Marine LNG transfer solutions

How Technip offers a perfect combination of onshore and offshore technology and experience
Technip is a world leader in project management, engineering and construction for the energy industry.

With a workforce of 38,000 around the world, we constantly offer the best solutions and most innovative technologies to our clients to meet the world’s energy challenges. We operate in three main businesses:

**Subsea**

In subsea hydrocarbon development, Technip’s activities include the design, manufacture and installation of rigid and flexible subsea pipelines and umbilicals. Thanks to its portfolio of technologies and industrial and operational assets, Technip offers a unique vertically integrated model in the industry.

The Group has 3 flexible pipe manufacturing plants, 4 umbilical production units, 9 logistics and pipeline assembly bases, and 1 construction yard. Technip’s worldwide leadership is supported by a modern fleet of vessels for subsea construction, pipelay development (rigid and flexible pipes using S-Lay, J-Lay or Reeled technology) and heavy lift applications.

**Offshore**

In the Offshore business segment Technip performs engineering, procurement, construction, installation, commissioning and the refurbishment/upgrading of offshore facilities for the oil and gas industry.

Technip provides these services for fixed platforms in shallow water with conventional sub-structures and self-installing platforms such as the TPG 500 and for deepwater facilities including Spar, semi-submersible, TLP, FPSO and FLNG units. Technip is a world leader in floatover installation of topsides and its R&D effort is focused technology transfer for local content and new frontier areas such as ultra-deepwater and the Arctic.

**Onshore**

Technip covers the full range of onshore facilities for the oil and gas chain, petrochemicals and other energy industries (nuclear, renewables including biofuels and offshore wind). It holds many proprietary cutting-edge technologies and is the leader in the design and construction of LNG and gas treatment plants as well as ethylene, hydrogen and syngas units.

Technip is also one of the key actors in refining and petrochemical units, and has developed a leadership position in the fertilizer industry. Moreover, the Group is very active in non-energy activities such as mining and metals, life sciences, buildings and infrastructures.
Technip offers a perfect combination of onshore and offshore technology and experience

Engineering and execution ensured by:
- Extensive references
- Proprietary technologies
- Partnerships with other industry leaders
- A worldwide network of offices ensuring local knowledge and commitment
- Manufacturing facilities to maximise local content
- Dedicated teams
Prototype as tested

Engineered pipe-in-pipe systems with straight line installation

- Fully industrialised methods
- Large range of inner pipe diameters (6” to 40”)
- Invar® inner pipe
- Aerogel insulation
- Carrier pipe in carbon steel or stainless steel
- Approved welding procedures
- Fire resistant

Services

- Design, manufacture and installation
- Stand-alone package or as part of a complete terminal
- Complete studies by dedicated specialists: conceptual through to FEED

Certificate of Fitness for Service

ABS

APPROVAL IN PRINCIPLE STATEMENT

QUALIFICATION OF TECHNIQUE LNG SUBSEA PIPELINE CONCEPT

Marine LNG transfer solutions
C-PIP applications

Technip provides transfer lines for LNG, LPG, and vapour return and utilities

On land
- No need for expansion loops
- Can be easily installed on sleepers/trestles
- On and in ground applications

Subsea
- Shore to loading platform
- On seabed or in a trench
- Straight line bottom tow installation
- C-PIP risers

Spoolbase type facilities to produce 500-m PIP strings ready for a bottom tow installation

Cryogenic PIP lines directly installed in trench
The Amplitude-LNG Loading System (ALLS)

Integrated offloading system with light-weight removable supports

- Amplitude-LNG compliant offloading system – for all sizes of LNG carriers
- Standard mid-ship manifolds on LNG carriers via fixed or adaptable bolt-on spool piece
- FLNG and FSRU offloading architectures
- Full QCDC / ERS system (KSB Connectis™)
- Integrated instrumentation and control system
- Full engineering studies for specific cases can be carried out
- Complete EPCI solutions

LNG transfer through Amplitude-LNG Loading System (ALLS)

ALLS - Disconnection and storage after LNG transfer

16" ID cryogenic flexible pipe
Connection system covered in ice

DNV statement “Fitness for service”: ALLS operability

Operability trials completed
Detailed procedures and design package for marine operations
Qualified “Fitness for Service” by DNV

Full scale spool operational trials
[Photo courtesy of Hoegh LNG]
The ALLS family of LNG transfer configurations

LNG transfer through Amplitude-LNG Loading System (ALLS)

Extended Reach Offloading Station (EROS)

Complete LNG Transfer Stations including all mooring facilities
FLEXQUAY on fixed support

Flex-Arm in side-by-side configuration

Tandem - Full design packages for LNG and LPG transfer

Side-by-side using standard mid-ship manifolds
Marine terminal engineering and delivery

Freeport LNG receiving terminal, USA

Capability
- Concept development
- Concept selection
- FEED
- Detailed engineering
- MetOcean data collection

Qatargas 2, berth 5 module load-out

Supervision
- Port simulations
  - Berth availability
  - Confirm tank sizes
  - Confirm number of berths
- Mooring analysis
- Manoeuvering studies
Traditional port facilities

Detailed design of port facilities
- LNG carrier berth
- LNG pipelines
- Transfer systems
- Breakwater civil design

Key references
- Freeport, USA
- Pascagoula Gulf LNG, USA
- Arzew, Algeria
- Nigeria LNG, Nigeria
- Yemen LNG, Yemen
- Olo Kola LNG, Nigeria
- Shtokman, Russia
- Browse, Australia
Marine transfer berths
Near-shore and exposed facilities

ALLS and C-PIP based solutions with minimal civil works
- No breakwater
- No jetty
- No dredging

LNG carrier berthing and mooring facilities
- Mooring & breasting dolphins design
- Full engineering studies for specific cases
- Complete EPCI solutions
- Long period swell, open roadstead, and deepwater solutions

Integrated offloading station, support jacket and mooring structures
- Amplitude-LNG compliant offloading system – for all sizes of LNG carriers
- Modular lightweight architecture
- Support jacket design

FLOATING QUAY with double Amplitude-LNG Loading System
FLEXQUAY on floating support

FLEXQUAY

Complete LNG Transfer Stations including all mooring facilities
FLEXQUAY on fixed support

Technip
The ultimate LNG transfer system

Continuous long length floating flexible pipe

Near-shore or offshore – at both ends of the LNG chain

- Standard LNG carriers (e.g. no bow manifold)
- Floating flexible pipes (short or long length) for LNG and gas return
- Storage on FLNG, FSRU or SPM platform
- Complete system including KSB Connectis™ - QCDC & ERS
- Subsea cryogenic Pipe-in-Pipe and riser for nearshore SPM architectures
- Subsea manifold or PLEM

Near-shore

Floating cryogenic flexible pipe