

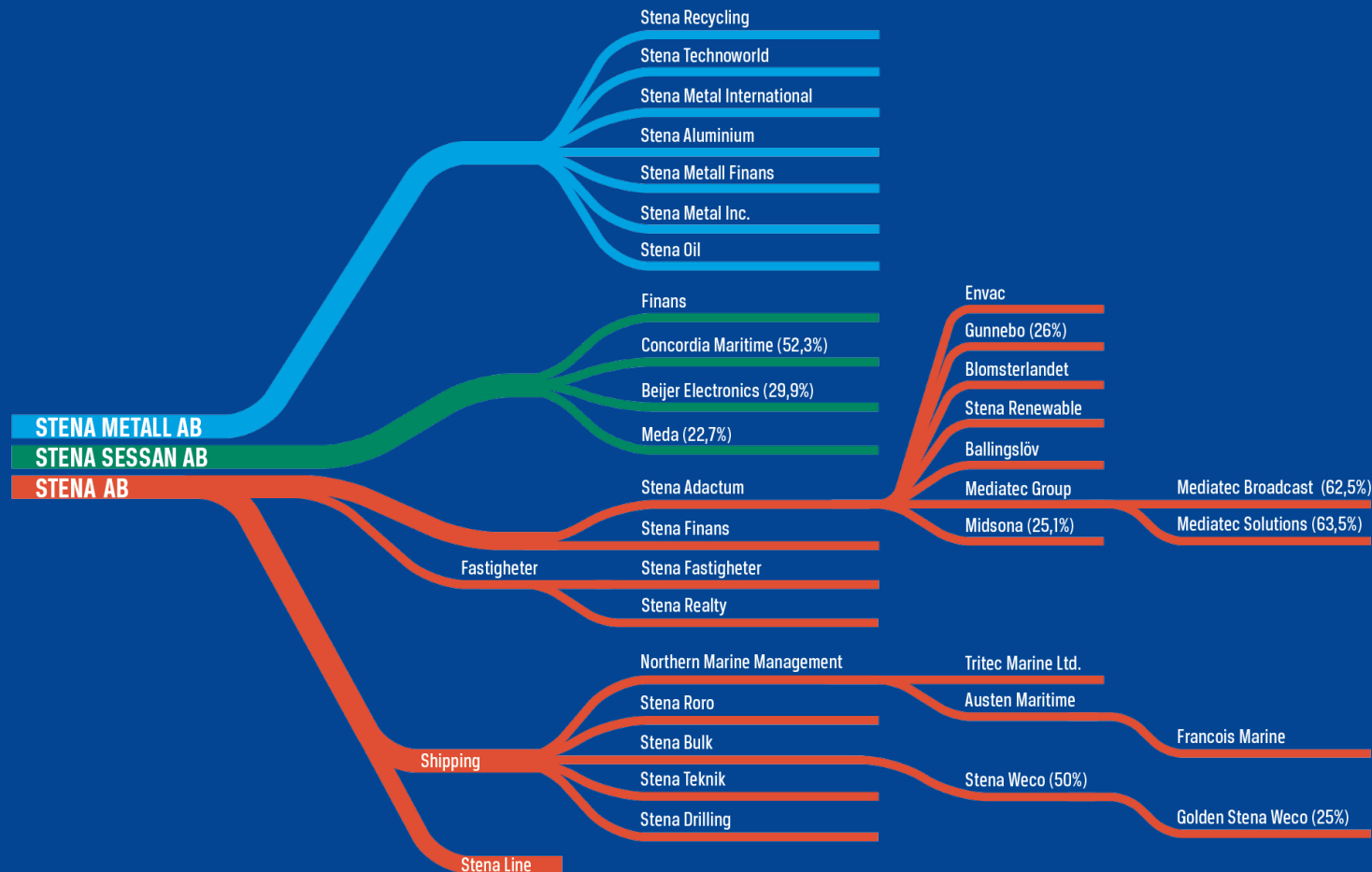


Maritime Tourism and Mobility – Sustainable Strategies

Ron Gerlach
Stena Line, Trade Director Germany

Kiel, 13th March 2017

The Stena Sphere



INNOVATING IN ALL BUSINESS AREAS



Sten A Olsson buys three older vessels in 1946. Takes the best parts of each and assembles his first ship - DAN.



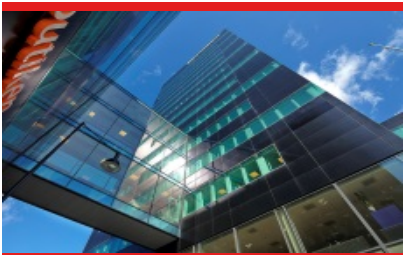
In 1996 the worlds largest high speed ferry concept is launched – the HSS. Built in aluminium.



In 2001 the worlds two most wide and shallow VLCC tankers are delivered - with twin engines.



Stena DrillMAX ICE - launched in 2012. The worlds first ultra deep-water ice classed drillship.



The green building, operated by Stena since 2013 is one of the highest environmentally certified buildings in Scandinavia.



In 2013 Stena Metall starts constructing the most modern recycling facility in the Nordic region.

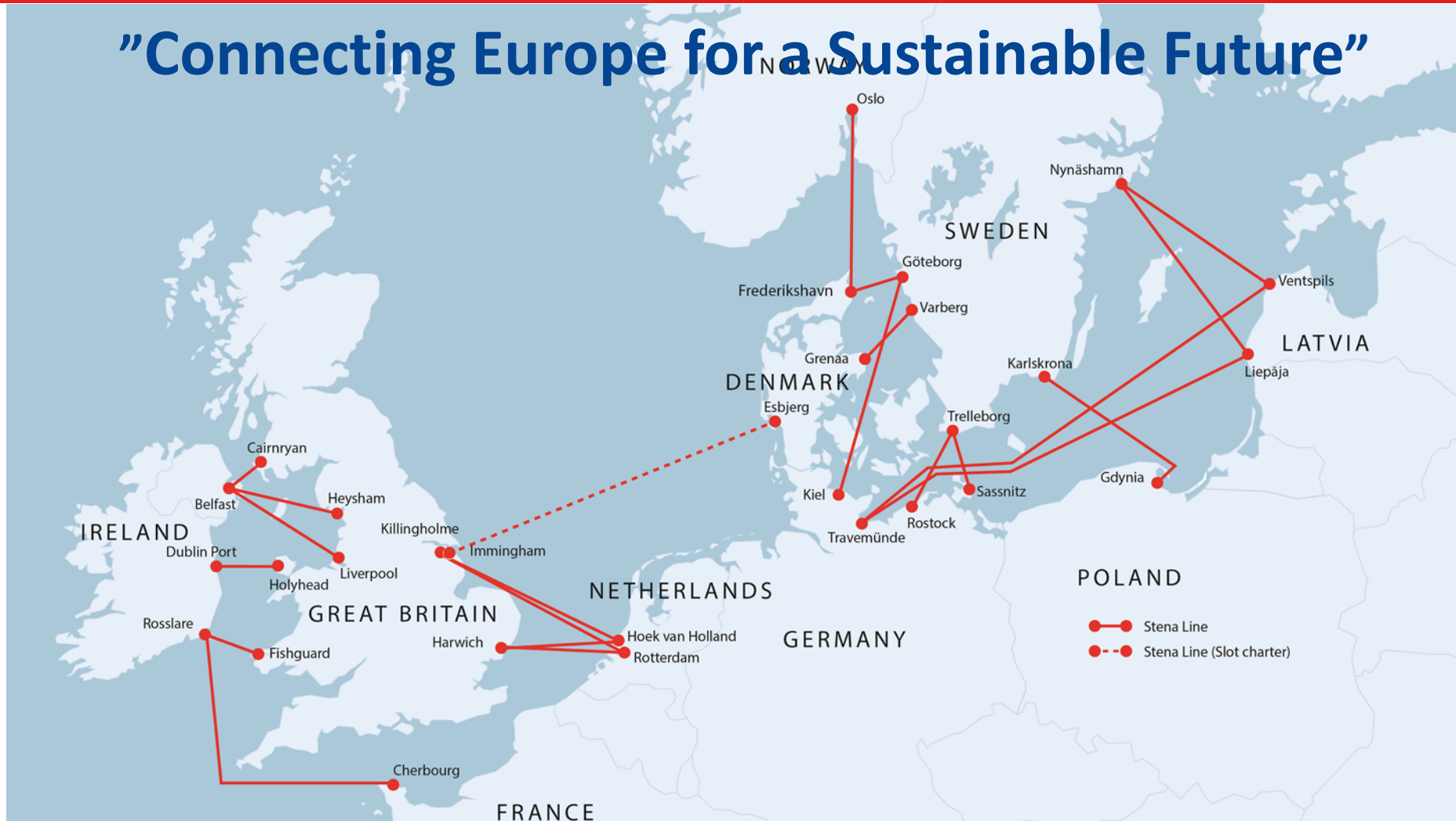


First in the world again. RoPax Stena Germanica is converted to methanol propulsion in 2015.



Delivering 2015 – 2017, our series of MR tankers will use 30% less fuel than a ship built 10 years ago.

"Connecting Europe for a Sustainable Future"



Ferries - provides safe and efficient infrastructure

Every year ferries in Europe transport*:

- 805 million passengers – slightly less than aviation
- 154 million cars
- 33 million trucks and trailers

Ferries are safe, past 10 years there have been 14 fatalities in Europe.

European companies run 70% of the world ferry capacity.

The EU shipping industry is estimated to directly employ approximately 600 000 people. Each direct employee creates another 2.8 employees.



*Research for Trancommitee- The EU Maritime Transport system: Focus on Ferries 2016

Our reasons to engage

Strategy and culture - we Care

Vision: *Connecting Europe for a **sustainable** future.*

Mission: *....and a **reduced environmental footprint.***

Values: *We deliver efficiency and sustainability through care – care for our customers, **care for resources, care for each other***

Owner and employee expectations



Exceed customer expectations and reduce risk

- Increased focus on ethical and environmental matters in all parts of the value chain.
- Stakeholder trust
- Brand reputation
- Risk mitigation



Because it's 2017

Aviation Shipping Transport

UN shipping chief: Climate change is 'top priority'



Last updated on 02/02/2016, 5:01 pm

The International Maritime Organization is set to consider an emissions target in April, says newly appointed head Kitack Lim



Kitack Lim took the top IMO job on 1 January (FIC International Maritime Organization)

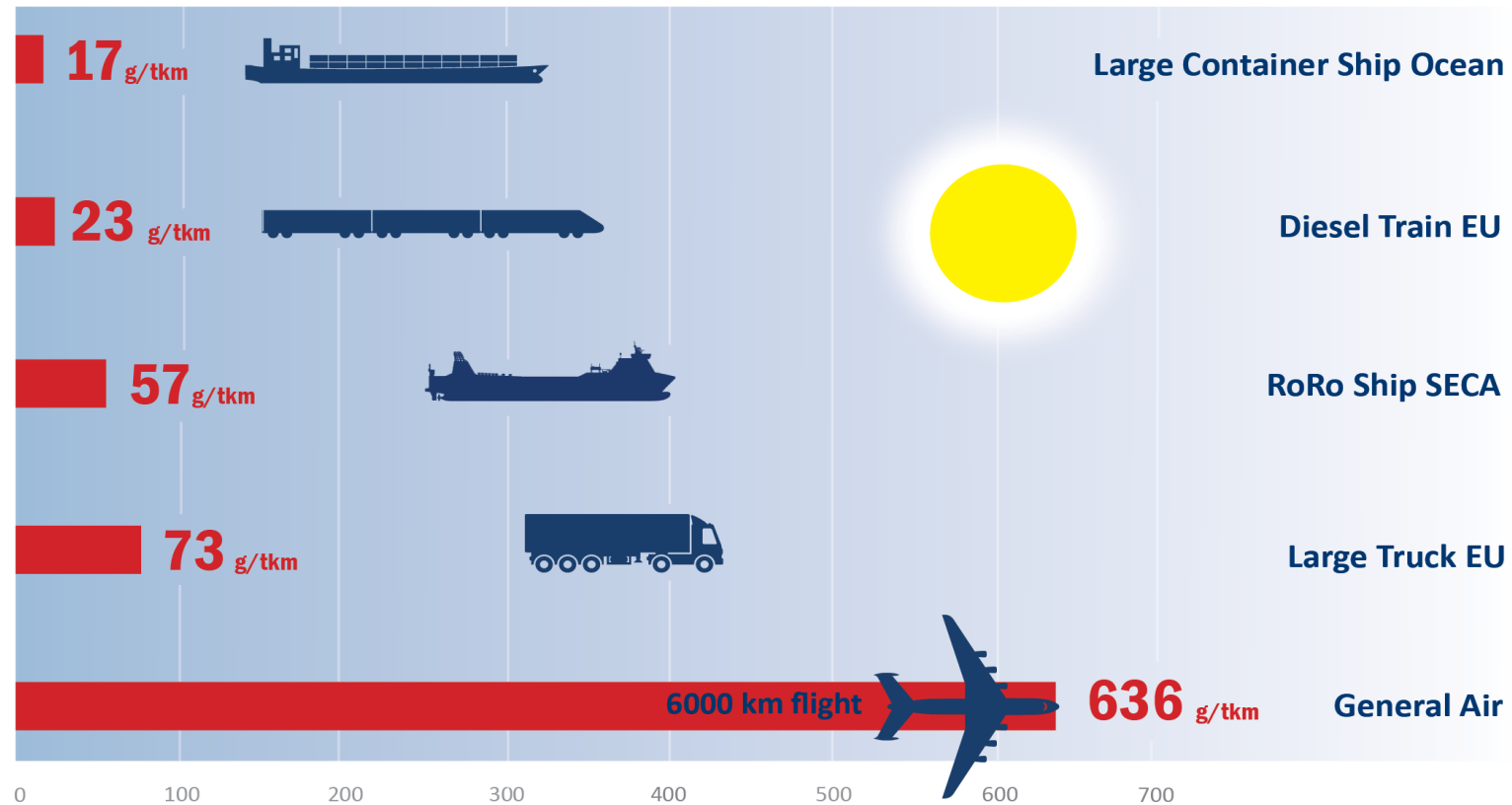
By Megan Darby

The UN shipping body is likely to consider a greenhouse gas emissions target for the sector this spring, its newly appointed chief told Climate Home.



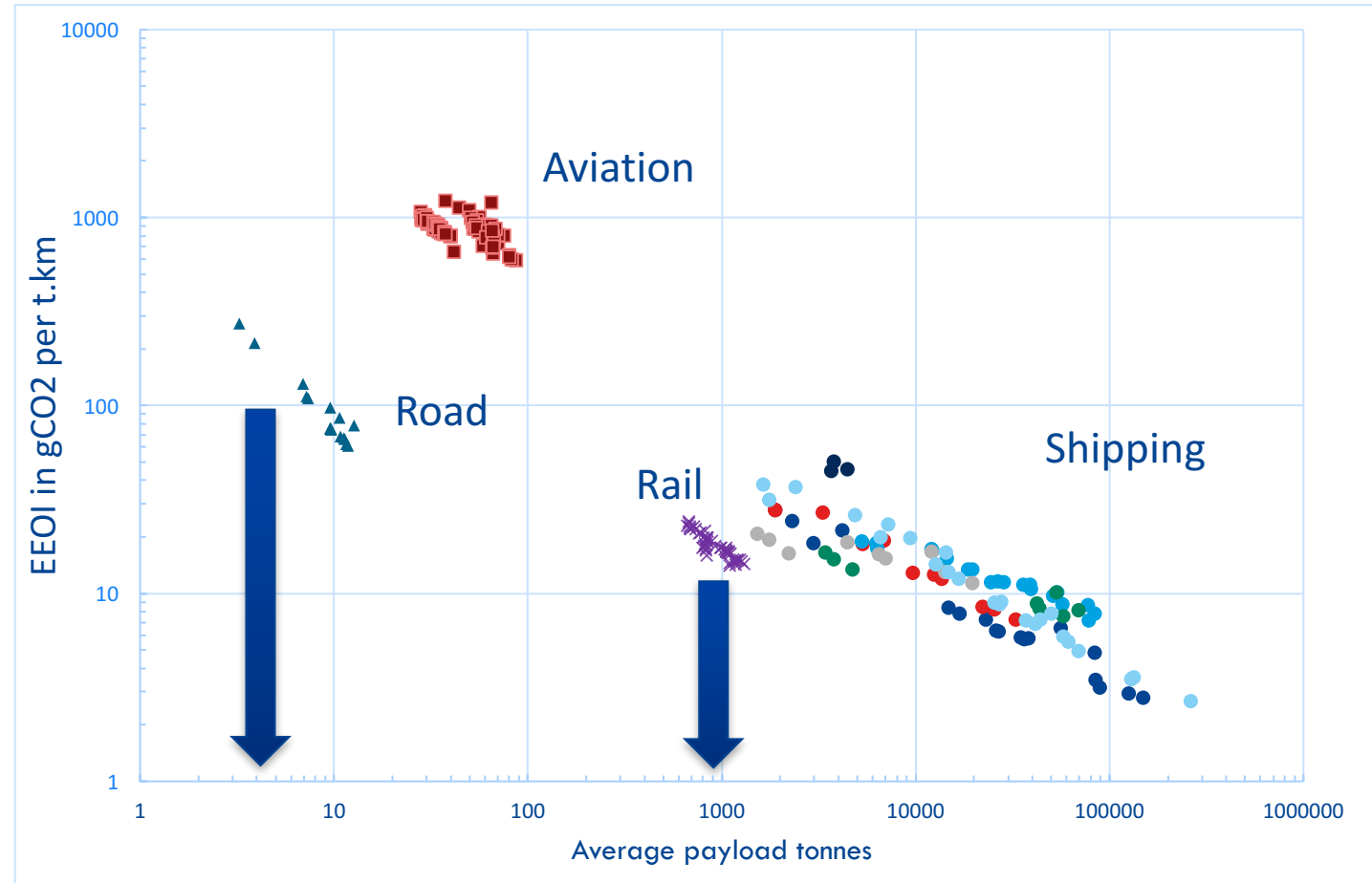
Shipping – global, safe and energy efficient

Comparison of CO₂ emissions between different modes of transport.



2014 • Figures apply Well to well • Calculations by Conlogic. Source: NTM Calc.

We need to maintain shipping's green image



Some of our other priorities



Plastic production and pollution is growing and microplastics (< 5 mm) are increasingly found in fish.

In 2050 there will be more plastic in the oceans than fish if nothing changes.



Emissions to air of SO_x, NO_x, and particles are estimated to cause 3 million premature death ww each year.

They are also the subject of increasingly forceful regulations and taxation.



Over-fertilization in the Baltic is major concern.

About 50% decline in world marine populations in 40 years.

Pollutants can end up in marine organisms, fish and eventually humans.



About 1/3 of all food produced is estimated not to be eaten.

That is a major waste of resources, water, energy – and revenue.

In a world with a fast growing population – to reduce, reuse and recycle is increasingly important.

Stena Line focus areas and commitments



Health & Well-being

Through care for each-other and an absolute commitment to safety, Stena Line shall actively promote the well being of our guests and staff.



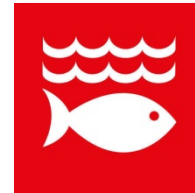
Responsible Consumption

We care for resources by responsible purchasing and by every year reducing waste and increasing recycling.



Clean Energy

We shall relentlessly strive for improve in energy efficiency on shore and at sea - and actively stimulate the usage of renewable energy sources.



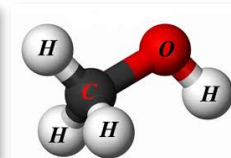
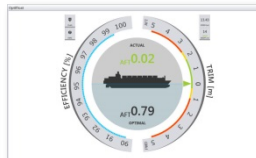
Life below water

We rely on the ocean for of our company's existence and as such shall have minimal impact to marine life from our operations.

Additional projects and decisions

Objective/area	Year	Target
Energy efficiency - ESP	2016	FMS on 28 vessels, light version evaluated
Use of alternative fuel	2016	Stena Germanica - one trip 100% methanol
Use of biofuel	2017	Stena Germanica - one trip 100% bio-methanol
Life under water	2017	Use only closed loop scrubbers
Reduce SOx emissions	2017	Cap max 1,5% sulphur on 3 RoRo on ISN
Increase recycling	2017	Equip all terminals with recycling bins
Clean energy	2017	Run terminals on 100% renewable energy
Use of alternative fuel	2018	Stena Jutlandica – battery propulsion project
Responsible consumption	2020	Increase ecological food purchases to 40%
Life under water	2017	Remove plastic disposables
Life under water	2017	Double the amount of environmental detergents

**APPROVED
BY GM**



The greenest ferry shipping company



EVERY DAY OPTIMIZATION – 294 PROJECTS

TRAINING OF PERSONNEL

- “SAVE” e-learning for crew and onshore staff.
- Comparison and competitions between the ships in energy efficiency.
- An advanced Fuel Management System (FMS) is a system installed on board 28 Stena Line vessels. The system measures the fuel and energy in real time to support effective work on the bridge as well as in the engine room.

HULL

- Regular cleaning of the hull and propeller.
- Optimized trim between bow and stern
- Replacing the ship's bulbous bow based on the vessel's current average speed.

MACHINERY AND PROPELLERS

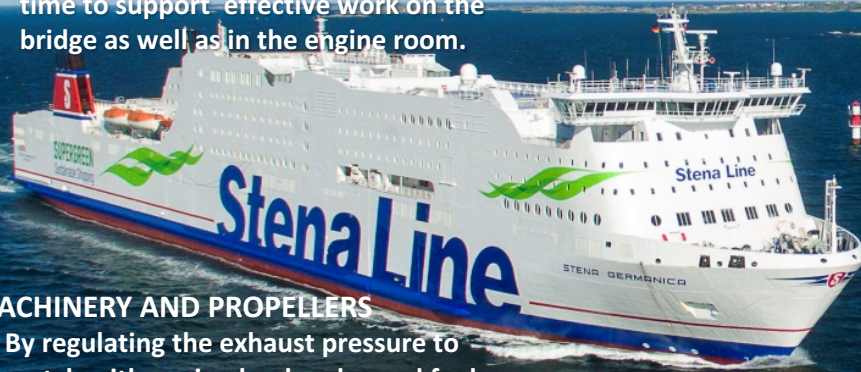
- By regulating the exhaust pressure to match with engine load and speed fuel consumption is reduced.
- Optimization of the adjustable propeller blades.
- By replacing and optimizing the ship's propeller based on average speed energy savings of 5-10% has been achieved.
- Frequency controlled pumps and fans .
- Installation of regulators on main engines that control the supply of fuel.
- Isolation of heating pipes in the engine allows some of the heat to be recycled on board.

SPACES ON BOARD

- Installation of induction-stoves in the kitchen spaces saves energy.
- Installation of LED-lights. In some cases they are linked to motion detectors.
- Cabin windows are covered with window film that blocks out 82% of the sun's radiant heat.

ACTIONS FROM SHORE

- EMS (Energy Management System) is a digital toolbox used on shore to compare the energy consumption of the fleet and be able to apply best practice.
- By planning the timetable the ship of average speed can be adjusted - affecting fuel consumption.
- On 11 vessels that Stena Line operates the ports have shore side electricity. This allows engines on board to be turned off.
- In the Gothenburg the Stena Danica is connected to the district heating grid when she is at berth – a worlds first.



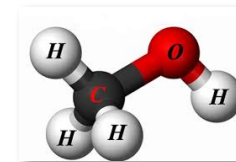
Methanol project – Stena Germanica

Methanol reduce emission while being liquid and not needing large investments in infrastructure such as LNG

- Worlds first conversion of a vessel to methanol/diesel propulsion
- Stena Germanica very large RoPax built 2001
- Currently in testing and evaluation phase – Sweden/Germany
- Converted for six weeks at Remontowa, Poland 2015
- Budget abt €11 million. EU supported through MoS and TEN-T
- Large public interest, six international awards
- Methanol operation reduce SOx, PM with 90% and NOx with 60%
- Methanol can be produced by a variety of feedstock's. If bio-methanol - no CO2.



Stena Germanica - Built 2001 (RoPax)
Passenger capacity 1,300
Lane meters 4,100
About 365 voyages / year



Stena Jutlandica battery pilot

- Ship is sailing on the route Gothenburg – Fredrikshavn
- Application for EU support has been sent via TEN-T
- Planned to start in 2017
- Power one auxiliary engine with Energy Storage System
- Charging by green shore-side electricity while in port
- Size of battery about 1,000 kWh
- Vessel to maneuver thrusters on electricity, lowering emission, noise and maintenance. Also to be used as back-up power in shallow passages.
- Budget €2.5 mill

Second stage is planned as conversion of two main engines, to enable the ship to sail through the archipelago on electricity.



Stena Jutlandica - Built 1996 (RoPax)
Passenger capacity 1,500
Lanemeters 2,750
About 1,400 voyages / year

District heating connection to Stena Danica

- EU Smart cities project in co-op with local Power company. Aim to show new areas where district heating can be used.
- On most ships, while at sea the hot water on-board is maintained by excess heating from the exhaust and in port the boilers are usually used to heat water.
- First district heating installation in the world 2014 with heat exchangers on shore and on the ship (four small) .
- The ships consumption of district heating in 2015 was about 600,000 kWh for her night time stops.
- Compared to using boilers it reduce CO2 emission with abt. 250 mt/year plus lowering other emissions and creating less noise.



Stena Danica - Built 1983 (RoPax)
Passenger capacity 2,275
Lane meters 2,290
About 1,400 voyages / year
Gothenburg - Fredrikshavn

INTERMODALITY LINKING SEA, RAIL AND ROAD



OPS – On Shore Power Supply

Using OPS reduce CO2 emissions with 13 000 tons/year
– about 1% of Stena Line total emissions.

- In port usually one auxiliary diesel engine is running to produce electricity for the ship.
- Today 10 out of 35 vessels are equipped to accommodate OPS.
- Installation cost on the ship abt. € 400-500 k.
- Installation cost on shore abt. €700 – 1,000 k (switchgear, drives, crane, groundwork's, container)
- In some ports it is mandatory for the environmental permit. In most ports it is not possible due to lack of interest, cost or grid.
- No common standard although work in progress.
- Electricity prices vary greatly in Europe - bunker prices are the same all over.
- Ship usually use 60 Hz on-board while shore grid is 50 Hz – frequency converter is needed. Ship will have a high power output, 1 – 2.5 MW.
- Saves NOx, SOx, particles and noise – important in urban areas. If green electricity – save CO2.



So how do we succeed – by taking part

- **CARE** is in Stena's DNA. "Nobody cares like us" – we care for customers, passengers, environment and each other.
- Sailing towards a more sustainable future requires all of us onboard and onshore to **take daily action** – large and small - with the authority we have been given.
- **Our engagement, initiatives and action** are crucial tools for success.
- On the agenda. Evaluate what each department can do.
- We have plenty of tools to choose from – sharing what works and not!



Stena *E-Flexer* - to be delivered 2019/2020

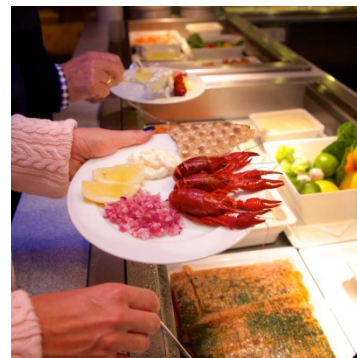
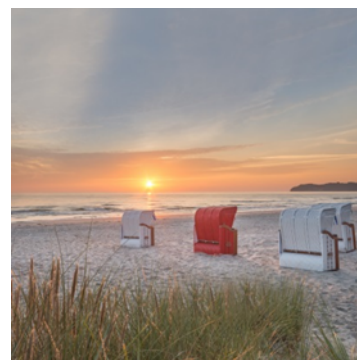
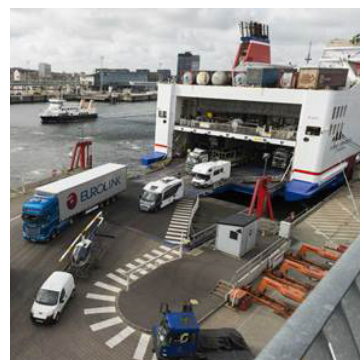
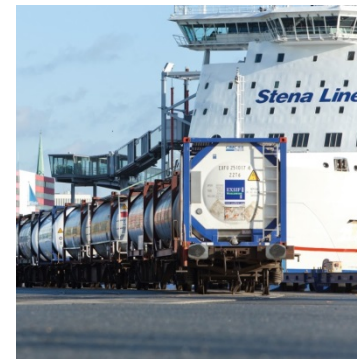


Est. -15% consumption/lm vs. standard design
FMS and BWTS
LED lightning and window film
Bio degradable hydraulic oils
Frequency controlled pumps/fans
Compactors for plastics and glass
Green passport

Stena Elektra design concept

- First electric ferry “Elektra” from Siemens in 1886 carried 25 passengers
- Our version is in-house future design concept, will be complete in December 2016
- RoPax vessel with estimated capacity 3,000 lm and 1,000 pax
- Lightweight material saves fuel
- Electric and/or hybrid versions for short/mid distances
- Full electric with a range of about 100 nm steaming
- Quick loading and discharge with double stern quay side ramps





Thank You!