

Resolution

ON THE APPROVAL OF THE NATIONAL ENERGY STRATEGY

10 October 2002 No IX-1130

Vilnius

The Seimas of the Republic of Lithuania, invoking Article 9 of the Law on Energy (*Valstybės žinios* (Official Gazette), 2002, No 56-2224) and having regard to the Resolution of the Seimas of 14 May 2002 on Lithuania's Position in Negotiations with the European Union in the Negotiation Chapter on Energy and Amendments to the National Energy Strategy Necessary to Ensure a Successful Course of EU Accession, has resolved:

Article 1.

To approve the updated National Energy Strategy submitted by the Government (attached thereto).

Article 2.

To repeal Resolution of the Seimas No VIII-1348 of 5 October 1999 on the Approval of the National Energy Strategy (*Official Gazette*, 1999, No 86-2568).

CHAIRMAN OF THE SEIMAS

OF THE REPUBLIC OF LITHUANIA

ARTŪRAS PAULAUSKAS

APPROVED

by Resolution No IX-1130

of 10 October 2002

of the Seimas of the Republic of Lithuania

NATIONAL ENERGY STRATEGY

I. GENERAL PROVISIONS

1. The energy sector of Lithuania, according to its importance, the number of employees (about 14% of industrial employees), the total value of capital assets of energy enterprises (about 25% of the total assets of the enterprises in the country) and the amount of expenses for the acquisition of energy resources, which are imported into Lithuania, is one of the most significant sectors in the country. The energy sector comprises interrelated energy systems (electricity, district heat supply, oil, natural gas, coal, as well as indigenous fuel and renewable energy resources), which consist of the entirety of enterprises and equipment intended for the extraction, generation, transformation, transmission, distribution and consumption of different energy resources. The inherited extensive energy sector, which is oriented towards substantial, yet inefficient consumption of electricity and oil products, as well as towards considerable exports, does not conform to the current requirements in its essential characteristics (efficiency, management principles, structure, etc.). Therefore, the recent national policy is primarily focused on substantial restructuring of the energy sector, the reorganisation and privatisation of the energy sector, as well as the implementation of the European Union (EU) directives.

The National Energy Strategy, which was approved by Resolution of the Seimas No VIII-1348 of 5 October 1999, formulated the key provisions of the Government on the restructuring and development of the energy sector for the period until 2020. Although the Law on Energy provides

that the National Energy Strategy must be revised and updated every five years, the Government, taking into account Lithuania's striving to complete negotiations for EU membership in 2002 and to become an EU member in 2004, prepared this updated National Energy Strategy (hereinafter referred to as the Strategy). The Strategy contains particular decisions on conditions and terms of the final decommissioning of the Ignalina NPP, considers new environmental requirements, as well as revises the energy development trends established in 1999. When updating the Strategy, account has been taken of significant changes in the economy and energy sector, use has been made of the acquired experience and information required for the planning and forecasting of the development of individual energy sectors, and account has been taken of the plans for the energy sector development in Lithuania and neighbouring countries, and of global trends in the area of environmental protection and market liberalisation.

2. The Strategy has been prepared:

1) applying the experience acquired from the preparation of the second National Energy Strategy approved in 1999;

2) taking into account the development of the country's economy and energy sectors during the period since the restoration of independence, their current status and the key provisions of the Long-term Strategy for Lithuania's Economic Development until 2015 approved by Resolution of the Government No 853 of 12 June 2002;

3) taking into account global energy development trends, as well as trends and basic provisions in energy sector development in the European Union countries;

4) on the basis of the experience of Western, Central and Eastern European countries;

5) on the basis of the analysis carried out in different studies commissioned by the Ministry of Economy and prepared by national energy specialists in co-operation with foreign experts;

6) on the basis of the provisions laid down in the executive summary of the revised and updated National Energy Efficiency Programme approved by Resolution of the Government No 1121 of 19 September 2001;

7) by applying modern methods of economic planning (forecasting and optimisation);

8) taking into account the European Union *Acquis communautaire* and the course of negotiations with the EU;

9) taking into account the Law on the Basics of National Security.

The energy policy in Lithuania is significantly influenced not only by internal factors of the country, but also by external factors. The most distinctive trend of the energy sector development in the European Union and many other developed countries is universal and free competition, an open energy market in each country and between countries, as well as stricter environmental requirements.

The current energy sector has its strengths and weaknesses. With more efficient use of available opportunities and existing capacities, the energy sector can make significant contribution to more rapid economic growth of the country and its integration into the economic structures of the European Union, avoiding unforeseen threats and troubles.

3. Strengths:

1) Energy capacities are sufficiently developed: power plants, an oil refinery, an oil import and export terminal, a transshipment terminal for petroleum products, natural gas and district heating systems;

2) The primary energy balance is well-structured and dominated by natural gas, petroleum products and nuclear energy;

3) A possibility to use different fuels in the majority of energy enterprises helps to ensure the reliability of energy supply and to maintain comparatively low electricity and heat prices, as well as low environmental pollution.

4. Weaknesses:

1) Due to major economic decline in Lithuania and neighbouring countries, the available energy potential is not used to the full;

2) The Lithuanian electricity and gas networks have no direct connections to the energy systems of Western Europe, thus, they are dependant on a single supplier of natural gas and have no opportunities to integrate into the power systems of Western and Central European countries;

3) The use of energy is still inefficient in many areas of the national economy. District heating systems of residential houses and other buildings constructed before 1990 are not designed appropriately for the rational use of energy, and their modernisation requires considerable investments;

4) A large amount of radioactive waste and spent nuclear fuel has accumulated; the funds necessary for its safe disposal have not been accumulated; reserves of petroleum products conforming to European Union requirements have not been built up and natural gas storage facilities have not been set up;

5) A number of electricity networks and substations, as well as of pipelines are physically and morally worn; a significant number of towns and settlements have not yet connected to the natural gas supply system.

5. Opportunities:

1) Integration into the liberal energy internal market of the EU and the restructuring of the energy sector will accelerate the creation of the competitive energy market in Lithuania and increase the efficiency of energy enterprises;

2) A better use of energy-saving potentials will reduce the rates of growth of energy demands and energy-generating capacities, thereby facilitating the solution of environmental issues and reducing investment demands;

3) The existing gas pipelines allow a substantial increase in the consumption of natural gas. A transit gas pipeline from Russia to Western Europe, if constructed across the territory of the country, would highly increase the strategic reliability of supply;

4) The installation of an interconnection with the Polish power system will allow integration into the Western European electricity market reducing the vulnerability of the economy to the disruption of, or significant decrease in, the supply of energy resources from one country for various reasons, more efficient utilisation of the Kruonis HPSP, as well as a possibility to receive income from electricity transit;

5) The share of renewable and indigenous energy resources (wood, peat, various combustible wastes, wind and hydro energy, etc.) in the primary energy balance will further increase; their potential has so far not been sufficiently used;

6) The existing district heating systems make it possible to expand substantially the combined heat and power generation thereby enabling more efficient consumption of primary energy;

7) Financial support by the European Commission and other donor countries for the decommissioning of the Ignalina NPP will be extended for several decades. This will help consumers to avoid any additional tax burden related to decommissioning, in particular to the management of radioactive waste and spent nuclear fuel, at the end of the lifetime of the Ignalina NPP.

6. Threats:

1) About 90% of primary energy is imported from a single supplier; therefore, energy supply to Lithuania is vulnerable. However, this vulnerability will significantly decrease through future membership in the European Union, planned ratification of the European Energy Charter, political and economic developments in neighbouring countries, as well as alternative supply sources of electricity and petroleum products envisaged in this Strategy. The development of the use of indigenous and renewable energy resources foreseen in this Strategy will gradually reduce dependence on primary energy suppliers;

2) The early closure of the Ignalina NPP without the required financing from the European Union and international financial institutions would become an unbearable burden on the economy of the country;

3) As a result of the slow modernisation of district heating systems, a number of consumers are disconnecting from these systems, and this may cause economic and social problems;

4) As a result of reliance on imports of primary energy resources, the economy of Lithuania is highly dependent on the general situation in global energy resource markets. Any delay in accumulating experience and slow transition to the latest technologies in electricity and heat generation, as well as higher prices of imported fossil fuel will lead to an inevitable rise in energy prices for consumers.

II. Objectives of the Energy Strategy

7. When setting up the main objectives of the National Energy Strategy, account was taken of the essential requirements and provisions of the Europe (Association) Agreement, the Energy

Charter Treaty, other international treaties and European Union directives in the area of energy, as well as of the principles and guidelines of energy policy formation in the European Union and individual Member States.

The future energy sector of Lithuania will constitute an integral part of the advanced economy in a modern society that will ensure reliable and secure energy supply to all economic sectors at economically justified prices, taking into account actual costs and operational efficiency. It will be environment-friendly, create favourable conditions for further progress of the country, be integrated into the Western and Eastern energy systems and competitive in an open international energy market. It will consist of well-balanced energy sectors enabling further development of the society and economic growth.

8. Taking into account the key factors that shape the energy policy, the following strategic objectives of the Lithuanian energy sector have been set:

1) to ensure a reliable and secure energy supply at least cost and with minimum environmental pollution, as well as constantly enhancing the operational efficiency of the energy sector;

2) to liberalise electricity and natural gas sectors by opening the market in accordance with the requirements of EU directives;

3) to privatise energy enterprises subject to privatisation in the natural gas transmission and distribution and power sector, as well as to continue privatisation of oil refining and transportation enterprises;

4) within the terms agreed with the European Union, to develop and start performing a set of measures facilitating the implementation of the European Union environmental directives in the energy sector, as well as to ensure compliance with nuclear safety requirements;

5) to ensure that 90-day stocks of crude oil and petroleum products are built up by 2010 according to the agreed schedule;

6) to prepare for the decommissioning of the reactors of the Ignalina NPP, the disposal of radioactive waste and the long-term storage of spent nuclear fuel;

7) to integrate the Lithuanian energy systems into the energy systems of the European Union within the next 10 years;

8) to further develop regional co-operation and collaboration with a view to creating a common Baltic electricity market within the next five years;

9) to pursue an active policy of integration into the Western and Central European electricity markets and ensure that conditions conforming to the Energy Charter, EU legislation and practices are applied to the transit of energy resources through Lithuania;

10) to increase the efficiency of district heating systems;

11) to achieve that the share of the electricity generated in the combined heat and power operation mode would account for at least 35% in the electricity generation balance at the end of the period;

12) to strive for a share of renewable energy resources of up to 12% in the total primary energy balance by 2010;

13) to improve energy sector management, i.e. strengthen institutions in the sector, improve the skills and knowledge of specialists of those institutions.

III. Economic Development Forecast

9. In this Strategy, like in the National Energy Strategy approved in 1999, the same scenarios have been chosen: 1) fast economic growth scenario, 2) basic scenario, 3) slow economic growth scenario.

The fast economic growth scenario foresees very high rates of economic growth in Lithuania during the period until 2020, i.e. on average 5% per year (7% until 2010 and 3% after 2010) assuming that: 1) the expansion of the Lithuanian industry would be very fast; 2) the common policy of economic development would be very favourable to large investments intended for the modernisation of the economy and the acquisition of new technologies; 3) technical and economic assistance by the EU would be generous and efficiently used.

The low average annual growth rates of GDP in Lithuania (2% until 2010 and 3% in 2011-2020) forecasted in the slow economic growth scenario could be a result of very slow pace of economic restructuring, insufficient domestic and foreign investments, unexpected economic and political crises, slow privatisation of infrastructure enterprises, etc.

The basic scenario is based on the economic development trends, which have been provided in the forecasts of macroeconomic indicators for the years 2002-2005 prepared by the Ministry of Finance, extending them to the year 2010 and assuming that a GDP growth rate would be 4.7% until 2010 and 3% after 2010 (on the average 3.85% during the period from 2000 to 2020). The common assumption of the three scenarios is that after the year 2010, upon the expiry of the first phase of economic restoration, GDP growth rates would be 3% per year.

IV. Energy Demand Forecast

10. The new version (2000) of the Model for Analysis of Energy Demand (MAED) widely applied in Western countries in forecasting energy demand was used. This version offered better opportunities to analyse energy consumption in economic sectors depending on mutual relationship between the factors determining consumption and tendencies of their changes.

In drawing up the energy demand forecast, detailed information on the GDP growth, its structural changes, development of social indicators, technological indicators of energy consumption by economic sectors (industry, construction, agriculture, transport, household, trade and services sector), changes in energy consumption and other indicators was used.

11. Final energy demand has been predicted by estimating energy saving potential in particular economic sectors in accordance with the executive summary of the National Energy Efficiency Programme revised and updated in 2001. The total increase in energy efficiency has been predicted by taking into account a reduction in energy intensity, i.e. a decrease in the final energy consumed per GDP unit. Final energy means the share of primary natural resources (coal, natural gas, oil, etc.) and secondary energy resources (electricity, petroleum products, district heat, etc.), which is consumed for a particular type of industrial production, for a desired quantity of services provided by the services sector and a desired level of living conditions. Final energy is directly

consumed by final consumers (industrial and agricultural enterprises, enterprises in the transport and services sector, individual consumers, etc.) in their equipment.

A thorough analysis shows that in all cases the final energy demand in 2020 would not exceed the demand in 1990. At the end of the forecasting period, the consumption of fuel and energy in the basic scenario would be 6.2 million tons of oil equivalent, or 71% of the amount in 1990. In this case, the energy intensity index in 2020 would constitute only 49%, as against 1990, while energy efficiency according to this indicator would be close to the current average level in the European Union.

12. The decrease in the electricity consumption in 1990-2000 was the least as compared to the consumption of other energy forms. However, at present Lithuania is lagging behind developed European countries in terms of the comparative indicator of electricity consumption in economic sectors per capita (1860 kWh per capita), i.e. the average indicator in the European Union in 1999 was 3.1 times higher. Thus, according to forecasts, the modernisation of the national economy could lead to the fast growth of electricity demand, and its share in the structure of final energy would increase according to all scenarios and in all economic sectors. During the period until 2010, electricity demand in economic sectors in the basic scenario could increase annually by 4.3% on average. According to this scenario, electricity consumption in 2020 could exceed the 1990 level nearly 1.1 times.

District heat consumption decreased nearly three times in 1990-2000. In all cases, the district heat demand in 2020 will not reach the 1990 level. At the end of the forecasting period, the district heat consumption in sectors of the Lithuanian economy in the basic scenario would be 1.3 times higher than in 2000.

13. With the closure of the Ignalina NPP by the end of 2009, primary energy demand in the basic scenario would increase only by approximately 30% during the period until 2020. However, total demand for fossil fuel would increase almost 1.9 times within 20 years, i.e. from 5 million tons of oil equivalent in 2000 to 9.4 million tons of oil equivalent in 2020. The increase in natural gas consumption would be particularly rapid – from 2.1 million tons of oil equivalent in 2000 to 5 million tons of oil equivalent in 2020. During the forecasting period the share of natural gas in the primary energy balance would increase from 28.5% to 53%. The forecasts predict that at the end of the period the share of indigenous (excluding indigenous crude oil) and renewable resources in the

total primary energy balance would increase by up to 14%, while the share of petroleum products would constitute about 32%.

V. Strategy for the POWER Sector Development

14. The total installed electricity-generating capacity (nuclear and non-nuclear) exceeds the present domestic needs of Lithuania by three times, and the main source of electricity in the country is the Ignalina NPP, which generates cheaper electricity than thermal power plants using fossil fuel. Over the period of the last five years it has generated from 76% to 86% of the total electricity production. The development of the entire power system of Lithuania in the next decade will be considerably influenced by the choice of the operation period of the Ignalina NPP, which should be substantially dependent on its safety and economic indicators.

The Ignalina NPP was inherited from the former Soviet Union with the low level of safety culture, but much has been done in the last decade to improve safety at the Ignalina NPP. Many countries which have considerable experience in the nuclear energy area have provided and continue providing effective support in improving the safety of the Ignalina NPP to ensure its better compliance with international nuclear safety objectives. Information and conclusions about the safety level of the Ignalina NPP are based on numerous in-depth and voluminous international analyses. The probabilistic safety assessment indicators show that the present safety level of the Ignalina NPP could be compared to that of nuclear power plants of Western countries; however, the Ignalina NPP does not have a containment installed in the Western power plants, which would contain accidentally released radioactive materials. Thus, some experts from Western countries and different organisations draw the conclusion that the risk of operating nuclear power plants with RBMK reactors cannot be reduced to such an extent that they could be safe enough for long-term operation. The opinion of the international community is important to Lithuania, which is preparing for accession to the European Union and NATO.

15. The National Energy Strategy approved by the Seimas in 1999 provided that in accordance with the Nuclear Safety Account Grant Agreement Unit 1 of the Ignalina NPP will be

closed before 2005, taking into account the conditions of long-term and considerable financial assistance from the European Union, G-7 countries and other countries, as well as international financial institutions. On the basis of the same assumptions and taking into consideration the recognition by Member States of the European Union that the decommissioning of the Ignalina NPP will have to continue beyond the current financial perspectives and that this effort represents for Lithuania an exceptional financial burden not commensurate with the size and economic strength of the country, and the declaration that the Member States are, in solidarity with Lithuania, ready to continue to provide adequate additional Community assistance to the decommissioning efforts also after Lithuania's accession to the European Union, Unit 2 of the Ignalina NPP will be closed in 2009, subject to financing sources, the required scope of financing supported by agreements with EU institutions and other donors. Lithuania commits itself to the closure of reactors, on the understanding that a programme organising additional financial assistance of the EU to the early closure of Unit 1 of the Ignalina NPP before 2005 and Unit 2 in 2009 will be adequately addressed at a later stage of accession negotiations. By implementing this programme, Lithuania will resolve the consequences of the closure of the Ignalina NPP. In the event of a failure to ensure the required financing from the EU and other donors, the operation of Units 1 and 2 of the Ignalina NPP will be extended taking into account their safe operation period.

In accordance with the Nuclear Safety Account Grant Agreement, the Government of the Republic of Lithuania will take all the necessary measures to ensure that the Ignalina NPP satisfies international nuclear safety requirements. The Government commits itself that Lithuania will completely fulfil all the nuclear safety recommendations presented to the EU Council in the report of the Working Party on Atomic Questions and Nuclear Safety, as well as the recommendations of the Safety Analysis Report, its Independent Review and the international Ignalina Safety Panel.

16. On the basis of the available information and the technical-economic analysis carried out, it can be stated that upon the closure of both the units of the Ignalina NPP the following measures will be necessary in order to ensure the least costs of the development and operation of power and district heating systems, as well as higher reliability of electricity supply:

1) modernisation of the Lithuanian Power Plant, the major electricity source, and of the Vilnius and Kaunas CHP plants: installation of new burners, modern control and management equipment, flue gas cleaning equipment;

2) renovation of the Kaunas Hydro Power Plant by 2007;

3) should new capacities be required and be economically justified, the construction of CHP plants in Klaipėda, Šiauliai and Panevėžys, a combined cycle gas turbine condensing power plant and additional CHP plants in other cities;

4) reconstruction of the existing boiler-houses: installation of gas turbines and generators or small CHP plants using indigenous fuel, provided that their installation would be economically feasible taking into account the local conditions and that they could compete with renewed large power plants.

The strategy for the development of the Lithuanian power sector is based on the continuity and development of the safe nuclear energy. With a view to remaining a nuclear energy state in the future and generating electricity in nuclear power plants complying with modern safety requirements, Lithuania will legally, financially and politically support investments in the construction of a new unit or reactor with the use of the existing infrastructure at the Ignalina NPP.

As a result of the closure of Unit 2 at the Ignalina NPP, the average electricity generation cost will increase by approximately 3 Lithuanian cent/kWh. In calculating the average electricity generation cost, all the components of the operational costs of power plants (expenses for fuel, repairs, wages, etc.), investments in the construction of new units or modernisation of the existing ones, as well as the costs of the management and disposal of new radioactive waste and spent nuclear fuel have been taken into account. In addition, with a view to enhancing the reliability of fuel supply, providing opportunities to use at least two types of fuel in large thermal power plants and satisfying the environmental requirements, it is necessary to construct flue gas cleaning installations. While transferring the solution of the problem related to the reliability of fuel and energy supply in the Lithuanian energy sector to one or several power stations, and with a view to avoiding distortion of the opportunities of the power plants in the competitive market, it is necessary to foresee ways of targeted financing for the installation of environmental protection measures or a pollutant quota trade system.

The negative effects of the premature closure of Unit 2 of the Ignalina NPP will be more abrupt and will have greater impact on the national economy, compared to a later closure.

17. The closure of Units 1 and 2 of the Ignalina NPP will have direct socio-economic, environmental, energy-related and other consequences, including impact on the security of supply. The solution of problems resulting from these consequences will require a lot of time.

In addressing the issue of the closure of the Ignalina NPP, the consequences of this closure, including the maintenance of the reactors of the Ignalina NPP after their shutdown, also problems concerning the dismantling of the reactors, radioactive waste management, compensation for socio-economic consequences in the region, modernisation of electricity capacities and construction of alternative electricity generating sources, as well as environmental problems related to the decommissioning of the Ignalina NPP should be considered.

The decommissioning of Units 1 and 2 of the Ignalina NPP will entail technical decommissioning costs. The structure of a near-surface repository for low- and intermediate-level short-lived radioactive waste will be finally chosen only after decisions on waste management and disposal strategies are taken. Costs for spent nuclear fuel disposal will be adjusted in accordance with the chosen waste management strategy.

The evaluation of all groups of consequences resulting from the closure of Units 1 and 2 of the Ignalina NPP will be regularly updated on the basis of the most recent information, while in updating such evaluation, the actual costs incurred, should also be taken into account. In this context, a number of dynamic parameters should be taken into consideration, i.e. parameters related to economic growth, changes and trends in the internal energy market, the reliability of energy supply (including dependence on oil and gas prices in global markets), effects of efficient energy consumption, response to social consequences, the role of the private sector, as well as the complexity and extended duration of the decommissioning process. In addition, it is necessary to take into account the fact that the closure of Units 1 and 2 of the Ignalina NPP is the first case when RBMK-1500 nuclear reactors of such capacity are being decommissioned. Thus, the current evaluation should be regularly updated to ensure safety requirements in the long closure process.

The closure of the Ignalina NPP will also have positive consequences, i.e. the amount of radioactive waste in Lithuania will stop increasing, thereby reducing the costs of the storage of radioactive waste and spent nuclear fuel, a better environment for competition will be created.

Measures for the mitigation of social consequences and their financing will be established by appropriate legal acts.

18. After the closure of the Ignalina NPP, the existing capacities will be sufficient to meet the national demand for a period beyond the year 2010 in all cases of the domestic demand growth in Lithuania, if the Lithuanian Power Plant is maintained and modernised. The modernisation of the

existing combined heat and power plants and the construction of the new ones (of about 400 MW capacity) will facilitate the solution of the problem relating to the growing demand.

With at least one unit of the Ignalina NPP in operation and with limited export, the Lithuanian Power Plant would serve as a source for meeting demands for reserve and manoeuvre capacity, as well as being able to substitute for the Ignalina NPP during its scheduled repairs. After the closure of both the units of the Ignalina NPP, the Lithuanian Power Plant will become the major source of electricity. All the four 300 MW units should be prepared for operation before the closure of Unit 2 of the Ignalina NPP. It is also expedient to use the Kruonis HPSP not only in a regime of daily regulation but also in a regime of weekly regulation; its role, however, in the Lithuanian power sector and in the larger region will depend on the course of the implementation of other international projects (the Baltic Ring, the electricity transmission line to Poland, etc.) and on the increase in electricity demand in neighbouring countries. Having modernised the existing thermal power plants, the cheapest electricity generating sources would be combined heat and power plants in the combined heat and power operation mode, and their share of electricity generated (also taking into account the contribution of new CHP plants) in the total electricity balance could increase up to 35-45% in 2015-2020. A greater contribution of CHP plants would correspond to a scenario of high fuel prices as CHP plants enable to increase the total fuel consumption efficiency. With regard to changes in fossil fuel prices, the construction of new hydro power plants on the Neris cascade and the mid Nemunas may be justifiable.

Taking into account global nuclear energy development trends, the latest technologies of reactors and their technical-economic characteristics, a comprehensive study on the continuity of the use of nuclear energy in Lithuania will be prepared in 2003-2004, covering the justification of nuclear safety and acceptability of nuclear energy, including the construction of new nuclear power plants (reactors).

19. Electricity transmission and distribution networks in principle are able to meet the current needs of the power system; however, three quarters of the transmission and distribution equipment are more than 20 years old, and one quarter of this equipment is more than 30 years old. Thus, investments will be required not only to maintain the current level of electricity networks, but also to improve their status with a view to complying with the increasing requirements for the reliability and stability of energy supply, as well as to create a common Baltic electricity market.

It is a major shortage that there is no direct connection to the power systems of Central and Western Europe. It is necessary to construct a powerful inter-connection with the Polish power system as soon as possible. In the near future, this line would allow integration into the Western European electricity market and thus enhance the reliability of energy supply.

Lithuanian integration into the European Union and closer co-operation with the other Baltic and Scandinavian countries require changes in the structure of the national electricity grid. The three Baltic States should make joint efforts to prepare a strategy for the development of the transmission system and action plans for its implementation, as well as to plan a sequence of actions and financing sources.

20. Taking into consideration the economic significance of the efficient use of all the available capacities, the forecast of electricity export and of the reliability of electricity supply is as follows:

1) with at least one unit of the Ignalina NPP in operation, it is possible to maintain traditional electricity export via available transmission lines to the North and the East;

2) until 2010, energy export from the Lithuanian Power Plant could be profitable only during peak and half-peak hours;

3) the construction of an electricity transmission line to Poland is necessary for integration into the European electricity market.

Taking into account the strategic significance of an inter-connection between the Lithuanian and Polish power systems, the state will give political and legal support for investments satisfying the criteria defined in the Law of the Republic of Lithuania on the Basics of National Security. It is necessary to ensure that the planned inter-connection with the Polish electricity transmission system, like the national transmission networks, would belong, directly or indirectly, to Lithuania and that the latter would have considerable influence when taking decisions that are important for ensuring national security and security of energy supply.

21. In order to ensure the reliability of electricity supply and integration into the EU internal market, the following measures are necessary:

1) to maintain the existing potential of non-nuclear power plants by gradually adapting them to the requirements of a market economy and by introducing measures for instantaneous capacity balance regulation;

2) to reconstruct and restore physically and morally worn electricity transmission and distribution networks in order to accommodate the growing loads, ensure the reliability of electricity supply and meet quality requirements;

3) to ensure the safety and reliability of the Ignalina NPP;

4) to co-operate with the neighbouring countries to provide reserve capacity;

5) to construct an inter-connection with Poland for integration into the power system of Western European countries, thereby increasing the strategic reliability of electricity supply;

6) to strengthen co-operation and collaboration with other Baltic States, i.e. to create a common electricity market and utilise optimally the total potential of the power systems of the Baltic States;

7) to prepare, in conjunction with Latvia and Estonia, a new strategy for the development of the Baltic transmission system better adapted to integration into the networks of Western European and Scandinavian countries and allowing better utilisation of available generating capacities;

8) to implement the programme for the privatisation of generating enterprises and distribution networks, as well as the requirements of the EU directives. To this end, the electricity sector was reorganised in 2002 by separating the Lithuanian and Mažeikiai Power Plants, as well as the East and West Electricity Distribution Networks. The implementation of programmes for privatisation in the sector is foreseen in 2003.

In implementing programmes for privatisation in the electricity sector, account should be taken of the provisions of the National Security Strategy, which prohibit investors of one foreign state from dominating in this strategically important economic sector and which require to prevent the penetration of illegal capital or capital of undetermined origin into enterprises of the Lithuanian economy.

22. Taking into account the analyses carried out in the Baltic Ring feasibility study, the most acceptable way for Lithuania of connecting the national power system to the Western system is via a

direct current back-to-back station. This would allow having a direct connection with the common Western European system without disconnecting from Eastern neighbours and losing opportunities to purchase services on a regular basis from the East.

VI. STRATEGY FOR THE HEAT SUPPLY SECTOR DEVELOPMENT

23. About 75% of residential houses in Lithuania's towns is supplied with heat from district heating systems. The method of district heat supply, prevailing in Lithuania, is fairly advanced; however, due to various economic, technical and social reasons it is not sufficiently effective and needs rehabilitation. This option of heat supply must be brought in line with the decentralised heat sources in order to benefit most from the advantages offered by both methods.

24. To this end, the key strategic provisions shall be as follows:

1) to prepare heat supply development plans for municipalities, in line with the national priorities of the energy sector;

2) to manage the heat sector in accordance with the heat sector development plans approved by the municipalities, providing for key decisions in the rehabilitation and development of the heat sector in the long term. The main target of the heat sector development plan is meeting the consumers' demand for heat at least cost and pollution, by zoning according to the main method of heat supply, introducing an economically justified procedure for choosing the main method of heat supply and regulating the conditions of connection and disconnection;

3) to set up gradually at district heating utilities, after the closure of Unit 1 and especially of Unit 2 of the Ignalina NPP, combined heat and power (CHP) plants, subject to their economic feasibility study, offering electricity at a price that would be competitive on the open electricity market;

4) to encourage heat production from local and renewable energy sources;

5) to use the domestic waste collected by municipalities for the generation of heat and electricity where it is economically and ecologically feasible. To exploit the potential of waste heat and combustible substances. This would enable the reduction of fuel imports and contribute to the

solution of the waste storage problem. A possibility to use waste for co-generation must be assessed on a case-by-case basis;

6) to provide conditions for competition among heat producers and to establish a procedure for purchasing heat from the independent producers for the heat supply systems;

7) to modernise consistently the heat supply systems by providing a possibility for the consumers to regulate the amount of heat to be consumed and the consumption schedule of their own choice;

8) to establish the procedure for the purchase of electricity generated by CHP plants to encourage the consumption of heat generated by CHP plants for heating in towns;

9) to encourage participation of private capital in the projects of rehabilitation of the heat sector through energy service companies and in any other way meeting the public interest;

10) to provide conditions for heat consumers to take part in the management and rehabilitation of the heat sector. To control natural monopolies and to balance the interests of suppliers and consumers.

25. Consumers residing at some distance from gas pipelines and heat supply systems, where their connection to these systems is not economically feasible, for the purposes of decentralised heating, taking account of the local conditions, should use:

- 1) wood and other biofuels;
- 2) liquefied gas;
- 3) heating oil;
- 4) environment energy by using heat pumps;
- 5) other sources meeting the public interest and ecological requirements.

The State shall encourage competition between fuel suppliers and heat producers.

VII. STRATEGY FOR THE NATURAL GAS SECTOR DEVELOPMENT

26. The share of natural gas in the national balance of primary energy resources constitutes at present close to 28%. Natural gas is imported from a single source – the Russian Federation. In 2000, 2.58 billion m³ of gas was imported for domestic needs, and 0.47 billion m³ of gas was supplied in transit to the Kaliningrad Region. The import capacity of the gas pipelines in Lithuania (6 billion m³ per year) is in excess of the current consumption needs. The Lithuanian gas supply network is linked with the Latvian gas pipeline grid and the Kaliningrad Region. However, it is not connected with the gas pipeline grid of Western Europe, which prevents there being an alternative natural gas supply.

Technologically and ecologically, natural gas is the most effective fossil fuel with its vast world reserves. Taking into consideration the large resources of Russia's gas fields, the routes of and trends in their export to the West, the existing technical supply facilities and the ever more stringent environmental requirements, natural gas in Lithuania is the most promising kind of fossil fuel during the whole period under review.

27. Technical facilities for the supply of natural gas from Russia do not in any way restrict the use of natural gas in Lithuania at present, nor will they restrict its supply in future. However, some gas pipelines are outworn and even at present the pressure of gas transmitted through them is being limited. This calls for their upgrading and enhanced capacities in future, especially in the direction of Kaliningrad. The construction of a new pipeline for natural gas to Kaliningrad should be considered and a feasibility study needs to be prepared. The increase in the consumption of natural gas in future may be restricted owing to the inadequate reliability of gas supply.

Adequate reliability of gas supply may be insured by supplying gas from several sources, by developing transit, building up gas reserves at storage facilities, and regulating the balance of primary energy consumption. A gas storage facility should be constructed or leased in order to enhance reliability in gas supply. Gas supply and transmission enterprises are responsible for building up gas reserves. The enterprises, which use gas as a raw material for the manufacturing of mineral fertilisers, oil refining etc., should solve by themselves, together with the gas supply enterprises, the issues related to the accumulation of gas reserves.

Gas reserves have to be ensured with priority for the producers of electricity and heat who use only natural gas for generation of energy.

28. In order to enhance strategic reliability in the supply of natural gas it is necessary:

1) to expand and upgrade the gas transmission networks and ensure that conditions applied for transit of energy resources in Lithuania are in line with the European Energy Charter, legal acts of the European Union and their practical implementation;

2) to install the missing gas metering stations on the cross-border gas pipelines;

3) to continue the investigation and prepare a study for the construction of the storage facility, to be followed, subject to a feasibility study, by the construction of an underground gas storage in Lithuania;

4) to consider, together with the other Baltic States, the possibility of connecting with the gas pipelines of Poland and Finland.

29. The development of the national natural gas system shall be market oriented and based on mutual arrangements between the consumers and suppliers. The State shall provide support for the strategic projects, necessary for ensuring the reliability of gas supply and environmental standards. The forms and measures of assistance will be determined by the Government.

The natural gas market will be developed and regulated in accordance with the provisions of EU directives and other legal acts, implementing regulations, having regard to the realistic possibilities for implementing these provisions and commitments to the EU.

30. In 2000, 190,000 tons of liquefied gas were consumed in Lithuania, 57% of that amount – by transport. In future, demand for liquefied gas in households will increase insignificantly. If the tariff system is not changed, consumption of liquefied gas for transport will grow faster.

The consumers whose demand for fuel is not high are recommended to use liquefied gas as a type of ecological fuel. To ensure a stable supply of liquefied gas, advanced technologies are to be applied.

VIII. STRATEGY FOR THE CRUDE OIL AND PETROLEUM PRODUCT

SECTOR DEVELOPMENT

31. The share of petroleum products in the balance of the country's primary energy resources is quite significant: in 2000, the consumption of oil products by all sectors of economy amounted to 2.2 million tons. This constituted about 31% of the total amount of the consumed primary energy resources. Lithuania possesses the only oil refinery in the Baltic states region with the annual crude oil refining capacity amounting to 7-8 million tons, also the oil terminal for oil import-export via the Baltic Sea with the capacities equal, accordingly, to 6 and 8 million tons, and the petroleum products transshipment terminal in Klaipėda, reconstructed in 2001, one of the region's most modern, the capacity of which reaches 7 million tons. At the present time Lithuania possesses all technical possibilities for importing crude oil and petroleum products and has achieved diversification in supply countries. In this way Lithuania has substantially expanded its petroleum products supply capacities and is technically protected against possible disruptions in the supply from any country.

32. Implementing the provisions of the Law on the Basics of National Security and seeking to have an alternative source of supply with petroleum products, state control over the management of AB "Klaipėdos Nafta" should be guaranteed.

33. In order to ensure reliable supply of the economy with oil and petroleum products, mandatory 90-day stocks of crude oil and petroleum products will be built up. The stocks will be accumulated gradually until the end of 2009, i.e. for an eight-year period. 50% of the stocks of petroleum products will be built up with state funds. In order to ensure reliable and safe storage of petroleum products, warehouses, storage facilities and terminals should conform with the EU legislation and environmental requirements.

The state will establish measures for the regulation of the petroleum product market and restriction of petroleum product consumption in emergency situations in the energy sector in accordance with the provisions of the Law on the State Stocks of Petroleum Products and Crude Oil. The Lithuanian Petroleum Products Agency was established on 31 December 2001 for the accumulation of stocks of petroleum products with state budget funds.

34. Indigenous oil resources are not very plentiful, however, oil production from them can be continued for several decades, maintaining the annual oil extraction level of 0.3-0.5 million tons. For this reason the sector of crude oil and petroleum products will remain, in the near future and in

later years, dependent on the import of crude oil and partly on the import of petroleum products. In the balance of primary energy resources the share of petroleum products used for the production of other types of energy will shrink and at the end of the period under consideration will amount to 20-25%. Nevertheless, petroleum products will remain a reserve fuel for thermal power plants and large district heating systems and, upon installation of flue gas cleaning equipment, these products will compete with natural gas.

35. Investors of any one country may not dominate the retail trade sector in petroleum products of Lithuania. It must be ensured that the Competition Council of the Republic of Lithuania, in accordance with the Competition Law and other legal acts of the Republic of Lithuania, has at its disposal adequate leverage to ensure fair competition.

36. According to the forecasts, the most noticeable increase in the consumption of light petroleum products is envisaged in the transport sector where their consumption will amount to approximately 2.0 million tons per year in 2020. The currently available transportation, processing, storage and distribution facilities are sufficient to meet the demand in petroleum products.

37. In the process of Lithuania's integration into the EU, more strict petroleum product quality requirements will be gradually imposed seeking to meet environmental goals and reduce pollution. After the accession to the EU, the quality of petroleum products consumed in the country will have to meet the minimum requirements of European standards.

During the entire period under consideration, minimum excise duty rates, provided for in the EU directives, will be applied to petroleum products. Following accession to the EU, Lithuania will harmonise its import-export duty rates with those applied in the EU member states.

IX. STRATEGY FOR THE DEVELOPMENT OF THE SECTOR OF INDIGENOUS, RENEWABLE AND WASTE ENERGY RESOURCES

38. In 2000, the share of indigenous, renewable and waste energy resources (hereinafter - indigenous energy resources), (indigenous crude oil excluded), amounted to about 9% in the overall primary energy balance. A target should be that approximately 2 million tons of oil equivalent of the

above energy resources are used per year (from this amount - about 430 000 tons of oil equivalent of waste energy resources).

39. In order to ensure optimum use of indigenous energy resources and at the same time reduce fuel imports as well as create new jobs and improve environmental standards:

1) programmes for the consumption of indigenous energy resources will be drawn up and regularly updated;

2) extensive use of indigenous energy resources will be encouraged by organisational, economic and financial measures, support will be given to enterprises and production of equipment intended for the processing and use of the above-mentioned resources will be increased and the installation of this equipment will be organised;

3) projects for the use of wind, water and solar energy as well as for the consumption of other renewable and waste energy resources will be implemented, the experience gained in the construction and operation of the relevant facilities will be accumulated and summarised. The state will back the implementation of these projects and provide conditions for the EU structural and other support funds to be used for achieving the above goals;

4) conditions will be provided for developing the production of biofuels (denatured dehydrated ethyl alcohol, oils of biological origin, ethyl and ethyl ester). The existing legal acts and regulations promoting production and use of the above biofuels will be amended and revised on a regular basis;

5) efforts will be directed to increasing share of renewables in the primary energy balance by 2010 to 12% and ensuring that the share is close to meeting the requirements of EU directives.

X. IMPROVING ENERGY EFFICIENCY

40. It has been estimated when revising and updating the National Energy Efficiency Programme that 20- 50% of the currently consumed energy resources may be saved in particular economic units of the Republic of Lithuania. The major share of the final energy (approximately 45%) is consumed by households as well as trade and service sectors (1.84 million tons of oil

equivalent were consumed in 2000). These sectors provide a lot of possibilities for energy saving. The total amount of energy resources that may be saved in industry is 0.2 million tons of oil equivalent (in 2000, 0.75 million tons of oil equivalent were consumed in the sector) and in the transport system - about 0.15 million tons of oil equivalent (the amount consumed in 2000 is 1.05 million tons of oil equivalent).

41. A revised National Energy Efficiency Programme will be implemented according to the following principal directions:

- 1) drafting of legal acts, regulatory enactments and technical documents intended for implementing the National Energy Efficiency Programme;
- 2) renovation of buildings and modernisation of their energy facilities;
- 3) intensification of the use of indigenous, renewable and waste energy resources;
- 4) increasing energy efficiency in production processes;
- 5) further development of information, educational and consulting activities.

With a view to regulating the saving of energy resources, legal grounds for meeting the requirements of the EU directives in the field of energy efficiency will be established.

42. The renovation of residential houses and public buildings as well as the modernisation of their energy facilities will be further financed by the residents, using soft credits administered by the public agency Housing and Urban Development Foundation as well as drawing on other possible sources of financing. Funds of the Housing and Urban Development Foundation are comprised of allocations from the state budget and loans granted by the World Bank and foreign countries.

Energy saving measures as well as implementation of projects for the use of indigenous, renewable and waste energy resources will be supported by Special Programme for the Implementation of Energy Saving Measures.

The State will seek to promote the modernisation of energy facilities in existing buildings and the improvement of their insulation, the increase of energy efficiency in industry, transport and other sectors of economy as well as the increase of use of the EU structural and other support funds for the implementation of energy efficiency projects and measures.

XI. ENVIRONMENTAL PROTECTION

43. In the energy sector Lithuania will comply with the international environmental conventions acceded to by Lithuania, with the National Environmental Strategy approved by Resolution of the Seimas of the Republic of Lithuania No I-1550 of 25 September 1996 (Official Gazette, 1996, No. 103-2347), the Strategy for Approximation in the Environment Sector and the National Strategy for the Implementation of the United Nations Framework Convention on Climate Change accepted by Resolution of the Government of the Republic of Lithuania No 1236 of 25 October 1996 (Official Gazette, 1996, No 105-2409) and the requirements of the EU environmental directives.

44. The main environmental directions for the energy sector in the nearest future are as follows:

1) in order to comply with environmental requirements, all combustion plants will have to reconsider by 2008 the structure of the fuel used and to prepare for fulfilling new requirements;

2) in order to ensure energy supply reliability, the largest Lithuanian power plants will have to install flue gas cleaning equipment;

3) priority in fuel consumption will be given to indigenous and renewable energy resources, having regard to the environmental and economic aspects of the use of these resources;

4) the Government shall prepare the required legal acts and measures ensuring stable long-term supply of indigenous and renewable resources to energy generating enterprises and other consumers;

5) improvement of radioactive waste management and reconstruction of radioactive waste storage facilities in conformity with international requirements;

6) ensuring pollutant emission monitoring in major thermal power plants and boiler houses;

7) implementation of oil products desulphurisation technologies in the Mažeikiai Oil Refinery;

8) wider application of economic measures promoting pollution reduction and implementation of environmentally friendly technologies;

9) further development and improvement of the environmental taxation system by introducing pollution trading systems, green certificates systems and other measures;

10) priority environmental investment in the energy sector should be made in the atmosphere sector first of all in order to fulfil the EU requirements and other international obligations in the field of atmospheric pollution, taking into consideration the consequences of the Ignalina NPP decommissioning.

XII. MARKET LIBERALISATION AND IMPROVEMENT OF ENERGY SECTOR MANAGEMENT

45. Liberalisation of energy market relations will be continued and competition between energy companies will be encouraged seeking to accomplish the main objectives of the National Energy Strategy. When implementing the requirements of *Acquis communautaire*, legal acts in the energy sector will be further drafted and improved with a view to providing favourable conditions for the integration of the energy sector into the EU energy markets.

46. When further revising legal acts and developing market relations, the following is intended:

1) liberalisation of power and gas sectors, opening the market in accordance with the requirements of EU directives;

2) development of co-operation with the Baltic States by creating a common electricity market and later, having connected the Lithuanian and Polish power systems, integration into the electricity market of the Western Europe;

3) integration, together with Latvia and Estonia, of the Baltic states market into the electricity market of the Scandinavian states;

4) promotion of local and foreign investment in modernisation and reorganisation of energy enterprises, and privatisation of those energy sector enterprises listed for privatisation;

5) retention of state control in the electricity transmission company;

6) improving pricing in the energy sector by implementing effective competition and competitive prices, and in monopolistic area by implementing the price cap principle with a view to transferring to the adoption of the principle prohibiting abuse of a dominant position, removing cross-subsidisation and gradually introducing multi-component energy prices to be charged to all consumers;

7) improving the procedure for promoting energy production from renewable and waste energy resources and purchasing this energy, implementing competition between the producers, examining the possibility of introducing "Green Certificate" schemes or other systems.

47. Seeking to implement the established strategic objectives of the energy sector, it is necessary to amend legal acts regulating energy management draft new ones, to strengthen institutions of energy management, control and regulation and to define measures for their implementation, that are based on a comprehensive analysis of scenarios of balanced development of the country's economy and of the energy systems, by optimising calculations using accumulated and systematised statistic information.

48. When improving the energy sector management, the following is required:

1) reduction of influence on the activity of companies by the Government and municipalities, leaving for state institutions the right to make decisions on the strategic issues of energy planning, development and regulation;

2) formation of the structure of energy enterprises, conforming to the requirements of EU directives;

3) development of management incentives, based on economic methods and pricing;

4) establishment of a competitive environment for energy enterprises or creation of an adequate regulatory framework for monopolies.

XIII. TRAINING OF SPECIALISTS AND RESEARCH

49. The changes of management principles and forms of ownership in the energy sector, the introduction of the universal energy accounting, emergence of new technologies, and the introduction of entirely new systems of information, control and regulation require specialists with different professional qualifications. Their present training lags behind the rapidly changing needs of the energy sector. If the necessary specialists are not prepared in due time it will be difficult to reorganise the Lithuanian energy sector and the reforms will be delayed.

50. Therefore, it is very important to prepare a programme for the training of energy specialists, based on the experience of Lithuania and foreign countries in preparation of such specialists with similar qualifications. This programme should provide for:

- 1) updating the training programmes and educational facilities in the technological universities in line with the demand;
- 2) measures for promoting education and training of the appropriate academic staff;
- 3) optimisation of the number of students in order to meet the future demand;
- 4) measures for re-qualification of older specialists;
- 5) sources of financing the essential upgrading of educational facilities.

National research, design and consultative service institutions will also be necessary in order to modernise the energy sector, increase the consumption of indigenous resources, and provide services to energy consumers and suppliers. In this field the state will promote the establishment of privately funded organisations .

51. The priority areas in research requiring specific support and obligations of the Government are as follows:

- 1) energy saving and energy efficiency, environmental aspects of energy;

2) energy economics, planning of energy development, optimisation of design and management of complex systems, optimisation and control of technological processes, management and operation of energy systems in the conditions of a competitive market, improvement of management institutions by developing a common, integrated, liberal market of the European Union;

3) nuclear energy safety, reliability and durability of energy equipment, ageing of construction materials;

4) management, storage and disposal of spent nuclear fuel and other radioactive materials;

5) technologies for the use of renewable, indigenous and waste energy resources;

6) small CHP plants, including fuel cells;

7) informatics in the field of energy.

XIV. FINAL PROVISIONS

52. The presented revised National Energy Strategy defines the main targets set by the State and directions for their implementation in modernising the country's energy sector, adjusting it to the growing State demand and the most recent international requirements relating to efficiency, reliability, environmental and management improvement. Already at the initial stage of implementation of this Strategy, Lithuanian energy sector will be made fully compatible with the EU requirements and will be in the position to integrate into the common European energy structure. For the implementation of the provisions laid down in the Strategy, the Government of the Republic of Lithuania will approve a five-year Strategy implementation plan and programmes of action, setting specific deadlines for their implementation, together with the sequence of actions, amount and sources of financing as well as the designated implementing institutions.