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Liquefied Natural Gas in the Baltic Sea Region

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This study analyzes the liquefied natural gas (LNG) terminal plans and their impact on gas supply in the Baltic Sea Region (BSR). Although the realized capacity of the planned terminals will be smaller than the planned one, these LNG terminals are strategic investments, as they will introduce competition that has a lowering impact on the price, and moreover, the terminals will improve the security of gas supply, though the BSR cannot build its gas supply on the LNG deliveries alone. In other words, the terminals will not replace Russia's deliveries but rather allow the countries in the eastern BSR to diversify a proportion of their gas supply.

KEYWORDS Baltic Sea Region, liquefied natural gas

U.S. UNCONVENTIONAL GAS PRODUCTION CAUSES LIQUEFIED NATURAL GAS BOOM IN THE BALTIC SEA REGION

In 2010, the United States produced nearly 360 billion cubic meters (bcm) of gas with an unconventional method (Energy Information Administration [IEA] 2012). Five years ago, the U.S. total gas output was some 520 bcm. In 2011, production already exceeded 650 bcm. The growth of 130 bcm is equivalent to the EU's total natural gas imports from Russia. At the same period, gas production of Russia, which produces gas only in a conventional

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manner, has grown at a moderate tempo from 595 bcm to 607 bcm (British Petroleum [BP] 2012).

In 2005, the EIA forecast that the United States would need to import 70 bcm of liquefied natural gas (LNG) in 2010 but, due to the unconventional gas revolution, the United States imported only 12 bcm of LNG that year (i.e., around 60 bcm of gas was free to flow elsewhere). Most of the liberated LNG found a consumer in Europe and Japan. In 2011, the U.S. LNG imports were just 6 bcm (International Gas Union [IGU] 2011, 2012).

The global LNG trade has grown rapidly. In 2006, around 160 million ton of LNG[1] was traded globally, whereas 5 years later, the LNG trade exceeded 240 million ton per annum, which means that a tenth of the global gas consumption was met with LNG (IGU 2011; BP 2012; IGU 2012).

The LNG represents a fourth of the European Union's (EU's) gas imports, whereas the pipelines cover the remaining three-fourths of the imports. In 2010, nearly half of the EU's LNG imports came from Qatar. The share of both Nigeria and Algeria was close to one-fifth. To put it differently, the aforementioned trio practically takes care of the EU's LNG supplies. All gas arriving from Russia to the EU is piped. The EU's major importers of LNG in rank of size were Spain, the United Kingdom, France, Italy, and Belgium. They covered 95% of the EU's LNG imports in 2010. None of the Baltic Sea Region (BSR) countries imported LNG in 2010 (Eurogas 2011).

The EU's LNG regasification capacity has more than doubled in the last 5 years. In 2010, the EU provided a total regasification capacity of 175 bcm per annum with 18 LNG terminals. The nominal capacity and the real regasification differ quite a lot. The EU's total LNG imports in 2010 were slightly below 80 bcm, though the regasification capacity is twice as much (Eurogas 2011).

The unconventional gas production revolution in the United States has set in motion a global chain reaction, which has ignited an LNG terminal boom in the BSR as well. The chain reaction is caused by the fact that the United States can reduce its LNG imports, and this reduction forces the LNG exporters of the Middle East and Africa to find alternative consumers in Europe or Asia. In addition to this indirect impact of the U.S. unconventional gas revolution, it seems probable that the United States will start exporting considerable amounts of gas to Europe and Asia by the end of this decade.

The U.S. gas exports are motivated by a substantial price difference between the United States and Europe or East Asia, where gas costs more than five times that of the United States. Even if the gasification and transport costs are included, the price advantage is sufficient for the U.S. gas producer to start their gas exports (Henderson 2012).[2] In addition to economic goals, LNG exports may be used to serve political goals, as the United States may wish to support the energy independence of the Baltic States, for instance, by supplying them with LNG. Riley (2012a) argues that "the U.S. will see these 'LNG Freedom Carriers' delivering 'free market gas' to reduce Gazprom's influence and boost the developing European spot markets."

It is difficult to predict the U.S. gas export volume to Europe and Asia since the U.S. Cabinet may wish to restrict the gas sales abroad in order to break away from the energy import dependency. On the other hand, major energy users in the United States may wish to prevent the exports in order to get cheap gas within the country (i.e., they do not wish to have foreign demand competition, which would raise the domestic gas prices).

The EIA, a unit providing official energy statistics of the United States, estimates the U.S. LNG exports to begin already at the end of this decade though the volumes may be around 10 bcm (IGU 2012). Conversely, some analysts refer to 40 to 110 bcm of annual gas exports, but they do not define any time frame (Levi 2012; Reuters 2012).[3] Current gas deals of the gas producers based in North America, totalling 70 bcm, indicate that the overwhelming majority of the gas exports will be directed to the Asian countries. So far, less than 10% of the existing agreements of the North American producers have been designed for the European demand. On the basis of the signed agreements, it seems that Asia will be the primary export target for the American gas (Henderson 2012; Riley 2012a).

Due to the chain reaction caused by the unconventional gas revolution, the LNG terminals will mushroom in the BSR within the following 10 years. Hence, the main objective of this article is to describe the existing LNG infrastructure and to analyse the LNG terminal plans and their possible impact on gas supply in the BSR.

LIQUEFIED NATURAL GAS TERMINALS IN THE BALTIC SEA REGION

In the following, the existing and proposed LNG terminals in the Baltic Sea Region are analyzed country by country (see table 1).

Denmark

Denmark produces some 8 bcm of gas, of which the country uses itself a half and exports a remaining half. A half of the Danish gas exports end in Sweden, a third in Germany, and the remaining stake in The Netherlands. Denmark has neither LNG plants nor LNG terminals, and it has no plans to construct a major unit in the near future (Energy Delta Institute 2011).

Estonia

The country receives all its gas from Russia via pipe (0.7 bcm). A lesser part comes directly (0.2 bcm) from Russia and the main part (0.5 bcm) via Latvia (McClay and Ortmans 2011). Currently, Estonia does not have any LNG

TABLE 1 Some Major LNG Liquefaction Plants and Regasification Terminals in the Baltic Sea Region[a]

Country	Name and location	Annual capacity (bcm)	Status
Denmark	No existing LNG plants or terminals—no information about plans to build a major LNG unit		
Estonia	Paldiski LNG terminal (50 km west of Tallinn)	2.5–3.0	Planned (in operation 2015)
	Muuga LNG terminal (Tallinn)	3.0	Planned (in operation 2016–2017)
Finland	Porvoo or Inkoo LNG terminal (50 km of or 60 km of Helsinki)	Up to 2.0	Planned (in operation 2015–2018)
Germany[b]	Wilhelmshaven LNG terminal (1 and 2)	16.0	Suspended
Latvia	Riga LNG terminal	2.0	Planned
Lithuania	Klaipeda LNG terminal (300 km northwest of Vilnius)	1.0–3.0	Planned (in operation 2014–2015)
Norway	Snøhvit LNG plant (connected to the Melkoya Island with a 160-km submarine pipe)	5.8	On stream since 2007
	Risavika LNG plant (close to Stavanger)	0.4	On stream since 2011
	Kollsnes LNG plant (1 and 2)	0.2	On stream since 2003
Poland	Swinoujscie LNG terminal (close to Szczecin)	2.5–5.0 with upgrading potential to 7.5 by 2020	Under construction (in operation 2014-2015)
Russia	Baltic LNG plant (Primorsk—100 km northwest of St. Petersburg)	2.0 (downsized from original plan of 6.8–9.8 bcm)	Cancelled by Gazprom in 2008, project acquired by Sibur (Novatek) in March 2012—in operation by 2018?
Sweden	Brunnsviksholme LNG terminal (Nynäshamn)	0.4–0.5	On stream since 2011 (onshore)
	Gothenburg LNG terminal	0.5	Planned (in operation 2013–2015)

[a]Liquefaction plant indicates a possibility to export LNG and regasification terminal readiness to import LNG. The information presented in the table is gathered from various public sources. Information is rather contradictory, and hence, the table may contain errors. Moreover, the situation develops rather quickly, and hence, the data needs constant updating.

[b]The Global LNG Info (2012) mentioned only the Wilhemshaven LNG terminal plan in its list. According to the Global LNG Info, the project has been suspended. In fact, this project has stalled already in the autumn of 2008, but the revitalization of this project is possible depending on the development of the LNG prices. The Global LNG Info did not mention anything about Germany's earlier LNG terminal plans (i.e., Lübeck and Rostock proposals).

receiving terminals, but it has plans to build one. Two LNG terminal plans exist; one unit is planned in Paldiski, 50 km west of Tallinn, and one in the port of Tallinn, Muuga.

The nameplate capacity of the Paldiski could go up to 2.5 to 3.0 bcm. The estimated cost of the Paldiski terminal is $400 million to $650 million.

The project is developed by Balti Gaas, a company owned by Baltic International Trading, Paldiski Arendamise, and Sergey Timoshenko. It seems that Balti Gaas is ultimately under control of Russian businessmen.

The Tallinn project has been initiated by Elering, a fully state-owned corporation, and the Port of Tallinn. The annual capacity of the terminal may go up to 3.0 bcm, and its planned costs are over $300 million. The estimated time of construction is 4 years from the final investment decision, and the location of the terminal will be in Muuga, a part of the Port of Tallinn.

There is also a proposal to build a joint Finnish-Estonian LNG terminal either on Estonian or on Finnish soil and to lay a gas pipeline under the Gulf of Finland to connect Estonia and Finland. This proposal could be regarded as an idea rather than a plan. At the moment, no gas pipeline exists between these countries, but such a pipeline, Balticconnector, could be built, provided that a large LNG terminal will be erected either on Estonian or on Finnish territory. It is also possible that at least a medium-sized terminal will be built in both the countries.

Probably, there will be only one major LNG terminal in Estonia. Elering's plan may be more realistic due to security considerations of the Estonian state. Whatever unit will go forward, it is rather certain that the terminal's annual regasification capacity will be much smaller than that indicated in the plans. When analyzing the possible size of the LNG terminal, one should remember that Estonia's total gas consumption is just 0.7 bcm. Even if the utilization rate of the LNG terminals does not usually exceed 70%, the proposed LNG terminal size is far too large for the Estonian needs alone.

Finland

The first natural gas liquefaction plant in Nordic countries was built in Sköldvik/Kilpilahti, Finland. It is a small-scale unit that mainly serves the Finnish needs (Näslund 2012). Gasum, a gas distribution company partially owned by Gazprom, plans to build a major LNG terminal, the Finngulf LNG, in either Inkoo or Porvoo. The nameplate capacity of this LNG terminal could go up to 2.0 bcm. The first stage of the terminal could be in operation already in 2015. It is assumed that the facility will receive its maximum capacity by 2018, and the costs of the project are estimated to be $250 million to $500 million depending on the final size of the terminal.

Gazprom may wish to slow down the LNG terminal project[4] since these LNG deliveries will compete with Gazprom's pipeline deliveries to Finland. One should keep in mind that Fortum, the Finnish electrical company, is the main owner of Gasum (31%), and Gazprom owns a fourth in Gasum. Fortum is strongly committed to the Russian electricity market via its $4 billion to $5 billion investment in the electricity generation in the Ural Federal District, Russia. Here, it needs to be remembered that natural gas is a major

source of energy in Fortum's units in Russia; hence, Gazprom may indirectly influence Fortum's decision making.

In addition to this Finngulf LNG terminal, Finland plans to erect a small LNG unit in southwest Finland. The task of this small-scale unit is to bunker LNG-driven ferries and ships. The BSR will most likely witness several LNG fuel stations for ships by the end of the next decade, since the restrictions on sulfur emissions of the ships sailing in the Baltic Sea promotes the LNG-driven vessels starting from 2015. At least the following ports have agreed to promote the development of LNG bunkering infrastructure: Aarhus, Helsingborg, Helsinki, Malmö-Copenhagen, Riga, Stockholm, Tallinn, and Turku.

Germany

Depending on a source of information, the country consumes some 70 to 100 bcm of gas annually, of which close to 15% is produced domestically (Energy Delta Institute 2011; BP 2012). Germany is a major net importer of natural gas, though it also exports some 16 bcm of gas. All of gas arriving to Germany is piped. The major external sources are Russia (39%), Norway (33%), and the Netherlands (24%).

Germany does not have any LNG receiving terminals. However, before the Nord Stream consortium received green light to build direct pipes from Vyborg to Greifswald, Germany proposed several LNG receiving terminals, such as Wilhelmshaven 1 (capacity: 10.8 bcm), Wilhelmshaven 2 (5.2 bcm), Rostock (2.5 bcm), and Lüpeck (Energy Delta Institute 2011). All the aforementioned LNG projects seem to be on ice now. An LNG terminal may appear in Rostock, but its significance to the German gas supply diversification is nonexistent.[5]

The Nord Stream consortium controlled by Gazprom considers building one or two additional gas pipes from Russia to Germany or even to the United Kingdom in addition to those two operating ones. The capacity of two operating pipes is 55 bcm, but so far, the pipelines have been utilized clearly under their capacity due to lower demand for pipeline gas (i.e., cheaper LNG gas has challenged the Russian deliveries).

Latvia

Similar to Estonia, all of Latvia's gas is piped from Russia: 1.4 bcm arrives directly from Russia and 0.2 bcm via Lithuania. Of this imported gas, 0.5 bcm is re-exported to Estonia (McClay and Ortmans 2011). Latvia plans to build an LNG receiving terminal with a nominal capacity of 2.0 bcm in Riga.[6] The proposed nameplate capacity of this terminal is too high to serve Latvian gas consumption alone. As the common Baltic LNG terminal[7] is frozen at the time of writing this article, the downgrading of the Latvian terminal plan is

probable. Despite the possible failure of the common Baltic LNG terminal, I assume that Latvia is committed to build its own LNG terminal.

It will be seen whether the Baltic States will be more cooperative in terms of gas storage. Here, it needs to be underlined that the only storage in the Baltic states with a strategic capacity (2.3 bcm) is located in Inculkalns, Latvia.[8]

Lithuania

Lithuania is a major consumer of natural gas (3.1 bcm in 2010), taking into consideration its populations size. Lithuania receives some 5.1 bcm of gas from Russia via Belarus. Of this amount, Lithuania sends 1.8 bcm to Kaliningrad, the Russian exclave located between Lithuania and Poland, and 0.2 bcm to Latvia (McClay and Ortmans 2011).

Lithuania does not have any other source of gas supply except Russia and, therefore, it vigorously plans to construct an LNG terminal by the end of 2014, but a delay cannot be excluded (Grigas 2012; Hyndle-Hussein 2012b).

The terminal will be a floating one and could have a start-up capacity of 1.0 bcm that can be extended afterward to 2.0 to 3.0 bcm.[9] The terminal will be erected in Klaipeda, which is located approximately 300 km northwest of the Lithuanian capital, Vilnius. The developer of this project is Klaipedos Nafta, a state-controlled oil company that operates the oil terminal in Klaipeda.

In order to stabilize its external energy supply, Lithuania has a burning need to go forward with the terminal plan, since its dependence on Russian deliveries has substantially increased after the complete closure of the Ignalina nuclear power station at the end of 2009. Therefore, Lithuania has been the fastest among the Baltic states to implement the EU's Third Energy Package. Due to the execution of the package, Lietuvos Dujos, Lithuania's national gas company, is to be split into two separate firms by 2014; one dealing with gas trade and the second one with gas transmission. The Lithuanian government seeks to deprive Gazprom of control over Lithuanian gas grid so that Gazprom and the LNG terminal will have an equal access to the transmission infrastructure (Hyndle-Hussein 2012a).

Probably, the final capacity of the national terminal could be less than 2.0 to 3.0 bcm referred by the public sources. However, the LNG terminal will have a substantial impact on the Lithuanian gas diversification if its annual regasification volumes will go above 1 billion cubic meters.

Norway

According to Energy Delta Institute (2011), Norway produced some 106 bcm of gas in 2010. Around 6 cm is consumed domestically and the rest is exported. Five main importers of Norwegian gas are Germany (27%), France (12%), the Netherlands (10%), Belgium (7%) and Italy (6%). The overwhelming bulk of Norwegian gas is exported via pipelines to the European gas network and through this network to final consumers. The International

Gas Union (IGU 2012) indicates that the Norwegian LNG exports amounted to less than 5 bcm in 2010, and the main recipients of the Norwegian LNG were Spain (38%), the United Kingdom (20%), and the United States (15%).

Norway has one major LNG plant, Snøhvit, with the capacity of 6 bcm. Statoil Hydro, a Norwegian state-owned hydrocarbon producer, is the main owner of the field. Besides Snøhvit, there are two middle-sized plants with the combined capacity of 0.6 bcm. Risavika is owned by Skangass and Kollsnes by Gasnor. In addition to the aforementioned three plants, Norway has two small-scale plants; one in Karmöy and one in Tjeldbergodden.

Besides LNG plants, Norway has also erected LNG receiving terminals. The country possesses over 40 small-scale LNG receiving terminals designed for the domestic gas distribution. The majority of them are owned by Gasnor and Skangass (Stenkvist 2011).[10]

Most of Norway's LNG exporting capacity is in use; therefore, one should not be overoptimistic about Norway's capacity to send major amounts of LNG to other parts of the BSR if Norway does not increase its LNG exporting capacity.

Poland

Gas plays a much smaller role (less than 15%) in the country's primary energy consumption than generally believed. Poland does not use more than 15 to 17 bcm of gas, of which 11 bcm is imported. Nearly 90% of imports originate from Russia, whereas the remaining 10% comes from or via Germany (Energy Delta Institute 2011).

At least until mid-2014, all Poland's gas will be imported via the pipes but, thereafter, a significant amount of gas (2.5–5.0 bcm) could be received by the Swinoujscie LNG terminal, called Gazoport, located in southwest Poland. Qatar will most likely be the long-term supplier of LNG to the Polish terminal. Despite the progress of the project (a fourth of the project has been completed by the summer of 2012), one cannot exclude a considerable delay due to the bankruptcy of some building companies involved in the LNG project. In fact, the project was already late by 4 months in the summer of 2012 (Rozmarynowska, Nawigacyjny, and Systemow Transportowych 2011).

The project may cost close to $1.5 billion. The terminal is controlled by Polskie LNG, a subsidiary of Gaz-System. Gaz-System is a completely state-owned firm. The terminal may receive vessels of about 70,000 DWT, transporting some 145,000 cubic meters of LNG. Hopefully, the waterway to the terminal allows serving the vessels of aforementioned size, since the construction of the Nord Stream pipeline on the seabed may have raised the bottom of the sea.

In addition to this LNG terminal, a direct gas pipe from Denmark to Poland has been proposed. This pipeline would further diversify Poland's gas supply. However, there are speculations that this pipe will not be erected.

Russia

Russia is a major exporter of gas on the globe. Energy Delta Institute (2011) refers to that the country's exports reached nearly 180 bcm in 2010. The overwhelming bulk of Russian gas (over 50%) ends in the EU. Other major recipients of Russian gas are Ukraine (21%), Belarus (12%), and Turkey (10%). According to the International Gas Union (IGU 2012), Russia's LNG exports amounted to 14 bcm of the total exports of 180 bcm in 2010 (i.e., more than 90% of the Russian gas exports are tied to the pipes).

Russia's two major LNG plants with the nameplate capacity of 14 bcm are located in the Sakhalin Islands. In 2010, more than a half of the Russian LNG (59%) was sold to Japan and 32% to South Korea. The share of China was only 3%, reflecting that China is not ready to pay sufficient price for gas yet. Russia did not sell any of its LNG produced in Russia to Europe. In September 2012, Russia and Japan signed an agreement to build another LNG terminal with close to a 15-bcm capacity in Vladivostok (Argus 2012a; Geropoulos 2012c).

In addition to two Sakhalin units, the Yamal LNG plant has been planned. This plant could be in operation in 2018 with the annual capacity of 20 bcm. The project may get the final investment decision in the near future, but a postponement similar to the Shtokman field is possible. In principle, one cannot exclude an option that the Yamal LNG plant controlled by privately-run Novatek[11] could serve the needs of the LNG receiving terminals of the BSR.[12] However, the Russian government may not tolerate that privately owned Novatek would start to compete with the pipeline deliveries of state-owned Gazprom. Here, it needs to be underlined that at the time of writing the article, Gazprom still was a gas export monopoly of Russia, though public debate on breaking the monopoly has intensified. Moreover, the BSR governments may wish to diversify the country where gas comes from, not only the company that sells gas (i.e., this would put Novatek in an unfavorable position in the future LNG competition in the BSR).

The Shtokman LNG plant with the planned capacity of 10 bcm has been postponed, and it may remain idle for a very long time despite public statements indicating fast return of the project.

The Baltic LNG plant, which was to be placed in the Russian part of the Gulf of Finland, was canceled by Gazprom in 2008. In March 2012, the bulk of this project (80%) was sold to Sibur, a subsidiary of Novatek. The original size of the project was 6.8 to 9.8 bcm, with a budget of around $4 billion but, under the prevailing circumstances, the proposal to build a plant with a nominal capacity of 2.0 bcm sounds more realistic. The location of the Baltic LNG plant will be in Primorsk, the Leningrad region, close to the Finnish-Russian border. It has been estimated that the project can be completed within 2 to 3 years after the final investment decision. It would not be a surprise if the Baltic LNG terminal will not become operational prior

to 2018. In addition to the aforementioned Primorsk unit, Sibur aims at starting export deliveries of liquefied petroleum gas from Ust-Luga, a port close to the Estonian-Russian border, in 2013. A delay of implementing this project could also happen.

Even if Gazprom has earlier rejected the Baltic LNG project, it has recently expressed a plan to build a small-scale plant in Kaliningrad. Furthermore, Gazprom has proposed the construction of a major LNG plant in Vyborg. However, it is too early to comment how realistic these projects are, but it seems that Gazprom has once again become interested in LNG projects in the BSR (Stenkvist 2011).

Sweden

Sweden consumes a small amount of gas (1.3–1.7 bcm) compared to its size. As a comparison, Finland, with a population half that of Sweden, consumes almost three times more gas than its western neighbor. All gas deliveries to Sweden were conducted via pipeline from Denmark prior to opening of the LNG terminal in 2011. Due to the low level of gas consumption, it may seem surprising that Sweden was the first country in the Baltic Sea Region to construct a major LNG terminal, but obviously Sweden has been motivated by opportunities created by the gas bunkering business, which will grow significantly after 2015, when the ships are forced to reduce their sulfur emissions.

Sweden opened the Brunnsviksholme LNG terminal in Nynäshamn in May 2011. The nominal capacity of the Brunnsviksholme LNG terminal is 0.4 to 0.5 bcm. This LNG terminal will be supplied by a Norwegian Skangass LNG plant in Stavanger. The Brunnsviksholme terminal is owned by the industrial gas company AGA, which is a part of the Linde group.

In addition to this terminal close to Stockholm, Sweden plans to open another facility with a capacity of 0.5 bcm in Gothenburg in 2013–2015. Most likely, Norway will be the main supplier of the Gothenburg facility. If also the second terminal comes on stream, Sweden could in principle meet a lion's share of its gas consumption with LNG. Conversely, Sweden's gas consumption may grow considerably from what it is at the moment.

Besides these two aforementioned major terminals, Sweden has proposed several small scale terminals. As an example, one can name the terminal plans in Helsingborg, Malmo, Stockholm, and Sundsvall.

CONCLUSION

The BSR will not witness all the LNG terminal plans in their planned capacity.[13] Second, the postponement of some of these projects is evident. Third, it is important to remember than the nameplate capacity of the

terminals is much higher than the actual regasification volumes. On the other hand, for some BSR countries, these LNG terminals might prove to be strategic investments, even if their realized capacity would be smaller than the planned one (see table 2).

One can safely conclude that the LNG terminals of the eastern BSR will not replace Gazprom's deliveries but rather allow the BSR countries to diversify a proportion of their gas supply. On the other hand, these LNG terminals will introduce long-awaited competition that has a lowering impact on the price paid by the final consumers. Moreover, the LNG terminals will improve the security of gas supply, though the eastern BSR in particular cannot build its gas supply on the LNG deliveries alone.

To end, Gazprom's ongoing battle with the European Commission may lead to unexpected consequences (BBC 2012; Geropoulos 2012b; *Russia Today* 2012). Riley (2012b), one of the EU's leading gas experts, writes,

> It may well be that the Gazprom antitrust case launched by DG Competition on September 4th [2012] will turn out to be the landmark antitrust case of the decade, as Microsoft was of the last decade. . . . An increasingly exasperated Kremlin will be furiously lobbying major EU capitals to bring the process to a halt. The explanations from London, Berlin and Paris as to the application of the rule of law and the autonomy of the Commission will be disbelieved. There is therefore the prospect that in a stand-off between the Venusian Europeans and the Martian

TABLE 2 The Strategic Importance of the Existing or Planned LNG Terminals to the Gas Supply of the BSR, Excluding Gas Net Exporters of the Region (Denmark, Norway, and Russia)

Country	Maximum capacity of planned LNG terminals (bcm)	Gas consumption of the country (bcm)	Ratio[a]
Estonia	6.0	0.7	8.57
Finland	2.0	3.6	0.55
Germany[b]	0.0	72.5	0.00
Latvia	2.0	1.2	1.67
Lithuania	3.0	3.4	0.88
Poland	7.5	15.4	0.49
Sweden	1.0	1.3	0.77
Total	21.5	98.1	0.22
Author's estimate by 2020	less than 10	98.1	less than 0.10

[a]Ratio value of 1.00 means that the country could meet the nation's all gas consumption with LNG. Here one needs to stress that the planned nameplate capacity is much higher than the regasification volumes of the realized LNG terminals.

[b]Suspended terminal plans have not been included here.

Source: BP (2012).

Russians we will see a slash-and-burn gas policy from and uncomprehending and furious Moscow.

NOTES

1. Million ton of LNG equals 1.36 bcm of natural gas.

2. Gazprom doubts whether the United States will start to export LNG to Europe, as Gazprom considers the exports unprofitable (Geropoulos 2012a).

3. "Baringa, a London-based consultancy with a focus on energy, said that between 40 and 80 billion cubic metres (bcm) of liquefied natural gas (LNG) will be exported each year, starting from 2015. These figures are below some estimates that expect U.S. LNG exports to rise above 110 bcm by 2020, but Baringa's Jayesh Parmar and other analysts have said that political pressure could limit export capacities" (Reuters 2012).

4. Gazprom is not involved in any other LNG terminal project outside the Russian territory except that in Finland.

5. Puka (2012) states that a tenth of the German market benefits indirectly from spot gas trade. Furthermore, the German gas companies, E.On and RWE, have invested in LNG projects abroad.

6. Ventspils has also been mentioned as a possible location in earlier plans, but nowadays the Riga proposal has received backing by the authorities and businessmen.

7. According to the *Baltic Times* (2012), the EU will fund the LNG terminal only if all Baltic states participate. However, the participation of the members is not certain since the Baltic states have been trying to reach an agreement on having a regional LNG terminal since 2008 (EurActiv 2011). In November 2012, it was reported that "the Balts are waiting for a report from the European Commission on where best to place a 4 billion cubic meters (bcm) LNG terminal for the region. One possibility is that it would actually be in Finland, with a pipeline from the Nordic state to the Baltic countries" (Hellenic Shipping Company 2012). Some researchers have recently come to a surprising conclusion concerning the cost of the common LNG unit. Noël, Findlater, and Chyong (2012, 33) argue that the common LNG terminal in the BSR would be only marginally cheaper than the national LNG terminals and, therefore, "it might be better to let the Baltic States address gas supply security effectively through national measures, than spend time and energy trying to overcome serious political hurdles while gas insecurity is left unaddressed."

8. The capacity of Incukalns totals 4.4 bcm, but only 2.3 bcm is in active use (Grigas 2012).

9. It has also been proposed that the floating unit could move between Klaipeda and Riga, where it would stay during the summer time and supply Latvia's underground storage in Inculkalns and then relocate back in Klaipeda in the winter time. It remains to be seen whether such an intelligent form of cooperation will finally be executed or whether it will be blocked by Latvia's wish to have its own national terminal.

10. Until recently, RD Shell used to be a minority owner (4%) of Gasnor. However, Gasnor has agreed to sell all its shares to RD Shell. The transaction will be concluded by the end of 2012. In turn, Lyse owns Skangass. Correspondingly, Lyse is owned by 16 municipalities in the Southern Rogaland district of Norway.

11. Total owns 20% of Novatek's Yamal LNG terminal project (Argus 2012b).

12. Russia may aim to meet the gas needs of some Asian countries from the Yamal LNG plant via the North-East Passage. On the other hand, one should also keep in mind that China does not pay a sufficient price for gas at the moment and, second, the passage is truly operational only during a few months of the year. Third, Russia has major gas deposits, such as the Kovykta gas field, much closer to the Chinese market.

13. For instance, the total gas consumption of the Baltic states (Estonia, Latvia, and Lithuania) is around 5 bcm, whereas the proposed LNG terminal capacity is over 10 bcm.

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