A world designed to last

Offshore LNG

Leading engineering contractor
for floating LNG facilities



T.EN TECHNIP ENERGIES

World leader in offshore LNG

Technip Energies is a pioneer in offshore floating liquefied natural gas, providing an alternative to traditional onshore LNG plants. As it is not necessary to deploy onshore infrastructures, offshore LNG avoids the need to build and operate long-distance pipelines. This floating facility offers a fast and environmentally friendly solution to the monetization of offshore stranded gas fields, or associated gas from oil production.

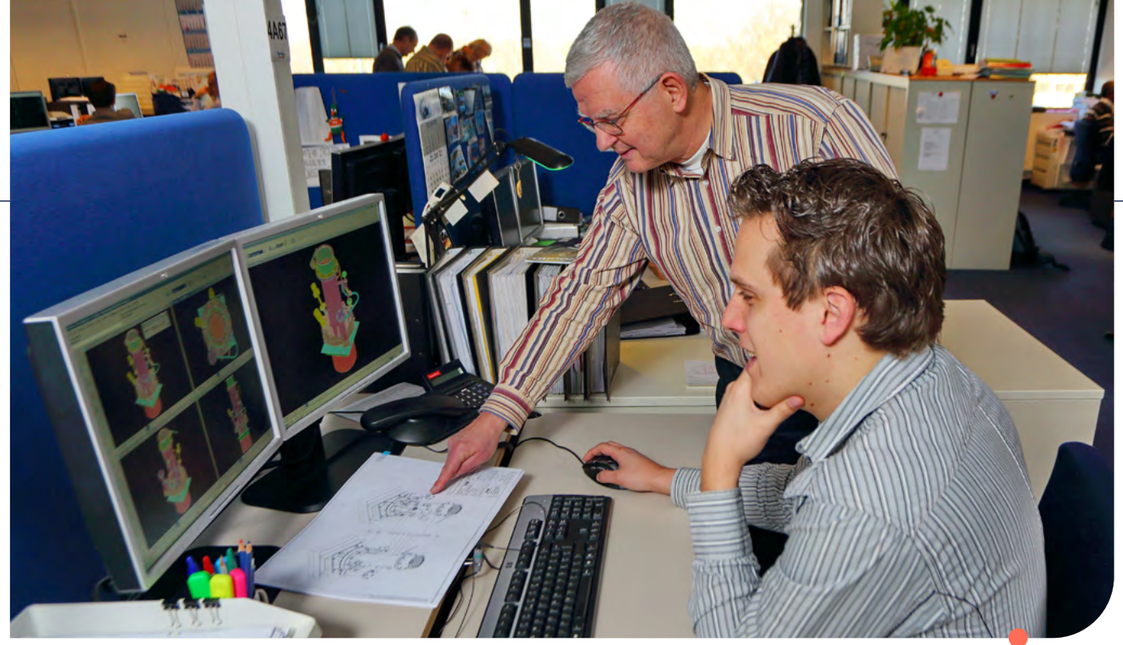
Fast, commercially attractive and sustainable solution

We are the only energy contractor to integrate all core activities that our clients need: gas processing and liquefaction, modularization, naval and marine engineering as well as LNG transfer. We benefit from key project references such as Prelude FLNG, PFLNG Satu and Coral South FLNG in addition to multiple front-end engineering studies. Our global team of experts and engineers covers our clients' entire projects needs from early concept definition to startup. We provide a unique source of delivery for integrated Engineering, Procurement, Construction and Installation (EPCI) contracts. Our offering also includes offloading solutions that ensure the safe LNG transfer between offshore producing facilities and LNG carriers, even in the roughest seas.

+40
years of experience

2017
The world' first offshore LNG droped

+40
Engineering studies from concept definition to epc



Complete flexibility from design to delivery

We provide the most advanced and safest solutions for the design and delivery of offshore LNG projects.

- From small scale up to 12 Mtpa production capacity
- Various gas pre-treatment and liquefaction processes
- Liquids storage capacity up to 400,000 m3
- Feed gas: from very lean to rich
- Mixed refrigerant or gas expansion liquefaction processes
- From pancakes to modularized topsides
- Spread or turret mooring facilities
- Membrane type or self-supporting LNG tanks
- Water and/or air cooling systems
- Side-by-side or tandem LNG offloading configurations
- Gas turbines, steam turbines and electric motors for mechanical drive

Leadership in project execution

The depth of our experience ensures project success from conceptual and pre-FEED studies through delivery and commissioning. We have solid references in working with major offshore yards and shipyards under all types of contractual relationships. Our combined resources, experience, technology, skills, and financial stability are unequalled in the market.

"An offering that covers all our client's needs."

Innovative technologies

As one of the pioneers in the provision of services and technologies to the LNG industry, Technip Energies has a long-standing record of innovation in developing offshore liquefied natural gas technologies.



Megamodule™

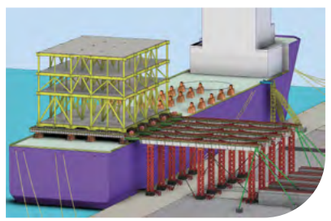
For the next generation of FLNG facilities, we offer an innovative Megamodule™ concept and a proven execution model to reduce projects costs and schedules:

- Optimized use of available deck space
- Maximum construction and commissioning at ground level
- Possible construction of hull and topsides in different locations
- Expanding the number of yards available for construction.

Alternative LNG tank designs

Self-supporting type C tanks (or equivalent) are an alternative to membrane containment systems, allowing a wider range of shipbuilding players to enter the market.
For protected environments or at-shore applications where liquid motions in tanks are limited, LNG tanks can be arranged in a single-row configuration to rationalize hull structures and reduce costs.





Advanced technologies in cryogenic transfer

We design and manufacture fully qualified LNG transfer systems with marinized mechanical loading arms as a central component for side-by side or tandem offloading.

Parallel LNG off-loading with HiloadLNG™

When side-by-side or tandem offloading is impossible, parallel offloading with HiloadLNG™, developed from proven technologies, is the ideal solution. It can notably be used for offloading LNG to conventional LNG carriers in harsh environments.

Know-how, tools and methods

To meet the needs of FLNG vessels operating in harsh environments, we offer a range of new tools and solutions of new tools and solutions, and adapted existing methods accordingly.

Process improvement

We offer commercially available qualified technologies from leading process licensors for gas pretreatment and liquefaction. Where have a number of patented processes that can add value in some cases.

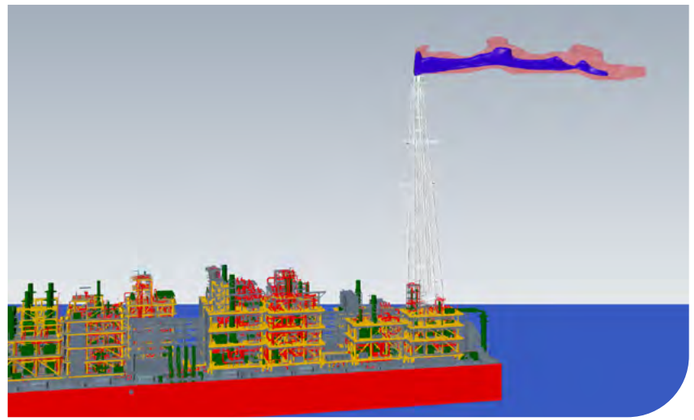
- Gas condensate stabilization producing rich gas for direct liquefaction without LPG production
- Cryomax processes for fractionation of the natural gas before liquefaction – heavy end removal from lean gas or deep NGL recovery
- Production of high-purity N2 from natural gas.

“Developing leading-edge processes to optimize safety and mitigate risks.”

Safety and risk management

The limited footprint of the process area on offshore LNG facilities necessitates the use of tall and highly congested topside modules. Offshore LNG flare radiation at deck level is potentially much higher than for conventional FPSOs, requiring the use of state-of-the-art modeling tools. Our risk-based approach assesses the potential consequences of accidental events and their frequency of occurrence to demonstrate that risks have been reduced to the greatest reasonably practicable extent.

By incorporating safety principles in engineering development, we are able to eliminate or reduce hazards and implement safeguards and mitigation measures derived from safety studies. LNG related risks that are amplified by the offshore context process risks, fires, explosions, personnel protection, and asset integrity following spillage of cryogenic fluids, Offshore specific non-process risks (ship collisions, dropped objects).



Cost effective solutions for all project needs

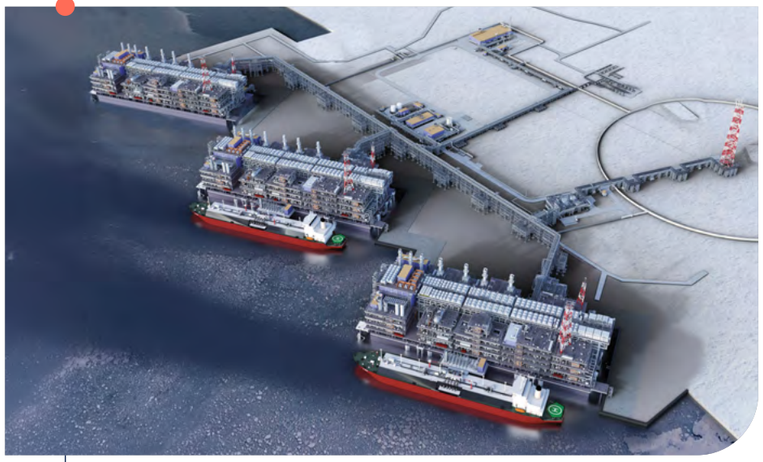
Technip Energies also provides Floating LNG technologies for even more commercially attractive solutions to liquefy natural gas from onshore sources.

These can be deployed in shallow waters nearshore, jetty-moored or on Gravity Based Structures (GBS).

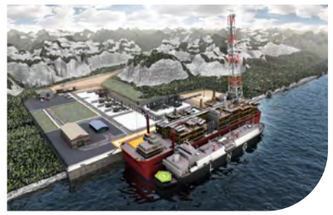
- Taking on board our accumulated experience in offshore LNG
- Based on mature offshore LNG and floating LNG technologies, with partial or simplified functionalities adapted to project requirements

Gravity Based Structures (GBS)

An FLNG-like topside modular design is fitted on a concrete structure that provides LNG and product storage, and designed to be towed to the final destination before being grounded on the seabed.



Jetty-moored/quayside FLNG



In situations where onshore construction is not possible and environmental impact must be kept to a minimum, a cost-effective liquefaction barge is suitable for at-shore applications. Utilities and pre-treatment can be provided onshore, further increasing liquefaction levels on each barge.



Fixed platform LNG

For small-scale LNG production in shallow water, integrated functional modules for liquefaction and pretreatment/utilities can be fitted on conventional offshore jackets. LNG storage and offloading are provided via external LNG FSO and conventional berthing facilities.

Project references

Our recent contracts awarded and our execution record confirm our position as the leading FLNG engineering contractor.

SHELL PRELUDE

- Contract: EPCIC
- Award: 2011
- Delivery: 2017
- Capacity: 3.6 Mtpa LNG, 1.3 Mpta Condensates and 0.4 Mpta LPG
- Client: Shell
- Location: Australia



Technip Energies led the consortium with Samsung Heavy Industries to complete a master agreement for multiple FLNG facilities over the next 15 years. It delivered the world's first ever qualified FLNG with a capacity of 5.3 Mtpa liquids, and the largest floating steel structure ever built designed to withstand the harsh cyclone conditions.

PETRONAS SATU

- Contract: EPCIC
- Award: 2012
- Delivery: 2017
- Capacity: 1.2 Mtpa LNG
- Client: Petronas
- Location: Malaysia



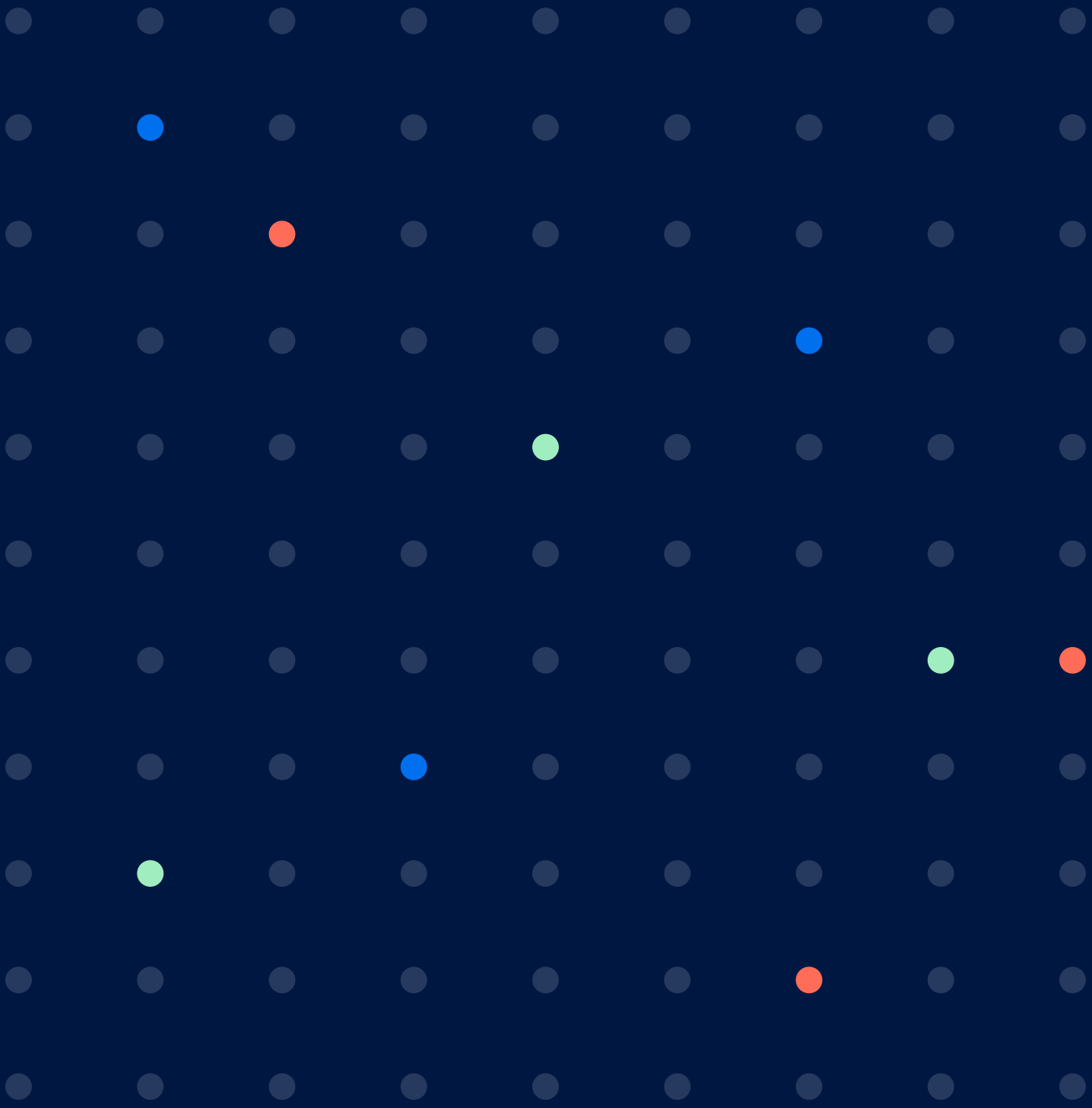
Designed by consortium leader Technip Energies and fabricated at the Daewoo Shipbuilding and Marine Engineering yard in South Korea, PFLNG Satu achieved the first-ever offshore production of LNG in April 2017.

ENI CORAL SOUTH

- Contract: EPCIC
- Award: 2017
- Delivery: 2022
- Capacity: 3.4 Mpta LNG
- Client: ENI
- Location: Mozambique



The Coral South FLNG turnkey contract includes both a floating facility and SURF in deep water executed by Technip Energies, leader of a consortium with JGC Corporation and Samsung Heavy Industries. It is the first FLNG project arranged with project financing.



Offshore LNG Business Development and Sales Manager
Lorenzo Disaro
+33 1 85 67 41 11
lorenzo.disaro@ten.com

Vice-President FLNG/ Gas Offshore Market
Benoit Seibel
+33 1 47 78 51 68
benoit.seibel@ten.com

Vice-President Early Engagement Gas
Dominique Gadelle
+33 1 47 78 22 43
dominique.gadelle@ten.com

www.ten.com

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