Running a ro-ro and ferry business under the new emission rules

Experiences of Finnlines

Staffan Herlin, Finnlines Oyj

Finnlines, one of Europe's largest shipping companies, specialised in scheduled liner services.

- efficient transport and port services mainly to meet the requirements of European industrial, commercial and transport sector companies
- As part of the Grimaldi Group Finnlines can offer liner services between Finland and any destination in the Mediterranean, West Africa as well as the Atlantic coast of both North and South America.
- In addition to providing sea transport services in the Baltic Sea and the North Sea areas, Finnlines provides port services, mainly in Helsinki and Turku.
- The Finnlines fleet (21 owned by the company) consists of ro-pax (ro-ro passenger) and ro-ro (roll-on, roll-off) vessels, specifically designed for northern conditions.

Finnlines Plc's turnover in 2015

- 511.2 MEUR

Personnel in 2015, average total	1,597
• Shore-based personnel	698
• Sea-borne personnel	899

Own offices in:

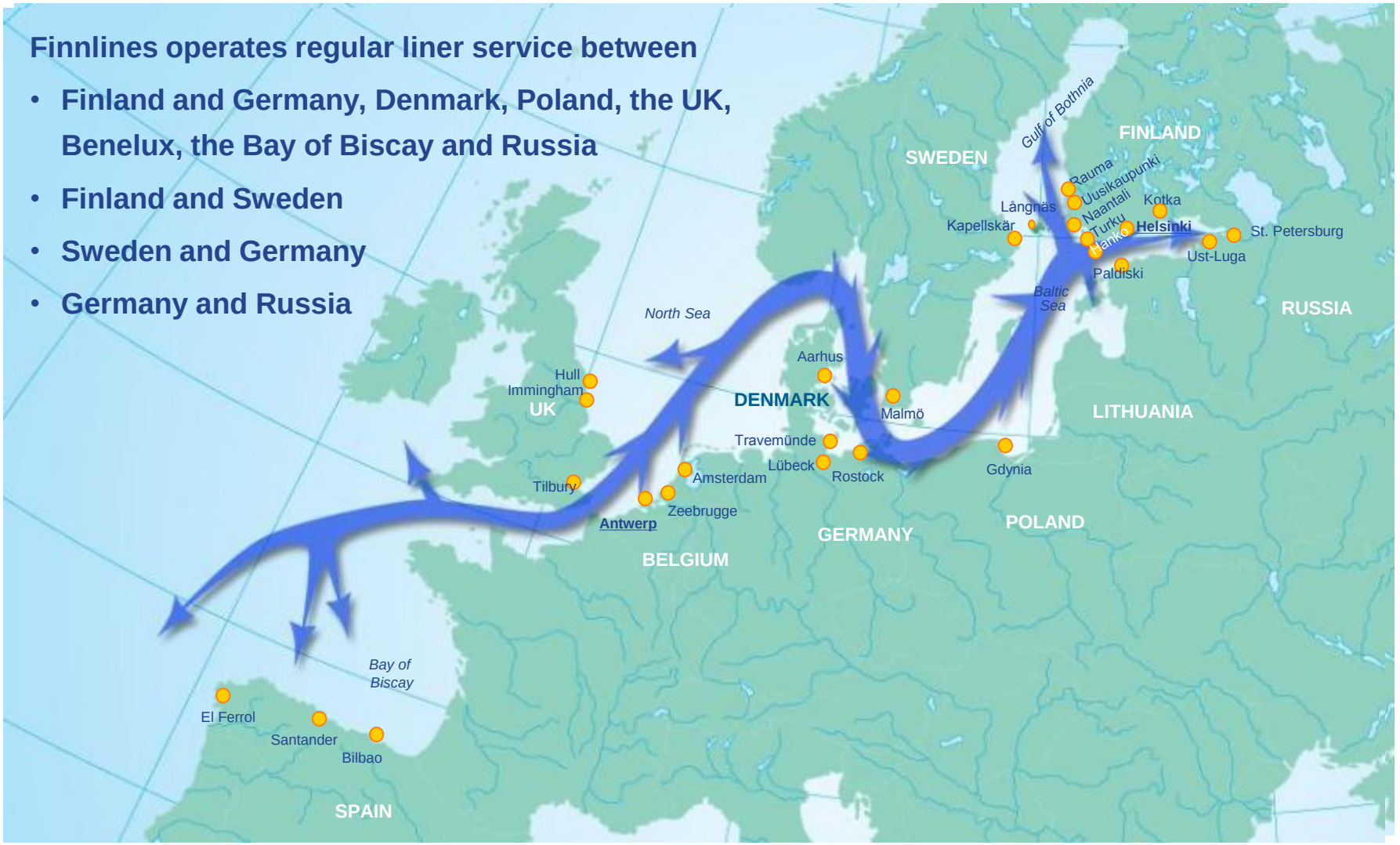
- Germany, Belgium, Great Britain, Sweden, Denmark and Poland, as well as a wide network of sales agents located throughout Europe.

Finnlines
a Grimaldi Group company

Baltic Sea, North Sea and beyond

Finnlines operates regular liner service between

- **Finland and Germany, Denmark, Poland, the UK, Benelux, the Bay of Biscay and Russia**
- **Finland and Sweden**
- **Sweden and Germany**
- **Germany and Russia**



Finnlines' Flexible, Economically and Environmentally Friendly Tonnage for Short Sea Shipping will Provide Competitive Advantage

RO-PAX VESSELS

2006–2007: Finnstar, Finnmaid, Finnlady, Nordlink
- 4,216 total lane length (m)
- 554 pax
- 25 knots

1999–2000: Finnclipper, Finneagle, Finnfellow
- 2,459-3,215 lm
- 440 pax
- 25 knots

1995: Finnpartner, Finntrader
- 3,050 lm
- 270 pax
- 21 knots

RO-RO VESSELS

2011–2012: Finnbreeze, Finnsea, Finnsky, Finnsun, Finntide, Finnwave
- 3,326 lm
- Hoistable car decks
- 21 knots

2003: Finnmerchant
- 2,606 lm
- 21 knots

2000–2002: Finnmill, Finnpulp, Finnkraft, Finnhawk
- 3,376/1,890 lm
- 20 knots

1998: Finnmaster and Finncarrier
(*delivered to Finnlines 01/2016)*

Environmental requirements for Maritime Transports

Regulation

2013 ... 2025: Energy Efficiency Design Index (EEDI) for CO_2 reduction

- Concerns new ships, as from 1.1.2013 (ro-ro and ro-pax vessels not yet included).
- Subsidy/penalty systems possible for low score ESI/CSI/EEDI units

2015 onward : Restriction of sulphur (SOx) emissions;

- 0.1% Sulphur content in SECA Areas as from 1.1.2015 (or equivalent amount of SOx in the exhaust gas

2014 ... 2016: Ballast Water Convention (subject to ratification rate)

- Entry into force during 12 months from the date of ratification
- Planned phasing: first phase: exchange of ballast water; second phase installation of treatment plants mandatory

2016 or later: NOx

- Tier II applies to vessels keel laid after 2011.
- Tier III: Baltic Sea as a special emission control area for Nox: for new vessels keel laid 2016 or later NOx emissions reduced by 80%

2020 and later: Black Carbon, BC

- Technology not yet feasible, timetable and measures uncertain

Costs

Depending on IMO EEDI decision and authorities' policies (e.g. ports)

Scrubbers & retrofits: running & maintenance & maintenance costs
or
Switch to gasoil: increase in fuel costs

Treatment plants: installation and operating costs

Tier II :+ x% fuel costs
Tier III: installation of new technology (catalytic converters)

Depending on eventual IMO decision

Finnlines
a Grimaldi Group company

Finnlines response to the environmental regulations

Fleet

Type, built	Lanemetres, passengers	Solution
4 ro-pax, 2006-2007	4 200 lm, 450 pax	Scrubbers, reblading
2 ro-pax, 1995 / 2007	3 000 lm, 270 pax	
3 ro-pax, 1999-2000	2 500 - 3 200 lm, 440 pax	
1 ro-pax, 1987 / 1996	1 400 lm, 120 pax	
2 ro-ro, 2000-2001	1 900 lm	Scrubbers
2 ro-ro, 2002 / 2009	3 300 lm	Scrubbers , reblading
6 ro-ro, 2011-2012 1 ro-ro, 2003	3 300 lm 2 600 lm	Scrubbers Scrubbers (August 2015)

Cleaner shipping does not equal to cleaner transportation

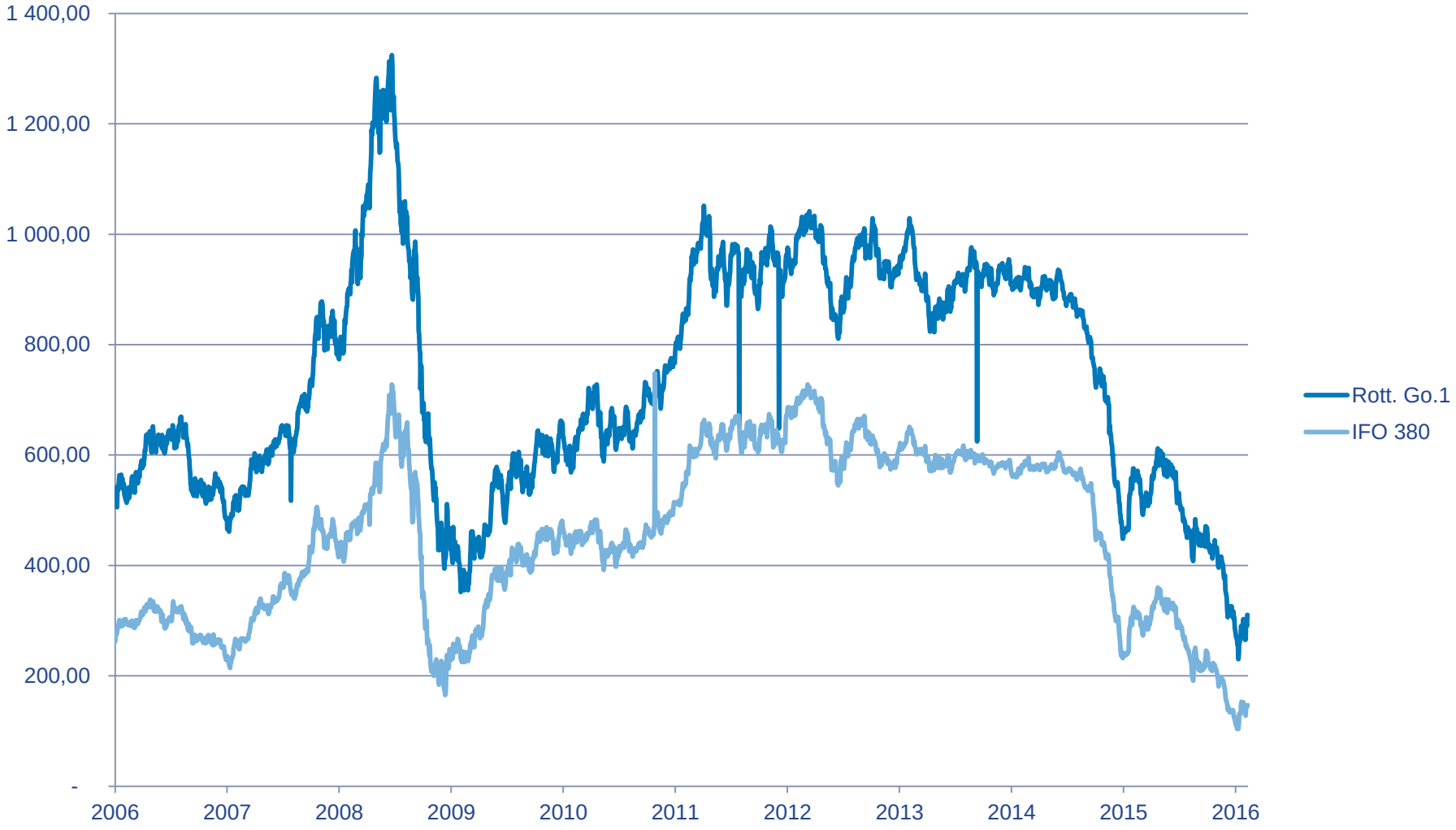
Cleaner shipping → Higher sea freights → Modal shift to land → More pollution in land transport

We will do whatever is needed to comply with the environmental regulations, but to minimize the modal shift we need efficiency and cost control in all the parts of the logistic chain – and all the parts of the chain should be playing by the same rules

The demands slow steaming will evoke

- More intelligent planning of logistics
- More demands for ports' efficiency and flexibility

Development of Bunker Prices



Finnlines Environmental Policy 1(3)

- To rank among the leading companies in the industry regarding focus on the environment
- To provide safe, top-quality services while taking into account their environmental impact in every aspect of operations
- To use natural resources responsibly.

Finnlines Environmental Policy 2(3)

Finnlines

- Places high priority on the environmental aspects of its operations in keeping with the requirements of sustainable development
- Observes existing environmental legislation unconditionally
- Continuously focuses on environmental and safety matters
- Integrates environmental programmes and operations into its management system
- Seeks to continuously improve its environmental programmes while considering the needs of technical development, its customers and partners, as well as the demands imposed by society

Finnlines Environmental Policy 3(3)

- Trains its employees and encourages them to be environmentally responsible
- Revises contingency plans for accidents that involve environmental risks
- Promotes environmental responsibility in sea transport and port operations in general and follows developments in this field
- Insists that its suppliers and subcontractors comply with the same environmental requirements
- Promotes environmental awareness both within the company and outside it
- Regularly measures the results of its environmental efforts.

Finnlines EUR 100Mio Environmental Technology Investment Programme

Alternatives and tools for complying

1. Change of fuel: MDO, MGO, LNG, biodiesel etc.
2. Technical changes of the vessel: scrubbers for exhaust gas cleaning
3. Plus reduction of fuel consumption:
    - Slower operational speed
    - Alternative energy sources (supplementing with sails, solar power)
    - Retrofitting of propellers
    - Hull and propeller maintenance
    - Weather routing
    - Optimising trim and ballast

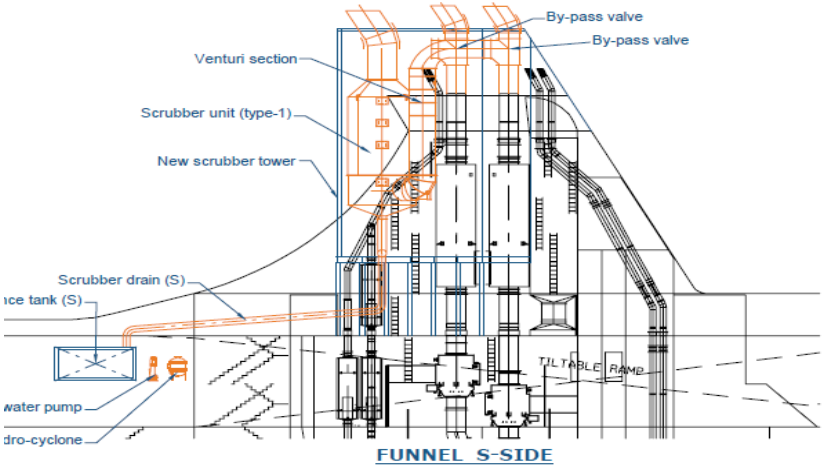
Scrubber - Exhaust Gas Cleaning System

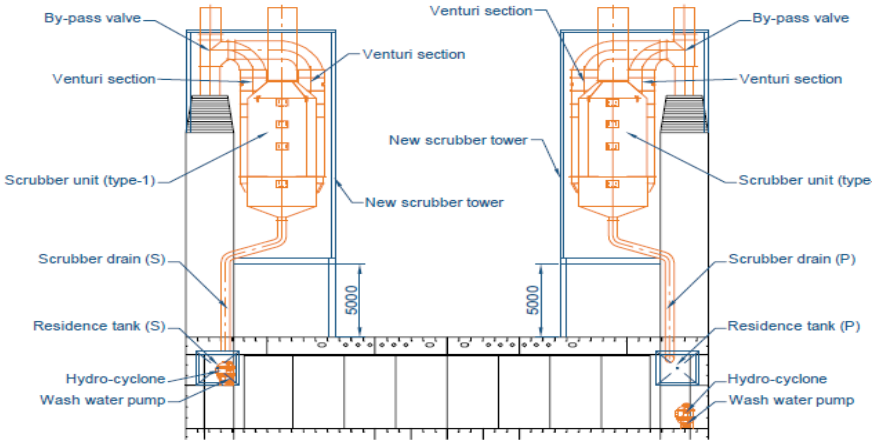
Exhaust Gas Cleaning System (Scrubber):

Being equipped with sulphur scrubbers, Finnlines ships will comply with the IMO and EU SOx emission regulations in a cost-efficient manner. From the 22 fully owned vessels included in the Environmental Technology Investment Programme, already 20 agreements have been concluded and remaining 2 vessel systems are under negotiation.

- N. 7 Open Loop Hybrid Ready Alfa Laval Scrubber
- N. 6 Open Loop Hybrid Ready Wärtilä Scrubber
- N. 4 Open Loop Hybrid Ready EcoSpray Scrubber
- N. 3 Full Hybrid Wärtsilä Scrubber
- N. 2 *under negotiation (configuration TBC)*

Scrubbers will reduce exhaust gas emissions, such as sulphur oxide emissions, particles matters efficiently and also some nitrogen oxide emissions.





Re-blading - Propulsion Efficiency

Re-blading

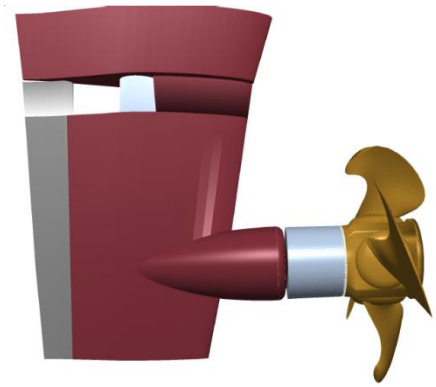
In 2012 Grimaldi Group started to upgrade the propulsion system of several RoPax vessels in their fleet
After the very good results obtained on these Ro-Pax, it was decided to enlarge the upgrade programme also to the Finnlines fleet.

From the 22 fully owned vessels included in the Environmental Technology Investment Programme, 9 vessels have been identified with high potential for energy efficiency improvements

- N. 4 RoPax re-bladings done
- N. 2 RoRo re-bladings done
- N. 2 RoPax re-bladings ordered
- N. 1 *Ro-Pax re-blading being finalized*

Promas Lite

Besides the re-blading, the majority of these upgrades will be improved also with the Promas Lite, this rudder bulb increases the propulsion efficiency by reducing vortex losses between rudder and propeller.



Silicon Paint - Foul Release Coating

This product is based on novel silicone elastomer technology and is quite unlike any other fouling control coating. The technology provides a smooth, low-energy surface to which fouling organisms either cannot attach, or to which they adhere only loosely and can therefore be easily removed. This innovative treatment, compared with traditional Self Polishing Coating system, has the following advantages:

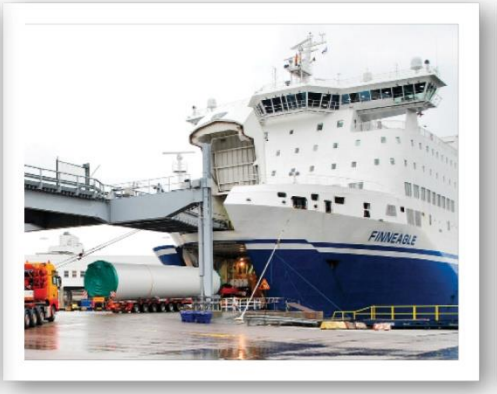
- Reduce Hull resistance and consequently Fuel oil consumption and CO2 emissions
- Not release any biocidal into the sea
- Expected constant hull efficiency during five years, with low decline

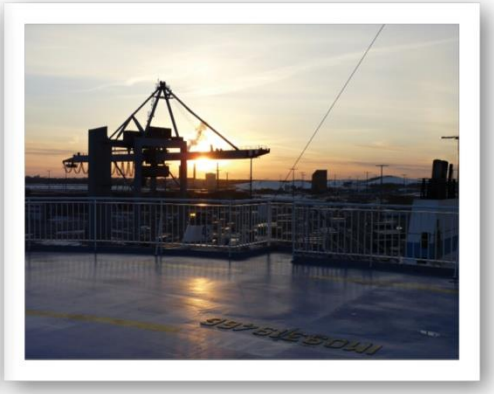
Two of the vessels included in the Environmental Technology Investment Programme will receive this coating (RoPax vessels on Sweden –Germany route).

It is unlikely to expand this action to cover other vessels as it is not suitable for operating in Ice condition.

Factors of uncertainty at present

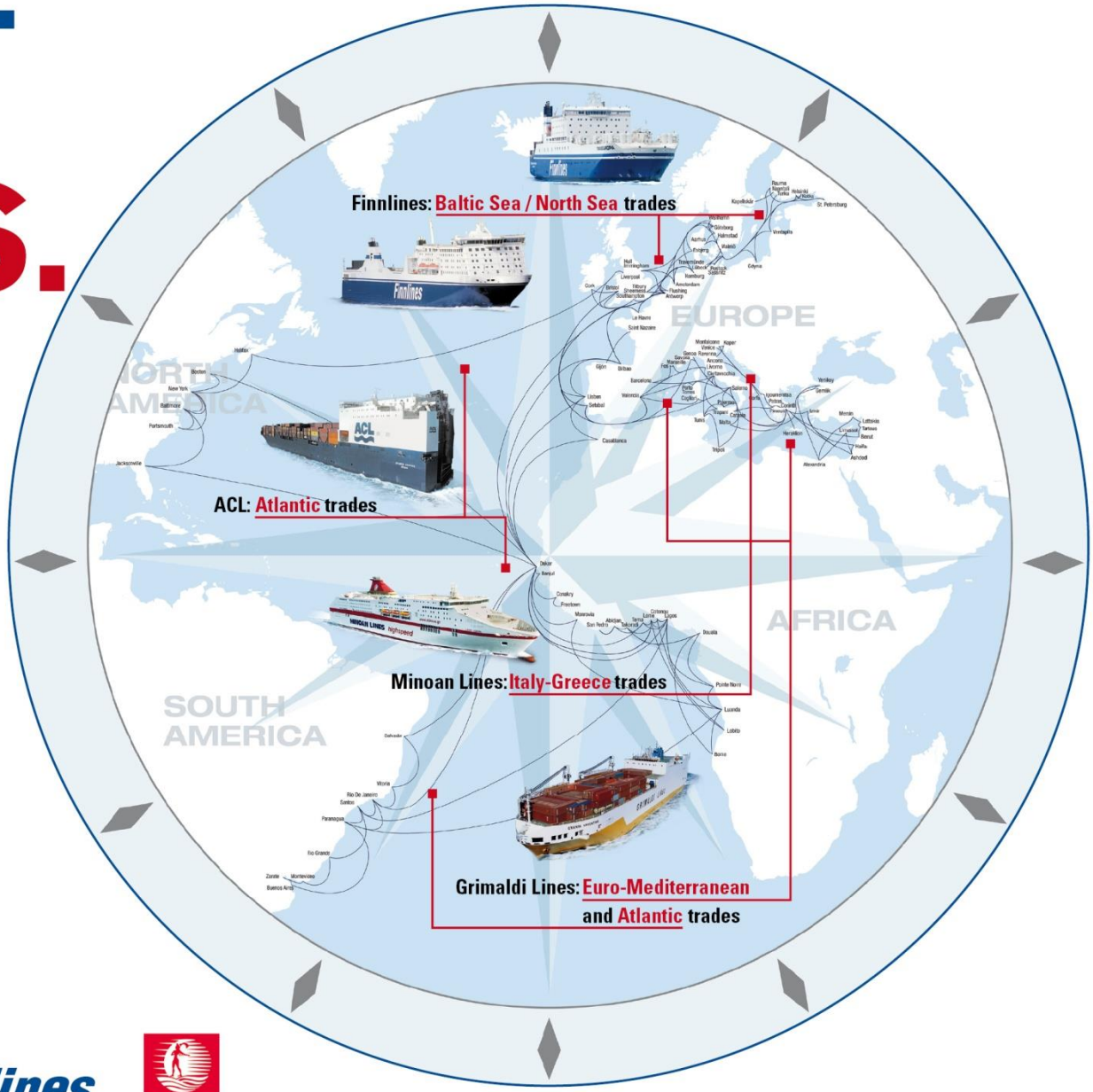
- Slow recovery from **financial crisis**, effects on foreign trade
- **Balance of traffic**, changes in the production infrastructure
- Changes in the **cost structure**, higher costs
- Development of **fuel prices**
- Measures to increase efficiency, **concentration of cargo flows**, cost efficiency
- Situation in **Russia**, EU’s sanctions





OUR NET WORKS.

RELIABLE.
PRECISE.
SAFE.



GRIMALDI LINES

ACL

Finnlines
a Grimaldi Group company

MINOAN LINES