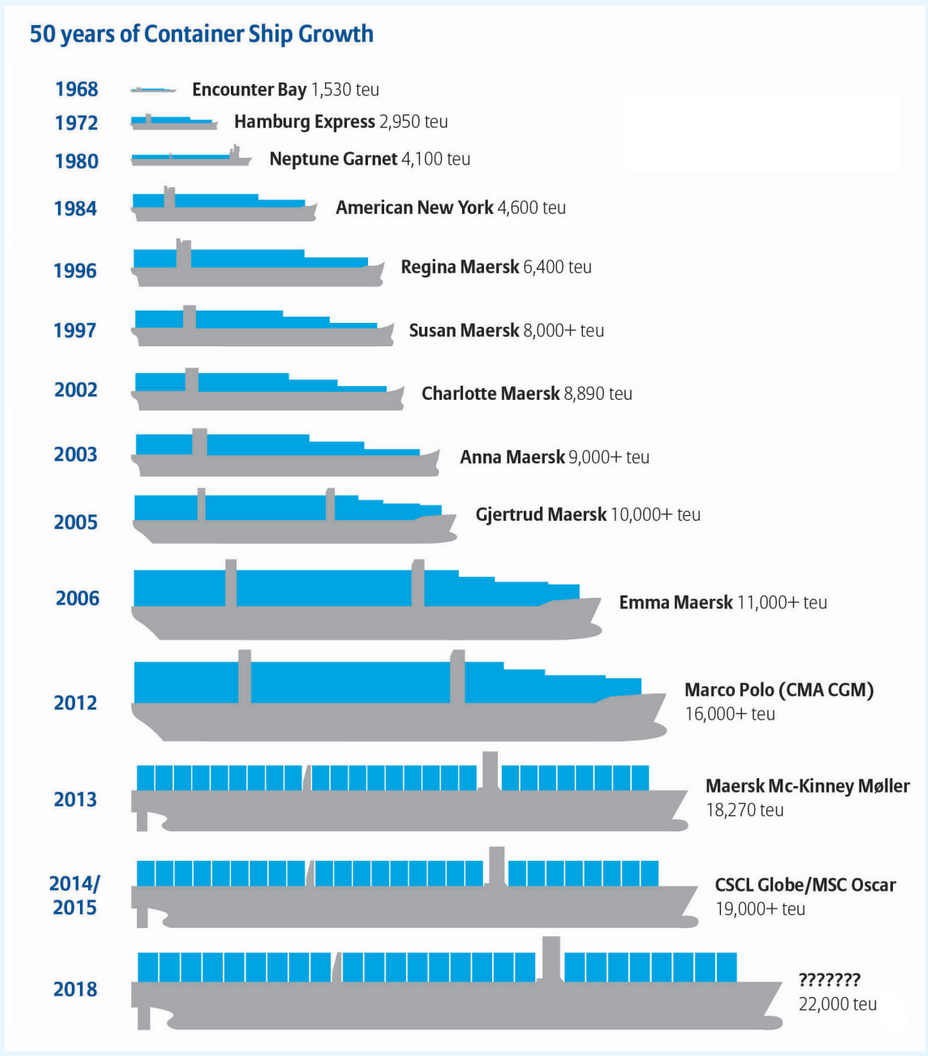
TREND I — INCREASE OF SHIP SIZE

EVOLUTION OF SIZE



Every year new plans are created to outsize the currently available megaships.

Growth of vessel size in the Baltic Sea is limited (BaltMax: 15.4m draught, 260m length, 48m width). Ship designers are creative and find extra room by width increments, U-shape hulls and shrinkages of bridge and engine rooms.

DIFFICULTIES IN HARBOURS

Big ships have more difficulties to enter ports, because of limited manoeuvre-bility or draught.

MEGA SHIPS TO CORE HARBOURS

Large container vessel will make berth in major hubs like Hamburg or Copenhagen.

SHORT SEA SHIPPING FURTHER INLAND

Containers will be loaded on more fuel efficient and flexible vessels. A possible growth of short sea shipping and the amount of short sea vessels can be expected.

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TREND II — NEW VESSEL DESIGNS

MORE HEAVY LIFTING VESSELS

Semi-submersible ships use water as ballast to allow the load to be floated over the deck.

Project cargo ships use at least one heavy-lift crane for handling heavy cargo.

Generators, turbines, reactors, boilers, towers, casting, heaters, presses, locomotives, boats, satellites and more.

OFFSHORE WIND FARMS DEMAND SPECIALISED VESSELS

The construction and removal of offshore wind turbines will increase the amount of specialised vessels in the coming years.

People carriers for maintenance will go regularly from the harbour to the areas.

Intervention ships will guard the offshore wind farm and function as a base for maintenance.

Cable laying vessels will put the grid on the sea bottom floor and connect the wind farm to land.

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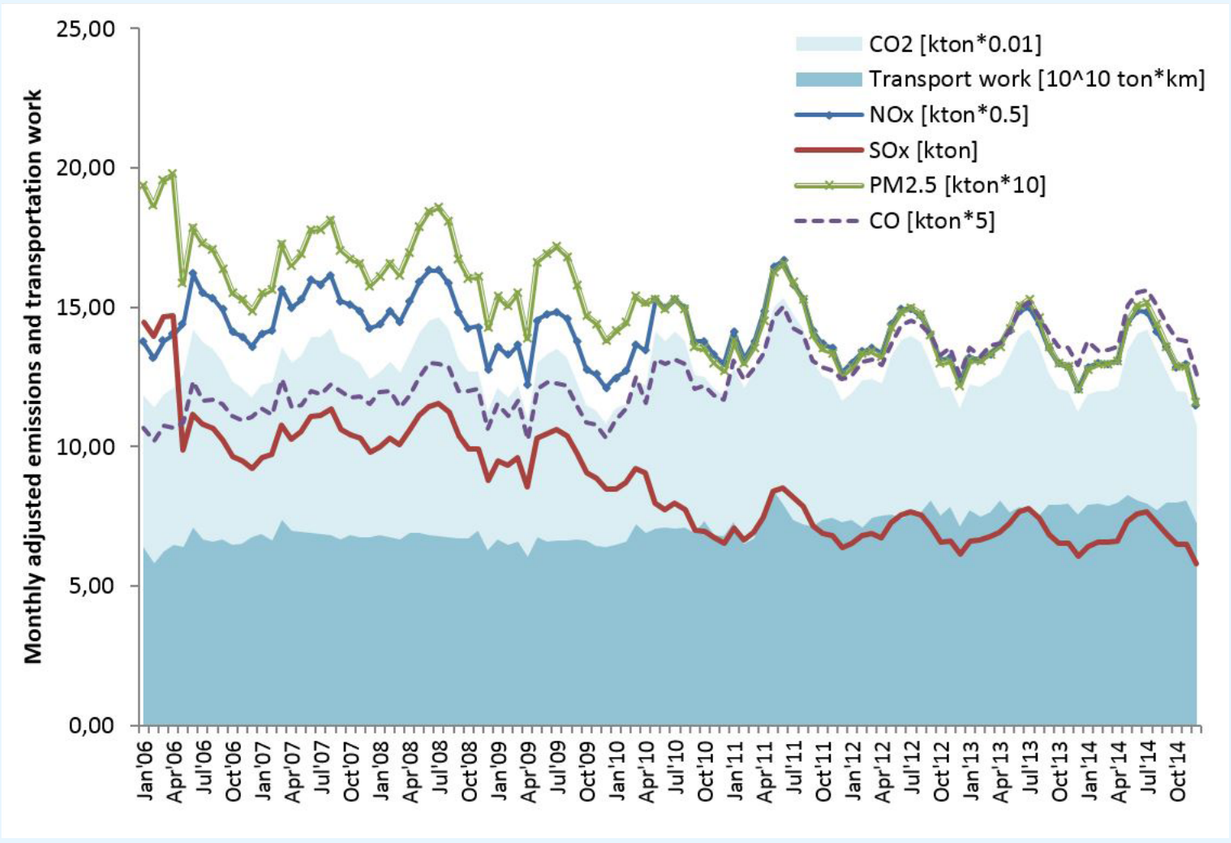
TREND III — FUEL AND ENERGY

EMISSIONS FROM SHIPPING IN THE BALTIC SEA



Improvements to the engines, better propeller performance and high-tech coatings, as well as friction-reducing air cushions and slow steaming might reduce carbon and sulphur emissions. Until now carbon emissions have stayed the same!

From January 2015, a sulphur cap of 0.1% has been put in place in the Baltic Sea.

DUAL-FUEL SHIPS

The lack of infrastructure and bunkering facilities has fostered the development of dual-fuel engines that can run on both LNG and conventional LFO, HFO or liquid biofuels.

In the future LNG will be combined with biofuels (e.g. fatty acid methyl ester (FAME)), methanol, hydrogen, nuclear energy or renewable energy, such as wind and solar.

Fuel between types of vessels will further differentiate. Ocean going ships will mainly use HFO + scrubber, feeder & short sea ships will have LNG biofuel or HFO with closed scrubber systems engines and service vessels will become battery driven.

SET UP NETWORK OF LNG TERMINALS

Focus is now on creating a network of LNG terminals (e.g Klaipeda & Świnoujście).
Many European funded projects, such as Blue Baltics (CEF), focussing on LNG infrastructure facility deployment, started.

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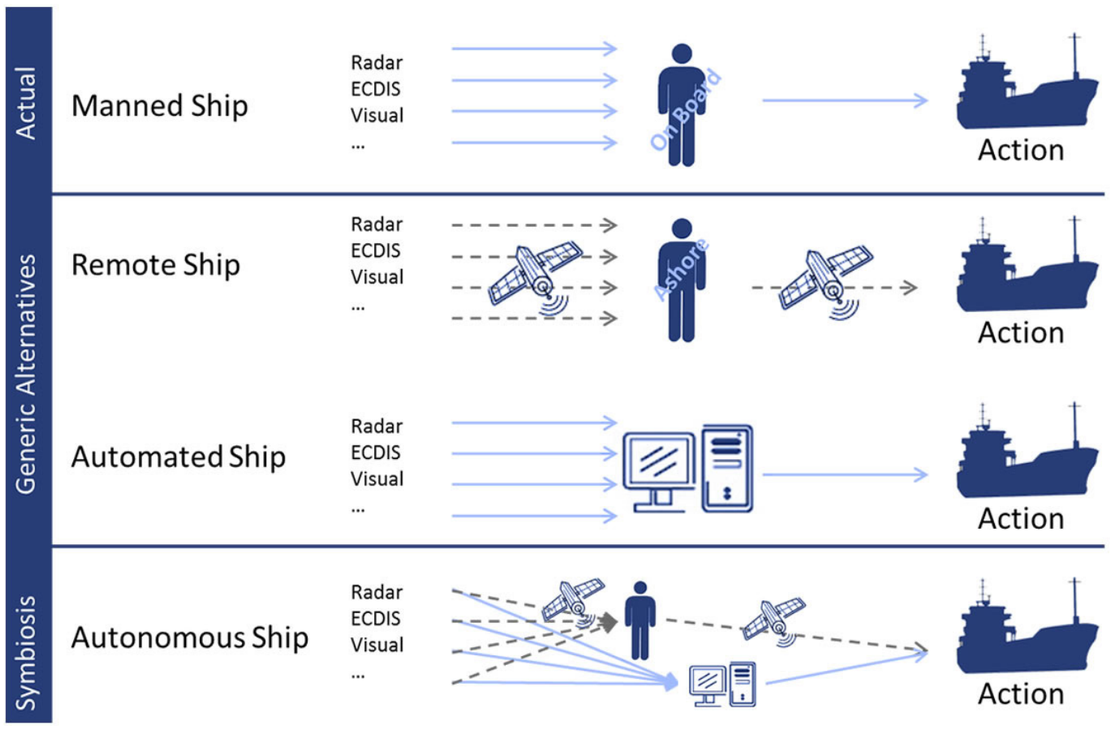
TREND IV — AUTONOMOUS VESSELS

The military, researchers already and offshore wind farm developers (cable laying) use unmanned vessels.

The first designated test area for autonomous cargo ships has been planned.

Lloyd's registers has developed a guideline:
AL1 and AL2: Manned with decision support from shore
AL3 and AL4: Human present as supervisor (2020)
AL5 and AL6: Fully autonomous, no human supervision.

CATEGORIES OF AUTONOMOUS VESSELS



PLATOONING OF VESSELS

Trains of ships in which only the front ship is manned, while the others follow autonomously.

UNMANNED SERVICES

Tug boats to direct ships into harbours and guiding vessels are examples of autonomous services in the future

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