



LNG 
in Baltic Sea Ports

Dear Friends,



The 'LNG in Baltic Sea Ports' project has undertaken a research challenge to investigate the possibilities of creating a liquefied natural gas (LNG) infrastructure in seven Baltic ports – Aarhus, Copenhagen-Malmö, Helsingborg, Helsinki, Stockholm, Tallinn and Turku. The initiative is co-financed by the European Union in accordance with the Community's goal to diversify the energy market.

The project is also a result of the impending International Maritime Organization's stricter regulation on sulphur content in ships' fuel (as of January 2015). The so-called Emissions Control Areas force all shipping parties to look for an alternative to bunker oil used today. Paying close attention to this issue, our main task will be to find out if LNG can become a suitable alternative for shipping companies in the future.

It is a great challenge for all of us who work within the project – to complete the works by the end of 2014 and hopefully be able to present a new opportunity to improve the air quality in Europe as well as lend a helping hand to the maritime sector.

Per-Olof Jansson
Project Leader



Christopher North

Head of Unit responsible for waterborne transport at the TEN-T Executive Agency

I am very pleased that the 'LNG in Baltic Sea Ports' project was selected for support under the 2011 TEN-T Motorways of the Seas (MoS) call for proposals. The MoS Programme seeks to address the challenges faced by short sea shipping in Northern Europe in the context of the amended Annex VI of IMO MARPOL Convention and the Sulphur Emission Control Areas requirements entering into force on the 1st of January, 2015.

The TEN-T assistance is therefore aimed, among others, at the deployment of new technologies and systems to make maritime transport more environmentally-friendly, safe and cost-effective. The TEN-T supports several new technological solutions such as LNG, scrubbers or shore-side electricity for greening shipping whilst ensuring that the overall approach is holistic – so as to help bring about real network solutions – and respects the competition principles within the sector.

The 'LNG in Baltic Sea Ports' project fits perfectly within the MoS Strategy. Building directly upon the results of a feasibility study, it targets to develop a harmonised approach to LNG bunker filling infrastructure in the Baltic Sea region. The initiative should lead not only to a more standardised process of how to plan and construct the relevant infrastructure but also to investments and implementation in some key Baltic ports.

The initiative is also expected to generate wider EU benefits through its dissemination activities. Some other ports in the Baltic region, but also in the North and Mediterranean Seas, are already very interested to learn from the work carried out under this project.

With no doubt, the 'LNG in Baltic Sea Ports' will make a significant contribution to the development of LNG bunkering systems in the EU and will be a milestone for creating an environmentally-friendly alternative for European shipping.

Monika Przedpelska-Öström

Representative of the Swedish Ministry of Enterprise, Energy and Communications

As the IMO's sulphur directive requires climate and environmentally-friendly fuels from the year 2015, from a ship owner's point of view, there are three main possible options – a shift to marine gas oil, retrofit the vessel with a scrubber system or install engines fuelled by natural gas.

From our point of view, liquefied natural gas is an interesting alternative as ships' fuel, especially in the Emissions Control Areas. However, some practical issues must be solved before LNG is ready to be introduced on a commercial scale, like bunkering, safety, technical and operational conditions and finally – the infrastructure. Therefore, we find the 'LNG in Baltic Sea Ports' project important and necessary, providing the proper know-how and a base for further undertakings.



About the project

Baltic Ports Organization has initiated 'LNG in Baltic Sea Ports' project as a response to the IMO's decision to establish new sulphur content limits in marine fuels sailing in Emission Control Areas (covering the Baltic, the North Sea and the English Channel) from the 1st of January, 2015. Liquefied natural gas is perceived as one of key solutions to meet the new requirements.

The main aim of 'LNG in Baltic Sea Ports', co-financed by the EU TEN-T Multi-Annual Programme, is to foster a harmonised approach towards LNG bunker filling infrastructure in the Baltic Sea area. Seven ports are involved in the project – Aarhus, Copenhagen-Malmö, Helsingborg, Helsinki, Stockholm, Tallinn and Turku. Each of the project partners is planning the development of port infrastructure to offer LNG bunker stations to ship-owners in the future. The works in the ports 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.

The results of the studies will allow to start the physical investments in infrastructure for LNG tanking. Moreover, project works include a so-called 'stakeholder platform' which will facilitate a discussion among various actors, such as port authorities, ship-owners, gas infrastructure providers, energy traders and bunkering companies. The platform will also welcome representatives from the North Sea who will share their knowledge and views on LNG.

The project's idea is meant to deliver both credible know-how on LNG as a marine fuel and an answer to the IMO's sulphur directive. This will also contribute to the realization of TEN-T Priority Area 21 (Motorways of the Sea) in compliance with the EU Strategy for the Baltic Sea Region – a model area for clean shipping.

The initiative's efforts will be centred in the 'LNG Guidebook' containing best practices, recommendations and standards on how to develop effective gas infrastructure in ports. The project will end on December 31st, 2014, just one day before ECA becomes the daily bread in the region for us all.



Background

In October 2008, the International Maritime Organization amended Annex VI of the MARPOL. Among many things, the new rules put forward more stringent requirements on sulphur content in ships' fuel across the so-called Emission Control Areas. The maritime sector now faces a serious challenge – how to adapt to the impending regulations in 2015?

The IMO's directive orders that from January 1st, 2015, the sulphur content in fuel burnt by ships sailing in the ECA zones must be below 0.1%. This is valid for the Baltic and North Seas and for the English Channel. The costs of sea transportation are believed to increase significantly which will hit the competitiveness of maritime shippers hard, and short sea shipping in particular, while parallel overland routes will immediately gain the upper hand. All in all, there is the threat of a modal backshift from sea onto roads – a consequence which sets against the very idea of relieving the environment from harmful substances.

In line with IMO's requirements set out under the Convention for the Prevention of Marine Pollution from Ships (MARPOL 73/78) on July 15th, 2011, the European Commission adopted a new legislative proposal – an amendment to the EU's Sulphur Directive. As a result, the Baltic shipping sector started to prepare for the economic consequences of the future situation, such as, among others, increased fuel expenses, logistics costs and the need for large investments in low-emission technology and infrastructure.

Available options

Today, there are three common answers to how shipping can deal

with the IMO challenge: low sulphur distillates (such as marine gas oil), scrubbers which capture acidic exhaust gases from traditional fuel, and liquefied natural gas (LNG).

LNG contains virtually no sulphur; particle emissions are close to 0%, while mono-nitrogen oxides (NOx) are reduced by approx. 85-90% and carbon dioxide (CO₂) by 23% (in comparison to conventional oil). The overall greenhouse gas production is lowered by 15-20%. True that burning LNG involves the so-called methane slip, but engineers are constantly upgrading engines to minimize this.

Challenges and opportunities

LNG has been in use as a marine fuel since 2001, mostly in Norway with a fleet of over 20 ships (other than tankers) from coast guard/supply vessels to ferries. It is assumed that in 2015 the region's ECA demand for LNG will reach 1.6 mln tn, in 2020 – 3.63 mln tn, and 6.21 mln tn (annually) by year 2030. Yet, liquefied natural gas must still overcome some major challenges before it becomes a widely used fuel. The gas tanks and the piping system onboard ships occupy space normally destined for cargo and their installation increases a vessel's construction costs significantly. LNG ships must also be refuelled

more often so the gas is said to be better suited for short-sea rather than cross-continental traffic. There are serious questions on tanking safety and security, and lack of bunkering facilities at ports, be they tank trucks, LNG terminals or bunker ships. Still, LNG can become a competitive edge for the whole industry in the future, but serious preparation works should kick off as soon as possible.



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PORT OF AARHUS, DENMARK

Kim Meilstrup, Project's Activity Leader

A bunkering entrance to the Baltic

We are taking part in a study on a future energy distribution network in Baltic Sea ports in order to prepare for the future challenges in relation to cleaner air or CO₂ reduction from ships. It is obvious that the ferry lines between Aarhus and other ports in the Baltic Sea region are in need of clean fuel bunkering from 2015. Nonetheless, further investigations and specific designs are required, since we cannot forget also about container ships, pure ro-ro lines and bulk vessels.

Our participation in the project is divided into three phases: conducting a feasibility study along with a market analysis upon transport opportunities; preparing documents for approval from the authorities (covering ecology, safety and security issues); and finally – carrying out proper design works, drawing out the station's layout, and its installation in the port. Within the 'LNG Baltic Sea Ports' we are looking forward to cooperation with other ports, since sharing knowledge and mutual support can substantially speed things up.



COPENHAGEN-MALMÖ PORT, DENMARK/SWEDEN

Brian Kristensen, Project's Activity Leader

For the sake of the environment

The new and stricter sulphur directive already causes major perturbations throughout the shipping industry. We, at CMP, feel in the very heart of the industry, and being located at the very entrance to the Baltic Sea (a very busy gateway indeed) we do care about the environment a lot. Thus, it is a natural consequence for us to participate in the investigation process aimed at finding the right replacement for the currently used fossil fuels.

Although we are at an early stage, we believe that joining forces in the 'LNG in the Baltic Sea Ports' partnership will be very fruitful for all parties involved. Sharing of knowledge and investigation results will save us all time and money.

In Copenhagen-Malmö Port we will conduct a feasibility study and its outcomes will be one of our key drivers in future discussions regarding how to proceed.



PORTS OF STOCKHOLM

PORTS OF STOCKHOLM, SWEDEN

Sandra Gegerfelt, Project's Activity Leader

Not only for Viking Grace

Ports of Stockholm are proud to be a part of the flagship project where Viking Line's new LNG-fuelled ferry Viking Grace starts its service in 2013, when we will be the first port in the Baltic providing LNG bunkering. Yet, we must study how to secure the bunkering issue in a long-term perspective and this is where 'LNG in Baltic Sea Ports' plays a major role for us. Thus, we believe the project will provide important input to our investment plans in LNG.

As for the project itself, it is an important element in the development of LNG use in the Baltic Sea. The cooperation between ports can create synergies where acquired knowledge and experience can be spread to other parts of the EU.



PORT OF HELSINKI, FINLAND

Jukka Kallio, Project's Activity Leader

Towards viable and safe operations near the city

LNG is naturally an issue which builds up emotions. It is important, however, to steer clear from going to extremes and becoming either a hothead enthusiast or a sceptic impervious to all arguments. I personally believe in LNG, but only to a certain extent. Converting a few year old vessels is expensive, as some examples show. In this context, I see the need for supporting the conversions. On the other hand, Viking Line's newbuilding Viking Grace (as well as other LNG ferries to come) will provide essential data about the whole LNG idea in the Baltic Sea.

Within the project, Port of Helsinki will conduct a feasibility study and all the possible investments depend on the results of this analysis. One of the most vital facts which we must bear in mind is that ports are located close to city centres. Consequently, it is necessary to find out if bunkering is even possible due to safety or technical details, afterwards – what is the best tanking model, and finally – what conditions must be met to establish viable and safe LNG operations.





PORT OF HELSINGBORG, SWEDEN

Roland Brodin, Project's Activity Leader

LBG & LNG for the local market

Today, 50 thousands ships pass nearby Port of Helsingborg and 3 million lorries go through the city annually. The local conditions in the port area are well suited for a specialized terminal which will bunker LNG in the Øresund region in the future.

Port of Helsingborg has formed a project named HELGA together with important local stakeholders – Øresundskraft, Nordvästra Skånes Renhållning (NSR) and Kemira – as well as two associations – Ports of Sweden and the Swedish Gas Association. The main aim of the project is to establish an LNG solution that will strengthen the competitiveness of the region, be a part of a harmonized bunker filling infrastructure as well as contribute to solving the air pollution problems within City of Helsingborg. NSR will set up a liquefied bio gas (LBG) plant which will be the first step in introducing both LBG and LNG to the local market and to the shipping industry.

The project is investigating the possible market volumes. The intention is to deliver LNG to ships, heavy vehicles, industries, green houses, etc. Sourcing is another important issue that will be carefully studied. Priority will be given to working together with other stakeholders and making strategic alliances which will ensure attractive LNG pricing. In the end, the market volumes along with expected competitiveness will act as the main driving factors deciding a terminal's capacity.

HELGA and other parties from the 'LNG in Baltic Sea Ports' project will cooperate to find commercial, technical and environmental tools to establish a harmonized bunker filling infrastructure in the Baltic Sea region. Together, we can approach important stakeholders and discover solutions from which we can all benefit.



PORT OF TURKU, FINLAND

Markku Alahäme, Project's Activity Leader

LNG import terminal in Pansio

LNG is a clean fuel, which can substitute oil-based energy sources in maritime transport and in the industry, thus reducing emissions caused by them. I personally see this as the future of the both mentioned sectors – namely LNG getting the upper hand. Therefore, it is of national interest that Finnish ports will have a network necessary for importing and distributing LNG.

Gasum and Port of Turku are on the forefront in building the LNG infrastructure in Finland. On the 21st of May, 2012, the two parties signed a letter of intent to construct an LNG import terminal in Pansio Harbour. The agreement levelled the project to the next stage and City of Turku has started to prepare an alteration of land use planning for the harbour area. As a result, it is possible to set up the LNG terminal operations including a storage tank of about 30,000 m³ in Turku port. From Pansio LNG can be transmitted to the port itself by bunker vessels or tank trucks. Besides, it is also no problem to construct a pipeline network for transmitting LNG from the terminal to industrial facilities.

Gasum will continue the technical planning of the terminal, while Port of Turku has started studies related to land use planning. The delivery of liquefied natural gas from the terminal could start already during year 2015. The LNG investment will total approx. EUR 60 mln. Our port wishes also to make an outline concerned with LNG bunkering arrangements as well as produce a safety manual for tanking up issues and use of LNG in the port areas. We expect that sharing knowledge and findings related to LNG projects in several ports will lead to a fruitful outlook of best practices regarding LNG – be it terminals, bunkering and safety matters.

PORT OF  TALLINN

The Port of Good News

PORT OF TALLINN, ESTONIA

Riina Palu, Project's Activity Leader

Gas terminal(s) in Muuga

Port of Tallinn has set a goal to penetrate the LNG/LPG logistics market in 2010-2015 by creating a suitable environment for the construction of gas terminals and thus building the base for energy independence of the Republic of Estonia.

In May 2012, Port of Tallinn and Elering (the Estonian energy transmission system operator) chose Vopak LNG as a strategic partner for the development of an LNG terminal in Muuga Harbour. The first phase of the project foresees a feasibility study covering technical parameters of the terminal, costs of its construction and options for gaining/utilizing EU funds.

Port of Tallinn envisages construction of a gas terminal (or terminals) into the eastern part of the Muuga Harbour. Transshipment operations could be performed on existing Quay No. 33 or – if necessary – a new berth which can be built to the breakwater extension. The concept of the terminal will cover the following areas: security of supply (in the form of long-term capacity reservations for the country's transmission system operators); commercial capacity for the interested gas shippers operating in Estonia, Latvia, Lithuania and in Finland; servicing the off-grid market in Estonia (hereunder district heating plants not connected to the network supplied via trucks) as well as refuelling LNG-driven ships via reloading facilities for bunker barges, which could then bring their cargo to the port in Tallinn, other locations in Estonia, or along the Finnish and Swedish coasts.

We believe that building the LNG terminal in Muuga will significantly contribute to a cleaner environment in the Baltic Sea. Port of Tallinn wishes to set up working groups in order to support Estonia's strategic goals for both energy security and for the sake of the Baltic Sea region's ecosystem.





PROJECT INFO

Project Leader: Per Olof Jansson, Chairman of the Steering Group, Port of Helsingborg (SE)

Project Manager: Emil Arolski, Business Development Manager, Actia Forum Ltd. (PL)

Partners: Port of Aarhus (DK), Copenhagen-Malmö Port (DK/SE), Port of Helsingborg (SE), Port of Helsinki (FI), Ports of Stockholm (SE), Port of Tallinn (EE), Port of Turku (FI)

Budget: EUR 4,785,040

EU grant: EUR 2,392,520

Timetable: September 2012-December 2014

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Co-financed by the European Union

Trans-European Transport Network (TEN-T)

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