

18<sup>th</sup> of March at 08.00 – 09.00 GMT

# Webinar: Peak shaving and ways to reduce fuel consumption with batteries

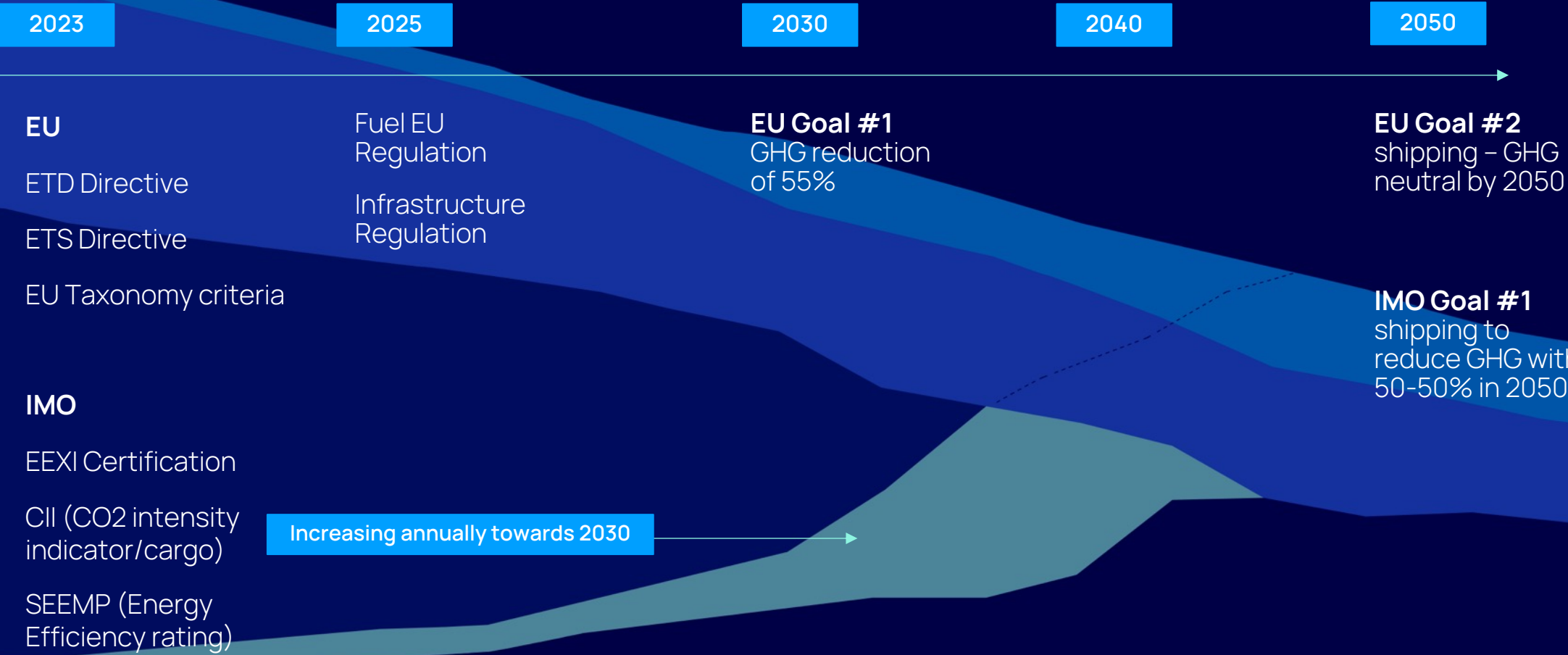


Presenter: Rakshith Sachitanand, PhD

# Today's agenda

- What is driving energy efficiency?
- How can batteries make vessels more efficient?
- The role of batteries onboard vessels
- Echandia solutions
- Summary
- Questions & discussion

# Summary of regulatory frameworks – EU & IMO



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## SMALL

**EU**

- ETD from 2023
- Fuel EU maritime (2025-)

**Inland waterborne**

**National**

**Regional**

**Local**

## MEDIUM

**IMO (International)**

- EEDI
- EEXI

**EU**

- ETD from 2023
- Fuel EU maritime (2025 )
- Infrastructure (2025/30)
- Inland waterborne
- ETS

**National, regional, local**

## LARGE

**IMO (International)**

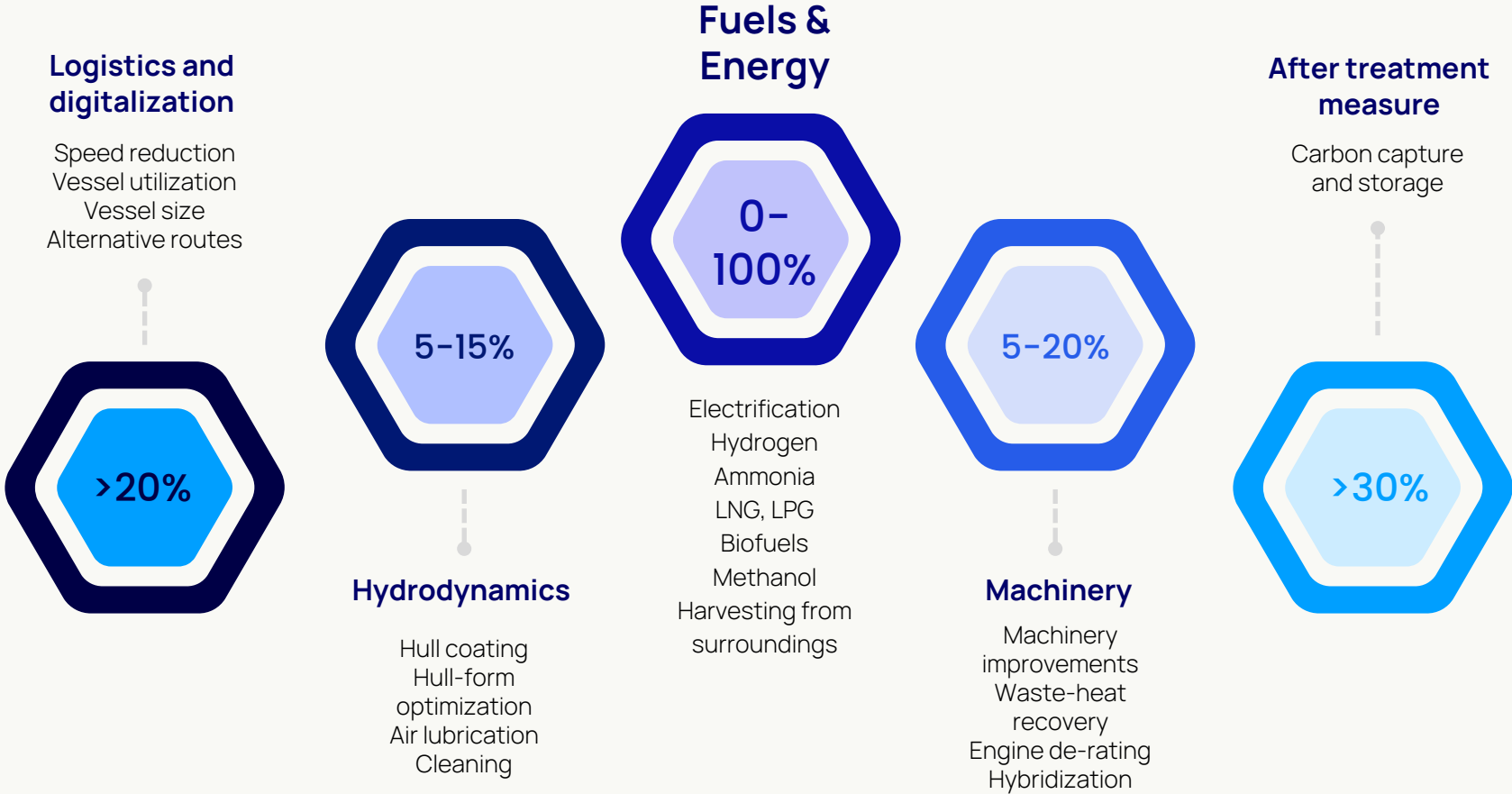
- EEDI + EEXI
- CII > 5.000 GT (2023)
- Enhanced SEEMP (2023)

**EU**

- ETD from 2023
- ETS > 5.000 GT (2023)
- Fuel EU maritime (2025 )
- Infrastructure (2025/30)
- Inland waterborne

**National, regional, local**

# Technologies and their GHG emission reduction potential



# Batteries can perform multiple roles onboard vessels

## Spinning reserve

- Backup for running generators
- Fewer generators needed online

## Optimize load

- Optimize operating point of gen'
- Reduce maintenance

## Harvest energy

- Recover energy from cranes, equipment
- Accommodate energy from renewables

## Peak shaving

- Act as buffer
- Level power seen by engines

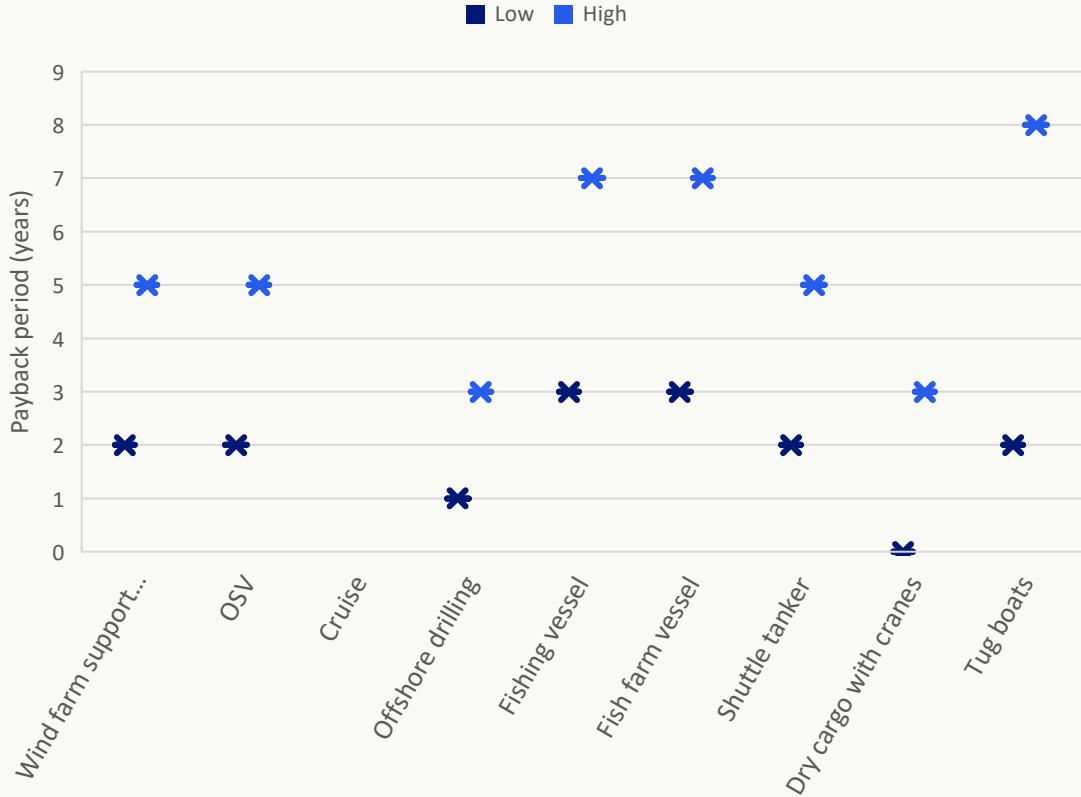
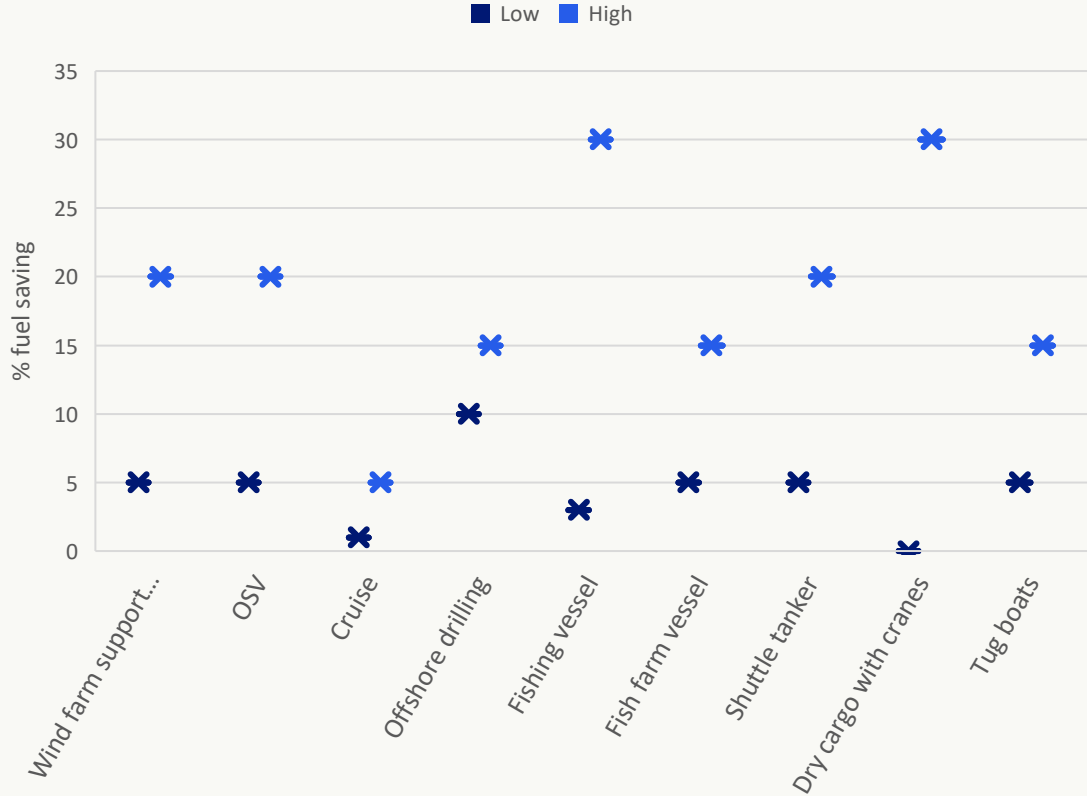
## Immediate power

- Instant power in support of generators

## Backup power (UPS)

- Battery system provides backup power, UPS-like functionality

# Typical ROI for battery installations onboard various vessel types





# What to look for in a battery?



## Long-term system stability and reliability

Designed to last +10 years for heavy duty operational profiles, without affecting safety or performance



## Rapid continuous charge/discharge

Market leading C-rates allows fastest charging – ferry charged in matter of minutes



## Safety first

Exceptional resistance to the most common causes of battery fires: Internal and external short circuits



## Modular

Tailored, scalable battery systems to fit every installation space



## Sustainable

Low environmental footprint



## Outstanding quality

Uncompromising quality for every installation

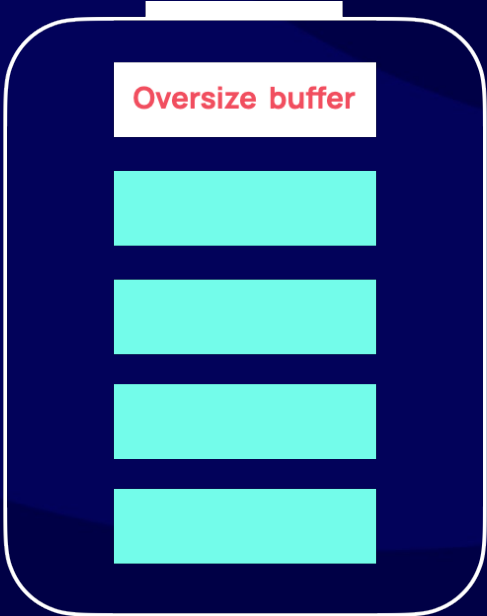
# Use smaller systems and more of installed capacity

Lighter, longer life, greater use of installed capacity

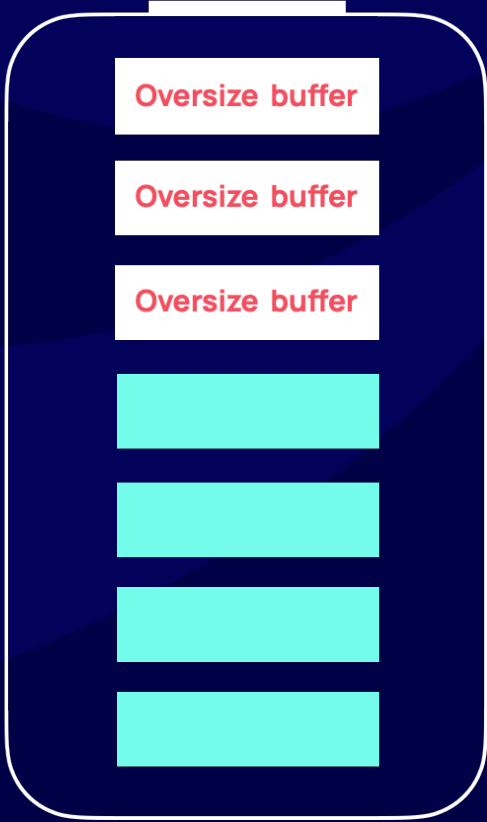
Required energy



Echandia LTO



Alternative



# Different cell types for energy and power applications

Example	Cell type	Charge/Discharge rate	Cycles over lifetime	Energy per cycle (kWh)	DOD at BOL(%)	Installed capacity (kWh)	Weight (kg)
Full Electric Ferry	26 Ah	2.6 C/0.5 C	37000	2050	60%	3466	41 000
Spinning reserve (1000 kW, 5 min)	20 Ah HP	1 C/ 6,5 C	N/A	84	50%	150	2580

# Echandia battery systems fit a wide variety of applications



## Electric Tugboat (Auckland)

ESS: 2800 kWh  
2 charges per day  
70 ton bollard pull for ½ hour on batteries only  
80-85% DOD per charge

15000 cycles (25 years)



## Full electric pax ferries (Copenhagen)

ESS: 183 kWh per vessel  
3 C continuous charge  
40% DOD per cycle

62 000 cycles (12 years)

# Summary

- National, regional and international policies are demanding an improvement in vessel energy efficiency
- Policies encompass the entire vessel fleet-small to large
- A battery system performs different functions depending on vessel type
- Savings of 5-30 % can be achieved depending on vessel type
- Echandia LTO systems are a compact, high power option for vessel hybridisation



Echandia

For more information, visit [www.echandiagroup.com](http://www.echandiagroup.com)