

Presentation May 2015



LNG solutions  
&  
recent projects

# Premises Cryonorm Alphen a/d Rijn - NL



**Total yard 8.000 m<sup>2</sup> - 4.400 m<sup>2</sup> production - 600 m<sup>2</sup> offices**



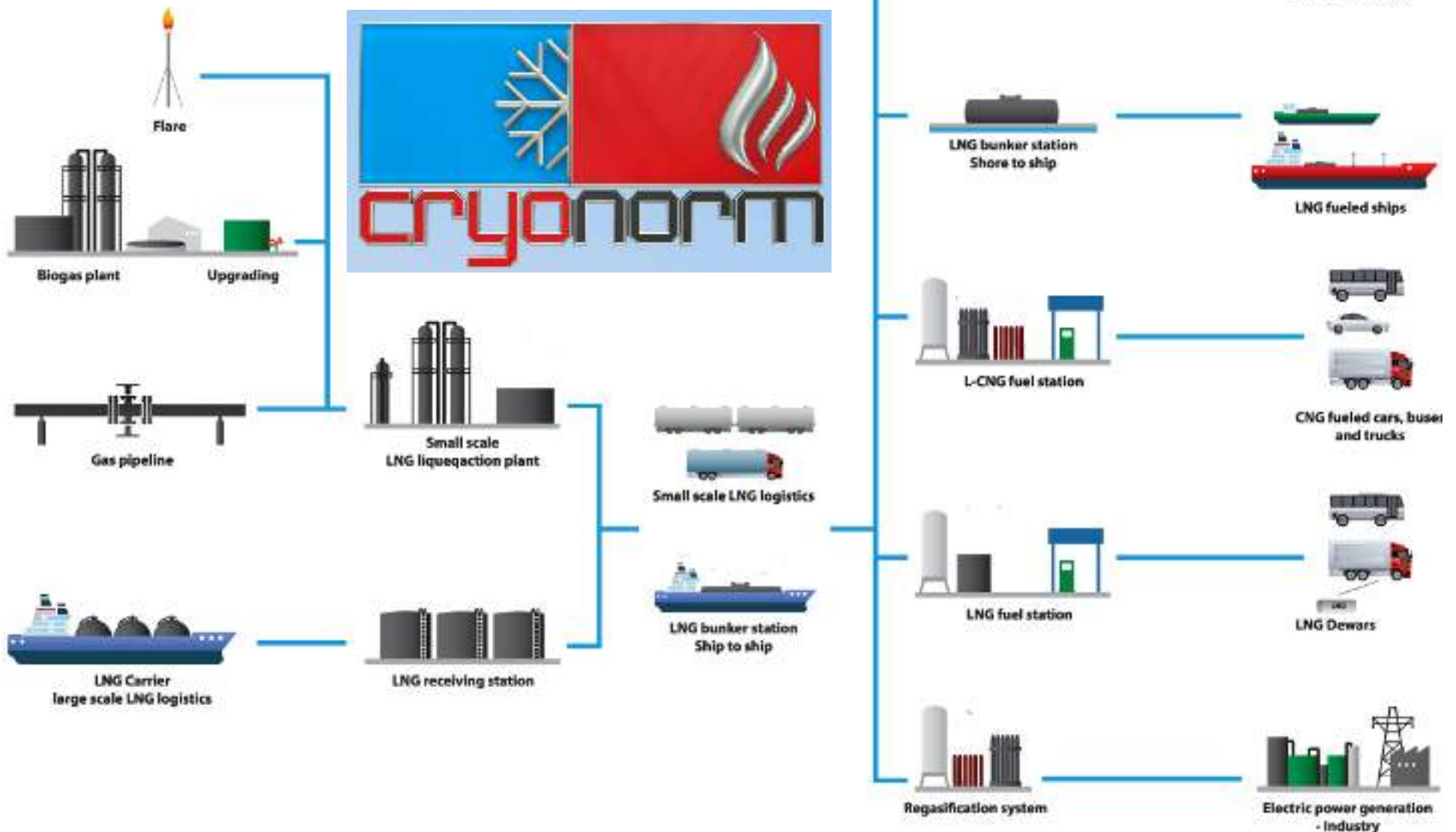
Total yard 8.000 m<sup>2</sup> - 1.600 m<sup>2</sup> production - 110 m<sup>2</sup> offices



Premises  
Cryonorm  
Edelény - HU



# LNG Supply chain





LNG regas



25.000 Nm<sup>3</sup>/hr @ 78 barg pipe line injection

2 banks of 10 pcs parallel working ambient vaporisers

Chile - Pemuco



1.500 Nm<sup>3</sup>/hr @ 6 barg satellite plant

Norway





**LNG satellite plants  
for nordic and  
tropical locations**





# Gas fired vaporisers (SCV)



# Mobile ambient air heated vaporisers for temporary gas needs or pipe line interventions





# LNG liquefaction

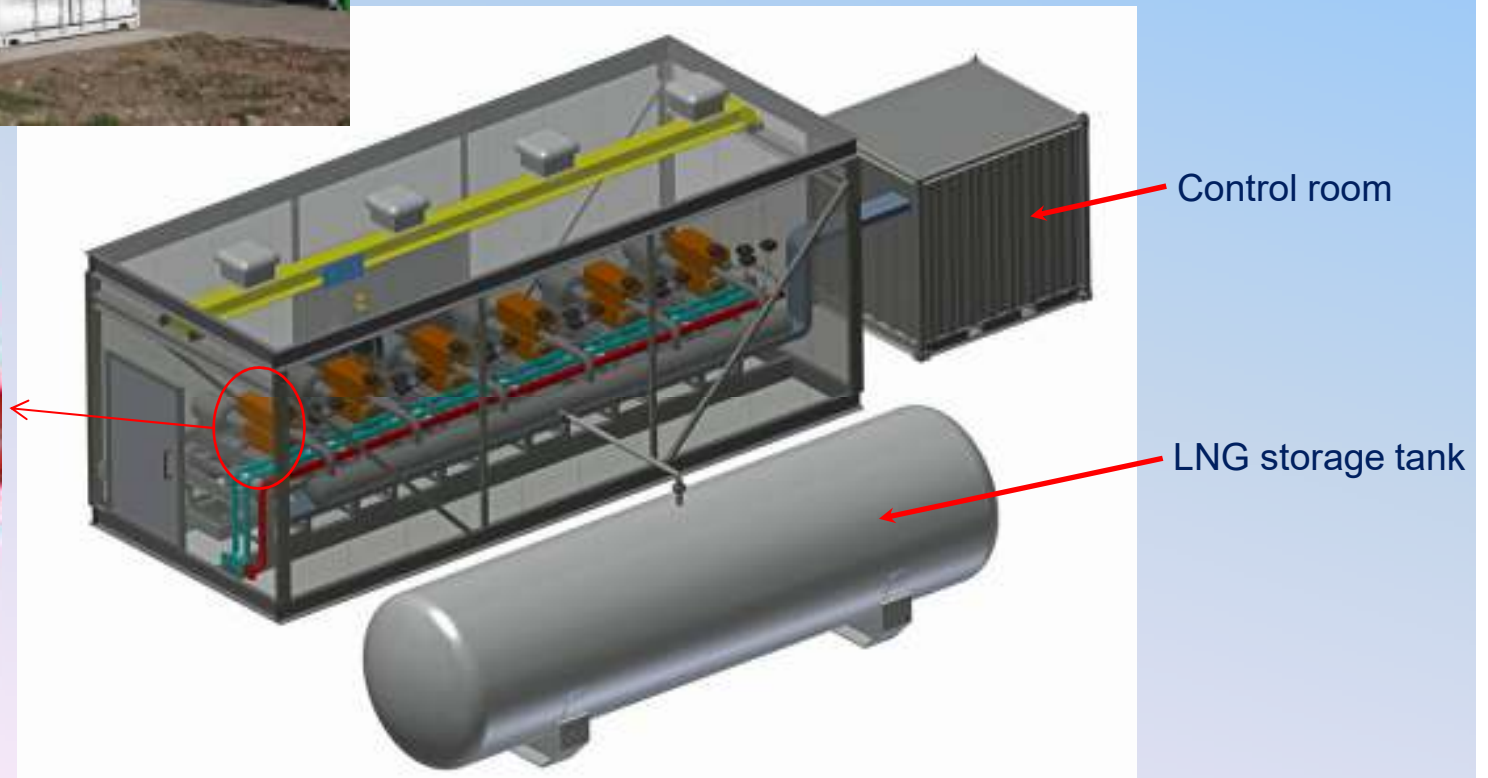
# Containerized micro scale LNG liquefaction plants up to 8 MTD



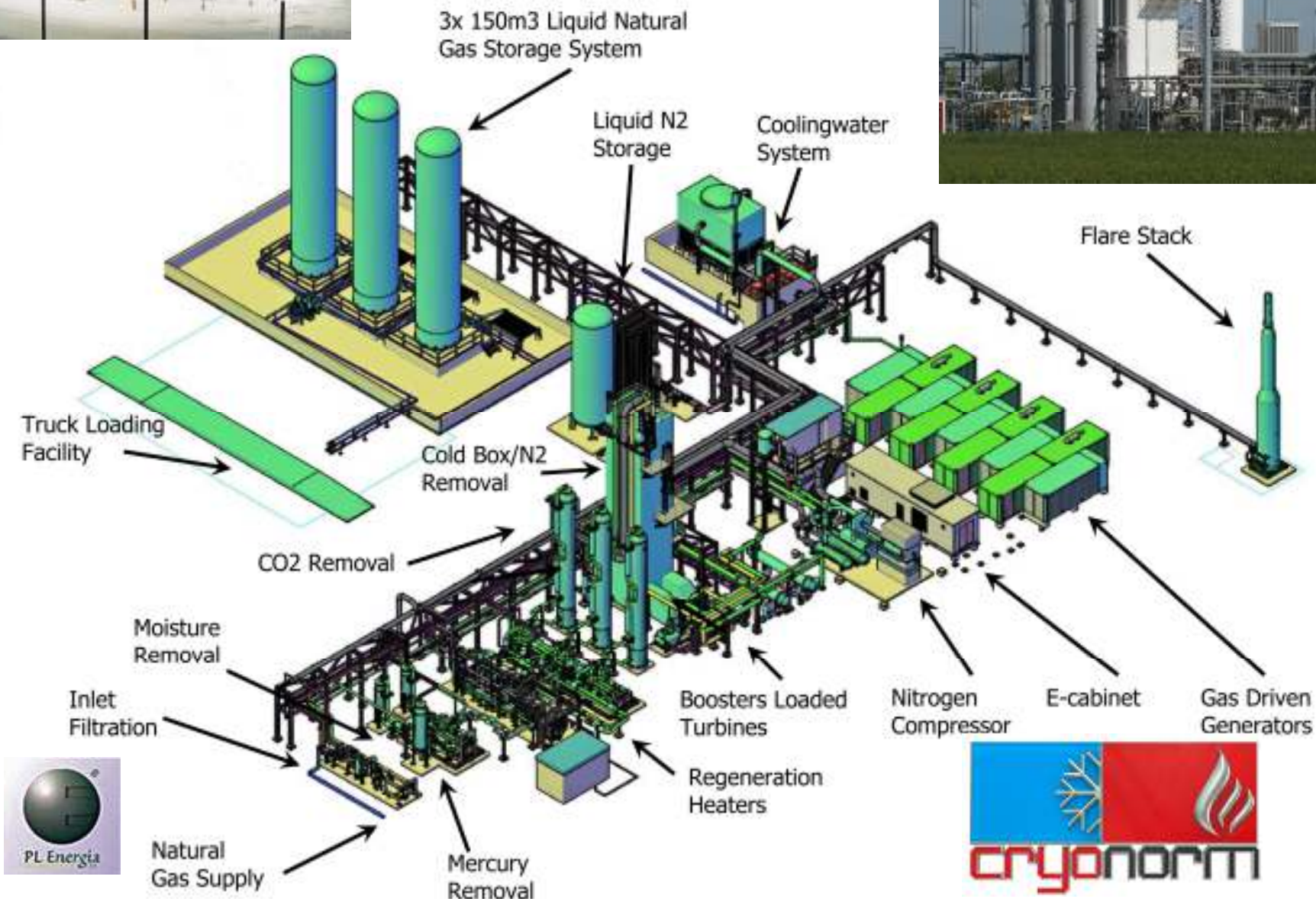
Typical lay-out containerized liquefaction plant, control container and LNG storage tank



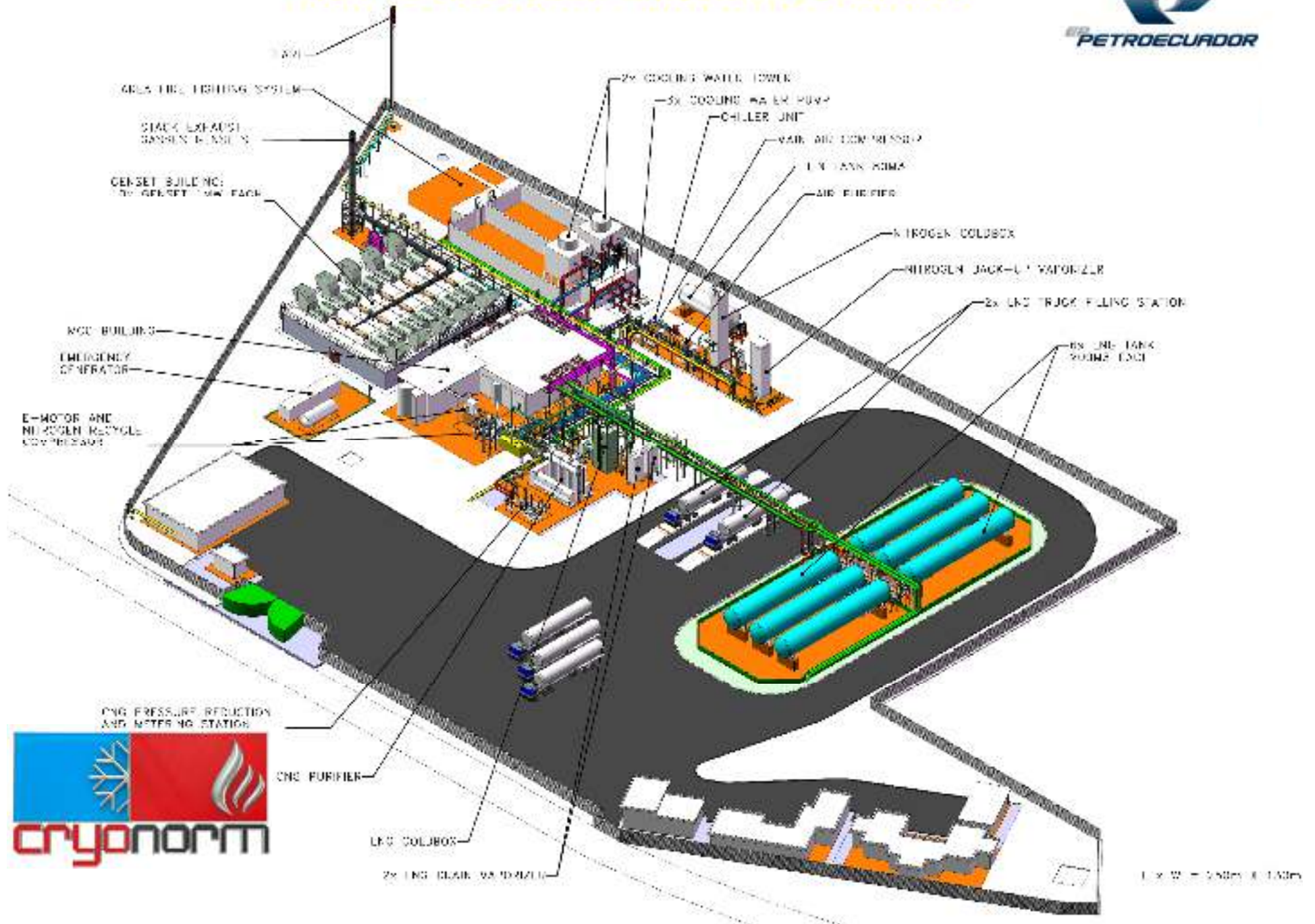
Cryogenerator



# 100 MTD liquefaction plant Chrzan - Poland



# 200MTD LNG PLANT - MACHALA - ECUADOR

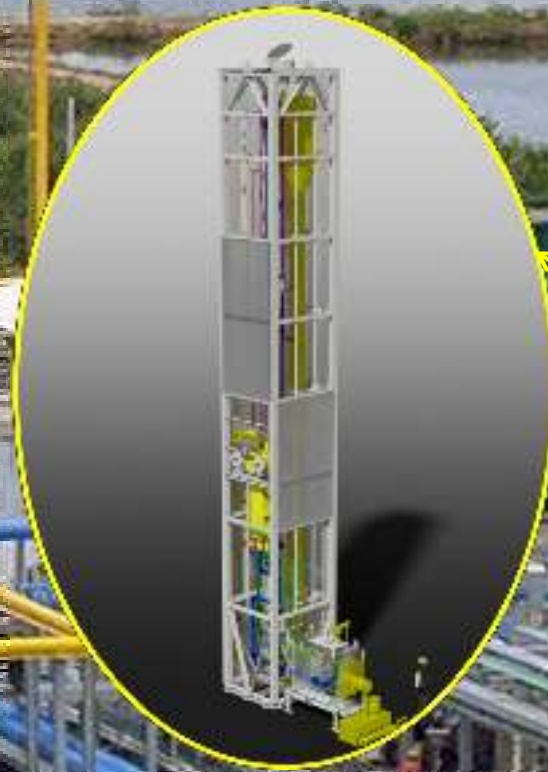
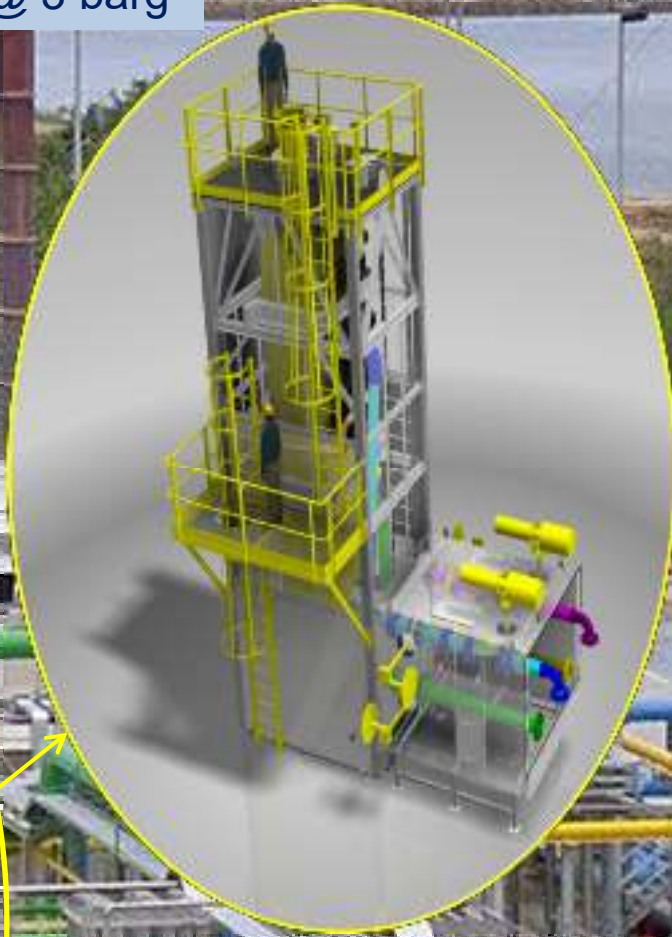


1 x W = 500m x 100m

# 200 MTD liquefaction plant Machala - Ecuador



LNG Coldbox  
200 MTD @ 3 barg



Coldbox for high purity Nitrogen  
LIN : 148 kg/hr @ 7 barg  
GAN: 1.282 kg/hr @ 7 barg



Incoming gas pre-treatment with LNG  
Coldbox in the back in Machala - Ecuador





Dual LNG truck loading bay



# LNG filling stations

# LNG filling stations



## Private station

QRS (Quick Response System) LNG filling station



### Scope of supply:

- LNG pump skid
- LNG dispenser (with filling – and gas return hose)
- Vehicle/driver recognition system (card/token reader) placed in safe zone
- 20ft container (PED certified), 12 bar MAWP
- "saturation on the fly" enabling saturated LNG supply for various filling pressures.

# LNG filling stations



Public station



## Scope of supply:

- Concrete pre-fab building with LNG pump skid and control system separated
- LNG dispenser (with filling – and gas return hose)
- Credit card payment system (Tokheim)
- 60 m<sup>3</sup> vertical LNG tank (PED certified), 12 bar MAWP
- "saturation on the fly" enabling saturated LNG supply for various filling pressures.

# L-CNG filling stations



Public station



## Scope of supply:

- Concrete pre-fab building with LNG pump skid and control system separated
- CNG dispenser and Credit card payment system (Tokheim)
- 60 m<sup>3</sup> vertical LNG storage tank (PED certified), 12 bar MAWP
- 625 Nm<sup>3</sup>/hr high pressure ambient air heated vaporiser

# L-CNG filling stations



500 Nm<sup>3</sup> @ 200 barg  
Bottle rack capacity



High pressure  
Odorizer system



High pressure  
LNG piston pump



# LNG marine fuel systems



# LNG as shipping fuel for inland chemical tanker

40 m<sup>3</sup> LNG tank, water heated vaporiser and control system



# LNG storage/regas system for two inland petrol tankers

LNG-electrical propulsion drive in Z-configuration

Dual system, per system 40 m<sup>3</sup> LNG tank, water heated vaporiser and control system



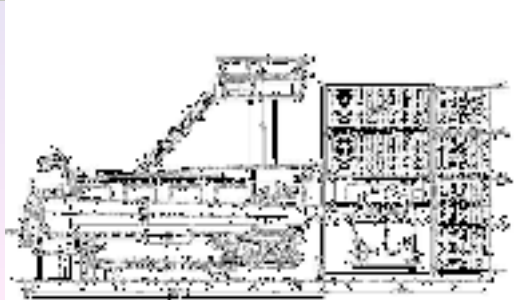


Retrofit to dual fuel  
propulsion

LNG storage 60 m<sup>3</sup>



**Vessel:** MS. EIGER  
**Owner:** Danser Container Line



# LNG storage/regas system for two short-sea LEG carriers

with dual fuel (LNG/MDO) propulsion

Dual system – top deck mounted, per system:

100 m<sup>3</sup> LNG tank (IGC IMO type C), water heated vaporiser and control system, Bureau Veritas approved



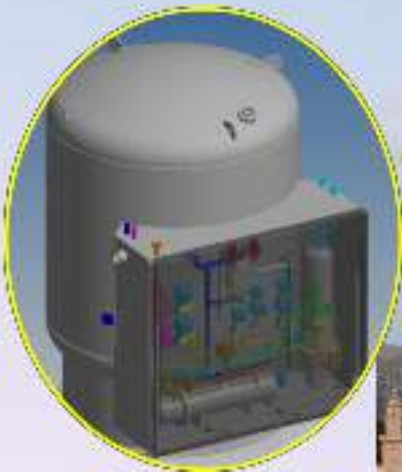


# - NEW PROJECT -



1x32 m<sup>3</sup> LNG tank (IGC IMO type C) with TCS containing water heated vaporiser, valves and control system Bureau Veritas Marine approved

Not for propulsion but power generation in harbour

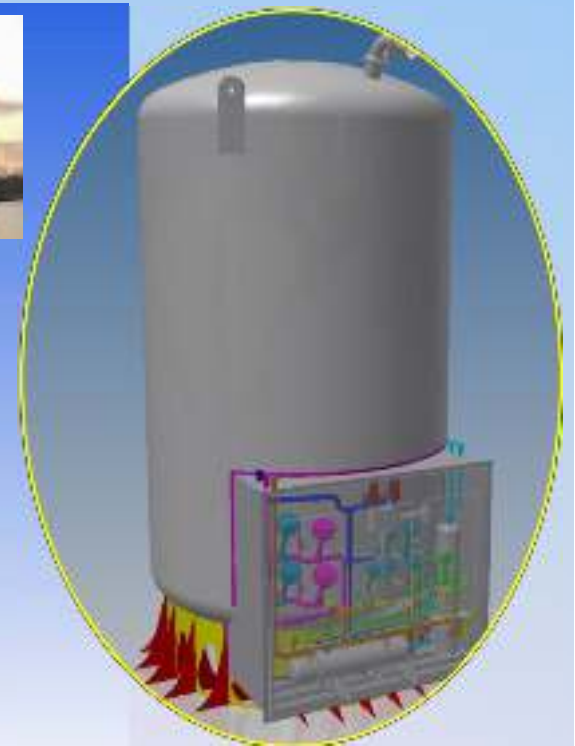
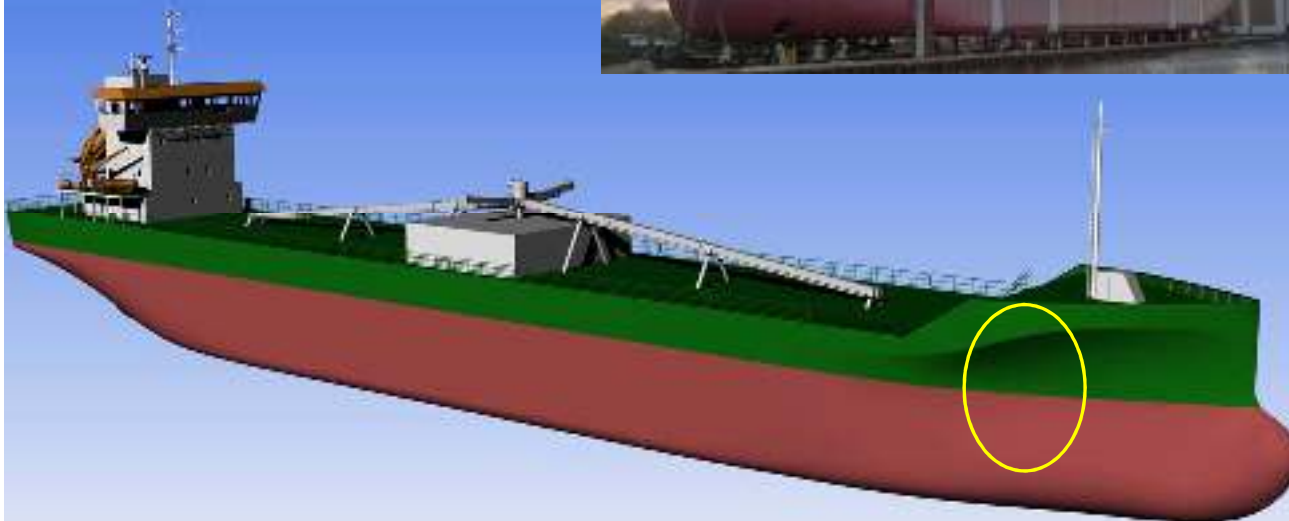


# - NEW PROJECT -



LNG storage/regas system for short-sea dry cargo vessel  
with dual fuel (LNG/MDO) propulsion

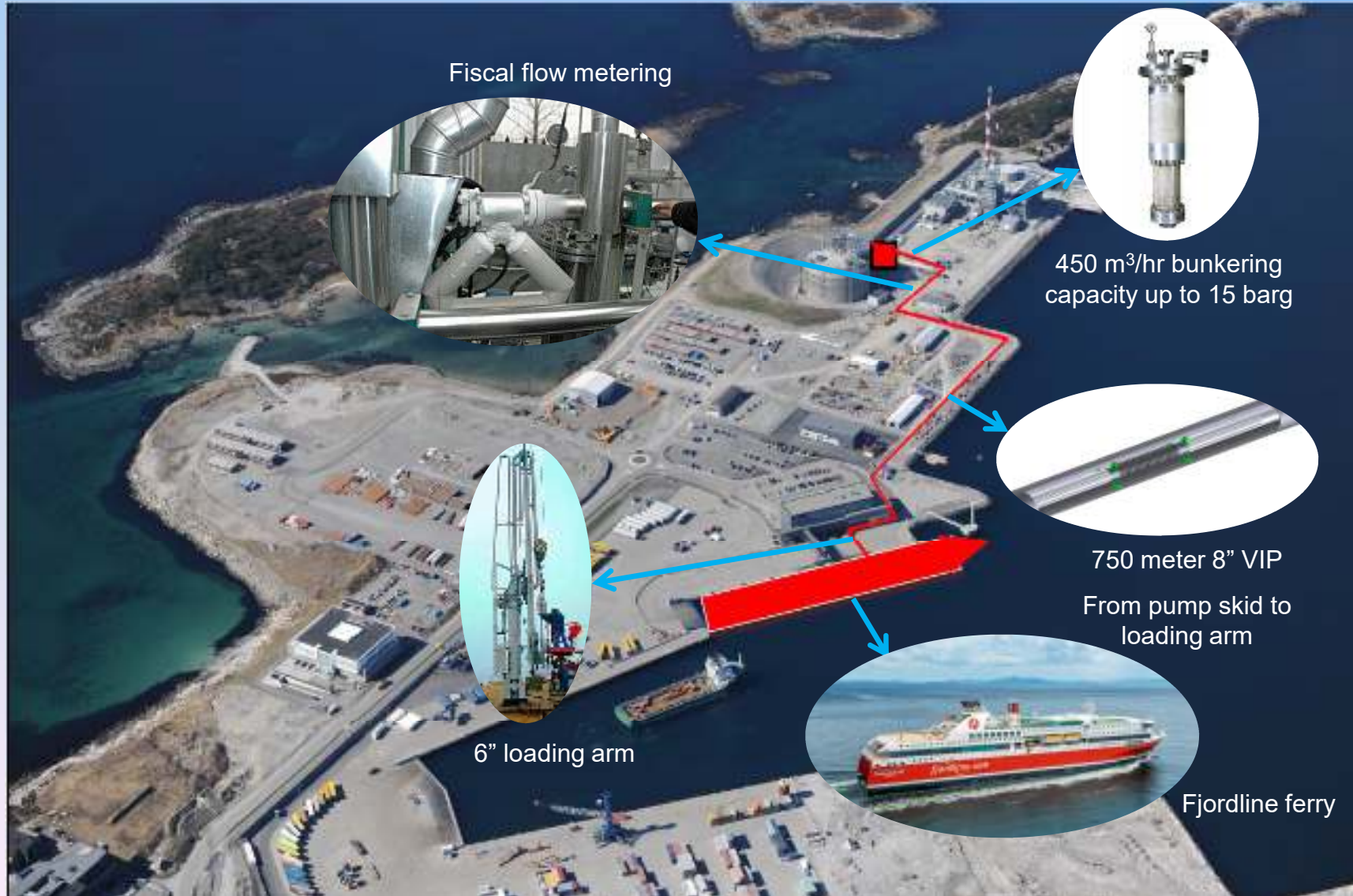
1x130 m<sup>3</sup> LNG tank (IGC IMO type C) with TCS  
containing water heated vaporiser, valves and  
control system Lloyd's Register Marine approved





LNG shore to ship  
bunkering

## LNG bunkering of dual fuel (LNG/MDO) propelled ferries





# Loading arm





# VIP piping

Batch delivery of pre-fabricated spools



# Site civil works



Installation of LNG-, gas  
return piping and cables





# Shop construction of skids



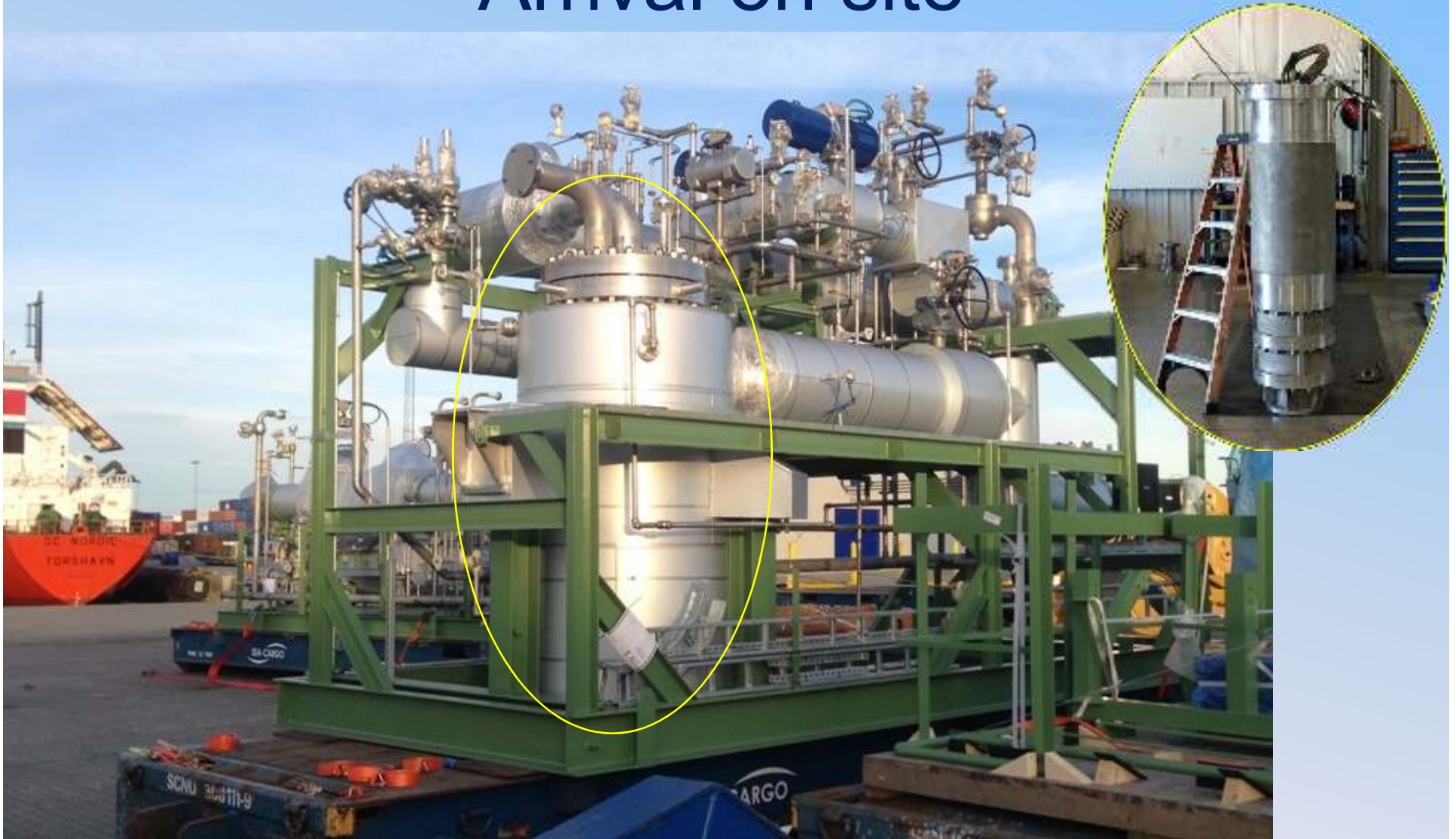
# Flow metering skids



MID approval  
on system

# LNG pump skid

Arrival on site



# FIRST BUNKERING





- Thank you for your attention -

