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# **LNG – the future of tanker shipping**

Zwolle, 24<sup>th</sup> April 2019



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# Terntank Rederi A/S

## In short:

- Terntank was founded in 1958 on the island of Donsö, Sweden.
- A private, family-owned company.
- We own and operate 10 ice-classed tanker vessels btw 8,000 and– 15,000 dwt.
- Primary markets are the Baltic Sea and the North Sea.
- "First Movers" for various green shipping technologies.
- We employ approx 250 people in total onboard our vessels and in our offices in Skaw, Donsö and Manilla.

# Donsö facts

16 km south-west of Gothenburg

1500 inhabitants

11 shipowning companies

No cars



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# Fleet

	Dwt	Built	Ice class
• Tern Ocean	15 000	2017	1A
• Tern Sea	15 000	2016	1A
• Ternsund	15 000	2016	1A
• Ternfjord	15 000	2016	1A
• Ternvind	10 300	2008	1A
• Tarnbris	10 300	2007	1A
• Ternholm	14 796	2005	1A
• Ternvag	14 796	2003	1A
• Ternhav	14 796	2002	1A
• Ternvik	14 796	2001	1A





# Customers



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**NEOT**  
North European Oil Trade

**ExxonMobil**



**NESTE OIL**





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# First Movers – Journey so far

- 1972 – first double hull tanker for Scandinavian market.  
(IMO regulation from 1996)
- 2011 – SCR installation on Ternvag on HM and AUX.  
(yearly savings: 370t CO<sub>2</sub>, 230t Nox, 120t gasoil)
- 2013 – Ordered 4 newbuildings with LNG/Dual-Fuel at Avic Dingheng.  
(delivered in 2016/2017)
- 2015 – Installation Frequency Converter/FuelOpt on 4 vessels.
- 2016 – Implemented "Just-In-Time" operation of TC and COA vessels.
- 2018 – SCR on AUX installed on Ternvind and Tarnbris.



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# Challenges and opportunities - choice of fuel/technology?

- Existing/future regulations; 20-22y forecasting?
- Low sulfur MGO vs HFO
- New technologies – ship design, digitalization, automatization
- Customer/Market demand – new cargo types
- Scrubber technology – open/closed loop
- Alternative fuels; LNG, Methanol, Battery, Shore Power and others

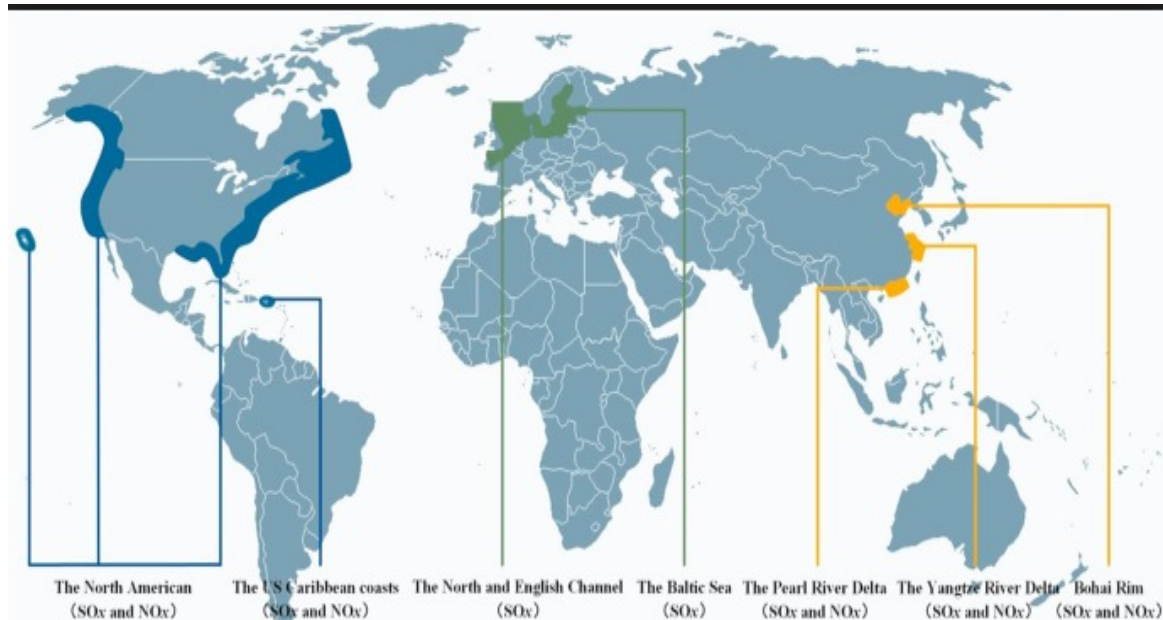
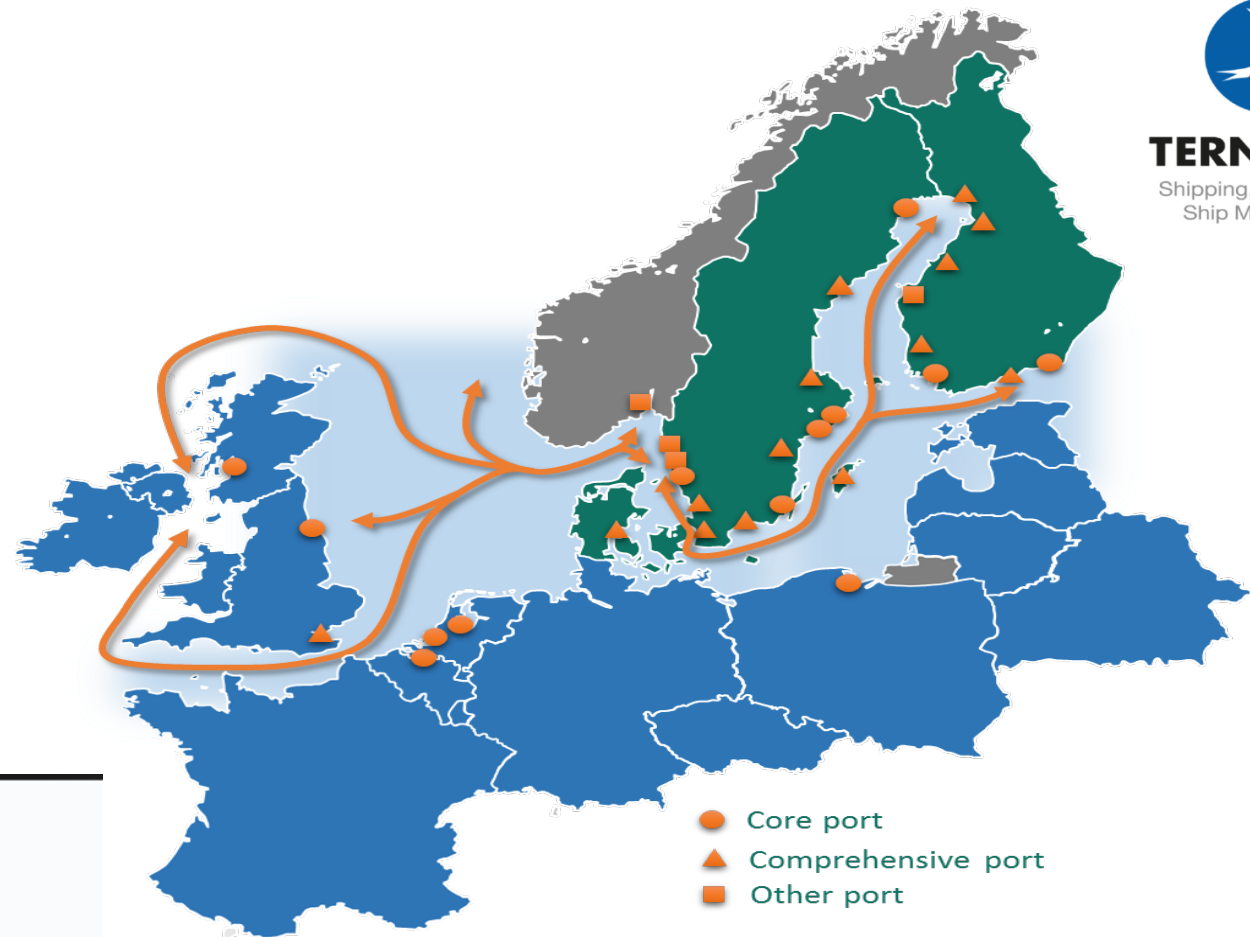
# Major trading area

- Operation 95% in the SECA area (North Sea and Baltic)
- SO<sub>x</sub> compliance and reduction of air emissions (NO<sub>x</sub>, PM and CO<sub>2</sub>) beyond existing requirements



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## Sulfur limits for fuel in SECA<sup>[7]</sup>

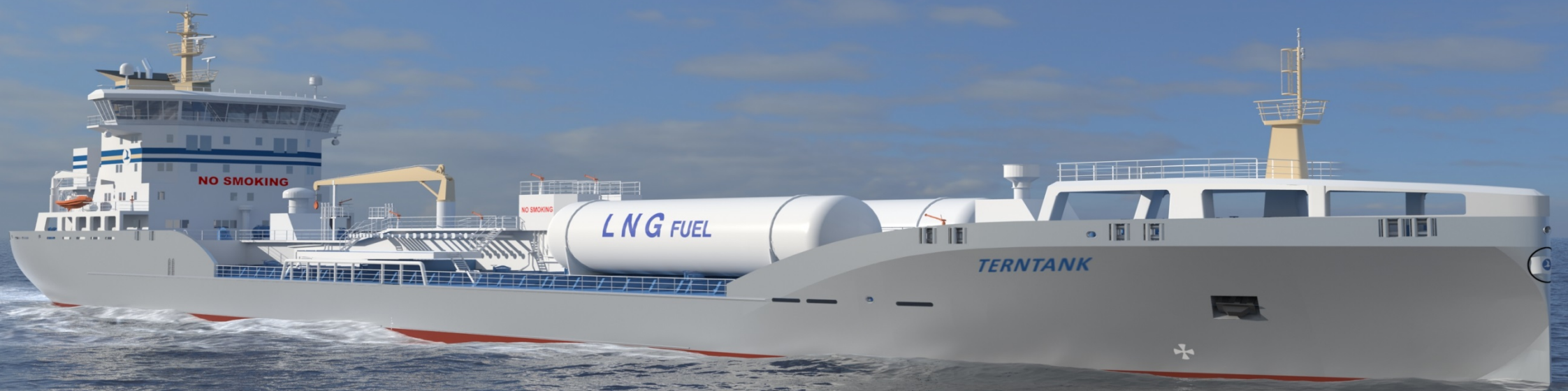
before 1 July 2010	1.50% m/m
between 1 July 2010 and 1 January 2015	1.00% m/m
after 1 January 2015	0.10% m/m

## General sulfur limits in other sea areas

before 1 January 2012	4.50% m/m
between 1 January 2012 and 1 January 2020	3.50% m/m
after 1 January 2020 <sup>[note 1]</sup>	0.50% m/m



# TERNTANK PRESENTS THE FUTURE OF TANKER SHIPPING



THE WORLD'S MOST ENVIRONMENTALLY FRIENDLY TANKERS





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## 4 new tankers built at AVIC Dingheng, China

- Four product tankers of 15 000 DWT with optimal environmental performance.
- The World's first LNG driven new tankers delivered from June 2016 to March 2017.
- The cost for optimized environmental performance is 25-30 % higher compared to a conventional tanker.
- The newbuildings are operating in the sensitive North Sea and Baltic Sea.







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# MINIMIZE AIR EMISSIONS INCREASE ENERGY EFFICIENCY OUTSTANDING WORKING ENVIRONMENT

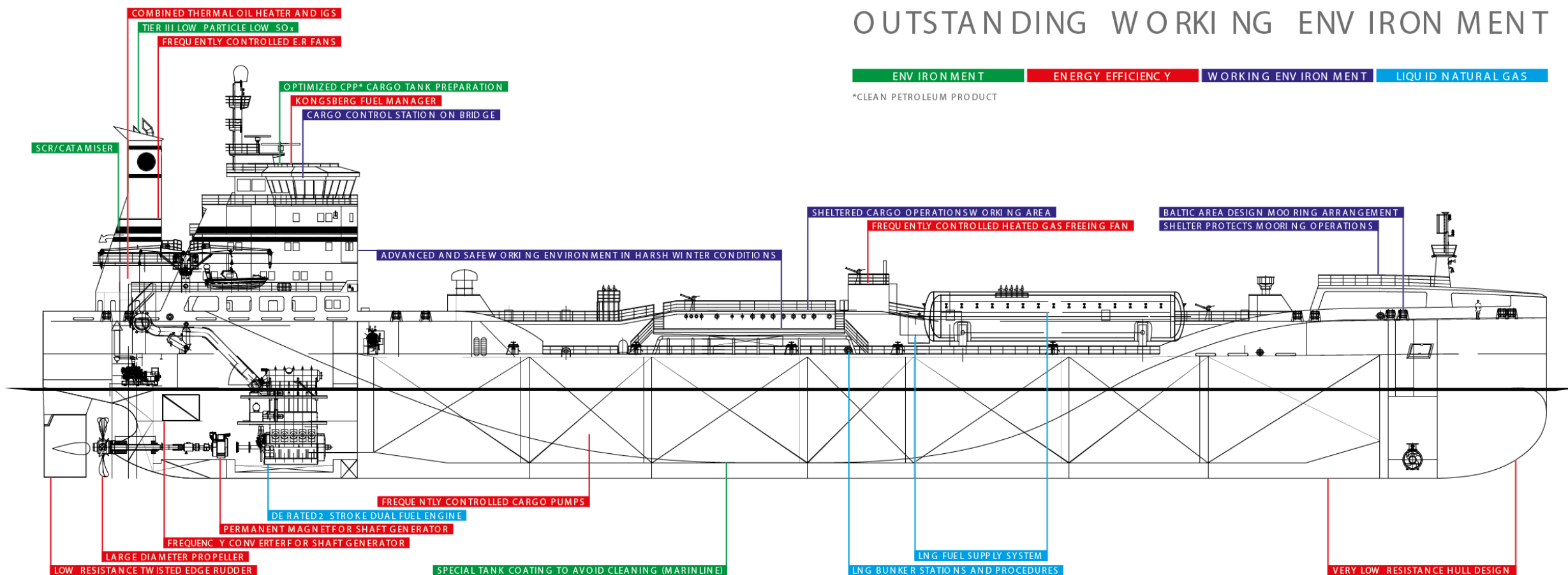
ENVIRONMENT

ENERGY EFFICIENCY

WORKING ENVIRONMENT

LIQUID NATURAL GAS

\*CLEAN PETROLEUM PRODUCT





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# New technology for low emissions

- A new innovative low-speed two-stroke dual-fuel engine of Wärtsilä
- New combined Catamizer (catalyzer/exhaust gas boiler/inert gas system) from Swedish Gesab.
- Energy efficient vessel design (Rolls-Royce Marine AS, Norway)
- Main engine meets IMO's lower NOX Tier III limit without additional exhaust gas treatment
- Increased propeller diameter
- Permanent Magnet Shaft Generator



# Emission reduction

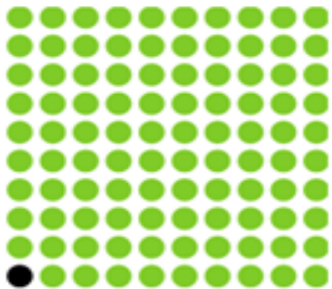


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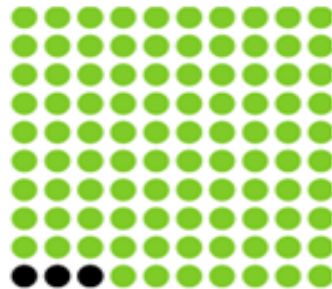
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## EMISSION & NOISE REDUCTION

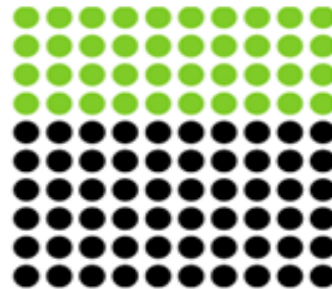
99% LESS  
**SO<sub>x</sub>**



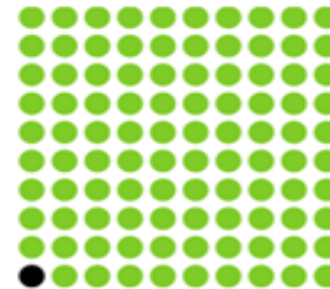
97% LESS  
**NO<sub>x</sub>**



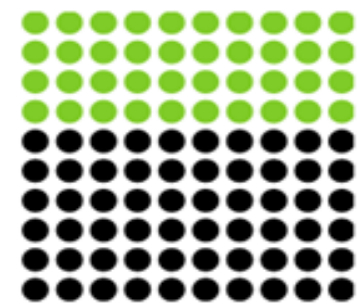
40% LESS  
**CO<sub>2</sub>**



99% LESS  
**PARTICLES**



40 % LESS  
**NOISE**



\* Compared to a vessel with same size built around 2005, operational speed 14 knots.



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# Bunkering STS or at Terminal

Bunkering STS



Bunkering at Risavika terminal



Or by truck





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# Economic aspects/funding

- 25-30% incremental cost for a "green" ship.
- EU support for new technologies/fuels (Motorways of the Sea etc).



**Co-financed by the European Union**

Trans-European Transport Network (TEN-T)

- NOx-Fond support for reduction of NOx.
- Reduction of Fairway Dues/Harbour fees (Sweden and Finland) etc.
- Missing LNG infrastructure.



# Göteborgs Hamn först ut med miljörabatt for LNG drift

Göteborgs Hamn går i bräschen för att uppmuntra redare att satsa på LNG för reducerad miljöpåverkan. Göteborgs Hamn reducerar kraftigt sin hamntaxa för fartyg som använder flytande naturgas (LNG) som bränsle. LNG-drivna fartyg beviljas totalt 30 procents rabatt vid ett anlop. Rabatten tas i bruk från och med 2015 och gäller fyra år framåt, till och med december 2018.





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# Early Movers rebate

Port	ESI/CSI Index	LNG rebate
• Port of Gothenburg	10 %	20 %
• Port of Lysekil	10 %	20 %
• Port of Rotterdam	10 %	10 %
• Port of Antwerpen	10 %	20%
• Port of Amsterdam	10 %	5 %
• Port of Pori	10%	5 %
• Port of Oslo	10%	5 %

## Ports to follow

• Port of Halmstad	Port of Oulu
• Port of Varberg	Port of Hamnina
• Port of Stenungsund	Port of Vaasa
• Port of Gävle	Port of Tees
• Port of Karlshamn	

# Assumptions



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## Exchange rate

Exchange rates (spot, Nordea 6/4-16):

USD/GBP	70,90
USD/NOK	834,58
USD /SEK	815,40
USD/DKK	655,99
EUR/USD	113,47

## Auxiliary engine – MGO consumption

	Load	Disch	Anch
AUX ENG LOAD %	57%	2x95%	45%
AUX ENG OUTPUT kW	450	1500	340
AUX RUNNING HOURS	1200	1200	864

## Fuel cost - LNG

14,0 knots laden / 229,167 days sailing / LNG: 14t/day – MGO 17t/day.

LNG Price Risavika (Scargas, 15th March, 2016): 26,2 EUR/MWh 406,23 USD/PMT

LNG Gothenburg & Brofjorden – Barge: 440,23 USD/PMT

MGO (Risavika/Tananger 15th March, 2016) 386,00 USD/PMT

MGO (Gothenburg 15th March, 2016): 355,00 USD/PMT

ULSFO price Got & Skaw (16 March, 2016): 22,65 EUR/MWh 300,00 USD/PMT

## Swedish Fairway dues

In the calculation we have used the new proposed fairway dues valid from 1<sup>st</sup> of January 2017

# Ternsund



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**Loading:** 45 x Gothenburg and 3 x Fredericia.  
**Unloading:** 3 x Aalesund, 2 x Kirkenaes, 2 x Bergen, 4 x Oslo, 3 x Stavanger, 1 x Bodoe, 3 x Gothenburg and 30 x Finland.  
**Other:** One voyage outside ECA each quarter. No Port Fees or Fairway dues in Finland included (no discounts for LNG). Fairway Dues in Sweden is based on 4 port calls/mht w/discount for LNG). No Nox fee included as assume no internal Norwegian water voyages.

Index points	MGO	LNG
ESI	48	87
CSI (<11 points - CO2)	0 (102)	132
<b>Cost (USD)</b>		
Bunker	1 383 080	1 414 266
Port Fee	223 281	177 965
Fairway Dues	163 527	50 410
Pilot Readiness Fee (NO)	26 384	0
Nox Fee	0	0
Total	1 796 272	1 642 641

**Running on LNG: total saving of USD 153 641 pa (USD 421/day).**

(If running on ULSFO (ECA) the bunker cost will be 8-10% less compared to running on MGO).



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# Statement

- Many new buildings have been ordered in our market segment however the majority of these are conventional vessels. This shows that the industry cannot make the transition into sustainable shipping by itself.
- If ports, authorities and governments are there to help and support the transition into sustainable shipping and if we all work together we will be able to reduce the environmental foot print in the transport chain.

# Thank you!



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