
Ministry of Economy

**ASSESSMENT OF IMPLEMENTATION OF ENERGY
POLICY
SINCE 2005 ONWARDS**

Appendix 1.

to draft "Energy Policy of Poland until 2030"

Warsaw, 10 November 2009

TABLE OF CONTENTS

1.	INTRODUCTION.....	3
2.	GENERATION CAPACITY OF THE DOMESTIC FUEL AND ENERGY SOURCES	4
3.	SIZE AND TYPES OF FUEL RESERVES	6
4.	TRANSPORT CAPACITY AND CROSS-BORDER CONNECTIONS	7
5.	ENERGY EFFICIENCY OF THE ECONOMY	9
6.	ENVIRONMENTAL PROTECTION	10
7.	INCREASE IN THE USE OF RENEWABLE ENERGY SOURCES.....	11
8.	RESTRUCTURING AND OWNERSHIP TRANSFORMATION.....	13
9.	RESEARCH AND DEVELOPMENT DIRECTIONS	15
10.	INTERNATIONAL COOPERATION	16

1. INTRODUCTION

Pursuant to Article 15(1)(1) of the *Energy Law*, the present document shall evaluate the implementation of the energy policy for the previous period. Adopted by the Council of Ministers on 4 January 2005, the *Energy Policy of Poland until 2025* specified the energy policy concept and long-term action directions until 2025 as well as the Action Plan until 2008. The Council of Ministers adopted the *Timetable for the implementation of executive tasks until 2008 specified in the Energy Policy of Poland until 2025* on 12 July 2005 as a supplement to this policy. This document specified implementation stages and dates for implementing individual executive tasks.

Apart from the energy policy, the Council of Ministers elaborated, adopted and implemented programmes specifying the action directions in individual energy subsectors in the years 2006–2007. These include in particular: *Programme for the electricity sector* dated 28 March 2006, *Policy for the crude oil sector in Poland* dated 6 February 2007, *Policy for the natural gas sector* dated 20 March 2007, and *Strategy for the hard coal mining sector in Poland for the years 2007–2015* dated 31 July 2007. These documents treat the improvement of energy security in individual sectors as a priority. Due to the fact that government actions targeted at the energy sector focused on the implementation of sectoral programmes, a part of executive tasks envisaged under the energy policy has not been fully implemented, and the implementation method of another part was different from the scheme adopted in the *Timetable for the implementation of executive tasks*.

The policy concept was determined for the first time in the *Energy Policy of Poland until 2025*. Under the concept, the relations that the energy policy should have with other strategic documents relating to the country's development were emphasised. Basic terms relating to energy security were redefined and the most significant principles of energy policy as well as energy security management were specified.

The most important principles of energy policy were specified as follows: development of the energy sector based on sustainable development and competition mechanisms, meeting obligations arising from the Treaty, promoting renewable energy sources and co-generation, retaining State owner's supervision over the transmission and transshipment infrastructure as well as co-operation of state and local administration in the implementation of the energy policy. These principles are deemed justified, universal, and consistent in their directions with the European energy policy.

Within this concept, the scope of entities and subjects involved as well as mechanisms and time span for the energy security management were systematised. In addition to the tasks related to energy security, resulting directly from regulations, it was decided it was necessary to prepare periodical forecasts and plans for the strategy of energy security, prepare the procedures for market regulation in the case of a supply crisis as well as to set up multi-energy companies based on the State Treasury property.

Although the principles of the energy security management specified in regulations were applied, the scope of analyses and plans was limited due to the liquidation of the Government Centre for Strategic Studies which was to prepare them. In the years 2005–2007, two energy forecasts were prepared on the request of the Ministry of Environment and the Ministry of Economy. In the recent years, the concept of the establishment of multi-energy companies was not pursued. Instead, a vertical consolidation process in the energy sector was initiated

with its aim being to strengthen the economic potential of enterprises and their capacity to prevent crises.

In relation to Poland's membership in the European Union, national law was gradually adjusted to the EU law. Despite the best efforts to carry out the process in a timely manner, delays have occurred in some areas. As a result, the European Commission initiated proceedings against Poland for failing to implement the EU directives.

The following part of the document assesses the implementation of government actions planned and undertaken since 2005 in individual fields of energy policy.

2. GENERATION CAPACITY OF THE DOMESTIC FUEL AND ENERGY SOURCES

According to the assumptions to the *Energy Policy ...*, actions in this field should focus on the implementation of the key objective – ensuring efficient and effective fuel and energy generation capacity, while meeting all the requirements related to environmental protection.

In order to achieve this objective, certain actions have been planned including, *inter alia*, preparation of the joint fuel-environmental-energy strategy which was to specify the way to achieve the optimal fulfilment of the environmental protection requirements imposed on the energy sector in an objective and cost-effective manner. However, this task has not been implemented, which made the coordination of this issue on the government level much more difficult.

As regards hard coal mining, the tasks specified in the government restructuring programme for 2004–2006, whose main objective consisted, *inter alia*, in adjusting production capacity to the market demand, have been fulfilled. Main assumptions for the programme covering the years 2004–2006 comprised a reduction in production capacity and costs.

As a result of the liquidation of mines after 2004, the production capacity of the sector as at the end of 2006 amounted to 96 million tons/year (a reduction by 6.6 million tons/year as compared to 2003). In the following years, the production capacity was further reduced which, however, was not assumed in the programme, but resulted from negligence in the investment process. The production capacity as at the end of 2007 amounted to approx. 89 million tons/year. Employment decreased by 20,000, i.e. from 136,400 in 2003 to 116,400 in 2007.

As a result, some tensions on the Polish hard coal market were seen in 2007, and continued also throughout 2008.

In 2007, the implementation of tasks specified in the strategy for the hard coal sector for the years 2007–2015 started.

The strategy for the hard coal mining sector for the years 2007–2015 assumed that the decreasing trend would halt. At present, one of the most important tasks is to maintain output at the level ensuring national energy security and profitable energy export. In order to achieve this objective, it is necessary to carry out modernisation and replacement investment projects worth approx. PLN 19 billion until 2015.

The objective for the natural gas sector was to maintain the domestic share of natural gas used in total gas consumption in Poland at the current level. In the recent years, this share has amounted to approx. 30%. PGNiG S.A. has been carrying out intensive prospecting for hydrocarbon deposits both in Poland and abroad. Owing to the discovery of new deposits, gas extraction in 2007 increased to 4.3 billion m³. New plans of PGNiG S.A. oblige the company to renew deposits in the ratio 1.1:1 to output (for 2007, this ratio amounted to approx.

0.9). Exploration in the crude oil sector takes place, *inter alia*, in Libya, Egypt, Pakistan, Denmark as well as in the Norwegian Sea (in co-operation with e.g. BP, Shell, Statoil/Hydro).

At present, PGNiG S.A. holds 72 concessions for prospecting and surveying hydrocarbon deposits and 215 concessions for the extraction of crude oil and natural gas. As at 31 December 2007, the company's deposits amounted to 21.2 million tons of crude oil and 99.8 billion m³ of natural gas (converted to high-methane gas).

As regards the increase in the generation capacity from domestic electricity sources, it was assumed that systemic solutions would be elaborated to support building new capacity, excise tax collection would be adjusted to the EU regulations and social consultations on the construction of the nuclear power plant would be carried out.

In December 2008, the Sejm of the Republic of Poland adopted the Act on excise tax adjusting, *inter alia*, the collection system of the electricity excise tax to EU regulations. With respect to the informational campaign on nuclear energy, in addition to the discussions held at various industry conferences and press releases on the justification for the use of nuclear energy in Poland, no development program for the nuclear energy sector has been prepared and submitted for social consultations. This results in a significant delay in preparing the construction of the first nuclear power plant in Poland. The support system for the highly efficient co-generation and renewable energy sources was prepared and implemented, using the system of certificates of origin. The work was also finalised on the Regulation on the tender for the construction of new electricity generation capacity or implementation of projects reducing the demand for electricity. However, no financial instruments encouraging such investments have been prepared. Due to lack of support instruments agreed on the domestic and EU level implementation of this instrument may be a lengthy process.

The electricity generation subsector saw the commencement of construction of three large generation units in the years 2005–2007. Their total capacity equals 1,757 MW. At the same time, the investments were made in the majority of existing units with a view to reducing sulphur dioxide emission.

As regards the liquid fuels sector, it was estimated that the share of the domestic production would be maintained at a significant level and the quality of fuels would improve. In 2005, the market share of domestic production of liquid fuels amounted to 84.95% and of diesel to 66.21%. As compared to 2006, the market share of domestic production of liquid fuels increased by 0.53 p.p. (from 85.60% to 86.13%) for engine petrol and by 3.61 p.p. for diesel (from 72.00% to 75.61%) in 2007. In 2008, as compared to 2007, the market share of domestic engine petrol production increased by 0.93% to reach 87.06%, while for diesel it increased by 2.25% to 77.86%. The total share of domestic liquid fuels production (engine petrol, diesel) between 2005 and 2008 remained close to 75%.

In accordance with the assumptions of the *Energy Policy*, regulations ensuring high quality standards for liquid fuels, including biofuels, and LPG gas, were prepared. On 25 August 2006, the Act on the fuel quality monitoring and controlling system, along with the implementing acts, as well as the Act on bio-components and liquid fuels, were adopted. The results of inspection by the Trading Standards Authority show that the quality of fuel sold in Poland is gradually improving.

In 2007, Grupa LOTOS S.A. started to implement the 10+ investment programme. After its completion, the share of transport fuels produced in Poland, including in particular diesel, will grow significantly. Grupa LOTOS S.A. was successful in completing intensive actions aimed at obtaining prospecting and extraction concessions in the North Sea. The volume of

extractable deposits of LOTOS S.A. Capital Group amounted to 6.21 million tons of crude oil as at 31 December 2008, including 1.8 million tons on the Norwegian Continental Shelf.

As regards the heating sector, according to the provisions of the *Energy Policy*, a market system was developed to support local heating systems with preferences given to highly efficient co-generation in the form of certificates of origin, i.e. the so-called red certificates. However, the activities concerning development of legal framework in favour of rational heat management are as insufficient. The cost regulation of heat prices in force results in decreasing profitability of heating companies. Such method of calculating tariffs, combined with the support of combined heat and power generation on the level compensating only higher costs of ongoing unit operation, does not provide sufficient incentives and investment opportunities for heating companies. Furthermore, strategic planning in the district heat sector is made more difficult (a change introduced by the Government Legislation Centre) due to local government failings to comply with the obligation imposed on them as regards preparing the assumptions to the plan of commune heat supply.

3. SIZE AND TYPES OF FUEL RESERVES

The basic direction of the state policy for fuel reserves was to ensure operational continuity of the economy in case of any supply disruption of a given type of fuel to the market. The *Energy Policy* specified the following measures in this respect:

- Effective management of liquid fuel reserves, keeping 90-day reserves, and preparing a comprehensive action plan in case of a crisis on the crude oil market;
- Devising and implementing the principles of operation and organisation of the natural gas reserves and storage systems;
- Achieving an appropriate hard coal and lignite reserves structure by amending relevant regulations.

In order to sort out the principles regulating the process of building obligatory reserves of crude oil, crude oil products, and natural gas, as well as principles of undertaking intervention activities on the fuel and natural gas market in the case of any disturbances in crude oil and/or crude oil products and/or natural gas supplies, the Act on crude oil, crude oil products and natural gas reserves and principles of operation in the case of a danger to the national fuel security and turbulences on the crude oil market was adopted on 16 February 2007. This act ensures the fulfilment of obligations arising from EU Directives 73/238/EEC and 2006/67/EC. The adoption of this Act makes it possible to fulfil the criteria necessary to be granted membership in the International Energy Agency (IEA) and, as a result, to participate in the crisis response mechanism on the crude oil market coordinated by the IEA consisting in mutual support of members of the organisation in case of any disturbances or supply disruption on the crude oil or fuel market. The mechanism is mainly based on the coordinated release of crude oil and fuel reserves by all IEA Member States. The above Act also created the legal framework for the comprehensive programme of intervention activities in crisis on the crude oil market through the specification of intervention tools, principles of their launch and providing government bodies with competence to use them. At the end of 2008, intervention crude oil and liquid fuel reserves (i.e. at the government's disposal) covered the domestic fuel consumption for 96.5 days on average. In 2007, intervention crude oil and liquid fuel reserves amounted to 98.5 days. Poland completed the process of building obligatory reserves as required by the EU regulations a year before it was assumed in the Accession Treaty.

Based on the Order of the Prime Minister No 71 of 11 May 2006, the Task Force for Crisis Response in the Power Sector was appointed. Its purpose is, *inter alia*, to ensure efficient government activities in case of any disturbances in the continuity of supplies on the fuel market.

With regard to natural gas, the above Act implemented a comprehensive organisation of natural gas obligatory reserves at the disposal of the Minister of Economy, and the procedure in case of crisis related to gas supplies. As at 31 December 2006, gas reserves amounted to 1.6328 billion m³. Obligatory reserves in the amount of 284 million m³, which equals approx. 11 days of average daily import, were created for the period from 1 October 2007 to 30 September 2008. From 1 October 2012, target obligatory reserves will equal 30 days of average daily import.

Hard coal reserves kept by utility power plants and combined heat and power plants at the end of 2008 covered their demand for approx. 48 working days, while at the end of 2007, certain units already reported shortages of reserves below the required level of 30 days. In 2006 the level of hard coal reserves in utility combined heat and power plants and power plants remained at the level of 35 days. The planned rationalisation of regulations concerning obligatory coal reserves was introduced to the draft Energy Law in 2009.

4. TRANSPORT CAPACITY AND CROSS-BORDER CONNECTIONS

Primary activities were to focus on supporting the development of natural gas, crude oil, crude oil products and electricity transmission and distribution capacity. In this respect, it was planned to establish systemic solutions in order to remove barriers to grid infrastructure development, develop an effective method of absorption of European funds and support activities improving natural gas and crude oil supplies security and diversification as well as electricity supply security. The evaluation of the implementation of this task should take into account that priority was given to the activities related to the diversification of energy generation directions, suppliers, transmission routes and transport methods for imported energy raw materials.

The Minister of Economy supported the activities at the government level as well as the activities of power companies aimed at ensuring alternative crude oil and natural gas supply routes, thus improving the national energy security. This comprised the following activities:

- Supporting PGNiG S.A. in preparing the feasibility study for the LNG terminal based on which, on 15 December 2006, the company made a decision to locate the terminal in Świnoujście and started preparations for the construction of the terminal;
- By way of Resolution 168/2007 of 20 September 2007, the Council of Ministers decided on state budget financing of the construction of the protective breakwater for the external port in Świnoujście, without which it would not be possible to build and operate the LNG terminal;
- Active support of the Polish government to the activities of PGNiG S.A. as regards the construction of the pipeline connecting Poland with gas deposits on the Norwegian Continental Shelf, where the company purchased shares both in crude oil and natural gas deposits.

As regards the extension of the natural gas transmission system, tasks consisting in investment were completed aimed mainly at eliminating barriers in the flow capacity of

individual parts of the transmission system, resulting from the existence of bottlenecks, and in full use of available transmission capacity. Furthermore, tasks were also carried out with respect to the extension of measurement and telemetric systems, aimed at improving services for the customers entitled to access the transmission grid – better adjusted measurement systems were installed and transmission parameters were improved.

As regards crude oil transmission, co-operation is being developed with Ukraine and Lithuania as well as with countries located in Central Asia and Caspian Sea region (Georgia, Kazakhstan, and Azerbaijan). On 10 October 2007, the agreement on the cooperation in the energy sector was signed between the Ministry of Industry and Energy of the Republic of Azerbaijan, the Ministry of Energy of Georgia, the Ministry of Economy of Lithuania, the Ministry of Economy of the Republic of Poland, and the Ministry of Fuel and Energy of Ukraine. Bearing in mind common interests of the parties in the implementation of the project of crude oil transmission from the Caspian Sea region to Poland and further to European and international markets, provided that it is economically viable, the parties committed themselves to undertake activities facilitating the establishment of the International Consortium with the participation of state-owned companies. Its objective will be to prepare and implement the feasibility study for the project of the hydrocarbon transport corridor whose part is the Odessa-Brody-Płock-Gdańsk project. In July 2004, the Polish-Ukrainian “Sarmatia” consortium was set up. It consists of PERN „Przyjaźń” S.A. and Ukrtransnafta, and was extended in January 2008 to include SOCAR from Azerbaijan, GOGC from Georgia, and Klaipėdos Nafta from Lithuania. On 15 April 2008, International Pipeline Company “Sarmatia” Sp. z o.o. concluded an agreement with Granherne Limited for drafting the feasibility study for the project of the Eurasian Oil Transport Corridor. The feasibility study was completed in November 2008.

As regards electricity connections, the focus was mainly on preparing the plan of the Poland-Lithuania cross-border connection. The planned electricity bridge between Poland and Lithuania is to be an important element of the so-called Baltic Ring, comprising electricity systems of the Baltic countries. It was deemed a priority project under trans-European energy networks (TEN-E). The implementation of this project will be conducive to improving energy security not only of Poland and Lithuania, but in fact of entire Europe. At the same time, the scope of participation of Baltic States in the internal energy market of the European Union will be extended.

Apart from the activities related to the preparation of infrastructural investments, the implementation status of executive tasks is as follows:

- Despite the undertaken activities, no specific proposals for system solutions have been provided as regards the elimination of barriers to the grid infrastructure development. The failure to implement this task is one of the reasons for insufficient development of the energy grid infrastructure in Poland.
- Directive 2004/67/EC concerning measures to safeguard security of natural gas supply has been implemented. The draft act implementing Directive 2005/89/EC concerning measures to safeguard security of electricity supply and infrastructure investment was prepared.
- Poland is one of just a few EU countries which , provided financing for the development of grid and cross-border connections from European funds. Under *Operational Programme Infrastructure and Environment* , funds from the Cohesion Fund were earmarked to co-finance large investments relating to the modernisation of distribution grids, which will help reduce grid loss by at least 30%. At the same time, the EU

regulations on the use of funds from the Cohesion Fund state that the Fund may not support investments related to “re-electrification” and distribution grid development. Therefore, the task to improve the condition of the distribution grid in rural areas was entrusted in local governments under the regional policy with the use of funds from regional operational programmes. It should be noted that only nine provinces earmarked financing coming from structural funds for this purpose.

5. ENERGY EFFICIENCY OF THE ECONOMY

Since 2005, the majority of activities planned to enhance energy efficiency have been completed or at least initiated:

- Directive 2004/8/EC on the promotion of cogeneration was implemented. To this end, amendments were introduced to Energy Law by introducing the system of certificates of origin for energy from cogeneration, including energy produced from natural gas (the so-called red and yellow certificates).
- The analyses of energy intensity of selected economy branches were made and options for the reduction of energy loss in the Polish electricity system were determined. The results of these analyses were used to devise systemic solutions for the reduction of energy intensity of the economy.
- The Ministry of Economy started an informational campaign to promote rational use of energy. The purpose of this campaign was to acquaint and familiarise the Polish society with the issues related to the principles and profitability of the energy-saving solutions.
- Directive 2002/91/EC on the energy performance of buildings was implemented. The implementation of the Directive includes the promotion of pro-efficiency solutions, in particular the implementation of thermomodernisation projects under the Act on supporting thermomodernisation projects.

Implementation of the Directive 2006/32/EC on energy end-use efficiency and energy services started. The first *National Action Plan on energy efficiency* was devised, specifying funds and actions necessary to carry out national indicative objectives on energy saving. Preparing the assumptions and draft of the Act on energy efficiency, containing a market mechanism to support activities improving energy efficiency of the entire economy, was also a very important step.

A number of energy and pro-efficiency audits were performed in industrial plants and financed, *inter alia*, by environmental protection and water management funds. Some initial energy audits were also performed in selected industrial plants under the “Polish-Japanese Energy Efficiency Centre” project.

Under the operational programmes carried out in the years 2007–2013, funds were earmarked to support investments in the increase in energy efficiency of the economy, in particular the implementation of the best available technologies, developing the use of highly efficient cogeneration technology, reducing grid loss in distribution, and thermomodernisation of buildings.

The full evaluation of the economic transformation effects, including effects of the activities undertaken in this field, should be carried out based on rates reflecting changes in the energy generation, transmission and efficiency in the years 2005–2008, which will be possible only after obtaining and publishing statistical data for this period.

Despite a significant progress in energy efficiency, Poland still has room for improvements in this field. Therefore, it is estimated that further support mechanisms for projects in energy generation, transmission, distribution and efficiency of fuel and energy usage will be introduced.

6. ENVIRONMENTAL PROTECTION

The primary directions of actions under the energy policy comprise the mitigating the negative environmental impact of the energy sector by implementing new technological solutions, supporting the use of more environmentally-friendly types of fuel and introduction of economic mechanisms to achieve compliance with the environmental protection requirements.

Until the beginning of 2008, the majority of power companies carried out investment projects adjusting its operation to legal requirements in the field of environmental protection. The emission of basic pollutants by utility power plants and combined power and heat plants as at the end of 2008 amounted to: CO₂: 143.5 million tons, SO₂: 444.8 thousand tons, NO_x: 224.4 thousand tons. The emission of basic pollutants in 2008 was reduced as compared to 2007 when they amounted to: CO₂: 149.9 million tons, SO₂: 668.7 thousand tons, NO_x: 248.7 thousand tons.

In the years 2003–2006, the basis for the implementation of the CO₂ emission allowance trading scheme in Poland in line with the European Union guidelines was established. This system was designed to offer economic incentives stimulating investments in installations reducing the emission of pollutants. Based on its Decision of 26 March 2007 concerning the national allocation plan for the allocation of greenhouse gas emission allowances, the European Commission granted the average annual CO₂ emission limit of 208.5 million tons to Poland for the period from 2008 to 2012. This is a very unfavourable decision for Poland because it allows to increase the actual CO₂ emission throughout the 5 years by 2.66% as compared to 203.1 million tons in 2005, while the average annual GDP growth for the years 2008–2012 is estimated at 5.1%. As the Polish economy is significantly dependent on coal and this cannot be changed in a short time, the decision by the European Commission means that the growth opportunities for the Polish economy will be limited or its costs will increase if the imposed limit is exceeded (as a result of the penalties imposed on the companies which exceed limits or the obligation to purchase emission rights on a free market).

Poland appealed against the Decision of the Commission to the Court of First Instance. On 23 September 2009, the Court of First Instance annulled the Commission Decision in whole (case T-183/07). It allowed to increase the annual average number of CO₂ emission allowances available for Polish installations in the period from 2008 to 2012.

The trading scheme for SO₂ and NO_x emission has not been introduced. The *Energy Policy* also envisages measures aimed at agreeing the strategy of the fulfilment of obligations arising from the Accession Treaty with regard to the conditions of implementing the Directive 2001/80/EC with the European Commission. The Ministry of Environment devised two proposals for implementation of these obligations. However, they were not approved by the European Committee of the Council of Ministers due to the failure to comply with the emission caps specified in the Accession Treaty on the set deadlines.

The *Energy Policy* also assumed that activities should be undertaken to reduce the negative environmental impact of hard coal and lignite mining.

The main ecological problems of the hard coal mining sector include saline waters from drainage of mines, mining waste, areas degraded due to mining activities (requiring reclamation and land management), emission of dust and gas pollutants into the air, mining damage and the impact of rock mass pressure on buildings, roads, infrastructure, agricultural and forest land. For example, financial expenses of the mining sector for reclamation and development of land degraded by industrial activities amounted to PLN 69,044,500 in 2006, while expenses incurred to remove mining damage caused by the mining activity on surface amounted to PLN 315,561,900, and in 2007 to PLN 73,114,800 and PLN 275,745,200, respectively.

The *Strategy for the hard coal mining sector in Poland for the years 2007–2015* assumes that, due to increasingly restrictive environmental norms on coal combustion, one of the policy priorities of mining companies should be to maximise coal output with the lowest possible volume of pollutants, in particular sulphur and ash.

A very important task of the lignite mining sector was the reclamation of land withdrawn from production after the end of the deposit exploitation. Reclamation allowed using post-mining areas as water reservoirs, for agricultural and forest production, or for leisure.

To achieve the objective of improvement of fuel ecological properties, the law was amended to give preference to the use of less polluting fuels. Therefore, the Act on the fuel quality monitoring and controlling system, together with implementing regulations, was prepared and adopted.

The assumed specific activities have not been not fully implemented. However, significant mechanisms were implemented which made it possible to reduce the negative environmental impact of the energy sector. The objectives related to environmental protection were also achieved through activities focused on increasing energy efficiency and the use of renewable energy sources.

7. INCREASE IN THE USE OF RENEWABLE ENERGY SOURCES

The basic directions of actions in this field, specified in the *Energy Policy*, consisted in maintaining stable support for the use of renewable energy sources, increasing the share of biomass, water energy, and wind energy in generation, increasing the share of bio-components in the transport fuel market, and developing the industry manufacturing machinery for the renewable energy sector. It is estimated that the activities of the government in the years 2004–2007 were in principle compliant with the above directions, though their effects are not fully satisfactory.

The most important element of the measures aimed at increasing the use of renewable energy sources was the introduction of the solutions implementing the Directive 2001/77/EC into the Polish legal system. A support instrument was implemented which consists in the commitment to obtain and present for redemption the certificates of origin or the obligation to pay a substitution fee – the so-called mechanism of “green certificates.” The above was supplemented by solutions on the fulfilment of this obligation and imposing fines by the President of the Energy Regulatory Office. Funds obtained from substitution fees and fines are used exclusively as financial support for investments in renewable energy sources. Furthermore, energy suppliers are obliged to purchase all energy generated from renewable energy sources at market price and are fined if they fail to meet the obligation. In addition, renewable energy sources pay for only 50% of the costs of connecting to the power grid which is an important element of support. In 2006, the total amount of support (resulting from

certificates of origin and the substitution fee) amounted to PLN 1,096 million, while in 2007 it totalled PLN 1,537 million.

In order to increase the share of bio-components in the liquid fuel market, Directive 2003/30/EC was transposed based on the Act of 25 August 2006 on bio-components and liquid fuels and the Act on the fuel quality monitoring and controlling system. Furthermore, Poland set an ambitious path to carry out the National Indicator Target¹, going beyond the framework of Directive 2003/30/EC, setting the target for the period until 2013 at 7.1% of the share of bio-components in the transport fuel market.

An important element supporting the development of biofuels was the adoption of the *Long-term biofuels and other renewable fuels promotion programme for the years 2008–2014* by the Council of Ministers in 2007. The state aid programme consisting in excise tax exemptions for using biocomponents in fuels was launched. In 2008, the total amount of exemptions in this regard amounted to PLN 879 million.

Moreover, Operational Programmes for the years 2007–2013, financed with the European funds, earmarked funds for supporting the development of the generation capacity of electricity, heat, and transport fuels from renewable sources. Furthermore, support will be also offered to investments in connecting generation units to the grid and development of the industry manufacturing machinery for the renewable energy sector.

Not all executive tasks envisaged in the *Energy Policy* have been fulfilled. The concept behind combining wind energy development with pumped storage power plants and analysis indicating optimal locations for the purposes of the wind energy sector have not been completed. The fulfilment of the first task was deemed pointless due to lack of interest from power companies for which the construction of wind power plants is not economically viable when compared to pumped storage power plants. The need to perform the analysis of the optimal location of land to be used for the purposes of wind power generation was negatively evaluated by the organisations dealing with wind energy as well as by the Ministry of Environment.

Poland has vast and diversified renewable energy resources. The economic potential of renewable energy resources amounts to 1,160 PJ and practical possibilities of its use in 2020 are estimated at 697 PJ. There are, however, infrastructural and mainly environmental and spatial limitations that hamper the use of the potential.

At the end of 2008, Poland attained a 5.2% share of renewable energy sources in the primary energy balance. The share of renewable energy sources in gross electricity consumption increased from 2.9% in 2005 to 3.9% in 2007 and 4.7% in 2008. At the same time, the share of biofuels in the transport fuel market increased from 0.29% in 2004 to 0.92% in 2006, and then decreased to 0.68% in 2007, as a result of the change in the tax policy. This is an example showing how important it is to maintain stable support systems for the renewable energy sector in Poland. In 2008, this share increased to 3.66%, which made it possible to achieve the National Indicator Target. This resulted from implementing the obligation to ensure a specific share of bio-components in transport fuels from 1 January 2008.

Despite the solutions implemented, the results which have been obtained so far indicate that the achievement of the objectives specified in the *Energy Policy*, i.e. a 7.5% share of renewable energy sources until 2010 in the primary energy balance, a 7.5% share of

¹ National Indicator Target is the minimum share of bio-components and other renewable fuels in the total volume of liquid fuels and biofuels used during the calendar year in transport, calculated according to combustion value.

electricity generated from renewable energy sources in gross electricity consumption, and a 5.75% share of biofuels in the transport fuel market, is still at risk.

8. RESTRUCTURING AND OWNERSHIP TRANSFORMATION

The following activities were planned for restructuring and ownership transformation in the fuel and energy sector: implementing the competition mechanism on the fuel and energy market, building strong entities able to compete both on the domestic and the Community markets and gradual reduction of the direct impact of state authorities on the functioning of energy companies. Between 2005 and 2007, the government owner's policy focused on strengthening the competitive position of Polish companies from the energy sector, *inter alia* by vertical consolidation. The development of the privatisation process and the implementation of the competition mechanisms, in particular on the natural gas market, were not strong enough.

In March 2005, the Directives concerning common rules for the internal market in electricity and in natural gas (2003/54/EC and 2003/55/EC) were implemented into the Polish legal system through the amendment of the Energy Law. They created the legal basis for better operation of the competition mechanisms on these markets. Nevertheless, the results of these activities are not fully satisfactory.

Between 2004 and 2007, restructuring programmes were implemented separately for each of these subsectors. These programmes were, in general, compliant with the general directions determined in the energy policy to strengthen the position of Polish companies on the European market.

Hard coal mining sector

The programme basis for the restructuring of the hard coal mining sector in the years 2004–2006 was the document entitled *Restructuring of the hard coal mining sector in the years 2004–2006 and the strategy for the years 2007–2010*, adopted by the Council of Ministers on 27 April 2004. The description of restructuring activities carried out in order to implement the above programme was presented in the part entitled “National fuel and energy generation capacity”.

After 2004, the hard coal mining sector has achieved positive net financial results. This was also due to the fact that the economic situation on the coal market improved, in particular in the recent years.

On 31 July 2007, the Council of Ministers adopted the *Strategy for the hard coal mining sector in Poland for the years 2007–2015*. The purpose of this document is to ensure that after 2015 the hard coal mining sector becomes competitive enough to successfully operate in a free market economy.

When evaluating the progress achieved in the restructuring process, it should be noted that the focus on the production capacity and cost reduction led to negligence of investments. Consequently, the resulting problems could be observed on the Polish hard coal market already in 2007, and continued in 2008.

Gas sector

The main objectives of the reorganisation of the gas sector in Poland included ensuring national energy security by preventing hostile takeovers of strategic companies, implementing the competitive gas market and adjusting it to efficient operation on the market of the European Union.

On 20 March 2007, the Council of Ministers adopted the *Policy for the natural gas sector*, in which it specified the action plan to improve energy security. The document contains the guidelines for state administration and strategic companies from the gas sector with regard to activities aimed at improving Poland's energy security.

In the framework of restructuring, work started to establish a fully independent transmission system operator. PGNiG-Przesył Sp. z o.o. (currently Operator Gazociągów Przesyłowych GAZSYSTEM S.A.) was appointed for this function. At the end of June 2007, six distribution system operators were assigned and legally set up within the PGNiG S.A. Capital Group. At the end of 2008, a branch of PGNiG S.A. was to perform the function of the gas fuels storage system operator. On 31 December 2008, the President of the Energy Regulatory Office appointed PGNiG S.A. as the gas fuels storage system operator.

Crude oil sector

On 6 February 2007, the Council of Ministers adopted the *Policy of the Government of the Republic of Poland for the Polish crude oil sector* specifying the objectives which should be implemented by the state as a shareholder in companies operating in the crude oil sector as well as the programme of legislative work relating to the liquid fuels security. The activities in the crude oil sector were aimed at retaining the ownership structure of key crude oil companies preventing their hostile takeover. The sale of shares of PKN ORLEN S.A., belonging to Nafta Polska S.A., to a strategic investor was suspended, and the shares are to be taken over by the State Treasury. The consolidation of PKN ORLEN S.A. with GRUPA LOTOS S.A. was not carried out either, due to an increasing risk of a hostile takeover of the consolidated company and the risk of increasing monopolisation of the internal market.

In September 2006, Operator Logistyczny Paliw Płynnych Sp. z o.o. (OLPP) was registered. The idea behind the OLPP establishment was to integrate fuel logistic resources by the State Treasury in one business entity providing integrated logistic services in the field of liquid fuels.

Electricity sector

The Ministry of Economy prepared the *Programme for the electricity sector*, adopted on 28 March 2006 by the Council of Ministers. As a result of the Programme, the transmission system operator (PSE–Operator S.A.) and distribution system operators were separated. At the same time, the consolidation of companies on the electricity market was carried out. The process resulted in establishing four energy groups: Polska Grupa Energetyczna S.A., Tauron Polska Energia S.A., ENERGA S.A., and ENEA S.A. The chosen vertical consolidation method seems more efficient in terms of establishing companies able to compete with foreign companies on the common market of the European Union, but it limits competition on the domestic market. At the same time, restructuring processes were carried out to improve the efficiency of companies and allow their adjustment to new operating conditions.

The work on the termination of long-term agreements was finalised, which should be considered very important for stimulating competition on the electricity market. As a result of the electricity market liberalisation and a long-lasting process of negotiating with the European Commission, the conditions of the state aid scheme were agreed in 2007. They were approved for implementation by way of the Decision of the European Commission on the state aid awarded by Poland as part of Power Purchase Agreements and the state aid which Poland is planning to award concerning compensation for the voluntary termination of Power Purchase Agreements. The conditions on the basis of which the producers voluntarily joined the state aid scheme were laid down by the Act of 29 June 2007 on the rules of covering the costs incurred by producers in relation to the earlier termination of the long-term power

purchase agreements. Pursuant to the Act, by 31 December 2007 the parties to long-term agreements, i.e. producers and PGE S.A. (legal successor of PSE S.A.), concluded agreements terminating the above agreements, which became effective on 1 April 2008.

9. RESEARCH AND DEVELOPMENT DIRECTIONS

In the period under analysis, progress was made in research and development in the power sector due to increasing importance of the issue in the European Union and worldwide. This was the result of the tendency to prevent climate change associated primarily with greenhouse gas emissions, mainly from the energy sector, and the need to improve energy supply security in the light of depleting resources of hydrocarbon fuels.

The activities specified in the *Energy Policy* and relating to the promotion of issues related to power have not been fully implemented, in particular as regards the informational campaign on nuclear energy. The document entitled *Scenarios of technological development for the fuel-energy complex to ensure national energy security*, containing a review of new energy technologies in terms of their potential uses, was prepared with the participation of the Ministry of Economy and Central Mining Institute. Preparatory measures were carried out to start the informational campaign relating to nuclear energy. The energy issues were promoted by way of an informational campaign on the effective use of energy. An incentive for the intensification of research and development was Poland's accession to the European Union as well as the participation of Polish scientists in numerous international research programmes and a prospect of absorbing significant EU funds allocated for Poland for the years 2007–2013 under the *National Cohesion Strategy*. However, this progress has not yet contributed to significant improvement of Poland's position in the EU or world ranking of innovative economies, nor has it modernised the Polish energy sector.

The *Programme for the electricity sector* also emphasised the importance of the implementation of modern technologies in the electricity sector whose generation and transmission capacity will require significant investments in the coming years. Significant effort as regards innovation is also required by other energy systems: gas, liquid fuels, heat systems as well as by the development of the use of renewable energy sources and improvement of the energy efficiency. Progress was made in these areas in the period under analysis, however, it was too slow for these challenges.

On 30 October 2008, the Minister of Science and Higher Education established the National Research and Development Programme (Polish abbreviation: KPBNiPR). The objective of the strategic programme entitled *Advanced technologies of obtaining energy* under the above Programme is to support research and development work and implementation work related to environmentally friendly state-of-the-art technologies of coal extraction and processing. The programme focuses on research results which have the greatest chance for application and full implementation. It demonstrates Polish scientific and technological specialisations based on the main fuel material in Poland, i.e. coal, and also on alternative sources of energy. The programme contains also advanced research allowing to obtain scientific knowledge, technological experience and domestic know-how in the area of new technologies of energy generation.

In addition, the Ministry of Science and Higher Education financed or finances the following research projects commissioned in the area of energy, including clean coal technologies:

- Clean coal – optimization of economic and ecological consequences of hard coal extraction and utilisation by 2020, coordinator – Central Mining Institute (project completed in 2004);

- Materials and technologies for water management development on the basis of industrial process gases, coordinator – Central Mining Institute (project completed in 2009);
- Chemistry of the prospective processes and products of coal conversion, coordinator – Institute for Chemical Processing of Coal (project completion – 2010);
- Supercritical coal fired power plants, coordinator – Silesian University of Technology (project completion – 2010);
- Modern technologies of biomass and biodegradable waste (B&BW) use for power generation – B&BW conversion to energetic gaseous fuels, coordinator – Institute of Power Engineering in Warsaw (project completion – 2010).

The Ministry of Science and Higher Education also finances research in the field of energy under own research, development and targeted programmes.

The activities supporting research and development so far have not significantly accelerated the progress in scientific research in the power sector. Therefore, it will be necessary to devise more efficient support mechanisms in this regard.

10. INTERNATIONAL COOPERATION

The activities carried out within the framework of international cooperation were aimed at enhancing energy security, ensuring relevant conditions for energy raw materials and electricity trading, attracting foreign investors to Poland and supporting Polish businesses in investments and other activities carried out abroad.

Intensive activities were carried out to tighten cooperation within the European Union. In this context, it is necessary to underline the actions supporting the establishment of the common European energy security strategy and active participation in the debate on the future European Energy Policy.

Poland actively participated in the creation of new EU regulations, in particular the Directive on the promotion of the use of energy from renewable sources and the ETS Directive.

The Government successfully supported Polish enterprises from the crude oil and gas sector in the activities performed abroad, in particular as regards gaining access to crude oil and natural gas deposits.

- As for the natural gas sector, the most important international successes include the purchase of 12% of shares in the crude oil and natural gas deposits on the Norwegian Continental Shelf by Polskie Górnictwo Naftowe i Gazownictwo S.A. on 28 February 2007, approval of the Company's offer for crude oil and natural gas exploration in Egypt in May 2007 and the participation of the Company (15% of shares) in the Skanled consortium building the gas pipeline from Norway to Denmark and Sweden, on 20 June 2007. Furthermore, a very positive opinion should be given to the activities carried with a view to building the Baltic Pipe gas pipeline. Earlier efforts made to carry out this investment were suspended in 2003, which was a mistake. The representatives of PGNiG S.A. also held talks with companies from Qatar and Algeria as regards the possibility of arranging LNG supplies to Poland.
- The Minister of Economy supported the activities of Grupa Lotos aimed at purchasing additional crude oil deposits in Norway. (In 2007, Grupa Lotos registered a company responsible for the crude oil exploration and extraction on the

Norwegian Continental Shelf). In 2008, Grupa LOTOS S.A. purchased a 20% share in Yme crude oil deposit and was granted 5 exploration concessions on the North Sea.

Poland completed the process of accession to the International Energy Agency. On 3 October 2007, the Executive Council of IEA invited Poland to join the Agreement on an International Energy Programme, which is a basis for the functioning of the International Energy Agency. Poland became a fully-fledged IEA member on 25 September 2008.

The co-operation on the fuel market with Kazakhstan, Azerbaijan, Georgia, Ukraine and Lithuania was intensified and resulted in the Energy Summit held in Cracow on 11–12 May 2007. These activities should ensure the diversification of the raw material supply sources, hence reducing Poland's dependency on a single supplier. The activities were undertaken to extend (develop) the Odessa-Brody pipeline to Adamow and further to Plock and Gdansk.

The Government actively participated in the consultations on the environmental impact of the German-Russian Nordstream gas pipeline according to the European Union rules and procedures of the Convention of Espoo, presented reservations and conducted an active informational policy in this respect co-operating and exchanging information with individual countries (Finland, Sweden, Denmark, Germany, Russia, Estonia, Latvia and Lithuania).

Regional co-operation with Baltic States in the electricity sector was strengthened. Poland undertook intensive activities to include Lithuania, Latvia and Estonia in the internal electricity market. The main co-operation areas included Poland-Lithuania electricity connection and Poland's participation in the construction of the nuclear power plant in Ignalina.

Bilateral co-operation with Denmark, Germany and the Netherlands brought about significant benefits for the exchange of experience in the energy sector, including negotiations of common positions presented on the EU forum.

Poland actively participated in the BASREC (*Baltic Sea Region Energy Co-operation*) activities, which helped Poland gain a considerable share in the creation of the energy policy in Baltic Sea countries and the internal energy market.

Poland also carried out intensive activities to include Polish projects of installations for CO₂ capture and storage (CCS) in the Flagship Programme consisting in building 10-12 CCS demonstration plants in the European Union.

Summing up the implementation of the Energy Policy of Poland until 2025, the objectives set in the document were appropriate. The implementation of executive actions was appropriate, though not always compliant with the determined method and according to the specified timetable. Long-term directions of the energy policy should be continued. However, it is necessary to accelerate implementation of the energy policy objectives as much as possible in order to increase the energy security and ensure sustainable development of Poland.