

## High dependence does not mean high energy insecurity

**Dependence on Russian gas:** Baltic States and Finland have an exceptionally high dependence on Russian gas imports. First of all, in all of these countries Russia is the sole supplier, providing 100% of natural gas imports. Moreover, at present none of these countries have alternative sources of gas imports with the only gas supply channel being Yamal-Europe gas pipeline, operated by government-owned Russian gas export monopoly Gazprom. In addition, none of the countries extract their own gas (even though attempts are being made to look for shale gas in the Baltics) thus making the gas market fully dependent on Russian imports.

**Country by country dependence:** In absolute terms, Finland and Lithuania has the biggest dependence on Russian gas imports (3.7 and 3.3 billions of cubic meters respectively) followed by Latvia (1.7 billions) and Estonia (0.7 billions). In relative terms, Russian gas constitutes respectively 37% and 27% of total primary energy consumption in Latvia and Lithuania vis-a-vis a mere 9% for both Estonia and Finland.

**Dependence by sectors:** Lithuania has the highest relative exposure to Russian gas imports primarily owing to of the high usage of gas by industrial companies (i.e. fertilizer producer AB “Achema” alone imported 1.45 billion cubic meters of gas in 2012 which constitutes 44% of overall Lithuanian gas imports). AB “Achema” employs 1400 employees and is responsible for 2.4% of Lithuanian goods exports (2012) hence potential gas supply disruptions would make significant adverse effect on Lithuanian economic development. On the other hand, Latvian and Estonian industrial companies do not have significant exposure to gas imports.

In spite of increasing usage of renewable energy sources (e.g. wind, biofuel), Russian gas still remains among the most popular resources for energy generation in Lithuania and Latvia with gas-powered plants supplying around 25% of overall electricity consumption (2012). On the contrary, Estonian energy sector is the least dependent on Russian gas owing to its abundance of shale oil reserves, which generates more than 100% of Estonia's electricity needs (and makes Estonia net-exporter of electricity). Finnish electricity market also has relatively limited dependence on Russia due to its well-diversified electricity market with nuclear (25%), hydro (19%), biofuel (13%) and coal (8%) being more widely used than gas (8%).

Gas is also widely used for heat generation in all the Baltic States with the share of gas in central heating system production varying from as high as 78% in Latvia, 48% in both Lithuania and Estonia and 21% in Finland.

Consumption for residential purposes is low in all the analysed countries (<10% of total gas consumption).

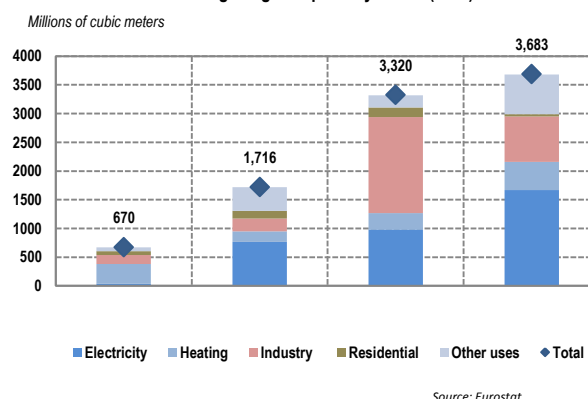
### Dependence on Russian gas

Criteria	Estonia	Latvia	Lithuania	Finland
Gas imports (millions of cubic meters)	670	1716	3320	3683
Share in primary energy consumption	9%	27%	37%	9%
Import share from Russia	100%	100%	100%	100%
Existing import alternatives	No	No	No	No

Source: Eurostat (2012)

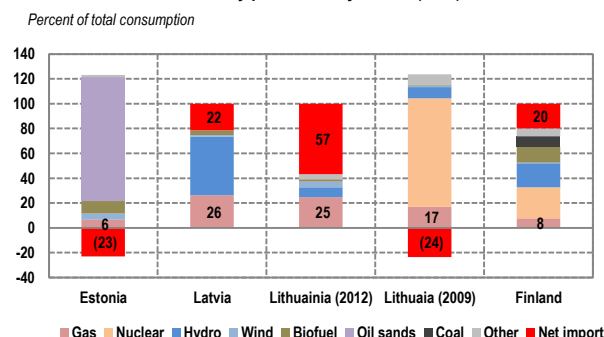
### Gas mainly consumed for power generation

The usage of gas imports by sector (2012)



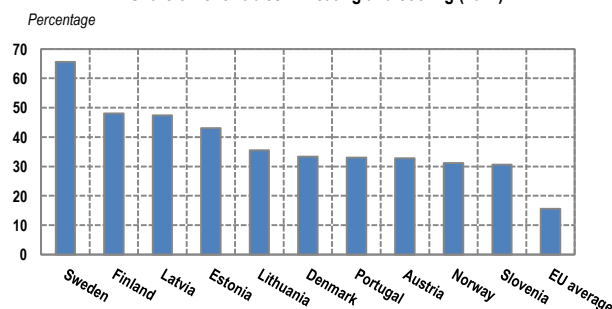
### Usage of gas in electricity power generation

Electricity production by source (2012)



### Baltics extensively use renewables in heating

Share of renewables in heating and cooling (2012)



### High energy dependence is not energy insecurity.

High dependence on Russian gas should not be confused with supply insecurity, since security of gas supply not only depends on import dependence, but also on other factors such as the existence of gas storage facilities, availability of substitutes, the status of a country as a transit country or development of new energy security enhancing projects.

**Gas storage facilities:** Statistically, Latvia may seem to be highly dependent on Russian gas imports, but actually it has virtually no risk of gas supply disruptions in the upcoming months due to the existence of Incukalna Underground Gas Storage Facility, which has a capacity to store up to 2.32 billion m<sup>3</sup> of natural gas (140% of annual Latvian consumption). According to the Latvian Economy Minister, Incukalna gas storage facility continued to pump gas to the storage facility and held 65% of the necessary natural gas supply for Latvia as of August 1, 2014 (c.a. 1 billion m<sup>3</sup>). The facility plays very important role in enhancing gas supply security not only in Latvia, but in the Baltic region as a whole. It buys gas from Russia in summer (when demand is low) and sells it in winter to their customers in Latvia, Estonia, Lithuania and Russia (see graph). Finland, on the other hand, is the most vulnerable to unforeseen gas supply disruptions, since it has no large scale storage facilities. To reduce this vulnerability, Finland is implementing "Balticconnector" gas pipeline project, which would connect Finland to the Baltic grids and would allow access to the Latvia's natural gas storage facilities in Incukalna (expected: 2016-2018).

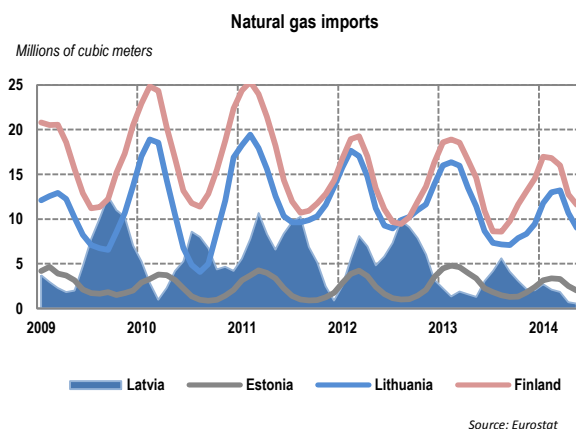
**Status of a transit country:** Lithuanian gas energy security is enhanced as a result of its status as a transit country to Russian Kaliningrad district, which receives 100% of its gas supplies via Lithuania. Existing underground gas storage facility in Kaliningrad district (52 million m<sup>3</sup>) is able to supply Kaliningrad with only 7-12 days of gas consumption (total annual consumption in Kaliningrad district: ~2 billion m<sup>3</sup>), while Nord Stream offshore gas pipeline, running directly from Russia to Germany via Baltic Sea does not have a branch to Kaliningrad. Other Baltic States and Finland are not transit countries.

**Energy security enhancing projects:** Lithuania is in the final stages of building Klaipeda LNG terminal, which is scheduled to begin operations on December 2014. The terminal has a capacity to supply up to 2 billion m<sup>3</sup> of natural gas per year (~2/3 of annual consumption in Lithuania) and would provide real alternative to Russian imported gas (gas supplier - Statoil, terminal - Hyundai). In addition, Lithuania fully implemented The EU's Third Energy Package, which will enable to create competitive and transparent gas market (as a consequence of its efforts to liberalize gas market, Lithuania was paying the highest gas import price for the last couple of years). Estonia and Finland have also plans to build LNG terminals (expected in 2018), while Latvia currently has no plans to diversify its gas import markets.

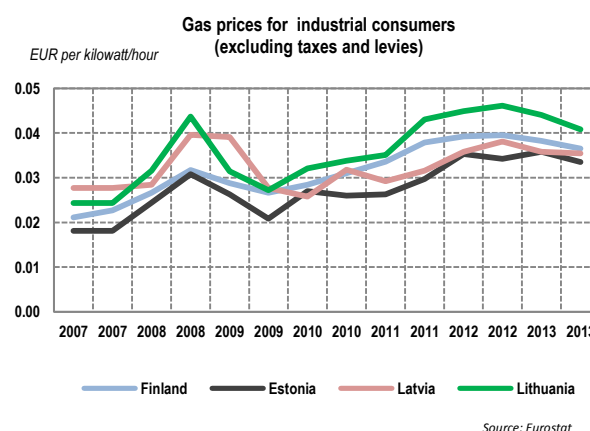
### Assessment of gas supply security

Criteria	Estonia	Latvia	Lithuania	Finland
Absolute exposure	Low	Medium	High	High
Relative exposure	Medium	High	Very high	Medium
Supply insecurity (short-term: < 1 year)	High	Low	Medium	Very high
Supply insecurity (long-term > 1 year)	High	High	Low	High
Gas storage facilities	No	Yes	No	No
Transit country	No	No	Yes	No
Import independence	2018	No plans	2014	2018

### Unusual gas import patterns in Latvia



### Lithuania paid the price for gas independence



### Upcoming projects to enhance gas supply security

Country	Project	Completion	Capacity
Lithuania	Klaipeda LNG terminal	2014 Dec	2 billion m <sup>3</sup>
Lithuania	Gas Interconnection Poland-Lithuania (GIPL)	2018	2.3 billion m <sup>3</sup>
Estonia <sup>1</sup>	LNG terminal	2018/20	~2 billion m <sup>3</sup>
Finland <sup>1</sup>	LNG terminal	2018/20	~2 billion m <sup>3</sup>
Finland/Estonia	Balticconnector: pipeline between EE and FI	2018/20	~2 billion m <sup>3</sup>

#### Notes:

1. European Commission in June 2014 rejected the Finnish-Estonian proposal to build two separate LNG terminals (one in Estonia and one in Finland), hence Estonia and Finland will yet have to agree in which country the terminal should be built, which may delay the construction

**Electricity market:** Electricity market dependence on Russia can be divided into two categories: direct and indirect. Direct dependence occurs from direct imports of electricity from Russia whereas indirect – from electricity production using imported Russian gas. Lithuania and Latvia have significant both direct and indirect exposure whereas Estonia and Finland – has very little to no exposure.

**Direct dependence:** Even though all the Baltic States are members of Nord Pool Spot electricity market, only Estonia can fully enjoy the benefits of the free market, since it has required infrastructure to connect to other market regions. Estlink1 (350MW) and Estlink2 (650MW) electric cables effectively allows creating one price zone between Estonia and Finland and limit the need of direct electricity imports from Russia. Finland is an active member of Nord Pool spot electricity market and has enough capacity to import potential electricity shortfall from Sweden, Norway or Estonia.

However, Latvia and Lithuania presently has no connections (existing 330MW connection to Estonia creates a bottleneck) to other Nord Pool Spot regions, which isolates the Latvian/Lithuanian region and creates a separate zone with persistently higher prices. The closure of Ignalina nuclear power plant in 2010 transformed Lithuania (and Latvia) region from surplus to deficit region and further increased its dependence on Russia (~30% of Lithuanian electricity imports come from Russia).

**Projects to reduce direct dependence:** The situation, however, is expected to change by the end of 2015, after the construction of NordBalt (700MW) cable between Lithuania and Sweden and LitPol Link (1000MW) cable between Lithuania and Poland will be completed (both projects are in a final stage already). Hence, in case of gas and/or electricity supply disruptions from Russia, the temporary jump in electricity prices in Latvia and Lithuania can be expected (until projects will be completed in end-2015).

**Indirect dependence:** The dependence on Lithuanian/Latvian region on Russia is further enhanced by the usage of gas powered plans for electricity production, which supplied around 25% of overall electricity consumption both in Latvia and Lithuania (2012). To limit the dependence on gas, Baltic States and Poland considered building regional “Visaginas” nuclear power station (together with Japanese Hitachi corporation), but the project have been postponed many times and now it is highly unlikely that it will be implemented any time soon. Lithuania and Latvia, however, are constantly increasing the share of renewable energy sources that somewhat helps reducing dependence on gas (mainly wind and bio-fuel).

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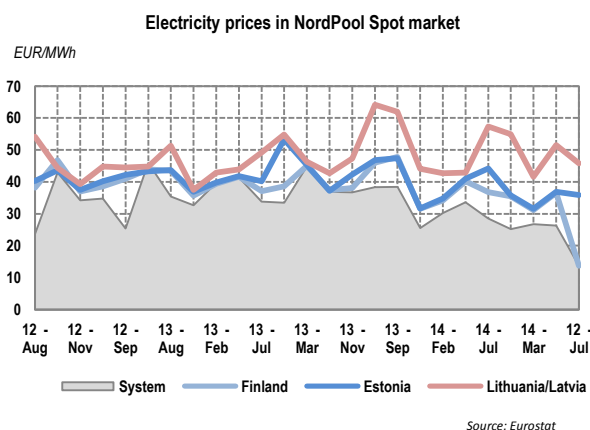
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## Assessment of electricity supply security

Criteria	Estonia	Latvia	Lithuania	Finland
Direct exposure (imports)	Low	Medium	High	Medium
Indirect exposure (production from gas)	Low	High	Very high	Medium
Supply insecurity (long-term > 1 year)	Low	High	Very high	Low
Supply insecurity (long-term > 1 year)	Low	Low	Low	Low

## Separate price zones in Nord Pool Spot



## Existing and upcoming electricity connections

Connection	Connects	Completed	Capacity
Estlink1	Estonia-Finland	2007	350MW
Estlink2	Estonia-Finland	2014	650MW
NordBalt (SwedLit)	Lithuania-Sweden SE4	end-2015	700MW
LitPol Link	Lithuania-Poland	end-2015	1000MW

## Map of existing and planned electricity connections



Source: Elering

