

# LNG Marine Bunkering Solution

## Plate heat exchanger application

Decarbonization has been carried out through every field. Too many companies and groups are giants in property and systems in the global maritime shipping industry. Rapid decarbonization would be impossible.

Yet, maritime shipping contributes nearly 3% of annual carbon-dioxide emissions, a revolution of the engine fuel is inevitable.

Compared to traditional marine fuels, LNG is a cost-competitive and cleaner burning solution for ship owners and operators.

Compared to all the potential carbon-neutral solutions, like ammonia, biomethane, fuel cell, etc. LNG might be a more commercial viability option at the moment.

HFM has been devoted to helping shipping customers on carbon-neutralization.





LNG is a technically feasible option as an alternative fuel for shipping. However, as fuel for shipping, as an emerging market segment, is already shaping new ship design, technical options and operations.

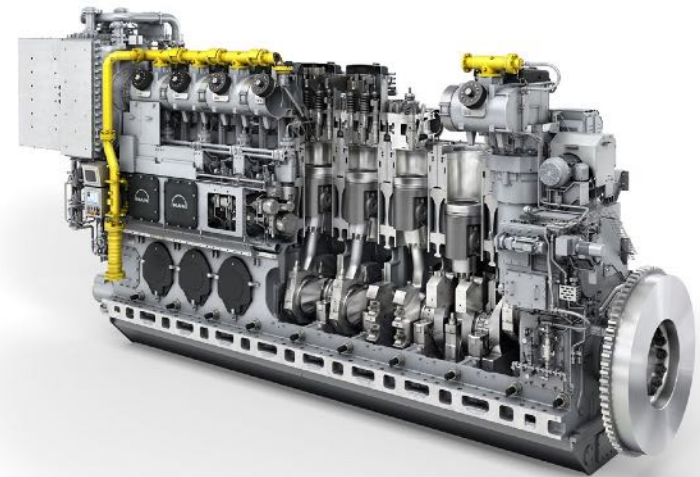
It's different from diesel fuel, LNG is carried as a boiling liquid, and is a cryogenic liquid at temperatures of about  $-162^{\circ}\text{C}$  ( $-259^{\circ}\text{F}$ ).

In liquid form, natural gas occupies 600 times less volume than in a gaseous state, making it easier to transport over long distances and enabling a large storage capacity to be achieved in a relatively small space.

Natural gas, like other combustible liquids, is not flammable in the liquid phase and cannot ignite. However, in the vapor phase it is highly flammable and will readily burn when there is a 5 to 15 percent by volume mixture with air.

It also has down side, LNG vapor can form explosive clouds in confined spaces and is considered hazardous. This requires special handling of the vapor when bunkering.

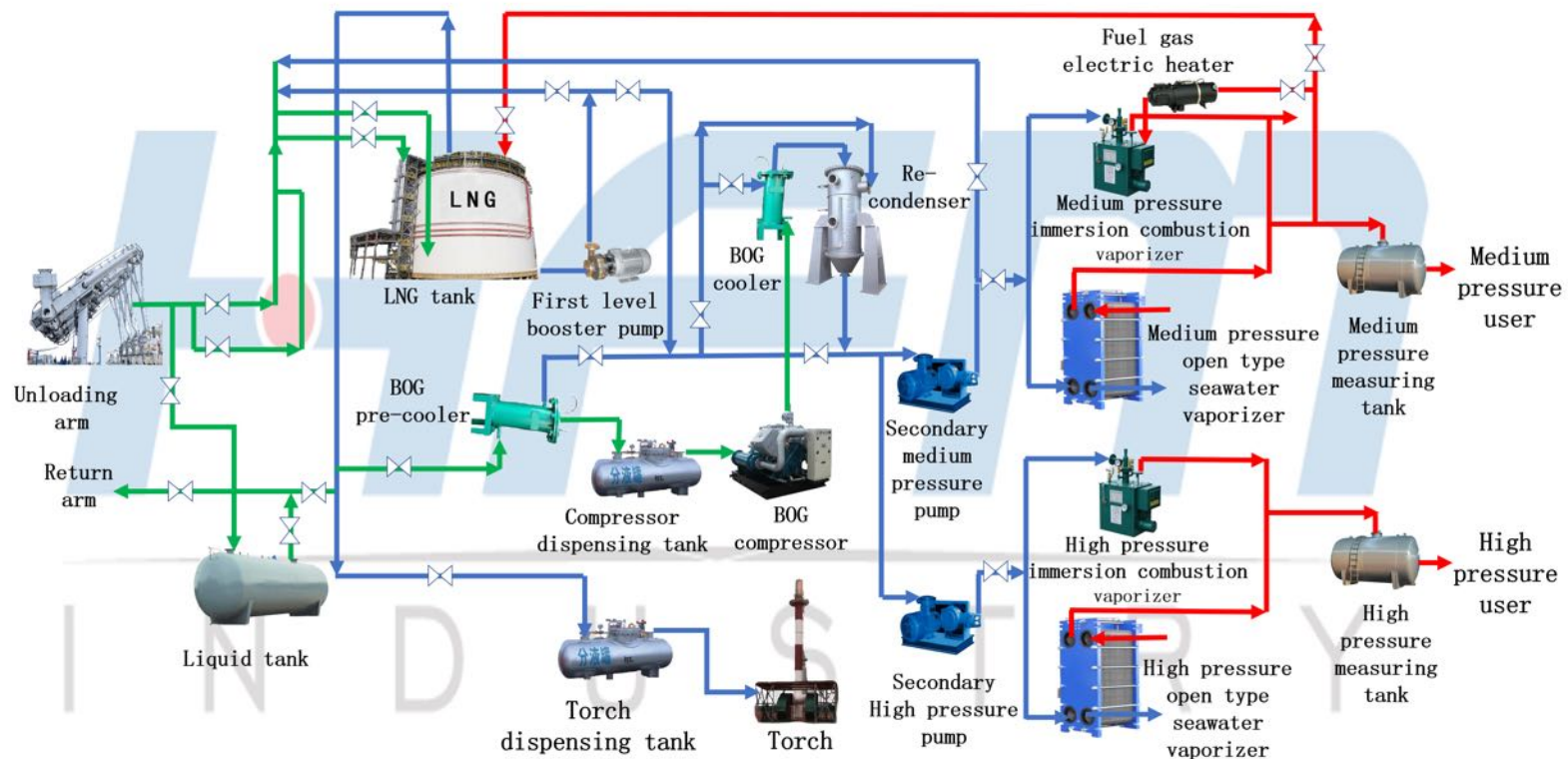
Due to heat leakage through the insulation of the fuel tanks, LNG in storage will be evaporating and giving off natural gas vapor constantly.



Liquefied Natural Gas (LNG) is burnt in dual fuel engines, either in low pressure (Otto) engines or in high-pressure (diesel) engines. Dual fuel means that the engine can run on both liquid and gaseous fuels.

LNG can serve as such a transitional fuel only if it is combined with the best engine technology, such as diesel dual fuel engines.

LNG in combination with the 2-stroke Dual fuel diesel engine reduces GHG emissions by 10–20% compared to MGO.



## Six process systems in LNG receiving station

The liquefied natural gas (LNG) terminal process scheme is divided into two types: direct compression and recondensation.

The main difference between the two process schemes is the treatment of the tank boil-off gas. The direct compression type is to use the compressor to compress and pressurize the LNG storage tank's boil-off gas (BOG) to the pressure required by the low-pressure user and mix it with the gas from the low-pressure gas vaporizer for export.

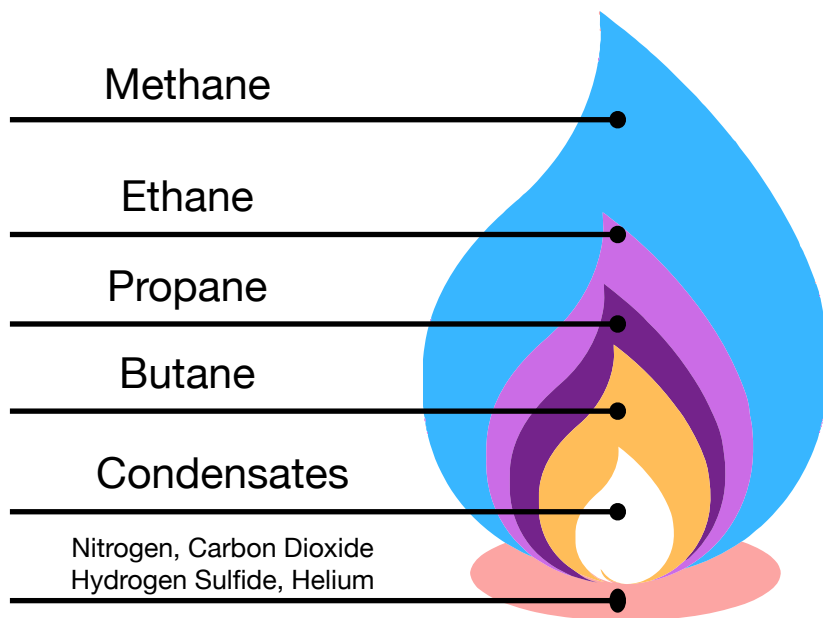
The recondensation type is to pressurize the evaporated gas in the storage tank by the compressor, enter the recondenser, and exchange the cold energy with the LNG pumped from the LNG storage tank evaporated gas (heat exchanger) is in the recondenser. Liquefaction, and then pressurized by the high-pressure pump and then enter the high-pressure gasifier for gasification and export. An appropriate process scheme should be selected according to the user's pressure needs when designing. To prevent the formation of negative pressure in the cabin due to the drop of liquid level during unloading, the boil-off gas in the storage tank is returned to the LNG cabin through the return arm to maintain the pressure balance of the cabin.

The LNG boil-off gas (heat exchanger) in the storage tank is compressed by the boil-off gas compressor and then enters the recondenser for re-liquefaction. Process System Description The processing system of the liquefied natural gas (LNG) terminal consists of six parts present above.

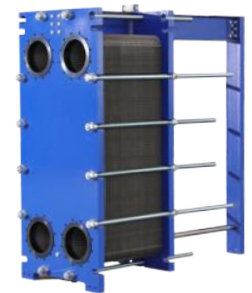


## The working circumstances of PHE is different from the land

- 1, Unstable on the sea, which causes vibration, impact, large angle tilt and noise, etc.
  - There are multiple hook points located in the frame, and the frame foot could be riveted into the ground.
  - Very compact in structure which having more stringent restrictions on the heat exchanger space and quality.
- 2, In the LNG bunkering process, sea water is used to heat up the refrigerant, high salinity and high corrosiveness.
  - Titanium plates with 100% dye penetrant inspection, and specific corrosion resistant protection layer if our customers need.



The Gasket plate heat exchanger is expandable and easy servicing. The design flexibility makes them ideally suited for a wide variety of shipboard cooling and heating applications.



Fully welded plate heat exchanger is a plate heat exchanger made of a series of corrugated metal plates welded by laser or argon arc welding. The plate group and the plate group are connected by welding with molding strips. Because there is no gasket seal, it has higher temperature and pressure resistance. It can be applied to extreme working conditions of high temperature and high pressure.



Plate and shell heat exchanger is a new type of heat exchanger. The cold-pressed plates are welded by laser or automatic plasma to form a plate group with two different medium flow channels. It's usually used in regasification process.





# Our service is better than you expected

HFM offers rich experience in LNG applications. We have multiple global warehouses and service teams around the world, the delivery time and freight are reduced to the largest extent, and spare parts can be delivered at the fastest speed. Manufacturing is merely one part of our business, knowing our customers requirements and acknowledge various kinds of working conditions is our daily life.

## 1, Inventory management

In order to ensuring delivery effectiveness, based on the acknowledge of PHE market and supply chain management, HFM has distributed the warehouses around the world.

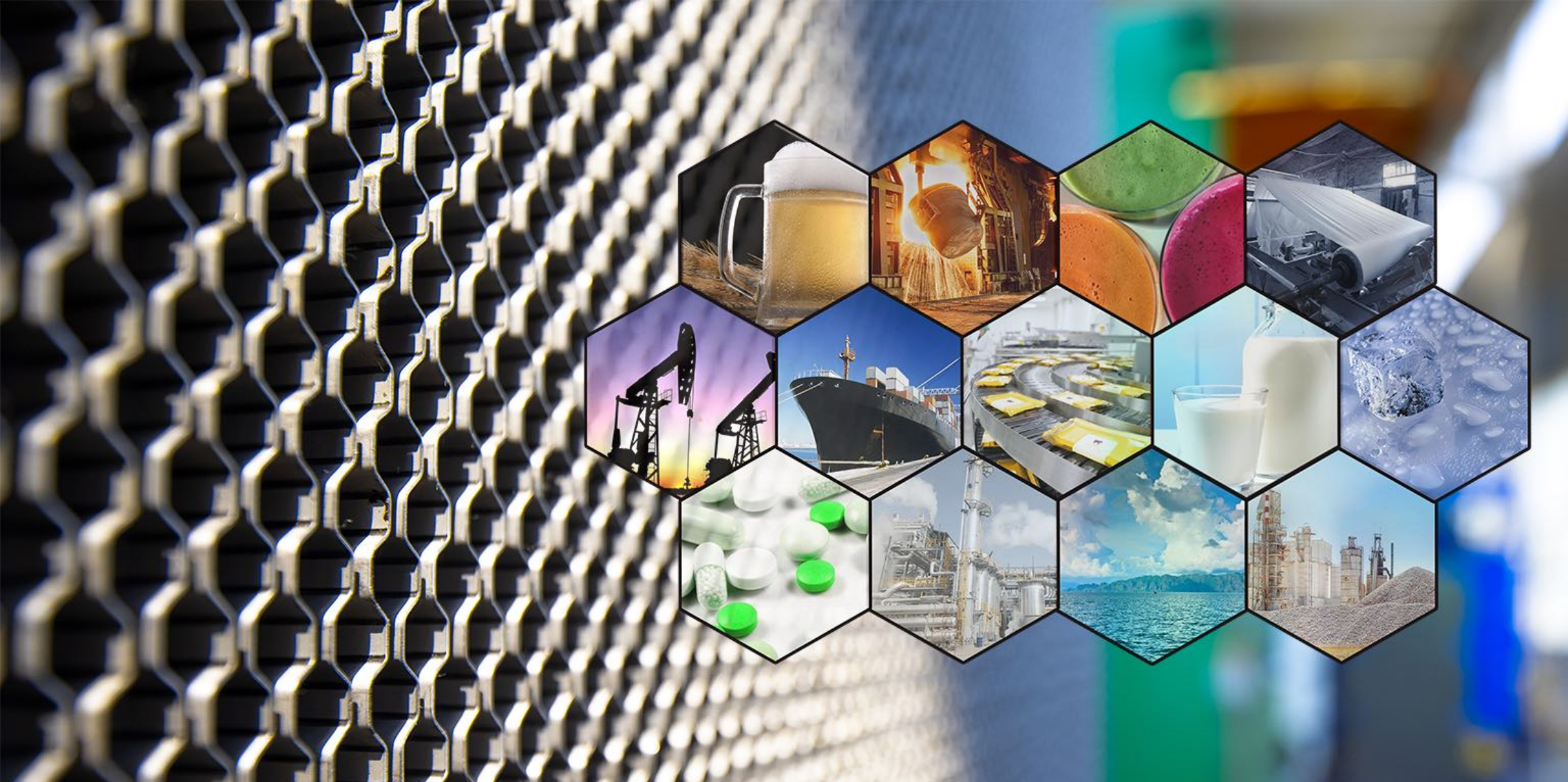
## 2, Spares replacement

HFM has the full range of plate heat exchanger spares, our service engineers could either travel to the scene or remote guid your team to replace.

## 3, Cleaning service

HFM can provide both CIP(cleaning in place) and disassembling cleaning services depending on your circumstances.





## Professional design solution:

Our technical department dealt with various application year after year, the accumulative experience forged a special team with exploring spirit and critical spirit. The gasket plate heat exchanger is our core business, thousands of units have been in services for many years in different fields.

## Service is our cornerstone:

We consider customer as our priority, understanding customers' real needs and rapid feedback are the basics.

We and customers are bound to each other for learning and developing, sharing knowledge keeps us growing, which makes accomplishing projects easier and faster.

[www.hofmann-heatexchanger.com](http://www.hofmann-heatexchanger.com)



Download HFM Cloud for more  
products information



Follow us