International Marine Contractors Association

Improving performance in the marine contracting industry

South America Webinar
An Environmental Sustainability focus

Date: 28 April 2021 starting at 0930hrs local time Brazil

There will be opportunity for Q&A at the end of the presentations – please submit questions at any time under the Q&A section on your screen

IMCA®

Welcome

- This is a webinar
- The sound works one way only
  - —from presenters to you
- Written questions are encouraged
  - —Q&A box is monitored
- Today's Speakers and Members of the South America Committee will be on the line to answer questions
- We hope to resume face to face meetings when possible
- A recording of today's webinar will be shared with you
- Competition Law

- Presentations will be in English
- Questions & Answers may be in either English or Portuguese

Your moderators today

John Chatten

Chair

IMCA South America Committee

- **Business Development Manager, Fugro**
- 2016 joined IMCA South America Committee as regional Survey Representative
- Appointed Chairman 2018

Daniel Marins

Vice Chair

IMCA South America Committee

- **Fleet Manager Subsea 7**
- 20 + years career @ Subsea 7
- Vessel Superintendent Contract & Operations Manager, Macaé Base & Docking Manager

Andy Goldsmith

IMCA

IMCA Lead

- **Technical Marine**
- IMCA 2015
- DP expert
- Lead for South America

Today's speakers

Margaret Fitzgerald

IMCA

Head of Marine Policy & Regulatory Affairs

Nadine Robinson

IMCA

Technical Adviser

Environmental Sustainability

Marcelo Martins

Grupo CBO

Reducing the environmental impact of our fleet

Steffan Lindsø

Oceaneering

Reducing CO2 emissions for Offshore Operations

Q&A with Speakers

&

South America Committee Members

Margaret Fitzgerald

IMCA

Margaret Fitzgerald

Head of Marine Policy & Regulatory Affairs

- Margaret is a qualified maritime lawyer and chemical scientist who holds Chartered status with the Royal Society of Chemistry (CChem) and Chartered status with the Institute of Occupational Safety and Health (CMIOSH).
- Margaret has over 20 years' experience in shipping. She previously worked for the IMO Secretariat, leading on the development of the International Maritime Dangerous Goods Code and related regulations on the carriage of hazardous chemicals and noxious and polluting substances, including the HNS Convention.
- Her experience also includes working for a member of the International Association of Classification Societies as a senior safety and environmental specialist, and as an expert adviser on several high-profile maritime incidents.

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Improving performance in the marine contracting industry

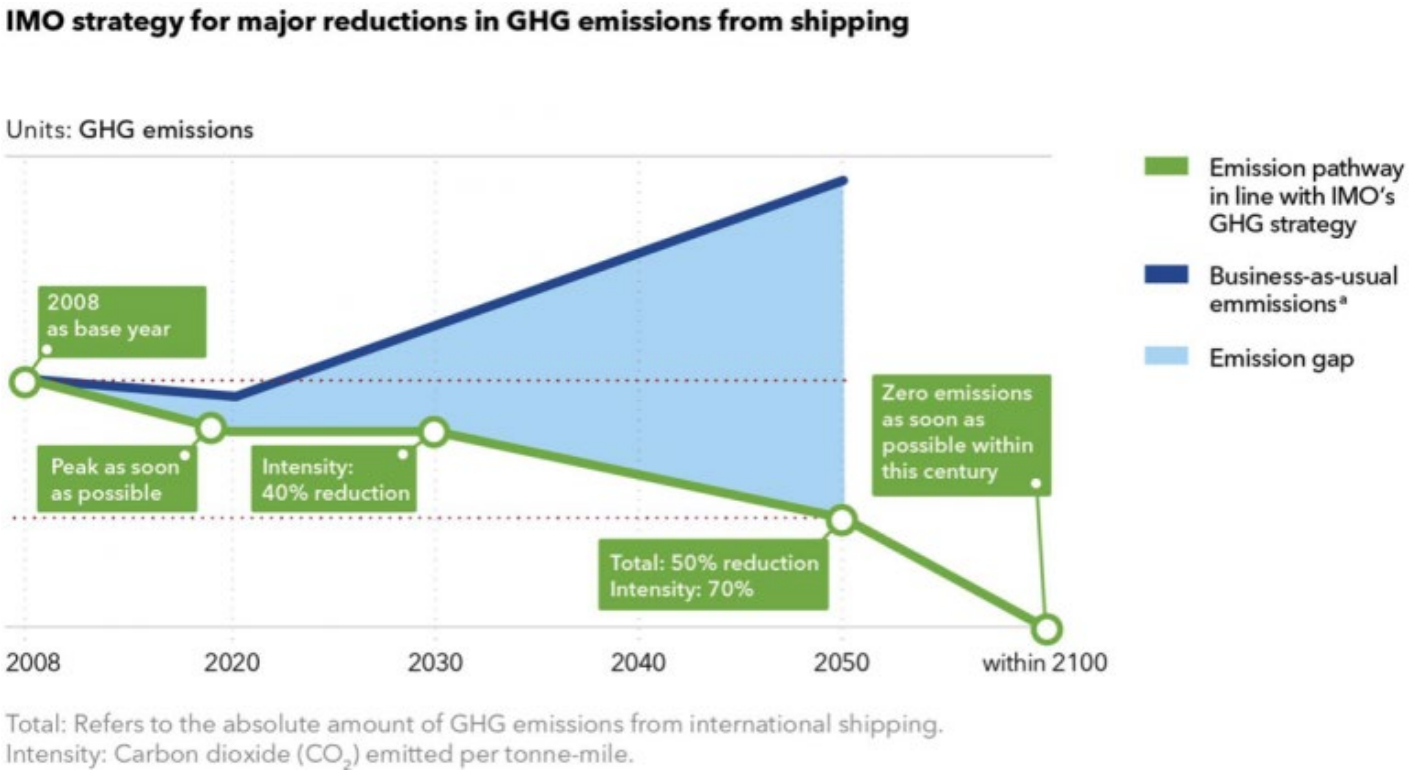
Environmental Sustainability from a Regulatory perspective

IMCA South America Webinar

Margaret Fitzgerald, Head of Marine Policy & Regulatory Affairs, IMCA

Wednesday 28 April 2021

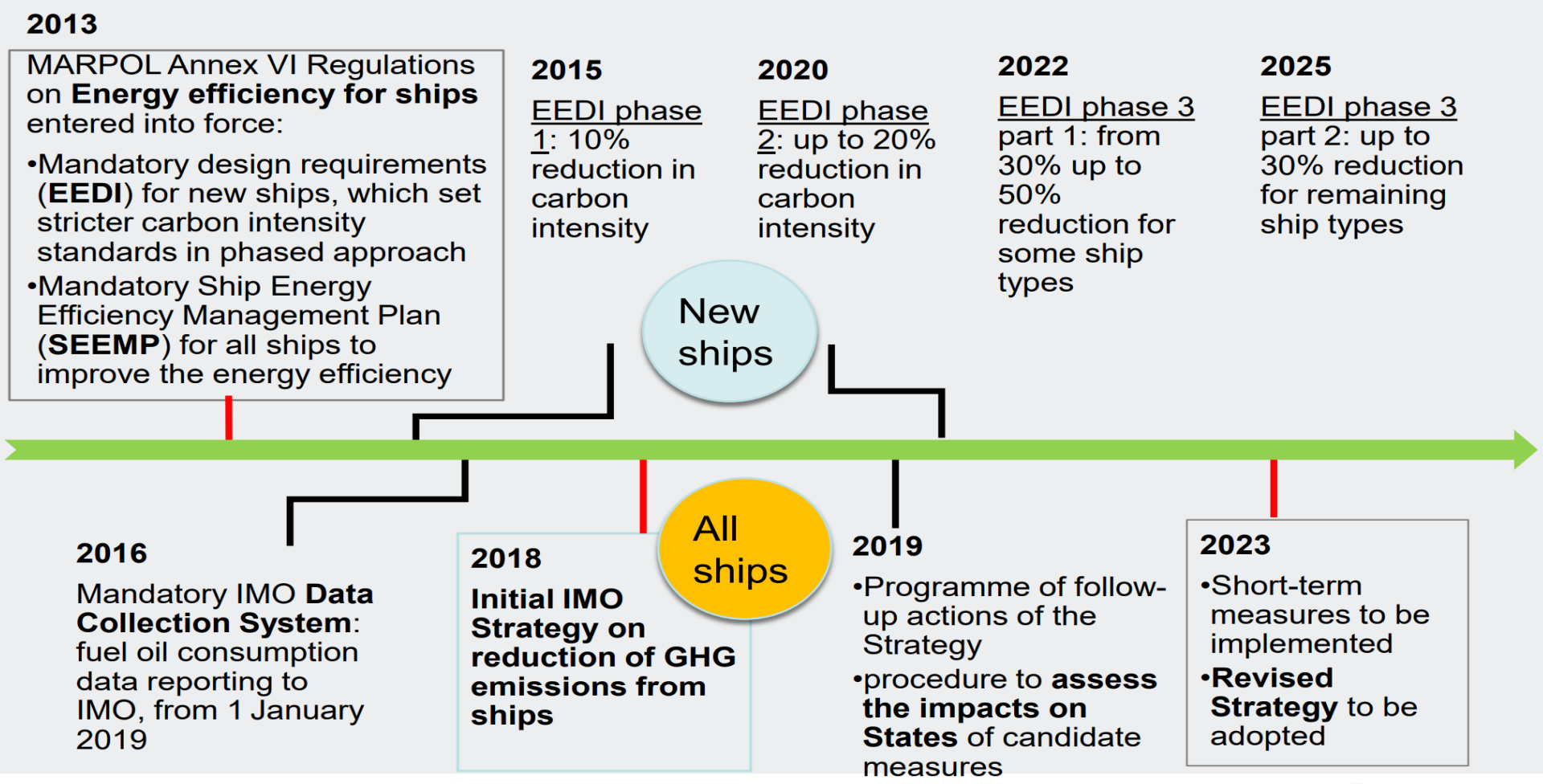
The Initial IMO Strategy on reduction of GHG emissions from ships



- Reduction of CO2 emissions per transport work (carbon intensity), as an average across international shipping, by
- at least 40% by 2030,
- pursuing efforts towards 70% by 2050 compared to 2008

- to peak GHG emissions from international shipping as soon as possible and to reduce the total annual GHG emissions by at least 50% by 2050 compared to 2008

IMO action on reduction of GHG emissions from ships



Shipping warned for sluggish decarbonisation efforts

- US will push IMO to adopt target of absolute zero emissions by 2050

- JOHN KERRY PROMISES TO INFLUENCE THE IMO DEBATE WHEN IT REVISES ITS TARGETS AND ITS STRATEGY IN 2023

IMO's MEPC 76

- In June, the 76th session of IMO's Marine Environment Protection Committee (MEPC) will be deciding a number of key issues to achieve its' roadmap

Carbon Intensity Indicator Guidelines

01

Draft guidelines on operational carbon intensity indicators and the calculation methods (CII guidelines)

02

Draft guidelines on the operational carbon intensity rating of ships (CII Rating Guidelines)

03

Update the 2016 Guidelines for the development of a Ship Energy Efficiency Management Plan (SEEMP) (and incorporate the development of a plan of corrective actions and verification requirements of SEEMP

Carbon Intensity Indicators (CII)

The formula of CII of individual ships, especially the proxies (carbon intensity metrics) to be used by individual ships to calculate “transport work”

A single metric should be taken as the mandatory CII for each and every ship type

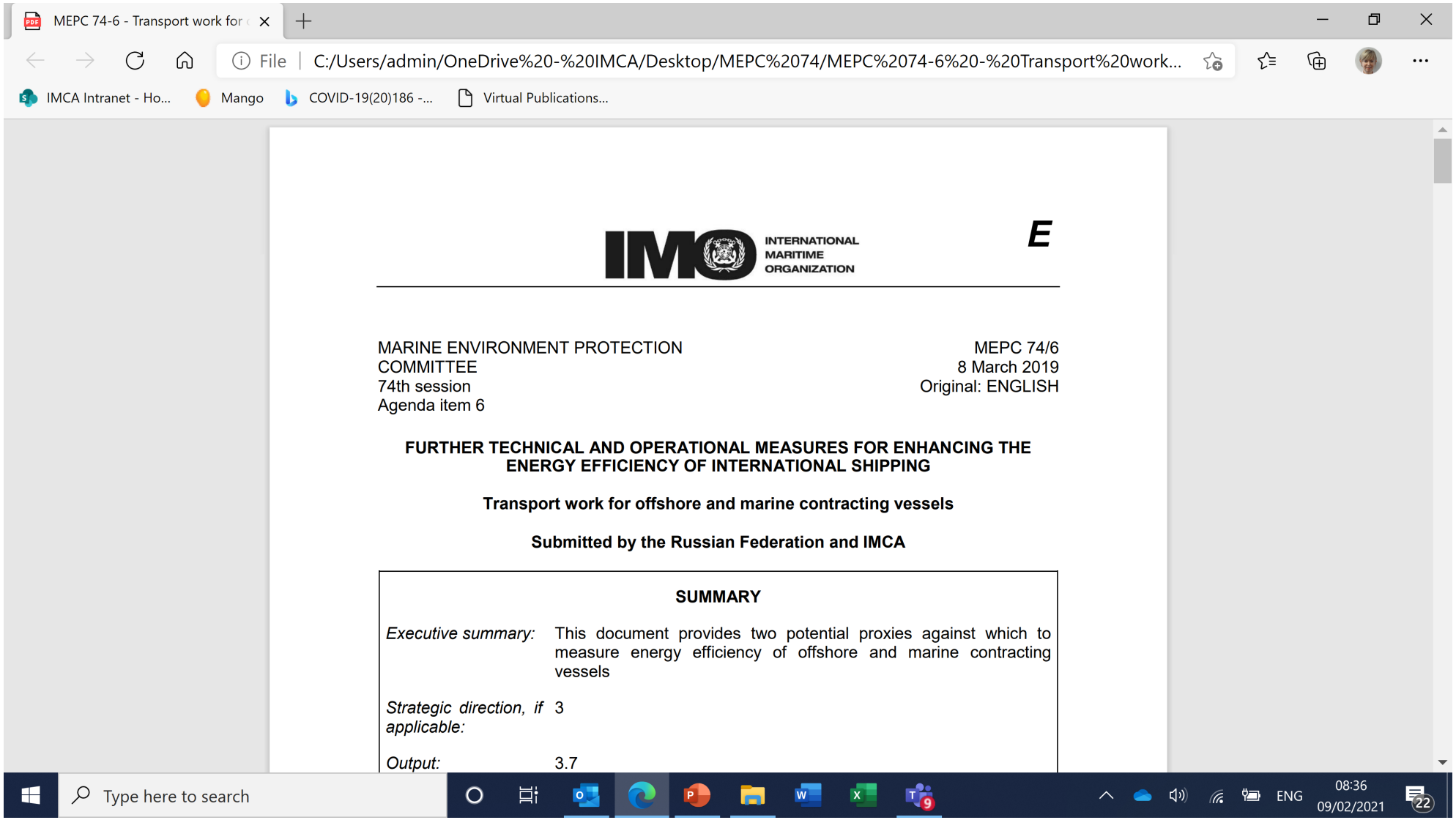
The mandatory CII should be calculated on the basis of the Data Collection System (DCS)

Carbon Intensity Indicators (CII)

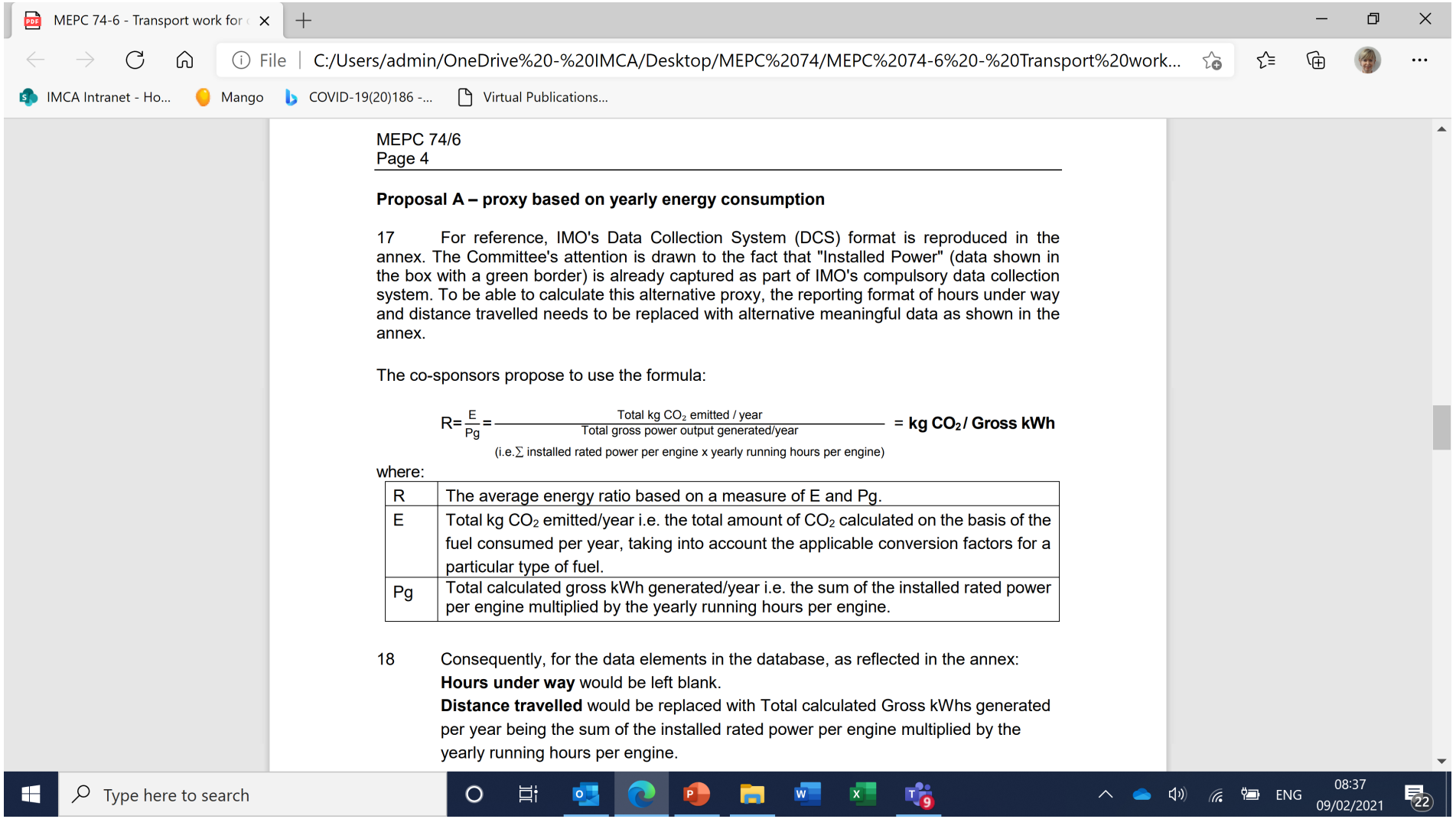
- To ensure the comparability between ships of various design and operational features, there is a need to introduce certain correction factors and voyage exclusions in the CII calculation

- Certain ship types which frequently undertake various high fuel consuming operations, the introduction of correction factors or voyage exclusions may not help in addressing the unfair punishment in terms of CII rating

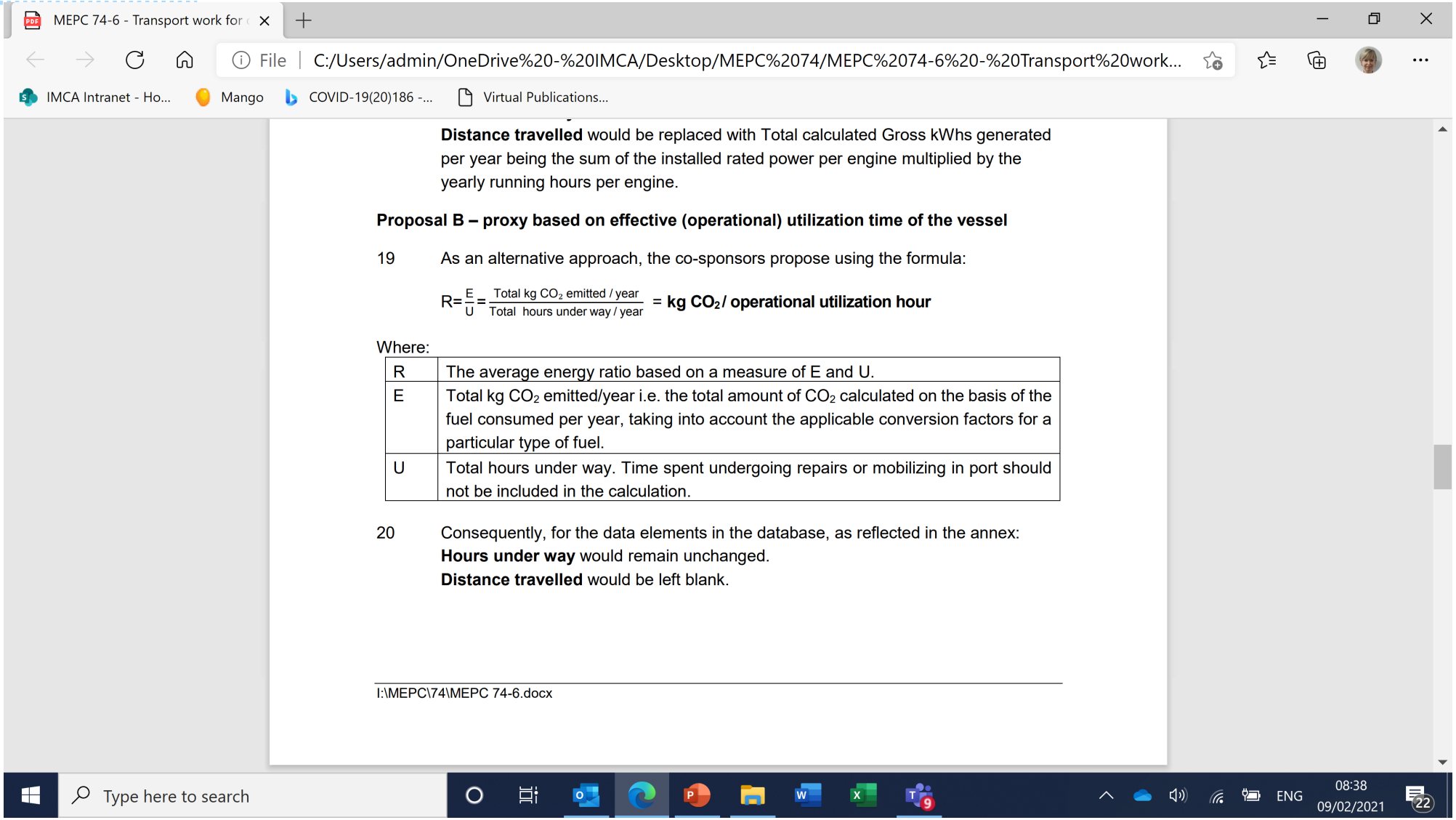
Proxies for the offshore marine contracting Sector



Proxy A – based on yearly energy consumption



Proxy B based on the effective utilization of the vessel



Distance travelled would be replaced with Total calculated Gross kWhs generated per year being the sum of the installed rated power per engine multiplied by the yearly running hours per engine.

Proposal B – proxy based on effective (operational) utilization time of the vessel

19 As an alternative approach, the co-sponsors propose using the formula:

$$R = \frac{E}{U} = \frac{\text{Total kg } CO_2 \text{ emitted / year}}{\text{Total hours under way / year}} = \textbf{kg } \mathbf{CO_2} \textbf{/ operational utilization hour}$$

Where:

R	The average energy ratio based on a measure of E and U.
E	Total kg CO_2 emitted/year i.e. the total amount of CO_2 calculated on the basis of the fuel consumed per year, taking into account the applicable conversion factors for a particular type of fuel.
U	Total hours under way. Time spent undergoing repairs or mobilizing in port should not be included in the calculation.

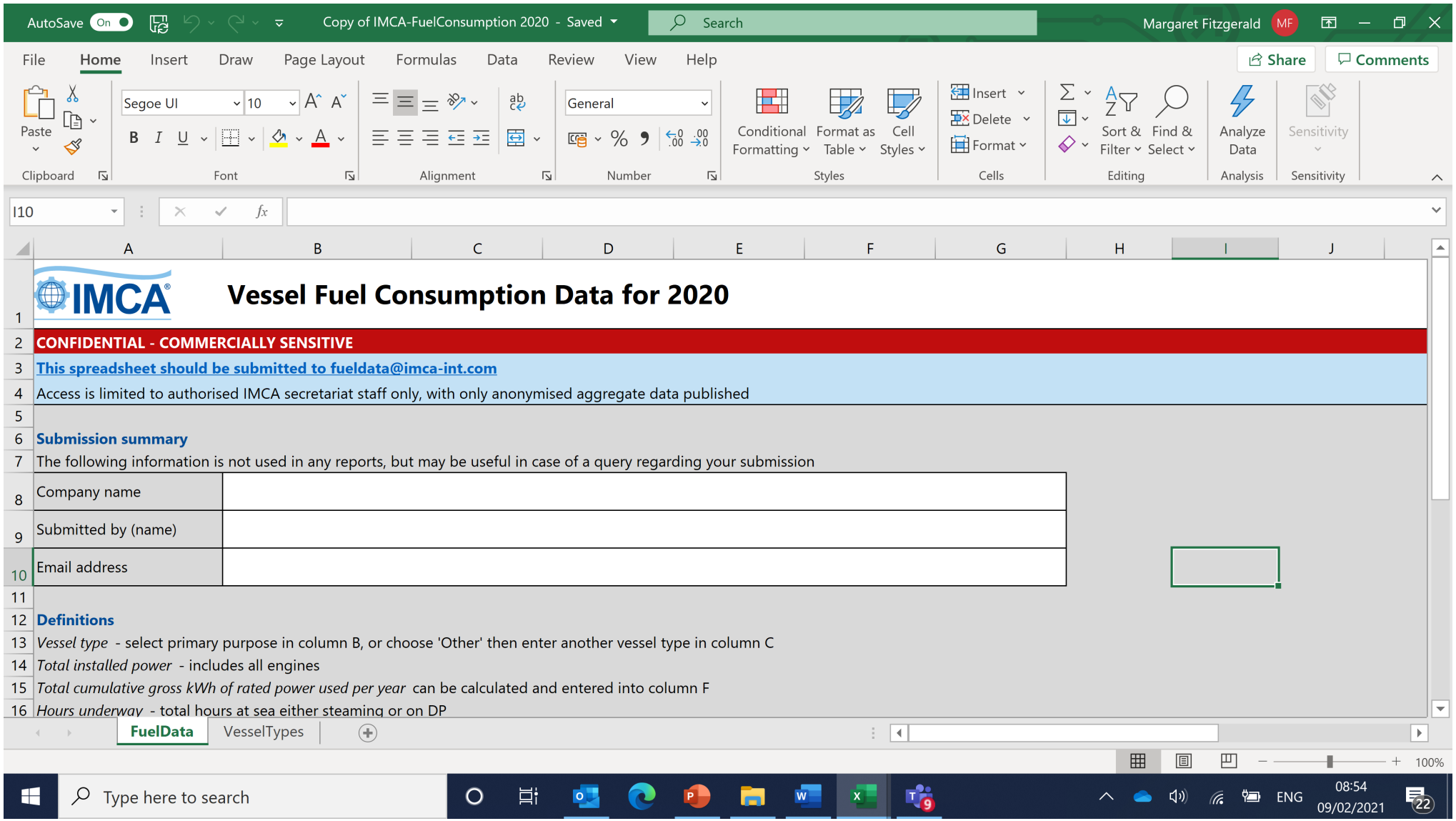
20 Consequently, for the data elements in the database, as reflected in the annex:
Hours under way would remain unchanged.
Distance travelled would be left blank.

I:\MEPC\74\MEPC 74-6.docx

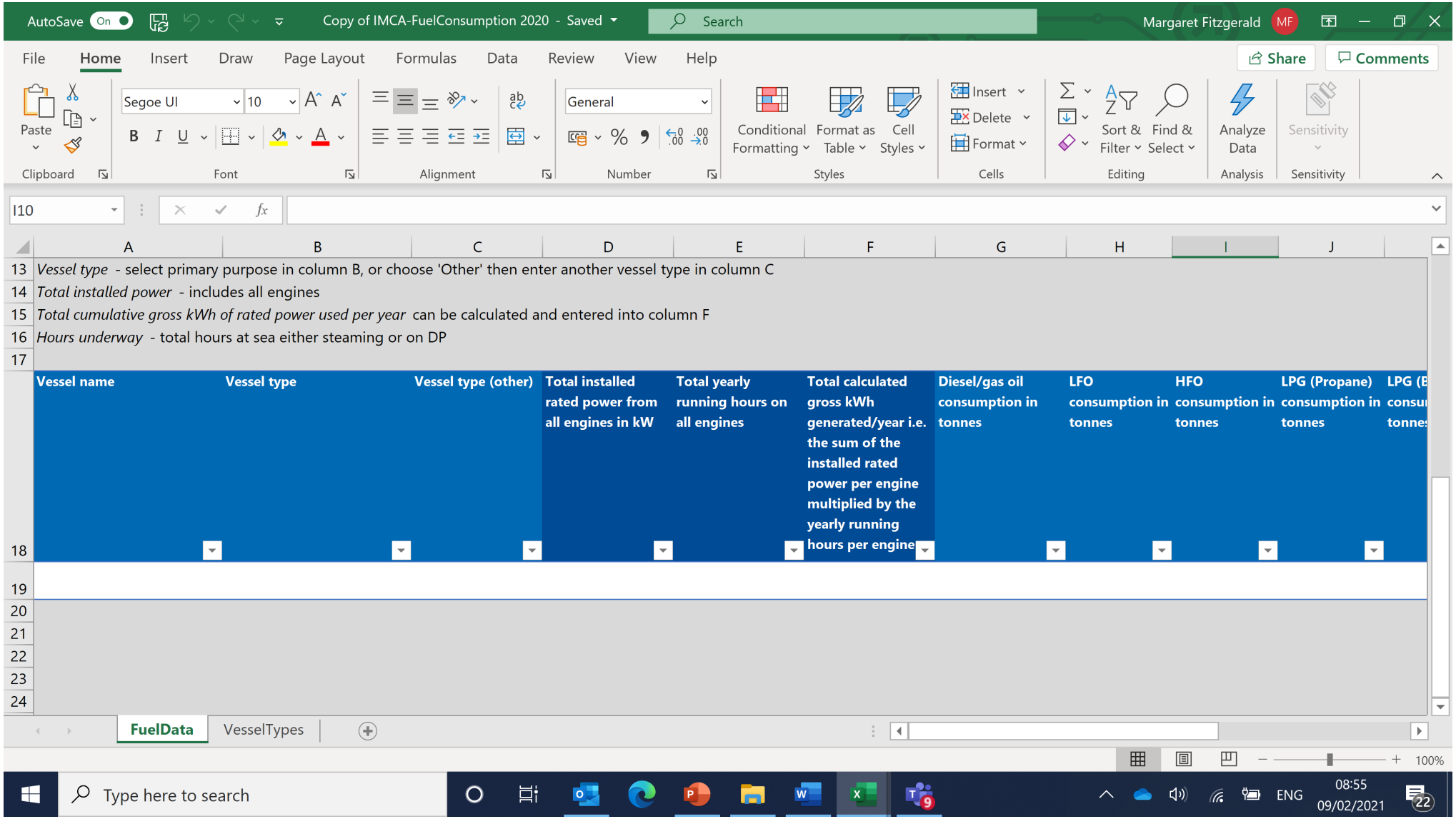
Mandatory Data Collection (DCS)

- The DCS for fuel oil consumption of ships entered into force in March 2018
- Intended to provide robust data and information on which future decisions on additional measures, over and above those already adopted, can be made.
- IMCA is collecting fuel consumption data from its' members
- Currently two reporting periods – 2019 and 2020
- Data will be submitted to the IMO to help to assess the carbon intensity of the offshore marine contracting Industry

Fuel Consumption Data



Fuel Consumption Data



Shipping demands market-based measures debate at the IMO

IMCA has joined forces with eight industry groups in calling for IMO member states to consider the role of Market Based Measures (MBMs) to facilitate the adoption of zero-carbon technologies and commercially viable zero-carbon ships

The measures aim to reduce the price gap between fuel oil and alternative fuels and could take the form of a carbon tax or a fuel levy

Improving performance in the
marine contracting industry

Nadine Robinson

IMCA

Nadine Robinson

Technical Adviser – Environmental Sustainability

- Nadine joined IMCA as Technical Adviser in May 2020. She leads our environmental sustainability strategy and related programme of member engagement on a global level.
- Nadine brings a wealth of experience to IMCA having held positions as Technical Director (Climate Disclosure Standards Board in CDP), as an Environmental Consultant, Environmental Policy Lecturer (Birkbeck College), Economic Advisor on Climate Change (Commonwealth Secretariat), Shipping Finance Solicitor (Allen & Overy). She has also held various policy and research roles in Government and UNDP advising on environment, climate finance, energy, the green and blue economy, and sustainable development.
- Nadine holds a BA (McGill University) and an MA (York University, Canada) in Geography.

International Marine Contractors Association

Improving performance in the marine contracting industry

Environmental Sustainability, IMCA and South America

IMCA South America Webinar

Nadine Robinson, Technical Adviser, Environmental Sustainability, IMCA

Wednesday 28 April 2021

Environmental Sustainability in a South American Context

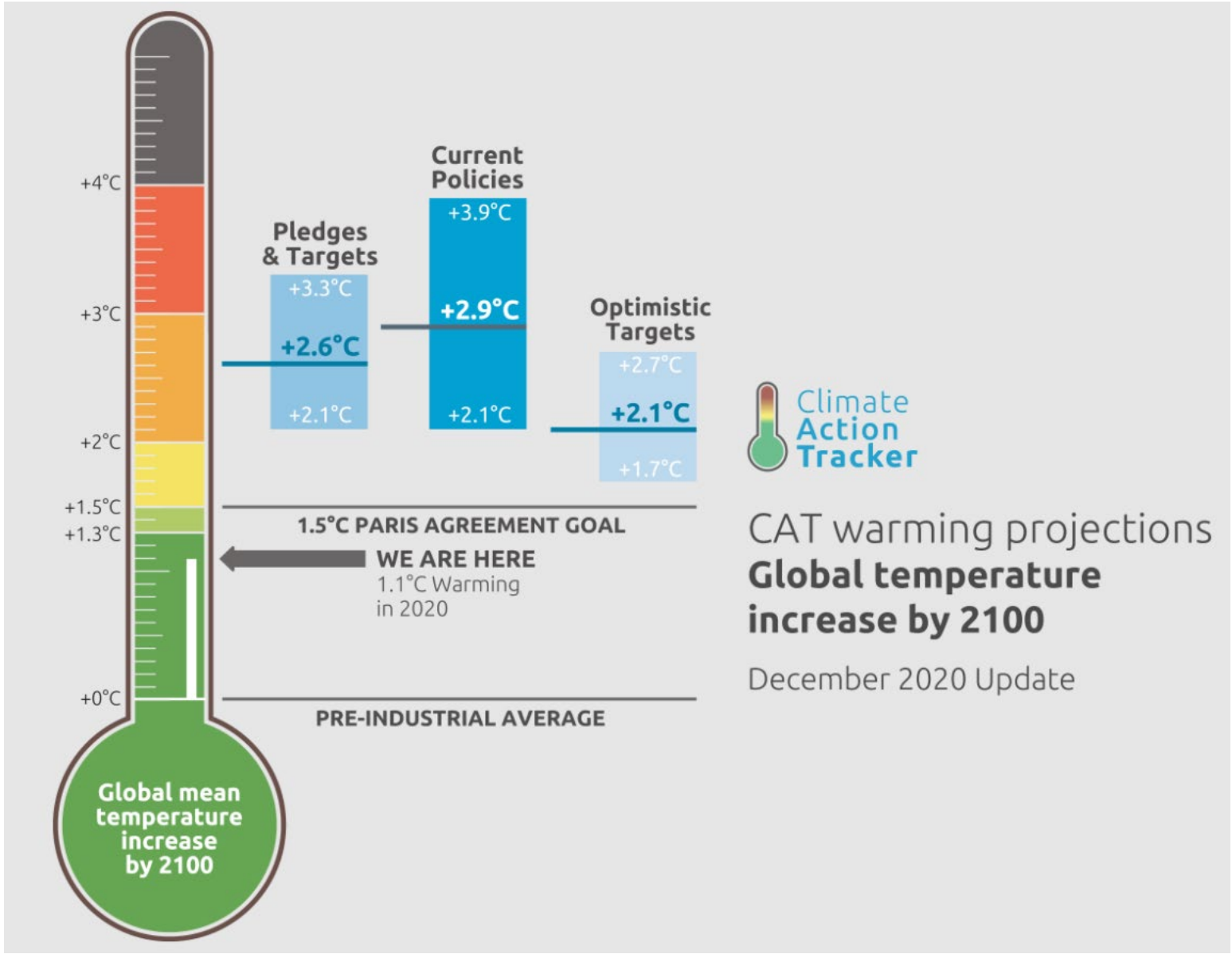
Tackling Environmental Sustainability and the Energy Transition: From Words to Actions

- Making sense of the jargon
- The Call to Action – drivers for making commitments
- Energy companies' commitments
- IMCA's new Code of Practice
- Practical actions taken by IMCA members, including those operating in South America

Making Sense of the Jargon…

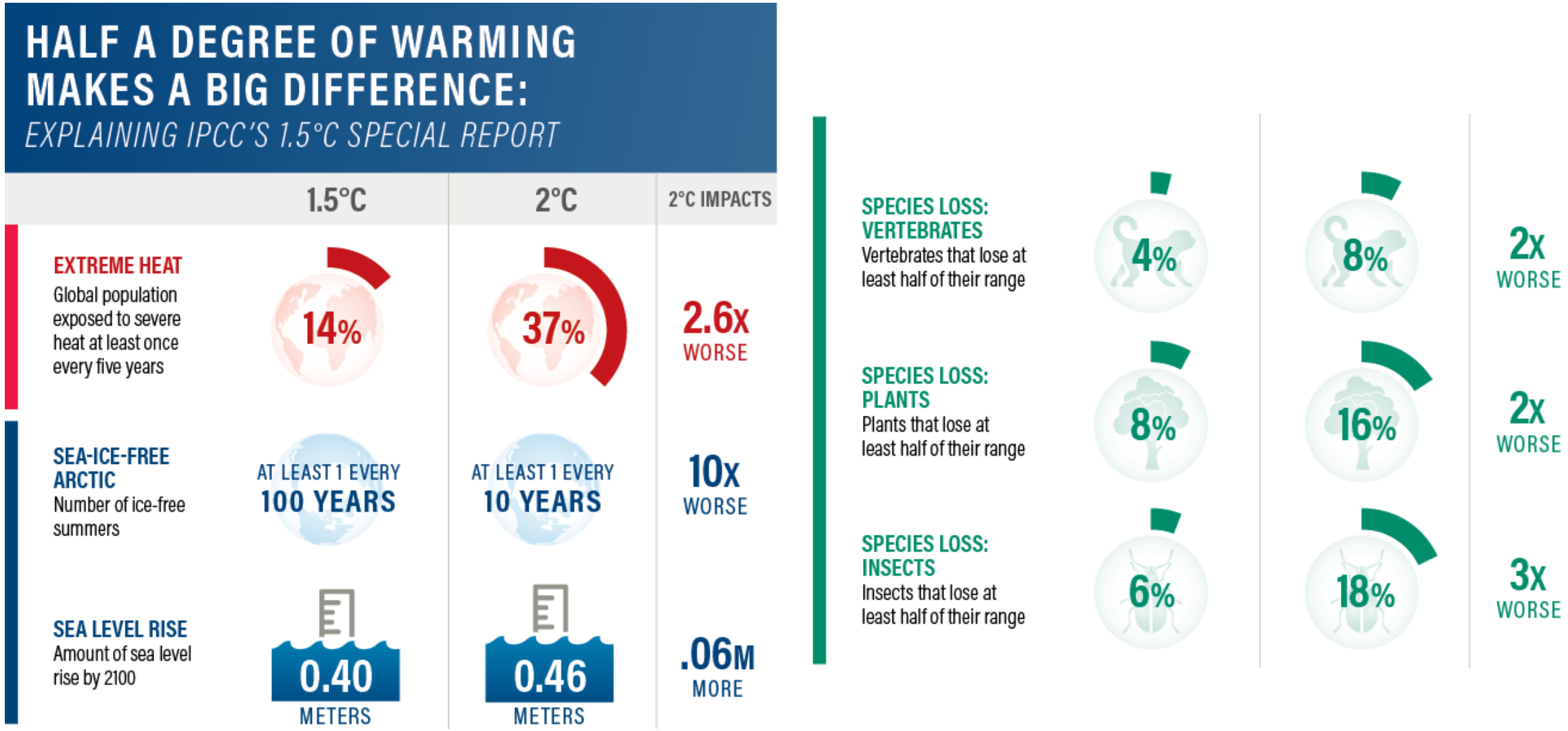
Carbon neutral = net zero?

Where are we now?



Source: [The CAT Thermometer | Climate Action Tracker]

What difference does 0.5°C make?



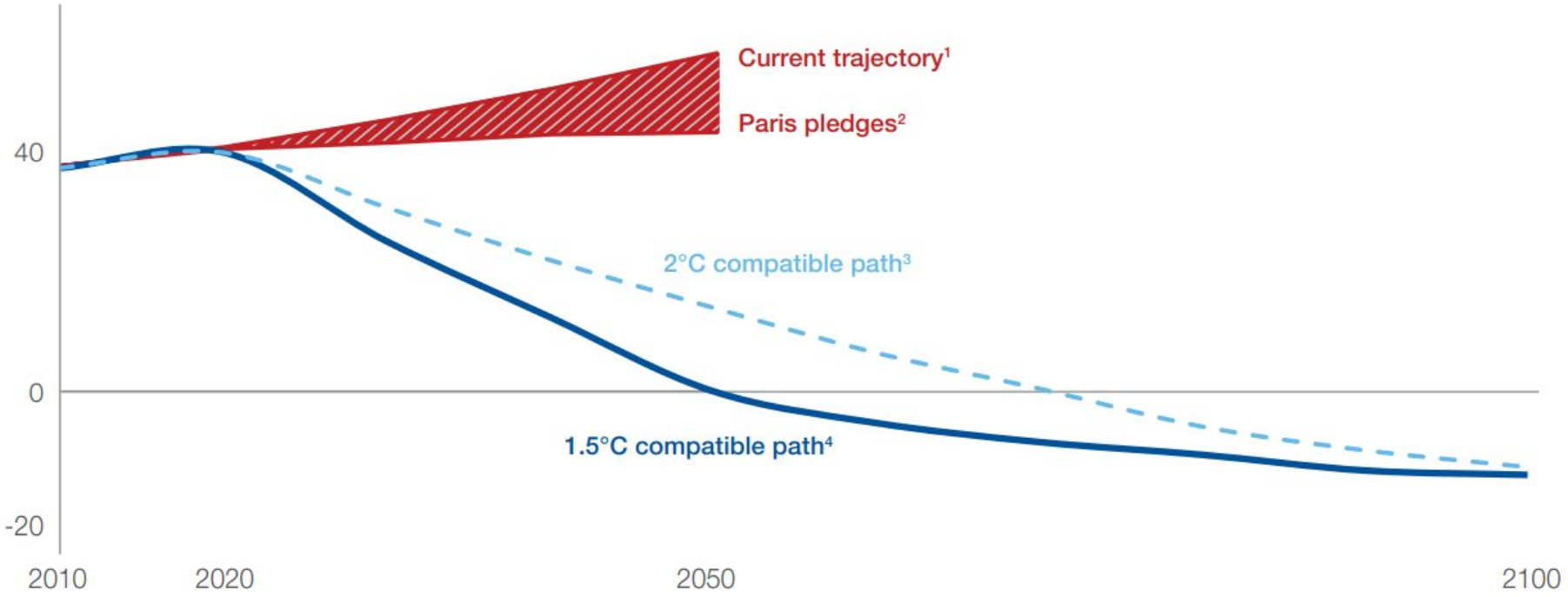
Source: WRI 2018/ Half a Degree and a World Apart: The Difference in Climate Impacts Between 1.5°C and 2°C of Warming | World Resources Institute (wri.org)

Net zero by 2050

Figure 1: The world needs to move to "net zero", 2010-2100

Global net CO_2 emissions pathways

Gt per year



IMO current targets

Total GHG reductions by the shipping industry by at least 50% by 2050;

And to reduce carbon emissions by 40% by 2030 (2008 baseline)

Source: Source:WEF in collaboration with BCG (January 2020). The Net Zero Challenge: Fast Forward to Decisive Climate Action (p.6). http://www3.weforum.org/docs/WEF_The_Net_Zero_Challenge.pdf. References the IPPC; UNEP, *Emissions Gap Report 2019 BCG analysis*

Drivers for Making Commitments and Targets: Public pressure

Court convicts French state for failure to address climate crisis

State found guilty of 'non-respect of its engagements' aimed at fighting global warming

Government Commitments

- **125+** countries have announced, adopted or are considering a net zero goal!

WORLD

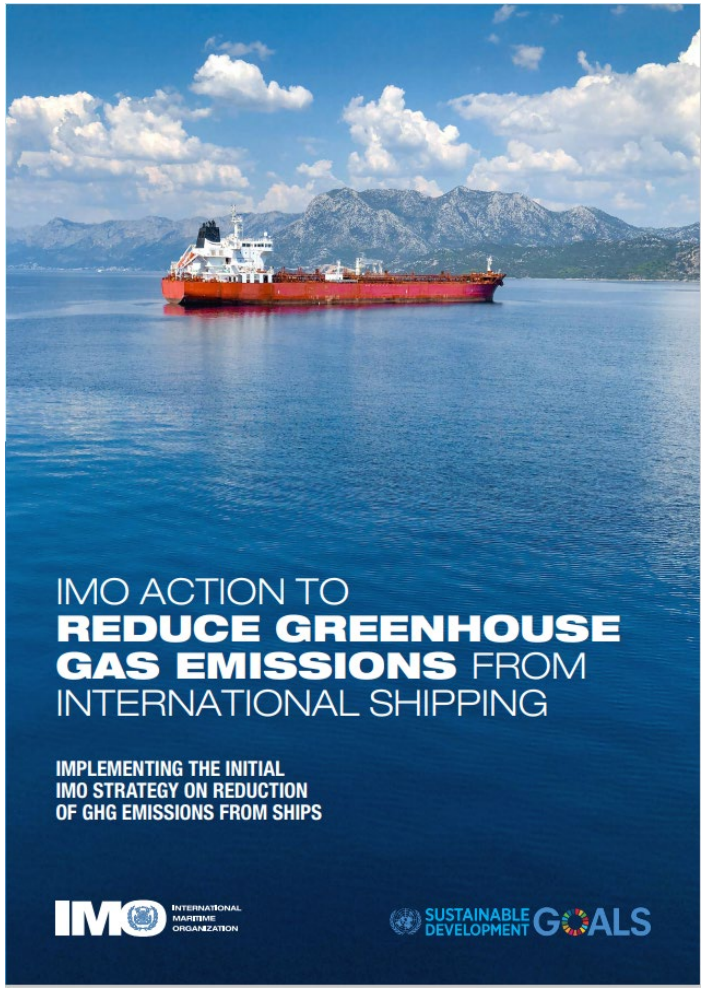
Brazil will reach climate neutrality by 2050, Bolsonaro says

- Speaking at a summit of world leaders, Bolsonaro's pledge would move up the previous target for reaching net zero emissions by 10 years.
- He repeated a commitment made last week to end illegal deforestation by 2030, adding that it would reduce the country's greenhouse gas emissions by roughly 50% by that date.

Reuters 22 Apr 2021

Facebook Twitter Whatsapp Comments

The Call to Action: Regulator Drivers



The Call to Action: Investor Demands

A Tectonic Shift Accelerates

The Opportunity of the Net Zero Transition

Extracted from Larry Fink's 2021 CEO Letter

Match the climate statements...

Get to net zero

Become a net zero company by 2050 or sooner, and help the world get to net zero.

1

- Carbon-neutral by 2025

  Scopes 1 and 2: Direct emissions from our energy generation, operations, and administration (scope 1); and indirect emissions from our energy consumption (scope 2).

- 50 % carbon reduction in 2032

  Scope 3: Indirect emissions from our supply chain, construction contractors, wholesale buying and selling of natural gas, and administration.

- Carbon-neutral by 2040

  Scopes 1-3: All direct and indirect emissions from our business.

2

We're taking action to align with 1.5°C

The world must reach net-zero emissions by 2050 to limit global warming to 1.5 °C above pre-industrial level. is on the road to carbon neutrality and aligned with the 1.5 °C pathway.

"....get to Net Zero by 2050 – together with society, for its global business across its product and energy products used by customers."

6

...to become a net-zero emissions energy business by 2050, in step with society's progress in achieving the goal of the UN Paris Agreement on climate change

3

Our goal of carbon neutrality in the long term

All business net zero Scope 1+2 carbon footprint by 2040.

4

We have made a commitment to achieve long-term carbon neutrality by reducing and offsetting climate-altering gas emissions.

Our ambition is to become a net-zero company by 2050.

5

Match the environment statements...

PRESERVING **OUR LOCAL ENVIRONMENT**

6

Care for our planet

Make a positive difference to the environment where we operate.

1

Biodiversity management supports accelerated green build-out

2

Protecting the environment, reducing waste and making a positive contribution to biodiversity

3

Managing our environmental impact

5

Being a large offshore oil and gas operator and a growing offshore wind power provider, preserving biodiversity and sensitive areas in the marine environment are of particular importance. In this respect, significant environmental aspects to manage include discharges of produced and processed water to sea, spills, drilling waste, use of areas and emissions of sound from our operations.

4

IMCA ES Code of Practice – Overview

Chapter 1 – **Introduction**

- Why a Code of Practice for our Industry?
- Principles for environmental sustainability
- Scope and regulatory context
- Strategy objectives and target setting

Chapter 2 – **Significant Environmental Issues**

- Greenhouse gas emissions reduction strategy
- Energy management and energy efficiency measures
- Life below water and environmental impacts
- Encouraging a circular economy, waste management and end-of-life assets

Chapter 3 – **Making an Impact across our industry**

- Raising awareness, competence and training
- Engaging the supply chain
- Embracing automation and digitalisation and associated environmental benefits

Chapter 4 - **Measuring and Monitoring**

- Reporting
- Updating the Code

Annexes

- Multi-stakeholder Initiatives
- Glossary

Practical Actions - Energy Transition

Supporting clients in decarbonisation	Carbon footprint tools (internal and client use)	Shorepower project – e.g. connect vessels to wind turbines
R&D/innovation investments/programmes	Growth in renewable energy	Participation in emerging opportunities – e.g. H and CCS and related initiatives
Fleet improvements – hybrid power/battery packs, digital fuel readings, alternative fuels	Net-Zero Implementation Plan	Case study - internal price on carbon

Practical Actions – Life below water

- Collaborative scientific partnerships
- Technological innovations - vibratory hammer to reduce noise in monopile foundations
- QHES/Environmental policies/strategies
- Planning, design and risk assessment to eliminate/ reduce environmental impacts
- Cleaning and decontamination to avoid introducing non-indigenous species
- Applying relevant standards; a Global Environmental Management Standard
- Monitoring air emissions
- Developing systems to collect waste in waterways before it reaches the sea and break up micro-plastics

Practical Actions – Circular Economy

Reducing waste, segregated recycling of offshore non-hazardous waste

Zero single use plastics offshore - alternatives, plastics estimator tool, water fountains/ drinking filtration systems

Adopting green procurement practices

Reducing carbon intensity of products

Using sustainable materials

Establishing an internal marketplace for steel reuse

Practical Actions – Supply Chain

- Engage on single use plastics
- Codes of Conduct for Suppliers
- GHG emissions estimation tool and carbon footprint studies
- Use of international standards, e.g. Bluescan

Practical Actions on Environmental Sustainability – some examples

Improving performance in the
marine contracting industry

Margaret Fitzgerald

IMCA

Head of Marine Policy & Regulatory Affairs

Nadine Robinson

IMCA

Technical Adviser Environmental Sustainability

Marcelo Jorge Martins

Marcelo Martins

Grupo CBO

- Marcelo has 20 years experience in the area of shipbuilding and maritime support. A director of the CBO Group since 2013 and since 2009 has served as the planning, engineering and supply superintendent of Aliança Shipyard.
- Previously, in 2005, he worked at the shipyard as Project Manager for a series of 8 vessels, following from the basic project to the delivery of the ships.
- Since 2002, he worked as CBO‘s technical / commercial advisor, discussing charter contracts, adapting vessels to customer requirements, maritime support market analysis and customer relations.
- He joined CBO in 1996 as an intern and was hired as an engineer in 1997 where he served in the new construction supervision group, responsible for the basic design, structure, steel fittings and finishing areas.
- Marcelo holds a degree in Naval Engineering from the Federal University of Rio de Janeiro, a Master‘s degree in Naval and Oceanic Engineering from COPPE and an MBA from COPPEAD.

CBO | 2030

INSTITUTIONAL

CBO at a Glance

35 vessels

Second largest Offshore Support Vessels Company in Brazil

Founded in 1978 by Fischer Group

~1.100 Employees

Fleet recognized by top level designers

ULSTEIN® ROLLS ROYCE HAVYARD

Average fleet age **9 years**

Net Revenue (USD)
$254MM

Adj. EBITDA (USD) & Margin (%)
$172MM(68%)

Backlog (USD) – (jan/2021)
~$800MM

Net Debt/ Adj. EBITDA
4,4x

Debt Maturity
Tenor: 2038
Duration 8 years

As of December 2020

Premium Fleet Mix 35 Vessels

(33 own vessels and 2 contracted via bareboat)

17 PSV
Platform Supply Vessel

Logistics

Designed to transport supply drilling & production bulks, fluids, potable and drill water, fuel oil, pipes, backload and other equipment to and from offshore units

10* AHTS
Anchor Handling Tug Supply Vessel

Logistics & Subsea

Designed for anchor handling and towing offshore platforms, barges, production units and other vessels, support shuttle tankers in offload operation as well as supply duties

03 RSV
ROV Support Vessel

Subsea

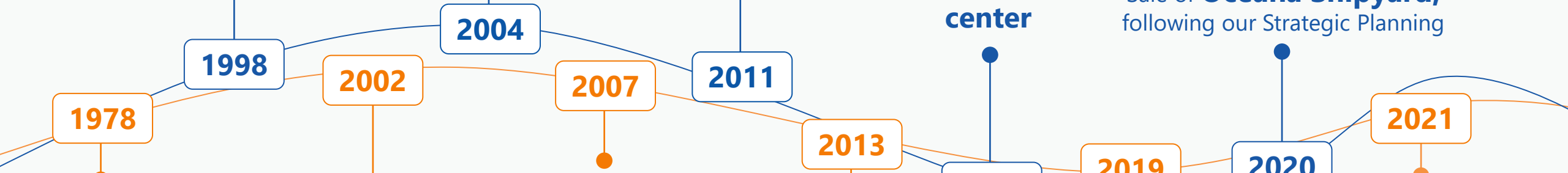
Inspection, Maintenance and Repair (IMR) vessels, designed for launching and operate a Remote Operated Vehicle and for support several subsea activities

05 OSRV
Oil Spill Response Vessel

Environmental

Designed to attend the field emergency plan for oil spill, performing oil recovery activities with oil boom and skimmer besides fire fighting

*Being 8 own AHTS and 2 foreign AHTS contracted by CBO via bareboat



1978

CBO is founded by Fischer Group
one of the first offshore support vessel companies to operate in Brazil

1998

First company to **build a PSV** in Brazil
CBO Campos

2002

Construction and operation of the **OSRV CBO Vitória**

2004

Proprietary Shipyard
Construction of its own vessels in its proprietary shipyard and conversion of PSVs to RSVs

2007

Construction of **AHTS and RSV vessels**
in a market dominated by PSVs

2011

Creation of a **training center**
to develop maneuvering practices to prepare the Company's crew for critical situations

2013

Entry of new shareholders
Pátria Investimentos, *BNDESPAR* and *Vinci Partners* became the new shareholders of Grupo CBO

2018

Creation of an **operational intelligence center**

2019

Creation of an **Excellence Program**
&
Acquisition of the PSV **CBO Supporter**

2020

First **hybrid vessel conversion** project in LatAm
(Partnership with Wartsila)
&
Acquisition of the AHTS **CBO Endeavour**
&
Sale of **Oceana Shipyard,** following our Strategic Planning

2021

Integrated Logistics Contract
first Company in its sector to offer those services to Brazil's Offshore Market

The new contract is in line with our Strategic Planning, as well as the sale of Oceana Shipyard

solid pillars to sustain

CBO'S HIGH OCCUPATION RATES AND CONTRACT RENEWALS

Best-in-class Own Training Center & Top-notch Operator in Brazil

Fleet Occupation Rate
~75% in 2020

High Fleet Uptime
~98% in 2020

4,668 hours
on training programs in 2020

Digital Education Platform
available for all employees

Source: Company Information

WHAT IS THE DIRECTION

OSV market

ENERGY and LOGISTIC...

...ACCORDING TO ITS **main stakeholders**

- **BP** Energy Outlook
- **EIA** Short-term Energy Outlook
- **CBO** Strategic Planning 2019
- Base Supply x Demand **BI CBO**

Projections

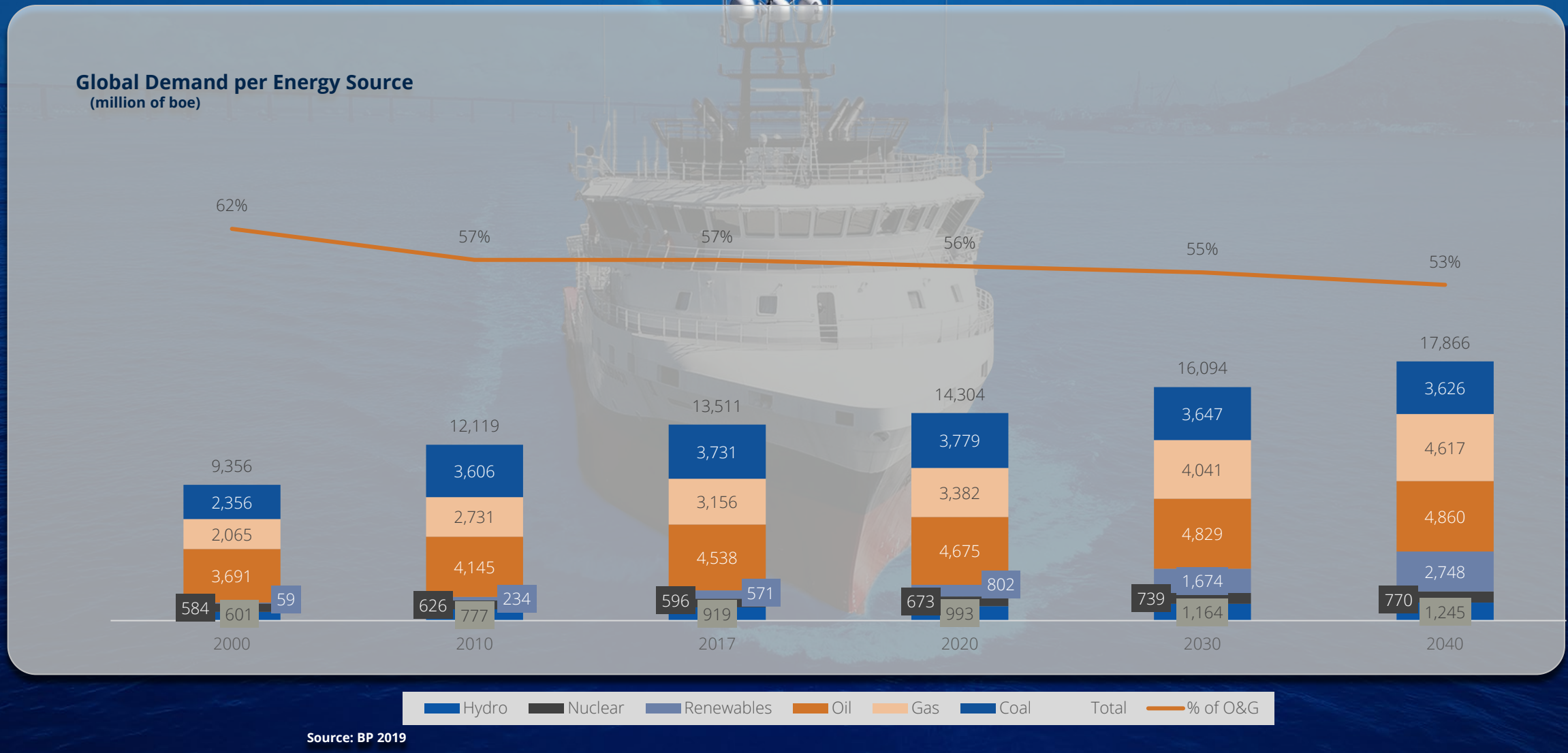
More than 20% increase
energy demand
up to 2040

Oil and Gas
industry still
main global
energy source

Main frontier
South American is one
of the main places for
Oil and Gas activities

Global Perspectives for the Energy Sector

O&G will Remain as Key Energy Sources Backed by Strong Fundamentals



Source: BP 2019

A SUDDEN
AND DRASTIC

change

STILL WITHOUT
ENDING DATE

Postponements or cancelations
drilling projects

Postponements can achieve up to **30% next years in Brasil**

Reduction on demand for fuel
fossil after social isolation and changing on profile of the work (remote, etc.)

Impact on fuel consuption
by cars and airplanes temporaly and on long term

More conscience about **emissions impacts and** about health in general

remarks

Revisions on rules
new targets or limits stablished for Oil and Gas industry

Possible impacts on **OSV market**

Time frame, cost and feasibility to implement new technological solutions

clients **still not willing to pay more** for new new technologies

Energy matrix changing
short, medium long terms

Slow reduction participation of **Oil and Gas**

Impacts on oil price
on global market

Oportunities

New way
to be contracted

New technical
solutions

More dynamic
solutions
and inovation

WHAT
trends
ARE CLOSE TO BECOME REAILITY?

\+ **Probability**
specialists

\- **Time**
to happen

more conscious on energy efficiency
and social/environmental awareness

WHAT
is

CBO

DEVELOPING IN THIS
DIRECTION?

Strong ESG Philosophy

Environment

1st Latam Hybrid Vessel Project

PSV 4500 DWT
CBO Flamengo

Wärtsilä Hybrid Solutions

OSRVs

*Specialized in the remediation of oil spills that directly **protect the environment from massive impacts.***

Energy Efficiency Project

*Reduction of the fleet **carbon footprint***

Social

GPTW for the 2nd Consecutive Year

***Increase** in the score, based on surveys with collaborators*

Gender Equality

*Increase in the number of **women in leadership positions***

"Projeto Pescar"

***Social and Educational** Program promoted by the Company*

For All Committee

*Policies to **support and increase equality** in gender, sexual orientation, medical disabilities and social vulnerability*

Governance

Corporate Standards

***Company complying with CVM requirements** since 2015*

Risk and Strategy Management

***Corporate and Operational Risk Management** and ESG Strategy Definition*

Our Certifications

ISO 9001, ISO 14001,
OHSAS 18001
ISM CODE
ISPS CODE

Source: Company Information

OPERATIONAL CONDITIONS

- Speed
- Environmental conditions
- Draft
- Energy demand
- Operational modes
  DP / Sailing /Maneuver / Harbor

FUEL CONSUPTION

Fuel consuption
vs. Operational conditions

GRUPO CBO

HEALTH MONITORING OF CRITICAL EQUIPMENT

Failure tendencies
Potential failures indication

EQUIPMENT STATUS

Operacional parameters of
Equipments

Fleet monitoring

REDUCTIUON OF FUEL CONSUPTION AND EMISSIONS

- Operational decisions based on energy demand
- Set of optimal speed
- Trim optimization
- Optimization of engine performance

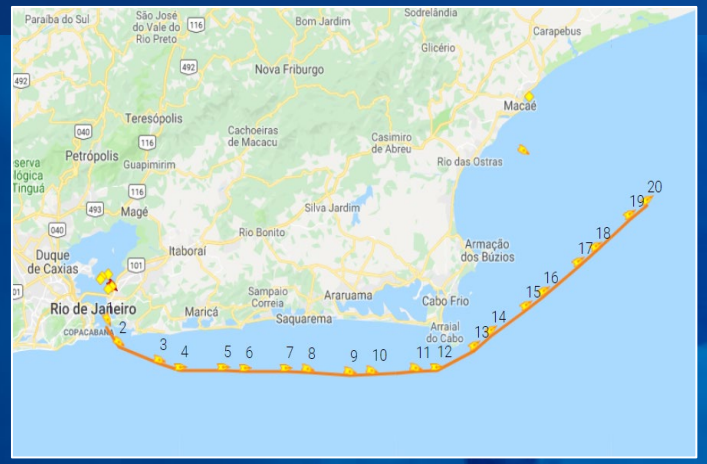
MORE VESSEL UPTIME AND LOWER MAINTENANCE COST

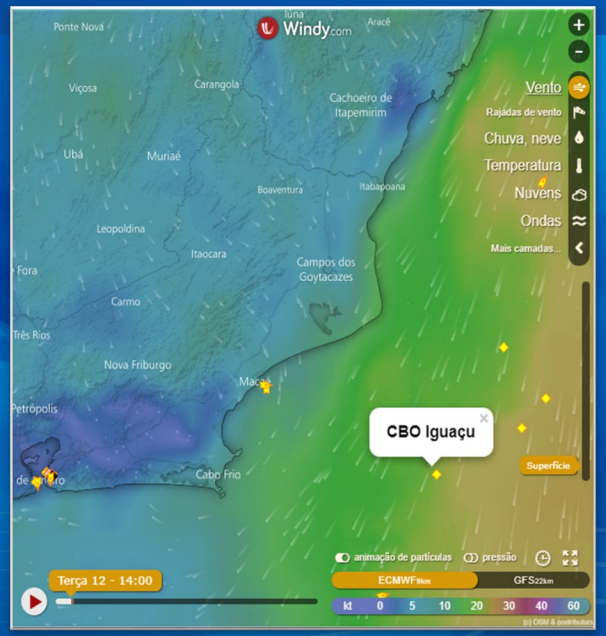
- More efficient predictive maintenance
- Follow up by experts onshore

CIOP
Operational Inteligence Center

Fleet monitoring

- Real time vessels **Position**
- **Environmental Conditions**
- **Speed** Log
- **Operational modes** (DP, Sailing, Maneuver and Harbor)
- **Fuel Consumption**
- **Live Cameras** on board broadcasted to shore
- Support on **Operational decisions** → More safety and less response time
- Online **Auditing**





CBO ISABELLA
KONGSBERG VP

- Automatic identification of operational modes
- Fuel consumption on each operational mode
- Equipment health monitoring

Expansion 2021:

- 7 vessels

TELEMETRY

ssel CBO Isabella 2020 Export 87

4817 h
Run

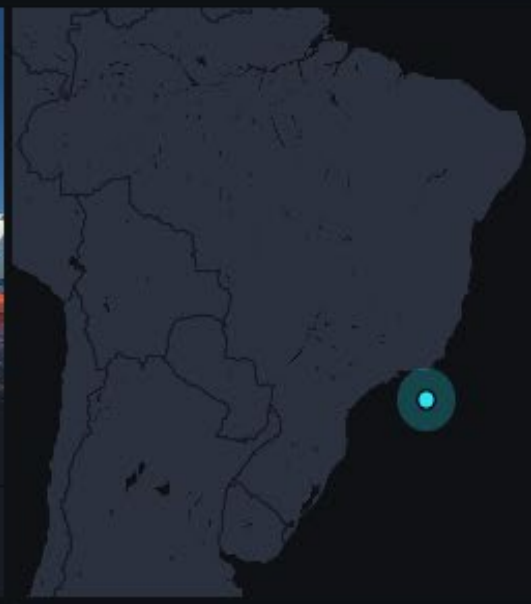
2120 m3
Fuel consumption (MDO)

O P M ET T FT DP

CBO Isabella
IMO 9454008

Engines
4

Max Rating
5360 kW



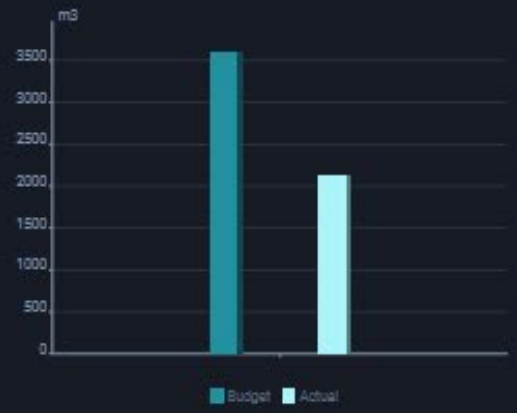
SAILING PERFORMANCE (MDO)

73.7
l/nm

PASSIVE PERFORMANCE (MDO)

440.5
l/h

FUEL CONSUMPTION (MDO)



HOTEL/REST LOAD

123.9
kW

ENGINE PERFORMANCE (MDO)

205.4
g/kWh

consumption is available when selecting monthly date ranges.

HULL

Hull
UT 715 L

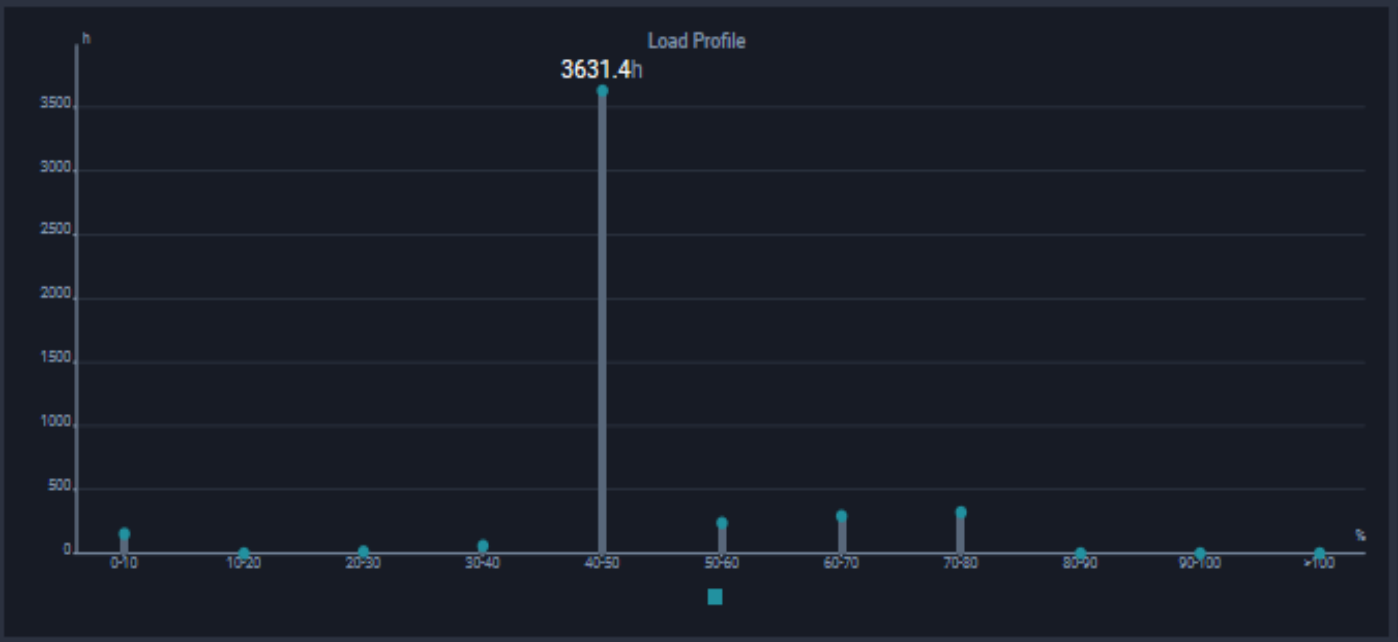
2.1 kn	5.3 kn	4.6 m	4.3 m	3.9
Speed over ground	Speed through water	Draft bow	Draft stern	Beaufort

ENGINE

Me1
C25:33 L8P 2320 kW

4710 h	1109.7 kW	1098.8 m3	3047.2 t
Run	Power	Fuel consumption (MDO)	CO2

Profile Details



OPERATION	Run	Power	Fuel consumption (MDO)	CO2
Fast Transit	64.1 h	1624.5 kW	25113.7 l	69645 kg
Other	0.1 h	21.2 kW	13.1 l	36.3 kg
DP	764.8 h	1094.6 kW	168.9 m3	468.4 t
Eco Transit	177.8 h	1019.4 kW	43016.6 l	119.3 t
Maneuver	3034.9 h	1056 kW	639.8 m3	1774.2 t
Port	111 h	0.4 kW	11613.8 l	32207.3 kg
Transit	558.3 h	1612.9 kW	210.6 m3	584.1 t
Agg.	4711 h	1109.7 kW	1099 m3	3047.8 t

Bow TT1
TT1850 DPN CP 590kW

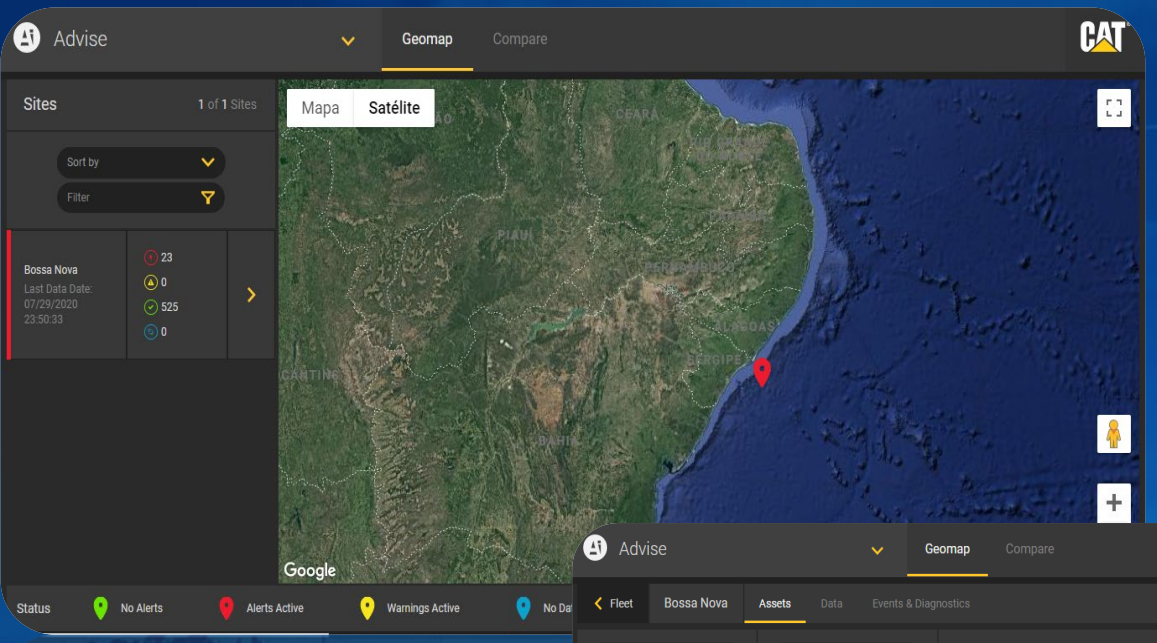
3708.1 h	188.1 kW	-1.2 %	281.1 rpm
Run	Power	Pitch	Speed

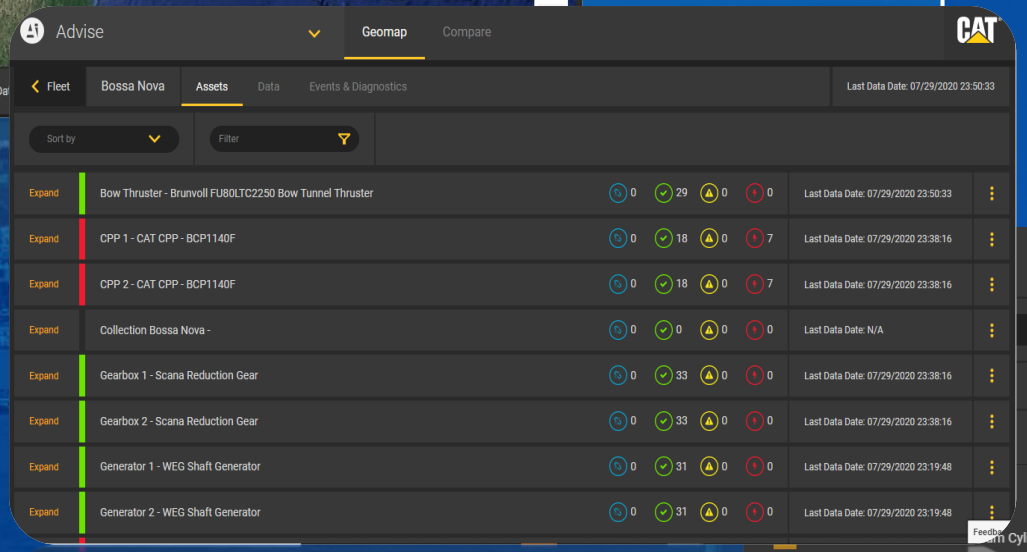
Bow TT2
TT1850 DPN CP 590kW

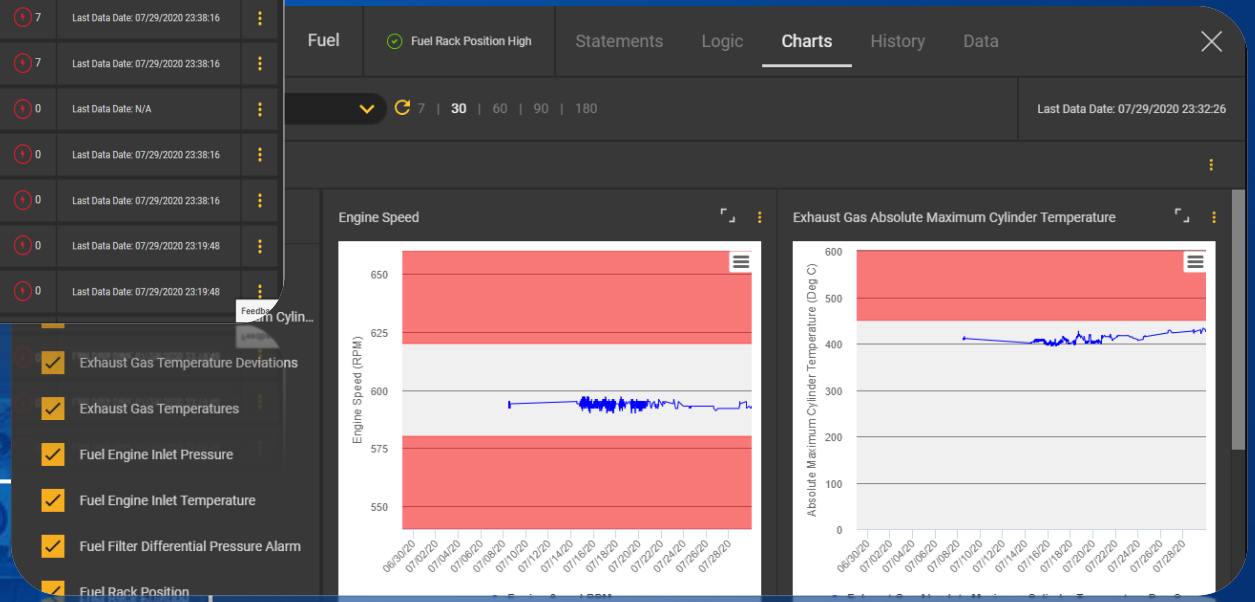
3713.3 h	185.4 kW	-3.2 %	281.2 rpm
Run	Power	Pitch	Speed

CBO BOSSA NOVA
CAT AI

- Main equipment monitoring
- Online alarms sent to shore
- Indication of maintenance to be performed
- Fuel consumption per operational mode







Expansion 2021:

- CBO Iguaçu
- CBO Parintins
- CBO Xavantes
- CBO Cabrália
- CBO Terra Brasilis

TELEMETRY

Advise

Geomap | Compare

Fleet

Sort by

Collapse

ME2 39270 - MAK 6M 32C

0 | 75 | 0 | 3

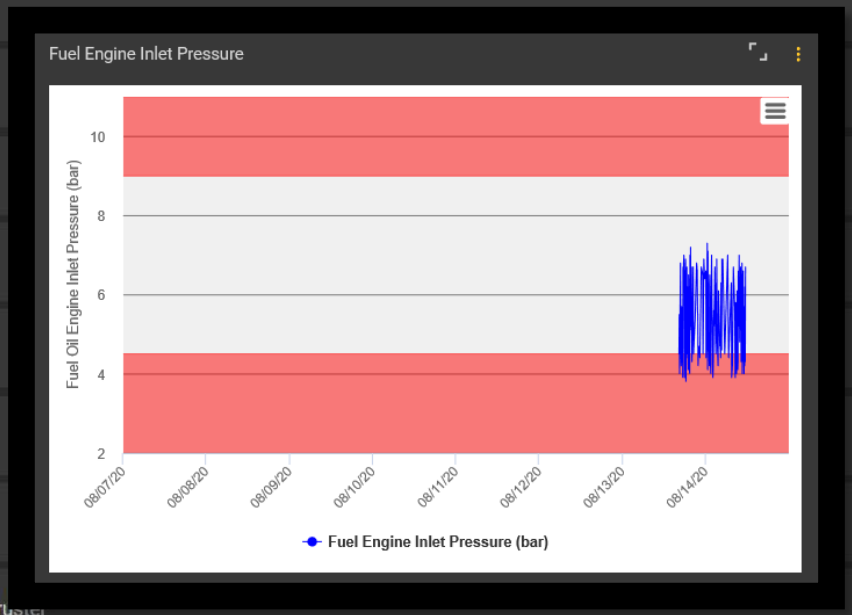
MAK 6M 32C -Steady Load

Alerts

No Data | Warning | Alert

- Fuel Engine Inlet Pressure Low is in Alert state
- Insufficient Fuel Engine Inlet Pressure is in Alert state
- Fuel is in Alert state

- Cooling
- Exhaust
- Fuel
- Intake
- Lubrication
- Starting



Expand	Gearbox 2 - Scana Reduction Gear	0	33	0	0	Last Data Date: 08/14/2020 11:43:59
Expand	Generator 1 - WEG Shaft Generator	31	0	0	0	Last Data Date: 12/31/1969 22:00:00
Expand	Generator 2 - WEG Shaft Generator	31	0	0	0	Last Data Date: 12/31/1969 22:00:00
Expand	ME1 39269 - MAK 6M 32C	0	78	0	0	Last Data Date: 08/14/2020 11:45:07
Expand	ME2 39270 - MAK 6M 32C	0	75	0	3	Last Data Date: 08/14/2020 11:28:57
Expand	ME3 39271 - MAK 6M 32C	0	78	0	0	Last Data Date: 08/14/2020 11:47:15
Expand	ME4 39272 - MAK 6M 32C	0	78	0	0	Last Data Date: 08/14/2020 11:28:57
Expand	Retractable Thruster - Brunvoll AR63LNC1650 Retractable Azimuth Thru	0	26	0	3	Last Data Date: 08/14/2020 11:48:50

Feedback

CBO ANNA GABRIELLA
FUELTRAX

Speed and position

Fuel consumption monitoring

Fuel oil supply monitoring

Real time alerts of Fuel Oil supply

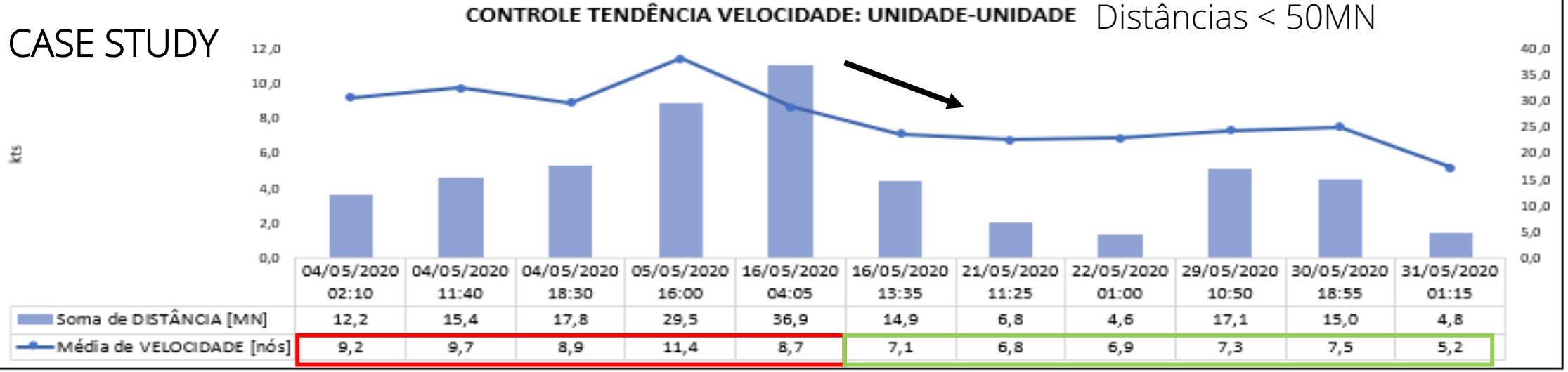
Expansion 2021:

- 3 vessels

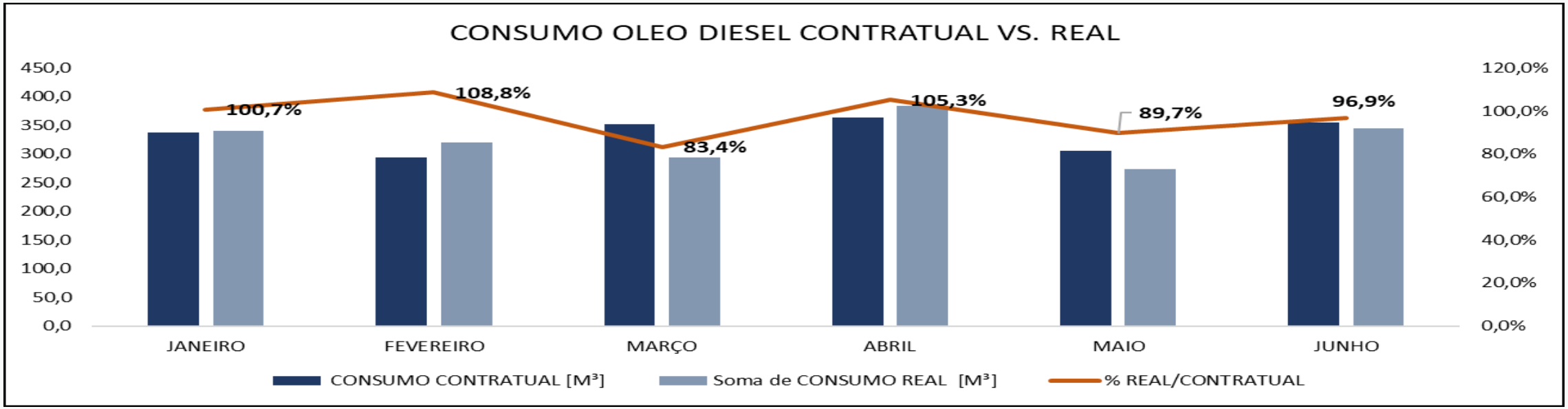
TELEMETRY

OPERATIONAL EFFICIENCY – SPEED CONTROL

CASE STUDY



	04/05/2020 02:10	04/05/2020 11:40	04/05/2020 18:30	05/05/2020 16:00	16/05/2020 04:05	16/05/2020 13:35	21/05/2020 11:25	22/05/2020 01:00	29/05/2020 10:50	30/05/2020 18:55	31/05/2020 01:15
Soma de DISTÂNCIA [MN]	12,2	15,4	17,8	29,5	36,9	14,9	6,8	4,6	17,1	15,0	4,8
Média de VELOCIDADE [nós]	9,2	9,7	8,9	11,4	8,7	7,1	6,8	6,9	7,3	7,5	5,2



Battery

CBO

WÄRTSILÄ

CBO Flamengo

First Hybrid Vessel in Latin America

Battery

- Optimized engine operation
  - Energy storage support operation of engines at optimal specific fuel consumption
  - Reduced maintenance cost

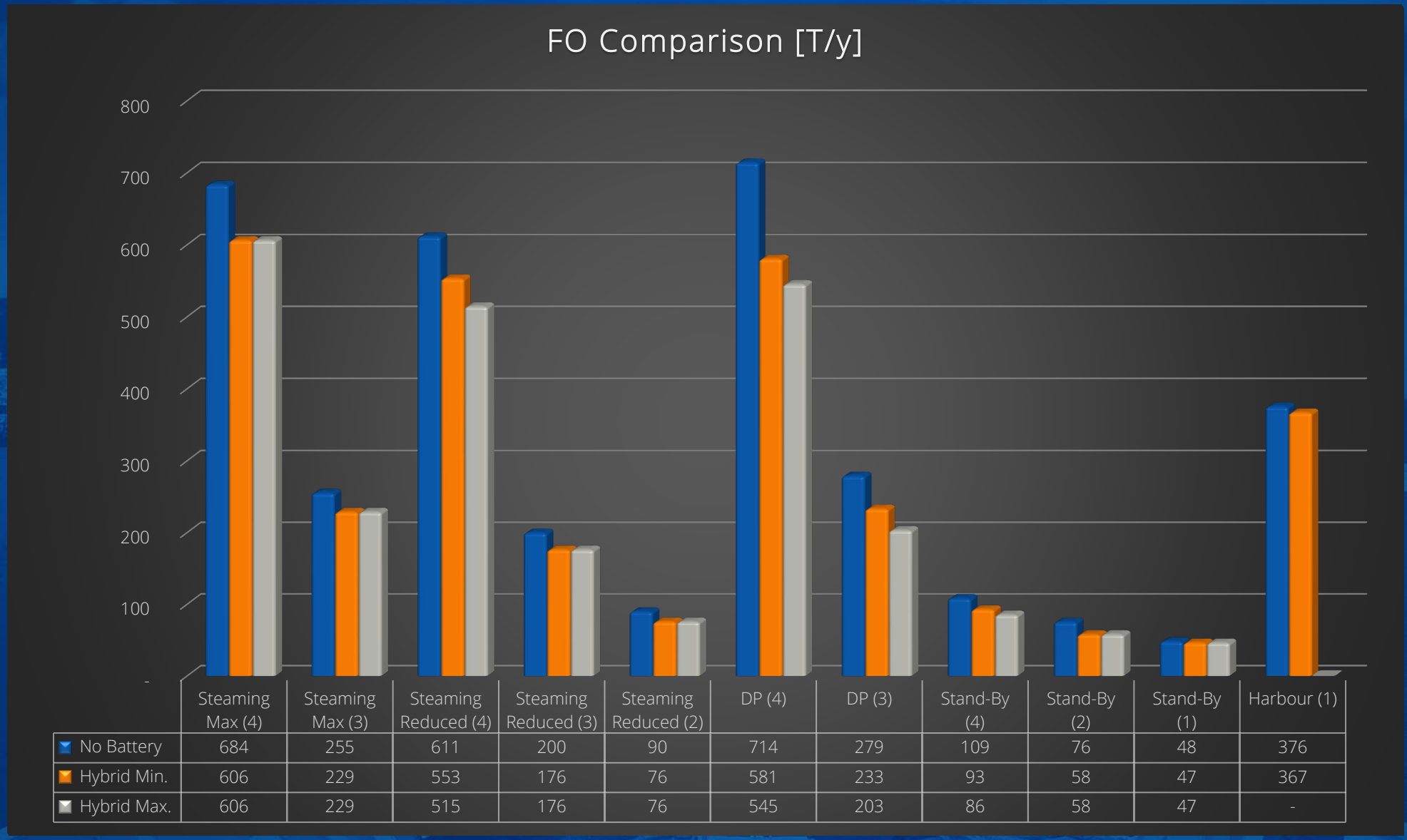
- Reduced engine transients
  - Energy storage will be used to reduce transient loads in engines. Transients will increase fuel consumption and emissions.
  - Maintenance cost will be reduced

- Redundant and efficient operations
  - Power redundancy requirements requires engines to run at low loads.
  - Energy storage is accepted as redundant power the engine will operate more efficient on higher loading and secure back-up in case of trip of engine.

Wärtsilä Battery Hybrid System

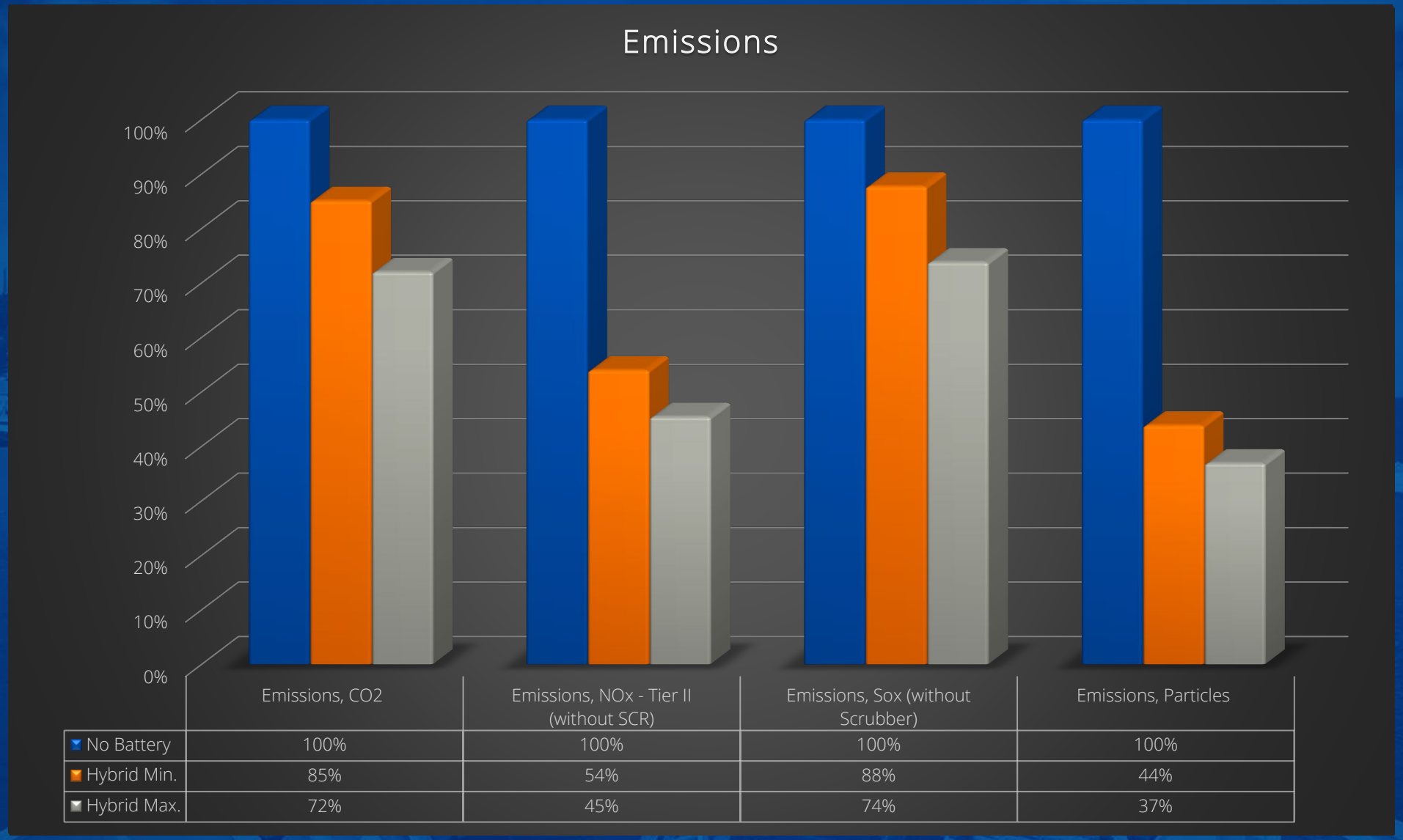
- 868 kWh battery capacity
- 1700 kW nominal power
- DNV GL Battery Power notation
- Peak shaving operation

Battery



	Steaming Max (4)	Steaming Max (3)	Steaming Reduced (4)	Steaming Reduced (3)	Steaming Reduced (2)	DP (4)	DP (3)	Stand-By (4)	Stand-By (2)	Stand-By (1)	Harbour (1)
No Battery	684	255	611	200	90	714	279	109	76	48	376
Hybrid Min.	606	229	553	176	76	581	233	93	58	47	367
Hybrid Max.	606	229	515	176	76	545	203	86	58	47	-

Battery



	Emissions, CO2	Emissions, NOx - Tier II (without SCR)	Emissions, Sox (without Scrubber)	Emissions, Particles
No Battery	100%	100%	100%	100%
Hybrid Min.	85%	54%	88%	44%
Hybrid Max.	72%	45%	74%	37%


CBO

Marcelo Martins

Grupo CBO

Steffan Lindsø

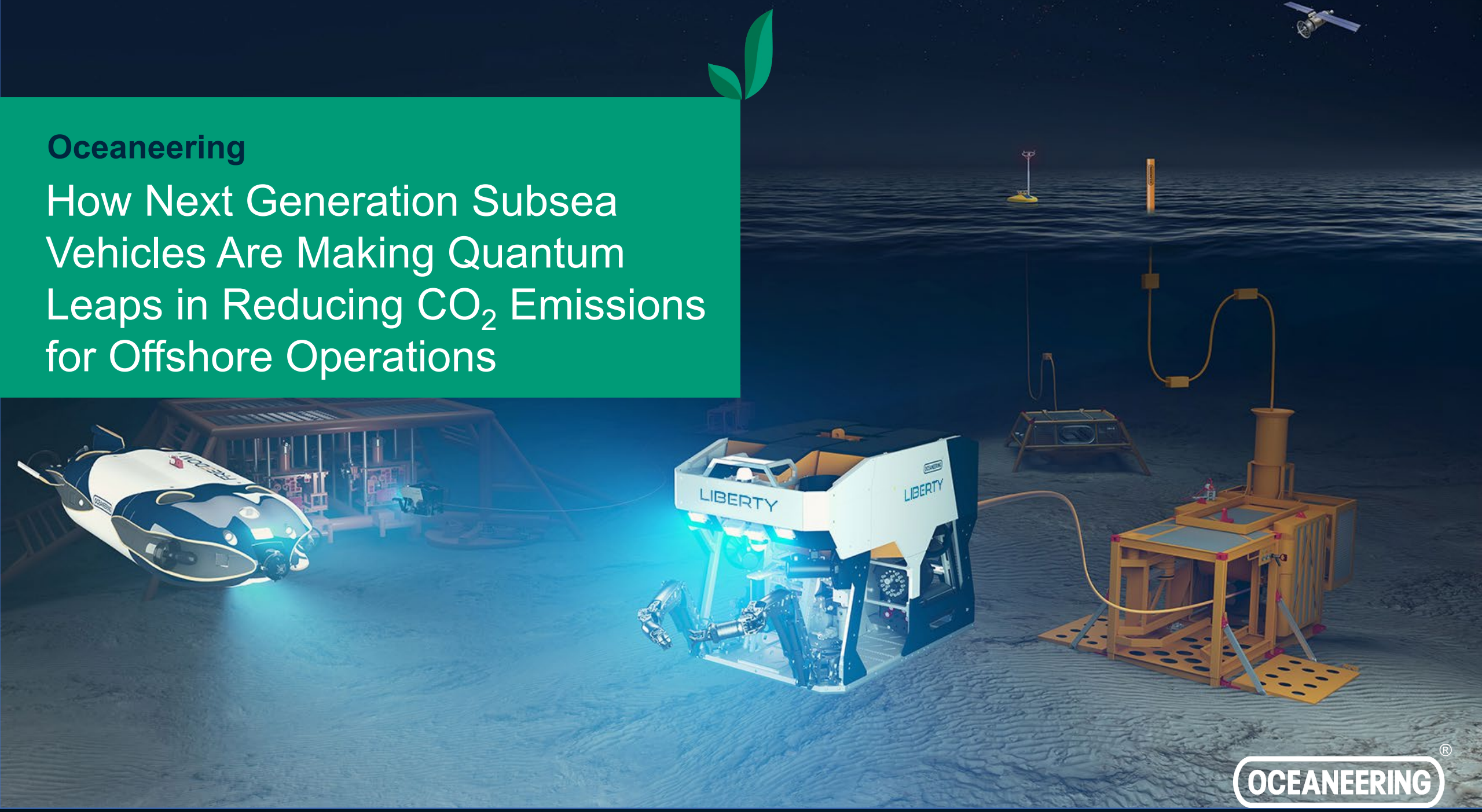
Steffan Lindsø

Oceaneering

- **Robotics Product Manager for Autonomous systems, Oceaneering**
- Main focus in this role is to set the strategy for Oceaneering's product offerings within this segment and ensure that Oceaneering is at the forefront, when it comes to best data and most cost efficient solutions to clients, through the application of the right technology.
- As a Naval Architect from University of Southampton, Steffan has been involved in ship design and ship building around the globe, before his involvement in technologies for the Oil&Gas sector within Oceaneering.

Oceaneering

How Next Generation Subsea Vehicles Are Making Quantum Leaps in Reducing CO_2 Emissions for Offshore Operations



Onshore Remote Operations Center (OROC)

OCEANEERING®

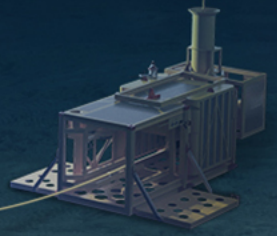
Onshore Remote Operations Center

- 4 Pilot Stations, Morgan City, Louisiana - USA
- 6 Pilot Stations, Stavanger - Norway
- 24/7 operations
- Remote piloting of conventional ROVs as well as our new resident vehicles
- Communications via fiber, 4G and satellite

Remote ROV Piloting

CONNECTIONS
Fiber, Satellite, or 4G

OROC
ROV Pilot, Subject Matter Experts,
Client Representatives



SUBSEA
ROV System

OCEANEERING®

Conventional Operations vs OROC Operations

OROC CO_2 Emission Saving Assumptions

Helicopter type: Sikorsky S-92
No of passengers: 19
Average flight time: 1 hour

Every person mobilized to OROC is one person saved offshore

Only saved helicopter emissions has been used in calculation, not any other logistics

OROC CO_2 Emission Saving Assumptions

Sikorsky S-92 average fuel flow:	576 kg/hr
Fuel usage per passenger seat	30 kg/hr/seat
CO2 factor on aviation fuel:	3.15
CO2 emission per passenger:	0.1 MT/hr/seat
OROC emission savings:	**1hr x 2 trips x 0.1MT/hr/seat**

OROC Emission Savings

0.2 MT

Per mobilization

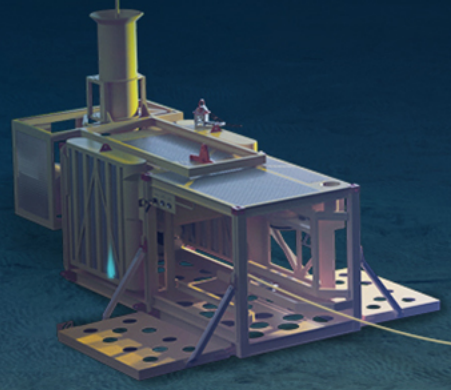
Liberty™ E-ROV

Liberty™ E-ROV

Battery-powered ROV System

CONNECTIONS
Fiber, Satellite, or 4G

Onshore Remote Operations Center (OROC)



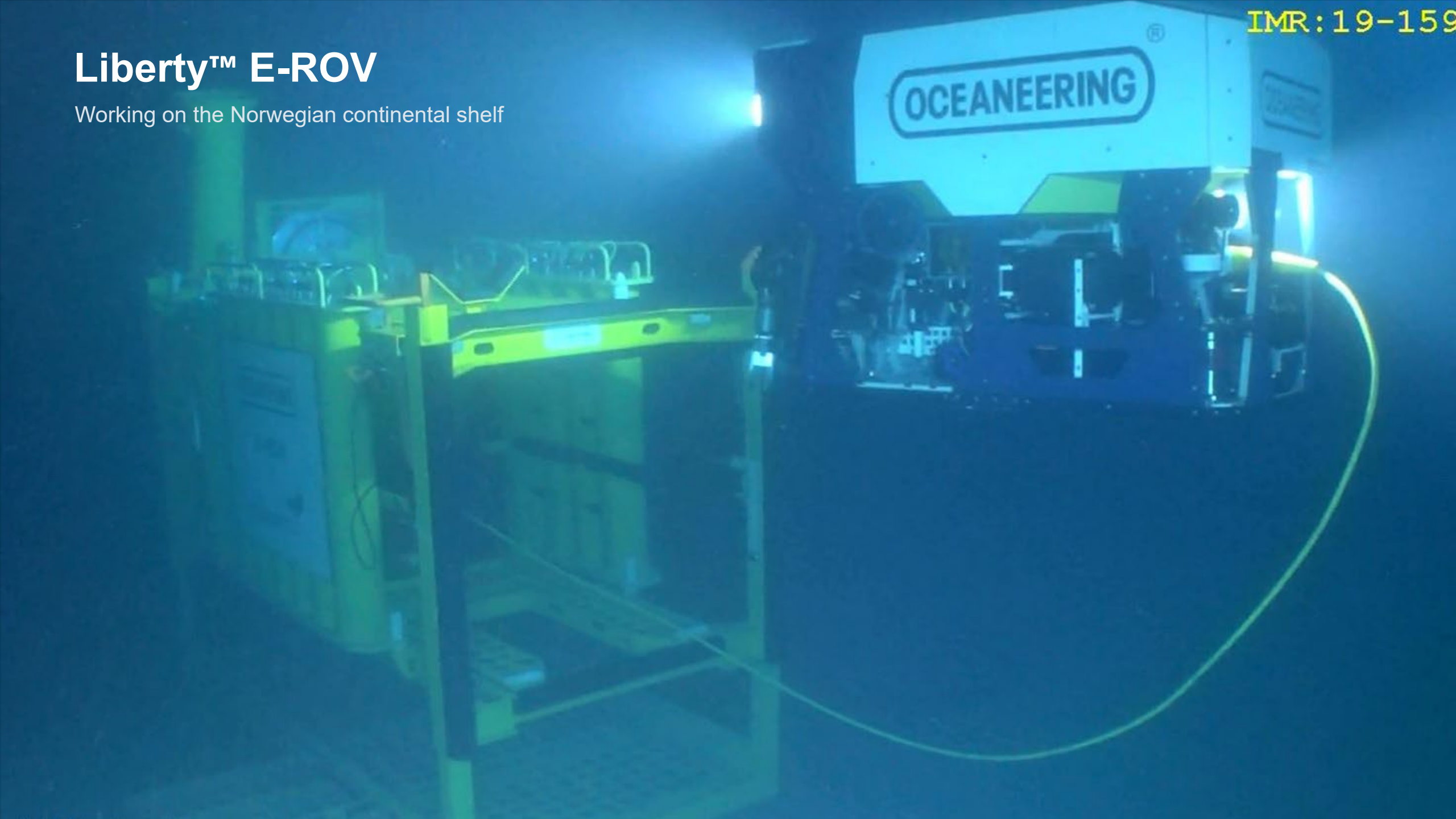
Buoy Mooring with Video and Data Communication

Resident Vehicle

OCEANEERING®

Liberty™ E-ROV

Working on the Norwegian continental shelf




LIBERTY
OCEANEERING
OCEANEERING

Liberty™ E-ROV Operations June 2019 - Dec 2020

OCEANEERING®

Operational Stats

- Number of dives 31 (deployments)
- Dive time 4964.79 hours (207 days)
- Longest dive 1445 Hours (60 days)

Missions

FIELD	TASK
Statfjord B&C	Periodic ROV Inspection
Oseberg A	Periodic ROV Inspection
Johan Sverdrup	Commissioning
Johan Sverdrup	Periodic ROV Inspection
Gullfaks A&C	Periodic ROV Inspection
Fram East	Operation of Gas Line Flapper Valve
Troll A&B	Periodic ROV Inspection
Valemond	Riser Inspection
Åsgard B	Leak Detection
Snorre A Riser monitoring (x 110)	
Troll B&C	Well Commissioning
Snorre Expansion	Well Commissioning
Troll A	Well Commissioning

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Conventional Operations vs E-ROV Operations

Liberty™ E-ROV CO_2 Emission Saving Assumptions

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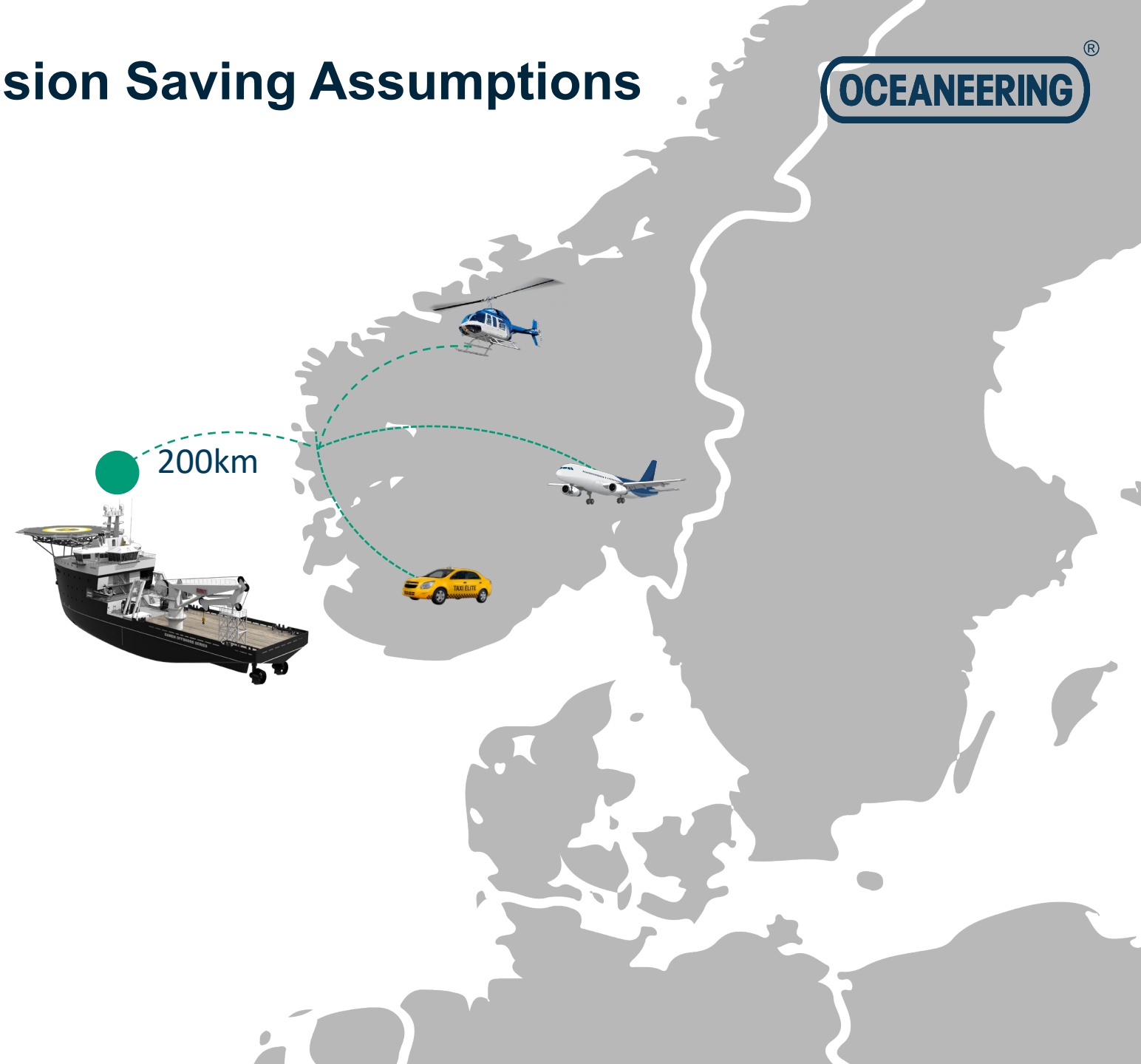
Vessel type: IMR
Transit: 200 km
Campaign length: 14 days
Liberty L&R: 6 hrs

Vessel will work on other jobs in between launch and recovery of Liberty™ E-ROV

Vessel will return to base after end campaign

Only vessel emissions used in calculation, not any other logistics



Liberty™ E-ROV Enables CO_2 Emission Savings

OCEANEERING®

Conventional ROV

644

MT of CO_2 emitted

Emission Savings

466

MT CO_2

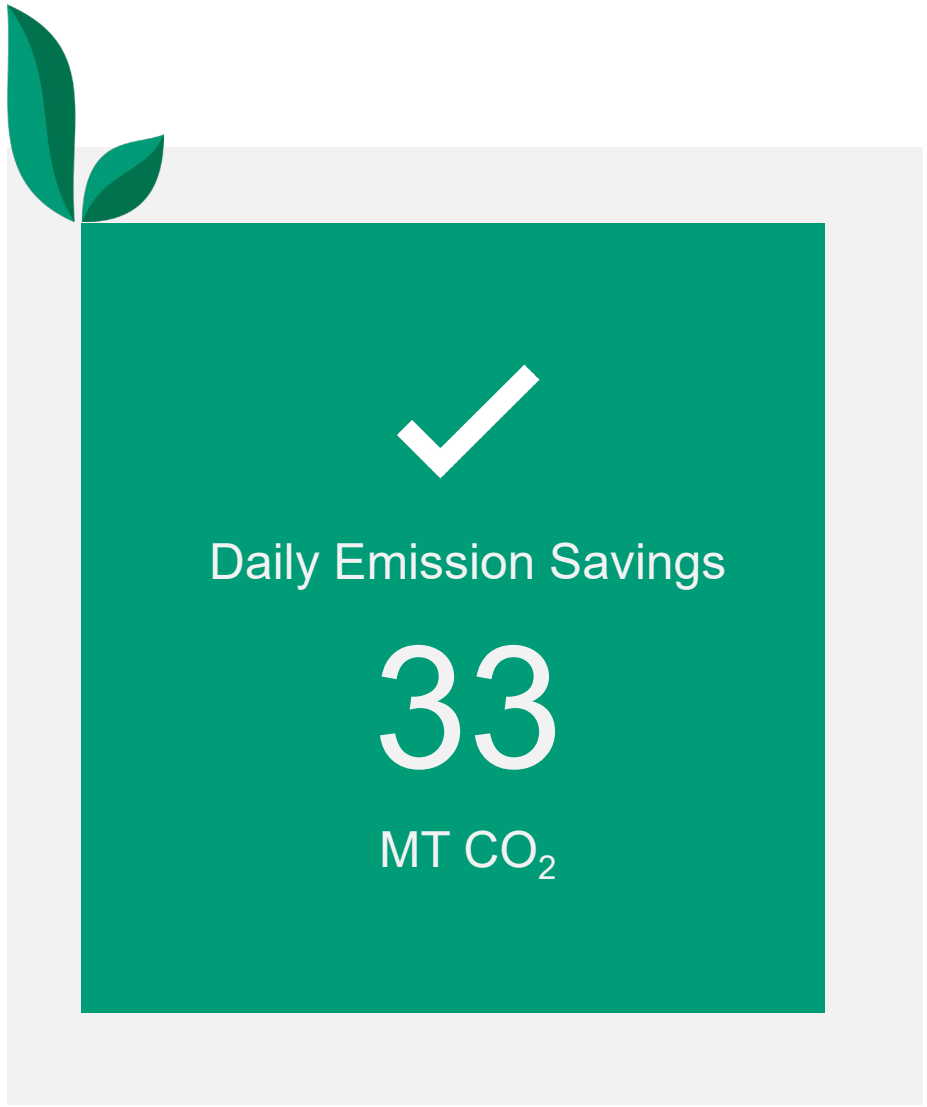
Liberty™ E-ROV

178

MT of CO_2 emitted

CO_2 emissions by vehicle over a 14-day IMR campaign

Daily Liberty™ E-ROV CO_2 Emission Savings



Conclusions

To date, Liberty™ E-ROV and OROC have saved over

7,840 MT

This number is rising with each subsequent deployment

*Updated March 2021

OCEANEERING®

What could the world do with 7,840 MT of CO2?

Drive 19,454,094 miles (31,308,330 Km) by an average U.S. passenger vehicle

Charge 999,852,622 Smartphones

Provide 905 homes with energy for one year

Consume 18,151 barrels of oil

Data calculated using the U.S. EPA Greenhouse Gas Equivalencies Calculator

OCEANEERING®

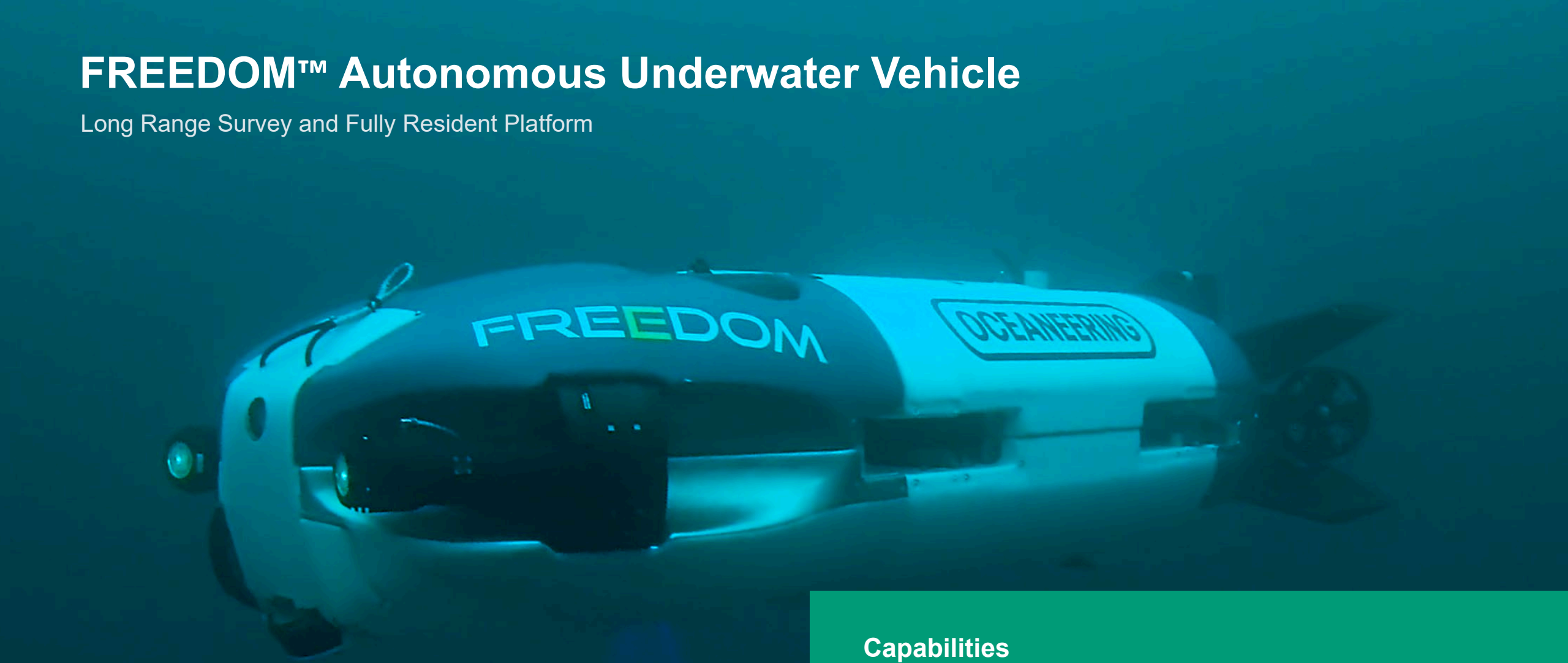
Added benefits on top of emission reductions

E-ROV Deployments	31
E-ROV Operational Hours	1,140
Offshore Personnel Hours Eliminated	57,000
Support Vessel Hours Eliminated	855

What’s Next

FREEDOM™ Autonomous Underwater Vehicle

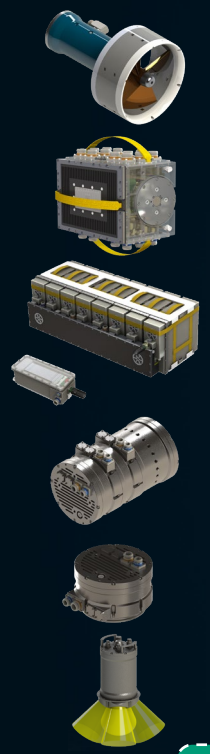
Long Range Survey and Fully Resident Platform



Capabilities

- Autonomous Navigation through real-time sensor input
- Machine Vision and Sensor Fusion Engine for object recognition
- 200km+ range
- 6000m depth rating
- Fast survey and hovering close-up inspections
- Subsea docking, charging and communications

Freedom and Liberty Building Blocks



Freedom Hardware

- Thruster
- iPEM
- Cables
- Battery
- Hull
- Computer
- ERS
- Sensors

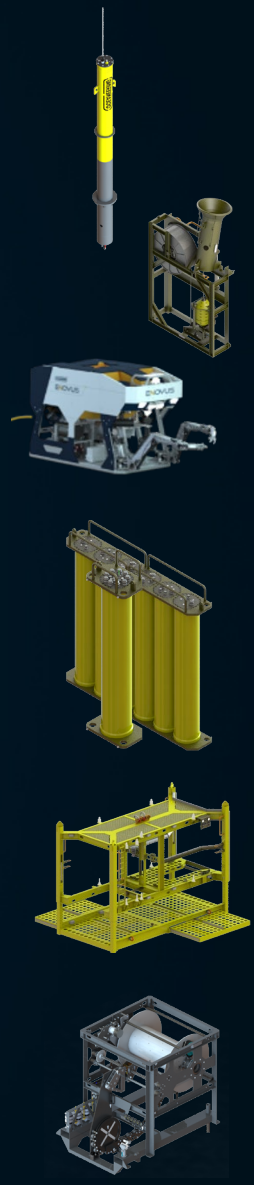
Compass Software

- Framework
- Analytics
- Control
- Autonomy

FREEDOM

LIBERTY

- Remote Piloting
- Comms buoy
- Comms Deployment System
- eROV
- Batteries
- Garage
- TMS



Freedom and Liberty Roadmap

Liberty

Freedom Hardware

Compass Software

2021

Pipeline Survey

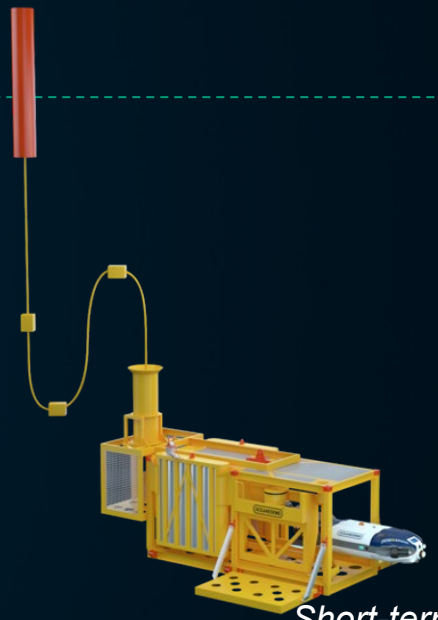
2022

Geophysical- and Pipeline Survey

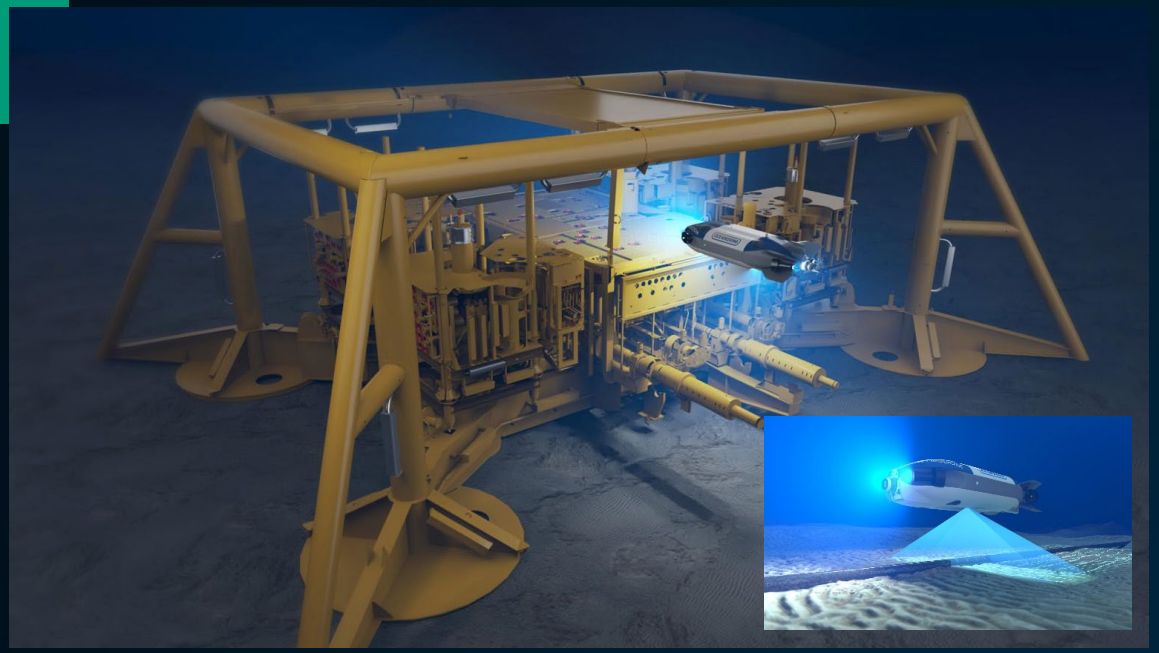
Freedom for defence

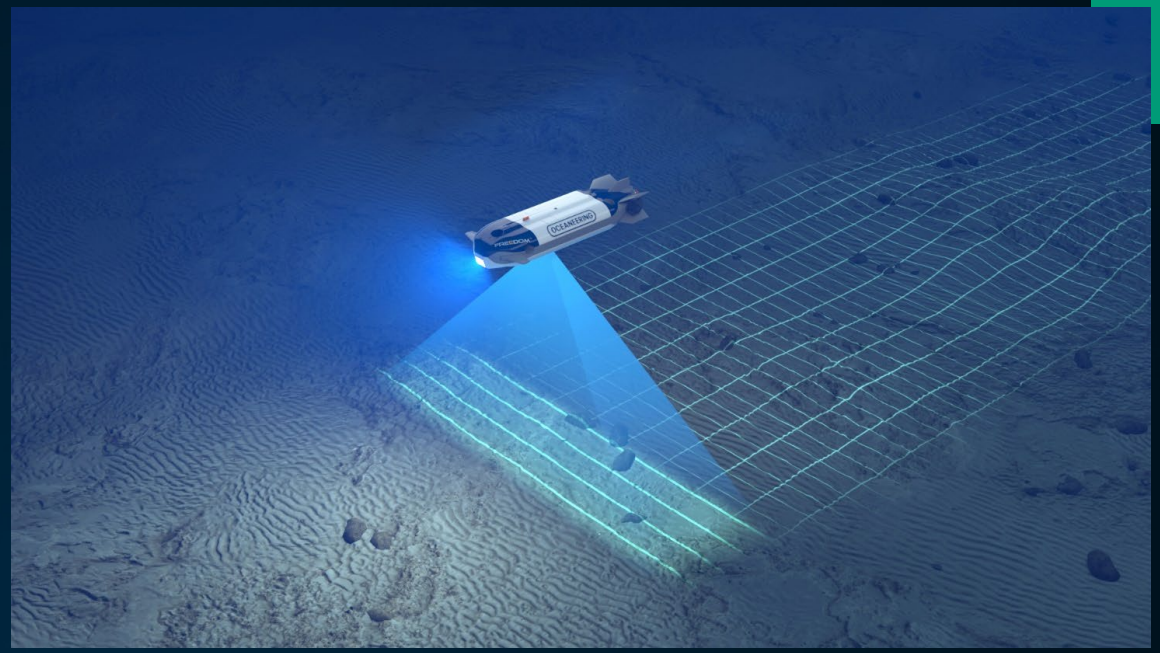
Resident Tooling

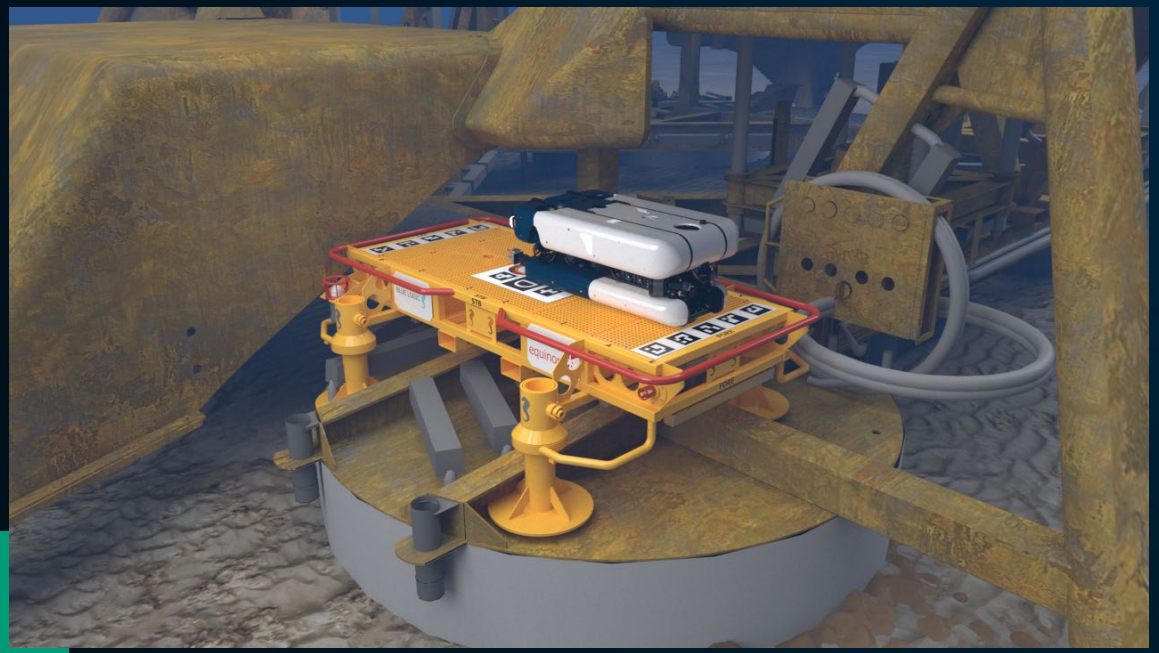
Resident Intervention

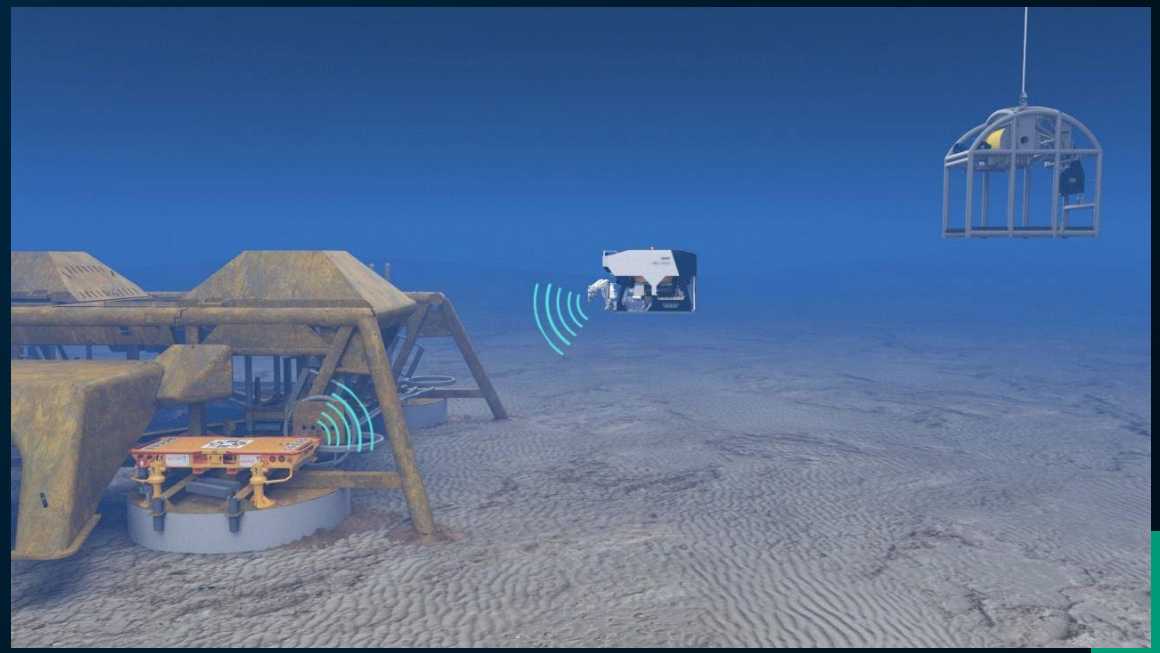


Short-term Resident









OCEANEERING®

Questions and Answers

Steffan Lindsø

Oceaneering

Question and Answer Session

Today's speakers and panelists

Margaret Fitzgerald
IMCA

Nadine Robinson
IMCA

Marcelo Martins
Grupo CBO

Steffan Lindsø
Oceaneering

Plus
South America Committee Members:

- Simone Uribe – Kongsberg
- Otto Mota – Oceaneering
- Michel Teicher – SISTAC
- Bart Kramer – TechnipFMC
- Sergio Cassano - Total

South America Committee

John Chatten

Daniel Marins

Andy Goldsmith

Key Messages from today

Margaret - Regulatory

- IMO is now actively working on its' decarbonization strategy to attain the 2023 and 2030 goals
- IMCA is pushing for the best outcome for its' members and the offshore sector
- IMCA desperately needs Members' fuel consumption data to be able to argue for the best proxy (carbon intensity metric) for its' members
- Please participate in this work by engaging with the MPRA Committee – contact Margaret

Nadine

- Pressure on companies from the public, regulators and investors to make environmental and climate commitments and targets.
- IMCA's new Code of Practice on Environmental Sustainability will be published in May. Members are encouraged to self-reflect and report on these areas.
- IMCA Members operating in Brazil are taking practical actions on environmental sustainability.

Key Messages from today

Marcelo – Grupo CBO

- Global Energy Matrix is changing for cleaner energy but oil and gas will have still a relevant role until 2030 at least;
- CBO has innovation in its DNA developing projects and solutions to reduce level of fuel consumption and emissions of its fleet;
- CBO and Wartsila develop first hybrid propulsion OSV vessel in Latin America;

Steffan - Oceaneering

- Remote piloting is the enabler that opens up for breakthrough technologies
- For 40% of IMR, no vessel needs to be present
- Significant emissions reductions can be achieved by reducing the need for a vessel

Thank You

- **Thank you** to today's speakers, panellists and Committee
- **Thank you** for your attention
- A recording will be available shortly
- Please complete our short feedback survey

Improving performance in the
marine contracting industry