



BUREAU VERITAS

MARINE & OFFSHORE

BUSINESS REVIEW

2019/20



BUREAU
VERITAS

**BUREAU VERITAS
MARINE & OFFSHORE
PROFILE**

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**BUREAU VERITAS
IS ONE OF THE WORLD'S
LEADING CLASSIFICATION
SOCIETIES AND
OFFSHORE SAFETY AND
VERIFICATION BODIES**

A diverse network of engineers and technical experts are dedicated to ship and offshore safety and efficiency. They set, measure and inspect standards for structures, materials, machinery and operations and share their expertise through advisory and support services and training.

180

SURVEY STATIONS

19

LOCAL PLAN APPROVAL
OFFICES

6

MARINE OPERATIONS
CENTERS



WHO?

**2,650
PEOPLE IN MARINE
& OFFSHORE**

**WHAT
DRIVES US?**

**KEEPING
OUR CLIENTS' CREW
AND ASSETS SAFE,
EVERY DAY**

WHERE?

**CLOSE TO
OUR CLIENTS,
WHEREVER
THEY ARE**

**HOW DO
WE WORK?**

**HAND-IN-HAND WITH
OUR CLIENTS**

**WHAT DO
WE DO?**

**PROVIDE OUR CLIENTS
WITH THE SUPPORT
AND KNOWLEDGE
THEY NEED**

**WHAT
MAKES US
DIFFERENT?**

**OUR COMMITMENT
TO THE MARINE
AND OFFSHORE
INDUSTRY**

Volatility and uncertainty dominated 2019- and emerging confidence has taken a major hit in 2020 as the spread of the novel coronavirus, and an oil price crisis, impact both people and markets.

Last year saw weakening global economic demand and geopolitical risk impacting both marine and offshore industries

In Marine, this weighed heavily on new orders for bulk carriers and tankers. Owners struggled with the double whammy of major fluctuations in charter rates for oil tankers and dry bulk and uncertainty over the best response to both the IMO 2020 sulfur cap regulation and the need to decarbonize. The result has been a wait-and-see approach to new orders. Anticipating the timing of a return to growth today is complex, as it will be linked to global economic demand in the wake of the COVID-crisis. It will also depend on owners feeling that they can make more informed choices about their energy transition options.

In Offshore markets, oil prices were volatile in 2019 and plummeted in the first quarter of 2020. Many projects are now on hold, as their economics no longer stack up.

Orders increase as owners seek expertise

Against this backdrop, Bureau Veritas saw an uptick in new orders in 2019 thanks to our positioning in the market segments where demand was strong: gas carriers; passenger ships including expedition cruise and eco-friendly ferry concepts; and vessels of many types that use LNG as fuel and other clean propulsion solutions. We also benefited from a steady stream of class transfers. 2019 was the first full year of activity for

A CRITICAL DECADE

Matthieu de Tugny

PRESIDENT MARINE & OFFSHORE
DIVISION



“ In a fast evolving market, Bureau Veritas is well positioned to meet client needs. ”

Bureau Veritas Solutions. The clarity of our proposition – a separate company dedicated to providing our clients with technical advisory, asset management and assurance – appeals to clients. We have seen strong, and growing demand for services as owners seek expertise to increase the performance of their marine and offshore assets.

A crucial decade ahead

As we go into the new decade, three main topics dominate the agenda. The first is environmental – how the Marine industry will lower its impact in line with ambitious regulations and commitments by IMO and the European Union.

The second is digital – how the industry will become smarter, with digital tools to increase efficiency and protect itself against cyberattacks. The third is the energy transition – how marine and offshore players will use their existing expertise to respond to today's energy needs while developing the technology necessary for a low-carbon future. Innovation in these three areas will be rapid, and grounded in the expertise that is being developed today. This decade will be a turning point – for the industry, and for the planet.

Lastly, the spread of COVID-19 will have a major impact on marine and offshore markets in 2020 and beyond. At Bureau Veritas, we have been able to keep working, not least because of the digital investments we have made enabling us, for example, to carry out remote surveys. We cannot know what the full consequences will be. But we do know that we will continue to make safety and the well-being of our people, your people and all communities, our absolute priority. We have been helping keep society safe since 1828 and we will continue to help shape the world we need now, more than ever – a world of trust.

2030: HOW TO ACHIEVE THE SUSTAINABILITY CHALLENGE?

One idea will dominate the next decade – environment. As young people around the world demand an urgent response to the climate crisis, the onus is on industry to act. With IMO setting ambitious long-term targets, ship owners are adopting innovative technologies and fuels to improve efficiency and reduce emissions. Offshore, oil majors, EPCs and new technology companies are leveraging traditional expertise to develop new energy-efficient solutions. Bureau Veritas is on hand to support the transformation ahead.



ALTERNATIVE PROPULSION

IMO 2020 is just the beginning. To reach ambitious targets of -50% in GHG emissions by 2050, owners are exploring alternative fuel options. New designs increasingly feature LNG as fuel, with some owners turning to LPG. The industry is researching innovative solutions including biofuels and ammonia. Electric power is also on the rise, albeit for short distance travel.



ENERGY TRANSITION

The offshore industry has a major role to play in developing less carbon-intensive energy sources. If gas is a critical transition fuel, offshore wind and marine renewable energies offer the promise of zero-carbon energy. In the meantime, energy efficiency is key, with oil and gas majors looking to increase the performance of assets, extend their life, and decommission them safely at the appropriate time.



DIGITAL

Digitalization continues apace as owners and operators seek to improve performance and protect against cyber risk. Ship designs increasingly incorporate smart technology, a trend set to continue in the next decade. Smart solutions will also support the energy transition, as increased automation for engines, navigation systems and machinery helps owners improve energy efficiency and reduce OPEX to meet decarbonization requirements.

TRENDS

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CMA CGM POWERS AHEAD WITH LNG AS FUEL

CMA CGM strengthened its environmental commitment in 2019 with the delivery of the world's first LNG-fueled ultra large containership and an order for five more LNG-fueled vessels.

The CMA CGM Jacques Saade was the first of nine 23,000 teu ships to be delivered by Shanghai Jiangnan-Changxing Shipyard. The 400m-long ships' environmental performance is also boosted thanks to their hydrodynamically optimized hull form.

CMA CGM went on to place an order with Jiangnan for five 15,000 teu LNG-fueled containerships. These vessels offer operational flexibility, as they could potentially be used on both Europe-Asia routes and Pacific West Coast routes. A further five 15,000 teu vessels are to be built with scrubbers at Hudong Zhonghua Shipbuilding in China. All vessels will be built to Bureau Veritas class.

IMO 2020 READY

With the IMO Low Sulphur Regulation coming into force on January 1st 2020, environmental compliance moved center stage.



FUEL TESTING SUPPORTS IMO 2020 COMPLIANCE

To achieve compliance with IMO 2020, the majority of owners chose to switch to low-sulfur fuel oil (VLSFO) or Marine Gas Oil (MGO) rather than make costly decisions on installing a scrubber or switching to LNG as fuel.

Bureau Veritas published dedicated Guidelines (NI 559) covering the use of low sulfur fuel oils and detailing design and operational measures with a view to supporting ship operators to prevent issues and ensure regulatory compliance.

We also offer dedicated marine fuel testing via our VeriFuel program. Backed by our global network of laboratories, VeriFuel provides marine fuel quality and quantity assessments. For owners operating on VLSFO or MGO, this includes test for stability, compatibility, cold flow properties and many other necessary tests in order to mitigate any potential issues onboard the vessel.



TRENDS

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PASSENGER VESSELS TARGET LOW EMISSIONS

For passenger ferries, electric power is an increasingly attractive and viable option. Bureau Veritas is classing two innovative concepts. BC Ferries has ordered four diesel-electric Island Class vessels from Damen, as part of its move to full electric. The 300 pax vessels are sister ships to two vessels that will enter service in mid-2020.

And Norwegian operator Brevik Fergeselskap has ordered an all- electric 98-pax ferry to be delivered by Holland Shipyards end-2020.

Rauma shipyard in Finland is also building a highly efficient dual fuel ferry to BV class for Tallink. The 50,000 CT MySTAR will accommodate 2,800 passengers on the Tallinn-Helsinki route.

FERRIES: THE FUTURE IS ELECTRIC

As regulators and local communities push for greener coastal navigation, ferry operators and ro-ro ship owners are responding with dual fuel and electric hybrid solutions.



TWO NEW LNG-ELECTRIC HYBRID VESSELS FOR SEASPAN

Damen is building two more BV-classed LNG-electric hybrid ro-ro ferries for Seaspan. The 149m vessels will go into service for Seaspan Ferries in 2021 as part of the company's fleet replacement programme. They will join two BV-classed LNG-hybrid vessels already linking the British Columbia mainland to Vancouver Island, which operate with emission reductions of over 50% compared to traditional vessels. Seaspan's low emissions also enable it to take advantage of tax reductions offered by the Port of Vancouver as part of its EcoAction program.

TRENDS

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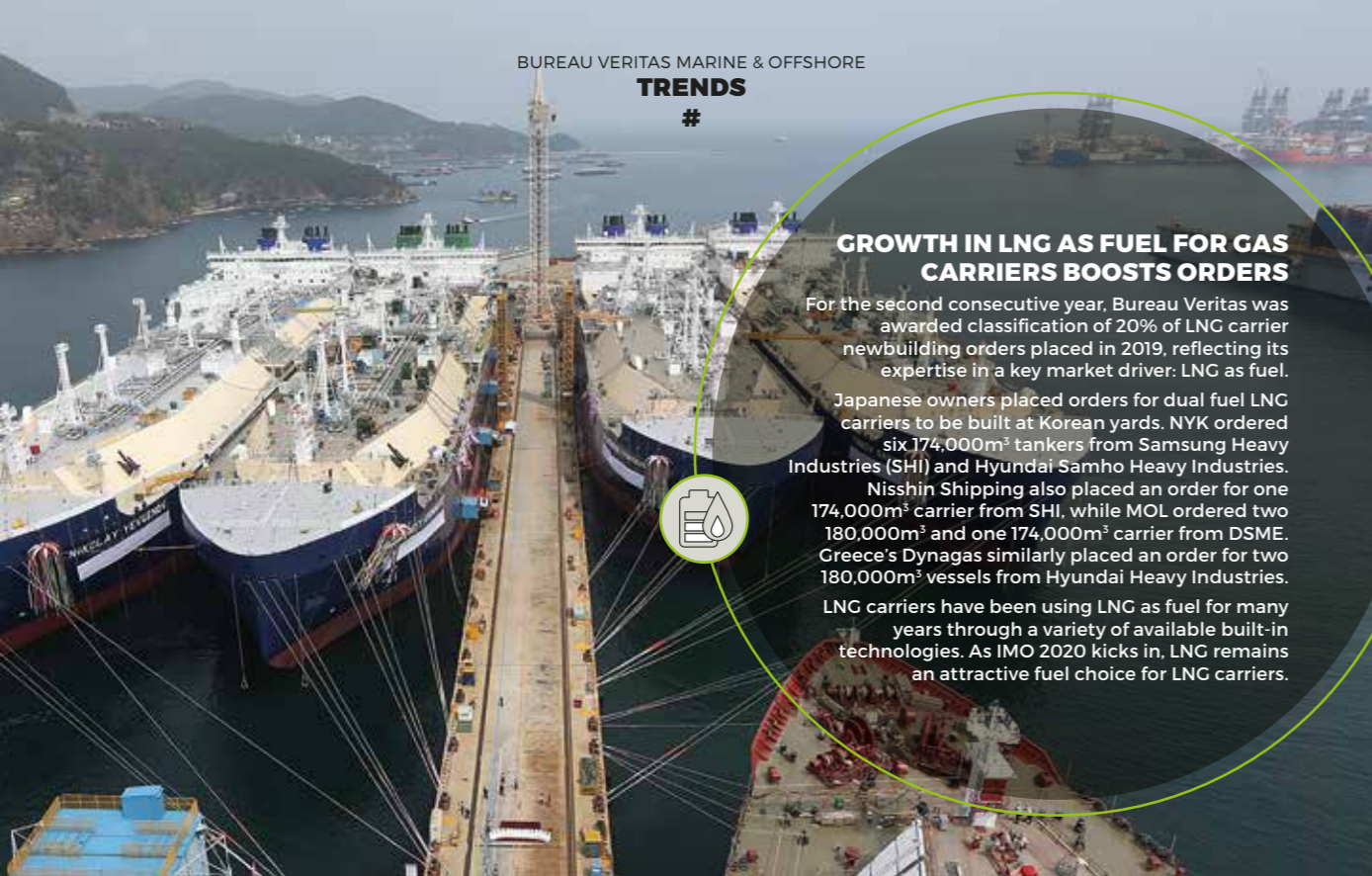
GROWTH IN LNG AS FUEL FOR GAS CARRIERS BOOSTS ORDERS

For the second consecutive year, Bureau Veritas was awarded classification of 20% of LNG carrier newbuilding orders placed in 2019, reflecting its expertise in a key market driver: LNG as fuel.

Japanese owners placed orders for dual fuel LNG carriers to be built at Korean yards. NYK ordered six 174,000m³ tankers from Samsung Heavy Industries (SHI) and Hyundai Samho Heavy Industries.

Nisshin Shipping also placed an order for one 174,000m³ carrier from SHI, while MOL ordered two 180,000m³ and one 174,000m³ carrier from DSME. Greece's Dynagas similarly placed an order for two 180,000m³ vessels from Hyundai Heavy Industries.

LNG carriers have been using LNG as fuel for many years through a variety of available built-in technologies. As IMO 2020 kicks in, LNG remains an attractive fuel choice for LNG carriers.



TRENDS

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SUPPORTING A BUNKERING BOOM

Bureau Veritas is the classification society of choice for LNG bunker ships, accounting for over half of vessels in service and under construction.

New orders in 2019 included two dual-fuel bunker vessels for Mitsui O.S.K. Lines (MOL). A 135m-long ship with capacity of 18,600m³ will be built by Hudong-Zhonghua Shipbuilding. Chartered to Total, it will supply LNG bunker to a wide range of ships in the Mediterranean. A second 12,000m³ newbuilding, chartered to Pavilion Gas, is to be constructed by Sembcorp Marine. Both vessels will be fitted with GTT's Mark III membrane containment system, which is designed to reduce cargo loss through operation thanks to a lower boil-off rate.

Bureau Veritas is also classing Shturman Koshelev's 5,800m³-capacity ice-class bunkering vessel built by Keppel Offshore & Marine.



**LNG AND BIOGAS
A NATURAL CHOICE
FOR TANKERS**

LNG carrier and oil/chemical tanker designs are adapting alternative propulsion and other low emission technologies.



**TÄRNTANK POWERS
ITS ENERGY TRANSITION
WITH FOUR-FUEL TANKERS**

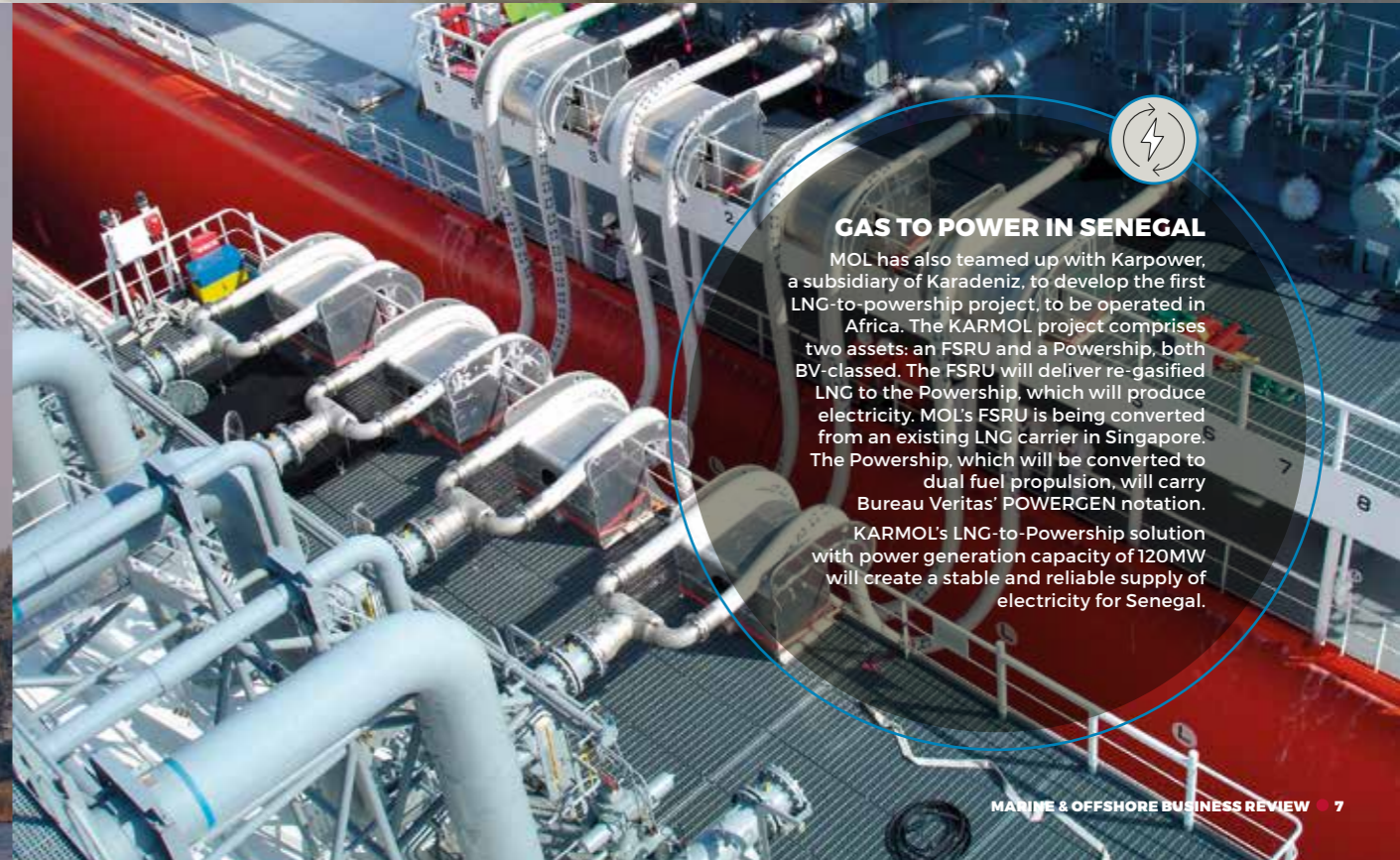
As part of its transition to clean energy, Tärntank Ship Management AB ordered two 15,000-DWT liquefied biogas/liquefied natural gas-powered (LBG/LNG) product and chemical tankers with a hybrid battery system from AVIC Dingheng Shipbuilding. Designed by Kongsberg Maritime, this is the second series of ships ordered from the Chinese shipbuilders. These latest vessels can run on four different types of fuel - LBG, LNG, MGO and LSHFO - making them environmentally friendly and efficient.



GAS TO POWER IN SENEGAL

MOL has also teamed up with Karpower, a subsidiary of Karadeniz, to develop the first LNG-to-power project, to be operated in Africa. The KARMOL project comprises two assets: an FSRU and a Powership, both BV-classed. The FSRU will deliver re-gasified LNG to the Powership, which will produce electricity. MOL's FSRU is being converted from an existing LNG carrier in Singapore. The Powership, which will be converted to dual fuel propulsion, will carry Bureau Veritas' POWERGEN notation.

KARMOL's LNG-to-Powership solution with power generation capacity of 120MW will create a stable and reliable supply of electricity for Senegal.



TRENDS

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ADVANCING DEVELOPMENT OF LNG CONTAINMENT SYSTEMS

Leveraging 50 years' experience in the LNG industry and extensive expertise with GTT LNG containment systems, Bureau Veritas Marine & Offshore has performed Design Assessment of the latest GTT Mark III Flex+ system. Based on Mark III Flex technology - a cryogenic liner used to contain liquefied gas at low temperatures during shipping at atmospheric pressure - this new GTT containment and insulation system uses the latest membrane technology to offer greater capacity, increased thickness and better insulation.



TRENDS

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INNOVATION POWERS OFFSHORE WIND SUPPORT VESSELS

A raft of innovative SOVs and construction vessels are supporting construction and operation of tomorrow's offshore wind projects.

Jan De Nul Group ordered two innovative offshore wind installation vessels, both built to BV class and slated for delivery in 2022. The *Voltaire* is Jan de Nul's third jack-up installation vessel, under construction at COSCO Shipping Heavy Industry in China. Designed to transport, lift, install and decommission offshore wind turbines, transition pieces, and foundations, the *Voltaire* also will carry Bureau Veritas' Ultra-Low Emissions Vessel (ULEV) notation, assigned to vessels with very advanced emission-control technology. The *Voltaire* is the tallest jack-up in the world, and its crane, with a capability of more than 3,000 tons, is capable of loading the next generation of wind turbines and foundations (more than 270m high and fitted with 120m long blades).

The Luxembourg-based group also ordered *Les Alizés*, a floating installation crane vessel, from China's CMHI Haimen shipyard. Equipped with a crane with a lifting capacity of 5,000 tons, *Les Alizés* is capable of both building the newest generation of offshore wind farms and also decommissioning offshore oil and gas platforms.

Also in 2019, DEME Group held a keel-laying ceremony for its first dedicated offshore wind farm maintenance SOV, also the world's first DP2 twin-hulled SOV. Due for delivery in 2021, the 60m vessel will feature a Small Waterplane Area Twin Hull design, which ensures low wave impact on movements when approaching turbines, compared to a monohull SOV.

Finally, Louis Dreyfus Armateurs' 83m SOV, *Wind of Change*, was awarded the Offshore Renewables Award at the Offshore Support Journal Awards. Capable of accommodating 90 people on board, it was designed by Salt Ship Design, it was built by Cemre in Turkey, and delivered in April 2019. A second vessel, *Wind of Hope*, is under construction for delivery in 2021 and will service Ørsted's Hornsea two offshore wind farms.

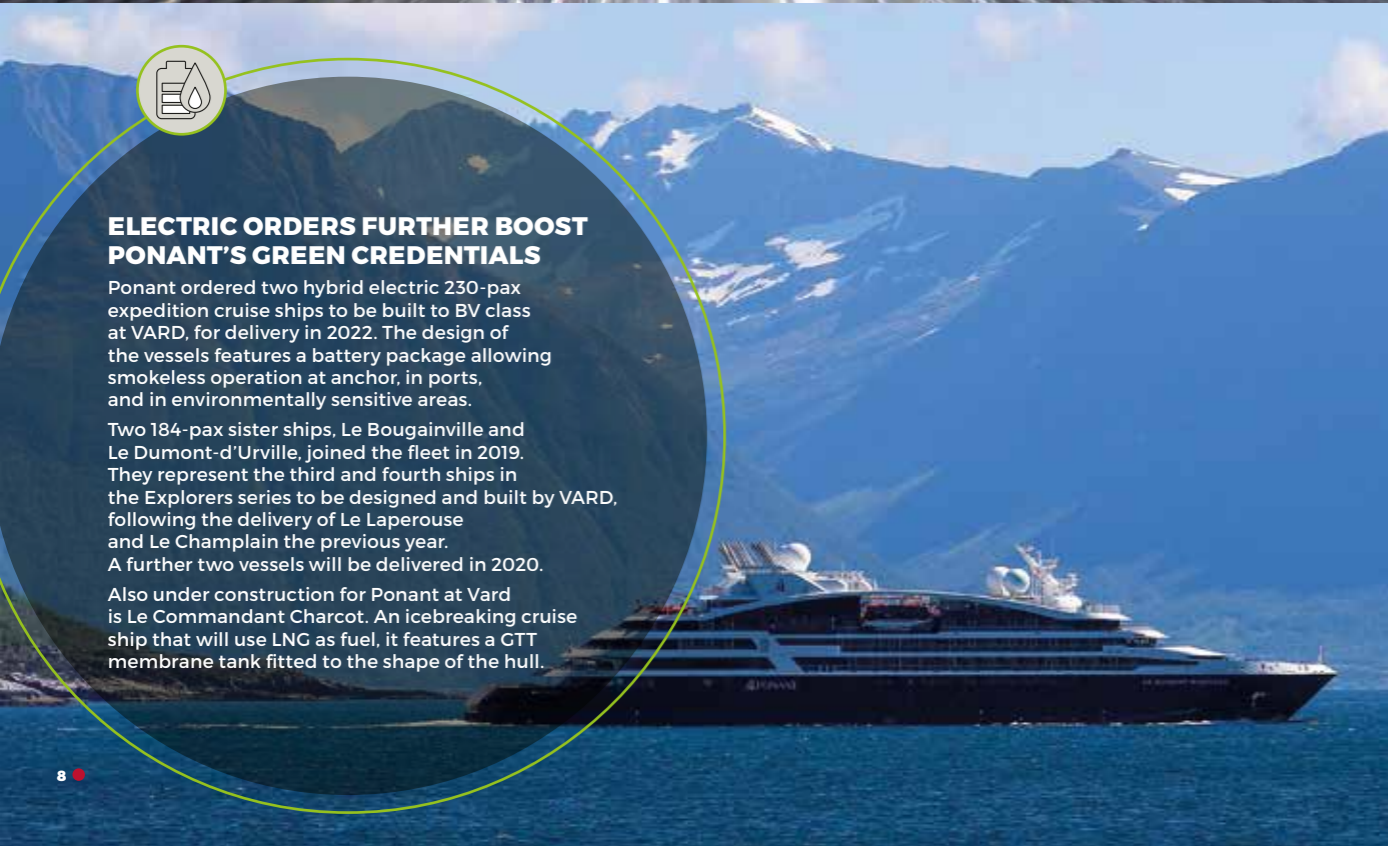


ELECTRIC ORDERS FURTHER BOOST PONANT'S GREEN CREDENTIALS

Ponant ordered two hybrid electric 230-pax expedition cruise ships to be built to BV class at VARD, for delivery in 2022. The design of the vessels features a battery package allowing smokeless operation at anchor, in ports, and in environmentally sensitive areas.

Two 184-pax sister ships, *Le Bougainville* and *Le Dumont-d'Urville*, joined the fleet in 2019. They represent the third and fourth ships in the Explorers series to be designed and built by VARD, following the delivery of *Le Laperouse* and *Le Champlain* the previous year. A further two vessels will be delivered in 2020.

Also under construction for Ponant at Vard is *Le Commandant Charcot*. An icebreaking cruise ship that will use LNG as fuel, it features a GTT membrane tank fitted to the shape of the hull.



TRENDS

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RESEARCH & DEVELOPMENT

Bureau Veritas takes part, alongside industry partners, in R&D programs that advance understanding necessary to the development of marine renewable energy (MRE) technologies. These range from development of calculation tools to full-scale demonstration of new concepts.

One such project is RealTide, a 3-year project funded by the European Union. The project focuses on reliability, design and materials, condition-based monitoring, tidal flow characterization and turbulence, and realistic simulation of tidal energy converters. It seeks to improve understanding of the tidal energy environment and to assess where system-wide reliability improvements can be achieved.

Bureau Veritas is also taking part in the MONAMOOR project run by *France Energies Marines*, an institute for Energy Transition dedicated to MRE. Focused on monitoring of polyamide mooring lines, the project aims to develop modelling tools to understand the dynamic behavior of cables, and monitoring instruments to study how cables deteriorate over time.



FACILITATING DEVELOPMENT OF MARINE RENEWABLE ENERGIES

Wind and sea offer potentially limitless sources of energy. But harnessing them requires new technology. An established player in the mature offshore fixed wind sector, Bureau Veritas supports developers of floating wind and emerging tidal technologies at every stage in their journey from initial concept to final installation.

TRENDS

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CERTIFICATION

MRE developers need to de-risk their innovations, and demonstrate to public authorities and finance providers their safety and performance. Bureau Veritas has developed robust sector-specific certification schemes in line with IEC guidelines that prove developers' ability to deliver. In 2019 it issued an update to its dedicated rule note for floating offshore wind turbines (NI 572), a supplement to its Certification Scheme for Marine Renewable Energy Technologies (NI 631).

Bureau Veritas provided certification services for two projects in the Mediterranean. It is providing full scope certification services for *Provence Grand Large*, a project 40km offshore Marseille led by EDF *Renouvelables*. The project, which consists of three 8MW Siemens Gamesa Renewable Energy wind turbines installed on floating sub-structures supplied by SBM Offshore, aims to demonstrate that generating electricity from floating wind technology is both technically and commercially viable. The wind farm will produce a total capacity of 24MW, or enough electricity to power a town of 40,000 inhabitants.



Eoliennes Flottantes du Golfe du Lion (EFGL), a 24MW project by ENGIE, EDPR and *Caisse des Dépôts* also benefited from support. Bureau Veritas is providing certification of the WindFloat floater technology developed by Principle Power, following an initial Approval in Principle in 2016.



APPROVALS IN PRINCIPLE

An Approval in Principle (AIP) provides a technology developer with third-party validation that a concept is fit for purpose. Achieving an AIP can be an essential step to secure financing for a prototype or to pitch technology to a project owner.

Bureau Veritas has recently provided two AIPs for innovative floating wind concepts. It assessed Saipem's pendular floater technology, enabling the EPC contractor to conduct a complete design review and verify that design assumptions matched market needs. And in a second project, it is working on an AIP for an offshore floating platform concept by Saitec. SATH - Swinging Around Twin Hull - is designed to reduce construction and maintenance costs through the use of concrete rather than steel. Bureau Veritas also provided *Ciel & Terre* with design review for a floating photovoltaic panel concept to be used on lakes.

TRENDS

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**3D CLASSIFICATION
ACCELERATING THE DESIGN REVIEW
PROCESS**

Today our 3D Classification allows ship builders and designers to share the 3D model of their assets with Bureau Veritas experts, who can use this digital twin to conduct design review and perform necessary calculations within a single model. This will enable ship builders and designers to save time in modelling, get improved reply time and gain in quality with accelerated iterations. As we continue implementing our vision, our 3D classification offer will enable the sharing of up-to-date information from design and construction to surveys and decommissioning, helping owners keep assets safe and compliant.

TRENDS

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**REMOTE AND AUGMENTED SURVEYS
INCREASING SAFETY, REDUCING
PREPARATION COSTS**

Today we can successfully see remotely thanks to data-capture technology such as drones and robots. We have now also tested the use of connected devices onboard for the surveyors to be able to perform the verification remotely for a range of class items. We are also progressively developing artificial intelligence solutions, such as an application that allows automatic detection of corrosion on pictures. The data we are already gathering will feed artificial intelligence to help monitor assets from a distance. This smart approach to monitoring vessels helps reduce risk to personnel and provides a safe way to survey inaccessible areas.

**OPTIMIZED AND
PREDICTIVE SURVEYS
A SOLUTION FOR CLASS
AND STATUTORY SURVEYS**

Optimized and predictive surveys will use a ship's most recent data and complete maintenance history to evaluate when it should undergo survey. This risk and condition-based approach, already applied today by BV for the classification of offshore units, will help optimize survey costs, improve efficiency and safely resolve asset-specific problems quickly and accurately.

**TAKING CLASSIFICATION
TO NEW DIMENSIONS**

Our new Digital Classification offer will combine three pillars to provide our clients with improved efficiency and quality throughout the Classification processes, while further improving ship's safety and maintenance.

**15,000
E-CERTIFICATES
ISSUED IN 2019**

**CYBER MANAGED NOTATION
ENABLES IMO 2021 COMPLIANCE**

Bureau Veritas launched Cyber Managed, a class notation providing a pragmatic approach to cyber security -reflecting industry needs and cyber security best practice. Co-developed with marine security experts, it enables shipowners to meet IMO 2021 requirements for cyber security.

Cyber Managed focuses on ensuring that cybersecurity is managed onboard as per industry best practice for change management and traceability of IS/IT systems, emergency procedures and basic security protection measures. The voluntary notation is being applied to a growing number of ships including some large Greek-owned fleets. Around 100 ships are expected to be operating under the notation in 2020.



**NEW TOOLS SIMPLIFY CLIENT
EXPERIENCE**

Bureau Veristar has introduced two new tools as part of its end-to-end digital offer to improve client experience. Veristar Equipment is a digital platform that enables manufacturers to create requests, select certifications, and monitor requests in real-time. Users can receive automated notifications, contact Bureau Veritas directly and download their certificates from the platform.

A second tool, Optimum Survey Planning, ensures that fleet managers get the right survey at the right time in the optimal location. The digital survey planning tool helps save time and money while minimizing disruption to ship operations. It provides notifications on survey times and locations, taking into account availability of Bureau Veritas surveyors and their expertise. Users benefit from optimized proposals, information on surveyor availability in each port, and visibility of the status of their request.

**VERISTAR
EQUIPMENT**



TRENDS

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DIGITAL TOOL FACILITATES REGULATORY COMPLIANCE

Bureau Veritas introduced an online tool to support offshore verification and safety projects for North Sea clients including Shell and NOV. BV Compliance is a desktop and app-accessible tool, that enables operators to get complete maintenance, inspection and verification information through a single user-friendly interface.

It offers operators both a holistic view and the ability to obtain detailed data on individual assets and systems and their verification, inspection and certification programs. Clients benefit from ease of planning and historical data tracking, all with a much quicker turnaround than was previously possible. BV Compliance will be available for use in other regions in 2020.



SUPPORTING EFFICIENT OFFSHORE OPERATIONS

Offshore operators demand the highest levels of safety and performance. Digital tools and new flexible designs are helping them achieve their objectives

FAST BUILD TIME SECURES NEW ORDERS FOR SBM OFFSHORE

Bureau Veritas further developed its collaboration with SBM Offshore during 2019 as part of a long-term technical and commercial frame agreement covering classification, second party inspection and design assessment studies.

It is classing four new build FPSO hulls to be constructed at Shanghai Waigaoqiao Shipbuilding and Offshore Co., Ltd. (SWS) and China Merchants Industry Holdings (CMIH). The orders take the total number of Fast4Ward™ hulls to five. Two will serve the Liza field offshore Guyana operated by an ExxonMobil-led consortium and its block co-venturers. Another will be deployed at the Petrobras-led Mero field offshore Brazil. The Fast4Ward™ concept featuring standardized hull and topsides is designed to meet the needs of offshore operators, offering reduced cycle time to energy delivery, the de-risking of projects and improvement of the quality and safety.

Bureau Veritas is also supporting SBM Offshore with technical studies and vendor qualification. In 2019 alone, it processed 300 vendors in Europe, China and Brazil.



TRENDS

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BUREAU VERITAS SOLUTIONS - MARINE & OFFSHORE

Bureau Veritas Solutions Marine & Offshore (BVS) provides technical advisory, asset management and assurance solutions for the shipping and offshore energy markets. Its added-value solutions enable clients to resolve new and complex issues, de-risk projects, and optimize costs. It comprises five main areas of activity: engineering, risk, regulatory support, assurance and asset management. In 2019, its first full year as an independent entity, BVS saw strong organic growth of +16%. Services are performed independently from Bureau Veritas Marine & Offshore regulated activities, such as classification and statutory certification.



ENGINEERING STRUCTURAL ANALYSES FOR INNOVATIVE VESSELS

Demand for engineering services is growing, with owners turning to BVS for structural integrity calculations, hull performance audits and hull optimization studies in particular.

Jan de Nul called on BVS to carry out structural analyses for the Voltaire wind turbine installation vessel (see pg.9), expected to be the largest in the world when it launches in 2022. The studies covered the hull and the truss legs as part of the vessel's basic engineering phase. BVS worked in close collaboration with Jan de Nul and naval architect Stogda to overcome specific challenges. These included the interface between the hull, the jacking system and the truss legs, as well as hydrodynamic loading of the structure in order to ensure safe operations at sea.



RISK SAFETY STUDIES SUPPORT NEW DESIGNS

BVS supports owners to manage risk throughout the asset lifecycle with studies to identify, quantify and understand risks related to your assets. Owners called upon BVS in 2019 for safety studies relating to new designs for assets and processes in the LNG value chain: dual fuel vessels, bunkering vessels and transfer systems. BVS also developed Risk-based Inspection projects for clients.

In 2019, BVS performed more than 40 risk projects for the main industrials such as Total, Exmar, SBM Offshore, Reliance, Ponant.

TRENDS

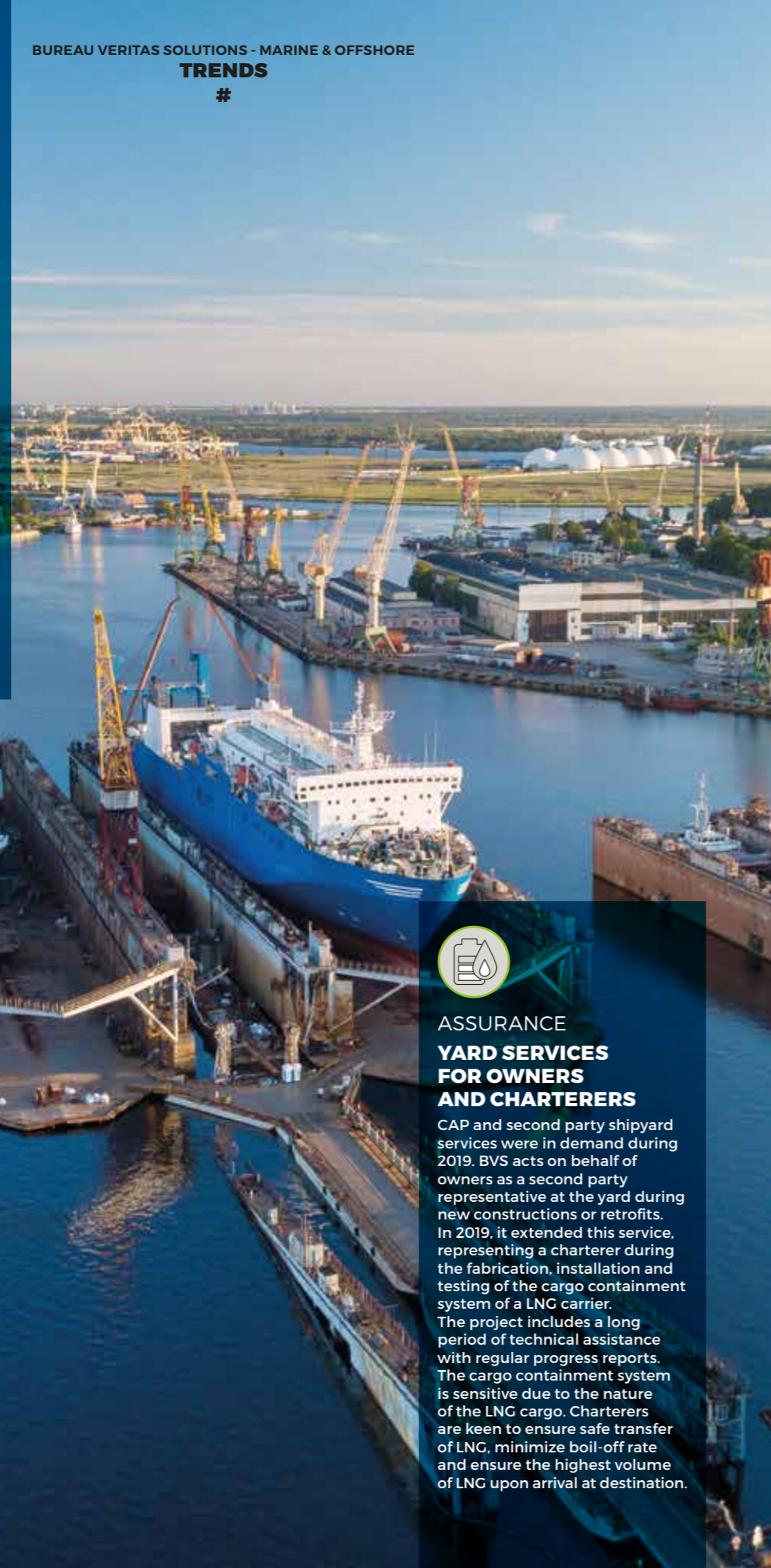
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REGULATORY FACILITATING IHM COMPLIANCE

The end-2020 deadline is looming for compliance with the European Ship Recycling Regulation (EU SRR), introduced to ensure safe disposal or recycling of all ship components at end of life. To assist shipyards and owners, BVS supports preparation of an Inventory of Hazardous Materials (IHM) and development of a compliant Ship Recycling Plan (SRP).

It has also launched IHM Praxis, a user-friendly digital application that facilitates compliance with both EU SRR and the IMO Hong Kong convention, keeping owners up to date and offering a simplified process for IHM Certification. Fleet managers can control and maintain multiple IHM manuals, keep track of HAZMAT locations and maintain maintenance records.



ASSURANCE YARD SERVICES FOR OWNERS AND CHARTERERS

CAP and second party shipyard services were in demand during 2019. BVS acts on behalf of owners as a second party representative at the yard during new constructions or retrofits. In 2019, it extended this service, representing a charterer during the fabrication, installation and testing of the cargo containment system of a LNG carrier. The project includes a long period of technical assistance with regular progress reports. The cargo containment system is sensitive due to the nature of the LNG cargo. Charterers are keen to ensure safe transfer of LNG, minimize boil-off rate and ensure the highest volume of LNG upon arrival at destination.

TRENDS

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CREATIVE THINKING TO KEEP UK DECOMMISSIONING LOCAL

Through its Aberdeen-based company, Maritime Assurance and Consulting (MAC), Bureau Veritas Solutions Marine & Offshore is collaborating with Forth and Tay Decommissioning alliance (F&TD) to offer an innovative, low-cost solution to keep North Sea decommissioning local. To overcome the UK's lack of natural ultra-deep water ports, they are exploring the concept of a "virtual deep-water port", by creating a 'virtual' floating quayside for natural inshore UDW areas far from the quayside.

F&TD and MAC are defining the scope of this project and its accompanying practicalities, and a full cost benefit analysis is to be conducted. Bureau Veritas subsidiaries TMC Marine and MatthewsDaniel are also providing support with specialty services.



ASSET MANAGEMENT NEW SOLUTIONS FOR DECOMMISSIONING

With the North Sea set to be a decommissioning hub for decades to come, the oil and gas industry is looking for efficient solutions.



VERISTAR AIM^{3D}: A DIGITAL TWIN FOR DECOMMISSIONING

Bureau Veritas Solutions' Asset Life Management solution Veristar AIM^{3D} creates a digital twin of an asset. With the inclusion of comprehensive condition monitoring, RCM, CBM and other maintenance techniques, it enables better understanding and faster maintenance and repair decisions, saving time and money.

Used until now to create digital twins of new and existing floating units, the scope of Veristar AIM^{3D} will soon be extended. The Oil and Gas Technology Centre, an Aberdeen-based industry body, has approved a project to use Veristar AIM^{3D} in a decommissioning environment, and is seeking a pilot project to demonstrate the value of using digital twin technology in end-of-life applications.



THE BV CLASSED FLEET

The BV classed fleet reached 11,400 vessels in 2019. In addition to seeing strong growth from LNG carriers and gas-fueled newbuildings, Bureau Veritas welcomed 440 existing vessels to its register.



GROWTH IN CLASSIFICATION FOR NAVAL SHIPS

Naval expansion continues worldwide, with countries adding new vessels as they increase defense spend. Bureau Veritas is classing several ships under construction at French yards. *Chantiers de l'Atlantique* is building two 194m auxiliary ships for the French Navy, while UAE has ordered a 102m corvette from Naval Group. The Argentine Navy, meanwhile, has placed orders with Kership for three 87m patrol ships. Bureau Veritas was also appointed to the classification panel of the Royal Australian Navy.

NEW STRUCTURAL RULES

Bureau Veritas developed new Tentative Rules for the Structural Assessment of Steel Ships. The new Rules represent a voluntary alternative to NR467 structural requirements for the classification of ore carriers, non-CSR oil tankers, product tankers, liquefied gas carriers and general cargo carriers. They follow the lead of BV's recent Rules for container ships, increasing accuracy by introducing the powerful concept of equivalent design waves alongside new formulae for fatigue assessments. Bureau Veritas will extend the Rules to additional ship types before the new Rules become compulsory in 2021.



The FSRU Turquoise built by Hyundai Heavy Industries and delivered to Pardus Energy Limited in June 2019 has a capacity of 170,000m³.

MSC CRUISES

Construction of mega-cruise ships continues apace at *Chantiers de l'Atlantique*, with two new vessels joining the fleet in 2019. The 170,500 GT MSC Bellissima accommodates 5,500 passengers. The 177,500 GT MSC Grandiosa is the first of a series of three Meraviglia-Plus ships which will accommodate 6,200 passengers: a mid-section has been inserted to lengthen the vessel. The next to be delivered will be the MSC Virtuosa in 2020, followed by the LNG-fueled World Class series over the next decade.



SUNSTONE PLACES NEW ORDERS

The first expedition cruise ship to be built in China, SunStone's Greg Mortimer, was delivered by CMHI in 2019. The 104m-long ship built to Polar Class 6 standards features Ulstein's X-bow hull, designed to improve comfort and efficiency. SunStone has ordered a further six ships to BV class, with up to two to be delivered in 2020.

The Olympic Life is managed by Springfield Shipping. Hyundai Heavy Industries achieved the construction of this 318,676-dwt oil tanker in March 2019.

BULK CARRIERS MOVE TO BV CLASS

BV-classed bulk carrier tonnage grew 6% over 2019, largely as a result of owners transferring 68 existing vessels to BV class. Greek owners including Star Bulk chose Bureau Veritas, alongside owners from the Far East, including Sinokor.



SURGE IN CLASS CHANGE FOR OSVS

A significant number of offshore service vessels switched to BV class during 2019, reflecting our traditional strength in this segment. Class transfers included multi-purpose support vessels from Boskalis, Fugro, Louis Dreyfus Armateurs and Olympic Shipping. Two platform supply vessels from Gardline and Rohde Nielsen also joined the fleet.



MARINE & OFFSHORE EXECUTIVE COMMITTEE

Bureau Veritas' Marine & Offshore business is led by an Executive Committee. Engineers and business leaders with an international background and outlook, they steer a global organization of 2,650 people. Together, they lead the development of new services, rules and tools, and are spearheading a digital transformation designed to deliver ever-better service to Bureau Veritas' customers.



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140
 COUNTRIES

1,500
 OFFICES AND
 LABORATORIES

77,000
 EMPLOYEES

€5,1 BN
 IN REVENUE

FOCUSED ON OUR CLIENTS, DRIVEN BY SOCIETY

Bureau Veritas is a Business to Business to Society company, contributing to transform the world we live in. Our mission is to reduce risk, improve our clients' performance and help them innovate to meet society's challenges with confidence.

A world leader in Testing, Inspection and Certification, we help clients across all industries address challenges in quality, health and safety, environmental protection (QHSE) and social responsibility. Through our wide range of expertise, impartiality and independence, we foster confidence between companies, authorities and consumers. For 190 years, our brand has been synonymous with integrity and trust, for the benefit of business and people.

OUR CORE SERVICES

Bureau Veritas supports clients across all industries to improve safety, quality and performance throughout the life of their assets and products, and to achieve continuous improvement in their management systems and processes.

We do this via three core services:



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