

LNG SOLUTIONS FOR A GREENER FUTURE

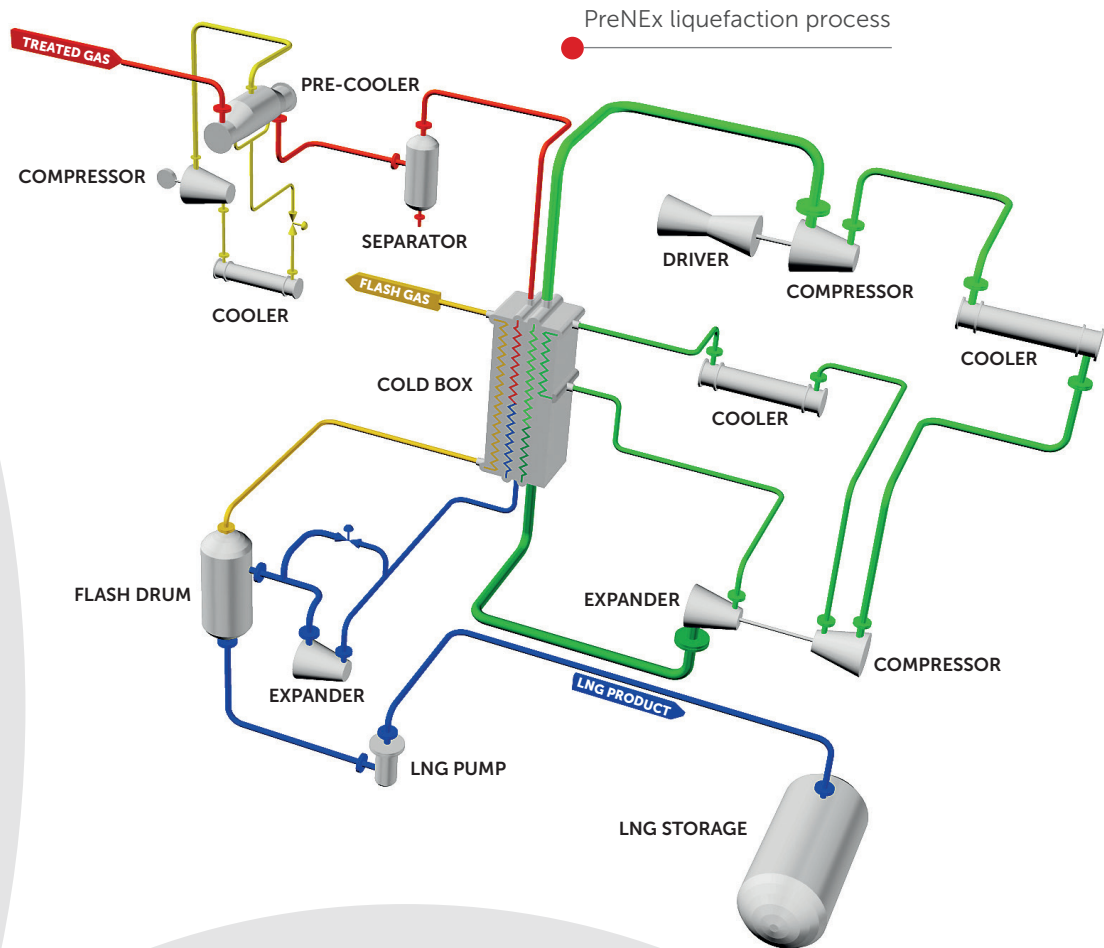


ABOUT **KEPPEL OFFSHORE & MARINE**

Keppel Offshore & Marine is a global leader in ship repair and conversion, specialised shipbuilding, and offshore rig design, construction and repair.

Through our design and technology units Gas Technology Development and Marine Technology Development, we have brought together our Research & Development capabilities and marine conversion expertise to develop a suite of gas solutions.

By providing robust solutions that can effectively bring ***Gas to Liquid, Liquid to Gas, Liquid to Users, Gas to Power*** and utilise ***Gas as Fuel***, we aim to be the provider of choice for Liquefied Natural Gas (LNG) solutions to meet the world's growing demand to monetise LNG in a fast and cost efficient way.



PreNEx

COST EFFECTIVE LIQUEFACTION SOLUTION

PreNEx (Pre-cooled Nitrogen Expansion) is Keppel's proprietary natural gas liquefaction technology. It offers a **simple, safe and reliable** alternative to other nitrogen expansion processes, and can be employed for offshore and onshore purposes such as Floating LNG (FLNG) and land-based LNG facilities.

GAS TO LIQUID

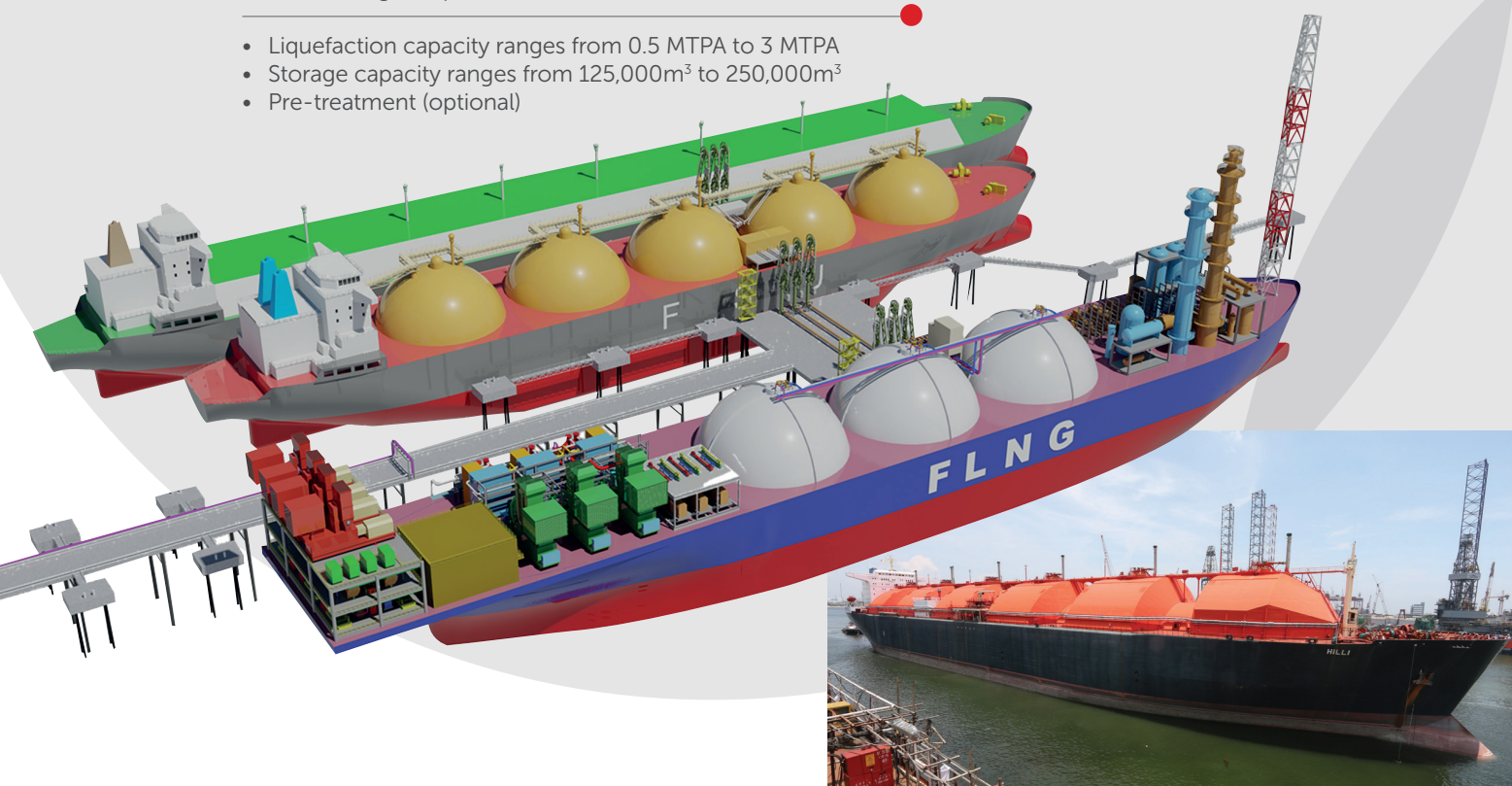
Liquefaction solutions

Economical, safe and quick to market - Keppel's innovative offshore and onshore liquefaction solutions address the growing midstream needs of the LNG industry. It is a result of Keppel's proprietary liquefaction technology, PreNEX, and over 35 years of experience and expertise in conversion and modularisation.

Offshore solutions

Our FLNG + FSU deployment concepts provide cost effective solutions for gas export terminals

- Liquefaction capacity ranges from 0.5 MTPA to 3 MTPA
- Storage capacity ranges from 125,000m³ to 250,000m³
- Pre-treatment (optional)

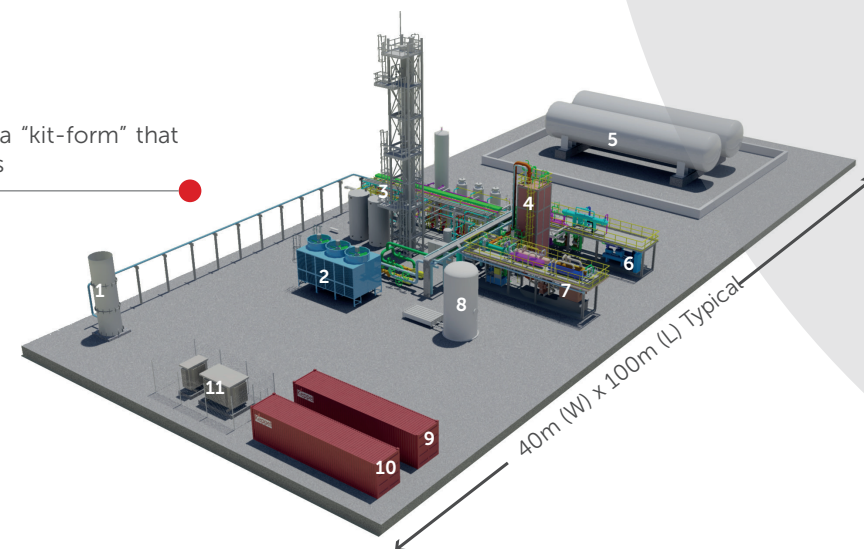


Moss-type LNG carrier, the HILLI, undergoing the world's first conversion into a FLNG facility by Keppel

Onshore solutions

We offer micro liquefaction plants in a "kit-form" that can be scaled to suit customers' needs

- 1 Ground Flare
- 2 Cooling Tower
- 3 Gas Pre-Treatment
- 4 Cold Box
- 5 Storage Tanks
- 6 Pre-Cooling and LNG Module
- 7 Compressor Module
- 8 Liquid Nitrogen Storage Tank
- 9 Office
- 10 E-House
- 11 Substation

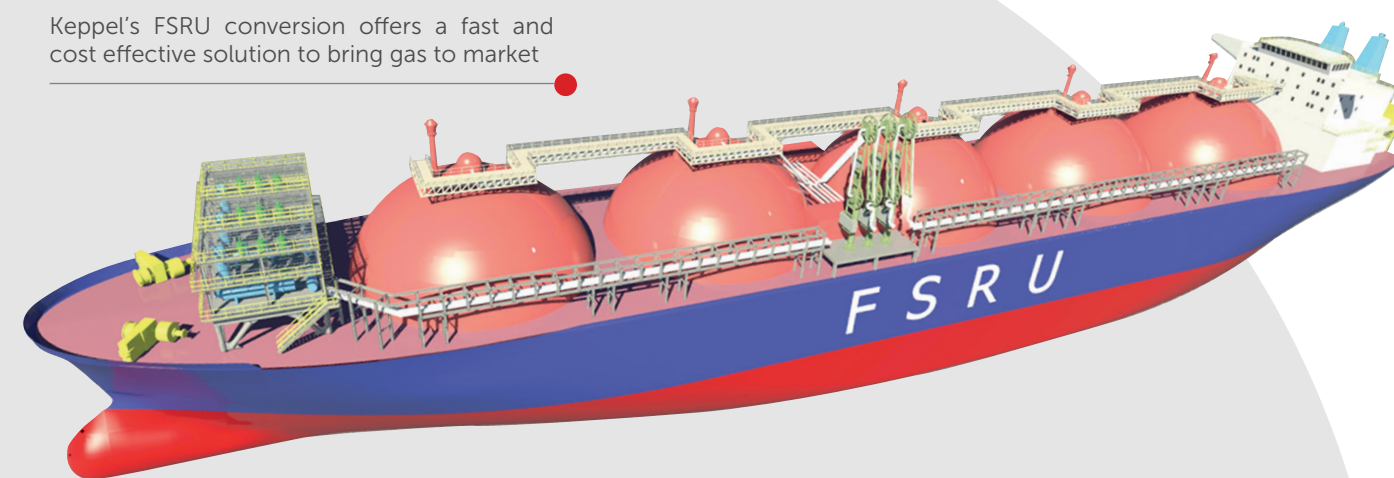


Keppel completed the world's first Floating Storage Regasification Unit (FSRU) conversion in 2007



Floating Storage Unit (FSU) converted for Malaysia's first regasification terminal

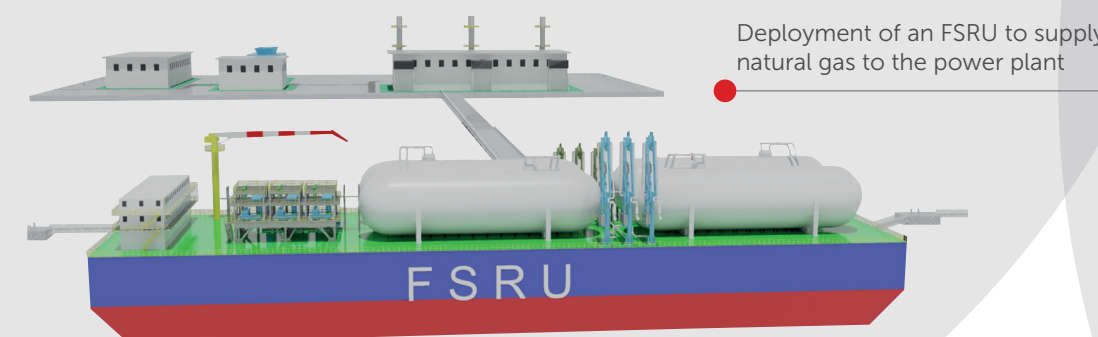
Keppel's FSRU conversion offers a fast and cost effective solution to bring gas to market



LIQUID TO GAS

Regasification and storage solutions

We have a strong track record in the conversion of Floating Storage and Regasification Units (FSRU), which enables our customers to bring their gas to markets in a fast and cost effective manner without relying on land-based terminals.



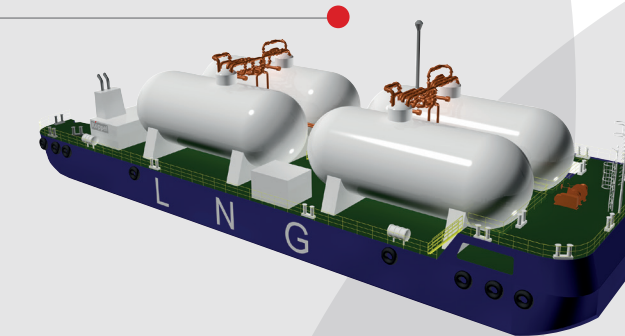
Deployment of an FSRU to supply natural gas to the power plant

LIQUID TO USERS

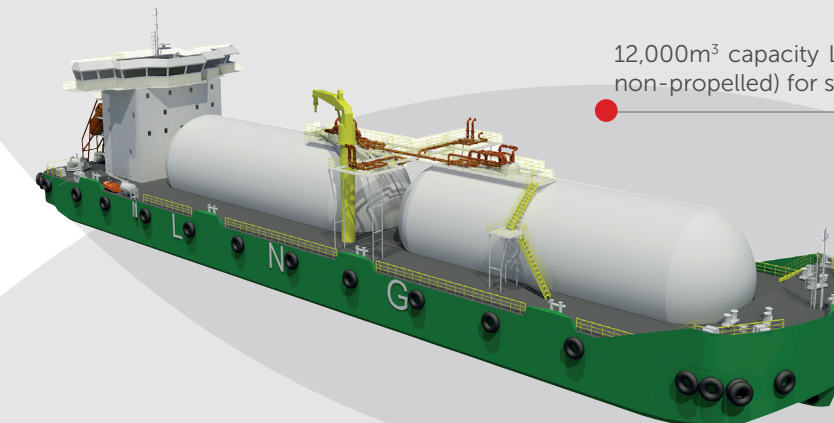
Transportation solutions

With our experience as a specialised shipbuilder, Keppel has designed a range of robust carriers that can deliver LNG along shallow water rivers, coastal areas and inter-islands. Our designs for carrier/bunker vessels range from 3,000m³ to 30,000m³ capacity with non-propelled or self-propelled designs to meet a wide range of LNG transportation needs.

3,000m³ capacity non-propelled LNG carrier for shallow waters (3.8m draft)



12,000m³ capacity LNG carrier (self-propelled or non-propelled) for shallow waters (3.5m draft)



LNG carrier/bunker vessel ideal for shallow water river and coastal transportation

8,000m³ - 4.8m draft;
10,000m³ - 6m draft

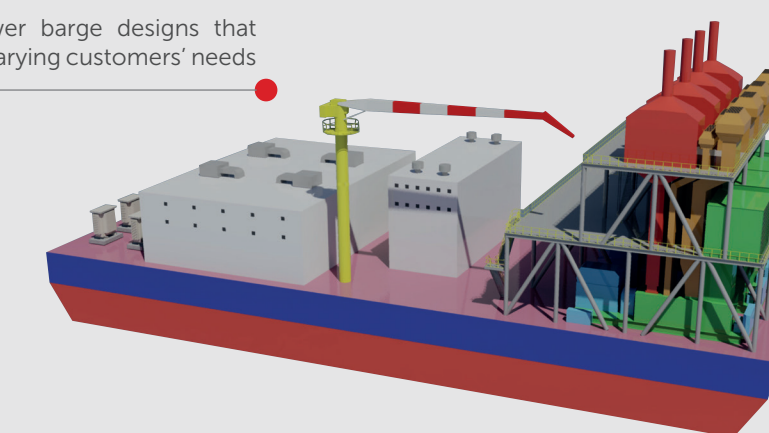


GAS TO POWER

Bringing power to users

Our LNG-fuelled power barges are designed with enhanced efficiency and can be installed quickly and economically.

Self-contained power barge designs that are scalable to suit varying customers' needs



GAS AS FUEL

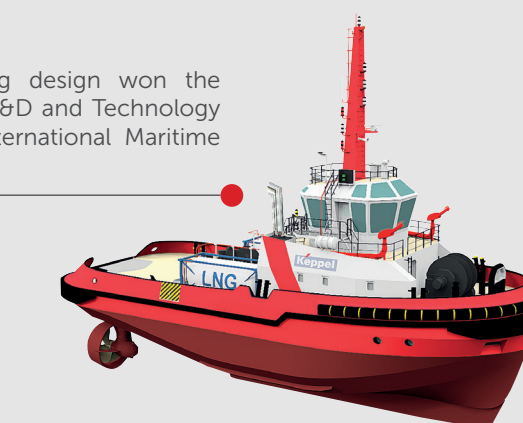
Engine conversion

With the world embracing cleaner emissions, Keppel is well-placed to provide retrofit solutions and newbuild designs for dual-fuel (diesel/LNG) propulsion systems.



World's first conversion of a large Ro/Ro vessel to dual-fuel (diesel/LNG) awarded to Keppel

Our dual-fuel ASD tug design won the Outstanding Maritime R&D and Technology Award at Singapore International Maritime Awards 2015



Keppel

**Gas Technology
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