STRATEGY & OPPORTUNITIES FOR LNG

Tallinn, Estonia

May 16, 2018

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Agenda

- **Who we are and Our aims**
- **Introduction**
- **Background**
- **SWOT – Assessment**
- **Future of LNG**
- **Conclusion**
- **Q & A ….**

Who we are and Our aims

GoLNG

Interreg Baltic Sea Region

EUROPEAN UNION — EUROPEAN REGIONAL DEVELOPMENT FUND

SCOPE

19 Partners - 50 Associated organizations - 3 year project (2017-2020) - €3,297,000 funding

Shipping Offshore NETWORK

KLAIPEDA SCIENCE AND TECHNOLOGY PARK

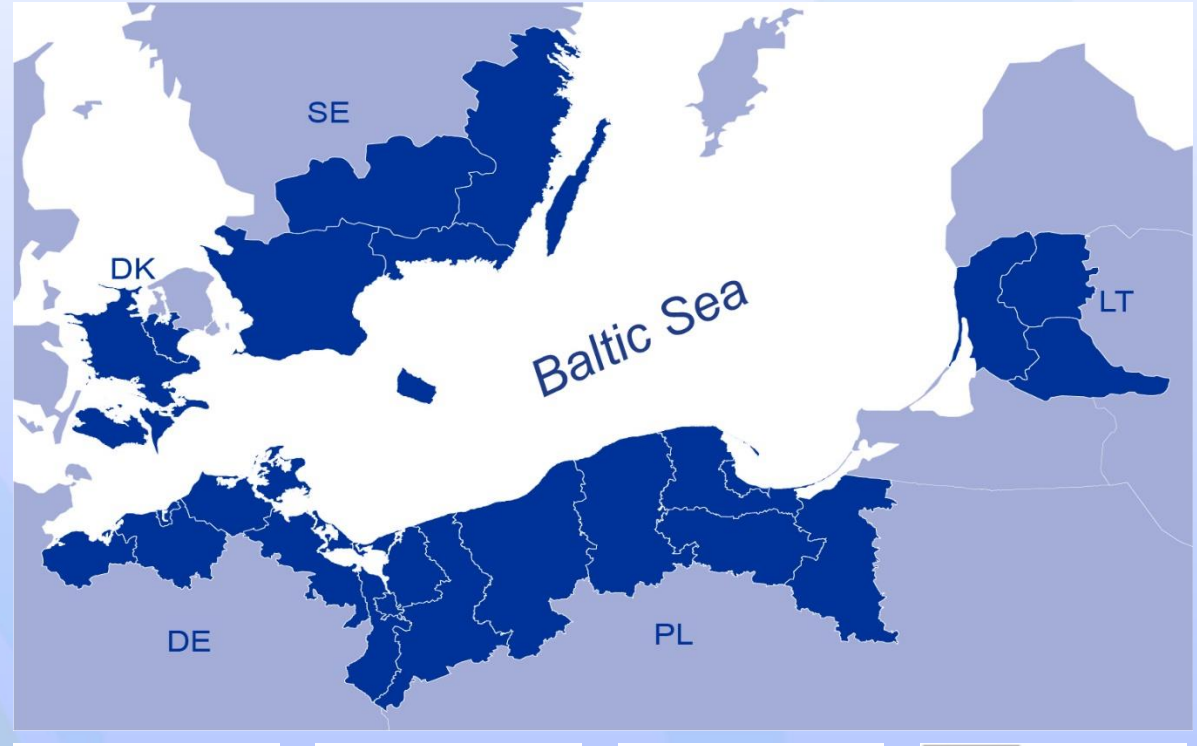
HOCHSCHULE WISMAR

BLEKINGE TEKNISKA HÖGSKOLA · BTH

AKADEMIA MORSKA SZCZECIN

KLAIPEDA SHIPPING RESEARCH CENTER

OSK-ShipTech A/S



Clean Shipping Index

Logistik-Initiative Hamburg

MDC MARITIME DEVELOPMENT CENTER

ATI erc gGmbH

BPO BALTIC PORTS ORGANIZATION

motus foundation

Svenskt Marintekniskt Forum

The Transport Innovation Network

i=nwl institut für nachhaltige wirtschaft und logistik

WMU WORLD MARITIME UNIVERSITY

SAMSØ KOMMUNE

KN

Aim of the project

GoLNG project will focus on developing LNG competence and value chain (in Baltic Sea Region) by:

- ✓ Providing strategic approach towards the LNG infrastructure deployment in BSR shaping BSR Blue Corridor strategy
- ✓ Consolidating integrated LNG value chain adding users to existing LNG infrastructure.
- ✓ Providing technology, skills and knowledge for LNG value chain, establishing BSR LNG competence center.
- ✓ Providing business opportunities for regions LNG industry, establishing BSR LNG business cluster.
- ✓ Establishing a sustainability factor for LNG infrastructure, providing LBG value chain, technological concepts and business models

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Project content structure

BSR Blue corridor strategy	BSR LNG Business Cluster	BSR LNG competence center
Integrated value chain study	Functioning business network	Training programs
LNG fuel distribution strategy	International conference	Training and research infrastructure
LNG Standard and regulation toolbox	Study visits	Service package
LNG shipping index	B To B meetings	Network of training institutions
LBG business concept	Business plans and pilot projects	

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Introduction

- The European Commission's EU White Paper for Transport (2011) has set a greenhouse gas reduction goal of at least 40% by 2050 (compared to 2005) in absolute terms for the shipping sector.

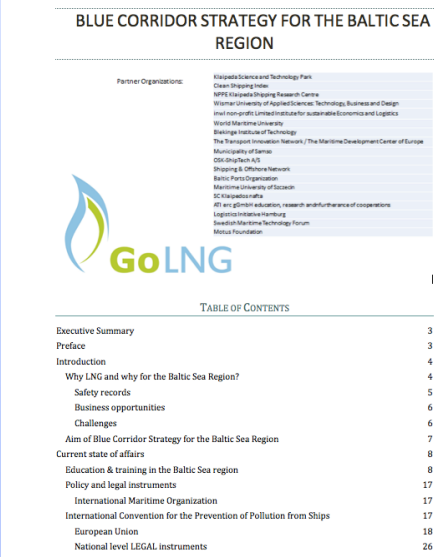
How?……

The 2020 Energy Strategy- 5 priorities

1. **Making Europe more energy efficient by accelerating investment** into efficient buildings, products, and transport.
2. **Building a pan-European energy market** by constructing the necessary transmission lines, pipelines, LNG terminals, and other infrastructure. Financial schemes may be provided to projects, which have trouble obtaining public funding.
3. **Protecting consumer rights** and achieving high safety standards in the energy sector. This includes **allowing consumers to easily switch energy suppliers**, monitor energy usage, and speedily resolve complaints.
4. **Implementing the Strategic Energy Technology Plan** – the EU's strategy to accelerate the development and deployment of low carbon technologies such as solar power, smart grids, and carbon capture and storage.
5. **Pursuing good relations with the EU's external suppliers of energy** and energy transit countries. Through the Energy Community, the EU also works to integrate neighboring countries into its internal energy market.

BLUE CORRIDOR STRATEGY FOR THE BALTIC SEA REGION

The Blue Corridor Strategy that is defined in this report provides a road map for promoting LNG use as a fuel for transport and energy, linking LNG infrastructure development, transport flows, business models, and government policies into one cohesive and efficient LNG infrastructure development plan, which could lead to stronger “Blue transport corridors” in the BSR



BLUE CORRIDOR STRATEGY FOR THE BALTIC SEA REGION

Partner Organizations:

Klaipeda Science and Technology Park
Clean Shipping Index
NPPE Klaipeda Shipping Research Centre
Wismar University of Applied Sciences: Technology, Business and Design
inval non-profit Limited Institute for sustainable Economics and Logistics
World Maritime University
Blekinge Institute of Technology
The Transport Innovation Network / The Maritime Development Center of Europe
Municipality of Samso
OSK-ShipTech A/S
Shipping & Offshore Network
Baltic Ports Organization
Maritime University of Szczecin
SC Klaipedos naftai
ATI erc gGmbH education, research and furtherance of cooperations
Logistics Initiative Hamburg
Swedish Maritime Technology Forum
Motus Foundation

GoLNG

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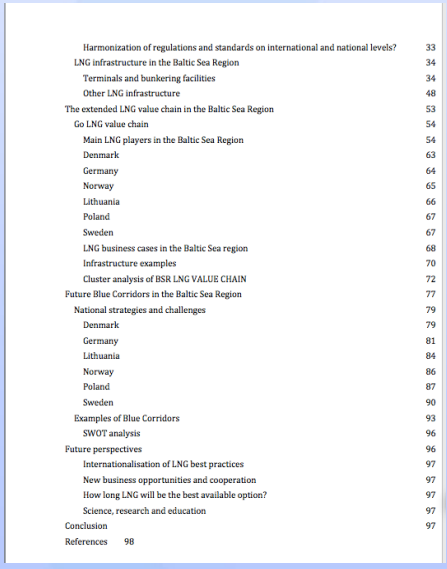


Over 150+ pages !

Project: GoLNG
www.GoLNG.eu

LNG STAKEHOLDERS WILL MEET ONBOARD FI ERRY

The upcoming internati
ferry M/S Stav
platf

G powered
ideal
and

den,
w LNG

ought together 18 partners from

panies *Bureau Veritas Marine & Offshore, Kosan Crisplant,*
Nauticor ; established by the International Maritime Organisation (IMO), and
Maritime U

Formal sessio to experience the bunkering of M/S Stavangerfjord and guided tour "LNG from the Engine room to
the Bridge" – t time and outstanding networking opportunities.

Organisers of the vestments are required worldwide to meet the growing LNG demand: "It is time for the Baltic Sea Region LNG Cluster companies
and businesses to ge, cutting edge technologies and newest innovations to the world".

The global demand f expected to increase 4-5% pr. year between 2015 and 2030. Most of the future LNG growth is anticipated to be created by further floating storage regasification
units (FSRUs), the declining domestic gas production, small scale LNG and the transport sector.

REGISTRATION

Back

Upcoming Events | Helpful Links | Part-Financed By | Get In Touch

Executive Summary in progress

Background

Bringing LNG out of the “Dark Side”

Pick up any Trade/Industry magazine and we see that Automation and Energy is here to stay

Motivation

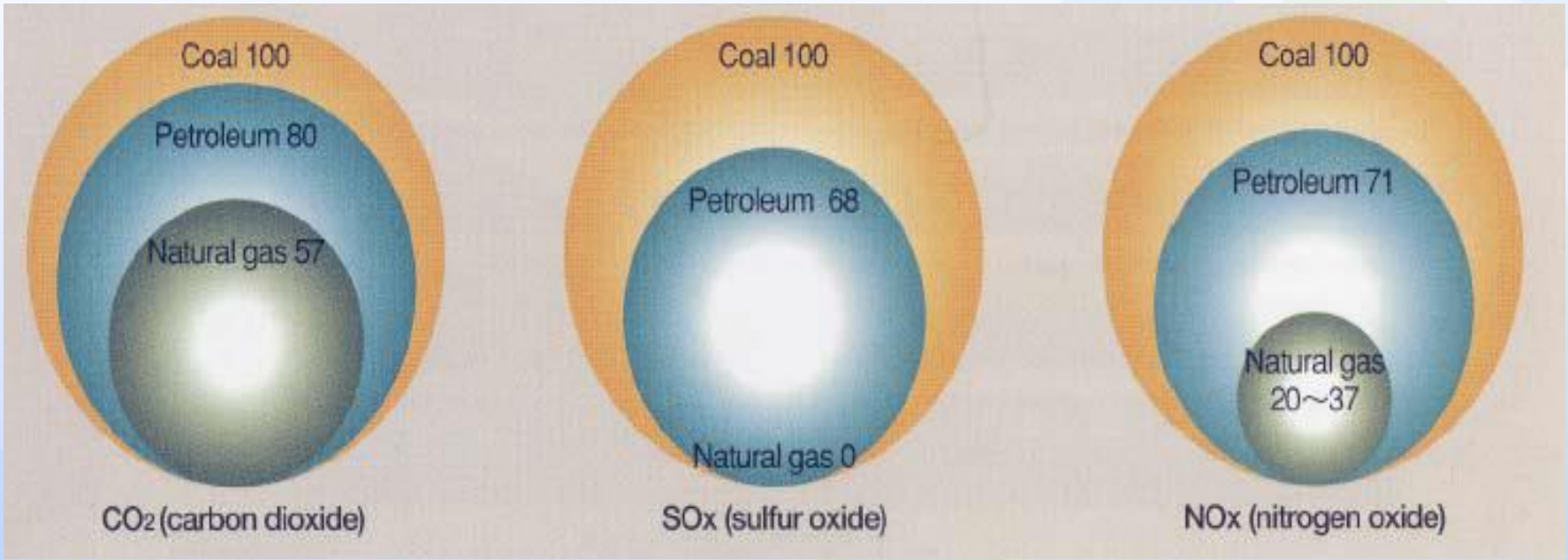

50
50


WE WANT SAFE STREETS
NO MORE TRUCKS


Benelux port delays costing car
Congestion at Antwerp and Rot
17 Augustus, 2007 - CONGESTION char
CBRB voorziet forse tariefsverhoging
binnenvaart
Containers staan ECT tot aan de nek
Nieuws 20 februari 2007, auteur: Ferdi den Bakker
De Rotterdamse container
niet aan. Om er to
containers
op
de stroom containers
Nieuwe vertragingen bij ECT Delta
Terminal
Contargo voert congestietoeslag in
16 juli 2007 – Nieuwsblad Transport.nl
Binnenvaart is wachten bij ECT beu
ROTTERDAM

…Or attend a GO LNG meeting to see how misinformed people are?

Emmissions and from Fuels



2 major obstacles stand in the way of resolving emissions from international shipping:

- shipping is not bound by the COP21 climate deal
- lack of promising technology to replace fossil-based fuel and propulsion systems.

Challenges for LNG in BSR (1/2)

- Safe LNG storage in main LNG import and small scale LNG terminals on basis of “Safety first”;
- Safe transportation from main import and small scale LNG terminals to LNG end users;
- Promote and start more wide use of LNG as fuel in different transport modes (sea, road, railway, inland waterway transport);
- Promote and start more wide use of LNG as energy resource in small and medium energy and heating plants;
- Promote and start more wide use of LNG as energy resource in industry;

Challenges for LNG in BSR (2/2)

- Promote and create LNG bunkering constant, movement and mobile stations in BSR region close to the users;
- Educate and train personnel who will work along the LNG supply chain;
- Make sure the new infrastructure is sustainable and can be used for other purposes in the future (biofuels):
- Continue working for a greening of LNG, that is, including biogas in the gas mix;
- Better understanding of LNG quality/gas composition and energy density, especially in the light of mixing natural and biogas;
- Improve stakeholder relations management:
- Promoting LNG and environmental performance of shipping so as to prevent a major shift of transport from shipping to land routes.

Lack of Infrastructure – the Supply

LNG infrastructure in Baltic

Blue Corridor Strategy

The aim of the Strategy is to establish strategic approach of LNG infrastructure development and mobilize the critical mass of technology, business partnerships, and regulative authorities to implement LNG powered transport networks in BSR.

We will provide a model on how LNG infrastructure should be deployed in order to establish LNG powered transport corridors for Maritime; Road; Rail; Port equipment.

Blue corridor strategy 2.1

BSR Blue corridor strategy will provide the following content:

1. LNG Stakeholder analysis: policies and regulations; policy makers; industry-value chain.
2. LNG as a fuel for intermodal transport means- economic and environmental benefits, LBG perspective.
3. Technological standards and regulations to apply LNG as a fuel/market harmonization analysis
4. Technological solutions and business models for LNG distribution in BSR
5. Intermodal approach to LNG as a fuel transport networks, cargo flow and environmental impact analysis from LNG as a fuel perspective. Blue corridor concept
6. LNG infrastructure development plan for BSR in order to enable Blue corridors in the region

The purpose of the strategy is to provide the strategic approach towards LNG infrastructure development in BSR. Strategy will provide a concept of LNG use as a fuel for transport linking LNG infrastructure development, transport flows, business models and policies in to the efficient structure to enable Blue corridors in BSR

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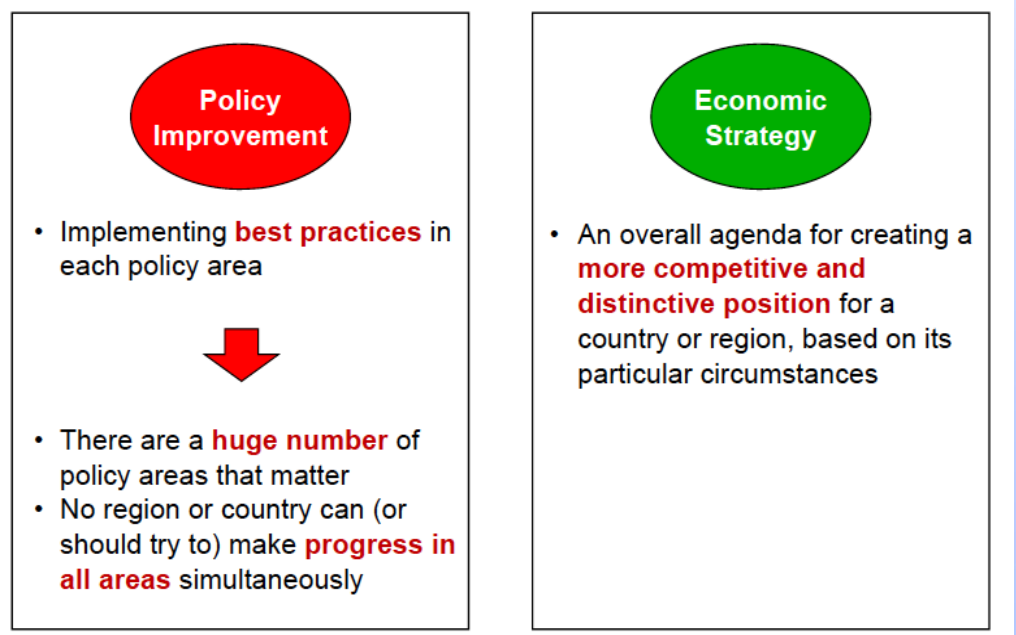
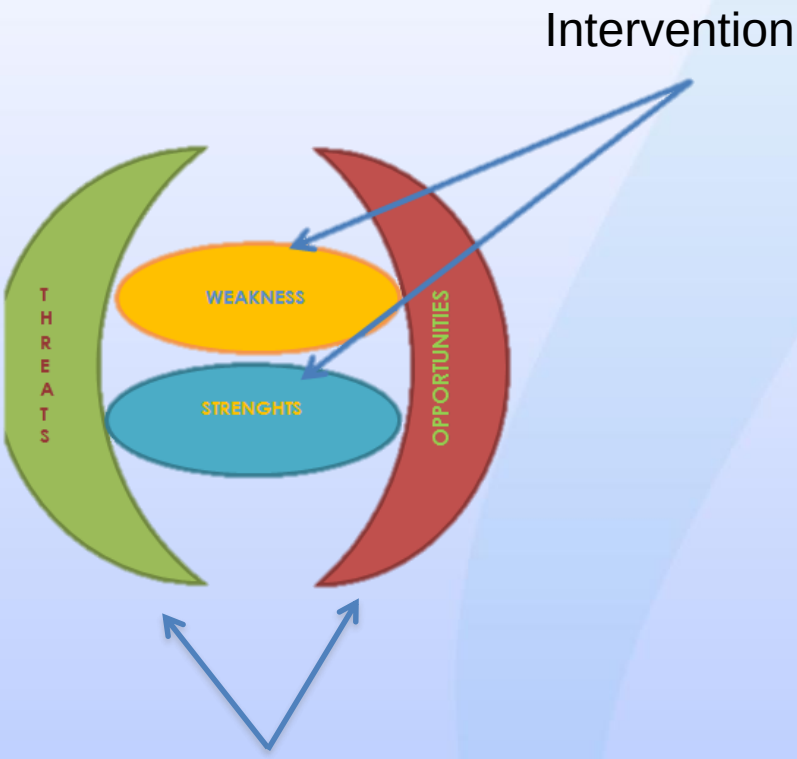
SWOT Analysis of LNG in BSR

Analysis

- The objective is to demonstrate key areas or factors that can either enable or impair the regional development of LNG in the BSR.
- Coordinating with over 400+ members that are a part of the GoLNG network.
- Policy Improvement
- Economic Strategy



S.WO.T. Analysis



Summary of Findings

STRENGHTS	WEAKNESSES
✓ Comply with EU regulations ✓ Gas characteristics: large quantities available, competitive costs etc. ✓ Less polluting than petroleum, very eco friendly ✓ Greater energy independence for BSR countries ✓ Important Role in BSR Energy Mix ✓ Strong gas demand and supply growth in the BRS countries ✓ Best practices on LNG in the BSR (Norway, Sweden etc.) ✓ Increasing of the liquefaction and regasification capacity of the LNG markets in the Baltic Sea countries ✓ Good scientific knowledge in the BSR countries ✓ Accomplished safety record along supply chain ✓ Viable in different areas not reached by pipeline (for example Norwegian fjords) ✓ Regas/storage sites planned to increase the supply on BSR market ✓ Forescast Subisies and/or Tax cut in the BSR	✓ Differences (geographical, socio economic etc) between BSR countries ✓ High capital costs ✓ Needed implementation of joint actions ✓ Public consciousness on safety and environmental risks ✓ Oversupply risk due to total size of global LNG small market
OPPORTUNITIES	**THREATS**
✓ Stricter regulations come in place ✓ More jobs for the people living in the area ✓ Improving LNG education in BSR countries to increase awareness and future innovations within the area: skilled personnel will be able to sustain rapid growth ✓ Economic development in the area ✓ Sharing risk and reducing the risk level ✓ Good conditions for new competitive LNG cluster development ✓ Attraction element of human, industrial and financial resources to be allocated to technical innovations ✓ Supply in new markets ✓ Implementation of economies of scale ✓ Improving operating, procurement and contracting procedures ✓ Increasing price competitiveness	✓ Uncertainty over gas price, unsure about the market situation ✓ Security aspects: terrorism, cyber security attacks etc. ✓ Accidents: increasing on public perception of LNG safety ✓ The development of alternative technologies

STRENGTHS

STRENGHTS
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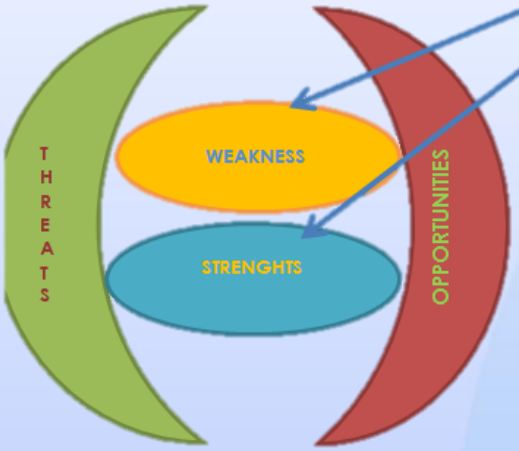
SWOT ANAYLSIS

Intervention



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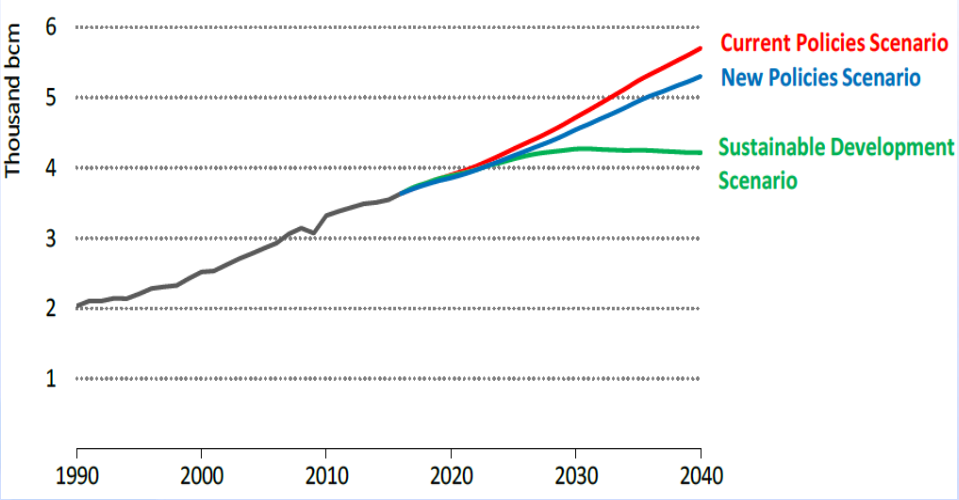
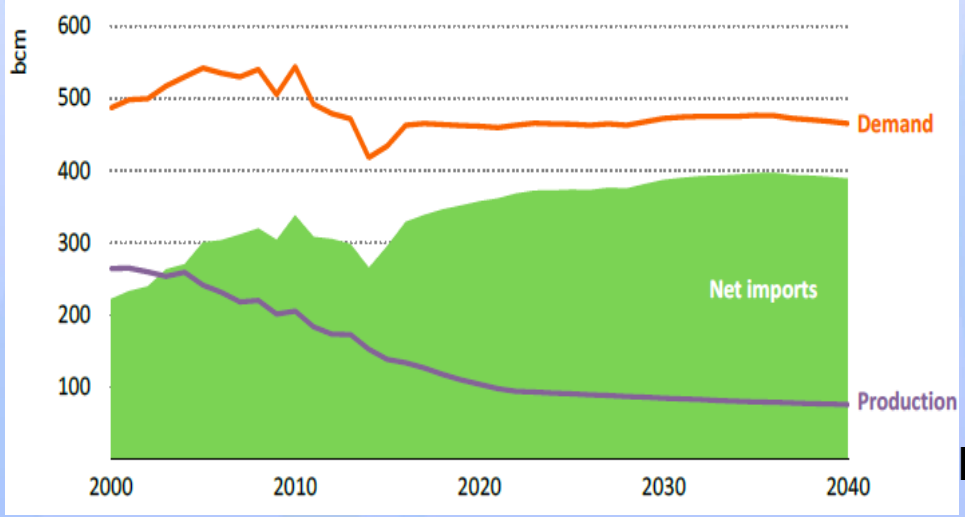
Intervention Context

Future of LNG

Future so Bright?





	2000	2016	2025	2030	2035	2040	2016-40 Change	2016-40 CAAGR*
North America	**763**	**960**	**1 166**	**1 212**	**1 282**	**1 338**	**379**	**1.4%**
Canada	182	174	159	165	190	222	49	1.0%
Mexico	37	37	35	38	48	58	21	1.9%
United States	544	749	971	1 009	1 043	1 058	309	1.4%
Central & South America	**102**	**175**	**178**	**207**	**242**	**279**	**104**	**2.0%**
Argentina	41	42	53	70	90	104	62	3.9%
Brazil	7	24	28	43	60	77	53	5.0%
Europe	**337**	**285**	**244**	**238**	**236**	**236**	**- 49**	**-0.8%**
European Union	264	134	91	85	80	76	- 58	-2.3%
Norway	53	121	105	101	99	100	- 22	-0.8%
Africa	**124**	**205**	**273**	**330**	**392**	**460**	**254**	**3.4%**
Algeria	82	92	97	102	107	113	21	0.8%
Mozambique	0	5	13	32	49	64	59	11.6%
Nigeria	12	41	46	45	56	70	29	2.2%
Middle East	**198**	**585**	**703**	**832**	**931**	**1 003**	**418**	**2.3%**
Iran	59	190	243	301	332	338	149	2.4%
Qatar	25	165	182	214	240	256	91	1.8%
Saudi Arabia	38	90	107	120	131	142	52	1.9%
Eurasia	**691**	**842**	**935**	**978**	**1 035**	**1 095**	**252**	**1.1%**
Azerbaijan	6	19	37	44	51	55	36	4.6%
Russia	573	644	718	730	752	788	144	0.8%
Turkmenistan	47	80	86	102	124	141	61	2.4%
Asia Pacific	**290**	**568**	**675**	**749**	**832**	**894**	**326**	**1.9%**
Australia	33	88	149	162	188	195	107	3.4%
China	27	137	222	261	298	336	199	3.8%
India	28	31	42	59	72	84	53	4.3%
Indonesia	70	77	70	73	80	90	13	0.6%
Rest of Southeast Asia	89	146	128	131	131	127	- 19	-0.6%
World	**2 506**	**3 621**	**4 174**	**4 545**	**4 950**	**5 304**	**1 683**	**1.6%**
Unconventional	196	780	1 180	1 320	1 486	1 654	874	3.2%

* Compound average annual growth rate.

Future of LNG (1/2)

- **Globally connected energy system** includes LNG prospects in world energy balance. BSR as very dynamic industry and transport region will request more energy in coming decades. The main drivers of LNG demand in BSR are increasing GDP and transportation requirements.
- **New natural gas producing regions**, such as US, Canada, Australia and other countries can rich by its gas just as LNG and it should dramatically increase LNG transportation to BSR because requirements of the gas should increase in average up to 2,0 – 2,5 times in 2050 in comparison with 2015 (DNV-GL, 2017).
- **LNG use as fuel in shipping** should increase few times in coming decades. Main users in Maritime Industry in World and in BSR as well will be shipping companies using LNG as fuel for the ships as more economical and environmental friendly fuel. Global as well BSR waterborne transport LNG as fuel demand should increase up to 2,5 – 2,8 times in coming decades.
- For the wider using LNG as fuel for the ships and other transport modes in sea and ports need have **enough bunkering and fueling capacities**. EU approved Directive, which request in TNT core port (in BSR are 16 such ports) have LNG bunkering facilities until 2025. In same time ports, which operate Ro-Ro or Ro-Pax vessels are very much interesting attract more Ro-Ro shipping lines, which ships could use LNG as fuel. This situation should push port Authorities and terminals develop LNG bunkering facilities parallel with LNG fueling ships building.

Future of LNG (2/2)

- According EU Directive **fueling stations on the TNT corridors** should be on distances not more than 400 km.
- For the successful using LNG as fuel in Maritime transport **in all (ships, port equipment) should be develop LNG bunkering and fueling facilities** sustainable network which will be adequate to the LNG fuel users requirements. New building big ships like container vessels, bulkers and other similar size ships running on LNG request big quantities of the LNG bunker (up to 15000 – 18000 cub m of the LNG for one ship. Such big LNG bunkering quantities could be realize by “ship to ship” or “shore LNG terminal to ship” systems and this situation should stimulate LNG bunkering companies take some risk and development much bigger capacity bunkering facilities.
- **Inland waterway (IWW) vessel start implemented LNG** or duel engines and it request to have LNG bunkering facilities on IWW what push development mobile LNG bunkering facilities on barges or pontoons. In same time IWW ships operators are more conservative as Marine ships operators and political decisions are very important are need to help implement more wide and fast LNG on IWW navigation.

Case for LNG

- PORT EQUIPMENT OPPORTUNITIES
- PORT EXAMPLE…

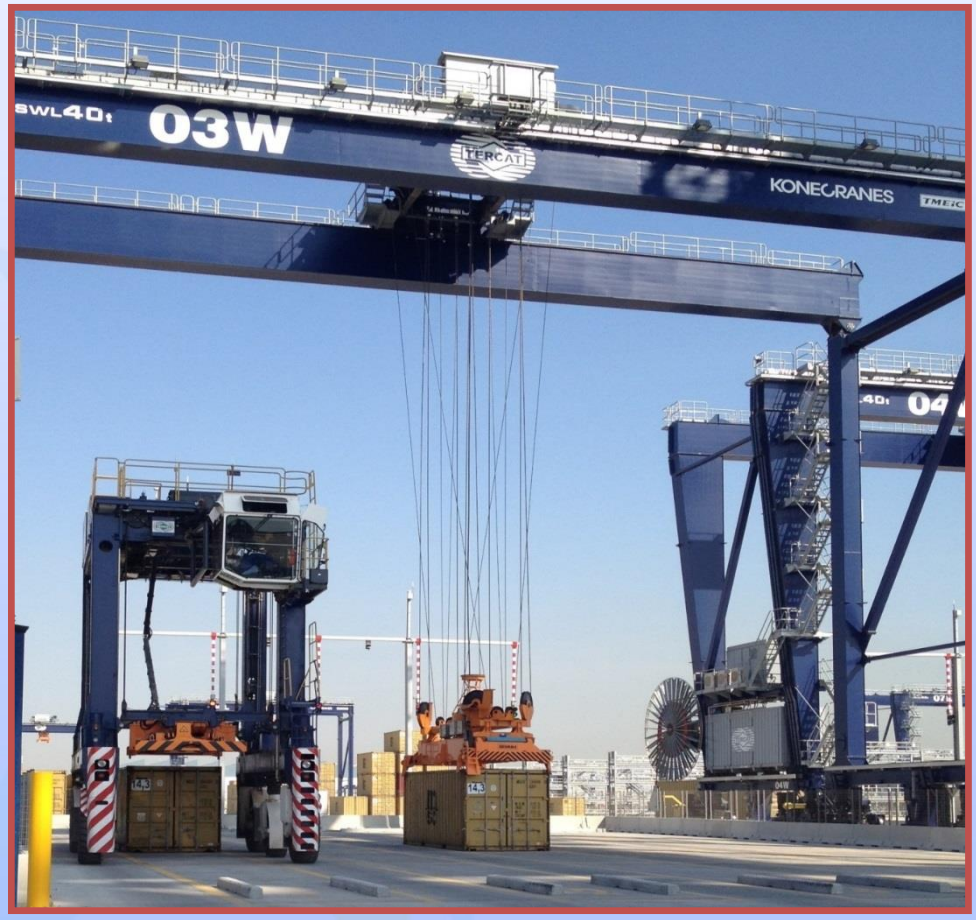
Opportunities & Synergies for LNG in the port and cargo handling industry

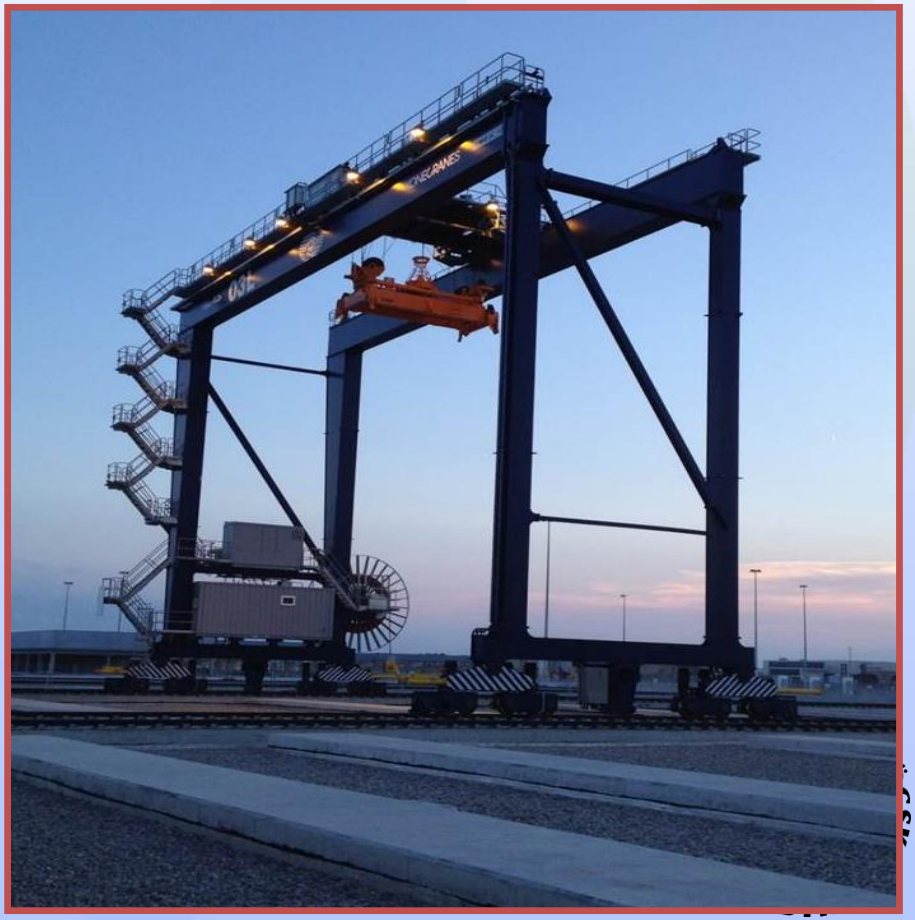
Go LNG, May 16, 2018

Asst. Prof. Lawrence Henesey
Blekinge Institute of Technology,
Karlshamn, Sweden

Cargo Handling : Container Terminal case

We find ourselves, once again, at the threshold of a new vision in terminal production, safety and cost savings





Pick up any Trade/Industry magazine and we see that Automation and Energy is here to stay

Port Equipment in Container Terminals

1. *STS* | Ship to Shore Cranes
2. *RTG* | Rubber Tyred Gantry Crane
3. *RMG* | Rail Mounted Gantry Crane
4. Intermodal Cranes
5. Horizontal Transport | AGVs, Trucks, Straddle Carriers
6. Shore Power Supply (LNG Bunkering..)

Market size for Port Equipment & Container Handling

9 Billion €

GoLNG

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

CAVOTEC
PINTSCH BUBENZER
PEPPERL+FUCHS
RAM SPREADERS
SICK Sensor Intelligence.
TMEIC We drive industry
KONECRANES
APS Technology Group, Inc. Automated Technologies With A Vision
SANY
ELME Swedish Spreader Systems
navis PART OF CARGOTEC CORPORATION
LIEBHERR
Franz Wölfer Elektromaschinenfabrik Osnabrück GmbH
PRYSMIAN CABLES & SYSTEMS
SIEMENS
ABB
ZPMC
AME ADVANCED MICROWAVE ENGINEERING
BROMMA
CONDUCTIX wampfler
TTS Liftec Oy
PHOENIX DURABILITY X DESIGN
AVAHLE
TOC WORLDWIDE www.toc-events.com
WCS
EMERSON Industrial Automation
moffatt & nichol
GROENEVELD
PACECO CORP.
künz
EATON
HYSTER STRONG PARTNERS. TOUGH TRUCKS.
Continental
GANTRAIL A world of crane rail expertise
GAUSSIN MANUGISTIQUE
GANTREX
HIRSCHMANN A BELDEN BRAND
TAYLOR
RHM 润邦重机
WAM TECHNOLOGIES
TRATOS
master terminal
Portunus PORT SPARES & SERVICES
KALMAR
Spahn+Burkhardt
cascade
APM TERMINALS Lifting Global Trade. Crane & Engineering Services
MICHELIN A better way forward
ifm electronic
ARISTONCAVI
Nexans
RFT
MAFI TRANSPORT SYSTEMS
KABELSCHLEPP TSUBAKI KABELSCHLEPP
SIBRE Sure to be Safe
Schneider Electric
smart-Tecs Bringing smart Technology to Ports
IDENTEC SOLUTIONS
TVH
LASE Industrielle Lasertechnik GmbH
INTERCON
ISL APPLICATIONS
HPC
Liftech LIFTECH CONSULTANTS INC.
CERTUS PORT AUTOMATION
igus
BALTKRAN
BROSA
CRANEPORTS LIFTING - HANDLING & PORT EQUIPMENT
TERBERG BENSCHOP
VDL
SEOHO ELECTRIC CO., LTD.
LEHNERT crane intelligence
SYMEO ABSOLUTE POSITIONING
MGM OMG
stinis
JOHANNES HÜBNER GIESSEN ideas and solutions
brevetti stendalto
BTG SPECIAL PRODUCTS
DUTCH LANKA TRAILERS
BANNER more sensors, more solutions
KRANUNION
briedacabins
TEREX Port Solutions
MALMEDIE
TIMARS
TBA SIMULATION EMULATION SOFTWARE
PORTEK Knowledge & Solutions in Port Business
BTH

Main drivers of the Market

Trends	Container Ports	Consequence
Increasing competition of terminals	GTOs 	More efficient systems
Globalization	Carriers/Liners 	New investments in modern port facilities
Bigger Vessels		Bigger Cranes and faster logistics
Increase in energy costs	Port Authorities 	Energy Savings
Increasing environmental demands		Automation of Container Yards

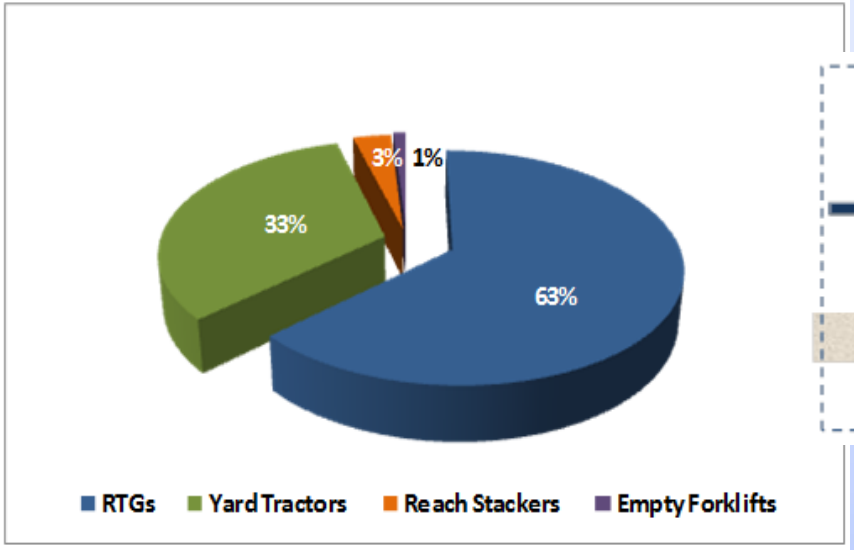
Lets Go GREEN!

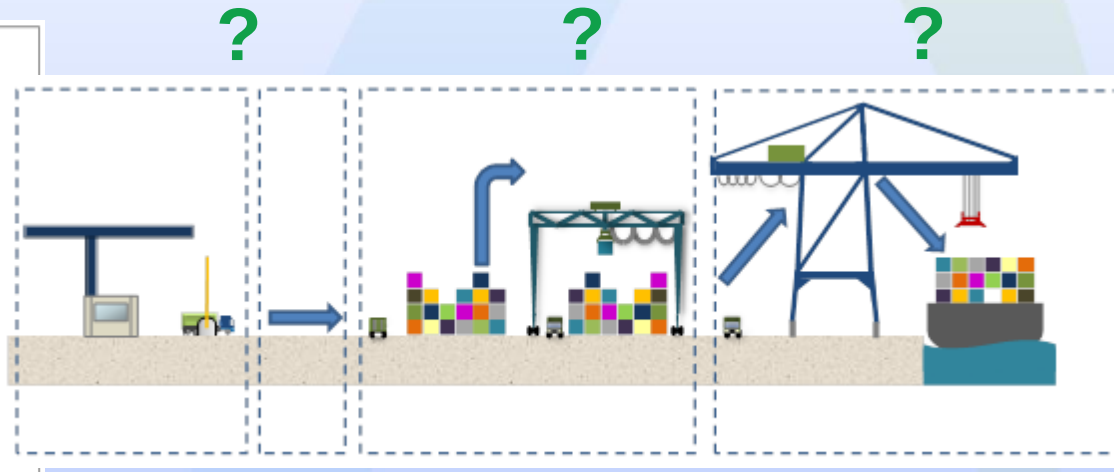
= *Ecological Equipment*

Where can we apply Ecological Equipment?

How much energy is consumed?

Where is the energy consumed?





Reference: GreenCranes Project

Which Machinery or Equipment to Consider?

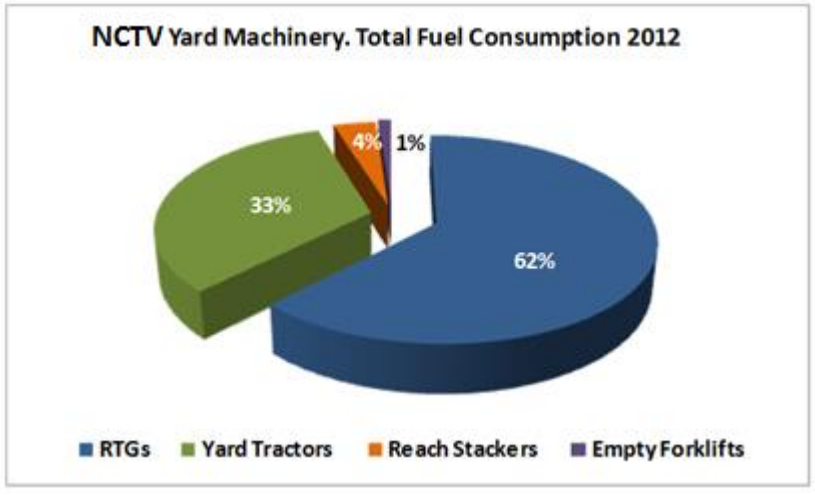
Rubber Tyred Gantry Crane (RTG)

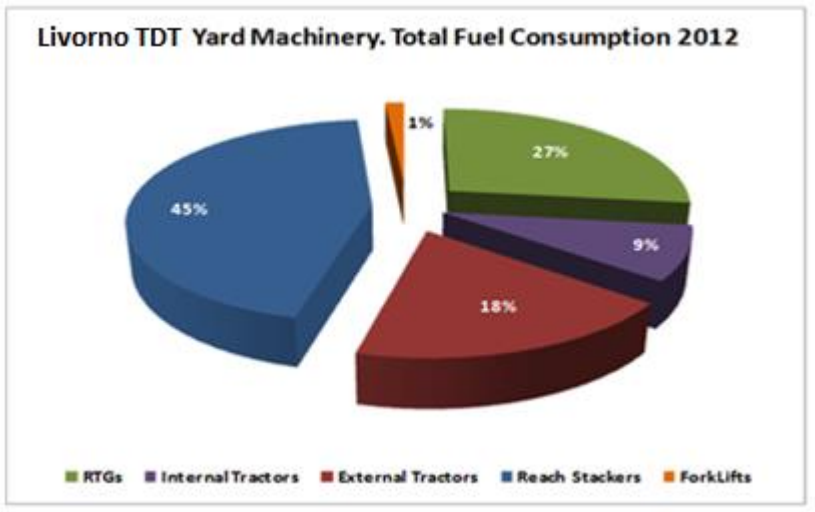
Terminal Tractor

Reach Stacker

Empty Forklift

How much DIESEL (FUEL) consumption?





4,049,138 L (58%)

2,245,147 L (32%)

90%

611,460 L (9%)

80,819 L (1%)

6,986,564 L

X 4,000 (1,300 L / year)

- Terminal Tractors are the most used type of horizontal equipment found in Container Terminals worldwide
- Terminal Tractors represent significant part of the total fuel consumption in a port – often the 2nd most consuming of fuel after yard cranes.

Feasibility Evaluation: Terminal Tractors

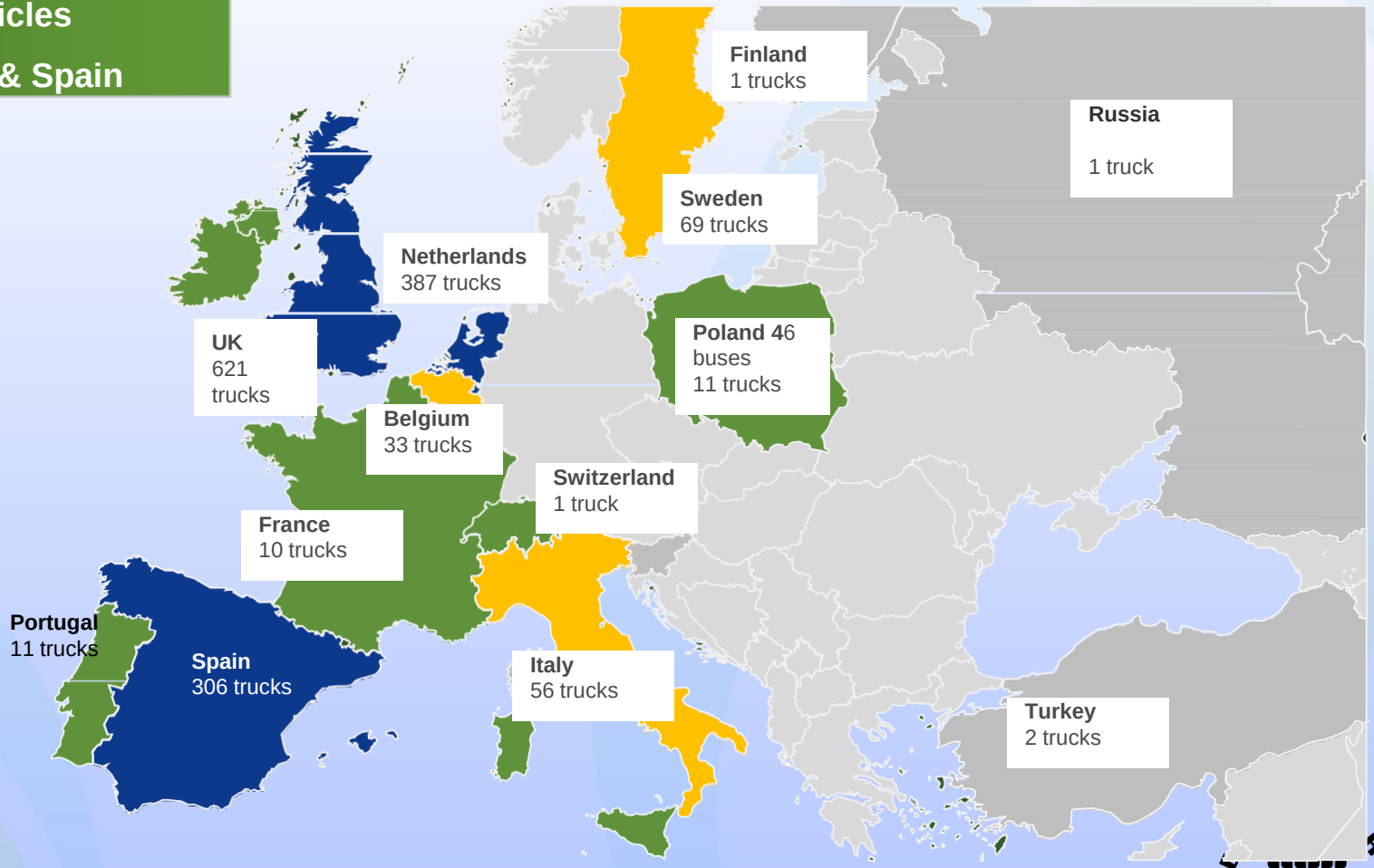
Terminal Tractors	RTGs	STS + Other
2,4 Million L 1,8 Million € GoB	4,6 Million L 3,4 Million € GoB	17,8 GWh 2,2 Million € kWh
Alternatives TT	**Alternatives RTG**	**Supply Alternatives**

• Gasoil TIER 4 / Stage IV (2014)
• LNG
• Dual Fuel
	• RTG Engine Replacement TIER 4 (2014)
	• LNG / Dual Fuel
	• Electrification
	  • Conductor Bar
	  • Cable Reel
		• Current Electrical Tariff
		• Tariff 6.1 (Electrical Supplier)
		• Tariff 6.3 (Electrical Supplier)

Current European LNG market

1.500 LNG Vehicles

Mainly UK, NL & Spain



- > 200
- > 25
- < 10
- None

Source: NGVA Europe, 01.12.2014

LNG Facts for Terminal Tractors

- LNG in fuel tank is stored at less than 100 PSI but at temperatures of –259 F and lower. It has the ability to **contain more fuel in slightly less space** and much lower pressure than CNG.

- Fuel consumption in liters per hour is about **13.2 – 17 Liters per hour**.(Cummins C Gas + 250 HP/750lb/ft T).

- Based upon a 216 liter usable tank size this would **limit to about 12 –16 Hours** on LNG vs. **about 24 – 30 hours on a standard 190 liter** tank of diesel.

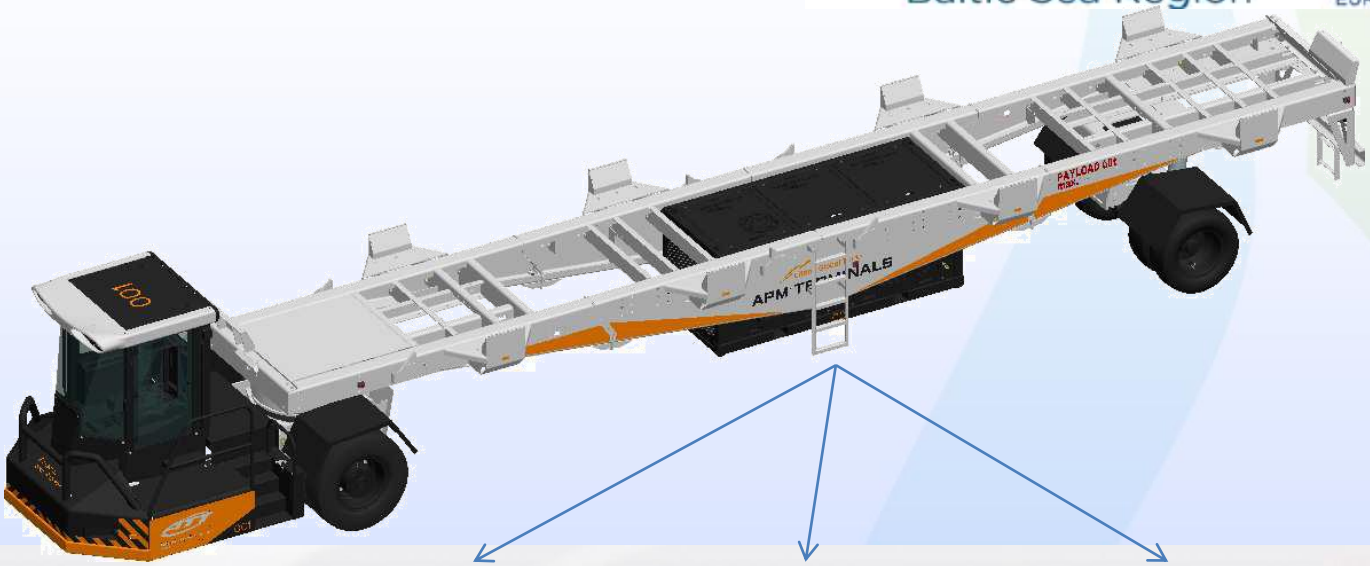
- Clear, odorless, and non-corrosive.

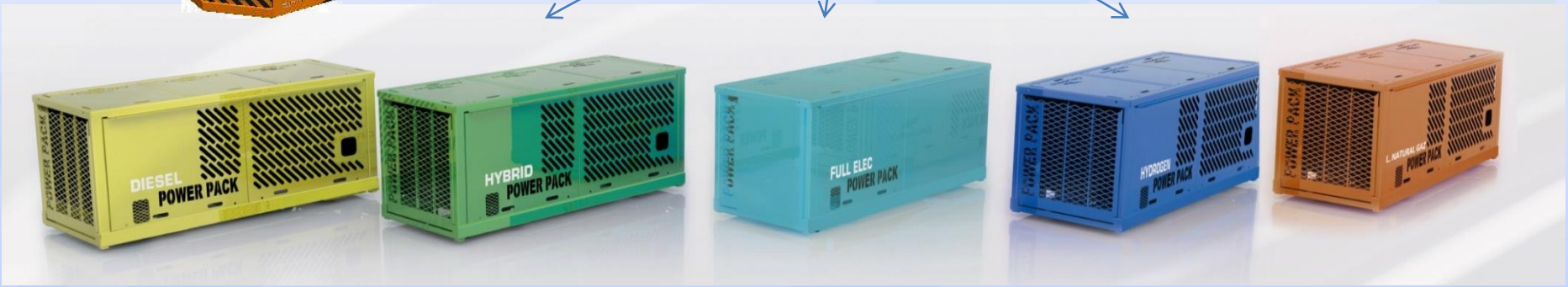
Reference : Kalmar Industries

GoLNG

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND





Diesel

Hybrid Diesel/Electric

Full electric Battery

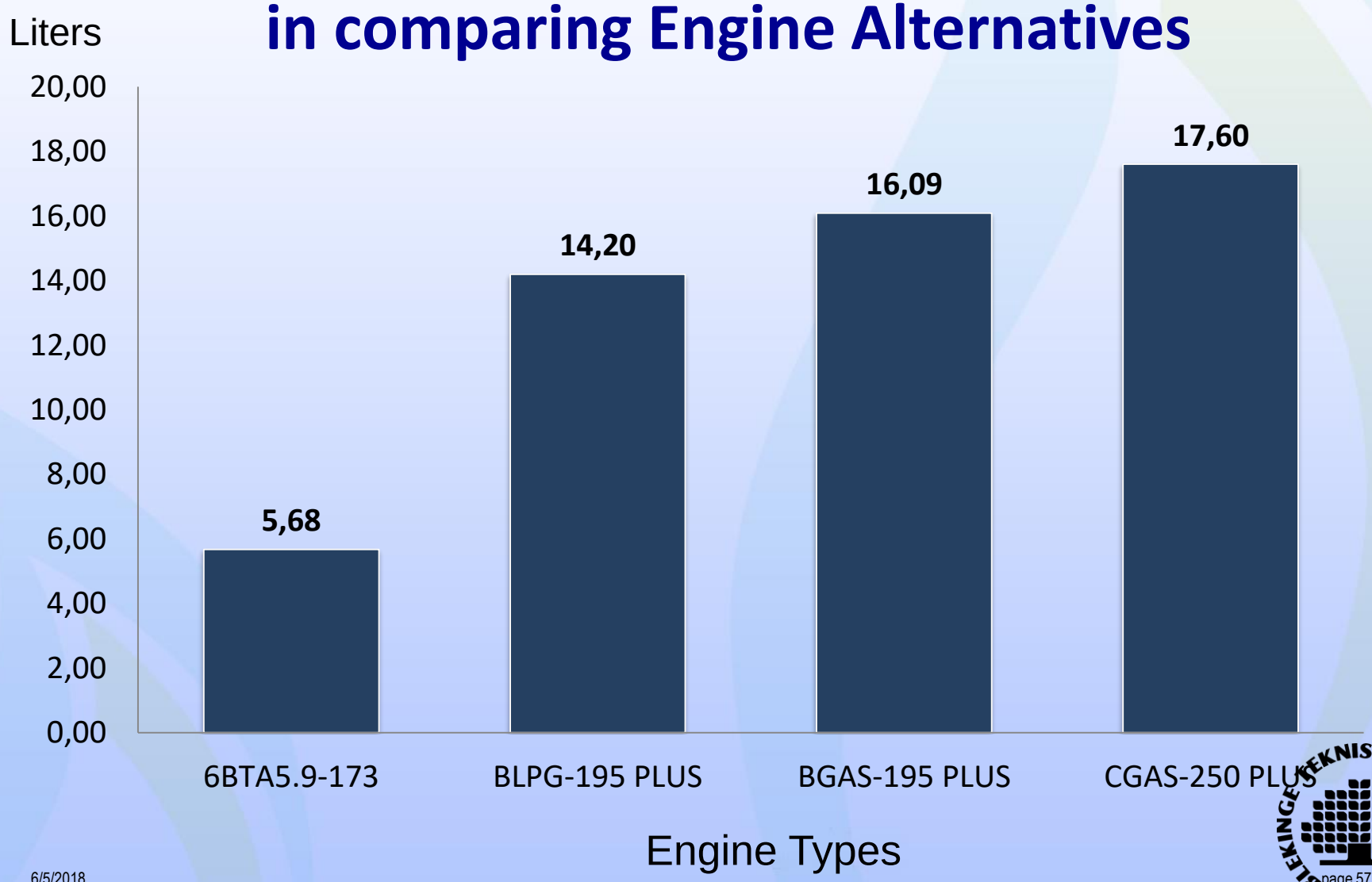
Future energy Full cell-hydrogen
Under development

LNG
Under development

GAUSSIN MANUGISTIQUE

BLEKINGE TEKNISKA HÖGSKOLA · BTH

Fuel Consumption per Liter in comparing Engine Alternatives



Machinery or Equipment Deliveries 2008-2013

Equipment type	2008	2009	2010	2011	2012	2013
Reach Stackers	1408	796	1227	1452	1504	1324
FLTs Laden	198	110	113	146	178	146
FLTs empty	613	318	467	549	709	671
Terminal Tractors 4x2	2843	1778	1343	1727	1625	1596
Terminal Tractors 4x4	692	404	320	375	414	404

Terminal Tractor 4x2

Terminal Tractor 4x4

Reach Stacker

What is the Pay Back?

ICC = (Initial Cost of Vehicle) – Purchase Incentives + PVFuel – PVResale

Where:

- **Purchase Incentives** = Value of Grants, Tax Credits, etc. Applied to Vehicle Purchase
- **PVFuel** = Present Value of Fuel Expenses During Vehicle Service Life
- **PVResale** = Present Value of Resale Value of Vehicle at End of Service Life
- **PV** = Ft /(1 + d)t
- **Ft** = Future Cash Flow in Year t
- **d** = Discount Rate

Factor	Diesel	LNG – No Incentives	LNG – LNG Incentives	LNG – SCAQMD (Max. 25 Vehicles)
Initial Cost of Vehicle	$80,000	$120,000	$120,000	$120,000
Purchase Incentives	$0	$0	$32,000	$40,000
Fuel Cost/Gallon After Tax Credits	$2.60	$0.50	$0.50	$0.50
Gallons/Operating Hour	1.7	3.8	3.8	3.8
Annual Operating Hours	2	2	2	2
Annual Fuel Costs	$8,840	$3,800	$3,800	$3,800
Service Life	10 Years	10 Years	10 Years	10 Years
Discount Rate	3%	3%	3%	3%
Present Value Fuel	$77,669	$33,387	$33,387	$33,387
Resale Value	$5,000	$0	$0	$0
Present Value Resale	$3,832	$0	$0	$0
ICC	$153,837	$153,387	$121,387	**$113,387**

GoLNG

Interreg Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

- RTG are the main solution for moving containers in terminal yards worldwide
- RTG represent significant part of the total fuel consumption in a port (more than 50%)

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Feasibility Evaluation: RTG

Green Cranes

Terminal Tractors	RTGs	STS + Other
2,4 Million L 1,8 Million € GoB	4,6 Million L 3,4 Million € GoB	17,8 GWh 2,2 Million € kWh
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Facts + Figures

- Diesel engines are the main source of RTGs
- Container handling increases
- At the same time diesel prices increased rapidly
- In some cases RTGs account for 50 % of a container terminals‘ diesel consumption

Effects

- High fuel consumption & costs
- High dependecy on fossil fuels that have unpredictable prices
- High cost in larger size Genset service (- USD 20k / year)
- Environmental; carbon emissions, air and noise pollution

Full LNG powered Reach Stackers

Kalmar is engineering a diesel-LNG powered reachstacker prototype as part of the GREENCRANES project.

"The LNG power is a very interesting future fuel alternative both for port equipment business as well as for the whole shipping industry. Natural gas extractions are increasing and this can clearly be seen as one of the future trends."

What have we learned in 20+ minutes. ?...

- Port **Container Terminals are huge energy consumers,** especially on those energy sources based on fossil fuels.

- From the **economic point of view**, increase of **energy prices** means more cost which **reduces Port competitiveness.**

- In terms of **environmental impact**, with the current motivation in having LNG bunkering and ships being built with LNG engines, the additional effort to **"bunker port equipment is a low barrier to entry (Cherry Picking).**

- Concerning **social impact**, ports are usually located near populated cities **affect nearby population as direct GHG emissions (derived from diesel oil) are locally deployed, not only CO_2, but also other pollutant and toxic gases like N_2O, Sulphur compounds and suspension particles.**

- Efforts to reduce fuel consumption and GHG emissions produced **by RTGs, yard tractors and reach stackers are <u>strongly recommended</u>.**

Total to Supply LNG for CMA CGM's New 22,000 TEU Ships

News:
05 Dec 2017
09.32am

Questions …

Is your Port Ready?

Will you be able to Compete or risk be left behind….?

Total and CMA CGM have signed an agreement covering the
supply of around 300,000 tons of liquefied natural gas (LNG) a
year for 10 years starting in 2020.

More information found at: www.GoLNG.eu

LNG STAKEHOLDERS WILL MEET ONBOARD FJORD LINE'S LNG POWERED FERRY

The upcoming international conference "LNG – best fuel of the future!" will take place onboard Fjord Line's LNG powered ferry M/S Stavangerfjord. Bringing together buyers and sellers from all Baltic Sea Region, the event will give an ideal platform to get the latest news on LNG technologies, legislation and funding possibilities, explore new markets and become a part of the current and future LNG supply chain.

On 10-12 April 2018, the ferry will host participants, representing business organisations from Denmark, Lithuania, Sweden, Norway, Germany and Poland. Professionals will meet to exchange ideas and opinions about LNG development, to review LNG regulatory landscape, deepen technical and scientific knowledge.

International conference is to be held within the framework of the Go LNG project that has brought together 18 partners from 7 countries.

The speakers list includes the delegates of the international companies *Bureau Veritas Marine & Offshore, Kosan Crisplant, Nauticor GmbH&Co KG, DNV GL, Fjord Line A/S, SkanGas* etc. Academic institutions, such as World Maritime University, established by the International Maritime Organisation (IMO), and Maritime University of Szczecin will also send their delegates to share their presentations.

Formal sessions and discussions will be coupled with matchmaking meetings, possibility to experience the bunkering of M/S Stavangerfjord and guided tour "LNG from the Engine room to the Bridge" – the programme will ensure that attendees were given meaningful time and outstanding networking opportunities.

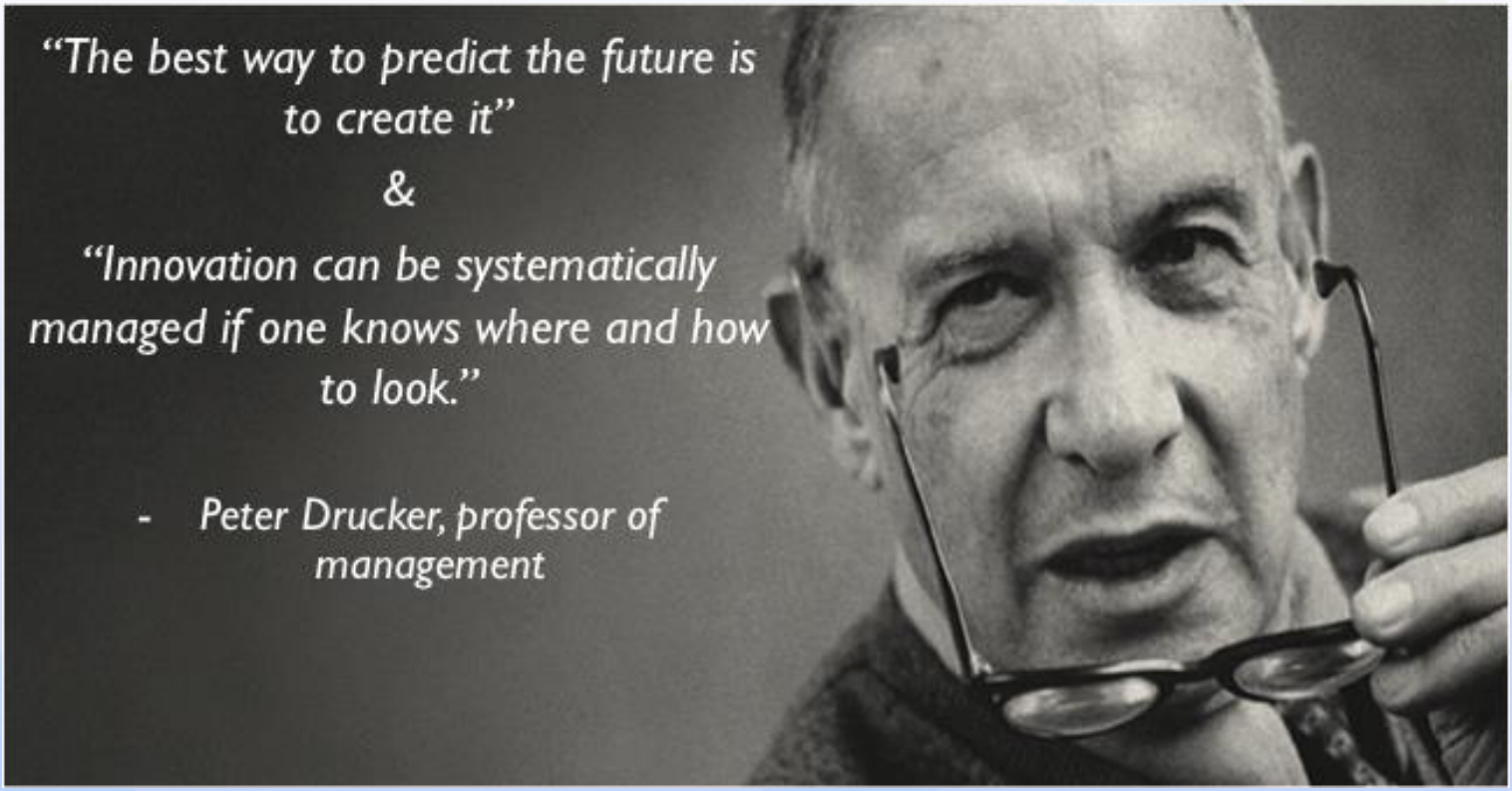
Organisers of the upcoming conference highlight that new investments are required worldwide to meet the growing LNG demand: "It is time for the Baltic Sea Region LNG Cluster companies and businesses to demonstrate their vast knowledge, cutting edge technologies and newest innovations to the world".

The global demand for LNG is expected to increase 4-5% pr. year between 2015 and 2030. Most of the future LNG growth is anticipated to be created by further floating storage regasification units (FSRUs), the declining domestic gas production, small scale LNG and the transport sector.

REGISTRATION

Back

Upcoming Events | Helpful Links | Part-Financed By | Get In Touch


"The best way to predict the future is to create it"
&
"Innovation can be systematically managed if one knows where and how to look."
- Peter Drucker, professor of management

QUESTIONS?....

CASE FOR LNG...?

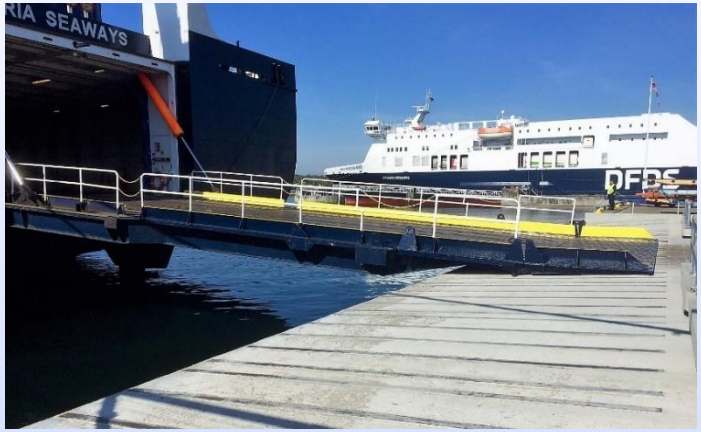

Gothenburg
Jönköping
Älmhult
Olofström
Baltic Sea
KARLSHAMN
Copenhagen
Malmö
Image NASA
Image © 2008 TerraMetrics
Image © 2008 GeoContent
Image © 2008 COWI A/S, DDO
Google

BACKGROUND: MAJOR PORT IN SWEDEN

- 5,4 million tons
- 82.000 cargo units RoRo
- RoRo-leader on Baltic States/RUS
- 163.000 passengers
- 10.000 rail wagons
- Full service deep sea port
- No ice/tide. 3 Port tug boats
- Easy access from sea and land
- Rail tracks to quays/warehouses
- Environmental friendly location
- Plenty of expansion areas

SETTING: LOCATION 4 KM OUTSIDE CITY

DEMAND FOR LNG: RO-RO/FERRY



- DFDS Seaways RoPax Klaipeda 10/w
- Trucks, Trailers, General cargo/cont. on Mafi
- Passengers

PROJECT CARGO / BREAK BULK

- LMH 550 lifting 144 tons at 18 m
- Access to extra mobile capacity
- Direct call USA: Grieg Star Shipping 3-4/year
- Frequent direct calls UK for break bulk

KARLSHAMN CONTAINER TERMINAL

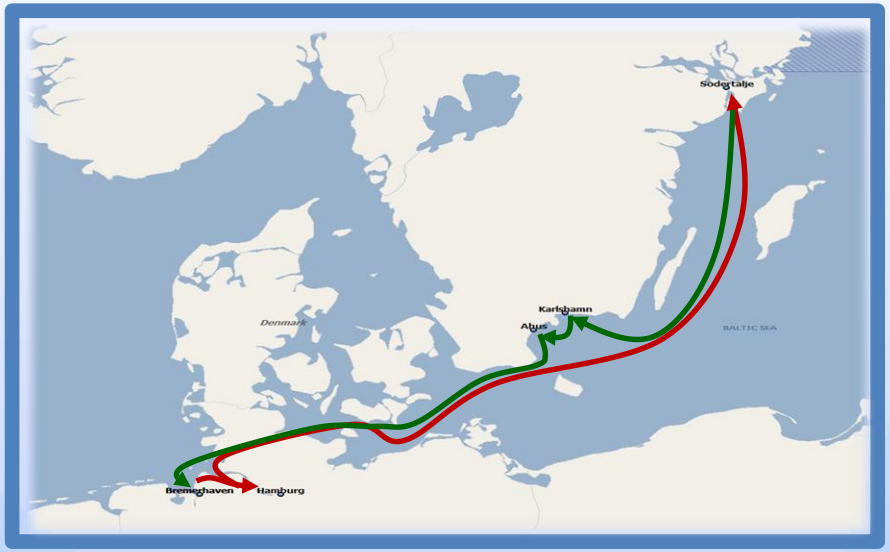
- West quay, south: 11 m, LOA 200 m
- Min 8 m (draft 7,5 m) all quays
- >1.600 TEU vessels handled
- Ice-free, easy navigation
- Liebherr mobile crane 40 t at 50 m
- Reach stackers + Tug Masters
- Depot areas, Rail connection
- Vehicle scale (VGM)
- Port-IT terminal system with EDI
- 3 tug boats, Local pilot station
- Repair shops

FEEDER SERVICE KARLSHAMN

- TransAtlantic Container / X-Press Feeders
- Largest independent feeder operator
- Operating 108 vessels, 26 owned
- 1 / Week
- Flexibility in capacity
- Karlshamn-Bremerhaven/Hamburg

TFS – TransFeeder South

North Europe Coverage



Service details

- weekly fix day service
- 1 vessel @ 508 TEUs
- Exclusive coverage to Karlshamn
- 4 terminal calls in Hamburg

TFS –Service pro-forma

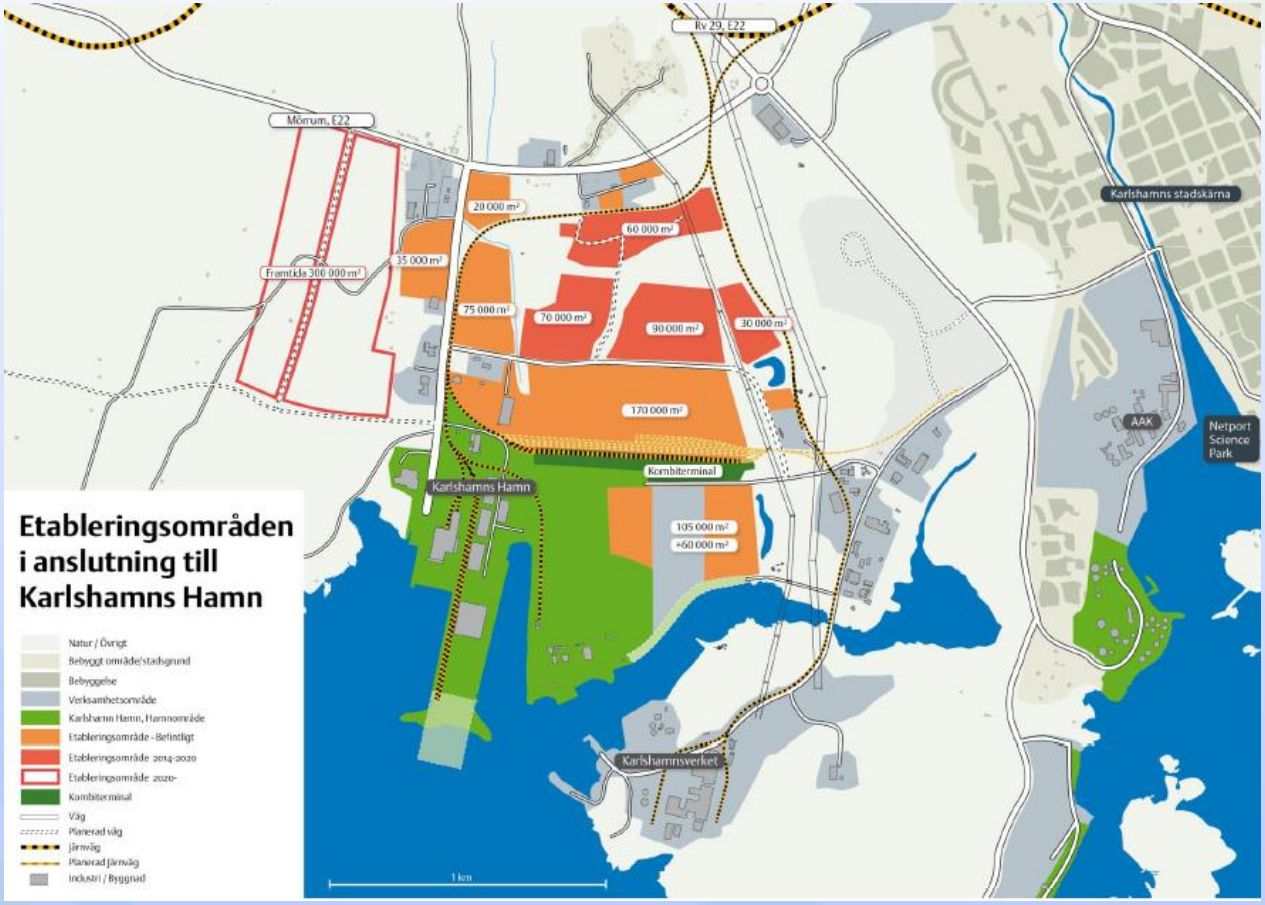
Port Rotation	Terminal	Berthing Day
Bremerhaven	Eurogate	Thu/Fri
Hamburg	CTA/CTB/CTT/EUROGATE	Fri/Sat
Södertälje	SYDHAMNEN	Mon
Karlshamn	STILLERYD	Tue
Åhus	CONTAINERTERMINALEN	Wed
Bremerhaven	Eurogate	Thu/Fri

Service transit times

POD / POL	Bremerhaven	Hamburg	Södertälje	Karlshamn	Åhus
Bremerhaven	X	1	3	4	5
Hamburg	5	X	2	3	4
Södertälje	4	5	X	2	3
Karlshamn	2	4	5	x	1
Åhus	1	3	4	6	X

LNG BUNKERING „HUB” KARLSHAMN

DEVELOPMENT AREA



DEVELOPMENT AREA KARLSHAMN

LOCAL LARGE SHIPPERS O/S & SSS

Conclusion

Concluding remarks

- **Liquefaction and regasification capacity** of the LNG markets in the Baltic Sea countries (expansion projects or new projects in the area relative to the LNG infrastructure) combined with optimism on supply and demand in the region, represent the ideal basis for the whole area.

- **Essential for an adequate development** of the market in the various sectors starting from a shared implementation of organic legislative measures and technical regulations. All this is integrated with a good system of incentives and / or tax relief that stimulate the demand for LNG.

- It is **important to push the LNG outside of the sea sphere**: pressing the price in order to make the markets more accessible to consumers.

- More **training and education** on energy, sustainability, logistics, business and transport and the BSR LNG Competence Center will guarantee an integrated training system.

- Individual national strategies must flow into **a comprehensive development plan of the entire BSR area.**

WWW.GOLNG.EU

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Baltic Sea Region

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QUESTIONS?

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Thank you

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