POLICY BRIEF
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GOVERNMENT'S ANALYSIS, ASSESSMENT AND RESEARCH ACTIVITIES

Perspectives into topical issues in society and ways to support political decision making

Finland's security of supply and Russia's ability to influence through energy under energy transition

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The most critical factor for Finland's security of supply is the safeguarding of fuel logistics and the functioning of the electricity grid going towards 2040

Transitions in energy markets and new technologies can have a significant impact on geopolitical balance and national security by affecting countries' energy trade, economy and security of supply. For example, combatting global climate change has already had and will continue to have an impact on the demand for hydrocarbons. Decreasing demand can put financial pressure on countries with economies dependent on export of hydrocarbons (coal, oil and gas), and this may create political instabilities. Simultaneously, political decisions to financially support energy production from renewable sources, mainly wind, have reduced countries' dependency on fossil fuel imports and paved the way for a wave of countries' own competitive renewable energy sources.

This policy brief is based on the third phase of a three-phase study on changing geopolitics of energy conducted in cooperation with Pöyry Management Consulting Oy and Aleksanteri Institute of the University of Helsinki, and finalised at the end of 2017 (Sipilä et al., 2017).

The first phase of the study involved performing a global, market-based analysis and developing three energy scenarios until 2040: base scenario, rapid development scenario and slow development scenario (Semkin, et al., 2017). The second phase of the study assessed the impacts of these scenarios from the point of view of Russia's energy and security policies. Moreover, the policy brief analysed how Russia is using control of its energy resources and flows of traded energy commodities to exert political leverage in conflict situations (Tynkkynen et al., 2017). The third phase of the study is based on this understanding of leverage and dependencies in energy trade to propose measures that simultaneously promote the energy transition and energy security in Finland.

This policy brief focuses on Finland and analyses how the Finnish energy security will develop and what the challenges are if the rapid development scenario takes place until 2040. Based on the scenario analysis, it can be concluded that:

- Finland's security of supply will improve with the decline in the share of imported fuels, and decreasing economic dependence on Russia and Russia's ability to influence through energy.
- Russia is likely to use less direct means of action but the use of indirect means is possible.
- The most critical factors for Finland's security of supply are the safeguarding of fuel logistics (biofuels in heat production and oil products and liquid biofuels in transport sector) and the functioning of the electricity grid, especially in situations where the gap in production capacity and peak consumption in Finland is large.

In order to prepare for the possible indirect impacts of Russia on Finland's energy sector in the future, cooperation between authorities, ministries and the private sector is essential in anticipating various uncertainties and risks as well as in policy drafting.

THE STUDY ENABLES POLICY MAKERS TO PREPARE FOR FUTURE IN ENERGY SECTOR

The purpose of the study was to enable Finnish policy makers to prepare for future situations in energy sector and make sound decisions that will guarantee continued economic energy production and both national and energy security in Finland.

To assess global changes in energy markets, three energy scenarios (base scenario, rapid development and slow development) until 2040 were constructed with projections for total energy consumption, demand for oil, gas, coal and electricity, as well as wind and solar power production (Table 1). The rapid development scenario is based on a target of limiting global temperature increase to 2 degrees compared to the pre-industrial era. The base scenario represents a mainstream view of energy sector development. The slow development scenario is an unlikely scenario and primarily serves as a benchmark to reflect on the other scenarios.

Table 1 – Three energy sector scenarios

Rapid development	Base scenario	Slow development
• Corresponds to IEA 450 scenario • Constructed with a set goal – limiting increase in global temperature to 2 degrees. Scenario represents credible path to this objective • Policy, technology development and renewable energy uptake all support climate change prevention	• Synthesis of five different energy scenarios* • Represents the current mainstream view of future changes • Energy sector transformation continues, but at a much slower pace than in the rapid development scenario e.g. oil remains critical fuel * IEA 2016, WEC 2016, BP 2017, McKinsey 2017 and EIA 2016	• Historical trends extrapolated to the future • Benchmark, 'no-will, no change' scenario, showing the unlikely but possible outcome • Requires large-scale political reversals

Focus in this policy brief

RESULTS AND CONCLUSIONS

This section presents a short background and key findings of the study. An overview of the Finland's energy system and energy imports, as well as their dependence on Russia is presented. Then key changes to energy security of supply and a potential risk of indirect influence to Finland from Russia under rapid development scenario are discussed.

Finland's energy system and dependency on energy imports from Russia

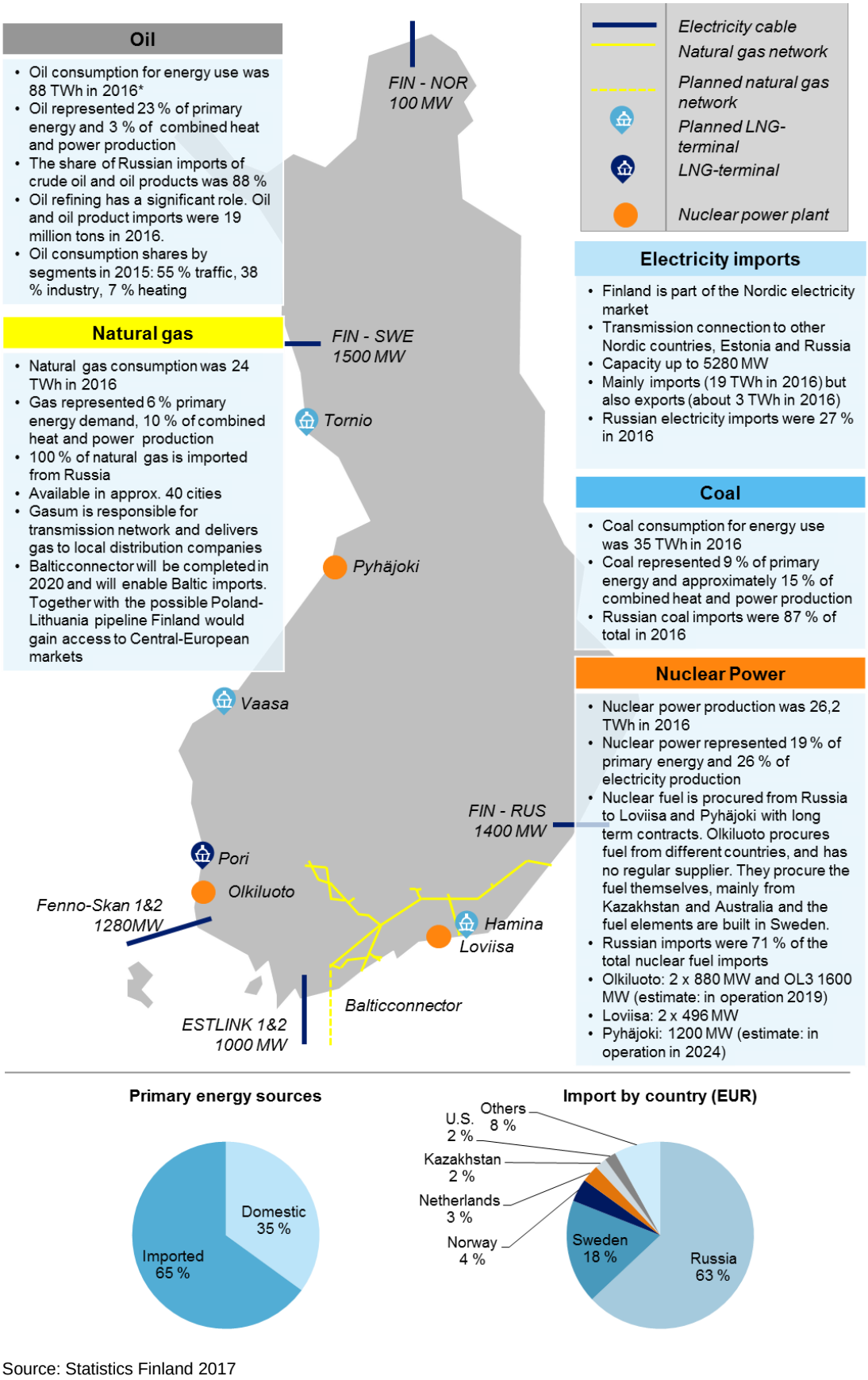
Finnish energy security is built on a diverse energy production portfolio. Finland is heavily dependent on energy imports (65% of primary energy is imported). Russia represented 63 % of the total value (in EURs) of energy imports in 2016 with particularly high shares of fossil fuel imports from Russia. The next largest import sources to Finland are Nordic countries (Sweden 18% and Norway 4%). A high level overview of Finnish energy imports and their use is shown in Figure 1.

Imports of oil and natural gas represent the most significant dependencies from Russia. Around 87% of all oil products and 100% of natural gas is imported from Russia. Oil imports in total represented 78 % of the total cost of energy imports in 2016 (Statistics Finland, 2017). More than half of the oil imports, however, are refined to oil products and exported.

High levels of imports from Russia are primarily explained by their price compared to alternatives: Most of the imported energy sources from Russia are a cheaper option than comparable sources from other countries. This is because of physical proximity of Russia but also generally the cheaper price level of Russian energy sources. For example, Urals quality oil from Russia is typically cheaper than Brent quality from Norway (Neste, 2017).

According to the previous policy brief of this series (Tynkkynen et al., 2017) cheaper prices and the high volume of imports create a potential leverage for Russia. It therefore makes sense to attempt to quantify the extent of this energy dependency. Table 2 shows an estimate of the cost of importing all of fuels and energy coming from Russia from alternative sources. Thus, it represents the high-level view of financial dependency on Russian energy imports. However, it should be noted that the analysis shows only the cost side. Multiplier effects, e.g. potential loss of revenue and profits of Neste, a company using high amounts of Russian oil to produce export products, have not been taken into account.

Figure 1 – Finnish energy system and energy imports



Source: Statistics Finland 2017
*Includes transport use, e.g. diesel & gasoline

Table 2 – Financial benefit of Russian energy imports to Finland when compared to alternative import sources

Energy source	Financial benefit per year	Comment
Coal*	**11 – 12 MEUR**	• 2016 Russian import price adjusted with the average price difference between Russia and Polish imports between 2013 and 2017
Oil*	**160 – 450 MEUR**	• 2016 Russian import price adjusted with the average price difference between Russia and the next two cheapest options after Russia and all the other options between 2013 and 2017
Other oil products*	**190 MEUR**	• 2016 Russian import price adjusted with the average price difference of Russian imports and imports from all the other countries between 2013 and 2017
Natural gas	**>210 MEUR**	• Replacing Russian imports is currently theoretical • As a reference: in 2016 the value of Russian gas imports was 380 M€ • Estimation is based on the difference between German border price and Finnish imports' price and gas transmission costs through Poland and Baltics ▪ Transfer costs through Poland is based on local transmission tariffs ▪ Transmission from Poland to Finland has been estimated on average tariff which with Balticconnector and GILP would be profitable, if transfer is reserved entirely for Finnish gas imports ▪ No additional investment costs have been taken into account • The outcome is not entirely independent of Russian gas, as Russian gas prices have a considerable effect on German border price
Uranium	**–**	• Between 2011 and 2015 imports from Germany and Sweden have been approximately 26 % cheaper than from Russia. Real situation is challenging to estimate, as price is affected by the standards from the power plant in question.
Biomass	**–**	• No financial dependency on imports. Price is determined locally.
Electricity	**70 – 80 MEUR**	• Based on Pöyry estimate of electricity spot-price, if Russian imports are not available, and the volume of electricity consumption

* Compared cif (Cost, Insurance and freight) prices.
Sources: Statistics Finland, Finnish customs statistics, Pöyry, Reuters, CEF Energy, Gaz System

Impact of rapid development scenario on security of supply – key issues

Finland's dependency on Russian energy imports is expected to decrease in the rapid development scenario. This is mainly due to decreasing use of hydrocarbons for energy production and the movement towards increased use of biomass, nuclear power, wind and

solar in energy production and electricity and biofuels in transport sector. Looking at the financial dependency described above, this would mean a reduction of 60% in “financial dependency”, assuming the price difference between Russian imports and alternative sources remain the same. In the long term, key changes happen with regards to the electricity grid, electricity production and the importance of logistics from the perspective of security of supply.

Finland’s dependency on Russian energy imports is expected to decrease

In the rapid development scenario in particular, the electrification of all sectors increases. By 2040 there will be 800 000 personal electric vehicles (approximately 30 % of the whole stock), public transport and possibly heavy traffic vehicles. Heat pumps produce 12 TWh of heat, which represents the demand of 800 000 domestic houses (62 % of all domestic houses). As a result, security of electricity distribution becomes more critical; electricity outages will have a greater negative impact as availability of electricity can have a major effect on domestic heating and mobility.

At the same time an increasing share of electricity is produced with weather-dependent intermittent production – wind and solar power (see the full final report of this study for more detail: Sipilä et al., 2017). Because of the increased use of wind and solar power in electricity production there will be more “standing capacity” to secure energy supply during peak demand hours. That is, capacity that produces less frequently throughout the year than what it would have in current market conditions (i.e. lower load factor). In the rapid development scenario this capacity would be primarily biomass based CHP production. In the base scenario this capacity could exist in the market without subsidies. However, in the rapid development scenario the decreasing demand and price of gas and coal, together with increasing wind and solar production could create a low electricity price market and there might be a need to resort to capacity payment mechanisms or other changes to market to keep the capacity in the market.

There is large potential for demand side response in the rapid development scenario. Market mechanisms need to be reviewed and new mechanisms may need to be created in order for it to efficiently participate in the market. Demand side response can, however, only assist in short term demand spikes. Longer term (in this case longer can mean a few hours) demand spikes and production/system disruptions will still be problematic as the responsive demand still needs to be realised at some point. An example of this type of demand side response is electrical vehicles.

Increased use of biomass in energy production will make supply logistics more critical from a security of supply perspective. The poor storing properties of biomass means that the amount of biomass stored at site covers shorter production periods than coal for example and therefore it is critical to ensure smooth logistics at all times.

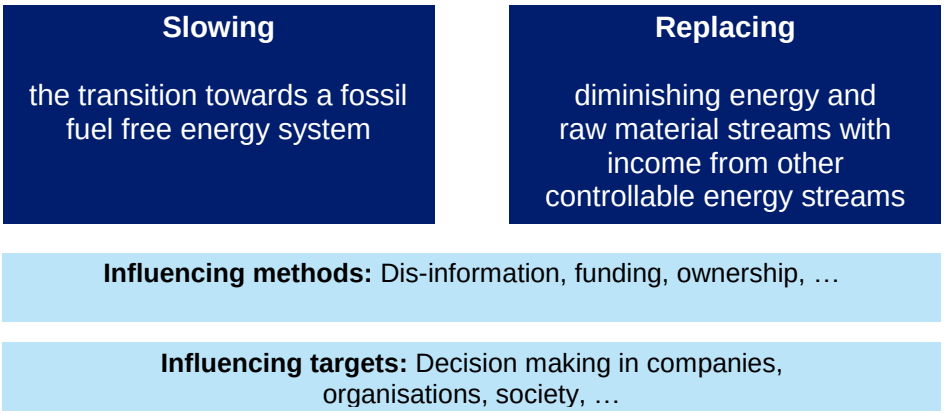
Risk of indirect action against Finnish energy policy

From a Russian perspective the global energy revolution and EU-market development are key challenges, not just for the economic development, but also for the stability of the political

system. The transition in the rapid development scenario is challenging for the Russian economy, as within the current political system, Russia will not make the required structural changes to succeed in the world of the rapid development scenario. The depletion of energy income will happen with relatively slow pace and won't therefore force the Russian government to active decision making early enough.

Taking into account the strategic importance of the energy sector to Russia, it is realistic to assume that various indirect influencing methods could be used to secure energy income and influence. In previous studies it has been shown how Russia has sought to influence the target country's energy politics both with hard (closing pipelines) and soft (selling energy with cut prices) methods (Øverland ja Orttung, 2011). In the Ukrainian conflict Russia has demonstrated significant capability to influence the target country by combining financial, information and military influencing methods. Figure 2 below presents what could be the goal of indirect influencing methods in order to secure energy income and influence.

Figure 2 – Indirect influence in the energy sector



Slowing the transition means that Russia would seek to slow down the process of switching to renewables, or energy sources sourced from outside Russia, especially in countries that are important export countries to Russia. This could concern especially oil and gas, as they have the largest effect on export income. Suspicions of this type of activity have been raised in Bulgaria and Romania for example, where fracking experiments by US companies to produce hydrocarbons inland where brought down by large demonstrations. In both cases questions have arisen regarding the involvement of Gazprom and Russia in arranging and funding the demonstrations, with the goal of bringing down the projects and sustaining the states' dependency of Russian gas (New York Times 2014; Financial Times 2014).

In Lithuania a process is underway to open up political connections in the energy sector linked to strategic initiatives. This is linked to the decision by the Lithuanian parliament to initiate a treason trial against a member of the parliament from the leading Social Democratic party. He is suspected of acting in compliance with the interest of the Russian state company Rosatom in the Kaliningrad nuclear power plant project (Elta 2017a; Elta 2017b; BNS News 2017).

Russia can also seek to **replace energy and raw-material streams** with other export products to replace depleting income especially from oil. The most realistic alternatives are nuclear power and gas, of which the latter is linked to the aforementioned slowing of the transition. Exporting nuclear power technology is an important strategic goal for Russia (see final report of this study Sipilä et al. 2017). In addition, there are indications that nuclear power co-operation is a high priority in the relations between Finland and Russia. Rosatom,

for example, has started an initiative which seeks to create a positive image of nuclear power and Russia in general.

Recommendations for policy makers

In order for the government and policymakers to prepare for the potential of indirect influence of Russia, three fundamental principles can be identified based on the Finnish context and recent research (e.g. Chivvis, 2017):

Firstly: Collaboration between private and public sector, such as ministries and authorities responsible for critical assets to society is essential to identify different uncertainties and risks. In addition, operations and political security risks need to be identified to assess critical infrastructure and plans to mitigate risks.

Secondly: Sufficient resources and tools need to be allocated to intelligence and data analysis. For example in the case of disinformation, continuous situational awareness is fundamental for timely action by authorities.

Thirdly: Open and democratic society is based on the ability to have broad societal discussions. This requires improving citizens' media literacy, communications by authorities and other actions that reinforce spreading timely information and reduce the impact of disinformation under normal conditions and during crisis.

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