



INNOVATING ACROSS THE ENTIRE LNG VALUE CHAIN





# Introduction

**EXMAR has transformed itself from being an LNG vessel owner and operator into a fully integrated, turnkey solution provider for the LNG industry.**

With over three decades of specialised know-how in handling, storing and transporting LNG by sea, EXMAR has been a pioneer in introducing innovations along the entire LNG value chain. Through its expertise, EXMAR has helped its customers and partners achieve significant efficiencies, enabling them to bring their product to market faster than by using traditional supply chain solutions. EXMAR provides this added value by offering bespoke solutions under a build-own-operate model.

In 2005 EXMAR became the first industry player to perform LNG regasification at sea. Since then it is responsible for the operation of 10 FSRUs which are deployed around the world. With several other projects due to come on stream in the coming years, the market for floating LNG terminals offers steady growth for the future. EXMAR has taken further innovative steps by ordering the world's first barge-based

Floating Storage and Regasification Unit (FSRU) for delivery in 2016. This FSRU will offer unprecedented efficiency and flexibility making this the preferred solution for a wide range of LNG projects.

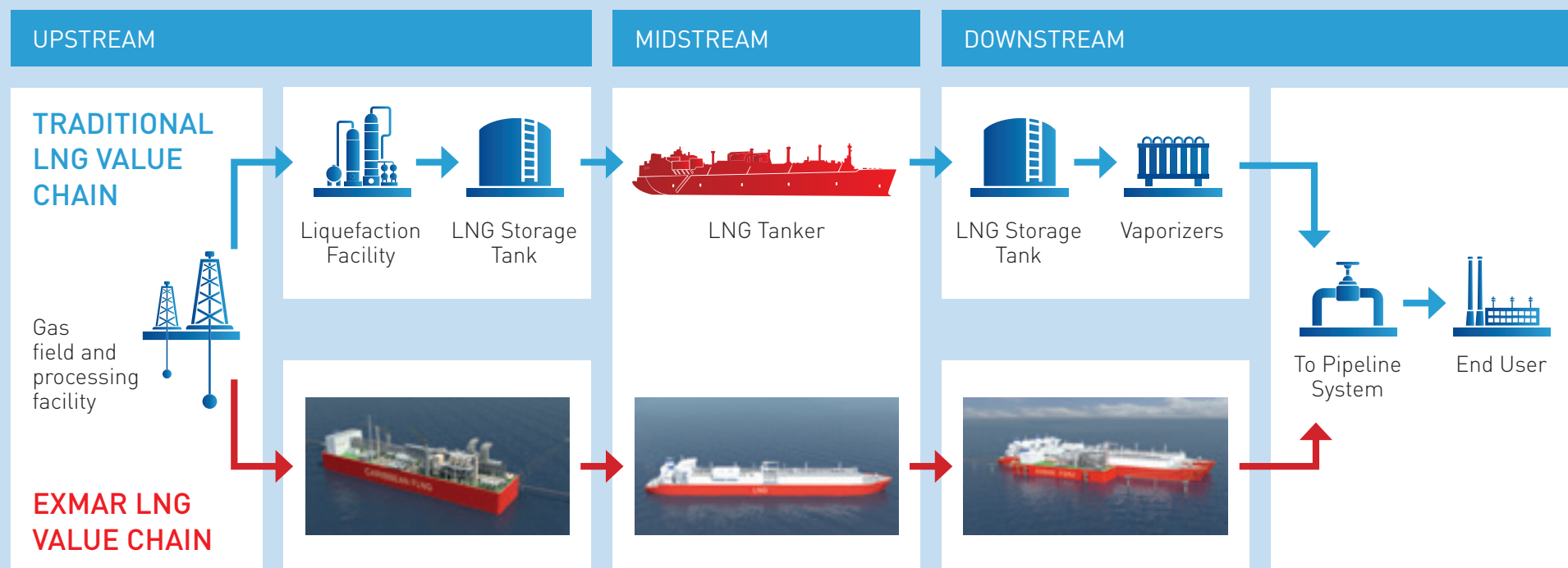
EXMAR was the first company ever to perform a commercial ship-to-ship transfer of LNG in 2005. Since then, EXMAR has successfully supervised 754 ship-to-ship LNG transfers of over 79,000,000 cubic meters using its STS protocol (to date May 2015, including transfer across the jetty). This has offered new logistical solutions for world-wide trading of LNG to new LNG import markets.

Today, EXMAR brings innovation further upstream with the completion of the world's first barge-based offshore Floating Liquefaction Unit (FLNG) and the delivery of a second, even larger FLNG to serve the market in 2017. Both will drastically reduce time-to-market by providing floating liquefaction and storage in a cost-efficient and flexible way to gas fields located onshore and offshore, eliminating the need for large infrastructure on land. Other FLNG units are also under development by EXMAR, in support of several LNG export projects of EXMAR's clients and business partners.





## EXMAR across the entire LNG value chain





FLOATING LIQUEFACTION - LNG SHIPPING & STS TRANSFERS - FLOATING REGASIFICATION - TURNKEY SOLUTIONS



# Floating liquefaction

The surging demand for LNG and requirement to monetize vast amounts of stranded gas reserves drive EXMAR to create innovative LNG infrastructure solutions that bring LNG to the market in a fast-track, cost-effective, flexible and reliable manner.

EXMAR started the development of floating liquefaction (FLNG) solutions in 2008. After having performed several feasibility and FEED studies for various clients, EXMAR signed an agreement with Pacific Rubiales Energy in 2012, which calls for EXMAR to build, own and operate the **"CARIBBEAN FLNG"**. This unit will be the world's first barge-based floating LNG export facility.

The floating liquefaction unit **CARIBBEAN FLNG** is being constructed at Wison's shipyard in Nantong, China. The barge was launched on the 19th of November 2014 for final outfitting and completion of pre-commissioning activities. The unit will be commissioned by the end of 2015.

Building on the experience that EXMAR gained in the Caribbean FLNG project, EXMAR is also pursuing a variety of other floating liquefaction opportunities that are in different stages of development. Significant amounts of engineering man-hours have been spent on the development of a wide range of FLNG concepts from 0.5 to 3 million tonnes per annum (MTPA).

EXMAR sees strong growth in the floating liquefaction market and therefore placed an order for a second FLNG, at the end of 2014. This second unit will be built at Wison's shipyard, benefiting from the knowledge gained from the construction of the first barge-based FLNG.





FLOATING LIQUEFACTION - LNG SHIPPING & STS TRANSFERS - FLOATING REGASIFICATION - TURNKEY SOLUTIONS

# LNG shipping, STS transfers & LNG bunkering

EXMAR has over 35 years of experience in the transportation of LNG and currently operates a wide fleet of LNG carriers. These LNG vessels vary in size and technical specifications. Many of the LNG carriers developed by EXMAR can also be deployed as LNG shuttle- and regasification vessels or as floating storage and regasification units (FSRU).

EXMAR continuously strives to add value for its long-term customers by developing integrated logistical solutions. EXMAR will therefore mostly develop its LNG shipping solutions in conjunction with projects for the liquefaction of natural gas and export of LNG or for the import and regasification of LNG.

The niche market of small and mid-scale LNG shipping is considered as a growth market as it frequently provides a cost-efficient solution for the numerous regional LNG export and import projects under development worldwide. In this market EXMAR is well positioned to leverage its longstanding experience in the shipping and handling of liquid gases.

As global market demand for LNG expanded, EXMAR proactively foresaw the need to transfer LNG from the larger trading vessels to smaller LNG tonnage to effectively open up new markets where either draft or infrastructure limitations exist at receiving locations, especially in emerging markets. Following the world's first commercial STS transfer of LNG in 2005 for its client in the Gulf of Mexico, EXMAR has led the market in successfully deploying its STS protocol with over 750 transfers to its name.

As part of its suite of LNG value chain solutions, EXMAR not only offers LNG shipping, but also develops logistical solutions to promote the use of LNG as a fuel for ships. LNG as a fuel is an excellent solution for ship owners to meet the various emission regulations that will come into force. LNG is considered as the fuel of the future in shipping, and EXMAR is involved in various studies to work on the development of LNG bunkering services at various ports around the world.

In this way, vessel owners will be able to rely on EXMAR's experience in the safe and timely handling of their LNG bunker operations.

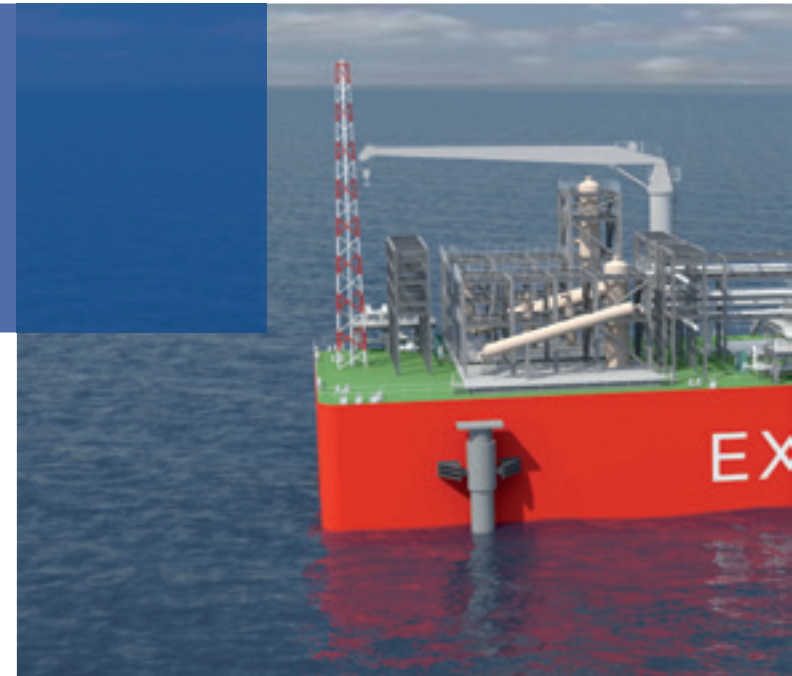
# Floating Regasification

EXMAR was the first company in the world to build, own and operate a floating storage and regasification unit (FSRU), which was delivered from DSME in 2005. EXMAR built up significant knowledge and experience in the construction, development, ownership, management and operations of FSRUs for LNG projects around the world.

Today EXMAR is responsible for the operations of 10 FSRUs, giving it a unique position in the FSRU market. This expertise and operational background is of great value to EXMAR's clients in the development of their LNG import projects. EXMAR is working with several clients on the development of traditional FSRUs, stand-alone Q-Flex FSRUs, and barge-based FSRUs. All of EXMAR's solutions are tailor-made to the requirements of each client and underlying FSRU project.

Based on its experience and continuous monitoring of the LNG regasification market, EXMAR has recently ordered a barge-based FSRU. This latest innovation responds to the anticipated demand for increased flexibility and cost-efficient, fast-track and scalable FSRUs, which can be more rapidly deployed than existing FSRUs.

With the delivery of the unit anticipated in 2016, this solution meets the quick-to-market requirements of EXMAR's clients. Options for additional barge-based FSRUs have been secured in order to respond to the large demand for this innovative FSRU solution.









# Turnkey solutions

EXMAR offers its turnkey solutions under a build-own-operate model. With hundreds of its highly-skilled engineers, naval architects, designers and project managers located in Antwerp, Houston, Paris, Shanghai and Singapore and operators spread across the globe, the potential to develop an integrated supply chain solution is virtually limitless.

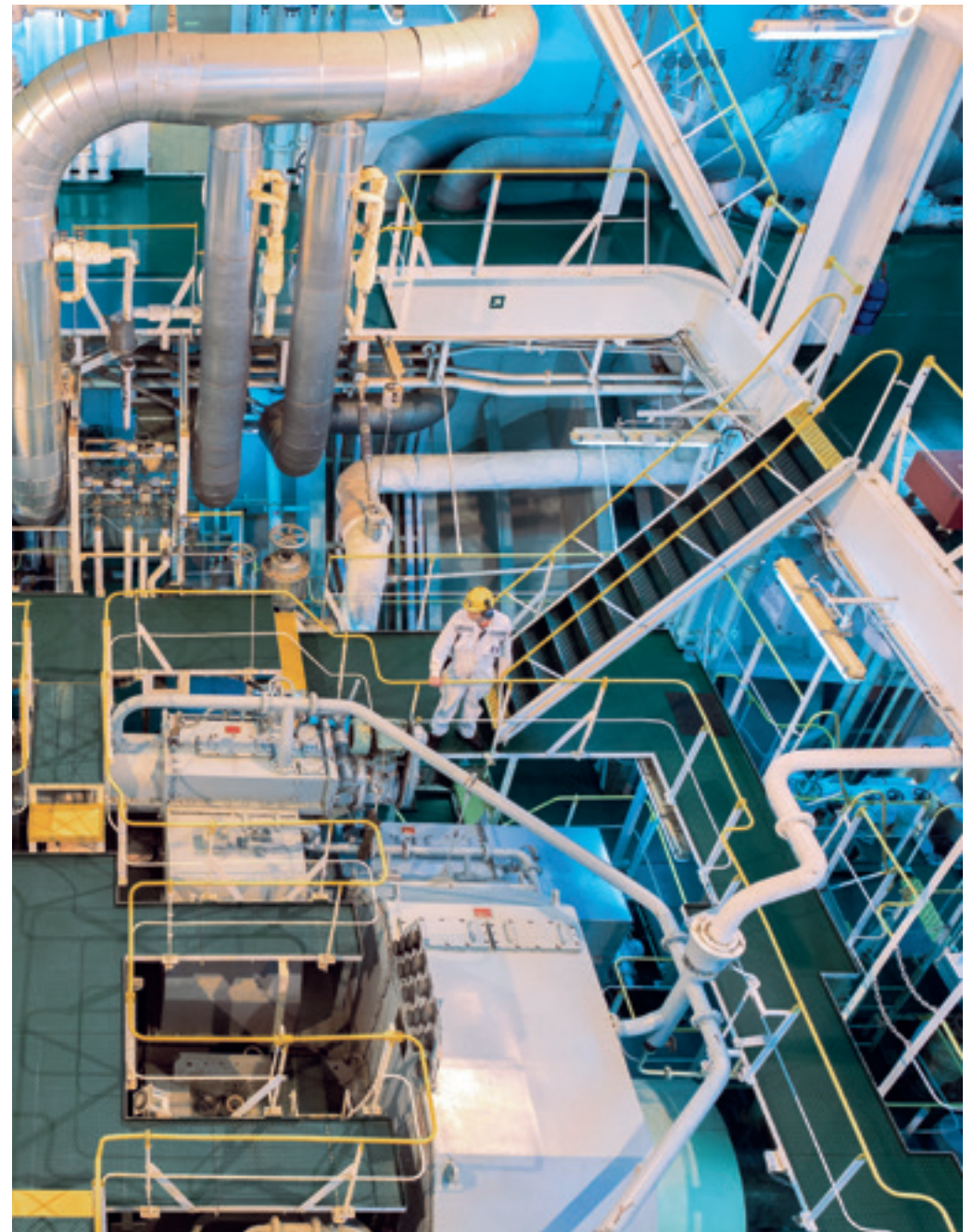
EXMAR builds on its experience and expertise to develop innovative solutions for its clients and partners, covering floating liquefaction, LNG shipping and floating regasification projects. EXMAR assists with siting, feasibility or FEED studies and accompanies its clients throughout the project development process.

The pioneering of the floating regasification concept was started by EXMAR in the early 2000's. Today EXMAR has unrivalled experience in the development of floating regasification solutions.

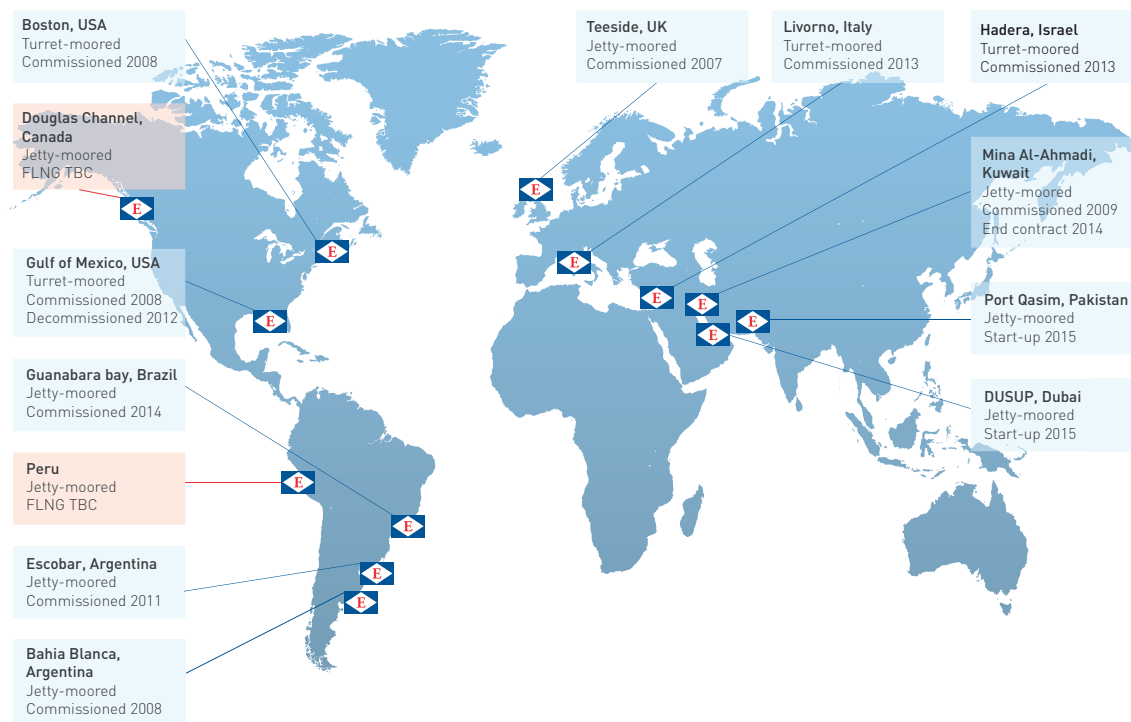
In the field of FLNG, EXMAR's LNG Infrastructure division commenced development of FLNG solutions in 2008, developing a FEED study for an FLNG concept. Structural analysis, material handling, module layout and equipment were completed for five separate modules: liquefaction, dehydration, refrigeration, boil off gas and gas pretreatment.

In collaboration with EXMAR Ship Management and EXMAR's Oil and Gas Infrastructure Services division, EXMAR LNG Infrastructure can offer a comprehensive range of operations and maintenance services, including crewing, marine and HSEQ management, certifications and class approval. A genuine turnkey solution is available to clients, including the formation of joint ventures as part of a long term partnership seen so often with EXMAR's key clients.





# EXMAR: leading provider of LNG solutions worldwide



## EXMAR LNG fleet



LNG FSRU



4 JV – 6 UM – 1 UC



LNG Carrier



2 JV – 3 UM



FLNG



2 UC

JV = Joint Venture, UM = Under Management, UC = Under Construction



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