

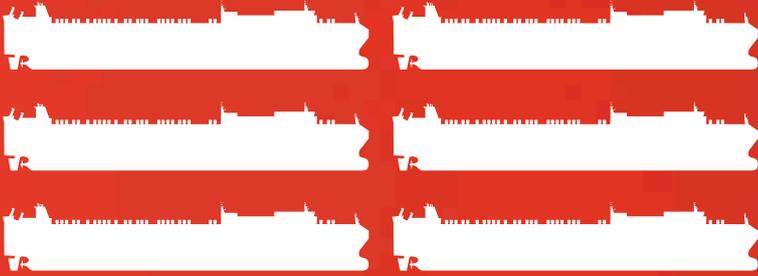
The environment

0.6%

reduction in fuel consumption per transported unit

6

new vessels entered service for group companies, three for WWASA's account



HIGH IMPACT INITIATIVES

The maritime industry faces environmental and energy efficiency challenges where only sustainable solutions are acceptable. WWASA believes that tomorrow's winners will be those who understand, respond to and utilise those challenges.

As a major player in the transportation industry, WWASA constantly strives to reduce its energy consumption and decrease the environmental footprint of its activities. Particular focus is on high impact initiatives such as reducing bunkers consumption and thereby emissions. Fuel consumption per transported unit decreased in 2012, despite the record number of units transported. Several ongoing and future initiatives are in the pipeline aimed at reducing energy and fuel consumption further.







HIGH ENVIRONMENTAL STANDARDS

Good for the industry, good for WWASA

We strive to deliver services to our customers and stakeholders with minimal effect on the environment. We acknowledge the environmental challenges faced by the maritime industry and see that only sustainable solutions are acceptable.

We believe that shipping companies which understand, respond to and utilise the energy efficiency and environmental challenges in our industry, will be tomorrow's winners, and that new business opportunities will emerge as a result of these challenges. An example of this was an initiative that we mounted in 2012 together with our partner Wallenius and the weather company StormGeo. Through a joint venture we will develop software solutions that optimize voyages, by decision support tools, and contribute to more fuel efficient operations. We see opportunities for making this game-changing technology and solution commercially available to the global merchant fleet. We also work continually with other partners, shipping companies and institutions of higher learning on projects aimed at further enhancing the shipping industry's energy and environmental advantages compared to other modes of transportation.

To achieve our environmental targets we set high environmental objectives and goals for all our operating companies, technical managers and other stakeholders. All our vessels and technical managers shall as a minimum comply with international and environmental standards as well as our self imposed requirements. The key to accomplish the results we are after is

our competent and empowered employees. In 2012, together with key stakeholders, we launched an energy efficiency competition for sailing personnel and technical management focusing on energy management solutions to be implemented on our fleet. Many of the entries are already implemented through the Ship Energy Efficiency Management Plan, which is now onboard all WWASA vessels.

We are committed to comply with not only national and international environmental legislation and regulations, but also to our own high standards. We work actively to influence the development of environmental legislation aimed at fair, predictable and practicable rules and regulations for a sustainable shipping industry. Our efforts to limit emissions to air and discharges to sea are based on the international regulations as in the IMO's Marpol 73/78 convention. In addition, a number of special national requirements must be taken into account, like the Emission Control Areas (ECAs) that impose stricter regulations for emissions to air. These ECAs are already implemented in many regions, and more are expected. There is no single solution to comply with these coming regulations, which is why we in 2013 will install and test an exhaust gas cleaning system onboard one of our vessels to ensure cost-efficient and safe operations within these areas.

This report focuses primarily on vessels owned and controlled by WWASA. A fleet environmental plan has been developed that tracks processes influencing emissions to air. The findings are compared with results from earlier years, and these comparisons are used to evaluate environmental targets for the future.



Jan Eyvin Wang
President and CEO

Environmental account 2012

As a shaper of the maritime industry, we are pursuing numerous initiatives aimed at reducing the environmental impact of our business. Our vision is to continuously improve our operations and seek to achieve minimum emissions.

This account incorporates the 35 vessels owned and controlled by WWASA and operated by Wallenius Wilhelmsen Logistics and EUKOR Car Carriers.

Despite a new record in shipping volumes in 2012, the fuel spent per cargo tonne over distance (g/tonne nm) decreased by 0.6%, showing that

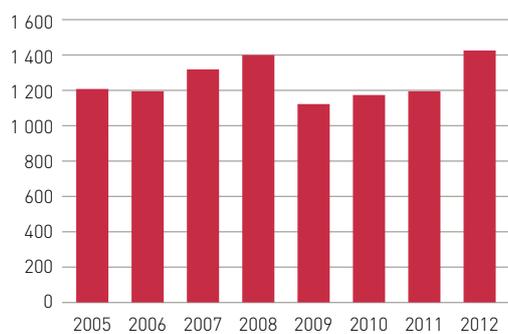
our vessels have been operated more efficiently than ever before.

Total SO_x and NO_x emissions were higher in 2012 than in 2011 due to increased number of vessels in the fleet, while emissions per transported unit came down.

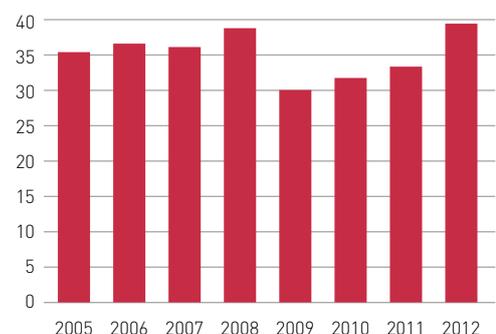
Average sulphur content in fuel consumed on board our vessels in 2012 was 1.80%, which is far below the legislative limit of 3.5% set by the International Maritime Organisation (IMO).

During 2012 the group took delivery of three new vessels for WWASA's own account: MV Tysla, MV Tulane, and MV Tongala. No vessels were recycled in 2012.

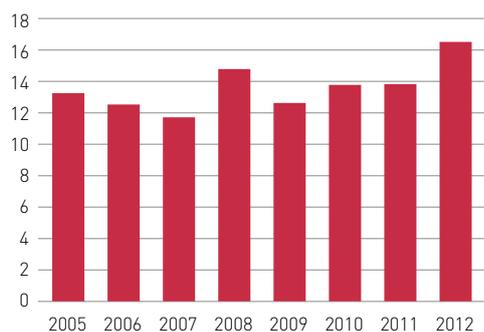
Total CO₂ emissions (THOUSAND TONNES)



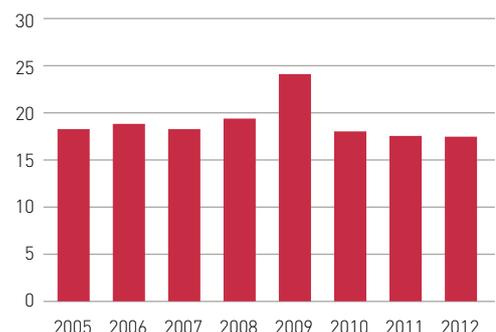
Total NO_x emissions (THOUSAND TONNES)



Total SO_x emissions (THOUSAND TONNES)



g fuel/tonne nm



WW Fleet

FLAG AND OWNERSHIP STATUS AS PER 31.12.2012

| NAME | BUILT | TYPE | FLAG | Owner | Owner-ship | Operating company |
|-----------------|---------|-------|-------|-----------------------------------|------------|-------------------|
| PCTC | | | | | | |
| TORONTO | 2005/8 | PCTC | UK | Lloyds TSB Marine Leasing | Bareboat | WWL |
| TOLEDO | 2005/2 | PCTC | UK | Lloyds TSB Marine Leasing | Bareboat | WWL |
| TORRENS | 2004/10 | PCTC | UK | Lloyds TSB Marine Leasing | Bareboat | WWL |
| TOPEKA | 2006/06 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TOMBARRA | 2006/09 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TORTUGAS | 2006/12 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TOMAR | 2008/10 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TOREADOR | 2008/12 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TORINO | 2009/03 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TOSCANA | 2009/06 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | WWL |
| TONGALA | 2012/09 | PCTC | UK | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TAKARA | 1986/09 | PCTC | NIS | Caiano Shipping | Bareboat | EUKOR |
| TAI SHAN | 1986/12 | PCTC | NIS | Caiano Shipping | Bareboat | EUKOR |
| TANCRED | 1987/04 | PCTC | NIS | ICON Tancred | Bareboat | EUKOR |
| TRINIDAD | 1987/09 | PCTC | NIS | ICON Trinidad | Bareboat | EUKOR |
| TRIANON | 1987/04 | PCTC | NIS | ICON Trianon | Bareboat | EUKOR |
| TAGUS | 1985/03 | PCTC | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| TASCO | 1985/02 | PCTC | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| TERRIER | 1982/11 | PCTC | NIS | Wilhelmsen Lines Shipowning | 100 % | EUKOR |
| MORNING CONCERT | 2006/04 | PCTC | UK | Wilhelmsen Lines Car Carriers | 100 % | EUKOR |
| LCTC | | | | | | |
| TIJUCA | 2008/12 | LCTC | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TIRRANNA | 2009/6 | LCTC | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TIGER | 2011/06 | LCTC | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TUGELA | 2011/07 | LCTC | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TITANIA | 2011/12 | LCTC | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TULANE | 2012/06 | LCTC | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| RORO | | | | | | |
| MARK V | | | | | | |
| TØNSBERG | 2011/03 | RO/RO | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| TYSLA | 2012/01 | RO/RO | Malta | Wilhelmsen Lines Shipowning Malta | 100 % | WWL |
| MARK IV | | | | | | |
| TAMESIS | 2000/04 | RO/RO | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| TALISMAN | 2000/06 | RO/RO | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| TARAGO | 2000/09 | RO/RO | NIS | Wilhelmsen Lines | 100 % | WWL |
| TAMERLANE | 2001/02 | RO/RO | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| MARK II | | | | | | |
| TAIKO | 1984/06 | RO/RO | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| TAMPA | 1984/02 | RO/RO | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |
| TEXAS | 1984/03 | RO/RO | NIS | Wilhelmsen Lines Shipowning | 100 % | WWL |

Staying at the forefront of regulations

Major environmental regulation dealing with air pollution, greenhouse gases and invasive marine species will come into effect this decade aiming at reducing the environmental impact of shipping. Their scope will include international, regional, country and state level regulations. Our ambition is to be at the forefront of environmental regulations, both those already implemented and those expected. This illustration gives an overview of some upcoming major maritime environmental regulations and how WWASA is prepared.

REGULATIONS IN THE PIPELINE

Global Greenhouse Gas regulations and regulatory price of CO₂

In January 2013, all vessels are required by the International Maritime Organisation (IMO) to have a vessel specific Ship Energy Efficiency Management Plan (SEEMP) onboard. This plan is intended to be used for continuous improvement of energy efficiency measures. Also in 2013, IMO has implemented the Energy Efficiency Design Index (EEDI), ensuring more energy efficient vessels being built, i.e. it only applies to new builds. IMO has also been discussing a market-based mechanism for CO₂ emissions from shipping. Concurrently, the EU is developing a proposal to include maritime transport emissions in the EU's green house gas (GHG) reduction commitments. It is also anticipated that the EU will adopt a MRV (measurement, reporting and verification) requirement in the short-medium term to help better quantify the scale and distribution of GHG emissions from the European fleet.

WWASA's position: *Reducing fuel consumed per unit transported by WWASA owned vessels is the most efficient contribution to reduce CO₂ emissions, and the company works to influence IMO to form new regulations aiming at obtaining a level playing field for the shipping industry. The SEEMP, now onboard all our vessels, will be the key to implement and follow-up of initiatives to obtain more energy efficient operations.*

Ballast Water Management Convention

When ratified, the convention will require vessels to install ballast water treatment systems from 1 January, 2016. As of 2012, the 30 required Member States and 26% of the required 35% of world tonnage have ratified the convention.

WWASA's position: *We endorse ballast water treatment, and several of our vessels are equipped with pilot installations to find the most suitable and reliable system for retrofit.*

THE HONG KONG CONVENTION

The 2009 Hong Kong International Convention for the Safe and Environmentally Sound Recycling of Ships, aims at ensuring that ships, when being recycled, do not pose any unnecessary risks to human health, safety and to the environment. The convention is yet to be ratified by the necessary 15 States, representing 40 per cent of world merchant shipping by gross tonnage.

WWASA's position: *Our policy is that all vessels should be recycled in accordance with The Hong Kong Convention. We have approved recycling yards in China. All our vessels are issued with Inventory of Hazardous Materials/Green Passport certified by Class, before recycling.*

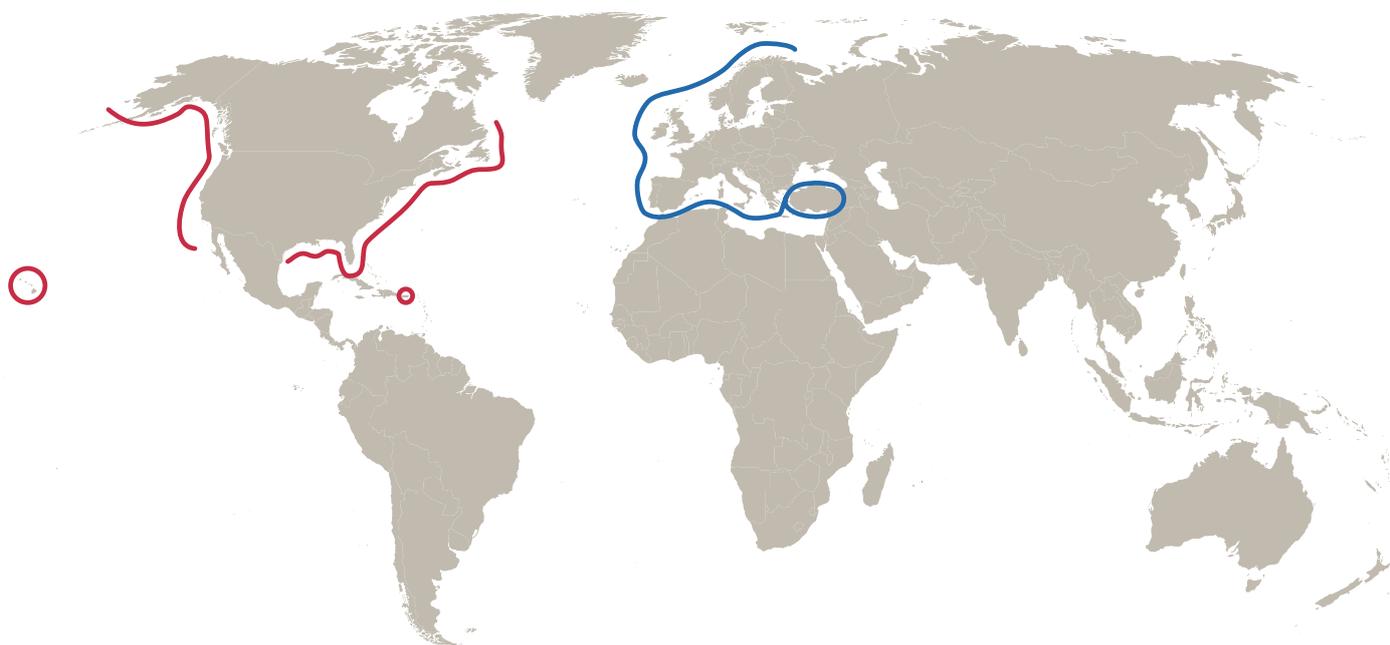
EMISSION CONTROL AREAS (ECA)

The International Convention for the Prevention of Pollution from Ships (MARPOL) defines certain sea areas as "special areas" in which, for reasons related to their oceanography, ecological conditions and sea traffic volume, require special controls for the prevention of sea pollution. Under the Convention these ECAs ('Emission Control Areas') are provided with a higher level of protection than other areas of the sea. Today there are several such ECAs in operation in both Europe, the US and the Caribbean, covering both SOx and NOx emissions. The major ECAs include:

Designated Emission Control Areas (date of entry into force):

2006-05-19: Baltic Sea
2007-11-22: North Sea
2012-08-01: US and Canada
2014-01-01: Caribbean

Emission Control Areas (ECAs): The International Convention for the Prevention of Pollution from Ships (MARPOL) defines certain sea areas as "special areas" in which, for reasons related to their oceanography, ecological conditions and sea traffic volume, require special controls for the prevention of sea pollution. Ships operating in the ECA zones will have to burn much cleaner fuel or use abatement systems, to comply with stricter emissions of sulphur, NO_x and other greenhouse gases. Today, most ECAs are located in Europe, the United States and Canada.



ECA Sulphur Limits

2010-07-01: Max 1.00%

2015-01-01: Max 0.10%

ECA NO_x Limits

2011-01-01: Tier II

2016-01-01: Tier III

In addition to the above ECAs under MARPOL, there are also other environmental regulations that apply:

EU Sulphur Directive

2010-01-01: Max 0.1% at berth

Turkey Sulphur Regulation

2012-01-01: Max 0.1% at berth

Global Sulphur Limits

2012-01-01: Max 3.50%

2020-01-01*: Max 0.50%

* subject to feasibility review in 2018

California Air Resources Board Sulphur in fuel limits (24nm from coast)

2009-07-01: Max 1.5% MGO , or 0.5% MDO

2012-08-01: Max 1.0% MGO or 0.5% MDO

2014-01-01: Max 0.1% MGO /MDO

WWASA's position: *Through WWL's low sulphur policy, we have gained vast experience with low sulphur operations. To meet the requirement of future ECAs, we are working closely within the group and with industry partners to find the most cost-efficient and environmentally sound solution. Currently there is no single solution to the sulphur challenge, and the group is engaged in a four stream approach exploring different options. One initiative is the installation and testing of a Exhaust Gas Cleaning System (EGCS) onboard one of our vessels in 2013.*

Four stream sulphur approach

To meet the tougher environmental regulations, WWASA will as vessel owner and through ownership in several operating companies pursue several initiatives to prepare for and implement necessary actions to stay compliant and/or ahead of environmental regulations.

Reducing fuel consumption and fuel sulphur content have been singled out as the most important tasks, deemed to have the highest impact on reducing the company's environmental footprint and financial impact in the years to come.

SULPHUR REGULATIONS

Fuel mandates already require all shipping companies to use a more expensive low sulphur fuel while in EU ports and while sailing in the North Sea and Baltic ECAs. IMO has also officially designated the waters off the North American coasts as an ECA with effect from August 2012.

Stringent international emissions standards will apply for ships sailing in these waters. All vessels sailing within 200 nautical miles of North America will have to use the more expensive, low-sulphur fuel, which will reduce air pollution but also increase vessel fuel costs.

Looking further into the decade, the IMO's global sulphur limit of 0.50% Sulphur (S) is scheduled to come into effect from 2020. The impact will be even more significant as it is a global requirement, applicable to all bunker purchased.

GLOBALLY

| | | |
|------------|---------|-------------|
| Pre 2012 | 4.50% S | (45,000ppm) |
| 1 Jan 2012 | 3.50% S | (35,000ppm) |
| 1 Jan 2020 | 0.50% S | (5,000ppm) |

EMISSION CONTROLLED AREA (ECA)

| | | |
|------------|---------|-------------|
| Pre 2010 | 1.50% S | (15,000ppm) |
| July 2010 | 1.00% S | (10,000ppm) |
| Jan 1 2015 | 0.10% S | (1,000ppm) |

A FOUR STREAM APPROACH

Investing in vessel design and technology contributes to mitigating the increase in costs by reduc-

ing emissions and increasing efficiency, reducing exposure to variable and unpredictable fuel costs.

The WW group is currently evaluating exhaust gas cleaning systems and other technical solutions. We are looking at new engine and vessel designs that will further reduce fuel consumption. In addition we are more closely managing our sailing schedules and vessel speeds, in addition to several other initiatives. The overall goal is to find the most cost efficient and sustainable solutions for complying with sulphur regulations.

Together with partner Wallenius and headed by WWL, WWASA will explore a number of solutions to ensure that they are feasible for a mixed fleet composition and for international trading, and that the economics make sense. WWL has chosen a four stream approach to tackle stricter sulphur regulations and is dedicated to find the most cost efficient and sustainable solutions for customers.

MARINE GAS OIL

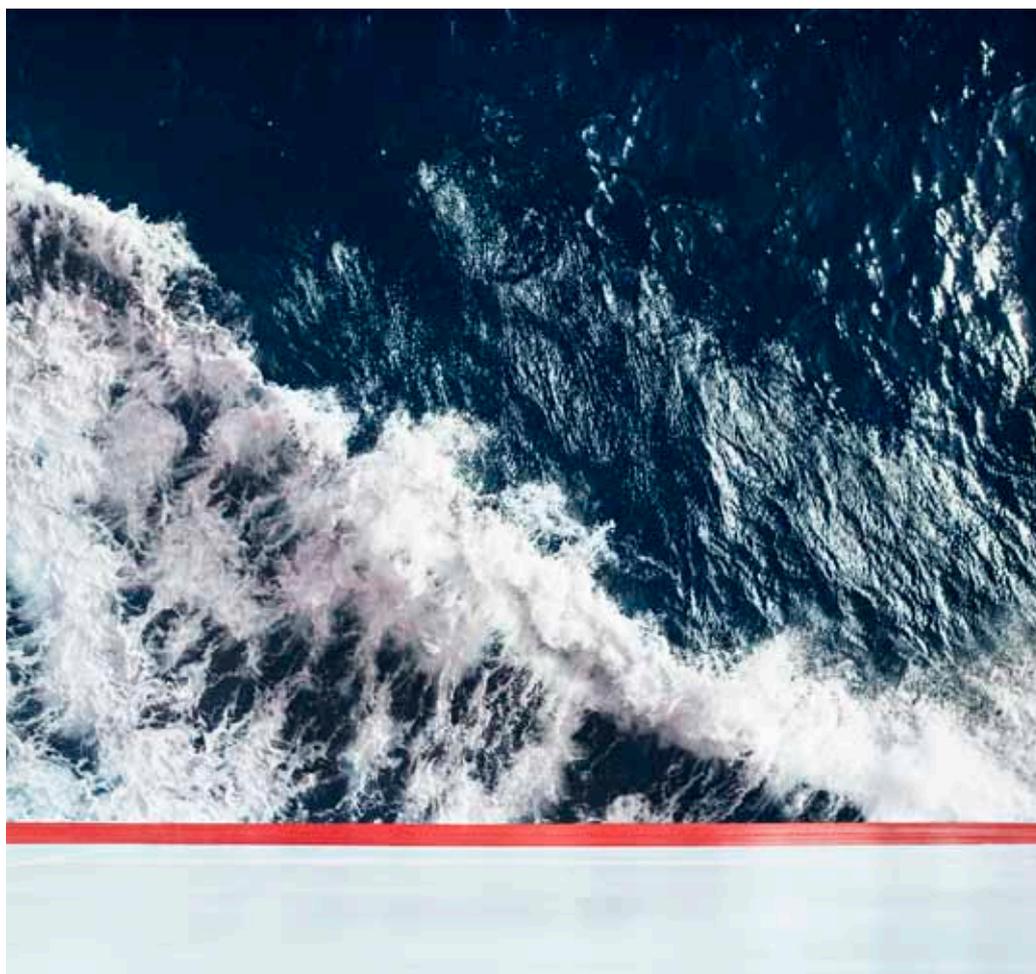
A compliant but expensive solution is to switch to Marine Gas Oil (MGO) with a sulphur content of 0.1% S. While this option requires only minor adjustments to the vessel design and operation, the availability and pricing of this type of fuel comes at an estimated cost at ~50% higher than Heavy Fuel Oil (HFO).

MULTI-STREAM SCRUBBER

Exhaust gas cleaning systems, also called scrubbers, are a compliant, technical approach to the regulations that remove sulphur from the vessels' exhaust gases. Scrubber technology is considered to be immature in shipping. In line with our continuous effort to explore new technology, WWL and WWASA are conducting a pilot project in 2012 - 2014 to evaluate the design, technical, operational, safety, environmental and regulatory aspects of scrubber installations.

WWASA and WWL have made significant financial investment in this pilot project in order to gather early experience on this technology as a potentially compliant solution.

In the first quarter of 2013, one of the world's largest hybrid scrubbers will be installed on the ro-ro vessel MV Tarago. The scrubber will clean the



exhaust gases produced by the 38 486 dwt vessel's combined engine power of 28 000kW.

Following the commissioning, a comprehensive third party measurement and verification programme will be completed during the second quarter of 2014, partially funded by the Research Council of Norway.

ALTERNATIVE FUELS

Alternative fuels will be explored through research and development projects. WWL is working together with its owners to explore alternative fuels such as LNG, Ethanol, Methanol, and others.

The objective is to develop a potential competi-

tive advantage for WWL in terms of price stability, supply/ availability and the possibility of decoupling from fossil fuels in the future.

< 0.5% SULPHUR BUNKER OIL

Removing the sulphur at the refinery is potentially a good, long term solution from the perspective of the shipping industry. As an upstream solution it takes care of the sulphur at the source.

WWL has initiated dialogues with other shipping companies to form a group of like-minded industry players seeking both facts and solutions for compliant low sulphur residual fuels. This group of companies represents at least 10% of the total industry bunker demand.

Marine Gas Oil (MGO)

Ensure bunker supply chain in order.

Prepare fleet for use.

Multi-stream Scrubber

Install and run pilot project to gain early experience.

Work with stakeholders in global operating environment to evaluate risks and costs.

Alternative Fuels

Develop competitive advantage in terms of price stability, availability, etc.

Decouple from fossil fuels.

≤0.5% Bunker Oil

Ensure a supply of ECA compliant ≤0.5% sulphur bunker.

Mobilise an industry initiative to drive demand.

Environmental initiatives in 2012 and forward

We will continue to develop new solutions that benefit the environment through reduced emissions. In 2012, one such initiative was the new joint venture Shippersys, aiming at developing a game-changing technology for efficient voyages. In 2013, installing and testing the largest scrubber of its kind on one of our vessels will receive particular attention.

Shippersys - developing software for sustainable shipping industry

Together with partner Wallenius Marine AB, WWASA have entered into a joint venture with Norwegian meteorological company, StormGeo AS in 2012. The company aims at developing a range of innovative software solutions for the shipping industry. StormGeo will hold 50% of the new venture with the remaining 50% split evenly between the two other partners.

Fuel efficiency is an important contribution to greener shipping. Combining Wilhelmsen's and Wallenius' vast experience from operating vessels with StormGeo's meteorological and data models, tailor made software solutions for optimising the shipping industry will be developed.

Wilhelmsen and Wallenius have during the last four years developed a highly sophisticated ves-

sel reporting tool. This reporting tool will bring vessel reporting accuracy to a new level for the shipping industry. In addition, a vessel ballast optimisation tool, developed by Wilhelmsen and Wallenius, will be a key component in the partnership's development work. StormGeo will contribute advanced meteorological models and advanced ship specific weather routing models. When launched, this unique system will give us as owners as well as our commercial operators' an important tool for optimizing voyages with fuel efficient operations being one of the key benefits. At the same time, new and innovative solutions will contribute to safer operations for crew onboard vessels operating at sea. For the first two years, development will focus on further development and streamlining the existing solutions to be fully integrated within the joint venture companies. Through developing an efficient, well-proven system, broader commercial opportunities will make this game-changing technology and solution commercially available to the global merchant fleet.

The world's largest multi-stream exhaust gas cleaning system (EGCS)

In 2012, WWASA started a project to install a 14 metre high multi-stream exhaust gas cleaning system, a so-called scrubber, on the ro-ro vessel MV Tarago. When commissioned, it will be the largest of its type in the world.

The multi-stream scrubber is a pilot unit supplied by Wärtsilä Moss AS and represents a major step towards more reliable technology that can help the industry comply more efficiently with increasingly stringent environmental regulations. It is based on the Krystallon Exhaust Gas Cleaning System that removes

sulphur and particulates from the exhaust gases from the vessel's main and auxiliary engines. The system will clean an almost unprecedented amount of exhaust gas: the main engine alone produces approximately 180 000 kg per hour. When in operation the scrubbing unit alone will weigh close to 45 tonnes. The installation on the Mark IV roll-on roll-off vessel MV Tarago is scheduled for March 2013 at Sembawang Shipyard in Singapore. The project is headed by Wilh. Wilhelmsen ASA's technical department.

Risk assessment.

Prior to the installation, DNV performed a risk assessment of the project covering the design, installation and the operational phases. This process was divided into a Failure Mode Effect Analysis (FMEA), to identify possible risk elements in the design itself and a Hazard Identification (HAZID) to identify risks related



Multi-stream scrubber

Supplied by Wärtsilä Moss AS

Scrubber unit is 14 meters tall and weighs close to 45 tons when in operation

Combines the exhaust from the main engine and all five auxiliary engines into a single stream

Removes sulphur and particulates from the vessel's exhaust gases

Cuts SO_x emissions equivalent to 0.10% sulphur in fuel

Project participants include WWASA, Wärtsilä Moss, Sembawang, DnV, Marintek and The Research Council of Norway

to installation and operation. The scrubber can be operated in both an open and a closed loop, where the latter releases a very limited amount of effluent. This effluent can either be collected in a holding tank or be discharged directly into the sea. There are currently no restrictions concerning the discharge of effluent from scrubbers, although some local ports might require limited or even zero discharge at some time.

The new sulphur requirement compels ships to use cleaner fuel with max. 0.10% sulphur content in the Emission Control Areas (ECA's) from 1 January 2015. Alternatively, IMO allows scrubbers with corresponding emission limits. When this new requirement comes into effect, the most likely scenario for the majority of the existing fleets operating in ECAs is to use marine gas oil (MGO), which is a more expensive fuel. By installing scrubbers, owners can be in

compliance while at the same time cut their fuel bills considerably.

Extended testing.

WWASA will evaluate the test results to determine which vessels in the WW fleet might be suitable for a similar installation. Such evaluation will be limited to ships where the number of years of operating service left justifies the investment. Ships routinely sailing in ECAs will also be candidates for such an evaluation.

An important objective of this project is to provide reliable information to lawmakers and port state authorities on effluent discharge and particulate matter. The Norwegian Maritime Technical Institute, Marintek, will be involved in the testing phase after commissioning, which will last until spring 2014. This project is partly funded by the Research Council of Norway.

For the second time in a row, the Energy Efficiency Competition was conducted by Wallenius Wilhelmsen Logistics. Fuel consumption represents the largest operating cost operating a vessel, so all initiatives that can reduce the consumption of bunkers is both a large gain for the company and for the environment.



Energy Efficiency Competition

Headed by operating company WWL, WWASA contributed to a Energy Efficiency Competition (EEC). The aim of the EEC is to generate energy efficiency ideas from personnel with onboard and shore experience that can be implemented across the 60+ vessel fleet of WWL.

The prize fund is a vessel's bunker consumption over 24 hours, equivalent to approximately 32 000 US dollars. All seafarers in the WWL operated fleet could participate, as well as superintendents, trade vessel operators and site offices for newbuildings.

The 2012 competition attracted 36 persons/teams who submitted 43 entries in total. The Energy Efficiency Working Group (EEWG), consisting of representatives from WW, WWL and partner Wallenius, has already decided that all the five winning entries will all be implemented on pilot ships during 2013.

Here are the winners of the Energy Efficiency Competition 2012:

MV Tysla - Eldar Danielsen

Optimizing the output of the steam turbo generator: A well-documented proposal on how to optimise the output of the turbo generator and thus reduce the demand on the shaft generator. Even though it's only applicable to Mark V vessels, the savings are substantial.

MV Toscana - Sarvesh Almeida

Installing motion sensors on light fixtures in accommodation and in cargo holds: Two constructive and well documented suggestions, which present savings at sea and in port. The total savings depend on the degree of implementation but as it's applicable for all vessels the total savings will be substantial under any circumstances.

MV Aida - Ingvar Persson

Improved lube oil system: The idea centred on a method to optimise the way the lube treatment plant and associated pumps are utilised. As it's applicable for almost all vessels the total saving will be significant.

MV Isolde - Mats Høglblom

Installing motions sensors on light fixtures in accommodation: Identical to below above, comment applies to both. The entries share the advantage of having limited cost and time for implementation.

MV Isolde - Mats Høglblom :

Ambient air supply to main engine turbocharger: This well-documented proposal represents a major saving potential at sea and in port as fewer engine room fans would need to be run. Although the implementation cost will be significant, it will still be outweighed by the potential savings. The proposal applies to several existing vessels and will be also be considered for incorporation into newbuilding designs.

Orcelle Grants 2012

Partly owned WWL has a fund - Orcelle Grants - that supports clean tech entrepreneurs aimed at making shipping and logistics more sustainable. WWL awards Orcelle Grants to clean tech entrepreneurs working on alternative energy sources and energy efficient technologies for commercial ocean vessels, and marine terminal & processing facilities. This focus reflects WWL's own research and development into the E/S Orcelle, a zero-emissions concept vessel, and the Castor Green Terminal, a zero-emissions terminal and cargo processing centre.

From 2012, WWL has partnered with the Ocean Exchange to extend the reach of the Orcelle Grants and to facilitate the leap of ideas and innovations across industries. The Ocean Exchange unites international organisations from multiple disciplines and across boundaries to distribute

and adopt solutions that positively impact oceans and ocean life. In 2012, the Ocean Exchange's competition generated applications from North America, South America, Europe, Asia, Australia and the Middle East.

The USD 100 000 WWL Orcelle® Grant for 2012 was awarded to NoNox: Emulsion Combustion Systems.

Fossil fuel emissions contribute to global warming and are a root cause of many health problems. Creating a stable water in fuel emulsion is a proven method of to help cleaning up these emissions. The NoNox emulsion combustion unit (ECU) is a complete emulsion fuel system containing the mixing chamber and fuel/water proportioning controls. The ECU can be switched back and forth between emulsion and straight fuel at the flick of a switch. More information may be found at nonoxltd.com