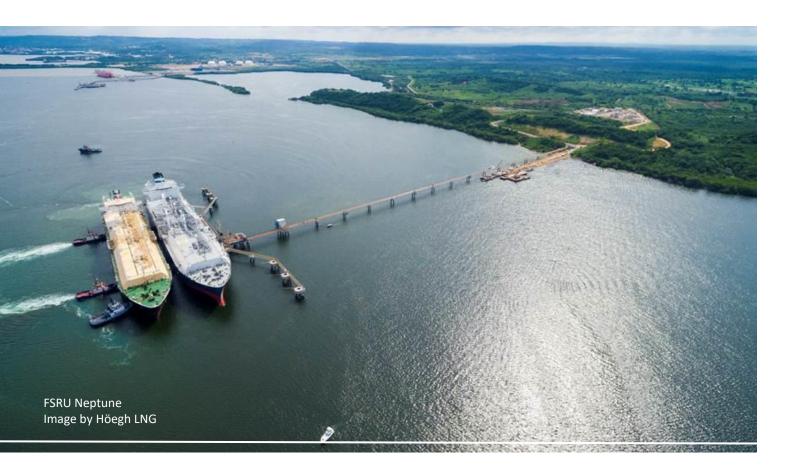
SAFER, SMARTER, GREENER

DNV-GL



# **FSRU TERMINALS**

# Independent, end-to-end technical expertise throughout the value chain

The growing availability of liquefied natural gas (LNG) is providing many coastal nations with access to the least carbon-intensive hydrocarbon. Floating storage and regasification units (FSRUs) terminals play a key role in the LNG value chain, forming the interface between LNG carriers and the local gas supply infrastructure. They are versatile, convenient and can make natural gas available to the market faster than land-based installations.

FSRU terminals are typically subject to a range of technical challenges as the interface between maritime and onshore infrastructure. To ensure cost-efficient, reliable and compliant projects and operations, working with a competent partner is a must.

#### Why partner with DNV GL?

With a global network of more than 2,000 oil and gas industry experts, DNV GL provides multi-disciplinary technical expertise across the LNG value chain. Our work helps manage risks, achieve cost-efficiency, transparency and sustainability in compliance with the highest industry standards and regulation.

We have a unique heritage in the gas industry. Combining gas services from DNV, GL Noble Denton, Advantica (British Gas Research and Technology) and KEMA (Gasunie Technology), DNV GL has assisted 500 LNG clients in more than 70 countries for over 50 years. This enables us to bring a broader view in addressing your most challenging business and technology risks, making us the trusted partner in complex and large infrastructure projects.

#### **DNV GL's FSRU experience**

With extensive experience in the global development of FSRUs and onshore terminals, we have been involved in more than 40 newbuild and conversion FSRU projects globally, incorporating pipelines, terminals and floaters. The table below shows some of DNV GL's project references.

Project	Country (as at Oct 2018)	Classification	Verification / Certification	Advisory Services
BW Integrity	Pakistan	X		
BW Singapore	Egypt	X		
EON FSRU Toscana	Italy			X
Excelerate Excelerate	United Arab Emirates			X
Excelerate Excelsior	Trinidad and Tobago			Χ
Exmar Excellence	Bangladesh			X
GDF Suez Cape Ann	Nigeria	X		X
GDF Suez Neptune	Turkey	Х	Х	
Golar Eskimo	Bangladesh	X		
Golar Freeze	Dubai	X	Х	
Golar Igloo	Kuwait	X	Х	X
Golar Nanook	South Korea	X		X
Golar Spirit	Greece	X		X
Golar Tundra	Egypt	X		
Golar Winter	Brazil	X	Х	X
Hoegh Esperanza	Singapore	X		X
Hoegh Gallant	Egypt	X		
Hoegh Giant	Panama	Х		
Hoegh Grace	Columbia	X	Х	X
Independent Trial	Lithuania	X		
Nusantara Regas Satu	Indonesia	Х	Х	
PNG FSRU Lampung	Indonesia	Х	Х	X

#### Services covering every aspect of the project lifecycle

#### **STRATEGY & FEASIBILITY**

- Demand forecasting
- Network planning
- Concept selection
- Site selection
- Tender process assistance
- Regulatory support
- Yard assessment

#### **DESIGN & CONSTRUCTION**

- Classification
- Construction monitoring
- Geotechnical studies
- Hydrodynamics (sloshing) analysis
- Machinery optimization
- Mooring and Navigation studies
- Owners engineer
- Safety and environmental risk
- Strength and fatigue analysis
- Technology qualification

#### **OPERATIONS**

- Classification
- Condition Monitoring
- Asset Integrity
- Demand studies
- Due diligence
- In-service risk studies
- Maintenance planning
- Reliability studies

## CONTACTS

#### Johan Petter Tutturen

**Business Director, Gas Carriers and FSRUs** 

Phone: +47 4826 0720

Email: johan.petter.tutturen@dnvgl.com

### Espen Cramer

Business Development, LNG Phone: +47 9011 4162

Email: espen.cramer@dnvgl.com

For more information, please visit

www.dnvgl.com/fsru