30th May 2013 - Varna

ESPO 2013 Conference

“LNG Bunkering – LNG in Baltic and Black Sea Ports"-

Emil Arolski – Project Manager-“LNG in Baltic Sea Ports”

LNG in Baltic Sea Ports

LNG in Baltic Sea Ports

Plan of the presentation:

- LNG in Black Sea Ports- transfer of LNG "know-how" from the Baltic Ports.
- LNG powered shipping fleet.
- LNG as a future fuel.
- Pricing of LNG as a bunker fuel.

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Why LNG ?

- In order to reduce SOx emissions from ships, in October 2008, IMO adopted tighter limit for the sulphur content of marine fuels. These regulations were transposed in EU law by Directive 2012/33/EU of the European Parliament (known as sulphur directive).
  - The strictest rules are established for the North Sea, the English Channel and the Baltic Sea, which are included in Sulphur Emission Control Areas (SECA).
    - According to the new requirement, from 1st January 2015 ships operating in SECA shall not use marine fuels with a sulphur content exceeding 0.1% by mass.

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7 ports around the Baltic Sea plus supporting ports; supported by ESPO and many industry organizations (ship-owners, national ports organizations,)

A positive decision at the TEN-T Financial Assistance Committee(30 January 2012)

- Focus on pre-investment studies such as environmental impact assessments, feasibility analyses for LNG terminals or bunkering vessels, project designs, regional market studies, safety manuals, etc.
- Project works include a so-called 'stakeholder platform' which will facilitate a discussion among various actors, such as port authorities, shipowners, gas infrastructure providers, energy traders and bunkering companies.
- Project Budget - Around 4 mln. Euro;
  Jan. 2012 – Dec. 2014

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Objectives:

Development of the infrastructure in the ports for LNG bunkering, thus making possible to use LNG as fuel for the shipping industry in the future. This will decrease the emission to the atmosphere and make sea transport more environmentally friendly.

The project will result in jointly developed operational ships bunkering installations in ports that can serve as objects of reference to other ports in the Baltic Sea region and to other regions in EU.

The wider benefits of the project are to:

Foster innovation and deployment of necessary infrastructure for LNG bunkering facilities and to increase faster implementation of new technical developments in the maritime sector of the Baltic Sea Region;

Contribute to the promotion of efficient, safe and environmentally sound maritime transport in the Baltic Sea by creating a harmonised infrastructure for bunkering LNG in the Baltic Sea region (based on on-going LNG feasibility study led by the Danish Maritime Administration)

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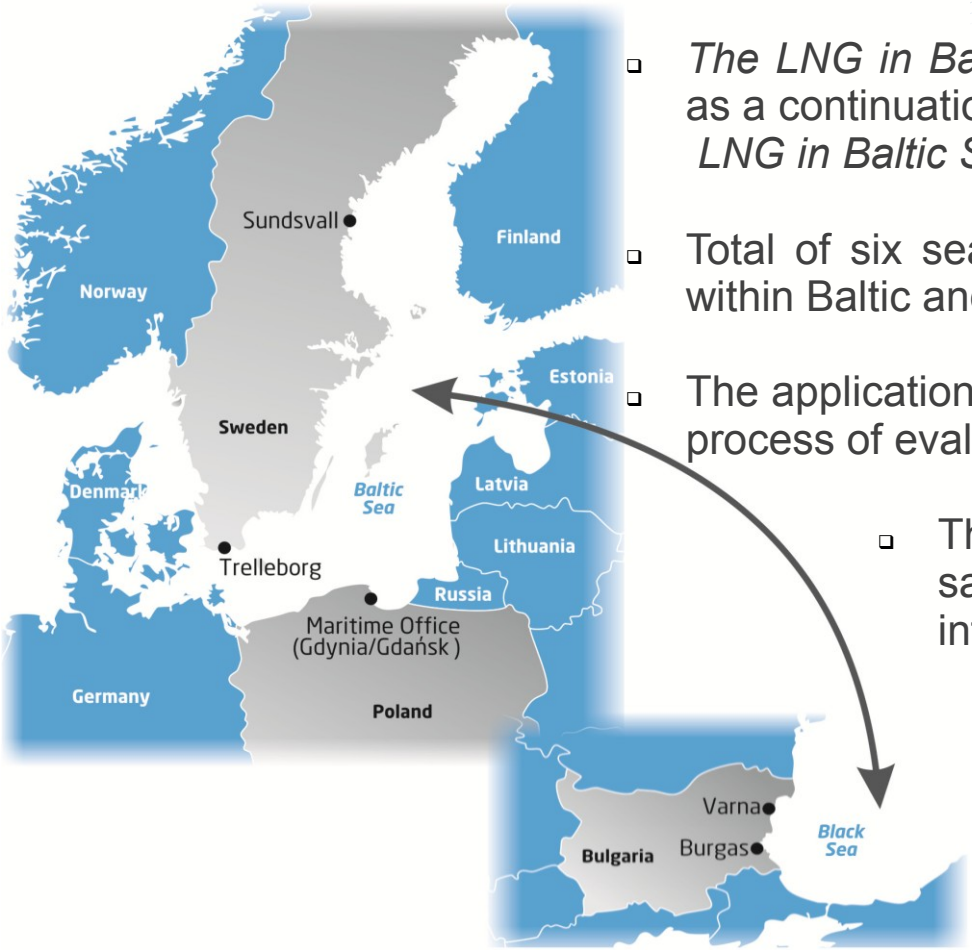
LNG in Baltic Sea Ports

LNG in Baltic and Black Sea Ports – transfer of "LNG know-how"



- *The LNG in Baltic and Back Sea Ports* project, could be regarded as a continuation and completion of the on-going project: *LNG in Baltic Sea Ports.*
- Total of six seaports from Sweden, Poland and Bulgaria, located within Baltic and Black Sea.
- The application 2012-EU-21012-S has been submitted and is in the process of evaluation by the TEN-T call for proposals team.
  - The main goal of the project is to initiate planning and safety procedures when it comes to developing LNG infrastructure in the six ports.
    - Project will allow for a better harmonization while developing LNG as a fuel in all EU waters by involving ports located outside the so-called SECA Area.
    - Project Budget - Around 1.2 mln. Euro;
      Jan. 2013 – Dec. 2015

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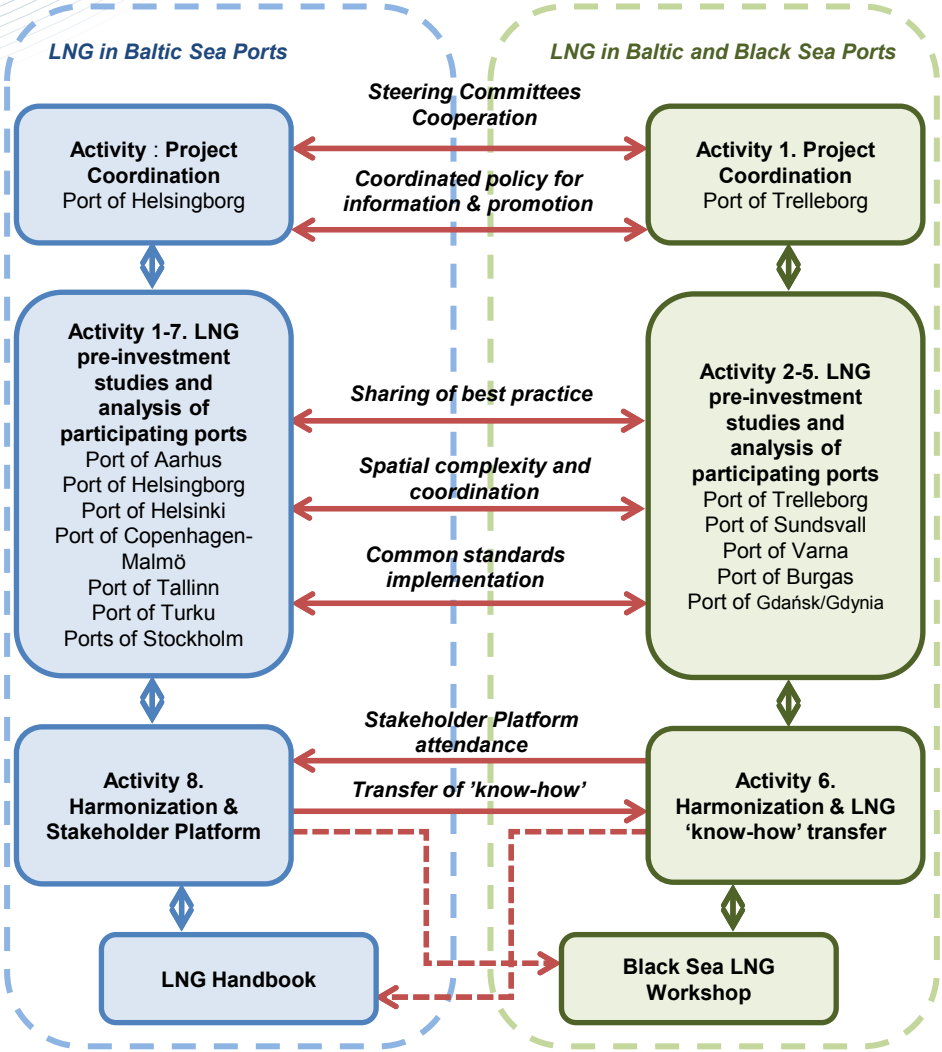
LNG in Baltic Sea Ports

LNG in Baltic and Black Sea Ports – transfer of "LNG know-how"

- Synergy will be achieved when it comes to effective implementation of EU policies and regulations on emission from shipping and clean fuels.
- There will also be a cost-saving effect: project co-ordination, communication and harmonization activities will be optimized.
- The project will also seek to cooperate with other European initiatives such as BSR InnoShip, EMSA, Clean Ship, NOx-fund (Norway) and Clean Baltic Sea Shipping (CLEANSHIP)



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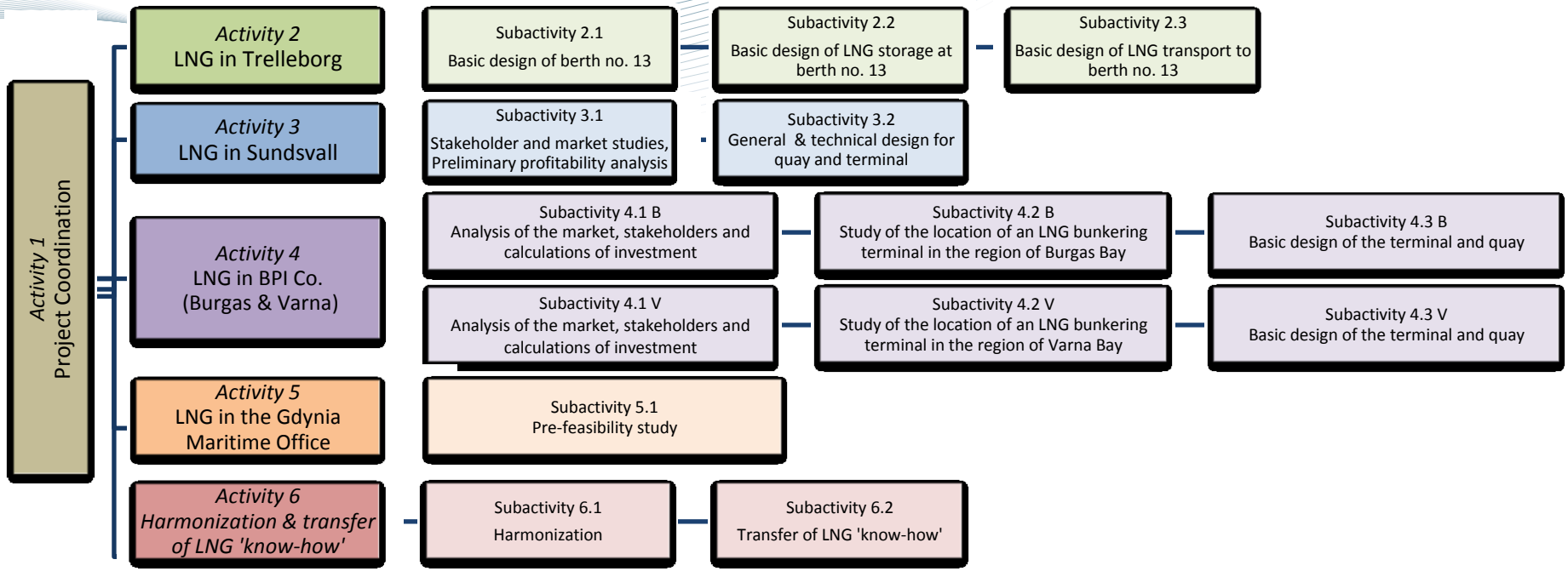

- Activity 1: Project coordination:

This activity will secure the professional and timely management of the Action and sharing of knowledge gained in the project. Port of Trelleborg, supported by (BPO), is responsible for the project's coordination.

- Activity 2 – 5: LNG pre-investment studies and analysis in participating ports:

These activities comprise the pre-investment studies and risk or market analyses that will be performed in respective ports, which will provide the necessary background for investments in LNG infrastructure and securing the safety rules.

- Activity 6: Harmonization and LNG 'know-how' transfer:

BPO will secure transferring of LNG 'know-how' and cohesion between the on-going project and the present proposal to make sure that the Actions are based on common outcomes, best practices and recommendations.

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LNG in Black Sea Ports – transfer of "LNG know-how" from the Baltic Ports

- The main concept of the BPI Co. is to join the new LNG initiative and create a benchmark from the Baltic Sea ports' experiences in LNG projects for the field of the Black Sea.
    - The idea of LNG in the seaports comes from an EU Resolution which directly describes the sulphur limits and nitrogen oxide for sea-going vessels, which is going to be implemented from January 1, 2020, in the Black Sea area.
- Port of Varna and Port of Burgas do not have infrastructure for liquefied natural gas to be used in shipping and for this reason BPI Co. has an interest and sees a necessity to participate in the future of the fuels system for vessels.
    - By supplying LNG to potential clients, Port of Burgas and Port of Varna can become one of the first ports in the Black Sea basin to provide LNG as fuel for ships and thus impose the idea of environmental shipping and greener ports, which will significantly improve the environment in the vicinity of the ports.

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LNG in Black Sea Ports – transfer of "LNG know-how" from the Baltic Ports

- Sub-activity to take on in Varna and Burgas:

- Detailed study of possible performances required for the provision of LNG as an alternative ship fuel.
  - Technical design; consistent with financial and economic analyses; possible sites for the location of LNG storage tanks.

- The study will also consider the regulatory issues regarding safety in transportation of the LNG to the berths, and also the safety regulations concerning proximity – statutory safety clearances to the city.
  - It is important also to consider the future demand for LNG in the Bulgarian ports, given the current and future market.

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LNG in Baltic Sea Ports

LNG powered shipping fleet

Source -Per-Erik Adamsson/ Ports of Stockholm

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LNG in Baltic Sea Ports

LNG powered shipping fleet

Ships in operation

Year	Type of vessel	Owner	Class
2000	Car/passenger ferry	Fjord1	DNV
2003	PSV	Simon Møkster	DNV
2003	PSV	Eidesvik	DNV
2006	Car/passenger ferry	Fjord1	DNV
2007	Car/passenger ferry	Fjord1	DNV
2007	Car/passenger ferry	Fjord1	DNV
2007	Car/passenger ferry	Fjord1	DNV
2007	Car/passenger ferry	Fjord1	DNV
2008	PSV	Eidesvik Shipping	DNV
2009	PSV	Eidesvik Shipping	DNV
2009	Car/passenger ferry	Tide Sjø	DNV
2009	Car/passenger ferry	Tide Sjø	DNV
2009	Car/passenger ferry	Tide Sjø	DNV
2009	Patrol vessel	Remøy Management	DNV
2009	Car/passenger ferry	Fjord1	DNV
2010	Patrol vessel	Remøy Management	DNV
2010	Car/passenger ferry	Fjord1	DNV
2010	Patrol vessel	Remøy Management	DNV
2010	Car/passenger ferry	Fjord1	DNV
2010	Car/passenger ferry	Fjord1	DNV
2010	Car/passenger ferry	Fosen Namsos Sjø	DNV
2011	PSV	DOF	DNV
2011	Chemical tanker	Tarbit Shipping	GL
2011	Car/passenger ferry	Fjord1	DNV
2011	PSV	Solstad Rederi	DNV
2012	Car/passenger ferry	Fjord1	DNV
2012	PSV	Eidesvik	DNV
2012	PSV	Olympic Shipping	DNV
2012	PSV	Island Offshore	DNV
2012	General Cargo	Nordnorsk Shipping	DNV
2012	PSV	Eidesvik Shipping	DNV
2012	PSV	Island Offshore	DNV
2012	Car/passenger ferry	Torghatten Nord	DNV
2012	Car/passenger ferry	Torghatten Nord	DNV
2012	Car/passenger ferry	Torghatten Nord	DNV
2013	PSV	REM	DNV
2013	RoPax	Viking Line	LR

Updated 10.01.2013
Excluding LNG carriers and inland waterway vessels

- Currently, there are 37 LNG powered ships in operation worldwide, mainly small ships such as: small car/passenger ferries, patrol vessels and offshore ships.
- In addition, since January 2013, there is also the first large vessel ferry - Viking Grace which is the first LNG fuelled ferry that operates in the Baltic Sea.

- By 2015, over 30 new LNG powered vessels are scheduled to be put into service worldwide.
- Apart from small units such as offshore vessels and tugs, there are also ro-ro ships, container ships, high speed ro-pax vessel and large car/passenger ferries.

Confirmed orderbook

Year	Type of vessel	Owner	Class
2013	Car/passenger ferry	Torghatten Nord	DNV
2013	Harbor vessel	Incheon Port Authority	
2013	High speed RoPax	Buquebus	DNV
2013	Ro-Ro	Sea-Cargo	DNV
2013	Ro-Ro	Sea-Cargo	DNV
2013	RoPax	Fjordline	DNV
2013	RoPax	Fjordline	DNV
2013	General Cargo	Eidsvaag	DNV
2013	Car/passenger ferry	Norled	DNV
2013	Car/passenger ferry	Norled	DNV
2013	Ro-Ro	Norlines	DNV
2013	Ro-Ro	Norlines	DNV
2013	Tug	Buksér & Berging	DNV
2013	PSV	Harvey Gulf Int. Marine	ABS
2013	PSV	Harvey Gulf Int. Marine	ABS
2013	Patrol vessel	Finish Border Guard	GL
2013	Car/passenger ferry	Society of Quebec ferries	LR
2013	Tug	CNOOC	CCS
2013	Tug	CNOOC	CCS
2014	Car/passenger ferry	Society of Quebec ferries	LR
2014	Car/passenger ferry	Society of Quebec ferries	LR
2014	Tug	Buksér & Berging	DNV
2014	PSV	Harvey Gulf Int. Marine	ABS
2014	PSV	Harvey Gulf Int. Marine	ABS
2014	Gas carrier	SABIC	BV
2014	Gas carrier	SABIC	BV
2014	PSV	Remøy Shipping	DNV
2014	PSV	Siem Offshore	DNV
2015	PSV	Harvey Gulf Int. Marine	ABS
2015	Container Ship	TOTE Shipholdings	ABS
2015	Container Ship	TOTE Shipholdings	ABS
2015	LEG Carrier	Evergas	BV
2015	LEG Carrier	Evergas	BV
2015	LEG Carrier	Evergas	BV

Source: *Shipping 2020, Technology investments in the new market reality, DNV,* Claus Winter Graugaard

Updated 15.01.2013
Excluding LNG carriers and inland waterway vessels

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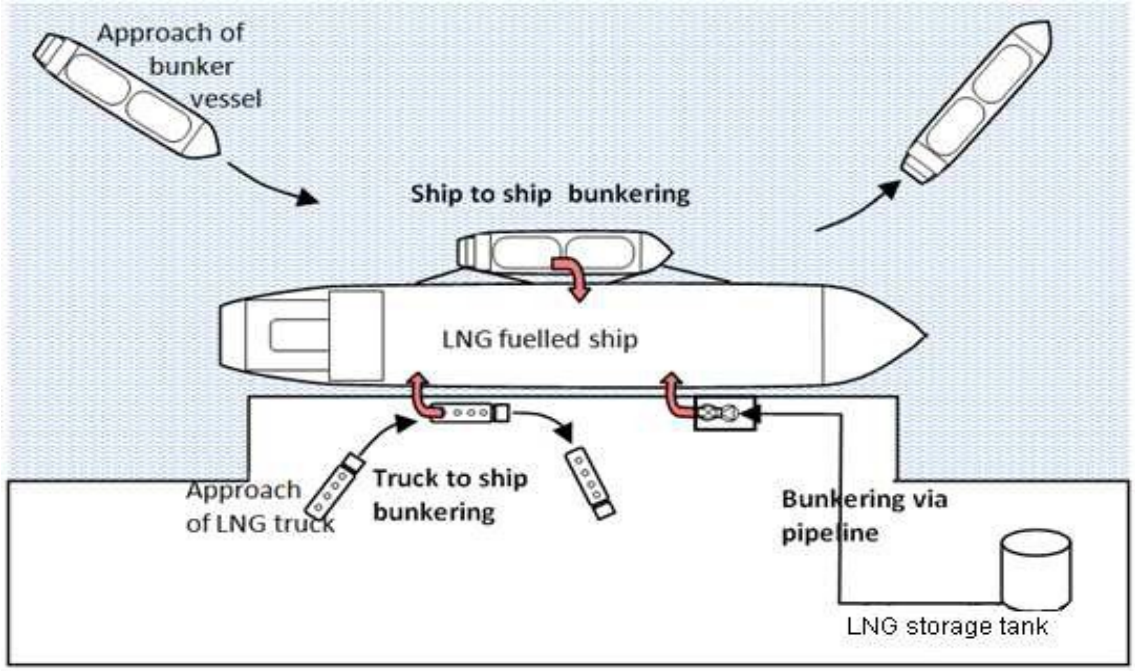

Source: *North European LNG Infrastructure Project,* Danish Maritime Authority, Copenhagen, 2012

Bunkering solutions

- Bunkering via pipeline form LNG small scale terminal,
- Tank truck to ship bunkering,
- Ship to ship bunkering (at quay or at sea).

✓ First two options are now used in Norway. Tank truck's capacity varies from 40 to 80 m3 of LNG;

✓ Ship to ship bunkering has been performed on Viking Grace by AGA's new bunker vessel "Seagas" since April 2013.

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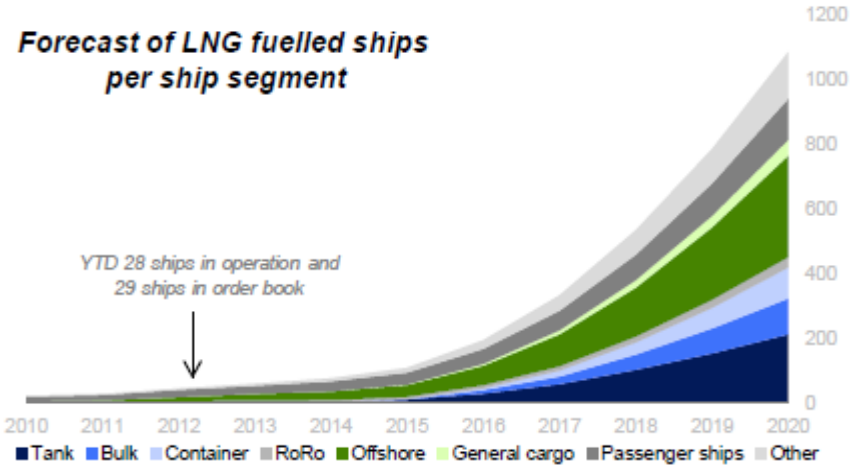
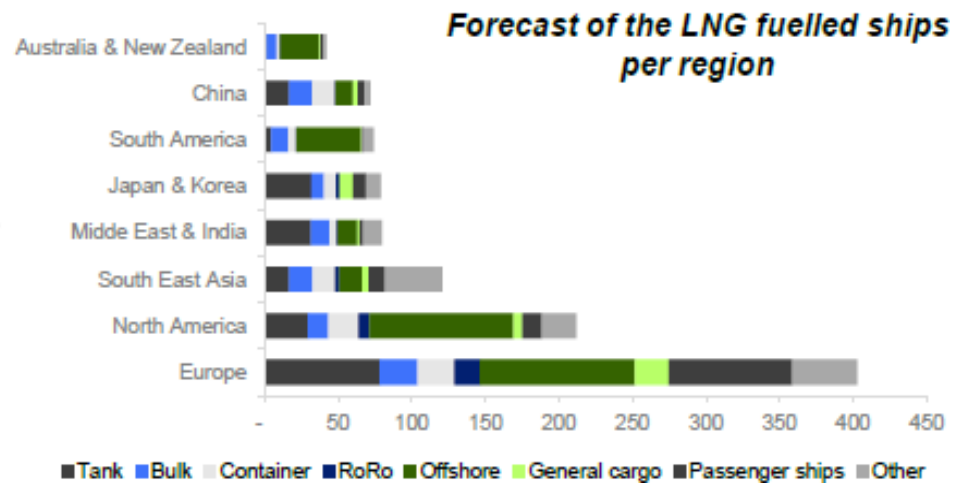


- By 2020 there will be approximately 1,000 LNG powered vessels worldwide;
- Offshore vessels and ships operating in regular shipping (ferries, ro-ro ships, and container vessels) will dominate the future LNG fuelled fleet and may account for about 60% of that fleet;

- In Europe, there will be about 400 such ships;
- Offshore ships and passenger ships will constitute the largest group;



Source: *Shipping 2020, Technology investments in the new market reality, DNV,* Claus Winter Graugaard

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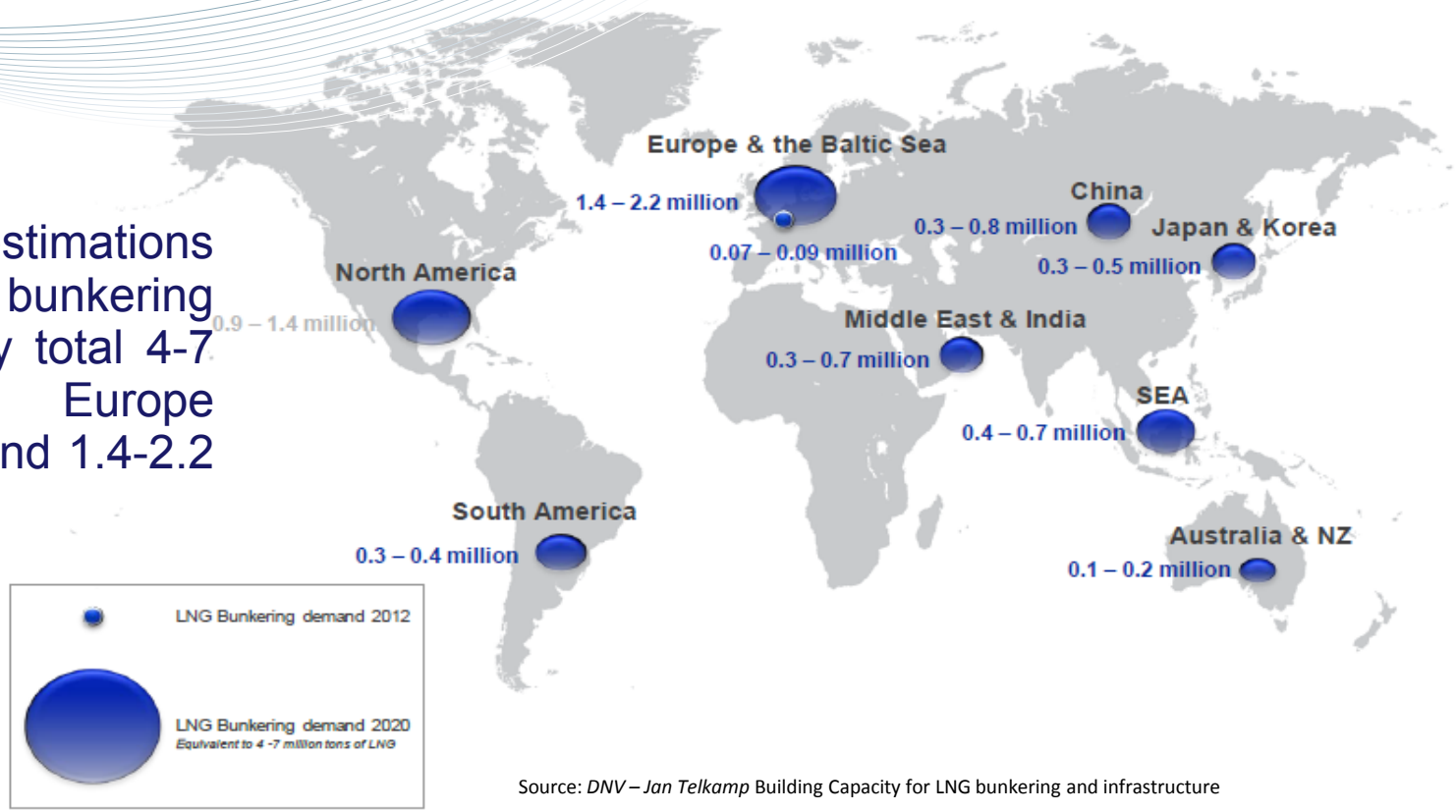
- According to DNV estimations the world LNG bunkering demand in 2020 may total 4-7 million tonnes. In Europe demand may be around 1.4-2.2 million tonnes;



Source: *DNV – Jan Telkamp* Building Capacity for LNG bunkering and infrastructure

- In Estimations by Danish Maritime Authority, in 2020 demand may range from about 1.5 million tonnes to about 6 million tonnes per year (in SECA)-
  - A *'Feasibility study for an LNG filling station infrastructure and test of recommendations '*

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EC actions towards LNG framework

EUROPEAN COMMISSION

"01 Jan 2020: All TEN-T core ports will have to provide LNG refuelling facilities."

Brussels, 24.1.2013
SWD(2013) 4 final

COMMISSION STAFF WORKING DOCUMENT

Actions towards a comprehensive EU framework on LNG for shipping

Accompanying the document

Communication de la Commission au Parlement européen, au Conseil, au Comité économique et social européen et au comité des régions

Energie propre pour les transports: une stratégie européenne en matière de carburants de substitution

{COM(2013) 17 final}

- ✓ 2.2Mt LNG p.a. in 2020
- ✓ 366 days in 2020
- ✓ If implemented in 100 main ports:
  - 60t/day in each port
- ✓ Only in 20 major ports implemented:
  - 300t/day in each port

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Current and future pricing of LNG as a bunker fuel:

- During the last decade, cost of ships' fuel has been characterized by a large fluctuations. The distillate fuels remained more expensive than residual fuels;

- Predicting how bunker fuel prices will change in future is a matter of pure speculation as the price levels are influenced by a series of different factors:
  - ✓ supply of crude oil,
  - ✓ demand,
  - ✓ development of alternative fuels,
  - ✓ geopolitical developments.

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Pricing of LNG as a bunker fuel

- The highest prices are observed in Asian Pacific market and the lowest prices are in USA, where gas pricing is driven by supply and demand;
- In Europe, LNG gas price mechanism is linked to pipeline gas prices and typically follows the price of crude oil or other oil products prices;
- In Europe, the price for mmBtu of LNG was at around 15 USD (Spain) and 10 USD (UK and Belgium).

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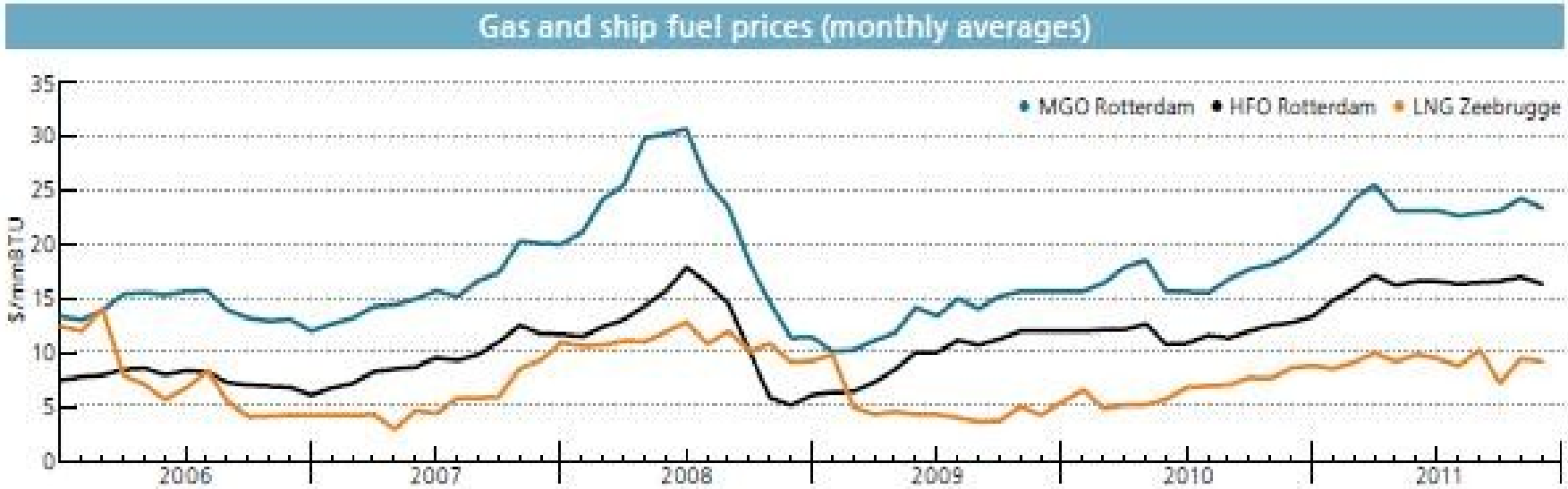
Pricing of LNG as a bunker fuel



Source: Costs and benefits of LNG as ship fuel for container vessels -Key results from a GL and MAN joint study, Germanischer Lloyd, 2012

- For shipping operators, the very important issue will be the relation between LNG and traditional bunker fuel price;
- From 2009-2011 one million BTU of LNG was about 40-60% cheaper than the HFO with the same energy. In comparison with MGO, the price for one million BTU of LNG was about 60-70% lower.

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LNG in Baltic Sea Ports

Full Speed Ahead ; No Smoke !!!

Thank you

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