

Greening the European research vessel fleet

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1. Environmental Management

- LCA (Ship – Equipment – Operations)
- RVEMPlan
- RVEMSystem (compatible with ISO14001)

2. Design guidelines for regional research vessels

- Description of current performance
- Available techniques
- Guidelines



Current Performance

Operators generally follow international conventions

Older MARPOL annexes (I, IV & V) efforts to green operations and vessels

Disposal of oil, sewage and garbage accustomed to practice costs involved have become standard or costs have evolved to acceptable levels

Recent conventions simple compliance

In time rules become simpler, older ships are being decommissioned. Community adapts, maybe slowly, but surely to an environmentally more friendly activity

Greening occurs equally for smaller and larger vessels (<>400GRT)

'Margin for growth'

All operators consider the environment important enough to consolidate an environmental policy into a management systems that are even often certified, the overall tendency seems to adopt what is legally asked for

Some operators indicate absence of compliance with international regulations



Green/Clean Ship

Fashionable term

The green ship does not exist

Continuous development of technologies/legal demands narrows the definition

Greener/Cleaner ship

Environmental awareness :
crew & shore staff training
environmental management system
certification

Clear definition of the greener ship concept & auditing



Greener Ship Designs

Green Ship Technology Book (European Marine Equipment Council 2010)

<http://www.emec.eu/green/>

- Reduction of air emissions
- Ship waste disposal
- Bilge water treatment
- Black water treatment
- Grey water treatment
- Ballast water treatment
- Anti-fouling systems

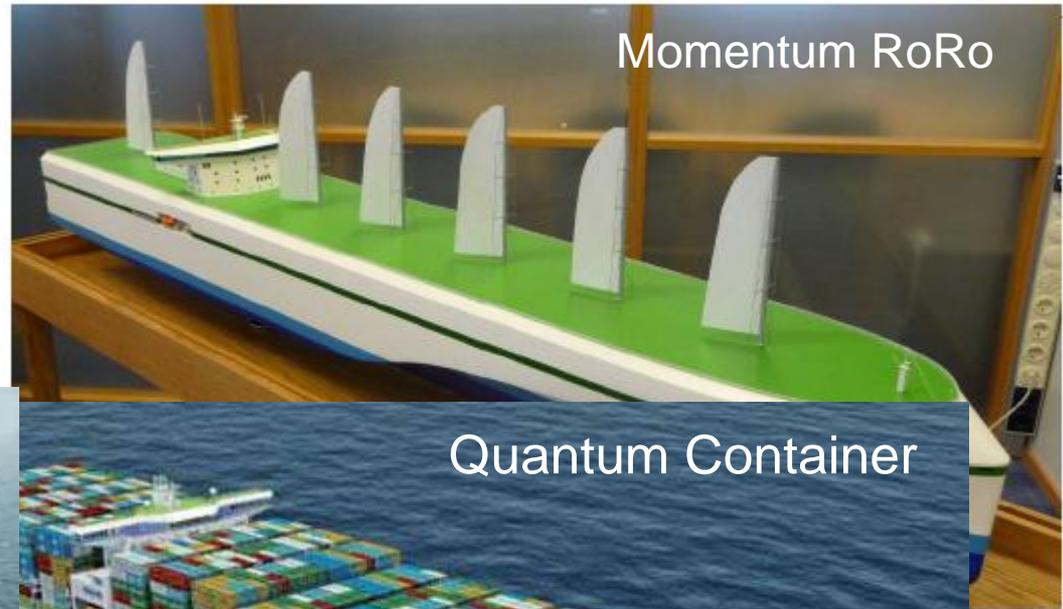
Integration of existing technologies : 15-20% improvement

Further development of technologies : 30% more eco-friendly ships



Greener Ship Designs

Det Norske Veritas



Greener Ship Designs

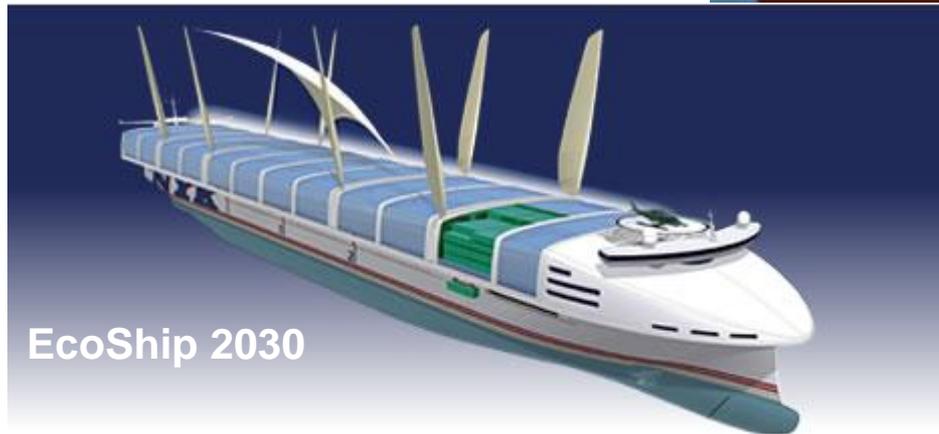
Germanischer Lloyd



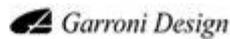
0-emissions container feeder



Best-Plus Aframax

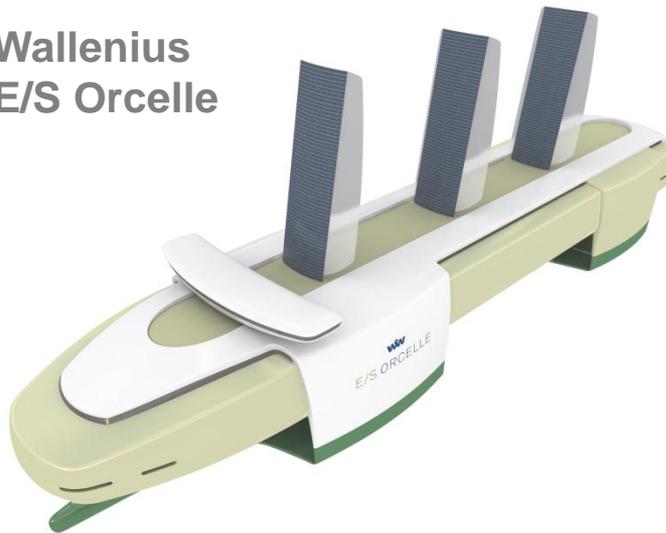


EcoShip 2030



Greener Ship Designs

Wallenius
E/S Orcele



Greener Ship Designs



Greener Technologies

MARPOL I Oil

Dispose off at shore

High speed centrifuges

Biodegradable fuels & oils

Green ship initiative NOAA-GLERL since 2006

Water lubed stern tube

MARPOL IV Sewage (no discharge anticipated)

Dispose off at shore

Sewage treatment system

Membrane bioreactors

Vacuum toilets

MARPOL V Garbage (recent MEPC62 results)

Dispose off at shore

Waste compressors

Incinerators (heat recovery)



Greener Technologies

MARPOL VI Air Pollution

- Slow steaming
- Low sulphur fuels
- Cold Ironing
- Improved hull, propeller & rudder design
- Engine performance monitoring
- Waste heat recovery
- LNG as fuel
- Exhaust cleaning – NOx, Soot & SOx
- Hybrid power generation fuel cells, solar, wind
- Air lubrication

Anti-Fouling Systems

- Biocide free systems (Natural biocides under development)
- Surface treated coatings
- Non-stick coatings
- Photoactive paints
- Active anti-biofouling
(Slime producing coatings)



Greener Technologies

Balast Water Convention

Balast water treatment systems
Balast water free hull design

Harmfull substances

Assured through EMP/EMS

Underwater Radiated Noise

All electric propulsion; cleaner exhausts & lower fuel consumption
Silent Class notations (DNV, BV)

Conduct of Marine Science

Adopted by IRSO & ERVO
Assured through EMP&EMS

Administrative tools

Green Class notations (DNV, GL), Green Passport (ABS)
ISM
ISO9001, ISO 14001
Blaue Engel (ship & operations)



Greener Technologies

Energy Efficiency Design Index - EEDI

Ship Energy Efficiency Mgmt Plan - SEEMP

Ship Energy Efficiency Operational Index - EEOI



Greener Ship Designs

Tsekoa II



BMT Fleet Technology



Greener Ship Designs

Princess Royal



Greener Ship Designs



Greener Ship Designs



Derek M. Baylis



Oceania



Greener Ship Designs

Tara Oceans



Alguta



Greener Ship Designs

R/V RACHEL CARSON



11,000 nm RANGE @ 13 KTS.
30 SCIENTISTS- 30 DAYS
TOP SPEED UNDER POWER 23 KTS.
TOP SPEED UNDER SAIL 25 KTS.

ENDURANCE AT 10 KTS. 65 DAYS+

nallsyste
rg.de/Do
ail.pdf



RACHEL CARSON Design by Wylie Design Group

Greener Ship Designs



LOA: 100m, LPP: 84.8m, Beam: 20.0m, Draught: 7.6m

