

CARGO HEATING MANAGEMENT SERVICE



Annual Report 2018



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 80645.81 MT CO₂ 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

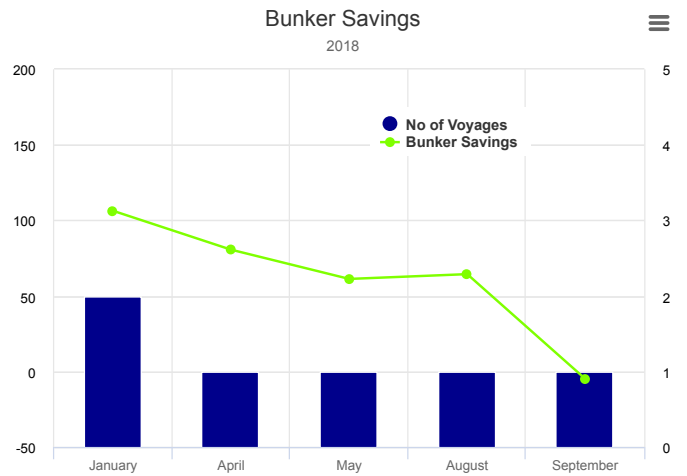
(Managing Director)

BP Highlights 2018 Vs 2017

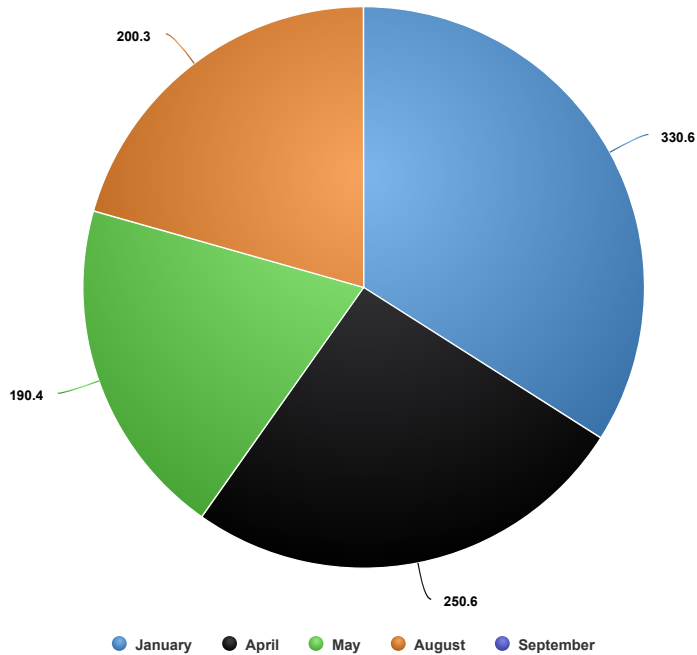


No.Of Voyages	Total Savings (MT)	FOC (MT)			Cargo Qty. (MT)	Emission Reduction		
		Actual	Proj	Variance		CO ₂	NO _x	SO _x
6	307.6	666.2	592.6	73.6	459825.5	956.6	17.5	6.2
33.3 % ▼	6.1 % ▼	8.7 % ▼	7.0 % ▼	20.5 % ▼	21.9 % ▲			

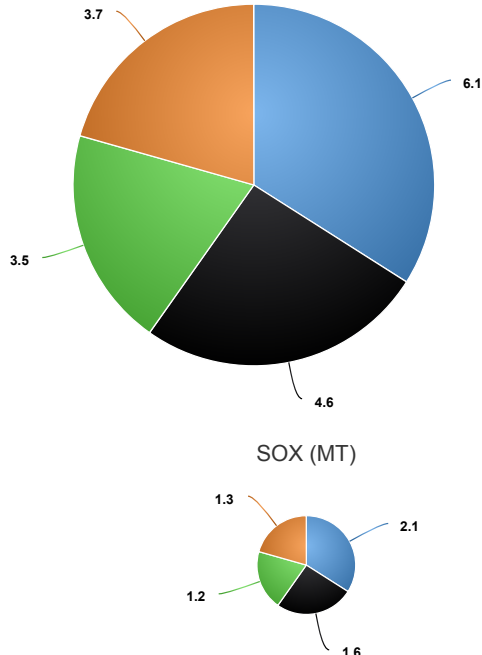
Month	Voyages	Actual FOC (MT)	Bunker Savings (MT)
January	2	245.40	106.30
April	1	131.20	80.56
May	1	100.00	61.23
August	1	92.20	64.40
September	1	97.40	-4.90
Total	6	666.2	307.6



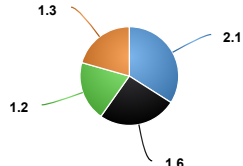
CO2 (MT)



NOX (MT)



SOX (MT)



Month	CO ₂	NOX	SOX
January-18	330.6	6.1	2.1
April-18	250.6	4.6	1.6
May-18	190.4	3.5	1.2
August-18	200.3	3.7	1.3
September-18	-15.2	-0.3	-0.1
Total	956.7	17.6	6.1

2018					
Month	Voyages	Cargo Qty (MT)	Bunker Savings (MT)	Average Bunker Price (\$)	Monetary Savings (\$)
January	2	122365.0	106.3	394.0	41882.2
April	1	76400.0	80.6	404.0	32562.4
May	1	94560.0	61.2	442.0	27050.4
August	1	89419.5	64.4	469.5	30235.8
September	1	77081.0	-4.9	491.5	-2408.4
Total	6	459825.5	307.6	440.2	129322.4

2017					
Month	Voyages	Cargo Qty (MT)	Bunker Savings (MT)	Average Bunker Price (\$)	Monetary Savings (\$)
January	2	68772.0	25.9	345.8	8956.2
February	2	66795.0	146.9	326.1	47904.1
March	1	31944.0	6.1	311.7	1901.4
April	2	108400.6	80.0	315.5	25240.0
June	1	30591.0	39.3	310.5	12202.7
November	1	70573.0	29.3	311.0	9112.3
Total	9	377075.6	327.5	320.1	105316.7

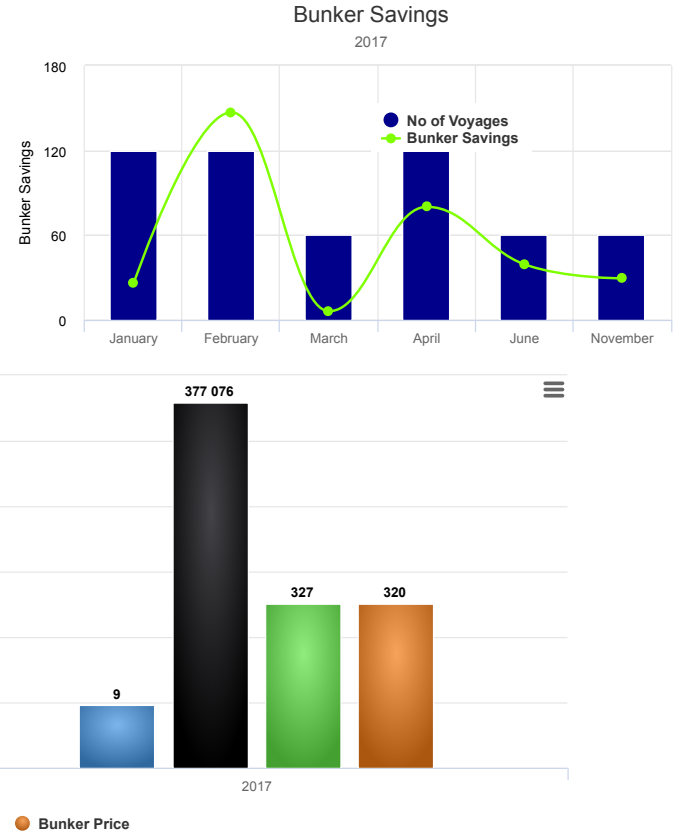
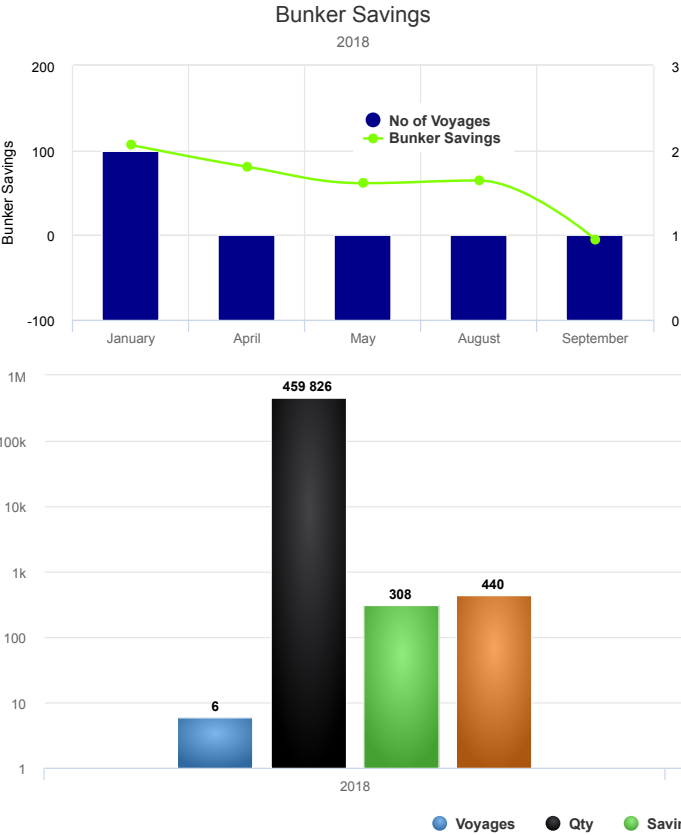


Figure 1

We observed a 33.3% decrease in the number of voyages enrolled under Blue Water Cargo Heating Management Service. However, the bunker savings declined by 6 % only. The variance between the actual and projected consumption has come down by 20.5%.

We strive to increase the number of voyages on which our services are undertaken. We are continuously working towards minimizing the variance between actual and projected consumption figures through continued research.

Annual Performance Summary 2018

A total of 6 heated cargo voyages for BP 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	2	245.4	211.5	351.7	106.3	394.0	41882.2
April-18	1	131.2	121.7	211.8	80.6	404.0	32562.4
May-18	1	100.0	86.1	161.2	61.2	442.0	27050.4
August-18	1	92.2	94.9	156.6	64.4	469.5	30235.8
September-18	1	97.4	78.4	92.5	-4.9	491.5	-2408.4
Total	6	666.2	592.6	973.8	307.6	440.2	129322.4

Table 1

Actual Bunker Cons. On Maintaining Cargo Temp 607.4 MT

Bunker Consumption To Heat Up 58.8 MT

Total Bunker Consumed On Cargo Heating 666.2 MT

Giving Us An Average Bunker Consumption Per Day To Maintain Cargo Temp 3.6 MT

Annual Performance Trends

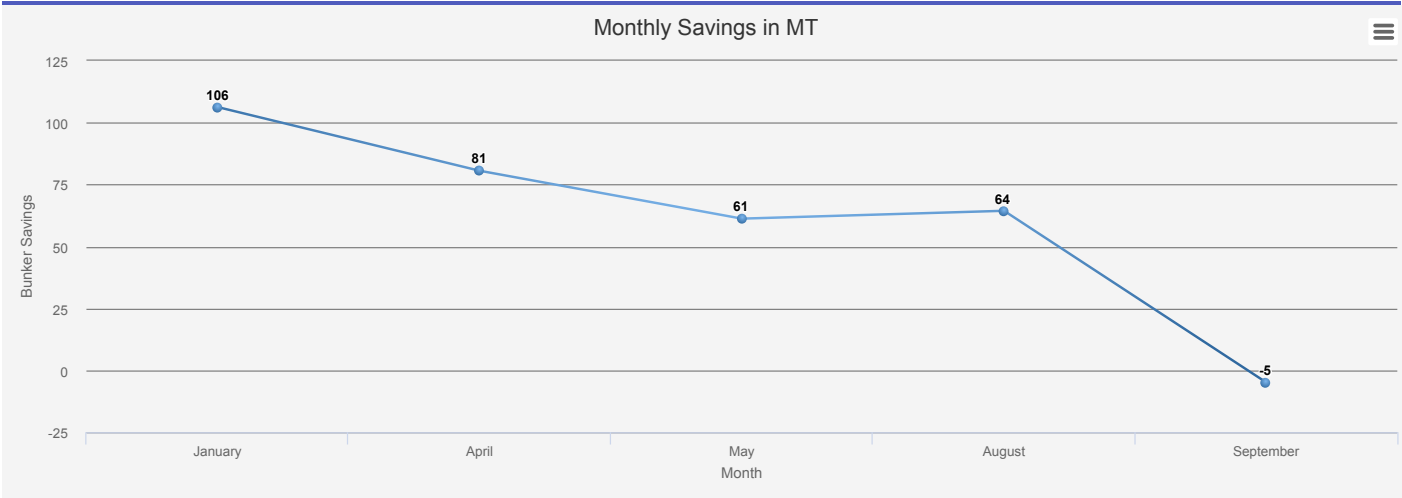


Figure 2

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

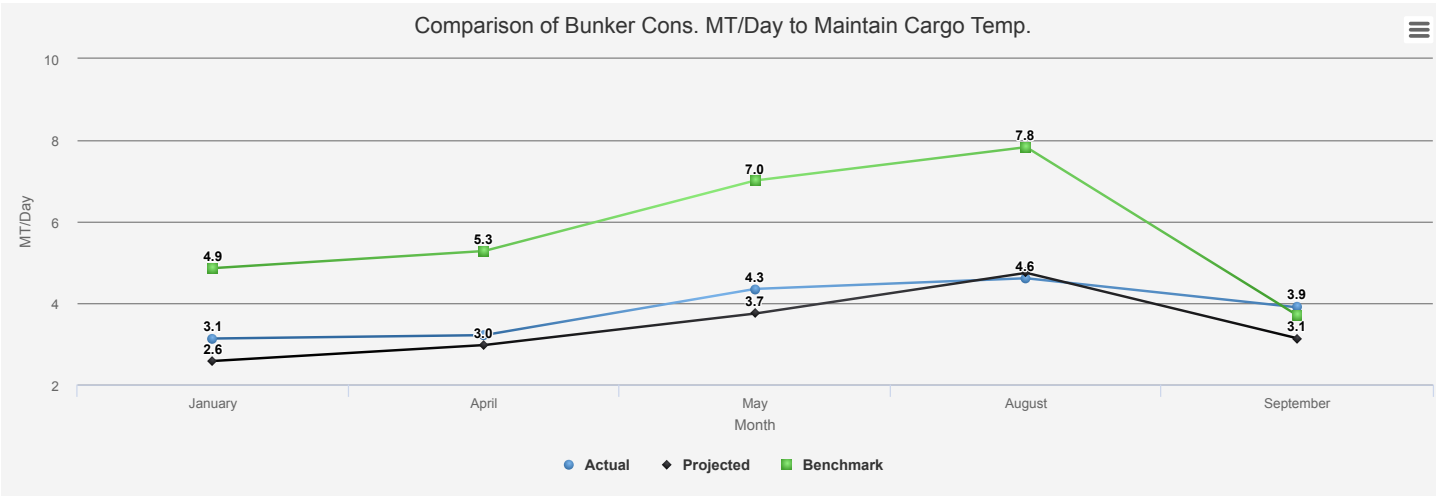


Figure 3

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

Total Bunker Cons. to Heat Up (MT)

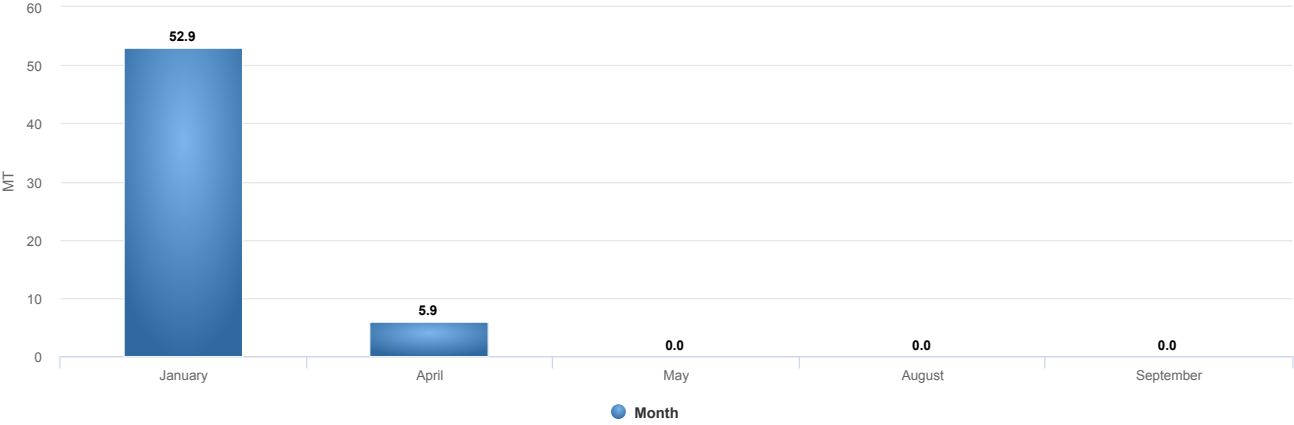


Figure 4

Environment Sustainability

The net reduction in green house gases emission for year **2018** is around **980.3 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)	307.6
Green House Gases Reductions (MT)	980.3
Energy Efficiency Operational Indicator (EEOI)	0.3x10 ⁻⁶

Quarter	No. of Voyages	Bunker Saving(MT)	CO ₂ (MT)	NO _x (MT)	SO _x (MT)
Q1	2	106.3	330.6	6.1	2.1
Q2	2	141.8	441.0	8.1	2.8
Q3	2	59.5	185.0	3.4	1.2

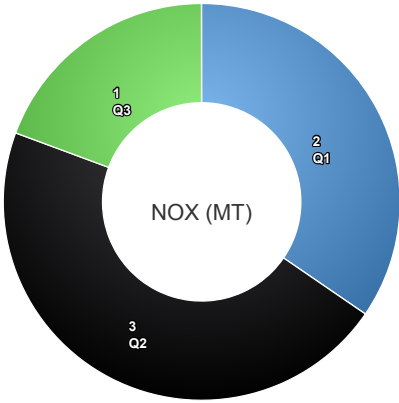
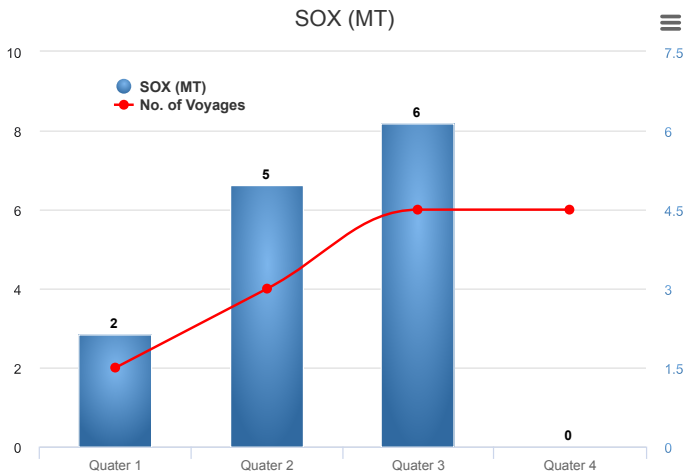
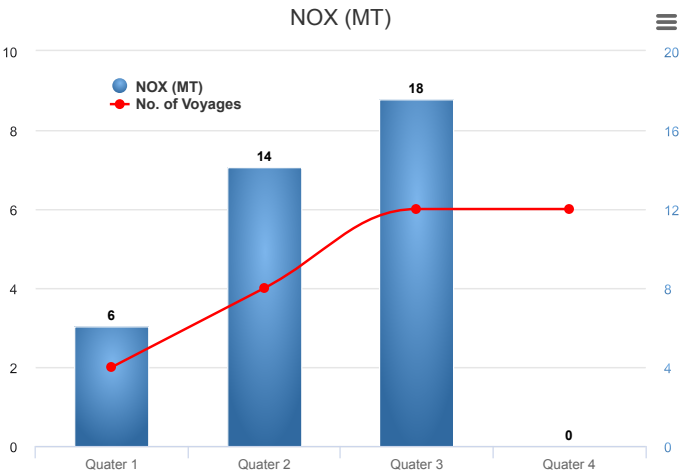
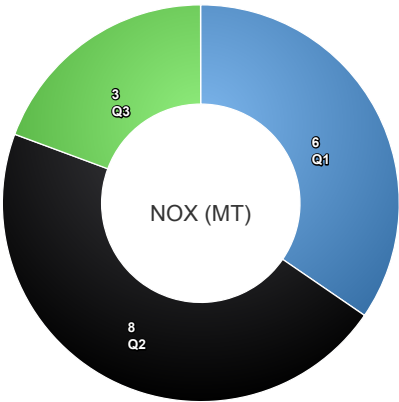
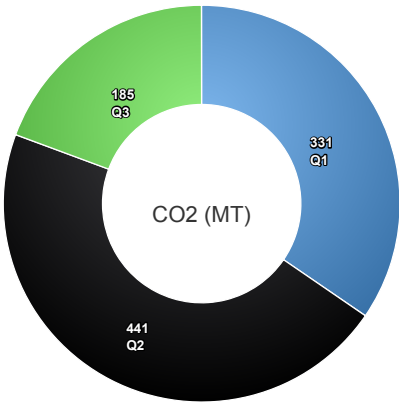
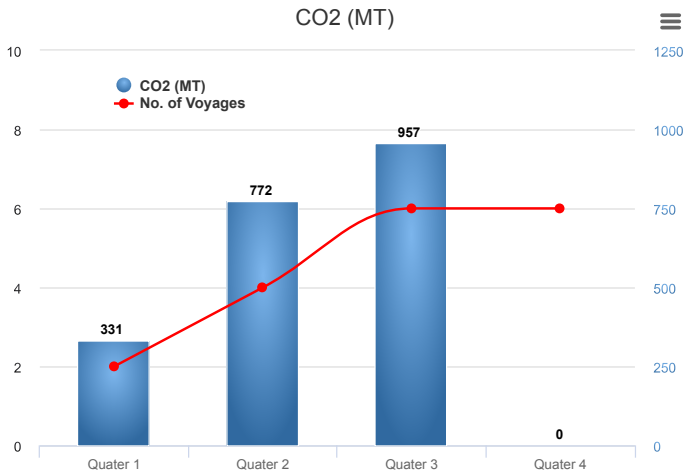


Figure 5

* 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%	11.1%
Bunker Savings against Benchmark Consumption	25.0%	31.6%
Performance Indicator(PI)	3-6	4.0
Response Time	< 01 Working Day	On Target

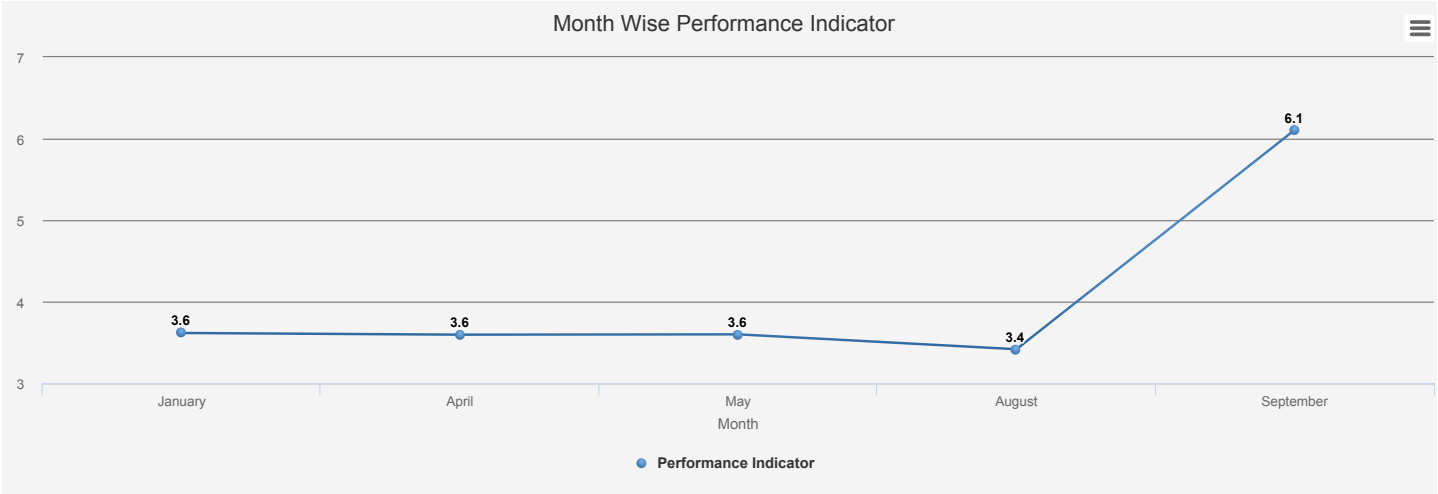


Figure 6

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	2	245.4	211.5	351.7	13.8 %
April-18	1	131.2	121.7	211.8	7.2 %
May-18	1	100.0	86.1	161.2	13.9 %
August-18	1	92.2	94.9	156.6	-2.9 %
September-18	1	97.4	78.4	92.5	19.5 %
Total	6	666.2	592.6	973.8	11.0%

Table 2

General Observations & Trends

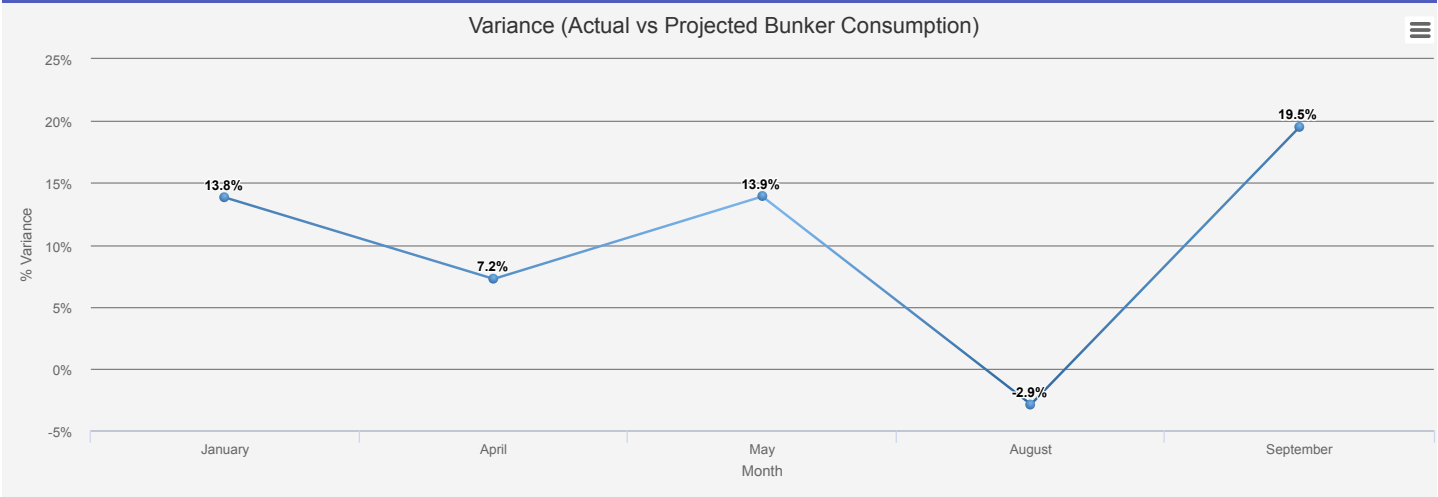


Figure 7

Note:1.
Please refer Appendix for the method adopted in working out Benchmark consumptions and figures for emission reductions.

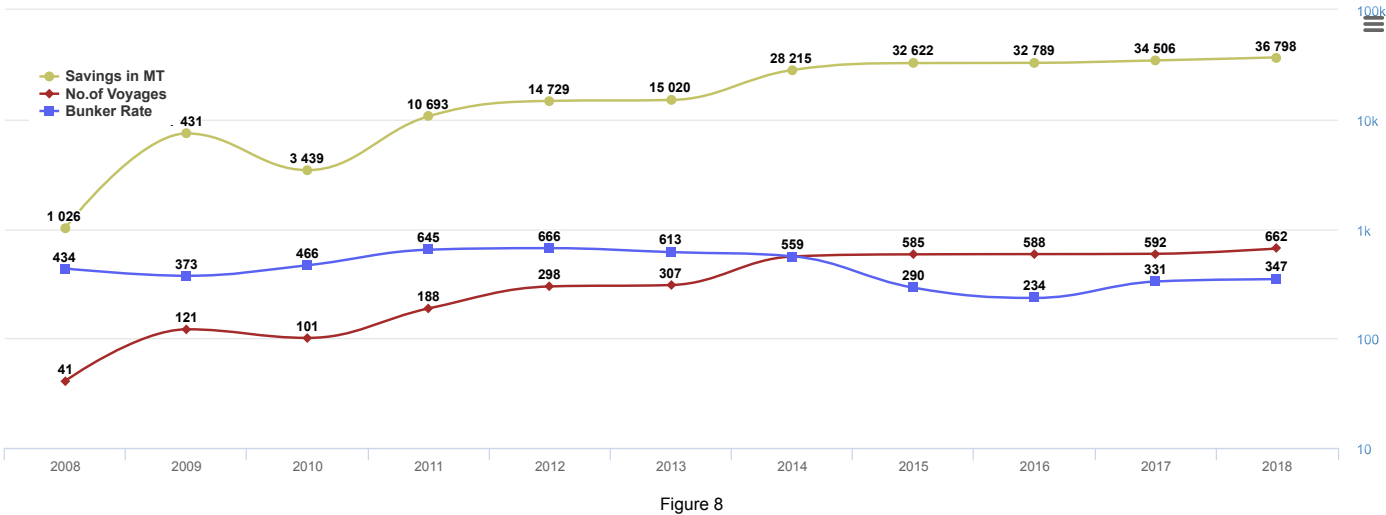
2(A). The TARGET CONSUMPTION mentioned in the table above is the summation of the projected Bunker consumption, calculated from the CHP during the quarter.

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



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.

Observations By Heating Desk

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

b) Some of the most common observations during the course of heating cargo voyages were:

1. Not maintaining recommended condensate temperature.
2. Running boiler at lower load for prolonged periods
3. Incomplete data in the Daily Heating Telegram and overheating of cargo by certain vessels
4. 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 vessels during the voyage.

c) We look forward to receiving past heating logs, so that we may review and modify our Benchmark as per BP vessels. It will help us create BP specific yardstick, which will allow BP Operations to appreciate value of our services.

d) We look forward to increase in interaction between BP 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 BP 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 BP 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 BP 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:

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

PI = (CO₂ emitted/Transport work) x 10⁶

Where **E** is the emitted mass (in tons) of the emitted gasses (CO₂, 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:

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

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 CO₂, 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/>)