
KEEPING ENERGY SECURITY AND COMPETITIVENESS IN EQUILIBRIUM: THE CASES OF THE REGIONAL NUCLEAR POWER PLANT AND THE LIQUEFIED NATURAL GAS TERMINAL

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Abstract

This paper is concerned with the validity of the regional nuclear power plant that is to be built in Visaginas by 2020 and the liquefied natural gas terminal to be constructed by the Pig's Back Island in the harbour of Klaipeda by 2014 through the prism of energy security and competitiveness. The common European Union energy policy, especially its first two of the three main objectives, i.e., *energy security*, *competitiveness*, and *efficiency*, constitute the focus of analysis. It is sought to cast light upon the question whether energy security and competitiveness will be kept in equilibrium when the regional power plant has been commissioned and the liquefied natural gas terminal has been constructed. The article will also provide some recommendations as to what actions to resort to should these objectives clash with each other.

Introduction

Energy is one of the most important economic fields. Lithuania puts forward several goals that are both relevant and necessary to all the Baltic States. The main goal in this field is energy security, especially after the decommissioning of the second unit of the Ignalina Nuclear Power Plant (NPP). Lithuania is also seeking to ensure competitiveness in the energy sector. In pursuit of these goals, the Government implements measures of the National Energy (Energy Independence) Strategy and, in particular, two construction projects: of the new nuclear power plant (New NPP) and of the liquefied natural gas (LNG) terminal. These projects, however, have garnered controversial assessments.

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Some analysts and politicians argue that the new NPP will solve the issue of an “isolated energy island”, create new workplaces, and have a positive impact on the country’s economy. Meanwhile others emphasise that the project of the new NPP is not justifiable on economical grounds. Thus it is not clear how much the project will cost, nor is it clear whether it will be competitive. It is argued that the attention should rather be focused on the creation of a common energy market where it would be possible to purchase electricity at a competitive price. With regard to the LNG terminal, critics recommend Lithuania to participate in the construction of the regional LNG terminal in Latvia intended for all the Baltic States, which would receive financial support from the European Union (EU).¹ Therefore, the question that needs to be answered is as follows: will these two great projects ensure energy security and competitiveness?

This article analyses the validity of the new NPP and the LNG terminal projects in terms of the objectives of energy security and competitiveness. The present article also supplements current analyses and contributes to the general discussion on this issue.

The topic is relevant because increased dependence of Lithuania, Latvia, and Estonia on imported gas from a single supplier encourages the three Baltic States to address the issues of energy independence, reliable supply, and competitiveness. The common EU energy policy just brings these issues into focus. There are positive shifts in terms of energy security and competitiveness, but what can be done should these objectives clash with each other?

The sources used in this article are related to the common EU energy policy and relevant Lithuanian goals as well as the implementation of the strategic energy projects. Edward Lucas’s book, in which much attention is invested to energy, highlights the dependence of the EU and the Baltic States on a single energy supplier.² The discussion of the objectives of the common EU energy policy will benefit from references to the Green Paper prepared by the European Commission, in which the EU’s attention to the Baltic States

¹ Lietuvos Respublikos Seimas, *Frakcijos naujienos*, Seimo narės B.Vėsaitės pranešimas: kiek Lietuvos gyventojams kainuos A. Sekmoko energetinės vizijos? [Message by member of Seimas B. Vėsaitė: How much A. Sekmokas’ energy visions will cost to Lithuanian residents?] 2011 m. vasario 18 d., <http://www3.lrs.lt/pls/inter/w5_show?p_r=6258&p_d=107653&p_k=1>, 03 03 2012.

² Lucas E., *The New Cold War: How the Kremlin Menaces Russia and West*. Bloomsbury, 2008.

is reflected.³ Another useful document in this respect is the Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and Committee of the Regions “Energy 2020: A strategy for competitive, sustainable and secure energy”.⁴ Similar goals are raised in the Lithuanian New National Energy (Energy independence) Strategy.⁵ All these materials are relevant for the discussion of energy security, competitiveness, and sustainability.

The assessment of the strategic energy projects, i.e., the validity of the new NPP and the LNG terminal in light of the objectives of energy security and competitiveness, will rely on the data from the Organisation for Economic Co-operation and Development, renewable energy country profiles, press releases, information from the Ministry of Economics of the Republic of Latvia, the Ministry of Economic Affairs and Communications of the Republic of Estonia, Agrus Media Ltd, Visagino atominė elektrinė JSC, and Klaipėdos nafta SC.

The present article explores the equilibrium between energy security and competitiveness of the Lithuanian energy sector in light of the implementation of the new NPP and LNG terminal projects.

The goal of the article is to assess the validity of the new NPP and LNG terminal projects. On the basis of primary and secondary sources, the following questions will be considered: 1) will the implementation of these projects keep energy security and competitiveness in equilibrium? 2) what measures are to be taken should these objectives clash with each other? 3) which of the objectives should be given priority?

The goal will be achieved through the following steps:

- a discussion of the objectives of the common EU energy policy on the basis of primary and secondary sources;

³ European Commission, *Green Paper* “A European Strategy for Sustainable, Competitive and Secure Energy”. Brussels: European Commission, March 8, 2006. <http://europa.eu/documents/comm/green_papers/pdf/com2006_105_en.pdf>, 17 11 2011.

⁴ European Commission, *Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and Committee of the Regions* “Energy 2020: A strategy for competitive, sustainable and secure energy”. Brussels: European Commission, November 10, 2010, <<http://www.energy.eu/directives/com-2010-0639.pdf>>, 17 11 2011.

⁵ *Lietuvos Respublikos Seimo nutarimas „Dėl nacionalinės energetikos (energetinės nepriklausomybės) strategijos patvirtinimo“ projektas* (Nr. XIP-2488) [*Seimas Resolution On National Energy (Energy Independence) Strategy*]. Vilnius: Lietuvos Respublikos Seimas, 2010 m. spalio 6 d.

- a critical analysis of the two strategic energy projects in Lithuania through the prism of energy security and competitiveness;
- recommendations regarding measures to be taken should the objectives in question clash with each other.

The following methods are used:

- analysis of primary sources related to the common EU energy policy and to Lithuania's implementation of the strategic energy projects;
- analysis of secondary sources related to the construction of the new NPP and LNG terminal;
- critical assessment of the situation in question.

The article has the following structure. In the first section, the three objectives of the common EU energy policy and their importance to Lithuania are discussed. The objectives constitute the basis for the analytical approach towards the issue. The second section seeks to provide a critical assessment of the benefits of the project to the economy and consumers. Consequently, it is centred around the construction of the new NPP and the question of how successful this project will be in keeping energy security and competitiveness in the Baltic States energy sector in equilibrium. In the third section, the LNG terminal project is analysed through the prism of energy security and competitiveness, and its benefits to Lithuania are critically assessed. In the conclusion, the most important findings of the present research will be presented.

1. Common European Union energy policy

As mentioned in the introduction, since the decommissioning of the second unit of the Ignalina NPP on 31 December 2009, the dependence on Russian gas has increased significantly. Currently, 100 percent of natural gas is imported from Russia, Lithuania's single gas supplier. On the other hand, almost all Europe is dependent on Russian gas, and only a small part is imported from Norway and Algeria.⁶ While the dependence on gas constantly increases, new gas pipelines

⁶ European Commission (note 2), 17 11 2011, p. 3.

are developing, most notably, “Nord Stream”.⁷ The severe consequences of the dependence on gas were most obvious in the gas war between Russia and Ukraine, which sparked because of Ukraine’s unsettled bills to Russia. As a result, several EU countries suffered from disruption of gas supply in 2006 and 2009.⁸ Another conflict of the same nature took place between Russia and Belarus in 2007.⁹ These factors determine the necessity to strengthen the external dimension of the common energy policy, viz., *security of supply*.

To reduce the dependence of its member states on a single energy supplier, the EU must ensure a competitive and efficient energy market. This means that the consumer should be able to choose an energy supplier at a competitive price. The competition allows the consumer to avoid monopoly prices imposed by a single supplier at its discretion. For that purpose, it is necessary to implement the third energy package so as to separate production and supply activities by gas and electricity transmission networks and to integrate these energy networks into the internal market.¹⁰ In the Green Paper issued in 2006, the Baltic States were indentified as an “isolated energy island”.¹¹ These are the countries which are not integrated into the EU market, while their electricity system is synchronised with the Russian IPS/UPS system. For that purpose, in 2009, the European Commission developed the Baltic Energy Market Interconnection Plan (BEMIP), which posits as its goal full integration of the Baltic States into the Western energy market as well as strengthening interconnections with the neighboring EU member states. Together these objectives meet the EU’s 20-20-20 objectives, i.e. 20 percent reduction in the greenhouse effect, 20 percent increase in renewable energy, and 20 percent increase in energy efficiency by 2020.¹²

⁷ Lucas E. (note 1), p. 222–228.

⁸ BBC, “Russia-Ukraine gas row heats up”. BBC, 31 December 2008. Retrieved from <<http://news.bbc.co.uk/2/hi/7805770.stm>> on 17 November 2011.

⁹ EUbusiness, “EU gas meeting off as Russia, Belarus solve supply row”. EUbusiness, August 3, 2007. Retrieved from <<http://www.eubusiness.com/topics/energy/russia-belarus-gas.80>> on 17 November 2011.

¹⁰ European Commission (note 3), p. 2–21.

¹¹ European Commission (note 2), 25 11 2011, p. 6–7

¹² European Commission, *Energy Infrastructure, Baltic Energy Market Interconnection Plan (BEMIP)*. Retrieved from <http://ec.europa.eu/energy/infrastructure/bemip_en.htm> on 25 November 2011.

Faced with climate change caused by CO₂ emissions, which are also largely the result of the energy sector, the EU seeks to increase the development of renewable energy and promote energy efficiency. This means that both energy extraction and production must be based on *sustainability* principles. The development of local energy resources contributes to the increase of competitiveness and partial independence, because it would reduce the demand for oil and gas. As mentioned before, the EU has also committed itself to reducing its greenhouse gas emissions by 20 percent while proportionally increasing renewable energy content, in accordance with the Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and Committee of the Regions “20 20 by 2020: Europe’s climate change opportunity”.¹³ Although Lithuania is committed to achieving the rate of 23 percent in total gross final energy demand by 2020, the country does not take active measures to attain that goal. This is understandable – projects like this require huge investments and pay off over a long period of time. Currently, renewable energy amounts to 17 percent of total energy consumption in Lithuania. Meanwhile Estonia is committed to getting 25 percent of renewable energy by 2020; currently, the share of renewables amounts to 23 percent. Latvia is committed to achieving a 39 percent share by 2020. The ambitious goal is justified, for Latvia has the biggest hydro power plant (HPP), and currently, the share of renewables in total energy consumption reaches about 36 percent.¹⁴ A comparison of the three Baltic States reveals that Lithuania has the most ambiguous aim in terms of renewables, but sustainability has no priority over the other two objectives of the common EU energy policy.

It seems that the Baltic States are mostly interested in energy security and competitiveness; therefore, the great projects, presented in the introduction, are high on the energy policy agenda. The section below will examine the

¹³ European Commission, *Communication From the Commission to the European Parliament, the Council, the European Economic and Social Committee and Committee of the Regions “20 20 by 2020: Europe’s climate change opportunity”*. Brussels: European Commission, January 23, 2008, p 3–4. Retrieved from <<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0030:FIN:EN:PDF>> on 17 November 2011.

¹⁴ Re-Shapping, *Shaping an effective and efficient European renewable energy market*, “Renewable Energy Policy Country Profiles”, Mach 2011, p. 82–88, 171–195.

validity of the new NPP project in light of these two objectives and will serve as a preparatory stage for the following discussion of what measures are to be taken should these objectives clash with each other.

2. The new nuclear power plant in Lithuania

The Ignalina NPP, which was decommissioned on 31 December 2009, supplied about 70.2 percent of Lithuanian electricity production.¹⁵ A small part was exported. However, since the beginning of 2010, more than 60 percent of electricity has been imported from a single supplier.¹⁶ To compare, Latvia imports about 12 percent¹⁷ and Estonia – 4.7 percent (according to data as of 11 December 2009, i.e., before the decommissioning of the Ignalina NPP).¹⁸ Moreover, Lithuanian energy dependence on Russian gas increased due to the need for electricity generation. It is worth noting that Lithuania's dependence on Russian gas, as well as the dependence of its two sisters, Latvia and Estonia, amounts to 100 percent.

To solve this issue, the three Baltic States are seeking to build a new NPP in Visaginas by 2020. Initially Poland was also involved in the construction plans, but has recently withdrawn from the project. Despite that and Polish plans to build its own nuclear power plant, the decision is arguably not permanent, and the situation might change again. This may depend on the speed of the implementation of the project and the country's belief in its success. Meanwhile the project is moving forward smoothly: the EU and Lithuania have expressed their strong support, the Business and Financial Model has been

¹⁵ Lietuvos Respublikos valstybės kontrolė, *Valstybinio audito ataskaita. Elektros energijos kainų didėjimo pagrįstumas* [State Audit Report. The Validity of Increase in Electricity Prices], 2008 m. gruodžio 30 d. Nr. VA-P2-20-1-28 Vilnius.

¹⁶ UAB „Visagino atominė elektrinė“, „Nucleus“. (Informacinis leidinys Nr. 15) [“Nucleus”. (Informational edition No. 15)]. Vilnius: UAB „Visagino atominė elektrinė“, 2011.

¹⁷ Ministry of Economics of the Republic of Latvia, *Energy*. Rīga, 2012. Retrieved from <<http://www.em.gov.lv/em/2nd/?cat=30166&lng=en>> on 26 January 2012.

¹⁸ Ministry of Economic Affairs and Communications of the Republic of Estonia, *National Development Plan of the Energy Sector until 2020*. Tallinn: Ministry of Economic Affairs and Communications of the Republic of Estonia, 2009. Retrieved from <http://www.mkm.ee/public/ENMAK_EN.pdf> on 26 January 2012.

prepared, the Environmental Impact Assessment and relevant geological studies have been completed,¹⁹ strategic investor Hitachi has been selected, the negotiations have been completed, and the concession treaty has been initialed. The main driving force for this project is the objective to ensure energy security, to satisfy future electricity demand, and to prevent any electricity shortages, thereby safeguarding against the consequences of the closure of the Ignalina NPP and old power plants. This requires national capacities and alternative supply. Moreover, as noticed in the New National Energy (Energy Independence) Strategy, this objective is the state's priority until 2020.²⁰

However, critics argue that the project has no economic grounds. Thus no cost-benefit analysis has been conducted. At first glance, the project of the new NPP quite meets the energy security objective. According to economist Professor Rimantas Rudzkis, "political benefits are more important for politicians; therefore, it is increase in energy independence that is emphasised, but not economic effect"²¹. Concerning competitiveness, as underlined by critics, it is necessary to talk about the cost. Will it be competitive? Will the new NPP establish a monopoly in the energy sector, by radically changing the situation with respect to gas importers, thermal powers and developers of renewable energy? According to Rudzkis' calculations, electricity rates would amount to about 9 euro ct/kWh. Rudzkis emphasises that many doubts concern the possibly protracted construction and unforeseen costs increases. Moreover, the average price of electricity at Lithuanian power exchange amounts to about 5 euro ct/kWh²² (it is difficult to predict what electricity price will be in 2020. Of course, according to ENTSO-E forecasts, the price would range between

¹⁹ Government of the Republic of Lithuania, *Resolution No. 300 of 22 April, 2009*, "Strategic Directions of the Implementation of the New Nuclear Power Plant Project in Lithuania". Vilnius: Government of the Republic of Lithuania, 2009. Retrieved from <http://www.vae.lt/files/resolution_no_300.doc> on 21 November 2011, p. 3–4.

²⁰ Lietuvos Respublikos Seimas (note 4), p. 10.

²¹ Rudzkis R., „Kiek kainuos VAE gaminama elektros energija?“ [“How much will electricity generated by the Visaginas NNP cost?”]. Delfi, 20 November 2008. Retrieved from <<http://www.delfi.lt/news/ringas/lit/rudzkis-kiek-kainuos-vae-gaminama-elektros-energija.d?id=50295440&l=fplead>> on 25 November 2011.

²² BALTPPOOL UAB, *Prekybos Lietuvos elektros biržoje duomenys [Trade Lithuanian electricity exchange data]*, 2010-01-01–2011-11-25. Retrieved from <<http://www.baltpool.lt/index.php?585831303>> on 25 November 2011.

5 and 9 euro ct/kWh²³). This price is calculated taking into consideration the construction costs, the discount rate, debt refinancing expenditures that could amount to about 7–8 percent, operation and maintenance, insurance and waste management costs. According to the economist, if the cost of power exchange reached around 9 euro ct/kWh, the electricity price at 9 euro ct/kWh would be competitive. There is, however, one “if”, which creates much uncertainty, because of the significant variation in prices. According to the economist, it would be difficult to trade such electricity in the open market because of the cheaper imported electricity on the one hand, and the expected surplus of electricity in the market on the other. But at this point Rudzkis avoids answering the question of what will happen to electricity demand after 2016, when some polluting power plants in Estonia and Poland will be decommissioned following the EU environmental directives.²⁴ Would this not produce a shortage of electricity supply? Rudzkis attributes the expected surplus to the possible shrinking of the population in the Baltic countries,²⁵ but emigration mainly depends on economic cycles, while the economy of the region is currently recovering. Although it is impossible to make optimistic projections and maintain that emigration will not increase and all emigrants will return to Lithuania, the extent of emigration should contract a little or become stable.

Economist Dr. Raimondas Kuodis adheres to similar views. According to Kuodis’ calculations, electricity prices would also amount to 9 euro ct/kWh until the loan for construction has been paid out. Such a high cost is determined by capital costs which could increase from 5 to 6 bn EUR due to interest rates²⁶ (according to Kuodis’ calculations – 5.5 percent). It is clear that there are two main important variables – construction costs and interest rates. These should be carefully discussed at the political and public level in as much detail

²³ Lietuvos Respublikos energetikos, „VAE – elektros tiekimo saugumas konkurencinga kaina“ [“The Visaginas NPP – security of electricity supply at a competitive price”]. Vilnius, 2010 m. kovo 30 d. Retrieved from <http://www.enmin.lt/lt/naujienos/VAE_tiekimo_saugumas_konkurencinga_kaina.pdf> on 16 April 2011.

²⁴ UAB „Visagino atominė elektrinė“, „Nucleus“. (Informacinis leidinys Nr. 10) [“Nucleus”. (Informational edition No. 10)]. Vilnius: UAB „Visagino atominė elektrinė“, 2011.

²⁵ Rudzkis R., (note 20).

²⁶ Juršytė J. „R. Kuodis: elektra VAE iki paskolų išmokėjimo kainuotų apie 30 ct/kWh“ [“R. Kuodis: The Electricity of the Visaginas NPP would cost about 30 ct/kWh until the loan has been paid out“]. Delfi, 9 March 2012. Retrieved from <<http://verslas.delfi.lt/energetics/rkuodis-elektra-vae-iki-paskolu-ismokejimo-kainuotu-apie-30-ctkwh.d?id=56491531>> on 18 April 2012.

as possible, because any uncertainty regarding competitiveness casts shadows of doubt on the entire project and could negatively affect interest rates, especially when borrowing from commercial banks.

In Kuodis' opinion, when solving energy security and competitiveness issues, it is necessary to focus on interconnection projects like the Lithuania–Sweden electricity interconnection “NordBalt” (to be built by 2015). This interconnection would enable Lithuania to get cheap electricity from Scandinavia.²⁷ Furthermore, it would solve the issue of an “isolated energy island” by integrating the country into the Western power system, as noticed in the BEMIP.²⁸ According to Kuodis, the main problem is the failure to prepare a cost-benefit analysis.²⁹ In Rudzki's opinion, the new NPP “would increase the average price for consumers and would reduce the country's competitiveness”³⁰. It might reduce the country's attractiveness to investors, as they are primarily concerned about economic benefits.

As regards possible alternatives, critics of the Visaginas NPP recommend Lithuania to develop renewable energy sources, such as wind power, solar energy, and biomass. According to the estimates of the Lithuanian Energy Consultants Association, which is usually in favour of the Greens, electricity demand in 2020 will be similar to that of 2011. The main argument of why the demand would not increase is the efficiency of electricity consumption and emigration.³¹ But authors of the research do not take into account the aforementioned fact that the polluting power plants in Estonia and Poland are to be decommissioned by 2016. Most importantly, the research is carried out at the national level, while the Visaginas NPP is a regional project. In this way, what alternative to the NPP is offered? According to research findings examining all available potential generating capacities, generation is exceeded by demand by 83 days

²⁷ Kuodis R., „Nauja atominė elektrinė – amžiaus mitas“ [“The New Nuclear Power Plant – the Myth of the Century”], *Respublika*, 2007 m. lapkričio 27 d., p. 3.

²⁸ European Commission (note 11).

²⁹ Kuodis R., „Kaip finansuoti naują atominę elektrinę“ [“How to Finance the New Nuclear Power Plant”], *Valstybė*, 2007, p. 86–89.

³⁰ Rudzki R., (note 20).

³¹ Nagevičius M., „Visagino atominės elektrinės projektas ir atsinaujinančių energijos šaltinių energetika – ar yra vietos abiems?“ [“The Visaginas NPP and renewables – is there enough place for both in Lithuania?”]. Vilnius: Lietuvos energetikos konsultantų asociacija, 2012.

per year. But if future development of biomass-fired combined heat and power plants over the planned objectives is taken into consideration, this number shrinks to 5 days per year. To fully satisfy the demand, it is recommended to develop offshore wind power plants and solar energy. There are great aims indeed, and such initiatives are highly welcomed. Unfortunately, the cost of electricity generated by alternative sources is still rather high, and the country should subsidise it. In addition, renewable energy sources cannot ensure stable generation of baseload electricity. Kuodis believes that this problem could be solved by diversifying generation capacities, for example, in the geographic context, by developing offshore wind power plants and solar elements in sunny places. The cost of electricity, in turn, could cheapen due to technological progress, innovations and provided that generation operates under economies of scale.³² This means that, throughout the next decade, the cost of electricity generated by wind power plants would be competitive. Finally, the economist also draws attention to the fact that, if the country

is ready to build the NPP, *de facto*, it crowds out all other alternatives for decades ahead. It needs to take it into account that it has gone the wrong way, i.e., to rise the cost due to the uncertainty of what alternative technologies would be like in 10–20 years, and what the cost of it would be³³.

In short, the cost of electricity generated by the Visaginas NPP would be uncompetitive and, alongside interconnections, the country should develop alternative sources like wind power plants, in particular, offshore plants (though there has been no detailed planning conducted for marine areas) and biomass energy.

These are, however, only calculations and opinions of several economists accompanied by a limited analysis of the Lithuanian Energy Consultant Association. To get a more comprehensive view, it is necessary to review studies

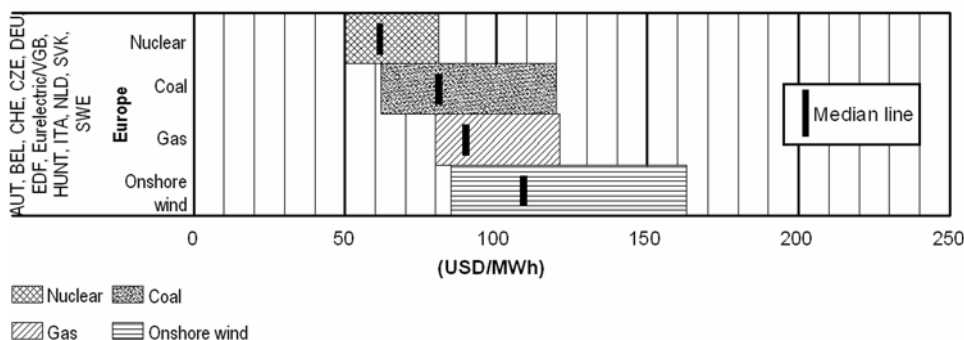
³² Interview “Ar tikrai energetikoje ignoruojama ekonomika? Kaip ekonominiu požiūriu vertintinas Visagino atominės elektrinės projektas, šilumos ūkio ir dujų monopolijų skaidymas?” [“Is economy really ignored in energy? How should the project of the Visaginas Nuclear Power Plant and the schism between heating and gas monopolies be assessed in terms of economy?”]. Žinių radijas, 28 February 2012. Retrieved from <<http://www.ziniur.lt/archyvas/2012/269/aktualusis-interviu/16025/ar-tikrai-energetikoje-ignoruojama-ekonomika-kaip-ekonominiu-pozhuriu-vertintinas-visagino-atominės-elektrinės-projektas-silumos-ukio-ir-duju-monopoliju-skaidymas->> on 18 April 2012.

³³ *Ibid.*

performed by international agencies like the Organisation for Economic Co-operation and Development (OECD). The study of interest in the present discussion focuses on the expected plan-level costs of baseload electricity generation by power plants that could be commissioned by 2015. Therefore, similar plan-level costs could be attributed to the new NPP, too.

To estimate prospective electricity costs, the levelised costs of electricity (LCOE) are used. The EBPO 2010 Edition includes 21 countries and provides cost data gathered for 190 power plants when baseload electricity is generated by nuclear and fossil thermal power plants as well as a wide range of renewable technologies. The data reveal that, at a 5 percent discount rate, the costs of generating baseload electricity from European nuclear power plants amount about 5 euro ct/kWh (taking into account that 1 EUR – 1.3176 USD). Meanwhile the costs for electricity generation amount to 7 euro ct/kWh when using natural gas, and when using wind power plants – to 8 euro ct/kWh. This is an optimistic scenario (see Figure 1). What is the pessimistic one? According to the scenario, the levelised costs of electricity are calculated at 10 percent discount rate. The costs of generating baseload electricity from nuclear power plants would amount to about 8 euro ct/kWh, from gas-fired ones – to 7 euro ct/kWh, and from wind power plants – to 11 euro ct/kWh (calculations also depend on the exchange rate).³⁴

Fig. 1. Regional ranges of LCOE for nuclear, coal, gas, and onshore wind power plants (with a discount rate of 5 %)³⁵

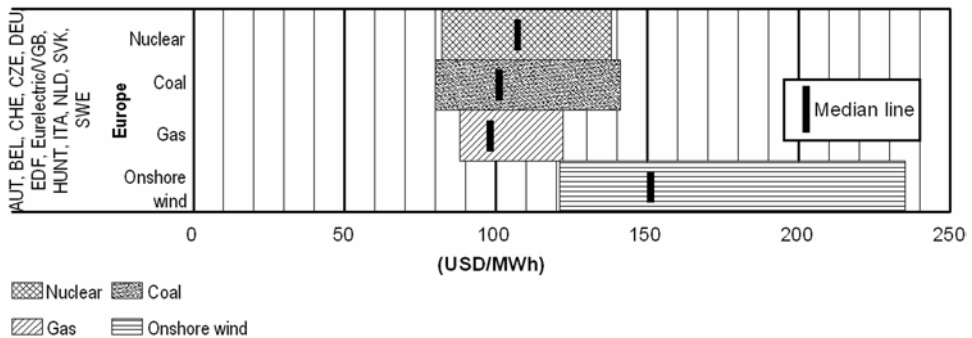


³⁴ Organisation for Economic Co-operation and Development, International Energy Agency and Organisation for Economic Co-operation and Development, Nuclear Energy Agency, *Projected Costs of Generating Electricity: 2010 Edition*. Paris and Issy-les-Moulineaux, 2010.

³⁵ *Ibid.*

It seems that, according to a pessimistic scenario, the costs of generating baseload electricity from nuclear power plants would be a bit higher than relevant costs from gas-fired plants (see Figure 2). However, it is important to notice that Lithuania pays the highest price for natural gas in Europe – 480 US dollars per 1000 m³ (which is not taken into account in the report), and it constitutes from 60 to 80 percent of electricity costs,³⁶ while nuclear fuel – about 16 percent. In this way, LCOE for gas power plants in Lithuania would be higher by 30 percent and would amount to about 9 euro ct/kW. This is because natural gas is imported from a single supplier – Russian gas monopoly Gazprom, which imposes prices based not only on economic, but also on political reasons. Authors of the edition also argue that the competitiveness of power plants depends on local conditions, i.e. access to resources. The closer the power plant to fuel resources, the cheaper electricity will be produced.³⁷

Fig. 2. **Regional ranges of LCOE for nuclear, coal, gas, and onshore wind power plants (at a discount rate of 10 %)**³⁸



Electricity produced by the new NPP would be competitive, and competitiveness is a constituent part of energy security. But in terms of security, the project of the new NPP means much more. Critics' arguments that there will be a possibility to import electricity at a competitive price through

³⁶ UAB „Visagino atominė elektrinė“ (note 16).

³⁷ Organisation for Economic Co-operation and Development, International Energy Agency and Organisation for Economic Co-operation and Development, Nuclear Energy Agency, (note 26).

³⁸ *Ibid*, 2010.

“NordBalt” and “LitPol link” (to be built by 2015) as well as “EstLink 1” and “EstLink 2” (to be built by 2014) interconnections do not account for the risk of cross-border restrictions that would be introduced because of technical reasons.³⁹ Moreover, countries lose money purchasing imported electricity. For example, Lithuania expends 0.87–1.16 bn. EUR a year to purchase imported energy resources and thus supports the importers’ economies, mainly Russia.⁴⁰ Estonia has other problems related to CO₂ emission, because of oil shale-fired power plants that emit more greenhouse gas than natural gas-fired plants. As mentioned before, some of these latter power plants will be decommissioned soon (by 2016) because of the EU environmental directives. Meanwhile Latvia has the Daugava HPP – the biggest HPP in the Baltics – but, as noticed by Energy Department of Ministry of Economics of the Republic of Latvia, “power plants [...] are not capable of producing the required amount of electricity”⁴¹. The Daugava HPP uses variable hydro resources, which influences producing electricity in some periods.⁴² This is the first sign of the predicted lack of generation capacities in the Baltic region; therefore, the development of power plants is a crucial element in the BEMIP, as not only interconnections, but also generation is considered⁴³. This is why the Baltic States must be concerned about energy security. Yet one might wonder why, for example, Finland is constructing the Olkiluoto 3 nuclear power plant and is planning to build Olkiluoto 4, or why Poland seeks to build its own nuclear power plant. The latter country has many coal-fired power plants that greatly pollute the environment and are economically unattractive due to expensive pollution permits.⁴⁴

³⁹ Gatermann, R., “Energy fever in the Baltics”. European Energy Review, 5 February 2010. Retrieved from <<http://www.europeanenergyreview.eu/site/pagina.php?id=1694&zzoek=Energy%20fever%20in%20the%20Baltics>> on 25 January 2012.

⁴⁰ Lietuvos Respublikos Energetikos ministerija, *Lietuvos tikslas Nr. 1 – energetinė nepriklausomybė [Lithuanian goal No. 1 – energy independence]*, 2011. <<http://www.enmin.lt/lt/nes/strategija.pdf>>, 25 01 2012.

⁴¹ Ministry of Economics of the Republic of Latvia, *Latvian Energy in Figures*. Rīga 2011, p. 4. Retrieved from <http://www.em.gov.lv/images/modules/items/Latvijas_energetika_skaitlos_2011%281%29.pdf> on 26 January 2012.

⁴² *Ibid.*, p. 4.

⁴³ Gatermann R. (note 31).

⁴⁴ UAB „Visagino atominė elektrinė“ (note 24).

In conclusion, the new NPP will ensure energy security for the Baltic States, i.e., it will eliminate the risk of cross-border restrictions and shortage of electricity supply; it will open an opportunity for full control over supply and will ensure revenues from potential export earnings. The potential export revenue is related to electricity export from the new NPP. Lithuania has now become a net importer of electricity, mainly from Russia. Prior to this, Lithuania was a net exporter of electricity. Currently Lithuania expends about 0.5 bn EUR for electricity import and gas to produce electricity. In addition, the money expended to import electricity would be left in Lithuania and fuel its economy, while electricity would be more competitive and cheaper than electricity generated by gas-fired or wind power plants. Moreover, discount rate has a considerable impact on price. To keep it reasonable, it is important to ensure a sustainable economic growth. It is, however, difficult to predict exactly, because the construction costs could go up, while the construction itself become protracted because of the growing economy. The electricity generated by gas-fired power plants could cheapen because of the LNG terminal that is to be in place by 2014. This terminal will diversify gas supply and will open possibilities of importing gas from alternative suppliers.⁴⁵ Together with the gas pipeline between Lithuania and Poland, the terminal will also ensure competition with Russian monopoly Gazprom, which is a precondition for a lower and more reasonable gas price.⁴⁶

Should the electricity cost be higher than its market price, the Government might subsidise part of the cost, for example, nuclear waste management costs (this depends on the outcome of the negotiations with strategic investor Hitachi, but the probability of this type of cost is very low). Nevertheless, the Government's resolution to implement this project shows that the most important objective is to ensure energy security and to remain a nuclear energy state. At the same time, this project ensures a better efficiency of electricity generation because the environment is not polluted by CO₂ emission.

⁴⁵ AB „Klaipėdos nafta“, „Terminalas“. (Suskystintų dujų terminalo naujienlaiškis Nr. 1) [“Terminal”. (Liquefied Gas Terminal Newsletter No. 1)]. Klaipėda: AB „Klaipėdos nafta“, 2011.

⁴⁶ Lietuvos Respublikos Seimas (note 4), p. 26–28.

3. Liquefied natural gas terminal

The biggest problems, however, lie in Lithuanian gas sector. As mentioned before, Lithuania is totally dependent on Russian gas, and this dependence has become particularly acute after the closure of the Ignalina NPP. It was also determined by the infrastructure inherited after the collapse of the Soviet Union. The clearest evidence of such dependence, as underlined in the previous section, is gas price imposed on Lithuania, which amounts to 480 US dollars per 1000 m³ and is currently the highest in Europe. This is because there are no alternative supply routes which could be competitive with Russian gas monopoly Gazprom and encourage the latter to play under market conditions and impose prices based only on economic, rather than political, reasons.

To solve these issues, Lithuania seeks to diversify its gas supply. Several projects are provided in the National Energy (Energy Independence) Strategy: the LNG terminal, the Lithuania–Poland gas interconnection, the underground gas storage, of which the most important is the construction of the LNG terminal of 2–3 bcm per year with the possibility of expansion by Pig’s Back Island in the harbour of Klaipėda. This is the best project that develops the fastest.⁴⁷ Currently, it is progressing consistently: thus, the technical adviser has been chosen, the cost-benefit analysis has been completed, the Development Plan and the Strategic Assessment of Environmental Impact have been prepared,⁴⁸ Norwegian company Høegh LNG was selected on 12 January 2012 as the preferred bidder for the construction of the floating storage with a regasification unit (FSRU)⁴⁹ and a 10-year charter party with purchase options offered after the lease period has been signed.⁵⁰

In terms of energy security, the LNG terminal will diversify gas supply. As a result, Lithuania will not be dependent on a single supplier, which will open an

⁴⁷ Lietuvos Respublikos Seimas, (note 4), p. 26–28.

⁴⁸ AB „Klaipėdos nafta“, „Terminalas“. (Suskystintų dujų terminalo naujienlaiškis Nr. 2) [“Terminal”. (Liquefied Gas Terminal Newsletter No. 2)]. Klaipėda: AB „Klaipėdos nafta“, 2011.

⁴⁹ AB „Klaipėdos nafta“, „Terminalas“. (Suskystintų dujų terminalo naujienlaiškis Nr. 3) [“Terminal”. (Liquefied Gas Terminal Newsletter No. 3)]. Klaipėda: AB „Klaipėdos nafta“, 2012.

⁵⁰ Ramoškaitė I., „Klaipėdos nafta“ pasirašė laivo-plaukiojančio dujų saugyklos nuomos sutartį [“Klaipėdos nafta” has signed vessel-floating gas storage lease agreement”]. *Verslo žinios*, 2012 m. kovo 2 d. Retrieved from <<http://vz.lt/article/2012/2/29/vyriausybe-pritare-idejai-ipareigoti-bendroves-kekvirtadali-isigyjamu-duju-importuoti-per-busima-terminala>> on 3 March 2012.

opportunity for full control over flows of gas. Gas could then be imported from the USA, Norway, Central Asia, or the Caspian Basin.⁵¹ In the report of the Strategic Assessment of Environmental Impact of the development plan of the LNG terminal, it is noticed that, according to planning capacities in emergency cases, the terminal alone could provide all Lithuanian secured consumers with the minimum amount of gas.⁵² The demand for gas in 2020 is forecasted to range between 1.6 and 3.7 bcm per year.⁵³ Given these figures, it is believed that security could be insufficient because it does not focus on the satisfaction of all potential need. One of the main arguments for chosen capacities has to do with seasonal variations in consumption, economy considerations being another relevant issue. During the cold time of year, gas consumption is increased relative to the warm period. Due to that gas balancing is designed, i.e., during the summer season the excessive amount of supplying gas would be accumulated and supplied during the winter season to compensate for the lack. To sum up, it is possible to state that security will be ensured sufficiently.

Concerning competitiveness, it is worth noting that the cost-benefit analysis for the period 2013–2023 has been prepared. The conclusions of the analysis reveal that the building of the LNG terminal by Pig's Back Island in the Curonian Bay, the benefit-to-cost ratio amounts to 1.59 in a pessimistic scenario, to 3.87 in a moderate scenario, and to 6.51 in an optimistic scenario.⁵⁴ The LNG terminal will also create preconditions for the formation of gas market. First of all, competition with Russian gas monopoly Gazprom will be ensured. Therefore, there is no doubt that the price of gas will be reducing, because gas imported through the terminal is cheaper by 30 percent.⁵⁵

To compare a contractual gas price, i.e., the price imposed under the so-called *take-or-pay* long term contracts, with spot prices, the data of December 2009–December 2010 are used. According to these data, the average spot

⁵¹ AB „Klaipėdos nafta“ (note 37).

⁵² UAB „Sweco Lietuva“, *Suskystintų gamtinių dujų importo terminalo plėtros plano strateginio pasekmių aplinkai vertinimo ataskaita* [*Strategic Environmental Assessment Report on Liquefied Natural Gas Terminal Development plan*], Vilnius: UAB „Sweco Lietuva“, 2011.

⁵³ Lietuvos Respublikos Seimas (note 4), p. 26–28.

⁵⁴ UAB „Sweco Lietuva“, *Suskystintų gamtinių dujų importo terminalo plėtros planas* [*Liquefied Natural Gas Terminal Development plan*], Vilnius: UAB „Sweco Lietuva“, 2011.

⁵⁵ AB „Klaipėdos nafta“ (note 37).

price of LNG for Europe amounted to about 6.75 USD per mn Btu (million British Thermal Unit). 1000 m³ is equivalent to 40 mn Btu.⁵⁶ In this way, Belgium, France, Greece, Italy, Portugal, Spain, and United Kingdom averagely paid about 270.08 USD per 1000 m³ in 2010,⁵⁷ whereas Lithuania paid 320 USD per 1000 m³. The aforementioned European countries imported LNG mainly from Qatar, Yemen, Egypt, Libya, Algeria, Equatorial Guinea, Nigeria, Peru, Trinidad, the USA, and Norway. As regards contractual prices, in 2010, Germany paid Gazprom as little as about 220 USD per 1000 m³ – almost by one-third less than Lithuania.⁵⁸ It is a contractual price, yet it is lower, because Germany has an alternative supply that competes with Gazprom.

Currently the lowest spot prices for natural gas are to be found in the USA. This relates to captured shale drilling boom, which results in excess gas supply. Prior to that time, the financial and economic crisis caused aggregate demand to contract. Gas prices fell significantly from 188.4 USD per 1000 m³ in the first quarter of 2009 to 107.5 USD per 1000 m³ in the third quarter of 2009. In 2010, prices ranged around 158.02 USD per 1000 m³.⁵⁹ Currently, because of cheap shale gas, the US energy sector is one of the potential drivers of the recovering economy. Shale gas could be liquefied and shipped to an importer country. The price of such gas usually consists of three parts: liquefaction – 40 USD per 1000 m³, shipping – 16 USD per 1000 m³, and regasification – 16 USD per 1000 m³.⁶⁰ LNG from the USA would be priced at about 230.02 USD per 1000 m³. This price seems rather competitive.

Another interesting aspect is that all Lithuanian consuming companies will be obliged to purchase no less than 25 percent of the total consumed amount of natural gas. At first glance, it seems that this could clash with the principle

⁵⁶ Kristensen J. M., “Liquefied Natural Gas: Global Experience and Economic Benefits”. Ramboll Oil & Gas, October 2010.

⁵⁷ Agrus Media Ltd, “Global LNG”, *LNG Markets, Projects and Infrastructure*. Volume VII, Issue 2, February 2011, p. 21–22.

⁵⁸ Lukaitytė R., „A. Sekmokas: Lietuva už dujas moka maždaug trečdaliu daugiau nei Vokietija“ [“A. Sekmokas: Lithuania pays for gas by nearly a third more than Germany”]. Delfi, 14 September 2010. Retrieved from: <<http://verslas.delfi.lt/energetics/asekmokas-lietuva-uz-dujas-moka-mazdaug-trecdaliu-daugiau-nei-vokietija.d?id=36502729>> on 16 April 2012.

⁵⁹ Steelonthenet.com, Natural gas prices – USA – 2009–2011. Retrieved from http://www.steelonthenet.com/files/natural_gas_prices_USA.html on 16 April 2012.

⁶⁰ Kristensen J. M. (note 49).

of free competition. But, according to the Government of Lithuania, “this clause is necessary to begin creating a real gas market – that new player could come to current clearly monopolised gas market”⁶¹. On the contrary, the LNG terminal would be unprofitable and would not ensure payback on investments to be expended to lease, if, for example, Gazprom reduced gas price to the market price level, or even lower. Therefore, the decision made by Lithuania’s Government could be reasonable, but such a clause should be applicable for no longer than 10 years, i.e., for the lease period of FSRU vessel.

The gas pipeline between Lithuania and Poland is important in terms of its competitiveness, as it provides the connection between the gas networks of the Baltic States on the one hand and the gas networks of Poland and Western Europe on the other. There are also plans to build a regional LNG terminal in Latvia, which would be financed by the EU. All these measures will make better conditions for the competition and will create the European gas market, which will open an opportunity to buy gas at the lowest price.

One question comes up: should Lithuania participate in the project for constructing the regional LNG terminal? This is a much debated issue. In terms of economy, the answer would be in the affirmative, because, as mentioned, the project would be financed by the EU. However, in terms of security, Lithuania, as well as Estonia, should construct their own LNG terminals, because this would reduce the political risk that one terminal could be taken over, for example, by Gazprom, should it be promised a lower price under the condition to obtain a major stake of the regional LNG operator company. This scenario would again open an opportunity to impose an economically unreasonable gas price. On the other hand, if Lithuania and Estonia decide not to participate in the regional LNG project, Latvia would be at stake in the context of the Baltic region, because there is no strategic energy project either in the gas sector, or in the electricity sector (as is known, “NordBalt” will connect Lithuania and Sweden, “EstLink 2” will connect Estonia and Finland). The best way to ensure energy security and competitiveness in all the Baltic

⁶¹ Ramoškaitė I., „Vyriausybė pritarė idėjai įpareigoti bendroves ketvirtadalį išigyjamų dujų importuoti per būsimą terminalą“ [“The Government has approved the idea to oblige companies to import a quarter of the gas obtained through the future terminal”]. *Verslo žinios*, 28 February 2012. Retrieved from: <<http://vz.lt/article/2012/2/29/vyriausybe-pritare-idejai-ipareigoti-bendroves-ketvirtadali-isigyjamu-duju-importuoti-per-busima-terminala>> on 3 March 2012.

States, therefore, presupposes that Lithuania and Estonia should invest some money in the construction of their regional LNGs and simultaneously develop their own LNG projects.

In addition to the creation of a competitive gas market, Lithuania seeks to implement the third EU energy package. According to this package, production and supply activities will be separated by gas transmission networks. This is a necessary step for the well-functioning of the LNG, because otherwise, should the tap be turned off by the gas operator, the way to supply imported gas would be blocked.

In conclusion, the LNG terminal will ensure energy independence of Lithuania on imported gas from a single supplier and will provide full control over flows of gas and competition, as it creates opportunities to buy gas at the lowest price while choosing the best offer from several suppliers. Moreover, competitiveness will be increased by the implementation of the third EU energy package, the pipeline to Poland, and the regional LNG terminal in Latvia (if the latter is to be constructed). It will also create a proper background for the formation of the European gas market. Therefore, this project keeps energy security and competitiveness in equilibrium.

Conclusions

Having analysed the validity of the new nuclear power plant and LNG projects, it is possible to conclude to following:

1. The project of the new NPP will ensure energy security and will satisfy future electricity demand for the Baltic States. In addition, it will increase efficiency. In terms of competitiveness, it may be noted that the cost of electricity will be competitive and lower than the cost of generating electricity from gas-fired power plants even though the LNG terminal has been constructed. However, the likelihood of a higher, and consequently less competitive, cost does exist. It depends on what the discount rate will be as well as how much the construction works could increase in price or become protracted. Therefore, it is important to ensure a sustainable economic growth and keep consistency. In a pessimistic scenario, the Government might subsidise part of the cost, for example, by assuming nuclear waste

management costs. The Government resolution shows that this project will not be rejected since, according to the New National Energy (Energy Independence) Strategy, the main goal until 2020 is energy security.

2. Bearing in the mind that Lithuania is totally dependent on imported natural gas from a single supplier and that there is no competition in the gas sector, the LNG terminal will ensure independence from a single supplier and will make conditions for full control over flows of gas and competition, because it allows to choose a gas supplier offering the lowest price. It is worth noting that competitiveness will be ensured by implementing the so-called third EU energy package. As a result, Lithuania will have a well-functioning LNG terminal with transportation and distribution gas pipelines separated. In addition, the Lithuania–Poland gas pipeline and the regional LNG terminal in Latvia will increase competitiveness even more. Therefore, the gas sector is important for Lithuania in terms of security and competitiveness. As has been demonstrated, this project, among other advantages, keeps security and competitiveness in equilibrium because, according to the cost-benefit analysis, it is economically viable on an optimistic, a moderate, and a pessimistic scenario.

Finally, the implementation of the project for the construction of the regional NPP and the LNG terminal will reduce the country's dependence on imported energy sources by diversifying alternative gas supply, increasing domestic energy production, and ensuring an alternative supply of electricity to all the Baltic States and Poland (if the latter decides to participate in the implementation of the new NPP project). The first project will also increase the formation of a common energy market, as indicated in the BEMIP.

Despite that, many questions come up regarding the project of the regional NPP. These are mainly related to the issue of competitiveness. The main question is what electricity cost will be. What will it be if the new NPP is not to be built? According to the results of this article, the cost of electricity will be competitive, but it depends on how rapidly the economy will grow. Meanwhile little research has been done on the impact of economic growth on this project (of course, a cost-benefit analysis could be prepared for that purpose). Such investigation could refine the criteria for the formation and

evaluation of the economic policy and have the nature of a recommendation. It could also help avoid another economic boom that has to do with the construction sector and that threatens high construction costs and discount rates. Indeed, the new NPP means energy security and a competitive price of electricity, opportunities for exporting electricity, as well as the creation of many workplaces and a source of GDP generation. However, the Government must not forget fiscal prudence and must be consistent in implementing the National Energy (Energy Independence) Strategy, since this project is long-term, has a high investment risk, and consequently, needs specific guarantees.