STRATEGY & OPPORTUNITIES FOR LNG
Tallinn, Estonia
May 16, 2018

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Blekinge Institute of Technology, www.bth.se
Biblioteksgatan 4, Karlshamn, Sweden
Agenda

• Who we are and Our aims
• Introduction
• Background
• SWOT – Assessment
• Future of LNG
• Conclusion
• Q & A ....
Who we are and Our aims
SCOPEx

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

WWW.GOLNG.EU
Project content structure

BSR Blue corridor strategy
Integrated value chain study
LNG fuel distribution strategy
LNG Standard and regulation toolbox
LNG shipping index
LBG business concept

BSR LNG Business Cluster
Functioning business network
International conference
Study visits
B To B meetings
Business plans and pilot projects

BSR LNG competence center
Training programs
Training and research infrastructure
Service package
Network of training institutions

WWW.GOLNG.EU
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.
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.
Project: GoLNG
www.GoLNG.eu

LNG STAKEHOLDERS WILL MEET ONBOARD EUROPA II FERRY

The upcoming international LNG powered ferry M/S Europa II will serve as the ideal platform to bring together stakeholders from the maritime and the LNG industry.

The event will be held on the M/S Europa II on 25th May 2023, and it will be attended by participants from various organisations and companies. Bureau Veritas Marine & Offshore, Kosan Crisplant, Nauticor, and Tugboat Group are some of the organisations involved. The LNG sector is being facilitated through this event, established by the International Maritime Organisation (IMO), and Maritime Unions.

Formal sessions will be presented by two keynote speakers sharing real-life experiences. The first speaker will experience the bunkering of M/S Stavangerfjord and guided tour “LNG from the Engine room to the Bridge” – the LNG owners’ perspective. The second speaker will provide an overview of the time and outstanding networking opportunities.

Organisers of the event have drawn an optimistic conclusion that investments are required worldwide to meet the growing LNG demand. “It is time for the Baltic Sea Region LNG Cluster companies and businesses to take advantage of industry leadership, cutting-edge technologies, and newest innovations to the world”.

The global demand in 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

Upcoming Events
Helpful Links
Part-Financed By
Get In Touch
Background
Bringing LNG out of the “Dark Side”

Fear is the path to the dark side. Fear leads to anger. Anger leads to hate. Hate leads to...suffering“
Pick up any Trade/Industry magazine and we see that Automation and Energy is here to stay.
Motivation
…Or attend a GO LNG meeting to see how misinformed people are?
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

WWW.GOLNG.EU
SWOT Analysis of LNG in BSR
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.W.O.T. Analysis

Intervention Context

Intervention
## Summary of Findings

<table>
<thead>
<tr>
<th>STRENGTHS</th>
<th>WEAKNESSES</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓ Comply with EU regulations</td>
<td>✓ Differences (geographical, socio economic etc) between BSR countries</td>
</tr>
<tr>
<td>✓ Gas characteristics: large quantities available, competitive costs etc.</td>
<td>✓ High capital costs</td>
</tr>
<tr>
<td>✓ Less polluting than petroleum, very eco friendly</td>
<td>✓ Needed implementation of joint actions</td>
</tr>
<tr>
<td>✓ Greater energy independence for BSR countries</td>
<td>✓ Public consciousness on safety and environmental risks</td>
</tr>
<tr>
<td>✓ Important Role in BSR Energy Mix</td>
<td>✓ Oversupply risk due to total size of global LNG small market</td>
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<td>✓ Strong gas demand and supply growth in the BRS countries</td>
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<td>✓ Good scientific knowledge in the BSR countries</td>
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<td>✓ Accomplished safety record along supply chain</td>
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<td>✓ Economic development in the area</td>
<td>✓ The development of alternative technologies</td>
</tr>
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<td></td>
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<td>✓ Supply in new markets</td>
<td></td>
</tr>
<tr>
<td>✓ Implementation of economies of scale</td>
<td></td>
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<td></td>
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<tr>
<td>✓ Increasing price competitiveness</td>
<td></td>
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### WEAKNESSES

- 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

- 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
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SWOT ANALYSIS

Intervention Context

www.GoLNG.eu
Future of LNG
Future so Bright?

- **Current Policies Scenario**
- **New Policies Scenario**
- **Sustainable Development Scenario**

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<th>Region</th>
<th>2000</th>
<th>2016</th>
<th>2025</th>
<th>2030</th>
<th>2035</th>
<th>2040</th>
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<td>53</td>
<td>70</td>
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<td>330</td>
<td>392</td>
<td>460</td>
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<tr>
<td>Saudi Arabia</td>
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<td>978</td>
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<td>730</td>
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<td>Turkey</td>
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<tr>
<td>Indonesia</td>
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<td>675</td>
<td>749</td>
<td>832</td>
<td>894</td>
<td>326</td>
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<td>162</td>
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<td>107</td>
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<tr>
<td>China</td>
<td>27</td>
<td>137</td>
<td>222</td>
<td>261</td>
<td>288</td>
<td>336</td>
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<tr>
<td>India</td>
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<tr>
<td>Rest of Southeast Asia</td>
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<td>131</td>
<td>131</td>
<td>127</td>
<td>-19</td>
<td>-0.6%</td>
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<tr>
<td>World</td>
<td>2,506</td>
<td>3,621</td>
<td>4,174</td>
<td>4,545</td>
<td>4,950</td>
<td>5,304</td>
<td>1,683</td>
<td>1.6%</td>
</tr>
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</table>

*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.

WWW.GOLNG.EU
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.

WWW.GOLNG.EU
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
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..)**

**Port Equipment in Container Terminals**
Market size for Port Equipment & Container Handling
9 Billion €
Main drivers of the Market

Trends
- Increasing competition of terminals
- Globalization
- Bigger Vessels
- Increase in energy costs
- Increasing environmental demands

Consequence
- More efficient systems
- New investments in modern port facilities
- Bigger Cranes and faster logistics
- Energy Savings
- Automation of Container Yards
Let's 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?

**NCTV Yard Machinery. Total Fuel Consumption 2012**
- 4,049,138 L (58%)
- 2,245,147 L (32%)
- 611,460 L (9%)
- 80,819 L (1%)

**Livorno TDT Yard Machinery. Total Fuel Consumption 2012**
- 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

<table>
<thead>
<tr>
<th>Terminal Tractors</th>
<th>RTGs</th>
<th>STS + Other</th>
<th>Supply Alternatives</th>
</tr>
</thead>
<tbody>
<tr>
<td>2,4 Million L</td>
<td>4,6 Million L</td>
<td>17,8 GWh</td>
<td>Current Electrical Tariff</td>
</tr>
<tr>
<td>1,8 Million € GoB</td>
<td>3,4 Million € GoB</td>
<td>2,2 Million € kWh</td>
<td>Tariff 6.1 (Electrical Supplier)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tariff 6.3 (Electrical Supplier)</td>
</tr>
</tbody>
</table>

**Alternatives TT**
- Gasoil TIER 4 / Stage IV (2014)
- LNG
- Dual Fuel

**Alternatives RTG**
- RTG Engine Replacement TIER 4 (2014)
- LNG / Dual Fuel
- Electrification
  - Conductor Bar
  - Cable Reel

**Supply Alternatives**
- Current Electrical Tariff
- Tariff 6.1 (Electrical Supplier)
- Tariff 6.3 (Electrical Supplier)
1.500 LNG Vehicles
Mainly UK, NL & Spain

- UK: 621 trucks
- Netherlands: 387 trucks
- Belgium: 33 trucks
- Italy: 56 trucks
- Spain: 306 trucks
- Portugal: 11 trucks
- France: 10 trucks
- Poland: 46 buses
- Switzerland: 1 truck
- Sweden: 69 trucks
- Finland: 1 truck
- Russia: 1 truck
- Turkey: 2 trucks

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
Hybrid Diesel/Electric
Full electric Battery
Future energy Full cell-hydrogen
Under development

Diesel
LNG Under development

GoLNG
Interreg Baltic Sea Region
Fuel Consumption per Liter in comparing Engine Alternatives

<table>
<thead>
<tr>
<th>Engine Types</th>
<th>Fuel Consumption per Liter</th>
</tr>
</thead>
<tbody>
<tr>
<td>6BTA5.9-173</td>
<td>5.68</td>
</tr>
<tr>
<td>BLPG-195 PLUS</td>
<td>14.20</td>
</tr>
<tr>
<td>BGAS-195 PLUS</td>
<td>16.09</td>
</tr>
<tr>
<td>CGAS-250 PLUS</td>
<td>17.60</td>
</tr>
</tbody>
</table>
### Machinery or Equipment Deliveries 2008-2013

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

- **Terminal Tractor 4x2**
- **Terminal Tractor 4x4**
- **Reach Stacker**
What is the Pay Back?

\[ ICC = (\text{Initial Cost of Vehicle}) - \text{Purchase Incentives} + \text{PVFuel} - \text{PVResale} \]

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** = \( \frac{Ft}{(1 + d)t} \)
- **Ft** = Future Cash Flow in Year \( t \)
- **d** = Discount Rate
<table>
<thead>
<tr>
<th>Factor</th>
<th>Diesel</th>
<th>LNG – No Incentives</th>
<th>LNG – LNG Incentives</th>
<th>LNG – SCAQMD (Max. 25 Vehicles)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Cost of Vehicle</td>
<td>$80,000</td>
<td>$120,000</td>
<td>$120,000</td>
<td>$120,000</td>
</tr>
<tr>
<td>Purchase Incentives</td>
<td>$0</td>
<td>$0</td>
<td>$32,000</td>
<td>$40,000</td>
</tr>
<tr>
<td>Fuel Cost/Gallon After Tax Credits</td>
<td>$2.60</td>
<td>$0.50</td>
<td>$0.50</td>
<td>$0.50</td>
</tr>
<tr>
<td>Gallons/Operating Hour</td>
<td>1.7</td>
<td>3.8</td>
<td>3.8</td>
<td>3.8</td>
</tr>
<tr>
<td>Annual Operating Hours</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Annual Fuel Costs</td>
<td>$8,840</td>
<td>$3,800</td>
<td>$3,800</td>
<td>$3,800</td>
</tr>
<tr>
<td>Service Life</td>
<td>10 Years</td>
<td>10 Years</td>
<td>10 Years</td>
<td>10 Years</td>
</tr>
<tr>
<td>Discount Rate</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Present Value Fuel</td>
<td>$77,669</td>
<td>$33,387</td>
<td>$33,387</td>
<td>$33,387</td>
</tr>
<tr>
<td>Resale Value</td>
<td>$5,000</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>Present Value Resale</td>
<td>$3,832</td>
<td>$0</td>
<td>$0</td>
<td>$0</td>
</tr>
<tr>
<td>ICC</td>
<td>$153,837</td>
<td>$153,837</td>
<td>$121,387</td>
<td>$113,387</td>
</tr>
</tbody>
</table>
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%).
Feasibility Evaluation: RTG

Terminal Tractors
- 2,4 Million L
- 1,8 Million € GoB

Alternatives TT
- Gasoil TIER 4 / Stage IV (2014)
- LNG
- Dual Fuel

RTGs
- 4,6 Million L
- 3,4 Million € GoB

Alternatives RTG
- RTG Engine Replacement TIER 4 (2014)
- LNG / Dual Fuel
- Electrification
  - Conductor Bar
  - Cable Reel

STS + Other
- 17,8 GWh
- 2,2 Million € kWh

Supply Alternatives
- Current Electrical Tariff
- Tariff 6.1 (Electrical Supplier)
- Tariff 6.3 (Electrical Supplier)
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

High fuel consumption & costs
High dependency on fossil fuels that have unpredictable prices
High cost in larger size Genset service (~ USD 20k / year)
Environmental; carbon emissions, air and noise pollution
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 **CO₂**, but also other pollutant and toxic gases like **N₂O**, Sulphur compounds and suspension particles.

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

Questions …

Is your Port Ready?

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

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
CASE FOR LNG...?
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
• 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

Service transit times

<table>
<thead>
<tr>
<th>Port Rotation</th>
<th>Terminal</th>
<th>Berthing Day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bremerhaven</td>
<td>Eurogate</td>
<td>Thu/Fri</td>
</tr>
<tr>
<td>Hamburg</td>
<td>CTA/CTB/CTT/EUROGATE</td>
<td>Fri/Sat</td>
</tr>
<tr>
<td>Södertälje</td>
<td>SYDHAMNEN</td>
<td>Mon</td>
</tr>
<tr>
<td>Karlshamn</td>
<td>STILLERYD</td>
<td>Tue</td>
</tr>
<tr>
<td>Åhus</td>
<td>CONTAINERTERMINALEN</td>
<td>Wed</td>
</tr>
<tr>
<td>Bremerhaven</td>
<td>Eurogate</td>
<td>Thu/Fri</td>
</tr>
</tbody>
</table>

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
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**.
QUESTIONS?
Thank you

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