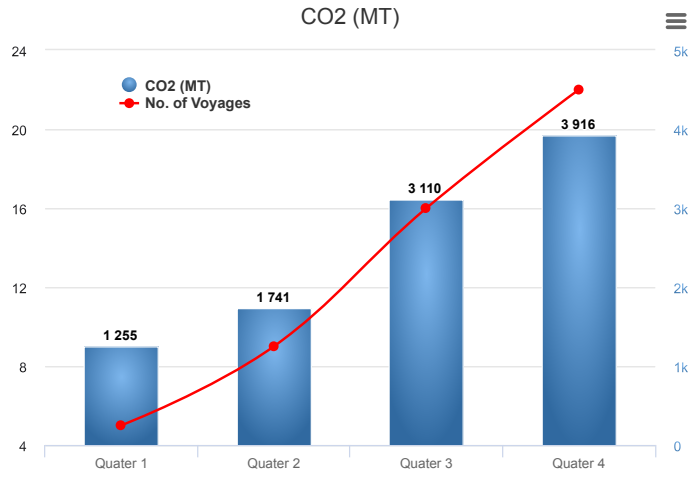

Figure 4

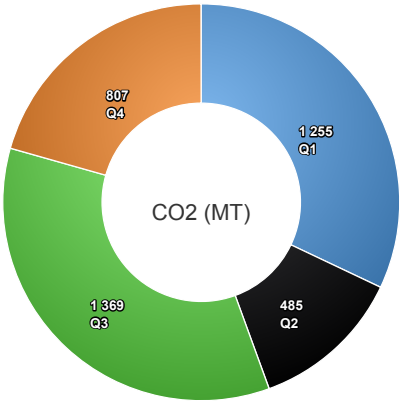
## Environment Sustainability

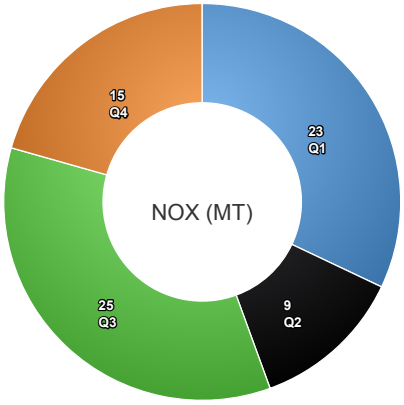
The net reduction in green house gases emission for year **2018** is around **4013.4 MT**. We have also included **EEOI (Energy Efficiency Operational Indicator)** as an ensuring measure to comply with proposed **IMO** policies and practices related to the reduction of greenhouse gas emissions from ships. Please note that empirically, **1 MT** of bunker saved is equivalent to reducing **3 MT** of carbon dioxide as provided by **CDM (Clean Development Mechanism)** consultants.

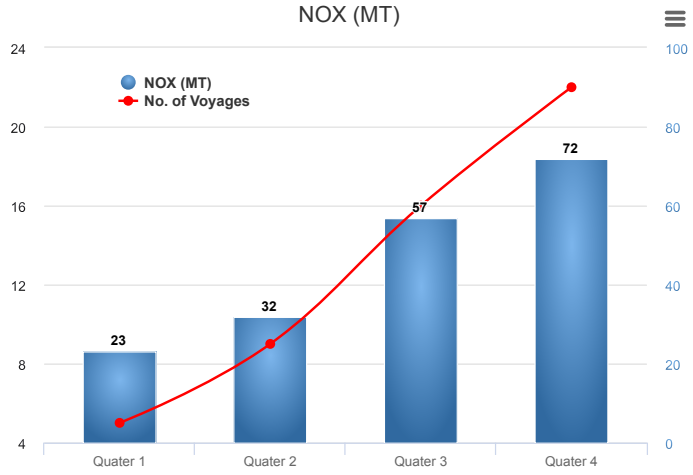
| Year 2018 | |
|---|---|
| **Bunker Savings (MT)** | **1259.3** |
| **Green House Gases Reductions (MT)** | **4013.4** |
| **Energy Efficiency Operational Indicator (EEOI)** | **$1.4x10^{-6}$** |

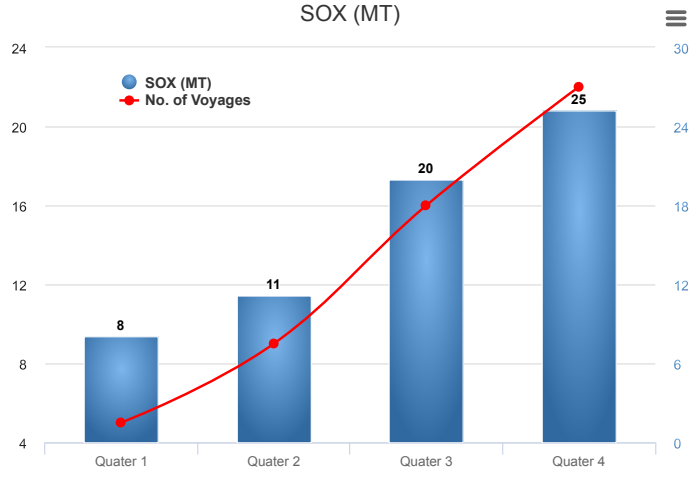
| Quarter | No. of Voyages | Bunker Saving(MT) | $CO_2$(MT) | $NO_x$(MT) | $SO_x$(MT) |
|---|---|---|---|---|---|
| **Q1** | **5** | **403.6** | **1255.3** | **23.0** | **8.1** |
| **Q2** | **4** | **156.0** | **485.2** | **8.9** | **3.1** |
| **Q3** | **7** | **440.2** | **1368.9** | **25.1** | **8.8** |
| **Q4** | **6** | **259.5** | **807.0** | **14.8** | **5.2** |



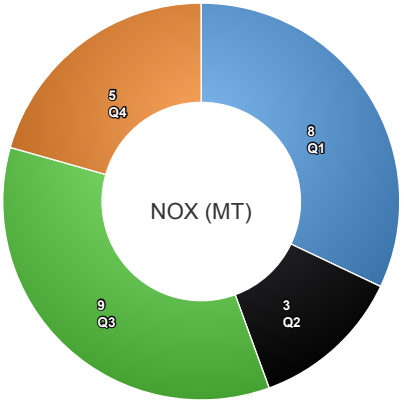




Figure 5

*** Reference: www.shipping-kpi.com (https://www.shipping-kpi.org/)**

## Internal Assessment Of KPI

| KPI | Our Target | Actual |
|---|---|---|
| Heating Cargo Claims/Disputes | 0 | 0 |
| % Variance in Bunker Consumption for Actual vs Projected | **15%** | 9.2% |
| Bunker Savings against Benchmark Consumption | 25.0% | 24.0% |
| Performance Indicator(PI) | 3-6 | 4.4 |
| Response Time | < 01 Working Day | On Target |

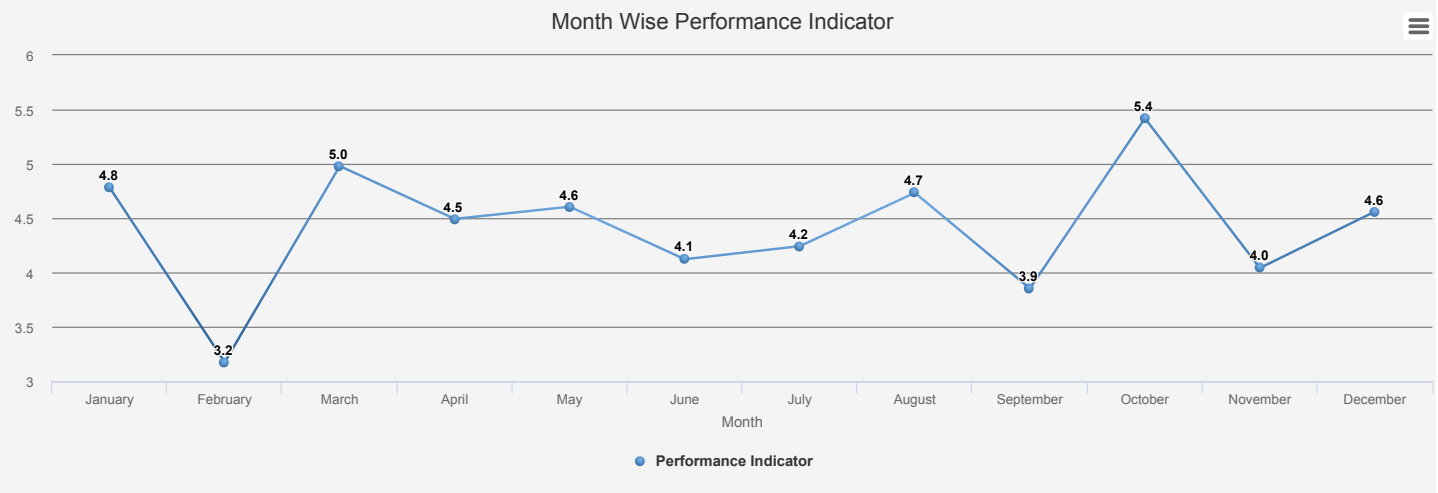



Figure 6

The above figure depicts average **performance indicator** **(/hb/pi_doc.html)** on monthly basis which is well within our target.

## General Observations & Trends

| Month | No.of Voyages | Total Bunker Consumed (MT) | | | % Variance Act vs Proj |
|---|---|---|---|---|---|
| | | Actual | Target | Benchmark | |
| January-18 | 1 | 199.5 | 195.5 | 242.0 | 2.0 % |
| February-18 | 2 | 363.0 | 338.2 | 641.9 | 6.8 % |
| March-18 | 2 | 544.2 | 468.4 | 626.4 | 13.9 % |
| April-18 | 2 | 340.5 | 259.7 | 432.9 | 23.7 % |
| May-18 | 1 | 97.1 | 74.8 | 122.3 | 23.0 % |
| June-18 | 1 | 94.4 | 76.9 | 132.9 | 18.5 % |
| July-18 | 3 | 609.5 | 551.1 | 833.3 | 9.6 % |
| August-18 | 3 | 876.0 | 863.7 | 1063.2 | 1.4 % |
| September-18 | 1 | 57.6 | 57.5 | 86.7 | 0.2 % |
| October-18 | 1 | 126.8 | 93.1 | 135.7 | 26.6 % |
| November-18 | 2 | 248.1 | 235.6 | 351.0 | 5.0 % |
| December-18 | 3 | 436.1 | 409.5 | 583.7 | 6.1 % |
| Total | 22 | 3992.8 | 3624.0 | 5252.0 | 9.2% |

Table 2

## General Observations & Trends

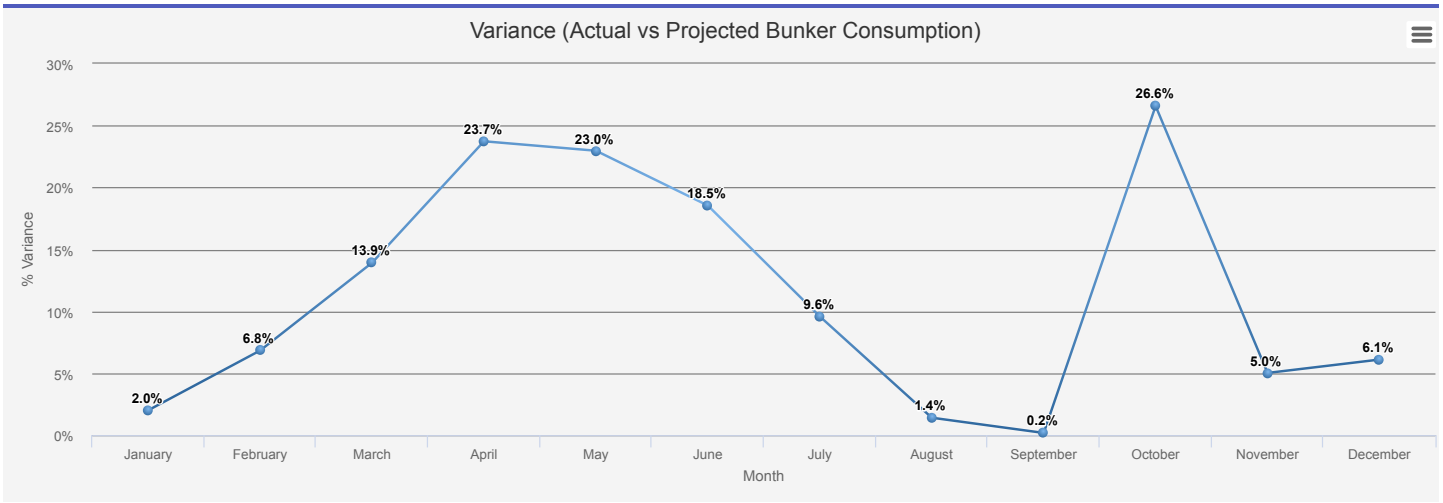



Figure 7

**Note:1.**

*Please refer Appendix for the method adopted in working out Benchmark consumptions and figures for emission reductions.*

**2(A).** The TARGET CONSUMPTION mentioned in the table above is the summation of the projected Bunker consumption, calculated from the CHP during the quarter.

**2(B).** The ACTUAL CONSUMPTION refers to observed bunker consumption on cargo heating as reported by the vessels.

**# Average Reduction in Bunker Cons on cargo heating = (B'Mark Bunker Cons – Actual Bunker Cons.)/B'Mark Bunker Cons %**

*** Bunker Consumption per day = Total Bunker Cons for maintaining/Number of laden days**

## Industry Bunker Trend Vs Blue Water Optimization

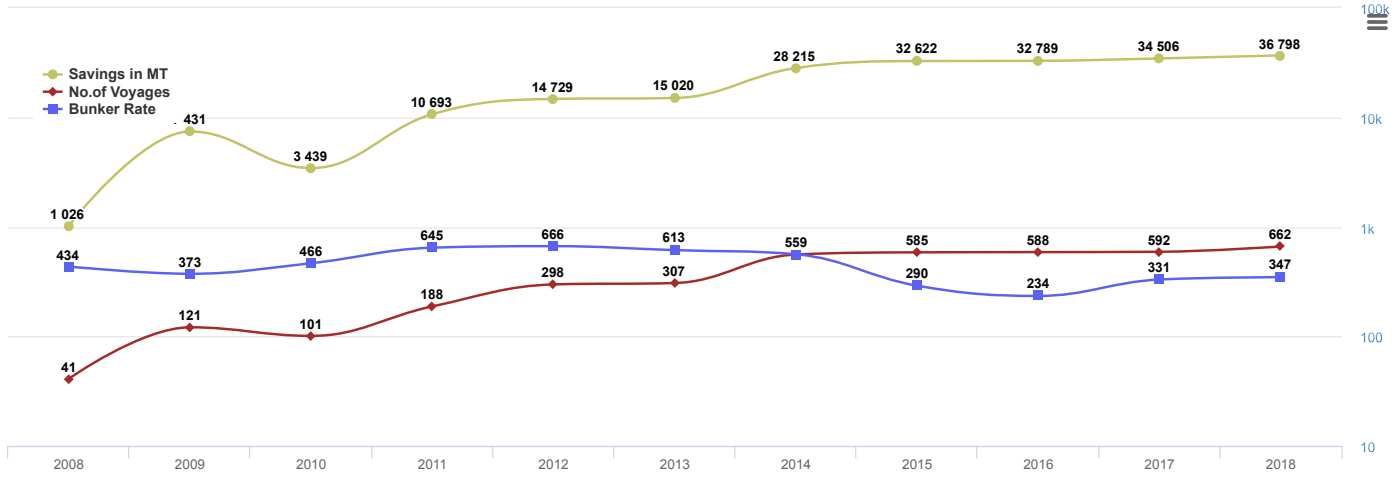



Figure 8

The above graph gives a snap shot of the average bunker rate trend (ex-Singapore) over the last ten year period super imposed with Blue Water's total annual fuel savings achieved and total number of voyages handled within the same period. Fuel is the most expensive OPEX item and plays an important role in defining the future of the shipping industry. The drivers for new marine fuels are: regulations, financial considerations and available technology. However shipping thrives through innovation and technology development.

The graphical representation gives a revealing insight into the effectiveness of our cargo heating fuel optimization service. The average bunker rate has seen a steady increase from $372.7/MT: 2009 to $666.3/MT: 2012 which is a 78% increase in the cost of fuel.

The annual fuel savings achieved by Blue Water for various tanker owners has shown an impressive increase from 7431MT: 2009 to 36798 MT: 2018. Thus the MT bunker saved annually has seen a jump of 395.2%. These results have been translated mainly through a 555.4 % increase in the total volume of voyages handled by us through the year 2010: 101 to 2018: 662. The annual increase in volume of voyages over this period (2009:2018) has been due to the addition of various new clients to our customer base.

This overall positive trend highlights the impact of cargo heating optimization in reducing the operational costs of the various tanker ship owners in the maritime industry and also depicts the confidence shown in our fuel optimization service.

# Observations By Heating Desk

1. Good co-operation was extended by most of the ship's staff. We appreciate the extra-ordinary efforts made by some vessels, in fully implementing the Cargo Heating management Plan in fuel optimization and thus resulting in savings.

2. Although concise heating instructions were always sent with the cargo heating plan, importance of running the boiler at optimum load and maintaining recommended condensate temperature had to be often reminded to the vessel during the voyage.

3. Chances of error in split up between cargo heating and discharging was observed on one of the vessel.

4.We appreciate performance review meetings and frequent queries from Reliance Operations with regards to Post Voyage Reports sent out for their review. Moreover, we also applaud decision of Reliance Operations for allowing cargo temperature to drop to minimum possible, voyage length and cargo properties permitting, prior commencing cargo heating. Thus, maximizing the scope of bunker savings.

5.We look forward to increase in interaction between Reliance Operations and Blue Water team for matters pertaining to cargo heating and usage of our online web application CHAMP, so that we may assist each other in collective advancement.

## Going Forward

The tanker market has undergone significant trend shifts from crude oil tankers seeing lesser demand and the product tanker market picking up steadily through the current economic downturn.

Blue Water is proud to be a pioneer in providing “Cargo Heating Management Service”. We expect to see a much higher volume of heated cargo voyages from Reliance in the coming year of 2019 as the demand for liquid bulk shipping picks up. We are poised to leverage the expertise and strength of our team to achieve greater fuel savings across Reliance fleet and cut emissions from their ships.

In the closing, we thank everyone involved in this fuel optimization project for their valuable inputs and look forward to suggestions and feedback from Reliance to further customize our service towards our client.

We hope that our relationship in the coming Year grows manifold and we continue to serve you with our best attention

Sincerely

**Heating Project Team**

# APPENDIX

## Calculation Of EEOI (PI – Environment)

The **Performance Indicator (PI)** is defined as follows:

$$PI_{value} = \frac{E.10^6}{\sum m_{cargo}.D}$$

PI = (**$CO_2$** emitted/Transport work) x $10^6$

Where ***E*** is the emitted mass (in tons) of the emitted gasses (**$CO_2$**, **$SO_x$**, **$NO_x$**).

The **PI** compares the emitted mass to the vessel’s transport work (usually measured in a given time).
Using the **PI** rating formula one can evaluate the performance as follows:

$$PI_{rating\ formula} = 100 - (Z.PI_{value})$$

The resulting value lies in the range of **0** to **100**.Values below **0** are replaced by **0** and above **100** are replaced by **100**.

The ***Z*** value is an empirical estimation and is given such a value that the **PI** rating is a number between **0** and **100**.
According to Shipping KPI Project Final Report **(Shipping KPI (2009))** the values that should be used to estimate **$CO_2$**, **$SO_x$**, and **$NO_x$** efficiency are as follows:

$$Z_{CO_2} = 7$$

$$Z_{SO_x} = 500$$

$$Z_{NO_x} = 250$$

**Reference**:
**Shipping KPI (2009)**, “**Shipping KPI**: An Industry Initiative to enhance excellence in ship operation by setting standards for **Corporate Governance**”,
***Shipping KPI Final Report v.1.1, Inter-Manager, the International Ship Managers' Association***, Available online at **www.shipping-kpi.com** (https://www.shipping-kpi.org/)