

Maritime Group
Twelfth Meeting
Helsinki, Finland, 4 June 2013

Agenda Item 3 Ministerial Declaration

3.4 Airborne emission including alternative fuels

Document code: 3.4/2/INF

Date: 14.5.2013

Submitted by: Finland

NATIONAL LNG ACTION PLAN FOR SHIPPING 2013 – 2017

The attached document is the national “LNG Action Plan for shipping 2013-2017 - Introduction of liquefied natural gas in maritime transport” prepared under the leadership of the Finnish Ministry of Transport and Communications with the aim to promote the use of liquefied natural gas (LNG) in shipping.

The Meeting is invited to take note of the document.



Ministry of Transport
and Communications

LNG Action Plan for shipping 2013 – 2017
- Introduction of liquefied natural gas in maritime
transport

LNG Action Plan for shipping 2013 – 2017

This Action Plan, prepared under the leadership of the Finnish Ministry of Transport and Communications, is aimed at promoting the use of liquefied natural gas (LNG) in shipping on the basis of the following guidelines:

- focus resources on providing LNG bunkering in Finland, taking into consideration synergies with domestic industry and heavy vehicles, and the need for an EU-wide LNG infrastructure;
- examine the use of financial incentives, such as investment aid and guarantees for ship acquisitions, in the construction of LNG infrastructure and procurement of LNG-powered ships; and
- work actively at international level (IMO, EU and HELCOM) to promote the use of LNG as ship fuel, including efforts to establish LNG infrastructure and draft the associated regulations and guidelines, particularly for LNG bunkering.

Background

On 24 January 2012 the Ministry of Transport and Communications of Finland appointed a working group to explore alternative propulsion systems for the transport of the future. As part of its work, the group prepared this LNG Action Plan for shipping with the purpose of surveying the studies that have already been made on alternative ship fuels - particularly LNG - at EU level, together with the associated R&D work that has been conducted. In addition, the group was also charged with drafting recommendations for what steps Finland should take in order to promote the use of LNG as ship fuel in the Baltic Sea area, and to facilitate preparations for a regulatory framework and guidelines in the EU and IMO. The drafting of this Action Plan included representation from the Ministry of Transport and Communications, Ministry of the Environment, Finnish Transport Safety Agency, Finnish Shipowners' Association, Finnish Port Association, Port of Helsinki, Port of Turku, VTT Technical Research Centre of Finland, Neste Oil, Gasum and Wärtsilä. Specialists from a number of different fields were consulted during the process.

The use of liquefied natural gas, or LNG, as ship fuel requires that its supply and distribution be assured in Finland and across Europe. As far as Finland is concerned, LNG-powered ships and LNG tankers must also be suitable for winter conditions, including navigation through the ice. The global nature of shipping requires that regulatory decisions aimed at ensuring the safe transport and use of LNG be made at international forums: the IMO and EU. The establishment of LNG infrastructure calls for cooperation at EU level, particularly as regards funding. At the same time, permit processes affecting the setting up of the necessary infrastructure, preparedness for accidents, and training require examination at national level.

LNG is odourless, colourless and non-toxic. It is non-corrosive, and does not contain sulphur, particulate matter or heavy metals.

In exploring the use of LNG as ship fuel, it is also necessary to look at synergies with other users of LNG, such as industry and heavy vehicles. The greatest challenge associated with the use of alternative fuels is how to plan investments in ships and bunkering infrastructure so that supply and demand meet at the same time. How quickly maritime operators switch to LNG largely determines how much will be invested, and when. In this connection, various forms of support both nationally and at EU level will play a key part.

Promoting the use of LNG calls for measures from government actors, municipalities, ports, port operators, shipowners, businesses, rescue services and investors. In central government, clear responsibilities lie with the Ministries of Transport and Communications, Employment and the Economy, Finance, Social Affairs and Health, the Environment, and the Interior.

This LNG Action Plan discusses the recommendations set forth in the North European LNG Infrastructure Project, which submitted its final report in June 2012. The project, which Finland participated in, was co-financed by the European Union and carried out under the leadership of Denmark.

The present Action Plan for shipping will be further elaborated on the basis of the EU Commission's Communication on a European alternative fuels strategy and the associated legislative proposal.

The areas covered by the LNG Action Plan for shipping, together with the responsible actors and timetables proposed, are presented in the following:

I Bunkering	
1 Bunkering solutions need to be considered at an early stage	
<p>Bunkering solutions include bunkering from terminal-to-ship (TPS), ship-to-ship (STS) and tank truck-to-ship (TTS). The volume of fuel, place of bunkering and the environment in which it is performed determine the solution best suited. Bunkering directly from terminal-to-ship via pipeline (TPS) is suitable for all fuel volumes. Ship-to-ship (STS) bunkering is recommended where receiving ships have a bunker volume $\geq 100 \text{ m}^3$. The tank truck-to-ship (TTS) bunkering solution is recommended for receiving vessels with bunker volume requirement of a few m^3 up to 200 m^3. Bunkering from tank truck-to-ship also requires that transport arrangements be examined on the land-side.</p>	
Timetable	2013 – 2015
Key actors	<p>a) in Finland: gas suppliers, shipowners, port authorities, port operators, rescue services, investors, municipalities (incl. land use planning), ship design companies, shipyards and tank truck companies</p> <p>b) internationally: investors</p>
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of the Interior, Ministry of the Environment
II Financial perspectives on LNG infrastructures	
2 Examination of financial incentives related to LNG infrastructure construction	
<p>To support the establishment of a land-based LNG infrastructure, it is recommended that financial incentives be used. They should be sufficient to guarantee that LNG retail prices correspond to a payback time of approximately 8 years. In considering the use of financial incentives, action needs to be taken to examine investment in LNG infrastructure and in LNG transportation and bunkering vessels. It is also necessary to look at synergies with other users of LNG, such as industry and heavy vehicles.</p>	
Timetable	urgent
Key actors	<p>a) in Finland: government bodies, financial institutions</p> <p>b) internationally/EU: EIB, NIB, European Commission</p>
Responsible ministries	Ministry of Finance, Ministry of Transport and Communications, Ministry of Employment and the Economy
3 Plans and project funding for business activities associated with LNG bunkering	
It is recommended that such research projects be launched which are eligible to apply for EU	

project funding. These include demand analyses; projects focusing on the logistics questions of LNG distribution; planning projects related to terminal capacity, design and site; together with rough financial and economical calculations. EU calls regarding business case studies have already been issued and further are expected.

Gasum, for example, has explored the feasibility of setting up an LNG import terminal as part of its business development activities. This terminal would serve the needs of shipping and of industry located outside the scope of the current natural gas pipeline network. The study covers potential sites of the terminal, together with assessments of bunkering solutions at different ports. The results indicate that in some locations the needs of industry even guide infrastructure construction. As a joint effort with the Port of Turku, Gasum has initiated a process to change the local detailed plan in the Pansio port area to enable the construction of an LNG import terminal. Gasum is also carrying out an environmental impact assessment (EIA) concerning the construction of a large-scale LNG import terminal in Porvoo and Inkoo.

A large terminal would serve not only shipping and industry, but also the current natural gas transmission network, by supplying it with natural gas vaporised from LNG. A large LNG terminal would also decentralise the acquisition of natural gas, which would improve the security of its supply.

Timetable	2013 - 2020; emphasis on 2013 – 2016
Key actors	a) in Finland: gas suppliers, port authorities, shipowners, research institutions, potential investors b) internationally/EU: European Commission
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of Finance, Ministry of the Environment

4 Creation of collaboration models for local and regional port clusters

It is recommended that local and regional port clusters be set up to develop local LNG infrastructures and launch business plans. This is particularly important in the coming ten years, with an emphasis on the early years (2013-2016).

LNG as ship fuel is exempt from excise duty, which must be taken into account in planning the supply of LNG from storage facilities to ships.

In autumn 2012, the Centre for Maritime Studies at Turku University and the Pori Unit of Turku School of Economics conducted a preliminary study on the business opportunities of natural gas in the province of Satakunta. The project examined the perspectives of LNG, its potential demand and the implementation possibilities of its distribution for the needs of shipping, industry and transport, together with the associated business opportunities.

Timetable	2013 – 2020; emphasis on 2013 – 2016
Key actors	a) in Finland: port authorities, port operators, municipalities, gas suppliers, Finnish Customs, industry, shipowners b) internationally/EU: cross-border cooperation between ports and port operators, municipalities, gas suppliers and industry
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of Finance, Ministry of the Environment

5 Early creation of a minimum infrastructure and secured market

To speed up and facilitate the introduction of LNG and to secure the market, it is recommended that wide-ranging cooperation also be sought with gas end-users from outside the shipping sector, such as industry and heavy road transport. This will help ensure the minimum infrastructure and secure the market.

According to studies conducted by Gasum, the needs of shipping and industry constitute the necessary LNG user potential in Finland. However, the needs of shipping are dispersed between different ports. Since no LNG infrastructure covering the coastline currently exists, LNG must be transported by tank trucks from terminals located further away.

Timetable	work has already begun – 2015
Key actors	a) in Finland: gas suppliers, industry, transport operators, transport authorities, energy authorities, engine manufacturers (ships, heavy road transport, rail transport) b) internationally/EU: European Commission
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of the Environment

6 Need for and availability of a floating LNG infrastructure (vessels, barges)

The need for bunkering vessels and barges should be explored as soon as possible, since the construction and delivery of a new ship takes around two years. In doing this, the requirements arising from Finnish winter conditions should also be taken into account.

Timetable	urgent, 2013 – 2014
Key actors	a) in Finland: shipowners, gas suppliers, distribution companies, ship design companies, shipyards b) internationally/EU
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy

III Acquisition of an LNG fleet to sail under the Finnish flag

7 Use of financial instruments for the purposes of ship procurement

Action should be taken to explore whether financial incentives, such as investment aid and guarantees for ship acquisitions, could be used in the procurement of LNG-powered ships.

The average age of tonnage sailing under the Finnish flag is currently around 17 years, which is a high figure in international comparisons. LNG is a viable fuel option as far as the construction of new ships is concerned. However, making existing ships LNG-compatible is not considered to be cost-effective.

Timetable	urgent
Key actors	a) in Finland: shipowners, Finnvera, Finnish Funding Agency for Technology and Innovation (Tekes), financial institutions, National Emergency Supply Agency b) internationally/EU: European Commission, EIB, NIB
Responsible ministries	Ministry of Employment and the Economy, Ministry of Finance, Ministry of Transport and Communications
IV Safety	
8 Definition of "small-scale LNG handling"	
<p>It is recommended that <i>small-scale LNG handling</i> be defined as involving tank capacities of $\leq 10,000 \text{ m}^3$ and bunkering pipe/hose diameters of < 7 inches.</p> <p>Most of the regulation governing the use of LNG has been drafted specifically for large-scale LNG import and industry. Size-specific and quantitative requirements are important for legislators when they outline the regulatory framework for small-scale LNG bunkering and other procedures related to the use of LNG.</p>	
Timetable	urgent, 2013 – 2014
Key actors	a) in Finland: Finnish Safety and Chemicals Agency (Tukes), Finnish Transport Safety Agency, Finnish Transport Agency, rescue services b) internationally/EU: European Commission, EMSA
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of the Interior, Ministry of Social Affairs and Health, Ministry of the Environment
9 Guidelines for safety assessment related to LNG bunkering	
<p>Guidelines should be developed for risk-modelling approaches to be applied in safety assessment and risk assessment. It has been estimated that the guidelines will be complete and ready for implementation around 2013/2014. An associated ISO TC67/WG10 standard is also under preparation.</p> <p>Bunkering from tank truck-to-ship requires that steps be taken to review legislation concerning the transport of dangerous goods.</p>	
Timetable	urgent, 2013 – 2014
Key actors	a) in Finland: Finnish Safety and Chemicals Agency (Tukes), Finnish Transport Safety Agency, rescue services, research institutes (incl. VTT Technical Research Centre of Finland) and higher education institutions b) internationally/EU: IMO, EU, EMSA

Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of the Interior, Ministry of Social Affairs and Health
10 Reporting and analysis of accidents and incidents	
<p>Steps should be taken to establish a harmonised way of reporting incidents and accidents related to LNG bunkering, both on land and at sea. It should be determined which organisation or entity is to take responsibility for analysing the reports and making proposals for corrective measures.</p> <p>The system should be in place from the start of the operation of the LNG bunker filling station, which means that harmonised reporting routines should be established without delay.</p>	
Timetable	urgent
Key actors	<p>a) in Finland: Ministry of the Environment, research institutes and higher education institutions, rescue services, Finnish Customs, Safety Investigation Authority, Finnish Safety and Chemicals Agency (Tukes), Finnish Transport Safety Agency</p> <p>b) internationally/EU: IMO, EU, EMSA</p>
Responsible ministries	Ministry of Justice, Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of the Interior, Ministry of Social Affairs and Health
11 Harmonisation of legislation and standards governing LNG bunkering	
<p>In order to attain a consistent safety level for all modes of bunkering, it is necessary to harmonise legislation, regulations and standards applicable to land-based and sea-based LNG bunkering activities. Harmonisation needs to be done urgently to avoid a situation in which legislation directs choices between different modes of bunkering.</p> <p>The European Maritime Safety Agency (EMSA) launched a Study on Standards and Rules for Bunkering of Gas Fuelled Ships, which was carried out by Germanischer Lloyd. The report was completed in early 2013. Representatives from business and industry, including ports, took part in the process.</p> <p>LNG regulation should be premised on the idea that no new separate legislation on LNG use and bunkering is required. This situation must, however, be re-evaluated when more experience has been gained on the use of LNG.</p> <p>In using LNG, attention must also be paid to the EU Marine Strategy Framework Directive (2008/56/EU) and its objective to achieve or maintain a good environmental status in the marine environment by 2020.</p>	
Timetable	urgent
Key actors	<p>a) in Finland: Finnish Safety and Chemicals Agency (Tukes), Finnish Transport Safety Agency, rescue services</p> <p>b) internationally/EU: European Commission, EMSA, IMO</p>

Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of the Interior, Ministry of Social Affairs and Health, Ministry of the Environment
12 Pilotage requirements for vessels carrying LNG in Finnish waters and on the Baltic Sea	
<p>This issue should be discussed at international level, in cooperation with the Baltic Sea countries, and at national level.</p> <p>It is recommended that ships carrying LNG be treated, both in the IMO and nationally, in the same way as other ships carrying noxious substances.</p> <p>Pursuant to the Finnish Pilotage Act (940/2003), ships carrying liquefied natural gas in bulk are subject to compulsory pilotage, regardless of vessel size. The Finnish Ministry of Transport and Communications, the Transport Safety Agency, and the Environment Institute have conducted a study on whether pilotage should be compulsory for small tankers. The results of the study speak in favour of potentially granting these ships an exemption from pilotage.</p>	
Timetable	urgent
Key actors	<p>a) in Finland: Finnish Transport Safety Agency, Finnish Transport Agency</p> <p>b) internationally/EU: Maritime administrations in the Baltic Sea countries, HELCOM, European Commission, EMSA</p>
Responsible ministries	Ministry of Transport and Communications, Ministry of the Environment
V Technical and operational aspects	
13 Challenges of winter navigation	
<p>Aspects related to navigation in icy conditions and ice class requirements should be taken into consideration in planning the transportation of LNG in bulk to Finland and in Finland's coastal waterways. Ice class requirements applicable to LNG tankers in Finland and on the Baltic Sea should already be taken into account in the planning stage of ships.</p>	
Timetable	urgent
Key actors	<p>a) in Finland: gas suppliers, shipowners, Finnish Transport Safety Agency, Finnish Transport Agency, ship design companies and shipyards</p> <p>b) internationally/EU: IMO, EU, EMSA</p>
Responsible ministries	Ministry of Transport and Communications

14 Guidelines for LNG bunkering during loading/unloading	
<p>In developing new global guidelines (the IGF Code of the IMO) and ISO standards for LNG bunkering, it needs to be noted that bunkering may take place at the same time with cargo loading/unloading or passenger embarkation/disembarkation.</p> <p>Negotiations are currently underway at the IMO on the IGF Code, which is due to be completed in 2014. The IMO has issued its interim guidelines in resolution MSC.285(86) adopted on 1 June 2009. An ISO standard should also be finalised in 2014 (ISO TC/67/WG 10 new guidelines).</p>	
Timetable	2013 – 2014
Key actors	a) in Finland: Finnish Transport Safety Agency, Finnish Safety and Chemicals Agency (Tukes), rescue services, port authorities, gas suppliers, port operators, shipowners b) internationally/EU: IMO, EU, EMSA
Responsible ministries	Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of Social Affairs and Health, Ministry of the Interior
15 Safety measures to prevent LNG bunkering accidents	
<p>In connection with LNG bunkering, it is recommended that an Emergency Shutdown System (ESD) and communications connection be used to prevent gas leakage, both on the bunkering and on the receiving side.</p> <p>This issue is currently being discussed by the IMO working group preparing the IGF Code, and by the ISO TC 67/WG 10 in conjunction with developing the new guidelines.</p> <p>Action should be taken to assess the need for developing procedures relating to the prevention of and response to extensive chemical spills from ships, both in terms of the equipment and expertise necessary.</p>	
Timetable	2013 - 2014
Key actors	a) in Finland: Finnish Customs, gas suppliers, shipowners, port authorities, port operators, ship design companies, shipyards b) internationally/EU: IMO, EU, EMSA
Responsible ministries	Ministry of the Interior, Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of Social Affairs and Health, Ministry of the Environment
16 Safety measures to prevent LNG bunkering incidents	
<p>To prevent LNG bunkering incidents, it is recommended that an automatic Emergency Release System (ERS) be introduced.</p>	

<p>The system will automatically disconnect the bunkering pipe/hose from the ship (in case of a sudden drift of the ship, for example). This method, too, is being discussed as part of the preparations for the IGF Code of the IMO and in developing the new ISO TC 67/WG 10 guidelines.</p>	
Timetable	2013 - 2014
Key actors	<p>a) in Finland: gas suppliers, shipowners, port authorities, port operators, rescue services, ship design companies, shipyards</p> <p>b) internationally/EU: IMO, EU, EMSA</p>
Responsible ministries	Ministry of the Interior, Ministry of Transport and Communications, Ministry of Employment and the Economy, Ministry of Social Affairs and Health
<p>17 Reviewing the need for LNG-related training</p>	
<p>Action should be taken to review the training needs of the entire chain involved in the use and transport of LNG, and adjust the training requirements, if necessary, to ensure that the criteria are met as soon as possible. Steps must be taken to arrange sufficient training for crew on-board small and medium-sized LNG tankers, and LNG bunkering vessels. It also necessary that the involved operators both on-board LNG-powered ships and in small and medium-sized LNG terminals are trained to a sufficient level. The same applies to parties responsible for the prevention of environmental damage.</p>	
Timetable	demand analysis urgent
Key actors	<p>a) in Finland: National Board of Education, Finnish Transport Safety Agency, educational institutes in the field, shipowners, port authorities, gas suppliers</p> <p>b) internationally/EU: IMO, EU, EMSA</p>
Responsible ministries	Ministry of Education and Culture, Ministry of Transport and Communications, Ministry of Social Affairs and Health, Ministry of the Environment
<p>18 Measures to reduce methane release</p>	
<p>The main constituent of LNG is methane, which makes it a strong greenhouse gas. In setting up LNG infrastructure, particular attention must be paid to this fact. Steps must be taken to examine how to minimise methane release in the entire LNG supply chain and the associated operations. This is an ongoing process in which engine manufacturers have a central role.</p> <p>LNG is made by cooling natural gas to -162 degrees Celsius. As a fuel, it has the same characteristics as natural gas; its predominant component is methane (CH₄).</p>	
Timetable	ongoing
Key actors	<p>a) in Finland: engine manufacturers, gas suppliers, port authorities, shipowners</p> <p>b) internationally/EU: IMO, EU, EMSA</p>

Responsible ministries	Ministry of Employment and the Economy, Ministry of Transport and Communications, Ministry of the Environment
VI Permit processes	
19 Early communication about LNG projects	
Providing the general public and the authorities concerned with early information about the LNG project constitutes an essential part of the permit process.	
Timetable	ongoing
Key actors	a) in Finland: gas companies, port authorities, shipowners b) internationally/EU:
Responsible ministries	Ministry of Employment and the Economy, Ministry of the Environment, Ministry of Transport and Communications
20 Developing guidelines on the location of LNG terminals	
Guidelines are expected to be complete by 2013-2014.	
Timetable	2013 – 2014
Key actors	a) in Finland: Finnish Safety and Chemicals Agency (Tukes), regional state administrative agencies, rescue services, municipalities, gas suppliers b) internationally/EU: European Commission
Responsible ministries	Ministry of Employment and the Economy, Ministry of the Environment
21 Creation of an integrated national permit process	
It is recommended that a shortened, integrated permitting process ("one stop shop") be introduced, allowing the national authorities to cooperate closely during the process. It should also be explored whether the permit procedure for LNG facilities could be shortened to be able to establish an LNG infrastructure by 2015.	
Timetable	urgent
Key actors	a) in Finland: regional state administrative agencies, Finnish Transport Safety Agency, Finnish Transport Agency, Finnish Safety and Chemicals Agency (Tukes), municipalities b) internationally/EU:

Responsible ministries	Ministry of the Interior, Ministry of the Environment, Ministry of Transport and Communications, Ministry of Social Affairs and Health, Ministry of Justice
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