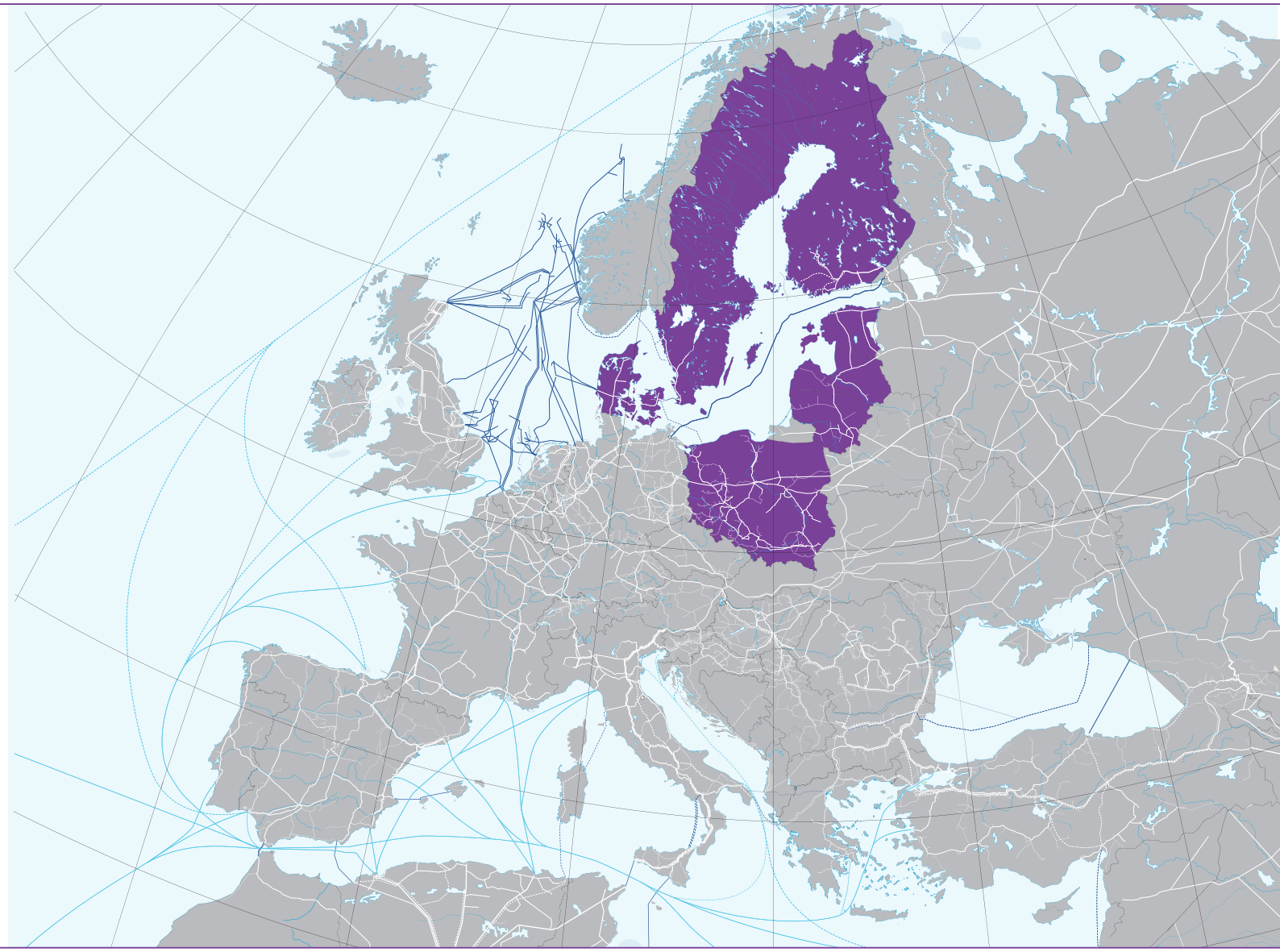
EESTI GAAS ENERGINET.DK Gasum GAZ system

LATVIJAS GĀZE LIETUVOS DUJOS swede gas



BEMIP

Gas Regional Investment Plan

2012 - 2021

entsog

european network of transmission system operators for gas

Table of contents

Annexes

Table of Figures

Preamble

Metering station 'Korneti' © Image courtesy of Latvijas Gaze

The European Union is now importing a major part of its gas demand, 62% in 2010 and, forecast to rise to 78% in 2020. The imports of natural gas to the EU has been occurring for many years, and as such Transmissions System Operators (TSOs) have been cooperating in order to ensure that there is sufficient cross border capacity available. The close interaction and cooperation between European TSOs has been crucial for supporting market integration and developing the security of supply of all Member States.

At a European level the TSOs have worked together in order to fulfil the European Network of Transmission System Operators for Gas (ENTSOG) obligation to produce the Community-wide Ten-Year Network Development Plan (TYNDP) for the period 2011-2020. This TYNDP was published on 17th February 2011 and is available on the ENTSOG website[1] .

The requirement to promote regional cooperation has now been enshrined in European law through the Directive 2009/73/EC (DIR-73) in Article 7 and further detailed by the Regulation 715/2009 (REG-715) in Article 12. The TSOs will now publish every two years, a Gas Regional Investment Plan (GRIP) based on regional co-operation, which will contribute towards the fulfilment of tasks listed in the Gas Directive and Gas Regulation.

The Gas Regional Investment Plan of Baltic Energy Market Interconnection Plan Region (BEMIP GRIP) serves to fulfil the requirements of REG-715.

Its primary objectives are to create an awareness of infrastructure developments within the BEMIP region and to provide sound basis for subsequent BEMIP GRIP's development. The BEMIP GRIP aims in particular to present the relevant investment projects offering the possibility both to integrate the gas market in the BEMIP region and meet EU objectives in the field of energy policy, and to analyse the main barriers that hamper investment development. The BEMIP GRIP is also taking into consideration the ongoing developments of the gas sector in the region.

The TSOs of the BEMIP region believe that this document will provide useful information to stakeholders and will support informed discussion in assessing the ability of investment projects to address regional market needs.

This is the first edition of the BEMIP GRIP and it should be acknowledged that this first publication is intended to present a foundation upon which subsequent reports can be developed. It is anticipated that the format and content of the GRIP will change over time. The BEMIP GRIP working group would welcome any comments, advice or feedback that will assist in improving the effectiveness of the document in the future.

[1] Available at: http://www.entsog.eu/publications/tyndp.html.

Executive Summary

Incukalns underground storage facility © Image courtesy of Latvijas Gaze

This is the first edition of the BEMIP GRIP that has been prepared by TSOs of Baltic Sea region. The starting point for the preparation of the BEMIP GRIP were the main findings of the BEMIP, a comprehensive Action Plan on energy interconnections and market improvement in the Baltic Sea region, both for electricity and gas sector, that was delivered in 2009.

The first chapter of the BEMIP GRIP contains a short summary of EU energy policy objectives that are especially relevant for the Baltic Sea region, as the priorities defined on the EU level address in many instances the challenges that market participants in the Baltic Sea area need to overcome in order to integrate and foster the regional market.

The following parts of the BEMIP GRIP are devoted to description of natural gas markets in the Baltic Sea region, as well as the main conclusions and experience gained from the BEMIP. Further on, future investment projects (both FID and non-FID) in gas infrastructure are presented (more detailed information on them is available in the Annex) and main non-FID projects, that offer a possibility to integrate and foster the regional market, are analysed. The BEMIP GRIP is completed by the analysis of risk and barriers that hamper implementation of gas investment projects in the region, and conclusions that summarise findings of the report.

The BEMIP GRIP concentrates on the:

- overview of the current BEMIP markets and challenges to be tackled in future and also,
- regional gas infrastructure outlook assessing and identifying potential future infrastructure investments in upcoming decade.

Taking into consideration the capacities of existing and future (FID, as well as non-FID) gas infrastructure in the region, it was identified that the projects which might connect the overall region, such as:

- Poland-Lithuania Interconnection (GIPL),
- Poland-Denmark Interconnection (Baltic Pipe)
- Finland-Estonia Interconnector (Balticconnector),

are still considered as non-FID. This implies that they will not be able to be introduced in the short-term perspective. The first project of regional importance, namely LNG Terminal in Świnoujście, will be established in 2014.

Introduction

Gudeliai MRS

The BEMIP region is composed of seven EU member states. In the course of work on BEMIP GRIP these countries were represented by their national TSOs:

Country:	TSO:
Estonia	Eesti Gaas
Denmark	Energinet.dk
Finland	Gasum
Poland	GAZ-SYSTEM
Lithuania	Lietuvos Dujos
Latvia	Latvijas Gaze
Sweden	Swedegas

The Poland's TSO acted as a coordinator of work.

The BEMIP region may be regarded as one of the most heterogeneous gas area in the EU. In practice, it is divided into four sub-regions including: (1) Finland, (2) Estonia, Latvia, Lithuania, (3) Poland, (4) Denmark, Sweden.

This situation originates from the lack of interconnection between all countries in the region[2] and the existence of isolated markets, that are not directly connected to the gas grid in other EU member states[3]. Sub-regions (1) and (2) are totally dependent on the import from the third country. Sub-region (3) is also highly dependent on supplies from the one direction. Sub-region (4) has until recently been self supplied by its own indigenous production, but this situation is changing making this sub-region dependent on the import from other EU countries.

Furthermore, the BEMIP region is diverse because of different stage of gas market development and its role in individual countries.

The situation in the BEMIP region is, nevertheless, dynamically evolving. The latest developments including a strong potential for gas market growth in some parts of the region indicates the need for infrastructure development linking gas transmission systems, enhancing security of supply and system resilience, as well as diversifying supply sources.

Having in mind the above mentioned conditions, the following areas were identified as key priorities of the BEMIP GRIP:

- Identification of future gas infrastructure development in the Baltic Sea region.
- Analysis of proposed investment projects, estimating the potential impact of these projects to regional gas market;
- Identification of main barriers that hamper infrastructure development in the region.
- Close cooperation with all relevant stakeholders.

The aim of this Plan is to present a regional gas infrastructure outlook, which will contribute to the TYNDP assessing and identifying current and future infrastructure investment gaps, the potential impact of new infrastructure on gas market, and its opportunities and threats. It also endeavours to capture the wider gas market dynamics by looking at aspects such as supply potential, market integration and security of supply on a regional level.

The BEMIP GRIP provides a regional view of supply, demand and capacity development in the Baltic Sea region from the perspective of the Baltic Sea gas transmission network operators.

[2] The pipelines link only Estonia with Latvia, Latvia with Lithuania and Denmark with Sweden.

[3] According to art. 49 DIR-73, Finland, Estonia, Latvia and Lithuania were classified to the group of countries which are isolated and not directly connected to the interconnected system of any other EU member state and having only one external supplier.

1. Objectives of the EU energy policy

© Image courtesy of GAZ-SYSTEM

The importance of energy in the European Union's political agenda is growing. The major factors driving this change in approach are EU climate policy, completion of an internal energy market and the need to enhance the security of supply. In order to achieve these goals, infrastructure developments, as well as upgrades are necessary. Thus, EU energy policy is increasingly focused on the infrastructure.

The DIR-73 and REG-715 introduced in 2009, and being in force from March 2011, paved the way for establishing ENTSOG, one of primary goals of which is to prepare biannually TYNDP. The REG-715 introduces also the obligation for TSO to publish GRIPs.

In order to safeguard security of supply the Regulation 994/2010 (REG-SoS) was enacted in 2010. It introduces the concept of protected customers and some infrastructure standards. The issues related to the GRIPs are the infrastructure standards. The N-1 infrastructure standard aims at providing stable supply during emergency situations. It also endeavours to ameliorate the internal flexibility of gas network and enable bi-directional flows via interconnection points (IPs). Such solutions pave the way for future cooperation, Regional and European preventive and emergency action plans.

Integration of the natural gas market and ensuring the security of supply were also in the heart of Communication Second Strategic Energy Review (SER2) of 2008. SER2 urged to expand the transmission networks, diversify supply routes and sources in order to provide immediate and effective response to emergency situations. SER2 listed for the first time areas of priority interest with respect to gas infrastructure needs such as: **BEMIP**, Southern Gas Corridor or North-South Gas interconnections in Central and Eastern Europe (CEE).

Also the European Energy Programme for Recovery (EEPR) which was announced on 2009, provided the financial support for the number of the Projects, among other also from the BEMIP region: Skanled/Baltic Pipe, LNG Terminal in Świnoujście, enhancement of bi-directional interconnection between Lithuania and Latvia, etc.

In 2010 an analysis of EU infrastructure policy was conducted showing that existing trans-European energy network (TEN-E) framework is

insufficient to fulfil the goals of EU energy policy. The Communication "Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy Network" served as a base for preparation of "Energy Infrastructure Package" – legislative proposal – published in October 2011.

The above mentioned proposal, which will shape the EU energy infrastructure policy in the coming years consists of two elements:

- Connecting Europe Facility (CEF), which constitutes the financial framework of future EU financial support in the field of energy infrastructure, transport and broadband in terms of volume, rules and instruments to be provided to project promoters.

- New TEN-E guidelines laying down principles for identification and selection of Projects of Common Interest (PCIs). The guidelines will also serve to facilitate the administrative procedures (accelerated permit granting) and to enhance public participation. Moreover, they will provide new rules for cross-border cost-allocation and risk-related incentives. New Guidelines set out priority corridors for natural gas: North-South gas interconnections in Western Europe; North-South gas interconnections in Central Eastern and South Eastern Europe, Southern Gas Corridor, **Baltic Energy Market Interconnection Plan in gas**.

The legislation is expected to enter into force in 2013 and it should significantly contribute to the development of projects aiming to enhance security of supply and integrate the markets, also in BEMIP Region where there is an urgent need for such developments.

Finally, it should be noted that the EU Council recognized the urgent need for developing new energy infrastructure serving market integration and enhancing the security of supply. In its conclusions of February 2011 it urged to finish the isolation of "energy islands" in the EU, referring namely to the Baltic States.

2. Description of the BEMIP region

Wierzchowice Underground Gas Storage Facility

2.1 Finland

2.1.1. Energy Policy

The new government programme has a strong environmental approach: "The environment will be left in better condition for future generations. Finland will be developed with the aim of becoming a pioneer in protecting natural diversity and combating climate change. The Government aims to elevate Finland to top place in environmental technology and to develop Finland into the most environmentally aware nation in the world."

The Government will set up a ministerial working group to update the national climate and energy strategy by the end of 2012.

2.1.2. Players

Gasum is the sole importer and wholesaler on the natural gas market in Finland. There are 23 local distribution companies in Finland. Less than 5 % of the natural gas is supplied by the local distribution companies (LDCs). The rest is supplied directly from the transmission system. Gasum is the only TSO in Finland and has been appointed system responsible of the Finnish natural gas system.

2.1.3. Energy mix

Finland has a very diversified energy mix which can be seen from the graph below.

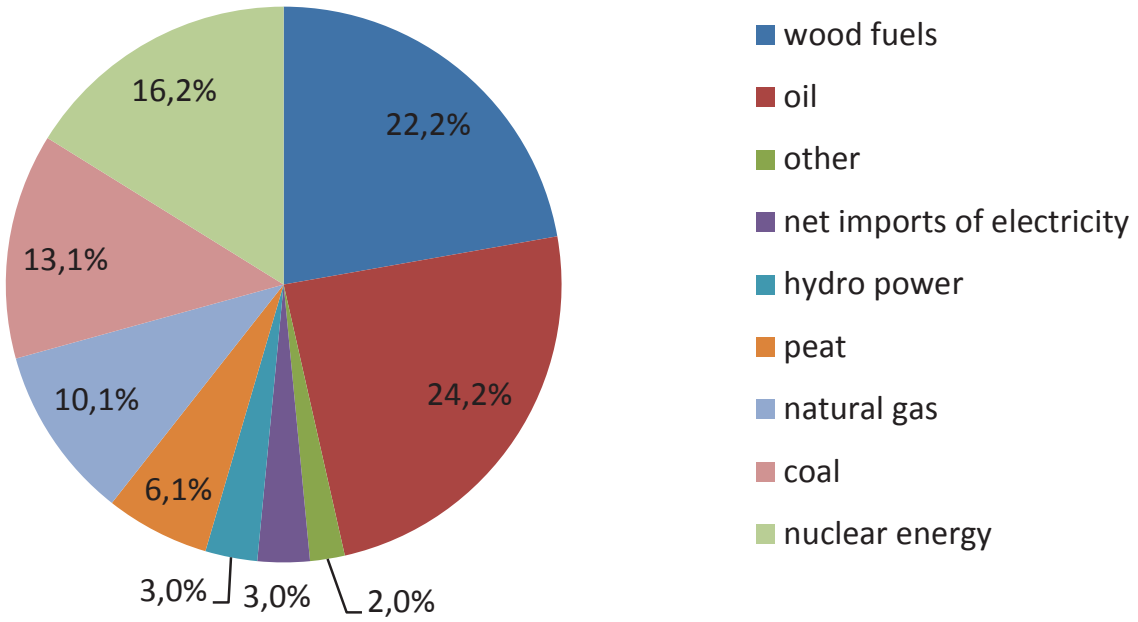


Figure 1: Total energy consumption by source 2010.

2.1.4. Supply/Demand

The natural gas supply is based on import from Russia. Sufficient access to natural gas is ensured on the basis of a supply contract that is valid until 2026.

The structure of the Finnish natural gas market differs from that of the common European market, where the supply of natural gas to private households and other small consumers plays an important role. In Finland, the bulk of natural gas is supplied to major natural gas users, i.e. industrial enterprises, power plants and district heating plants. Local supply of natural gas accounts for only 5% of the total supply.

Natural gas accounts for about 10-11% of Finland's energy consumption. Natural gas plays a key role in the combined production of electricity and heat by industry and the power plants of communities. About two thirds of all natural gas consumed in Finland is used in the co-generation of electricity and heat. Other important uses are the production of condensing power and district heat as well as various industrial processes and feed stock.

Natural gas consumption increased by around 10% on the year before in 2010. The year saw new consumption records at the hourly and monthly levels as well as usage periods with consumption rates remaining clearly below the long-term average. Gasum sold a total of 49,0 TWh of natural gas during the year (2011 43,4 TWh).

Natural gas sales are affected by weather, price development in the electricity and fuel markets and industrial utilisation rate.

There were no new major natural gas-fuelled sites introduced by our customers during the year 2010. Fortum's natural gas-fuelled Suomenoja power plant in Espoo saw its first full year of operation in 2010. The highest spikes in natural gas consumption took place in early and late 2010, while in the summer consumption was considerably lower than in 2009. The very first week of 2010 broke a new record in natural gas consumption: Friday 8 January from 10:00 to 11:00 am saw the highest hourly consumption in Finnish history: 10,000 MWh.

The development of the gas consumption in Finland can be seen in the graph below.

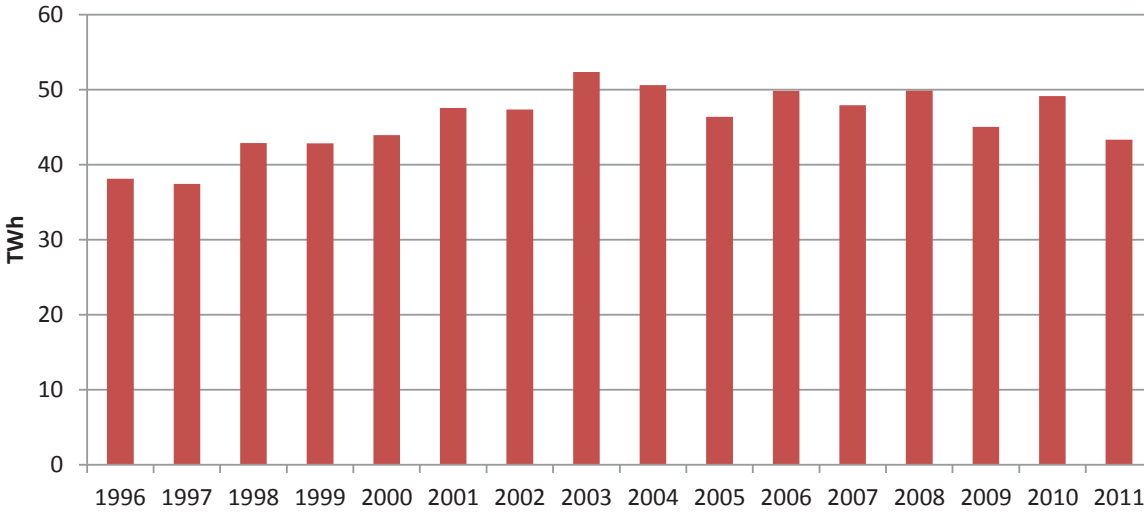


Figure 2: Natural gas consumption in Finland

A total of 35% of district heat production and 14% of electricity production in Finland was fuelled by natural gas in 2010. Combined heat and power (CHP) production will also remain the biggest use of natural gas in the next few years. The structure of the natural gas consumption can be seen in the graph below.

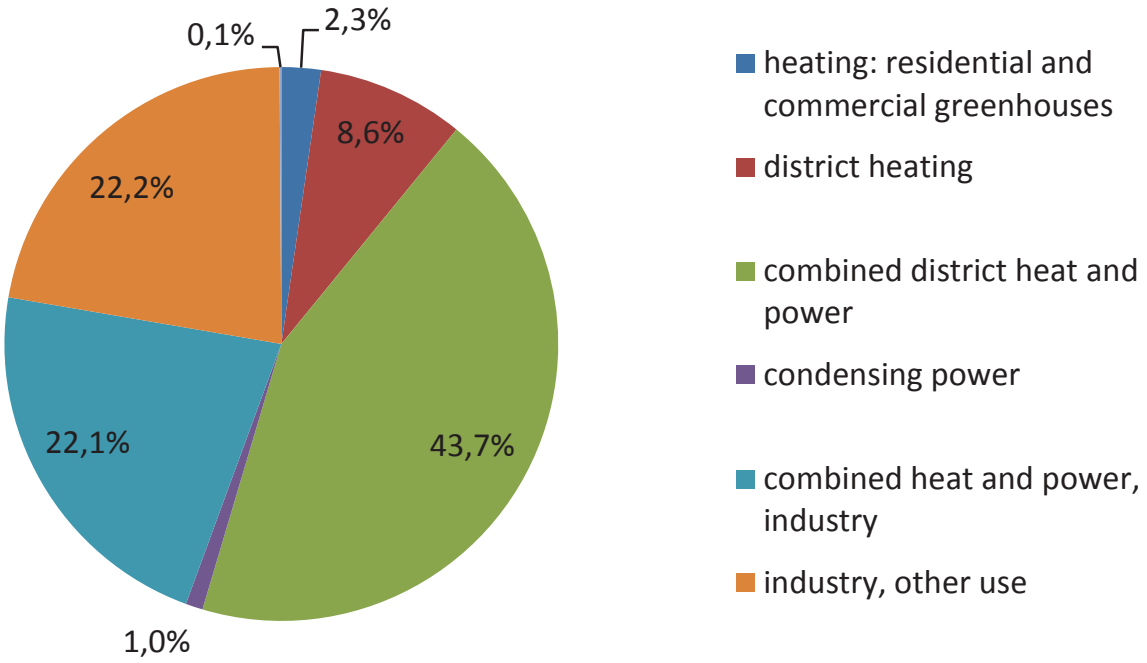


Figure 3: Natural gas consumption in Finland

The consumption of natural gas in different sectors can be seen in the graph below.

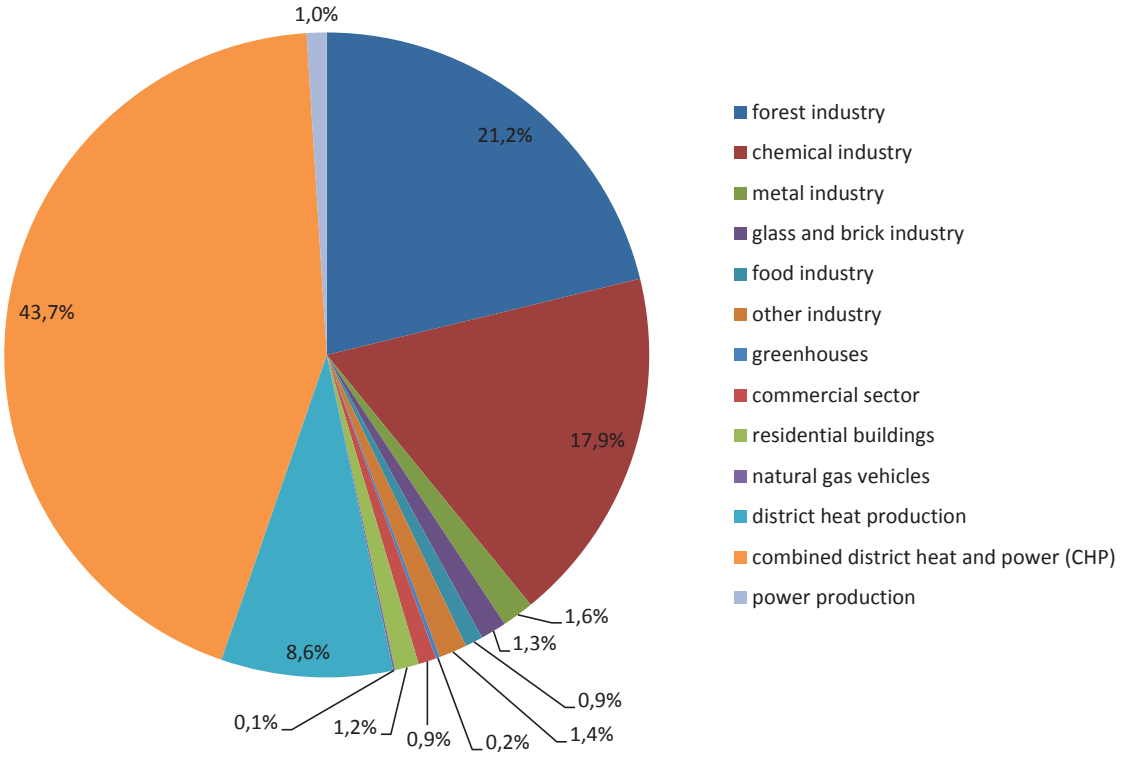


Figure 4: Natural gas consumption by market sector in Finland

National Demand Scenarios									
Year									
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Peak Day Demand (mcm/day)									
22	22	22	24	24	24	24	24	26	26
Yearly Consumption (bcm/year)									
4,2	4,1	4,2	4,2	4,4	4,4	4,4	4,4	4,5	4,5
Yearly Consumption (TWh/year)									
47,08	45,82	46,11	46,44	48,76	48,87	49,01	49,12	49,45	49,46

Gasum's subsidiary Gas Exchange Ltd maintains an online marketplace for natural gas short term market trading. Trading takes place in the Gas Exchange online service, which is open around the clock every day of the year. The number of transactions during the year 2010 was almost 129,000, which corresponds to an average of 353 executed transactions a day.

Gasum aims to introduce biogas production facilities in conjunction with the natural gas transmission network so that biogas generated from biomass can, after processing, be fed into the transmission network and supplied to customers.

The year 2011 saw the completion of Finland's first biogas production plant (in Kouvola) that enables the injection of purified biogas into the natural gas transmission network.

2.1.5. Infrastructure/Third Party infrastructure

The network of natural gas pipelines covers the south-eastern and southern parts of Finland. In this area, natural gas accounts for about 30% of the fuels used in the production of electricity and heat. On the scale of the whole country, natural gas accounts for about 10% of the use of primary energy.

Gasum is the natural gas transmission network system operator in Finland. Gasum owns the pipelines needed for natural gas transmission and is responsible for network maintenance and development.

Figure 5: Natural gas transmission network in Finland

The natural gas transmission network covers the south-eastern and southern parts of Finland and totals around 1,200 km in length.

Preventative maintenance helps ensure the transmission network remains safe and reliable. The central control room of the transmission system is located at Gasum's Natural Gas Centre in Kouvola. The central control room is staffed 24/7 throughout the year.

In 2010, Gasum – with the financial support of the European Commission – has completed a study of an offshore gas pipeline between Estonia and Finland, the so-called Balticconnector offshore pipeline. The objective of the study was to investigate the possibilities to create a more coherent and diversified natural gas grid within the Baltic Sea Region, more precisely around the Gulf of Finland, and thereby improving the security of supply of this important commodity to the EU member states. The Study ascertained that it is possible to lay an offshore pipeline between Finland and Estonia, and that the installation thereof could be done with generally available equipment and within budgetary limits commonly known within the industry.

Gasum has come to the conclusion that the offshore pipeline project would only be justified on economic as well as on operational grounds if gas supply to the area could be secured through import of liquefied natural gas (LNG). Gasum has launched a project "Finngulf LNG" with the aim of starting large-scale LNG import to Finland. Preliminary technical studies about an LNG import terminal have been carried out and currently there are two potential site locations on the southern coast of Finland. The environmental impact assessment will be started in spring 2012.

2.1.6. Legal framework

The Natural Gas Market Act that entered into force at the beginning of August 2000 has implemented Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas (DIR-30). The Directive allows Finland to deviate from the regulations concerning the deregulation of the natural gas market as long as the country has only one principal supplier of natural gas, because Finland has not been connected to the natural gas network of any other EU Member State.

Due to this, the Finnish natural gas market has not been deregulated in the literal sense of the word. Only the so-called secondary market in natural gas has been deregulated, and the deregulation concerns only parties that meet certain requirements. Users or retailers of natural gas, who purchase over five million cubic meters of natural gas per year, whose metering is based on remote reading and whose pricing has been agreed upon after the Natural Gas Market Act entered into force can participate in the operation of the secondary market. A special market place managed by Kaasupörssi Oy has been founded for trading in the secondary market.

The Energy Market Authority supervises compliance with the Natural Gas Market Act and promotes the operation of a competitive natural gas market. (Source: Energy Market Authority)

2.2 Estonia

2.2.1. Energy Policy

In June of 2009 Estonian Parliament published the Energy Strategy for Estonia until 2020.

VISION

The efficient and innovative energy sector supports the sustainable and balanced development of Estonia.

MISSION

The mission of the Estonian energy sector is to ensure continuous, efficient, sustainable energy supply at a justified price and sustainable energy consumption. According to this document, aims of energy strategy in Estonia are:

1. In order to ensure continuous energy supply, the use of energy sources shall be diversified by supporting, among others, local energy sources upon the production of energy. By 2020 the share of any energy source in the energy balance shall not exceed 50%. It is also important to have several strong energy supply channels from other states, reliable grids and to stockpile fuel and production capacity supplies in a reasonable amount.
2. In order to ensure sustainable energy supply and consumption, energy efficiency shall be improved by energy producers, transporters and consumers, the share of renewable energy sources and cogeneration shall be increased in the energy balance up to the optimal level, which does not cause damage to the environment. Estonia shall participate in the development of technologies for carbon-free combustion of fossil fuels. Upon the development of sustainable energy supply and consumption, the awareness of the public of the possible solutions and innovative technologies shall be increased and implementation of new solutions shall be promoted.
3. For the purpose of supply of energy at a justified price, regulations shall be developed, which would prevent market distortions and abuse of the market position by energy undertakings. At the same time the price of energy carriers shall lead to reasonable investments in energy conservation.

Regarding natural gas, as priority projects, Balticconnector and LNG regional terminal were identified.

2.2.2. Players

Similar to wholesale and retail market the market of gas transmission and distribution services is extremely concentrated. AS EG Võrguteenus rents both the gas transmission.

AS EG Võrguteenus is the so-called combined network operator where transmission, distribution and ancillary activities are separated by accounts and disclosed. In doing so the undertaking is obliged to establish accounting rules for allocation of assets and liabilities, revenue and cost. The structure of AS Eesti Gaas is presented in the following drawing.

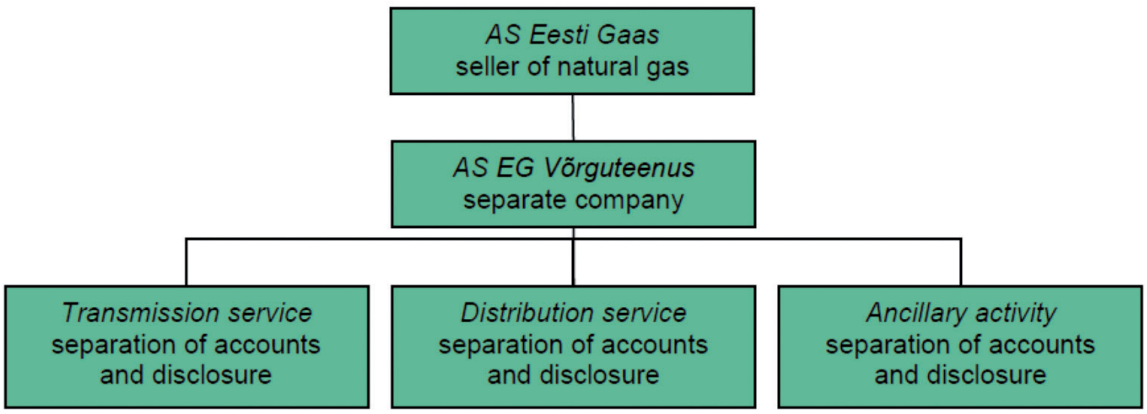


Figure 6: Structure of AS EG Võrguteenus

AS Eesti Gaas is the owner of the shares of AS EG Võrguteenus and is also the largest natural gas undertaking on the Estonian gas market. The major shareholders of the undertaking are Gazprom, E.ON Ruhrgas and Fortum. The total number of gas distribution undertakings in Estonia, including AS EG Võrguteenus, is 25 and that is a relatively large number. The list of gas distribution networks is given on the homepage of the Competition Authority (www.konkurentsiamet.ee).

The market share of distribution services of AS EG Võrguteenus reaches ca 91% and the undertaking has 42,3 thousand customers. The remaining distribution network operators are as a rule relatively small, only two of them have sales volumes over 103,8 GWh/year and the number of their customers does not exceed a thousand. The total market share of distribution services of small gas networks is only 9%.

Unlike electricity network operators, the so-called exclusive rights principle is not applied to gas network operators in issuing activity licences, and pursuant to the Natural Gas Act construction of parallel networks is allowed. So far no parallel networks have been built. When the Competition Authority issues activity licences to distribution network operators they define the activity areas of network companies on the map. Network operators are obliged to develop networks in their area in the manner that would ensure gas supply to the customers already connected and those who want to be connected to their network.

2.2.3. Energy mix

The percentage of natural gas in Estonian fuel mix was 9,5% in 2010 (Figure 7). The percentage is not especially high since gas is used mainly for industrial purposes and for heating. However, the share of natural gas in electricity generation is only 4,0%, but in heat production it amounts to 41,9% (See Figure 8).

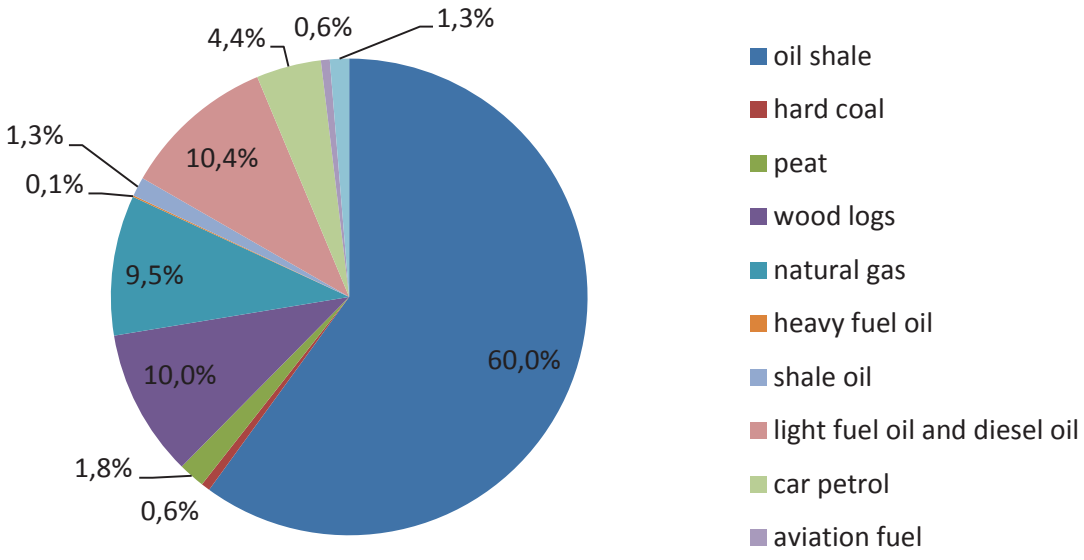


Figure 7: Domestic fuel consumption in 2010 based on calorific value.
Converted from the quantitative data of the Statistical Office: Fuel consumption by fuel type

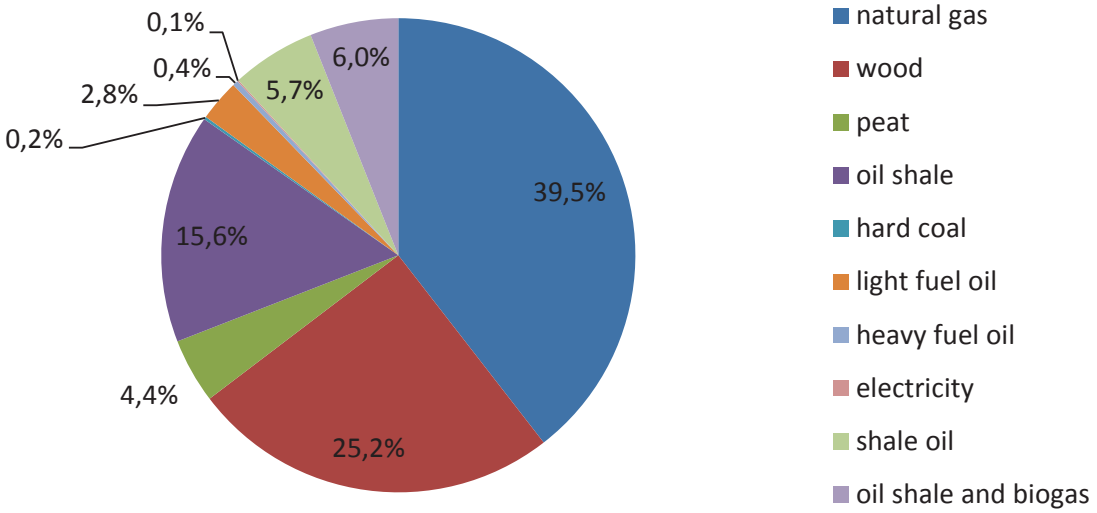


Figure 8: Fuels used for heat production. Statistical Office 2010

2.2.4. Supply/Demand

Estonian gas supply is also characterised by the fact that there is no gas supply to several regions like Western Estonia, islands as well as to Central Estonia and it is greatly due to low population density on the Estonian territory. In recent years the gas network was extended to Pärnu county, Põltsamaa and Muuga port.

In 2009 gas consumption fell by 32% in comparison to 2008. The decrease in consumption in recent years was partially related to the economic situation. However, the greatest impact was caused by suspension of production by the largest gas consumer, fertiliser producer AS Nitrofert, in 2009. (The quantity of gas consumed by AS Nitrofert reached almost 20% of Estonian total gas consumption). At the same time Väo, Anne and Pärnu wood-fired and peat-fired cogeneration plants were launched in Tallinn, Tartu and Pärnu respectively that also led to reduction in gas consumption.

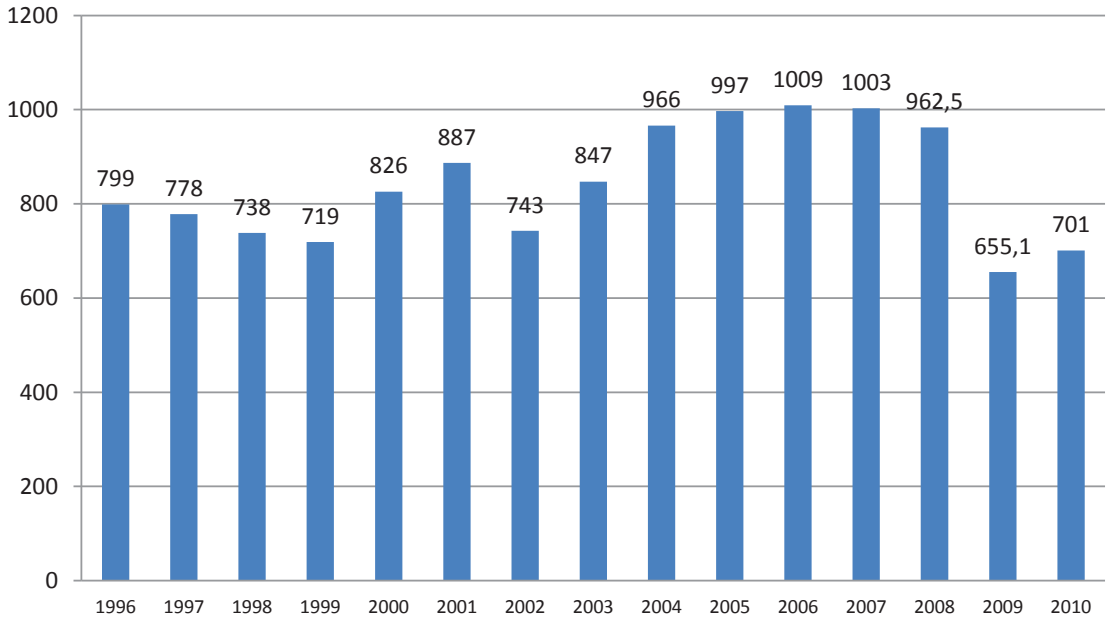


Figure 9: Gas consumption in mcm/y. Source: Statistical Office and AS Eesti Gaas

In 2010 the total consumption of natural gas in Estonia was 700,9 million m^3 (7,59 TWh), 363,6 million m^3 (3,9 TWh) out of this was used for energy production (electricity and heat). Compared to 2009 the consumption rose by 7,1%, but compared to 2008 it was lower by 27,1%.

The total quantity of natural gas consumption in 2009 was 6,8 TWh of which 0,26 TWh was used for electricity generation, 3,2 TWh for heat production in power stations and boiler houses, 1,7 TWh for heating by residential and commercial customers and 1,6 TWh for industrial purposes. The breakdown of gas consumption by different customer groups is shown in Figure 10.

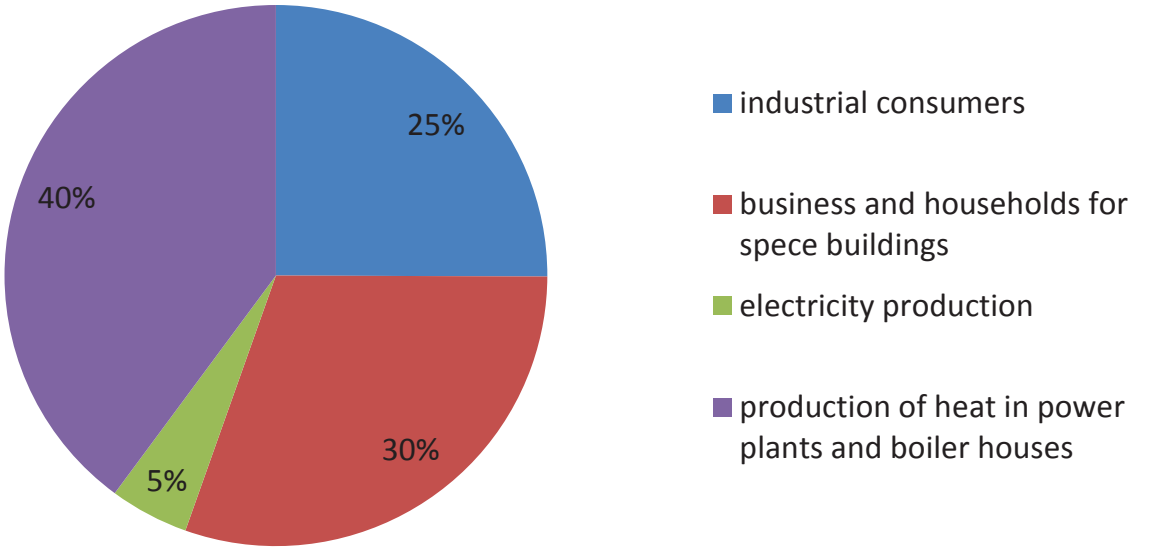


Figure 10: Natural gas consumption by different customer groups in 2009. Source: AS Eesti Gaas.

The peak load in 2006 was 72,5 GWh/day in 2008 was 57,0 GWh/day, in 2009 it was 48,1 GWh/day, in January 2010 it was 65,3 GWh/day and that is much less than the maximum 119,1 GWh/day transmission capacity of the system.

Upon the development of regional energy markets, Estonia cooperates actively with its neighbouring states. The objective of this cooperation is to ensure higher security of energy supply and more efficient operation of the energy markets. Closer cooperation takes place with the other Baltic States and the Nordic countries.

At present the Baltic States use a diverse set of energy sources based mainly on the Estonian oil shale, Latvian hydro resources and Lithuanian nuclear energy, which are supplemented by imported natural gas and petroleum products and local and renewable energy sources, the use of which is gradually increasing. In addition to that, the underground gas storage in Latvia and the oil refinery in Mažeikiai are important facilities that help to ensure the security of energy supply in the Baltic States.

According to the Baltic Energy Strategy, the objectives for increasing the security of energy supply of the Baltic States are integration of the power and natural gas systems into the energy systems of the European Union, construction of new production capacities, modernisation of power systems, construction of a liquefied natural gas and liquid gas terminal in the region, accelerated introduction of local and renewable energy sources, increasing of energy efficiency.

National Demand Scenarios									
Year									
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Peak Day Demand (GWh/day)									
61	64,2	69,0	73,8	75,0	76,0	77,0	79,2	79,2	80,2
Yearly Consumption (GWh/year)									
8 560	8 560	8 560	8 560	9 630	9 630	10 300	10 300	12 840	14 980

Figure 11: National demand scenario in Estonia. Source: AS Eesti Gaas.

2.2.5. Infrastructure/Third Party infrastructure

Estonia has an interconnection with the Russian natural gas network in Värska 43,3 GWh/day (in the South-East) and an interconnection with Latvia in Karksi 75,8 GWh/day (Figure 12), the maximum input capacity of the two connections is 119,1 GWh/day.

Figure 12: Estonian gas transmission network.

Estonian gas system has another interconnection with Russia in Narva (in the East) that is closed in normal circumstances and can be used only in special circumstances (alert level) by special agreements with Gazprom Transgaz Sankt-Petersburg depending on the operation regime of their gas system. Consequently, in planning of supply and the regime of operation of the gas system we can rely only on the cross-border interconnection with Russia through Värska and the connection with Latvia through Karksi.

Pressure in the Estonian gas system is ensured by the compressor stations of the Russian transmission system and/or from the Inčukalns underground storage facility located in Latvia.

Metering of incoming gas and determination of its properties is performed in Värska and Karksi gas metering stations.

The problem for Estonia is not the limitations of the transmission capacity, but in the case of peak load of gas consumption the inlet pressure on the Estonian border may drop below the agreed limit.

The largest planned investment in the natural gas sector is the construction of a gas pipeline interconnecting Estonia and Finland. The described project has not been finally approved yet, at present plans and environmental impact assessment of the project are being made. The connecting pipeline is an instrument for ensuring security of supply of the whole region, primarily in Finland and Estonia, and that would enable us to comply with the N-1 criterion of gas network (Today N-1 is only 59,7%). The developers Gasum OY and AS Eesti Gaas estimate that the final decision concerning the Balticconnector project will be made in 2013-2014
As a further development of the same project it has been planned to extend the gas distribution network to the cities of Paldiski and Keila.

Gas is transported into the Estonian gas transport system through these two gas metering stations, 34 gas distributions stations and transmission pipelines (with total length of 878 km).

No	Gas pipeline	Year of putting into operation	Length, km	Conventional diameter, mm	Age, years
1	Viresi-Talinn	1991/92	202,4	700	20
2	Vändra-Pärnu	2005/06	50,2	250	58
3	Tallinn-Kohtla-Jarve I	1951/53	97,5	200	58
4	Tallinn-Kohtla-Jarve II	1962/68	149,1	500	43
5	Kohtla-Jarve-Narva	1960	45,1	350/400	51
6	Tartu-Rakvere	1979	133,2	500	32
7	Izborsk-Tartu	1975	85,7	500	36
8	Pskov-Riga	1972	21,3	700	39
9	Izborsk-Incuklns	1984	21,3	700	27
10	Branchlines		72,3		
	TOTAL:		**878**		

Figure 13: Description of gas transmission system in Estonia

	Peak load		Max transfer capacity of the system	
Years	**1000 m³/day**	**MW**	**1000 m³/day**	**MW**
2001	5400	2099	7000	2721
2002	5000	1944	7100	2760
2003	5500	2138	7800	3032
2004	5100	1982	8300	3226
2005	5200	2021	10400	4043
2006	6700	2604	10500	4081
2007	6400	2488	10700	4159
2008	5200	2021	10900	4237
2009	4300	1671	11000	4276
2010	5300	2060	10900	4276
2011	5200	2021	10900	4276

Figure 14: Maximum transfer capacity of the system and peak load

Disruption of Incukalns UGS/EE-LV interconnection, main import pipeline would amount to the loss of 75,8 GWh/day. In case of disruption of largest infrastructure (cross-border with Latvia) the N-1 criteria is not fulfilled (N-1= 59,7%). In case of disruption of supplies from Incukalns UGS, the only supply route will be interconnection with Russia, capacity 43,3 GWh/day. Maximum historic consumption of lat 20 year is 72,56 GWh/day.

The planned LNG terminal connected to the Balticconnector would improve the security of supply in the gas systems of Finland and Estonia. According to the information available to the Eesti Gaas several investors have indicated an interest in building of a liquefied natural gas (LNG) terminal in the northern shores of Estonia (Paldiski, Muuga, or Sillamäe) although, no concrete investment decisions have been made. One of the reasons is the circumstance that the European Union agrees to partly finance the construction of a LNG terminal in the Baltic countries, i.e. either in Estonia, Latvia or Lithuania. Negotiations in the question are ongoing, but no agreements have been reached yet between the countries on common activities. This affects also possible other LNG related decisions. The AS EG Võrguteenus (TSO) is in an opinion that a LNG terminal in conjunction with the Balticconnector would improve security of supply both in Estonia and Finland and would also activate competition in the wholesale market of gas. Taking into consideration the regional gas market, the LNG terminal, with possible location in Paldiski, would be of regional importance. The developer of the Paldiski terminal is the private company Balti Gaas. The estimated cost of the project is 320 mEUR. The capacity of the terminal will be approximately 24,9- 31,1 TWh year; the daily capacity of the terminal being 260 GWh/day. The capacity of liquefied natural gas (LNG) storage facilities is planned at 1,97 TWh LNG.

2.2.6. Legal framework

Although Article 49 of DIR-73 provides a derogation for Estonia and does not require ownership unbundling of the transmission system from gas producer and seller as long as any Baltic State or Finland is not directly connected to the interconnected natural gas network of any other Member States than Estonia, Latvia, Lithuania or Finland, Estonia has the right despite the derogation provided in the directive to establish national provisions which conform to the requirements of the directive by their content and purpose. The Estonian Government resolve to that for the development gas market in the Country best model is TSO, a transmission system operator independent of the seller or importer. The legislative amendment sets 1 January 2015. From that date, the network operator who owns the transmission network, owns or operates measurement systems at state border and who has been certified and designated as system operator according to Article 3 of REG-715, shall be the system operator. Presumably the amendments of the law will be adopted by Riigikogu at the beginning of 2012. In accordance with the Natural Gas Act all network tariffs and methodologies for calculating connection fees are approved by the Competition Authority in Estonia. The price of balancing gas and the fees for gas transit do not require approval, the Competition Authority applies so-called ex-post control or price supervision. Gas price is not fully regulated and all customers buy gas at market price. Only the market dominant company - currently JSC "Eesti Gaas", has to approve the sales marginal, as a component of the price for households. For dominant gas company gas pricing for households is based on the principle that the weighted average price of gas sold includes the import price and the selling margin. The dominant gas company must have coordinated the margin's limit with the competition authority. JSC "Eesti Gaas" itself forms its sales price on the basis of the import price. At the end of each calendar year the company makes a settlement of accounts (recalculation).

2.3 Latvia

2.3.1. Energy Policy

In August of 2011 Ministry of Economics published the draft of the Energy Strategy for Latvia until 2030. According to this document, aims of energy strategy in Latvia are:

- to secure market based energy price level in order to ensure competitiveness in the region and globally, and positive impact on national economy;
- to diversify primary energy balance by implementation of new energy sources and technologies, in particular renewables, to diversify sources of supply in order to secure sustainable energy development;
- to secure stable and reliable energy supply by provision of safe infrastructure of production, transmission, distribution and storage.

Regarding natural gas, draft of Energy strategy provides for reduction of supply from current suppliers in the 3rd countries by 50% till 2030, by 2015 to ensure alternative gas supplies and legal conditions for opening of the gas market. Regarding renewables, the draft Strategy sets a target of 50% in gross domestic consumption by 2030. Draft Energy strategy currently is discussed and it shall be adopted by the Cabinet of Ministers.

2.3.2. Players

At present, JSC "Latvijas Gāze" is the only player in the natural gas market in Latvia. The company is owned by the E.ON Ruhrgas International GmbH (47.2%), OJSC Gazprom (34%), LLC ITERA Latvija (16%0 and others (2.8%). According to the share purchase agreement, which was signed with the strategic investors, JSC "Latvijas Gāze" has exclusive rights on transmission, storage, distribution until year 2017 and license for sale of natural gas, as well as unlimited and exclusive right to use Inčukalns UGS for the same period. JSC "Latvijas Gāze" carries out transmission, distribution, storage and sale of natural gas in compliance with the licences issued by the Public Utilities Commission.

On 3 December 2009, the Saeima (Latvian Parliament) adopted a decision to postpone liberalisation of the natural gas market in Latvia until 4 April 2014.

2.3.3. Energy mix

In 2010, the total consumption of primary energy resources in Latvia amounted to 55500.0 GWh. Natural gas was the main resource for generating of heat energy and electric energy. Total consumption of natural gas reached 17027.8 GWh, which corresponds to 31 % of the total primary energy consumption. The share of heat energy produced using natural gas as a fuel was 81.4%. In the total consumption of primary energy sources, firewood with its total consumption forming 14055.6 GWh was the most widely used local energy resource, electricity generated in hydropower stations and wind power stations constituted 3555.6 GWh.

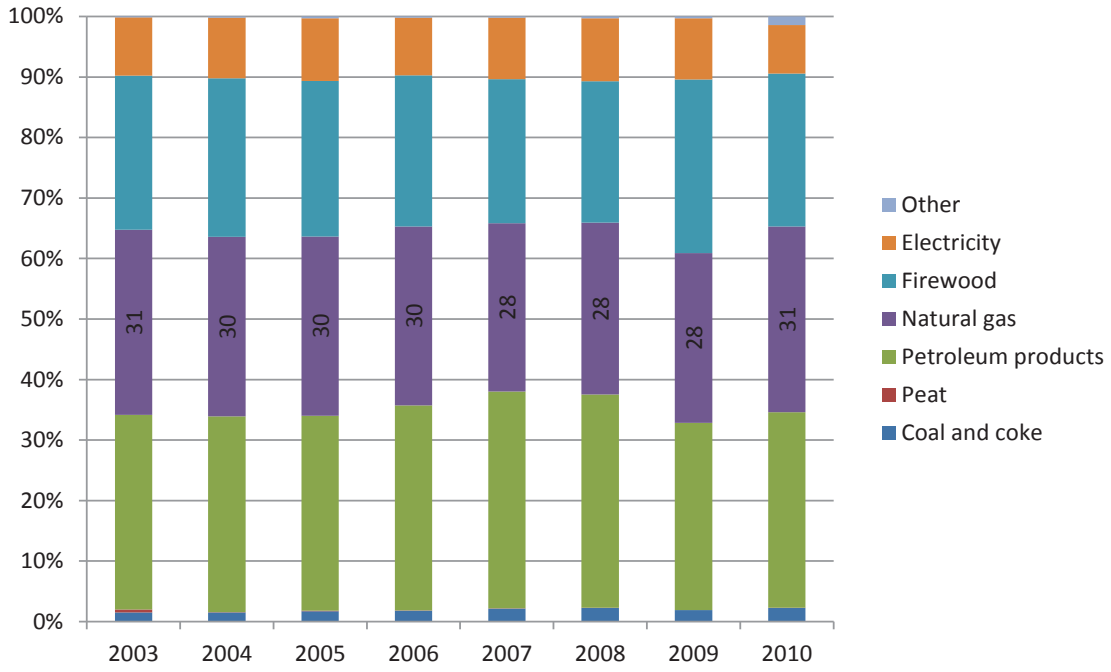


Figure 15: Consumption of primary energy resources in Latvia (%)

2.3.4. Supply/Demand

Latvia's gas supply system is not connected to the EU common gas grid, and Latvia has one main gas supplier – the JSC Gazprom and other gas supplier – the ITERA Latvia, which delivers less than 25% of the total gas consumed in Latvia.

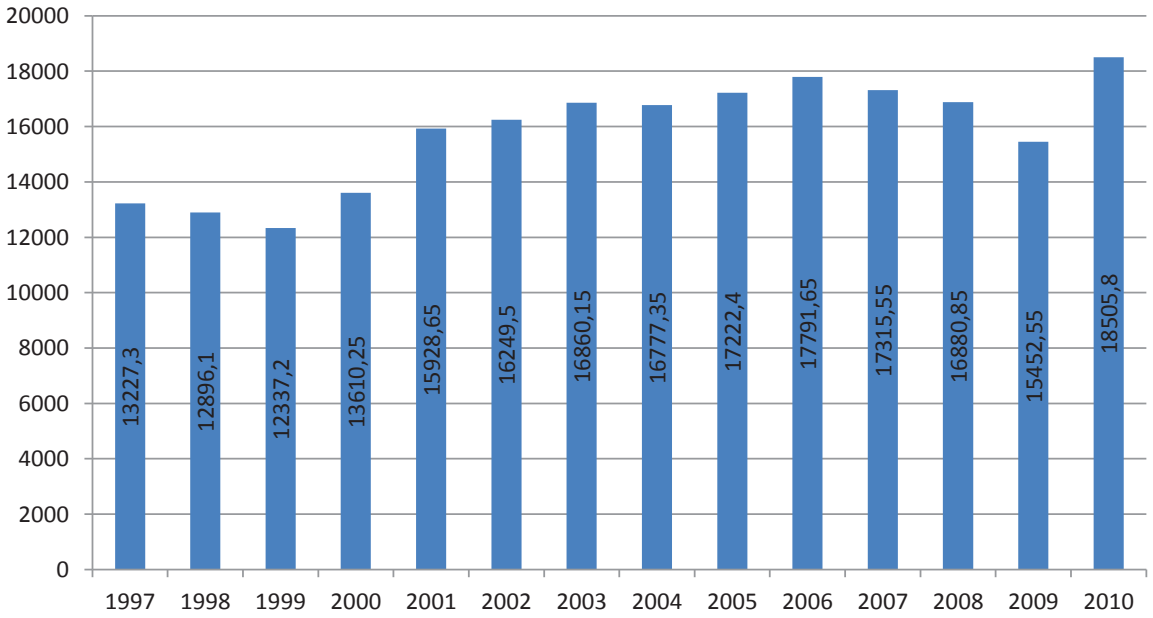


Figure 16: Natural gas sales in Latvia (GWh)

National Demand Scenarios									
Year									
2011	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Peak Day Demand (GWh/day)									
134	133	133	132	132	132	130	130	130	128
Yearly Consumption (GWh/year)									
15215	15000	14800	14500	14500	14500	14000	14000	14000	13455

Figure 17: National demand scenario (GWh)

The largest consumers of natural gas are the power company JSC "Latvenergo" and heat supply enterprises, as well as manufacturing sector. Riga region accounts for about 70% of the total natural gas consumed in Latvia.

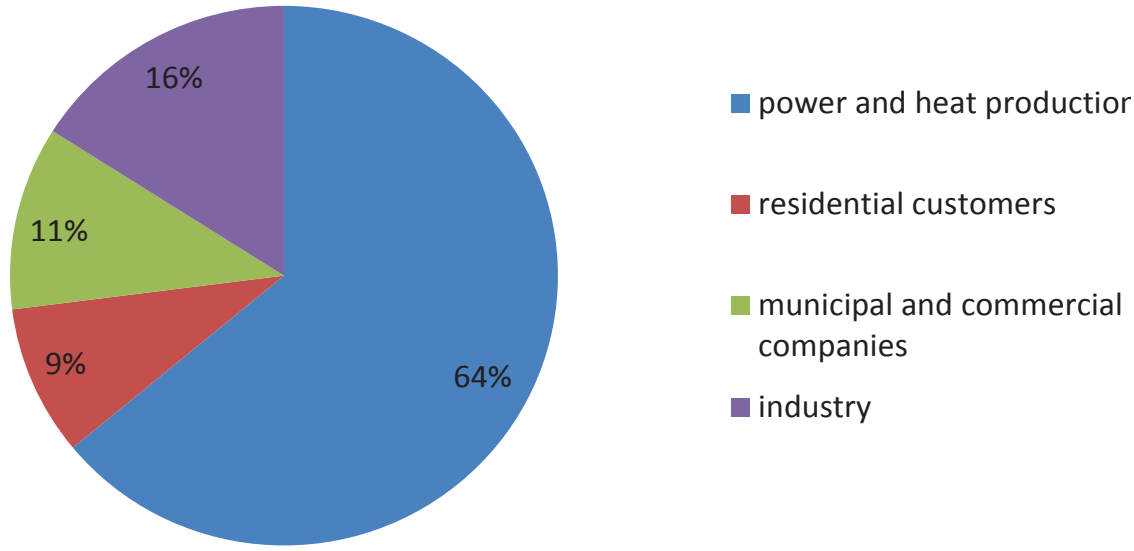


Figure 18: Natural gas sales by customer group in Latvia in 2010 (%)

In order to diversify gas supply sources Latvian government has decided to support construction of LNG terminal in Latvia. In particular, government owned power company "Latvenergo" as the largest gas consumer is charged with the responsibility to manage and supervise performance of feasibility study on construction of LNG terminal in Latvia. Preliminary results of the study show that LNG terminal either in Riga or in Riga Bay is feasible and competitive. Full results of the study are expected to be ready by the end of 2011.

In total JSC "Latvijas Gaze" has 442.5 thousand customers, including 433.7 thousand residential customers.

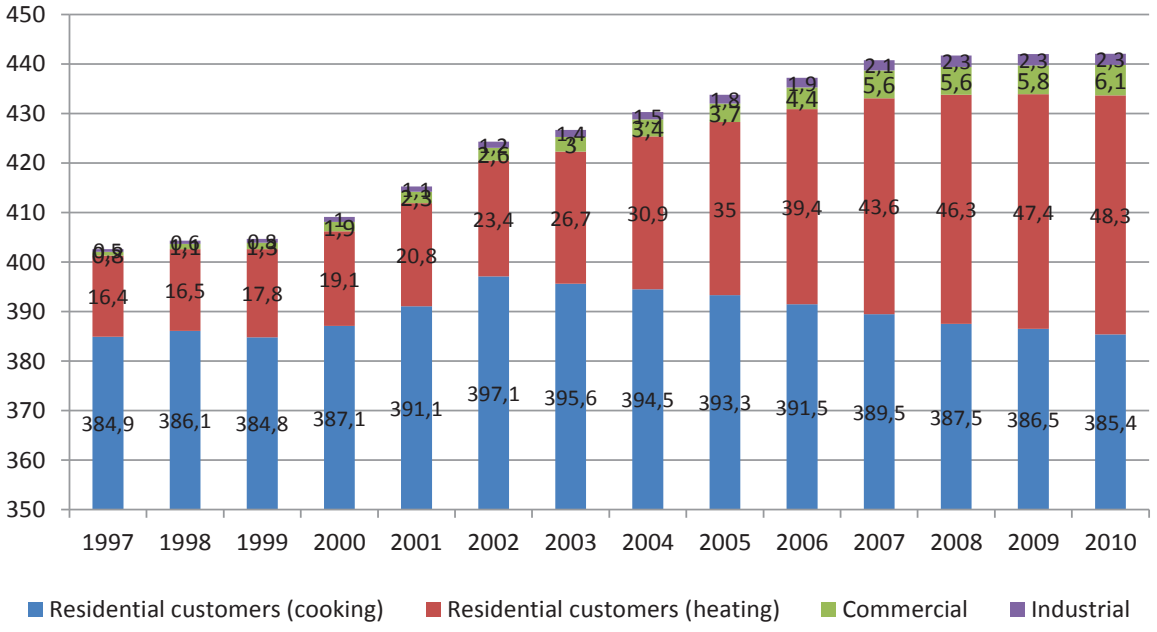


Figure 19: Number of customers (in thousands)

2.3.5. Infrastructure/Third Party infrastructure

There is no indigenous gas production in Latvia, and all gas consumed in the country is imported from Russia by two 700 mm pipelines only during the warm period of the year (April-September), when part of received gas is injected into Inčukalns Underground Gas Storage, but the rest is delivered directly to the consumers. During winter, gas from the underground facility is delivered to Latvian customers, as well as customers in Estonia and NW Russia thus securing reliable gas supply for the whole region. There is also a gas connection to Lithuania, but, currently, it is only used in emergency cases for gas supply to Lithuania or in case of construction works or other situations when there is need to supply part of customers in Latvia from Lithuanian side. Since first natural gas supplies to Latvia were started on 1962, part of gas network is old, and the whole transmission system is designed for annual consumption of up to 41400 GWh (4 bcm), more than two times above the current consumption level in Latvia.

After privatization of JSC "Latvijas Gāze" in 1997, assessment of technical state of infrastructure was carried out and step by step and modernization of the whole gas supply system in Latvia was started.

Extensive modernization works were carried out in the last decade, and from 1997 till 2010 including, JSC "Latvijas Gāze" for modernization and improvement of safety have spent 214.4 mLVL (305.1 mEUR).

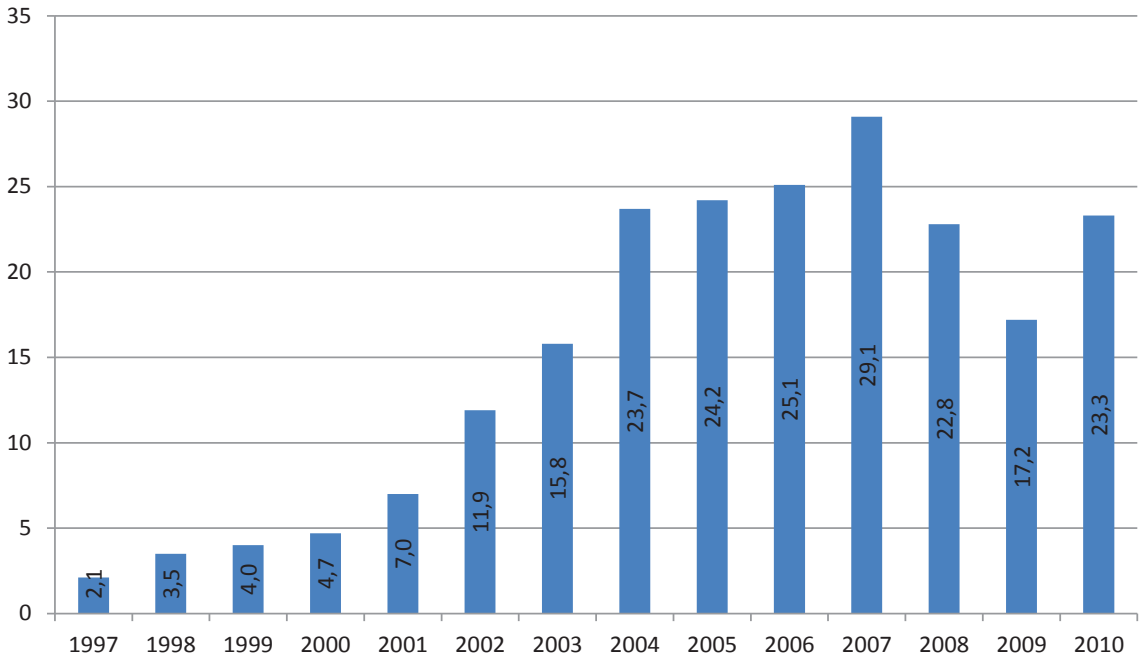


Figure 20: Investments in modernization of infrastructure in LVL

2.3.5.1. Inčukalns Underground Gas Storage

Total volume of Inčukalns UGS is 45540 GWh (4.4 bcm), including working gas volume of 24322.5 GWh (2.35 bcm).

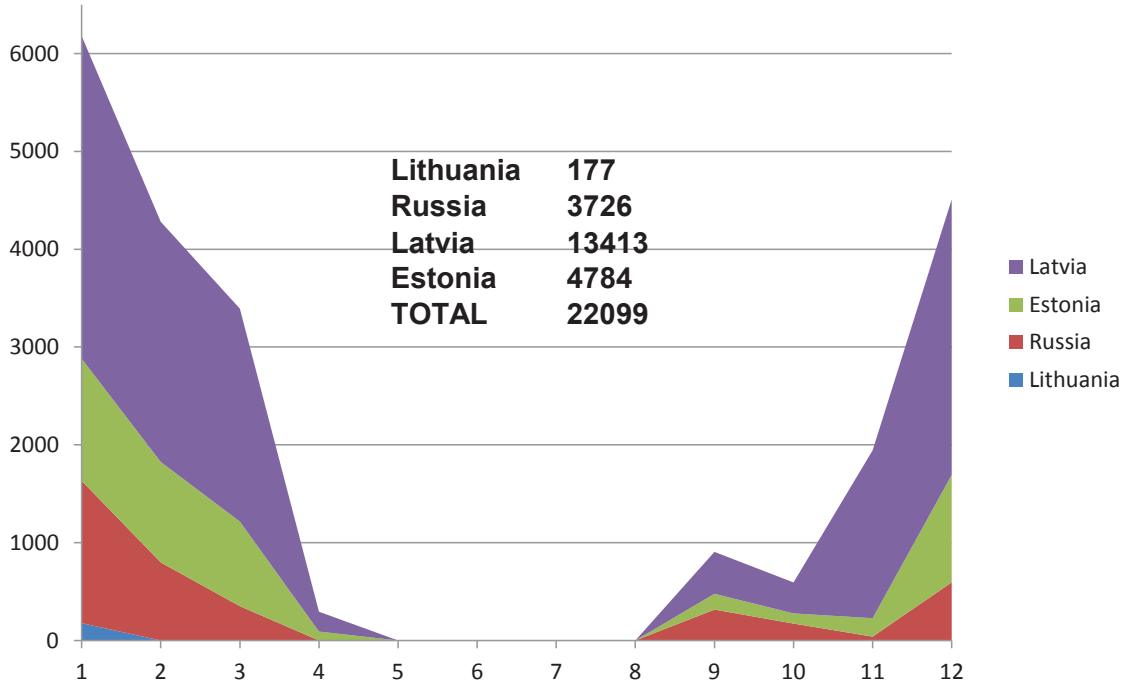


Figure 21: Natural gas supply from Incukalns UGS in 2010 (GWh)

Incukalns UGS started its operation already in 1968, and therefore overall modernization was needed in order to meet modern gas storage standards. Before works were started, few technical studies had been carried out with the aim to decide on necessary modernization and replacement measures. For example, German company "UGS Mittenwalde GmbH" performed Inčukalns UGS safety analysis, and few technical studies had been performed by "Gazpromenergodiagnistica". Based on these studies, program of necessary measures for modernization and increase of safety was worked out and gradually is successfully implemented. In the time period from 1997 to 2010, JSC "Latvijas Gaze" has invested 63.4 mLVL (90.2 mEUR) in modernization of Inčukalns UGS. In the framework of EERP for modernization of 15 wells in Incukalns UGS, JSC "Latvijas Gaze" will receive 7.5 mEUR from European funds. Works have to be finished by the end of 2011. In order to prepare a program for further modernization of Incukalns UGS, JSC "Latvijas Gaze" in May signed agreement with VNIIGAZ on carrying out technical feasibility study and preparation of the concept of safe operation of Incukalns UGS. According to preliminary estimates it will be necessary to invest 120 to 130 mLVL (170 to 185 mEUR) for finalizing of modernization works.

2.3.5.2. Gas transmission system

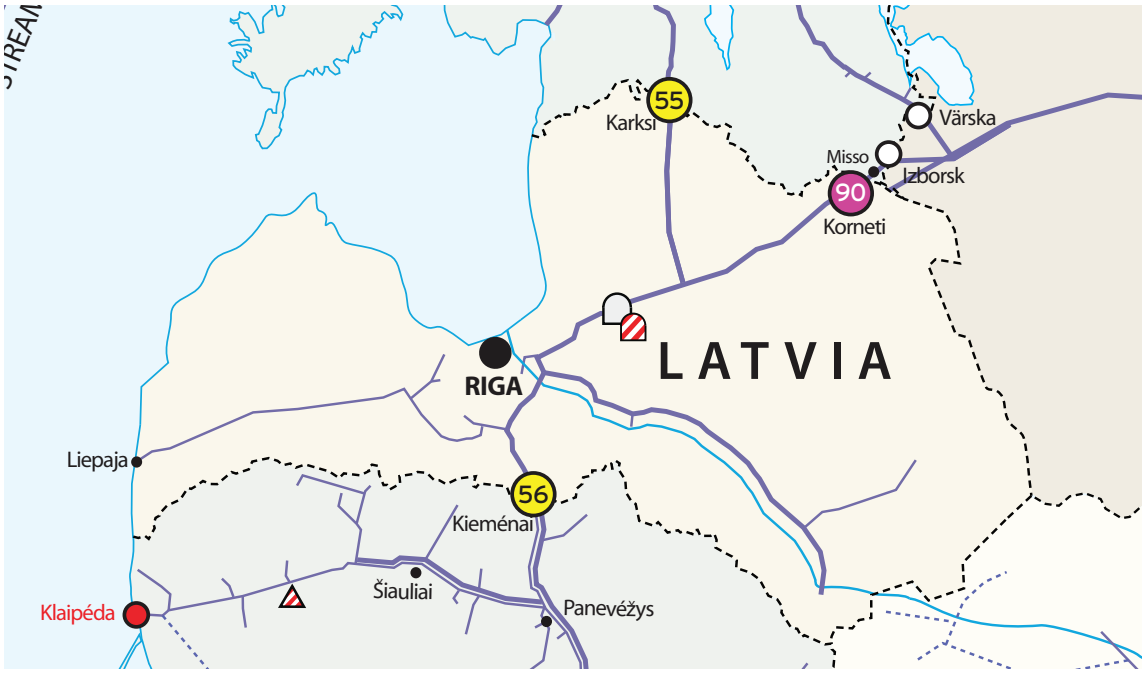


Figure 22: Gas transmission system in Latvia

First gas transmission pipeline to Latvia was built in 1962, followed by the two next pipelines in 1966 and 1967. In general, almost 25% of pipelines are older than 40 years.

No	Gas pipeline	Year of putting into operation	Length, km	diameter, mm	Age, years
1.	Vilnius-Riga	1962	42.33	500	49
2.	Iecava-Liepaja	1966	209.64	500/350	45
3.	Riga-Inčukalns UGS I	1967	41.75	700	44
4.	Pskov-Riga	1972	160.63	700	39
5.	Riga-Inčukalns UGS II	1978	41.74	700	33
6.	Riga- Panevežys	1983	84.03	700	28
7.	Izborsk-Inčukalns UGS I	1987	162.51	700	24
8.	Riga-Daugavpils	1988	203.00	500	23
9.	Vireši-Tallinn	1994	88.00	700	17
10.	Upmala-Rezekne	2001/2005	66.71	400/300	10/6
11.	Branch lines		137.41	100,150,200, 250,300,350, 500,700	27
	TOTAL:		**1,237.75**		

Figure 23: Description of the gas transmission system in Latvia

In order to assess conditions of pipelines already in 1999 JSC "Giprospecgaz" analyzed gas supply system in Latvia and elaborated the "Action plan for gas supply system development till 2010 and concept till 2030", which was updated by the same company in 2008. Gas transmission network of Latvia was studied, and particular measures were proposed for increase of gas supply safety. Based on these studies program for inspection of pipelines and repair of discovered defects was elaborated. At present, 85% of the whole transmission network in Latvia is inspected and it is planned for to finish inspection and repair of defects discovered by the inspection by the end of 2014.

2.3.5.3. Gas distribution network

The total length of gas distribution network in Latvia is almost 4720 km, and only around 1600 km of the whole network consists of polietilene pipelines. Therefore, there is well developed cathode protection system in place. In general, all gas regulation stations and units recently are reconstructed or replaced with modern ones, as well as cathode protection system. The whole distribution system is supervised by SCADA.

2.3.5.4. Construction of new pipelines

In total 1595.9 km of pipelines were constructed from 1997 to 2010.

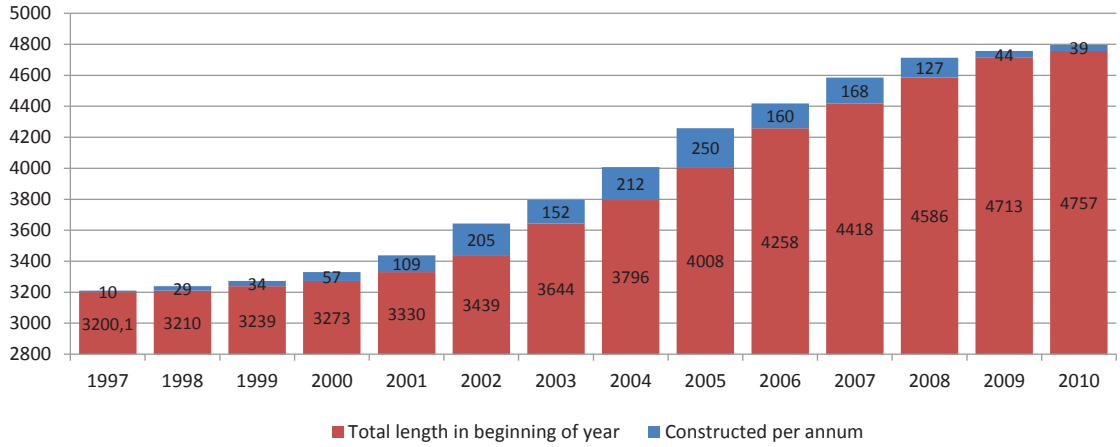


Figure 24: Development of gas pipeline network

2.3.6. Legal framework

Energy Law regulates the energy industry as an infrastructure of the economy that covers acquisition, utilisation of energy resources and generation, purchase, conversion, storage, transmission, distribution, supply of various types of energy to the energy users and consumption of energy resources, as well as prescribes the transmission procedures within the energy industry and the principles for the organisation and development of the activity of energy supply merchants.

Law on Regulators and Public Services. Aim of the Law is to ensure the possibility of receiving continuous, safe and high-quality public services, the tariffs (prices) of which conform to the economically substantiated costs, as well as to promote the development and economically substantiated competition in the regulated sectors, defining the procedure for regulating public services and legal relations in providing public services. Regulations on Supply and Use of Natural Gas sets gas supply procedures, including reasons and procedures of disconnection from the gas supply, responsibilities of the user and the owner of a gas supplied facility, procedures of metering of gas consumption, issues of payment, etc.

2.4 Lithuania

2.4.1. Energy Policy

The National Energy Strategy adopted in 2007 and the draft of new National Energy Strategy (NES), which was approved by the Government and submitted to the Parliament for final approval, both are focused on infrastructure projects orientated at diversification of gas supply sources and increasing security of gas supply. The draft of the new NES makes preference for LNG terminal, naming it as the best and the fastest option of solving the problem of Lithuania's dependency on single external gas supplier. However, it foresees that in medium term, until 2020, other projects, namely gas interconnection with Poland and UGS in Syderiai, should also be implemented.

Also the draft of new NES foresees that in long term the demand for natural gas should decrease due to building new regional nuclear power plant in Lithuania and higher share of renewables in production of heat and electricity.

2.4.2. Players

Value chain of the natural gas market in Lithuania consists of the following segments: (1) transmission, (2) distribution, (3) gas supply.

Natural gas is imported to Lithuania by three gas supply companies – AB "Lietuvos Dujos" (hereinafter – Lietuvos Dujos), UAB "Dujotekana", UAB "Haupas" (importing gas only for small regional gas network in southern part of the country) and two major consumers importing gas for their own needs. Lietuvos Dujos is the biggest importer of natural gas, with 40% market share in recent years. The rest 60% Lietuvos Dujos transports under a free third parties access (TPA) regime, which is guaranteed by laws and regulations since 1993.

Gas to the end-consumers is supplied by 7 gas supply companies.

The gas transmission system is owned and operated by Lietuvos Dujos, a designated gas transmission system operator.

The distribution systems are mainly operated by Lietuvos Dujos. Six other distribution system operators (DSOs) provide services in a few regions. Four from six DSOs operate distribution systems, which are connected to Lietuvos Dujos transmission system, and two small interconnected distribution systems are connected to the Belorussian distribution system.

2.4.3. Energy mix

Total energy consumption in Lithuania was 81 TWh in 2010. The dominating fuels were oil products that amounted to 36% and natural gas with a share of 35% of the primary energy balance. Since the end of 2009 there has been no nuclear energy in the Lithuanian energy mix due to the decommissioning of the Ignalina nuclear power plant. The nuclear energy was substituted by imported electricity, oil products, natural gas and renewables.

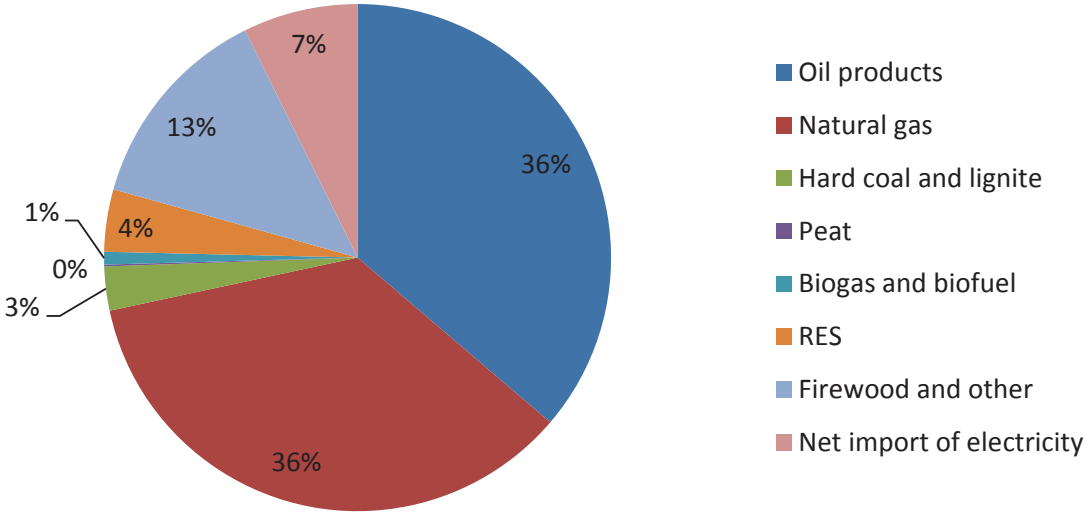


Figure 25: Energy mix in Lithuania

2.4.4. Supply/Demand

Lithuania is exclusively supplied by gas from Russia, which is mainly transited via Belarus.

Consumption of natural gas by Lithuanian consumers amounted approximately to 31.7 TWh in 2010.

The number of gas consumers in Lithuania amounts 556 thousand. However, the major part of gas is used by a handful of biggest consumers (electricity power plants, CHPs, industrial consumers, etc.). The top 10 consumers account for 74% of national gas consumption.

Household consumers amount to 550 thousand, however, most of them use gas for cooking only, as they are connected to district heating systems. Due to the dominance of district heating, households account for just 6% of the quantities consumed.

Through Lithuania gas is transited to the Kaliningrad region of the Russian Federation. Transited gas volumes totalled 14.3 TWh in 2010.

National Demand Scenarios									
Year									
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Peak Day Demand (mcm/day)									
17	17	17	17	17	17	17	17	17	17
Yearly Consumption (bcm/year)									
3	3	3	3	3	3	3	3	3	3
Yearly Consumption (TWh/year)									
31	30	30	29	29	29	30	30	30	30

Figure 26: National Demand Scenario(s) (Lithuania)

2.4.5. Infrastructure/Third Party infrastructure

The gas network of Lithuania has interconnection with the Belorussian gas system (maximum cross-border capacity – 323 GWh/day, through which gas is mainly supplied to Lithuania, a bi-directional interconnection with Latvia (maximum cross-border capacity from Latvia – 22 GWh/d, to Latvia – 55 GWh/d, and interconnection with Kaliningrad region, used only for gas transit.

Lithuania has an access to the Incukalns UGS in Latvia, however, gas from the storage could be supplied to Lithuanian consumers only at limited scale. Currently, the bi-directional interconnection capacity between Lithuania and Latvia is being enhanced to 62 GWh/d. The bi-directional capacity expansion will improve safety and security of gas supply for both countries and foster the development of a regional gas market.

Analytical works on the new gas interconnection between Lithuania and Poland are being carried out. This interconnection would let to integrate the Baltic States into the common EU gas market, would create access to global LNG market through Polish LNG terminal in Świnoujście and would increase security of supply.

In order to increase security of supply and to diversify gas supply sources, the project of LNG terminal is carried out by the state (through state-controlled company AB "Klaipedos nafta"). Currently, the preparatory territory planning works and environmental impact assessment of the LNG terminal in Klaipeda are performed. Terminal capacity is planned at the level of 33 TWh/y and start of operation date - 2014.

The possibility of underground gas storage in Syderiai is also investigated by the state (through state-controlled company AB "Lietuvos energija"). Geological - geophysical research in Syderiai area in order to determine the geological structure of the UGS facility are carried out. The final results of the research will be available in 2013.

Figure 27: Existing and planned gas infrastructure in Lithuania. Source: Lietuvos Dujos

The gas transmission system consists of 1.9 thousand km of gas transmission pipelines (design pressure 46-54 bar), 65 gas metering and regulation stations, 3 gas metering stations and 2 compressor stations (42 MW).

Lietuvos Dujos is currently in the process of the expansion of the transmission system in the western part of Lithuania. In order to insure reliable gas supply to Lithuanian consumers, a gas pipeline from Jurbarkas to Klaipeda (approx. 140 km) will be constructed. This pipeline will make a "ring-system" effect. Also, this pipeline has a great significance for proper functioning of LNG terminal in Lithuania.

2.4.6. Legal framework

The main national legal acts determining the functioning of the natural gas market in Lithuania:

- Energy Law sets the main principles on energy policy and energy sector regulation.
- Natural Gas Law determines the licensing requirements for gas companies, main principles of gas sector regulation, development of gas systems, obligatory reserves, consumer protection, etc. In June 30, 2011 a new Natural Gas Law was adopted, by which the EU 3rd Energy Package requirements were transposed into national legislation. In new Natural Gas Law Lithuania has opted to implement ownership unbundling of natural gas transmission (despite that non-discriminatory TPA was guaranteed also before and investments into national transmission system were sufficient).
- Methodology of the calculation of natural gas transmission and distribution price caps defines the principles of the calculation of gas transmission and distribution prices.

2.5 Poland

2.5.1. Energy Policy

The Poland's Energy Policy towards 2030 was adopted by the Council of Ministers on 10 November 2009. The document drafted by the Ministry of Economy contains a long-term strategy of the energy sector development, demand forecast for energy sources and the action plan for the period of 2009-2012. The Policy indentifies six main directions of energy sector development: energy efficiency, security of supply, diversification of energy production, renewable energy, competitiveness and limitation of impact of energy on environment.

Natural gas constitutes an important element of the strategy. The document provides for further development of natural gas market, inter alia through stable outlook for investment in transmission system and cross-border connections, ensuring diversification and security of supply. According to the Policy, the total demand for natural gas in Poland will increase up to 219 TWh in 2030. This will be mostly driven by the power generation sector that should experience the highest growth rate with regard to the gas demand. The Ministry of Economy has recently indicated the willingness to update the Energy Policy to order to adjust it to current circumstances on the market.

2.5.2. Players

Value chain of the natural gas market in Poland consists of six segments: (1) exploration and production, (2) transmission, (3) storage, (4) distribution, (5) wholesale and (6) retail trade.

The capital group of Polish Oil and Gas Company (POGC) holds a dominant position on the market. It is practically the only importer of gas in the country (almost 100% capacity booked at all entry points), the main domestic gas producer (98% of national production), as well as it owns and operates (by a subsidiary created in 2010) all UGS facilities in Poland. As far as distribution segment is concerned, there are six DSOs that remain within the vertically integrated structure of POGC.

Furthermore, POGC effectively controls the wholesale market and is the main player in the retail market. There are other companies (G.EN Gaz Energia, CP Energia, EWE Poland, Enesta SA and KRI S.A.) that entered the retail market but their share is limited to approximately 2%. This is due to the fact that these companies do not have a direct access to resources of natural gas. They mostly buy gas from POGC and then sell it final consumers, often by means of their distribution networks[4] . The conclusion of the Capacity Allocation Procedure for the Poland – Germany interconnection in Lasów increased the number of the market players , but their overall market share remain constantly marginal.

Activities related to the transmission of gas in Poland are fully separated from the capital group of POGC. Gas Transmission Operator GAZ-SYSTEM S.A. (GAZ-SYSTEM) was established in 2004 as a wholly owned subsidiary of POGC, under the name PGNiG Przesył Sp. z o.o. (POGC Transmission). In 2005 all shares of the company were transferred to the state treasury and the current name of the company was adopted. GAZ-SYSTEM was granted a concession to transport gas via the transmission network, to supply with gas the distribution networks and final customers connected to the transmission system. GAZ-SYSTEM is also responsible for the construction of LNG terminal in Świnoujście and interconnection points with adjacent operators.

Transit Gas Pipeline System EuRoPol GAZ s.a. is the owner of the Polish section of the Yamal-Europe pipeline that allows for transit of gas from Russia to Western Europe. Since November 2010 GAZ-SYSTEM acts as the independent system operator (ISO) and is responsible, inter alia, for steering the operations of the pipeline in Poland, cooperation with adjacent TSOs (Gascade and Beltransgaz) and ensuring the security of pipeline operations through management and supervision of its operation and maintenance work.

[4] The only exception is EWE Poland that imports natural gas from Germany, through its own distribution network.

2.5.3. Energy mix

The structure of energy consumption in Poland is closely linked to significant resources of raw materials (mostly coal and lignite, to a much lesser extent natural gas) that are located in Poland. Total energy consumption in Poland amounted to 95,2 Mtoe in 2009. The Polish energy mix is dominated by solid fuels that accounted for 54% in total energy consumption in 2009. The second largest source of primary energy is petroleum with its share in energy mix amounted to 26% in 2009. Natural gas in the third major source of primary energy in Poland and accounted for 13% in total energy consumption. Its share in energy mix has remained quite constant since 2005 but it is still below the average for all EU member states (24%).

2.5.4. Supply/Demand

National Demand Scenarios									
Year									
2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Peak Day Demand (mcm/day)									
70	75	88	105	109	111	116	117	121	124
Yearly Consumption (bcm/year)									
15,6	16,2	18,8	22	26,1	26,6	28,4	28,7	29,4	29,7
Yearly Consumption (TWh/year)									
168	175	203	238	282	287	306	310	318	321

Figure 28: National Demand Scenario. Source: GAZ-SYSTEM

Consumption of natural gas in Poland amounted to 155 TWh in 2010. Total demand for natural gas has not changed significantly since 2005. The largest consumer of natural gas in Poland is the industry sector, accounting for nearly 49% of the total domestic gas consumption that is equivalent to 73 TWh. The largest share of the demand within this group came from fertilizer plants (21 TWh) and medium customers with an annual gas consumption between 10,8 GWh and 270 GWh (about 20 TWh). The another major groups of consumers include households (44 TWh), trade and services sector (14 TWh). Furthermore, it is worth mentioning that increasing consumption in the power generation and CHP can be observed. Their share in total demand reached 8% (10,8 TWh) in 2010.

Natural gas supplies in Poland amounted to approximately 154 TWh in 2010. Approximately 70% of gas available on the Polish gas market was imported, while 30% came from domestic production. As far as import is concerned, the largest quantity of gas was transported from Russia (97 TWh) and Germany (10,8 TWh). In this context, it should be borne in mind that small amounts of gas entered the Polish network from Ukraine (63 GWh) and the Czech Republic (3 GWh). In 2010 indigenous production of natural gas reached 45 TWh. The main three areas, where natural gas is mined, include Carpathian, Upper Silesian and Greater Poland regions. Domestic production capacity is expected to increase up to 48 TWh by 2015.

Figure 29: Main areas of natural gas exploration in Poland. Source: GAZ-SYSTEM

Natural gas production may increase significantly due to unconventional gas. Preliminary analysis (prepared by U.S. Energy Information Administration) suggest that Poland might have large shale gas deposits estimated even at the level of 57 240 TWh. Poland's Ministry of Environment has already granted more than 100 licenses for exploration of unconventional gas. The first wells were drilled in 2010 but it may take 10-15 year before a massive exploitation in Poland commences.

Figure 30: Potential location of unconventional gas reserves in Poland, Source: GAZ-SYSTEM (based on Poland's Geological Institute's maps)

2.5.5. Infrastructure/Third Party infrastructure

The gas network in Poland is connected with the European grid, but mainly along the East-West axis. There are six major entry points into the transmission network that are located at Drozdowicze (Ukraine), Wysokoje (Belarus), Lwówek and Włocławek (Belarus, from the Yamal-Europe pipeline), Lasów (Germany), Cieszyn (Czech Republic). Total capacity of all cross-border points amounts to approximately 200 TWh/y.

GAZ-SYSTEM is taking steps to build new interconnection points and expand the ones that already exist. In this context it should be borne in mind that LNG terminal in Świnoujście is currently under construction. It will come on stream in mid-2014 with 54 TWh/y regasification capacity (expandable to 81 TWh/y or more). Moreover, analytical works are being carried out with regard to further development of existing interconnection points at Lasów (Germany) and Cieszyn (Czech Republic), as well as feasibility studies are performed for the construction of new pipelines connecting the Polish transmission system with Lithuania and Slovakia. Additionally, GAZ-SYSTEM plans to realise the Baltic Pipe project – a offshore gas pipeline that aims to link the gas transmission systems in Poland and Denmark.

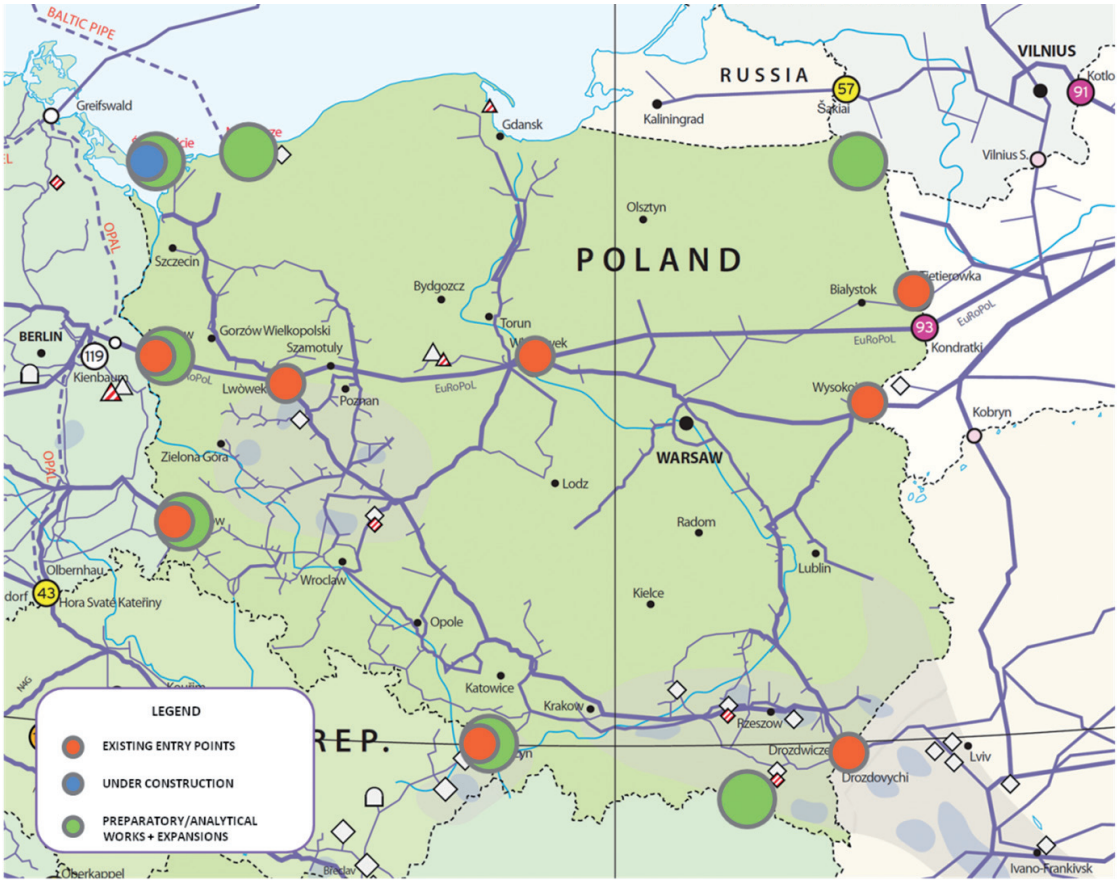


Figure 31: Existing and planned interconnection points in Poland. Source: GAZ-SYSTEM

In 2011, gas transmission system in Poland consisted of high pressure gas pipelines with total length of 9,678 km, 58 entry points, 973, exit points, 851 gas stations, 14 compressor stations and 57 system nodes.

GAZ-SYSTEM is currently in the process of upgrading and expanding the transmission system in Poland. The majority of the works are/will be carried out in Western, North-Western and Central Poland. In total 1,000 km of new pipelines will have been built by 2014 in order to eliminate internal bottlenecks, enhance flexibility of the network, increase security and safety of operations and ensure the transport of gas from new sources (mostly LNG terminal in Świnoujście).

Figure 32: Development of gas transmission system in Poland. Source: GAZ-SYSTEM

There are eight UGSs in Poland. Their total working capacity amounts to 19 TWh. The majority of USGs are located in depleted reservoirs, while one is located in a salt cavern. Storage capacity is expected to increase up to more than 33 TWh in 2015.

Figure 33: Location of UGSs in Poland. Source: GAZ-SYSTEM (based on POGC's maps).

2.5.6. Legal framework

Description of the most important legal acts that determines the functioning the natural gas sector in Poland:

- Energy law – it is the main act on the energy market in Poland. The law refers to electricity, gas, heat and renewable energy sectors. The objectives of the energy law is to create conditions, inter alia, for: sustainable development of the country, providing energy security, economical and rational use of energy sources, development of competition, complying with the environmental protection requirements and fulfilling the obligations arising from international agreements.
- The Law on compulsory reserves of fuel and natural gas – it sets forth the rules concerning creation, maintaining and financing, inter alia, of natural gas reserves. The law determines the minimum mandatory reserves (30 days of sales of the entity) that should be stored by producers and TSOs.
- Regulation on conditions of functioning of the gas system – the regulation specifies the maximum possible share of gas originating from one source of supply (understood as the country of origin), at the level of: 70% – in the period between 2010 – 2014, 59% – in the period between 2015 – 2018, 49% – in the period between 2019 – 2020.
- Regulation on principles of tariff calculation and settlement of the gas trade – the regulation provides for detailed principles of components of: gas tariffs, calculation of regulated revenue and calculation of gas prices and other charges (including transmission charges).

2.6 Denmark

2.6.1. Energy Policy

The Danish Energy policy has since the 1980's focused on ensuring energy efficiency by promoting combined heat and power production. Since the 1990's the energy policy has focused on introducing wind power into the electricity system and promoting other forms of renewable energy – especially biomass in large CHPs.

In the latest years discussions have focused on increasing the amount of fossil fuels in the coming years with the aim of either being independent of fossil fuels in 2050 (the former government) or only base the energy system on renewable energy in 2050 (the current government).

The government has in the end of 2050 published an energy policy with the following targets:

- All energy must come from renewables in 2050 (including transport sector)
- Electricity and heat production should by 2035 be based only on renewable energy
- Coal as such and oil burners in households should be phased out by 2030
- The amount of wind power should be increased to 50% in 2020

Specifically regarding the gas system the government proposal includes the following items:

- Stop to new natural gas burners in new houses in 2013
- Still acceptable in existing houses (complete stop to all oil burners in houses)
- Dispensation possible for buildings without viable alternatives
- Analysis of future use of gas infrastructure before 2013
- In the interim, continued use of natural gas
- A future where biogas and other renewable gases have taken over
- Develop model and plan for out-phasing of natural gas burners
- Equal PSO treatment for biogas in the gas grid (0.8 bDKK by 2020)

Denmark has a tradition for broad political agreements on the energy policy and in March 2012 a broad agreement of the energy policy in the years 2012-2020 was reached. Behind the agreement are all parties in the parliament except one. The agreement underlines the policy of developing a fossil free energy system by 2050.

2.6.2. Players

In 2011 there were 15 active shippers on the Danish Market. On top of that there are a number of shippers that are not currently active, but that can start up at a later stage. In that group are also shippers that have previously been active.

Gas is traded on GTF and Nord Pool Gas. On the bilateral trading facility – Gas Transfer Facility (GTF) amounts corresponding to 70 % of the Danish consumption was traded, which should be compared to 60% in 2009. 2011 looks as if an even larger amount will be traded.

Nord Pool Gas (NPG) got it's break-through as gas exchange the fall and winter of 2009/2010 starting in October when about 100 trades were made. Since then the number of trades increased – topping in March 2010 with over 800 trades in one month. Over the summer the number of trades decreased, but during the year 2010 trades were made corresponding to 8 % of the Danish gas consumption, and in 2011 the traded volume is expected to exceed 10%. In 2010 two new products were introduced on NPG – a balance-of-the-month product where gas for the rest of the month can be traded, and a swap product, where gas can be swapped between Germany and Denmark. In 2011 NPG has introduced intra-day trade and a weekend product, where Saturday and Sunday can be traded in-bloc.

The gas market prices in Denmark are influenced by the prices in Germany and Netherlands. Normally there is a high degree of correlation between the prices on Nord Pool Gas and the Dutch exchange TTF. In periods of time where the price does not correlate, the Danish price is typically higher than the price on TTF, which corresponds to the flows and nominations in the system – typically reflected in a wish to import gas at the Ellund border point.

Until October 2010 there have only been few days with bottlenecks on the Danish/German border, because there in many situations have been stable export of gas – enabling virtual import. In October 2010 a pressure-service agreement between Energinet.dk and Gasunie Deutschland started and from then physical import from Germany to Denmark was possible for the first time since 1982. From October and to the end of April there has been almost constant import of gas to the Danish system, resulting in a total import of approx. 4,5 TWh. In December and January the shippers wanted to import more than it was physical possible to support due to very large price differences between the Danish market and TTF.

2.6.3. Energy mix

The energy mix in Denmark is dominated by oil, natural gas and coal. Renewable energy accounted for 20% of the energy consumption in 2010.

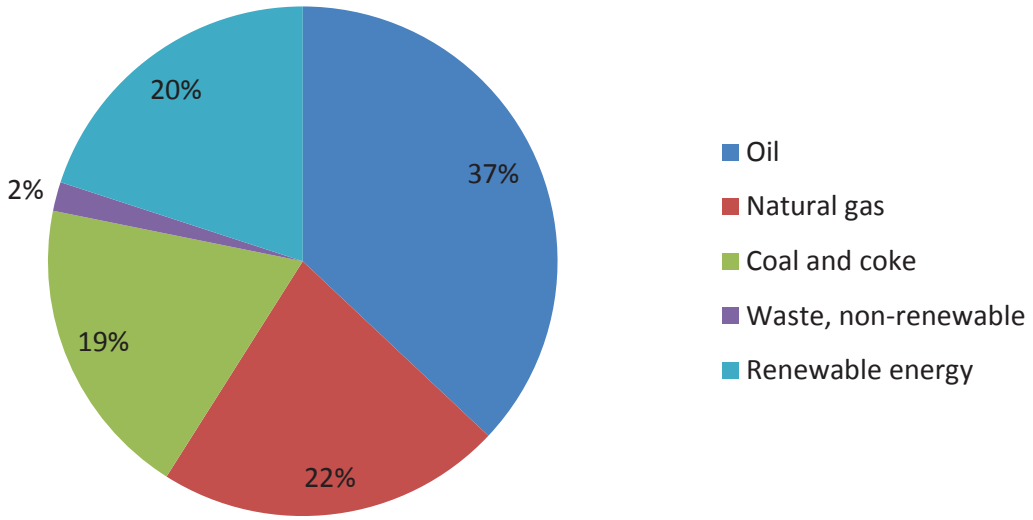


Figure 34: Total energy consumption in Denmark 2010, data from DEA

Denmark has been net exporter of natural gas since the beginning of the 1980's and is expected to remain net exporter until 2021.

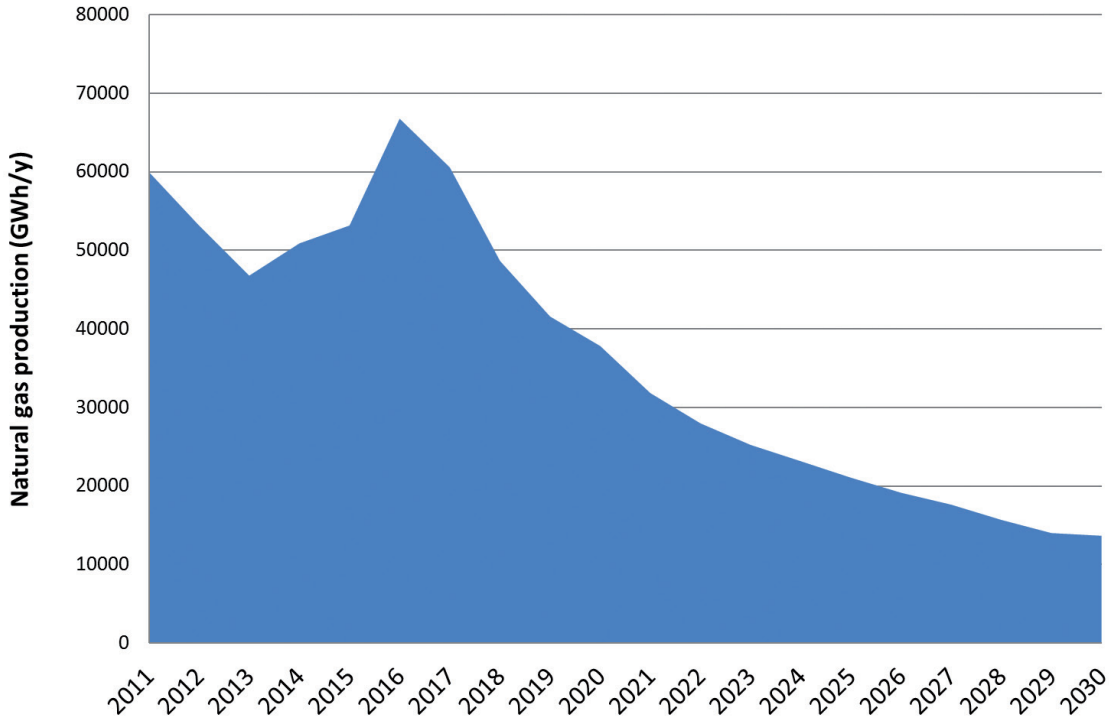


Figure 35: Danish natural gas production until 2010 and expected production until 2040, data from DEA

2.6.4. Supply/Demand

The production from the Danish part of the North See is expected to rapidly decline, reaching a level already in 2012 where it is no longer sufficient to cover the Danish and Swedish demand. In 2015 – 2017 there is a short period with production higher than the expected demand of the two countries due to a small field – called Hejre – which is expected to come online.

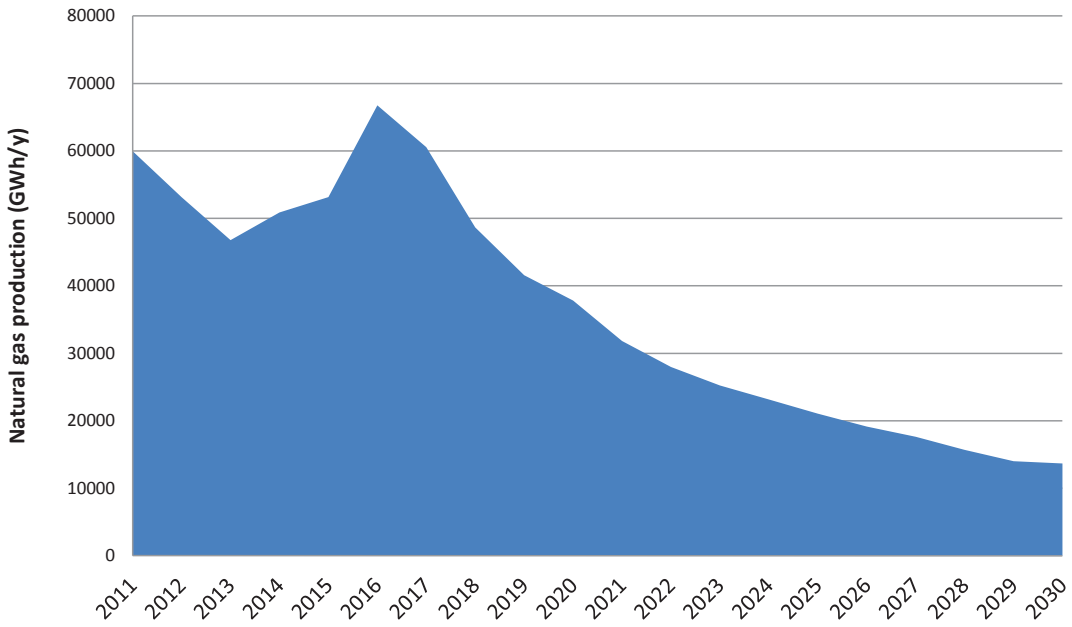


Figure 36: The consumption of natural gas on the Danish markets equals about 3,6 bcm, corresponding to 43 TWh

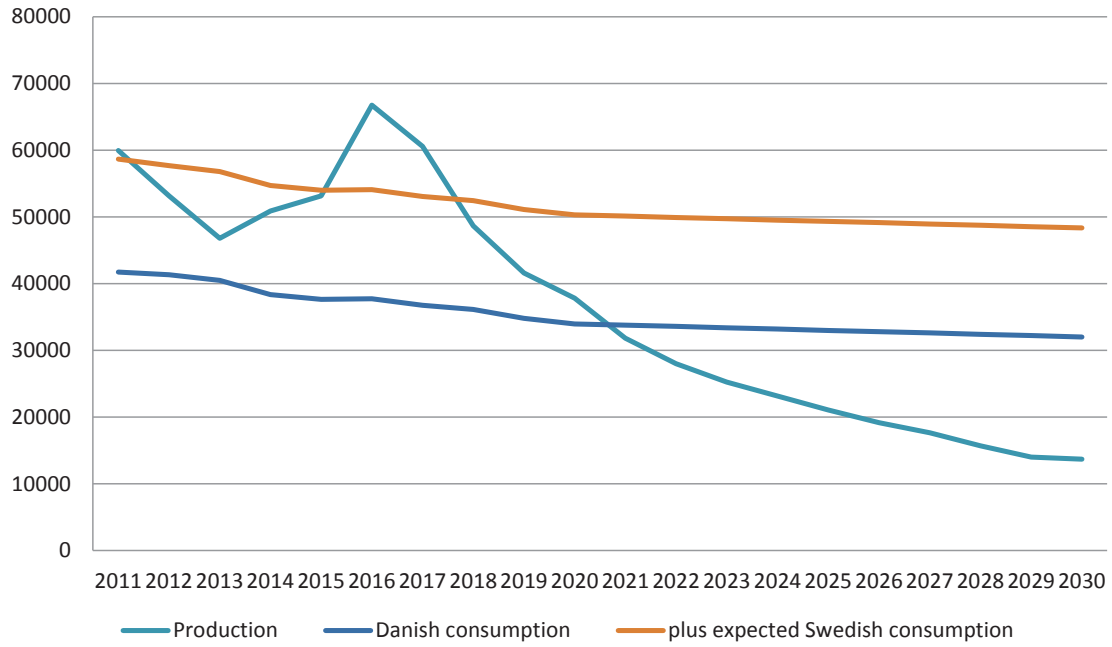


Figure 37: Danish production and Danish and Swedish consumption in GWh

35 % of the gas consumed on the Danish market is used for combined heat and power production. A little more than 20% is used in the industrial sector and like wise a little more than 20 % is used by the approximately 300.000 households using gas for heating purposes. The rest is used for district heating, agriculture, service industry etc. The market is expected to decline over the coming years due to more and more focus on energy efficiency and renewable energy.

Biogas is currently primarily used in small CHP and only to a very limited degree feed into the grid. The production is expected to grow from the current about 1,22 TWh (4 PJ) to about 5,5 TWh (18 PJ) in 2020 while the potential is more than 12,2 TWh (40 PJ). The potential of other renewable gasses is also being studied.

Currently there is no consumption of gas for transport purposes in Denmark. This is expected to change in the coming years. There are several ship operators and harbours looking at the possibilities for LNG for shipping, and minor activities concerning CNG for busses and other on shore transport.

2.6.5. Infrastructure/Third Party infrastructure

Existing infrastructure

The gas infrastructure in Denmark consists of two offshore pipelines sending gas from the Danish part of the north sea to an onshore facility in Nybro and an onshore transmission grid from west to east and from Ålborg in the north and to the Danish/German border in the south. From the landing point in Nybro and to the central point in Egtved the line i doubled as are the under sea lines crossing Lillebælt and Storebælt. In Dragør the Danish system is connected to Sweden. The onshore transmission grid is approximately 860 km of 80 bar pipelines and 42 measuring and regulator stations. The transmission system is connected to two underground storages and to about 17.000 km of distribution grids.

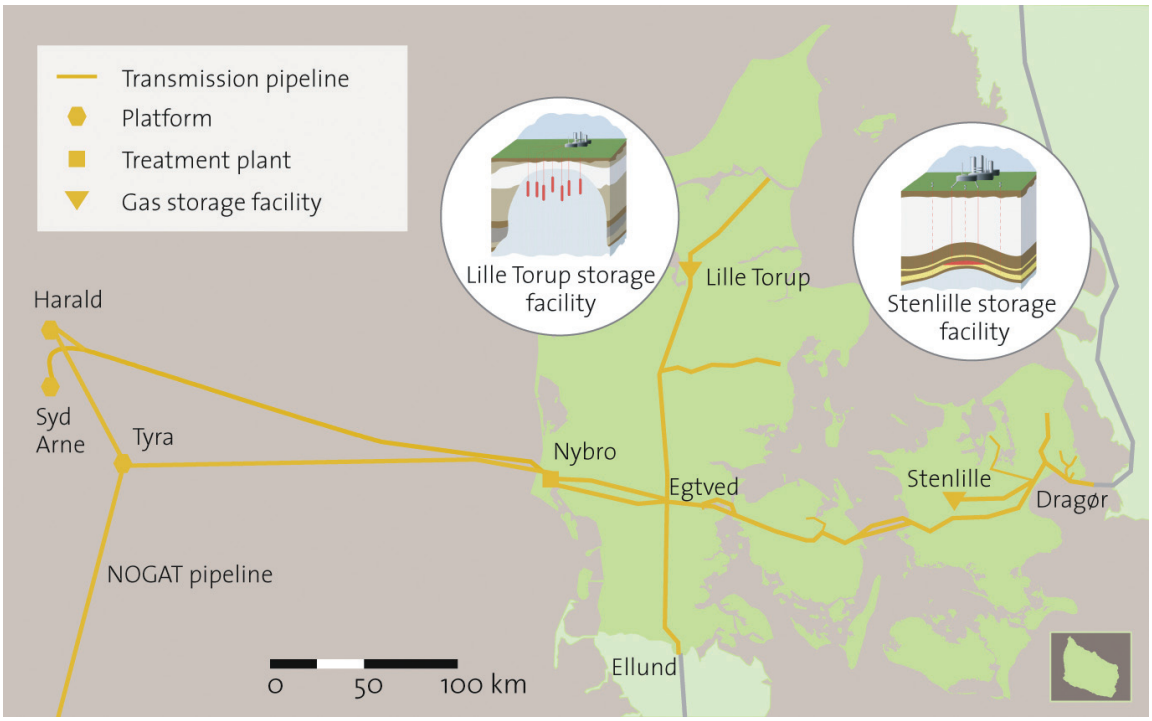


Figure 38: The Danish gas production, storage and transmission system

Under construction

In South Jutland the connection between Egtved and the Danish/German border at Ellund is being strengthen. The pipeline is being doubled which means that Energinet.dk is laying 94 km of 30" pipelines. Furthermore a compressor station is being constructed in Egtved which will allow to increase the pressure of the gas received from Germany and transport it to all locations in Denmark and to Sweden. In order for the investment to deliver a capacity of 700.000 cm/h or approximately 8 TWh/h there is a need for a corresponding investment on the German side of the border. So far the German TSO Gasunie Deutschland has decided to establish a less than half of this capacity. The permitting and planning procedures are under way for additional capacity. Energinet.dk is working with the German players to identify the best way forward in order to match the capacity need in Denmark. (The projects are further described in the appendix under FID).

New projects

Baltic Pipe: A connection between eastern Denmark and Poland (Baltic Pipe) has been investigated over the last years. Such a connection would make it possible to transport gas both from Denmark to Poland and from Poland to Denmark. (The project is further described in the appendix under Non-FID).

Norway- Denmark: Gassco and a number of gas producers on the Norwegian continental shelf have in 2010 looked into various possibilities of increasing Norwegian physical export capacity. In this connection, Gassco has analysed numerous potential links to Dutch and Danish platforms in the North Sea. The conclusion was that the physical export capacity would not be increased sufficiently to meet Gassco and the gas producers expectations, thus the connection was shelved in the spring of 2011. New analyses indicate that there may be better physical possibilities for increasing the export capacity, than the analyses originally showed. There is a positive development in the regulatory setup (tariffs and unbundling) of the Danish offshore pipeline that may help to provide a better framework for a connection between Norway and Denmark. Energinet.dk still believes such a connection may become necessary in the long term. The need may arise, for example, as a consequence of: Danish-Swedish requirement (seen from a security of supply viewpoint) for an alternative to German gas and a predictably declining Danish gas production, a positive competitive effect on gas prices and a number of other possible drivers.

Individually, these aspects seem insufficient at the moment, and Energinet.dk therefore discusses on an ongoing basis with players in Denmark and Norway the possibility of working together to identify an alternative business case based on a combination of these aspects that may meet Gassco's and the Norwegian producers' or other investors' requirements for investing in a new connection.

As such, Energinet.dk still sees a potential in a Norwegian-Danish interconnection transporting up to 9 million m^3/d or approximately 4.5 million kWh/h between Europipe I and the existing Danish upstream infrastructure.

2.6.6. Legal framework

The function of the natural gas market is regulated by the Natural Gas Act, where the latest version is from October 2011. The 3rd Energy Market Package has been implemented by a number of changes in the law.

2.7 Sweden

2.7.1. Energy Policy

The Swedish government consist a alliance of four liberal/conservative parties since 2006. The alliance has agreed on an energy policy based on ecological sustainability, competitiveness and security of supply. Goals for 2020 have been defined as:

- 50 % renewable energy
- 10 % renewable energy in the transportation sector
- 20 % more efficient energy usage
- 40 % reduction of climate gases

Concerning natural gas, the alliance states that it can play a role during a transition period, foremost in the industry and for power and heat production within the European Trading Scheme (ETS) system. Infrastructure for natural gas can be developed on commercial terms and in a manner which supports a gradual introduction of biogas.

2.7.2. Players

The TSO responsibility has since 2005 been split between Svenska Kraftnät, a state owned authority also being TSO for electricity, Swedegas, as owner and operator of the main parts of the transmission system, and E.ON Gas Sverige, owning most of its branches. This is now changing. In May 2011, a government commission proposed to move the Svenska Kraftnät responsibility to Swedegas. This will require changes in legislation and is planned to come into effect during 2012. In July 2011, Swedegas acquired the transmission system branches from E.ON, a deal which came into effect October 1st 2011. The acquisition includes 230 km of pipelines, 32 M/R stations and the only Swedish storage facility. In summary this gives Swedegas full TSO responsibility for the complete Swedish transmission system.

There are six distributors and a few larger industries connected to the transmission system, covering the southern and western parts of the country.

In May 2011, a LNG terminal with a storage volume of 9 000 tons was taken in operation in Nynäshamn south east of Stockholm. This is an area not covered by pipelines and the terminal will supply a local refinery, the local towngas market in Stockholm and industries to be supplied by trucks. The terminal is owned by the industrial gas company AGA being part of the Linde group.

The Swedish market not covered by pipelines is also supplied by trucks delivering LNG from Norway by the Norwegian companies Skangass and Gasnor.

2.7.3. Energy mix

There is no production of natural gas in Sweden, but all gas delivered through the pipeline system is imported via Denmark. The volume has grown from a level of 11 TWh per year until 2008 to 19 TWh in 2010.

Production of biogas in Sweden amounts to approx 1,5 TWh. 50% of the volume is used locally for heating purposes and about 35% as vehicle fuel. 10% of the total volume was upgraded and distributed via the natural gas grid.

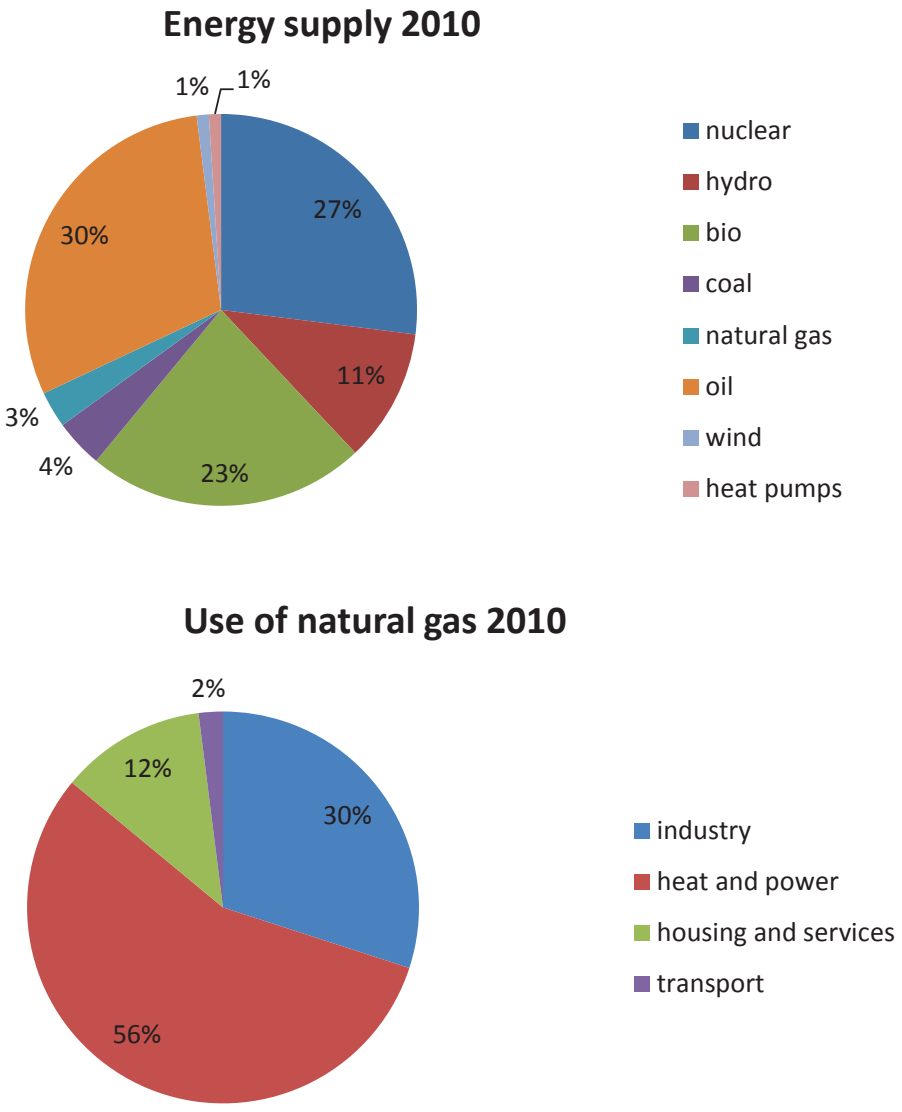


Figure 39: Energy mix in Sweden

The 20 TWh of gas (natural- and biogas) forms 3 % of the total Swedish energy supply but covers 20-25% in the south and western areas covered by the pipeline system.

2.7.4. Supply/Demand

Natural gas consumption in Sweden in 2010 (2009) was 1 553 (1 156) mcm which equals 19 (14) TWh gross calorific value. The increase in volume was both due to a new CHP plant in Malmö, being on stream for a first full year, and robust volumes to large industries. The Swedish market thereby grew by more than 70% from 2008 to 2010. The high volume in 2010 was however exceptional due to a combination of cold weather and high electricity prices and fell back to 1 227 mcm in 2011. There is no official demand prognosis for the Swedish market. The TSO Swedegas however expects a moderate continued growth according to figure 40 when industries continue to replace oil with gas.

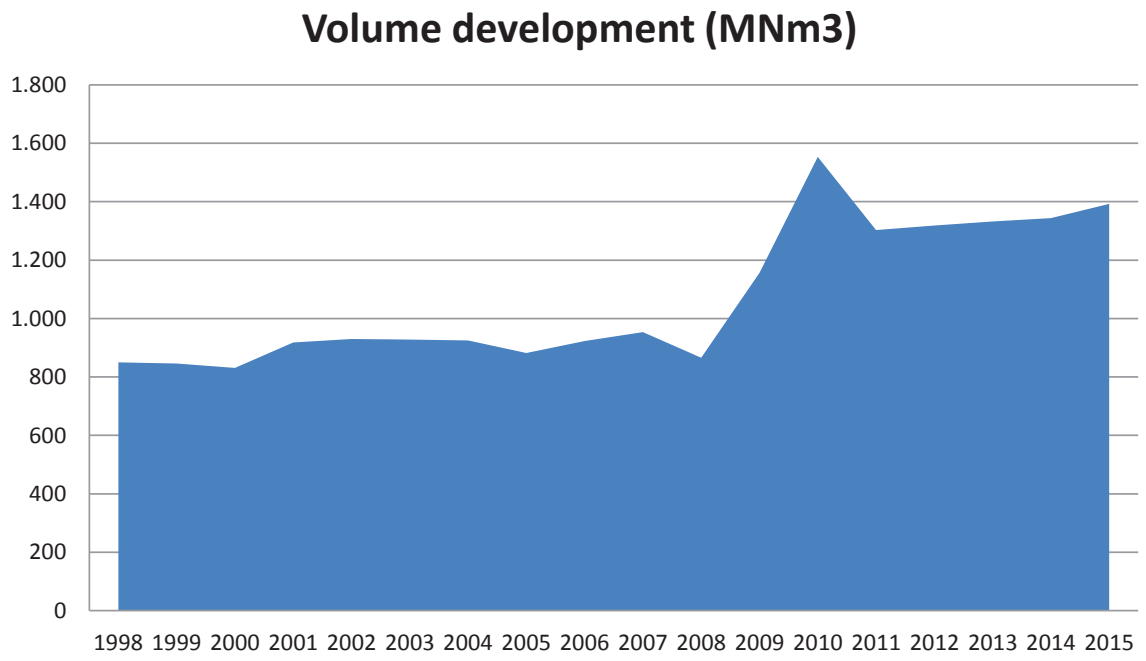


Figure 40: Natural gas usage in Sweden

The Swedish market is characterized by having an infrastructure forming a dead end at the outskirts of the European network. Limited gas sales competition results in gas prices to industrial users being 30% higher compared to the EU average taxes excluded. This position, with one connection only to Energinet.dk, also limits the possibilities to develop the market and makes it vulnerable from a SoS point of view.

The development of the Swedish market, in combination with the depletion of the Danish fields, described in section 2.6.4, calls for action just to maintain status quo, not to mention to allow further development. In 2010, physical flow from Germany to Denmark was opened up to complement the supply from the Danish North Sea. This was necessary to supply the Danish and Swedish markets, but might also cause limitations in the supply to Sweden since the import from Germany forces a reduction in pressure in the Danish system which from time to time might fall below the Swedish need.

2.7.5. Infrastructure/Third Party infrastructure

The Swedish natural gas grid covers the southern and western parts of the country. Starting in Dragör, the only IP connecting to Energinet.dk, it continues along the Swedish west coast until Stenungsund north of Gothenburg. The total length of the transmission network is 620 km. The number of physical TS-DS connections is 39.

The only storage facility is located approximately in the middle of the system, close to Halmstad. It is Lined Rock Cavern storage, originally built as a demonstration unit, with a storage volume of 10 MNm3 which equals 120 GWh. The size of the storage does not allow seasonal storage but is limited to peak shaving services.

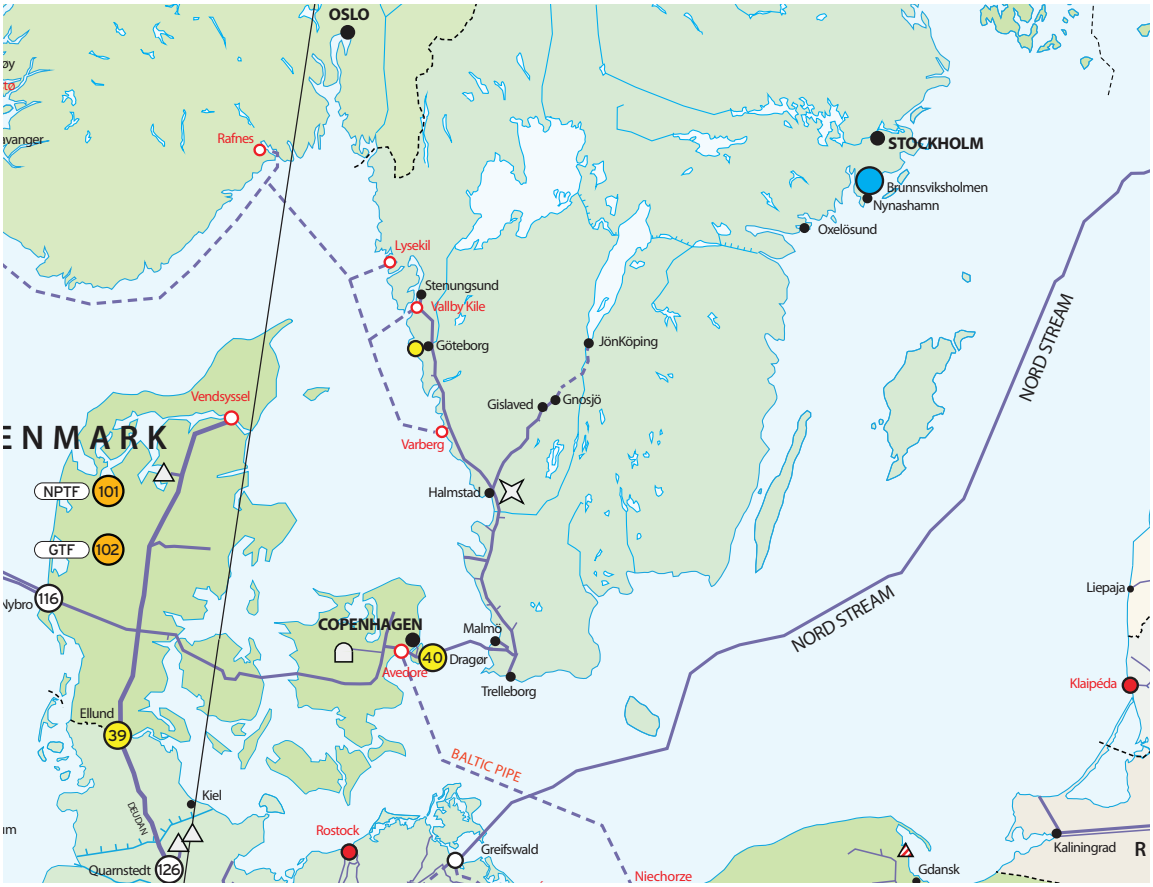


Figure 41: Natural gas transmission system in Sweden

Energinet.dk has decided to invest to increase the import from Germany. This project, which is also dependent on investments in Germany, is needed just to maintain the Swedish market, but does not solve the overall problems hindering market development.

Therefore, other projects regarding new supply routes have been or are being studied.

The consortium Baltic Gas Interconnector (E.ON Sverige, DONG Energy and VNG and Gothenburg E) has been granted permission for a new interconnector between Sweden and Germany. The project is however put on hold and unlikely to reemerge.

The Skanled project was originally intended to bring Norwegian gas to eastern Norway and to western Sweden, thereby ending the isolation of both areas and, for Sweden, solve the problems hindering market development mentioned above. After the suspension of Skanled, alternatives to secure supply and to allow market development have been evaluated, among them a revised reduced

version of Skanled with a scope within the original Skanled scope. Despite approval by the responsible authority, the Energy Market Inspectorate, the government recently (2011-12-01) decides not to grant the concession necessary to realize the project. Stakeholders are evaluating consequences of this decision.

The Nord Stream project was taken on stream in November 2011. The project task is to build a connection between Russia and Germany in order to increase the supply capacity for Europe. The possibility to add a spur line to Sweden would mean a positive contribution for developing the Swedish gas market but has been rejected for political reasons.

2.7.6. Legal framework

The function of the natural gas market is regulated by the Natural Gas Act from 2005. The 3rd Energy Market Package is being implemented in the national legislation stepwise. A new law from August 2011 stipulates the TSO-solution for the Swedish transmission system and regulates the procedures for the certification of TSOs. Additional changes, to facilitate a clear organization of responsibilities between network owners and authorities in accordance with the 3rd Energy Market Package are expected during 2012.

2.7.7. Other issues

An increased import to Denmark from Germany will have a lowering influence on the heat value on the Danish/Swedish markets. Investigations and preparations for this are ongoing in both countries.

2.8 Summary

The BEMIP region transmission system consists of seven TSO's grids: Eesti Gaas of Estonia, Energinet.dk of Denmark, Gasum of Finland, GAZ-SYSTEM of Poland, Lietuvos Dujos of Lithuania, Latvijas Gaze of Latvia and Swedegas of Sweden.

The biggest issue that the BEMIP region must tackle in area of natural gas transmission is the fact that it is still divided into four sub-regions:

1. Finland, which is isolated from the Baltic States;

2. The three Baltic States, which are connected to each other to some degree via respective interconnections between Lithuania and Latvia and Latvia and Estonia. Furthermore the only storage (Incukalns UGS, with a working capacity of 2.3 bcm) in the region is located in Latvia.

3. Poland, which is not connected to any of the BEMIP region members;

4. Denmark and Sweden, which are only connected to each other within the region.

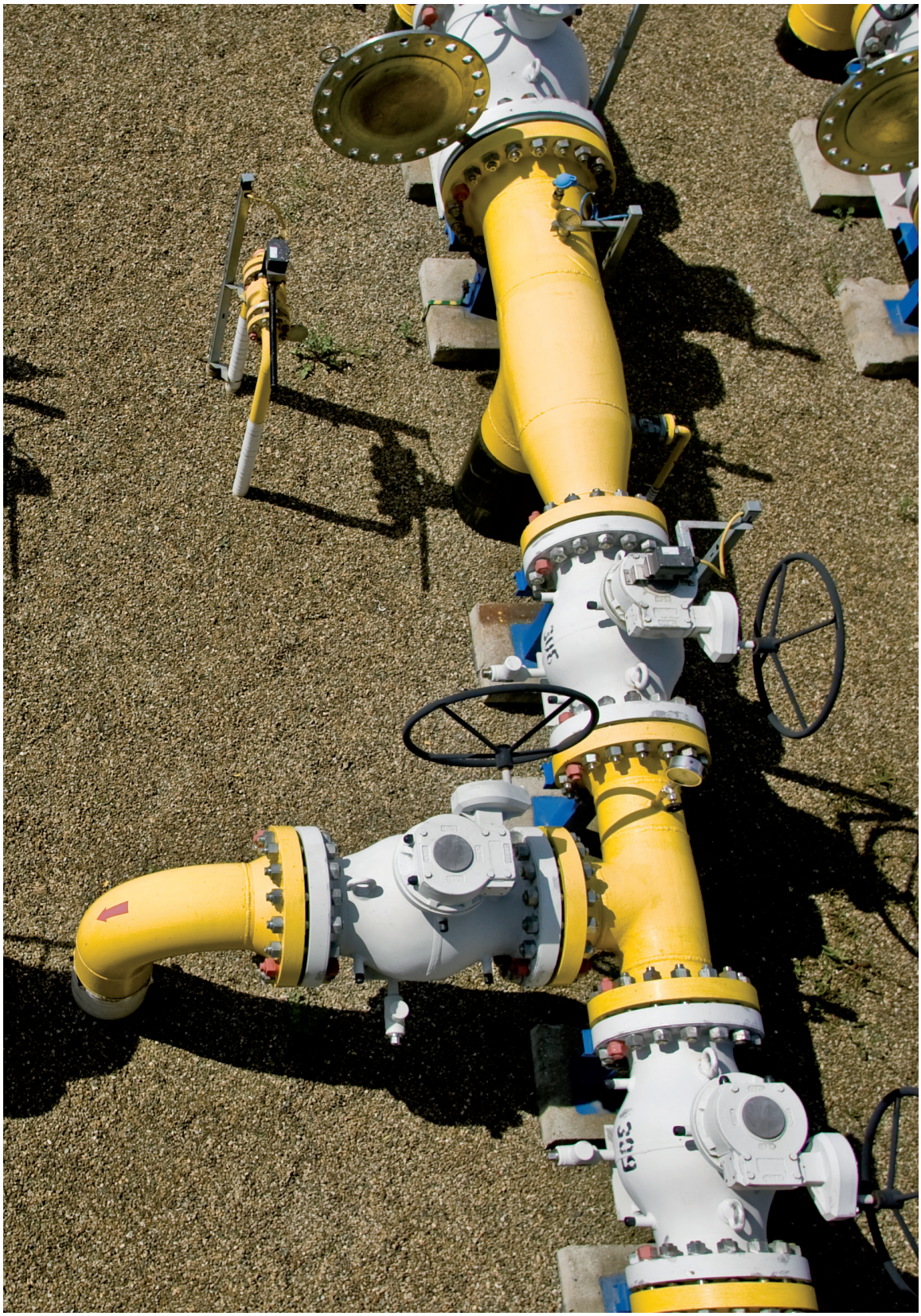
The markets are different in case of role of natural gas in the energy mix as well as in energy policy goals in general, market structure and organization and future role of gas. Such situation hampers the efforts related to the EU policy goal to create the joint EU market by linking the particular countries in one market area. Energy policy of particular members of the regions shows different approach related to the future energy mix and the prospects for gas. While some countries are forecasting the increase of natural gas role (Poland), some others (Denmark, Finland) are intending to become the fossil fuel free economies in future. Natural gas market in Latvia is foreseen to remain stable, however, it is provided for that gas supply from the third countries will decrease by 50% by 2020. The political support on natural gas in Estonia, mainly depends on alternative supply option in the future. In Lithuania, natural gas market is supposed to decrease in long term because of the planned higher share of renewables and nuclear energy in the energy mix, if new nuclear power plant is constructed.

The above-mentioned statements seem to be confirmed by demand and consumption prognosis published in this BEMIP GRIP. It is expected that annual demand in the Baltic Sea area will increase by 45%, from approx. 327 TWh/y in 2011 up to approx. 477 GWh/y in 2021. The demand growth, however, is not spread evenly across the whole region, as Estonia and Poland are to experience demand growth, in case of Finland, Lithuania and Sweden demand will maintain at the same level, while Latvia and Denmark's demand is expected to decline. The yearly consumption figures seem to reflect the trends projected by the demand data. In Estonia and Poland consumption will grow, in Finland, Lithuania and Sweden remain stable, whereas in case of Latvia and Denmark it may diminish.

It should be pointed out that countries of the BEMIP region have high dependency ratio from the one supplier (Denmark and Sweden's dependency on the supplies from the Danish production in declining gas fields on the Danish North Sea, in case of other countries - on the gas supplies from Russia, based on the long term contracts), and in parallel lack of supplies between each other due to lack of interconnections. This situation results in the fact, that in case of emergency situation some countries are not able to help each other.

In the next chapter of the Report the experience and the efforts made so far in order to change the current state of dialogue are described in detail.

3. BEMIP experience so far



© Image courtesy of GAZ-SYSTEM

In October 2008, following the agreement of the Member States of the Baltic Sea Region, a High Level Group (HLG) chaired by the Commission was set up on Baltic Interconnections. Participating countries were Denmark, Estonia, Finland, Germany, Latvia, Lithuania, Poland, Sweden and, as an observer, Norway[5].

The HLG delivered the BEMIP, a comprehensive Action Plan on energy interconnections and market improvement in the Baltic Sea Region, both for electricity and gas, in June 2009. The main objective is to end the relative "energy isolation" of the Baltic States and integrate them into the wider EU energy market. The lessons learnt from this initiative will be taken into account for other regional cooperation structures.

Internal market barriers had to be cleared in order to make investments viable and attractive. This involved aligning regulatory frameworks to lay the foundation for the calculation of fair allocation of costs and benefits, thus moving towards the "beneficiaries pay" principle. The EEPR was a clear driver for timely implementation of several infrastructure projects identified by BEMIP.

The EU's Strategy for the Baltic Sea Region has also provided a bigger framework for the energy infrastructure priority. The strategy already proposed a framework to focus existing financing from structural and other funds into the areas identified by the strategy as priority areas.

Several factors have led to this initiative being seen by stakeholders around the Baltic Sea as a success: (1) the political support towards the initiative, its projects and actions; (2) the high level involvement of the Commission as a facilitator and even driving force; (3) the involvement of all relevant stakeholders in the region from inception to implementation (ministries, regulators and TSOs) to implement the defined infrastructure priorities.

Despite the progress achieved so far, further efforts are still necessary to fully implement the BEMIP: continuous monitoring of the Plan's implementation by the Commission and the High Level Group will be necessary in order keep to the agreed actions and timeline. In particular support is necessary for the key but also more complex cross-border projects[6] ,

Based on High Level group Co-ordination, EC initiated establishment of 2 key task forces for the Baltic Sea Region in the field of natural gas at the end of 2009 in order to develop priorities for infrastructural investments and measures to eliminate major barriers of project implementation:

- West Baltic Task Force
- East Baltic LNG Task Force

Also Focus group on Regional Cooperation in East Baltic (Lithuania, Latvia, Estonia) was established.

Major results and achievements are as follows:

[5] COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITTEE OF THE REGIONS Energy infrastructure priorities for 2020 and beyond - A Blueprint for an integrated European energy network, Brussels November 2010, COM (2010) 677 final, page 31

[6] The project of electricity interconnection between Poland and Lithuania (LitPolLink), which is essential for integration of the Baltic electricity market with the EU, and for which an EU coordinator was assigned

3.1 West Baltic Task Force

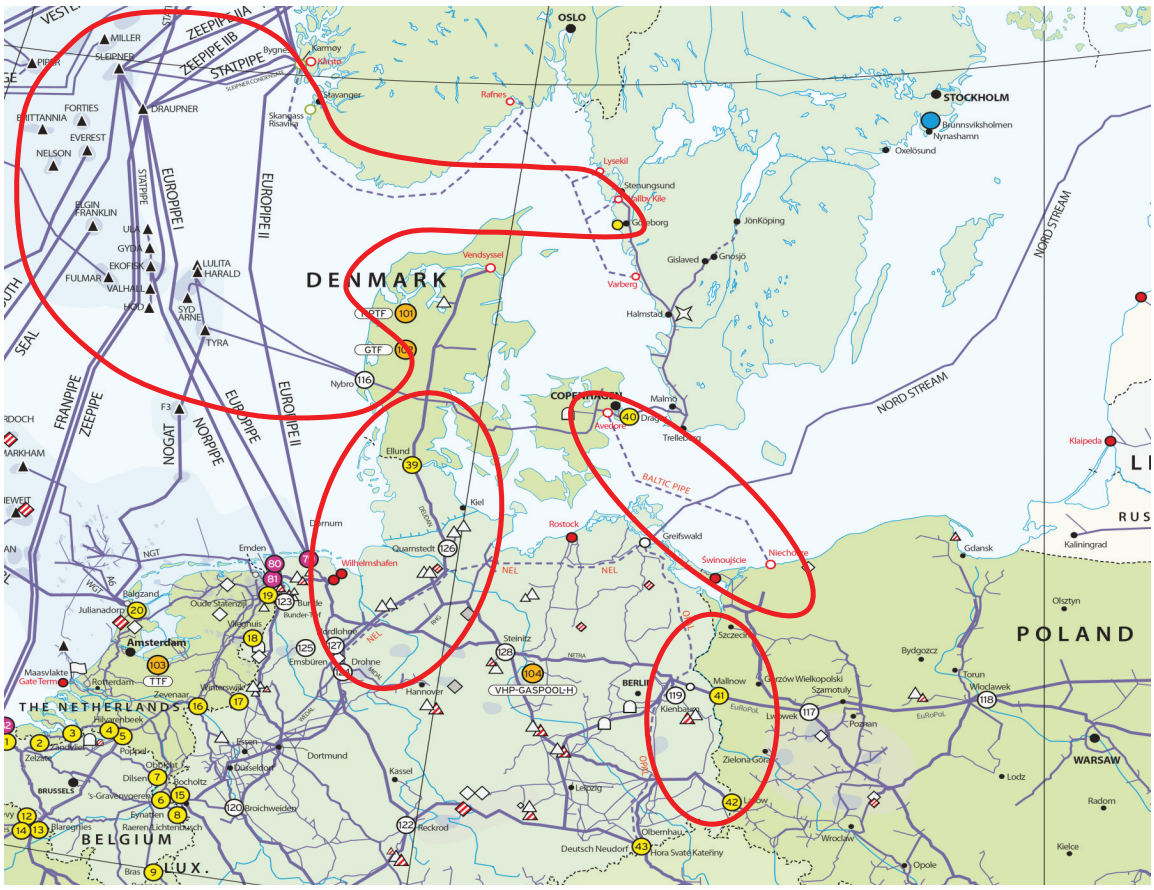


Figure 42: The visualisation of the four main axes

During the 2010 and beginning of 2011 the West Baltic Task Force worked on providing of Action Plan which was presented to the High Level Group in December 2010 and adopted by the group in March 2011. A status report on the actions was made in the summer of 2011.

In the Action Plan four solutions were highlighted as a means to increase the security of supply for Denmark as well as Poland and Sweden:

- **Axis Germany - Denmark:** The combination of the realisation of the integrated open season in the Netherlands and Germany including investments on the German side of the German/ Danish border together with the planned grid extension in Denmark will form this interconnection at the border point Ellund.
- **Axis Norway - Denmark and/or Sweden:** Capacity between Norwegian gas sources and Denmark via the existing entry point in Nybro can be realized by means of the extension of the Norwegian offshore grid and its connection with and the usage of the existing Danish offshore and onshore infrastructure. As an option, this may be supported by the additional connection between the Norwegian offshore system and the existing Swedish onshore system.
- **Axis Poland - Denmark:** This interconnection can be realized by means of the Baltic Pipe and has to be seen in the context of the LNG-Terminal in Świnoujście in the vicinity of the southern endpoint of the Baltic Pipe, and realisation of the axis Germany-Poland.
- **Axis Poland – Germany:** This axis provided for upgrade and further development of Poland-Germany interconnection in Lasów, as well as introduction of reverse flow and physical reverse flow on Yamal-Europe pipeline (to be in line with EU regulation).

The Action Plan specifies a number of Actions to be taken from a variety of stakeholders in the period between mid 2011 to mid 2014: A status was made by the West Task Force, and for the projects known by the BEMIP TSOs current status is included.

Following BEMIP, where one of the key projects proposed for diversification of gas supply and market integration for the East Baltic region was one LNG terminal that is at the benefit of all Member states of the Region, BEMIP High Level Group suggested to establish the East Baltic LNG task force in order to

Objective	Activity - Responsibilities	Status end 2011	Target dates
I. Interconnection between Germany and Denmark	1.a. German regulator Bundesnetzagentur (BNetzA) and Gasunie Deutschland (GuD) are to enter into the final phase of their dialogue on the subject of the integrated open season in order to provide for the desired new transport capacities at the cross border interconnection point in Ellund. BNetzA and GuD are responsible for this action.	GuD has decided to invest in a first phase providing less than half of the capacity, that the investment on the Danish side provides. Currently GuD is conducting planning and permitting processes for second phase, but no final investment decision has been taken yet.	June 2011
II. Interconnection between Germany and Poland	2.a. Yamal-Europe Pipeline Operators will cooperate on introduction of virtual reverse flow in 2011. GAZ SYSTEM and Gascade are responsible for this action.	The Network Code (NC) on the Polish section of the Yamal-Europe Pipeline was approved by the Poland's Energy Regulatory Authority on 31 August 2011. Virtual reverse flow was introduced on 1 November 2011.	2011
	2.b. GAZ-SYSTEM, Gascade Transport and EUROPOLGAZ should make all arrangements in order to introduce physical reverse flow on the Yamal-Europe pipeline in 2013, in line with the provisions of Regulation on security of gas supply. GAZ SYSTEM, Gascade, EUROPOLGAZ are responsible for this action.	GAZ-SYSTEM is in the process of negotiating the introduction of physical reverse flow with Gascade. A discussion has been initiated regarding the possible technical solutions which could be applied at Mallnow metering station. Relevant site visit to Mallnow and dialogue have taken place. Negotiations are ongoing.	2013
	2.c. The commercial parties involved in the construction of new interconnectors should clarify the legal and permitting barriers in Germany and Poland in more detail. Commercial parties involved in the interconnectors project are responsible for this action.	GAZ-SYSTEM carried out the Additional Capacity Allocation Procedure at the Lasów entry point in mid-2011. The allocation of the additional volumes of gas are available from January 2012.	2011
	2.d. The market interest for the project between Germany and Poland should be evaluated. Commercial parties and TSO's involved in the projects are responsible for this action.	Project parties are engaged in dialogue on the possible evaluation of market interest for an interconnection between Börnicke and Police.	2011

Objective	Activity - Responsibilities	Status end 2011	Target dates
III. Interconnection from Norway to Denmark and/or Sweden	3.a. Gassco will continue to analyse a connection to Denmark in the ongoing Gas Infrastructure Reinforcement (GIR) project. Study results will be presented to the sponsor group in spring 2011. The sponsor group will decide whether to pursue the project further. Gassco is responsible for this action.	Gassco has in May 2011 finished the feasibility study, which showed that a connection to the Dutch/Danish systems will be costly and will not provide significant new export capacity for the Norwegian producers. Gassco plans no further activities, but other players are wellcome to propose a mature business case if such can be identified. Commercial companies are investigating potential investments, but no final investment decision has been taken yet.	Report: Spring 2011
	3.b. Energinet.dk will participate in these analyses and will ensure dialogue between all the potential stakeholders in a Norwegian/Danish interconnection. Energinet.dk is responsible for this action.	Energinet.dk is engaged in the dialogue between all stakeholders.	2011
	3.c. The Danish Energy Regulator should in the currently conducted analysis of the offshore pipeline tariffs together with the Danish Energy Agency analyse access rules and include analyses of all parts of the Danish offshore system. The Danish Energy Regulatory Authority and the Danish Energy Agency are responsible for this action.	The analysis of offshore pipeline tariffs has been presented and the DERA board has recommended a major decrease of the tariffs. The operator has accepted to introduce a decrease which does not fully meet the recommendations of the DERA. Discussions are still ongoing.	2011-6/2014
	3.d. Operators of offshore infrastructure should be encouraged to analyse the potential impacts on future tariffs of increased volumes through their assets and share these analyses with the potential investors at the relevant point in time. The owners of this infrastructure (Dong Energy, Shell and Mærsk) are responsible for this action.	The operators of offshore infrastructure await the publication of the DERA analysis of offshore tariffs before any further action.	2011
	3.e. Baltic Gas will analyse the specific needs for transparency on conditions and tariffs for using existing infrastructure. Baltic Gas is responsible for this action.	Baltic Gas postponed the work until the tarifwork described above is concluded.	2011-6/2012

Objective	Activity - Responsibilities	Status end 2011	Target dates
III. Interconnection from Norway to Denmark and/or Sweden (continued)	3.f. A regional TYNDP should focus on the need for connecting Norwegian Gas sources with the region (Denmark, Sweden, Poland) and implications for regional security of supply. The conclusion should be discussed between TSOs, regulators and stakeholders ENTSOG, Baltic Gas and ACER are responsible for this action.	BEMIP GRIP will analyse these issues in more detail.	2011-6/ 2012
	3.g. The business case for a connection via eastern Norway to Sweden has been analysed by Norwegian and Swedish gas consumers and Swedish TSOs.	After the suspension of Skanled in 2009, alternatives to secure supply and to allow market development have been evaluated, among them a revised reduced version of Skanled with a scope within the original Skanled scope. Despite approval by the responsible authority, the Energy Market Inspectorate, mid 2010 the government recently (2011-12-01) decides not to grant the concession necessary to realize the project. Stakeholders are evaluating consequences of this decision.	Mid 2012

Objective	Activity - Responsibilities	Status end 2011	Target dates
IV. Interconnection between Denmark and Poland	4.a. The gas demand and the outlook of the level of security of supply in Denmark and Sweden with regard to the possible supply from LNG terminal in Świnoujście in combination with Baltic Pipe should be assessed by competent authorities in the framework of the new SoS Regulation (risk assessment, action plans), and the development in the axis Germany-Poland. The „Competent authorities" as pointed out in the new SoS Regulation are responsible for this action.	The process is still ongoing.	12/2012
	4.b. The issue appropriate allocation of tariffs when transporting gas through a series of systems could be addressed by ACER and ENTSOG in the work with Framework Guidelines for Tariff Harmonisation and the subsequent network codes. The National competent authorities, ACER and ENTSOG are responsible for this action.	ENTSOG is expected to start the work on the Tariff Network Code in 2012.	6/2014
	4.c. When implementing the third package provision on tariff the issue of risk sharing between TSOs and shippers in the light of long-term infrastructure investments and short-/medium-term capacity bookings could be analysed by ACER and ENTSOG, likewise the European Commission could pay attention to this aspect in the work with the Energy Infrastructure package. ACER, ENTSOG, European Commission are responsible for this action.	Implementation is ongoing.	12/2011
	4.d The commercial parties should re-investigate the market potential of Baltic pipe. If no strong commercial interest confirmed, its contribution to the regional security of supplies and market integration should be fully assessed by the European Commission. The results should be discussed by competent authorities with the aim to see which further measures are needed. The potential role of the Energy Infrastructure Package in this respect is noted. The commercial parties are responsible for this action.	GAZ-SYSTEM is conducting the preparatory works regarding Baltic Pipe project. A dialogue with Energinet.dk is taking place with regard to the future development of the project.	2013

3.2 East Baltic LNG Task Force

develop a common approach and cooperation with the aim to construct one regional LNG terminal.

In December of 2009 Terms of Reference (ToR) for LNG working group were approved, where as an objective of the task force was stated to establish a common approach and cooperation to construct one LNG terminal that is at the benefit of all Member States in the East Baltic Sea region, namely Lithuania, Latvia, Estonia and Finland. Such LNG terminal could be a regional investment involving all four Member States.

The tasks of working group include:

- Identify the value of having an LNG terminal for the region taking into account the assessment of the gas market situation in the East Baltic Sea Region in terms of supply and demand prospects, existing infrastructure and future investments and security of supply concerns;
- Take stock of current LNG plans, share results and conclusions of existing and ongoing studies;
- Compare options in terms of location, size, technology, timing and issues;
- Identify barriers that do not allow a regional investment to take place, including political, commercial, legislative/regulatory, etc.;
- Identify necessary actions to eliminate barriers with a timeline, as well as actions and timing of the regional LNG project itself.

It was expected that the result of this activity would lead to the definition of one regional LNG terminal with agreed specifications, including location; the identification of actions for internal market aspects, as well as for the terminal itself with timeline.

The East Baltic LNG task force was composed of:

- Commission acting as facilitator to the process and secretariat for the taskforce;
- From countries mainly impacted by the objective of the taskforce, Lithuania, Latvia, Estonia and Finland, representatives of Ministry, TSO, Regulator and gas companies.

Working group met few times and discussed proposed projects, but no compromise was found and each Member State continued to support its own project. In the light of that, and to the extent that no political decision was taken on the basis of other considerations, the East Baltic LNG Task Force has agreed on a set of criteria based on which to objectively evaluate the competing projects and to identify the one regional project that should be pursued with the common backing. This approach also did not give any results, and it was proposed to the BEMIP High Level Group to come to the common decision based on information gathered by the working group taking into consideration Finland's statement regarding concentrating on national LNG terminal instead of regional, but these efforts did not produce any results either.

Finally, on November 10, 2011 prime ministers of the three Baltic States (Latvia, Lithuania and Estonia) met in the framework of the Baltic Council and issued a joint statement. Referring to the statement regarding BEMIP, the prime ministers:

- welcomed the Commission's willingness, as expressed in the BEMIP High Level Group meeting on 24 October 2011, to conduct an independent regional feasibility study to analyze the viability and location of a regional LNG terminal;
- committed to co-operate within the BEMIP framework to develop the regional LNG (including possibly the interconnections within the region) project feasibility study pending on the agreement and decision of the Commission and other parties.

3.3 Focus group on regional cooperation

The Commission met with the representatives of Estonian, Lithuanian and Latvian ministries responsible for energy issues on 15 December 2009 in order to get familiar with the situation in the Baltic States and to identify the possible ways of starting a regional cooperation with the aim to carry out a joint risk assessment based on agreed scenarios and elaborate joint preventive and emergency action plans pursuant to the proposal for REG-SoS. During this meeting ToR and roadmap for the Focus group on regional cooperation were discussed and approved.

Objectives of the Focus group were set as:

- Introduction and promotion the regional cooperation among the three Baltic States, which in the future may be extended to other Member States such as Finland, Poland and Germany. Furthermore, carrying out risk assessments both on national and on regional level, creation a regional Preventive Action Plan and an Emergency Plan that contains measures to tackle the negative effects of disruption on a regional level.

- For this purpose, the tasks of this group include:

  - » Assignment of roles and responsibilities and agreement on the rules of procedure;
  - » Discussion of the individual risk assessments on the security of supply situation in each participating Member State;
  - » Identification of risks that arise on intra-regional level (between participants) and common risks, which are shared as a region;
  - » Identification and agreement on those preventive and mitigating measures, which could be used on a regional level in the regional Preventive Action Plans and Emergency Plans;
  - » Agreement on the implementation of the Plans;
  - » The result of this activity should lead to the identification and prioritization of actions and measures to be carried out in the Baltic Sea area to comply with the objectives included in the memorandum of understanding on regional cooperation.

Focus group for regional cooperation was chaired by the Commission and consisted of representatives of the ministries, regulators and TSOs of Lithuania, Latvia and Estonia.

Representatives of the working group met few times at different locations. First, National Risk Assessments were prepared, and based on these assessments Latvia agreed to coordinate process of preparation of Joint Risk Assessment for the whole region. Joint Risk Assessment for the three countries (Estonia, Lithuania and Latvia) was prepared. Members of the Focus group on regional cooperation will continue their work on preparation of regional Preventive Action Plans and Emergency Plans.

As provided for by REG-SoS, few disruption scenarios in conditions of exceptionally high demand were analyzed, consequences are assessed and solutions for minimizing the damages are proposed by TSOs.

Besides demand side management measures, the particular investment projects, which would increase the gas supply security, were identified. These projects include enhancement of bi-directional connections, further modernization of the underground gas storage, construction of new pipelines and introduction of the common software for dispatching purposes.

Identified investment activities for the increase of the regional natural gas supply safety are as follows:

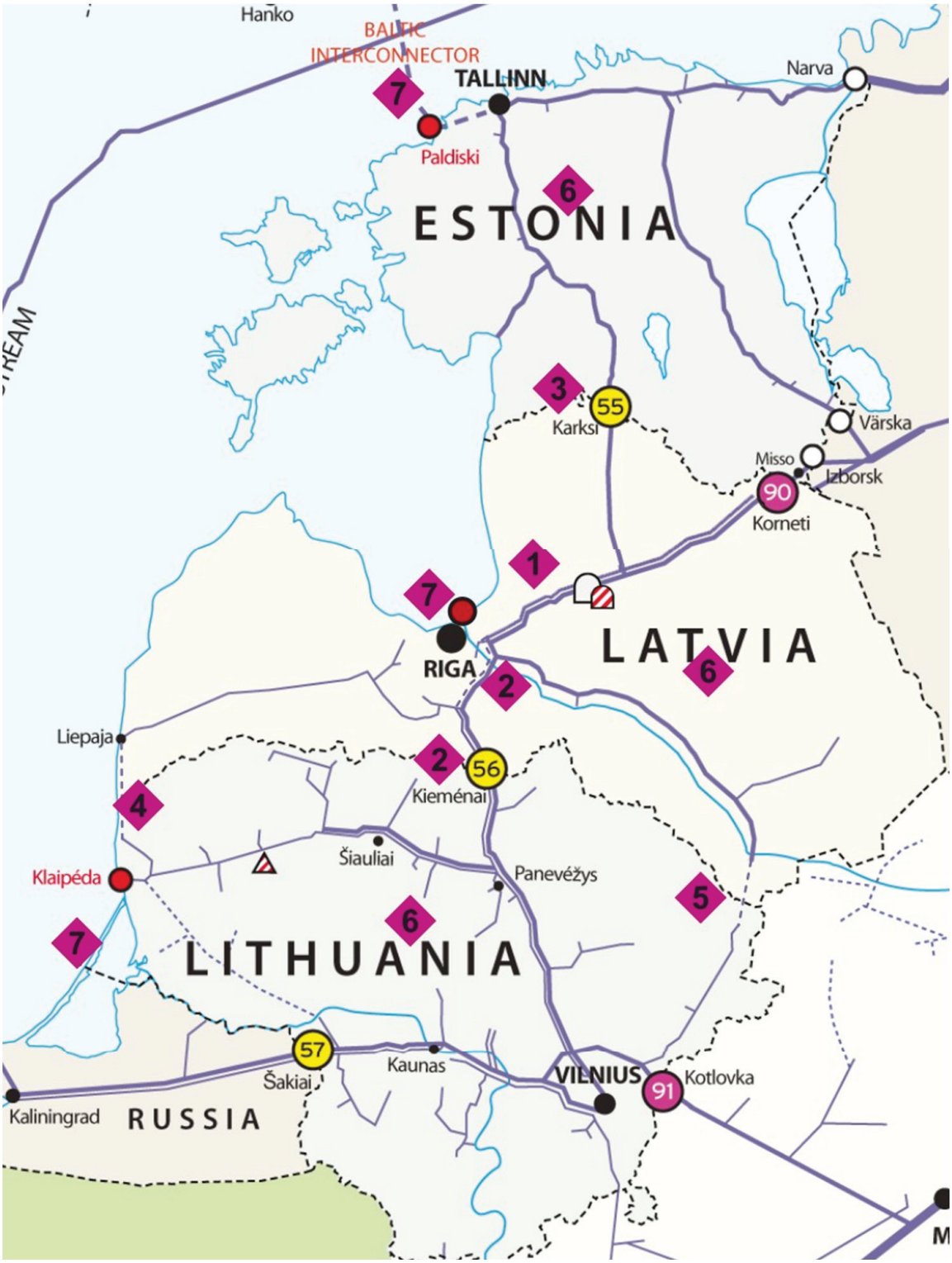


Figure 43: Activities for increase of regional security of supply identified by Regional Risk Assessment

1. Activities related to improvement of safety of operation, increase of injection and withdrawal capacities and possible expansion of Incukalns UGS (adjustments for transit gas compression, modernization of wells, installation of new compressor units, construction and modernization of gas collection facilities)

2. Increase of GMS Kiemenai capacity to 12 mcm/d (equivalent to 124 GWh/d) and construction of necessary connection. Construction of a new gas pipeline "Riga – Vilnius" (Ø500)

3. Construction of reverse connection for GMS Karksi and increase of capacity to 10 mcm/d (equivalent to 104 GWh/d).

4. Construction of connection transmission pipelines "Iecava – Liepaja" and "Panevezys – Klaipeda". Construction of GMS (95km, Ø400).

5. Construction of connection transmission pipelines "Riga – Daugavpils" and "Vilnius – Visaginas". Construction of GMS (40km, Ø400).

6. Hydraulic calculation software for management and supervision (including database) for gas transmission network system

7. Construction of LNG terminal

4. Investment projects in the BEMIP region

LNG terminal in Świnoujście

© Image courtesy of GAZ-SYSTEM

To provide an outlook on the development of the gas infrastructure development in all countries in the BEMIP region, the Baltic Sea TSOs have adopted an open approach and decided to collect data not only from their own but also from third-party project sponsors in Baltic Sea region.

To collect all necessary data for the GRIP 2012-2021 the Baltic Sea TSOs prepared an Infrastructure questionnaire based on the TYNDP infrastructure project questionnaire, aiming at collecting the same relevant information about gas projects. The questionnaire covers both FID (final investment decision) projects, as well as those at a less advanced stage of development – non-FID projects. All parties were asked to provide an update of information given in ENTSOG TYNDP 2011-2020 and, as appropriate, to add new projects.

In the following sub-chapters there are lists of infrastructure projects. They are presented according to the above mentioned grouping (FID and non-FID projects), further divided by the type of infrastructure (transmission, storage, LNG and others). The lists include only main project specifications while full submissions are available in the Annex: Infrastructure Projects. The capacities listed below show total capacity established after the project is completed.

The information below reflects the situation as of 31 December 2011[7] **.**

[7] Unless a project promoter provided updated information before publishing.

4.1. FID Projects

Transmission				
Country Code	**Name**	**Capacity (GWh/d)**	**Estimated Go-live**	**Remarks**
DK	Ellund-Egtved	180 (German FID 88-93)	2013	TEN-E (project of common interest),
LT, LV	Enhancement of LT - LV interconnection	62	2013	EEPR
LT	Jurbarkas-Klaipeda		2013	Project is partly financed from ERDF
PL	Gustorzyn node		2014	Project is under the OPIE (Cohesion fund)
PL	Gustorzyn - Odolanów		2014	Project is under the OPIE (Cohesion fund)
PL	Hermanowice MS		2012	
PL	Odolanów node		2014	Project is under the OPIE (Cohesion fund)
PL	Polkowice – Żary		2014	Project is under the OPIE (Cohesion fund)
PL	Rembelszczyzna - Gustorzyn		2014	Project is under the OPIE (Cohesion fund)
PL	Rembelszczyzna node (modernisation)		2014	Project is under the OPIE (Cohesion fund)
PL	Reszki - Kosakowo		2012	
PL	Świnoujście - Szczecin		2013	EEPR project
PL	Szczecin - Gdańsk		2013	Project is under the OPIE (Cohesion fund)
PL	Szczecin - Lwówek		2014	Project is under the OPIE (Cohesion fund)

Storage					
Country Code	**Name**	**Deliverability (in GWh/d)**	**WGV (in GWh)**	**Estimated Go-live**	**Remarks**
PL	Kosakowo	103,68	1 080	2015	
PL	Mogilno	222,96	5 313,6	2015	
PL	Strachocina	41,52	3 564	2012	
PL	Wierzchowice	155,52	12 960	2014	

LNG terminals					
Country Code	**Name**	**Annual Capacity (GWh/y)**	**Daily Send-out (in GWh/d)**	**Estimated Go-live**	**Remarks**
LT	Klaipėda LNG terminal	33 000	114	2014	Developer JSC "Klaipedos nafta"
PL	LNG terminal in Świnoujście	54 020	148	2014	EEPR Project, Project is under the OPIE (Cohesion fund), TEN-E (Priority project)

Others				
Country Code	**Name**	**Capacity (GWh/d)**	**Estimated Go-live**	**Remarks**
DK	Egtved CS		2013	TEN-E (project of common interest), EEPR project

4.2. Non-FID Projects

Transmission				
Country Code	**Name**	**Capacity (GWh/d)**	**Estimated Go-live**	**Remarks**
DK	Norway-Denmark	55-108	2013-2016	Being investigated
FI, EE	Balticconnector	120	2016-2018	TEN-E (priority project) to connect gas transmission networks of Finland and Estonia
EE	Cross-border interconnection with Russia through Narva	75,8	2015	Interconector Narva-Ivangorod and
EE	Transmission pipeline	75,8	2015-2016	Narva-K-Järve
EE	Karksi GMS (modernisation)	108,3	2016	Construction reverse metering station
EE	Transmission pipeline	75,8	2017-2020	K-Järve-Tallinn
LT, LV	Enhancement of LT - LV interconnection	124,2	3-4 years after FID	TEN-E (project of common interest)
PL	Czeszów - Wierzchowice		2015	Project is under the OPIE - Cohesion fund (complementary list), TEN-E (Project of common interest)
PL	Gałów - Kiełczów		2015	Project is under the OPIE - Cohesion fund (complementary list), TEN-E (Project of common interest)
PL	Hermanowice - Jarosław		2018	
PL	Hermanowice - Strachocina		2015	Project is under the OPIE - Cohesion fund (complementary list)
PL	Jarosław - Rozwadów		2020	
PL	Jeleniów - Taczalin		2020	
PL	Lasów - Jeleniów		2015	Project is under the OPIE - Cohesion fund (complementary list), TEN-E (Project of common interest)
PL	Lasów MS (extension)		2015	
PL	Lwówek - Odolanów		2020	
PL	Niechorze - Płoty		2020	TEN-E (Project of common interest)
PL	Odolanów - Tworzeń		2020	
PL	PL - CZ interconnection	approx. 148	2017	partly under TEN-E
PL	PL - DK interconnection (Baltic Pipe)	min. 88	2020	TEN-E (Project of common interest),
PL, LT	PL - LT interconnection	68 (stage I), 133 (stage II)	2016 (stage I)	TEN-E (Project of common interest)
PL	Płoty node		2020	TEN-E (Project of common interest)

Transmission (continued)				
Country Code	**Name**	**Capacity (GWh/d)**	**Estimated Go-live**	**Remarks**
PL	Pogórska Wola - Tworzeń		2016	
PL	Rozwadów - Końskowola - Wronów		2020	
PL	Skoczów - Komorowice - Oświęcim		2015	Project is under the OPIE - Cohesion fund (complementary list), TEN-E (Project of common interest)
PL	Strachocina - Pogórska Wola		2015	Project is under the OPIE - Cohesion fund (complementary list)
PL	PL - SK interconnection	approx. 148	2017	TEN-E (Project of common interest)
PL	Tworzeń - Oświęcim		2018	
PL	Wronów - Rembelszczyzna		2020	
PL	Wronów node extension		2020	
PL	Zdzieszowice - Wrocław		2015	Project is under the OPIE - Cohesion fund (complementary list), TEN-E (Project of common interest)

Storage					
Country Code	**Name**	**Deliverability (in GWh/d)**	**WGV (in GWh)**	**Estimated Go-live**	**Remarks**
LV	Incukalns	310,5-362,3	24323-33120	2020	Part of TEN-E (Project of common interest)
LT	Syderiai	104	5 200	2018	TEN-E (Project of common interest)

LNG terminals					
Country Code	**Name**	**Annual Capacity (GWh/y)**	**Daily Send-out (in GWh/d)**	**Estimated Go-live**	**Remarks**
EE	LNG regional terminal	24 900-31 100	260	2015	Developer Balti Gas
FI	Finngulf LNG project	27 000	132	2016-18	Developer Gasum
LV	LNG terminal in LV	25875-31050	149	2015-2017	
PL	Extension of LNG terminal in Świnoujście	81 000	223	2020	

Others				
Country Code	**Name**	**Capacity (GWh/d)**	**Estimated Go-live**	**Remarks**
EE	Compressor station in Puiatu	108,3	2017	Increase of capacity Karksi -Tallinn to 108,3 GWh/day
PL	Jeleniów CS (extension)		2015	EEPR project
PL	Odolanów CS		2016	
PL	Rembelszczyzna CS (modernisation)		2015	Project is under the OPIE (Cohesion fund)

4.3. Analysis of TSO's non-FID projects

The following subchapter provides the analysis of main non-FID gas investment projects in the BEMIP region. Description of a given project contains information on expected benefits that will result from the project implementation and the most important challenges that it has to respond.

The projects analysed in the subchapter are grouped according to the division of the Baltic Sea countries made in subchapter 2.8.

(1) Finland

Analysis of Finngulf LNG

Pre-engineering of a large scale LNG import terminal is on-going in Finland in order to provide a secondary source of natural gas supply to Finland. There are two locations under consideration: Inkoo and Porvoo (Tolkkinen), both located in the southern coastline of Finland. Inkoo is also the potential landing point of the Balticconnector.

Both locations are investigated as suitable locations of a large scale LNG-import terminal: the connection to the natural gas transmission network needs a reasonable length of onshore pipeline, fairways to both ports are suitable for LNG vessels and the land could be used for this purpose. In order to evaluate the applicability of these locations, a national Environmental Impact Assessments (EIA) has been started and is expected to be completed by March 2013. After the completion of the EIA, the site shall be selected for further engineering and the next engineering stage is expected to be started in the first quarter of 2013.

The terminal will be developed in stages: first stage could be a smaller scale terminal for marine and industrial (off-grid) use, having a storage capacity of 2 x 20.000 m3. Following step is seen to be a floating LNG storage and regasification unit (on board or on shore) with a storage capacity of about 150.000 m^3. The final stage would increase the terminal into its' final size of 2 x 150.000 m^3 storage capacity. There will be a high pressure gas pipeline connection to the gas transmission grid: in Inkoo about 20 km at 80 bar pressure level and in Porvoo about 5 km at 54 bar pressure level. The regasification and injection capacity of the terminal depends on the site being about 5500 MWh/h in Inkoo and 4100 MWh/h in Porvoo. The annual injection capacity would be about 27 TWh/a.

At the moment the Finngulf LNG terminal is considered solely from the national viewpoint due to the unclear situation regarding the Balticconnector and regional LNG solution. The national target for Finngulf LNG is to create an alternative source of supply mainly due to market reasons - at the moment there are no security of supply concerns in the discussions: the N-1 criteria of Finland is fulfilled and historical experience shows high level of supply security. Nevertheless, a LNG terminal would implicitly also bring a possibility to increase security of supply and that is seen as an additional benefit. Finland is relying in fuel switching to oil in case of supply disruption and so LNG storage in Finland would create an alternative for oil storages. Due to the price difference between light fuel oil and LNG, a terminal with a large storage capacity would be also economically viable alternative. Furthermore, gas consumption profile in Finland is changing due to the increased use of biofuels and reduction targets of oil use as a peak shaving fuel in heating plants. Therefore there is a need for a rapid gas supply capacity while the role of natural gas is moving more towards a peak shaving fuel and alternative fuel for biofuels in case of malfunction of these plants. In order to create this kind of fast peak shaving possibility, LNG terminal would be an ideal solution near the area, where gas consumption today is concentrated, namely in Helsinki area. If there is no LNG solution, there should be enough gas transmission pipeline capacity from Russia and/or storage capacity. These both alternatives would require higher investments compared to LNG and pipeline solution would also have too long response time for peak shaving purposes.

As a summary, Finngulf LNG terminal is planned in Finland from the national perspective in order to:

- provide secondary source of supply
- enable LNG to be used in case of pipeline transport disruption (SoS)
- create a possibility for peak shaving with fast response time
- provide a stepwise approach via marine LNG use

These targets set the priorities at the moment in Finland and thus the terminal development is going on from the national perspective with a target to be operational in 2016-18. If there is a regional solution available during the development phase of Finngulf LNG, it can be taken into account and the terminal designed accordingly.

Analysis of Balticconnector

Balticconnector was studied as a TEN-E project until 2010 by the Finnish TSO, Gasum. The study included the technical concept study, pipeline route engineering and seabottom survey. The most feasible route for Balticconnector was at that time determined to be from Inkoo Finland to Paldiski Estonia. The route was selected partly due to the limitations in the area use offshore, seabed conditions, onshore pipeline routing possibilities and transmission system connection and capacity possibilities. The pipeline was designed to have a diameter of 500 mm and pressure level of 80 bars resulting in a capacity of 5500 MWh/h. For the clarity reasons, the capacity is not limited only due to Balticconnector pipeline itself but also due to the capacity of on-shore transmission network. The annual volume to be transported through Balticconnector was estimated to be 22 TWh. The project included also a preliminary environmental impact program, but the project is not mature enough for a full EIA. The final report material was accepted by the Finnish Ministry and submitted to DG Energy.

It was originally considered that Balticconnector would increase the security of supply to Finland, which it may well increase, but the importance of diversifying sources of supply and need for peak shaving increased in importance. Due to these reasons, Balticconnector alone would not be the solution and LNG-terminal was seen as a precondition. This means that the development of Balticconnector will continue when the decisions concerning national and/or regional LNG-terminal are made and the benefits sought by Finland are available. Balticconnector is not needed for national reasons if the LNG-terminal would be in Finland, but is understood that then with the help of Balticconnector, other Baltic countries would be able to use the Finnish LNG-terminal and thus increase the load factor and consequently the costs involved. On the other side, an LNG-terminal in the northern part of Baltic countries would be operationally sufficient for Finnish needs and Balticconnector would be a viable solution as well. Locating the LNG-terminal further away from the Gulf of Finland would be too far to provide the needed fast response time for peak shaving.

As explained earlier, Finland is fulfilling the security of supply criteria in terms of N-1 standard at the moment due to the fact that Finland is supplied by two separate gas pipelines from Russia. There is nevertheless need to refurbish one of the main parallel pipelines in the near future in order to keep N-1 criteria at the acceptable level. This refurbishment project is foreseen to start in 2015 and as an alternative investment for it would be the Balticconnector. In this case the Balticconnector supply should be secured by an alternative source of supply, namely LNG-terminal in the area of Gulf of Finland, the pipeline alone is not sufficient. Thus the LNG-terminal and the Balticconnector are tied together: the pipeline alone will not bring the needed benefits. Therefore the continuation of Balticconnector project needs a clear decision on the LNG-terminal. Due to the time schedule of constructing the terminal and the Balticconnector, it is still possible to keep Balticconnector on hold taking into account also the schedule for refurbishments project in the Finnish natural gas transmission network.

Another perspective is seen as the possibility to use Balticconnector and Finnish and Estonian gas transmission network for filling up the Incukalns UGS during summer (off peak season), when there is plenty of free capacity available in the system. There are some limitations in the transmission capacity from Valdai to Incukalns UGS and instead of upgrading the capacity of that pipeline section, same capacity would be available as transit gas transport through the northern route with remarkably less investment. The need for this transmission capacity would increase if the storage would be enlarged as indicated in the plans.

As a summary, the Balticconnector is put now at hold due to the need to have a decision of the national and/or regional LNG-terminal and when the terminal will be built, there is a possibility to increase the utilisation rate of that terminal by the Balticconnector and increase the utilisation rate of Balticconnector by using it for transit gas transmission for Incukalns UGS through the Finnish and Estonian gas transmission system during off peak season.

(2) Estonia, Latvia, Lithuania

Analysis of Gas Interconnection Estonia- Finland (Balticconnector) and Regional LNG terminals

The aim of the Gas interconnection Estonia- Finland is the integration of the isolated gas markets of the Finland, by introducing the alternative gas supply route to the Estonia and Baltic States. This interconnection would diversify the gas supply sources, would increase the security of supply and would serve for the enhancement of competition in the gas market of the Finland and Baltic States.

For the Finland and Baltic States Balticconnector will provide the access to both, global LNG market via LNG terminal in Paldiski (Estonia) or Inkoo (Finland) and to the EU gas spot market. From long-term perspective it may also after full modernization Incukalns UGS, the Latvian storage could increase security of supply also for Finland.

Also through the Balticconnector gas could be supplied to currently non-gasified areas in Estonia Keila and Paldiski

The economic viability of Balticconnector is conditional upon other decisions regarding the development of the other gas infrastructure enabling new gas supply routes, gas market development in Baltic States and Finland including LNG import terminals.

Summarizing, the planned LNG terminal connected to the Balticconnector would improve the security of supply in the gas systems of Finland and Estonia. One of the reasons is the circumstance that the European Union agrees to partly finance the construction of a LNG terminal in the Baltic countries, i.e. either in Estonia, Latvia or Lithuania. Negotiations in the question are ongoing, but no agreements have been reached yet between the countries on common activities. Taking into consideration the regional gas market, the LNG terminal, with possible location in Paldiski, would be of regional importance. The developer of the Paldiski terminal is the private company Balti Gaas. Balticconnector and LNG terminal is the best measure to very significantly improve the security of supply for Estonia and Finland and a most cost effective way. Next step it provides the access to the EU gas markets and global LNG market.

Analysis of project of modernization and expansion of Incukalns UGS

Further modernization of Incukalns UGS is the most important project for Latvia. The storage is the backbone of the whole gas supply system because almost 80% of gas consumed in Latvia is received from the storage. Moreover, around 60% of gas consumed in Estonia also historically is received from the Incukalns UGS.

Since Lithuania, Latvia and Estonia have no connection to the common EU gas grid, Incukalns UGS is the only gas source in case of supply interruption for all three countries. According to the joint risk assessment, N-1 criterion for all three countries is 121.06%, but separately only Latvia fulfils this criteria (153.85%). Without Incukalns UGS, N-1 for Estonia is 59.7% and for Lithuania 27.4%.

Incukalns UGS started its operation in 1968 therefore original equipment is old and urgently needs repairs, modernization or replacement. Large scale modernization works in Incukalns UGS was started in 1998. Modernization was carried out step by step, and proposed project is continuation of the existing project. Up to now JSC "Latvijas Gaze" for modernization of the storage has spent 100 mEUR. From EERP funds Incukalns UGS has received 7.5 mEUR. Recent technical study revealed the most important jobs to be done in order to increase operation safety of the storage and set the time line for jobs to be done. According to the study:

- New gas collection facility shall be built and existing facilities modernized;
- Modernization of compressor facility No.1, renovation and installation of new compressor units in compressor facility No.2 shall take place;
- Modernization of wells shall be continued;
- New connecting pipelines shall be built etc.

Estimated costs are 180.9 mEUR and proposed date for finishing all jobs is end of 2020.

In case of construction of LNG terminal in Latvia, Incukalns UGS will be used for storing of gas from the LNG terminal, thus considerably decreasing costs of construction of LNG terminal (storage capacities) as well as offering beneficial conditions for gas purchase in summer at a lower price.

When interconnection between Lithuania and Poland will be built, Incukalns UGS can be used for storage of gas not only for Latvia, Estonia and Lithuania, but also for Poland, and expansion of the storage shall be considered. In case, interconnection Finland-Estonia would be implemented, the storage could increase security of supply also for Finland.

Main threat is lack of gas in the storage in case of gas supply disruption. It can happen in April, when storage is empty because Incukalns UGS is used as a seasonal gas storage. Therefore, some expansion of the storage can be considered with the aim to keep gas reserves in the storage. In case, interconnection Poland-Lithuania will be built and pipeline and gas metering station capacity between Lithuania and Latvia enhanced, the impact of gas supply disruption will be considerably less severe.

Analysis of the enhancement of bi-directional interconnection capacity between Latvia and Lithuania up to 124 GWh/d

The enhancement of bi-directional capacity between Latvia and Lithuania could be mainly driven for implementing the EU standards for the gas infrastructure for the security of supply (N-1 rule) at a very moderate cost. Besides, it would also create opportunities for higher usage of Latvian Incukalns UGS and a cross-border trade.

However, this project is highly dependent on the implementation of other infrastructure projects in the region, and the benefits or the threats to this project are different under any certain scenario of gas infrastructure development in the region.

In case gas interconnection with Poland and LNG terminal is constructed in Lithuania, the need of this project for security of supply reasons practically evaporates. But in that case this project could successfully serve for the diversification of supply to Latvia and Estonia. Moreover, when gas interconnection with Poland is constructed, this project may be needed to provide an access to Latvian Incukalns UGS at a sufficient scale for both Lithuanian and Polish market players. If LNG terminal is constructed in Lithuania, the use of Latvian Incukalns UGS to level out the demand/supply mismatch is also probable.

However, if also any other gas infrastructure, which diversifies gas supply sources, is constructed in Latvia and/or Estonia, the need of this project for diversification purposes also becomes non-existent. In that case this project could be implemented only if a sufficient market interest is expressed for the cross-border trade using this interconnection point.

If other scenario materializes, under which neither gas interconnection with Poland nor LNG terminal is constructed in Lithuania, but new gas import sources created in Latvia and/or Estonia, this project would gain its importance and will guarantee both, high level of security of supply to Lithuania and diversification of gas supply sources.

Summarizing, depending on what other investment projects are implemented in the region, this project may appear to be very beneficial and important for regional gas market, or not needed at all. The FID decision on this project should be taken when the prospects of other major gas infrastructures in the region will be clear.

Analysis of Gas Interconnection Poland - Lithuania (GIPL)

The very aim of the Gas interconnection Poland - Lithuania (GIPL) is the integration of the isolated gas markets of the Baltic States into EU gas grid, by introducing the alternative gas supply route to the Baltic States. This interconnection would diversify the gas supply sources, would increase the security of supply and would serve for the enhancement of competition in the gas market of the Baltic States.

For the Baltic States GIPL will provide the access to both, EU gas spot market and to the global LNG market via LNG terminal in Świnoujście. From long-term perspective it may also be used for importing shale-gas from Poland, if production of it comes to large scale level. For the Polish market players GIPL will provide the opportunity of using Latvian Incukalns UGS. Also through the GIPL gas could be supplied to currently non-gasified areas in Poland and Lithuania (though additional demand expected to be very low).

Notwithstanding a positive impact of the GIPL on the Baltic States gas market, the development of this interconnection would require large-scale capital

expenditures, which may be unjustified in terms of the market conditions. In the past (2009) the market screening showed a low interest of the market players in the capacities of GIPL. Therefore the commercial viability of the GIPL is expected to be relatively low and therefore considerable part of external financing (EU funds) is needed.

The economic viability of GIPL is conditional upon decisions regarding the development of the other gas infrastructure enabling new gas supply routes or sources to Baltic States, including LNG import terminals. The gas demand in the Baltic states is limited and any new supply infrastructure, also LNG terminal(s) in Baltic states and GIPL will be forced to share the same gas volumes, so an adverse effect to commercial viability of the projects will be observed with lowering of potential load factor of competing projects. If LNG import terminal is constructed, it would considerably reduce the commercial viability of GIPL, making the need of external financing higher and putting the implementation of GIPL at high risk.

Summarizing, GIPL is the best measure to very significantly improve the security of supply and end up the isolation of Baltic states from EU gas market in the most cost effective way. However, due to low market (shippers) interest, the considerable external financing is inevitable.

(3) Poland

Analysis of Baltic Pipe

The aim of Baltic Pipe is to connect directly the Polish and Danish gas transmission systems and thus create a technical possibility to transport gas from North Sea fields to Poland and possibly further to the Baltic states and the CEE countries. The reverse flow is also envisaged in order to enable gas transport coming from Poland to Scandinavian markets.

Construction of Baltic Pipe will contribute to development of infrastructure necessary to interconnect the subregions in the Baltic Sea area[8] . This will in turn enhance market integration, diversify supply sources and routes, as well as improve system resilience of the transmission grid in the region. The pipeline will, furthermore, allow for the access to gas deliveries from new sources (such as Norwegian gas) that are currently unavailable for the CEE region and the Baltic States. Consequently, the possibility for the entry of players present on the Scandinavian markets will be offered and stimulus for price competition will be increased.

Baltic Pipe shall also be perceived in parallel to the LNG terminal in Świnoujście, as the terminal may offer its regasification capacity to customers in the Scandinavian countries and deliver gas supplies necessary to compensate for depleting gas fields in Denmark. The project may also serve to transport the excessive volumes of unconventional gas (if deposits in Poland are confirmed). The diversity and availability of gas supply may pave the way to the creation of a regional gas hub in Northern Poland.

Implementation of Baltic Pipe was primarily linked to the Skanled project that was suspended by its investors in April 2009. Despite the suspension of the Skanled project and the lack of decisions on the construction of other links between Norway and Denmark, GAZ-SYSTEM decided to continue all preparatory works for the Baltic Pipe project including, in particular, the definition and approval of the final route of the gas pipeline in its offshore and onshore parts.

GAZ-SYSTEM is currently in the course of conducting or intends to conduct the following pre-investment activities:

- geophysical and geotechnical seabed surveys,
- environmental protection related activities,
- administrative procedures in Poland, Denmark, Germany and Sweden including the building permits,
- arrangements with the owners of the subsea infrastructure (power cables, telecommunication cables, pipelines) crossing the Baltic Pipe route,
- pre-engineering works for the onshore part of the Baltic Pipe,
- administrative procedures for the onshore part of the Baltic Pipe.

If a contractually confirmed market interest in the Baltic Pipe capacity is obtained, the performance of the aforementioned actions with the remaining development of the transmission system shall make it possible to considerably accelerate its realisation in the future. Once a contractually confirmed interest in the Baltic Pipe capacity is obtained as a result of the Open Season/capacity allocation procedure, GAZ-SYSTEM shall receive the basis to enter into the implementation stage. The Open Season procedure may also be conducted during the pre-investment stage if relevant market conditions appear.

[8] The indentified subregions consist inter alia of 1) Sweden, Denmark and 2) Poland. More information is presented in chapter 2.8 in this report.

Analysis of the extension of LNG Terminal

The LNG terminal in Świnoujście will be the first LNG terminal in the Baltic Sea area. In the first stage of operation (as of mid-2014), the terminal will enable the re-gasification of up to 54 TWh/y of natural gas. In the following years, depending on the increase of demand for gas, it will be possible to increase the capacity up to 84 TWh/y, without the need to expand the site on which the terminal is constructed.

The extension of the project will enable to benefit from the economies of scale, as relatively low investment costs (no need to construct facility from scratch, majority of costs will be related to construction of the 3rd storage tank) may bring further benefits to gas consumers in the Baltic Sea area and the CEE region. The additional capacity offered by the terminal will facilitate the access to spot LNG markets that are characterised by flexible supplies and lower prices than those that currently prevail in the CEE and Baltic regions.

The terminal may provide a new source of supply for Lithuania and the other Baltic States once GIPL is implemented and extended at a later stage. The project may also constitute a regional solution supplying local LNG terminals in the Baltic Sea area (smaller vessels) and addressing the "clean transport" goals. In this case it is worth mentioning that LNG/CNG supplies from the terminal in Świnoujście may be used in road, rail and maritime transport in the Baltic Sea area and thus contribute to reduction of greenhouse gas emissions. Furthermore, the supplies from the LNG terminal in Świnoujście may be directed through the planned Baltic Pipe to Denmark and Sweden and by means of upgraded transmission system in Poland, PL-CZ and PL-SK interconnections towards the South, to other CEE countries.

The extension of the terminal in Świnoujście together with the upgrade of transmission system in Poland and interconnectors between Poland and the other EU member states may contribute to the creation of a physical hub in Świnoujście and/or virtual hub in Poland.

Implementation of the project offers a possibility to make gas markets in the region more flexible, allow for the entry of new players to the market and increase price competition. The terminal will also play an important role in terms of security of supply and diversification of import sources and routes, as the terminal will offer free capacities that can be used in case of short-term disruptions.

The extension of Poland-Czech Republic Gas Interconnection (within N-S gas interconnection concept)

The PL-CZ interconnection aims to establish a well functioning interconnection between the Polish and Czech gas grids and assure transmission capacity complying with the current and perspective market requirements. The 1st phase of project development was completed in September 2011 when gas flows were initiated. Curentlly, the capacity of PL-CZ interconnection amounts for 5,4 TWh/y.

The Polish and Czech TSOs, GAZ-SYSTEM and NET4GAS respectevly, are cooperating with a view to upgrade technical conditions of the interconnection. The 2nd phase of project development will aim at increasing the interconnection capacity and providing bidirectional gas flow at the level of approx. 54 TWh/y by development of the transmission systems on both sides of the border (on the Polish side – Skoczów-Komorowice-Oświęcim pipeline).

The extension of PL-CZ interconnection would provide larger transportation corridor that will allow for flexible transport of gas between Poland, the Czech Republic and possibly Slovakia both under normal and emergency situations. This would in turn:

- enhance the security and diversification of gas supplies in the CEE region;
- improve the safety, reliability and interoperability of interconnected gas networks in Poland and the Czech Republic;
- allow new market players to approach the gas markets (currently the infrastructure in the region is fragmented and poorly interconnected and, thus, unattractive for upstream players);
- advance the integration of the regional market;
- possitively stimulate the competition on the market.

The final investment decision related to the project can be expected in relation to market needs, in particular based on the results of a market survey, an Open Season procedure and with the utilisation of preinvestment work results, which are currently ongoing.

The PL-CZ interconnection complies with priorities of the European energy infrastructure development policy, as well as regional cooperation priorities. The project constitutes a necessary element of gas grid development within the North-South natural gas interconnection concept, which aims to give the opportunity for the CEE countries to be well-connected to the EU gas network and to provide access to new sources and routes of gas supplies, such as LNG (terminals in Poland and Croatia), Southern Corridor projects, potentially Norwegian gas (through Baltic Pipe) and unconventional gas (if confirmed). The factor will positively influence on the regional economy and social benefits, as it is expected that the effect of competition should lead to decrease of gas price on the CEE market.

Furthermore, the extension of PL-CZ interconnection will help promote the use of natural gas as a sustainable source of energy that can contribute to reducing greenhouse gas emissions in the CEE region. In this context it should be borne in mind that gas-fired power plants may replace ageing coal-based power plants that are responsible for substantial (in Poland almost entire) part of energy production.

Summarizing, the project is expected to contribute to the development of the secure, competitive and liquid market, which, due to the development of the cross-border infrastructure under the BEMIP concept, may also expand on the Baltic region.

Poland – Slovakia interconnection (within N-S gas interconnection concept)

The main need addressed by the project is to provide a link between Poland and Slovakia that is currently missing. PL-SK interconnection constitutes a vital element of the strategy aimed to build a secure and diversified transmission system in Poland and in other countires in the CEE region. After its implementation, the regional gas grid will be characterised by a higher degree of reliability and it will also be less vulnerable to potential supply disruptions from Eastern direction.

GAZ-SYSTEM together with Eustream (the Slovak gas TSO) are conducting analytical works - feasibility studies - related to the project implementation. It is estimated that the PL-SK interconnection will come on stream in 2017.

The PL-SK interconnection complies with priorities of the European energy infrastructure development policy, as well as regional cooperation priorities. The project constitutes a necessary element of gas grid development within the North-South natural gas interconnection concept, which aims to give the opportunity for the CEE countries to be well-connected to the EU gas network and to provide access to new sources and routes of gas supplies, such as LNG (terminals in Poland and Croatia), Southern Corridor projects, potentially Norwegian gas (through Baltic Pipe) and unconventional gas (if confirmed). The factor will positively influence on the regional economy and social benefits, as it is expected that the effect of competition should lead to decrease of gas price on the CEE market.

Thanks to enabling the access to the new, competitive sources of gas deliveries, the project will enhance the safety, reliability and interoperability of interconnected gas networks in Poland and Slovak Republic and contribute to establishing a well-functioning internal gas market (the completion of the so called Carpathian gas ring). Construction of PL-SK interconnection may require, to some extent, modernisation of existing transmission system in the South-East of Poland (i.a. Tworzeń-Pogórska Wola pipeline, Strachocina-Pogórska Wola pipeline and Hermanowice-Jarosław pipeline).

The project shall be perceived as a complementary link towards the PL-CZ interconnection. The PL-SK interconnection will provide a new transport corridor that will streamline gas trading on regional markets and contribute to greater attractiveness of CEE markets for gas suppliers interested in delivering large volumes to new markets (currently the infrastructure in the region is fragmented and poorly interconnected and, thus, unattractive for upstream players).

Furthermore, the implementation of PL-SK interconnection will help promote the use of natural gas as a sustainable source of energy that can contribute to reducing greenhouse gas emissions in the CEE region. In this context it should be borne in mind that gas-fired power plants may replace ageing coal-based power plants that are responsible for substantial (in Poland almost entire) part of energy production.

Summarizing, the project is expected to contribute to the development of the secure, competitive and liquid market, which, due to the development of the cross border infrastructure under the BEMIP concept, may also expand on the Baltic region.

(4) Denmark, Sweden

To supply the demand in Denmark and Sweden in the light of the declining production in the Danish part of the north sea several projects are being investigated.

From 2015 the capacity which will be established through the FIDs in Denmark and Germany will no longer be sufficient to ensure supply to Denmark and Sweden. From this year the needed capacity will increase in line with the decrease in the production in the Danish part of the North Sea, combined with the expected development in demand and production of biogas in Denmark and Sweden.

In the following table the different alternatives are listed together with their expected capacity and the expected investments. The state of the projects differ greatly as some have already been investigated thoroughly, while other have only been analysed roughly. The LNG and Biogas alternatives are in reality several small projects that are being done for other reasons than to secure the supply of gas to the markets. And these projects are not expected to deliver sufficient capacity to meet close the gap between the expected demand and the capacity delivered by existing connections and FIDs. In the following only the four pipeline projects are treated.

Alternative	Capacity	Expected Investment
D - DK	54 GWh/day (4,5 Mm3/d) with potential to expand to 89 GWh/day (7,4 Mm^3/d)	approx. 200 mEUR
N - S	9 Mm^3/d with 4,5 Mm^3/d new market	6,5 billion SEK
P - DK	36-48 GWh/day or 3-4 billion m^3/Day	Approx. 540 mEUR
N - DK	60 GWh/day or 5 Mm^3/d	Approx. 200 mEUR
LNG	Projects aimed at fuelling ships	
Biogas	0,7 Mm^3/d for current discussed projects in Sweden, Current offgrid production in Denmark 0,55 Mm^3/d - expected potential in 2020 - 1,7 Mm^3/d	

Figure 44: The list of considered alternatives

The most mature project is D-DK which is phase two of the current German FID and matches the capacity of the project under construction on the Danish side. The project is based on an open season which showed market interest in the investment. The investment depends on a decision on the German side and is thus beyond the control of the TSOs in Denmark and Sweden. The project will increase the interconnection of the Danish/Swedish market with the mature market in Germany.

The N-DK project has been analysed in the Gassco run GIR process in 2011, but do to the fact that it will not increase the export capacity from Norway significantly, Gassco has stopped further analyses. The market interest has to be confirmed. The project will increase security of supply by adding a new direct supply route to the Danish/Swedish market.

The N-SE project, a revised reduced version of Skanled with a scope within the original Skanled scope, has been analysed by Swedegas in cooperation with Norwegian and Swedish stakeholders. Despite approval by the responsible authority, the Energy Market Inspectorate, the Swedish government recently (2011-12-01) decided not to grant the concession necessary to realize the project. Stakeholders are evaluating consequences of this decision. The project would facilitate supply to new market areas and increase security of supply by adding a new direct supply route to the Danish/Swedish market, and through its location in the North-eastern most part of the system, it would also reduce the vulnerability of the system.

The P-DK project has been analysed several times for at project with main flow in the opposite direction. The market interest still has to be confirmed in an Open Season. The project will increase security of supply by adding a new direct supply route to the Danish/Swedish market, and through its location in the eastern part of the system, it will also reduce the vulnerability of the system.

The D-DK, N-DK and P-DK connections will continue the current situation with Sweden being supplied through the Danish system and thus Swedish consumers paying tariffs in the Danish system. The N-SE project will alter this situation by establishing a direct supply route to Sweden.

5. Identification of risk and barriers

Górzyca

The table below provide a description of the most important barriers that hamper implementation of gas investment projects in the BEMIP region. The barriers were divided into several groups related to market, regulatory, supply and financing issues.

Type of risk/ barrier	Description
Market	**Differences in the role of natural gas in national economies.** The markets of BEMIP region are different in terms of role of natural gas in the energy mix, energy policy goals in general, market structure and organization and the future role of gas[9] . Such situation causes uncertainty about investment environment and project viability and, consequently, hampers the efforts to develop gas projects in the Baltic Sea area. **Lack of shippers willingness to commit in long-term perspective.** The degree of market development and natural gas transmission system varies considerably within the EU. Apart from countries with mature markets, a dense transmission system, equipped with a diversified portfolio of supplies, there are countries with underdeveloped transmission system, dependent on one source of supply, and also weakly linked with neighbouring states. This is mainly due to historical circumstances, including the energy-mix, the dominant supplier and shape of the transmission system as in the case of Baltic Sea countries. Investing in projects that remove existing market imperfections is associated with an increased risk of lack of profitability and, consequently, a lack of basic financial viability of the project for the investor. Changing the direction of development of the transmission system, which eventually will lead to the improved market situation (security of supply, increased competitiveness, market development, etc.) could not find a sufficient market base (contract) support. It is also a result of the impact of market evolution, including EU policy, which prefers market-based solutions on the short and medium term. Such circumstances have a direct impact on the increased risk of major infrastructure projects requiring large capital expenditures undertaken in the past on the basis of long-term contracts. It should also be stressed, particularly in the context of ensuring security of supply and diversification, that projects based solely on funding by the market will not be able to fully protect these objectives. This follows from the fact that the market (shippers) contracts the projects based on defined and specific customer expectations, and will not fund the additional capacity needed to ensure security of supply in the case of the exclusion of one of the sources of supply. In addition, it should be noted that the market-based infrastructure projects are always looking for the cheapest option, which usually are not, at least in the short and medium term, options to diversify. **Too small markets to ensure economic viability of the large scale projects.** The gas markets in the Baltic Sea region can be in general classified as small, fragmented markets with high dependency on external supplies. This situation causes, as described above, that global upstream and trading players are not interested in investing in these countries. **Interdependency between projects.** Projects in the BEMIP region are highly dependent on the implementation of other infrastructure projects in the region. This situation has already resulted in postponement of investments in the BEMIP region. This was for instance the case for Baltic Pipe, as it was initially linked to the Skanled project that was suspended by investors in 2009. **Competition between projects.** Gas projects in the region also struggle with high competition from other projects that have similar characteristics. This is especially relevant for proposed LNG import terminals in the Baltic States and Finland, as well as the Gas Interconnection Poland-Lithuania. Therefore, construction of LNG terminal in one of the countries would considerably reduce commercial viability of other LNG terminals or the Gas Interconnection Poland-Lithuania and putting their implementation at risk. **Producers.** Project promoters, especially in West Baltic area, pursued investments that were aimed at getting access to new sources of supply (for instance Norwegian gas). The projects such as Skanled and Baltic Pipe were not, however, implemented in the past, also due to lack of producer's interest in investing in new infrastructure to transport natural gas to new markets.This was mainly caused by too low return and higher attractiveness of gas markets in North-West Europe.

[9] More information on the future role of natural gas in the countries of Baltic Sea region in presented in chapter 2.8.

Type of risk/ barrier	Description
Regulatory framework	**Lengthy and complex consultation and permit granting procedures** often have an impact on delays in the pre-investment phase. The most important reasons for delays at this stage of investment process include: • Complexity of procedures; • Contradictions and regulation changes; • Blocking of procedures; • Protracted judicial proceedings; • Lack of binding time limits for procedures that may lead to their extension; • Requirement to obtain permits issued by many authorities; • Difficulties in obtaining access to land; • Interpretation latitude; • Excessive requirements regarding early stages of project plans development; Having in mind the above-mentioned challenges, it should be noted that actions aiming at accelerating and simplifying procedures for permits and licenses for energy infrastructure projects, by setting common standards for projects which involve more member countries, may positively contribute to implementation of investments in the Baltic Sea region. Realisation of certain investment project in the BEMIP area was facilitated by means of best practices and fast-track procedures. Such enhanced rules were adopted for instance in Poland in a view to ensure timely implementation of LNG terminal in Świnoujście and accompanying projects. **Tariff regime.** The most important problems noted in this context include: • too low rate of return allowed by regulators, which does not stimulate new investments, • lack of incentives for infrastructure projects mainly aimed at improving security of supply, • inadequate tariff solutions for projects passing through several countries, the so-called pancaking. There is also an issue of cross border cost allocation, where costs of the investment beneficial for one country/TSO have to be borne by the another country/TSO. In such cases, there are no solutions that enable conducting cross-border investment without potential disadvantage for investing parties.
Supply	**Pricing policy of the dominant external supplier.** The high flexibility of pricing policy set by one external supplier resulting in the lack of competitive pricing proposals. The current main (single) supplier may implement nonmarket-based price strategy adjusting gas sale prices in a flexible way potentially worsening economic viability of gas transport via new projects.
Financing	**Difficult access to competitive sources of financing.** Certain projects in the BEMIP area can be regarded as SoS investments that need the access to direct financial support (e.g. EU grants, interest rate subsidies) and innovative financial mechanisms (e.g. equity participation and support to infrastructure funds, loan guarantees, leveraging loan finance from international financial institutions and targeted facilities for project bonds.) in order to ensure economic viability of the project.

Figure 45: Identification of key barriers

6. Conclusions

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The gas transmission network in the BEMIP region is to a large degree characterized by infrastructure that is used to transport the gas from one external supplier that provides the major part or even all volume of gas consumed (as in the case of PL, LT, LV, ES, FI, SE) or domestic production (DK). Therefore, for the diversification of gas supply there is a big need of new gas infrastructure projects.

The BEMIP region in the next coming years may still remain not enough connected with the other European regions, due to the lack of connection between particular markets and external sources.

The BEMIP GRIP provides the list of future infrastructure projects that offer a possibility to overcome the currently existing division of the Baltic Sea region into four unconnected with each other subregions. This in turn may contribute to creation of a well-integrated, competitive and liquid regional market of approx. 30 bcm/y gas consumption that is attractive for upstream players and traders. It should be, however, noted that the majority of projects with the most added value for the region – such as Gas Interconnection Poland-Lithuania (GIPL), Poland-Denmark Interconnection (Baltic Pipe) and Finland-Estonia Interconnector (Balticconnector) – have non-FID status. Consequently, their implementation time is scheduled for the 2nd part of analysed period (namely between 2016 and 2021). This forecast does not apply to LNG terminal in Świnoujście that is coming on stream in 2014.

Timely implementation of gas infrastructure projects in the Baltic Sea area will depend on the way how the identified risks and barriers will be overcome.

Most of the BEMIP countries are expected to have stable demand rates, while Poland will record a high increase of both average and peak daily demand (amounting to an increase of 93% and 72% respectively by 2021). This may bring the necessary impetus for the development of the regional gas market. It should be also noted that the development of the shale gas extraction on the large scale in Poland may also bring the commercially driven boost on the cross-border infrastructure development. However, even in such case some existing barriers (particularly of permitting nature) may delay the development of infrastructure.

The BEMIP GRIP 2012-2021 can be considered as a pilot version of this GRIP. The BEMIP GRIP TSOs will appreciate all feedback, opinions and comments that will help to further improve following editions of BEMIP GRIP, as well as to adjust it both to market needs and challenges the BEMIP region is going to face in the future.

Assumptions

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Country	Conversion factors (kWh/m³)	Temperature (°C)
Finland		
Estonia		
Latvia	10,35	20
Lithuania	10,34	20
Poland	10,8	0
Denmark		
Sweden		

Figure 46: Conversion factors

Definitions

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Term	Definitions
Average Daily Demand	means the daily demand on an average day and is calculated as the annual demand divided by 365
Peak Daily Demand	means the daily demand under 1in20 climatic conditions
Technical capacity	means the maximum firm capacity that the transmission system operator can offer to the network users, taking account of system integrity and the operational requirements of the transmission network (Art. 2(1)(18), REG-715)
Transmission	means the transport of natural gas through a network, which mainly contains high-pressure pipelines, other than an upstream pipeline network and other than the part of high-pressure pipelines primarily used in the context of local distribution of natural gas, with a view to its delivery to customers, but not including supply (Art. 2(1)(1), REG-715)

Abbreviations

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Abbreviation	Full Name
Bcm	Billion normal cubic meters
BEMIP GRIP	Gas Regional Investment Plan of Baltic Energy Market Interconnection Plan Region
BNetzA	Bundesnetzagentur
CEE	Central and Eastern Europe
CEF	Connecting Europe Facility
CHP	Combined heat and power
CS	Compressor Station
DIR-30	Directive 98/30/EC of the European Parliament and of the Council of 22 June 1998 concerning common rules for the internal market in natural gas
DIR-73	Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas and repealing Directive 2003/55/EC
DSO	Distribution System Operator
EEPR	European Energy Programme for Recovery
ENTSOG	European Network of Transmissions System Operators for Gas
ERDF	European Regional Development Fund
ETS	European Trading Scheme
EU	European Union

Abbreviation	Full Name
FID	Final Investment Decision
GDN	gas distribution node
GIR	Gas Infrastructure Reinforcement
GRIP	Gas Regional Investment Plan
GTF	Gas Transfer Facility
GuD	Gasunie Deutschland
GWh	Gigawatt hour
HLG	High Level Group
IP	Interconnection Point
ITO	Independent Transmission Operator
MWh	Megawatt hour
NC	Network Code
NES	(Lithuania's) National Energy Strategy
NPG	Nord Pool Gas
N-S	North-South
OPIE	(Poland's) Operational Programme Infrastructure and Environment (cohesion fund)
PCI	Project of Common Interest
REG-SoS	Regulation 994/2010 of the European Parliament and of the Council of 20 October 2010 concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC
SoS	Security of Supply
TEN-E	trans-European energy networks
ToR	Terms of Reference
TPA	Third Party Access
TSO	Transmission System Operator
TTF	Title Transfer Facility
TWh	Terawatt hour
UGS	Underground Storage (facility)

Country Codes

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Country Code	Full Name	Country Code	Full Name
BY	Belarus	**LT**	Lithuania
DK	Denmark	**NO**	Norway
EE	Estonia	**PL**	Poland
FI	Finland	**RU**	Russia
DE	Germany	**SE**	Sweden
LV	Latvia	**UA**	Ukraine

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BEMIP
Gas Regional Investment Plan
2012 - 2021

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