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Actions towards a comprehensive EU framework on LNG for shipping

Accompanying the document

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

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

{COM(2013) 17 final}

Actions towards a comprehensive EU framework on LNG for shipping

The staff working document compliments the Clean Power for Transport Communication regarding the introduction of LNG as an alternative fuel for shipping.

1. The case for LNG as an alternative fuel for shipping

The EU White Paper for Transport has set a greenhouse gas reduction goal of at least 40% by 2050 (compared to 2005) in absolute terms for the shipping sector. This has to take into account the expected substantial traffic increase during that period. The White Paper also states that shipping will need to further contribute to the reduction of local and global emissions. In addition, the dependency on oil, a general risk factor for transport and EU economy, requires looking for alternative fuels which also further reduce greenhouse gas emissions.

LNG is the most promising alternative shipping fuel technology in the short to medium term, at least for short sea (and possibly inland waterway transport), but also for maritime activities outside transport, e.g. fisheries and offshore services. Nearly a decade of small scale LNG driven ships experience has proven the reliability of the technology. LNG can be sourced from a number of world regions and further distributed via existing and planned LNG import facilities to port based and mobile refuelling stations. Global known gas reserves are considerably higher than oil.

Compared to today's commonly used bunker oil for shipping, LNG reduces sulphur emissions down to nearly 0% and thereby fulfils existing and planned emission limits[1] for the currently designated sulphur emission control areas (SECAs) in the EU such as the Baltic Sea, North Sea and English Channel. The economic factors, once LNG takes up in SECAs, can also prevail and promote the use of the bunker in other areas across the EU.

LNG fuelled ships emit nearly no particulate matters, about 90% less nitrogen oxides and 20-25% less CO_2. Also from an economical point of view LNG is seen by many as – due to recent discoveries of vast resources - having the potential to decouple bunker prices from expected further increases in the cost of oil. This trend is also seen in other regions of the world such as in China, Japan, South Korea, Singapore and the US where plans to use LNG for shipping are emerging.

It needs to be noted that while the use of LNG in shipping will help to reach environmental targets with regards to emissions of sulphur and particulate matters, with regards to the CO_2 targets the use of LNG will have to be complemented on the long run by more energy efficient engines and vessels. A number of activities are on-going, amongst which R&D projects, but also incentives schemes such differentiated infrastructure charges and port fees and regulatory actions like the recently adopted Energy Efficiency Design Index (EEDI) by the International Maritime Organization (IMO), which sets specific criteria for new-built ships. Research and innovation have thus to be further supported also in view of the long-term competitiveness of the EU's maritime clusters. The potentials of non-fossil alternative shipping fuels (e.g. bio-LNG, methanol, hybrid propulsion and hydrogen) need to be further analysed and tested with a view to achieving a fuel mix that will further reduce greenhouse gas emissions.

2. Economic aspects of LNG for shipping

Apart from a clear environmental case, there seems to be a very strong economic argument in favour of supporting LNG in shipping. Even based on today's (July 2012) landed prices for LNG (300-410 EUR/tonne in the EU), it potentially provides a viable alternative to the use of heavy fuel oil (~480 EUR/tonne) and even more in SECAs which from 2015 will require the use of ultra-low sulphur marine gasoil (~ 730 EUR/tonne). Once a viable spot market for LNG for shipping establishes, prices might drop even further (prices in the US are as low as 90 EUR/tonne; it also reflects a huge supply of unconventional gas in the country). Variations in prices might be encountered until the major new LNG export countries (Australia, US) are in full production.

[1] Directive 2012/33/EU of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels

A broader market for manufacturers of LNG (dual) engines, fuel tanks etc. and the introduction of innovative LNG technology is expected not only to reduce these prices in the future, but also to provide opportunities for European shipyards and equipment manufacturers. Currently ship-owners seem to take a cautious approach and order few new ships for short sea traffic and/or opt for dual fuel engines (LNG and oil). The latter option not only increases costs but delays operational benefits until operations can be switched permanently to LNG.

A recent study[2] co-financed by the Trans-European Transport Network (TEN-T) looked into the payback time for ship LNG modifications or the acquisition of new ships for SECAs and concluded that payback times would be between 2-4 years for all of them. The same study concluded that a small scale LNG bunker facility would require an investment of 15 million EUR and while a full network would require a mix of some large, medium and many small bunkering facilities, infrastructure should develop in a cost-efficient, incremental way. This should include transitional mobile solutions such as LNG tank trucks.

3. State of deployment and main obstacles

Around 10.000 ships are currently mainly used for European Short Sea Shipping of which around 5000 are spending more than 50% of their time in SECAs, thus having to use mainly low sulphur marine gasoil (1% until 2015, 0.1% from 2015).

With the exception of Norway, supported by the state-driven introduction of a national LNG bunkering network, the take-up of LNG ship technology in Europe is still mainly in its infancy stage. Many ship-owners and ship operators have stated their interest in switching to LNG fuel, but withhold their investment and conversion plans due to missing LNG supply at their preferred ports of call. Given today's technology, LNG ship tanks require at least two times the size of an equivalent oil tank. Combined with a lack of appropriate bunkering facilities along shipping routes, this poses economic challenges (reduced cargo space) and potential stability issues (for existing vessels). A further concern for ship operators is the lack of harmonised bunkering procedures, requiring compliance with different procedures and technical requirements in every port of call.

The issue of locally applicable and diverging rules is shared by the port community where also a number of pioneers are analysing options for the provision of LNG bunker. Current procedures foresee conformity with local permit procedures and the local interpretation of environmental rules (e.g. Seveso rules, local risk assessments and stakeholder consultations). Those rules were not aimed at small or medium scale bunkering facilities, but at large scale LNG import and storage. Permit processes tend to take more than two years even in the best of cases. Furthermore and in particular for smaller ports, it seems difficult to justify investment into LNG infrastructure, not knowing about the future evolution (or absence) of a LNG bunkering network and thus the future demand by shipping (waiting for such a network to evolve).

Both ports and ship operators highlight the need for appropriate and harmonised safety rules and training for small scale LNG storage, bunkering and on-board use. Ship operators emphasise the potential increase in non-productive additional times spend in ports as currently Stockholm is the only EU port where LNG bunkering (unlike bunkering of oil) is permitted during cargo loading or while passengers are on board.

An issue beyond the transport sector is the perceived negative public perception of the dangers of LNG. Despite its excellent safety record so far, LNG is seen as a dangerous technology. There seems to be a need to provide more information, "demystify" the handling of LNG and better communicate the advantages of LNG as a cleaner fuel for shipping.

While European shipbuilding industry is still a global leader in innovative technologies, it is suffering from lack of demand for their products. Ship-owners seem to be waiting for clear indications as to the development of a future network for cleaner fuels before committing to modifying their ships or acquiring new ships. Empty order books and an uncertain economic future keep shipbuilders from investing into further research and innovation that could produce more efficient LNG technology.

[2] North European LNG infrastructure project; final report May 2012

4. The infrastructure issue

The EU co-financed study mentioned above concludes on the need to quickly establish a minimal infrastructure for LNG bunkering in order to kick-start the development, increase demand by ships and further decrease prices for technology and LNG fuel. The Impact Assessment accompanying document to the Legislative proposal on the deployment of Alternative Fuels Infrastructure showed that the build-up of a sufficient infrastructure network for alternative fuels is a necessary condition to achieve the take-up of the alternative fuel vessels.

A number of LNG import terminals already exist in Europe which could also further distribute and provide shipping with bunker fuel. Several ports are pursuing the introduction of LNG bunkering, mainly as local projects and based on local rules and procedures.

Accordingly, with targeted, limited public financial support it should be possible to lay the ground for initial fuelling infrastructure development along the EU coastline and effectively break the chicken and egg situation, with the market then picking up without additional public support needed. A harmonised framework for rules and procedures would ensure interoperability, a level playing field and avoid costly parallel developments.

Ambitious targets on development of LNG bunkering facilities and infrastructure have been included in the proposal for the "Directive of the European Parliament and of the Council on the deployment of alternative fuels infrastructure" which is part of the "Clean Power for Transport Package".

5. Available financial support

A number of financial instruments are available to support the introduction of LNG bunkering infrastructure, such as the Work Programme for the development of Motorways of the Sea (MoS) within the Trans-European Transport Network (TEN-T) will continue to finance projects addressing environmental issues and promoting the development of related green infrastructure and facilities. Other EU funds may also be used for instance to promote R&D through the research programmes and through regional funds. This would mainly relate to the required investments into further research and innovation as mentioned above.

Further possibilities for financing are available for the sector through the lending of the European Investment Bank (EIB)[3]. Financing of shipping is part of the core business of the EIB's overall long term transport lending. Particular attention is given to projects that better assist the sector to cope with the environmental challenges and encourage, in line with EU legislation, the development of clean technology.

Financing of LNG bunkering stations may also be supported under the conditions laid down in the Guidelines on National Regional Aid for 2007-2013[4].

6. Scope of activities to achieve an EU framework for shipping LNG

In order to create a harmonised framework for the provision and use of LNG for shipping, an appropriate set of guidelines, standards and rules could be recommended and where justified made mandatory on EU level.
It is also important to keep coordinating the EU development with international initiatives in IMO, ISO and other relevant bodies. Globally interoperable rules and procedures for technical, operational, security and safety aspects are required to ensure operational interconnectivity in the global shipping sector. Furthermore compatibility has to be achieved and maintained between developing rules and practices for use of LNG in shipping and in inland waterways navigation to improve interfaces for sea/river going vessels and economies of scale for LNG provision in ports with sea and inland waterway access.

The valuable experiences made by pioneering ports, ship-owners and LNG providers should be used to shape the EU framework for LNG bunkering and could also provide valuable assistance to stakeholders wanting to turn to LNG themselves. Learning from best practice could thus shorten the implementation

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[3] The EIB has lent more than €120bn to the transport sector over the past decade. Out of the total, about 4% has been for maritime transport (ports and vessels).

[4] OJ C54 of 4.3.2006, p13

time needed for new installations and ships and help to accelerate the development of a larger use of LNG as an alternative fuel, reduce the sectors emissions and help to ensure its long-term viability.

While conditions for ships and bunkering procedures are just emerging, stakeholders are faced with a number of existing rules and procedures for land based LNG installations. These were not aimed at bunkering LNG, but created with a different focus mainly on large storage of hazardous materials. Furthermore these conditions are established on a local level without a view to providing bunker fuel to a fleet of EU-wide or globally operating ships. It seems therefore particularly important to scrutinise existing rules for land based installations and try to adapt, simplify and harmonise them for the purpose of safe, secure and efficient LNG bunker provision.

A general assessment of risks, dangers and opportunities regarding the use of LNG for shipping could help to feed a public debate on LNG for shipping and provide arguments for stakeholder debate at local levels.

While economic advantages would be most obvious for ships travelling in sulphur emission control areas, LNG provision and use in other EU waters would not only help to reduce local and global emissions, it would help to decouple shipping costs in those areas from rising oil prices and could be expected to reduce operational costs, thus increasing the perspectives for long-term sustainability of EU shipping operations.

7. EU action already taken by the Commission

In September 2011, the Commission issued a staff working paper[5] on a "sustainable waterborne transport toolbox" describing possible measures to minimise the compliance costs for the industry in view of the new sulphur limits[6].

The Commission launched in April 2012 together with the European Maritime Safety Agency (EMSA) and stakeholders a number of activities in order to progress the introduction of LNG for shipping in the EU. Taking into account on-going work at international organisations such as the International Maritime Organization (IMO) and the International Standardization Organization (ISO), the toolbox approach aims at identifying gaps and the need for harmonised guidelines, standards and rules for LNG for three aspects:
(a) the storage and provision of LNG
(b) the use of LNG on ships
(c) the bunkering procedures

A comprehensive framework will need to cover all relevant aspects of safety, security, operations and training.

8. Next steps to achieve the EU framework for LNG as an alternative fuel for shipping

Current planning foreseen the following timeline:

Nov. 2012: First draft results of a legal gap analysis carried out by EMSA will become available. This gap analysis takes in particular into account on-going developments at IMO and ISO;

04 Dec. 2012: The Commission together with EMSA will hold a stakeholder workshop (involving industry and Member States) to assess and validate the results of the draft gap analysis including a first draft outline of a possible EU framework for LNG bunkering. ISO and IMO as well as third countries (US, China, Japan, Singapore) with important LNG bunkering developments have been invited to participate;

January 2013: The final gap analysis study report by EMSA will be available;

1Q2013: The Commission will set-up and chair a European Sustainable Shipping Forum (ESSF) with Member States and EU industry; The ESSF will progress all aspects of the sustainable waterborne transport toolbox; an expert working group as continuation of the

[5] (SEC(2011) 1052 final)

[6] Directive 2012/33/EU of 21 November 2012 amending Council Directive 1999/32/EC as regards the sulphur content of marine fuels

previous LNG ad-hoc expert working groups is envisaged to carry out further work towards an EU-wide framework for shipping LNG and also share best practices;

2013/2014: The Commission continues co-financing a number of TEN-T studies which are analysing and refining LNG bunkering networks on a regional basis, such as LNG in Baltic ports (until December 2014), LNG infrastructure and pilot project in the North Sea (until March 2013), COSTA study on use of LNG in the Mediterranean, Atlantic Ocean and Black Sea (until April 2014);

Mid 2014: ISO will finalise a global ISO guideline on LNG storage and bunkering (ISO TC67/WG10 currently working on such guideline which will comprise safety, security and training);

2014: IMO will finalise the International Code on Safety for Gas-Fuelled Ships (IGF-Code) covering all aspects of ship design and on-board use of LNG;

throughout: The Commission will address the progress of LNG for shipping in bilateral and multilateral dialogues with major international partners and IMO in order to ensure global compatibility and sharing of lessons learned;

throughout: The Commission will continue to support (via TEN-T/CEF and regional support measures) the implementation of LNG refuelling stations for ships;

End 2014: The Commission, in cooperation with EMSA will, based on the results of work mentioned above, propose a comprehensive set of rules, standards and guidelines for LNG provision, bunkering and use in shipping;

01 Jan 2015: New 0.1% SOx rules will apply in sulphur emission control areas (SECAs);

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

(separate action on LNG promotion to the public could be part of wider general action including road transport, inland navigation etc.)