

Energy Transition: European and Global Perspectives

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Regional Energy Supply and Security in the Transition to a Cleaner Energy World

1. Overview

This paper addresses the regional energy supply and security in the transition to a cleaner energy world based on industry experience and involvement working across the sector. Many interesting things are going on in the natural gas space on many fronts in Europe and neighbouring regions. Even countries far from Europe are experiencing similar changes in their markets. The reasons behind this vary and cleaner energy initiatives have a significant influencing role on these changes. In Europe, developing environmental targets and strategies of the European Union go hand in hand with newly opening gas markets and the strategies related to security of supply. There is also a new regulation¹ introduced which is aimed at improving the security of gas supply in the EU. The regulation entered into force on 1 November 2017. The new rules go further than the previous Regulation of 2010 by requiring EU countries to work together in regional groups to assess the potential for disruption to their gas supplies and agree on joint actions to prevent or mitigate the consequences. The new regulation introduces a new 'solidarity principle' according to which EU member states also need to be ready to help neighbouring countries guarantee the provision of gas to vulnerable consumers in the event of an extreme shortage. This reduces the risk of dependency on external sources.

We consider the role of gas as part of the energy mix going forward and the impact this may have on regional energy supply trends and development of both existing and planned gas infrastructure. As part of this analysis, we review and analyse trends in gas across different geographical markets. We look in more detail at projects across the European Union and the gas investment initiatives in the

¹ Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010.

region in this context. In comparison, we take a look at the Chinese markets where natural gas has already started to play an increasingly important role in the regional country's energy mix.

2. Results

General Direction

Our sector experience and research across the global gas market has shown that gas will play an increasingly important role in the transition to a cleaner energy world. We are not advocating that gas will be the sole energy solution for the future but rather that the role of gas is fundamental to the transition to a cleaner energy world in which it will also play an important ongoing role. This, not only because gas is needed to supplement unstable renewable supply, but because gas plays a strategic role in security of supply in national energy policies. These are issues that have to be addressed on a global scale.

As stated by ENI at the World Economic Forum, gas is the best least polluting fuel that can be used until renewables reach critical scale: Today, coal meets 29% of the global energy demand but causes 46% of CO₂ emissions. Further, as reiterated by David Kneipe, head of international gas at BP, at the recent Natural Resources Forum in London, gas produces fifty percent less CO₂ than coal. So there is a push for a transition to gas in coal heavy markets. Coal will dominate the market as long as its price is right and the users can cope with their emission strategies. The shale gas boom in the United States has diminished the use of coal within the country and pushed cheap coal into Europe. President Trump's goal to revive the coal industry will also support this development and keep coal as a player in the market for longer than climate change supporters had advocated.

The above changes in Europe, the US and China have also affected plans for India's energy mix which is above all driven by price considerations than anything else.²

There is a view taken by important market players that gas has a key role to play in the transition to the highly demanding renewables targets being set by and for various governments across the globe.

² India's Gas Market Post – COP21 (the Oxford Institute for Energy Studies (June 2017), p. 1.

David Kneipe also stated that by 2040 it is predicted that we will have the biggest mix of fuels the world has ever seen. As gas and renewables complement each other on the grid, it is inevitable that the two markets will co-exist. The lack of available storage for renewables mean that they are not currently a viable alternative to gas. This will remain the case until the technology is available for sufficient battery storage. Significant technological developments are necessary to solve this battery storage issue. This may indeed be achievable but time and investment is needed and policy needs to lay the path in this direction.

In this context, ENI also expressed that the future is to develop gas and invest in renewables and BP predicts that gas will form 60% of its portfolio by 2015. The same move towards gas is evident with the other energy majors: Natural gas already makes up more than 50% of Shell's production. Total has a 35 year plan to market more gas than oil. The big 5: Shell, Total, BP, Exxon and Chevron are all moving away from oil towards gas.

The International Energy Agency states that global gas demand is expected to grow by 1.6% per annum for the next five years. Industry leading the demand, with power generation growing at a slower rate.

There is also a report which states that there are plans to use the old gas infrastructure to store electricity and/or transport increasing amounts of biogas and gas made synthetically in the form of hydrogen or methane.³ This also further justifies the construction of natural gas infrastructure due to its multi-use later on.

Trends in gas

Logically, the trends in gas differ depending on whether or not we are looking at local, regional or global markets. But in short, we see gas playing an increasingly important role in the energy mix for the short to medium term.

Taking a look at the emerging markets: Exxon Mobil stated in 2017 that coal will lead in electricity production for the next 20 years but gas is set to take over. Reality is that coal will lead as long as it is cheapest, in particular in the emerging markets, but as gas becomes more affordable, there will be a

³ Frontier economics: The Importance of gas infrastructure for the German Energiewende (October 2017) p. 2-3.

swing in favour of gas. China currently produces four times as much coal as the US, so this is a market to watch for the swing to gas, following the trend seen already in the West. – The anticipated demand from the Chinese market is already evidenced in a series of MoU's that have been entered into by China for Russian gas. China is the worlds largest user of coal and in terms of oil, only second to US.⁴

Current projections, challenged by certain renewables advocates, are that natural gas will be the fastest growing fossil fuel in the energy mix going forward. So clearly indicating a move away from oil and coal. What cannot be denied by renewables advocates is that gas is the cleanest hydrocarbon and hence if any hydrocarbon were to coexist alongside renewables in the energy mix, gas is the fuel of choice.

The choice of fuel/ energy source will logically be driven by price, closely linked to its availability on the market. The future of gas being dependent on the competitiveness of its pricing compared to other viable alternatives that come to market. We will discuss price later on in this article.

Professor Jonathan Stern has stated that, broadly speaking, it should be anticipated that gas for power generation will be replaced with renewables over time.⁵ However, gas will have a role as a base load/back up for intermittent renewables. This of course until the technology has been developed sufficiently to facilitate long term storage through batteries. More specifically in China and India, however, air quality issues combined with a large and increasing demand mean that existing coal fired power stations may lead to large scale replacement by gas fired power generation. Note as mentioned above that the groundwork for the delivery of gas to China has already been laid through agreements with Russia to deliver pipeline gas to China. Also Chinese gas companies such as PetroChina and rival China Petroleum & Chemical (Sinopec) are all participating in Beijing's efforts for cleaner air. Massive programs are ongoing to meet the soaring demand for natural gas.⁶

The replacement of diesel/oil fired power stations across the Middle East, Africa and other places where 24/7 power supply is not yet generally available is also likely to take place over the coming

⁴ The east is green – China is rapidly developing its clean-energy technology – The Economist (Special Report), March 15, 2018.

⁵ Challenges to the future of gas, Prof Stern, December 2017.

⁶ China's gas producers ready to boost supply for Beijing's war on air pollution, 2 April 2018 Bloomberg law.

years, increasing the role for gas in these markets. These emerging markets have increasing power demand hence the role of gas in these changes is significant.

In countries where gas can replace oil products, the focus will not be limited to power generation but will impact the industrial, residential and the transport sectors.

In 2016, Modi announced that India would be a gas economy, so the plans and developments for this high demand energy nation are to be observed with interest. The developing world is key to the shift in the energy mix – but will have different phases, potentially seeing some leapfrogging both in terms of technology and in terms of choice of fuel. This will inevitably be driven by cost and availability (including infrastructure development), and here the recent discoveries in East and West Africa could play a major role in the switch to a gas economy in the relevant jurisdictions.

In the US, coal is cost competitive with gas but this is not the case globally and there is potential for change, especially as gas prices in the US are highly dependent on internal policy. There could be significant impact on this if there is resolution to allow more freedom to export. Department of Energy is required to authorize the export of LNG unless it finds the proposed exportation "will not be consistent with the public interest." Exports to a country that has entered into a Free Trade Agreement ("FTA") with the United States are deemed to be within the public interest. Presently, only one license granted by DOE for LNG export to non-FTA countries. The license is granted to Cheniere Energy. Currently, there are 48 other applications pending.⁷

When Trump talks of energy dominance for the US, he is referring to oil, natural gas and coal and not renewables. His goal in terms of energy dominance is to increase America's export capacity. In 2017, the US became a net gas exporter for the first time in over half a century. Trump is steadily building on this achievement and shaping policy to further this effort. America's increased export levels have made a significant contribution towards the global gas market, most importantly the global LNG market (although the pipeline gas to Mexico is not unimportant). If the United States continues its export development at this rate, it will soon move up to the levels to compete with Qatar and Australia as the world's largest LNG exporters.

⁷ Situation on March 16, 2018 (source: Department of Energy).

The first ever long-term contract to supply US liquefied natural gas to China was signed by Texas-based Cheniere Energy in February 2018 with China National Petroleum Corporation⁸ for 25 years.⁹

It should be noted that at the time of writing, Russian gas is cheaper, but the availability of American gas gives comfort of energy security.

In China, there are several energy policy/regulatory initiatives taking place which have changed and will in the future change the country's gas consumption as the country shifts its emphasis to cleaner and more efficient sources of energy. China's natural gas consumption increased by 18.9% year-on-year in the January-November period in 2017, 12 % higher than that in the first half of 2017 and more than 8% higher than the average growth in the previous five years. There have been estimates according to which natural gas use is expected to reach 230 billion cubic meters in 2017, with 20 billion cubic meters coming from the coal-to-gas transition.

The National Development and Reform Commission of the People's Republic of China (NDRC) (formerly State Planning Commission and State Development Planning Commission, is a macroeconomic management agency under the Chinese State Council) has broad administrative and planning control over the Chinese economy.

As regards the distribution of gas, natural gas prices in China are determined at city gates, subject to a ceiling price set by the government. The city gate price of natural gas has two components: ex-factory price and pipeline transportation tariff. Pipeline transportation tariff is subject to NDRC regulation and adjustment.

As a starting point, on February 28, 2015, the NDRC released the Notice on Rationalizing the Price of Non-residential Natural Gas NDRC issued a Circular 1217 in 2017 "Notice on Opinion of Accelerating and Advancing the Utilization of Natural Gas". Circular 1217 establishes the principle of increasing the utilization of natural gas for town gas, industrial fuel, fuel gas power generation and transportation. There is still a big difference between the price of residential gas and gas for industrial use.

⁸ CNPC is the government-owned parent company of publicly listed PetroChina.

⁹ Cheniere signs long-term LNG export deal with China, Financial Times, 9 February 2018.

Currently, there are at least 13 new regulatory changes ongoing to boost the use of natural gas in China. These policies encourage greater natural gas consumption and are being accompanied by a more open and market-oriented structure for gas supply, with reforms both in the upstream and network regulation.

The natural gas price has been the major obstacle in developing the natural gas markets in China. There is a significant discrepancy in household prices as compared to the gas price in industrial purposes. Household prices have been extremely low in comparison to the prices offered for industry. This distortion of the market price structure needs a reform as a part of the other changes currently ongoing in the market. Currently, there is a pilot scheme ongoing according to which natural gas prices will be reviewed and adjusted annually (or semi-annually or quarterly at a later stage). This model does not offer any guidance on future reform processes for the price adjustment mechanism. One major change in the markets has been the introduction of third party access to mostly government owned pipeline network. This legislative reform took place in 2014¹⁰ and is one of the steps China is taken towards a commercialised market. Also, a further notice on disclosure requirements on third party access to oil and gas pipeline network facilities was issued on September 2, 2016.

The NEA released a further notice on disclosure requirements relating to the opening of oil and gas pipeline network facilities (No. 540/2016 of the NEA) (the "Notice"). The Notice was issued to strengthen the Supervision Measures on Fair Access to Oil and Gas Pipeline Network Facilities by supplementing disclosure requirements. The Notice applies to CNPC, Sinopec Corp and China National Offshore Oil Corp. and their respective subsidiaries who are operators of oil and gas pipeline network facilities.¹¹

This development is very similar to the development in the Baltic Countries (discussed below) where the third energy package as part of the legislative changes in the gas sector has aimed at a more competitive market and moved away from the Russian gas controlling position. China as a market area due to its size and its regulatory power within the country is an interesting reference point to other gas markets within the European Union that have yet to be opened up. Even if this comparison may

¹⁰ Measures of Fair Access to Oil and Gas Pipeline Network Facilities (for Trial Implementation) (No. 84/2014).

¹¹ International Energy Law Review 2017 Legal Update: China issues notice of disclosure requirements on third party access to oil and gas pipeline network facilities Lynia Lau.

seem impossible due to the obvious differences in the markets, it is still interesting to observe how similar instruments are used for different uses in markets that are far away from each other.

It is also interesting to consider the role of LNG and LNG infrastructure in the commercialisation of the natural gas markets with to the role of LNG in other European Union countries.

China has mentioned gas as a potential major part of its INDC (Intended Nationally Determined Contributions). To expand the use of natural gas: by 2020, achieving more than 10% share of natural gas consumption in the primary energy consumption and making efforts to reach 30 billion cubic meters of coal-bed methane production.¹² Also guidelines on accelerating promotion of natural gas was issued on June 23, 2017 which proposes that natural gas should account for about 10% of China's primary energy consumption by 2020. The guidelines state that China will open the market to more competitors, encourage more investments into the natural gas infrastructure and speed up efforts to build a market-oriented as pricing mechanism.¹³

Consequences – Case study - Europe:

The importance of gas in the energy mix, due to a vast number of influencing factors and for a number of reasons including with a view to reaching renewables/COP23 targets gives an increased importance to gas. This means that demand will increase and hence supply needs to be maintained, developed and expanded. This puts gas infrastructure development at an advantage. The existing infrastructure in Europe is not sufficient to meet growing demand.

Once very recent example of the insufficiency of the existing infrastructure is the consequences of the cold spell, colloquially referred to as 'the beast from the East' that hit the UK in February 2018. In this period, Siberian temperatures hit Western Europe. This caused the UK's National Grid to issue a gas supply warning. The existing infrastructure and supply arrangements were not sufficient to deal with the increased demand caused by the sudden drop in temperatures. Although the deficit did not hit domestic users, there was a concern as to the impact on industry. At the time, Platts reported a five year high in gas demand for the period. It so happened that the cold spell came at a time when the

¹² Chinas INDC p. 7 (30 June 2015).

¹³ International Energy Law Review 2017 Greater China: August update (Lynia Lau).

UK's existing gas infrastructure had also been hit by a number of technical issues, leaving the UK with already compromised infrastructure to cope with the upturn in demand.

Another contributing factor to the weakness in the infrastructure system in the UK is the lack of available gas storage. This has been significantly reduced over recent years with no back up plan or alternative solution in place to bridge the gap.

Recent events have proved that the existing UK gas infrastructure is not sufficient in times of crisis and heightened energy demand. So until renewables have the availability and reliability to bridge the gas, the gas infrastructure needs to be further developed to maintain supply.

In the State of the Energy Union speech on 18 November 2015, reference was made to the Framework Strategy for a Resilient Energy Union with a forward looking climate change policy, adopted on 25 February 2015 by the European Commission. As part of this masterplan, the EU announced the development of a comprehensive strategy on LNG and gas storage. The intention hereby is to see how to include LNG and gas storage as a key contributor in the 'security, affordability and sustainability of the EU energy system'. This supports our proposition that gas will indeed continue to play an important role in the energy mix.

Another European initiative that shows significant support for gas infrastructure projects is the programme of Projects of common interest (PCIs).¹⁴ PCIs aim to increase competition on energy markets, enhance security of supply and contribute to the EU's energy and climate goals, namely to the long-term goal of decarbonisation in accordance with the Paris Agreement. Notwithstanding the long term goal of decarbonisation, there is recognition through application of the policy that gas is an important part of the journey to meet the end goals of the Paris Agreement.

These projects, supported by the EU's Connecting Europe Facility have access to a total of €5.35 billion in funding between 2014 and 2020. Four of these broader projects, as defined by geography, have as their focus natural gas: Priority Corridor North-South Gas Interconnection in Western Europe (NSI West Gas), providing a connection within western Europe; Priority Corridor North-South Gas Interconnection in Central Eastern and South Eastern Europe (NSI East Gas), providing a connection

¹⁴ <https://ec.europa.eu/energy/en/topics/infrastructure/projects-common-interest>.

between and within the Baltic Sea region, Adriatic and Aegean Seas, eastern Mediterranean Sea and Black Sea; Priority Corridor Southern Gas Corridor (SGC), providing a connection from the Caspian Basin, Central Asia, Middle East and eastern Mediterranean Basin to the EU; and Priority Corridor Baltic Energy Market Interconnection Plan in Gas (BEMIP Gas), providing a connection covering the area of three Baltic States and Finland.

These are significant investments across broad European geographies. Taking the goals of the PCI investments one at a time:

1. To increase competition on energy markets

This is key to the future of diversification both of supply and technology. By working across different markets for import and export, Europe keeps itself as a player on the global energy market and benefits from as well as contributes to making and keeping the markets competitive. Gas and renewable energy will become increasingly competitive between themselves, but keeping the individual energy source from the global market competitive for the European market is essential for the sustainability of supply.

2. To enhance security of supply

The European Union invests significant effort to ensure that it is not reliant on one source of gas, notably Russian gas. The Southern Corridor project comprising TAP and TANAP to import Shah Deniz gas from Azerbaijan is the primary example for this. This alternative route, and related interconnector infrastructure, is being developed with EU funds and support to diversify supply. The intention being to reduce reliance on one source, being, at this stage, Russian gas. The struggle to establish this diversification has been long and not uncontroversial. But it is of strategic importance to the EU to continue on this path and continue the gas infrastructure investment to this end. Renewables it could be argued would offer more certainty of security of supply within the EU or individual Member States. That said, there have already been observations that whilst in the current landscapes there are disputes over delivery of gas through cross border pipelines, the same conflicts are likely to arise over renewable energy generated and delivered to the grid across borders.

3. To contribute to the EU's energy and climate goals, namely to the long-term goal of decarbonisation in accordance with the Paris Agreement

Indeed the EU takes the Paris Agreement goal seriously. As it should. But it also recognises that we are not in a position to switch to renewables tomorrow and leave gas in the past. Gas is already recognised as being far less damaging to our environment and hence has been adopted as a bridge to a reduced carbon future. The timescales for crossing that bridge are not clearly identified as there is still so much development required before renewables can be relied upon.

A more recent focus on gas (not only diversification) has offered increased opportunity for these infrastructure projects (note also die Energiewende and the German shutdown of nuclear and how this has created an increased demand for gas). That said, these opportunities have not come without challenges: politics, diversification requirements, financing, physical challenges, cost related to oil price, competition (Shah Deniz gas v Russian gas), required capacity in the market, impact of renewables (if any).

The European Commission Trans-European Energy Networks (TEN-E) Programme plays a great role in all network pipeline projects in the Baltics reaching also to Poland through GIPL. The key pipeline projects for the region are the Nordstream 2, Balticconnector-pipeline, the Estonia-Latvia enhancement, Estonia-Lithuania interconnector and Gas Interconnector between Poland and Lithuania (GIPL). There are also plans to construct a so-called Baltic Pipe which runs from Denmark to Poland. All of these projects are included in the PCI list. Here we discuss the impact these projects will likely have on addressing the gas security of supply and also the price of gas as a result of the market opening up increasing competition.

Below is a description of the projects ongoing (or recently completed) in the Baltic Countries, Finland and neighbouring areas supporting the opening of the gas markets, creating competition in the area and providing security of supply.

Balticconnector. The Balticconnector pipeline project is a joint construction project enabled by two state owned companies Baltic Connector Oy, in Finland and Elering AS, in Estonia. When commissioned in the beginning of 2020, the project will enable the interconnection of the Baltic and

Finnish gas markets and further enable the integration with the EU's common energy market once the Gas Interconnector between Poland and Lithuania (GIPL) is completed in the end of 2021.

The Balticconnector pipeline project will include the construction of an offshore pipeline between Inkoo, Finland and Paldiski, Estonia as well as Finnish and Estonian onshore pipelines and compressor stations linking the offshore pipeline to the existing gas transmission networks in both countries. The route will cover 21 km of onshore pipeline in Finland, 77 km of offshore pipeline, and 55 km onshore pipeline in Estonia. The transmission capacity of the pipeline will be 7.2 million cubic metre (72 GWh) per day and gas can be transported bi-directionally between Finland and Estonia according to market demand.

Balticconnector will improve energy security through diversifying gas distribution channels and promote security of supply in both countries while providing the opportunity for Finland to utilise the Inčukalns Underground Gas Storage in Latvia as well as the diverse supply sources of Klaipeda LNG terminal in Lithuania (technical capacity 122 GWh/d). The combined potential of these infrastructures will improve reliability in natural gas transmission in Finland.

The project has been recognised by the EU as a Projects of Common Interest (PCI) and has been granted funding by the European Commission (CEF-grant) covering 75% of the projects total construction costs.

Natural gas covers approximately 5% ¹⁵of Finland's total energy requirements, while the average within the EU area is over twice that amount. In the Baltic countries, the corresponding numbers are 25% for Latvia, 30% for Lithuania and 5% for Estonia.¹⁶

Nordstream 2. The Nord Stream 2 pipeline (NSP2) is a 1,200 km pipeline traveling through the Baltic Sea, starting from the coast of Russia and reaching landfall near Greifswald in Germany. It will run roughly parallel to the existing Nord Stream pipeline passing through the territorial

¹⁵ The rest conforms of oil (23%), coal (9%), nuclear (17%), hydro (4%), wind (1%), peat (4%), wood (27%), electricity net import (5%), others (5%) (2017) Statistics Finland. The Finnish Government has decided that the use of coal in energy production will be prohibited by law in 2029. The Government will also prepare an incentives package, amounting to EUR 90 million, for district heating companies that commit to phasing out coal use already by 2025 (Minister Tiilikainen: Finland to ban coal in 2029 – incentives package for faster phase-out, Ministry of Economic Affairs and Employment press release 10 April 2018).

¹⁶ Eurostar, <http://ec.europa.eu/eurostat/data/database>.

waters and/or the Exclusive Economic Zones (EEZs) of Russia, Finland, Sweden, Denmark, and Germany. According to current schedule, NSP2 will be put into operation before late 2019.

The pipeline will comprise twin-parallel lines with a total capacity of 55bcm (27.5bcm per pipeline) of natural gas a year. NSP2 is an expansion of the existing Nord Stream pipeline and the aggregated design capacity of both pipeline projects is 110bcm of gas per year. NSP2 is expected to transport enough gas to supply 26 million households a year covering one-third of the new gas imports required in the next two decades.

The shareholders in the pipeline project are Gazprom (50%), BASF/Wintershall (10%), Engie (10%), E.On (10%), OMV (10%) and Shell (10%). The Swiss entity, Nord Stream 2 AG, was established to develop the project and perform detailed project planning, permitting and survey work. The company will also operate the pipeline once completed.

In order to make the pipeline network function properly in the Baltic countries and open up the markets in the area and in Finland for alternative competitors to Russian gas, the Baltic network needs reinforcement. There are two contemplated projects to support this market opening, one enhancement and one interconnector.

Estonia-Latvia enhancement. One of the projects on the PCI list is the Estonian-Latvian enhancement. The enhancement covers the construction of gas network infrastructure in three different locations: a gas metering station near the Estonia-Latvia border in Karksi; a border valve in Lilli (between Karksi and the Estonia-Latvia border); and a bidirectional compressor station in South Estonia in Puiatu. The completion of this project targets to improving the gas transmission infrastructure to allow bidirectional gas flow between the Estonian and Latvian gas transmission systems as well as increasing the overall cross-border transmission capacity. The bidirectional gas flow is an essential part of opening up the markets in Finland and increasing competition in the already open Baltic markets. Currently, both Finland and the Baltic countries are completely dependent on Russian gas.¹⁷

Latvia – Lithuania interconnection. This project aims at enhancing the capacity of the gas systems interconnection between Latvia and Lithuania, ensuring safe and reliable natural gas supply, and

¹⁷ E.g., D. Gtitsenko, Energy Policy 112 (2018) 74-83, p. 76.

achieving a more effective use of the infrastructure and better integration of the gas markets of the Baltic States.

The implementation of the Project will also contribute to creating better conditions for the use of the Latvian Inčukalns Underground Gas Storage for Lithuania's and, in future, for Poland's gas market participants. The integration of the Baltic gas markets into a single European Union gas market, this interconnection will become an important route linking Europe and the Eastern Baltic region's markets.

In 2018, it is planned to carry out the feasibility study for the project of the Enhancement of Latvia-Lithuania interconnection. The scope of the project's implementation and the time schedule will depend on the outcome of the feasibility study. It is expected to be completed by 2021.

GIPL. The goal of the project is to integrate the gas markets of the Baltic countries and Finland into a single EU gas market, diversify gas supply sources and routes, security and reliability of gas supplies, increase the flexibility of the gas transmission system in BEMIP region and establish the mechanism of solidarity in case of emergency, create preconditions for a competitive regional gas market. The project is considered as important for the independence of the Baltic gas markets as the Balticconnector project discussed above.¹⁸

Inčukalns Underground Gas Storage in Latvia – the only storage in East Baltic EU Gas Market. The gas storage in Latvia and its pipeline connection to Estonia is important to eliminate Gazprom's ability to restrict the gas flow through the region.¹⁹ JSC „Conexus Baltic Grid” is a unified natural gas transmission and storage operator in Latvia owns the Inčukalns underground gas storage (Inčukalns UGS). Gazprom still owns about 34.1% of the shares in Conexus Baltic Grid. The Inčukalns UGS, located 40 km northwest from Riga, is the only functioning gas storage facility in the Baltic States ensuring stability of regional gas supply. The UGS has been in use since 1968 enabling natural gas supply stability and power by eliminating the seasonal dependency on other gas sources.

The capacity of the storage is 4.45 bcm of which 2.30 bcm is active working gas and 2.15 bcm is cushion gas. The layout of the joint gas networks of Latvia, Lithuania and Estonia is designed in the

¹⁸ Latvian and Estonian PMs welcome GIPL agreement as guarantee of Baltic energy independence (October 19, 2015) www.lrt.lt

¹⁹ Connecting the Baltic States to Europe's Gas Market (by Ambassador Matthew J. Bryza & Emmer C. Tuohy) (ICDS), p. 5.

way that gas is injected in Inčukalns UGS in summer and withdrawn in winter for customers in Latvia and Estonia. The total active gas volume of the storage almost equals to two years of annual consumption for Latvia and is designed as the regional seasonal gas storage.

At the Inčukalns UGS, natural gas is injected only during the summer months, when Latvia receives natural gas from Russia, in the amounts specified in contracts. Natural gas is mostly used for heating, and, therefore, the largest consumption of natural gas takes place during the cold season. The main pipelines through which Latvia receives natural gas have a high workload during the heating season; for this reason, Latvia receives natural gas from Russia only in the summer, as it has since the opening of the storage facility. The gas is then stored in the storage facility, so that Latvia is not dependant on the Siberia-Europe transmission pipeline system during the winter. A portion of the natural gas is sent back to Russia during the winter.

It should be noted that following the liberalization of Latvia's gas market in April 2017, issues concerning the necessity to search for new ways of using Inčukalns gas storage facility have been raised. Two possible goals for the use of the facility have been proposed to gradually replace its role as a seasonal facility. One of them is a so-called short-term use variant and the other is for ensuring safety of supplies.

Klaipėda LNG FSRU. Klaipėda liquefied natural gas floating storage and regasification unit terminal (Klaipėda LNG FSRU), located in the port of Klaipėda, is one of most important facilities in Lithuania to ensure the national energy security as well as the energy security of the Baltic Sea Region. The terminal was commissioned in December 2014 and has enabled the formation of a national natural gas market and opened opportunities for Lithuania to import natural gas from all over the world.

The LNG terminal consists of a floating storage regasification unit, a berth and a gas pipeline. The FSRU is permanently moored to a berth in the Klaipėda Seaport and holds a regasification capacity of up to 10,244,300 m³ of natural gas per day. The capacity of the LNG tanks is 170,000 m³. The FSRU is connected through an 18 km long pipeline to the natural gas distribution station of Amber Grid AB, Lithuania's natural gas system operator. The metering of the regasified LNG takes place at the gas metering station.

The infrastructure is suitable for both regasification and LNG transfer and the terminal enables the reservation of the spare LNG regasification and transfer capacities depending on the demand and technical capacity of the terminal. Third-parties have access to the capacities of the terminal allowing customers to receive the gas from various suppliers at market prices.

The FSRU is leased by Klaipėdos Nafta AB, the state-owned energy terminal operator, from Norway's Hoegh LNG Holdings (HLNG) for 10 years with an option to buy the regasification unit.

Baltic Pipe. To open the European markets further to Norwegian gas, there is a new PCI project called, the Baltic Pipe. The project concerns the transmission of natural gas from Norway to Poland, Denmark, Sweden, the Baltic states and Central and Eastern European regions. The project includes both onshore parts and offshore parts. Both on the Danish and also on the Polish side, the project calls for changes to the existing compressor stations as well as building of new pipelines.

Government ownership in natural gas companies is evident in all the countries within the Baltic Sea Region which is due to historical reasons. Similarly to electricity networks but decades later, the natural gas markets have been opened. Finland will be the last market to open in 2020 and Latvia has been the latest country to open up their markets. In Latvia, the unbundling procedures have just been completed. Open season for the project was completed in 2017 and an investment decision for the project is yet to be made.

Price of Gas and the Market

Globally gas prices are being decoupled from oil prices, hence creating an independent industry, although subject to the volatility of the world's changing energy needs, not wholly dependent of OPEC and oil price fluctuation. Further, oil and gas companies are taking an increased development in the power sector to optimise their positions in the market in a gas world – involvement in the generation side as well as the exploration to get benefit for the value chain .

Also coal is linked to the price formation.²⁰ Originally, this linkage was established due to the isolation of separate gas markets and the lack of actual natural gas market price against index prices.

²⁰ Holland & Ashley, Natural Gas Price Reviews: Past, Present and Future, Journal of Energy & Natural Resources Law, Vol. 30, 2012, pp.29-44.

Therefore, natural gas was indexed to alternative competing fuels. Thus, the oil price indexing is based on an established practice rather than a pricing mechanism based on market influences, whereas the lack of a market-based pricing mechanisms for natural gas has been prominent due to the lack of effective competition.²¹

Price of gas has been one of the factors which affects the opening of the Finnish and Baltic natural gas markets in various ways.²² The conversion of power producing facilities as well as large energy using market players into gas users will be delayed due to the price of gas and the possibilities of utilizing coal in the energy production.²³ Finland, for example, there have planned to phase out the usage of coal earlier than 2030.²⁴

The approach in Finland and in the Baltic countries is very different from the political approach taken e.g. in China where there is no phasing out period for coal but a ban that comes into effect immediately. In Europe, the Energy Charter Treaty protects foreign investment from political and regulatory risks and, therefore, sudden changes of energy policy are not possible or very difficult to enforce. China is not part of the Energy Charter Treaty and it is not part of any bilateral investment agreements and therefore these types of changes in energy policy are possible. Coal in the Baltic countries does not play a large role.²⁵

Due to the long-term take or pay agreements between the Baltic countries and Russia, the natural gas market used to be non-liquid and very segmented. This resulted in the European Commission starting an investigation against Gazprom Export in 2011/2012 due to its market position. On 4 September 2012, the Competition Directorate (DG COMP) of the European Commission (EC), having carried out unannounced inspections ('dawn raids') at the premises of several companies in ten EU Member States one year earlier, opened formal proceedings against Gazprom for possible abuse of a dominant position under Art. 102 of the Treaty on the Functioning of the European Union (TFEU) in

²¹ Talus, 'Long-term natural gas contracts and antitrust law in the European Union and the United States', *Journal of World Energy Law and Business* 4, 2011, 3, pp. 260-315.

²² Csrekelyei, Z. Thurner, P.w. Bauer, A- Küchenhoff, H. 2016. The effect of ebolic growth, oil prices, and the benefit of reactor standardization: duration of nuclear power plant construction revisited. *Energy Policy* 91, p. 49-59.

²³ IGU, 2017. *World LNG Report 2017*. International gas Union (accessed date 23 February 2018).

http://www.igu.org/sites/default/files/node-document-field_file/103419-World_IGU_Report_no%20crops.pdf and also Tim Boersma : "The challenge of completing the EU internal market for natural gas", *Swedish institute for European Policy Studies*, November Issue 2015:27 epa, p. 2.

²⁴ <https://www.tekniikkatalous.fi/tekniikka/energia/kivihiihkiellon-aikaistamista-aletaan-selvittaa-tiilikainen-kivihien-energiakaytto-voisi-loppua-jo-2025-6695051>.

²⁵ The statistics sometimes give a false picture on the matter due to the fact that shale oil is falsely categorized as coal usage and therefore results in high coal consumption numbers for the area.

upstream gas supply markets in several central and eastern European member states. It stated that Gazprom may have (a) divided gas markets by hindering the free flow of gas across member states; (b) prevented the diversification of supply of gas; (c) imposed unfair prices on its customers by linking the price of gas to oil prices.²⁶ The investigation took over two years after which in April 2015, the European Commission sent a Statement of Objections to Gazprom alleging that some of its business practices in Central and Eastern European gas supply segment the EU's Single Market and constitute an abuse of its dominant market position in breach of EU antitrust rules. The Commission's investigation concerned the prices that Gazprom's customers such as gas wholesalers and industrial customers pay for their gas. These wholesale prices play an important role in determining the prices for gas charged at retail level to households and businesses. They can also impact the prices of industrial goods for which energy costs are an important factor in the production costs.²⁷ In response to this, in 2016, Gazprom Export published a proposal for commitments which included two subject groups that concerned the Baltic countries.²⁸ Gazprom suggested that it would remove the destination clauses from the long-term agreements with the Baltic countries and also Gazprom committed to introduce competitive benchmarks, including western European hub prices, into its price review clauses in contracts with customers in the Baltic countries. These commitments will give the customers an explicit contractual right to request changes to their gas prices when they diverge from competitive price benchmarks, thus, ensuring competitive prices in these countries in the future. Gazprom has also committed to increase the frequency and speed of price revisions and will also introduce clauses reflecting the above elements into those contracts (for instance those with the Baltic states' customers) where price revision clauses do not currently exist.²⁹

While the above investigation was ongoing Lithuania filed a complaint against Gazprom and Gazprom has been under investigation as regards its gas pricing in Lithuania since 2012. To find a solution on the price issue with Russian gas, Lithuania also launched an LNG terminal in Klaipeda, Lithuania, at the end of 2014 (see below).

²⁶ The EU Competition Investigation into Gazprom's Sales to Central and Eastern Europe: a comment on commitments (Oxford Institute of Energy Studies April 2017) p. 1.

²⁷ European Commission - Press release: Antitrust: Commission sends Statement of Objections to Gazprom for alleged abuse of dominance on Central and Eastern European gas supply markets (22 April 2015).

²⁸ Proposals for Commitments, COMP/39.816 – Gazprom, Commitments under Article 9 of Council Regulation N1/2003.

²⁹ Id. p. 3-4.

Also the Finnish natural gas monopoly, Gasum Oy (Gasum), sued Gazprom Export in the Swedish Arbitration court for the length of the take-or-pay agreements and the price of natural gas in 2015. Gasum and Gazprom Export had conducted negotiations on the supply price of gas already since the beginning of 2014. The arbitral tribunal session was not in the end needed because the parties were able to conclude a solution before the procedures commenced. During 2015, the price of gas had already decreased considerably. The solution reached in the negotiations resulted in a slight further reduction in the price of gas, and the price linkage to the market price of oil will also be lessened. This will increase price predictability and ensure that gas imported to Finland will be price competitive in the European context in the coming years. The negotiated solution reached by the gas companies will ensure a competitive price for gas imported to Finland over the coming years.³⁰

On 5 December 2014, the Prime Ministers of the Baltic States in Tallinn jointly agreed that it is of crucial importance to ensure the implementation of the EU Third energy package together with clear, transparent and competitive rules for third party access to the gas system throughout the Baltic States. The Prime Ministers of the Baltic States also encouraged stakeholders to work closely together with regard to the development of a functioning regional gas market and initiated the establishment of the Regional Gas Market Coordination Group (hereinafter – RGMCG). The RGMCG was established by the Agreement signed by the Ministers for Energy of Lithuania, Latvia and Estonia on 14 January 2015 by which Finland has been invited to contribute to the creation of the regional market. The RGMCG consists of the Lithuanian, Latvian, Estonian and Finnish Ministries, NRAs, TSOs, LNG terminal and storage system operators. The main task was to prepare an Action Plan (which was signed on 9 December 2016) on regional gas market development; to facilitate an effectively functioning common regional gas market in the Baltic States; to develop measures in order to interconnect the Baltic States' regional gas market and the Finnish gas market; and to contribute to the security of gas supply in the East-Baltic region using market measures. The general objectives of the RGMCG are to facilitate the opening of the national gas markets;³¹

In December 2016, in Riga, Latvia, Baltic States Prime Ministers in the meeting within the framework of the Baltic Council of Ministers appreciated the progress made in the latest period of RGMCG work

³⁰ <https://www.gasum.com/en/About-gasum/for-the-media/News/2015/Gasum-and-Gazprom-reach-agreement-on-gas-price/> (accessed on 27 March 2018).

³¹ https://www.acer.europa.eu/fr/Gas/Regional_%20Initiatives/Pages/BALTIC-RGMCG.aspx (accessed 27 March 2018).

for development of the regional gas market until 2020. Baltic Council of Ministers welcomed the Regional Gas Market Development Action Plan and invited Finland to it and continue taking part in the regional gas market development process.³²

In case Finland would join the gas area of the Baltic countries, together they would confirm a market area of a demand of 60-70 TWh annually. This would give the area a different type of market power and would attract market players to the area. A new market model is in the works in the opening Finnish natural gas markets. Finland needs to create an entry exit market model and rules for the market. Biogas will be a part of those market rules.

A TSO TF (Task force) that has been established inside the RGMVG meets on a monthly basis to work on the common market area including a joint balancing area. Integrating these gas markets is not simple and e.g. one of the most challenging tasks is to make all the market rules work together and agree on compensation mechanisms whereby the revenues of the TSOs can be allocated correctly between all the TSOs. As regards the common balancing area, the goal is to have an "interim" solution ready by the beginning of 2019 and a long term solution by 2020.

The dependency of the Baltic States and also Finland of Russian gas started to be addressed with the assistance of the third energy package.³³ The third energy package mandates the following things: unbundling of natural gas transit and distribution networks from the sale functions of natural gas; diversification of natural gas supply sources; EU member states need to connect across state lines as well as third party access etc.

3. Conclusions

The above analysis and experience in the market shows that there is window of opportunity for this sector to drive forward if the opportunity is grasped. Gas will continue to play an increasingly important role in the regional energy supply and security in the transition to a cleaner energy world.

³² Regional Gas Market Coordination Group, Progress report No. 2, December 2015-February 2017, p. 1.

³³ RSCAS – Policy Brief – Issue 2017/16 – July 2017, The Baltic Litmus Test for Gas – Andris Piebalgs p. 2 and Connecting the Baltic States to Europe's Gas Market – Ambassador Matthew J. Bryza & Emmet C. Tuohy, p. 3

Based on the above, it is apparent that the price of gas can affect different geographical and political markets in a different way but it is also evident that very similar measures are taken to compete against the threats to the security of supply and to promote competition.

As regards the various projects that we described above under "Consequences – Case study – Europe - 3. To contribute to the EU's energy and climate goals, namely to the long-term goal of decarbonisation in accordance with the Paris Agreement", we will need to observe the development of these planned projects to see the reality of the commitment to the infrastructure and how this new infrastructure will affect the demand of natural gas and the long waited security of supply in many parts of Europe.