



**POSEIDON
MED II
LNG
BUNKERING
PROJECT**

LNG as an alternative marine fuel; Developments & Perspectives

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3rd INTERNATIONAL CONFERENCE Ports, Maritime Transport & Insularity

Piraeus Chamber of Commerce & Industry April 19 & 20, 2018



Co-financed by the European Union
Connecting Europe Facility



Content

- I. LNG as Marine Fuel
- II. Poseidon Med II Project
- III. Benefits & Perspective





Content

I. LNG as Marine Fuel

II. Poseidon Med II Project

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International regulation on the emission control



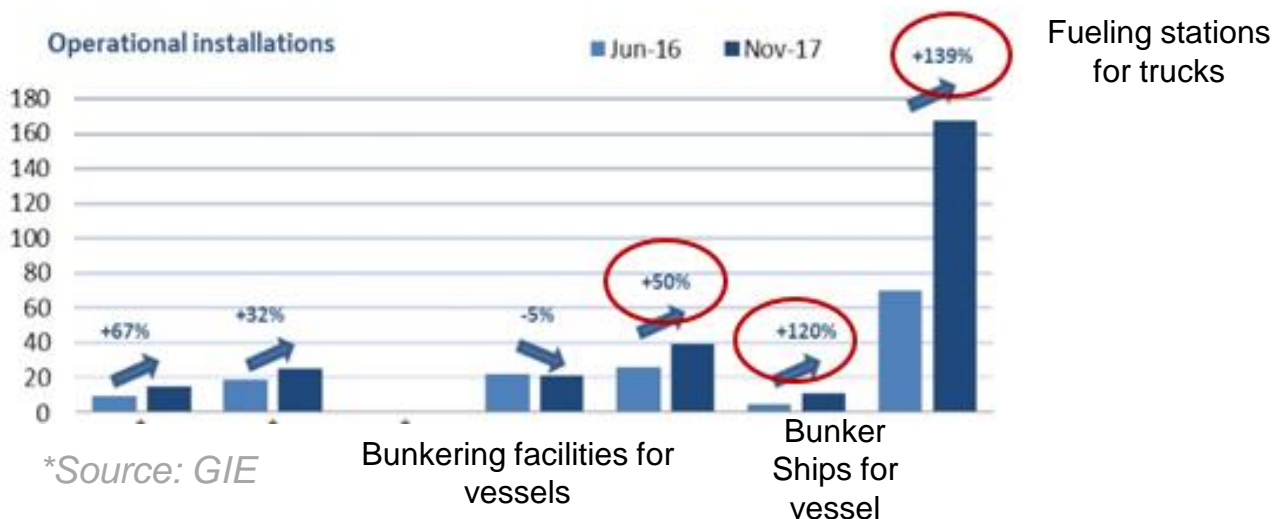
Ships trading...

...in ECA have use fuel oil with a sulphur content of no more than 0.10% since 1 January 2015.

...outside (ECA), the current limit for sulphur content of fuel oil is 3.50%, falling to 0.50% m/m on after 1 January 2020

Small-Scale LNG infrastructure in Europe

- 75% of operational SSLNG infrastructures were in countries that have large scale regasification terminals (Western Europe).
- LNG fuelling stations for trucks; both the number of operational stations as well as the number of under construction and planned stations have more than doubled to 167 and 71 respectively.
- Sea and river SSLNG infrastructure projects has also grown, moving from 31 to 50 over 2016-2017 (+62%), while the pipeline of new under construction or planned projects showed a slight decline from 37 to 31 (-16%).





LNG fuelled Vessels

There are currently 221 confirmed LNG ship fuel projects



Excluding LNG carriers & inland waterway vessels

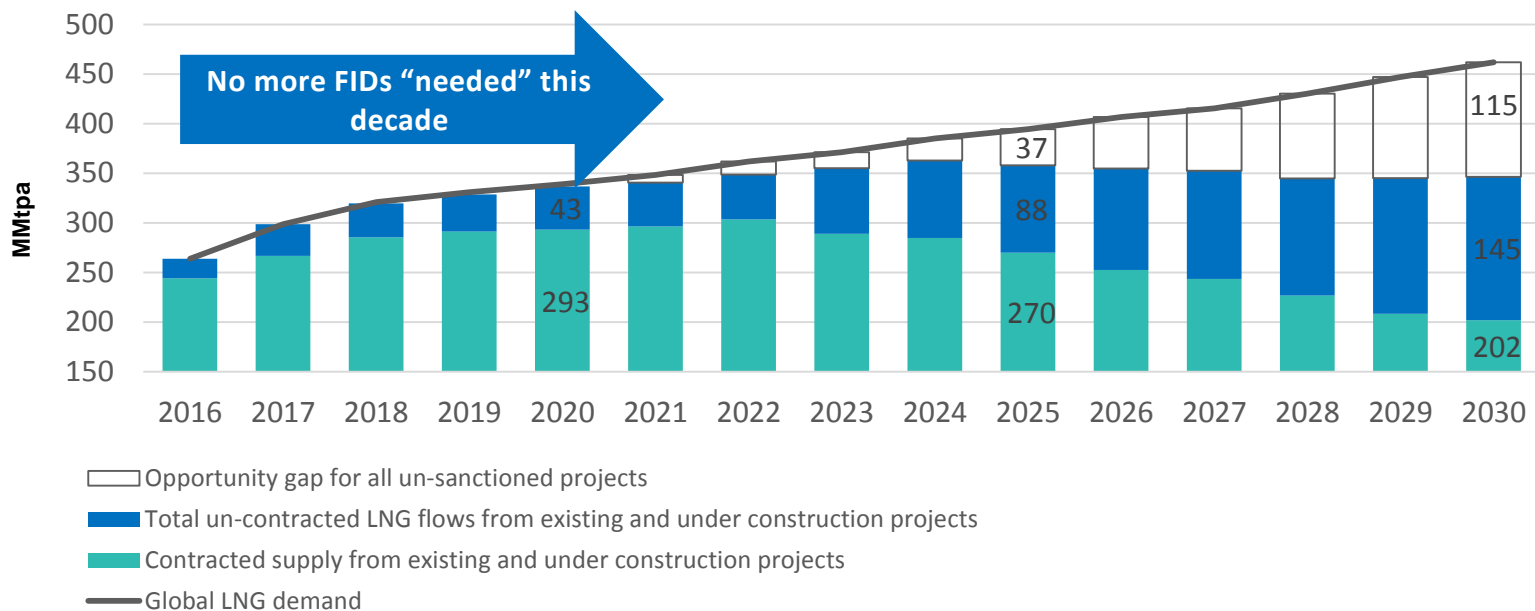
Source: DNV-GL, May 2017

106 LNG fuelled ships in operation worldwide today

115 confirmed LNG fuelled newbuilds in 2024

Supply – Demand Balance

Contracted supply and viable un-contracted supply versus global LNG demand



Note: MMtpa = Million metric tons per annum of LNG. Does not include market-driven underutilization from global projects
© 2016 IHS

Buyers market

Reduced capacity utilization 80%-90% vs. 88% (in the period of 2000-2016)

CMA CGM to Power Its 22,000 TEU Giants with LNG



French shipping major CMA CGM Group has unveiled the decision to equip its **nine** future ships of 22,000 TEUs with engines using liquefied natural gas.

"We have made the future 22,000 TEU firmly focus on environment

MOL orders LNG-fueled tugboat



Image courtesy of MOL

Japan's Mitsui O.S. ordered a liquefied fueled tugboat at Dockyard.

According to the MOL of the vessel is set to expected to be completed

The launching of the 2019, MOL said, noting the first tugboat with engines running on LNG engines will be manufactured by Yan.

World News

China Boasts a Gas-Fuelled Fleet of 275 as Bullish Outlook for LNG Bunkering Continues

Monday March 26, 2018

2018's bullish outlook for liquefied natural gas (LNG) bunkering continues this week courtesy of several recent reports highlighting increased interest and adoption for the emerging marine fuel.

Among those was a report by Interfax quoting Ji Yongbo, a researcher at the China Waterborne Transport Institute, who last week spoke at a



In the Press

MSC and Moby order LNG-ready ro-pax newbuild vessels from GSI



MSC and Moby have ordered **four** LNG-ready ro-pax ferry/cruise vessels, plus options for up four for more, from GSI Shipyard in China.

The four newbuilds will have 3,765 m of linear capacity and be able to accommodate 2,500 passengers. Two of the vessels are

World's first LNG-fuelled bulk carrier delivered.

Rotterdam: Less fuel oil and more LNG bunkered in 2017

in Port News 20/02/2018



In 2017, the sale of bunker oil – fuel for shipping – in the Rotterdam bunker port diminished from 10.1 million m3 to 9.9 million m3. Bunkers contain fuel oil, in 2017, 8.3 million m3. The throughput bunkered liquefied natural gas (LNG) – liquefied natural gas – increased from less than 100 tonnes to 1500 tonnes.

EMSA – New guidance on the use of LNG as a ship fuel

Maritime Cyprus admin / February 13, 2018



Guidance on LNG Bunkering European Maritime Safety Agency

Carnival Orders Third LNG-Fuelled Ship for Its AIDA Brand



Image Courtesy: Carnival Corp

Carnival Corporation & plc has signed a shipbuilding contract for a third next-generation cruise ship for its Germany-based AIDA Cruises brand.

Scheduled for delivery in 2023, the new 180,000-ton ship, being built by German shipbuilder Meyer Werft GmbH at its shipyard in Papenburg, will feature Carnival's "green cruising" design. The ship will also be fully powered at sea and in port by liquefied natural gas (LNG).

TOTE Completes First Phase of Vessel Conversion to LNG-Fuelled Propulsion

Tuesday, February 27, 2018

TOTE Maritime Alaska (TOTE) says it has completed the first of four conversion periods for its Orca class vessels, which will enable the ships to use liquefied natural gas (LNG) as fuel.

The company explains LNG tanks and critical engine updates necessary to utilise LNG as a fuel were completed during the initial phase of the planned four year process.

TOTE Maritime's vessel North Star arrived in Anchorage on Sunday after completing its first voyage with two LNG tanks fitted behind the ship's bridge.



TOTE Maritime's North Star has been fitted with two LNG tanks behind the ship's bridge. Image Credit: TOTE



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Poseidon Med II

Poseidon Med II is a key European project aiming to take all the necessary steps towards adoption of LNG as marine fuel in the Eastern Mediterranean Sea, while making Greece an international marine bunkering and distribution hub for LNG in South Eastern Europe.



Duration:
Jun.2015 – Dec.2020



Budget: ~€53M



Partners: 26



Coordinator: DEPA



Technical Coordinator: DESFA



Co-financed:
50% by EU - CEF

Poseidon Med II

3 Countries

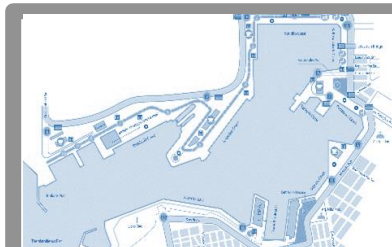
Greece
Italy
Cyprus

6 Ports

Piraeus
Patra
Heraklion
Igoumenitsa
Limassol
Venice



Activities



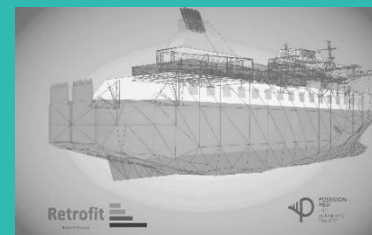
01

Studies for Ports

Infrastructure at Revithoussa LNG terminal -
LNG infrastructure at 5 ports -

02

Designs of Vessels



- LNG fuelled vessels (newbuilds & retrofit)
- LNG bunkering and feeder

Synergies

Adaptation of regulatory framework -
Environmental impact assessment -

- Financial assessment
- Financial tools for investments



03

Regulation

04

Financial

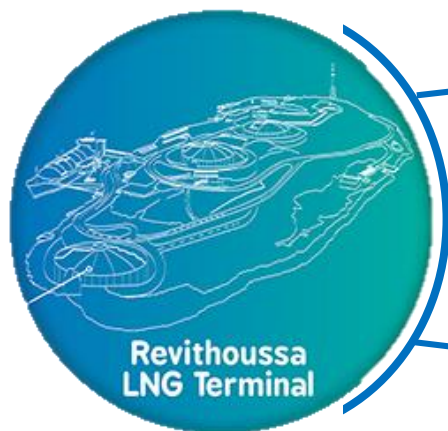




Small Scale LNG Infrastructure

LNG Terminal

From the LNG Import Terminal
(Revithoussa)



Transportation

LNG is being transported with
feeder/bunkering vessel or
trucks



Consumption

To the consumers, that could be



LNG storage tanks



Vessels users



Industry



Partners



Progress on ports & LNG Terminal Infrastructure



Progress on Vessels Designs





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Greece; Specific needs



➤ **2.500** islands

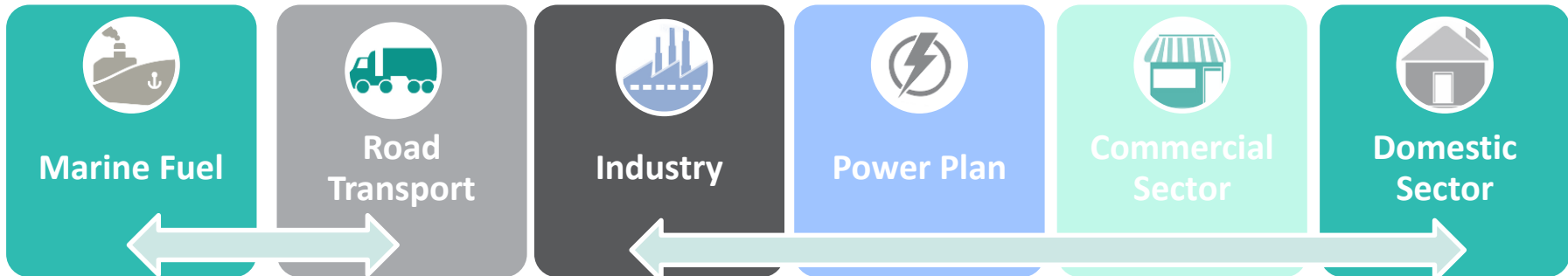
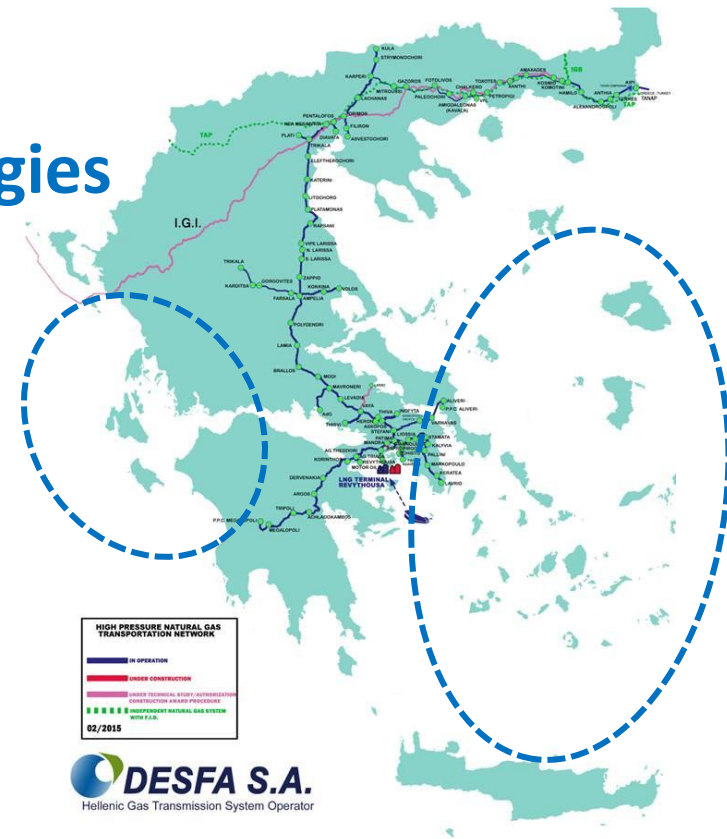
➤ **165** inhabited

➤ **53** islands > 1.000 population

➤ **162** ports

SSLNG Infrastructure - Synergies

High density residential areas & large industrial & commercial customers in Western Greece & the Islands without access to Natural Gas





Why LNG?



Safe and proven technology;
safe usage, storage
& transportation



Cost-effective fuel available today-
Viable and sustainable
solution



Environmentally friendly:
lower CO₂, NO_x, SO_x
and PM emissions



Economies of scale and synergies
with power and energy markets

Το Υγροποιημένο Φυσικό Αέριο



Gas

Cooled to approx -162 C



Easy transferred and stored
1/600 space of gas



Less Emissions

Main component metaine (CH₄)



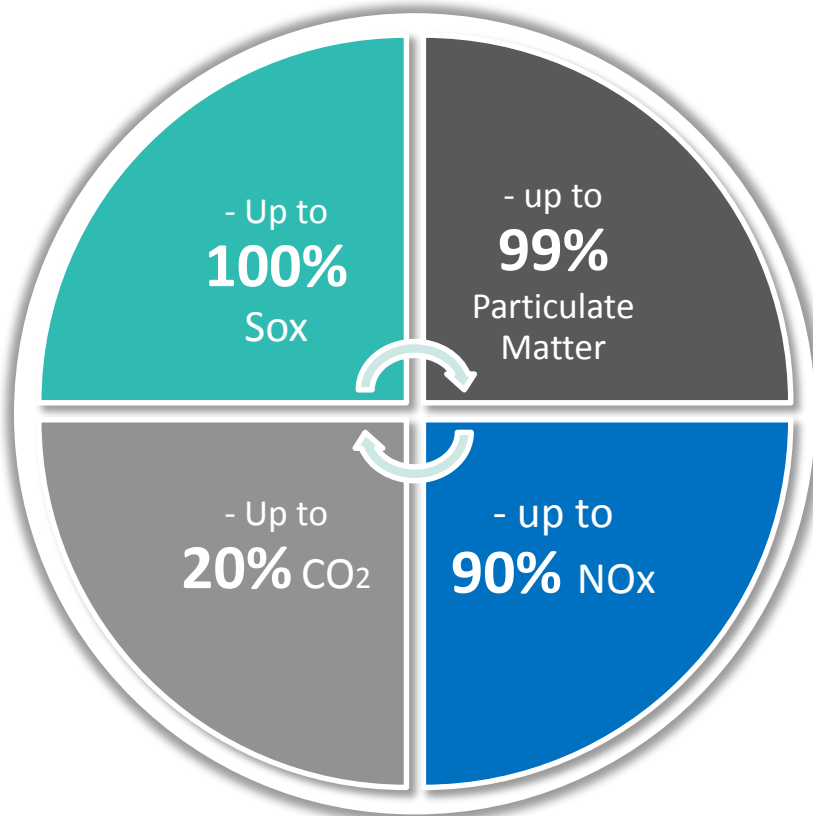
Efficient

Height Thermal



Environmental Friendly

Clear, odorless, colorless, non toxic





LNG Era; An Emerging Market

Improvement of the
ports competitiveness

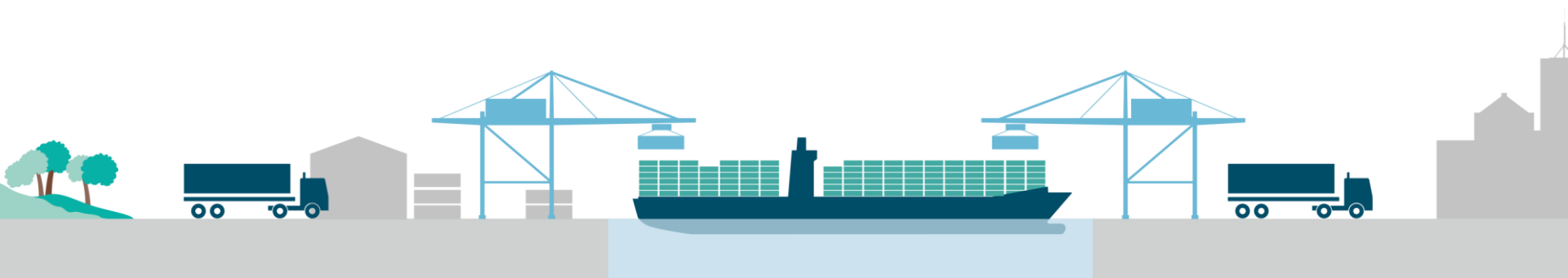
Know-how; Vessels
installations and LNG
infrastructure

Investment into LNG
Infrastructure

New Market & New
jobs

Strengthen Greece'
leadership in shipping

Boosting Hellenic
shipbuilding sector





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