Explore Circularity Across the Vessel Lifecycle

WELKOM

20.11.2025 – Gorinchem

MID

Explore Circularity Across the Vessel Lifecycle

17:45 Inleiding – **Julien Raes**

17:50 Circularity: relevance, necessity and commercial opportunities – **Sylvia & Marjolein Boer**

18:20 Voorgerecht

18:45 Cable reduction and lower maintenance costs through smart engineering – **Mischa Habermehl**

19:15 Hoofdgerecht

20:15 From newbuild to decommissioning: circularity in TSHD's – **Jorn Bertens**

20:45 Koffie & thee + Discussie & Talk

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Powered By:

Boskalis

Jan De Nul GROUP

DEME

Van Oord

exitŏ tekst- en vertaalbureau

IHC

MID

Faces Behind:

Frank de Waard
Van Oord

Julien Raes
DEME

Hilde Mol-Lukkezen
Exito

Marc Boer
IHC

Renaat Lebon
Jan De Nul

Martijn Cox
Royal Boskalis

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Mentimeter

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How familiar are you with the concept of **circularity** across the **vessel lifecycle**?

Not at all .....->..... Very familiar

0.0

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MID 2025.11.20

Choose a slide to present

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In your opinion, what 's the **biggest benefit** of **applying circularity** in the vessel lifecycle?

0	0	0	0	0
Cost Savings	Environmental Impact	Extended Asset Life	Compliance	Other

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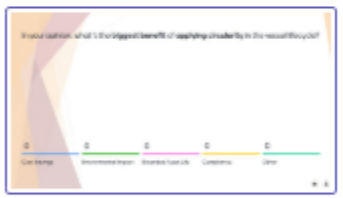
Choose a slide to present



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Explore Circularity
Across the Vessel
Lifecycle

Circularity: relevance, necessity and commercial opportunities

Sylvia & Marjolein Boer

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Explore Circularity
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Q & A

Explore Circularity Across the Vessel Lifecycle

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Cable reduction and lower maintenance costs through smart engineering

Mischa Habermehl

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How many **operational years** would you be willing to **invest** in your (new) vessel before the proposed investment solution becomes profitable?

< 2 Years	2-5 Years	5-10 Years	> 10 Years	I'm not sure yet / It depends on the solution
0	0	0	0	0

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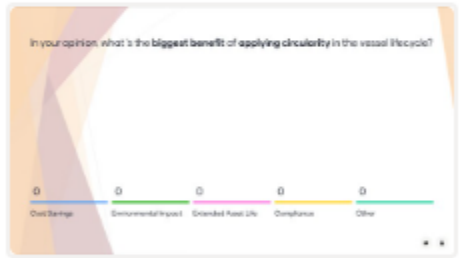

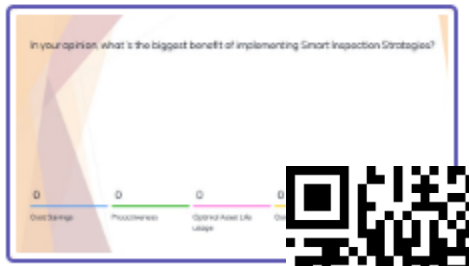

Alewijnse Group – +1000 FTE

NEW BUILD | REFITS | SOLUTIONS | SERVICE | PANEL BUILDING

RESOURCEPOULE: ENGINEERING & PROJECT MANAGEMENT

INTEGRAL SALES SET-UP

NAVAL & GOVERNMENTAL

DREDGING, OFFSHORE & TRANSPORT

SUPER YACHTS

INDUSTRY VERTICALS

Alewijnse WeConnect.

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CIRCULAR VESSEL DESIGN

3 Result domains:

- **Concurrent systems design leads to reduction of critical materials**
- Electrical solutions result in fuel savings and reduction of maintenance costs
- Awareness changes culture

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CIRCULAR VESSEL DESIGN

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CIRCULAR VESSEL DESIGN

The circular economy model:
less raw material, less waste, fewer emissions

- Early involvement
- Concurrent engineering

CIRCULAR VESSEL DESIGN

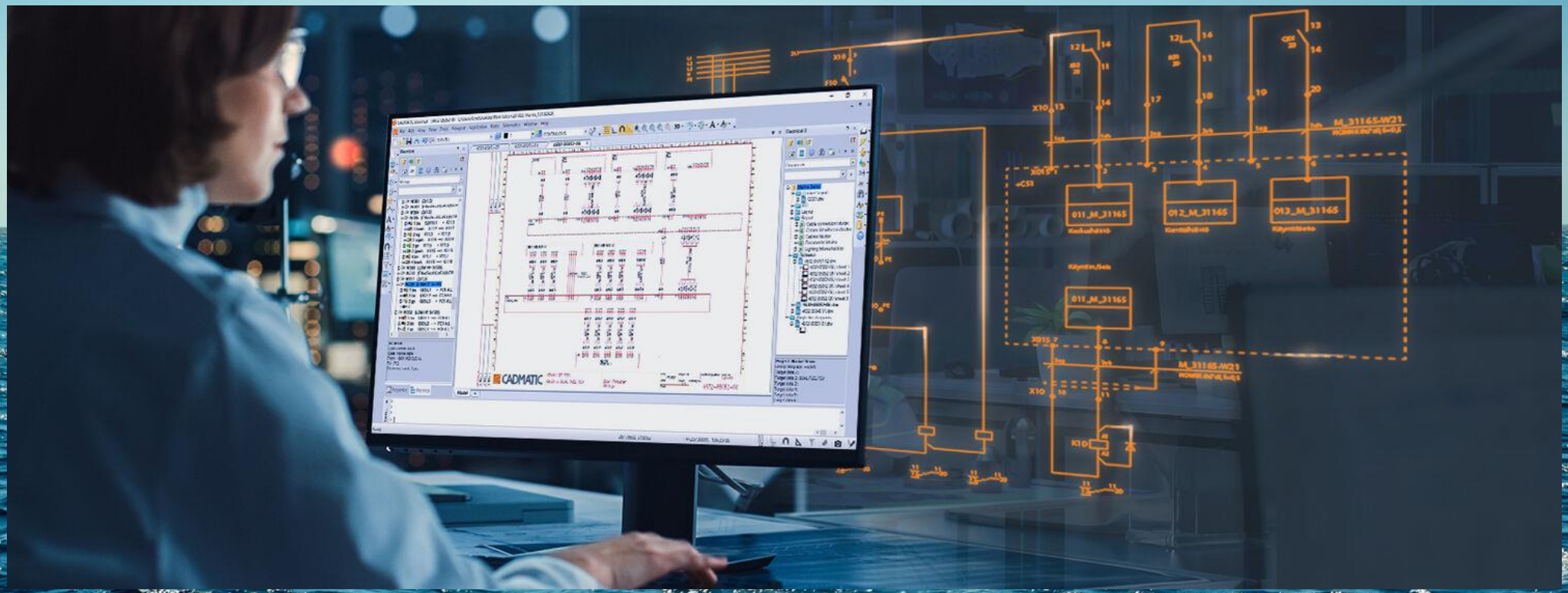
The circular economy model:
less raw material, less waste, fewer emissions

- Electric Solutions

CIRCULAR VESSEL DESIGN

- -Awareness

Early involvement / Concurrent Engineering



CONCURRENT ENGINEERING

- **Exists by systems based design**
- **Clusters Functions**
- Operates in a multi disciplinary team
- Demands full supply chain involvement
- Accelerates smart automation choices
- Challenges Classification authorities
- Needs cable manufacturer involvement

CONCURRENT ENGINEERING

- **Aims to achieve cable reduction of 20% by 2030**
- **Example pilot: Damen Combi Freighter series:**
- Savings of 25.000 EUR per kilometre cable
- About 5 t. Less critical raw materials (cupper) per vessel
- About 15 kW/h less heat dissipation due to function clusters = 131.000 kW annually equals 35 ton of CO2

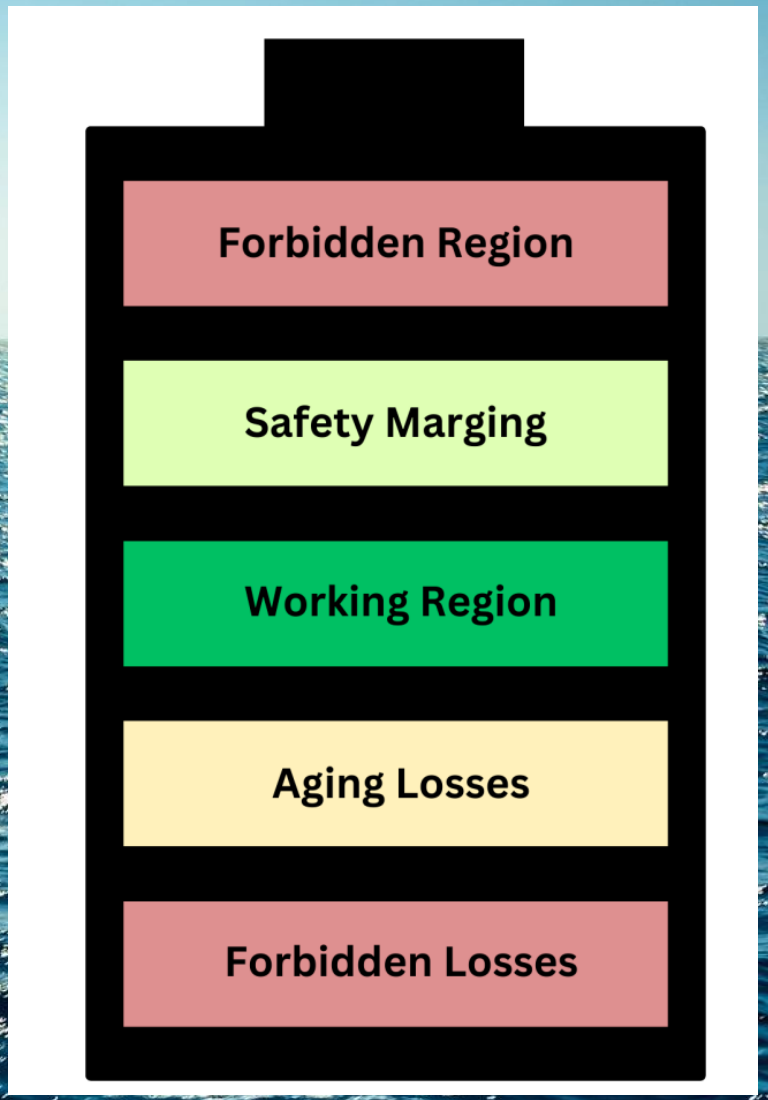
ELECTRIC SOLUTIONS

- **Battery energy storage &**
- **Energy management**
- Power optimization
- Spinning Reserve
- Load levelling
- Ramp up power assist
- Classification authorities support on CB-FMECA's

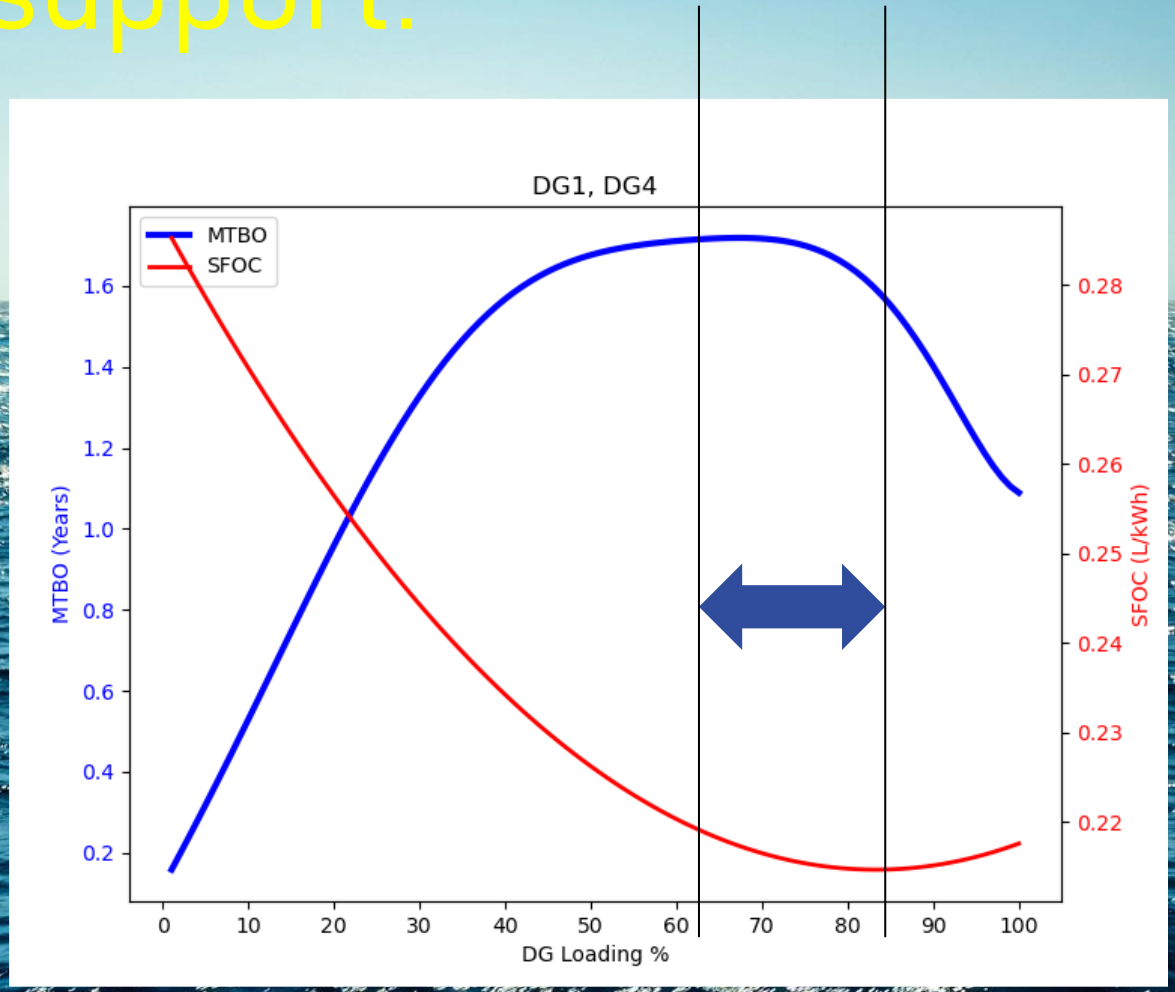
Electric Solutions
Battery energy storage:

80%

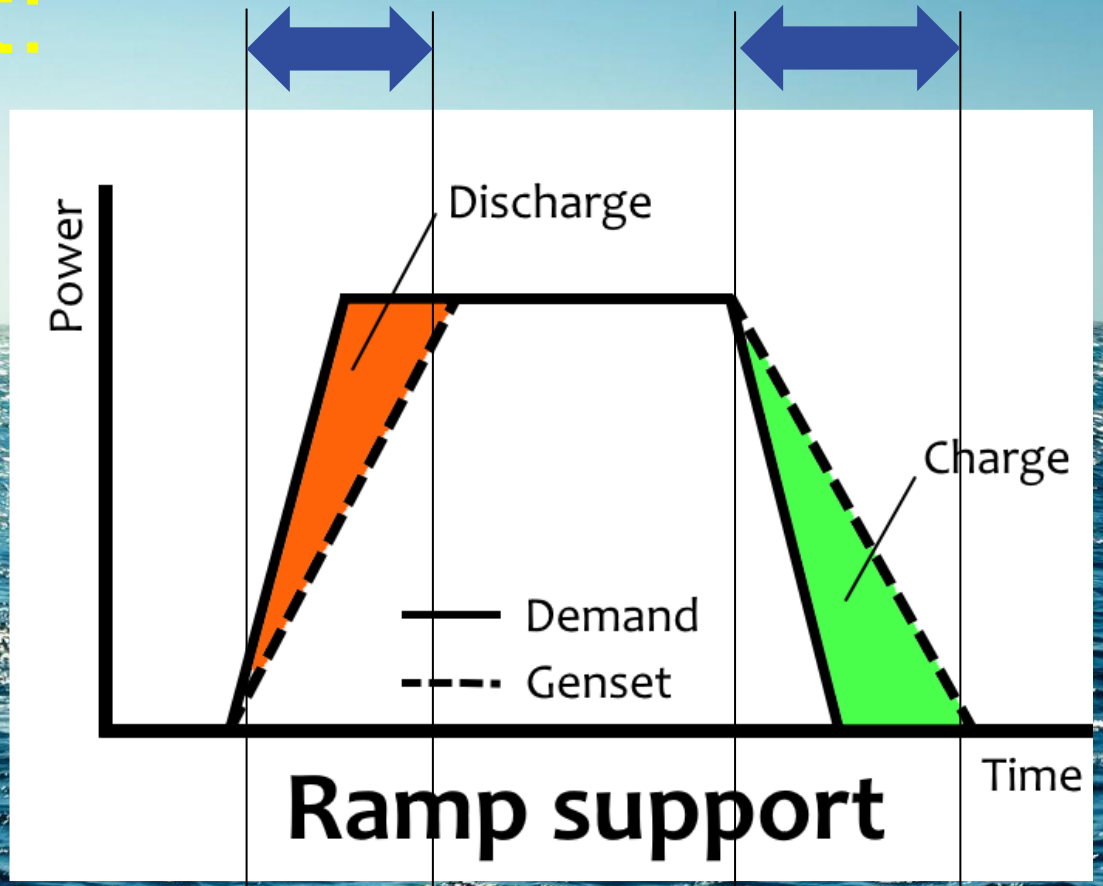
20%



Electric Solutions
Battery energy support:
Load levelling

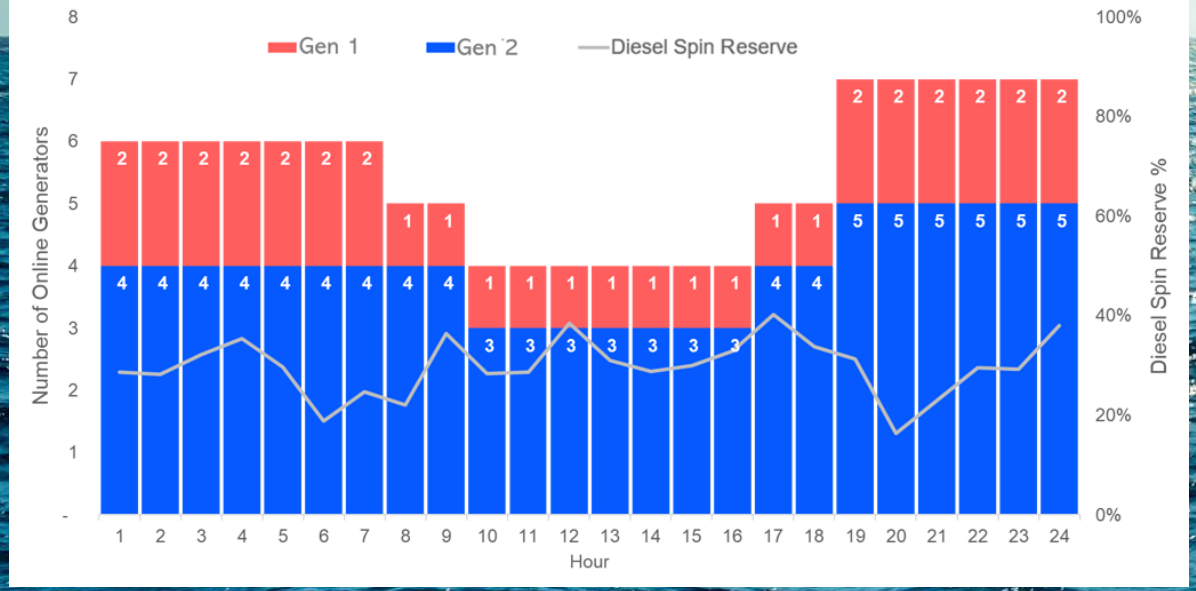


Electric Solutions
Battery energy support:
Ramp up power
Assist

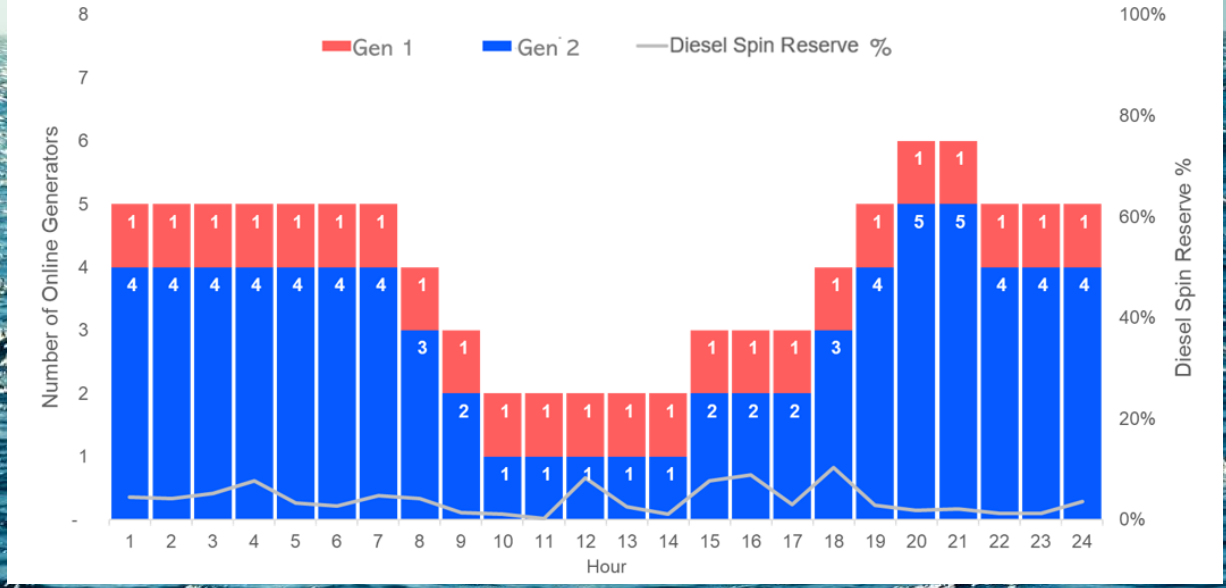


Electric Solutions
Battery energy support:
Spinning reserve

Without BESS



With BESS



Data & event analysed modeling

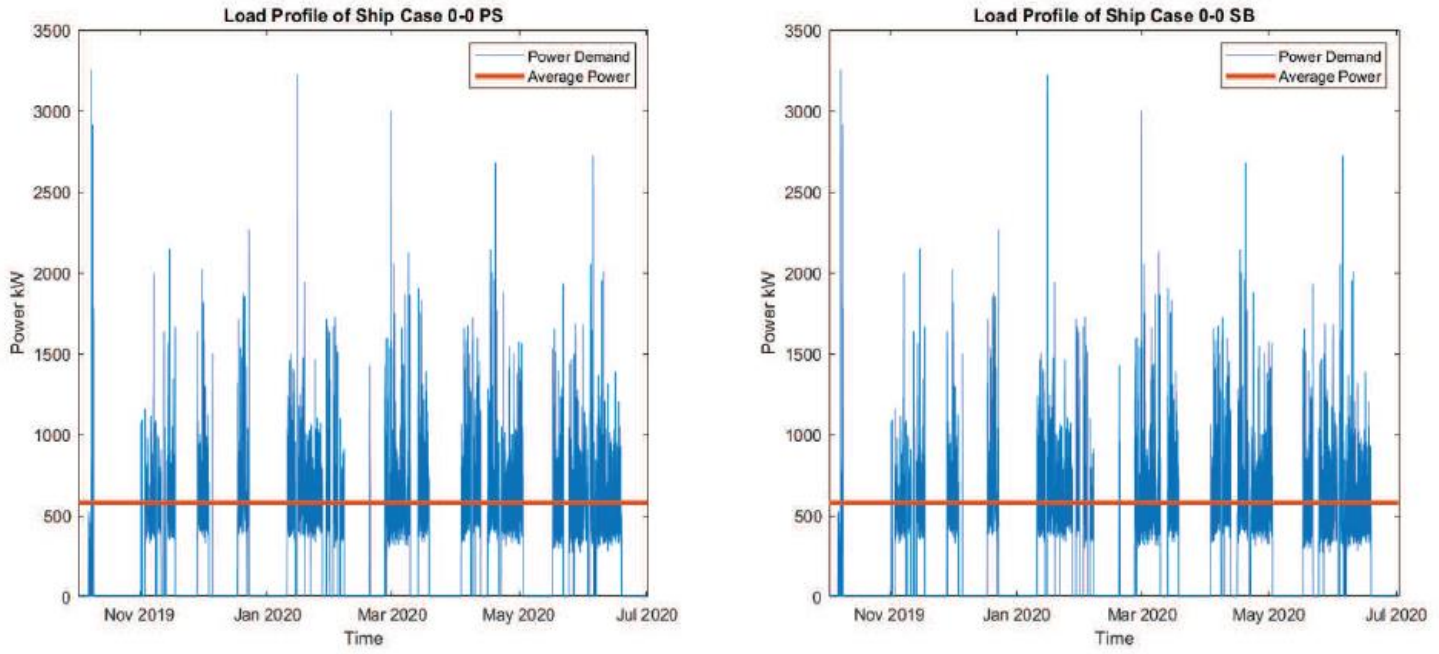
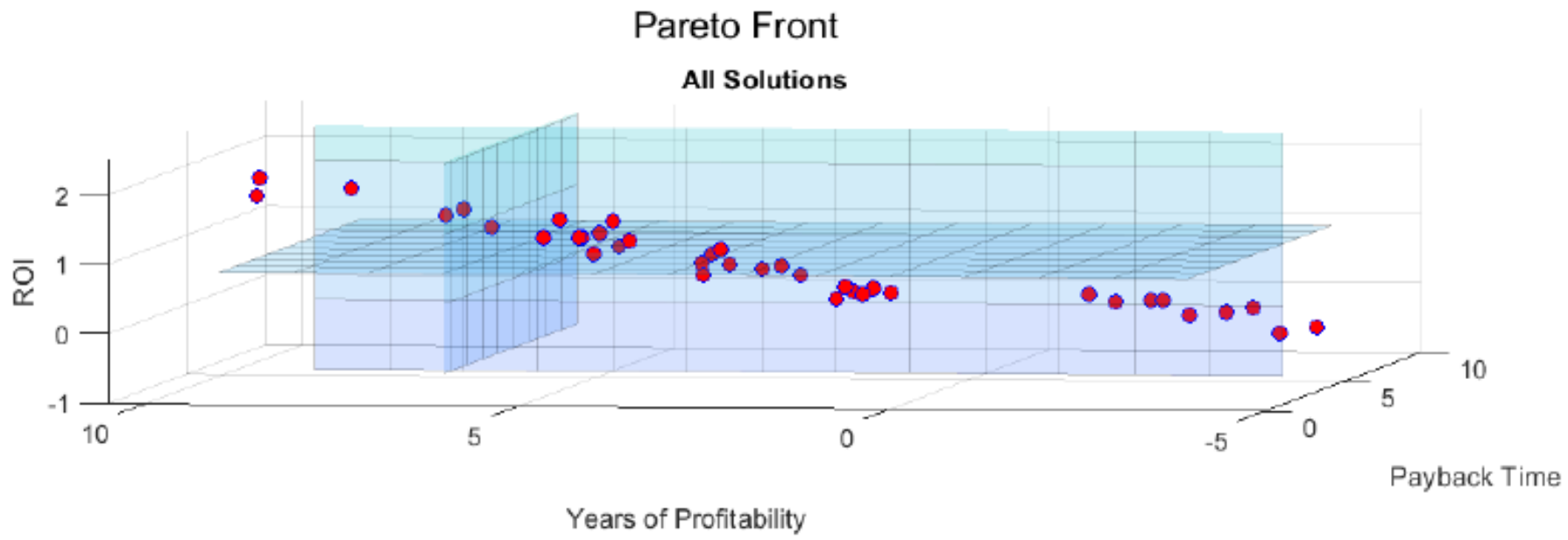


Figure 4.7: DP mode operation (left - port side, right starboard side

Total cost of ownership i.c.w. ROI

6.4.1. Best battery solution



Return of invest prognoses

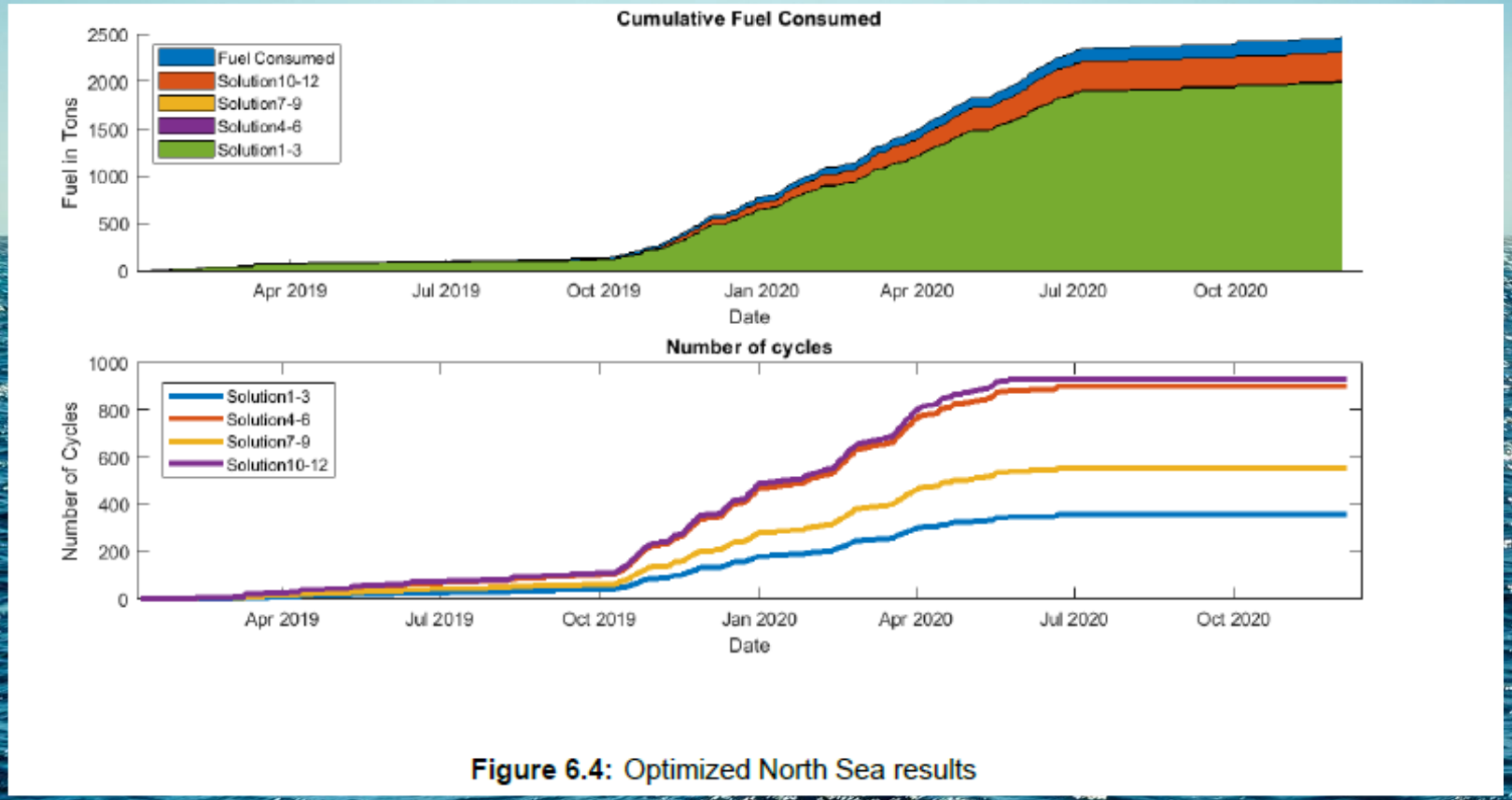


Figure 6.4: Optimized North Sea results

Maintenance analyses

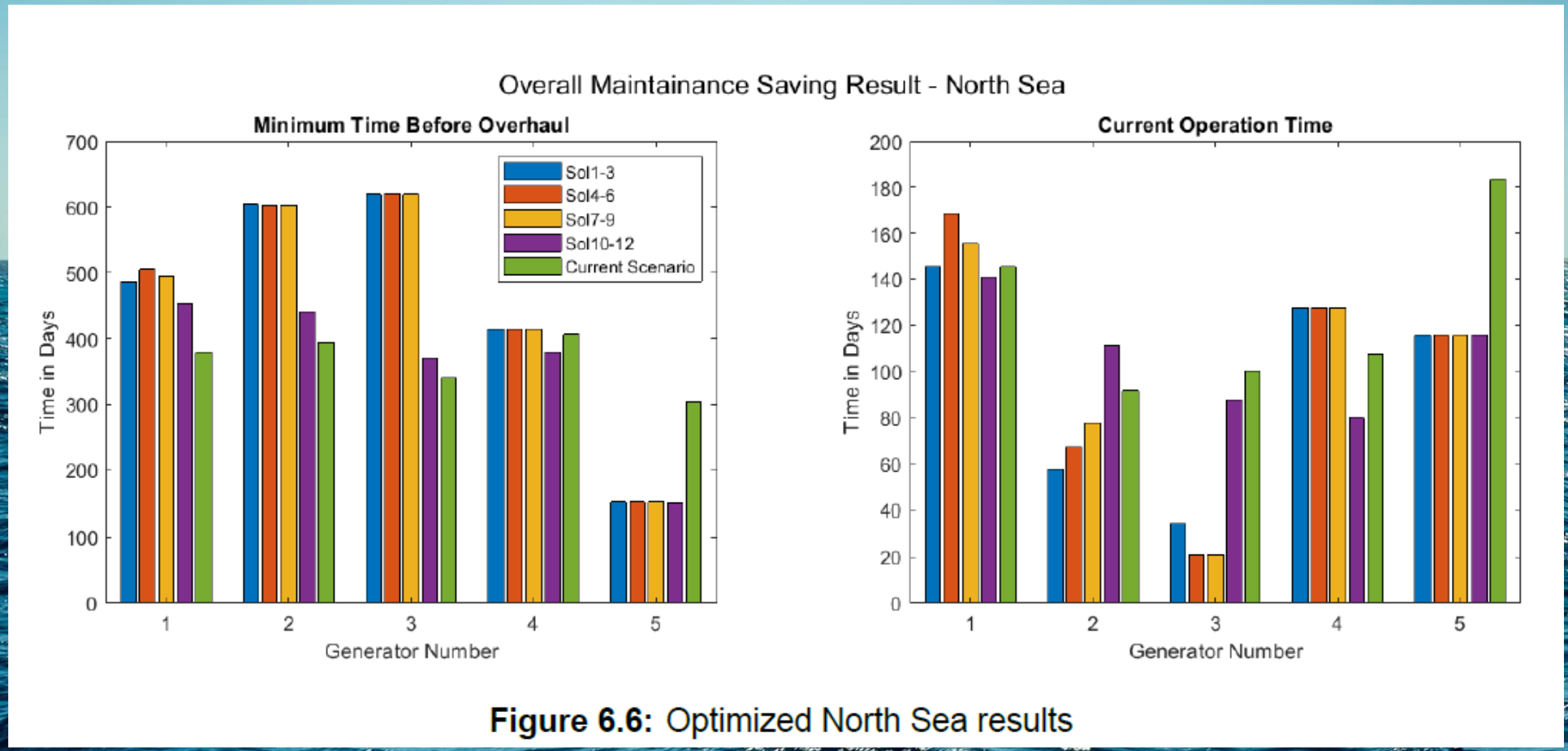


Figure 6.6: Optimized North Sea results

CIRCULAR VESSEL DESIGN

-Awareness

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CULTURE CHANGE

AWARENESS OF CIRCULAR GOALS LEAD TO:

- A strengthening of our international market position
- Reduction of fuel consumption
- Reduction of CO2 emission
- Reduction of maintenance cost
- A shift from CAPEX to OPEX

- **A SHIFT FROM TRANSACTIONAL TO TRANSFORMATIVE**

Alewijnse

WeConnect.

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From newbuild to decommissioning: circularity in TSHD’s

Jorn Bertens

Van Oord
Marine ingenuity

Total Life & Circularity

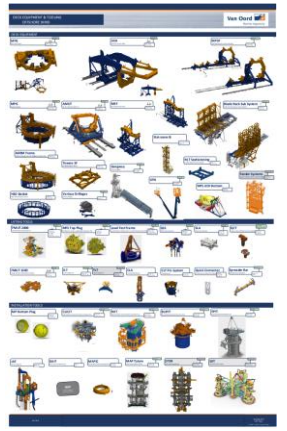
Jorn Bertens [Msc]
Manager Procurement
CAPEX & OPEX

(MID – 20/11/2025)

3 Decades - Van Oord - Various positions

Van Oord
Marine ingenuity

A VESSEL LIFETIME



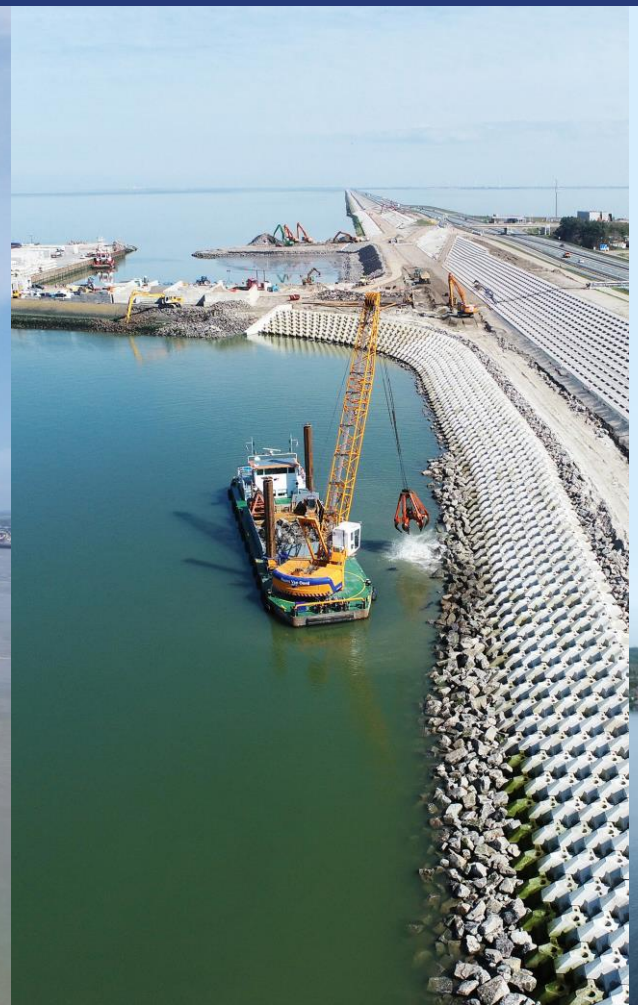
Jorn Bertens [Msc]
Manager Procurement
CAPEX & OPEX

About us

Deliver true Marine ingenuity

Van Oord
Marine ingenuity

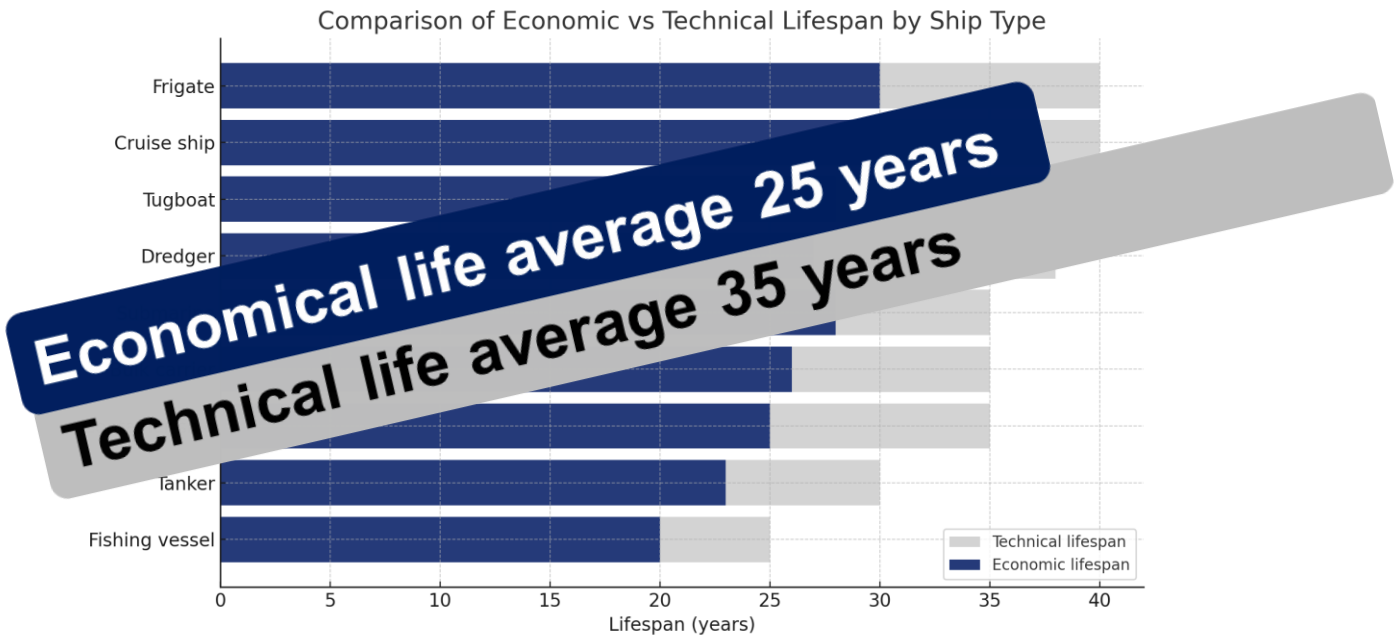
Dredging & Infra



Offshore Energy

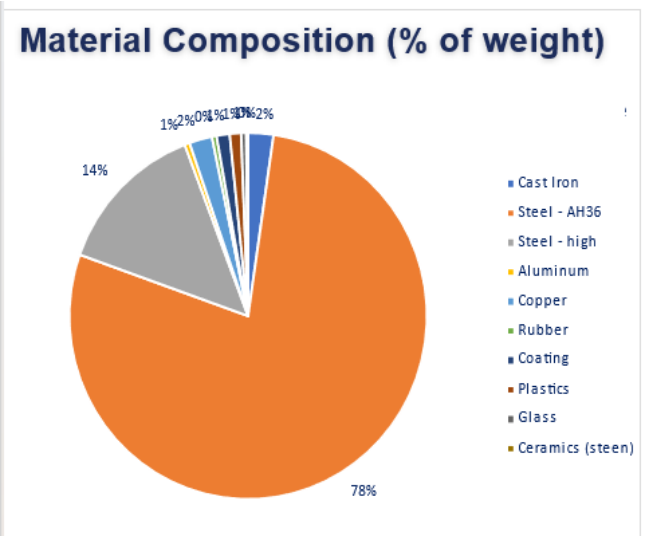
Jorn Bertens [Msc]
Manager Procurement
CAPEX & OPEX

END OF LIFE



Economical life average 25 years

Technical life average 35 years



+

Equipment & parts Second Life

+

IHM
Inventory Hazardous Material

HAZARDOUS MATERIALS AWARENESS

+

Waste

Recyclability 85-95%

CIRCULARITY

R-LADDER

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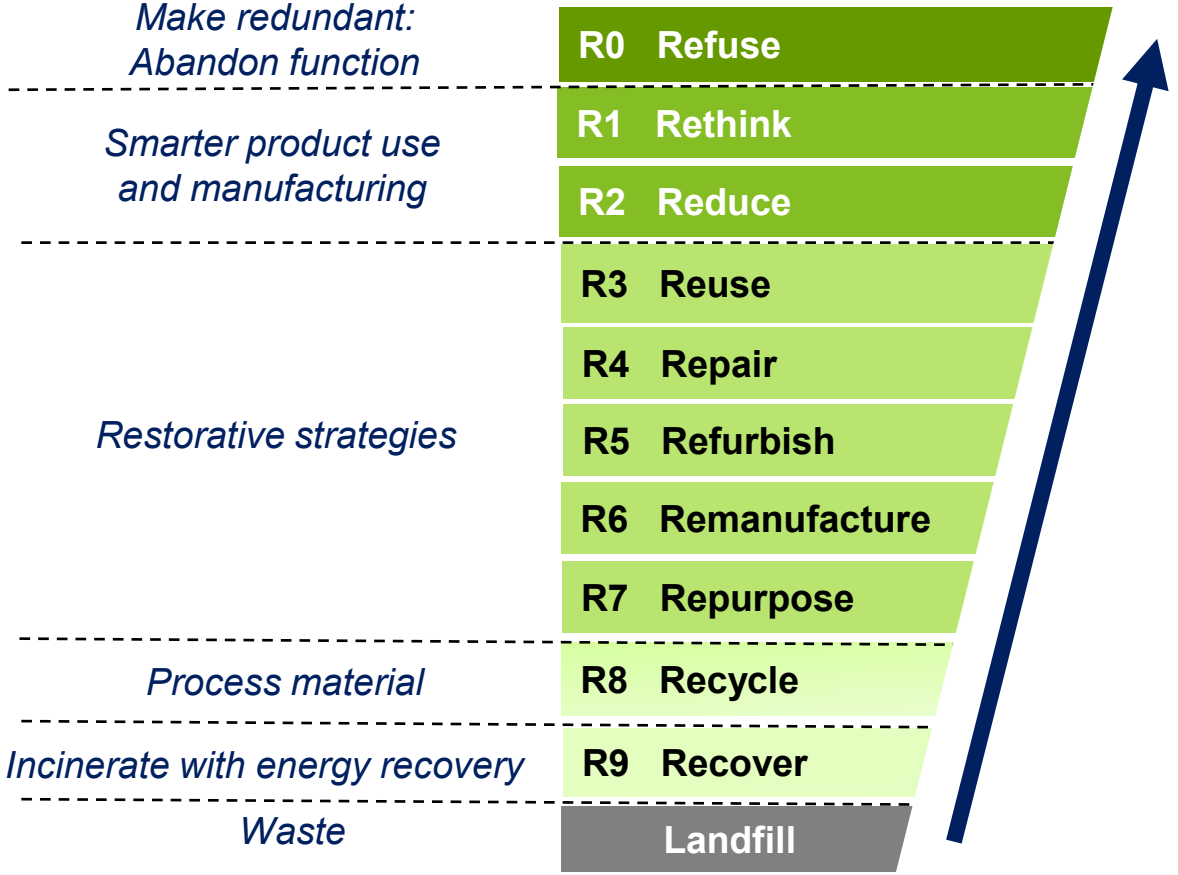
Improve Sustainability and resource efficiency

Extract maximum value & maximize circulation

From linear to circular economy



Lifetime & Circularity - 400 years ago

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Marine ingenuity

Year 1625

1625 New Build Vessel Costs 32.500 DF

REINIER NOOMS, HET AFLOPEN VAN EEN SCHIP, , CA. 1650-1665

CAPEX

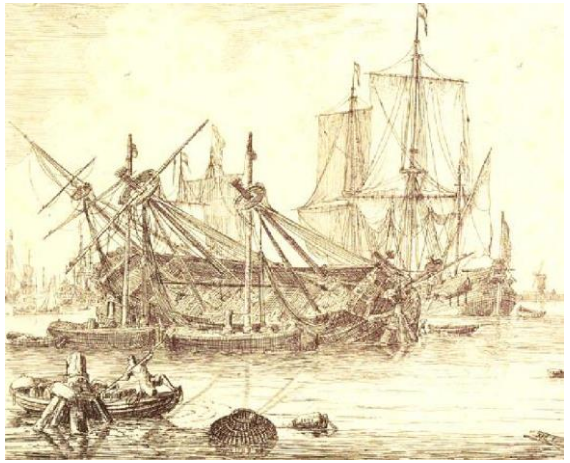
Repair of vessel

Reinier Nooms, *Het optakelen en kalefaten van een oorlogsfregat*, ets op papier, ca. 1650-1665. Het Scheepvaartmuseum, inv.nr. A.1723

LUDOLF BACKHUYSEN, KIELEN VAN EEN SCHIP EN HET , OPTAKELEN EN KALEFATEN, 1701

OPEX

Repair in Batavia – Increase potential return and faster to Netherlands



LUDOLF BACKHUYSEN, KIELEN VAN EEN SCHIP EN HET , OPTAKELEN EN KALEFATEN, 1701

OPEX

FLEETPLAN

Wanneer men dan 5 scheepen yeder jaer aen bouwde, soo souden in 12 oft 14 jaeren het gantsche getal 60 scheepen vernieuwt wesen, ende de outste scheepen maer 12 oft 14 jaer out sijn, en die daerover waeren konden worden verkocht.'

MAARTEN HARPERTSZOON TROMP AAN DE STATEN GENERAAL, JANUARI 1648

Displacement 1600T

Lifetime CO2 Emissions

350 tCO_2e

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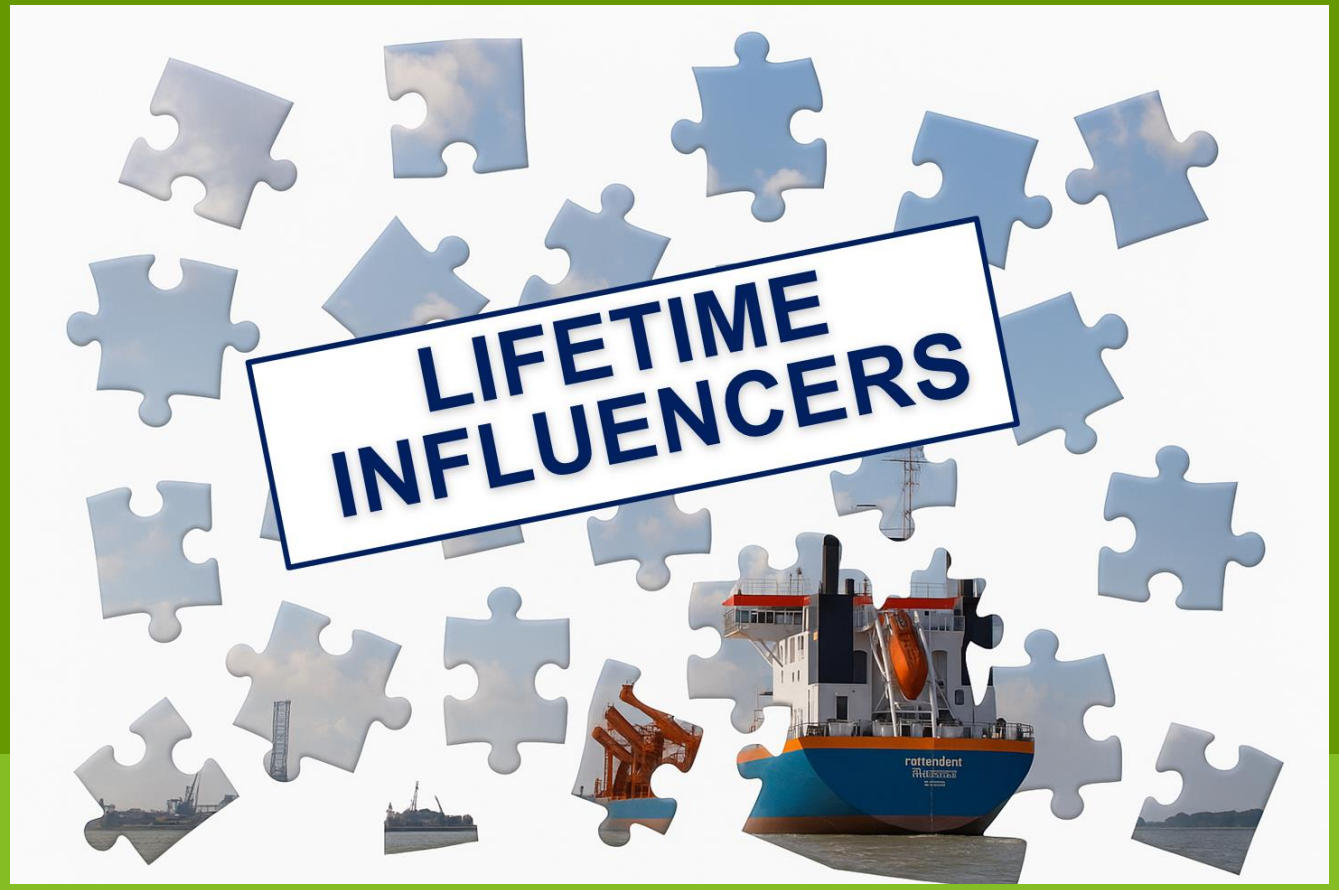
LIFETIME INFLUENCERS



HOW MANY YEARS TO GO?

Jorn Bertens [Msc]
Manager Procurement
CAPEX & OPEX

AND HOW ABOUT A DREDGER ?

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Manager Procurement
CAPEX & OPEX

Key Lifetime Influencers

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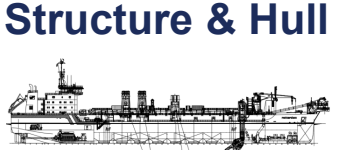
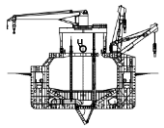
Structure & Hull





- Corrosion
- Fatigue Stress
- Cracks and Deformation

Design
Duty Cycles
Fatigue Factor

Equipment

- Running Hours
- Maintenance & Costs
- Mechanical Fatigue
- Obsolescence Spares

Quality
Mechanical Fatigue
Planned/Corrective
MTBF equipment
Products end of life

Operational Excellence & Intensity

- Operational Deployment
- Operational Efficiency
- Crew Experience / training

Material dredged
Wear & Tear
Weather / Sea States
Damages

Rules & Regulations Innovations

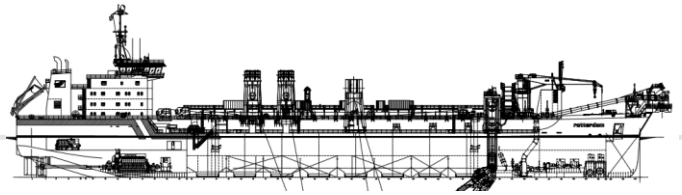
- Flag / Classification / IMO
- New Fuels
- New Technology

Return On Capital Employed

- Utilization Efficiency
- Lifecycle Cost Optimization
- Revenue / Profitability

Operational Profile & Energy

Niche market & its like Formula 1



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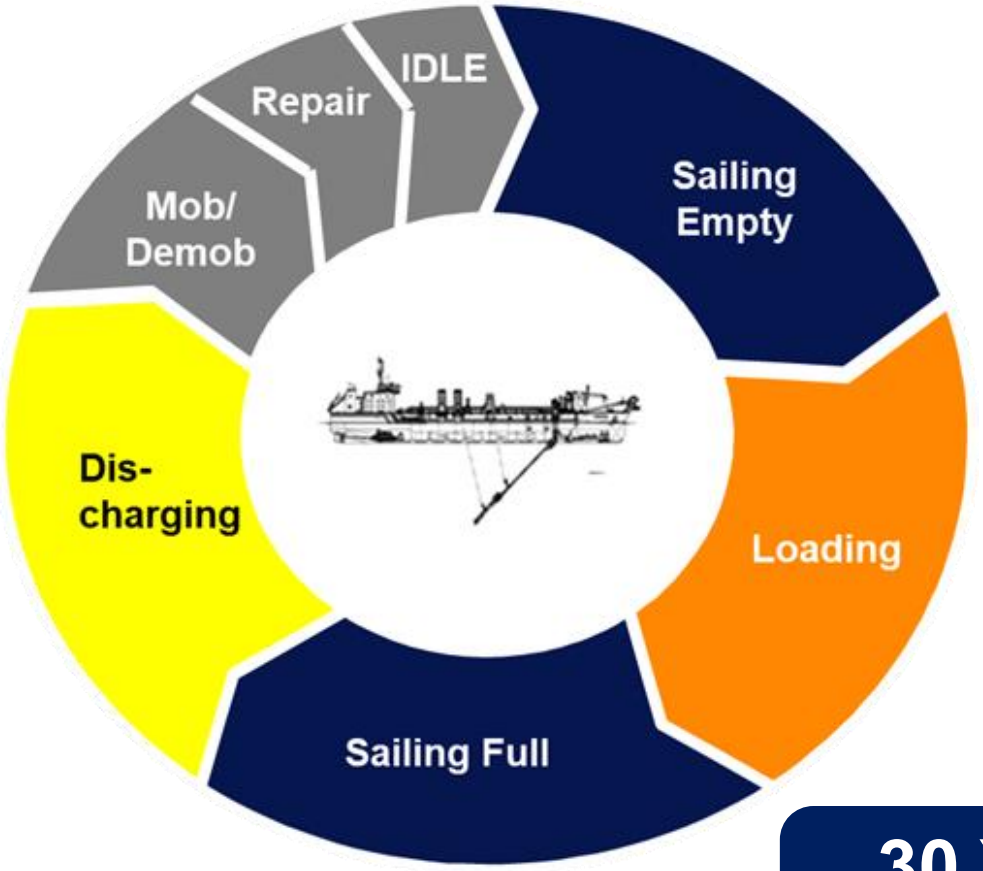

30 Year : 40.000 Cycles
+ 200x Mob

Lifetime influencers in time

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Return On Capital Employed

Utilization Efficiency

Lifecycle Cost Optimization

Revenue / Profitability

Client requirements

Structure & Hull

Corrosion

Fatigue Stress

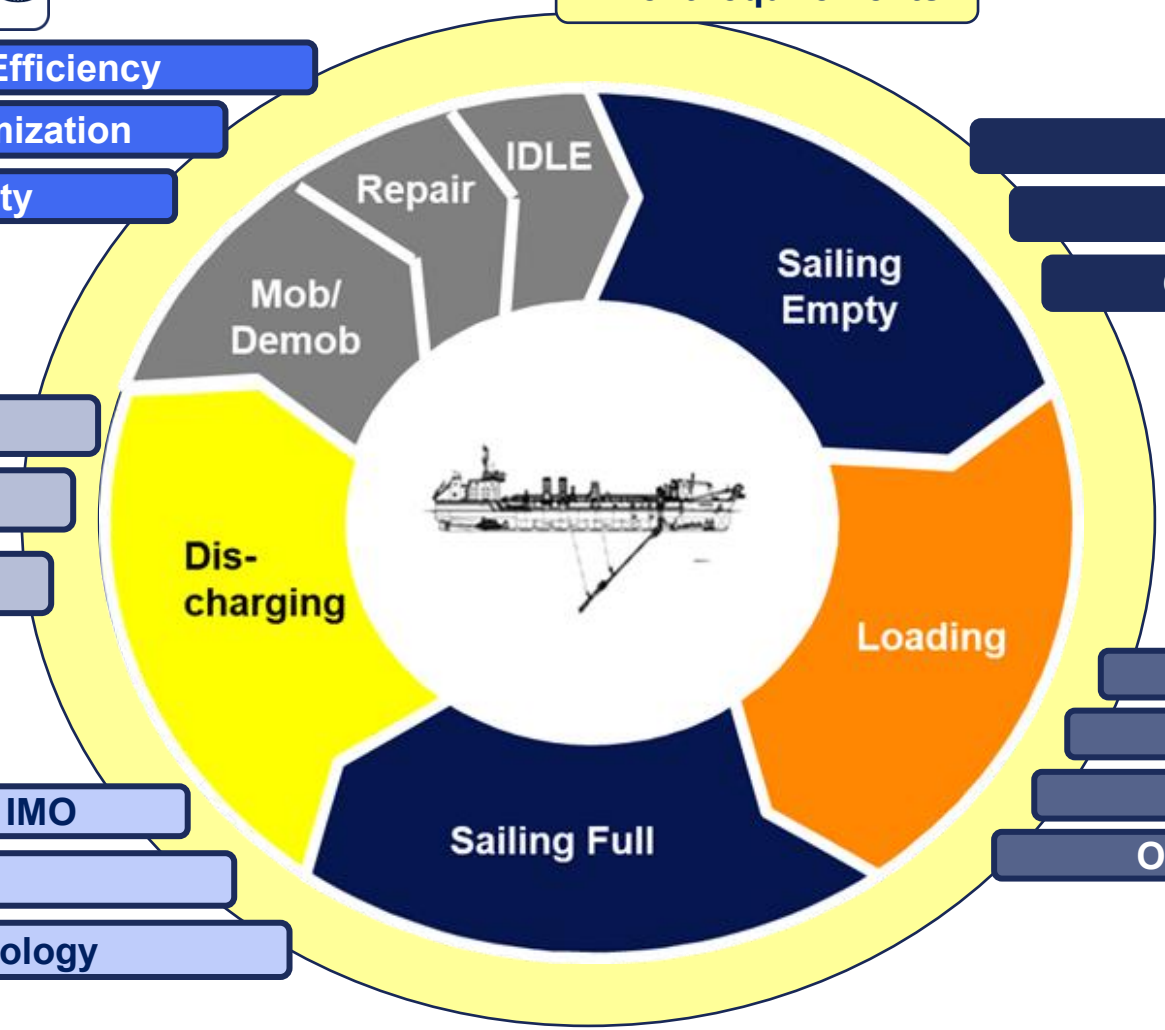
Cracks and Deformation

Operational Excellence & Intensity

Operational Deployment

Operational Efficiency

Crew Experience / training



Equipment

Running Hours

Maintenance & Costs

Mechanical Fatigue

Obsolescence Spares

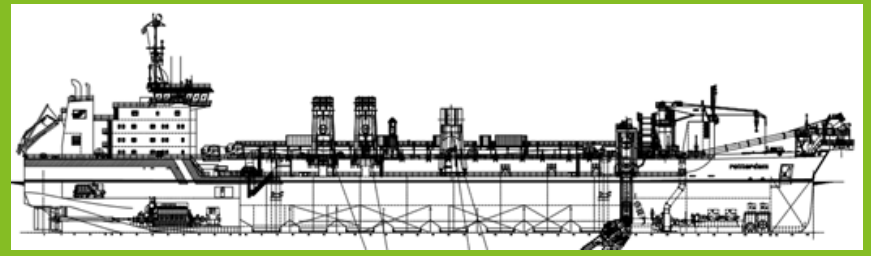
Rules & Regulations Innovations

Flag / Classification / IMO

New Fuels

New Technology

A CASE SCENARIO



Life of a Trailing Suction Hopper Dredger

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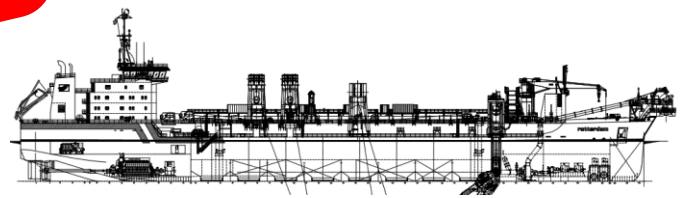
Case Scenario

New Build in 2000

30.000 tCO_2e

Uptime
Reliability
Optimize Production



Light Shipweight : 16.000 Ton / Dead Weight 40.000 Ton
Total installed kw : 25,000 KW

---

		20 Y	30 Y	40 Y	50 Y
Operational weeks	**Wks**	870	**1300**	1650	2000
Total cycles	**Cycles**	24.000	**40.000**	50.000	60.000
Running Hours	**HRS**	140.000	**210.000**	280.000	350.000
Dredged Material	**Mio M3**	300	**450**	600	800
Fuel Consumption	**MT**	370.000	**550.000**	700.000	950.000

52

30 Y -> 40.000 Cycles
+ 200 Mob

Rough indication - Total Lifetime costs - 30Y

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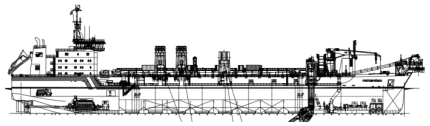
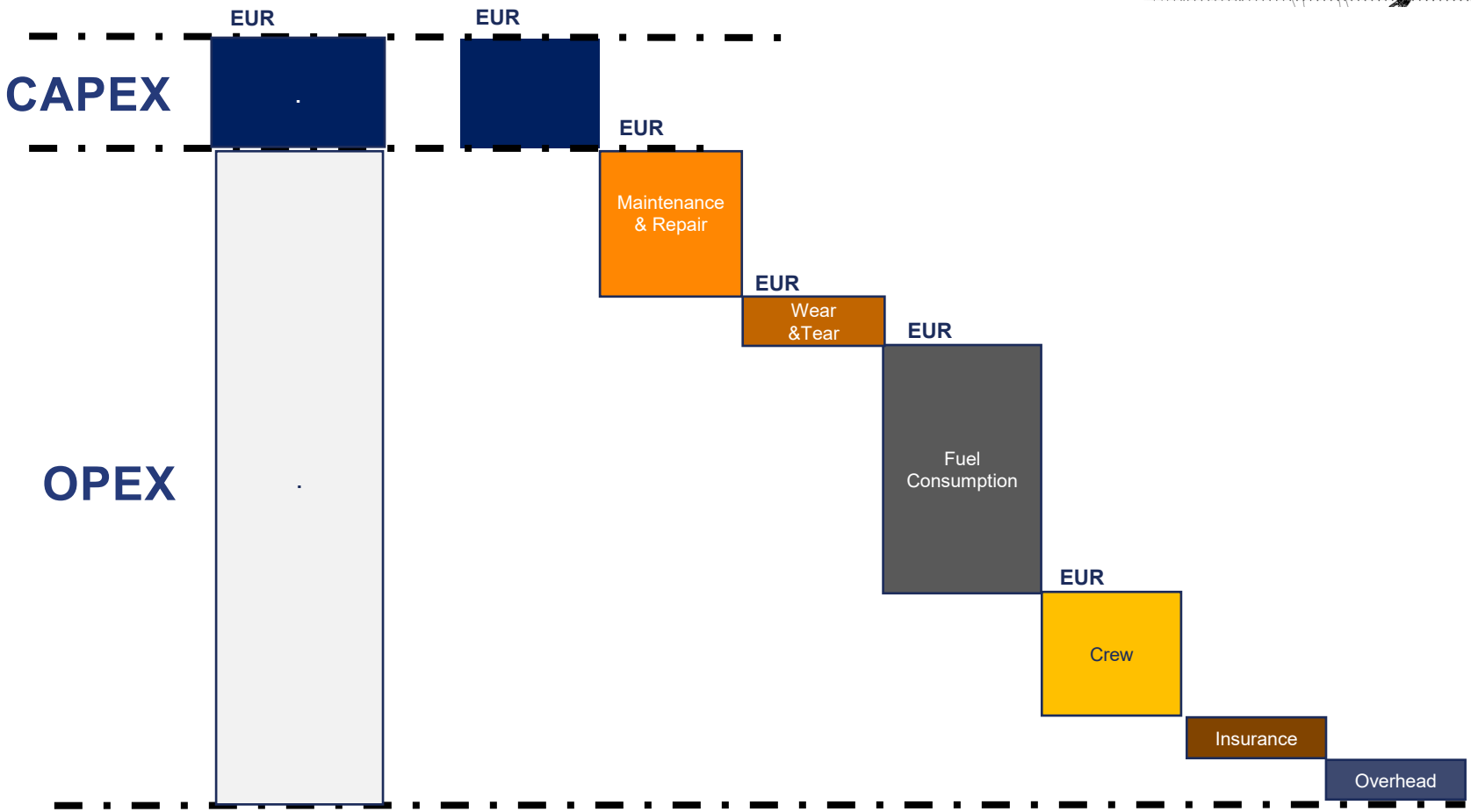
Case Scenario





OPEX – M&R + W&T

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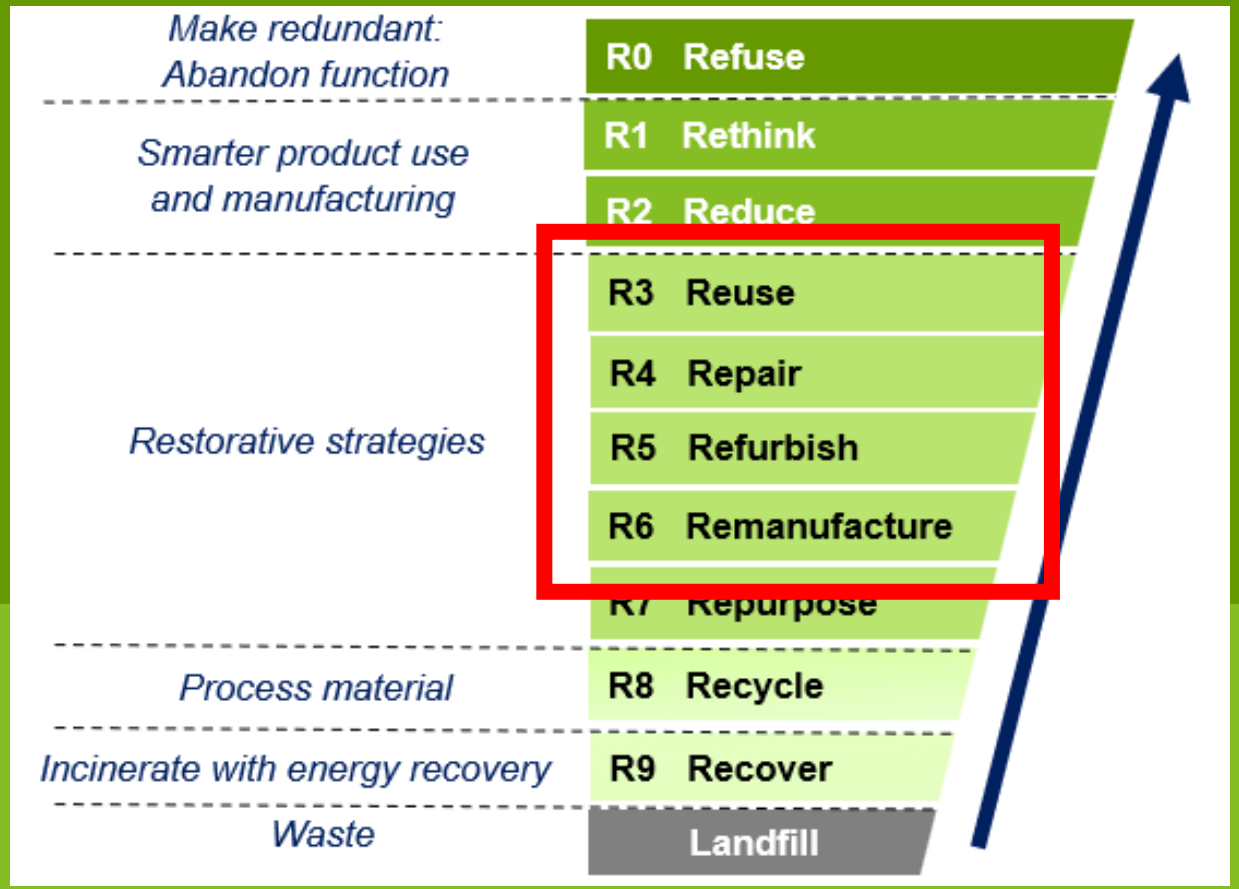
OPEX



Influence Lifetime drivers

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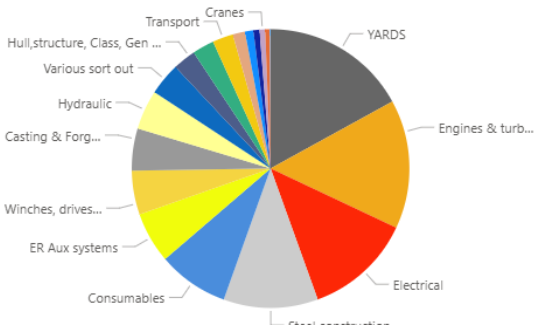
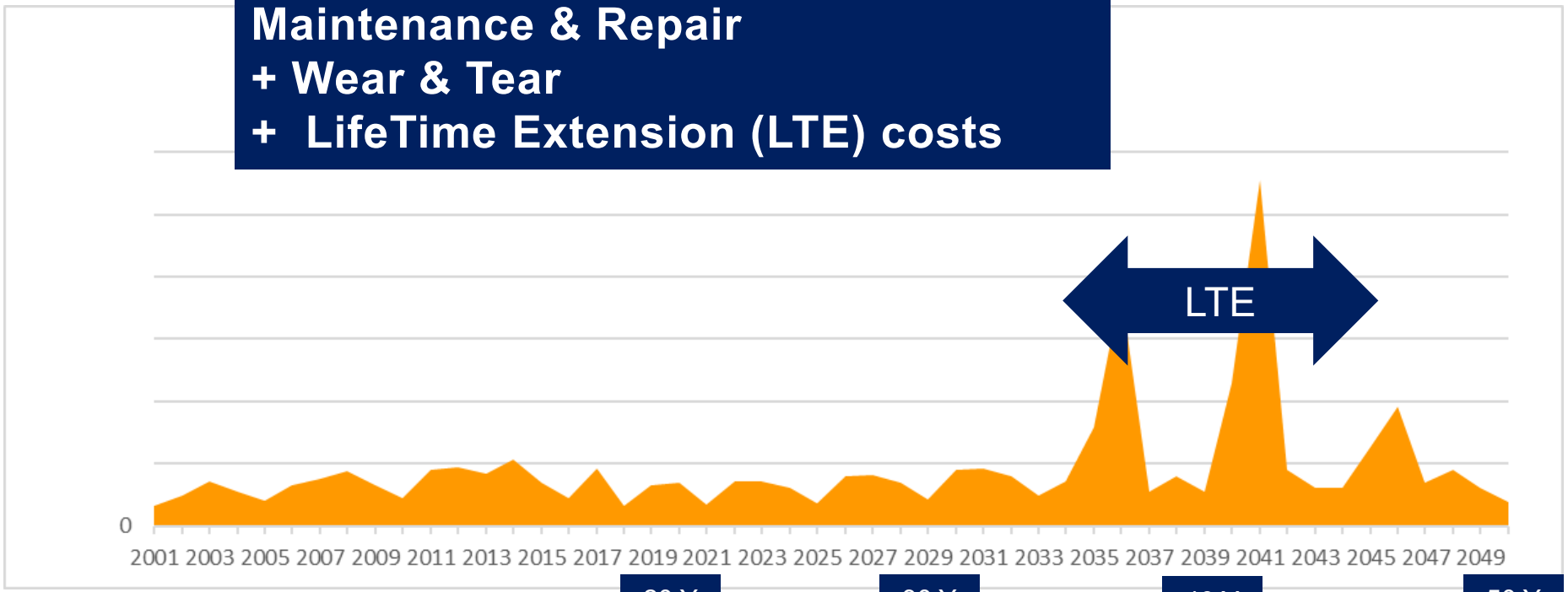
Case Scenario



Costs OPEX [EUR]
Maintenance & Repair
+ Wear & Tear
+ LifeTime Extension (LTE) costs



20 Y	30 Y	40 Y	50 Y
	30.000 tCO_2e	45.000 tCO_2e	60.000 tCO_2e

Towards Circularity Roadmap & obtaining focus

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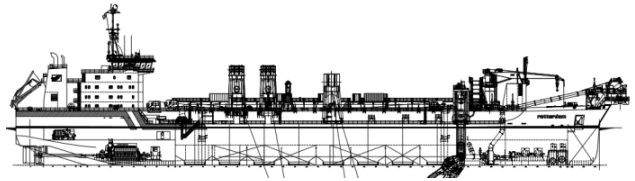
Category	Circularity
Steel	Design modular, Green Steel Rethink paint, to maximize recyclability of steel
Dredge installation	Different materials: f.e.Ceramic tiles. Only tiles instead of pipe replacement Green steel
Lub & hydraulic oils	Filtering, Condition Based Monitoring and Additives
Electrical / Hydraulics	Standardization
Consumables	Practice mindfull consumption, advocate circularity practice
Engines	Ensure efficient fuel consumption, extend standard intervals
Dredge Pumps	Improve impeller designs, dredge drives optimisation



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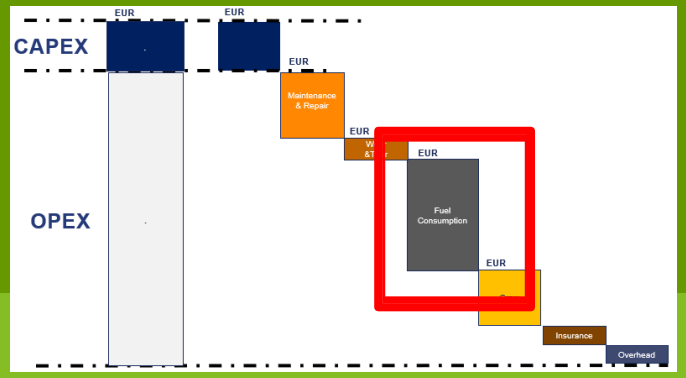
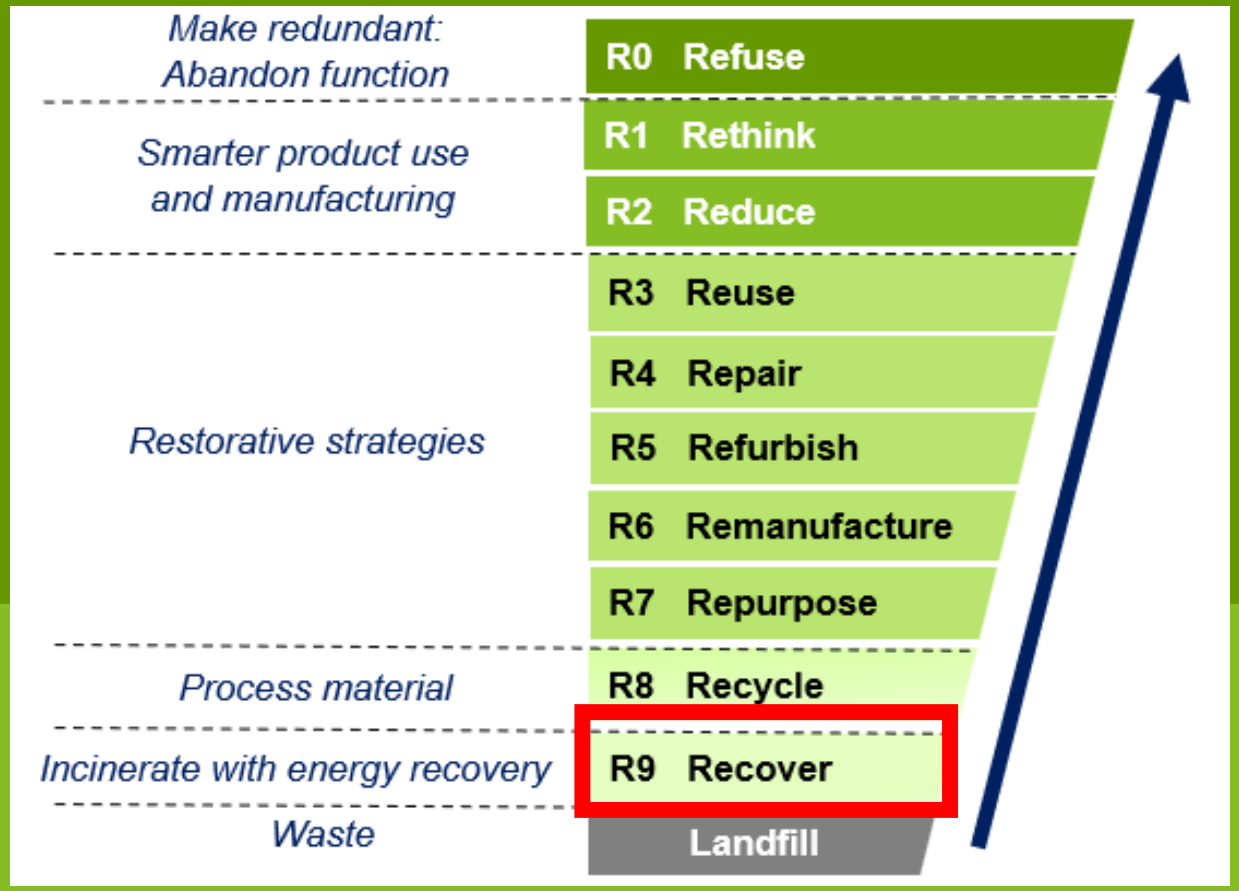
BIO FUEL





New Fuels – Multifuel Approach

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Past	Present	In process
MGO	MGO	MGO
HFO 180	HFO 180	HFO 180
HFO 380	HFO 380	HFO 380
	MGO 0,1%S	More types Low Sulfer Fuels
	ULSD 0,001%S	
	VLSD 0,0001%S	
	LNG	Methanol
		Ammonia
		New Developments
	MGO 0,1%S/FAME B20	More Fuel Blends with Bio
	MGO 0,1%S/FAME B50	
	MGO 0,1%S/HVO B30	
	ULSFO 0,1%S/HVO B30	
	HVO	More Bio Fuels
	FAME B100	

Diversity of fuels Multi-fuel approach

Jorn Bertens [Msc]
Manager Procurement
CAPEX & OPEX

New Fuels - Green Methanol – Dual fuel

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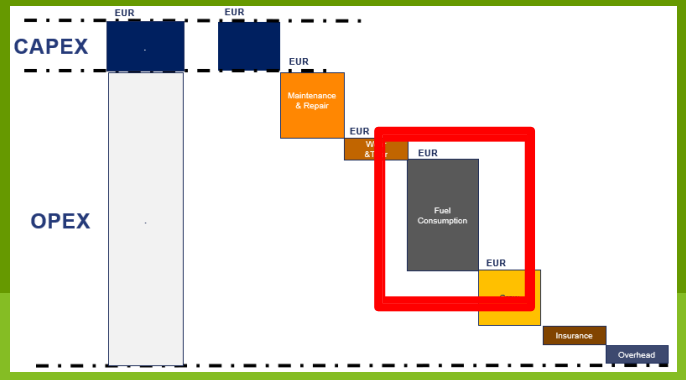
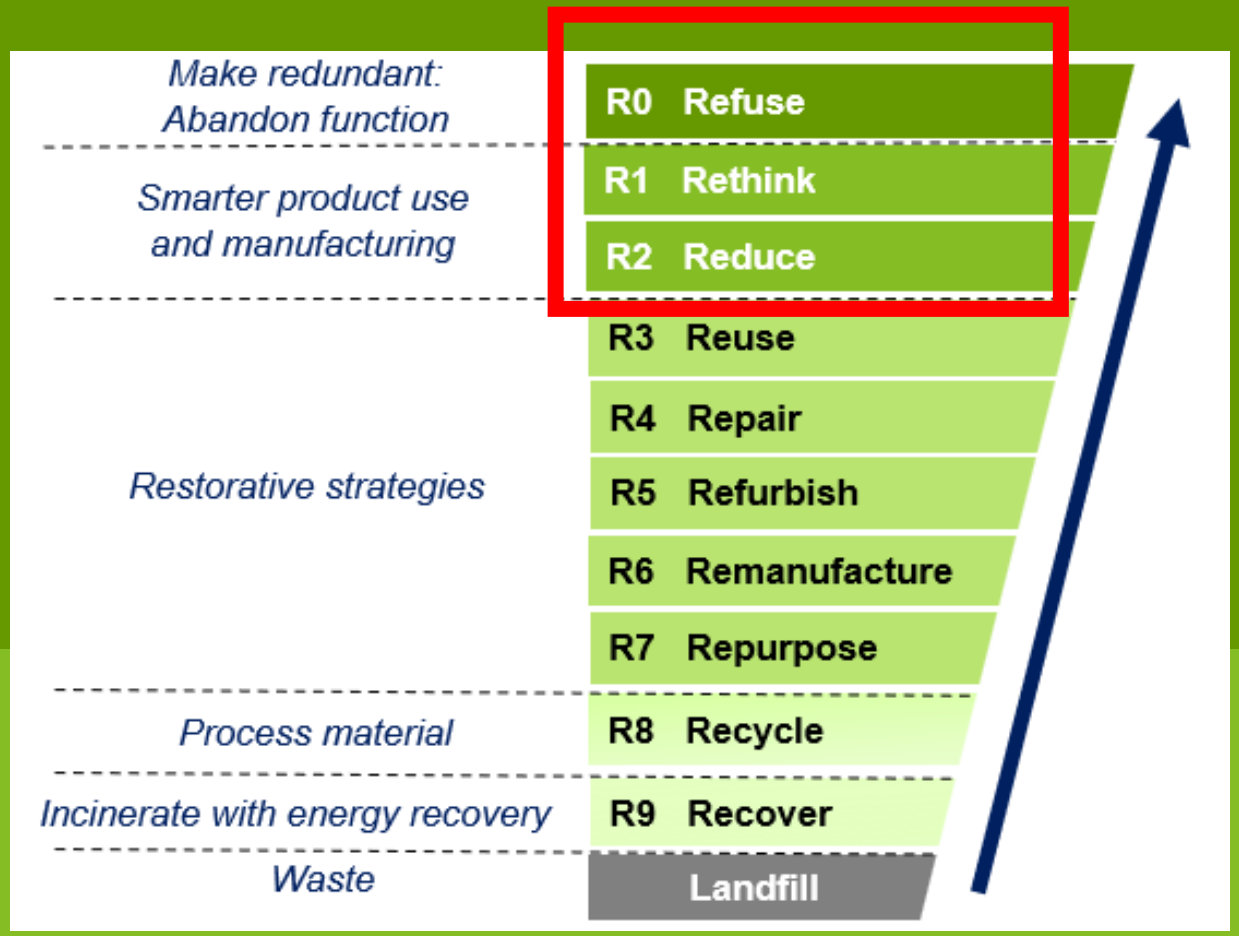
NEW FUELS





New Fuels – Green Methanol – Dual fuel – Wartsila 32M

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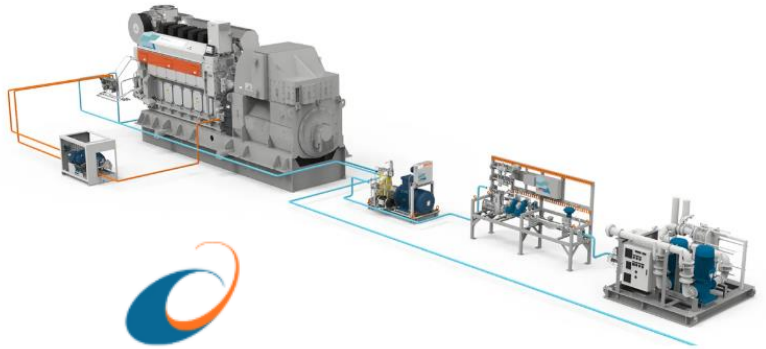

WÄRTSILÄ

80% tCO_2e Reduction

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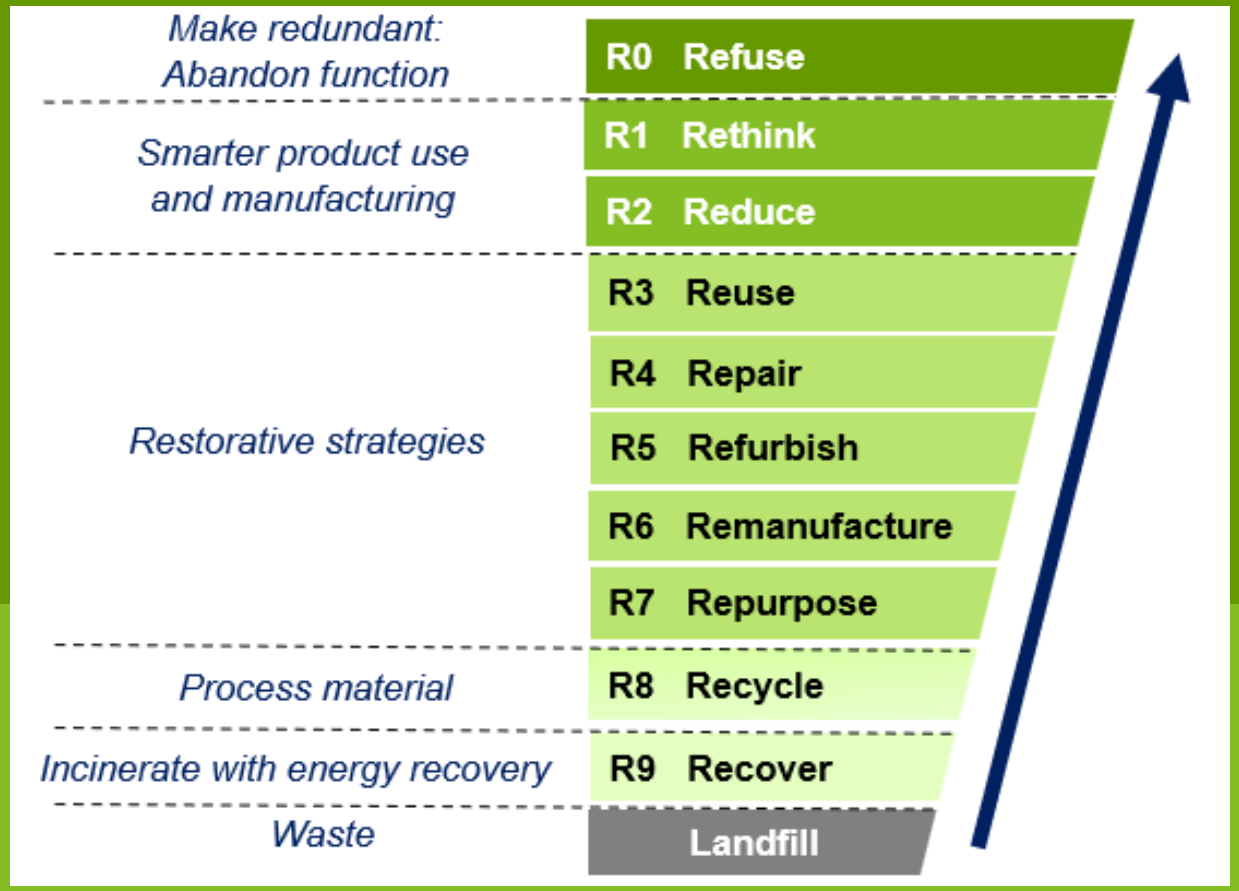

Total Lifetime CO2 Emissions - 30Y Life span

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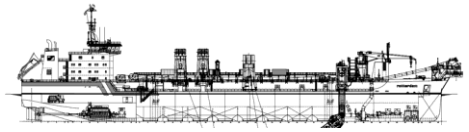
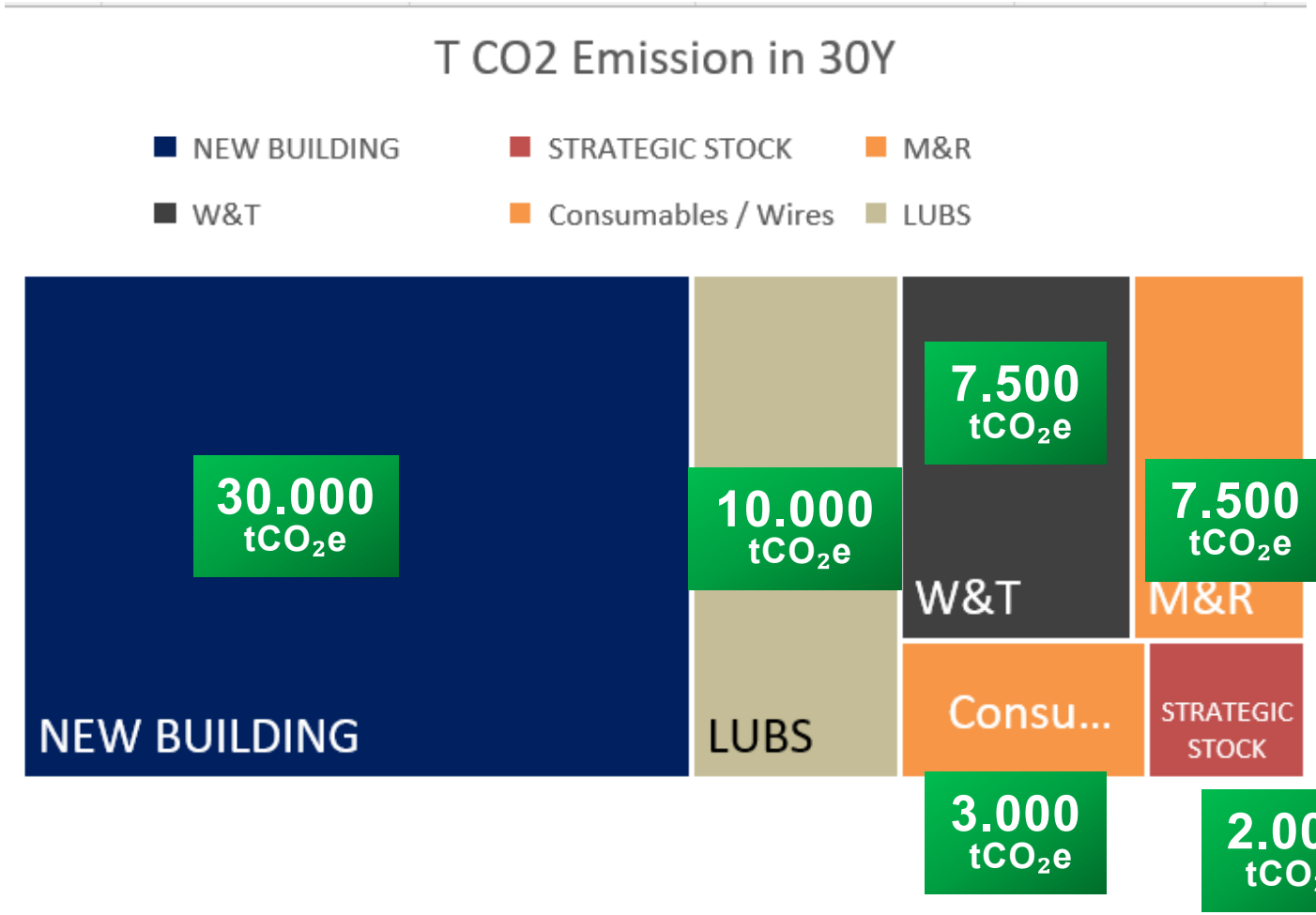
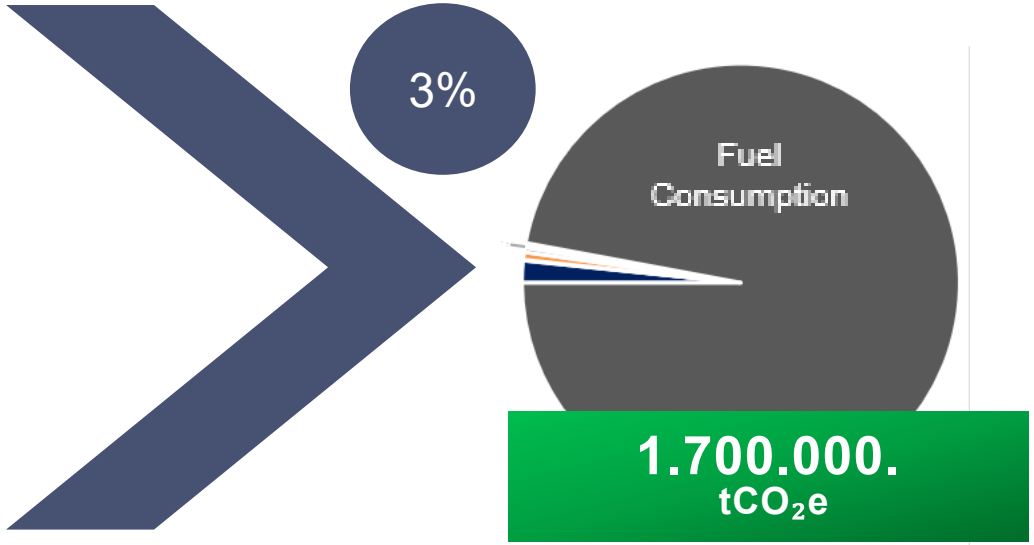
Case Scenario







1.760.000 tCO_2e Total 30 years

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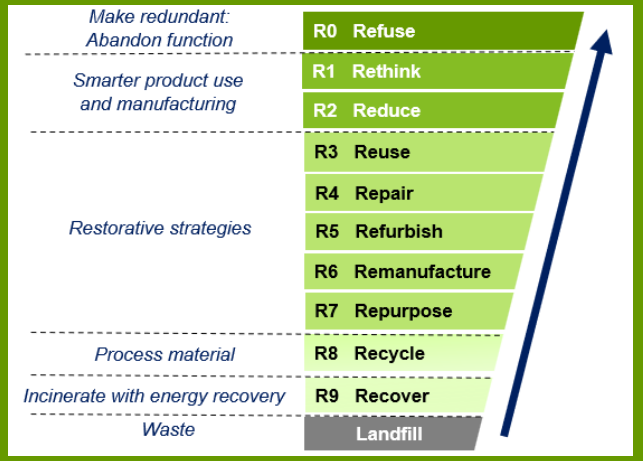
TAKE AWAYS



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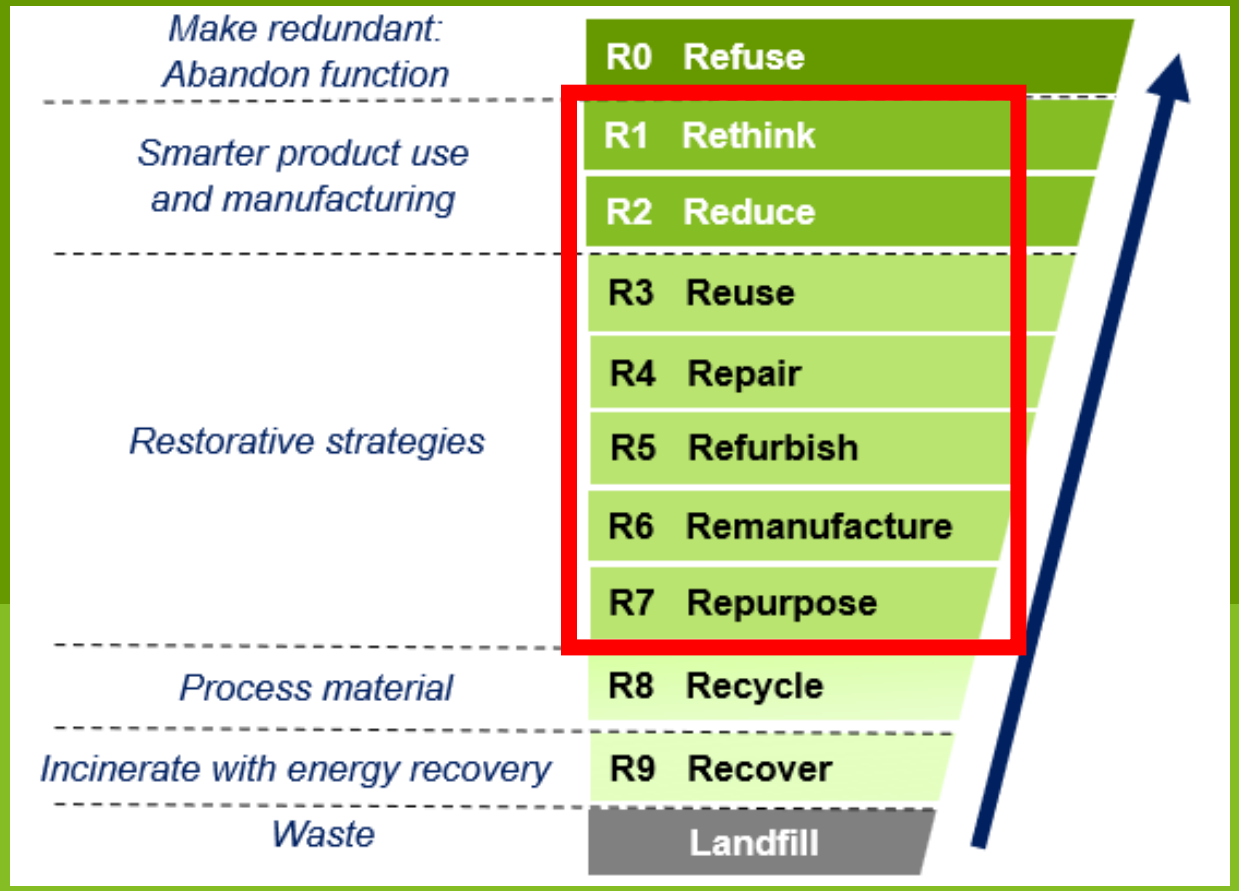
Take Aways

- In our drive to optimize dredge cycles we climb up the R-ladder by small steps

- In design have fatigue lifetime extension being in cooperated
- Standardization of equipment and parts
- Build Modular & standard interfaces
- Have digital material passports (materials/hours/maintenance records)
- Apply 9R principle at design and during lifetime

And most important look always for ways to REDUCE, RETHINK, REFUSE

MULTI - R SAMPLE



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It all started with the Oosterschelde works early 80's

Re-using hoist winches, anchor winches, sheaves, main engines and propulsion units of "Ostrea" and "Macoma

SVANEN

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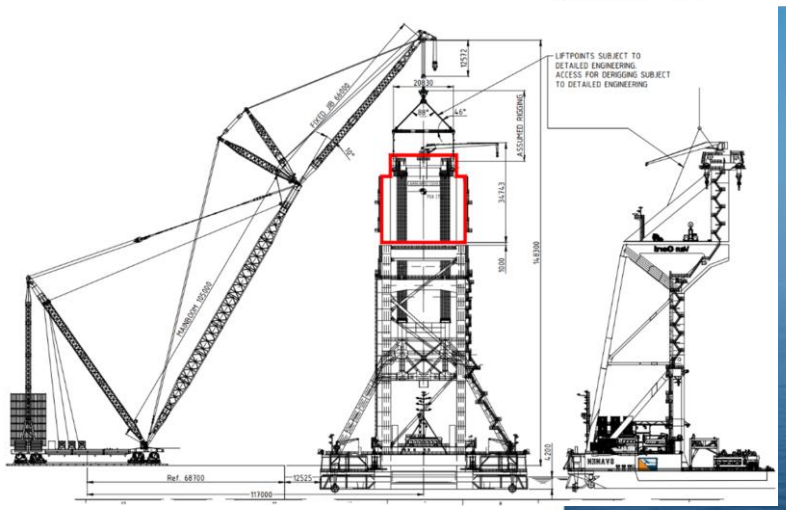
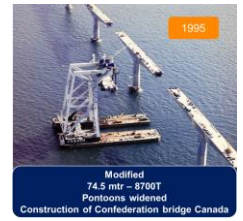


Lift of gantry extension of 1200 ton with 150 meter high crane



Present Svanen has installed approx. 750 Monopiles and 225 Transition Pieces with yearly increasing dimensions and weights

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THANKS FOR ATTENTION

Jorn Bertens [Msc]
Manager Procurement
CAPEX & OPEX

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Explore Circularity
Across the Vessel
Lifecycle

Q & A

Explore Circularity Across the Vessel Lifecycle

17:45 Inleiding – **Julien Raes**

17:50 Circularity: relevance, necessity and commercial opportunities – **Sylvia & Marjolein Boer**

18:20 Voorgerecht

18:45 Cable reduction and lower maintenance costs through smart engineering – **Mischa Habermehl**

19:15 Hoofdgerecht

20:15 From newbuild to decommissioning: circularity in TSHD's – **Jorn Bertens**

20:45 Koffie & thee + Discussie & Talk

MID

Special Thanks to Our **Speakers**:

Mischa Habermehl
Alewijnse

Sylvia & Marjolein Boer
Maritime Sisters

Jorn Bertens
Van Oord

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On LINKED in

And our NEW website:

www.mid-nl.org

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Next event May 2026!

Tot weerziens