FPSO Network

THE FPSO CONTRACTOR GUIDEBOOK

CONTENT PAGE

Disclaimer:
FPSO Contractors in the guidebook are arranged in alphabetical order, and in no order of merit/importance.

Consequentially, more than **50 FPSO projects** has been planned to take place within the next 5 years.

Unlocking the potentials and capabilities of each unique FPSO contractor becomes a key factor in project considerations.

FPSO Network

As the world continues its recovery from the effects laid down by the pandemic, there is an increase in demand for energy and projects across the Oil & Gas sector.

We have put together an essential easy-to-digest guidebook to some of the biggest FPSO contractors. Understand more about their strengths and benefits, operational track records, execution models, and get in touch with their unique insights on the potentials of the industry.

altera

Altera Infrastructure is a leading global energy infrastructure services group primarily focused on the ownership and operation of critical infrastructure assets in offshore oil regions. Altera develop solutions, business models and technology that will meet the changing demands of energy infrastructure. Altera is driven by a commitment to be at the forefront of sustainability.

OPERATIONAL ACTIVITY AT A GLANCE

- ~2,300 total workforce both onshore and offshore
- Strong representation of gender equality by having 17% of women in Altera's senior management (10% of total workforce)
- A total of 38 Vessels owned/operated

FPSO	Production Capacity (bbl oil per day)	Owner-ship	Year Built	Location
Petrojarl I	30 000	100%	1986	Atlanta, Brazil
Piranema Spirit	25 000	100%	2007	Lay-up
Voyageur Spirit	30 000	100%	2008	Lay-up
Petrojarl Knarr	63 000	100%	2014	Lay-up
Cidade de Itajai	80 000	50%	1995	Bauna & Piracaba, Brazil
Pioneiro De Libra	50 000	50%	1995	Mero/Libra, Brazil
3R3 (3R Petroleum)	140 000	O&M	2012	Papa Terra, Brazil
3R2 (3R Petroleum)	Tension Leg Wellhead Platform	O&M	2013	Papa Terra, Brazil

ESG EFFORTS & ACHIEVEMENTS

BUILDING EMISSIONS REDUCTION INTO FPSO DESIGN

Nearly all emissions on a conventional FPSO come from power turbines, engines, heaters, and flaring. Implementing a closed-flare system along with solutions such as drawing electrical power from external sources, carbon capture and storage (CCS), or carbon free firing of turbines/engines, could reduce Scope 1 emissions to near zero. Altera's standard offshore customer offering reflects their commitment to be a market leader in the deployment of sustainable technologies and incorporates solutions that cut emissions, including:

- Volatile organic compound (VOC) recovery system
- Waste heat recovery units (WHRU)
- Smart use of variable frequency drives (VFDs)
- Closed flare system
- Efficient and reliable water treatment processes

REGIONAL PRESENCE

CASE STUDY

NEXT GENERATION LOW-EMISSION FPSO

Altera focuses on Emission Reduction Technology in three key areas.

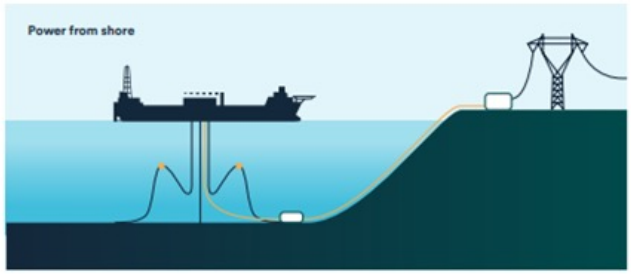
Assessment of combined heat and power cycle and deployment of a carbon capture module onboard FPSOs

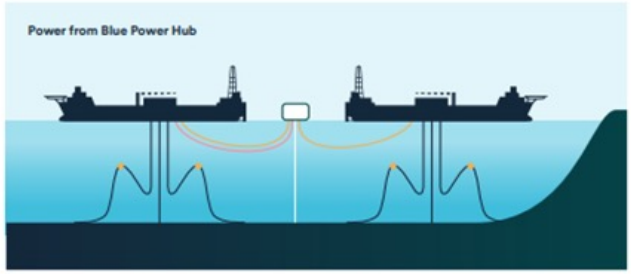
Effects of using power from external suppliers, either from the grid, a power hub, or floating wind turbines

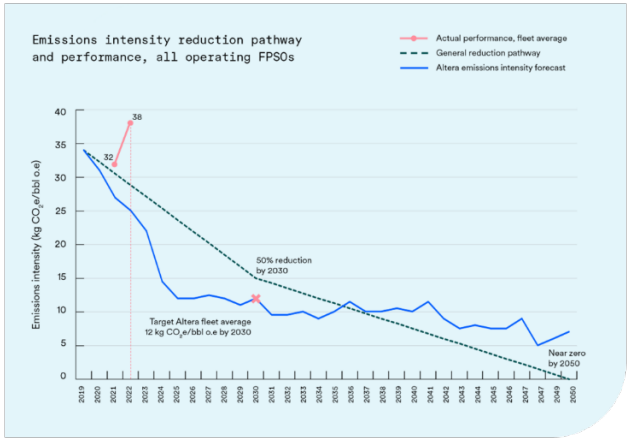
The use of alternative fuels, such as ammonia, hydrogen, or biofuels, to generate onboard power, which will be assessed during 2023.

Altera contributes to the development of these solutions by carrying out internal research and development work, and by collaborating with the industry and academia. In 2022, they remained an active partner of the LowEmission research centre led by SINTEF in Trondheim, Norway, as well as the Net Zero Technology Centre in Aberdeen, UK. Altera also became an industry partner of the HYDROGENi research program in Trondheim, Norway in 2022.

The outcome of this work will secure Altera's position as a leader in design and operation of the next generation of low emission units and will support our clients in their emission reduction efforts through the energy transition period.







BW OFFSHORE

BW Offshore is a diversified offshore energy company, positioned for sustainable value creation in a changing energy landscape. The company is a global owner and operator of innovative floating production storage and offloading (FPSO) vessels, and is part of a value chain that provides a safe and affordable supply of energy – an important factor for economic growth and security in both developed and developing economies.

OPERATIONAL ACTIVITY AT A GLANCE

97.1%
Commercial Uptime

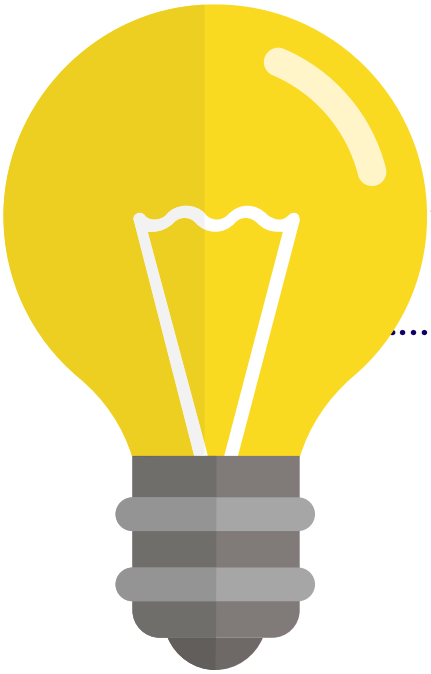
(-38%)
GHG emissions in 2022

0
Significant oil spills

322500
BOE per day

8
Assets

ESG EFFORTS & ACHIEVEMENTS



Strategic ESG Steering Committee in place to ensure that sustainability and the relevant environmental, social and governance-related risks and opportunities are integrated in the company's long-term strategy for value creation.

Building a substantial and growing position in offshore renewable energy infrastructure – Primary investment in Offshore Floating Wind through BW Ideol.

More efficient processing plants on the FPSOs by:

- Divestment of non-core FPSOs
- Combined cycle power generation
- Recovery of Volatile Organic Compound (VOC) Emissions from tanks
- Digitalisation, smart systems
- Improved energy and fuel management

Integrated monitoring software to assess GHG emissions of real-time operations

BWO are committed to efficient, reliable and compliant operations, with zero harm to people, the environment and the communities in which they operate

Sustainable packaging requirements included in tender documents for new FPSO prospects to encourage potential vendors to select sustainable packaging when providing materials.

KEY FINANCIAL FIGURES

BW OFFSHORE

2022

345.7
EBITDA

650.3
Operating Cash Flow

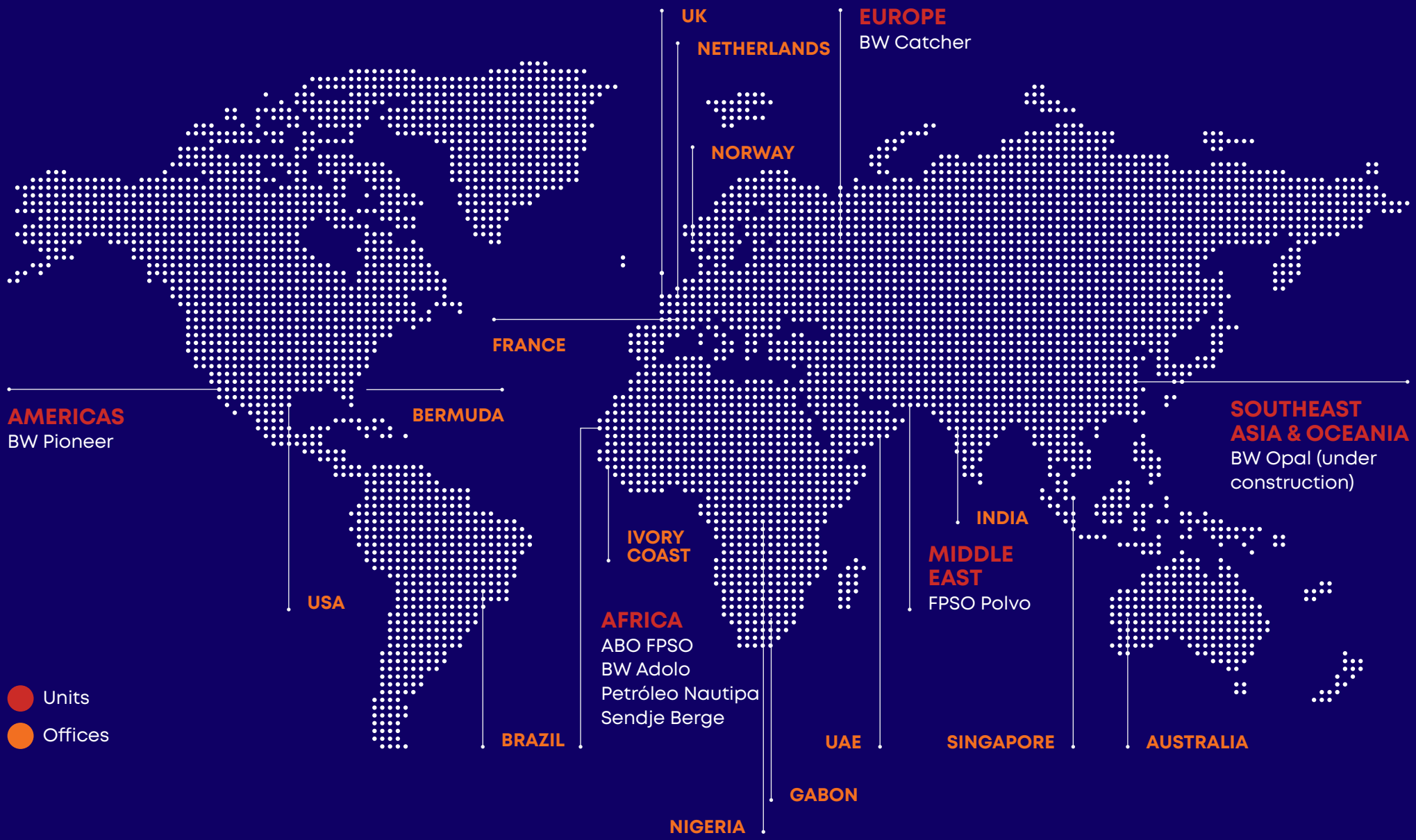
2021

401.3
EBITDA

510.2
Operating Cash Flow

BW Offshore has a sound financial position, enabling investments in offshore energy infrastructure projects and low-carbon offshore energy production solutions, while providing attractive shareholder returns over time.

GLOBAL PRESENCE



CASE STUDY

BW IDEOL - DEVELOPING FLOATING ENERGY SOLUTIONS & OFFSHORE RENEWABLE POWER PRODUCTION AT INDUSTRIAL SCALE

Primary investment with a 53.2% ownership in BW Ideol which possesses two full scale offshore floating wind turbines in France and Japan.

BW Ideol adopts a dual growth strategy of wind farm co-ownership as well as EPCI & maintenance service provider with 1 GW of projects under development and 2.9GW of substantiated pipeline which puts it 10GW ahead of its 2022 plan.

By combining existing FPSO and floating wind capabilities to develop and deploy clean offshore energy production and develop new adjacent business areas, BW Offshore explores several opportunities for growth. These include low-carbon FPSOs powered by floating wind or floating gas-to-power plants.

BW Ideol and BW Offshore are collaborating with Fram Green Technology and the broader Grieg Group to make Power-to-Platform solutions technically and economically viable on the Norwegian Continental Shelf.

MODEC

Founded in 1968, MODEC is a general contractor specializing in engineering, procurement, construction and installation of floating production systems including Floating. Production Storage and Offloading (FPSO) vessels, Floating Storage and Offloading (FSO) vessels, Tension Leg Platforms (TLPs), Production Semi-Submersibles, Mobile Offshore Production Units (MOPUs) and other new technologies which will meet the challenges of various types of gas production floaters.

OPERATIONAL ACTIVITY AT A GLANCE

EPCI EXPERIENCE

50
Units delivered

5
Units under construction

O&M EXPERIENCE

20
Units

275+
Years of cumulative experience

GHG EMISSIONS & REPORTING

CLARITY IN GHG EMISSIONS REPORTING

2022

0	1,503	5,203,364
Scope 1	Scope 2	Scope 3

For more information on the classification of Scopes 1, 2, 3, visit:
https://www.modec.com/sustainability/environment.html

KEY FINANCIAL FIGURES

REVENUE (US$M)

2022

1,775 EPC (I)	**964** Lease, Charter and O&M
2,739 Total	**75** Operating Profit

GLOBAL PRESENCE

UTILIZATION OF DIGITAL ANALYTICS TO IMPROVE OPERATIONAL EFFICIENCY

> 40
Advanced analytics use cases developed for predictive maintenance

> 170 bn
Lines of data stored on MODEC's cloud platform

> 400
Models live and operational on 9 vessels in Brazil & Africa

> 10 k
Sensors in each vessel

CASE STUDY

Digitalization allows MODEC to better integrate its fleet, making operations safer and more efficient. With more than 10 thousand sensors installed in each vessel, MODEC has boosted production leveraging Advanced Analytics for predictive maintenance, a digital twin of its process plant and a proprietary data platform to accelerate development and deployment of new algorithms. These techniques allowed for 65% downtime reduction in the FPSO Cidade de Campos dos Goytacazes MV29 from the beginning of the production for example, making this facility a leader in the industry.

The FPSO Cidade de Campos dos Goytacazes MV29 was selected by World Economic Forum, a Swiss-based non-profit foundation, to join the Global Lighthouse Network of leaders in applying the technologies of the Fourth Industrial Revolution in 2020. It was the only offshore facility recognized by the Global Lighthouse Network and also the first time a Latin American facility as well as a facility operated by a Japanese company is included in the network."

ocyan

Ocyan is an established integrated offshore services provider with over 45 years of experience in the oil and gas industry, acting in the key offshore segments, from production to offshore maintenance and subsea services.

We have a sustainable attitude and knowledge to provide solutions for the offshore upstream oil and gas industry in Brazil and abroad.

OUR VALUES

SAFETY FIRST

We take all necessary measures to preserve the lives of our members and the entire environment.

PARTNERSHIP OF TRUST

We are committed to our customers, we deliver everything we promise. This is how we build a relationship of trust.

COMMITMENT TO SOCIETY

We act with ethics and transparency. We know the importance of sustainable actions for the development of humanity.

OFFSHORE PRODUCTION

altera ocyan

The 50/50 Altera & Ocyan Joint Venture built, owns and operates two production units, FPSO Cidade de Itajaí, for Karoon, and FPSO Pioneiro de Libra for the Libra Consortium (Petrobras, Shell, Total, CNPC and CNOOC) in the Santos Basin.

In 2022, Altera&Ocyan signed a contract with 3R Petroleum Offshore for the maintenance and operation of two platforms, 3R3 and 3R2, in the Papa-Terra field, in the south of the Campos Basin, RJ.

PREVIOUS PROJECT

Ocyan operated the FPSO North Sea Producer production platform between 1997 and 2015 in the MacCulloch field (North Sea) for customer Conoco Phillips through a Joint Venture with Maersk.

OCYAN´S COMMITMENTS TO ESG

We believe that we must be a part of the energy transition and we are strongly committed with the sustainability of our planet

NOW — PERSISTENCE TO ACHIEVE ZERO ACCIDENT RECORD

2025 — TO CREATE OPPORTUNITIES AND TO EMPOWER OUR COMMUNITIES

2030 — TO BE RECOGNIZED AS AN INCLUSIVE COMPANY

2035 — CARBON NEUTRAL OPERATIONS

2040 — TO HAVE BUSINESSES BASED ON CLEAN ENERGY

INNOVATION

Ocyan has a dedicated team to leverage innovative initiatives since 2021 to focus on searching, evaluating, experimenting, and implementing solutions that lead to the improvement of our operational efficiency as well as the reduction of emissions in our activities.

The team has relied on the strategy to incorporate new technologies by interacting with startups and other companies in the innovation ecosystem. They seek to accelerate new business models that support our business and our customers on the ongoing energy transition.

Ocyan Waves is an open innovation platform that connects Ocyan to startups

ocyan waves

OCYAN WAVES **Challenge**

Matchmaking program between Ocyan and mature Startups, to solve internal challenges and co-development of new solutions since 2019.

OCYAN WAVES **Booster**

In May 2022, an early-stage startup acceleration program was launched. The main focus of Ocyan Waves Booster is to accelerate cleantechs on 4 main themes: air and environment, energy storage, efficiency and clean energies.

DIGITAL FACTORY

Program for the development and co-development of digital solutions and applications with technology companies and startups, involving customers, partners or regulatory bodies for agile and effective development.

INTRALAB

Intrapreneurship program that focus on enhancing operational efficiency and developing an innovative culture and entrepreneurial mindset of Ocyan's employees.

DECARBONIZATION ROADMAP

Program focused on the development of agile solutions and digital applications with companies and technology startups, involving customers, partners and regulatory bodies.

CASE STUDY

Ocyan has engaged the startup Vidya to implement Digital Twins to enhance the existing Asset Performance Management strategies, maximizing the efficiency, sustainability and safety of industrial operations.

The approach started at FPSO Cidade de Itajai with the reality capture, in which field photos were captured with just 8 days on board. Those photos were synchronized to the 3D model on Vidya's Platform and processed by Deep AI Neural networks to autonomously identify and classify visual anomalies, holding an accuracy higher than 90% and identifying 256% more anomalies than conventional methods. Results achieved:

- Identify affected areas by corrosion [m^2]
- Drastically reduce PoB necessary for inspection
- Feed corrosion predictive models
- AI integrated into the operation
- Transform images into maintenance actions
- Build a continuous flow of data between the FPSO and its virtual representation
- Promote operational awareness of the integrity process, for quick identification of critical problem
- Achieve a scalable ROI for the application

SBM OFFSHORE | TRUE. BLUE. TRANSITION.

SBM Offshore believes the oceans will provide the world with safe, sustainable and affordable energy. Working on energy transitions, SBM Offshore's vision and mission strategy are framed by climate change mitigations with clear net-zero commitments to reduce carbon and grow renewable energy.

OPERATIONAL ACTIVITY AT A GLANCE

16*
Assets leased/operated
*this number reflects status as per 31st of Dec 2022

91.1%*
Fleet production uptime
*Uptime and TRIFR reflect 2022 performance

0.12
Total recordable injury frequency rate
(per 200,000 hours)

EMISSION REDUCTION TARGET

50% reduction of GHG intensity by 2030 on downstream leased assets

2022 KEY FINANCIAL FIGURES

US$1,010 million
Record Directional EBITDA

US$30.5 billion[1]
Record year-end Backlog

US$1.75 billion
Largest ever financing raised for FPSO ONE GUYANA

10% dividend increase
US$1.10 per share
7% Yield[2]

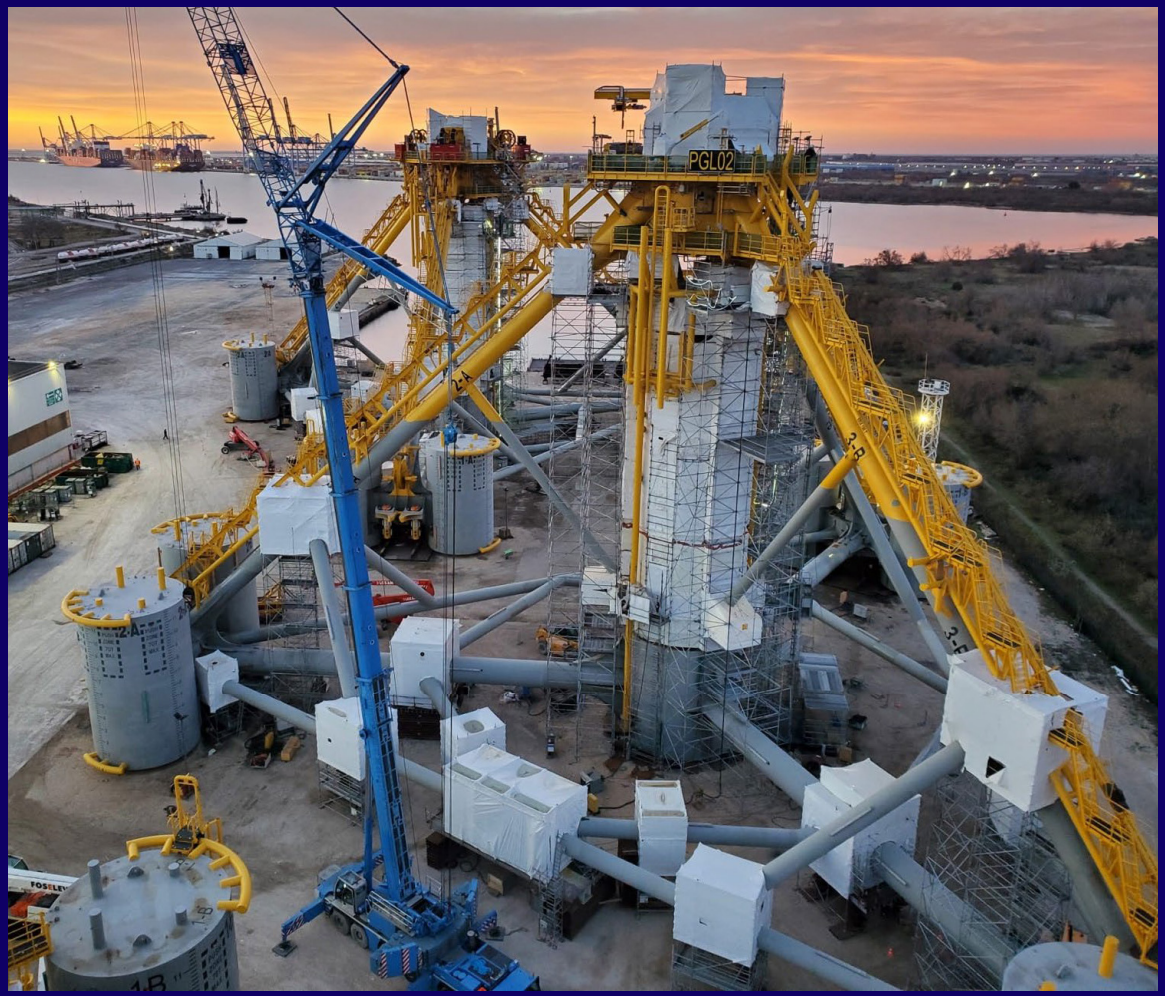
(1) Reflects a pro-forma view of the Company's Directional backlog
(2) Based on 14.66 euros year-end 2022 share price

PROVENCE GRAND LARGE, 25MW FLOATING WIND FARM

2023 EXPECTED COMMISIONING
all major milestones achieved

1st TENSION LEG FLOATING WIND
each floater will support 8.4MW turbines

~10%[1] OF TOTAL MW CAPACITY
for FOW installed by 2023



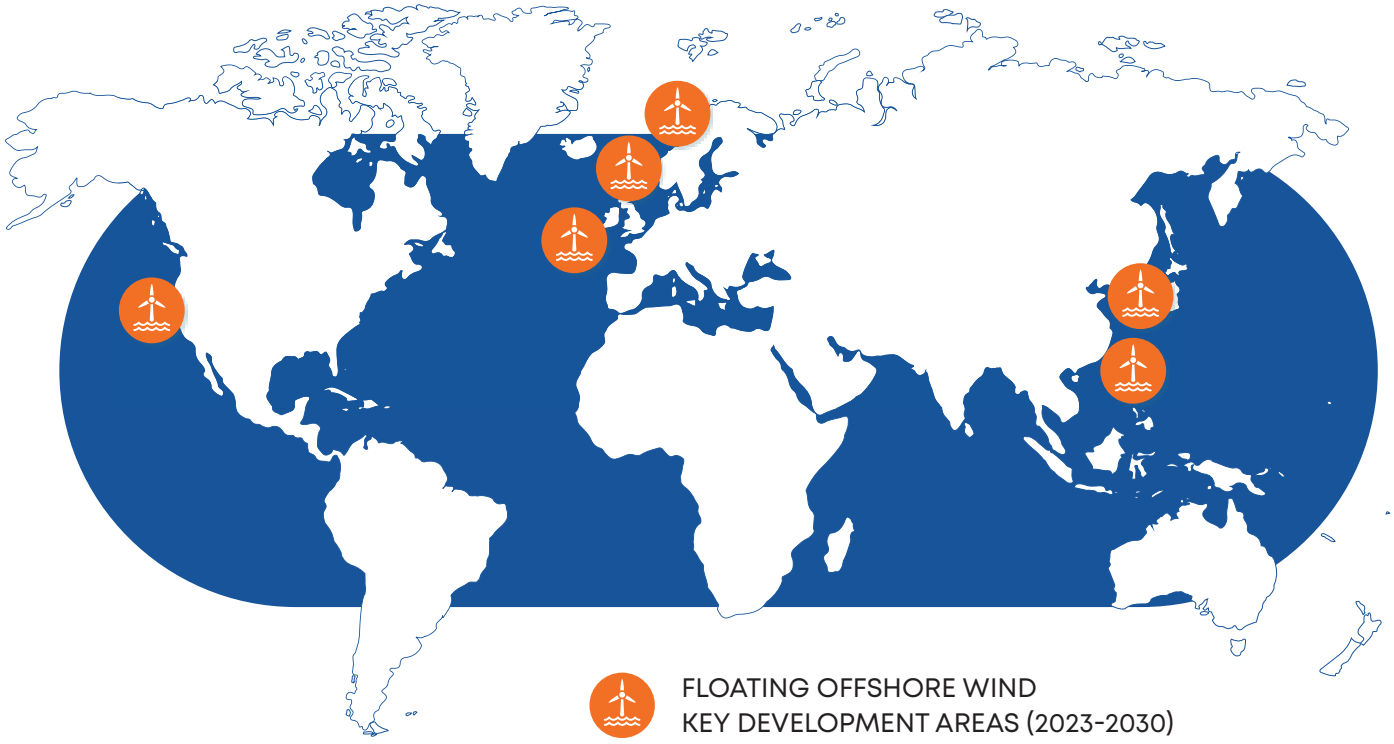
PROMISING FOW MARKET OUTLOOK

AMBITION TO BE A MAJOR PLAYER
as floating technology provider & leveraging full EPCI capabilities

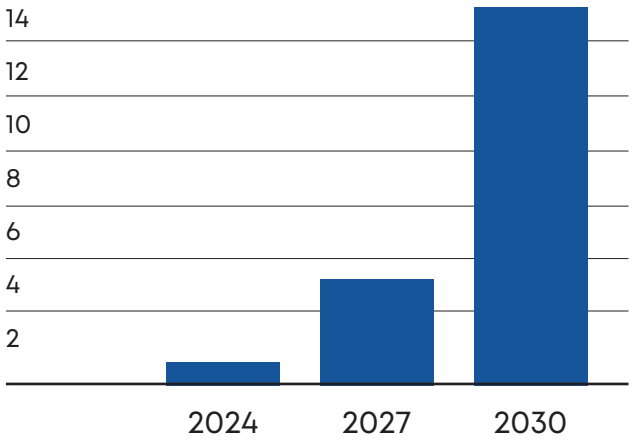
TARGETING AT LEAST 2GW BY 2030
installed capacity or under construction

SELECTIVE & DISCIPLINED
targeting projects delivering value to all stakeholders

6-12GW potentially installed by 2030



Potential installed capacity (GW)



REGIONAL PRESENCE

CASE STUDY

EMISSIONZERO® PROGRAM

EmissionZERO® is SBM Offshore's program targeting near zero emissions. EmissionZERO® brings to market floating energy production solutions with near zero emissions by setting targets in line with the net-zero ambitions of key stakeholders and call for their active engagement. Key commitments with emissionZERO®:

- Work towards near zero emissions from operations (scope 1 emissions)
- Source green electricity to run the business (scope 2 emissions)
- Execute projects and procure with continued emission reductions in mind (scope 3 emissions)

Development of an emissionZERO® based FPSO is a key element of the program and is planned in three phases:

PHASE 1

consists of including existing low-carbon solution alternatives in win phase;

PHASE 2

focuses on an all-electric drive FPSO to maximize energy efficiency, the feasibility of carbon capture technology integration and hybrid forms of power generation – for instance importing renewable energy from shore or floating renewable energy solutions;

PHASE 3

will look at power-from-shore technologies and carbon-free fuel power generation.

SBM OFFSHORE | TRUE. BLUE. TRANSITION.

A

Carbon Capture Modules
Working with vendor to develop carbon capture modules for offshore application

B

Zero Flare
Avoiding flaring of gases other than for emergency use

C

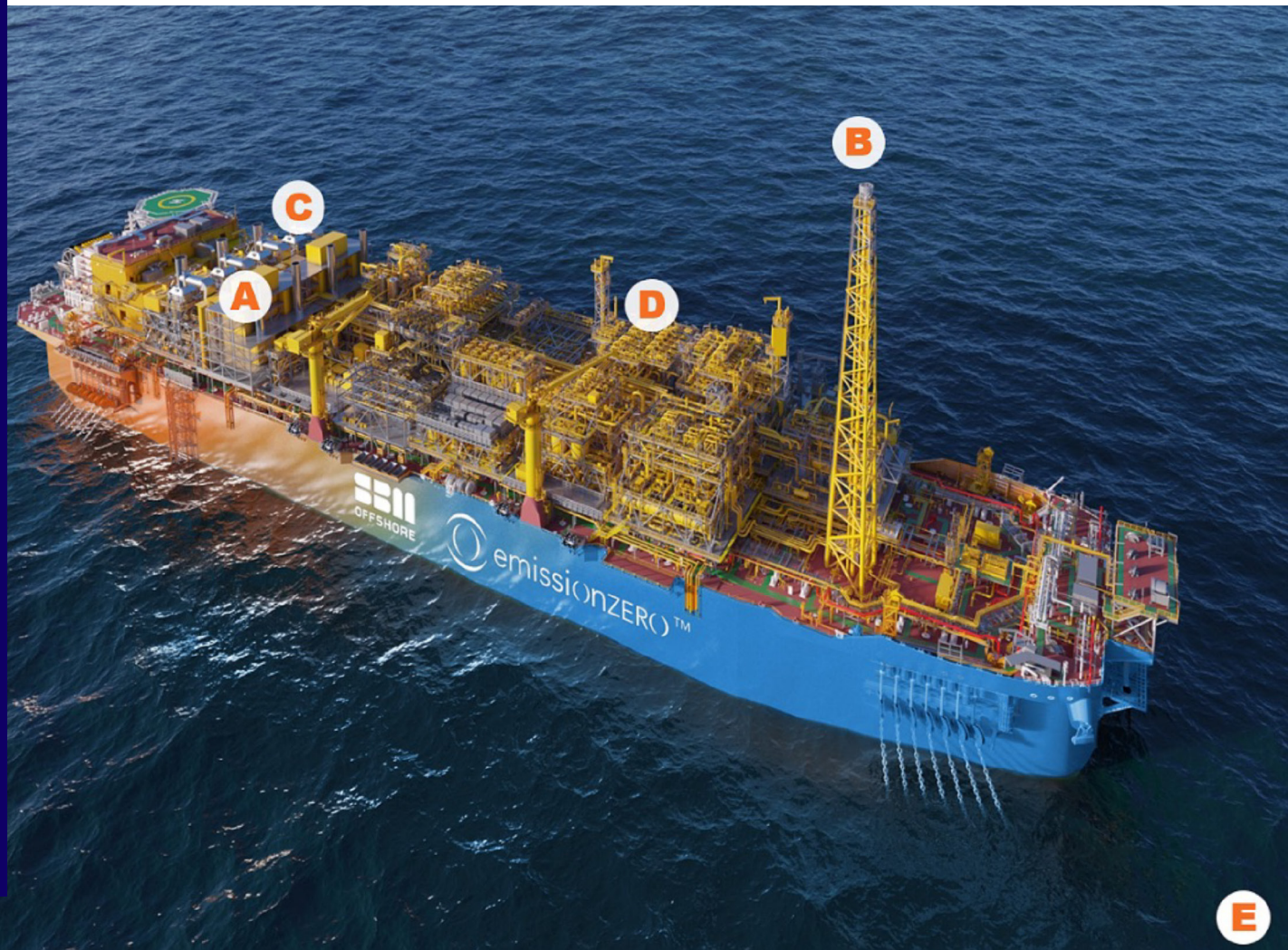
Combined Cycle Power
Using the heat from power generation to drive steam turbine that creates power

D

Digitalization
Remote operations and support digital twin and data analytics avoid unplanned shutdown

E

Other Means
Offgrid wind power, field central power, energy recovery & conversion



Shapoorji Pallonji ENERGY

Shapoorji Pallonji Energy Private Limited (SP Energy) is part of SHAPOORJI PALLONJI GROUP, India's diversified conglomerate with 158 years of a rich legacy. SP Energy is a leading offshore energy solutions provider, focusing on both Floating Oil and Gas solutions and Fixed Platforms. With our specialized expertise, we are dedicated to delivering cutting-edge technologies and innovative approaches to the energy sector. SP Energy is also India's leading integrated O&M solutions provider (offshore & onshore) to energy companies.

	Armada Sterling	Armada Sterling II	Karapan Armada Sterling III	Armada Sterling V
FPSO Project				
Contract Type	Bareboat and O&M Contract	Bareboat and O&M Contract	EPC Contract	Bareboat and O&M Contract
Location	Offshore Mumbai, India	Offshore Mumbai, India	Madura, Indonesia	Eastern Offshore, India
First Oil	April 2013	February 2015	July 2017	First oil ready
Production Capacity	60,000 blpd	30,000 blpd	11,000 blpd	51,254 blpd
Gas Processing	7 MMSCFD	63 MMSCFD	122 MMSCFD	105 MMSCFD

GLOBAL PRESENCE

*The global footprints indicate the presence of SHAPOORJI PALLONJI Group companies including FPSO business.

AMERICAS

North

- Canada
- USA

South

- Argentina
- Brazil
- Chile
- Mexico
- Peru

EUROPE

- Italy
- Spain
- United Kingdom

MIDDLE EAST

- Bahrain
- Iraq
- Jordan
- Kuwait
- Oman
- Qatar
- Saudi Arabia
- UAE

AFRICA

- Algeria
- Benin
- Egypt
- Ethiopia
- Gabon
- Gambia
- Ghana
- Guinea
- Ivory Coast
- Kenya
- Liberia
- Libya
- Madagascar
- Mauritania
- Mauritius
- Morocco
- Mozambique
- Namibia
- Niger
- Nigeria
- Rwanda
- Sierra Leone
- South Africa
- Tanzania
- Zambia
- Zanzibar
- Zimbabwe

ASIA

- Bangladesh
- Bhutan
- India
- Indonesia
- Kazakhstan
- Malaysia
- Maldives
- Philippines
- Singapore
- Sri Lanka
- Thailand

OCEANIA

- Australia

OPERATIONAL ACTIVITY AT A GLANCE

141 Mn+ boe
Production (till date)

99%+
Fleet production uptime

7.42 Mn+
LTI & TRI-free Operational Manhours

7.12 Mn+
LTI & TRI-free EPC Manhours

1600+
Professional strength

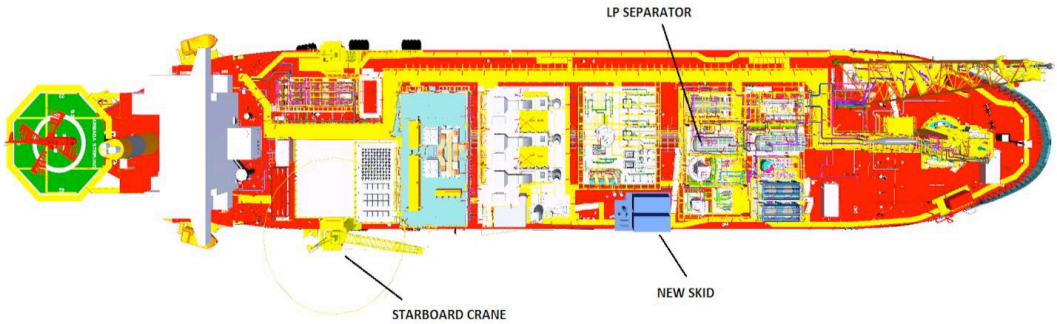
ACHIEVEMENTS

- **GLOBE OF HONOR** award to FPSO Armada Sterling and FPSO Armada Sterling II for excellence in Environment Management by the British Safety Council in Oct'2022
- **Safety Health Award Recognition Project (SHARP)** Award by the Ministry of Manpower, Singapore for the best performing vessel (FPSO Armada Sterling V) among all Singapore Shipyards for 2 consecutive years – 2021 & 2022
- Achieved **5 STARS** in all the 3 domains of HSE: Occupational Health & Safety, Process Safety Management, and Environmental Sustainability by the British Safety Council in 2022

CASE STUDY

RECOVERY OF LP SEPARATOR GAS FOR UTILIZATION AS FUEL GAS

SP ENERGY is implementing Recovery of LP separator gas for utilization as fuel gas at one of our operating FPSOs to eliminate gas flaring. Low-pressure gas from LP separators at FPSO in offshore field, currently gets flared as there is no provision to boost the gas pressure for usage as fuel gas. The project involves installing Gas compressors to compress this gas to utilize as fuel gas for Boilers & Gas Turbine Generators which will also result in a reduction in the consumption of diesel being used presently for reduced CO2 emission.



ARS Initiative to reduce environmental emission and marine diesel oil consumption by installing booster compressor to reuse gas flared from LP separator for internal consumption in boilers.

Scope- 3 emissions e.g. Economize in transportation change in pack sizes as per requirements, reduction in vehicle movement by better planning.

Equipment Health (remote) Monitoring program for – GTG & GTC

Ongoing Environmental Sustainability Projects & ESG Initiatives

YINSON Production

Yinson Production ("YP") is the offshore production business unit of Yinson Holdings Berhad ("Yinson", or "the Group"), a global energy infrastructure and technology company headquartered in Malaysia. The Group has businesses in offshore production, renewable energy, green technologies, and offshore marine, and has presences in 18 countries.

Yinson was established in 1984 as a transport agency in Johor Bahru. After successfully entering the offshore oil and gas market through a joint venture to build two offshore production assets in Vietnam, Yinson transformed to become a full-scale execution and service FPSO provider in 2014 through the acquisition of Fred. Olsen Production ASA, Norway, and the subsequent divestment of its non-oil & gas business segments.

Today, YP is one of the largest independent owners and operators of floating, production, storage, and offloading ("FPSO") assets globally, with 9 assets and a total orderbook of over USD22 billion until 2048. YP's position as a top tier FPSO contractor is driven by the excellent track record in project execution, industry-leading safety and uptime performance and leadership position in sustainable FPSO designs.

YP's Zero Emission FPSO concept is paving the way for the decarbonisation of the FPSO industry and aligns with the Group's Climate Goals to be carbon neutral by 2030 and net zero by 2050.

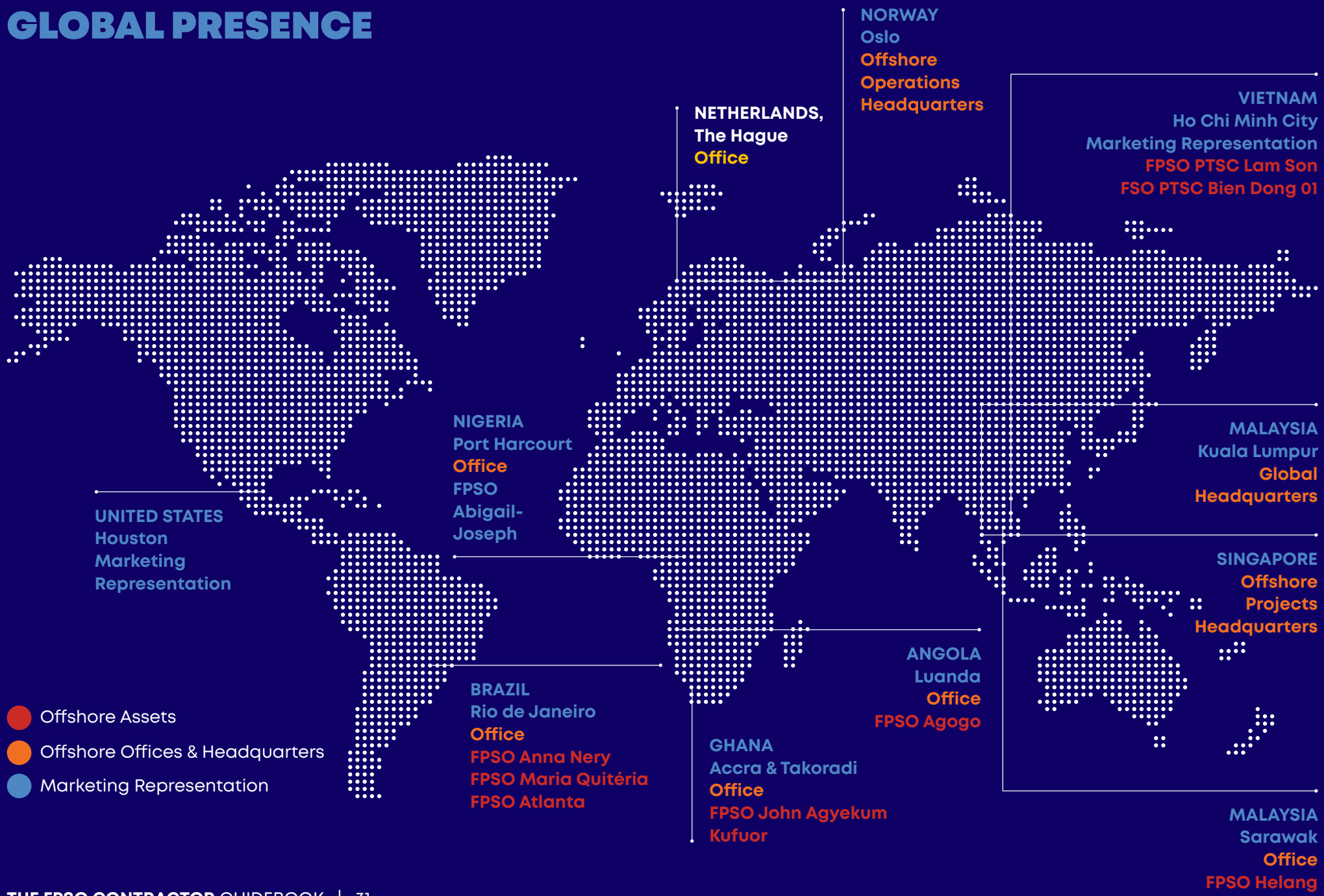
Yinson Production **MISSION**

To be the preferred FPSO partner, leading the way with responsible solutions

Yinson Production **VISION**

To design, construct, and operate industry-leading production assets for the offshore oil and gas industry towards improving global access to affordable energy

GLOBAL PRESENCE



YINSON PRODUCTION STRATEGY

SHORT TO MEDIUM TERM (1-5 YEARS)

Build sustainable project pipeline, including through mergers and acquisitions

Drive ESG initiatives towards reducing Group carbon intensity by 30% by 2030

Invest in asset lifecycle management via proactive digitalization strategy

Enhance learning, leadership, safety and corporate culture

LONG TERM (6-10 YEARS)

Continuous development of asset portfolio to create strong order book and stable cashflows

Optimize capital structure and expand liquidity pool to capture market opportunities

Continuously evaluate effectiveness of supply chain and project execution philosophy

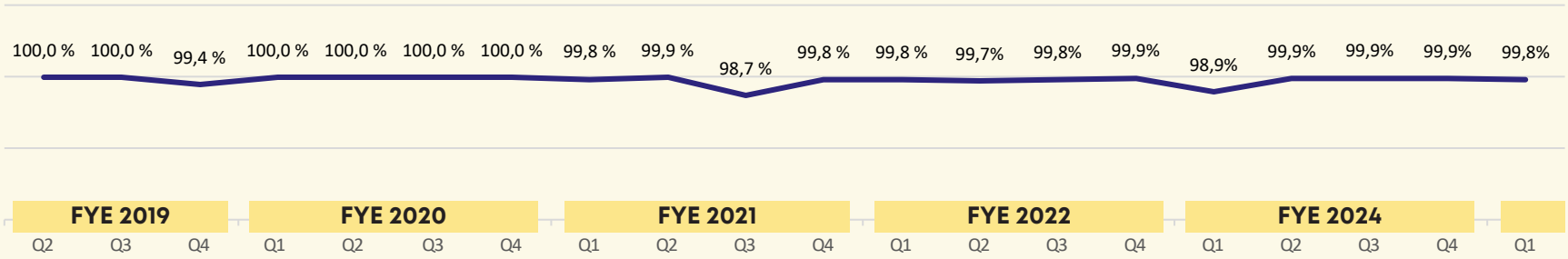
INDUSTRY LEADING SAFETY AND OPERATIONAL PERFORMANCE

	FYE 2021	FYE 2022	FYE 2023
Fatalities	0	0	0
Lost Time Injury	0	0	0
Medical Treatment Case	1	2	0
Restricted Work Case	2	2	2
First Aid Case	2	4	0
Lost Time Injury Frequency (LTIF)	0.00	0.00	0.00
Total Recordable Injury Frequency (TRIF)	0.44	0.21	0.14

Average 5-year fleet technical uptime

99.8%

Technical Uptime



LOWERING THE CARBON INTENSITY OF OUR FLEET

- YP is committed to implementing the significant business and operational changes that are required to meet our Group-wide carbon intensity targets in line with our Climate Goals.
- Technology and digitalisation play a key part in the lowering the emissions of our current and future fleet, with the key building blocks outlined in our Zero Emissions Concept.
- We are actively working with our clients to lower the emissions of our current fleet where possible and are careful to only select projects for our future fleet that have low emission features as a key design specification.

THE ZERO EMISSIONS FPSO CONCEPT

Developing and implementing the Zero Emissions FPSO Concept is a keyway that Yinson aims to lower our offshore production fleet's emissions to net zero. Both existing and future technologies have been included in the design. The concept comprises of five main building blocks, as depicted in the graphic below.

Carbon Removal

Remove carbon primarily via CCS, with remaining carbon removed via DAC

Emissions- Lowering Technologies

Utilise technologies such as hydrocarbon blanketing, closed flaring and vapour recovery units to eliminate routine flaring and venting

Combined Cycle Technology

Usage of combined cycle power generation significantly improves the efficiency of electricity production

Renewable Energy

Partial / full electrification of FPSO operations with renewable energy

Seawater Turbine Generator (SWTG)

Additional power can be generated onboard by installing turbines in the overboard seawater discharge caissons

CONNECT WITH FPSO OPERATORS AT FPSO WORLD / BRAZIL / AFRICA CONGRESS

REGISTER ONLINE TODAY

OR TAKE ADVANTAGE OF OUR ATTRACTIVE GROUP BOOKING RATES:

4 PAX	**20% OFF** tickets
7 PAX	**30% OFF** tickets
10 PAX	**40% OFF** tickets

Attend:
info@fpsonetwork.com

Sponsor:
sponsorship@iqpc.com.sg