**2012 – 2015 Triennium Work Report**

**June 2015**

**Programme Committee D3: SMALL SCALE LNG**

**REGIONAL TEMPLATE**

**REGioN: Europe and Russia**

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# General (and short) overview about LNG industry in the region

*Provide description of the regional area and background of the degree of penetration of the LNG as industry*

# Analysis of regional data based on report structure

*Two categories can be used: consumption driven projects (regas) and production driven projects (liquefaction); Transport/logistics project should be associated to the consumption/production project they support.*

*Please describe the category, not all the specific projects. Examples and information from specific projects shall be used to support the description.*

*For each of these categories:*

##  Consumption driven:

* ***Main drivers & business model:*** *for developing and implementing the projects of the category (generic). Example: main consumers, critical mass of the consumption (size), seasonality, price signals, alternative fuels, distance to supply, specific items for making the small scale feasible, business models, etc.*
* ***Key Players:*** *for securing consumption, for the infrastructures / technologies, for securing the supply.*
* ***Main conclusions***

## Production driven:

* ***Main drivers & business model:*** *for developing and implementing the projects of the category (generic). Example: Kind of resources (size), kind of companies, specific items for making the small scale feasible, business models, etc.*
* ***Key Players:*** *for upstream, liquefaction infrastructures-technologies, transport.*

*Note: in the case of Caribbean&Central America the shipping is included in this category.*

* ***Main conclusions***

**Gate (Netherlands):**

The Small Scale LNG Concept in Gate is based on the idea that standardized LNG cargos are delivered into Gate and reloaded via a new small jetty (or optional from existing modified big jetties) onto smaller LNG carriers and delivered to customer’s terminal (DAT) to meet demand in Scandinavia and Baltic states. The LNG will be sold as a substitution fuel for industry to lower energy cost (replacement of oil indexed commodities e.g. LPG), at the same time reducing environmental impact. Another additional demand could come from the requirement of replacement of HFO fuel in the maritime sector.

Plans to launch LNG bunkering and small-scale re-export services at Gate were announced in August 2012. Gasunie and Vopak signed an agreement with Shell as their first customer for their LNG Break Bulk terminal in Rotterdam, which will be linked via pipeline to the GATE LNG terminal. Bunkering vessels would be supplied with LNG held in Gate's storage tanks and deliver the fuel to ships in the Port of Rotterdam. The small-scale re-export concept would involve the shipment of LNG by small carriers to satellite terminals around the North and Baltic Seas.

For the first time in its history a small scale LNG reload has been conducted at Gate terminal on 6 September 2013, when the "Coral Methane" docked at Gate terminal. This first LNG exports stems from a contract between Eneco and AGA Gas AB for transit of LNG to Scandinavia. Gasunie and Vopak, the initiators and partners in Gate terminal, originally developed this terminal as a LNG import terminal. Since the reload Gate is also an export terminal. This allows the terminal from growing into a real LNG hub. The Netherlands gets through Gate terminal the ability to not only transport gas through the Dutch pipeline network, but also as a clean alternative to traditional transportation fuels for shipping and heavy road traffic. As a first step Gate terminal recently completed the additional investments to facilitate their customers to berth small vessels and reload LNG in order to support the small scale market developments. A truck loading station for reloading of LNG will be ready Q1 2014.

For the first time in its history a conventional sized reload has been conducted at Gate terminal on 5 November 2013, when the "LNG Excel" moored at Gate terminal on the Maasvlakte in Rotterdam. The carrier has a capacity of 135,000 m3 liquefied natural gas (LNG) and is a so called “full sized” LNG vessel. The arrival of the “LNG Excel” marks that the terminal grows into a liquefied natural gas (LNG) hub.

**Zeebrugge (Belgium):**

In May 2010 the terminal started to be used as a hub to supply small LNG carriers delivering to Norway. As of December 2012, Zeebrugge LNG terminal had secured the biggest number of long-term maritime loading agreements ever signed by a regasification facility after booking more than 200 loading slots for smaller ships.

Even though the second jetty for the LNG terminal is under construction, it is not designed to increase terminal's send-out capacity yet but rather to raise the berthing rights offered to the market, particularly for smaller tankers. While the jetty is set to become operational in early 2015, the wider expansion is expected to become operational during the course of 2017. (Woodmac, March 2013)

The Zeebrugge LNG terminal has already taken FID on developing a second jetty and a fifth Tank for their facility and at present they are looking for suitable contractors to pre-qualify. This facility will be suitable for re-loading; however it is not clear if breaking bulk is their main target as Zeebrugge already “re-loads” full cargos on a regular basis to get around the problem of destination clauses in some delivery contracts. Additionally, the new jetty will also be equipped to import LNG from Excelarate re-gasification ships so breaking bulk has clearly not been their sole reason for making an investment decision.

Ships and long-haulage trucks: To pave the way for LNG as a fuel in the transport sector, Fluxys LNG is also developing the Zeebrugge terminal into a hub for small-scale LNG. The second jetty currently under construction will accommodate loading of small LNG carriers to enable them to supply LNG to other ships or intermediate storage facilities. Small LNG carriers can be used to transport LNG from Zeebrugge to all ports in Belgium and northwest Europe, and terminal users have already booked capacity on the second jetty to load over 200 small ships. Furthermore, Fluxys Belgium is working with Belgian ports, the Flemish government and various other companies on research into how to further develop the basic infrastructure for supplying LNG as fuel for ships. Developing the necessary infrastructure for refuelling is also a challenge in paving the way for LNG as fuel for long-haulage trucks. Fluxys Belgium is working with a haulage company on a pilot project to build the first LNG filling station in Belgium.(Fluxys website, Results for the first half of 2013)

A second jetty is scheduled for 2015: The Zeebrugge Port Authority is putting the final touches on the underwater structure for the second LNG jetty. Once the underwater structure is completed, Fluxys LNG will start building the superstructure. The second jetty is scheduled for commissioning in 2015. The new jetty will enable ships to both unload and load, and will also make it possible to transfer LNG between ships berthed at the two jetties. Large and small LNG ships will be able to load LNG, including bunker ships with a loading capacity from around 2,000 cubic metres of LNG. Bunker ships load LNG, which is then used to supply other ships running on LNG. Fluxys LNG is currently working with the Belgian ports and a.o. the Flemish

government and several other companies to examine what form the basic downstream infrastructure for supplying LNG to ships and trucks should take. In addition to bunkering LNG with ships, another option is for tanker trucks to load up with LNG at the terminal’s loading station. The loading station is already in operation. The trucks can then bring the LNG inland to supply ships directly or to supply other LNG storage sites, where ships can take LNG onboard. The first truck-to-ship bunkering operation in Belgium took place early December 2012 in the port of Antwerp (Fluxys website, 19/12/2012)

Fluxys reported on 10th Oct 2013: LNG truck loading at the Zeebrugge LNG terminal has boosted over the past few years and Fluxys has innovated its service offer to enhance availability and flexibility. The current subscription window offers customers the opportunity to secure the number of loading slots they wish to use from 2014 until 2023 included.

**Grain (UK):**

Grain has no facilities at the moment to re-load ships, however Grain is currently doing a conceptual study for Bulk and small scale reloading of small and large LNG ships. Additionally they are also investigating truck loading. Grain has already committed to the development of a Road Tanker Loading Facility. Subject to the necessary consents, Grain is also seeking to develop additional small scale LNG distribution services - providing the infrastructure and expertise for the delivery of LNG from the two jetties for the LNG break-bulk markets, including LNG ship reloading and the use of LNG as a marine fuel. Towards end of 2012 National Grid launched an open season to test market demand for the new offering of a LNG loading service for road tankers. The service could become operational by late 2014/ early 2015 depending on when regulatory and planning approvals are given. (Woodmac, Jan 2013)

As well as being able to provide up to 20% of the UK’s gas supply, Grain LNG may soon offer a drive through service for road tankers to load up on liquid gas to distribute around the country. National Grid Grain LNG is looking at plans to develop an LNG loading service for road tankers. LNG is unloaded from ships at the terminal and stored in cryogenic tanks. When needed, the liquid gas is reheated and pumped into the national gas network to be used by homes and businesses. These new plans would see National Grid loading LNG from the storage tanks and on to road tankers for distributors to take to HGV refuelling stations as well as to off-grid industrial and commercial users.

Grain LNG is ideally located close to the major ports and road networks in South East England and in close proximity to the proposed ‘Blue Corridor’ routes, which are intended to support LNG fuelled HGV fleets across Europe. National Grid has launched an open season to gauge market appetite for the new offering. Depending on when regulatory and planning approvals are given, services could be up and running late 2014/ early 2015 (National Grid, 23/10/2012)

Nynäshamn (Sweden)

This terminal has been operational since 2011. Owner and operator is AGA, a member of the Linde Group. The design and delivery of the terminal was made by AGA Cryo which also is a member of the Linde Group. The tank is 20 000 m3 and is situated appr 50 km south of Stockholm. Contractor for the civil engineering and the tank was NCC. Estimated investment inclusive major civil work was appr 1 bn SEK (125 MEUR appr). Markets for the terminal is the nereby Nynäs refinery which get LNG by pipeline (<3 km) and the rest is trucked out to industrial customers and to a small regas terminal for a local gas grid in Stockholm. LNG is also trucked to Loudden storage in Stockholm where the bunkering ship Seagas picks LNG up and then bunkering the passenger ship Viking Grace at Stadsgårdskajen in Stockholm city. AGA is targeting customers within an efficient trucking distance from Nynäshamn, which is expected to be appr 300 km. For heavy vehicle there is also a potential market (4 truck filling stations so far) and this segment might tolerate a bit longer trucking distance. The terminal is only utilised by AGA at this moment and the supply to the terminal has so far come from Skangass plant in Risavika with the ship Coral Methane (7 500 m3) and from this year with Coral Energy (15 600 m3).

Lysekil (Sweden)

This import terminal is under construction and expected to be RFO beginning of 2014. Owner and operator is Skangass but the establishment of this terminal is made in tight cooperation with the base load customer Preem refinery. Preem will take 180 000 ton LNG for feedstock, replacing naptha and buthane. Preem is also taking use of the boil off gas. The size of the tank is 30 000 m3 and accept the supply to Preem, LNG will be trucked out to mainly industrial users. In the harbour at Lysekil (Brofjorden) there will also be possibility to bunker ships. There is cooperation with a local shipping company trying to establish this possibility. Linde got the contract for supplying the LNG equipment to the terminal and the contract value of this is 55 MEUR but it is not expected to include all the costs (civil, tank etc). Supply to the terminal will be done by Coral Energy and the product might come either from Risavika or from the break bulk facilities in Rotterdam and or Zeebrugge.

Skangass LNG production plant Risavika (Norway)

This liquefaction plant was commissioned in 2011. The plant is owned and operated by Skangass, a company owned by a large group of communities in south west Norway. The production capacity is 300 000 tonnes per year and the feedstock is pipe gas from the Norwegian Sea. Skangass sell LNG in

primarily Norway and Sweden, but have also sold LNG to Spain. At the Risavika harbour Skangass offer bunkering facilities direct from tank storage. There is also truck loading facilities for trucking LNG out. Estimated investment in this facility was ???. In Norway the LNG development is driven by the lack of pipe gas infrastructure, due to difficult terrain, and also by the Norwegian NOx funds which subsidy a large portion of the extra costs for LNG investments at ships.

Shell GasnorLNG production plant Kollsness (Norway)

The plant which is owned and operated by Shell Gasnor actually consists of two plants, one commissioned 2003 and one commissioned 2007. In total for Kollsness the LNG production capacity is 120 000 tonnes per year. The production goes to industrial users along the Norwegian coastline as well as to ferries. Shell Gasnor has to ships for the distribution, Coral Methane (7 500 m3) and Pioneer Knutsen (1 000 m3). The supply of pipe gas to the production units comes from the Norwegian Sea. Shell Gasnor truck LNG out as well from Kollsness with their 10-20 distribution trucks, some of the product go to industries and some go to bunker ships. Shell Gasnor was pioneers in this field and the driver for the development has been the difficult terrain for pipe gas and the NOx fund.

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# Safety, standards and regulations

*Where possible, highlight the characteristics of standards, safety and regulations specifically applicable to small scale LNG, emphasising differences with the large scale LNG sector. E.g.*

* *Small Scale LNG is more locally driven than the inherently global large scale market. What is the impact on this? Any examples available?*
* *Although Small Scale LNG shall be as safe as large scale, but as the implementation will be different*
* *Environmental and emission regulations will have an impact on driving the demand for small scale LNG projects. Examples?*

*In this section, please refer to standards and regulation applicable specifically to small scale LNG.*

*Other guideline questions:*

* *Which are the standards and regulations adopted in the area?*
* *Who are the responsible parties?*
* *If a regulatory framework is defined, how does it compare to the rest of the world? Are there links with other regions?*
* *Is the statutory status developing or stagnant? Which are the ongoing discussions in the area?*

# Conclusions

* *Overall status of small scale LNG in the areas*
* *Major drivers, major challenges*
* *Outlook on the area*
1. Data Collection from the Regions

Please include the excel data collection template

1. Small Scale LNG : Drivers and Business Models

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Type of Project**  | **Definition**  | **Challenges** | **Drivers, Purpose\***  | **Business Model\*\***  | **Examples** |
| Liquefaction  | Production of LNG with capacity lower than 1mtpa  |   |   |   |   |
| Break Bulk Infrastructure | Receives LNG (e.g. shipping) and breaks down the LNG into smaller quantities for further distribution to marine bunkering and truck fuelling stations. Also ship to ship transfer viable.  |   |   |   |   |
| Marine Distribution/Milk Run | Effective gas supply solution for thescattered islands or coastal areas, where the other transportation modes are not economically viable or the infrastucture is not present.Milk Run is characterised by partial unloading to multiple locations |   | \* Relatively low gas demand does not justify the high capital investment costs for pipelines |   | \* Eastern Indonesia\* Caribbean islands\* Coasts of Japan and Norway |
| Infrastructure for Inland Distribution  | Trucking/Shipping/Rail of LNG to inland satellite stations |   |   |   | \* China\* Spain  |
| Peak Shaving  | LNG peak shaving facility can be chosen to supply the incremental natural gas required to meet the demands peak demands for example, where the pipeline netweork is already fully utilised for normal demand, in remote areas far from NG resources, or where geology which prevents the development of underground gas storage.  |   |   |   | \* Mount Hayes LNG Peak shaving Facility - British Columbia (Vancouver Island) |
| Small Scale FloatingLNG | Offshore LNG production lower than 1 mtpa– Offshore stranded gas field– Associated gas available from offshore oil field– Near shore location to liquefy country excess gas or shale gas |   |   |   | Total & Technip presentation at LNG17\* Canadian Douglas channel project\* Rubiales LNG in Columbia  |
| Small Scale Regas | Facility regassing LNG with less than 1mpta capacity. Various locations and sources of LNG can be considered.  |   |   |   | \* Sweden - Linde Project \*  |
| …  |   |   |   |   |   |