LNG probunkers

SHORTSEA 2019

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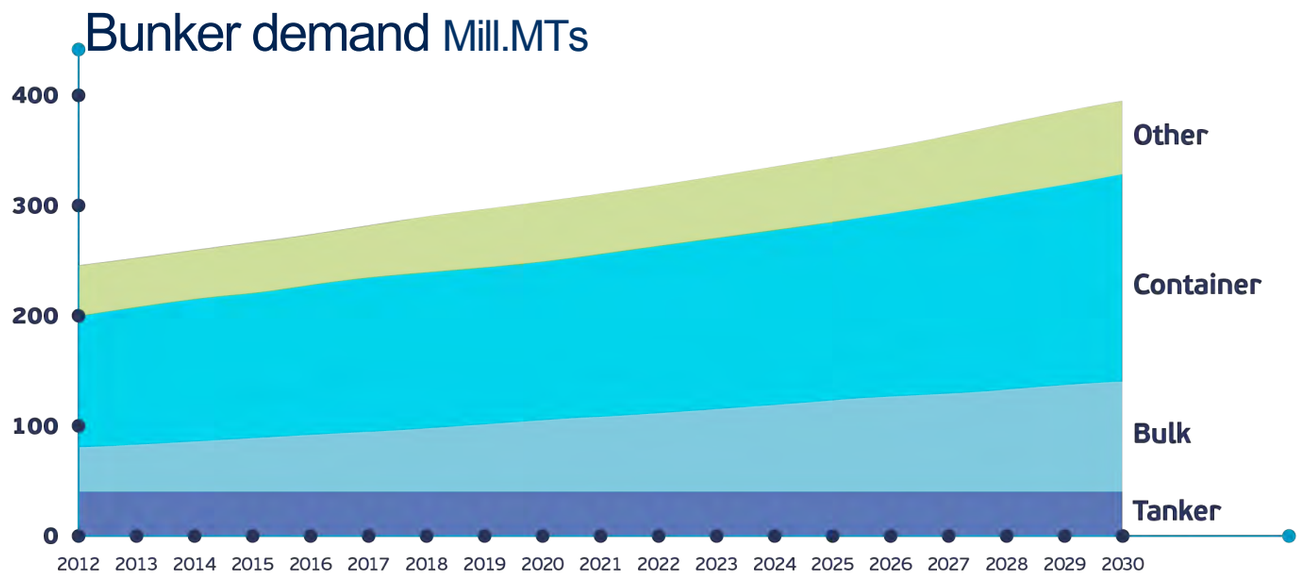
OUTLINE

- Bunkering
- GAS - LNG
- IMO - Main Alternatives LNG
- LNG Bunkering
- probunkers Project
- Conclusion

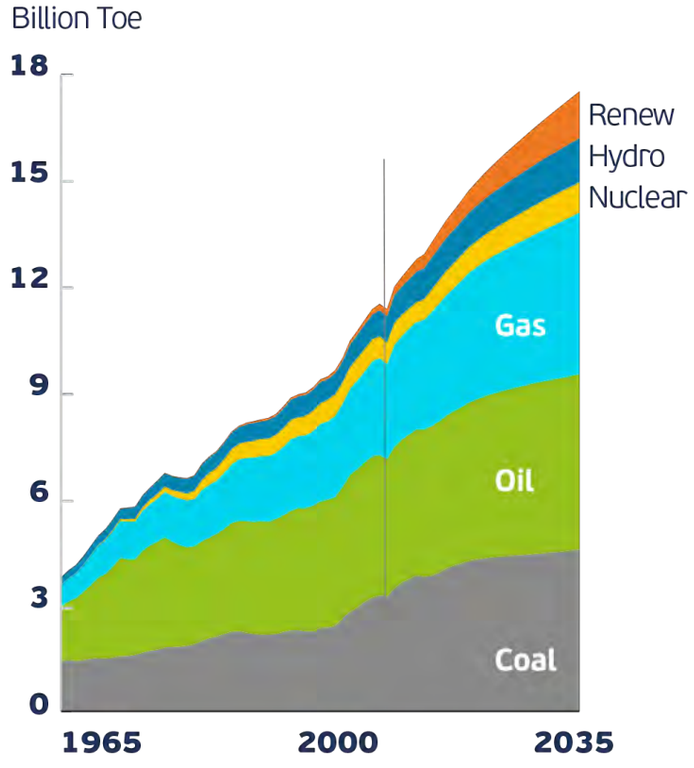
Business Overview - Bunkering

- A multibillion dollar industry.
- More than 250 mill MTs. sold annually.
- Estimated CAGR 2.6%
- FO / Diesel ratio: 80% / 20%



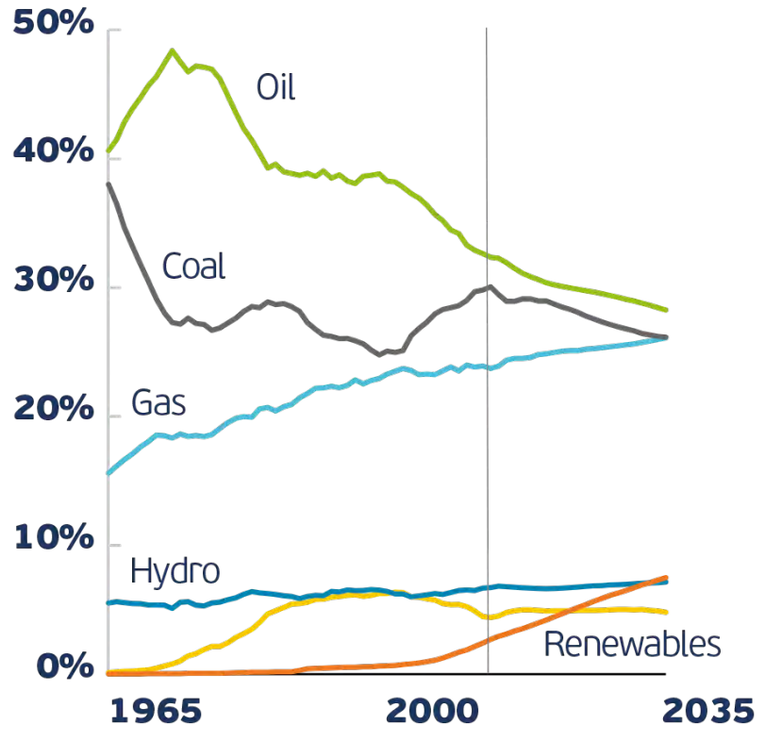
Business Overview - Gas

- Natural Gas is the fastest growing fuel type 1.9% p.a
- Gas gains share steadily, while Oil share falls in energy demand



Source: BP Energy Outlook 2035

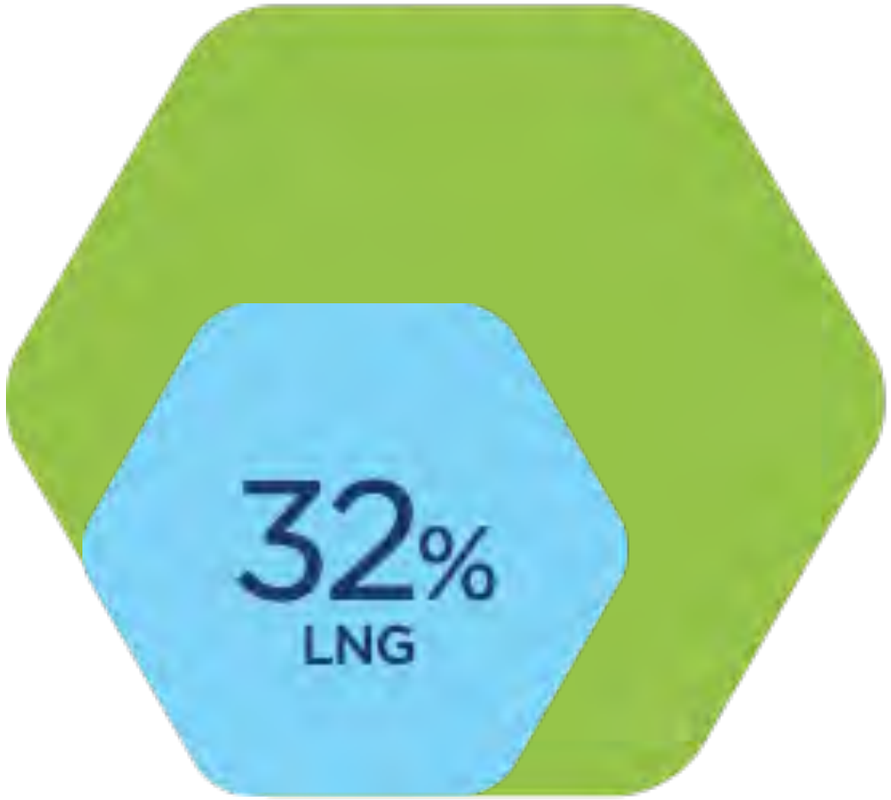
- By 2035 Coal-Oil-Gas will have a 26-28% share of primary energy
- 1/3 of the increase in energy demand is provided by Gas



Source: BP Energy Outlook 2035

Business Overview – LNG

Internationally Traded Natural Gas

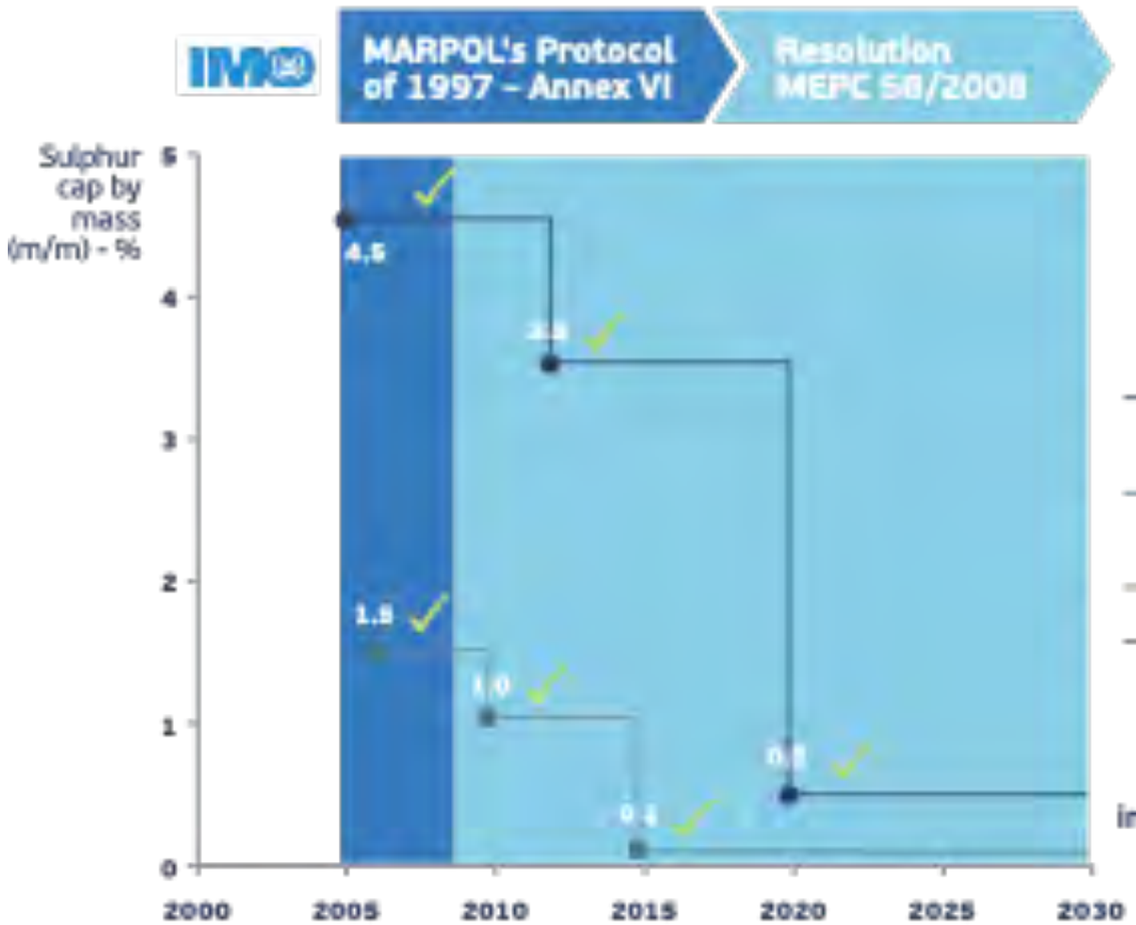


Global Gas Consumption

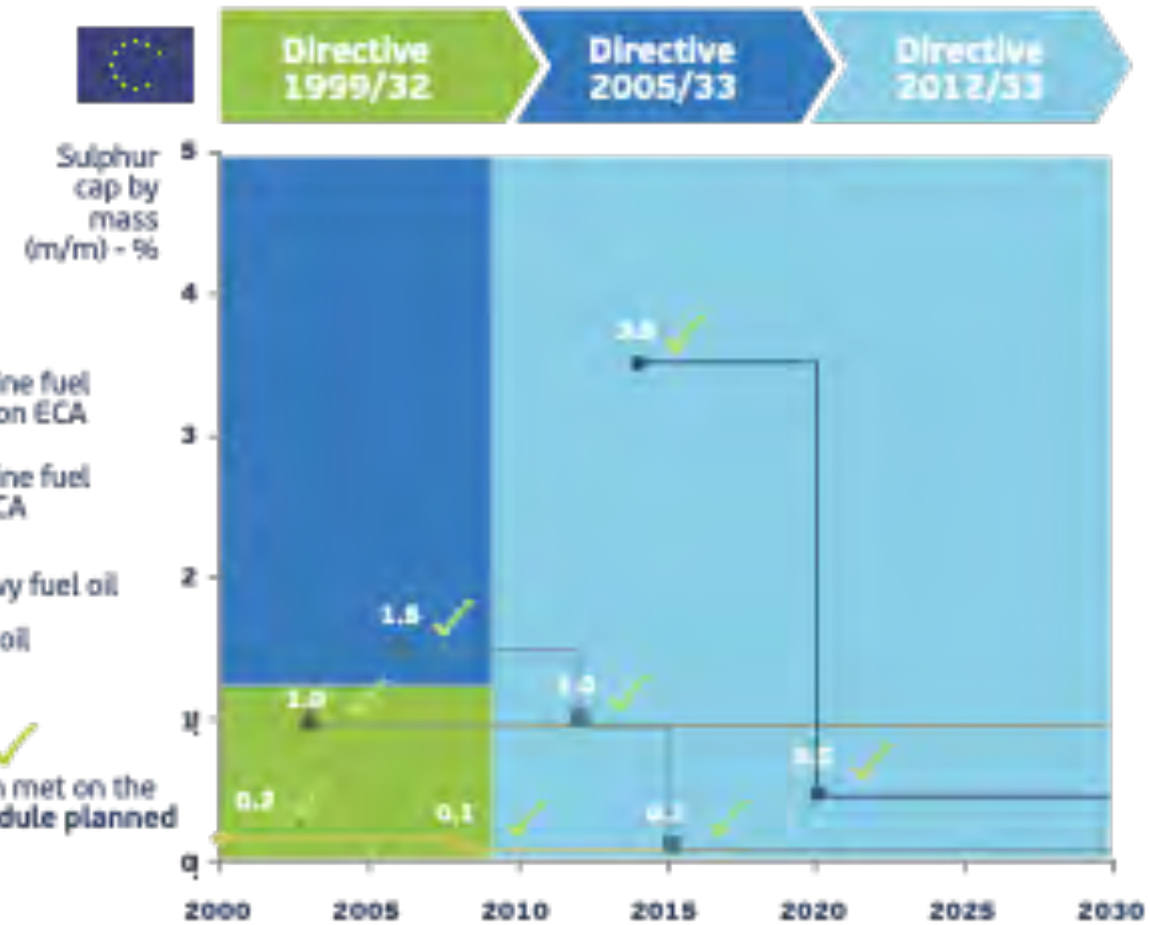
Source: Sea/LNG

Current Status

International Maritime Organization



European Union



Source: IMO,EUROPEAN PARLIAMENT

Main alternatives

- Low Sulphur FuelOil (LSFO) <0.5%
- Distillate Fuel Oil – MGO or MDO
- Exhaust Gas Cleaning Systems – Scrubbers
- Other Energy sources:
  - Biodiesel
  - Solar
  - Wind
  - LNG

Main alternatives

- Low Sulphur FuelOil (LSFO) <0.5%
  - Business as usual
  - CapEx & process taken care off
  - World wide availability
  - Price

Main alternatives

- Distillate Fuel Oil, MGO or MDO
  - Business as usual
  - Existing infrastructure
  - Product availability
  - Price

Main alternatives

- Exhaust Gas Cleaning Systems - Scrubbers
  - Product Availability
  - Low product cost
  - Maintenance and CapEx
  - Vessel Impact

Main alternatives

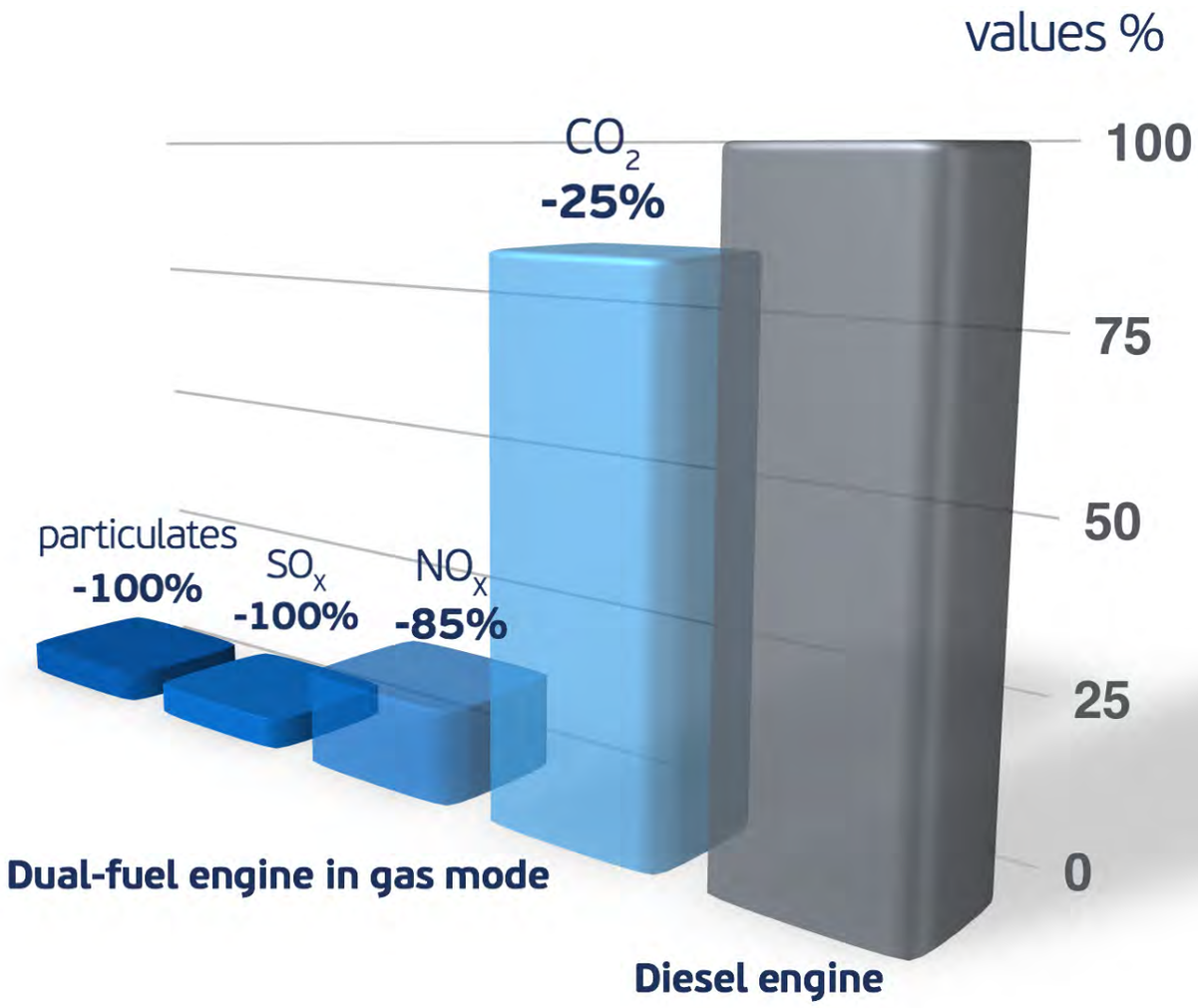
- Alternative Energy Sources
  - Environmental Compliance
  - Low OpEx
  - Unproven efficiency
  - Unknown cost

Main alternatives

- LNG
  - Environmental Compliance
  - Low OpEx and Product price
  - Infrastructure
  - Investment

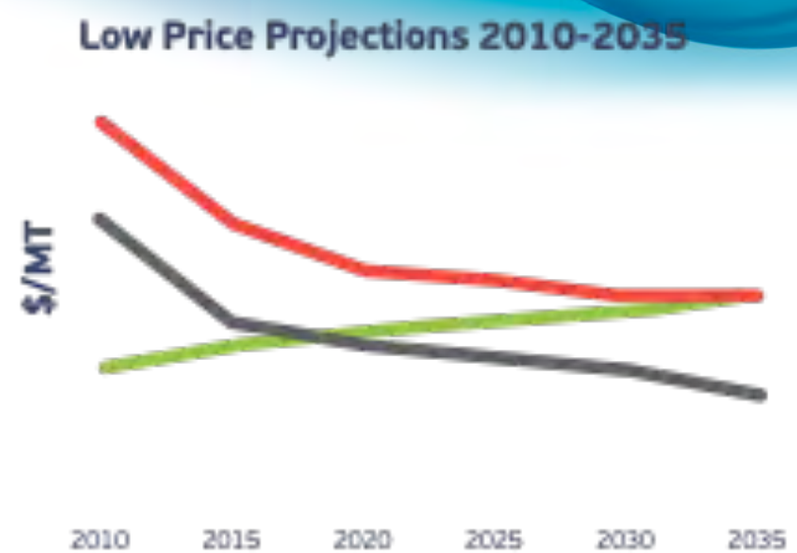
LNG advantages - Environment

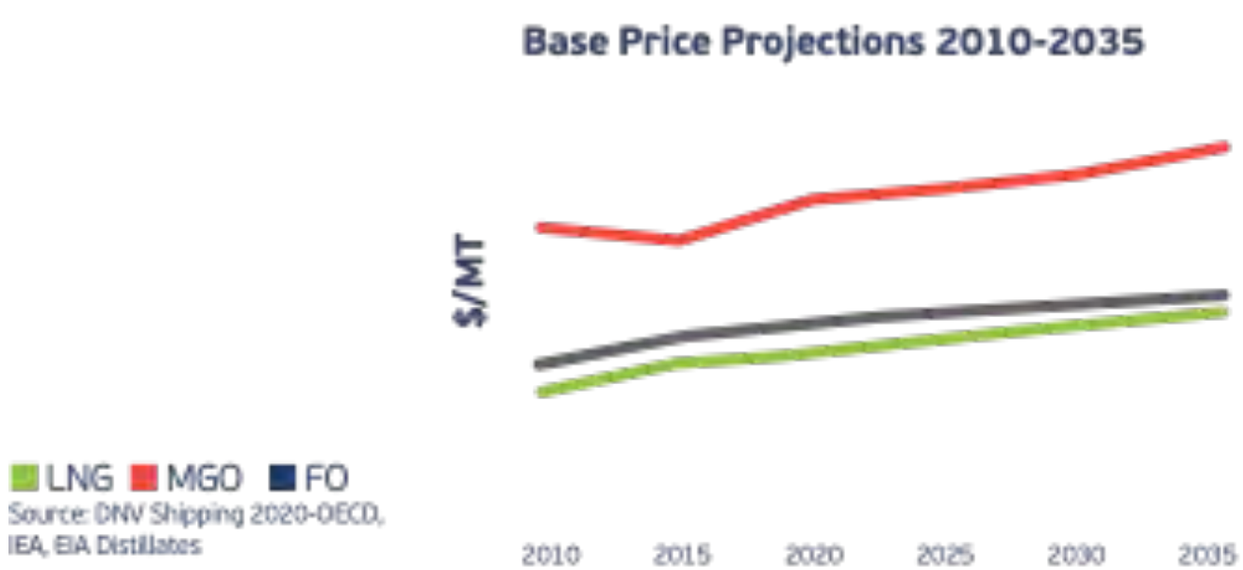
- LNG has significant environmental advantages with regards to:
  - Nox: 85% lower emissions
  - Sox: Virtually no emissions
  - PM: Virtually no emissions
  - CO2: 25% lower emissions

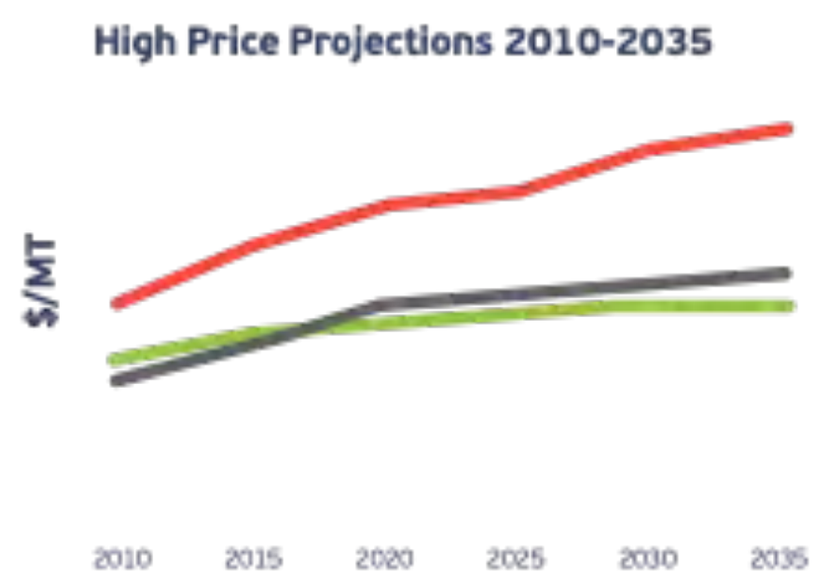


LNG advantages - Price

- **LNG is the most economic option**
- **Historical low prices**







LNG advantages

	LSFO <0.5%	Distillates	Scrubbers	LNG
OpEx	2	2	3	1
CapEx	1	2	3	4
Product availability	4	2	1	2
Enviroment: Impact/Regulations	4	3	3	1
Price	3	4	1	2
Infrastructure	1	1	2	4
Ship impact	1	1	4	2
	16	15	17	16

1=Best, 4=Worst

LNG advantages + probunkers

	LSFO <0.5%	Distillates	Scrubbers	LNG
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	16	15	17	14

1=Best, 4=Worst

LNG probunkers

Is there a firm business case for LNG as a marine fuel?

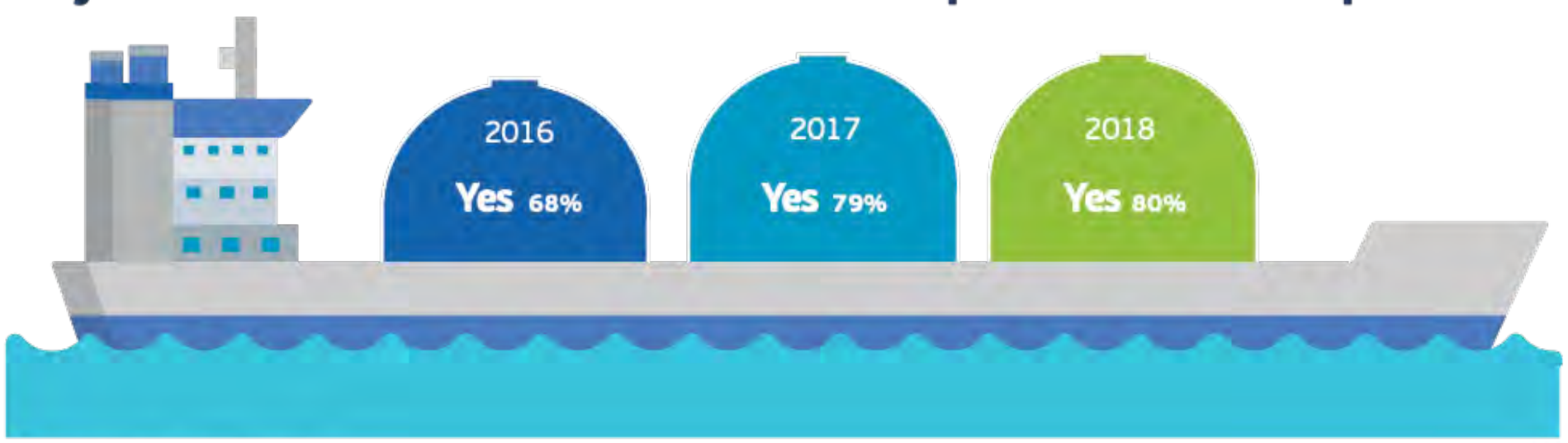
Source: LNG Bunkering summit survey 2013

What do you feel to be the greatest hurdle for LNG?

Source: LNG Bunkering summit survey

2015 2016 2017 2018

Do you feel that LNG will become a widespread fuel for ships?



Source: LNG Bunkering summit survey 2018.

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- LNG Bunkering is an increasing activity
- Each Vessel has its own design and there are no standards
- LNG Bunkering and conventional fuels Bunkering are somehow similar but with different requirements
- SAFETY is FIRST

LNG probunkers

Source: DNV.GL AFI portal

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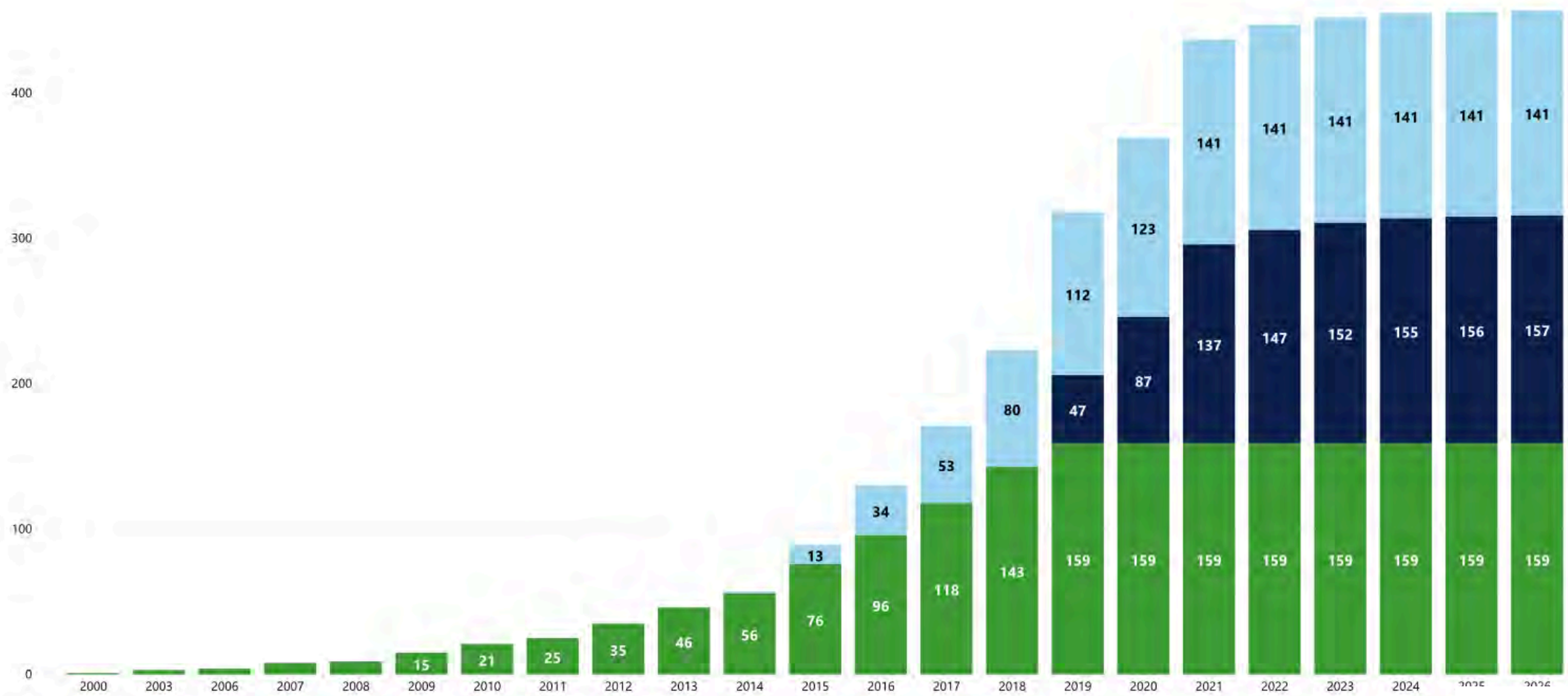
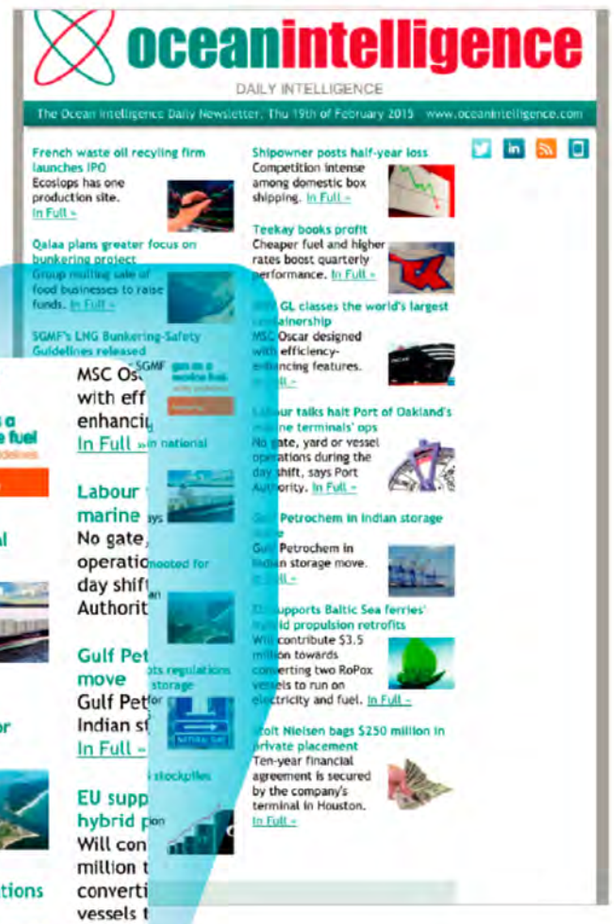
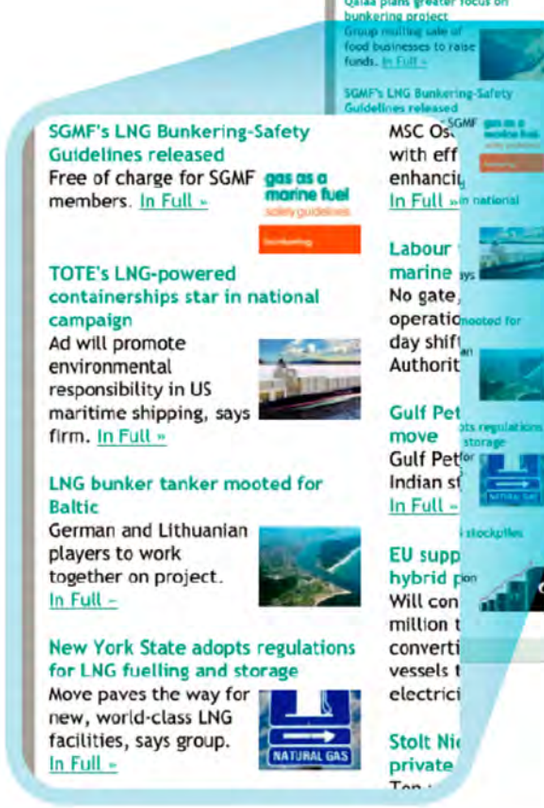


Source: DNV.GL AFI portal

LNG on the news

- More and more articles
- Large % of the shipping stories
- A lot of talk





TradeWinds 20 February 2015

In their own WORDS

"We really needed a deep shipping crisis in 2010 and 2011. If we hadn't built up that extra capacity then, we wouldn't have the problems we have now."
THOMAS KAAS CHRISTIANSEN / CHIEF EXECUTIVE, LORENTZEN & STEMOCO

"Nobody wants to take a haircut — everybody wants to maintain the value of vessels at the old high prices and loans."
TORSTEN TEICHERT / CHIEF EXECUTIVE, LLOYD FONDS

Market Analysis

THE LNG PRIME: An artist's impression of the bunker vessel, which will serve the ARA region.

First LNG bunker units show their colours

But will speculative units multiply this emerging breed or are their numbers set to remain restricted to dedicated trades?

Lucy Hine London

Two new dedicated LNG bunker vessels have been ordered since the start of the year, bringing the fleet total in this emerging sector to a tentative five.

It is tricky to call the number of LNG bunkering vessels as their ranks are swelled by existing gas carriers, which either have already carried out LNG bunkering operations or are claimed by their owners to be capable of doing the job.

In addition, there is a distinction to be made between seagoing vessels and inland bunker barges, although, in the case of the latter, some of these are being designed to serve the deepsea fleet.

But while the number of dedicated ships may not sound huge, as yet each has its own significance in the development of the sector.

First off the blocks was not a newbuilding but something of an experimental conversion. The *Seagas* is a former car ferry that was specially converted to supply Viking Line's 57,000-gross-ton (gt) cruise ferry *Viking Grace* (built 2013).

Dutch partners barge operator Deen Shipping and Veka Shipbuilding teamed up on a 2,250-cbm barge-type bunkering vessel in 2013, which, while not designed to be seagoing, is set to serve merchant vessels calling at ports in the Amsterdam-Rotterdam-Antwerp (ARA) region from 2016. The vessel is being offered into projects but could be classed as a speculative play.

A year later, GDF Suez and partner NYK, along with trading house Mitsubishi Corp, became the first shipowners to order a dedicated seagoing LNG bunker vessel, contracting a 5,000-cbm newbuilding at Hanjin Heavy Industries in South Korea.

The ship will be based in the Belgium port of Zeebrugge, from where it will be used to bunker a pair of LNG-fuelled car-carrier newbuildings.

At the end of last year, Shell joined the crowd as the first energy major to make a move. After a long debate over a series of three vessels, the company plumped for a single, firm 6,500-cbm newbuilding at STX Offshore & Shipbuilding in Korea. That vessel will be based at the Gate LNG terminal in the Netherlands.

This year, Dutch owner Anthony Veder, partnered with Sweden's Sirius Shipping, kicked off the action when it ordered a 5,800-cbm, ice-class 1A, dual-fuel vessel at Royal Bodewes shipyard in the Netherlands for delivery in February 2017. The LNG-bunker vessel is the first to be contracted in Europe.

Consultants working on LNG-bunkering projects say the key feature for ships being built to serve them is that they are capable of transporting any amount of cargo and not be restricted by any filling levels. In this respect, off-the-peg, Type-C tank technology has proved popular to date but other systems have been proposed.

SUITABLE SIZE AROUND 2,000 CBM

While the LNG-bunker tankers ordered have tended to be around 5,000 cbm, specialists point out that 2,000 cbm is likely a suitable size if the ship is going to be used purely for bunkering purposes.

However, they say that, certainly in the case of the 5,000-cbm plus ships that have been contracted, this size gives their end-users the added flexibility and fall-back to use them for making small-scale coastal LNG shipments.

Loading flexibility is another key consideration. Consultants say thought needs to be given to the positioning of manifolds based on likely load ports and their facilities as well as the placement of fenders.

Initially, pricing has proved something of a minefield, with Shell having to adjust its initial high specifications and shipyards trying to adapt to what those ordering could stomach. But, today, prices for 5,000-cbm units seem to be coming in at around the $40m-$50m mark, consultants reveal.

There are a number of other LNG bunker tanker projects in the works.

This week, TradeWinds revealed that Stena LNG was working on a pair of specialised LNG bunker tanker newbuilding orders. The first US-built LNG bunker barge order is also eagerly expected.

Numerous well-known LNG shipowner names have been quoted as expressing an interest in LNG bunkering. But, at present, the market is not there.

Last month, Belgian shipowner Exmar and the Port of Antwerp demonstrated this by announcing they would no longer jointly invest in an LNG-bunker vessel as the "critical demand for this service is currently not existing".

The recent drops in the crude oil price are also blunting interest in LNG fuelling as the best solution to meet the new and incoming emissions legislation. In the current climate, LNG is not looking as price competitive and the emergence of new, low-sulphur marine fuels have given owners a wider range of choice.

Consultants believe the industry will continue to see a steady stream of LNG bunker vessels emerge to serve the LNG-fuelled ships that have already been contracted.

But, for now at least, speculative LNG-bunker tankers could prove a step too far for most shipowners.

(See also Stena, page 21.)

LNG BUNKER VESSELS

Vessel	Capacity (cbm)	Delivery	Owner	Employment
Seagas	187	2013	AGA	Viking Line
Tbn	5,000	Q3 2016	NYK/GDF Suez/Mitsubishi	NYK/UECC
LNG Prime	2,250	Q1 2016	Veka/Deen LNG	ARA region
Tbn	6,500	2016	Shell	Gate LNG
Coralius	5,800	Q1 2017	Anthony Veder/Sirius Shipping	Skangass

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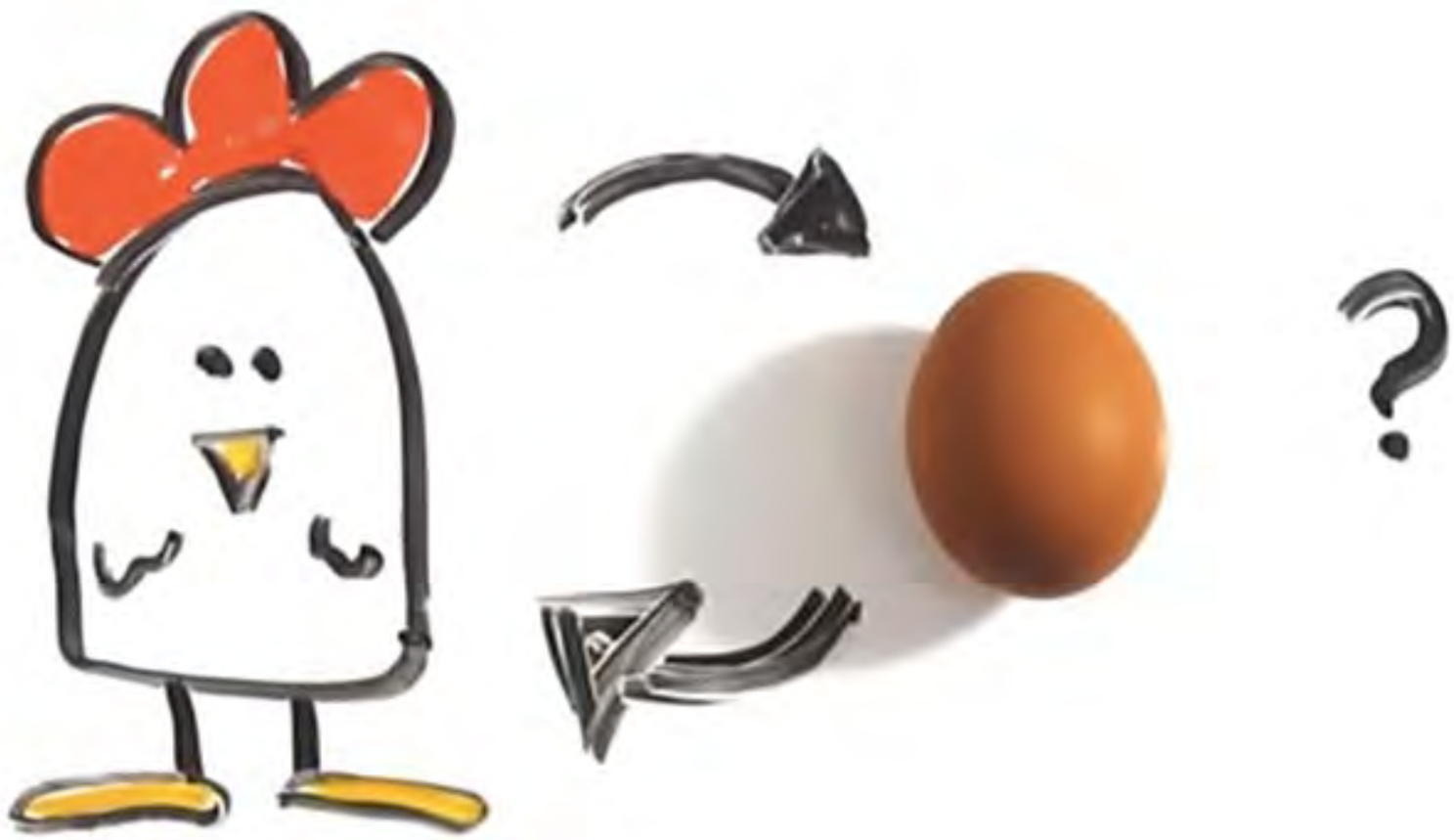
LNG Dilemma



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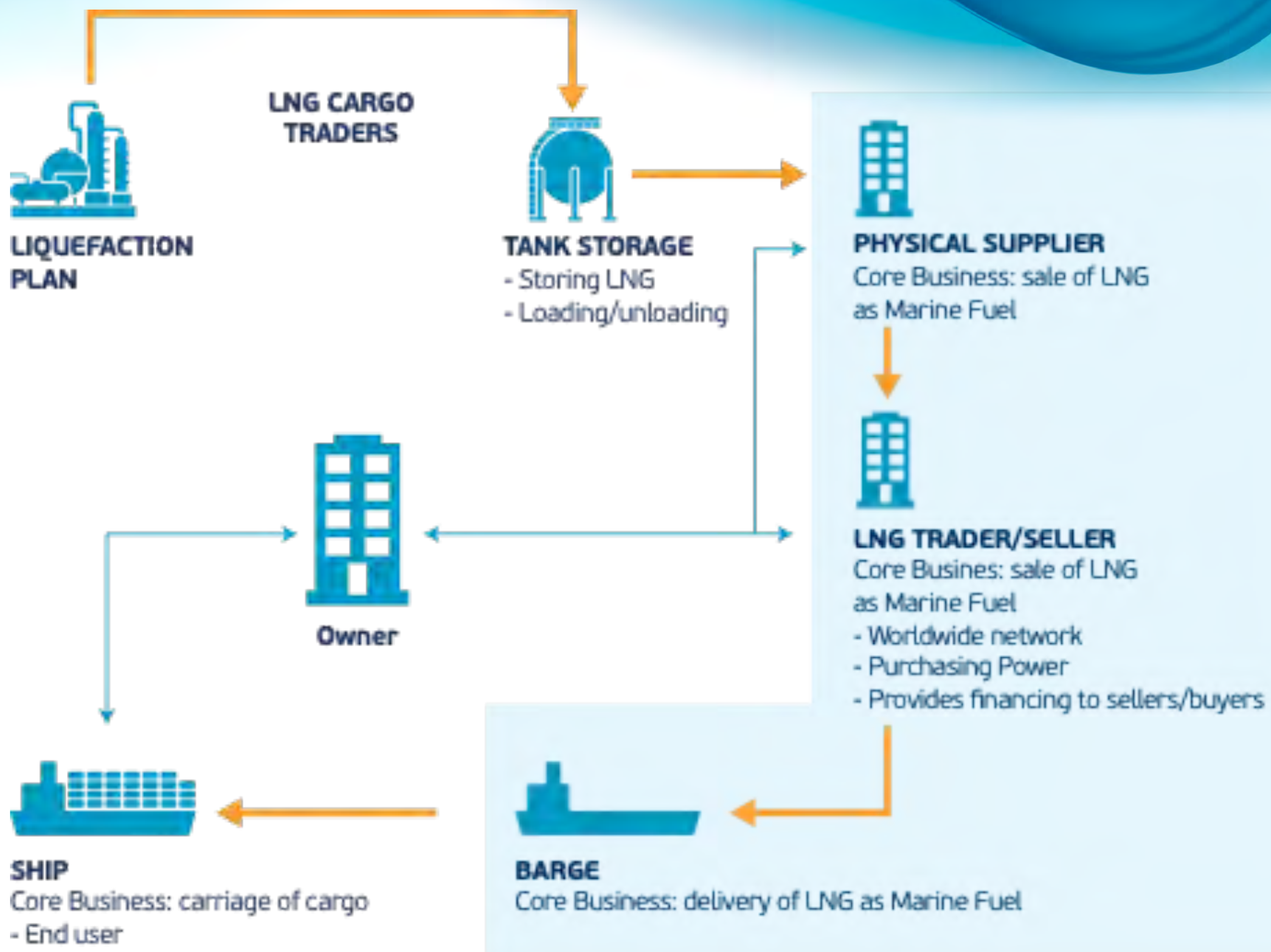
Project Overview

- Global LNG bunkering
- Establish an LNG global supply company
- Design, build and operate LNG bunkering vessels
- Physical LNG bunker supply in 7 key ports

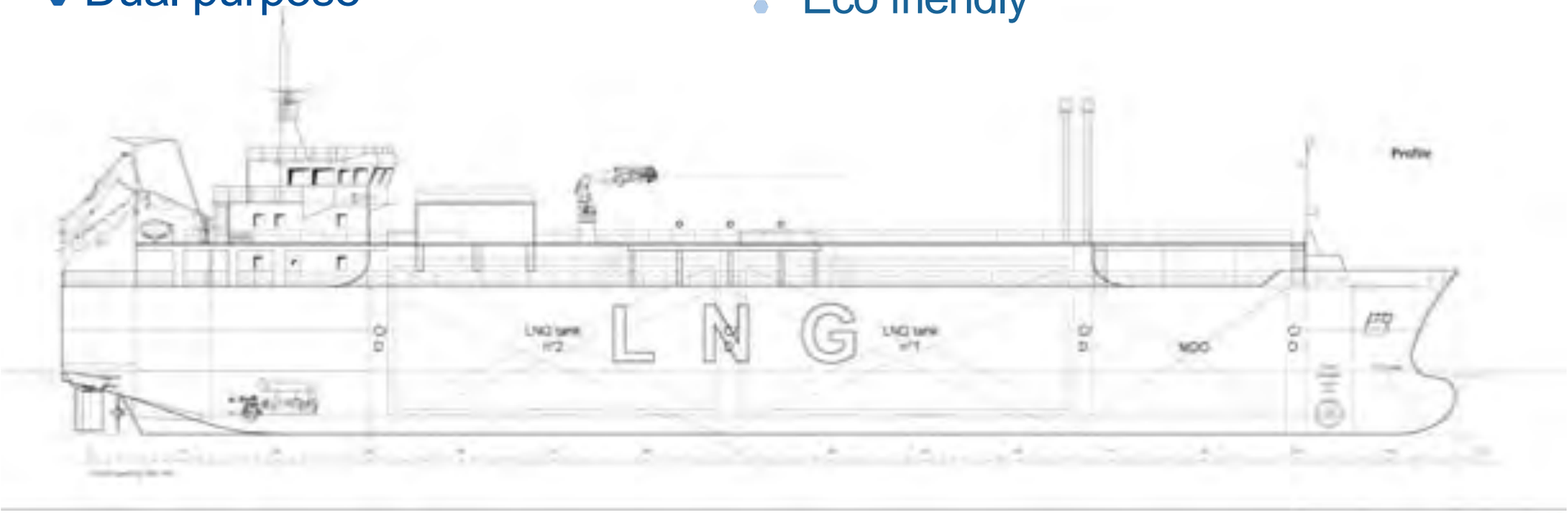
LNG Bunkering Flow



Design & Build LNG supply vessels

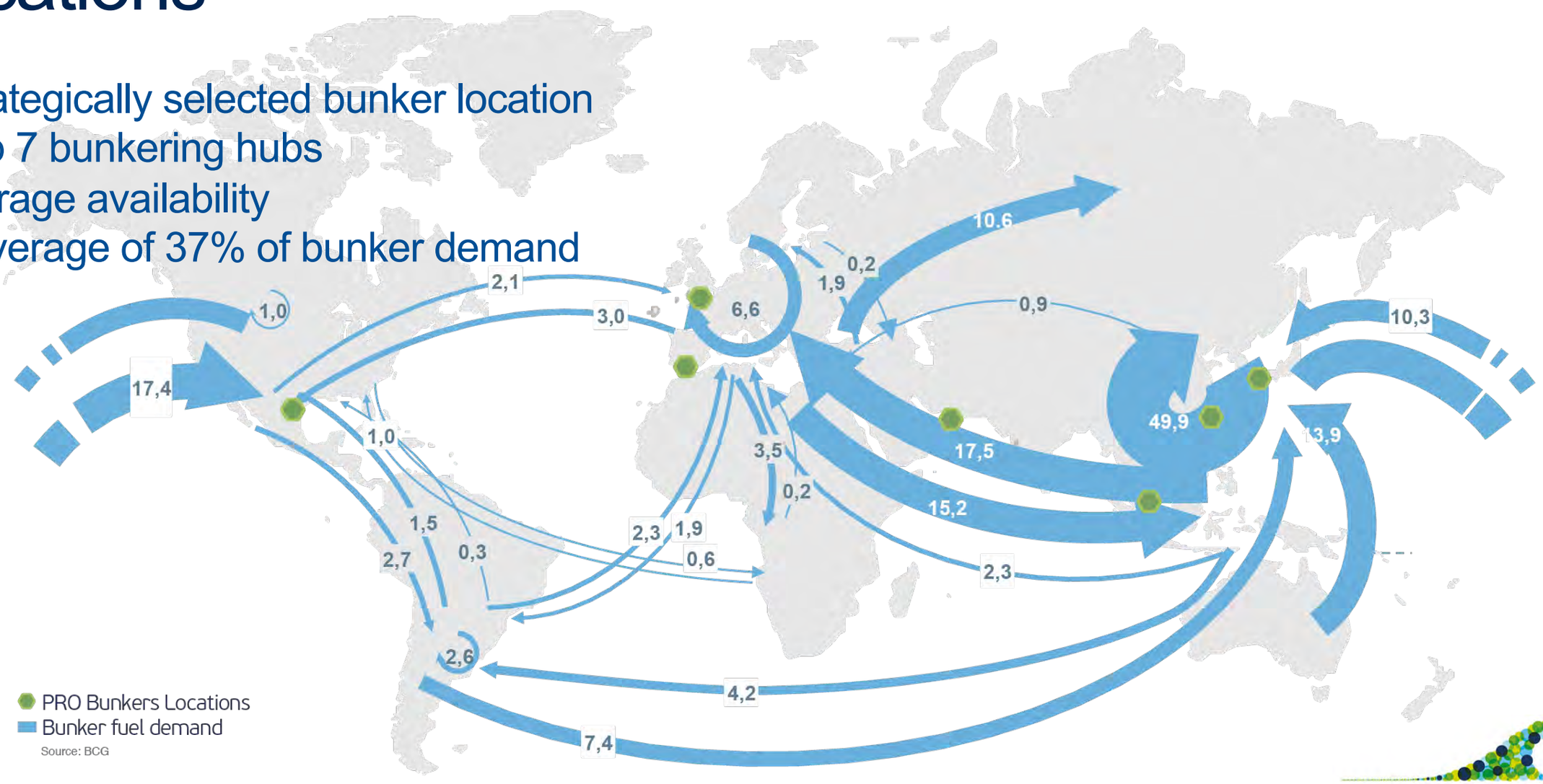
- Unique fleet
- Modern fleet
- Dual purpose

- State of the art
- Full monitoring systems
- Eco friendly



Locations

- Strategically selected bunker location
- Top 7 bunkering hubs
- Storage availability
- Coverage of 37% of bunker demand



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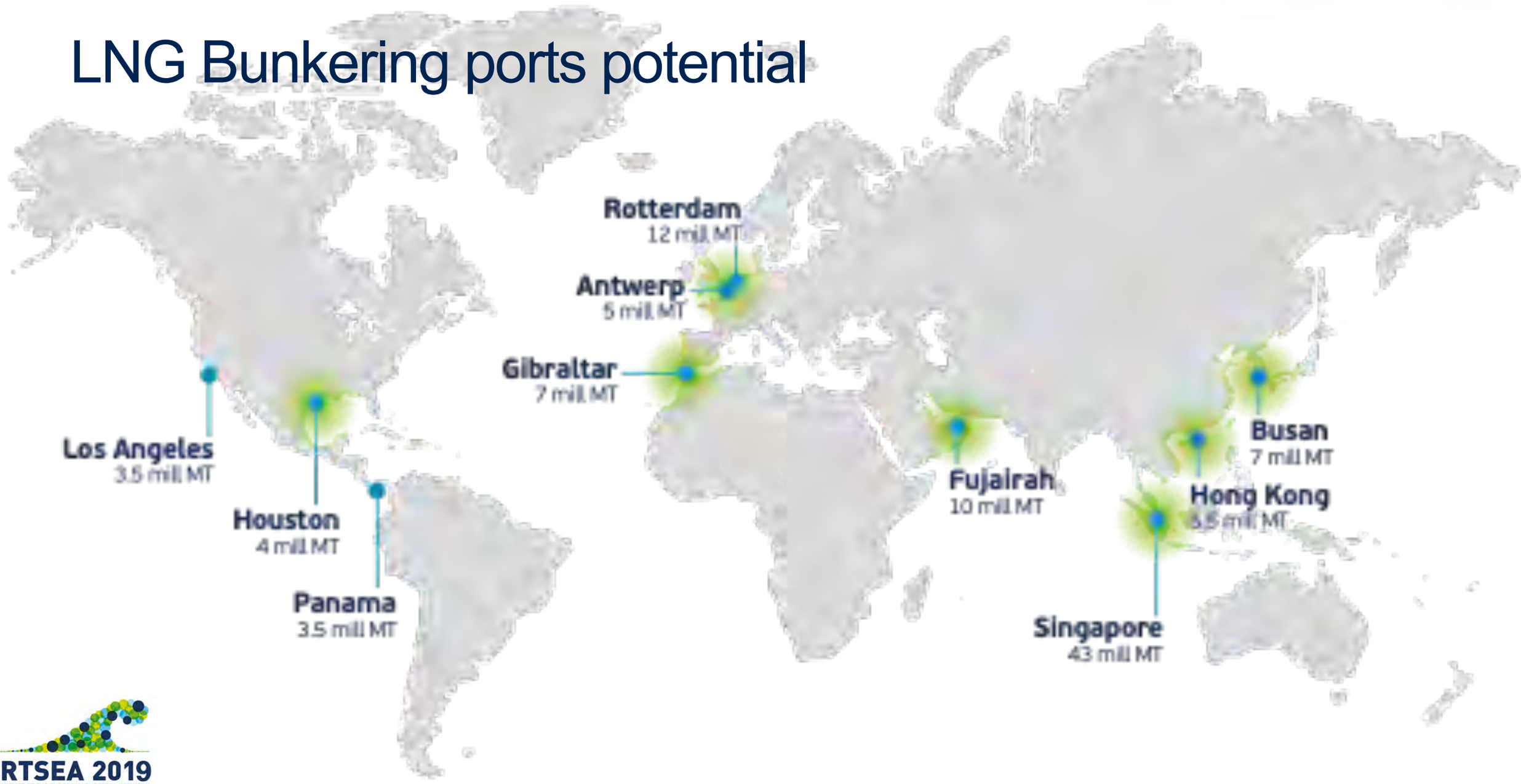
LNG Bunkering ports potential



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Dzięki Obrigado Merci Tack

Diolch

Grazie Ευχαριστώ

Terima Kasih

Ngiyabonga Dank U Thank you

Gracias شكر Спасибо Danke

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