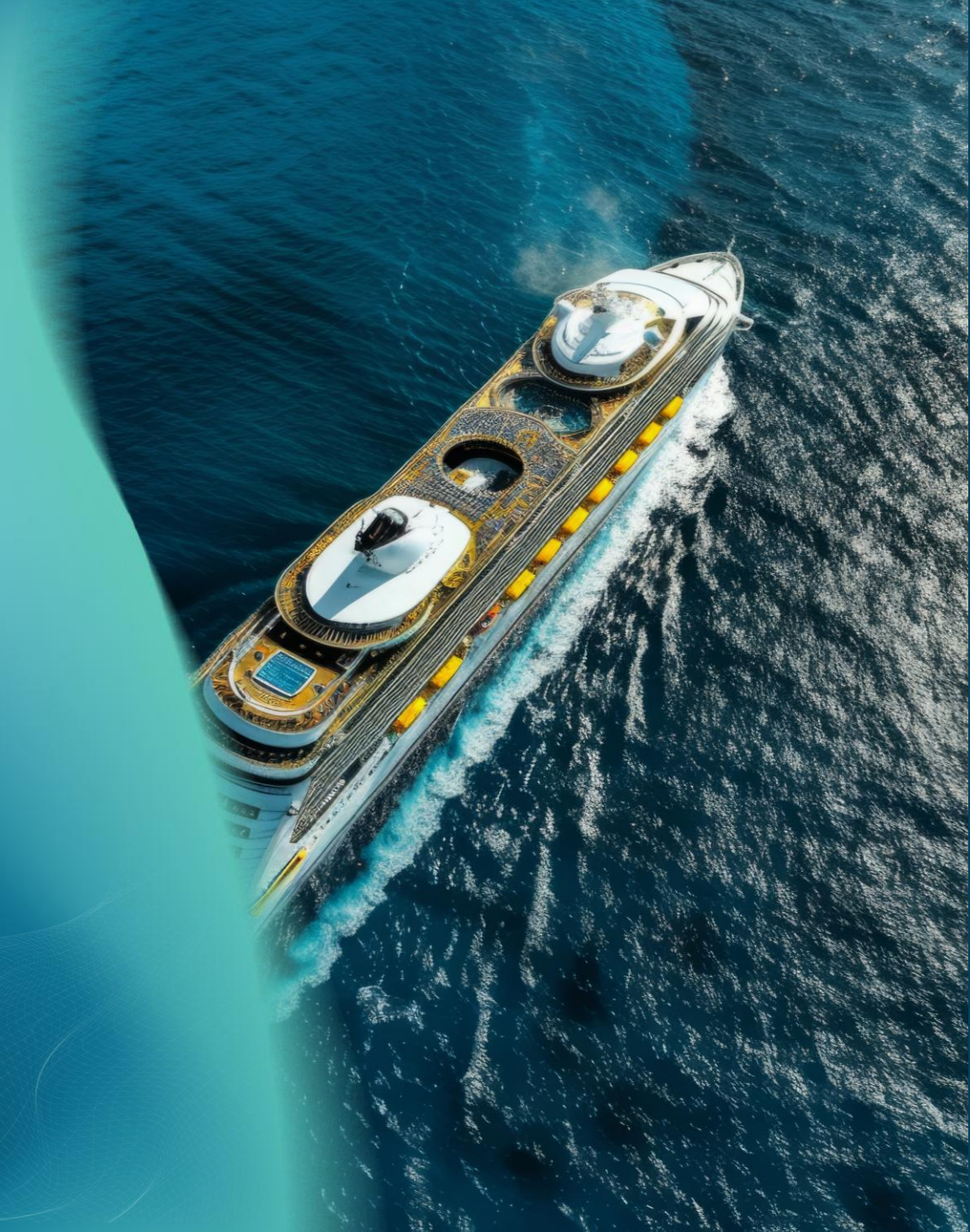
NAPA SAFETY SUMMIT 2026

SAFETY · EFFICIENCY · AUTOMATION

Behind the WOW effect

Aligning the Dimensions of a Cruise Newbuilding



Moderator

Lars Nickel

Sales Director, Safety Solutions, NAPA

- Joined NAPA in 2015, Business Economist WAH Hamburg
- Over 10 years working at NAPA in various roles, lately as a Sales Director for NAPA Safety Solutions
- Passionate about working with our customers to improve processses on board and ashore through digitalization
- Passionate about cycling

Panelists

Henning Luhmann
Naval Architect

Henning-Luhmann
NavalArchitecture

Christoph Arndt
Sales Director, Special Vessels

ABEKING & RASMUSSEN
Schiffs- und Yachtwerft SE

Kim Wikström
Professor

Åbo Akademi University

Risto-Juhani Kariranta
CEO

Ahti Climate

Behind the WOW – Aligning the Dimensions of a Cruise Newbuilding

Personal experiences

Teams seem to partly operate in silos

Vessel is handed over from the newbuilding team to the operational team as a surprise gift

Level of integration differs from project to project and customer organisation

The challenge

A successful cruise vessel project requires:

- Regulatory integrity,
- Operational intelligence / reality embedded early,
- Commercial ambition grounded in feasibility,
- And fuel strategies designed for uncertainty

So that is quite a puzzle, which requires that different stakeholders are working together as early and close as possible to make sure that all the requirements are considered.

How do we align technical, operational, commercial, and environmental objectives in the best interest of all stakeholders — not just at delivery, but over 30-40 years?

Let‘s dive into the different dimensions of a Cruise building project

SHIPYARD

NEWBUILDING TEAM

OPERATIONAL TEAM

PRODUCT / MARKETING DIMENSION

FUTURE PROOF FUELING / PROPULSION CONCEPTING

ABEKING & RASMUSSEN

NAPA SAFETY SUMMIT 2026

March 24th, 2026

BEHIND THE WOW

ALIGNMENT OF NEWBUILDING AND OPERATIONAL PERSPECTIVE

PROFILE & INTRODUCTION

SPEAKER

Christoph Arndt

- Captain / Master Mariner (unlimited)
- Sailing >10 years onboard Cruise Ships
- Previously heading the team responsible for training and development of all seafarers belonging to the major cruise company in the world
- Assuming responsibility for the Emergency Procedures ashore & onboard as well as Damage Control and Intact Stability management for 35 cruise ships of >100,000 GT
- At present responsible for all sales and strategic activities related to Special Vessels and Navy Ships on the international market at A&R

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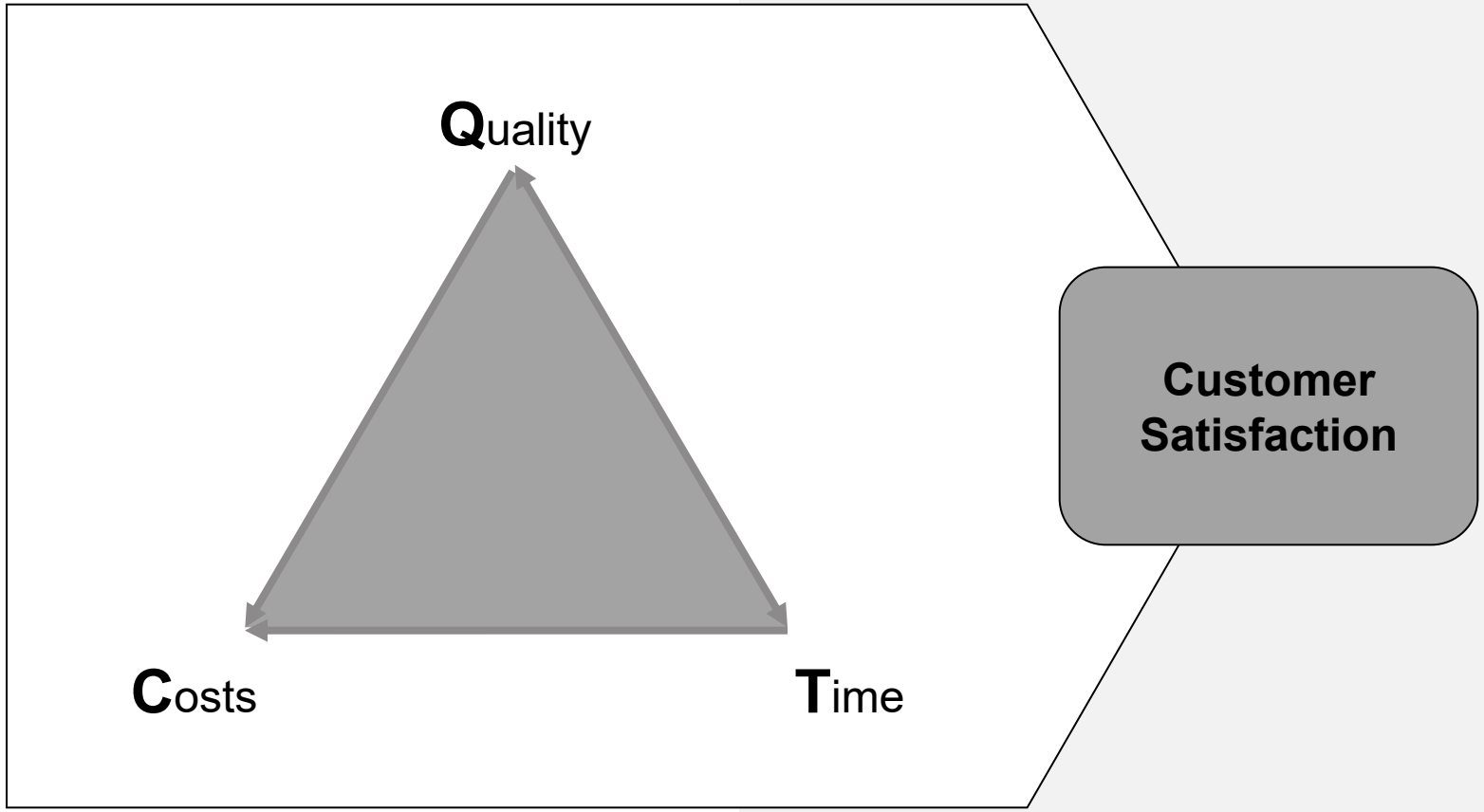
Yachts

Navy

Special Vessels

EXPECTATION MANAGEMENT



FROM VISION TO REALIT

80m Yacht
Based on Small Waterplane
Area Twin Hull

REAL LIFE > PLATFORM

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OCEAN GOING HYDROGRAPHIC VESSEL

DESIGN TO NEWBUILD

90m
Hydrographic and Oceanographic Vessel

105m Ocean Going Research Vessel

THANK YOU FOR YOUR ATTENTION!

ABEKING & RASMUSSEN

Behind the WOW
- A shipyard view -

Dipl.-Ing. Henning Luhmann

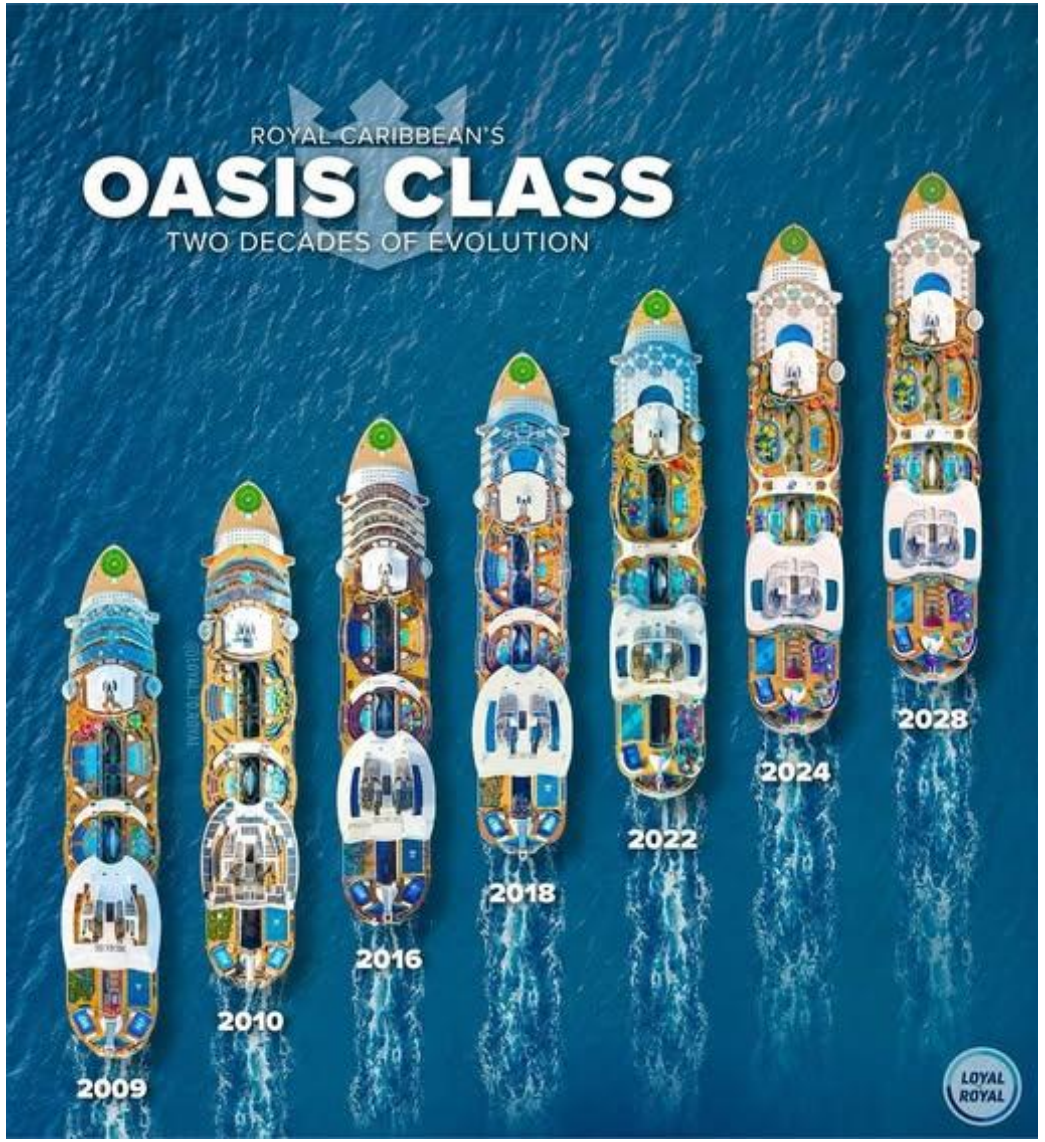
WOW ?

What does it take to design and deliver the WOW?

Time line

EXCEL class 2014-2028

OASIS class 2004-2028

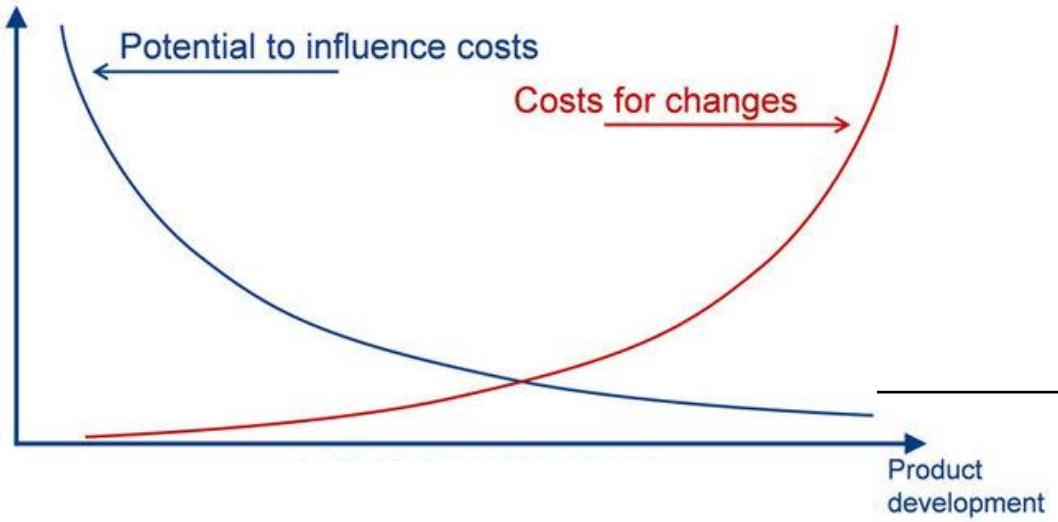


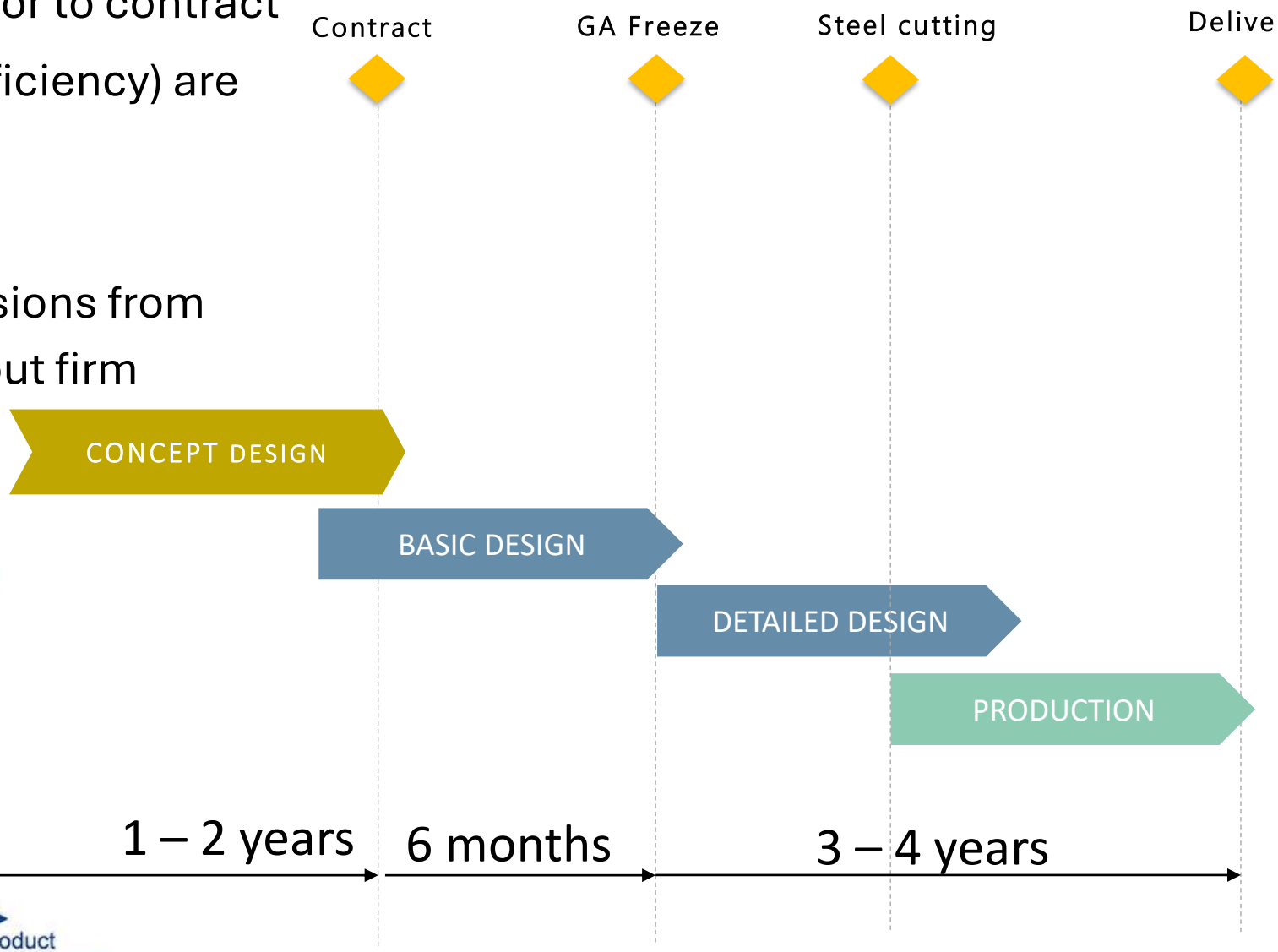
Time line

- The basic decisions are made prior to contract
- Performance (revenue, safety, efficiency) are based on this decisions

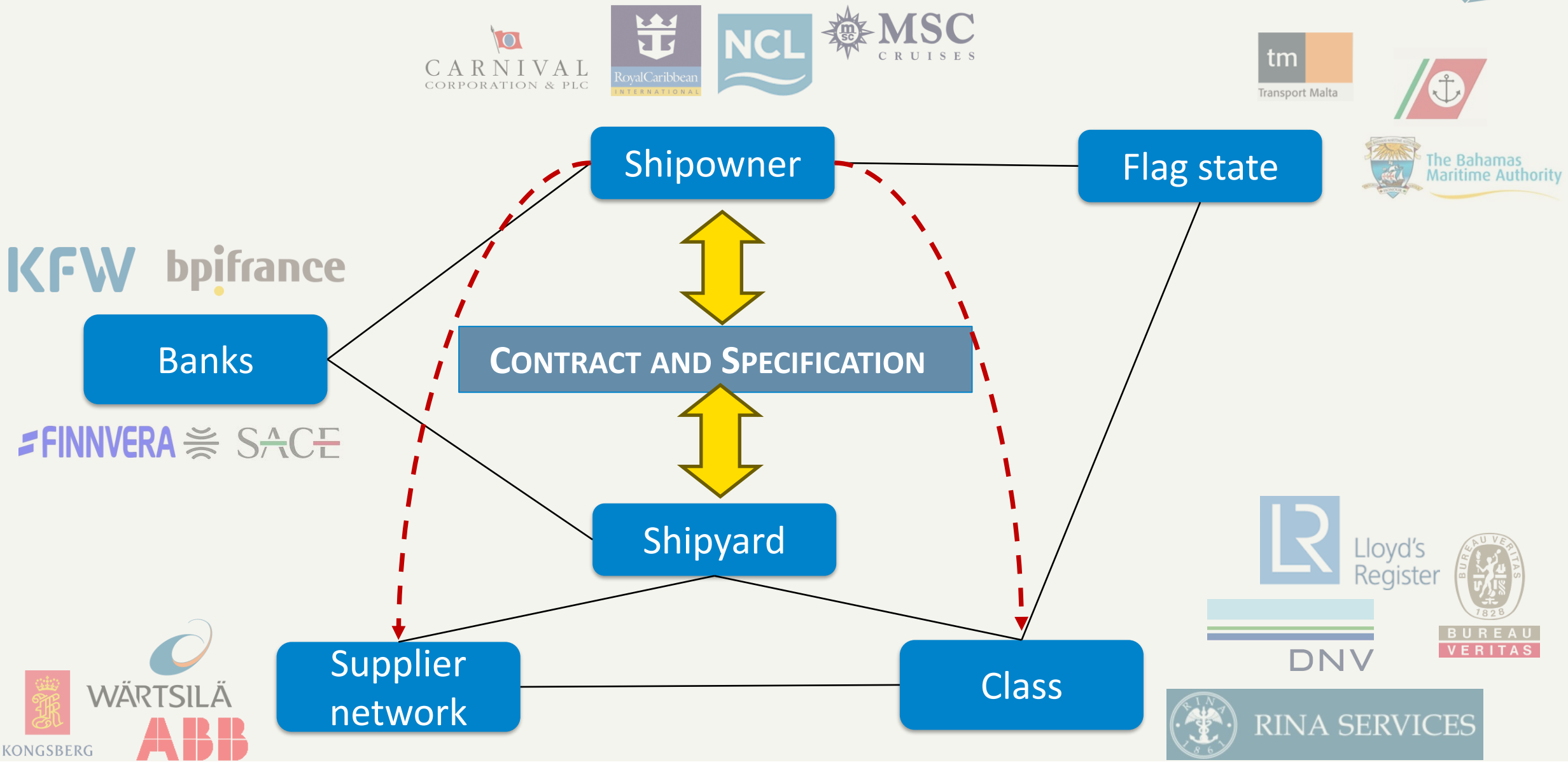
Challenge:

- No reliable information and decisions from class and supplier network without firm contract





Stakeholder



Collaboration | Dream vs Reality

The preferred solution:

- Joint development and optimization of the ship
- Understanding of constraints and business goals (Fit for Purpose)
- Compliance with agreed timeline
- Mature design at contract
- New technologies with TRL 8-9 only
- Shared risks, technically, financial
- Class as independent approval entity
- Fair contracts
- Only winners

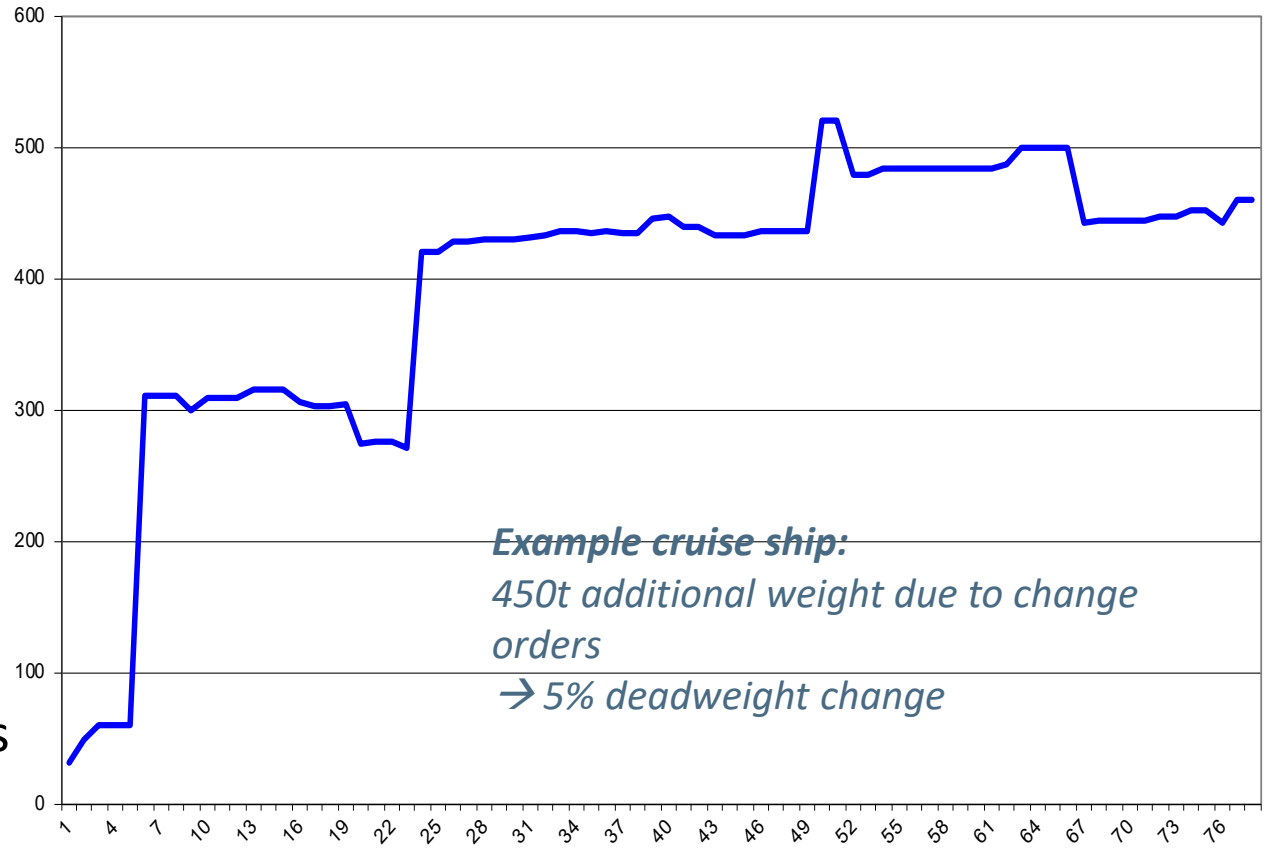
The reality:

- Two sides of the table (Buyer vs Builder)
- Tough contractual terms
- Performance based on estimations and pre-mature design
- Fixed price
- OECD financing (20% at contract, 80% at delivery)
- High financial pressure on supplier
- Main portion of risks at shipyard
- New technologies developed parallel to ship design
- Late changes
- May lead to poor designs and not fit for purpose

Examples

Late changes

- Changes and modifications are likely to happen
- Feedback from guests and market
- New technologies, rules and regulations
- Disturbances in project plan
- Interference with other projects
- Risk of non-compliance
- Legal issue, consequences to be defined for each change individually
- Sum of small changes may cause global problems
    - Speed / power
    - Weight and stability
    - Deadweight and draught



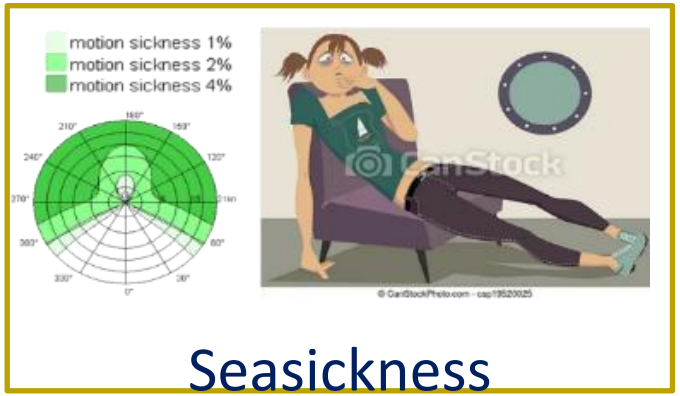
Examples

Missing propulsion power

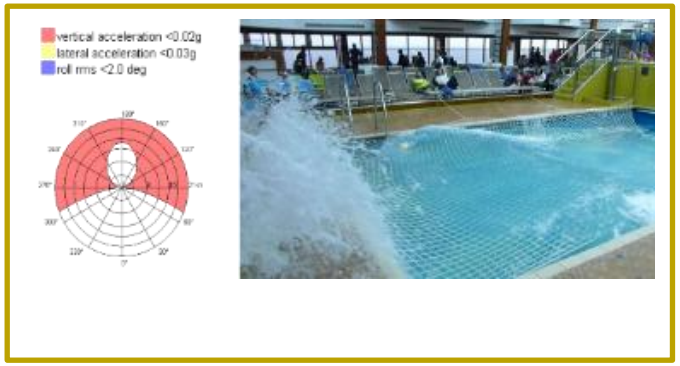
- Joint decision to reduce ship price
- Reduction of ship speed, propulsion and diesel power
- All contractual terms fulfilled

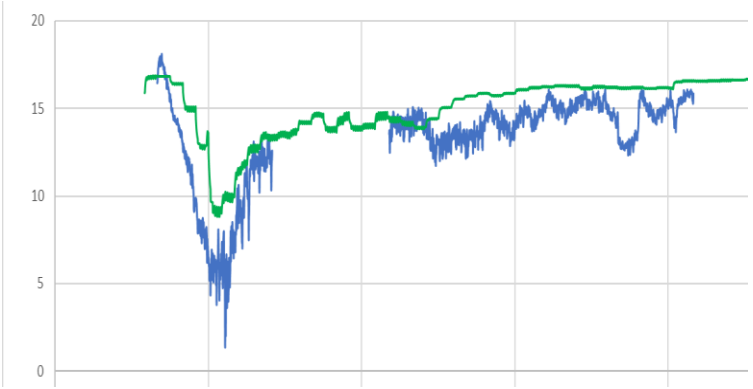
BUT

- Instead of the expected speed of 18 knots in severe conditions less than 10 knots could be reached.
- Missing ports due to delays
- Excessive ship movements due to reduced effectiveness of fin stabilizers
- Propulsion plant tripped due to emerging propellers



Seasickness





Examples

North star

Joint development between owner, shipyard, supplier and class

Totally new feature with some challenges

- Operable at high wind and waves
- Fail safe operation
- Escape procedures during black out
- Structural challenges due to high accelerations

Technical Qualification Process

- Classification societies have developed methodologies for new technology
  - Ensuring fit for purpose
  - Quality control
- Structured process through the whole development time
- Established approach in the industry

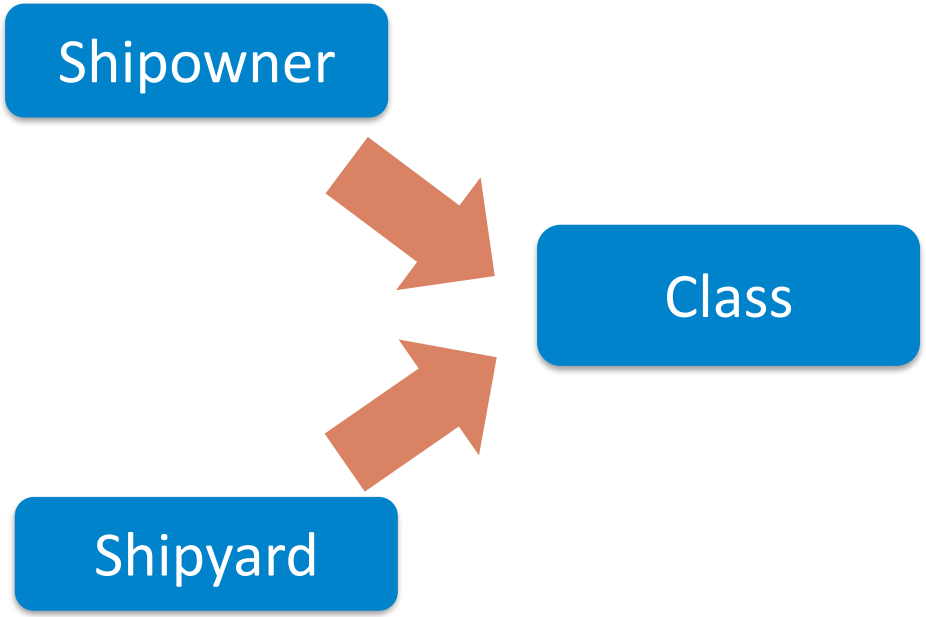
BUT

- Too slow, needs to be done in parallel to ship design process
- Uncertain outcome, sometimes too late

Role of Class

Classification societies have a difficult role:

- Client of shipyard during design and production
- Client of ship owner during operation
- Approval entity, usually also on behalf of Flag State
- Legal and formal constraints for surveyors and approval engineers
- Challenging situations during last weeks prior to delivery
    - Lack of on-site personnel, 24/7 activities
    - Pressure from shipyard to find practical solutions in case of production or design errors
    - Pressure from owner's site team to support in creating open items for delivery process



Conclusion

Each stakeholder has an own agenda and background

Successfully execution of such projects require competence, leadership and trust on all levels

Conflicts between commercial, legal and technical constraints are likely to happen.

Safety should not be undermined by this conflicts

Only trustful and respectful collaboration ensures a good product for all.

Build and design the ship together and not against each other

HENNING LUHMANN
NAVALARCHITECTURE

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henning.luhmann@strath.ac.uk

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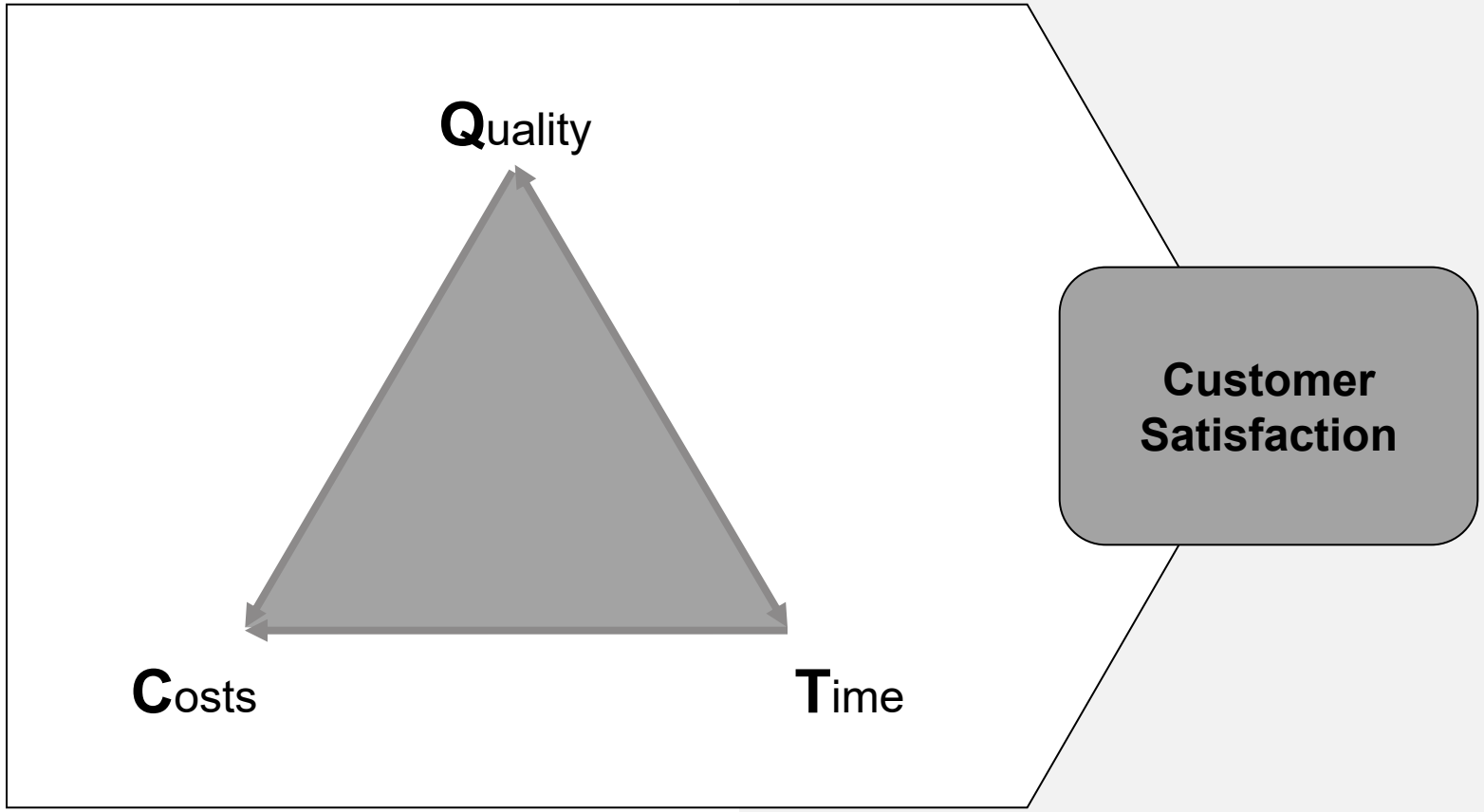

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Behind the WOW Effect

A Product View on Cruise Ship Innovation

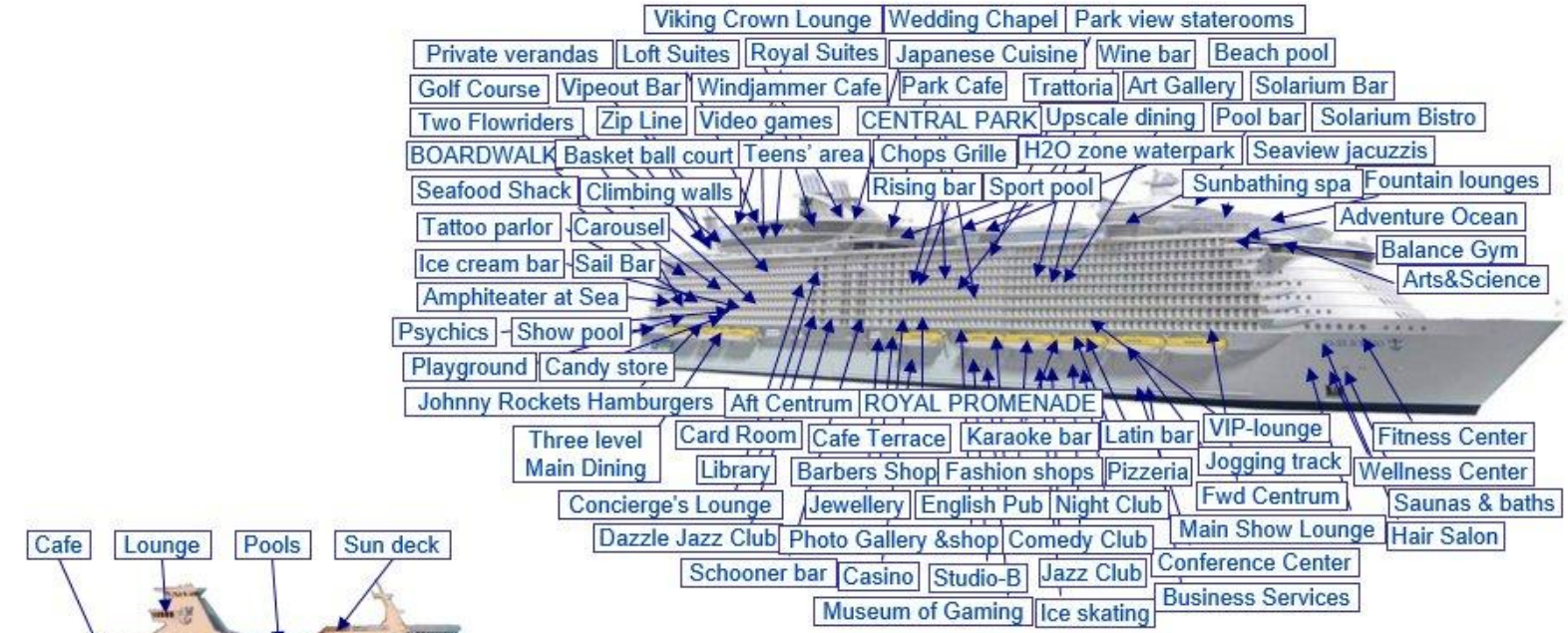
Kim Wikström
NAPA Safety Summit 2026

Åbo Akademi

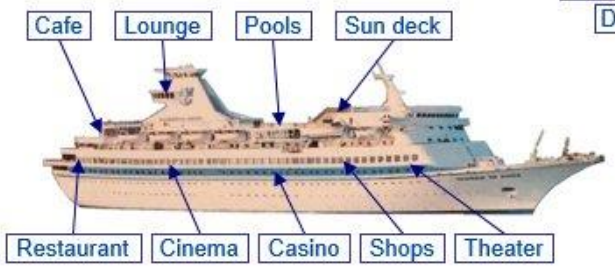
Research-based Consulting

Evolving Concepts

From floating hotel to floating city in five decades. Each generation introduces entirely new categories of onboard experience.



Oasis of the Seas



Song of Norway

Re: Keiramo, 2021

Åbo Akademi

Research-based Consulting

From Ship to System

The innovation space now extends well beyond the hull

01 The Ship

Hull, propulsion, onboard experience, energy systems, entertainment, cabin design

Traditional scope

02 Onshore

Private islands, dedicated ports, destination cities, shore excursion ecosystems

Emerging scope

03 The System

Multi-decade programs, long-term shipyard agreements, multi-stakeholder innovation

Future scope

Cruise ships evolve towards a systemic space of innovation

Åbo Akademi

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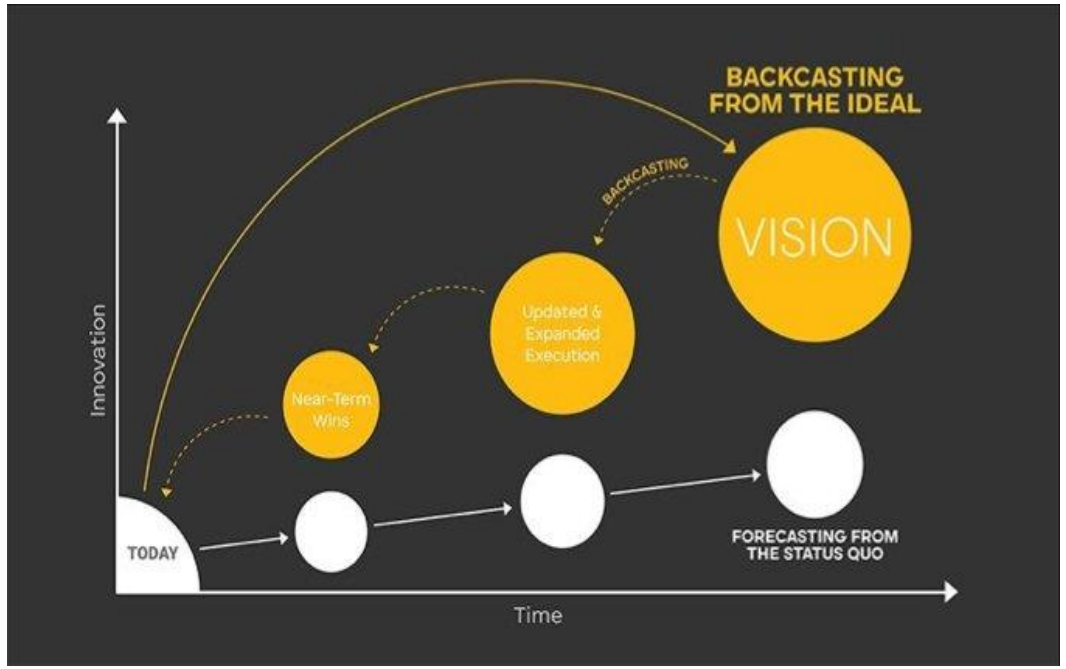
From Projects to Programs

1. **Passenger expectations**
   Demand for unique, immersive experiences beyond traditional cruising
2. **Propulsion complexity**
   LNG, methanol, hybrid systems, fuel cells need new approaches
3. **Sustainability targets**
   Zero-emission goals by 2050 reshaping every design decision
4. **Rising R&D costs**
   Longer lead times and higher investment for each generation
5. **Talent shortages**
   Aging shipbuilding workforce across all skill levels
6. **Digitalization gap**
   AI, IoT, predictive maintenance, cyber-secure design still maturing

Systems of Systems



New Ways for Collaborative Innovation & Design

Bringing together different actors in the innovation and design process to match the growing complexity of modern cruise ship development.

Thank you

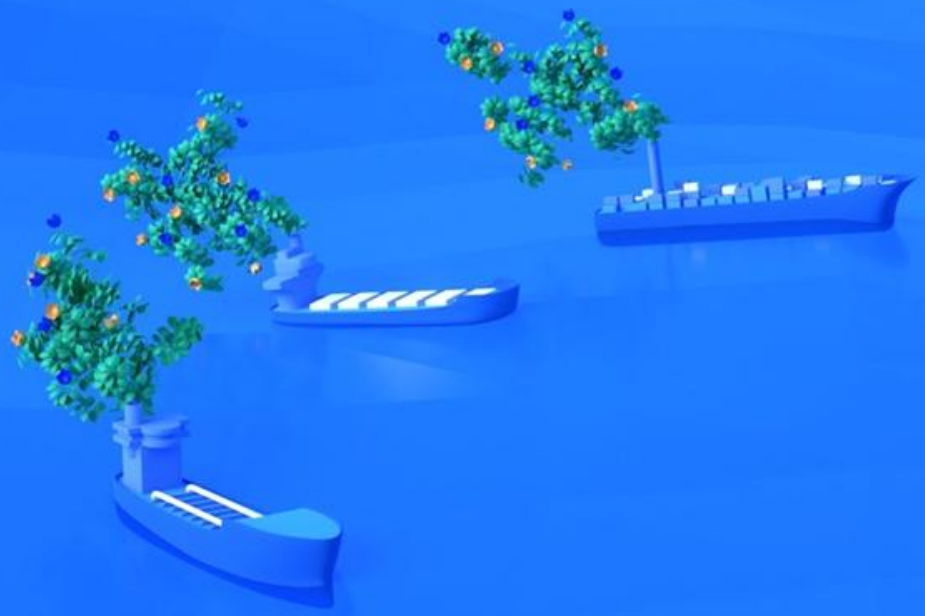
Kim Wikström
kim.wikstrom@abo.fi

Åbo Akademi

Research-based Consulting

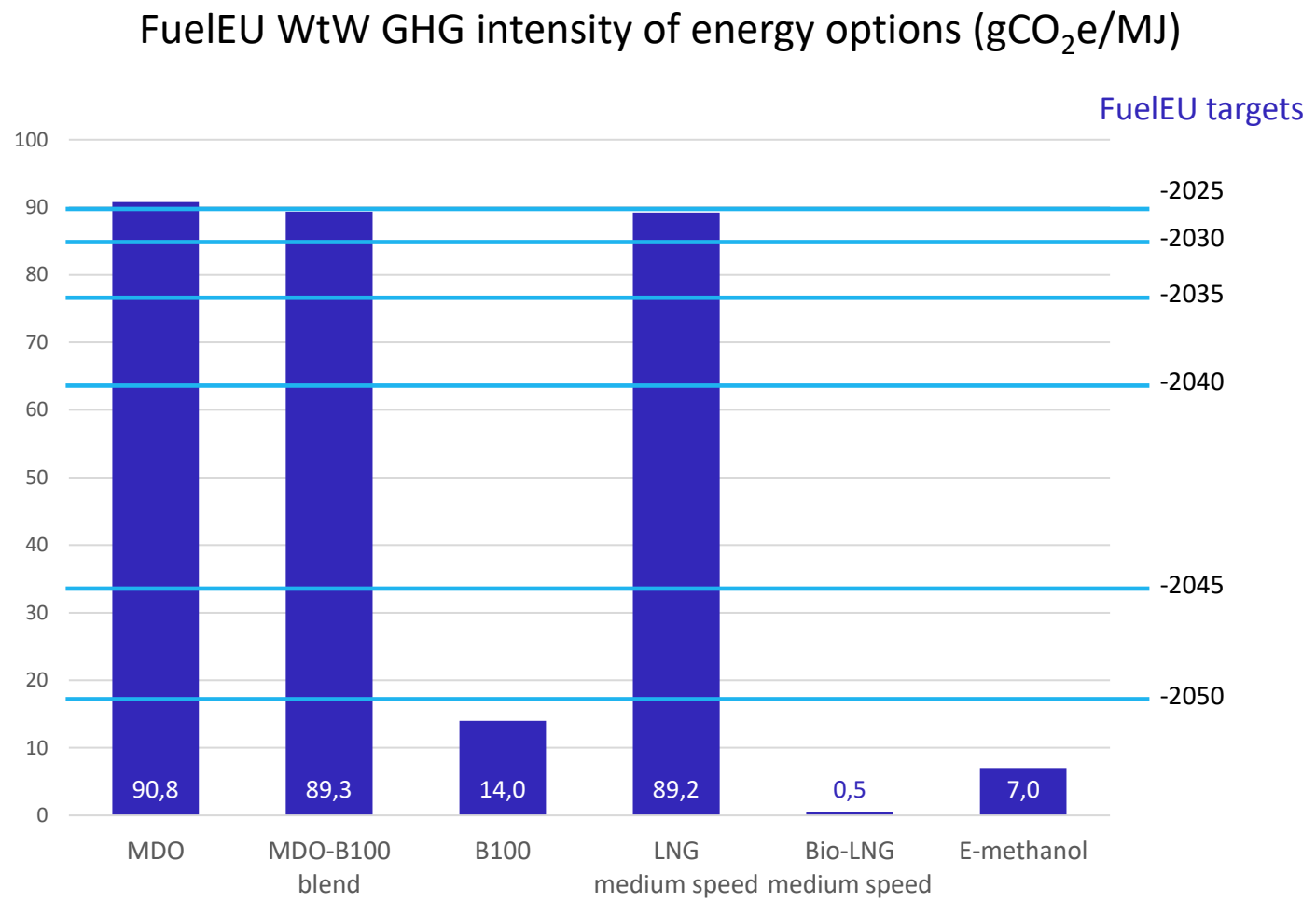
Future of fuels and performance

Ruka, 24 March 2026



Fuel alternatives for cruise ships

Scenario for a large cruise vessel operating mostly on 50% EU voyages



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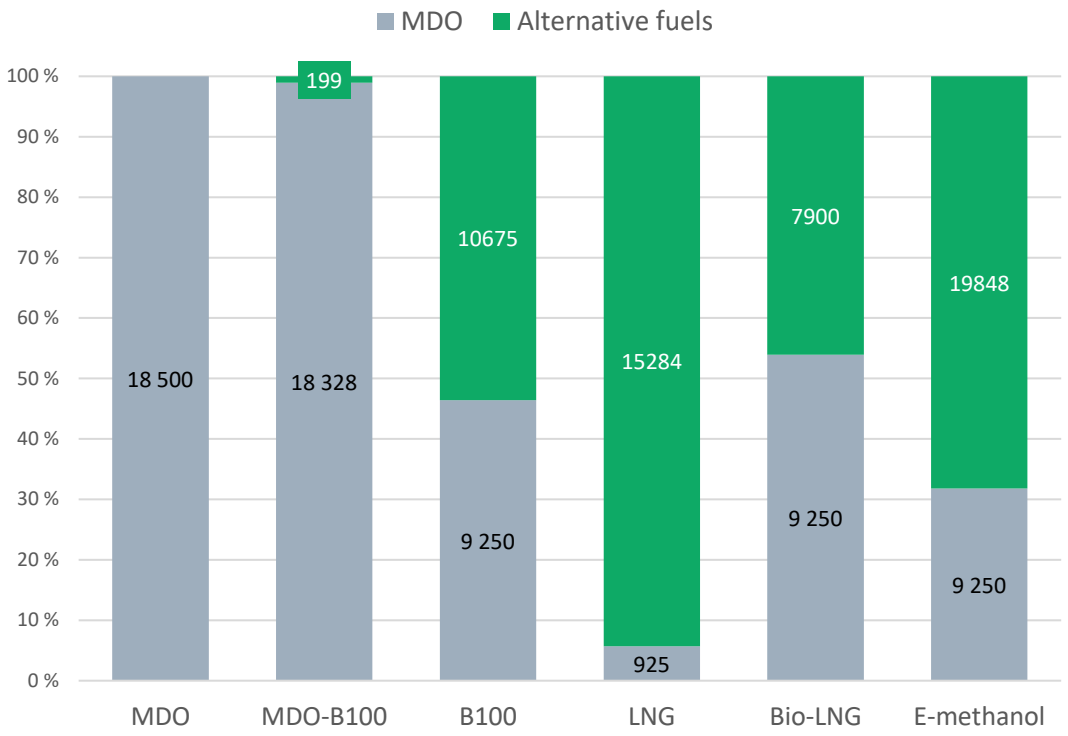
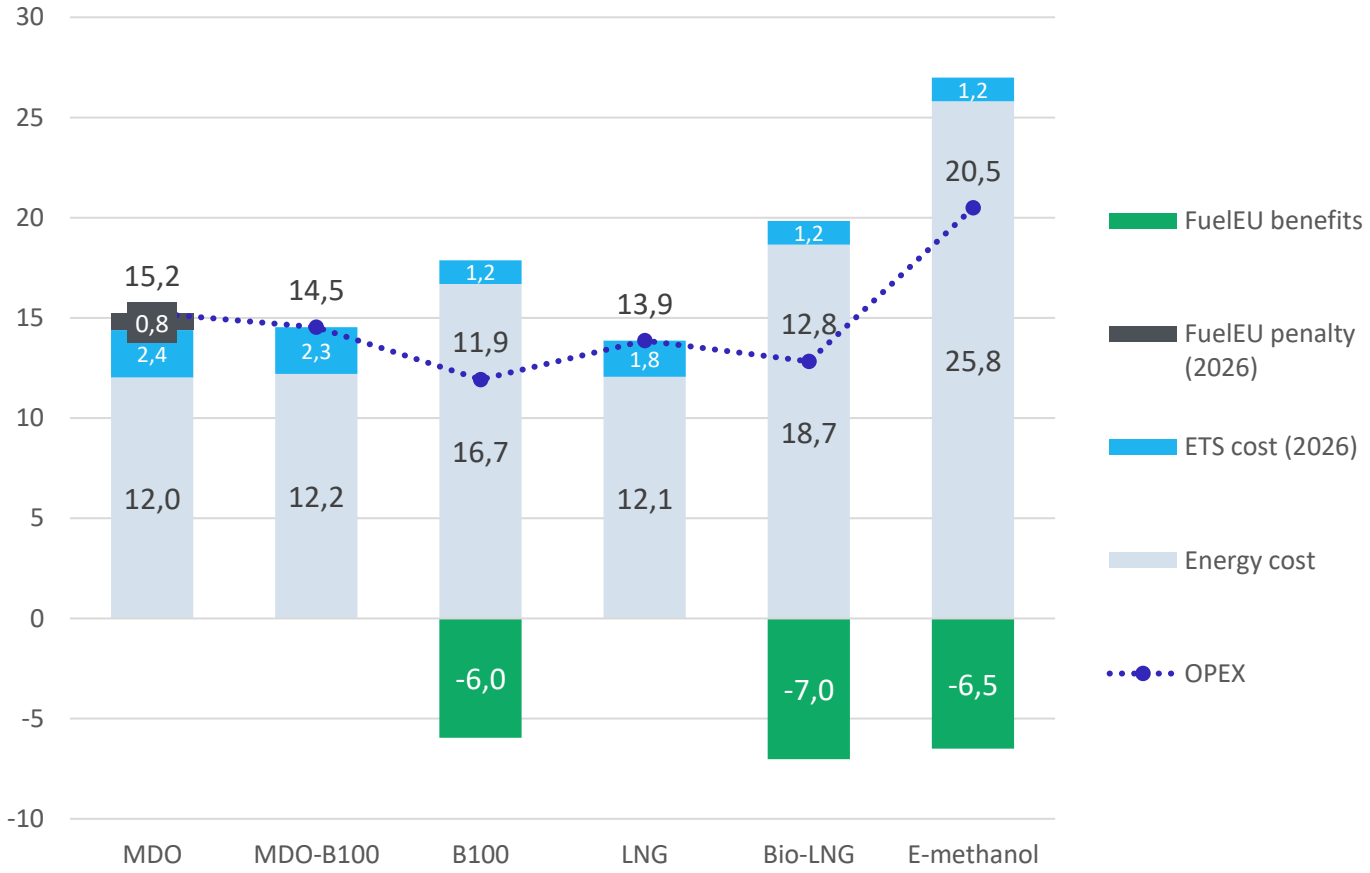
Fuel alternatives for cruise ships – 2026

Fuel mix options, optimized for FuelEU compliance (tons)



In alternative fuel mixes (B100, Bio-LNG, green methanol), the consumption is limited to the maximum energy in scope of FuelEU (50%)

Operational costs of alternative energy sources in 2026, pre-war fuel prices (MUSD)



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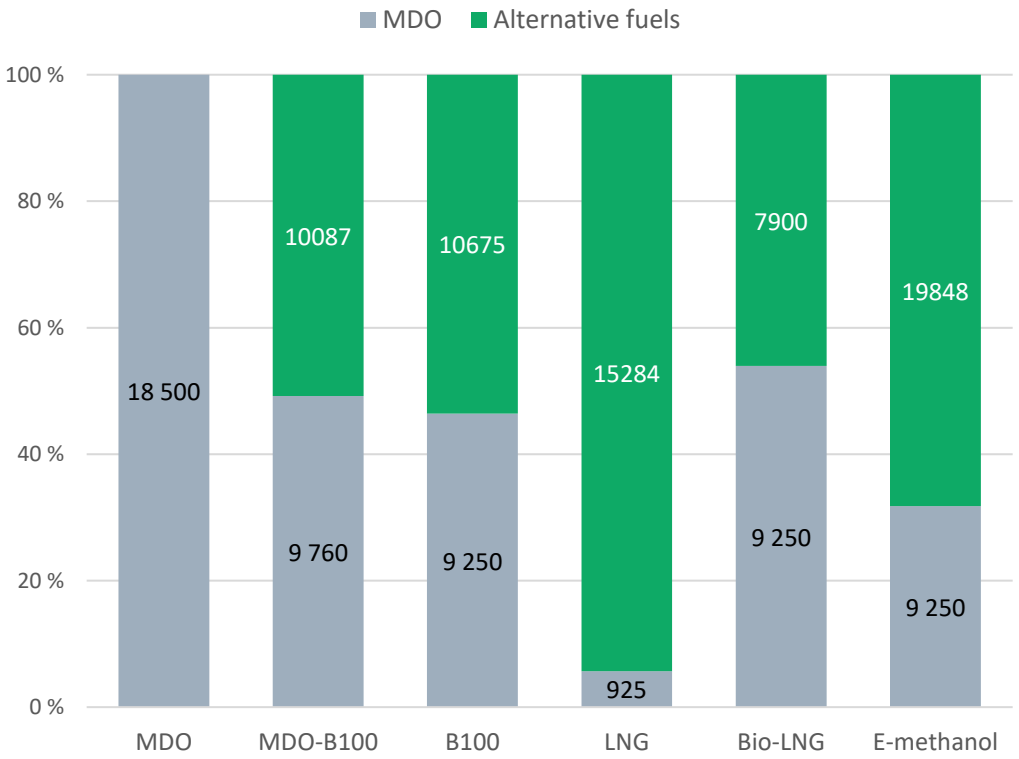
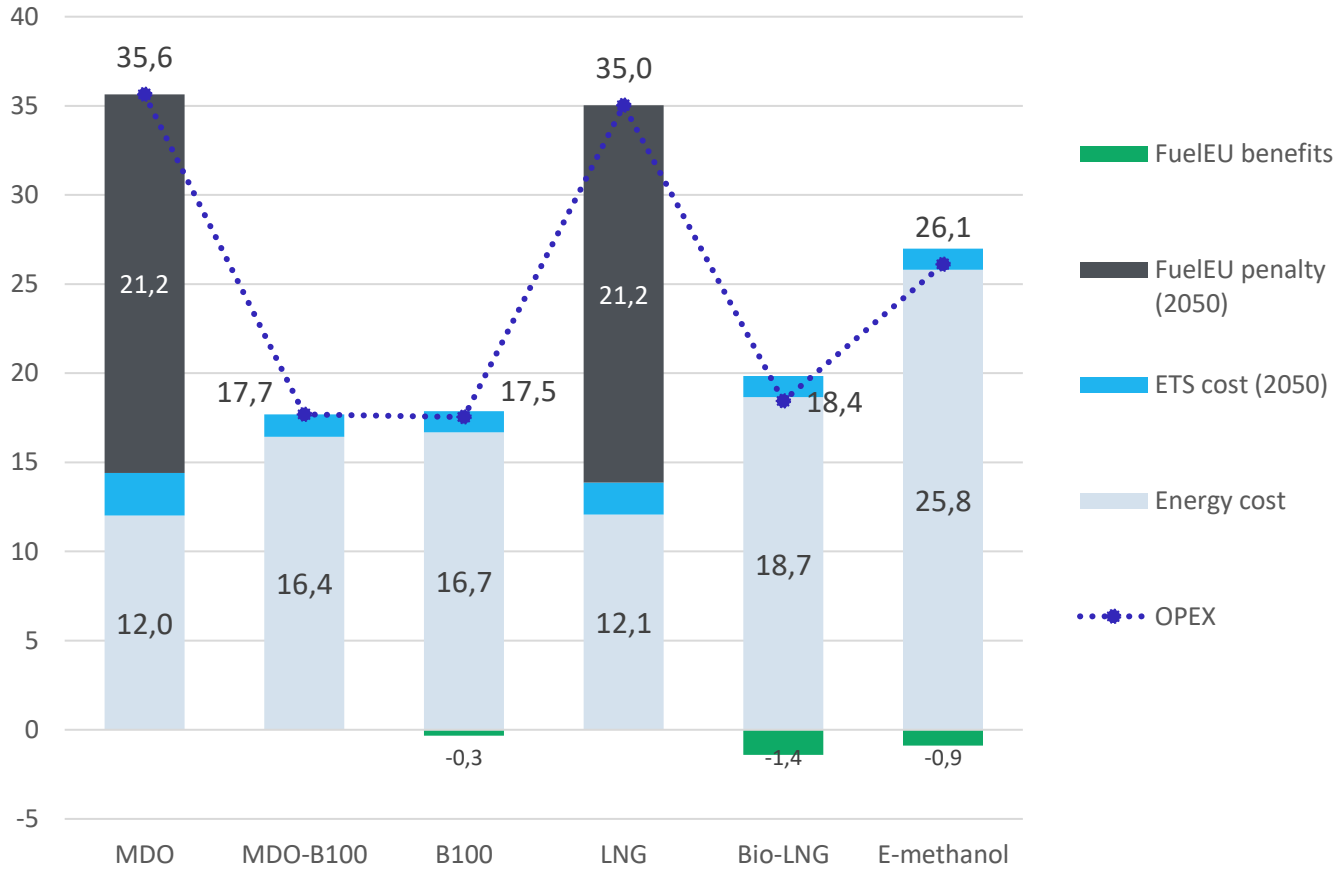
Fuel alternatives for cruise ships - 2050

Fuel mix options, optimized for FuelEU compliance (tons)



In alternative fuel mixes (B100, Bio-LNG, green methanol), the consumption is limited to the maximum energy in scope of FuelEU (50%)

Operational costs of alternative energy sources against 2050 FuelEU Target (MUSD)



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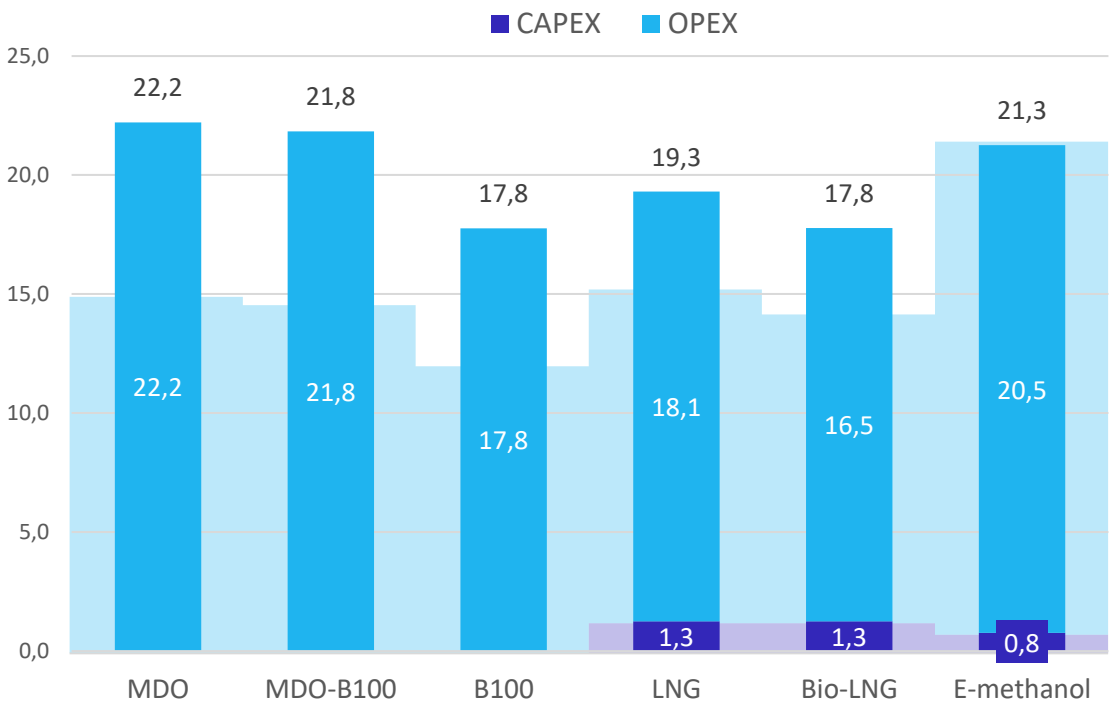
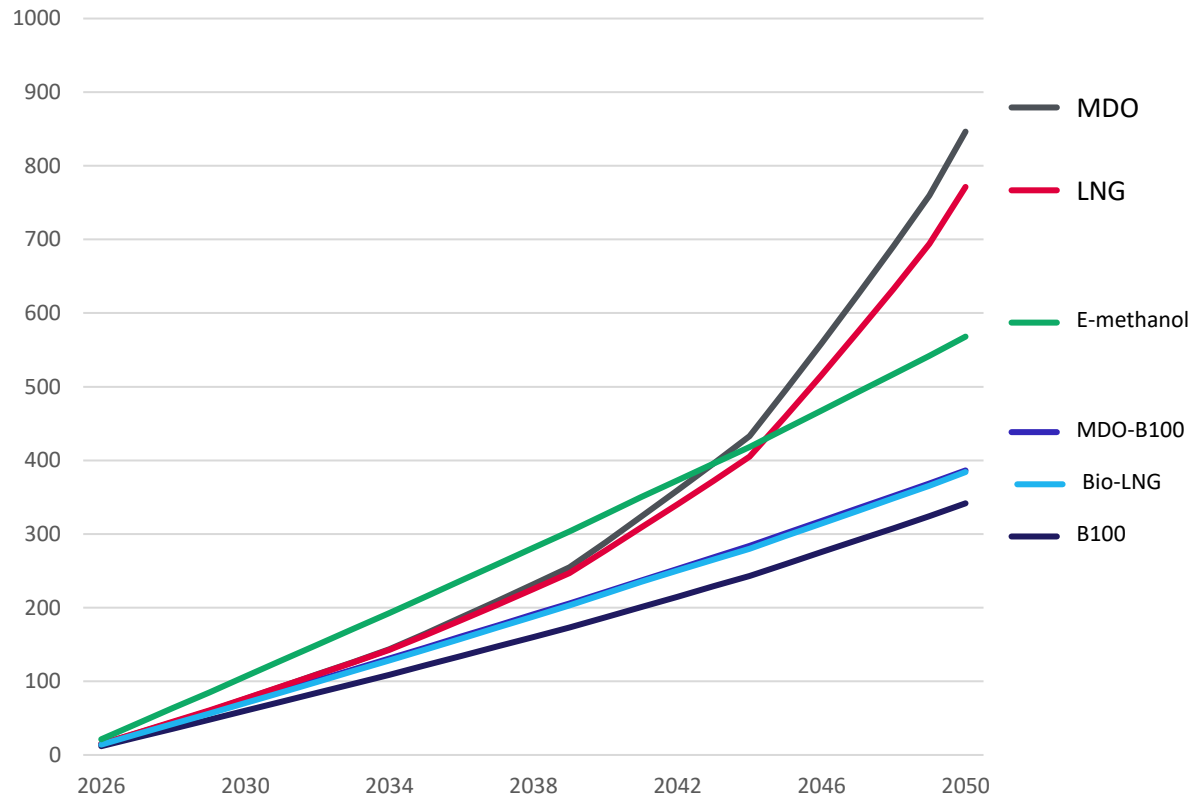
Optimized consumption of B100 and bio-LNG could provide added benefits for the vessel, compensating for capital cost

Total cost of ownership of energy alternatives

TCO of energy options in 2026, accounting for increased fuel price due to Iran war (MUSD)



Cumulative TCO over the vessel's lifetime, assuming fuel price level remains same as pre-war (MUSD)



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Assumptions

Fuel characteristics

	MDO	LNG Otto medium speed	Bio-LNG Otto medium speed	B100	Green methanol
WtW GHG intensity (gCO_2e/MJ)	90.76745	89.20293	0.5	14	32
LCV (MJ/g)	0.0427	0.0491	0.05	0.037	0.0199
$CfCO_2$	3.206	2.75	0	0	0
Pre-war price (USD/t)	650	750	1600	1000	1165
Increased price (USD/t)	1050	1000		1200	

CAPEX assumed for 50 MW engine

Engine type	CAPEX Premium	Annual CAPEX over 15 years financing period, 5% yearly interest
Fuel oil	0	0
LNG dual fuel	13	1.25
Methanol dual fuel	8	0.77

1 EUR = 1.15 USD
EUA 80 USD/t

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Thank you!

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