Energy Policy of Lithuania in 1990-2010 and Projections for the Future

By Jurgis Vilemas*

Introduction

Following the collapse of the Soviet Union, Lithuania inherited a very strong energy sector. Energy capacities substantially exceeded domestic needs: power plant capacity totalled 5.5 million kilowatts, the refinery was able to process up to 10 million tons of oil per year, a gas network was developed and more than half of the population was supplied with heat from district heating systems. In addition, Lithuania has also inherited grid connections with the power systems of its neighbours - the former republics of the Soviet Union. This is the positive part of the inheritance. However, at the same time the country inherited a consumer that had no concern about energy costs, and all the buildings and technologies had been designed reflecting cheap energy. All the energy sectors were managed by state monopolies with very conservative administrative staffs, that did not recognize the need for any reforms. The situation was complicated by the fact that Lithuania has almost no primary energy resources with almost all resources: oil, gas, nuclear fuel (except for small amounts of coal) imported from one country - Russia. The share of indigenous renewable energy sources at this time was only about 3%. In such circumstances the inexperienced political leadership of the country faced some difficult tasks in the field of energy policy.

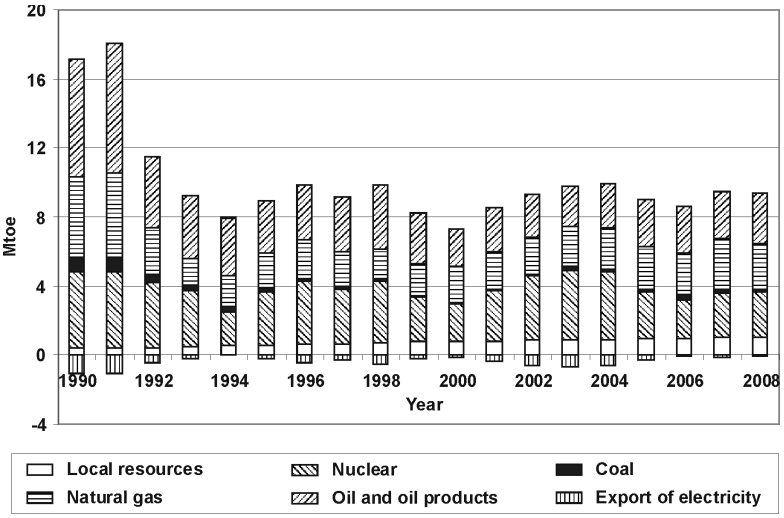

Figure 1
Total Consumption of Energy in Lithuania

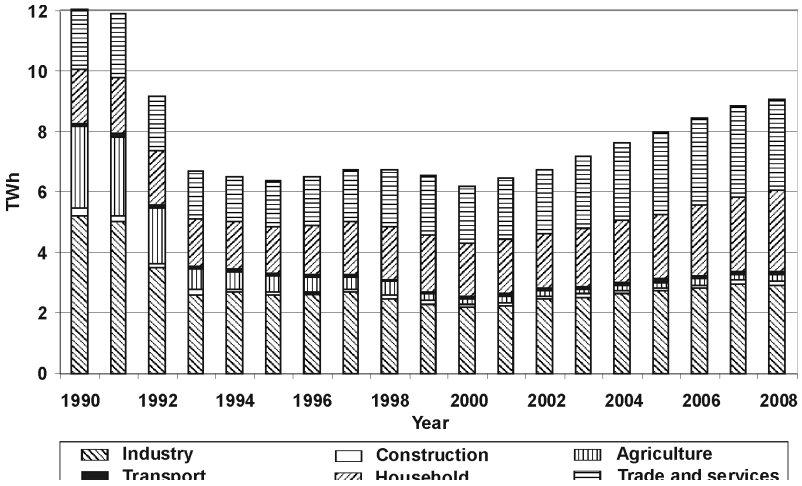

Figure 2
Electricity Consumption in Lithuania

First Years after Liberation

One of the main tasks of political and economic institutions of the country was to stabilize the supply of energy to all consumers: industry, transport and households. The formation of energy policy and strategy for the next 10-20 years has become a priority, but a very difficult task as conditions were changing rapidly in the country and abroad. A sharp reduction in energy demand occurred due to fundamental changes in the structure of the economy and the breakdown of economic relations with former partners followed by the deep economic crisis. Thus, primary energy consumption of the republic, which in 1991 amounted to 17.5 million toe, has decreased to 8 million toe, i.e., more than two times (Figure 1). Electricity consumption (Figure 2) and district heat supply decreased at about the same degree.

The major energy installations in Lithuania include a few large thermal plants, a nuclear power plant, and a refinery designed not only for the needs of Lithuania, but to supply a significant proportion of its production to Lithuania's nearest neighbours, which after 1991 were in the same economic decline and experiencing a reduction consumption of all types of energy. Therefore, the total capacity of the power plants exceeded domestic and export demand by almost three times. The refinery has suffered from a very irregular supply of oil from Russia. Naturally this excess energy sector wasn't

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effective and in some way was a burden for the economy.

Amidst all of these difficulties has come the unexpected demand of the European Union to develop a program of rapid closure of the Ignalina Nuclear Power Plant (INPP) - the cheapest source of electricity throughout the region. The main argument for this demand is that these reactors are the same type as in the Chernobyl NPP, and according to western experts cannot be considered safe. The opinion of Lithuanian and Russian experts who were familiar with all the features of these reactors and the actual condition of INPP was not taken into account. For Lithuania the most important political priority has been entry into the European Union and, therefore, none of the political leaders have been able to resist the unconditional requirement that membership in the EU is possible only if the Ignalina nuclear power plant is closed within a predetermined period of time. After lengthy negotiations deadlines were set as follows: first unit would have to close by the end of 2004 and the second block by the end of 2009.

Towards Professional Energy Policy and Strategy

The foregoing describes the main range of the constantly changing external and internal circumstances in which the Lithuanian government has had to develop energy policy and strategy. The first Energy Strategy of Lithuania was prepared with the help of Western experts and was approved by the Government in early 1994. In this strategy a gradual de-monopolization of the energy sector was set along with the desire to diversify energy supply and to forecast energy needs for the period to 2015. In real life the necessary reforms proceeded very slowly. Only in 1997 did the government finally decide to start dismantling the vertically integrated monopoly by transferring the management of district heating sectors to the municipalities. In the first strategy a very modest increase in consumption, not exceeding 3% per year over the next 10 years was forecast In Actuality total energy consumption declined. The first strategy correctly predicted that Lithuania would need no new electricity generation capacity until 2015.

The second (1999) Strategy sets out the main ideas of restructuring and privatization of the electricity and gas supply sectors. The basic idea in the electricity sector is to separate production, transmission (high voltage network) and distribution by creating independent companies. The electricity transmission sector and nuclear power plant was scheduled to remain as the property of the State and the remaining sectors were to be privatized. In the end half of the distribution network and nearly all the heat supply (generating units), gas supply sector and oil refinery were privatized. In this strategy the deadline for decommissioning of the Ignalina NPP Unit 1 set as 31 December 2004.

Today it can be said that the separation of the district heating sector and the privatization of large segments of this very complex and socially sensitive sector protected it from total collapse, especially in the small towns. Despite the continuing stagnation on the side of consumers (very slow renovation of buildings) the district heating systems in Lithuania not only maintained their performance, but in recent years have been effectively modernized and are gradually more and more oriented toward local renewable energy sources.

A major impact on energy policy in Lithuania had preparation for accession to the European Union. It was necessary to harmonize the energy policy of Lithuania with EU policy and a number of binding directives. The 1999 Strategy had not provided a decommissioning date for INPP Unit II. Following discussion with the EU this date was fixed in the renewed III Strategy, which was approved by the Seimas in 2002. It was determined the latest decommissioning date was still acceptable to the EU – December, 2009. Undoubtedly, the fate of the Ignalina nuclear power plant, the source of the cheapest electricity and which provided nearly 80% of the country electricity supply, will have a special impact on future of the electricity sector in Lithuania. In order to prepare a more or less reliable and realistic strategy for the period after shutdown of INPP, it was necessary to conduct a thorough modelling of the most probable scenarios for the future development of the energy sector, taking into account not only the closure of the Ignalina NPP, but also possible developments in international energy markets, actions and plans of Lithuania's neighbours, and to forecast the overall development of the economy and thus the future demand for energy resources. The analysis of all possible scenarios was carried out by the experts of the Lithuanian Energy Institute, starting from the second Strategy and constantly updating the analysis for each new version of the Strategy. Actual developments in the Lithuanian energy sector fully confirmed the results of the analytical forecasts of Lithuania's energy future (with the exception of the growth rate of prices for imported energy resources). The most important results and conclusions of these analyses are:

1. Even after shutdown of both units at IAE, Lithuania can satisfy all its electricity needs until 2015 using its existing generating capacity, on the basis of the most probable growth in the electricity consumption (4-5% per year);
2. The import of electricity can possibly compete with local production and postpone the need to

construct new capacities.

3. In the case where consumption growth exceeds 5% per year, the most cost-effective way to compensate for a shortage in capacity would be construction of new small cogeneration power plants in the small towns with district heating systems and to construct new combined cycle power plant of moderate capacity (400 MW);
4. In the longer term beyond 2020, in case of the significant price increases for fossil fuels (which has actually happened) and with a substantial tax on CO_2 emissions, a new nuclear power station becomes the most economically attractive source of electricity.

Without attempting to provide a detailed description of all strategic goals of the current Strategy (2007), some of the most important strategic objectives outlined in this document should be noted. They are: 1. Energy security, 2.Efficient use of energy; 3.Introduction of competitive principles in the energy sector; 4.Gradual integration into the energy systems of the European Union; 5.Diversification of primary energy sources and ways of their imports, the rapid increase of renewable and local energy resources, and reducing the share of natural gas in the energy mix in Lithuania.

In order to achieve these objectives, the most important following activities were identified:

1. Fully implement the EU directives related to the liberalization of electricity and natural gas markets;
2. Create a common electricity market of the Baltic countries and continue to integrate with the EU markets;
3. Ensure continuity in the use of nuclear energy by building a new nuclear power plant capable of ensuring the needs of all three Baltic republics and the region by 2015;
4. Connect the electrical transmission network of Lithuania with the networks of the Nordic countries and Poland no later than 2012;
5. Ensure compliance with EU directives related to the accumulation of reserves of oil (90 days) and natural gas (60 days);
6. Increase the share of renewables in the primary energy balance up to 20% by 2025. Increase the share of electricity produced at cogeneration power plants up to 35% by this time.
7. Build a new 400 MW combined-cycle unit at the Lithuanian thermal power plant in 2010;
8. Continuously improve the consumption efficiency of all types of energy, so that by 2025 it would be possible to achieve the efficiency levels of developed countries of the European Union.

Achievements and Projections for the Future

From the perspective of 2010, we should assess the reality of some objectives of the current Strategy adopted in 2007. First of all, it should be noted that some of these tasks were formulated during a very specific, not standard, economic and political circumstances. Primarily, in late 2006 and early 2007 the issues of energy security were the focus of attention of the public and politicians. The main reason for this - the conflicts between Russia, Ukraine and Belarus on gas and oil transit to European countries, together with an inevitable, significant rise in consumption (as it seemed at this time). The fact that Russia would use the strong dependence of Europe (including Lithuania) on gas supply for political purposes, was a very strong factor in determining the political atmosphere during the formation of energy policy in Lithuania.

In addition, during this period of general economic boom, it seemed that problems related to difficulties in ensuring the global economy with fossil fuels together with the inevitable increase in fuel prices (as actually has happened in 2008) would occur. In addition to all this, it was expected that at least in Europe would soon introduce heavy taxes on greenhouse gas emissions, which would have an affect on the attractiveness of fuel types. Nuclear fuel and renewable energy sources would have been winners under these circumstances.

The foregoing created favourable conditions for speculation about the security of energy supply and resulted in Strategy (2007) including a number unreal objectives, First of all was the construction of the new nuclear power plant by 2015. At present, all hopes rely on foreign investors and there is little hope that this power plant could be built until 2020.

Also the idea of building powerful high-voltage lines connecting the grid systems of Lithuania with Poland and Sweden by 2012 was not real. At this time these projects are just beginning and the expected completion date is 2016. The construction of these lines with minimal costs will radically improve the energy security of Lithuania and neighbouring countries; it will help the Baltic countries join the common Nordic energy market and will be the first important step in a future unified energy system of all

Europe. Therefore, the construction of these connections is a major strategic priority at present.

The closure of the Ignalina nuclear power plant greatly accelerates the creation of a common electricity market of the Baltic countries and apparently it will be created as planned, i.e., by 2015-2016. The Lithuanian Electricity Exchange has been in operation since January 2010.

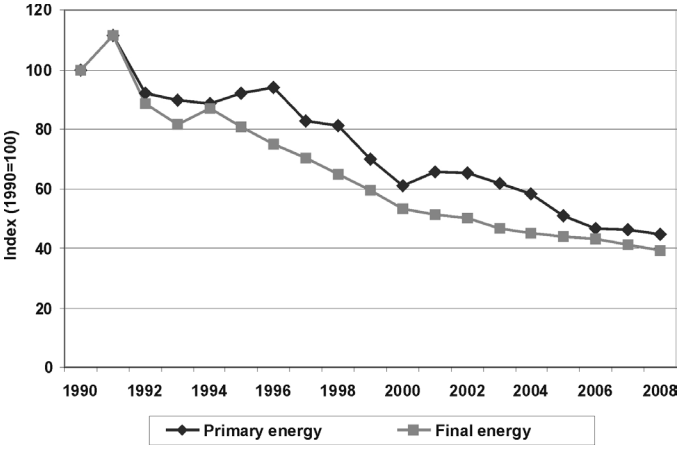

Figure 3
Energy Intensity of Lithuanian Economy

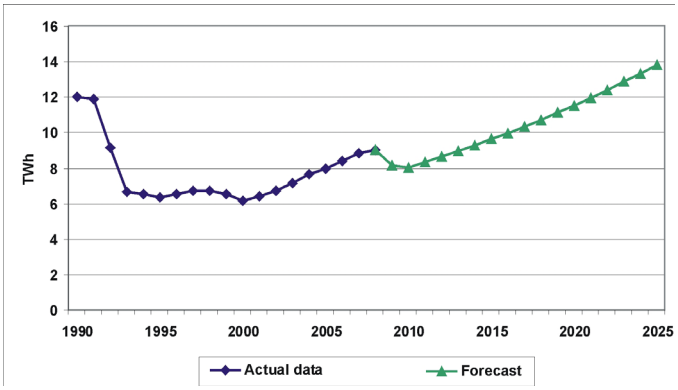

Figure 4
Forecast of Final Electricity Consumption

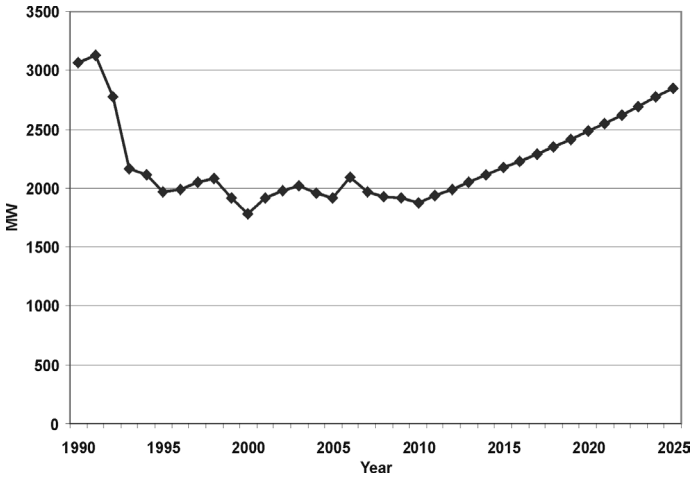

Figure 5
Demand of the Maximum Peak Capacity for the needs of Lithuania

The issues related to the increase in use of renewable energy are in good progress. Apparently Lithuania will be able to fulfil its obligation to the EU to get 23% of its energy needs from renewable sources by 2020. The new law on the use of renewable sources will be adopted in 2010 which should significantly stimulate the activity in this sector.

Since 1993 Lithuania has continuously decreased energy intensity per GDP (Figure.3) and will be able to fulfil another obligation by 2020: to lower energy consumption per unit of GDP by 20% compared with 2005.

Construction of a new combined cycle unit with a capacity of 450 MW at the Lithuanian thermal power plant has been started and it should be put into operation in 2012.

As already mentioned, Lithuania has seen a sharp reduction in the consumption of all types of energy since 1991, consequently emissions of carbon dioxide and other greenhouse gases in the atmosphere have been sharply reduced as well. Therefore, even after the closure of Ignalina NPP, Lithuania has fulfilled the obligations arising from the Kyoto Protocol: to reduce its emissions by 8% in 2010 compared to 1990.

Recent forecasts of electricity consumption growth and peak power demand for needs of the country (Figures 4, 5), show that only approaching the year 2025 will these figures be close to their 1991 values. Taking into account the necessity of constructing at least 500 MW of wind power plants in coming years, the availability of a new CCGT unit of 450 MW in 2012 and availability of interconnectors for import, it is clear that there is no need for construction of new large power plants, at least until 2025.

In conclusion, it can be stated that Lithuania is successfully using its heritage of energy infrastructure, its favourable geographic location and membership in the European Union and the professionalism of its energy engineers to reliably provide for all consumers the kinds of energy at an acceptable cost and with minimal impact on the environment.