danaos

2016

annual **environmental** report


www.danaosshipping.gr

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It is time to shift from traditional shipping and "smart ships" to "smart shipping". Technology transfer is a prerequisite to stay competitive, to modernize employees and partners and to safeguard stakeholders' interests.

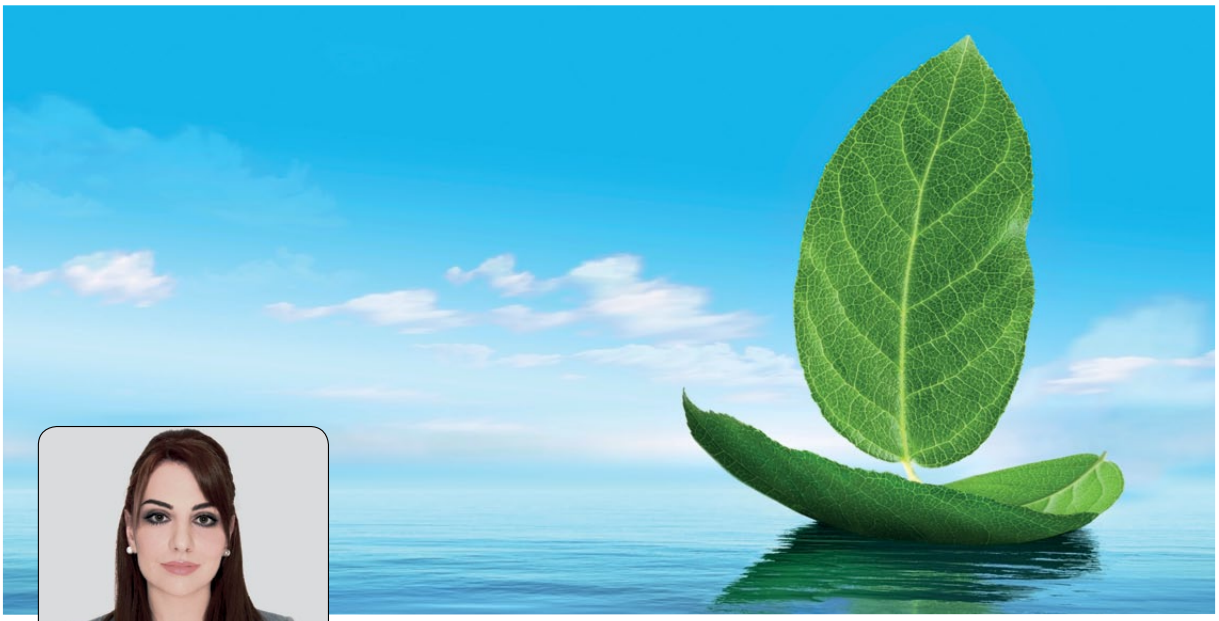
Dear Fellow Stakeholders,

Nowadays, the shipping industry is tested under severe conditions, where trade is at recent historical low and financing too difficult to support shipping companies' expansion plan. Therefore, everybody realises that it is time to shift from traditional shipping and "smart ships" to "smart shipping". Technology transfer is a prerequisite to stay competitive, to modernize employees and partners and to safeguard stakeholders' interests.

In this demanding era that we are going through, where environmental, societal, technological, commercial & political challenges & pressures have dramatically increased, all industries involved have to be armed with modernity and knowledge in order to deal with them effectively. Danaos was, is, and will be, among the pioneers in research and development field, and definitely will continue to drive innovation forward across the shipping industry, placing focus on operational excellence by investing in technology.

Respectfully

Dimitrios Vastarouchas
Deputy Chief Operating Officer
and Technical Director



Dear Fellow Stakeholders,

Our R&D department, strongly advocates that research creates new knowledge. Our motto is "He who doesn't move forward goes backward".

We always strive to be on the cusp of innovation, advancing our knowledge and competencies to lead the developments and preserve our competitive advantage over our peers. However, this is not an overnight achievement! It is the result of a consistent effort, thorough research and a continuous presence on all the technological, geopolitical and regulatory developments that affect the shipping industry.

To this respect, during the past few years, we have placed special focus on the digitalization, management and utilization of the information flows coming from the vessels. Vessels are becoming sophisticated data generators, where the utilization and processing of the data, through smart algorithms incorporated in advanced analytics platforms, helps to improve ship to shore communication, minimize response time, enhance control and monitoring functions, while also facilitating the decision-making process.

Another cornerstone of our research is the study and application of hull/engine optimization options in order to improve our vessels' energy efficiency and environmental footprint. To this respect, a number of retrofit options have been thoroughly studied and several of them have been implemented onboard.

Our business model supports a modern and transparent modus operandi both onboard and ashore. Investing in technology and research is the way to leverage our industry-leading fleet operations and technical expertise, to provide added value to our services.

Respectfully

Evi Politi
R&D Manager

PLANNING → STRATEGY → VISION

CONTENTS

DANAOS SHIPPING CO. LTD

Danaos Shipping Co. Ltd (DAS) is the exclusive Manager of Danaos Corporation (DAC).

DAC is a leading international owner of container ships who deploys its containership fleet principally under multi year charters with major liner companies that operate regularly scheduled routes between large commercial ports. As of February 28, 2017, these customers included COSCO, CMA CGM, Hyundai Merchant Marine, NileDutch, MSC, Yang Ming, ZIM, NYK, Hapag Lloyd, Maersk Line and OOCL.

OFFICES

Our head offices are located in Cyprus (Limassol), with Branch Offices in Greece (Piraeus), Ukraine (Odessa and Mariupol), Russia (St Petersburg), Tanzania (Zanzibar) and South Korea (Pusan).

59
CONTAINER SHIPS

2,200 TEU TO 13,100 TEU

353,576
TEU CAPACITY

Our values comprise of implementing the highest standards of efficiency, safety, and reliability

FLEET DEVELOPMENT

The fleet that DAS manages boasts modern, high-quality vessels many of which have been built in the past five years using the latest in design innovations and enjoy a reputation for safety and reliability within the industry.

DAS currently manages 59 containerships ranging from 2,200 TEU to 13,100 TEU with an aggregate capacity of 353,576 TEU.

On January 8, 2016 we finalized the sale of the Federal.

OUR VALUES

Our values comprise of implementing the highest standards of efficiency, safety, and reliability by:

- Enhancing the training of our personnel ashore and on-board.
- Integrating fully the vessels in the organization.
- Actively participating and leading research projects in efficiency.
- Promoting company culture and bonding on all personnel on board.
- Seeking growth by our strong comparative advantages to becoming the leader in our sector.

Our R&D department falls under the Technical department of DAS and was officially established in 2011.

Our goal is to be in the forefront of innovation, brainstorming ideas and developing our knowledge and competence in order to address our clients' needs, in the changing and evolving maritime environment. We apply the company's know-how and technical expertise in order to improve our fleet's fuel efficiency and our environmental performance thus, maintaining our competitive advantage and leadership position in the shipping industry.

R&D department:

- Studies a great number of energy efficiency improvement measures and innovative vessel retrofit solutions that improve fuel efficiency and/or operational flexibility. This includes, among others, engine derating, propeller retrofit, bulbous bow optimization, PIDs, engine tuning for SFOC improvement, advanced painting schemes application, container stowage optimization, etc.

- Works on deeply understanding and assessing the real benefit -efficiency and cost- of emerging technologies on energy saving and emissions reduction, including LNG for propulsion, SCR for NO_x reduction, SO_x scrubbers, etc.

- Performs feasibility and technical economic studies to assess systems from all related aspects -technical, safety, economical- and propose equipment and modifications required for regulatory compliance e.g. BWTS, ECA, etc.

- Collaborates with academic and industrial partners to develop knowledge and become prepared for future developments.

- Is engaged in Computational Fluid Dynamics (CFD) studies and model tests with major research institutes and ship model basins to identify the effect of various operational parameters or design aspects on vessels' performance. For example, hull roughness, trim, and weather effect. We are looking to verify, on a test scale, the effectiveness of various energy efficiency retrofit options examined.

- Places focus on ensuring the efficient and successful installation, as well as the stable and reliable operation of the online data acquisition and process system on board company vessels.

- Is engaged in the design and development of a business intelligence and analytics platform in cooperation with DMC (Danaos Management Consultants, our affiliate software company). This aggregates and analyzes almost real-time received data through the online data acquisition and process system to produce advanced performance assessment, energy efficiency, and operational control tools with inborn diagnosis functions. The design of all built-in algorithms

and performance assessment models is the essence of our accumulated knowledge and expertise.

- Is responsible for producing the Danaos Annual Environmental Report that summarizes, among other things, the company's environmental performance. At the same time, it monitors and evaluates the fleet's annual energy efficiency goals and sets the new targets for the year to come.

-Drives the design and implementation of energy management systems and practices like ISO 50001 and the Ship Energy Efficiency Management Plan (SEEMP).

2016 REVIEW

In 2016 the key areas of focus were:

01 The study of **technical modifications** in order to upgrade the commercial value of Danaos' 4,250 TEU vessels. The shortening process of the vessel "Colombo" was studied and finally given the green light for retrofit during vessel's drydock. Meanwhile other modifications such as bulbous bow retrofit, have been studied both with CFD and model testing, for the Danaos 10,100, 13,100 and 8,500 TEU vessels. Approval to proceed with the subject modification was granted to the Danaos 10,100 TEU vessels.

02 **Incorporation of Waves web-based Fleet Performance Platform to Danaos Management system**. Sixteen fully operational routines designed and validated by Danaos R&D have been successfully incorporated into the data analytics platform while control form alerting, import forms, On-line system auto-validation forms, fleet monthly reporting and map enhanced functionality are only some of the new add-ons to the platform.

03 Continuous update on **charterers' requests** and close follow-up on their needs. **Vessel's performance evaluation** based on Danaos business intelligence analytics models / gap-analysis/ study on how to enhance same and achieve better accuracy /higher credibility.

D

As a result of IMO regulations adopted in 2011, the expectation is that ships built in 2025 will be at least 30% more efficient compared with those constructed in the 2000s

SHIPPING **INDUSTRY**

COMMERCIAL ENVIRONMENT

2016 was an exceptionally challenging year for global shipping. The shipping industry remained depressed with stagnating growth while the geopolitical tensions, the higher operating costs and costs of compliance with regulations, the increased cost of lending and restricted access to finance added to this depressing picture. Shipping has never recovered from the impact of the 2008 financial crisis. In 2016 the falling growth in demand for maritime transport combined with serious overcapacity have deepened the recession. In recent years there has been a significant fall in the rate of Chinese GDP growth. As emerging economies like China increasingly come to resemble OECD economies, a larger proportion of their GDP growth is taken up by services and domestic consumption. Unlike manufacturing and infrastructure development this does not generate the same demand for maritime trade. A structural change in the relationship between demand for shipping services and global economic growth may not be insurmountable as long as the industry can manage capacity. But shipping's recent record in this respect has not been impressive. To restore equilibrium in the market, a large number of vessels will need to be recycled before the end of their normal 25 years lifecycle.

Demand for the seaborne transport of products in containers, which has declined sharply since mid-2015, has a significant impact on the financial performance of liner companies and, in turn, demand for containerships and our charter counterparty risk. The collapse of Hanjin Shipping last August had a devastating impact on the entire industry, with shipowners and vessel operators, ports and terminals, suppliers, shippers, banks, insurers, crews, and many more stakeholders to have been largely affected.

HMM on the other hand has managed to avoid bankruptcy; the reduction of the rates it paid to the owners of its chartered fleet was of decisive importance.

On top of the uncertainty and turmoil prevailing in the global marine arena characterized by the aforementioned market developments, the regulatory field presents serious challenges when it comes to compliance with the upcoming environmental regulations.

REGULATORY ENVIRONMENT

CO_2 Emissions

Shipping is already the most carbon efficient mode of commercial transport and in recent years has cut its CO_2 emissions per tonne of cargo moved per one mile. As a result of IMO regulations adopted in 2011, the expectation is that ships built in 2025

will be at least 30% more efficient compared with those constructed in the 2000s. Shipping is the only industrial sector to have global regulations to reduce CO_2. However the Paris Agreement has increased the pressure on IMO to take additional steps. The EU is already implementing a regional regulation on the Monitoring Reporting and Verification (MRV) of individual ships' CO_2 emissions. This currently uses different metrics to a global data collection system about to be adopted by the IMO. At the international level, IMO is developing its CO_2 emissions-monitoring regime through amendments to the Ship Energy Efficiency Management Plan (SEEMP) guidelines for fuel-consumption data collection. The IMO system should be up and running by 2018. This will facilitate the development by IMO of additional CO_2 reduction measures which could possibly include an MBM.

SO_2 Emissions

After a review of the outlook of the availability of compliant low sulphur fuel oil in 2020, the IMO has decided that the global fuel sulphur limit of 0.5% should enter into force in 2020. This requirement is in addition to the 0.1% sulphur limit in the North American, US Caribbean, North Sea and Baltic Emission Control Areas (SECA).

As per ICS if the global cap is implemented in 2020, and if fuel costs stay at the current low levels which have prevailed since the dramatic fall in oil prices during 2015, a mandatory switch to low sulphur fuel would mean that bunker costs would return to their 2014 peak.

But if by 2020, as some predict, oil prices increase to something approaching US$ 70 a barrel (still well short of the peak in 2014), it has been estimated that the differential between compliant and residual fuel could spike by as much as US$ 400 a ton.

Despite the fact that the IMO deemed the availability of low sulphur fuel to be sufficient, several stakeholders question this. As such, uncertainties when it comes to both fuel price and availability remain an issue for the industry. HFO (3.5% S) will be available, though compliance by use of this fuel will require the installation of exhaust gas cleaning systems. Scrubbers require a costly retrofit and there are questions regarding technological maturity and operational limitations, and LNG is mostly relevant for newbuildings.

Water Ballast Treatment

On another regulatory hot field, accession by Finland has triggered the entry into force of the IMO Ballast Water Management Convention on 8 September 2017.

Regarding ballast water treatment systems, the inherent technological uncertainty and the limited operational experience of these systems compose a rather complex and multi-parametric exercise that requires for very meticulous and methodic preparation in order to minimize the risk implied in the decision making process.

Even now, that the convention has been ratified by the IMO and that the USCG has approved three ballast water treatment systems, there is no absolute confidence that the equipment to be installed onboard will be regarded as fully compliant during Port State Control inspections.

Moreover there are serious operational limitations and considerations pertinent to the testing process, the performance of the various components at actual sea conditions worldwide and the liability and sanctions to be applied in case of an approved system's underperformance.

Ship Recycling

Meanwhile, the EU ship recycling regulation requires that EU-flagged vessels of 500 GT and over carry an Inventory of Hazardous material (IHM). When calling at EU ports, vessels from non-EU countries will also be required to carry an IHM identifying and quantifying all the hazardous materials on board that can pose a risk to the health and environment. EU-flagged vessels must also be scrapped in an approved ship recycling facility. The above necessitates that owners should be well prepared by taking all the necessary actions, investing in training their staff to respond effectively to the above requirements and ensure safe and environmentally sound recycling of ships when the decision is made.

This difficult and challenging global environment from both an economic and regulatory aspect, can still be a field in which a world-class leading shipping company with a respectful tradition, exceptional expertise and innovative vision for the future, can stand out through its operational and technological excellence and strengthen its position in the market.

*Sources:
-International Chamber of Shipping 2016 Annual Review
-Union of Greek Shipowners Annual Report 2015-2016

DANAOS' **APPROACH**

Nowadays, the shipping industry is being tested under severe conditions, where trade is at recent historical lows and financing is too difficult to support any expansion plans shipping companies may have. Therefore, everybody realizes that it is time to shift from traditional shipping and "smart ships" to "smart shipping".

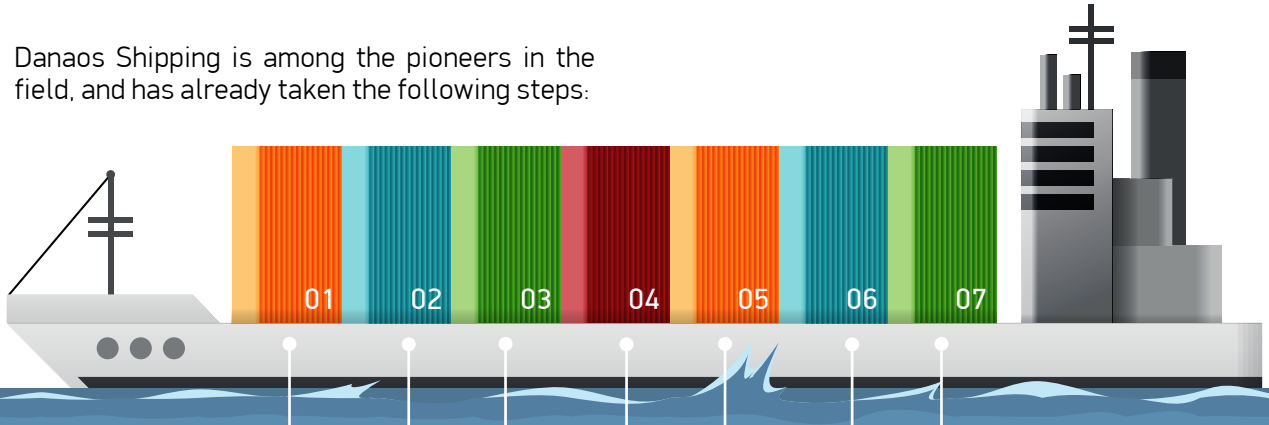
The key tool to manage new challenges is technology. New ideas such as real-time data acquisition and process platforms, big data analysis algorithms, promising neural networks, advanced operations software onboard and ashore etc., are available in the market, at their first steps, highlighting the walking path to the future.

Modern companies have adopted such changes in daily functions, enhanced culture and advanced intelligent systems respectively. Technology transfer is a prerequisite to stay competitive, to modernize employees and partners, to safeguard stakeholders' interests at various activities. It requires cost and effort but in terms of the derivatives, investment deserves a positive consideration.

"You don't discover new continents without having the courage to lose sight of old coasts."

André Gide

Danaos Shipping is among the pioneers in the field, and has already taken the following steps:



01
The R&D department has been established to contribute to in-house studies, algorithm development and big data analysis

02
A considerable investment cost has been approved for the development of modern intelligent systems

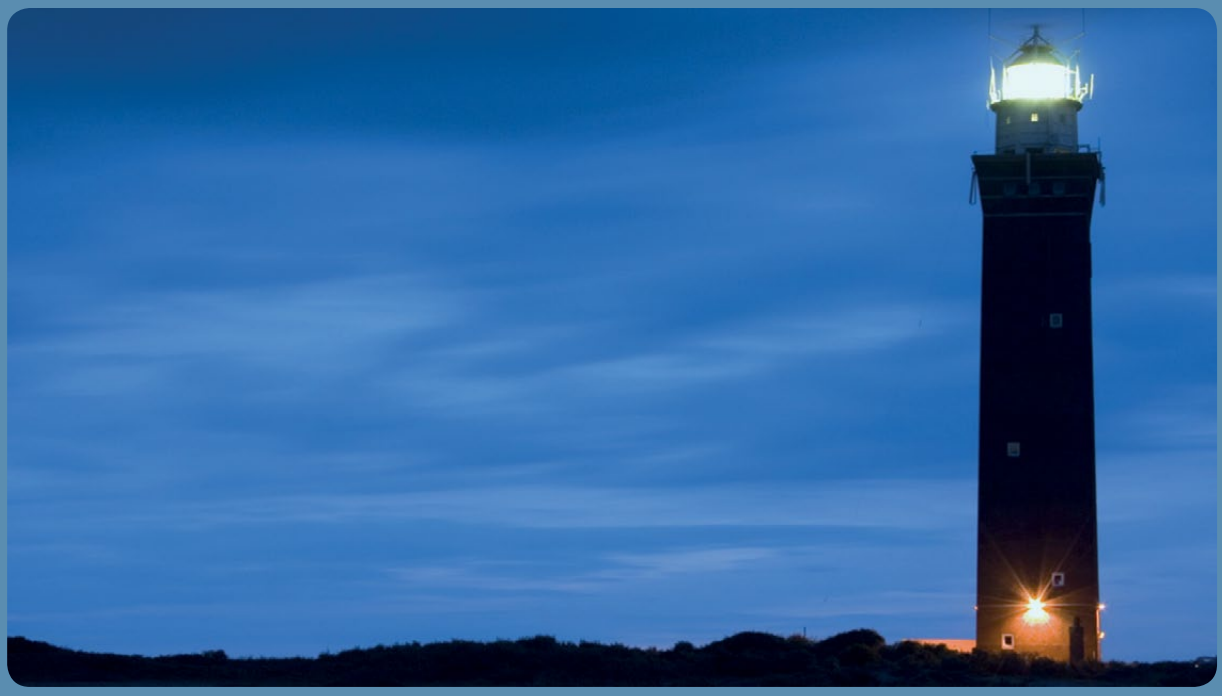
03
Training of key personnel and knowledge sharing to employees

04
Presentations to the public of latest developments and experience feedback exchange

05
In-house study of technology transfer effect on employees psychology

06
Contribution to JIPs utilizing systems, resources and facilities

07
Support of promising graduates and co-operation with universities



OUR **PROJECTS**

WAVES

Nowadays when environmental impact and vessel efficiency are amongst the most debatable and critical themes in the maritime industry, DANAOS rolled-out WAVES, an innovative maritime intelligence framework for extracting valuable information from maritime data. WAVES acts as an umbrella platform that enables the unified representation and visualization of enormous volumes of heterogeneous data, realizing superior decision making process through synergies between modern Big Data Analytics techniques and the accumulated technical and operational expertise of DAS.

WAVES also moves vessel monitoring one step further by implementing the "push" scheme, generating automatically daily, monthly and quarterly reports highlighting to the Superintendent Engineers' KPIs, problematic situations or even cases that require immediate action.

WAVES is fully integrated in the Danaos management system, providing personalized role-specific dashboards and maritime business operational intelligence tools, creating a true competitive advantage in ship management.

Danaos was among the first to recognize the significant potential that 'big data' has to transform shipping, from timely insights drawn from real-time monitoring and forecasting of events to improved management of performance and risk. Tangible examples of innovation or efficiency drawn from big data produce measurable results in areas such as (but not limited to): strategic business/ investment planning; performance monitoring and optimization; condition-based and predictive maintenance; optimization across systems and system overview of operations.

The incorporated algorithms and visualization tools transform data into useful information assisting company employees with the decision-making process.

WAVES acts as a highly effective and valuable tool for driving energy efficiency. Daily reports submitted through the system by the vessels enable continuous monitoring and decision support for the optimization of fuel consumption.

Below is a depiction of WAVES' major milestones for the year 2016.

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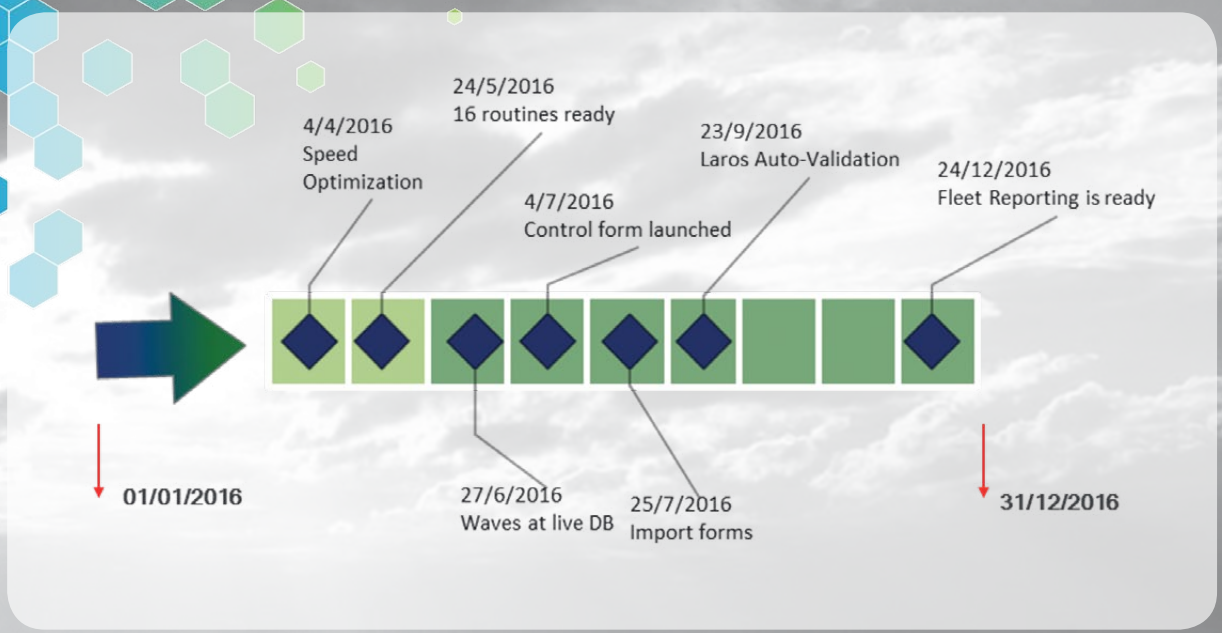
In Danaos we support research as a vital pillar of our strategy. Research creates new knowledge. New knowledge combined with our know-how and technical expertise help us stay at the forefront of innovation and better address our clients' needs.



ON LINE
Data Acquisition & Process System

VESSELS ENROLLED DURING 2016

In 2016, the Laros "On line" system was installed on another 2 vessels, increasing the total number of vessels equipped with the "On line" system to 29.

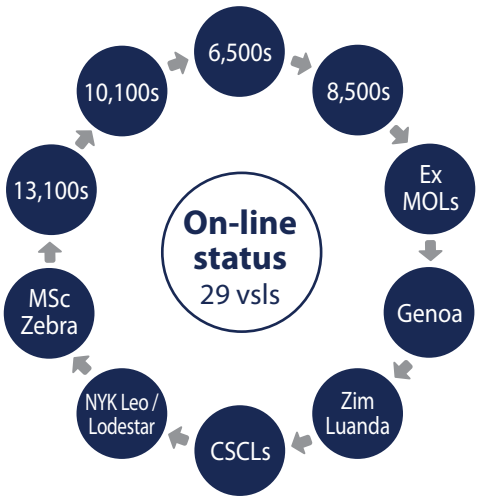
On-line reefer monitoring is available for twenty Danaos vessels. The vessels' actual power efficiency is calculated by monitoring the load of the actual reefers. The above raw input combined with a number of other data processed through WAVES' algorithms provide a reliable base for assessing the effectiveness of the energy management system onboard, ensure optimum energy use and minimization of energy losses while also trigger the implementation of corrective actions and adjustments where needed.

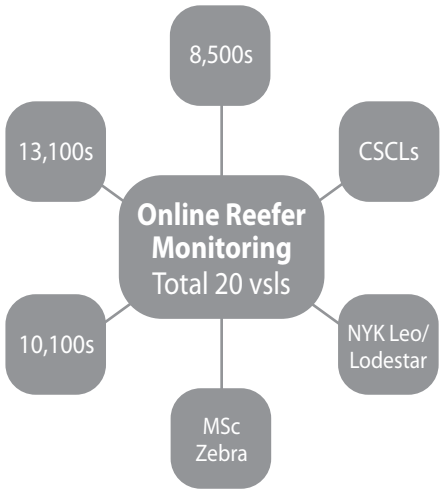
The on-line bunkering option which was first implemented on CMA CGM Rabelais has been successfully applied onboard all her sister vessels.

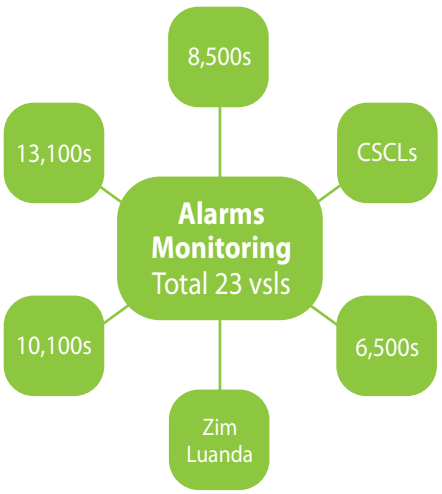
Finally the alarm monitoring option is currently applied to twenty three vessels. We are working on stabilizing and improving the quality of the data received.

According to our statistics logs which are updated on a regular basis, the system's stability has been remarkably improved compared with the previous year. The data loss due to equipment failure, on-line system hardware failure or communication issues between the servers, for the sum of vessels and the total number of parameters monitored within 2016 is far below our target limit of 3%.

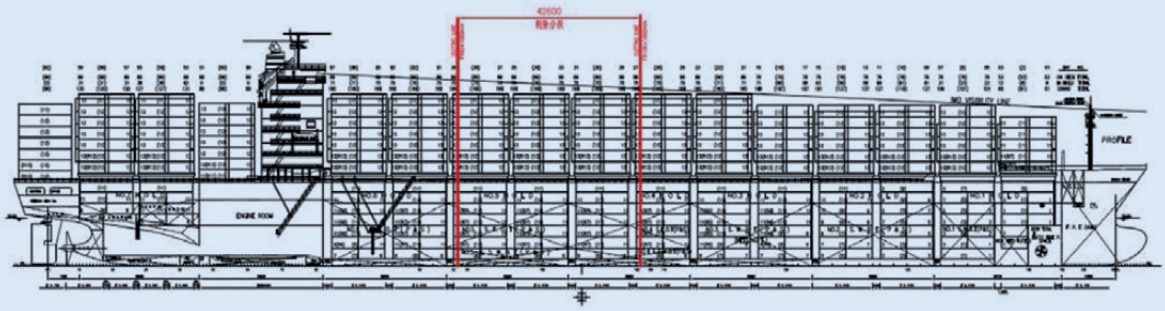
Zim Luanda	4,253 TEU
CMA CGM 6500s	5 x 6,500 TEU
CSCL 8500s	2 x 8,468 TEU
CMA CGM 8500s	5 x 8,530 TEU
CSCL 9200s	2 x 9,580 TEU
10100s	3 x 10,100 TEU
Hyundai 13100s	5 x 13,100 TEU
MSC Zebra	2,500 TEU
Priority/Performance	2 x 6,400 TEU
NYK Lodestar / NYK Leo	2 x 6,200 TEU
Genoa	5,500 TEU


On-line status
29 vsls
6,500s
8,500s
Ex MOLs
Genoa
Zim Luanda
CSCLs
NYK Leo / Lodestar
MSc Zebra
13,100s
10,100s


Online Reefer Monitoring
Total 20 vsls
8,500s
CSCLs
NYK Leo/ Lodestar
MSc Zebra
10,100s
13,100s


Alarms Monitoring
Total 23 vsls
8,500s
CSCLs
6,500s
Zim Luanda
10,100s
13,100s


Online Bunkering
Total 6 vsls
6,500s
Priority



Danaos, with this major innovative retrofit, succeeded to ensure the employment of one of its ex-panamax vessels with very competitive performance compared to the market status

4,250 TEU **SHORTENING**

With the Panama Canal expansion, the future of the class of ships specifically designed to maximize the use of the existing canal are put in jeopardy. There is a surplus of Panamax containerships whose fate is at risk. The scrapping of the oldest and the least fuel efficient ones seems to be the only way forward, while for the rest either scrapping or retrofit in order to become more commercially attractive in the new routes to be engaged are the options available.

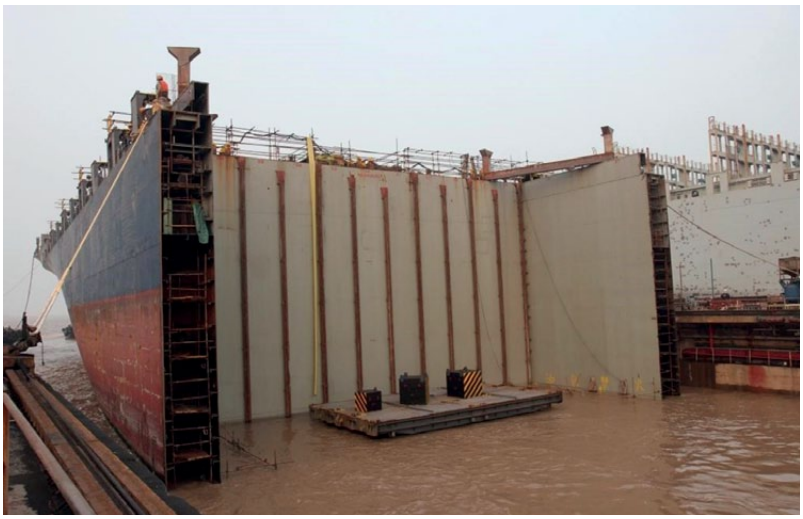
At Danaos, we considered many options in order to make the Panamax vessels more competitive for trade. Widening was one of them, but after reviewing relative studies that prospect was rejected. Bulbous bow modification, propeller derating and advanced paint schemes were also investigated, but none of them proved to be notably lucrative.

Having considered the interest of our Charters based on the fact that the IntraAsia route needs smaller vessels, equivalent to 2,700-2,800 TEU containerships, and after the thorough research of our R&D Department, Danaos concluded on shortening the M/V Colombo.

The plan was to shorten her hull by removing one and a half Cargo Holds from the parallel body, without any other modification of machinery or equipment. Existing tanks would be divided in order to be more flexible with various fuel grades. At the same time, the fuel pollution risk would be reduced since less fuel will be stored onboard and vessel's tanks will be smaller. Length and nominal containers capacity would be decreased by 15% and 23% respectively.

In order for this modification to work though, there were some limitations, regarding regulation and technical issues.

The technical considerations were mostly related to damage stability, which has been confirmed (the remaining ballast tanks fully cover stability



Length and nominal containers capacity would be decreased by **15%** and **23%** respectively

issues), propulsion and sea keeping tests (model tests), Russian stowage, AMSA requirements on deck and light running propeller margin (increased at about 1.5% and in accordance with the latest maker's recommendations).

Besides the technical considerations, there were regulation issues to overcome. The first one, which was also of critical importance, was to characterize this modification as minor by the flag State Administrator. Class confirmation was received, that the applicable Classification Rules for this vessel at the time of the original construction (i.e. 2004) will apply further. Applicable NO_x emission standards remain the same. An amendment of fuel oil tanks to reduce their capacity and increase the environmental protection, an up-to date SEEMP and an exemption already granted from the USCG on the Ballast Water Treatment Plant compile the picture of a safe vessel on terms of stability and seaworthiness. The Flag State administration (Liberia) confirmed that the SOLAS '92 and MARPOL Rules for fuel tanks arrangements were applicable on the date of her build and still stand unchanged. The next step was the plan approval, where 47 drawings were reviewed and excessive model tests were carried out, including propulsion and maneuvering, which were successful.

So, stability wise and consumption wise, the modified M/V ends up extremely competitive, even better, than the rest being 2,800 TEU class vessels.

As expected, after the transcended difficulties, the assiduous research and the satisfying findings, Danaos gave the "green light" for the initiation of dry docking activities.

The modification took place at Cosco Shipyard Co. Ltd. In Zhoushan, China within January 2017. The vessel's sea trial was completed and the whole project was an exceptionally successful endeavor.

Danaos seeking to maintain its pioneer position in operational efficiency and technological innovation, proceeded with this major retrofit, succeeding to ensure the employment of one of its ex-panamax vessels with very competitive performance compared to the market status. The shortening of the M/V Colombo, was an exceptional example of a successful tripartite collaboration between Danaos, the vessel's Classification Society DNV GL and the Shipyard, acting as a paradigm and leading the way for other future radical conversions, improving the ex-panamax vessels current market position and thus improving their commercial value.

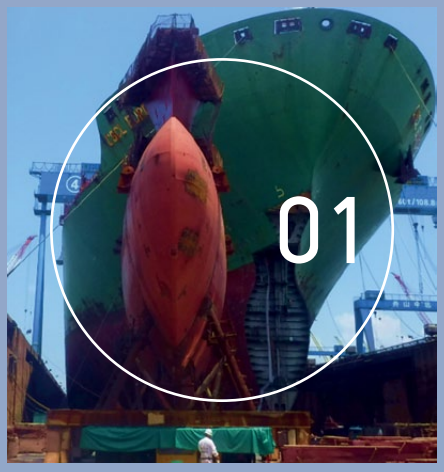
8,500 TEU **MODIFICATION**

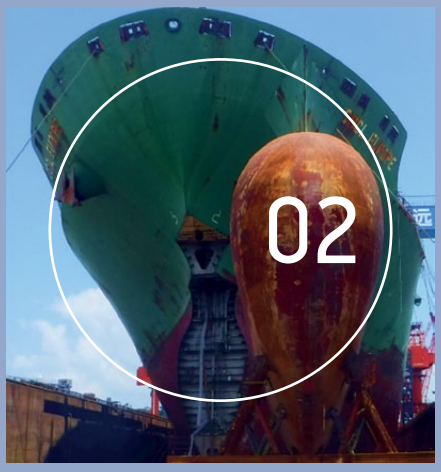
Following the thorough research of our R&D department on the subject, the right upgrade solution for Danaos' 8,500 TEU vessels, the "Europe" and "CSCL America" was successfully found.

The upgrade included a bulbous bow modification, the replacement of the existing conventional propeller with a Kappel high efficiency fixed pitch propeller combined with PBCF (propeller boss cap fins), along with engine-power limitation. Both container vessels were powered by MAN B&W 12K98MC-C main engines rated at 68,520 kW at 104 RPM. In connection with the propulsion upgrade, the main engines were limited to 44,000 kW at 89.7 RPM, however, top speeds of more than 23 knots are still available.

The modification took place at Cosco Shipyard Co. Ltd. in Zhoushan, China in 2016. The project was successfully accomplished with the combined and unswerving support of the vessel's classification society "LR" and the shipyard.

The actual performance tests carried out after the modification accomplishment, confirmed the savings that were forecasted based on the model test results.





01 **NEW Bulbous Bow (Shape)**

02 **OLD Bulbous Bow (Shape)**

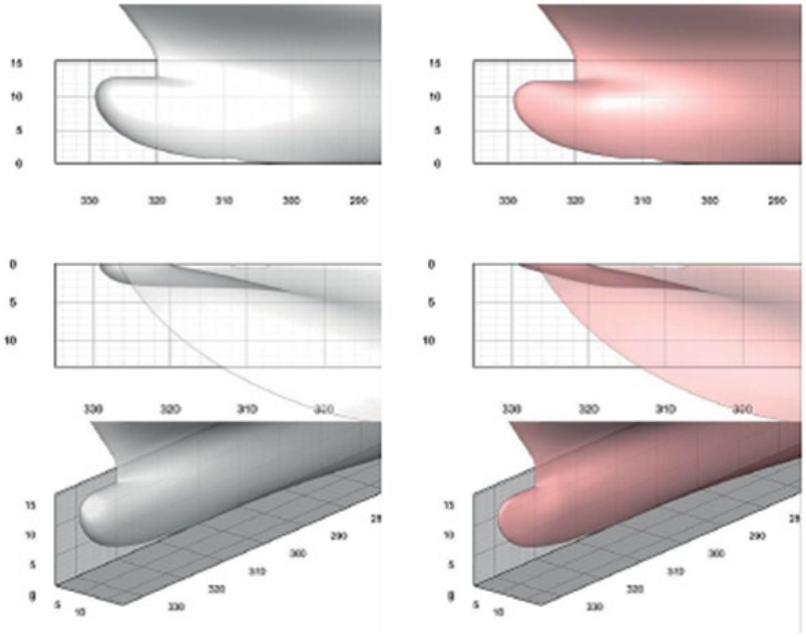
03 **Propeller (Before)**

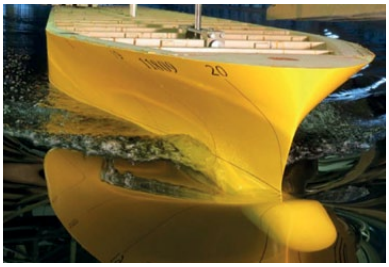
04 **Propeller PBCF (After)**

BULBOUS BOW **OPTIMIZATION**

The Bulbous bow optimization study for Danaos' 13,100 TEU vessels was performed by CFD with the evaluation of 30 alternative hull designs on 17 operating conditions.

The optimization was performed on effective power with the objective being to minimize it on a combination of operating conditions given. The optimization constraints were that the B/T room cannot be modified, Lbp and Loa cannot be modified, each hull form would be evaluated at maximum speed in order to check that it is unaffected, a certain penalty though could be accommodated. This is the second CFD study conducted on these vessels. The first was carried out based on another operating profile given the prevailing, at the time, speed-load operational conditions. For the Danaos 8,500 TEU vessels built at Jiangnan Shipyard, bulbous bow optimization was performed by Hydrocean with CFD and 29 hulls were evaluated on 17 operating conditions. Three years ago a similar study at a more limited operational range was performed in HSVA. In addition to the above studies, model tests have also been carried out with the best bulbous bow version providing the highest weighted average savings for the selected operational profile, in order to verify the savings forecasted by CFD, at the Krylov ship model basin, located in Saint Petersburg. Last but not least, model tests with optimized bulbous bow version as identified through the CFD study carried out at HSVA, have also been performed for Danaos' 10,100 TEU vessels at 3 drafts and a wide range of speeds. The weighted average savings for the selected operational profiles for all the examined series of vessels were found in the range of 5-12%.

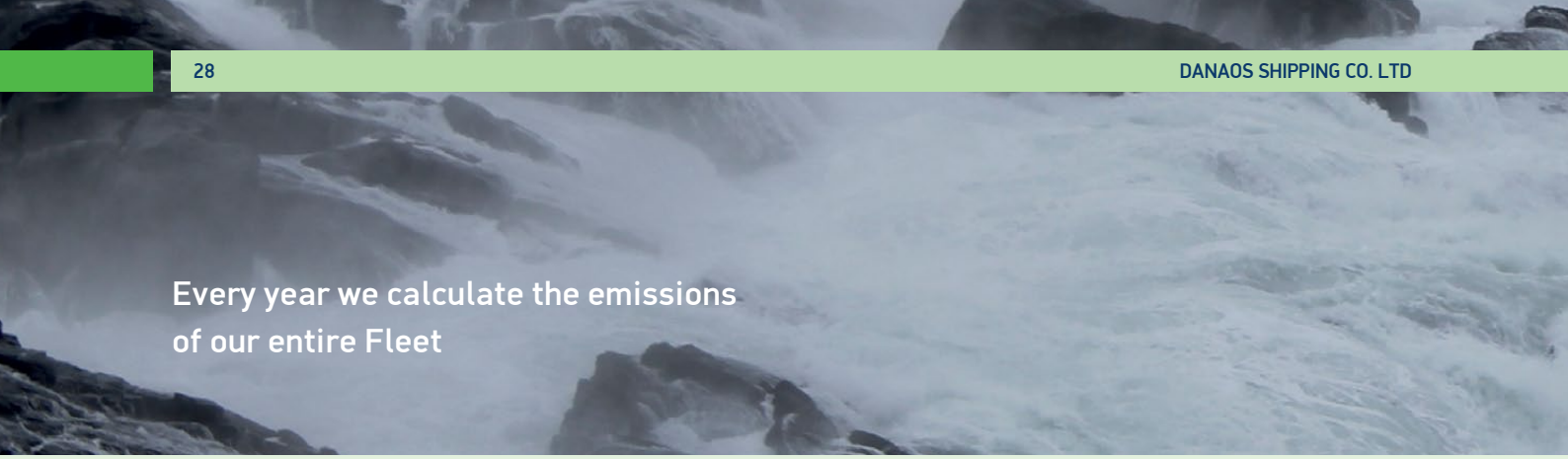




SUSTAINABILITY'S GOAL IS TO **CREATE POSSIBILITIES** NOT TO LIMIT OPTIONS

We developed our environmental indexes as monitoring tools of our fleet environmental performance and as a means to evaluate the effectiveness of our energy efficiency improvement measures.

OUR **ENVIRONMENTAL PERFORMANCE**



Every year we calculate the emissions of our entire Fleet

Every year we calculate the emissions of our entire Fleet, aspiring to be fully transparent on the parameters that can influence our efforts towards a more energy efficient management. We use those calculations as indicators of our environmental performance and share them with our clients, upon their request, in order for them to evaluate their fleet's environmental footprint.

All the formulae used for the calculation of our emission KPIs are in line with the ones used by the KPI platform: https://www.shipping-kpi.org/.

We adopted the above approach in order to use the same reference tool as that of our charterers so as to be fully aligned with them, regarding emissions calculations.

CO_2 EMISSIONS

References: IMO MEPC/Circ.471: Interim Guidelines for voluntary ship CO_2 emission indexing for use in trials CO_2 emissions in tons are calculated for each voyage of each vessel and then summed up for all voyages of each vessel. They are then summed up for all vessels accordingly. The total CO_2 emissions for the Danaos fleet are produced as per the below formula:

$$\sum_{v}\sum_{i}\sum_{j} FC_{ijv} \times C_{Fj}$$

Where:

FC_{ij} is the mass of consumed fuel j at voyage i (metric tons) for the vessel v,

C_{Fj} is a non-dimensional conversion factor between fuel j consumption, measured in grams and CO_2 emission also measured in grams based on carbon content (as per the update of the IMO 2000 study (Buhaug et al,2008))

EEOI (in gr/tons*miles) for each vessel is defined as the ratio of mass of CO_2 emitted per unit of transport work:

$$EEOI = \frac{\sum_{i=1}^{n}\sum_{i=1}^{k}(FC_{ij} \times C_{Fj})}{\sum_{i=1}^{n}(m_{cargo,i} \times D_i)} \times 10^6$$

Where:

j is the fuel type

i is the voyage number

$FC_{i,j}$, is the mass of consumed fuel j during voyage i (metric tons)

C_{Fj} , is a non-dimensional conversion factor between fuel j consumption, measured in grams and CO_2 emission also measured in grams based on carbon content (as per the update of the IMO 2000 study (Buhaug et al,2008)):

Diesel/Gasoil:	3.20600
Light Fuel Oil:	3.15104
Heavy Fuel Oil:	3.11440

$m_{cargo,i}$, is the carried cargo mass during the voyage i

D_i, is the distance in nautical miles corresponding to the voyage i.

The average EEOI of all vessels produces fleet average EEOI.

DANAOS' **EMISSIONS**

SO_2 EMISSIONS

References: "An Online Ship Emissions Calculator as a Decision-Making Aid and Policy Evaluation Tool", C.A Kontovas & H.N Psaraftis, Laboratory for Maritime Transport, National Technical University of Athens.

SO_2 emissions depend on the type of fuel and more specifically on the sulphur content of the fuel. One has to multiply total bunker consumption (in tonnes per day) by the percentage of sulphur present in the fuel (for instance, 3%, 1.5%, 0.5%, or other) and subsequently by a factor of 0.02 to compute SO_2 emissions (in tonnes per day). The 0.02 SO_2 factor is exact and comes from the chemical reaction of sulphur and oxygen to produce SO_2.

As far as the SO_2 index is concerned, the following expression found in the literature that gives the equivalent sulphur content per ton-nautical mile has been used for calculating SO_2I for each vessel and the average has been produced giving the SO_2I (in gr/tons*miles)for the whole fleet:

$$SO_2I = \frac{\sum_{i=1}^{n}\sum_{x=1}^{k}(20xFC_{i,x}\times S_{ix})}{\sum_{i=1}^{n}(m_{cargo,i}\times D_i)} \times 10^3$$

Where:

$FC_{i,x}$, is the mass of consumed fuel x during voyage i (metric tons)

$m_{cargo,i}$, is the carried cargo mass during the voyage i

D_i, is the distance in nautical miles corresponding to the voyage i and

$S_{i,x}$, is the weighted average of % sulphur content of fuel type x calculated by the formula:

$$S_x = \frac{\sum_{j=1}^{n}(A_{x,j}xB_{x,j})}{\sum_{i=1}^{n}(A_{x,j})}$$

Where:

x, is the fuel type (e.g. HFO, LSFO, MDO etc.) received by the vessel

n, is the number of bunkering operations in the reporting period

S_x, is the weighted average of % sulphur content of fuel type x

$A_{x,j}$, is the quantity of fuel of type x received during bunkering operation

$B_{x,j}$, is the sulphur content of fuel type x received during bunkering operation

NO_X EMISSIONS

References: The Norwegian Toll and Avgiftsdirektoratet (The Norwegian Customs and Tax department). Document (only available in Norwegian).

NO_X emissions based on the NO_X emission factor equal to 0.100 (ton of NO_X/ ton of fuel) for slow speed diesel engines and 0.07 (ton of NO_X/ton of fuel) for medium speed diesel engines.

The NO_XI emissions index (in gr/tons*miles) for a voyage is calculated based on the below formula:

$$\frac{\sum_{i=1}^{n}(FC_{i,ME}\times C_{FME}+FC_{i,DG}xC_{FDG})}{\sum_{i=1}^{n}(m_{cargo,i}\times D_i)}\ x10^6$$

Where:

i is the voyage number,

$FC_{i,ME}$, is the mass of fuel consumed in Main Engine during voyage i (metric tons)

$FC_{i,DG}$, is the mass of fuel consumed in auxiliary engine during voyage i (metric tons)

C_F, is a conversion factor between fuel consumption, measured in metric tons and NO_X emission also measured in metric tons:

Slow speed engines: 0.1 mt per metric ton of fuel used

Medium speed engines: 0.07 mt per metric ton of fuel used

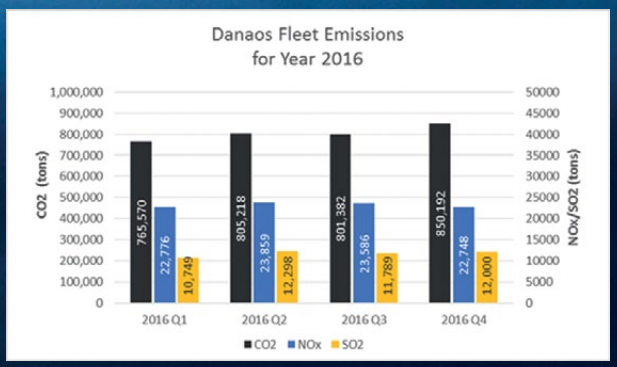
$m_{cargo,i}$, is the carried cargo mass during the voyage i and

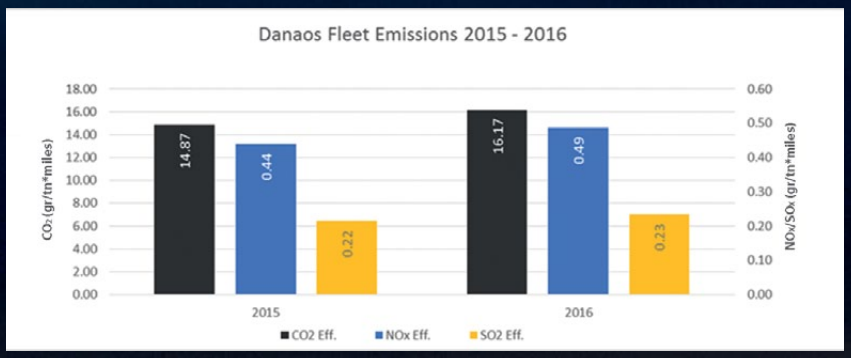
D_i, is the distance in nautical miles corresponding to the voyage i.


SWL 2001
4.5

Low sulphur fuel oil quantity bunkered has considerably increased compared to 2015

The below emissions figures and efficiency factors correspond to the total of our operating Fleet during 2016.





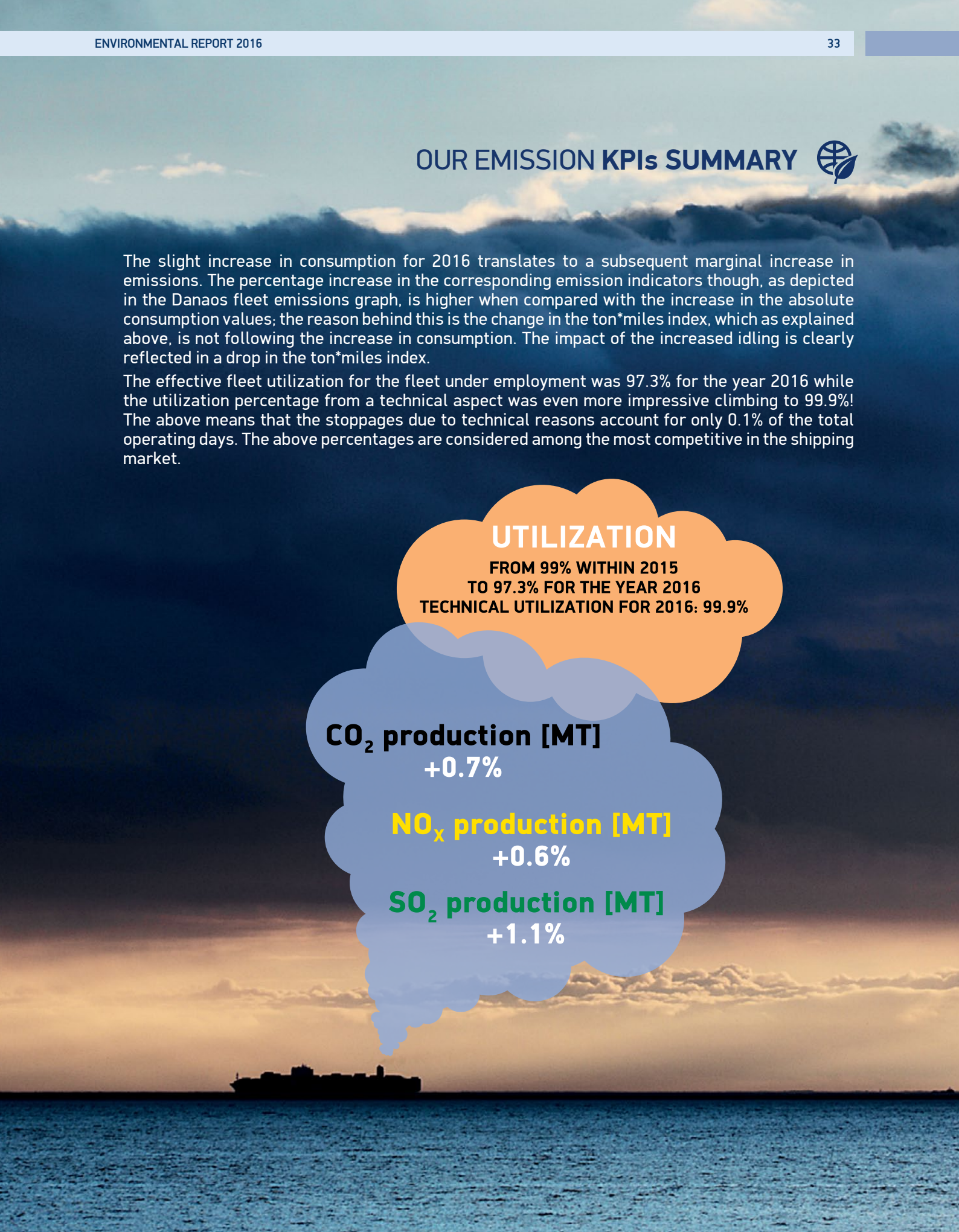
As it is shown in the above graph, the company's environmental footprint increased compared to that of the previous year. Additionally, the total number of produced emissions for 2016 (CO_2, NO_x, SO_2) is 0.7% higher compared to 2015.

The new acquisition of the NYK Leo, the full activity of the NYK Lodestar and Suez Canal and the entrance into service of the Genoa, together with the reduction in port stay time for the fleet and the reduction of ultra-slow steaming activity compared with 2015, as well as the increased percentage of reefers' utilization, have counterbalanced the otherwise expected drop in consumption due to the increased idling time during 2016. The result was a slight increase in consumption for 2016 and a subsequent increase in emissions as above.

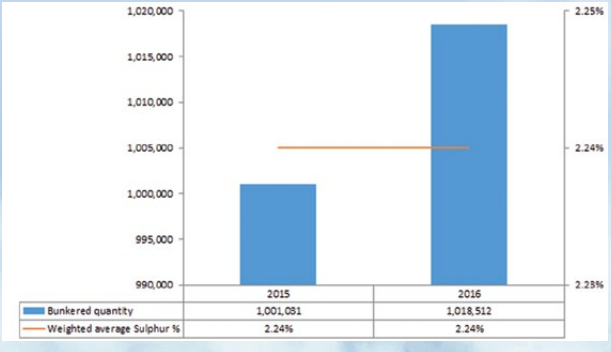
OUR EMISSION **KPIs SUMMARY**

The slight increase in consumption for 2016 translates to a subsequent marginal increase in emissions. The percentage increase in the corresponding emission indicators though, as depicted in the Danaos fleet emissions graph, is higher when compared with the increase in the absolute consumption values; the reason behind this is the change in the ton*miles index, which as explained above, is not following the increase in consumption. The impact of the increased idling is clearly reflected in a drop in the ton*miles index.

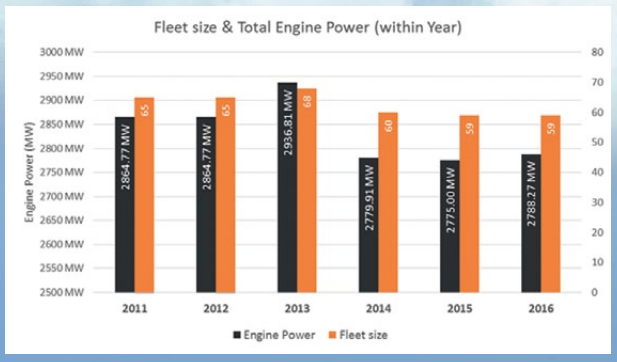
The effective fleet utilization for the fleet under employment was 97.3% for the year 2016 while the utilization percentage from a technical aspect was even more impressive climbing to 99.9%! The above means that the stoppages due to technical reasons account for only 0.1% of the total operating days. The above percentages are considered among the most competitive in the shipping market.



The fuel quantity delivered in 2016 based on our bunker delivery notes, presents an increase of 1.7% compared with the year 2015. The above is in line with the slight increase in consumption for the fleet as explained above. If we wish to make a qualitative analysis of the results based on the detailed graphs of bunkered quantities per fuel grade apposed here below, we see that the low sulphur fuel oil quantity bunkered has considerably increased compared to 2015. The reason is that to a small extent MGO bunkered quantity was replaced by LSFO, whilst the vessels' calls to ECA areas have been considerably increased by more than 35%. The weighted average sulphur content on the other hand remains steady.



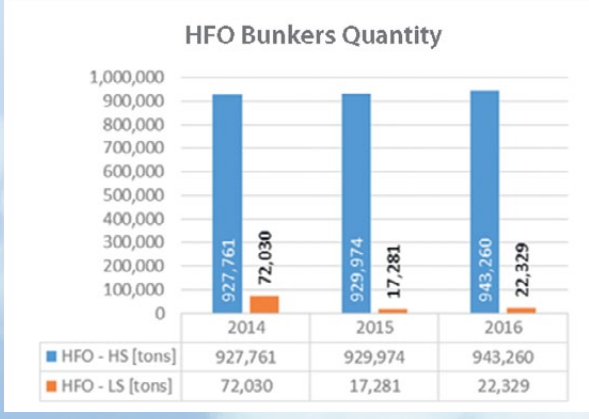
The bar graph shows our bunkered quantities and quality data for the years 2015 and 2016 concerning our operable fleet.

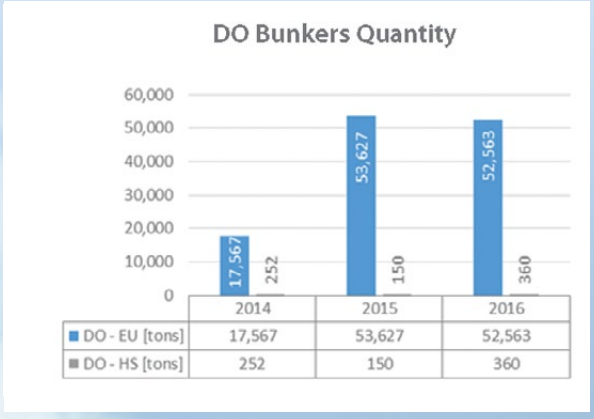


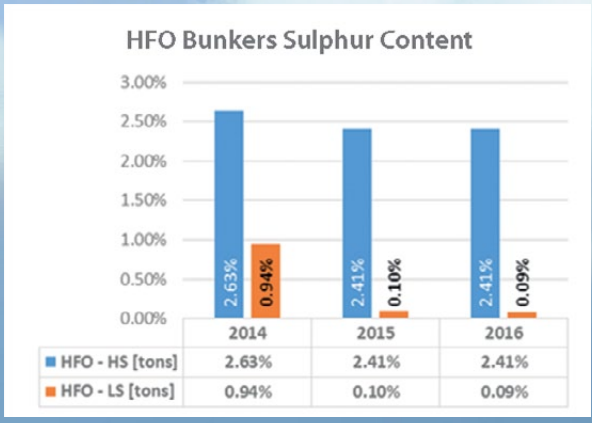
Fleet size and engine power within each year (including the 2 Danaos Bareboats).

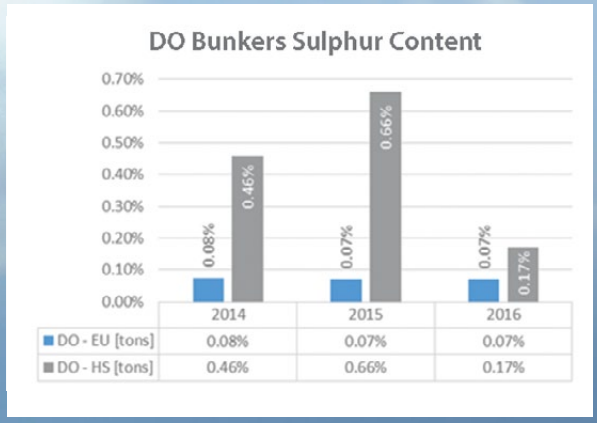
OUR **BUNKERS**

Below is the break-down of the bunkered quantities and the corresponding weighted average sulphur content for each grade.

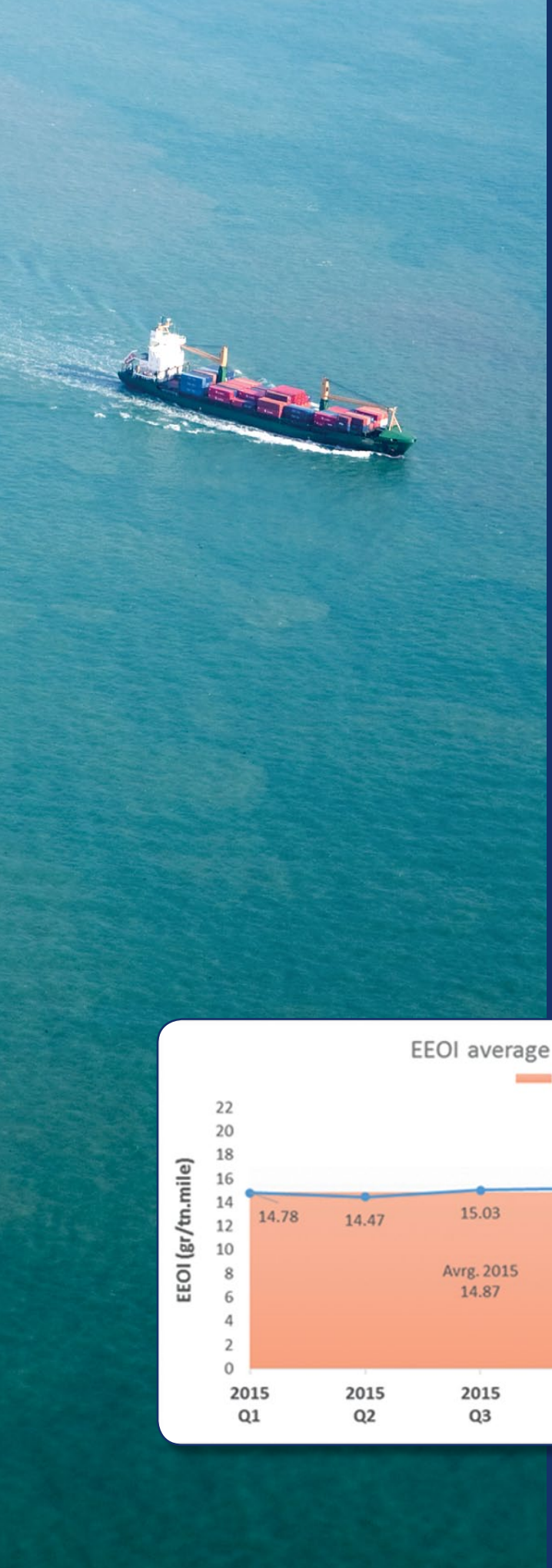








Operational excellence based on green technology is Danaos' core strength.



ENERGY EFFICIENCY OPERATING INDEX (EEOI)

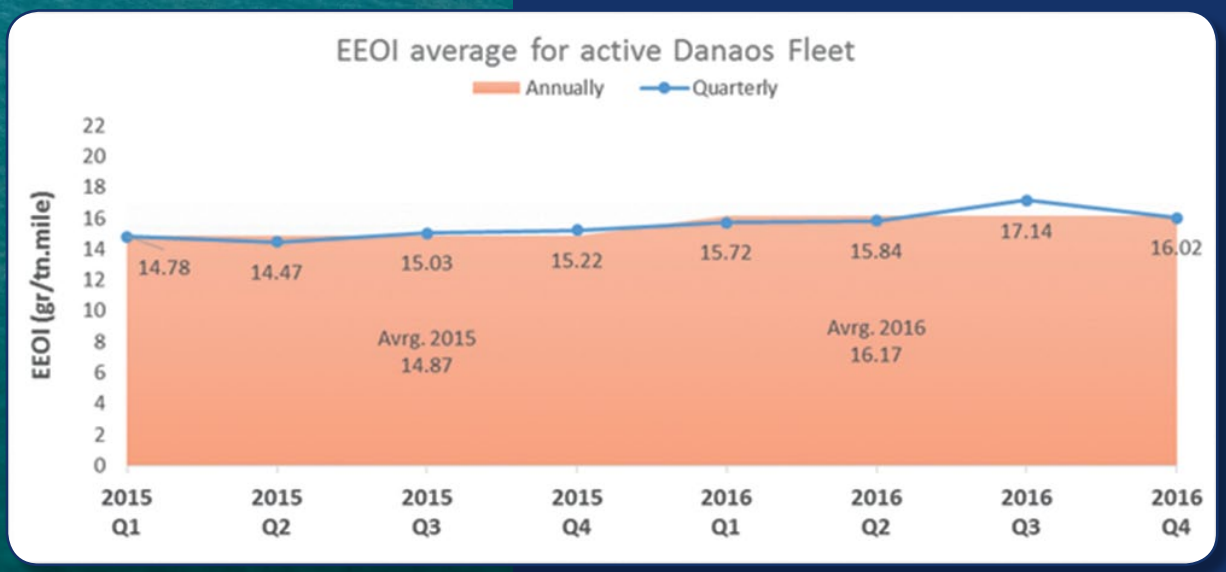
Developed by the IMO as per MEPC.1 Circ.684, the EEOI index calculates the amount of CO_2 emitted per ton/unit/TEU of cargo transported per nautical mile. CO_2 output per cargo can be used as an indicator of a vessel's fuel efficiency. This only reports CO_2 emission as a result of fuel combustion.

Industry standardization and verification of CO_2 data is a prerequisite in order to enable fair, reliable measurements of CO_2 performance and to enable CO_2 benchmarking with competition.

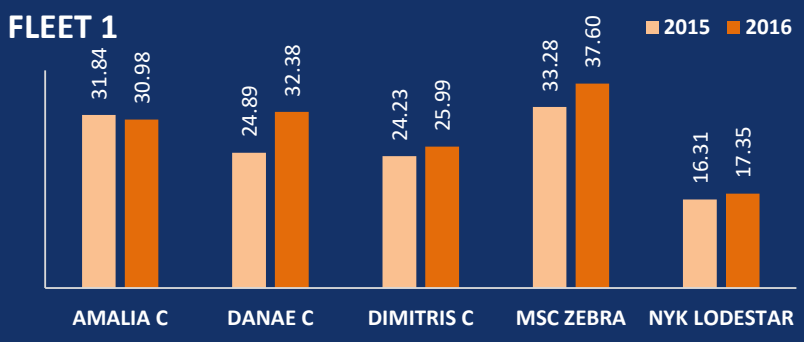
Danaos has achieved an improvement of about 16% since 2012 in CO_2 emissions production, mainly due to the consistent efforts in improving vessels energy efficiency and reducing fuel costs.

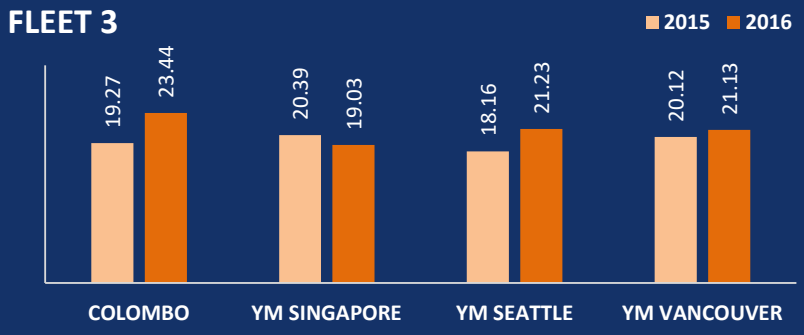
The above improvements have been driven by the results of a thorough technical research initiated in 2008 and have been realized within a controlled and structured framework without compromising the vessels' safety and utilization.

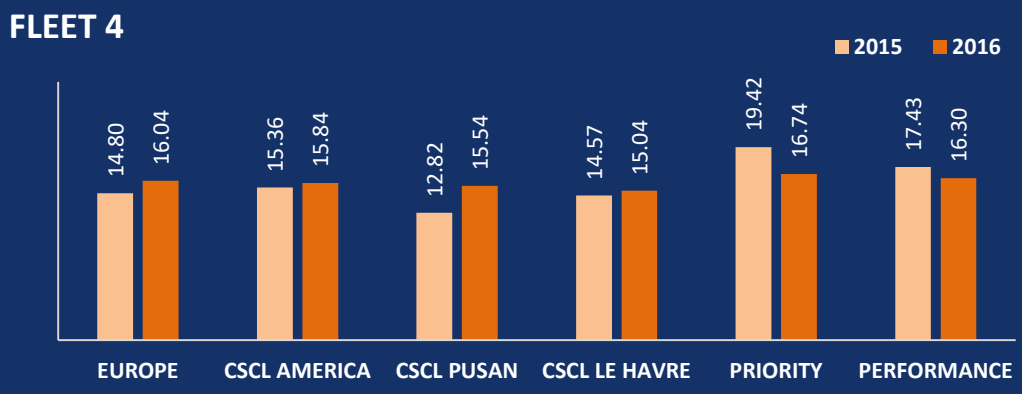
In the graph below, the Danaos fleet EEOI average for the years 2015-2016 can be seen.

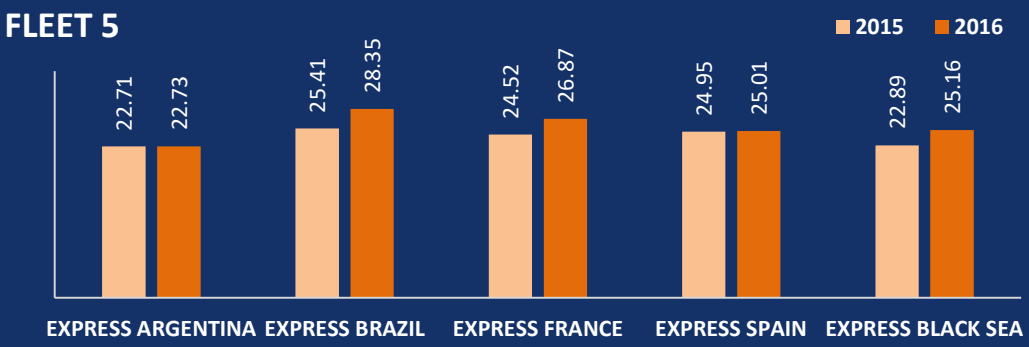


The EEOI figures for all company vessels are depicted in these graphs:

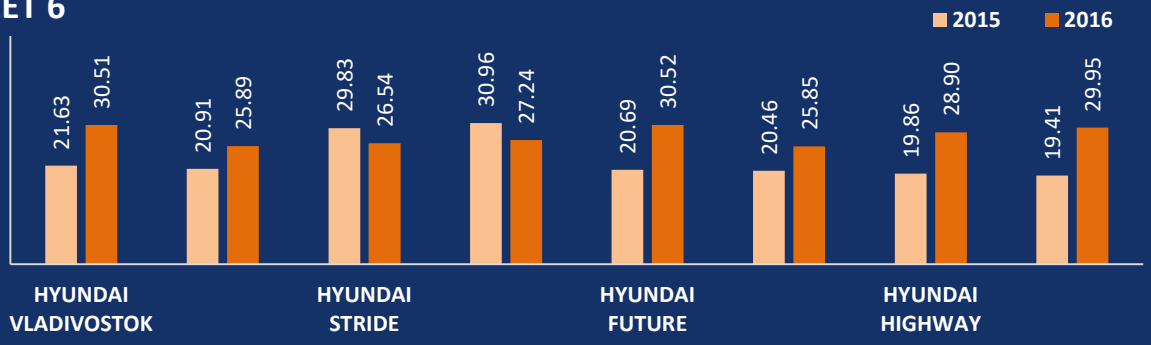




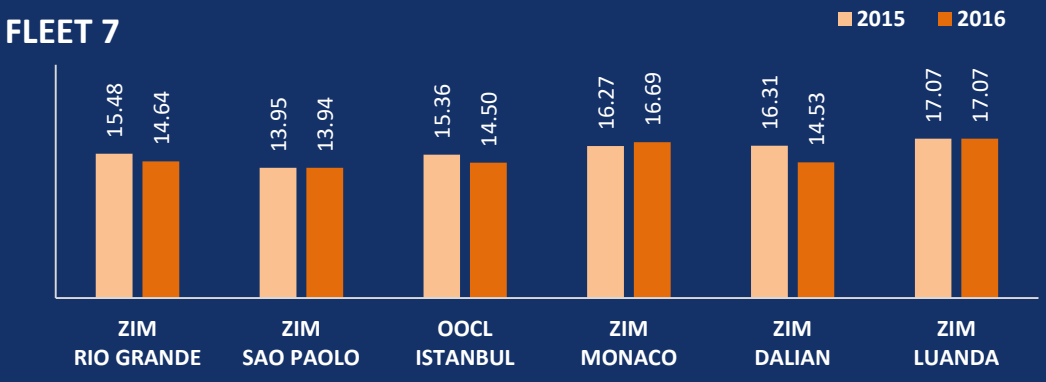




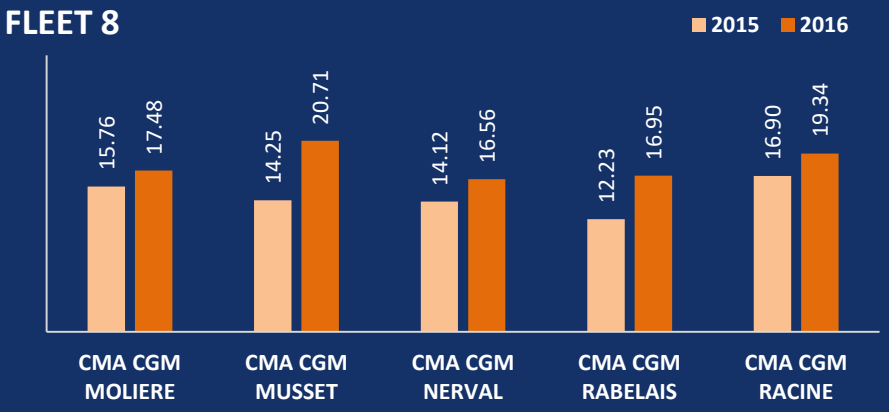
FLEET 6



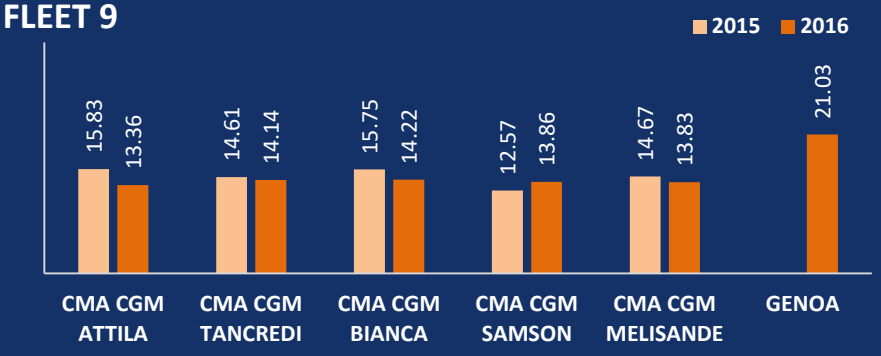
FLEET 7



FLEET 8



FLEET 9



DANAOS, following society's needs, has incorporated advanced techniques and focuses on the training of its engineers in order to improve energy awareness and make it part of their culture.
"The real benefit is utilizing existing energy to the best advantage"

EEOI FOR THE DANAOS FLEET (YEARS 2015-2016)

The EEOI has increased by 1.3 gr/ton*miles on average for 2016. This can be mainly attributed to the considerable drop in the fleets' ton*miles index compared to the previous year, combined with the increase in the fleets' average speed and operation within the critical draft area.

Nevertheless, increasing or decreasing tendencies are observed when examining each vessel separately.

In the majority of cases where slight variations have been noticed, those can be attributed to small deviations in the ton*miles index.

As a general observation, the increased operation in the critical draft area and/or the increase in average speed, result in the increase of the vessel's consumption. The reduction in transported cargo, on the other hand, or the disproportional increase in the ton*miles index, compared with the increase in consumption or even the decrease of the ton*miles index due to idling, have as a consequence the deterioration of the CO_2 footprint.

We incorporated, a calculation tool, to measure EEOI through the vessels' daily telegrams in our Danaos Enterprise software back in 2008. Since 2008, we have voluntarily enrolled nine of our vessels in the DNV-GL "CO_2 Index" project, monitoring their performance and CO_2 emissions. Within 2014, we have registered another ten vessels from the Danaos fleet in the project, while the same was done in 2015, raising the total number of enrolled vessels to nineteen. At the end of 2016 we count twenty vessels having an Energy Efficiency Operational Indicator Certificate issued by DNVGL.

In 2016 the sophisticated emissions routine designed by our R&D department providing a more thorough insight pertinent to the control and monitoring of ships' emissions was launched in our Waves data analytics platform. This tool with enhanced features, allows us to regularly monitor the fuel efficiency of all our ships being a valuable tool for MRV reporting.

DNV·GL

ENERGY EFFICIENCY OPERATIONAL INDICATOR CERTIFICATE

This is to certify that the vessel

CMA CGM TANCREDI

IMO No.: **9436355** Call Sign: **9HA2837**

Port of Registry: **Valletta**

Owner: **Teucarrier (No. 2) Corp.**

has been assigned the

ENERGY EFFICIENCY OPERATIONAL INDICATOR CERTIFICATE

Certificate No.: **45 041 - 17 HH**

based on the MEPC.1/Circ.684
"GUIDELINES FOR VOLUNTARY USE OF THE SHIP ENERGY EFFICIENCY OPERATIONAL INDICATOR (EEOI)"

The underlying data has been verified on 09.01.2017 in Hamburg.

The EEOI of the ship was assessed with a value of:

EEOI = **7.8** g CO_2 / (t * kilometre)
= **14.5** g CO_2 / (t * nautical mile)

2nd EEOI = **64.1** g CO_2 / (TEU * kilometre)
= **118.6** g CO_2 / (TEU * nautical mile)

This value is valid for one year and expires on **08.01.2018.**

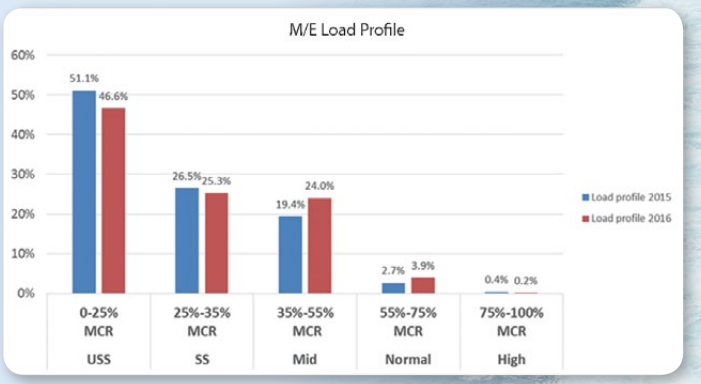
Hamburg **09.01.2017**

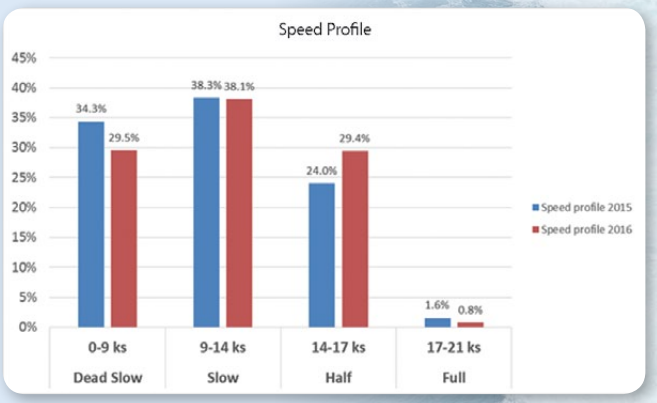
DNV GL

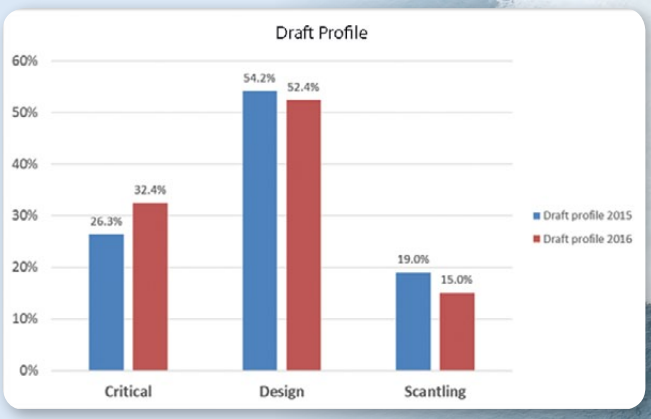
Claas Rostock Dr. Jörg Lampe

	2008	2009	2010	2011	2012	2013	2014	2015	2016
Elbe	24.70	25.30	38.40	33.10	22.60				
Komodo	25.00	29.00	54.10	41.60	21.60				
Deva	34.10	37.90	31.80	26.60	27.10	25.60	23.50	19.60	
Derby D	40.10	40.20	29.10	27.40	25.20	22.70	21.50	19.60	
Europe	26.80	22.70	17.50	15.40	17.40	19.10	19.30	13.70	18.00
CSCL America	22.00	22.40	18.80	19.90	17.90	18.60	17.10	14.80	16.40
YM Vancouver					23.80	22.30	23.90	20.80	
Hyundai Vladivostok	33.90	51.90	27.90	29.20	34.60	30.80	19.10	20.70	
Hyundai Advance	29.30	34.10	28.00	26.60	24.60	23.40	20.00	20.90	
Commodore						21.90			
Federal						17.70	20.70		
Hyundai Advance	29.30	34.10	28.00	26.60	24.60	23.40	20.00	20.90	
Hyundai Future							18.90	20.90	
Hyundai Bridge							18.10	20.90	
Hyundai Highway							18.00	20.10	26.00
Hyundai Progress							18.30	19.90	
Hyundai Sprinter							20.50	30.10	
Hyundai Stride							21.30	30.50	
Hyundai Ambition							9.60	10.20	10.00
Hyundai Smart							9.70	10.50	10.00
Hyundai Speed							10.00	10.30	10.80
Hyundai Together							9.90	10.60	11.10
Hyundai Tenacity							11.50	11.30	11.50
CMA CGM Tancredi									14.50
CMA CGM Attila									15.70
CMA CGM Bianca									15.80
CMA CGM Melisande									14.40
CMA CGM Moliere									16.30
CMA CGM Nerval									15.80
CMA CGM Rabelais									14.60
CMA CGM Racine									17.50
Express Rome									12.20
Express Athens									12.40
Express Berlin								13.70	13.60
Express Black Sea								24.70	23.80

OUR FLEET'S **OPERATIONAL PROFILE** (2016 VS 2015)







The above figures indicate that the super slow steaming activity has slightly been reduced within 2016, which is justified by the increased average speed profile and percentage of operation within the critical draft area.

DANAOS' **ENERGY EFFICIENCY** INDEX

Danaos has designed energy management algorithms which are incorporated in our WAVES analytics platform in order to achieve a close monitoring of its vessels' energy performance.

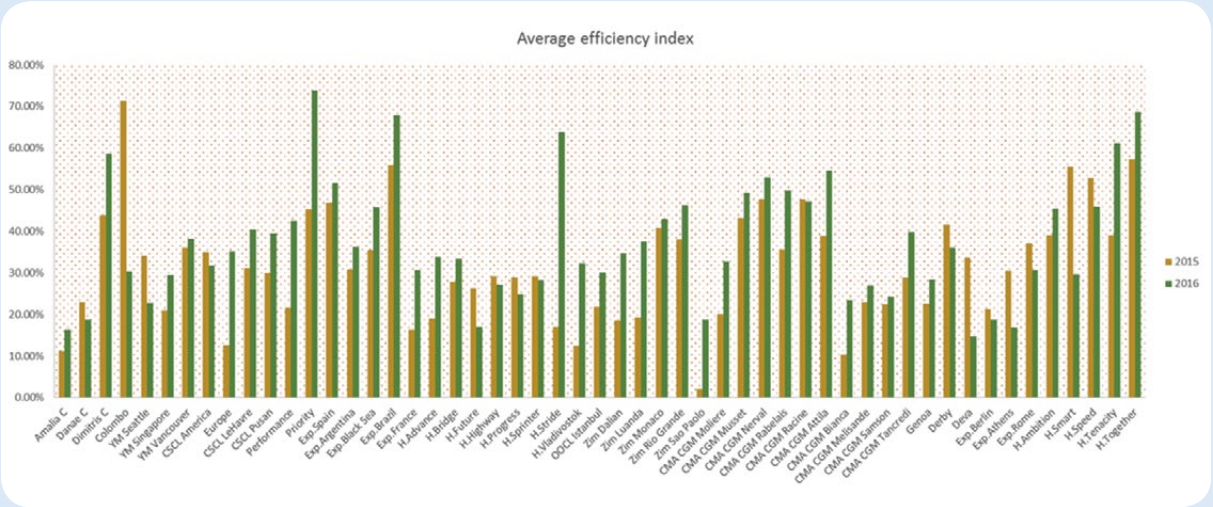
The online data acquisition of power consumption of reefer containers that are currently available for 20 vessels, enables us to calculate the vessels' actual power efficiency through actual reefers load, via WAVES algorithms. In that way, energy performance can be monitored in order to ensure optimum energy use onboard and minimize energy loss. A lot of focus has been placed on our engineers' training and information sharing, in order to eventually build a strong energy culture both onboard and ashore. The energy efficiency practices and measures are becoming a part of our crew members' habits.

Danaos has a Ship Energy Efficiency Management Plan (SEEMP) in place since 2012, whose main objective is to provide practices and metrics to evaluate and improve efficiency and decrease fuel consumption. Danaos has also been certified with ISO 50001 by DNV-GL.

The boundaries set were at the first phase of implementation at the Danaos Branch Office in Piraeus and on three vessels of the Danaos fleet. We underline our commitment to practice due diligence for the sustainable development of the environment and community. DAS has adopted the ISO 50001 Environmental Management System, in an effort to improve management processes, practices, and procedures that control the Company's functions and activities with significant energy use, with the intent to eventually achieve an improved energy performance.

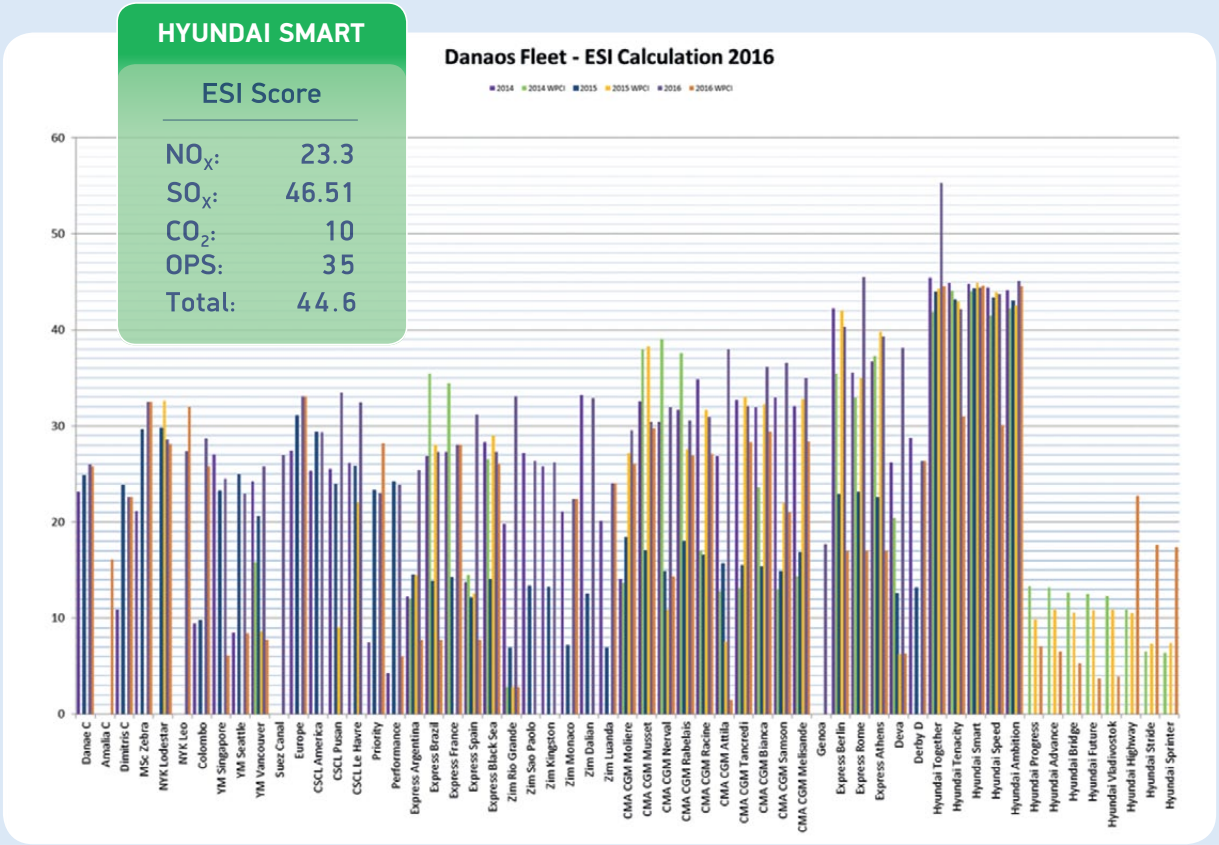
The SEEMP implementation and the ISO 50001 certification (where adopted), are stimulating more energy efficient operational practices and development of means and metrics to evaluate them and assess their actual impact.

The efficiency index, designed by R&D, contains the metrics of quantifying the implementation of energy efficient measures and instructed practices onboard, as well as the metrics for assessing the embedding of energy awareness of Danaos' personnel onboard. The indicator in question is considered as the barometer of the company's' policy assimilation and provides a good assessment tool for identifying areas offered for further improvement. For the years 2015 and 2016, the average energy efficiency index, as calculated through Waves, for all company vessels, is apposed here below.



Danaos was enrolled on a voluntary basis in the Environmental Ship Index (ESI) system which is developed by the World Port Climate Initiative (WPCI) (http://www.wpci.nl).

So far, 39 of our vessels have been officially enrolled on the WPCI ESI data base, either by our charterers or directly by us. However, ESI has been calculated for all our Fleet vessels built after 2000 (having a NO_x technical file) as it is considered as an extra tool for evaluating our vessel's environmental performance and an instrument for contributing to our clients' sustainability policy. Below you can find the relevant graph:



The Danaos fleet ESI score as viewed on the WPCI website and Danaos' calculations for the years 2014-2016

This project is a voluntary system designed to improve the environmental performance of sea going vessels and an instrument to visualize the environmental performance of ships regarding air pollutants and CO_2. It takes the NO_x and SO_x emissions directly into account and rewards documentation and management of energy efficiency, like EEOI and AMP installations.

PM is indirectly included because of its strong relationship to SO_x. Vessels with ESI indexes above a certain score (varying from port to port) are eligible to be granted as a reward with a discount at port dues in more than 20 major ports worldwide. Vessels calling ECA areas therefore burning MGO or 0.1% LSHFO are highly rewarded, gaining high scores. Contrary to the above, the

ENVIRONMENTAL SHIP INDEX (ESI)

vessels calling non-ECA areas, are not likely to achieve a high score.

The differences observed in some cases between Danaos' calculated ESI values and the ones in the WPCI web site, are owed to the different period that the calculation takes place. The yellow marked ESI refer to the 39 vessels subscribed in the WPCI and their score is according to the WPCI web site and depending on the vessel, are valid for the period mentioned in the table below.

The ESI scores calculated for a total of 48 vessels (equipped with a NO_x technical file) have been calculated by the Danaos R&D department based on the data available for the corresponding years (from 1/1-31/12) and are depicted in the graph above.

Hyundai Smart has an ESI score of 44.6 which is the highest among Danaos' registered vessels according to WPCI's website.

39 of our vessels have been officially enrolled on the Environmental Ship Index data base

ESI							
2014	Score Validity		2015	Score Validity		2016	Score Validity
YM Vancouver	01/10/2014 - 31/03/2015	1	YM Vancouver	01/04/2016 - 30/09/2016	1	Hyundai Smart	01/01/2017 - 30/06/2017
CSCL Europe	01/01/2015 - 30/06/2015	2	Deva	01/04/2016 - 30/09/2016	2	Hyundai Speed	01/01/2017 - 30/06/2017
Deva	01/10/2014 - 31/03/2015	3	Hanjin Germany	01/01/2016 - 30/06/2016	3	Hyundai Ambition	01/01/2017 - 30/06/2017
Derby D	01/01/2015 - 30/06/2015	4	Hanjin Italy	01/01/2016 - 30/06/2016	4	Hyundai Together	01/01/2017 - 30/06/2017
Hanjin Germany	01/01/2015 - 30/06/2015	5	Hanjin Greece	01/01/2016 - 30/06/2016	5	Hyundai Tenacity	01/01/2017 - 30/06/2017
Hanjin Italy	01/01/2015 - 30/06/2015	6	Hyundai Together	01/01/2016 - 30/06/2016	6	Hyundai Progress	01/10/2016 - 31/03/2017
Hanjin Greece	01/01/2015 - 30/06/2015	7	Hyundai Tenacity	01/01/2016 - 30/06/2016	7	Hyundai Advance	01/10/2016 - 31/03/2017
Hyundai Together	01/01/2015 - 30/06/2015	8	Hyundai Smart	01/01/2016 - 30/06/2016	8	Hyundai Bridge	01/10/2016 - 31/03/2017
Hyundai Tenacity	01/01/2015 - 30/06/2015	9	Hyundai Speed	01/01/2016 - 30/06/2016	9	Hyundai Future	01/10/2016 - 31/03/2017
Hyundai Smart	01/01/2015 - 30/06/2015	10	Hyundai Ambition	01/01/2016 - 30/06/2016	10	Hyundai Vladivostok	01/10/2016 - 31/03/2017
Hyundai Speed	01/01/2015 - 30/06/2015	11	Hanjin Buenos Aires	01/01/2016 - 30/06/2016	11	Hyundai Highway	01/10/2016 - 31/03/2017
Hyundai Ambition	01/01/2015 - 30/06/2015	12	Hanjin Santos	01/01/2016 - 30/06/2016	12	Hyundai Stride	01/10/2016 - 31/03/2017
Hanjin Buenos Aires	01/01/2015 - 30/06/2015	13	Hanjin Constantza	01/04/2016 - 30/09/2016	13	Hyundai Sprinter	01/10/2016 - 31/03/2017
Hanjin Santos	01/01/2015 - 30/06/2015	14	Hanjin Algeciras	01/01/2016 - 30/06/2016	14	Express Spain	01/01/2017 - 30/06/2017
Hanjin Versailles	01/01/2015 - 30/06/2015	15	Zim Rio Grande	01/04/2016 - 30/09/2016	15	Express Argentina	01/01/2017 - 30/06/2017
Hanjin Constantza	01/01/2015 - 30/06/2015	16	CMA CGM Attila	01/01/2016 - 30/06/2016	16	Express Brazil	01/01/2017 - 30/06/2017
Hanjin Algeciras	01/01/2015 - 30/06/2015	17	CMA CGM Tancredi	01/01/2016 - 30/06/2016	17	Express Athens	01/01/2017 - 30/06/2017
Zim Rio Grande	01/10/2014 - 31/03/2015	18	CMA CGM Bianca	01/01/2016 - 30/06/2016	18	Express Berlin	01/01/2017 - 30/06/2017
Zim Monaco	01/10/2014 - 31/03/2015	19	CMA CGM Samson	01/01/2016 - 30/06/2016	19	Express Rome	01/01/2017 - 30/06/2017
Zim Luanda	01/10/2014 - 31/03/2015	20	CMA CGM Melisande	01/01/2016 - 30/06/2016	20	CMA CGM Attila	01/01/2017 - 30/06/2017
CMA CGM Attila	01/01/2015 - 30/06/2015	21	Hyundai Progress	01/04/2016 - 30/09/2016	21	CMA CGM Bianca	01/01/2017 - 30/06/2017
CMA CGM Tancredi	01/01/2015 - 30/06/2015	22	Hyundai Advance	01/04/2016 - 30/09/2016	22	CMA CGM Samson	01/01/2017 - 30/06/2017
CMA CGM Bianca	01/01/2015 - 30/06/2015	23	Hyundai Bridge	01/04/2016 - 30/09/2016	23	CMA CGM Tancredi	01/01/2017 - 30/06/2017
CMA CGM Samson	01/01/2015 - 30/06/2015	24	Hyundai Future	01/04/2016 - 30/09/2016	24	CMA CGM Melisande	01/01/2017 - 30/06/2017
CMA CGM Melisande	01/01/2015 - 30/06/2015	25	Hyundai Vladivostok	01/04/2016 - 30/09/2016	25	CMA CGM Moliere	01/10/2016 - 31/03/2017
Hyundai Progress	01/10/2014 - 31/03/2015	26	Hyundai Highway	01/04/2016 - 30/09/2016	26	CMA CGM Musset	01/10/2016 - 31/03/2017
Hyundai Advance	01/10/2014 - 31/03/2015	27	Hyundai Stride	01/04/2016 - 30/09/2016	27	CMA CGM Nerval	01/10/2016 - 31/03/2017
Hyundai Bridge	01/10/2014 - 31/03/2015	28	Hyundai Sprinter	01/04/2016 - 30/09/2016	28	CMA CGM Rabelais	01/10/2016 - 31/03/2017
Hyundai Future	01/10/2014 - 31/03/2015	29	CMA CGM Moliere	01/04/2016 - 30/09/2016	29	CMA CGM Racine	01/10/2016 - 31/03/2017
Hyundai Vladivostok	01/10/2014 - 31/03/2015	30	CMA CGM Musset	01/04/2016 - 30/09/2016	30	Danae C	01/10/2016 - 31/03/2017
Hyundai Highway	01/10/2014 - 31/03/2015	31	CMA CGM Nerval	01/04/2016 - 30/09/2016	31	NYK Lodestar	01/10/2016 - 31/03/2017
Hyundai Stride	01/10/2014 - 31/03/2015	32	CMA CGM Rabelais	01/04/2016 - 30/09/2016	32	NYK Leo	01/10/2016 - 31/03/2017
Hyundai Sprinter	01/10/2014 - 31/03/2015	33	CMA CGM Racine	01/04/2016 - 30/09/2016	33	YM Vancouver	01/10/2016 - 31/03/2017
CMA CGM Moliere	01/10/2014 - 31/03/2015	34	NYK Lodestar	01/04/2016 - 30/09/2016	34	Priority	01/10/2016 - 31/03/2017
CMA CGM Musset	01/10/2014 - 31/03/2015	35	CSCL Le Havre	01/01/2016 - 30/06/2016	35	Performance	01/10/2016 - 31/03/2017
CMA CGM Nerval	01/10/2014 - 31/03/2015	36	CSCL Pusan	01/01/2016 - 30/06/2016	36	Zim Luanda	01/10/2016 - 31/03/2017
CMA CGM Rabelais	01/10/2014 - 31/03/2015				37	Zim Monaco	01/10/2016 - 31/03/2017
CMA CGM Racine	01/10/2014 - 31/03/2015				38	Zim Rio Grande	01/10/2016 - 31/03/2017
					39	Europe	01/01/2017 - 30/06/2017


EEDI values for Danaos vessels
Required EEDI (Phase 0: 1/1/2013 ~ 31/12/2014)
Required EEDI (Phase 1: 1/1/2015 ~ 31/12/2019)
Required EEDI (Phase 2: 1/1/2020 ~ 31/12/2024)
Required EEDI (Phase 3: 1/1/2025 ~ end of time)
Attained EEDI (Old vessels before 2000)
Attained EEDI (NBs after 2000)
Federal
Zebra
Amalia C
Genoa
Suez Canal
HJN 3400
SHI 4250 (Zims)
Priority
Danae C
SHI 4250 (Seattle)
Dimitris C
6500 Lodestar
Derby D.
Colombo/Spore
S4001s
JGN 8500
Bareboats 6500
SHI 8100
SHI 9200
HSHI 10100
HSHI 13100
EEDI
DWT (tons)
30
28
26
24
22
20
18
16
14
12
10
10,000
20,000
30,000
40,000
50,000
60,000
70,000
80,000
90,000
100,000
110,000
120,000
130,000
140,000
150,000
160,000

ENERGY EFFICIENCY **DESIGN INDEX** (EEDI)

Developed by the IMO as per MEPC.1 Circ.681, the EEDI is a tool for rating new building ships in order to stimulate innovation and technical development of all elements influencing the energy efficiency of a ship from its design phase.

Although the EEDI refers only to the new buildings, the EEDI has been calculated for all our existing vessels as a tool to estimate their design efficiency.

EEDI values for all Danaos vessels and relevant limits for the different phases are shown in the diagram below, which includes the newly acquired vessels in the Danaos fleet.

2016

annual **environmental** report

DANAOS SHIPPING CO. LTD

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