



# NEW SOLUTIONS FOR FAST TRACKED REGAS TERMINALS

*ANNUAL MEETING OF MARINE TECHNOLOGY 2023  
EUGENIDES FOUNDATION  
14-15 NOVEMBER 2023*

# COMPANY PROFILE



**MIB Italiana S.P.A.**  
**HQ in Padova (NE Italy)**

*START-UP OF THE COMPANY 1969*

- Head offices
- R&D
- Engineering
- Sales & Aftersales
- Manufacturing plant
- Quality Department
- Warehouse
- Logistics



# COMPANY PROFILE





# MIB LNG HISTORY IN BRIEF



**1969. MIB ENTERED IN  
THE OIL & GAS**



**1978. FIRST EVER LNG  
POWERED ERS  
GDF MONTOIR TERMINAL -  
STILL IN OPERATION!**

**1976. FIRST EVER LNG QCDC  
SHELL BRUNEI TERMINAL**



**2008. MEMBER OF IVG GROUP**



**2012. MIB ENTERED IN LNG  
STS MARKET**

**2019. MIB 50th ANIVERSARY**



**2023. FIRST EVER HPNG SHIP-TO-  
JETTY HOSE-BASED  
TRANSFER SYSTEM C/W  
ERS**

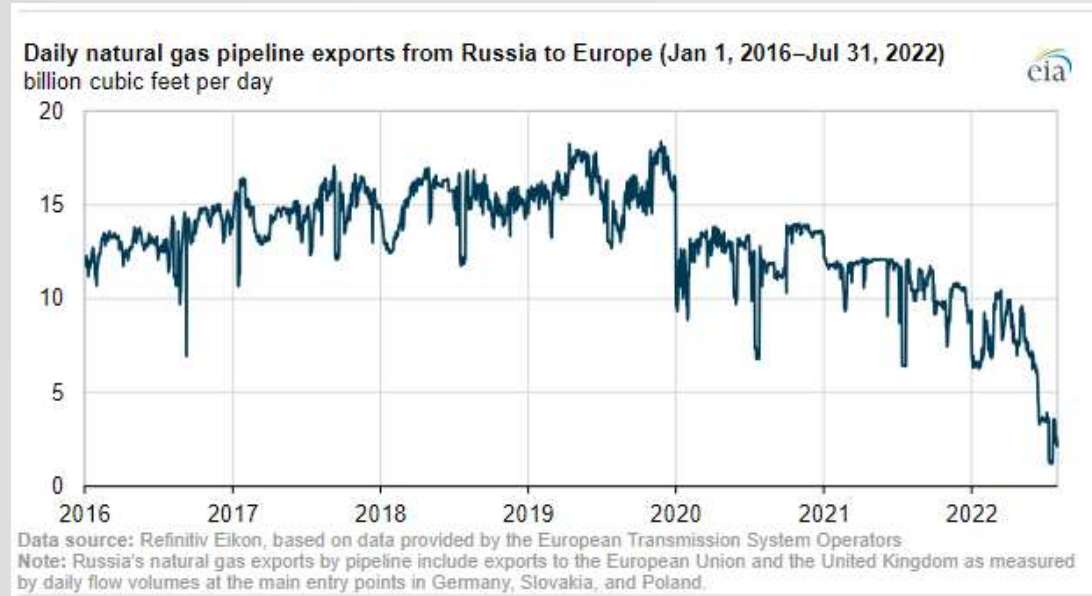


**WHAT'S NEXT?**



# DEVELOPMENT OF EU FSRU MARKET

Since Russia's full-scale invasion of Ukraine in February 2022 and the reduction in natural gas pipeline imports from Russia that followed, European countries have reactivated development of previously dormant regasification projects and have started development of new projects.



Many of the new regasification projects in Europe can be developed relatively quickly by chartering **Floating Storage and Regasification Units (FSRUs)**

Liquefied natural gas (LNG) import capacity in the European Union (EU) and the United Kingdom (UK) will expand by **34%**, or 6.8 billion cubic feet per day (Bcf/d), by 2024 compared with 2021, according to the International Group of Liquefied Natural Gas Importers (GIIGNL)

# DEVELOPMENT OF EU FSRU MARKET

Regasification terminals currently under construction in seven EU countries could add an additional **3.5 Bcf/d (36 bcm/y) of new capacity by the end of 2023**:

**Germany** has developed three new FSRU terminals, which will cumulatively add 1.4 Bcf/d of regasification capacity at Lubmin, Brunsbüttel, and Wilhelmshaven. Lubmin (Deutsche ReGas with FSRU Neptune) started operations in January 2023, Brunsbüttel (RWE with FSRU Gannet) started operations in February 2023, and the terminal at Wilhelmshaven is expected online within end of 2023.

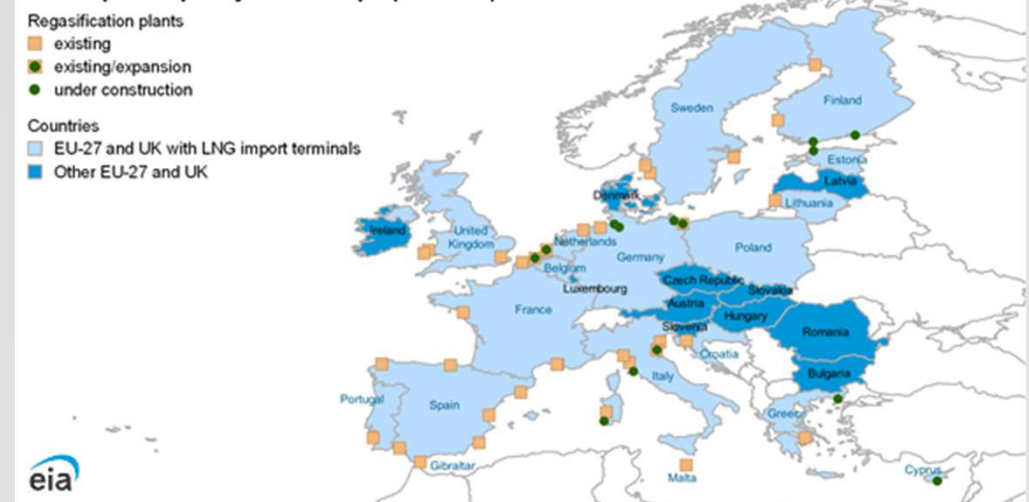
**France** will add 0.4 Bcf/d of regasification capacity using an FSRU vessel called Cape Anne at Le Havre port (TotalEnergies), which is expected to come online by end of 2023.

**Finland** and **Estonia** have jointly developed an FSRU terminal in the Finnish port of Inkoo (Gasgrid Finland with FSRU Exampplar), added 0.5 Bcf/d capacity and came online in April 2023.

**Italy** developed a new FSRU terminal near the port of Piombino, which added 0.5 Bcf/d (SNAM with FSRU Tundra) and is developing an additional new FSRU terminal near the port of Ravenna (SNAM with FSRU BW Singapore), which will add another 0.5 Bcf/d of capacity and will likely come online by end of 2024.

**Greece** will bring online an FSRU vessel at Alexandroupolis port (Gastrade) by the end of 2023, with 0.5 Bcf/d of regasification capacity and new FSRU Projects are planned/proposed to be developed in Corinth, near Athens (Motor Oil) and in the Port of Volos (Mediterranean Gas) with 0.5 bcf/d.

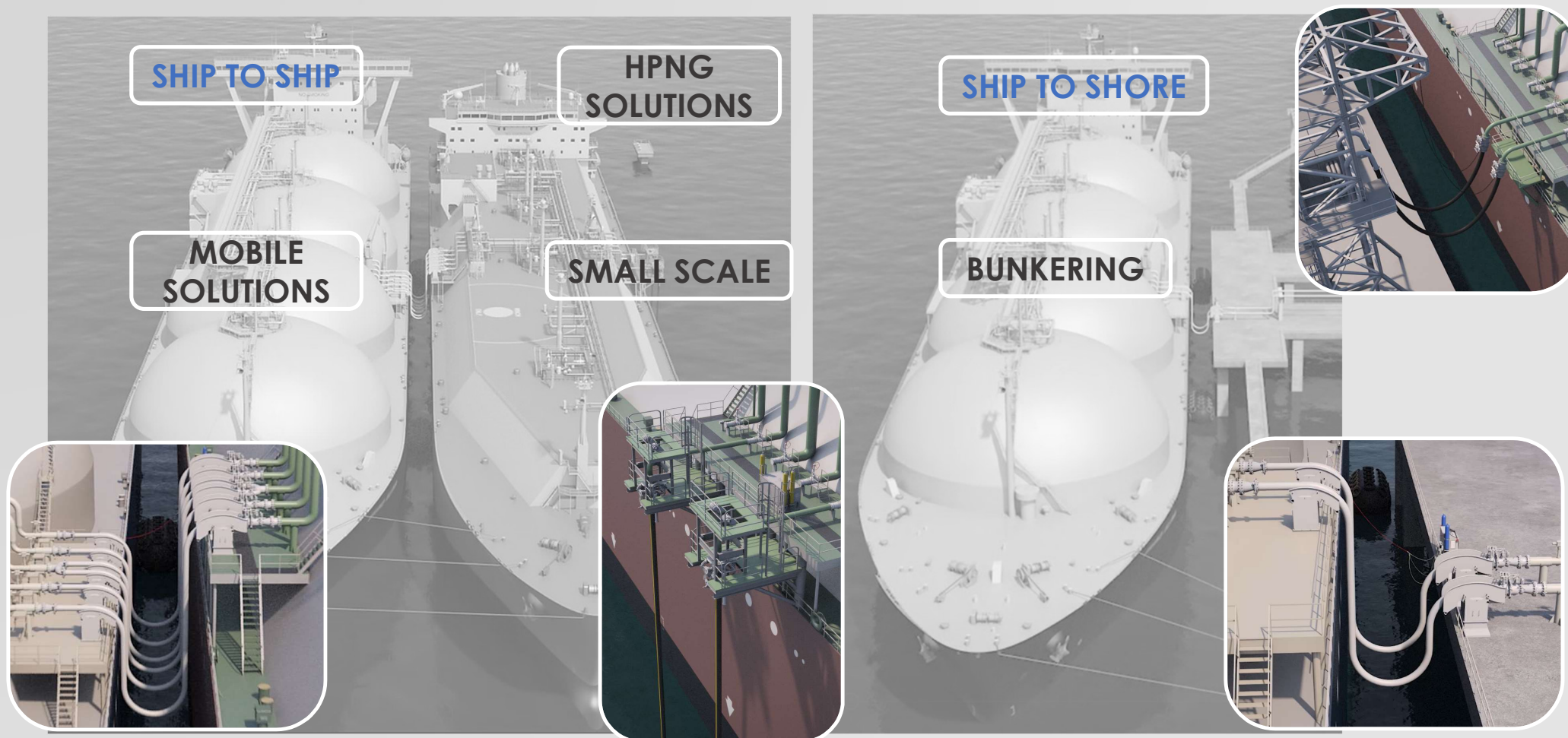
LNG import capacity into Europe (2022–24)



Data source: The International Group of Liquefied Natural Gas Importers (GIIGNL) and trade press



# MIB LNG & HPNG PORTFOLIO



All MIB solutions are customized, fully integrated and tested in our plant in Italy before delivery.

# INTEGRATED SOLUTION



MIB package comprises the following main equipment:

- Set of Proprietary Emergency Release Systems (Double Ball Valve with ERC or QCDC coupling);
- Cargo Transfer Hoses suitable for HPNG by OEM Contitech – Continental Group;
- Hydraulic Power Station c/w Local Control Desk;
- Remote Activation Panel c/w PLC for integration in the ship's CCR;
- Distance sensing system;



# INTEGRATED SOLUTION

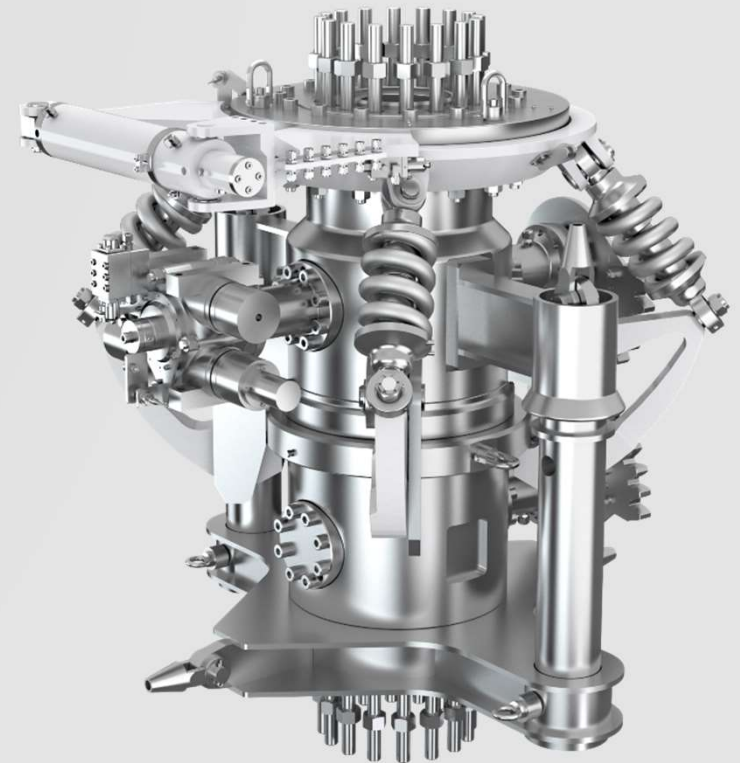


## Applicable codes & standards:

- The ERS units will be designed in accordance with OCIMF standard.
- The HPNG jumpers can be certified according to API 17K standard.
- The MIB HPNG Transfer System can be offered to comply and be certified with the Standards Series IEC 61508 / IEC 61511 providing the following Safety Integrity Levels (SIL) concerning the following safety function: EMERGENCY RELEASE (ESD2) – up to SIL2 (PFD < 0.01)

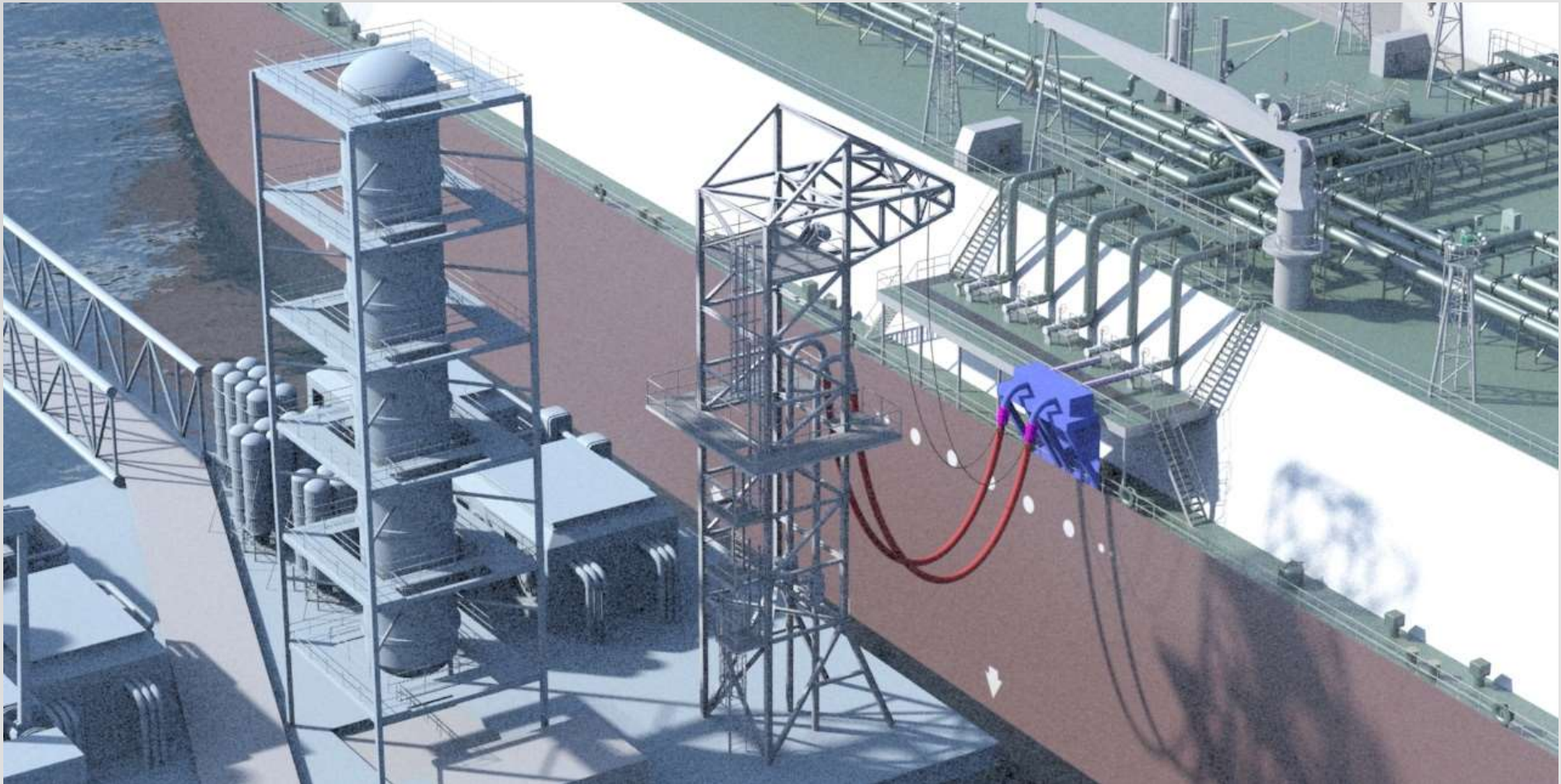
# ERS MAIN PURPOSES

1. Quick & **safe** method of making the hook-up of jumper without the need for bolting or direct hands-on intervention.
2. To provide a means of **isolating** both the jumper and the vessel piping by use of dual integral **ball** valves.
3. A **rapid** method to isolate the jumper/piping, by disconnecting the jumper from the vessel in an adverse or **emergency** situation.
4. The equipment shall be designed to withstand both internal fluid **pressure** and external **loads** applied by the jumper.
5. To be **compact** and of the **lightest possible weight** without compromising on safety or integrity of the system.
6. To provide a safety system which is suitable for a **25 year service life** or more with minimum maintenance requirements during the life of the installation.



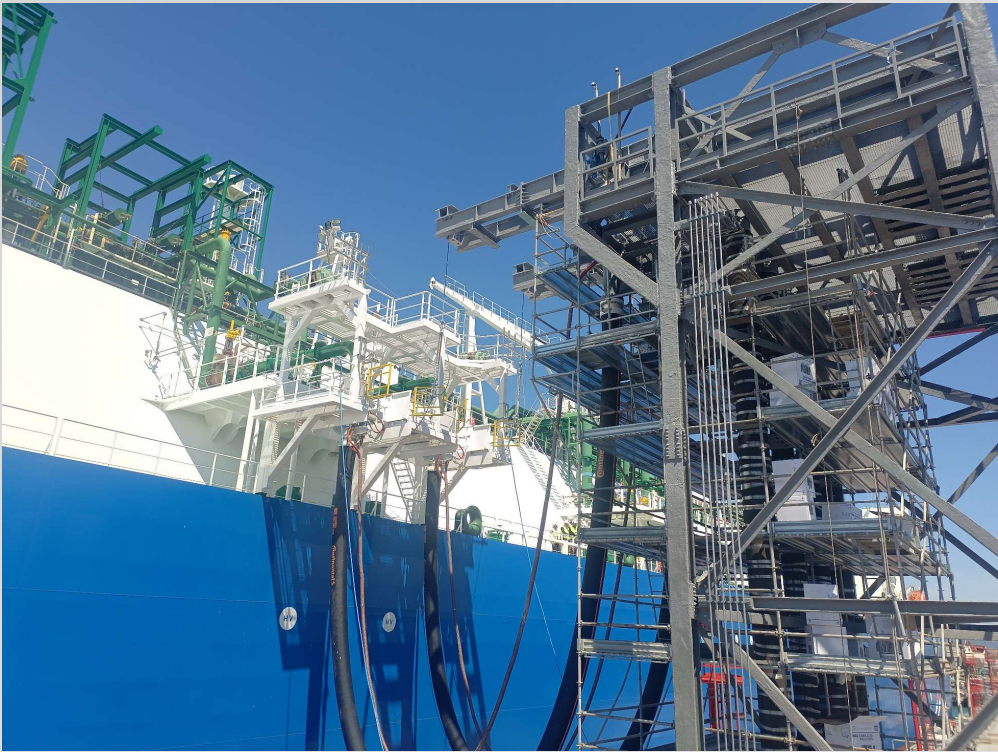


# INTEGRATED SOLUTION FOR SHIP TO JETTY





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**Snam Terminal in Piombino Italy – Golar Tundra FSRU**



# INTEGRATED SOLUTION FOR SHIP TO JETTY



**Snam Terminal in Piombino Italy – Golar Tundra FSRU**

# INTEGRATED SOLUTION FOR SHIP TO JETTY

- EQUIPMENT TYPE: **DOUBLE BALL VALVE WITH ERC**
- MEANS OF OPERATION: HYDRAULIC
- HANDLING FLUID: HIGH PRESSURE NATURAL GAS
- NOMINAL DIAMETER: 12"
- BODY DIAMETER: FULL BORE
- DESIGN PRESSURE [barg]: 75
- DESIGN TEMPERATURE MIN/MAX [°C] -10 / +80
- SIL RATING OF COMPLETE SYSTEM: 2

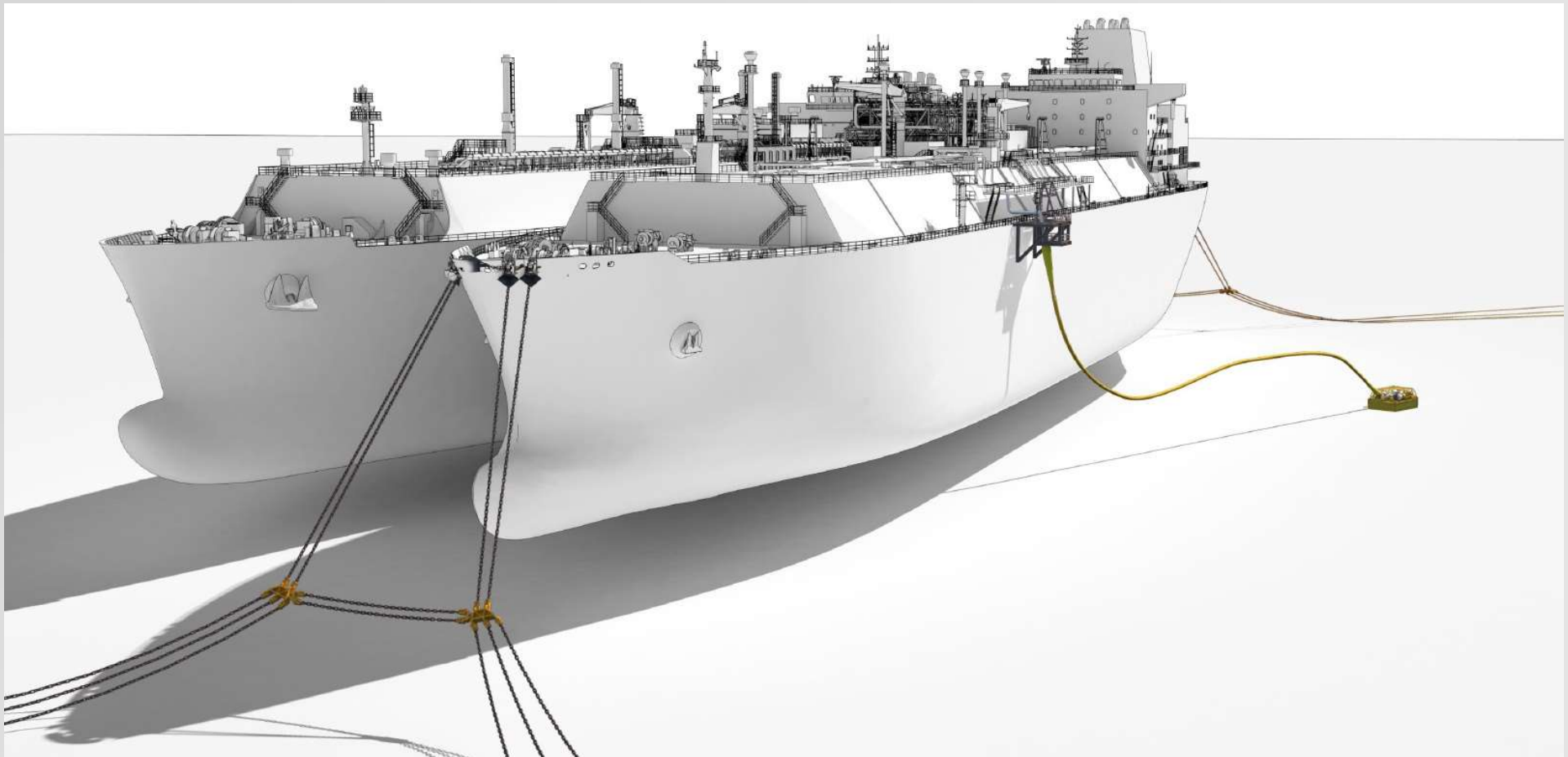
INCLUDED LOWER SHORT-SPOOL C/W LIFTING ARMS FOR HANDLING/RECOVERY/HOOK-UP.  
INCLUDED VALVE FOR TRAPPED HPNG VENT LINE.

**Snam Terminal in Piombino Italy – Golar Tundra FSRU**





# INTEGRATED SOLUTION FOR SHIP TO SUBSEA



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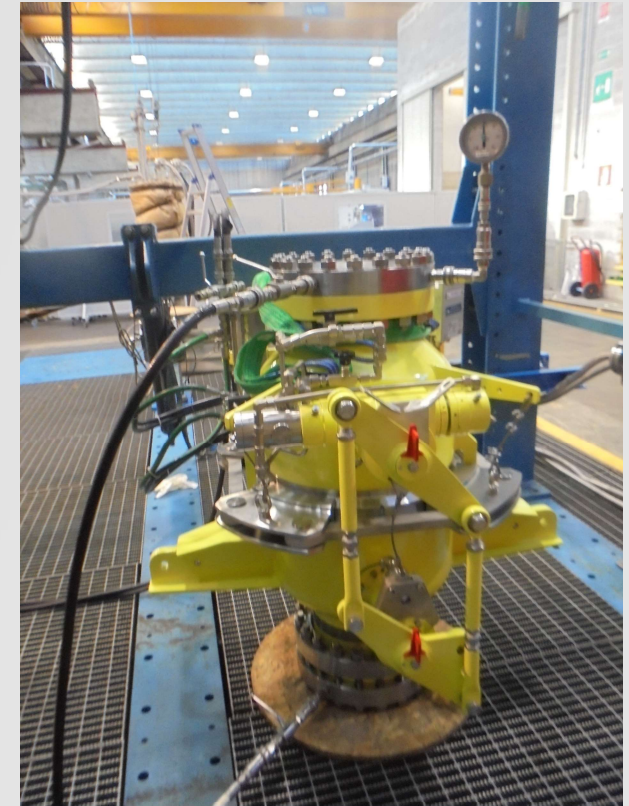


## KARMOL FSRUs – BRAZIL & SENEGAL

- EQUIPMENT TYPE: **DOUBLE BALL VALVE WITH ERC**
- MEANS OF OPERATION: HYDRAULIC
- HANDLING FLUID: REGASIFIED LNG
- NOMINAL DIAMETER: 12"
- BODY DIAMETER: REDUCED BORE
- DESIGN PRESSURE [BARG]: 19
- DESIGN TEMPERATURE MIN/MAX [°C]: -30/+90

THE HOSE END ASSEMBLY IS SUPPLIED WITH DIAMETRICALLY OPPOSITE LIFTING ARMS COMPLETE WITH SHACKLES AND MASTER LINKS.

ALSO INCLUDING A LIFTING BEAM AND ASSOCIATED CROSBY SHACKLES AND PULL-IN/LIFTING WIRES FOR HOSE RETRIEVAL AND REASSEMBLY.



# INTEGRATED SOLUTION FOR SHIP TO SUBSEA

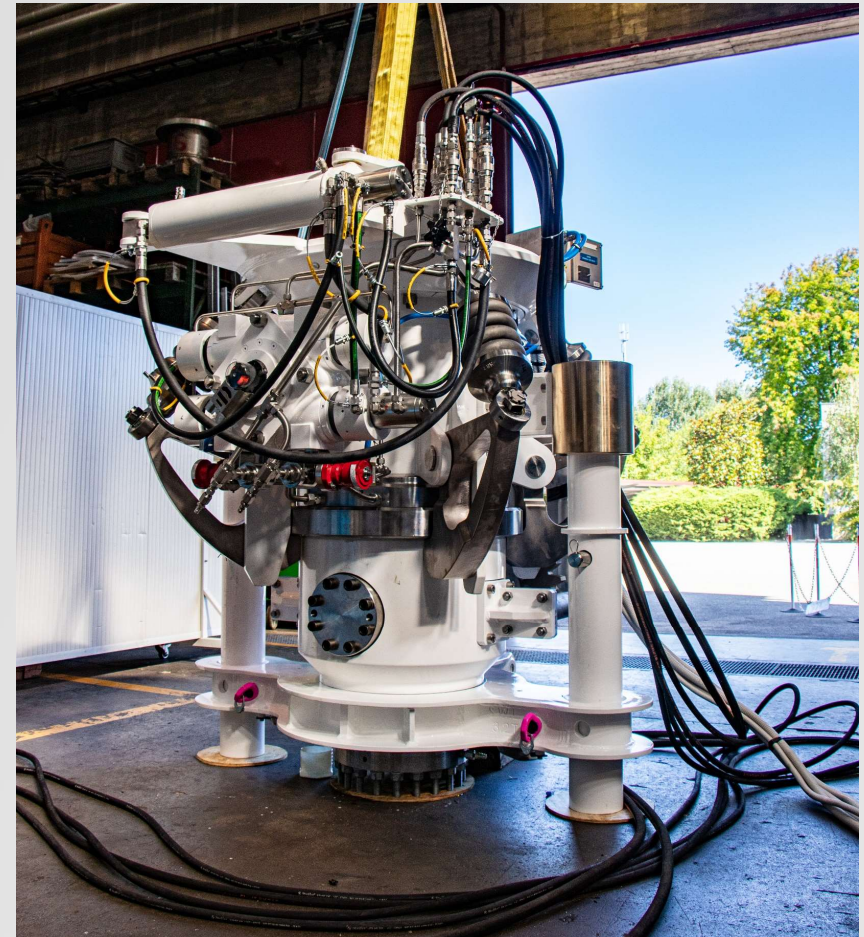


## WILHELMSHAVEN FSRU TERMINAL GERMANY

- EQUIPMENT TYPE: **DOUBLE VALVE WITH INCORPORATED QC/DC**
- MEANS OF OPERATION: HYDRAULIC
- HANDLING FLUID: HIGH PRESSURE NATURAL GAS
- NOMINAL DIAMETER: 12"
- BODY DIAMETER: FULL BORE
- DESIGN PRESSURE [BARG]: 100
- DESIGN TEMPERATURE [°C]: +38
- SIL RATING OF COMPLETE SYSTEM: 2

THE UNIT INCORPORATES A SWIVEL ASSEMBLY C/W GUIDING POSTS ON THE LOWER BODY AND RECEPTACLE FUNNELS ON THE UPPER BODY TO EASE CONNECTION DURING FIRST HOOK-UP OR AFTER EMERGENCY DISCONNECTION.

A BUMPER BAR IS ALSO INCLUDED TO PROTECT THE MECHANICAL GEAR MECHANISM ON LOWER BODY IN CASE OF EMERGENCY RELEASE.

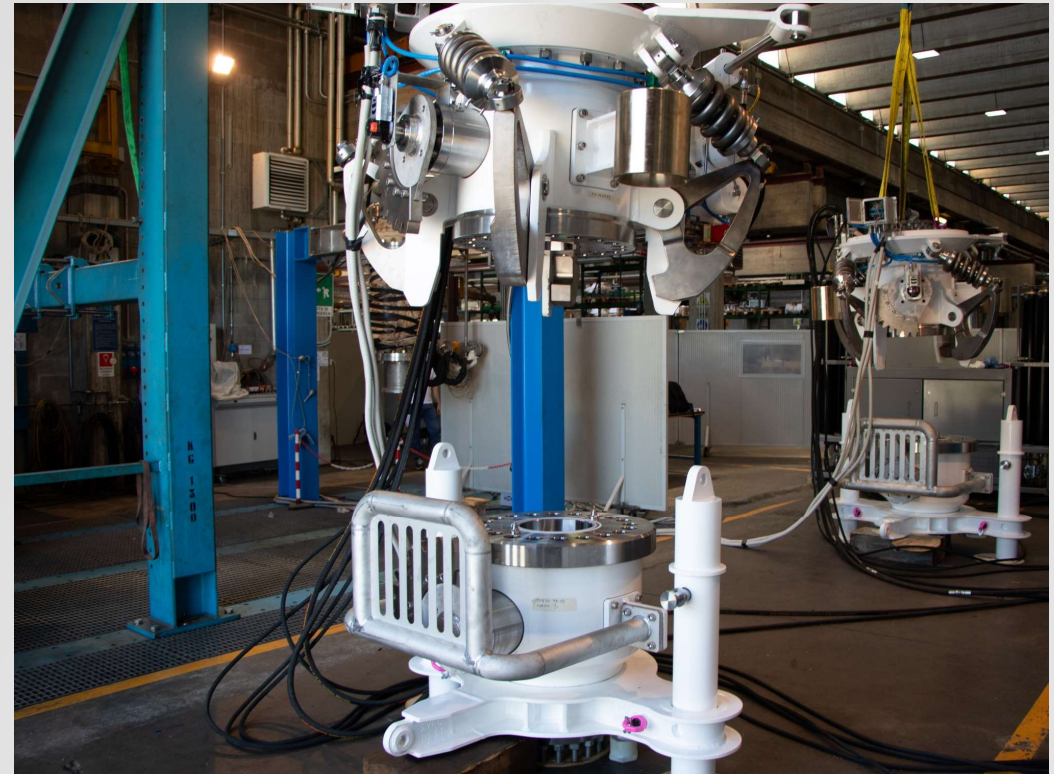




# INTEGRATED SOLUTION FOR SHIP TO SUBSEA



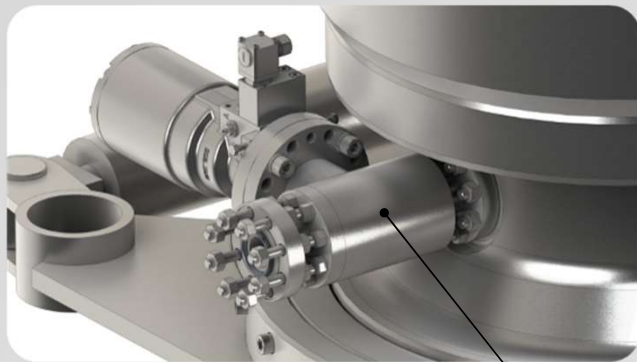
## WILHELMSHAVEN FSRU TERMINAL GERMANY



# ERS BLOWDOWN SYSTEM

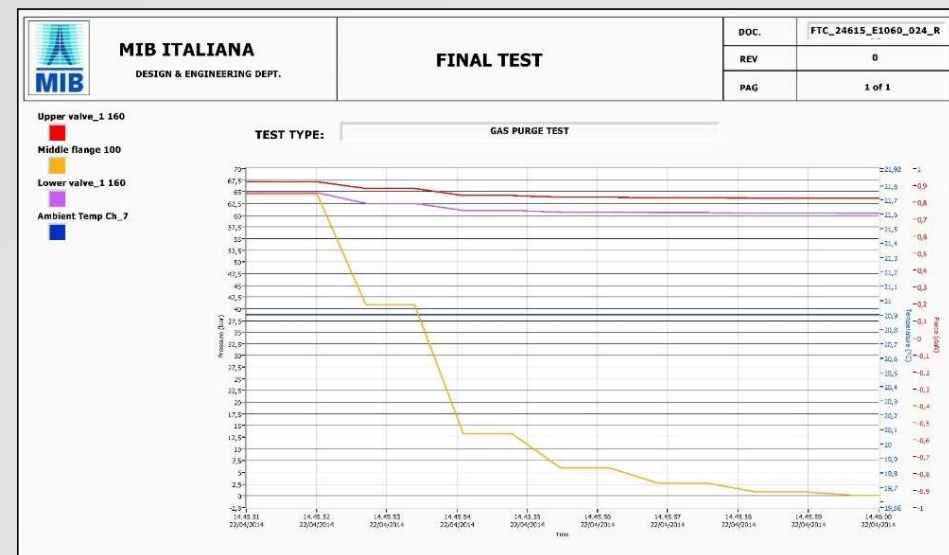
Built-in lines and devices to allow the **depressurization and blow-down of the high-pressure natural gas** trapped in the ERS back to the FSRU or terminal can be included.

Sequence valve and pressure transducer (and/or a timer) are **interlocked** in the system to ensure the coupling releases only when the pressure of the HPNG between the ball valves has reached the safety value set.



ONLY FEW LITERS OF TRAPPED GAS VOLUME BETWEEN THE CLOSED SPHERES

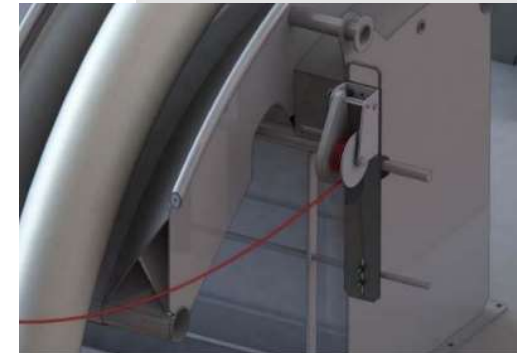
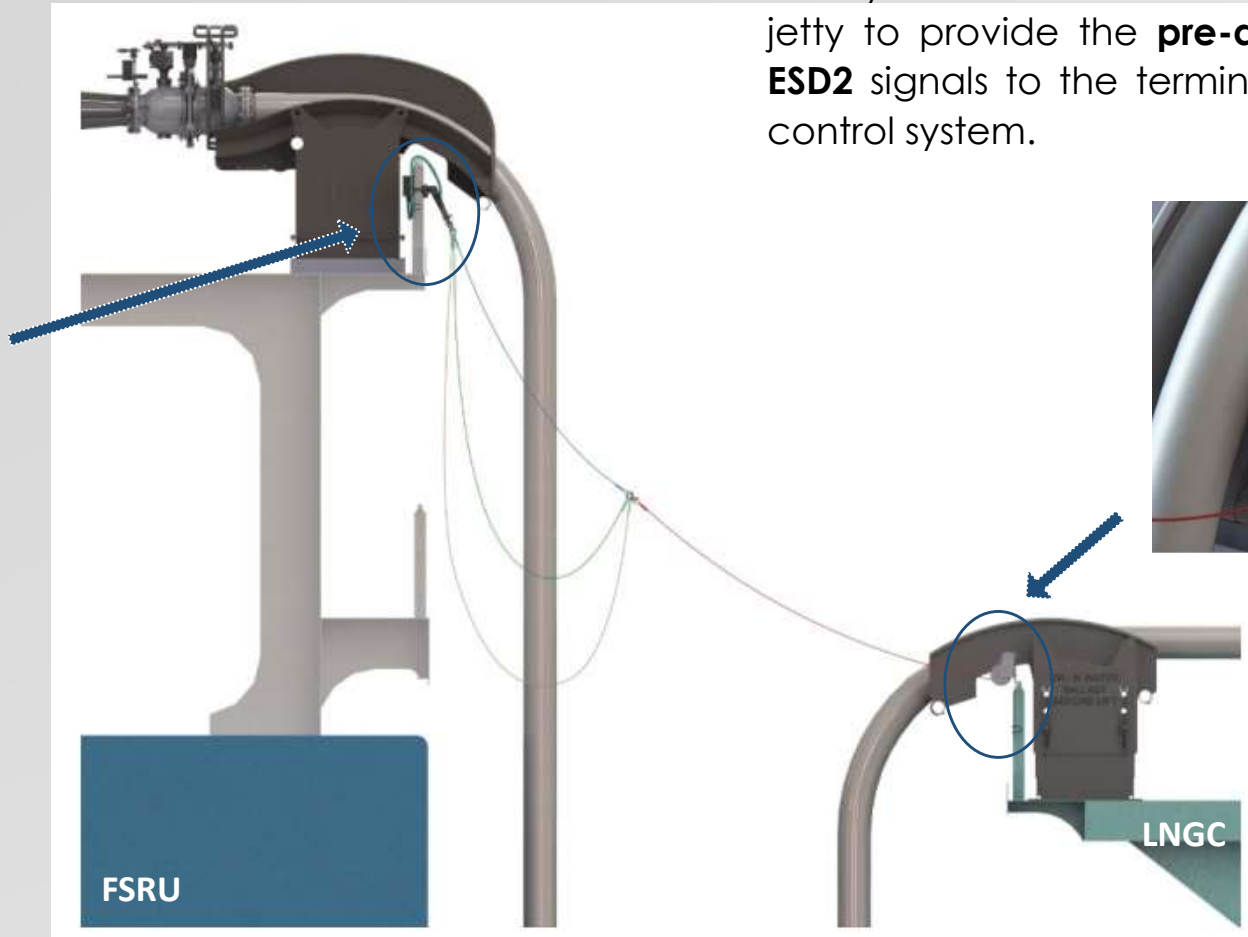
BLOW DOWN LINE



TYPICAL TIMING SEQUENCE TO CLOSE THE VALVES, COMPLETE BLOWDOWN AND RELEASE COUPLING IS LESS THAN **30 SEC.**

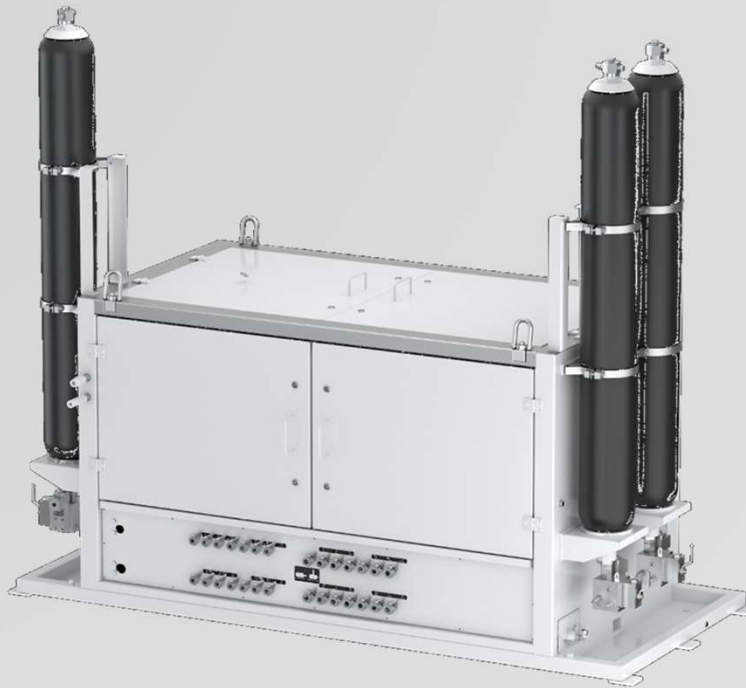
# DISTANCE SENSING SYSTEM

The system is installed between the ship and the jetty to provide the **pre-alarm**, the **ESD1** and the **ESD2** signals to the terminal control room and our control system.



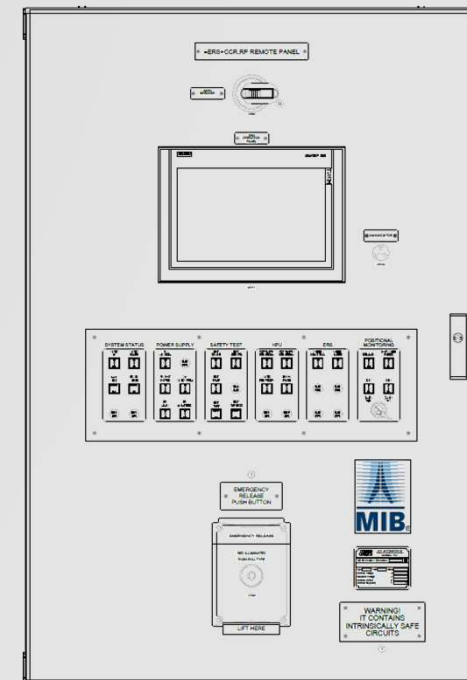


# HYDRAULIC POWER AND CONTROL PACK



Typical HPU layout with accumulators to activate all operating ERS simultaneously.

Remote control panel c/w PLC for terminal control room



# HP JUMPER HOSES BY CONTITECH

The hoses are manufactured by **compound** and **reinforced steel wire layers** as following:

- HNBR lining compound
- Textile layers
- Rubberised layers
- Steel wire reinforcement
- Reinforced layers with steel cable
- Glass textile layer
- Special fire resistant cover

Size range varies **from 2" to 14"**

Design Pressure **from 86 to 345 barg** (depending on hose size)

For the particular application a maximum recommended flow velocity of **20 m/s**

Target **minimum design life** under **continuous service** of **5 years** (depending on operating parameters)

The jumper hoses are manufactured in one single length and designed and built in accordance with **API 17K** standard.



# WHY THIS SOLUTION WAS SELECTED IN MANY OF THE NEW REGAS TERMINAL IN EUROPE?



The following are some key advantages of the jumper hose transfer system compared to other conventional systems (e.g. marine loading arms):

- 1) Reduction of **CAPEX** investment;
- 2) The lead time to supply a complete system is **less than a year**;
- 3) Significant **low weight overall**. This leads to basically **no jetty extra construction or modifications works** required;
- 4) Almost **no down time** with no long shut-down for major servicing and no need to bring the equipment to an off-site area;
- 5) Minimum number of potential leak paths;



# WHY THIS SOLUTION WAS SELECTED IN MANY OF THE NEW REGAS TERMINAL IN EUROPE?



- 6) Part of the scope (installation of the ERS and relevant power and control system) is typically done at yard, so **reducing further the activities to be carried out at final installation site**;
- 7) **Minimum requirement for hydraulic power**, only for the ERS in case of an emergency release;
- 8) The hoses are **maintenance free** during normal operations (not involving any moving parts);
- 9) **Reduction in OPEX** thanks to limited need for spare parts and intervention activities.

# Wilhelmshaven FSRU ERS c/w control system FAT video



[Link to video](#)





**THANK YOU  
FOR YOUR  
ATTENTION**



**MIB ITALIANA SpA**  
Via Giuseppe Garibaldi, 6  
35020 Casalserugo (PD)  
Tel.: +39 049 8741272  
Fax: +39 049 643834  
[sales@mibitaliana.it](mailto:sales@mibitaliana.it)

Visit our website: [www.mibitaliana.com](http://www.mibitaliana.com)