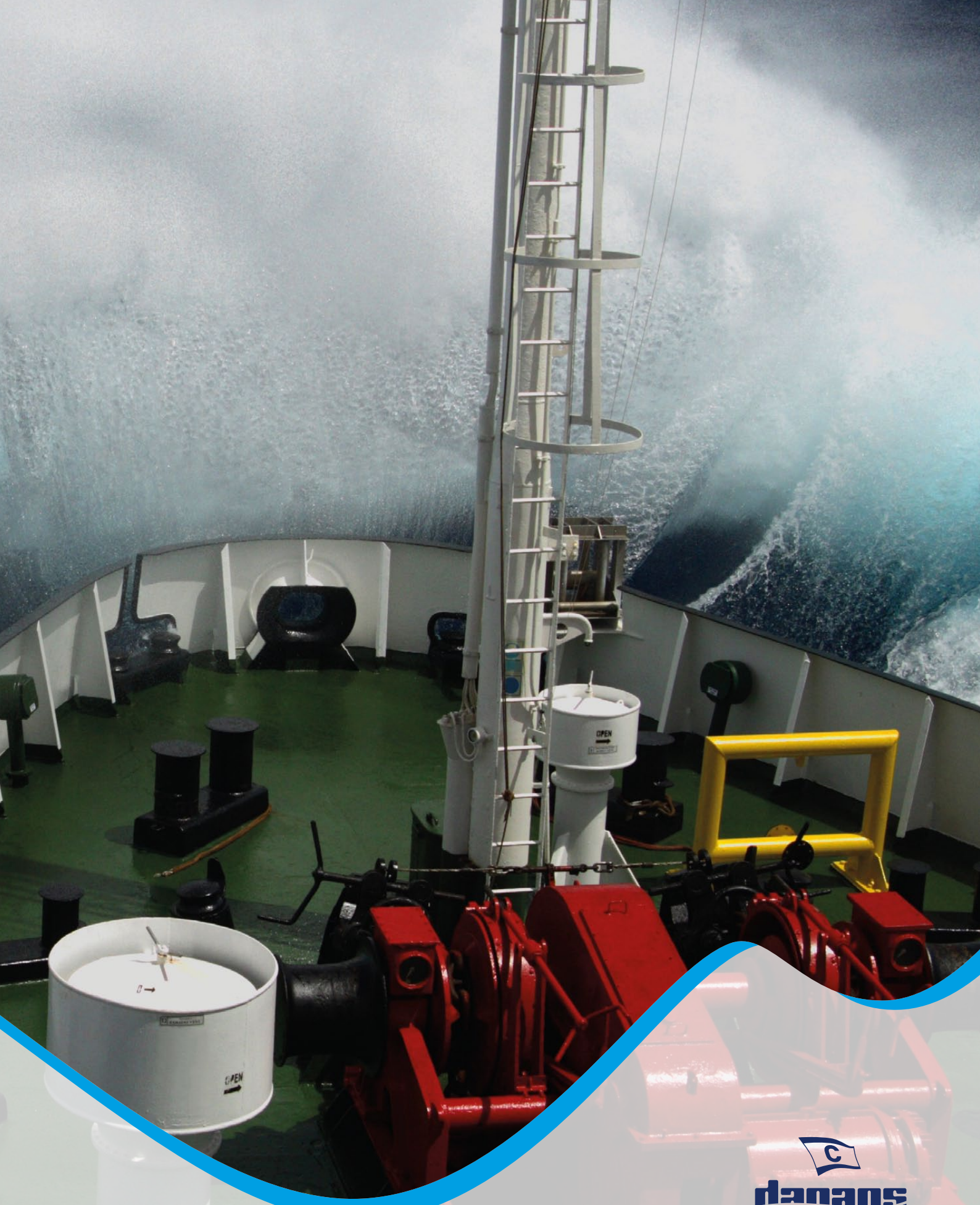
danaos

2015

annual **environmental** report

www.danaosshipping.gr



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Dear Fellow Stakeholders,

The dynamic maritime environment is constantly evolving, requiring fast, modern and innovative solutions to effectively address key areas of fuel and operational efficiency and improved environmental performance.

The important role that the adaptation of technological solutions has played in Danaos' development, can easily be detected in its advanced integrated systems, developed for budget control, the remote monitoring of vessels' performance and operational parameters, big data processing, mobile supervision and troubleshooting, emissions control and monitoring.

Among the benefits that our clients enjoy, resulting from Danaos' adoption of technology and innovation in its strategic planning and management practices, are exceptional KPIs acting as testimony of Danaos vessels optimum performance and utilization, high crew retention rates, close control and prompt response, as well as a high environmental and safety commitment.

During the previous year, we focused on the development of a smart analytic platform through which the fleet's efficient control and monitoring is ensured in a holistic way, covering all vessels' operations related aspects. In the optimisation field, a series of options were studied in order to improve Danaos' 8,500 TEU CSCL Europe/America competitiveness in the market. The retrofit package that was finally decided upon, includes bulbous bow optimisation along with propeller retrofit and engine derating.

2016 is a consolidation period for our systems' operation and a period during which the aforementioned upgrades shall be implemented.

Respectfully

Mr. Dimitris Vastarouchas
Deputy Chief Operating Officer
and Technical Director


idea

At Danaos, we stay ahead of technology shifts by embracing research. This way we can better serve our customers.

In R&D we always strive to be in the forefront of innovation, developing our knowledge and competencies to address the following Danaos key priority areas:

1. Close control and optimum performance monitoring of the vessels in respect to hull and engine performance
2. Study and safe implementation of retrofits related to compliance with regulatory requirements,
3. Development of technical proposals and tools to optimise vessels' performance
4. Environmental awareness and improvement in energy efficiency through the design and implementation of energy management systems and plans
5. Continuous monitoring of emerging technology developments and trends and assessment of their impact
6. Prompt response through Danaos advanced control, monitoring and diagnosis systems

The main pillars of our strategy, when it comes to project planning and execution, are defined by company needs, market trends, future demands and regulatory framework.

Our objective, as high quality & cost effective tonnage providers, is inherent in our customers' sustainability strategy.

Thus, in R&D, we develop and customize our tools to effectively address their needs.

Evi Politi
R&D Manager

59
CONTAINER SHIPS

99%
FLEET UTILIZATION IN 2015

2,200 TEU TO 13,100 TEU

DANAOS SHIPPING CO. LTD

GENERAL

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

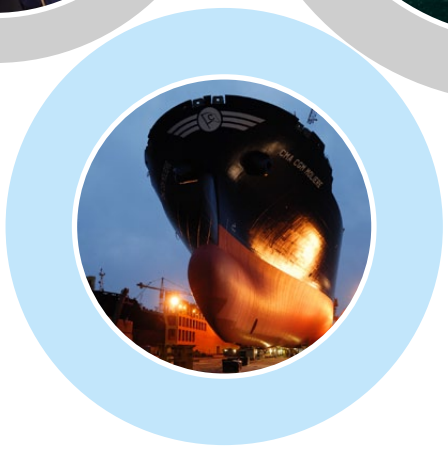
DAC is a leading international owner of container ships, whose strategy is to charter containerships under multi-year, fixed-rate period charters to a diverse group of liner companies, including many of the largest companies globally, as measured by TEU capacity. As of February 29, 2016, these customers included China Shipping, CMA-CGM, Hanjin, Hyundai Merchant Marine, Niledutch, MSC, Yang Ming, ZIM Israel Integrated Shipping Services, Nippon Yusen Kaisha Line (NYK), Hapag Lloyd and Maersk Line.

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).

FLEET DEVELOPMENT

The fleet that DAS manages boasts modern, high-quality vessels many of which have been built in the last 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. In 2015, DAS took over the Management of the Genoa, NYK Leo, NYK Lodestar and Suez Canal.

During 2015, our fleet utilization increased to 99.0% compared to 97.5% in 2014.

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 participate and head 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

Our R&D department falls under the Technical Dept. 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 competences 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 optimisation, PIDs, engine tuning for SFOC improvement, advanced painting schemes application, container stowage optimisation, 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 NOx reduction, SOx 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. DAS was among the pioneers to study the container eco-design of the future, back in 2011, in two JIPs with two major shipyards and classification societies. Other cooperation with industry partners include the development of the Hypercube platform with Propulsion Analytics for M/E performance assessment, the execution of a feasibility study related to WHR sustainability using DNVGL COSSMOS framework, and many others.

- 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 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. This aggregates and analyses 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).

2015 REVIEW

In 2015 focus has been placed in below key areas:

1 Study of technical upgrades aiming at boosting fuel efficiency onboard Danaos 8500 TEU vessels. In the above context, bulbous bow redesign to match vessels' current operating profile together with propeller replacement and installation of propeller boss cap fins (PBCF) have been studied and tested in model tests in order to verify performance and validate calculated fuel efficiency gains. The above upgrades are to be applied during vessels' upcoming drydocks.

2 Enhancement of Danaos existing control, monitoring and diagnosis tools through the development of a business intelligence and analytics platform aggregating and analyzing almost, real time received data, through the on-line data acquisition and process system and processing same with the use of built-in algorithms designed by R&D condensing Danaos' know-how and technical expertise.

3 Energy management algorithms design and their incorporation in Danaos' analytics platform for efficient and close monitoring of vessels' energy performance. Focus has been placed on implementing 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.

INTEGRATING SUSTAINABILITY IN OUR BUSINESS PROCESSES IS PART OF OUR COMMITMENT TO PROVIDE HIGH QUALITY SERVICES TO OUR CUSTOMERS

SHIPPING **INDUSTRY**

The Maritime transport system can be viewed as a complex stochastic system based on interaction and management of its subsystems - ships, ports and cargoes. The ship is the key element in this chain.

The negative indicators seen at the end of 2014 were not overcome and we saw a significantly lower level of growth for global GDP in 2015 than in the previous five years. This was primarily due to the struggling emerging markets and developing economies, led by changes in China's economic focus. Towards the end of 2015, idled container ship capacity reached a high not seen since 2010 at over 1 million TEU, as ships of all sizes were swiftly removed from over-supplied trade lanes. But it did not prove to be enough to counter the drop in demand and subsequent revenue erosion.

As per official shipping consultant reports, it is expected that further widening of the supply-demand imbalance combined with overcapacity, will continue to challenge the shipping industry in 2016. Weaker demand growth is assumed to increase overcapacity, the key factor that will probably stall the shipping sector's recovery prospects and put pressure on freight rates.

Factors that influence demand for containership capacity include among others:

- Supply and demand for products suitable for shipping in containers;
- Changes in global production of products transported by containerships;
- The distance that container cargo products are to be moved by sea;
- The globalization of manufacturing;
- Global and regional economic and political conditions;
- Developments in international trade;
- Changes in seaborne and other transportation patterns, including changes in the distances over which containerized cargoes are transported and steaming speed of vessels;
- Environmental and other regulatory developments, and
- Currency exchange rates

The current global economic weakness and the impact on consumer confidence and consumer spending may continue to result in a decrease in containerized shipping volume and adversely affect charter rates.

The Maritime transport system can be viewed as a complex stochastic system based on interaction and management of its subsystems - ships, ports and cargoes. The ship is the key element in this chain. Shipping companies will have to continue their efforts on improving their fuel efficiency and cost-containment policies. All involved stakeholders need to work together across the maritime industry in order to develop a clear, agreed framework improving efficiency,

cost-effectiveness and sustainability across the whole supply chain.

The increased focus on global and local environmental issues on the other hand, has led to an upsurge in both international and national regulations. Some are ready and will be entering into force in the near future, while others are still under development and will have an impact only in the intermediate term. Uncertainties notwithstanding, the international regulatory deadlines are clear and the key strategic decisions need to be made. The only certainty is that all solutions will require for significant investments that will further squeeze the already frustrated market.

The key issues with significant regulatory impact are, broadly speaking, sulfur oxides (SOx), nitrous oxides (NOx), particles (PM), greenhouse gases (in particular CO2) and ballast water management. For newbuildings from 2016 onwards and operating in an ECA, the NOx requirements add another layer of complexity due to possible technical integration issues between SOx and NOx solutions. Finally, in 2020 or 2025 (pending an IMO decision in 2018) the 0.5 percent sulphur global cap will enter into force, changing the economics of the decisions made in the preceding years.

Regarding ballast water treatment systems, the inherent technological uncertainty and the limited operational experience of these systems in combination with the fact that IMO convention has not been ratified yet, although ratification seems close enough, and the regulatory uncertainty in the US 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.

Meanwhile, the SEEMP implementation, the ISO 50001 certification where adopted, are stimulating more energy efficient operational practices and development of means and metrics to evaluate same and assess their actual impact. Moreover, the upcoming MRV regulation that aims to quantify and reduce CO2 emissions from shipping, requiring from ship owners and operators to establish a system to monitor, report and verify CO2 emissions on an annual basis, further underline the emphasis placed on enhancing existing monitoring tools and establishing reliable procedures to evaluate and verify the effectiveness of energy efficient practices and policies.

This report is intended to provide our stakeholders with an overview on Danaos' environmental performance and initiatives/actions taken towards improving our fleet's performance from a purely technical point of view. This data has been carefully integrated into this report in a transparent, accurate, and reliable manner.

DANAOS **APPROACH**

In an ever-changing environment, we focused on operational excellence by investing in technology, and that has had a tremendous impact on the way we conduct our business. To be the best at how we operate our fleet, we're investigating and investing non-stop in technology and R&D. Much of this work capitalizes on our firm organizational structure and established procedures for fleet operations and technical monitoring that allow us to keep our competitive advantage and strengthen our leadership position.

Of course the above would not be sustainable if we did not focus via comprehensive training and our systems' consolidation on cultivating a modern and transparent culture both ashore and onboard, aiming at proactiveness , energy awareness, increased social and environmental responsibility.

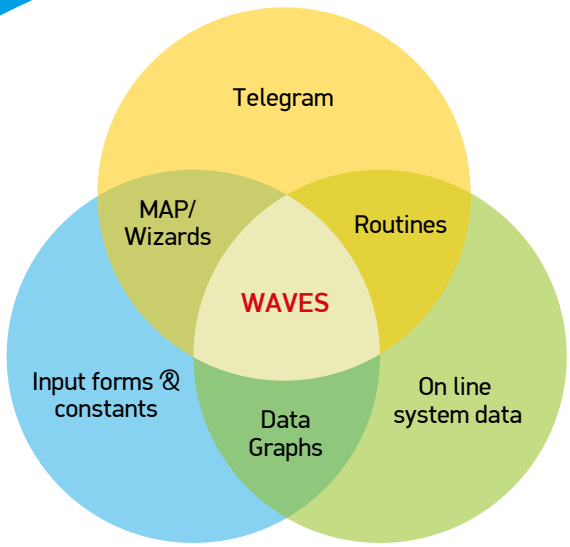
The performance improvement that goes hand in hand with increased utilization, fuel oil consumption improvement, efficient ships' operation and emissions reduction, as well as the effective control of operating expenses are two expressions of visible advantages owed to the adoption of advanced technological tools in Danaos operations' management model. The optimum control of crew quality and the increase in crew retention rates achieved via a well-structured network of manning offices and long term planning is another tangible example of how the business intelligence is translated into measurable indicators of business excellence.

Among the benefits that our clients enjoy as a result of Danaos adopting technology and innovation in its strategic planning and management practices, is having a robust and reliable partner with a healthy financial status and outstanding key performance indicators, that ensures stability in operations, exceptional vessels performance with optimum efficiency and utilization, high crew retention rates, close control and prompt response and a high environmental and safety commitment.

Continuous research
is a strategic choice, to always
have updated insight on the latest
technological developments
and take advantage of them,
thus being able to better serve
our client's interests and
sustainability targets.

OUR PROJECTS

WAVES



The intensive use of data has the potential to assist companies in improving their operations and business performance and make faster, more intelligent decisions. Business intelligence is already there. Danaos goes one step further, using big data to obtain knowledge, insights and predictions with the aim to optimise its operations and strengthen its competitive advantage.

Emphasis is placed on improving well-established procedures through the upgrade of existing performance monitoring and energy efficiency assessment tools in order to keep being in the forefront of innovation, by capturing all developments in the field and effectively adapting to the evolving market needs and demands. In this respect, Danaos as a first step, has established its tools for transforming structured data into useful information for business analysis purposes.

Data from a great number of equipment/ sensors (from GPS, speed log, auto pilot, wind indicator, draft gauges, M/E and D/G flowmeters, torquemeter, temperature sensors, inclinometers, auxiliary boiler panel, reefer panels and alarm monitoring system) is collected, stored, processed and analyzed accordingly . Aggregating and analyzing a great number of almost real-time received data, has been taken to the next step by combining it with semi-structured or unstructured data in a data fusion process, under the umbrella of a uniform analytic platform to build knowledge into models, communicate the insights and make predictions.

The Danaos modern web-based platform, **WAVES**, combines different forms of data transmitted in large volumes and high velocity and processes them in the built-in algorithms, which incorporate Danaos' technical expertise and know how, in order to produce performance, efficiency and emission KPIs, automated control forms, reports, graphs, alarms and warnings.

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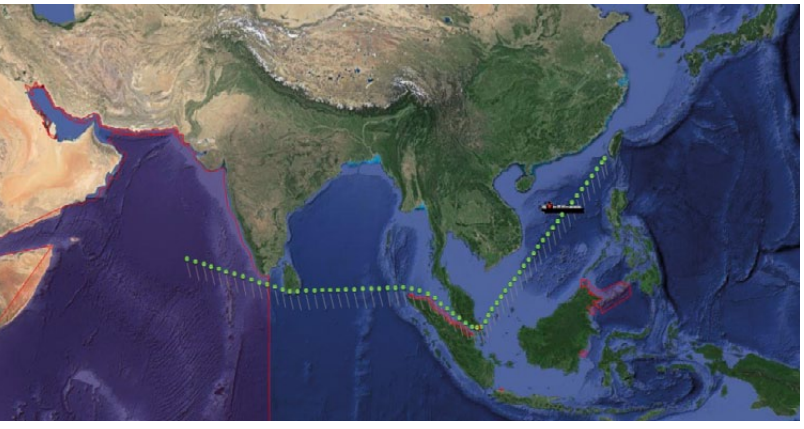
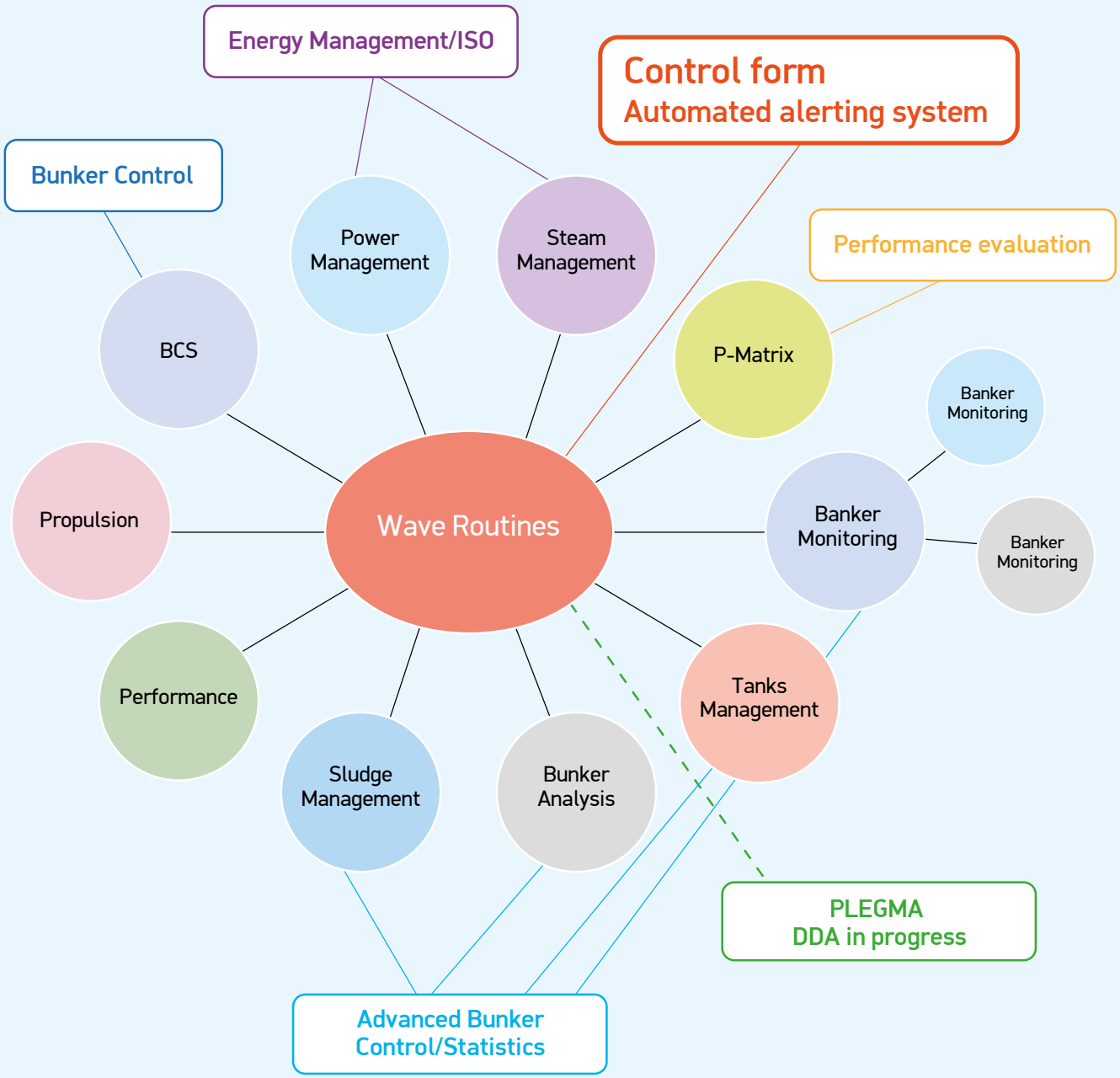
The system that combines a great variety of heterogeneous data ranging from streams of sensor data to text, log files, etc.. is designed to integrate new data sets as they become available in future. Based on its integrated knowledge, Danaos' platform exploiting developments in business intelligence, provides the possibility of advanced performance monitoring, close bunkers control, emissions monitoring, energy management, safety performance monitoring, risk management and advance superintendence.



The incorporation of these algorithms in a business intelligence and analytics platform supports the development of an enhanced performance assessment tool with inborn diagnosis functions. Some of the enhanced features of the new web application include partly automated telegram fill-in, monitoring of operational aspects, tracking/Polling, voyage parameters monitoring and plotting through voyage duration and speed control through voyage execution. The exploitation of Big Data by applying advanced predictive analytic techniques for performance forecasting is the next step, which is currently under way. The new data reality has shifted the existing, already successful, modus operandi towards a more sophisticated "intelligent" operation concept, which constitutes a basic element of Danaos' business excellence model.

WAVES


Energy Management/ISO
Control form
Automated alerting system
Bunker Control
Power Management
Steam Management
Performance evaluation
BCS
P-Matrix
Banker Monitoring
Propulsion
Wave Routines
Banker Monitoring
Banker Monitoring
Performance
Tanks Management
Sludge Management
Bunker Analysis
PLEGMA
DDA in progress
Advanced Bunker Control/Statistics

WAVES Fleet Performance

...riding the WAVE of innovation!

DANAOS SHIPPING Co. EXPERTISE | giving context to complex sets of information

Workflow Management

Operator-defined workflows for timely and effective response to rising events!

e.g. An alarm is fired
- what actions must take place
- who - from the crew - should be involved
- actions logging and system's feed forwarding

Routines

Data Analytics / Algorithmic Analysis (operator-defined) of Fused Data

HINDSIGHT: 'reflect and learn from past data'
- statistical processing of past observations (trend analysis, ...)
- detection of hidden correlations among seemingly un-related data

→ **Deep Knowledge on various aspects of vessels' lifecycle**

INSIGHT: 'interpret data and respond efficiently to the present'
- KPIs real-time monitoring (operational efficiency, safety performance,...)
- vessel's benchmarking against:
  - theoretical curves
  - specifications, tests and trials
  - sister and competitors vessels
- timely anomaly detection / alerting
  - abnormal behavior
  - deviation from predefined thresholds

Routines...
- BCS, pMatrix, Power Mgmt, Steam Mgmt, DDA...
- Tanks Mgmt, Bunker Analysis, Bunker Surveys, Bunkering Monitoring...
- Performance, Propulsion, Emmisions...

FORESIGHT: 'predict and get ready for the future'
- what-if scenarios (forecasting based on current observations)
  - e.g. condition-based maintenance
- risk assesment (technical / economical / environmental / ...)

Reflect on the past, respond to the present and prepare for the future!
- technical efficiency
- economical efficiency
- environmental protection

Data Visualization Layer

Situation-aware data representation in pictorial and/or graphical format

Dashboards | Wizards | MAPs | Plots → **easily conceivable media**
specialy designed - adopted to shipping industry

Quickly grasp the big picture over large volumes of data
- make observations
- uncover hidden patterns in the underlying data
- gain knowledge

→ Strengthen Decision Making!

Data Integration Layer

Machine-accessible low-level data

OPERATOR-DEFINED DATA COMBINATION

Change level of abstraction from data to meaningful info.

Higher-level abstractions suitable for DECISION MAKING

e.g. M/E Fuel Consumption
- flow meter [LAROS]
- Tank In Use [TELEGRAMS]
- fuel density [LAB ANALYSIS]

Conceptual Representation Layer

Transparent manipulation of data provided by heterogeneous sources

Data Conceptual Representation
- hide semantic heterogeneity of multi-source data using ontologies

e.g. Wind Speed
- Vessel A: from TELEGRAM
- Vessel B: from LAROS computed from TrueWindSpeed

Data Uniformity
- auto unit conversion of data pooled from different locales to single measures

e.g. M/E Power
- Vessel A: from LAROS in kW
- Vessel B: from MARORKA in BHP

Data Quality Layer

Incorrect Data → Misleading Conclusions

Corrupted/inaccurate piecies of data are filtered out
- validation against...
  - range constraints (negative power values, ...)
  - mandatory constraints (null values, ...)
  - set-membership constraints

→ Data Integrity: accuracy, validity, consistency

Data Access Layer (enormously large volumes of data)

Semi-Structured Data (typical organizational structure, although not so strict and formal)

MS, PDF, Cloud

Fuel Analysis Forms (sulphur, density...)
Port calls / Formalities
Int'l Safety Mgmt Forms...

Sensory Data Acquisition Systems

Online Sensor Data Streams
LAROS, MARORKA, KONGSBERG...
(Power, RPM, Flow Meter, FO TEMP.)

Structured Data (strictly formated - known meaning & relations)

Operational Data: Telegrams...
HR Data: Crewing...
Financial Data: Costs, supplies...

Unstructured Data

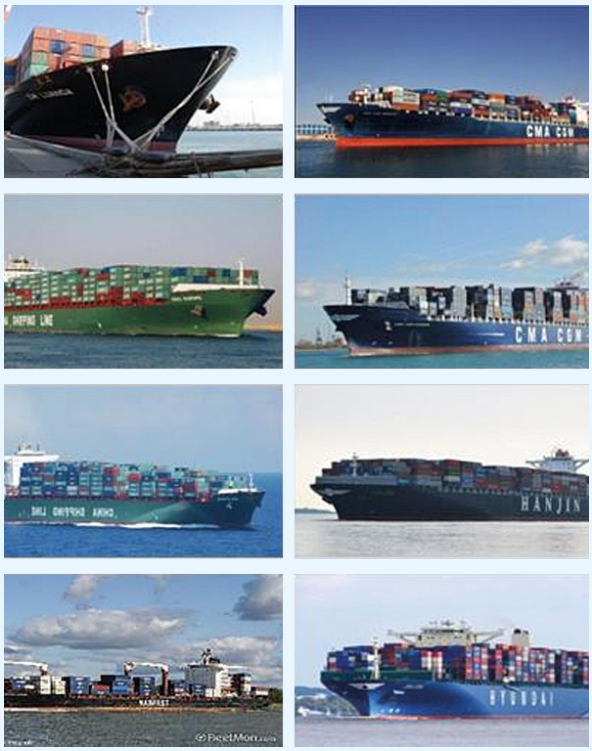
Logs, Reports...

ON-LINE DATA **ACQUISITION SYSTEM** UPDATE

VESSELS ENROLLED DURING 2015

Within 2015, Laros "On line" system has been installed on another 2 vessels, while installation onboard NYK Leo was accomplished within Q1 of 2016, increasing the total number of vessels equipped with "On line" system to 27.

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
Hanjin 10100s	3 x 10,100 TEU
Hyundai 13100s	5 x 13,100 TEU
MSC Zebra	2,500 TEU
Priority	6,400 TEU
NYK Lodestar/ NYK Leo	2x 6,200 TEU



The on-line acquisition of average power consumption of reefer containers was obtained for the MSZ Zebra, Hanjin Germany, Hanjin Greece and NYK Lodestar, while 15 vessels are scheduled to follow within 2016. Our target is to calculate the vessels' actual power efficiency through monitoring of actual reefers load.

The above is part of our energy management plan to ensure optimum energy use onboard and minimize energy losses. Towards this end, we focus on developing the appropriate structure to support a smart analytic platform through which we ensure holistic and efficient control and monitoring of various operational parameters and energy efficiency onboard.

In addition to the above, an on-line bunkering option has been successfully implemented onboard CMA CGM Rabelais within 2015 with impressive accuracy. The plan is for the on-line bunkering feature to be applied to all 6500 TEU vessels.

DERATING
DANAOS 8500 TEU

The newbuilding eco-designs set the competitiveness of the existing designs under pressure in today's sluggish global economy, characterized by weak shipping demand and tonnage surplus in the container shipping sector.

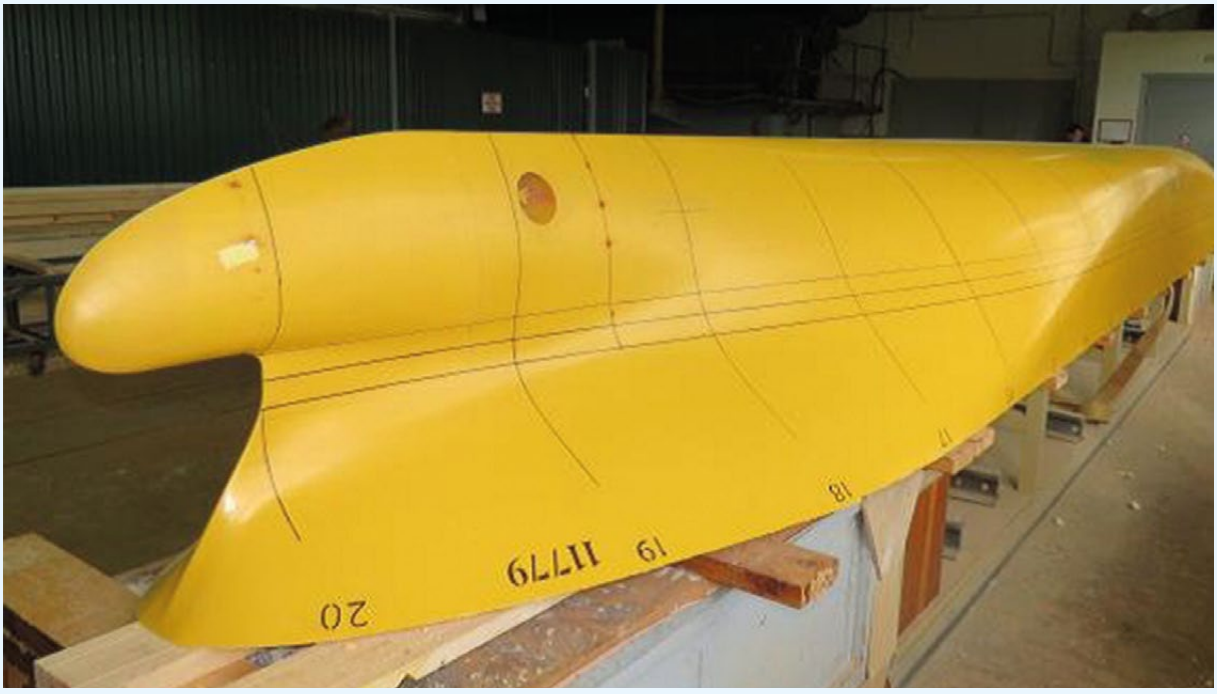
In the above market context, that exercises excessive commercial pressures on vessels built one decade ago and their charter party is close to expiration, a prudent owner should seek ways to ameliorate their competitiveness by launching comprehensive retrofit solutions addressing fuel efficiency and operational flexibility.

To this respect, Danaos through its R&D department, has studied a series of optimisation options in order to improve CSCL Europe/CSCL America commercial value in today's highly competitive industry regime.

The project researched 12 different potential solutions for optimising propulsion, using diverse technologies and in various combinations. Concurrently, Danaos ran some 35 concept studies on the optimisation of its vessels through its in-house R&D department before concluding on how to proceed.

Both container vessels are 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 will be limited to 44,000 kW at 89.7 RPM. Before the final choice of solution was made, exhaustive CFD-simulations and model tank tests were also carried out.

Bulbous bow optimisation combined with engine derating and propeller retrofit with Kappel design to address the vessel's current operational profile, have been investigated, in cooperation with HSVA, Man Diesel & Turbo and Krylov State Research Centre (KSRC) in St. Petersburg, Russia.



DERATING **DANAOS 8500 TEU**

Besides verifying the performance of the new Kappel propellers and the new bulbous bow design, a primary reason for carrying out model tests was also to ensure that the new propellers for the CSCL Europe and CSCL America would have the correct light running margin (LRM).

The bulbous bow was initially designed for over 25 knots sailing speed at scantling draft. The bulbous bow was redesigned to improve the ship's wave resistance and hydrodynamic efficiency at around 18 knots at design draft and at a lighter draft. The modification of the hull lines was examined in front of the collision bulkhead and up to on about 3rd deck height.

The replacement of the existing propeller with a new Kappel design, which is designed, strength and cavitation wise for max speed of 23 knots, at a design draft with specified sea and engine margin and optimum performance at around 18 knots, combined with PBCF, is part of the retrofit solution examined in combination with bulbous bow redesign. In the retrofit package main engine derating at the aforementioned limits and further tuning to achieve optimum SFOC have been examined.

Model tests, in order to verify performance with optimised bulbous bow and a new propeller, have been carried out in KSRC within August. The results indicate a total efficiency improvement potential exceeding 10%.

Both vessels are scheduled to undergo the retrofit work during their forthcoming drydocks.

The upgrade packages will rank the Danaos container vessels among the most competitive mid-size container vessels in the market.

DANAOS **OPTIMISATION STUDIES**

As a part of Danaos' policy, to address our clients' key areas of concern by improving our energy efficiency and operational flexibility, the design optimisation prospects of various Danaos ship designs have been studied.

The target of the above was to identify ways to improve the vessels' fuel efficiency by applying design improvements while also increase the vessels' operational flexibility.

The four main focus areas of retrofit options investigated are summarized in below points:

- Bulbous bow
- Draft increase
- Propulsion system
- Cargo flexibility
- Reefer maximization

In the above described context and in the frame of increased cargo flexibility, reefer containers maximization study has been carried out for all company vessels.

The photo on the right is from MSC Zebra, for which complete study, including power pack installation and extra reefer sockets in Cargo holds with consequent air supply provision have been studied.

BULBOUS **BOW OPTIMISATION**

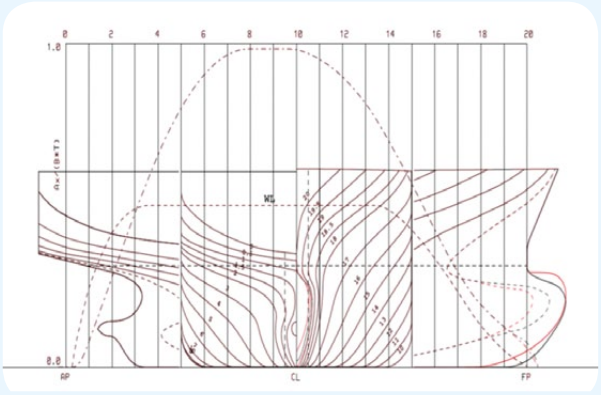
CONCEPT

Redesigning a container ship's bulbous bow for slow-steaming is a proven improvement in fuel efficiency.

By changing the bulbous bow we can neutralize the bow generated split waves, which hit the front shoulder of the ship, thus reducing the total needed power.

However, the modified bulbous bow is optimised for a design speed range – draft combination and subsequent sailing on a different profile, might result in a negative effect, compared to the original design.

The optimisation of the bulbous bow is carried out using the existing bow design as a reference.

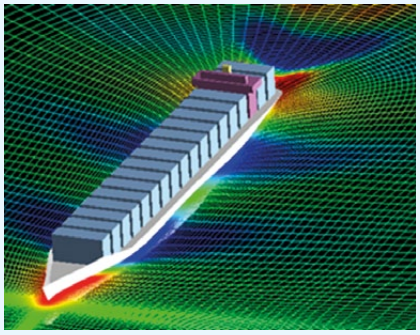


The optimisation process is performed in several steps and given the restrictions imposed by a. the limits provided for the modification and b. the smooth fairing with the rest of the hull, the optimum version giving the highest savings is then identified.

STEPS

The following steps take place during the bulbous bow optimisation study:

- Development of several new bow designs (six – seven), modification of the hull lines forward of the collision bulkhead and up to on about 2nd stringer height.



- Application of potential flow tools for the optimisation of the bow design.
- CFD analysis compared with the initial hull lines for lower speeds and draft combinations compared with design condition.

DANAOS STUDIES

Danaos, within 2013-2014, has conducted studies with Hamburg Ship Model Basin HSVA, for the following five container vessel sizes of:

- 4,650 TEU,
- 6,500 TEU,
- 8,100 TEU,
- 8,500 TEU,
- 9,200 TEU
- 10,100 TEU
- 13,100 TEU

In 2015 one more study has been accomplished in the same ship model basin for the following Danaos vessels:

- Priority-Performance 6400 TEU

SAVINGS

Weighted average power savings identified by the study, are at a maximum, in the range of 4-6%, whereas a 1-2% improvement is feasible on hulls that are deemed already highly 'optimised' in limited form variations.

ISO 50001 is a voluntary international standard, developed to provide organizations with an internationally recognized framework to manage and improve their energy performance. It specifies requirements for an organization to establish, implement, maintain and improve an energy management system, which enables that organization to take a systematic approach in order to achieve continual improvement of energy performance, including energy efficiency, energy use and consumption. It specifies requirements applicable to energy uses and consumption, including measurement, documentation and reporting, design and procurement practices for equipment, systems, processes, and personnel that contribute to energy performance. Implementation of this standard should lead to improvement of energy performance, reductions in energy cost, greenhouse gas emissions and other environmental impacts, through systematic management of energy.

As part of DAS's corporate responsibility, it is a Management commitment, to practice due diligence for the sustainable development of the environment and community. DAS shall focus on implementing 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 boundaries are at the first phase of implementation, on the Danaos Branch Office in Piraeus and the Hyundai Tenacity, Hanjin Germany and Hyundai Highway. Danaos has been certified with ISO50001 by DNV-GL.

What are the benefits of ISO 50001 for DAS?

- Increased energy awareness among staff members at all levels.
- Reduced greenhouse gas (GHG) emissions and carbon footprint.
- Increased energy cost savings for the organization and Charterers alike.
- Increased knowledge of equipment efficiencies.
- Improved operational efficiencies and maintenance practices.
- Enhanced corporate image and credibility with all stakeholders.


DNV·GL

MANAGEMENT SYSTEM CERTIFICATE

This is to certify that the management system of

Danaos Shipping Co. Ltd.

14, Akti Kondyli Street, 18545 Piraeus, Greece

and the Branch Office and vessels as mentioned in the appendix accompanying this certificate

has been found to conform to the Energy Management System standard:
ISO 50001:2011

This certificate is valid for the following scope:

Management of Container Ships.

NEW LASHING RULES

Classification societies following in-depth studies on sailing conditions in various ocean regions, have adopted a new approach to container stowage rules, to enable container lines to gain business flexibility and cost advantages through enhanced onboard stowage flexibility. The new rules consider lower acceleration values along all routes, providing thus higher loading flexibility to the operators. Moreover and within the same context they have developed standard routes to be applied with vessel-specific calculations, considering even lower acceleration values and thus providing even higher loading flexibility. Seventeen Danaos vessels are granted with corresponding class notations (WW, LC&RSCS, BoxMax or equivalent) and for another twelve vessels a relative process is in progress. By the end of current year it is expected that the number of vessels will be raised to 29.

OPERATIONAL **EXCELLENCE** BASED ON GREEN TECHNOLOGY IS DANAOS' **CORE STRENGTH**.

NEW REGULATIONS

Ballast water management is on top of the maritime agenda. The uncertainty and vagueness prevailing in the regulatory framework related to the differences between IMO G8 Guidelines and the US ETV Protocol, the approval and testing methods of ballast systems and the unavailability of USCG approved equipment at the moment, creates a big challenge for the owners that will soon be asked to proceed with big investments. At Danaos we keep up with regulatory and technological developments in the field, we have studied a large number of systems – a study that is constantly updated with the latest improvements - , in order to be well prepared to comply with the convention as soon as that enters into force.

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**

OUR **EMISSIONS**

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 the 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.

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 is 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.

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, 4%, 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:

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

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:

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

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

NOx EMISSIONS

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

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

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

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

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 NOX emission also measured in metric tons:

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

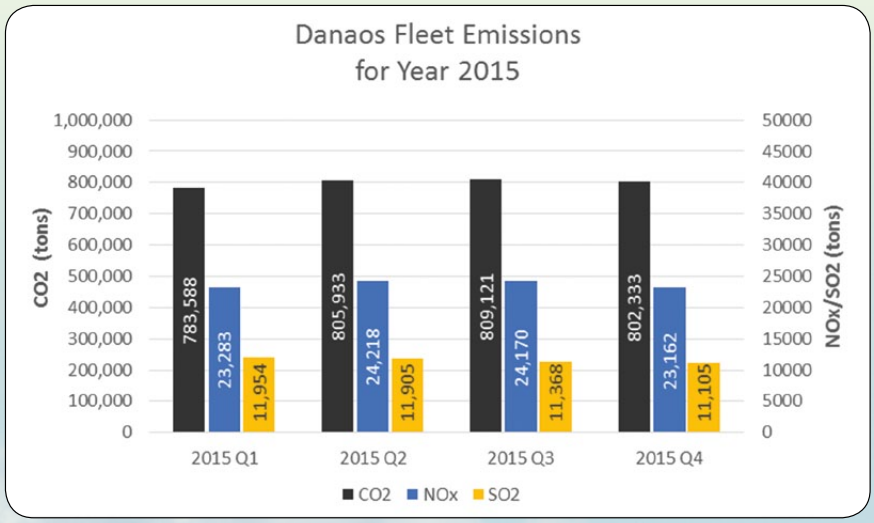
Medium speed engines: 0.07 mt per metric ton of fuel used

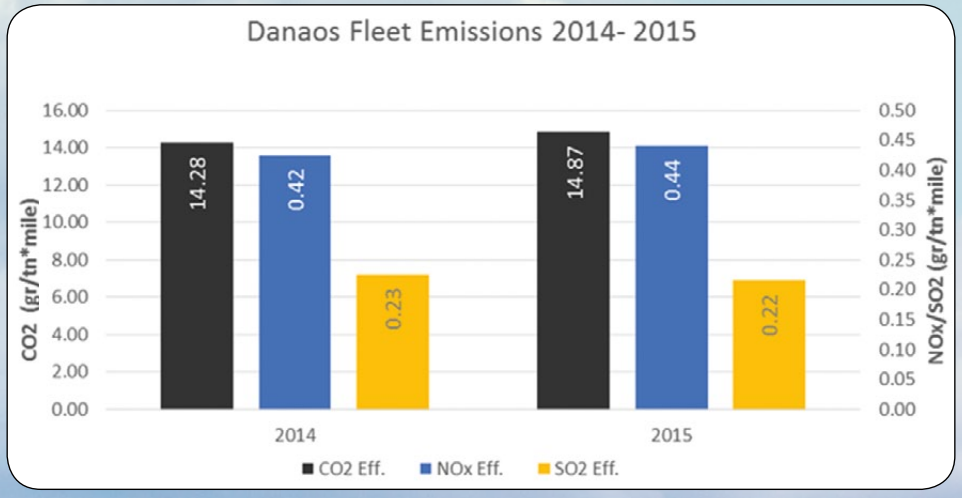
$m_{cargo,i}$, is the carried cargo mass during the voyage i and

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

OUR EMISSION **KPIs SUMMARY**

The below emissions figures and efficiency factors correspond to the total of our operating Fleet during 2015.





As it is shown in the above graph, the company's environmental footprint is slightly bigger compared to the previous, year except for the SO2.

Taking into consideration the idling periods in 2014-2015, as well as the sale of the old vessels and the acquisition of younger tonnage during these two years, the end result was 252 more sailing days for Danaos' fleet within 2015. In addition to the above, the increase in reefer containers' utilization for 2015, from 13% to almost 15%has resulted in increased consumption from the use of diesel generators.

As a result the fleet's total consumption has slightly increased, and as such, so have fleet's total emissions

UTILIZATION

**FROM 97.5% WITHIN 2014
TO 99% FOR THE YEAR 2015**

Despite the slight increase in consumption, resulting in a marginal increase of emissions, the weighted average reduction of the sulphur percentage in the bunkered fuels for 2015 resulted in a considerable reduction of S02 emissions.

CO2 production [MT]
+1%

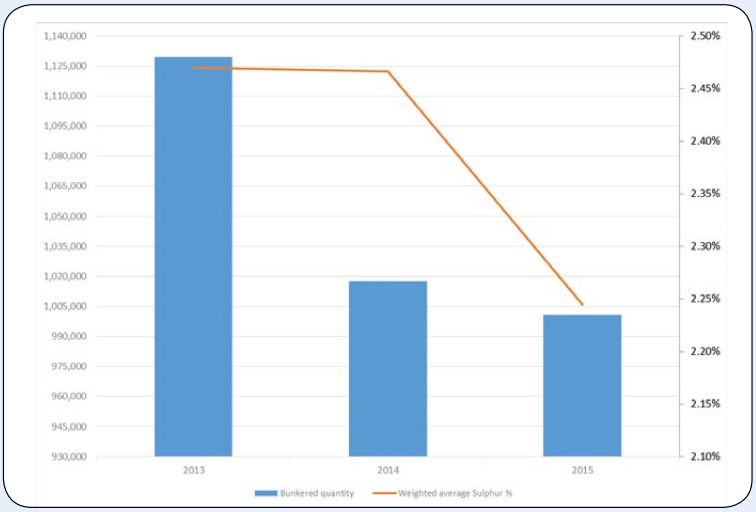
NO_x production [MT]
+0.7%

SO_2 production [MT]
-7.6%

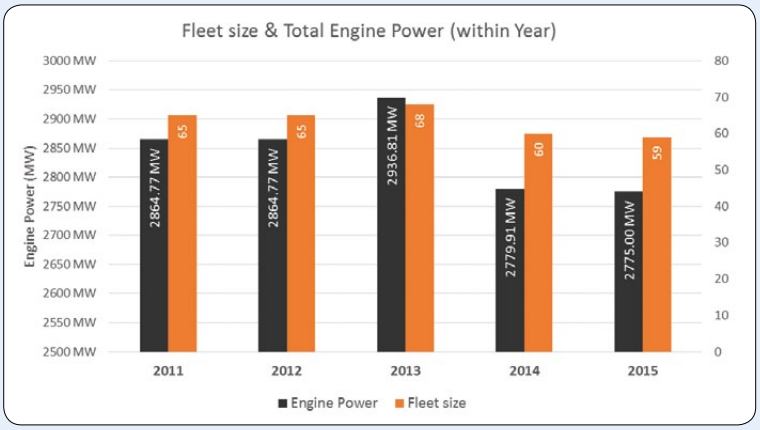
A remarkable achievement for Danaos' fleet, is that the utilization index in 2015 increased to 99.0%, compared to 97.5% in 2014. The latter can be considered as one more testimony of the added value we offer our clients and proof of the exceptional performance of the Danaos fleet.

OUR **BUNKERS**

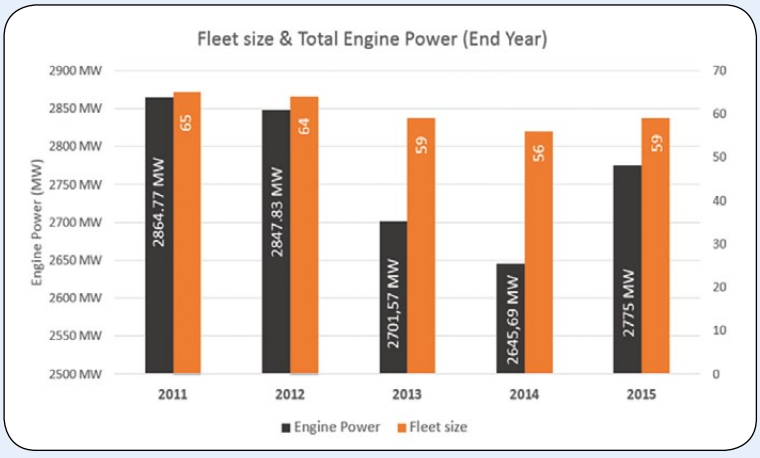
The below bar graph shows our bunkered quantities and quality data for the years 2013, 2014 and 2015 concerning our operable fleet:



The fuel quantity delivered in 2015 based on our bunker delivery notes, presents a small reduction compared to 2014. The above can mainly be attributed to the stock existing onboard from 2014 (the supply at the end of 2014 of EU MDO in order for the vessels to be ready to comply with the 0.1% SOx emission requirements within ECAs applicable as of 1/1/2015). From a consumption point of view the fleet's performance is almost steady. As it can be seen, the weighted average Sulphur content was significantly reduced from 2.47% to 2.24%



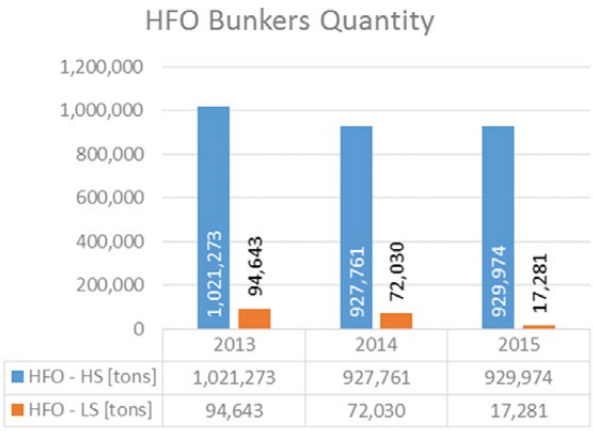
Fleet size and engine power within each year (including the 2 Danaos Bareboats).



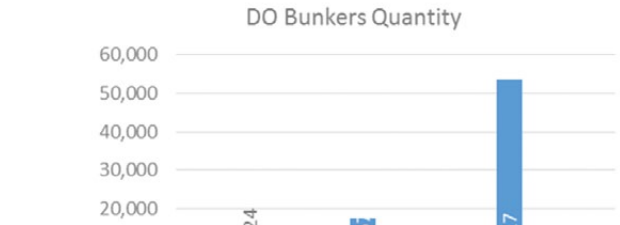
Danaos fleet size and engine power at the end of each year, including the 2 Danaos Bareboats

OUR BUNKERS

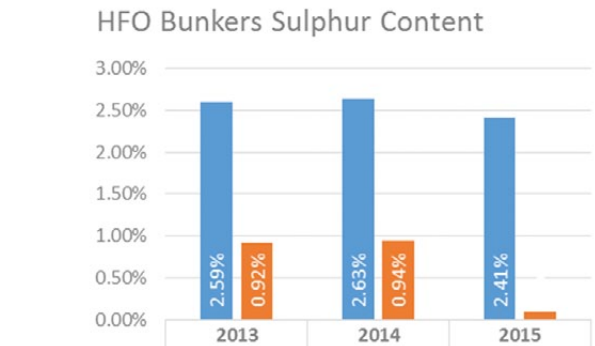
Below a break-down of the bunker quantities is provided and the corresponding weighted average sulphur content for each grade.



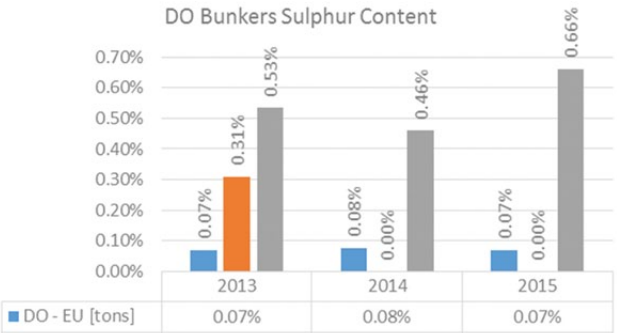
	2013	2014	2015
HFO - HS [tons]	1,021,273	927,761	929,974
HFO - LS [tons]	94,643	72,030	17,281



	2013	2014	2015
DO - EU [tons]	9,372	17,567	53,627
DO - CARB [tons]	4,124	0	0
DO - HS [tons]	158	252	150



	2013	2014	2015
HFO - HS [tons]	2.59%	2.63%	2.41%
HFO - LS [tons]	0.92%	0.94%	0.10%



	2013	2014	2015
DO - EU [tons]	0.07%	0.08%	0.07%
DO - CARB [tons]	0.31%	0.00%	0.00%
DO - HS [tons]	0.53%	0.46%	0.66%

High Sulphur HFO bunkered quantities, present a steady trend the last two years, whilst Low Sulphur HFO quantities have been significantly reduced compared to 2014. Latter is attributed to the new sulphur cap of 0.1% in ECAS as of 1/1/2015 and the increased use of MGO.

ENERGY EFFICIENCY OPERATING INDEX (EEOI)

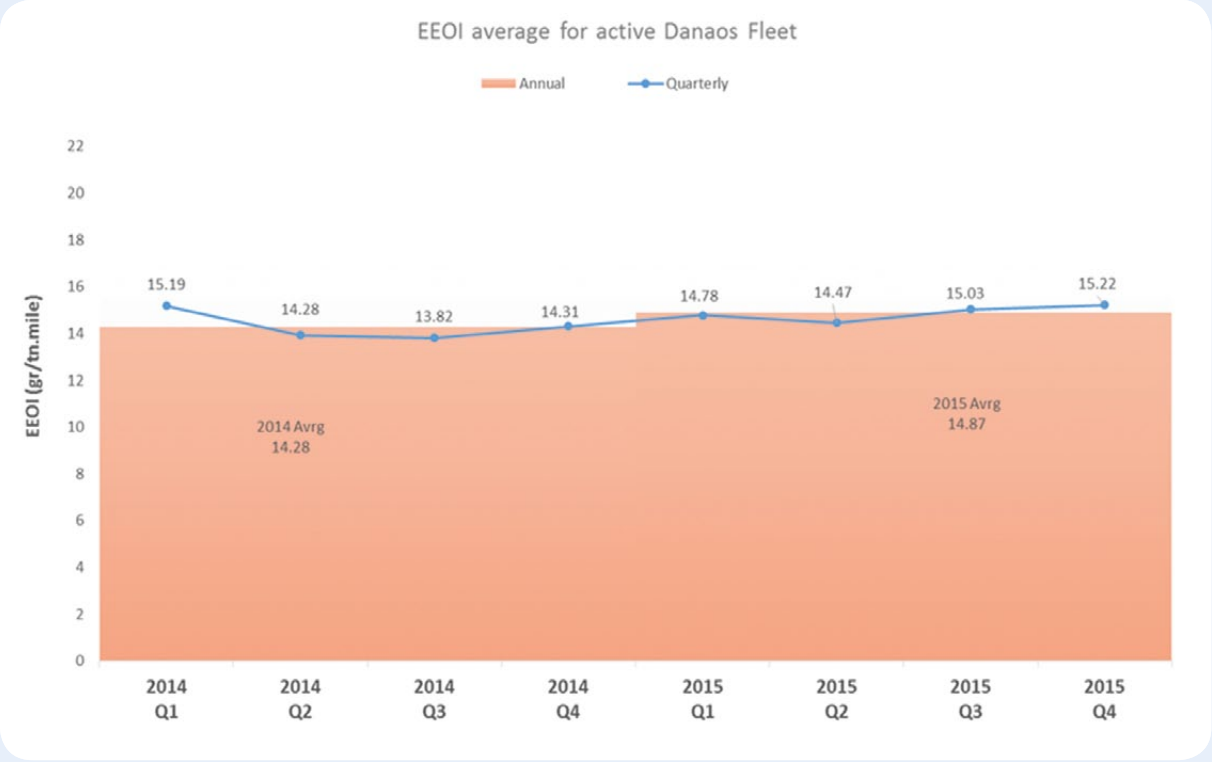
Developed by the IMO as per MEPC.1 Circ.684, the EEOI index calculates the amount of CO2 emitted per ton/unit/TEU of cargo transported per nautical mile. CO2 output per cargo can be used as an indicator of a vessel's fuel efficiency. This only reports CO2 emission as a result of fuel combustion.

Industry standardization and verification of CO2 data is a prerequisite in order to enable fair, reliable measurements of CO2 performance and to enable CO2 benchmarking with competition.

Danaos has achieved an improvement of about 19% since 2012 in CO2 efficiency, mainly due to the consistent efforts in improving vessels energy efficiency and reducing fuel costs.

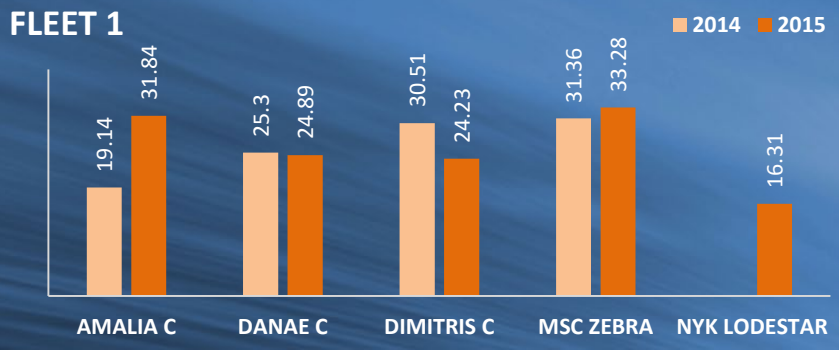
The above improvements have been driven by the results of a thorough technical research initiated in 2008, and have been realized within a controlled and structured framework without compromising vessels' safety and utilization.

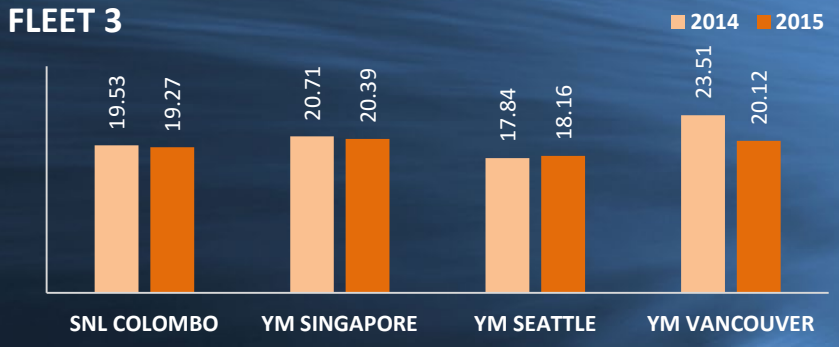
In the below graph, the Danaos fleet EEOI average for years 2014-2015 can be seen.

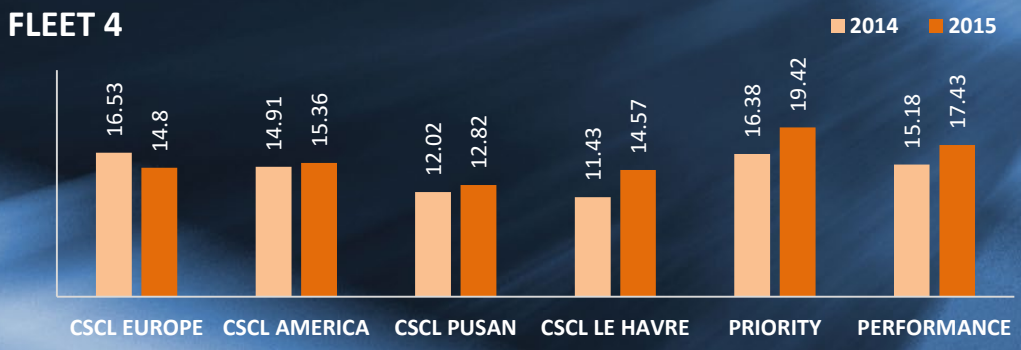


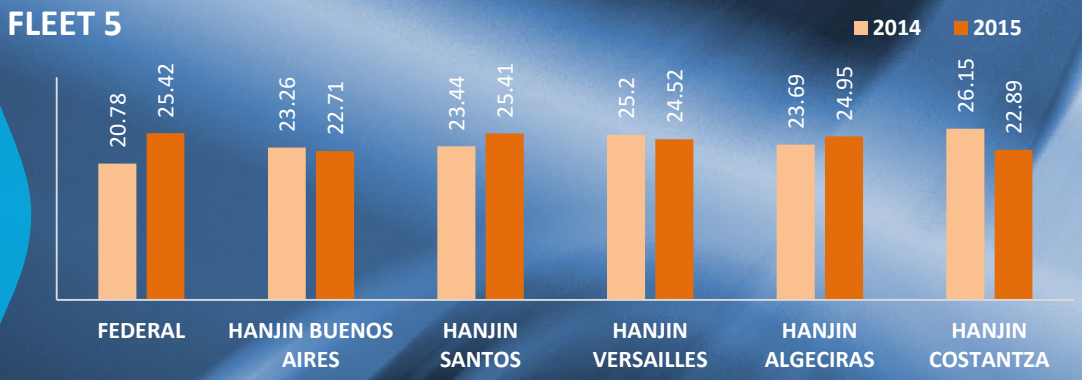
ENERGY EFFICIENCY OPERATING INDEX (EEOI)

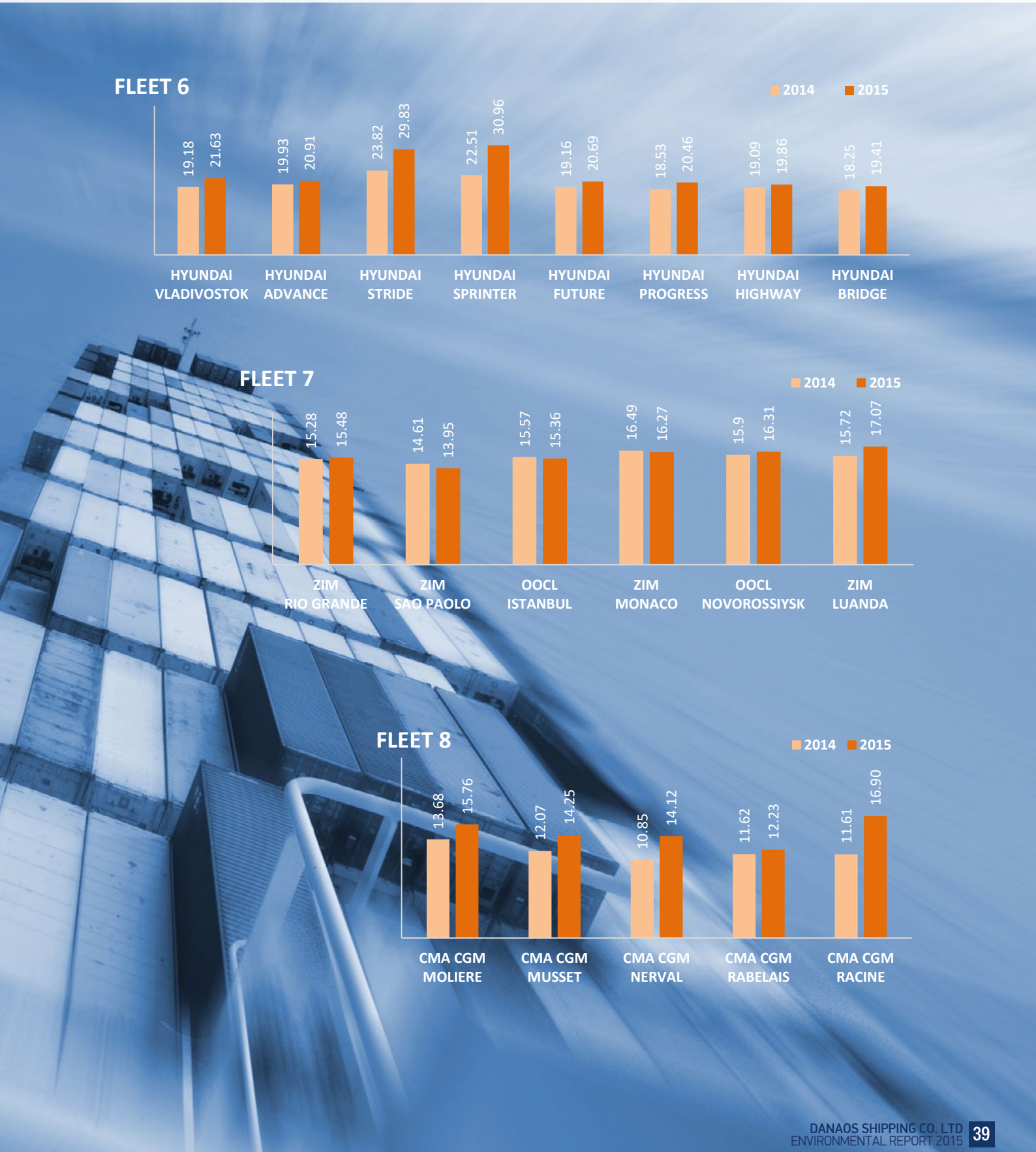
In the below graphs the EEOI figures for all company vessels are depicted.

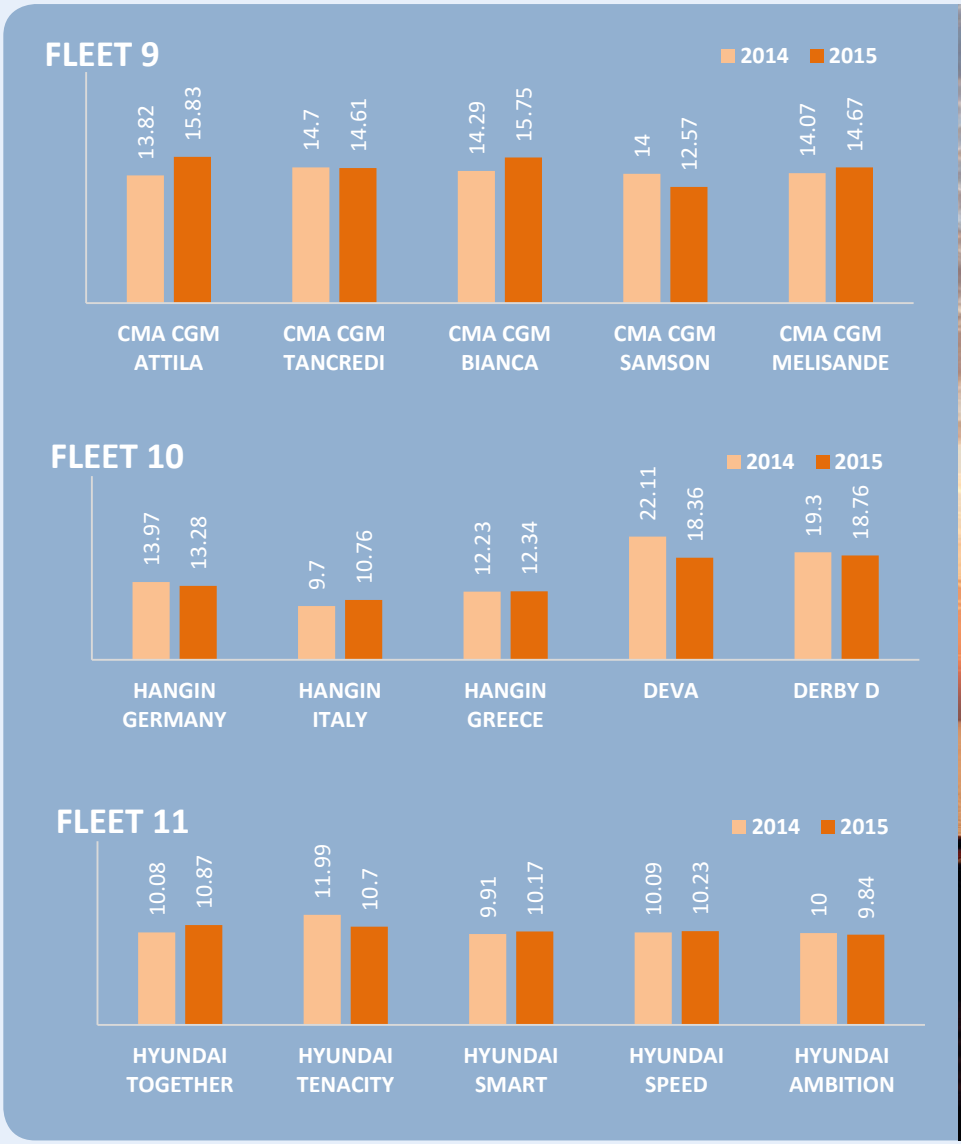









FLEET 6
2014
2015
19.18
21.63
19.93
20.91
23.82
29.83
22.51
30.96
19.16
20.69
18.53
20.46
19.09
19.86
18.25
19.41
HYUNDAI VLADIVOSTOK
HYUNDAI ADVANCE
HYUNDAI STRIDE
HYUNDAI SPRINTER
HYUNDAI FUTURE
HYUNDAI PROGRESS
HYUNDAI HIGHWAY
HYUNDAI BRIDGE
FLEET 7
2014
2015
15.28
15.48
14.61
13.95
15.57
15.36
16.49
16.27
15.9
16.31
15.72
17.07
ZIM RIO GRANDE
ZIM SAO PAOLO
OOCL ISTANBUL
ZIM MONACO
OOCL NOVOROSSIYSK
ZIM LUANDA
FLEET 8
2014
2015
13.68
15.76
12.07
14.25
10.85
14.12
11.62
12.23
11.61
16.90
CMA CGM MOLIERE
CMA CGM MUSSET
CMA CGM NERVAL
CMA CGM RABELAIS
CMA CGM RACINE



EEOI for Danaos fleet (years 2014-2015)

As it can be seen, the EEOI is almost steady for 2015 when considering the average value for the Danaos fleet compared to that of 2014.

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 ton*miles index.

As a general observation, the considerable reduction of consumption that was realized in some cases, due to the reduction of cargo transferred and average speed, was not reflected in the CO2 index. Contrary to the above, EEOI was increased due to the drastic reduction of cargo transferred, which negatively affected the vessels' transport work.

Another observation, that is worth mentioning, is that the reduction of the vessel's draft to the level that it is found within the critical draft zone, has a very negative impact on a vessel's consumption and EEOI.

We incorporated, a calculation tool, to measure EEOI through the vessels' daily telegrams in our Danaos Enterprise software. This allows us to regularly monitor the fuel efficiency of all our ships. Since 2008, we have voluntarily enrolled 9 of our vessels in the DNV-GL "CO2 Index" project, monitoring their performance and CO2 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.

These vessels receive an annual certification of their participation from DNV-GL., through DNV-GL Auditors, who come to the Danaos Athens Office to verify the validity of the data utilized to produce the CO2 index.

DNV·GL

ENERGY EFFICIENCY OPERATIONAL INDICATOR CERTIFICATE

This is to certify that the vessel

CSCL EUROPE

IMO No.: **9285998** Call Sign: **P3V29**

Port of Registry: **Limassol**

Owner: **Oceanew Shipping Limited**

has been assigned the

ENERGY EFFICIENCY OPERATIONAL INDICATOR CERTIFICATE

Certificate No.: **42 292 - 15 HH**

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

The underlying data have been verified on 17.12.2015 in Hamburg.

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

EEOI = 7,4 g CO_2 / (t * kilometer)
= 13,7 g CO_2 / (t * nautical mile)

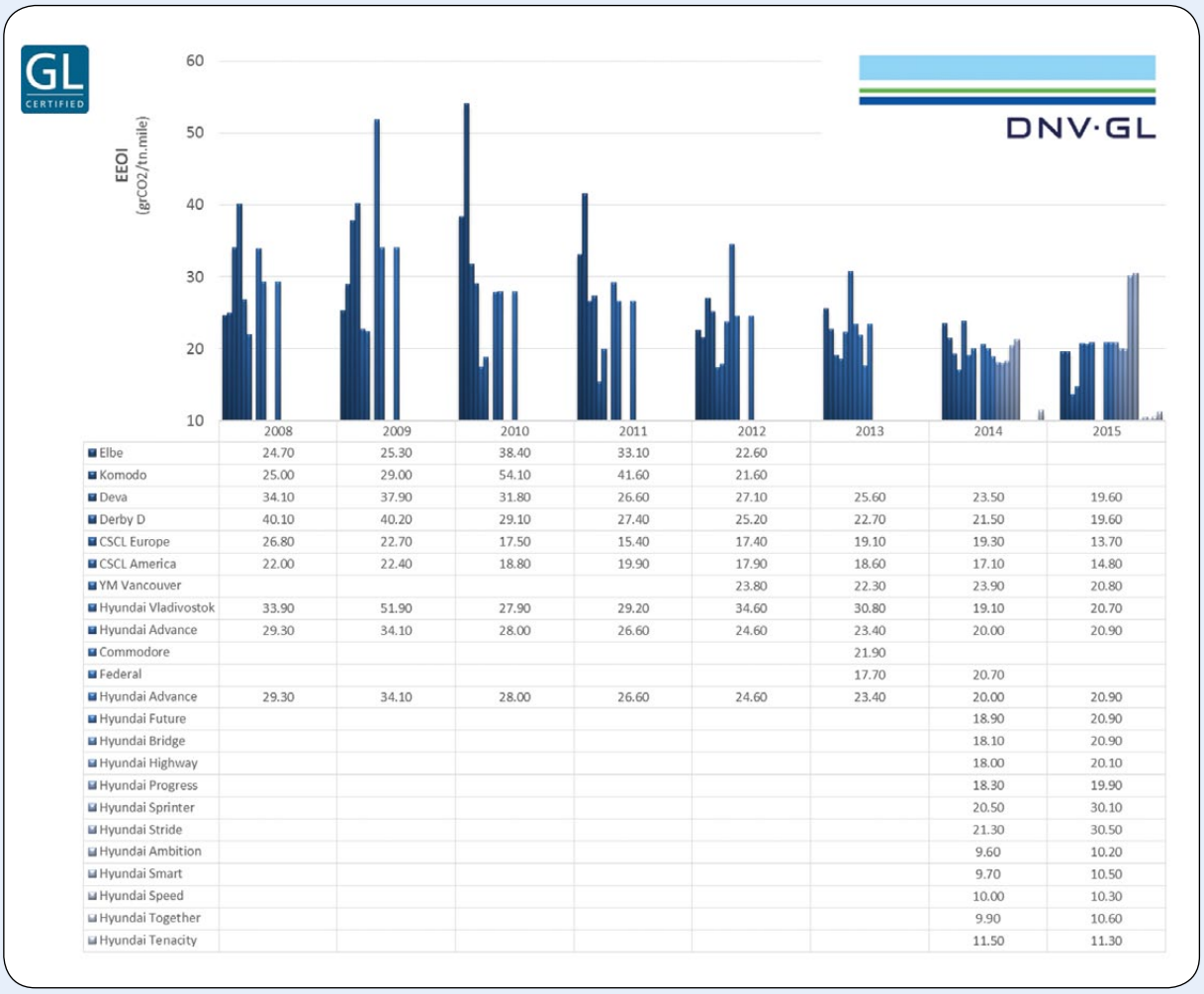
2nd EEOI = 70,6 g CO_2 / (TEU * kilometer)
= 130,8 g CO_2 / (TEU * nautical mile)

This value is valid for one year and expires on **06.01.2017.**

Hamburg **21.12.2015**

DNV GL

Dr. Gundula Stadie-Frohbös Dr. Jörg Kämpf

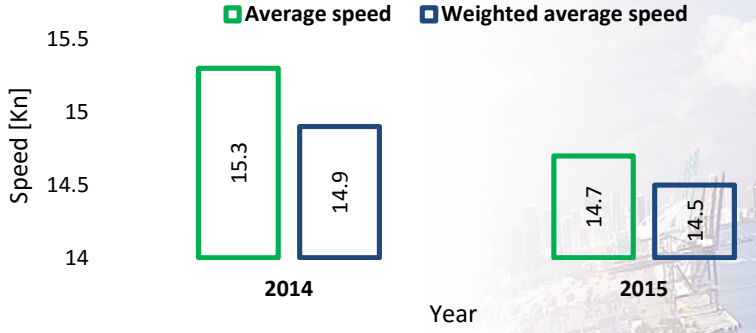


	2008	2009	2010	2011	2012	2013	2014	2015
Elbe	24.70	25.30	38.40	33.10	22.60			
Komodo	25.00	29.00	54.10	41.60	21.60			
Deva	34.10	37.90	31.80	26.60	27.10	25.60	23.50	19.60
Derby D	40.10	40.20	29.10	27.40	25.20	22.70	21.50	19.60
CSCL Europe	26.80	22.70	17.50	15.40	17.40	19.10	19.30	13.70
CSCL America	22.00	22.40	18.80	19.90	17.90	18.60	17.10	14.80
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
Hyundai Progress							18.30	19.90
Hyundai Sprinter							20.50	30.10
Hyundai Stride							21.30	30.50
Hyundai Ambition							9.60	10.20
Hyundai Smart							9.70	10.50
Hyundai Speed							10.00	10.30
Hyundai Together							9.90	10.60
Hyundai Tenacity							11.50	11.30

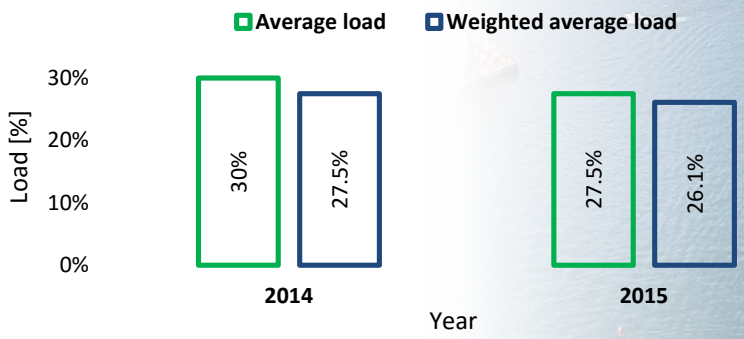
Danaos certified CO2 index by DNV-GL for years 2008-2015

OUR FLEET'S **OPERATIONAL PROFILE**

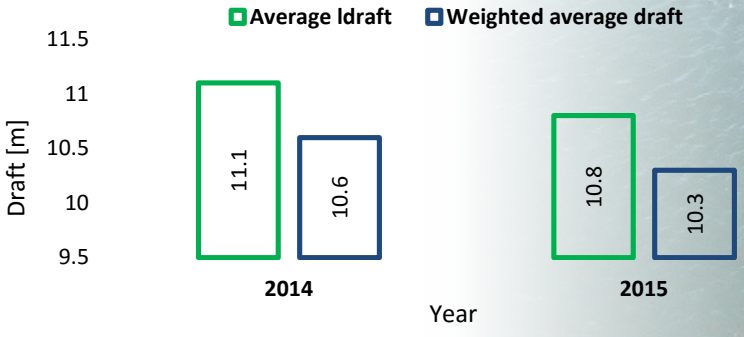
Speed



Load



Draft

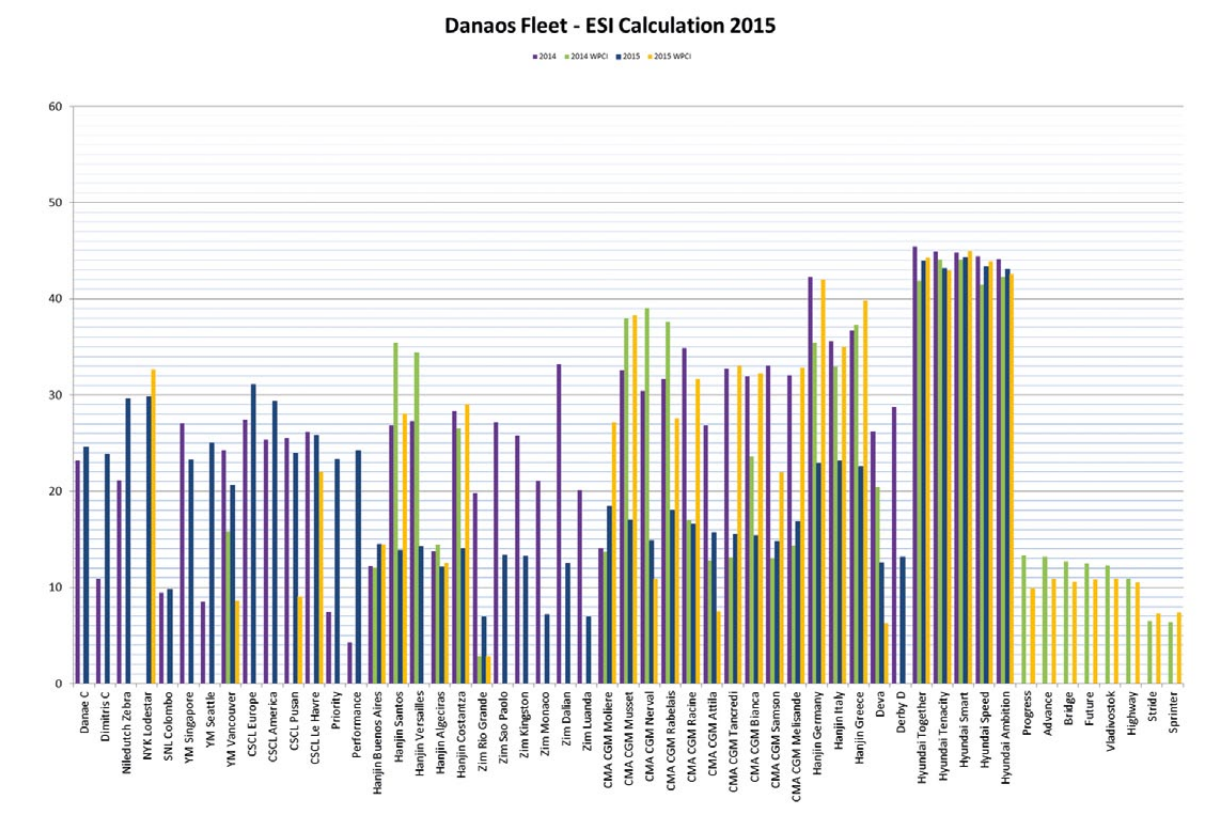


The above figures show Danaos average and weighted average (in terms of sailing days) draft, speed and load profile for 2015 compared to 2014. As it can be seen, there is a further slight reduction in the average speed (which was already lowered considerably in 2014 – the further reduction at these low enough levels did not contribute considerably to the power reduction) and a very marginal reduction in draft, while the percentage of the vessels' operation within the critical draft area has increased by 2.5%. Vessels' average load was only marginally reduced (by 1-2%), which, nevertheless, as an absolute number cannot be considered negligible at these low loads. However, if on top of the above, we consider the 252 more sailing days, compared with 2014 and the increased reefer containers' utilization within 2015, we can explain the small increase in the fleet's total consumption by 0.8% compared to that of the previous year that explains the marginal increase in CO2 and NOx emissions accordingly.

ENVIRONMENTAL SHIP INDEX (ESI)

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

So far, 36 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 NOx 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:



Danaos fleet ESI score basis WPCI web site and Danaos' calculations for years 2014-2015

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 CO2. It takes the NOx and SOx 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 SOx. 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

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 36 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 below table.

The ESI scores calculated for a total of 45 vessels (equipped with a NOx 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 the highest ESI score among Danaos registered vessels as per WPCI website: 44.9

2012	2013		2014	Score Validity		2015	Score Validity
YM Vancouver	YM Vancouver	1	YM Vancouver	01/10/2014 - 31/03/2015	1	YM Vancouver	01/04/2016 - 30/09/2016
CSCL Europe	CSCL Europe	2	CSCL Europe	01/01/2015 - 30/06/2015	2	Deva	01/04/2016 - 30/09/2016
Deva	Deva	3	Deva	01/10/2014 - 31/03/2015	3	Hanjin Germany	01/01/2016 - 30/06/2016
Derby D	Derby D	4	Derby D	01/01/2015 - 30/06/2015	4	Hanjin Italy	01/01/2016 - 30/06/2016
Hanjin Germany	Hanjin Germany	5	Hanjin Germany	01/01/2015 - 30/06/2015	5	Hanjin Greece	01/01/2016 - 30/06/2016
Hanjin Italy	Hanjin Italy	6	Hanjin Italy	01/01/2015 - 30/06/2015	6	Hyundai Together	01/01/2016 - 30/06/2016
Hanjin Greece	Hanjin Greece	7	Hanjin Greece	01/01/2015 - 30/06/2015	7	Hyundai Tenacity	01/01/2016 - 30/06/2016
Hyundai Together	Hyundai Together	8	Hyundai Together	01/01/2015 - 30/06/2015	8	Hyundai Smart	01/01/2016 - 30/06/2016
Hyundai Tenacity	Hyundai Tenacity	9	Hyundai Tenacity	01/01/2015 - 30/06/2015	9	Hyundai Speed	01/01/2016 - 30/06/2016
Hyundai Smart	Hyundai Smart	10	Hyundai Smart	01/01/2015 - 30/06/2015	10	Hyundai Ambition	01/01/2016 - 30/06/2016
Hyundai Speed	Hyundai Speed	11	Hyundai Speed	01/01/2015 - 30/06/2015	11	Hanjin Buenos Aires	01/01/2016 - 30/06/2016
Hyundai Ambition	Hyundai Ambition	12	Hyundai Ambition	01/01/2015 - 30/06/2015	12	Hanjin Santos	01/01/2016 - 30/06/2016
	Hanjin Buenos Aires	13	Hanjin Buenos Aires	01/01/2015 - 30/06/2015	13	Hanjin Constantza	01/04/2016 - 30/09/2016
	Hanjin Santos	14	Hanjin Santos	01/01/2015 - 30/06/2015	14	Hanjin Algeciras	01/01/2016 - 30/06/2016
	Hanjin Versailles	15	Hanjin Versailles	01/01/2015 - 30/06/2015	15	Zim Rio Grande	01/04/2016 - 30/09/2016
	Hanjin Constantza	16	Hanjin Constantza	01/01/2015 - 30/06/2015	16	CMA CGM Attila	01/01/2016 - 30/06/2016
	Hanjin Algeciras	17	Hanjin Algeciras	01/01/2015 - 30/06/2015	17	CMA CGM Tancredi	01/01/2016 - 30/06/2016
	Zim Rion Grande	18	Zim Rio Grande	01/10/2014 - 31/03/2015	18	CMA CGM Bianca	01/01/2016 - 30/06/2016
	Zim Monaco	19	Zim Monaco	01/10/2014 - 31/03/2015	19	CMA CGM Samson	01/01/2016 - 30/06/2016
	Zim Luanda	20	Zim Luanda	01/10/2014 - 31/03/2015	20	CMA CGM Melisande	01/01/2016 - 30/06/2016
	CMA CGM Attila	21	CMA CGM Attila	01/01/2015 - 30/06/2015	21	Hyundai Progress	01/04/2016 - 30/09/2016
	CMA CGM Tancredi	22	CMA CGM Tancredi	01/01/2015 - 30/06/2015	22	Hyundai Advance	01/04/2016 - 30/09/2016
	CMA CGM Bianca	23	CMA CGM Bianca	01/01/2015 - 30/06/2015	23	Hyundai Bridge	01/04/2016 - 30/09/2016
	CMA CGM Samson	24	CMA CGM Samson	01/01/2015 - 30/06/2015	24	Hyundai Future	01/04/2016 - 30/09/2016
	CMA CGM Melisande	25	CMA CGM Melisande	01/01/2015 - 30/06/2015	25	Hyundai Vladivostok	01/04/2016 - 30/09/2016
		26	Hyundai Progress	01/10/2014 - 31/03/2015	26	Hyundai Highway	01/04/2016 - 30/09/2016
		27	Hyundai Advance	01/10/2014 - 31/03/2015	27	Hyundai Stride	01/04/2016 - 30/09/2016
		28	Hyundai Bridge	01/10/2014 - 31/03/2015	28	Hyundai Sprinter	01/04/2016 - 30/09/2016
		29	Hyundai Future	01/10/2014 - 31/03/2015	29	CMA CGM Moliere	01/04/2016 - 30/09/2016
		30	Hyundai Vladivostok	01/10/2014 - 31/03/2015	30	CMA CGM Musset	01/04/2016 - 30/09/2016
		31	Hyundai Highway	01/10/2014 - 31/03/2015	31	CMA CGM Nerval	01/04/2016 - 30/09/2016

HUNDAI SMART

ESI Score

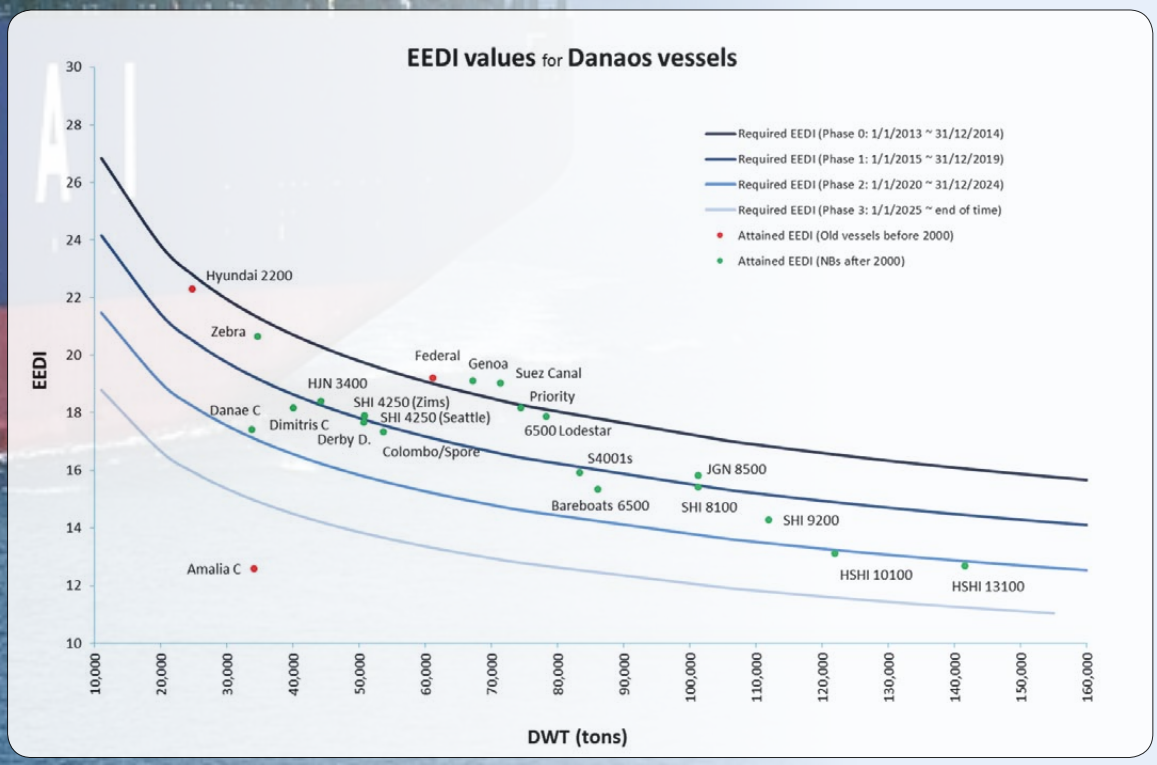
NOx:	23.3
SOx:	47.7
CO_2:	10
OPS:	35
Total:	44.9

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 below diagram, which includes the newly acquired vessels Genoa, Suez Canal and NYK Lodestar.



DANAOS SHIPPING CO. LTD

2015

annual **environmental** report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REMDESIGN