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Ministry of Economy

Energy Policy of Poland until 2030

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1. Introduction

1.1. Determinants

Currently, the Polish energy sector is facing a number of serious challenges. High demand for energy, inadequate fuel and energy generation and transmission infrastructure, significant dependence on external supplies of natural gas and almost full dependence on external supplies of crude oil, as well as commitments in the field of environmental protection, including climate protection, compel us to take decisive actions preventing the deterioration of the situation of fuel and energy customers.[1]

At the same time, the global economy witnessed a series of unfavourable events in recent years. Significant fluctuations in prices of energy-producing raw materials, the increasing demand of developing countries for energy, serious breakdowns of energy systems, and the increasing environmental pollution require a new approach to energy policy.

As part of its environmental protection commitments, the European Union set quantitative objectives for 2020, the so-called "3x20%," i.e. reducing greenhouse gases emission by 20% of 1990 levels, reducing energy consumption by 20% of the projected 2020 levels and increasing the share of renewable sources of energy to 20% of total energy generation, including an increase in the use of renewables in transport to 10%.In December 2008, the EU adopted the climate and energy package which contains specific legal tools to attain the above objectives. By means of actions initiated at the national level, the energy policy contributes to the implementation of energy policy objectives specified at the Community level.

This document has been drafted in accordance with Articles 13–15 of the Energy Law and presents the strategy of the state which aims to address the most important challenges that the Polish power industry must face, both in the short and in the long run, until 2030.

1.2. Primary directions of energy policy

As a Member State of the European Union, Poland actively participates in devising the Community energy policy, it also implements its main objectives under the specific domestic conditions taking into account the protection of interests of customers, the energy resources and technological conditions of energy generation and transmission.

In line with the above, the primary directions of Polish energy policy are as follows:

- To improve energy efficiency;
- To enhance security of fuel and energy supplies;
- To diversify the electricity generation structure by introducing nuclear energy;
- To develop the use of renewable energy sources, including biofuels;
- To develop competitive fuel and energy markets;
- To reduce the environmental impact of the power industry.

The adopted directions of energy policy are largely correlated. Improvement of energy efficiency reduces the increase in demand for fuels and energy, and thus it is conducive to

[1] These diagnosis of the problems was presented in Appendices 1, 2, and 4 to the present document.

enhancing energy security by reducing dependence on import; it also reduces the environmental impact of the power sector by reducing emissions. The development of renewable energy sources, including the use of biofuels and clean coal technologies, and introduction of nuclear energy bring about similar effects.

Implementing measures in accordance with the above directions, the energy policy will strive to enhance the country's energy security observing the principle of sustainable development

The Energy Policy constitutes a part of the priorities of the National Development Strategy 2007–2015 adopted by the Council of Ministers on 29 November 2006. In particular, the objectives and measures laid down in the document will contribute to the implementation of the priority concerning the improvement of the condition of technical infrastructure. The objectives of the Energy Policy are also convergent with the objectives of the renewed Lisbon Strategy and the renewed EU Sustainable Development Strategy. The energy policy will strive to meet the commitment contained in the two abovementioned EU strategies which assumes the transformation of Europe into a low-carbon economy with a reliable, sustainable, and competitive energy supply.

1.3. Energy policy tools

The main energy policy tools are as follows:

- Legal regulations setting forth the operating principles for the fuel and power sector, and defining technical standards;
- Effective use of owner's supervision by the State Treasury to implement the energy policy objectives within its competence;
- Ongoing regulatory activities of the President of the Energy Regulatory Office (Polish abbreviation: URE), consisting in verification and approval of tariffs, and application of benchmarking analysis to regulated energy markets;
- System mechanisms to support implementation of measures aimed at achieving the primary objectives of energy policy which are currently not commercially profitable (e.g. the certificate market, tax benefits and exemptions);
- Ongoing monitoring of the situation on fuel and energy markets by the President of the Office of Competition and Consumer Protection (Polish abbreviation: UOKiK) and the President of the Energy Regulatory Office and intervention measures within their competence;
- Activity within the structures of the European Union, particularly those leading to such EU energy policy and Community requirements in respect of environmental protection that would take into account the nature of the Polish power sector and result in Poland's enhanced energy security;
- Poland's active membership in international organisations, such as the International Energy Agency;
- Statutory activity of local government bodies taking account of the priorities of the Energy Policy of Poland, also through public-private partnerships (PPP);
- Hierarchic spatial planning ensuring the implementation of energy policy priorities, plans of electricity, heat, and gas fuels supply to communes and the development plans of power companies;

- Information activities conducted by government bodies and by co-operating research and development centres;
- Support of energy projects significant to Poland (e.g. investment projects, research and development) with public funds, including European funds.

Within the framework of energy policy implementation, a profound reform of the energy law will be carried out. It will result in drafting a set of new regulations. As a result, stable and transparent conditions for operation of entities in the area of fuel and energy market economy will be created.

Measures set forth in the energy policy will be largely implemented by commercial energy companies operating on competitive fuel and energy markets or on regulated markets. Therefore, state intervention in the operation of the sector must be limited and must have a clearly defined objective, namely to ensure energy security in Poland and to meet its international commitments, particularly in respect of environmental protection and nuclear safety. State intervention in the energy sector will be used exclusively to ensure security, and always in accordance with the EU legislation.

1.4. Document structure

The structure of this document mirrors the primary energy policy directions. For each of the directions, main objectives and, depending on the needs, also specific objectives are formulated, as well as measures for their implementation, and their anticipated effects. Chapter 8 presents measures supporting the implementation of the policy at the international level and at the local government level. Implementation of the majority of measures provided for in this paper will begin prior to 2012, but their effects will be long-term and will allow meeting the objectives set for 2030. Appendices present the projection of demand for fuels and energy, assessment of implementation of the energy policy since 2005 onwards, the action plan schedule for the years 2009–2012 and the conclusions from the strategic environmental impact assessment of the energy policy.

2. Improving energy efficiency

Improving energy efficiency is one of the priorities of the EU energy policy, whose goal is a 20% reduction in energy consumption by 2020 as compared to the “business as usual” scenario. Poland has made significant progress in this respect. Although GDP energy intensity declined by 30% within the last 10 years, efficiency of the Polish economy calculated as GDP (at euro exchange rate) per energy unit remains twice as low as the European average. Economic development, resulting from the use of new technologies, reveals a considerable increase in electricity consumption accompanied by a relative decrease in the use of other energy forms.

Energy efficiency is given priority in the energy policy; and progress in this respect will be of key importance to implementing all of its objectives. Therefore, all possible steps will be taken to enhance energy efficiency.

2.1. Objectives in respect of enhancing energy efficiency

The main energy policy objectives in the field are as follows:

- **To achieve zero-energy economic growth, i.e. economic growth with no extra demand for primary energy;**
- **Reducing the energy intensity of Polish economy to the EU-15 level.**

Specific objectives in the area are as follows:

- To enhance efficiency of power generation by building highly efficient generation units;
- To achieve a twofold increase (as compared to 2006) in power generation with the use of highly efficient cogeneration technology by 2020;
- To limit grid loss during transmission and distribution by i.a. modernising the existing and building new grid, replacing low efficiency transformers, and developing distributed generation;
- To increase efficiency of end-use of energy;
- To increase the ratio of annual demand for power to the maximum demand for power at peak usage hours, which allows to limit the total cost of meeting the demand for power.

2.2. Measures to improve energy efficiency

The measures include:

- Setting the national objective of enhancing energy efficiency;
- Introducing a systemic mechanism to support measures aimed at attaining the national objective of enhancing energy efficiency;
- Stimulating development of cogeneration through support mechanisms, taking into account cogeneration from sources up to 1 MW and appropriate commune policy;
- Using mandatory energy performance certificates for buildings and apartments upon their marketing or renting;
- Determining energy intensity of devices and power-consuming products, introducing minimum standards for power-consuming products;
- Committing the public sector to serve as a role model of economical energy usage;
- Supporting investments in energy saving through preferential loans and grants from domestic and European funds, also under the Act on supporting thermomodernisation and renovations, the Operational Programme Infrastructure and Environment, and the National Fund for Environmental Protection and Water Management;
- Supporting research and development on new solutions and technologies reducing energy consumption, in all kinds of its processing and use;
- Applying Demand Side Management techniques, stimulated by diversification of distribution prices during the day and of electricity prices on the basis of reference prices as a result of introduction of an intra-day market and sending price signals to customers with the use of remote bilateral communication via electronic meters;
- Informational and educational campaigns promoting efficient energy use.

In addition, the indicative target stemming from the Directive 2006/32/EC[2] will be implemented, which assumes energy savings of 9% of the annual average amount of end-use energy consumption from the period 2001–2005 by 2016 (i.e. by 53,452 GWh) laid down in the National Action Plan for Energy Efficiency, adopted by the European Committee of the Council of Ministers on 31 July 2007 and other measures stemming from the document, which are not listed herein.

2.3. Expected effects of measures to improve energy efficiency

As a result of implementing the proposed measures, the increasing consumption of energy by the Polish economy is expected to slow down, thus increasing energy security. Reducing energy consumption has also a measurable effect which consists in avoiding emission of pollutants by the energy sector. Finally, stimulating investments in modern energy-saving technologies and products will contribute to enhancing innovation in the Polish economy. Energy savings will significantly add to the improvement of economy efficiency and competitiveness.

3. Enhanced security of fuels and energy supplies

Security of fuels and energy supplies is understood as ensuring stable fuels and energy supplies at a level that guarantees meeting domestic needs at prices acceptable for the economy and the society, assuming the optimal use of domestic deposits of energy resources, and through diversification of sources and directions of supply of crude oil, as well as liquid and gas fuels.

Poland has large deposits of coal which, considering the dependency of our country on the import of gas (in almost 70%) and of crude oil (in over 95%), will play the role of a major factor stabilising Poland's energy security. The energy policy will be targeted at diversifying supplies of raw materials and fuels understood also as diversification of technologies, not as it had been understood until recently – as mere diversification of supply directions. Development of technologies, which make it possible to obtain liquid and gas fuels from domestic resources, will be supported.

Due to the gradual exhaustion of hard coal and lignite in the currently used deposits, the plans are in place to prepare and launch the use of new deposits by 2030. Therefore, it is necessary to ensure access to strategic coal resources by means of, *inter alia*, protection of their location from further infrastructural development unrelated to the energy sector and their inclusion in the spatial development concept of the country, local spatial development plans and long-term development strategy. It is also necessary to correlate the plans of deposits exploitation with the investment plans in other sectors, e.g. in relation to road infrastructure, in those documents. It concerns in particular the hard coal deposits of "Bzie-Dębina," "Śmiłowice," "Brzezinka" and lignite deposits of "Legnica" and "Gubin," as well as satellite deposits of operating mines.

[2] Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC (OJ L 114, 27.4.2006, p. 64–85).

In the sectors of natural gas and crude oil, it is also essential to increase transmission capacity of gas transport and storage systems and of oil and fuel pipelines, as well as their transhipment and storage infrastructure, including cavities in salt structures. The growth of natural gas extraction capacity should be used not only to satisfy the current needs but also to serve as a security in the case of exceptionally unfavourable weather conditions or external disturbances.

The current projections, concerning the possibility to meet future demand for electricity in Poland, point to the need to extend the existing generation capacity. The commitments to reduce greenhouse gas emission force Poland to seek low-emission solutions for electricity generation. All available technologies of coal-based energy generation will be applied on the assumption that they would lead to reducing air pollution.

Electricity is produced in the domestic system with reduced possibilities of international exchange – currently less than 10%. Thus, apart from the development of electricity generation capacity, power grid transmission and distribution capacity, the main directions of energy policy include also increasing the possibilities to exchange electricity with neighbouring countries. To that end, relevant statutory regulations will be introduced lifting the existing barriers.

Creating conditions for strengthening the competitive position of Polish energy sector entities so that they may compete in European energy markets is also an important element of energy policy in the area.

3.1. Objectives and measures to enhance security of fuels and energy supplies

3.1.1. Fuels – sources and transmission

3.1.1.1 Coal

The main objective of energy policy in this field is efficient and effective management of coal deposits located within the territory of the Republic of Poland.

State energy policy assumes using coal as the main fuel for the power industry in order to ensure an adequate level of energy security of the country.

Specific objectives in the field are as follows:

- Ensuring energy security of the country by meeting domestic demand for coal, ensuring stable supplies to customers and the required qualitative parameters;
- Use of coal in the energy industry by application of efficient and low-emission technologies, including coal gasification and processing it into liquid or gas fuels;
- Using modern technologies in the coal mining sector to enhance competitiveness, work safety, environmental protection, and to establish the basis for technological and scientific development;
- Maximum use of methane released when extracting coal in mines.

To accomplish the above objectives, the following measures will be taken:

- Introducing regulations which take into account the objectives proposed under the energy policy, particularly instruments motivating to carry out preparatory work and to retain appropriate level of mining capacity;
- Developing modernised pre-treatment technologies for coal to be used for energy production;
- Abolishing legal barriers to making new deposits of hard coal and lignite available;
- Identifying strategic national resources of hard coal and lignite and protecting them through inclusion in spatial development plans;
- Securing access to coal resources via undertakings making available new, documented, strategic deposits and their industrial use – through public purpose investments of supra-local significance;
- Intensifying geological research to extend the coal resource base, making use of state of the art prospecting and surveying techniques;
- Completing organisational and structural changes. In economically justified cases, allowing the possibility to establish capital groups on the basis of coal and energy companies, observing the principles of social dialogue;
- Supporting the industrial use of methane released when extracting hard coal in mines;
- Introducing technology solutions which allow recovery of methane from ventilation air pumped out of hard coal mines;
- Obtaining funds for development of the mining industry through privatisation, after consultations with social partners. Legitimacy of privatisation, the volume of shares, and the IPO date will be analysed in terms of energy policy objectives;
- Supporting research and development of technologies permitting to use coal for liquid and gas fuels production, mitigating the negative environmental impact of processes of obtaining energy from coal as well as coal fuel cells technologies;
- Retaining the competence of the minister in charge of the Treasury in respect of mining companies by the Minister of Economy.

3.1.1.2 Gas

The main objective of energy policy in the field is ensuring Poland's energy security through diversification of sources and directions of natural gas supplies.

Specific objectives in the field are as follows:

- Extending natural gas resources at the disposal of Polish companies;
- Extending natural gas extraction capacity in the territory of Poland;
- Ensuring alternative sources and directions of gas supplies to Poland;
- Extending the natural gas transmission and distribution system;
- Extending natural gas storage capacities;
- Polish companies winning access to natural gas deposits located outside Poland;
- Producing gas with the use of coal gasification technologies;
- Industrial use of methane by extraction through surface boreholes.

Measures aimed to diversify supplies will always be preceded by an economic analysis of alternative possibilities to produce gas from domestic resources, including the use of new technologies.

Measures in the field are as follows:

- Appropriate tariff policy encouraging investment in pipeline infrastructure (gas transmission and distribution);
- Building a terminal for receiving liquefied gas (LNG);
- Concluding arm's length contracts for diversified natural gas supplies to the liquefied gas reception terminal and from the north;
- Establishing sustainable management policy for domestic gas resources to allow extension of natural gas reserve base in the territory of Poland;
- Investments which allow extending natural gas extraction in the territory of Poland;
- Diversification of supplies by building a transmission system for natural gas supplies from the north, west, and south, as well as building connections to primarily meet the requirement of supply sources diversification;
- Polish companies winning access to natural gas deposits located outside Poland;
- Supporting investments in infrastructure with the use of European funds;
- Streamlining the crisis response mechanism;
- Securing state interests in strategic companies of the gas sector;
- Investment incentives for building storage space (by appropriate tariff structure and ensuring return on invested capital);
- Legislative measures aimed at lifting barriers to investments, particularly in respect of large investment projects in infrastructure (warehouses, LNG infrastructure, gas compressor stations, etc.) and linear investments;
- Further pilot work on making methane from hard coal deposits available.

3.1.1.3 Crude oil and liquid fuels

The global market of crude oil and liquid fuels is competitive, yet in the case of Poland there is a threat to security of crude oil supplies as well as a threat of monopolistic price fixing. This is a result of the market being dominated by supplies from one direction only. In order to avoid such a situation, the level of supply diversification needs to be enhanced (it is essential not only to increase the number of suppliers, but also to eliminate a situation where oil comes from a single area, and its transmission is controlled by a single entity).

The main objective of energy policy in the field is to ensure energy security by:

- **Enhancing the diversification level of crude oil and liquid fuels supply sources, understood as obtaining crude oil from various regions of the world, from different suppliers, using alternative transport routes;**
- **Building crude oil and liquid fuels storage facilities of capacity which ensures continuity of supplies, particularly in crisis.**

Specific objectives in the field are as follows:

- Diversification of crude oil supplies to Poland, inter alia by building infrastructure permitting to transport crude oil from the Caspian Sea region;
- Extension of transport and transhipment infrastructure for crude oil and oil products;
- Building and expanding crude oil and liquid fuel storehouses (cavern storage facilities, transhipment and storage bases);
- Polish enterprises winning access to crude oil deposits located outside the Republic of Poland;
- Increasing the amount of crude oil transited through the territory of the Republic of Poland;
- Enhancing competitiveness in the sector in order to minimise the negative effects for the economy which result from significant changes in prices of raw materials on global markets;
- Retaining state ownership in key companies of the sector, as well as in infrastructure companies;
- Mitigating the risk of hostile takeover of entities dealing in crude oil processing which render services in the area of transmission and storage of crude oil and oil products;
- Enhancing the security of fuel transport by sea.

Measures aimed to diversify crude oil supplies will always be preceded by an economic analysis of alternative possibilities to obtain liquid fuels from domestic resources, including the use of new technologies.

Measures in the field are as follows:

- Building infrastructure to allow transport of crude oil from other regions of the world, inter alia from the Caspian Sea region within the Euro-Asian Oil Transportation Corridor project;
- Supporting actions of Polish companies aimed at intensification of prospecting and enhancing national exploitation on land, in the Baltic Sea shelf and outside Poland;
- Extending transmission, transhipment, and storage infrastructure (including caverns) for crude oil and liquid fuels;
- Application of owner's supervision tools of the State Treasury to stimulate and monitor execution of projects in respect of security of crude oil and liquid fuel supplies;
- Legislative changes concerning liquid fuel reserves, particularly lifting the obligation of physical maintenance of reserves by enterprises in exchange for a special purpose fee intended for maintenance of reserves by a public law entity;
- Lifting barriers to development of fuel infrastructure and supporting investment projects in infrastructure with the use of European funds;
- Ensuring fuel transport by sea.

3.1.2. Generation and transmission of electricity and heat

The main objective of energy policy in the field is to ensure ongoing meeting of demand for energy, taking into account the maximum possible use of domestic resources and environmentally friendly technologies.

Specific objectives in the field are as follows:

- Building new generation capacity to balance domestic demand for electricity and maintain the operationally available power surplus during the peak generation capacity of domestic conventional and nuclear generation sources at the minimal level of 15% of the maximum domestic demand for electricity;
- Building intervention sources of electricity generation essential to security of the power system operation;
- Developing the national transmission system enabling sustainable economic development of Poland, its individual regions and ensuring reliable electricity supplies to agglomerations (particularly closing the 400 kV loop and loops circling Poland's largest cities), as well as receipt of electricity from the areas with a large number of planned and newly built generation facilities, including in particular the wind farms.
- Developing cross-border connections coordinated with extending the domestic transmission system as well as the systems in neighbouring countries, which will allow to exchange at least 15% of electricity used in Poland by 2015, 20% by 2020, and 25% by 2030;
- Modernisation and extension of the distribution grid which allows to improve the reliability of power supply and to develop distributed power generation using local sources of energy;
- Modernisation of transmission and distribution grids to reduce failure frequency by 50% by 2030 as compared to 2005;
- Aiming at replacing the heat and power plans supplying the centralised heat distribution systems of Polish cities with cogeneration sources by 2030.

To accomplish the above objectives, the following measures will be taken:

- Imposing an obligation to prepare development plans of the transmission and distribution grid on grid operators, with particular indication of preferred locations of new generation capacity and the costs of their connection. The plans will be developed and published every three years;
- Legislative measures aimed at lifting barriers to investments, particularly linear investments;
- Introducing long term contracts for system regulatory services covering intervention reserves and rebuilding supply to the national power system by the transmission system operator;
- The transmission system operator announcing tenders for intervention capacities essential to ensuring safety of the power system operation;
- Reconstruction and reinforcement of the existing power lines and building new ones, particularly those enabling cross-border electricity exchange with neighbouring countries;
- Establishing methodology for calculating return on invested capital as an element of cost justified in transmission and distribution tariffs for investments in grid infrastructure;

- Introducing amendments into the Energy Law consisting in defining the responsibility of local government bodies for drafting local supply assumptions for plans and plans for heat, electricity, and gas fuel supply;
- Transferring owner's supervision over the operator of electricity transmission system (PSE Operator S.A.) into the competence of the Minister of Economy;
- Retaining a majority stake in PGE Polska Grupa Energetyczna S.A. and a controlling stake in Tauron Polska Energia S.A. at the level which ensures retaining owner's supervision by the State Treasury;
- Introducing a qualitative element into transmission and distribution tariffs to which transmission and distribution system operators would be entitled if they reduced failure frequency rates and maintained them at levels specified by the President of the Energy Regulatory Office for a given grid type;
- Changing regulation mechanisms by introducing methods of heat price-fixing with the use of reference prices and incentives to optimise the heat supply cost;
- Preferential treatment of combined generation as the technology recommended for building new generation capacity.

3.2. Anticipated effects of measures to enhance security of fuels and energy supplies

3.2.1. Fuels – sources and transmission

Accomplishment of energy policy objectives will allow to reduce Poland's dependency on import of natural gas, crude oil, and liquid fuels from a single direction. Increasing the share of gas extracted in Poland, or manufactured on the basis of Polish raw materials, is a plausible objective. The capacity to store crude oil, liquid fuels, and natural gas allowing to supply the country with the necessary fuels in emergency situations will improve significantly.

Relying on domestic coal resources as the main fuel of the system power industry would bring about practically total independence of electricity generation and considerable independence of heat generation from external supply sources, particularly in large city systems, ensuring energy security with regard to electricity generation and supplies.

3.2.2. Generation and transmission of electricity and heat

Implementation of energy policy in the area of electricity generation will allow to balance the electricity demand, which increases quickly due to Poland's economic development. The regulatory power necessary to adjust electricity generation to the changing daily demand will be ensured.

Development of transmission and distribution grids would improve their reliability, while information on potential locations of generation capacity will facilitate making investment decisions. Granting connection conditions for a specific period, along with the necessity to pay a deposit, will eliminate a common phenomenon of blocking the investments by failing to use the connection conditions.

Introducing precise methodology of calculating the rate of return on capital invested in infrastructure will allow to attract commercial investors. Introducing a qualitative element into transmission tariffs will constitute an incentive for transmission and distribution system operators to enhance the reliability of grid operation.

An important step on the way to enhance energy security is the development of distributed power generation using local energy sources, such as methane or renewable energy sources. The development of this type of energy generation also allows to reduce grid investment, especially investment in the transmission system. The system of incentives for distributed energy generation, in the form of support systems for renewable energy sources and cogeneration, will result in considerable investment in distributed energy generation.

4. Diversification of the electricity generation structure by introducing nuclear energy

Poland's energy security requires ensuring supplies of an appropriate amount of electricity at reasonable prices, simultaneously observing the environmental protection requirements. Climate protection and the climate and energy package adopted by the EU result in the need of switching generation to low CO_2 emission technologies. In the current situation, particular significance is attached to using all available technologies simultaneously enhancing energy security and lowering emission of pollutants, retaining economic efficiency.

With the current trends in European energy policy, nuclear energy has become one of the most desired energy sources. Apart from the lack of CO_2 emission, it also ensures independence of typical directions from which energy resources are obtained. The Resolution of the Council of Ministers of 13 January 2009 imposed an obligation on all process participants to take intensive actions aimed at setting the stage for implementing the nuclear energy production programme in Poland in line with the requirements and recommendations specified in documents drafted by the International Atomic Energy Agency. Observing the scheduled date of launching first nuclear power plant by 2020 requires a considerable contribution of state bodies and budget funds, qualified personnel, and efficient institutions both at the preparatory stage prior to making the final decision on starting the nuclear energy production programme and at the stage of preparations for the tender procedure.

Preparatory works related to the introduction of nuclear energy generation in Poland will include in particular broad social consultation, as well as identification and minimisation of potential threats.

It is also necessary to ensure long-term access to all elements of the fuel cycle. Uranium may be obtained from politically stable regions and strong competition among uranium producers prevents them from dictating extreme prices. The issues of fuel purchase by EU Member States are coordinated by the Euratom Supply Agency which has been established by Euratom for that specific purpose.

4.1. Objectives in respect of diversification of the electricity generation structure by introducing nuclear energy

The primary objective of energy policy in the field is preparing infrastructure for nuclear energy generation and ensuring appropriate conditions for investors interested in building and launching nuclear power plants based on safe technologies, with public support and a high degree of nuclear safety at all stages of the process: location, designing, construction, launching, exploitation, and liquidation of nuclear power plants.

Specific objectives in the field are as follows:

- Adapting the Polish legal system so that the process of developing nuclear energy sector in Poland is efficient;
- Training personnel for the nuclear energy sector;
- Informing and educating the society on nuclear energy;
- Selecting locations for first nuclear power plants;
- Selecting a location and building a cemetery for low- and medium-radioactivity waste;
- Adding to the personnel of the nuclear energy sector and radiation safety;
- Establishing a research base for the nuclear energy production programme on the basis of existing research institutes;
- Preparing fuel cycle solutions ensuring Poland's permanent and safe access to nuclear fuel, recycling of spent fuel, and storage of high-radioactivity waste.

4.2. Measures for diversification of the electricity generation structure by introducing nuclear energy

Measures in the field are as follows:

- Establishing an institutional basis for preparing and implementing the Polish nuclear power programme;
- Defining essential amendments to the legal framework for implementing the Polish nuclear power programme, preparing and coordinating implementation of the amendments;
- Preparing a draft of the Polish nuclear power programme to constitute the basis for public consultations; holding the consultations and submitting the Polish nuclear power programme for approval by the Council of Ministers;
- Preparing the National Atomic Energy Agency to execute nuclear and radiological supervision of the nuclear power sector;
- Implementing the personnel training programme for institutions dealing with nuclear power;
- Preparing and holding an informational and educational campaign on the Polish Nuclear Power Programme;
- Location analyses for nuclear energy plants;
- Location analyses for the radioactive cemetery, its design and construction preparations;
- Building research and development capacity and supporting work on new reactor technologies and nuclear-coal synergy. Preparing the programme of Poland's participation in all phases of the fuel cycle;
- Preparing Polish industry's participation in the nuclear energy production programme;
- Preparing plans of adapting the transmission grid to nuclear power plants;
- Prospecting uranium deposits in the territory of Poland.

4.3. Anticipated effects of measures for diversification of the electricity generation structure by introducing nuclear energy

As an effect of the planned measures concerning nuclear energy, the programme of introducing nuclear energy generation in Poland will be presented to the Council of Ministers for approval. Also at this stage, the organisational and legal infrastructure for the implementation of the programme of introducing nuclear power generation in Poland will be prepared. In particular, the following processes will take place: acceleration of the training of personnel and development of training and research base for the nuclear power sector, raising the society's awareness of nuclear power generation, development of the basis related to the disposal of radioactive waste and increase in the number of domestic enterprises ready to carry out the orders of the quality required by the nuclear power sector.

5. Development of the use of renewable energy sources, including biofuels

Development of renewable energy production is of considerable importance for meeting the primary objectives of energy policy. Increasing the use of renewable energy sources translates into a higher degree of independence from imported energy supplies. The promotion of the use of renewable energy sources allows to increase diversification of the sources of supply and to create conditions for the development of distributed power generation based on locally available raw materials. Renewable energy production usually takes place in small power generation units, located close to the customer, which enhances local energy security and reduces transmission losses. Generation of power from renewable sources is characterised by little or no emission of pollutants, thus having positive ecological effects. Developing renewable energy production is also conducive to the growth of underdeveloped regions, rich in renewable energy sources.

Sustainable use of individual types of energy from renewable sources will be supported. As regards the use of biomass, special preference will be given to the most energy efficient solutions, *inter alia*, using various techniques of biomass gasification and conversion into liquid fuels, in particular the second generation biofuels. The use of biogas from landfills, wastewater treatment plants and other waste will be of great importance. The target is to use biomass by means of distributed generation. The development of wind power, both on land and at sea, is predicted. The increased use of water power will also be important, both the small-scale and larger water power facilities, with no significant environmental impact. The use of geothermal energy is to increase thanks to the use of heat pumps and direct use of geothermal water. Solar energy is to be used to a much greater extent than before, by means of solar collectors and innovative photovoltaic technologies.

In view of the expected dynamic development of renewable energy sources, the solutions which will ensure the stability of the power system operation, in particular using innovative technologies, become increasingly important.

5.1. Development objectives of using renewable energy sources

The main energy policy objectives in the field are as follows:

- **Increasing the use of renewable energy sources in the final energy use to at least 15% in 2020 and further increase in the following years;**
- **Increasing the share of biofuels in the market of transport fuels to 10% by 2020, and increasing the use of second generation biofuels;**
- **Protecting forests against overexploitation in order to obtain biomass, and balanced use of agricultural areas for production of renewable energy sources, including biofuels, so as not to allow competition between renewable energy production and agriculture and to preserve biodiversity;**
- **Using the existing weirs owned by the State Treasury for power generation;**

- **Increasing the diversification of supply sources and the creation of optimal conditions for distributed power generation based on locally available resources.**

5.2. Measures to increase the use of renewable energy sources

Measures in the field are as follows:

- Devising a path to reach a 15% share of renewable energy sources in the sustainable use of final energy, broken down into individual energy types, namely: electricity, heat, cold and renewable energy in transport;
- Retaining support mechanisms for producers of electricity from renewable sources, e.g. by means of a system of certificates of origin;
- Retaining the obligation to gradually increase the share of bio-components in transport fuels so as to meet the planned objectives;
- Introducing additional support instruments encouraging more extensive production of heat and cold from renewable energy sources;
- Implementing the directions of building agricultural biogas plants, on the assumption that at least one biogas plant is set up in each commune by 2020;
- Creating conditions to facilitate making investment decisions on building off-shore wind farms;
- Retaining the principle of exempting energy from renewable sources from excise tax;
- Direct support to building new renewable energy generation units and power grids that could be connected with the use of European funds and environmental protection funds, including funds gathered in the form of the substitute fee and fines;
- Stimulating the development of the Polish industry's which manufactures machinery for the renewable energy sector, also with the use of European funds;
- Supporting the development of technologies and building installations to obtain renewable energy from waste comprised of biodegradable materials (e.g. municipal waste with biodegradable fractions);
- Evaluation of plausibility of using the existing damming structures owned by the State Treasury to generate power by way of taking their inventory, establishing their framework environmental impact, and devising the rules of making them available.

Apart from the above measures, the implementation of the *Long-term Programme for Promotion of Biofuels or Other Renewable Fuels in Transport for the years 2008–2014,* adopted by the Council of Ministers on 24 July 2007, will be continued.

5.3. Anticipated effects of measures to increase the use of renewable energy sources

The planned measures will allow to meet the objectives set for the share of renewable energy sources, including biofuels. They will result in sustainable development of renewable energy sources, including biofuels, without negative impacts on agriculture, forest management, food sector and biodiversity. Positive effects of developing renewable energy sources will include the reduced CO_2 emission and increased Poland's energy security, through, inter alia, enhancing energy mix diversification.

6. Development of competitive fuel and energy markets

Competitive fuel and energy markets are conducive to lowering production costs and thus reduce the increase of fuels and energy prices.

The retail market for liquid fuels may be regarded as quite competitive, despite the fact that supplies of crude oil to the wholesale market come mainly from a single direction, as a considerable discharge capacity of the Gdansk port and the transmission capacity between the port and the main Plock-based refinery ensure a certain degree of independence from the 'Druzhba' pipeline. The two main companies operating on the fuel market fix their prices depending on purchase costs.

Despite the consolidation of coal mines, the coal market is also considerable. The possibility to import coal by sea and by land is conducive to market-based price-fixing. Some hard coal and lignite mines operate in capital groups including power plants. However, in practice the market-based fixing of the price of this fuel is distorted by costs of transport from abroad and within the country.

Despite introducing the structures stipulated by the Directive 2003/55/EC[3], i.e. the sectioning off and designating of the transmission network operator and gas distribution system operators, as well as the gas fuel storage system operator by the President of the Energy Regulatory Office, the gas market is still largely monopolised. The access of new entities to the market is difficult. Moreover, almost 70% of the domestic demand for natural gas is covered from a single supply direction, which influences both the lack of supply diversification and the possibility of price competition between gas suppliers.

Market principles have been implemented to a greater extent in the electricity generation sector. According to the Directive 2003/54/EC[4], system operators, i.e. the transmission network and the distribution network operators, were isolated. Long-term contracts, limiting the scope of the market, were liquidated and the obligation of submitting electricity tariffs for customers other than households or agricultural holdings for approval of the President of the Energy Regulatory Office was lifted. However, despite the numerous changes introduced, the market does not operate fully properly. The existing platforms, i.e. the power exchange and internet-based platforms, have very little turnover. Due to existing barriers, mainly economic, technical, and organisational ones, not many customers have decided to change their electricity supplier.

[3] Directive 2003/55/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in natural gas and repealing Directive 98/30/EC (OJ L 176, 15.7.2003, p. 57–78).
[4] Directive 2003/54/EC of the European Parliament and of the Council of 26 June 2003 concerning common rules for the internal market in electricity and repealing Directive 96/92/EC (OJ L 176, 15.7.2003, p. 37–56).

6.1. Objectives in the area of developing competitive markets

The main objective of energy policy in the area is to ensure undisturbed operation of the fuel and energy markets, thus counteracting excessive price increase.

Specific objectives in the field are as follows:

- Enhancing diversification of sources and directions of supplies of natural gas, crude oil, and liquid fuels, along with diversification of suppliers, transmission routes, and transport methods, including also by using renewable energy sources;
- Removing the barriers in switching between electricity and gas suppliers;
- Developing competition mechanisms as the primary means to rationalise energy prices;
- Regulating the fuel and energy market in the areas characterised by natural monopoly in a way which ensures balancing of interests of all market participants;
- Reducing regulations where competitive market functions and develops on its own;
- Participating in building the regional electricity market, in particular enabling the international exchange;
- Implementing an efficient electricity balancing mechanism to support security of energy supplies, trade in futures and intraday markets, identification and allocation of individual costs of energy supply;
- Establishing a liquid spot market and an electricity futures market;
- Introducing market-based methods of heat price fixing.

6.2. Measures for development of competitive markets

The key measures under the energy policy concerning the introduction of competitive mechanisms and extension of their scope on markets of liquid fuels, natural gas, and coal are identical to measures aimed at improving energy security. Therefore, only the additional measures concerning the electricity and natural gas market are presented below, including in particular:

- Implementing a new model of the electricity market which consists, inter alia, in introducing the intra-day market, the power reserve market, transmission rights market, and generation capacity market, as well as introducing a mechanism to manage system services and system constrained generation;
- Facilitating switching between power sellers, inter alia through introducing national standards for technical features of electronic electricity meters, as well as their installation and reading;
- Creating conditions allowing to fix electricity reference prices on the market;
- Optimising the conditions of pursuing a business in Poland by energy-intensive customers in order to prevent their products sold in international markets from losing competitive appeal;
- Protecting the poorest electricity customers from the effects of electricity price increase;

- Changing competition-supporting regulation mechanisms of the gas market and introducing arm's length methods of gas price-fixing.

Apart from above measures, the position of the President of the Energy Regulatory Office is to be strengthened in relation to the necessity to implement the guidelines from new market directives and to make adjustments to the consolidated energy sector structure, in particular by means of creating possibilities to shape the desired market structure and infrastructure.

6.3. Anticipated effects of measures for development of competitive markets

Accomplishment of the above objectives will allow to extend the scope of competitive markets in fuels, electricity, and heat, thus leading to enhanced competition between fuel and energy suppliers. This will result in reducing the increase in prices of fuels and energy, including the increase triggered by external factors, such as increasing crude oil or gas prices, or policy measures taken by other states to reduce fuel supplies.

7. Mitigating the environmental impact of the power industry

7.1. Objectives aimed at mitigating the environmental impact of power industry

The main energy policy objectives in the area are as follows:

- **Reducing CO_2 emission by 2020, while maintaining a high level of energy security;**
- **Reducing emission of SO_2, NO, and dust (including PM10 and PM2.5) to the level set forth in the current and drafted EU regulations;**
- **Reducing the negative impact of the power sector on the condition of surface water and groundwater;**
- **Minimising waste dumping by using them in the economy to the greatest possible extent;**
- **Changing the structure of energy generation towards low-emission technologies.**

7.2. Measures aimed at mitigating the environmental impact of power industry

Measures in the field are as follows:

- Establishing a system to manage national emission caps of greenhouse gases and other substances;
- Introduction of acceptable product emission rates for electricity and heat generation as a tool which allows reducing SO2 and NOx emission levels and reaching the emissions cap set forth for Poland in the Accession Treaty ;

- Meeting the commitments for the power and heat sectors stemming from the new ETS Directive[5] ;
- Using the income from auctions of CO_2 emission allowances to support measures aimed at reducing greenhouse gas emission volumes;
- Introducing standards for building new power plants under the system of preparation for carbon capture and setting national capacity for geological CO2 storage, including in empty crude oil and natural gas deposits at the bottom of the Baltic Sea;
- Active participation in implementing the initiative of the European Commission to build large-scale demonstration facilities for carbon capture and storage (CCS) technologies ;
- Applying CCS technologies to support crude oil and natural gas extraction;
- Intensifying research and development on the CCS technology and on new technologies which allow using captured CO2 as a raw material by other industry branches;
- Industrial use of waste coal;
- Increasing the use of incineration by-products;
- Using high-efficiency closed cooling cycles in power plants and in heat and power stations;
- Diagnosing the possibility of unintended production of persistent organic pollutants (dioxins and furans) by the power sector;
- Supporting measures in respect of environmental protection with the use of, inter alia, European funds.

Apart from the above measures, the implementation of the *State ecological policy in the years 2009–2012, with the prospect to 2016,* will be essential for accomplishing the energy policy objectives, in particular with regard to reducing dust emission, using waste and protecting surface water and groundwater.

7.3. Anticipated effects of measures aimed at mitigating the environmental impact of power industry

The anticipated measures will allow reducing SO_2, NO_x, and dust emission in line with the commitments assumed by Poland. Measures aimed at reducing CO_2 emission should result in a considerable reduction in emission volume per unit of energy generated.

The said document takes into account the measures allowing Poland to meet the obligations stemming from the regulations of the European Union currently in force. Measures aimed at implementing the draft legal acts comprising the energy and climate package adopted by the European Parliament in December 2008 were particularly taken into account.

As a result of negotiations on the assumptions of the draft Directive on the system of trade in emissions, Poland was granted the possibility of applying a transition period with regard to the obligation of purchasing all greenhouse gas emission allowances by the power systems from 2013. The systems operating in Poland as at 31 December 2008 will purchase only some

[5] Directive 2009/29/EC of the European Parliament and of the Council of 23 April 2009 amending Directive 2003/87/EC so as to improve and extend the greenhouse gas emission allowance trading scheme of the Community (OJ L 140, 5.6.2009, p. 63–87).

of the allowances they need at auctions – 30% in 2013 (as compared to average reference emission in the years 2005-2007 or based on fuel-weighted emission indicators). The number of free allowances will be gradually reduced in the years 2014-2019 to reach the full auction system in 2020.Additionally, the possibility of winning free allowances will be granted to systems in respect of which the investment process began physically prior to 31 December 2008. The said transition period will prevent eliminating coal from the portfolio of primary fuels, which would result in weakening of Poland's energy security. It will allow to verify the possibility of wide scale use of commercial CCS technologies or will provide a basis for using the revision clause with regard to the assumptions of the climate and energy package. Derogations for the electricity sector from 100% purchase of CO_2 emission allowances by auction may be prolonged for the period beyond 2020.

Introducing standards for building coal-fired power plants within the system of preparation for CO_2 capture resulting from the new EU regulations will allow to quickly introduce those technologies when they are ready for commercial use.

It is anticipated that at least two CCS demonstration facilities will be located in Poland.

8. Supporting measures

The implementation of energy policy will be supported by actions taken by Poland within the international community, in particular on the European Union forum, aimed at shaping the global and the European energy policy taking into account the specific characteristics of Poland, its deposits of energy resources, and actual possibilities of changing energy generation technologies.

In order to ensure that strategic directions of energy policy of Poland are followed, it is necessary to actively apply the available instruments of both Community policy and foreign policy.

The Minister of Economy will monitor on an ongoing basis the actions taken by Poland on the EU forum and relating to energy policy. His representatives will actively participate in the work of working groups, committees, and commissions dealing with energy security, electricity, natural gas and crude oil. At the same time, the Minister of Economy will on a current basis analyse the developments in the international environment of Poland in terms of possible threat for the energy security of Poland.

The Members of the Council of Ministers and other representatives of the Government of the Republic of Poland will initiate the actions at the EU level or support the activities of the European Union bodies aimed at:

- Building international infrastructure for transmission of crude oil to the EU Member States, in particular extending the Odessa-Brody pipeline to Plock, as an element of the Eurasian Oil Transportation Corridor;
- Introducing the rules of using the transmission infrastructure by crude oil and natural gas producing countries which will ensure energy interests of the consumers of those resources and transit countries. This objective may be achieved by the ratification of the Energy Charter Treaty by the Russian Federation and signing of the Transit Protocol of the Energy Charter Treaty, as well as the extension of the group of states bound by the Energy Charter Treaty;
- Rational and justified expansion of power networks, including cross-border connections of the Polish system and the systems of neighbouring countries;

- Establishing a special EU financial mechanism to support the building of necessary connections within the EU and with the EU eastern neighbours;
- Maintaining the existing and establishing new Community financial instruments allowing to implement the objectives of the energy and climate package, in particular those relating to the development of clean carbon technologies, increasing the effectiveness of energy use and development of renewable energy sources;
- Shaping future objectives and instruments of the Community environment and climate policy which will take into account the maintenance of the high level of energy security and competitiveness of the economy in the Member States where coal dominates the energy generation structure;
- Building infrastructure allowing to diversify natural gas supplies to Poland (LNG terminal on the Polish coast, a pipeline connection with the Norwegian Continental Shelf);
- Establishing rules of conducting multilateral EU policy and building internal systems of European Union's energy security, in particular the mechanism of response to crisis situations.

Within the framework of international co-operation and on the European Union forum, Poland will strive for halting infrastructural projects whose implementation could negatively impact energy security of Poland and at the same time will strive for implementing projects which may strengthened this security.

International arrangements will be made and other actions taken to establish operators, in line with the EU law, on all cross-border power lines and gas pipelines on the territory of Poland and to enhance their integration with the Polish and the European systems.

Poland will aim at playing the key role in the integration of the regional electricity market and will assume the role of en emissary of practical implementation of the European standards into the functioning of the markets. It will also strive for implementing the standards of power systems' cooperation with third countries (i.a. by building connections and developing trade in electricity with Lithuania, Ukraine and Belarus). Poland will also aim at extending the Energy Community by Ukraine and will support Ukraine in negotiations on accession to the Energy Community.

Along with Germany, Poland was the initiator of the establishment of the Central Eastern European Forum for Electricity Market Integration which will launch works aimed at creating a single regional electricity market, accelerating the construction of infrastructure connections and harmonisation of law on electricity in the region.

Intensive cooperation will continue with the Vysehrad Group countries and the Baltic states within the framework of the EU and with the beneficiary countries of the Eastern Partnership Programme.

The government will fully support the efforts of power and gas transmission system operators and the regulator to achieve a significant position of Polish entities within structures responsible for unifying management standards of the European power grid (electricity and gas) and in institutions responsible for market supervision in public interest. Through active participation of relevant authorities and enterprises in the ACER, ENTSO-E and ENTSO-G, Poland will aim at shaping the solutions in market regulation and operators' co-operation in line with the Polish energy policy, including the national investments in the European infrastructure development plans and taking into account specific conditions of Poland while formulating the European network codes.

The foreign energy policy will create a favourable climate for investments of Polish fuel and energy enterprises in other countries. Poland will also ensure support to those enterprises with regard to joint projects with foreign entities.

Another important element supporting the implementation of energy policy is active participation of local authorities in the process of achieving its objectives, including the development of the energy sector development strategy at the province, district or commune level. It is of utmost importance for local governments not to overlook the energy generation sector when setting investment priorities. Moreover, investment plans of communes and of energy companies must be correlated. The need for planning in terms of energy is now of key importance because the subsequent years will bring major challenges to Polish communes, inter alia in meeting environmental requirements or using the European funds for regional development, which entails the need to improve the condition of power infrastructure in order to ensure high quality services for local communities, to attract investors, and to enhance competitiveness and attractiveness of the region. Good planning in terms of energy constitutes one of the basic factors conditioning success of implementation of Poland's energy policy.

The most important elements of energy policy at the regional and local level should include:

- Aiming at fuel and energy savings in the public sector by implementing measures laid down in the *National Action Plan for energy efficiency*;
- Maximising the use of the local renewable energy potential, both for the generation of electricity, heat, cold, cogeneration, as well as for generating liquid biofuels and biogas;
- Increasing the use of technologies of high-efficiency cogeneration of heat and electricity, as a favourable alternative for supplying energy to heat systems and large facilities;
- Developing the locally centralised heating systems which allows to improve efficiency and environmental parameters of the heat supply process and to increase the local level of energy security;
- Modernisation and adjustment of the electricity distribution network to the current needs of the customers, in particular the modernisation of networks in rural areas and the networks supplying the areas characterised by low energy consumption;
- Expanding the natural gas distribution network in areas with poorly developed gas network, in particular in northern and eastern Poland;
- Supporting the infrastructural investments of strategic importance for energy security and development of the country in the communes, in particular the construction of transmission networks (for power, gas, crude oil and liquid fuels), storage infrastructure, energy resources mines and large system power plants.

9. Energy policy implementation system

Pursuant to Article 12(2)(1) of the *Energy Law*, the Minister of Economy is responsible for coordinating the implementation of energy policy, but the accomplishment of the energy policy objectives will require actions of numerous central and local government administration bodies, as well as the companies operating in the fuel and energy sector. In order to improve co-operation between those entities, an interministerial team will be establish to prepare legal and organisational solutions for implementing the energy policy.

Specific tasks presented in this document whose implementation will start within four years have been defined in Appendix 3 entitled *Action Plan for the years 2009–2012*. The plan describes the method of implementation of each measure of the energy policy. Each measure contains specific tasks with the deadlines and institutions responsible for their implementation. The implementation of *Action Plan for the years 2009–2012* will be monitored on a current basis by the Minister responsible for the economy. The Minister of Economy, in cooperation with competent ministers, will submit information about the energy policy implementation for the previous year to the Council of Minister by 31 March of each year, along with the proposed modifications of the measure implementation methods and adjustments to the current situation.

The measures laid down in this document are to be continued beyond 2012 in order to efficiently implement the energy policy objectives for 2020 and 2030. However, another action plan for the years 2013–2016, taking into account new conditions and forecasts, will be determined in 2012.

The progress in the energy policy implementation will be monitored in particular on the basis of indicators presented in the table below and in Appendix 4.

Table 1. Basic indicators of energy policy implementation monitoring

Item number	Name of indicator	Baseline value 2007	Expected value by 2030	Data source
1.	Annual average change in primary energy consumption in the country since 2005 (%)	2,7	Below 1	Central Statistical Office
2.	Hard coal and lignite extraction to domestic consumption (in tons) ratio (%)	105	Over 100	Central Statistical Office
3.	Maximum share of total natural gas and crude oil imports (in tons) from a single direction in the domestic consumption of both those resources (%)	85	Below 73	Ministry of Economy
4.	Generation capacity of domestic generation sources (conventional and nuclear) to maximum demand for electricity ratio (%)	130	Over 115	Ministry of Economy
5.	Share of nuclear power in the electricity production (%)	0	Over 10	Ministry of Economy
6.	Share of energy from renewable sources in the final consumption of energy (%)	7.7	Over 15	Ministry of Economy
7.	Annual emission of CO_2 in utility power generation as compared to the national electricity generation (tons/MWh)	0.95	Below 0.70	Ministry of Economy

Within the meaning of the Act of 6 December 2006 on the rules governing the development policy, *Energy Policy of Poland until 2030* is considered to be a sectoral strategy. Apart from the measures directly laid down in the documents, the objectives of the Policy will also be implemented through other sectoral development programmes and operational programmes, such as *Operational Programme Infrastructure and Environment. The* support from the European funds for investments, actions for education, research and development, envisaged in the national and regional operational programmes for the years 2007–2013, is an extremely important element of the energy policy implementation.

The implementation of the energy policy will also be supported by periodical analytical and forecasting works aimed at determining the impact of developments in legal and economic environment on possible results of planned measures. The results of those works will be taken into account while selecting optimal sets of tools to achieve the assumed policy objectives.

The government sectoral programmes for hard coal, gas, oil and electricity sector which were in force before the adoption of the Energy Policy of Poland until 2030 will be analysed in terms of their compliance with this document and will either be adjusted to it or will become ineffective.

The *Energy Policy of Poland until 2025*, adopted by the Council of Ministers on 4 January 2005, and the *Timetable for the implementation of executive tasks until 2008 specified in the Energy Policy of Poland until 2025*, adopted by the Council of Ministers on 12 July 2005, become ineffective upon the adoption of this document.

10. Appendices

Appendix 1. Assessment of implementation of energy policy since 2005 onwards

Appendix 2. Projection of demand for fuels and energy until 2030

Appendix 3. Action Plan for the years 2009–2012

Appendix 4. Conclusions from strategic Environmental Impact Assessment of Energy Policy

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

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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 transhipment 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 m^3. 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 m^3 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 m^3. Obligatory reserves in the amount of 284 million m^3, 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 Klaipedos 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: CO_2: 143.5 million tons, SO_2: 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: CO_2: 149.9 million tons, SO_2: 668.7 thousand tons, NO_x: 248.7 thousand tons.

In the years 2003–2006, the basis for the implementation of the CO_2 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 CO_2 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 CO_2 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 CO_2 emission allowances available for Polish installations in the period from 2008 to 2012.

The trading scheme for SO_2 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 Target[1], 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 biocomponets 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 CO_2 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.

Ministry of Economy

PROJECTION OF DEMAND FOR FUELS AND ENERGY UNTIL 2030

Appendix 2

to draft "Energy Policy of Poland until 2030"

Warsaw, 10 November 2009

TABLE OF CONTENTS

Introduction

This projection has been drawn up by Agencja Rynku Energii S.A. commissioned by the Ministry of Economy. Only one possibility was considered, namely active implementation of measures provided for in "Energy Policy of Poland until 2030." The main objective of the projection was to confirm if the projected effects of the measures' implementation would allow achieving the assumed objectives between 2020 and 2030. The projection is based on the most recent macroeconomic, strategic, and price assumptions as at the beginning of 2008. As the Council of Ministers approved the document over six months after its assumptions were drawn up, some of them may have expired. Nevertheless, as changes to the assumptions did not impact long term trends and projections, they are considered valid.

The Government does not treat the results of projections of demand for fuels and energy as target values which must be met when implementing the energy policy. Their value is analytical; they confirm appropriateness of policy directions adopted. The energy policy envisages this projection periodically updated with a view to adjusting to new economic conditions.

1. Assumptions of the projection

Strategic assumptions

The projection assumes that the following primary directions of Poland's energy policy, including the European Union's requirements, would be implemented:

- To improve energy efficiency;
- To enhance security of fuel and energy supplies;
- To diversify the electricity generation structure by introducing nuclear energy;
- To develop the use of renewable energy sources, including biofuels;
- To develop competitive fuel and energy markets;
- To reduce the environmental impact of the power industry.

As concerns energy efficiency, the following goals of the energy policy, essential to the projection, have been taken into account:

- To achieve zero-energy economic growth, i.e. economic growth with no extra demand for primary energy;
- Reducing the energy intensity of Polish economy to the EU-15 level.

Both the application was predicted and the impact on the demand for energy was assessed for existing capacity reserves resulting from the market reform of the economy and from other instruments to increase energy efficiency, *inter alia*:

- Extension of the application of energy audits;
- Introduction of energy management systems in industry;
- Introduction of sustainable traffic and infrastructure management in the transport industry;

- Introduction of energy efficiency standards for public utility buildings and facilities;
- Intensification of replacing lighting systems with energy-saving ones;
- Introduction of the white certificates system.

In the area of security of fuel and energy supplies:

- Generally, implementation of the strategic direction which consists in diversification of both primary energy carriers and directions of supplies of these carriers has been taken into account, as well as the development of all available energy generation technologies with reasonable costs, especially of the nuclear energy industry as an important technology of zero emission of greenhouse gases and low sensitivity to an increase in nuclear fuel prices;
- It has been assumed that domestic resources of hard coal and lignite would remain important stabilisers of Poland's energy security. It has been assumed that coal energy sources which are being withdrawn from use would be reconstructed on the basis of the same fuel[1] by 2017 and that a part of baseload CHP plants to be built will be fired with hard coal. Simultaneously, no restrictions were imposed on the increase in the share of gas in the power industry, both in gas-fired units generating electricity in cogeneration with heat as well as in peak sources and reserve for wind power plants.

According to the European Union's expected requirements, it has been assumed that the renewable energy's share in the final energy structure would increase to 15% in 2020 and that the 10% share of biofuels in the transport fuel market would be achieved in 2020. In addition, it has been assumed that forests are to be protected against excessive acquisition of biomass and that agricultural areas would be used in a sustainable way to generate renewable energy, including biofuels, so that no competition between the renewable energy industry and agriculture could occur.

To draw up the projection, the capacity of renewable energy resources according to an expert evaluation by EC BREC IEO[2], commissioned by the Ministry of Economy, was taken into account. The evaluation is a critical synthesis of Polish and foreign estimations of Poland's renewable energy resources to-date. Table 1 sums up the economic potential and plausibility of use (i.e. the market potential) of renewable energy resources to generate electricity, district heating, and produce transport fuels in Poland. Values for 2030 were derived from the expert evaluation by Agencja Rynku Energii S.A., commissioned by the Ministry of Economy, based on assumptions and limitations for respective types of renewable energy sources featured in the study by EC BREC IEO.

[1] With the exception of two units in Dolna Odra Power Plant and one unit in Skawina Power Plant. It is planned that they would be natural gas-fired.

[2] EC BREC IEO, Plausibility of use of renewable energy sources in Poland until 2020, Warsaw, December 2007.

Table 1. Economic potential and plausibility of its use, i.e. the market potential, of renewable energy resources

Potentials of renewable energy resources	Economic potential EC BREC IEO	Market potential until 2020 EC BREC IEO		Market potential until 2030 ARE S.A.	
Hydro power generation	5 TWh	3.1 TWh	1015 MW_e	3.1 TWh	1,015 MW_e
Wind power generation	124 TWh	33.5 TWh_e	15,250 MW_e	40 TWh_e	17,450 MW_e
- inland	105 TWh	31.5 TWh_e	15,750 MW_e	35 TWh_e	17,500 MW_e
- offshore	19 TWh	1.7 TWh_e	550 MW_e	5 TWh_e	1,650 MW_e
Photovoltaics	-	0.005 TWh_e	7 MW_p	0.05 TWh	70 MW_p
Solar thermal	83,153 TJ	19,263 TJ	10,848 MW_t	25,250 TJ	14,145 MW_t
- preparing domestic hot water	36,492 TJ	14,597 TJ	8,100 MW_t	18,250 TJ	10,100 MW_t
- heating	46,661 TJ	4,666 TJ	2,150 MW_t	7,000 TJ	3,250 MW_t
Geothermal power	-	12,367 TJ	1,067 MW_t	20,000 TJ	1,700 MW_t
- deep	-	4,050 TJ	250 MW_t	8,100 TJ	500 MW_t
- heat pumps	-	8,167 TJ	755 MW_t	12,000 TJ	1,100 MW_t
Biomass					
- fuel wood (heat plants)	24,452 TJ	24,452 TJ	1,540 MW_t	24,452 TJ	1,540 MW_t
- dry solid waste (small boilers)	165,931 TJ	149,338 TJ	16,000 MW_t	150,000 TJ	16,000 MW_t
- wet waste – biogas[*)] (cogeneration)	123,066 TJ	72,609 TJ		80,000 TJ	
		8.3 TWh_e	1,510 MW_e	9 TWh_e	1,640 MW_e
		42,711 TJ	2,150 MW_t	47,060 TJ	2,340 MW_t
- energy crops	286,719 TJ	250,307 TJ		286,719 TJ	
- cellulose – cogeneration[*)]	145,600 TJ	109,188 TJ		120,600 TJ	
		7 TWh_e	1,075 MW_e	7,7 TWh_e	1,180 MW_e
		83,990 TJ	3,585 MW_t	92,768 TJ	3,940 MW_t
- corn silage – biogas	81,638 TJ	81,638 TJ		81,638 TJ	

(cogeneration)		9.3 TWh_e	1,690 MW_e	9,3 TWh_e	1,690 MW_e
		48,022 TJ	2,410 MW_t	48,022 TJ	2,410 MW_t
- sugar-starch bioethanol	21,501 TJ	21,501 TJ		21,501 TJ	
- rape biodiesel	37,980 TJ	37,980 TJ		37,980 TJ	
-2nd generation cellulose biofuels	-	-		25,000 TJ	

*) Assumed combination coefficients (relation of generated electricity to heat):

for solid fuel-fired cogeneration systems – 0.3

for biogas-fired cogeneration systems – 0.7

As it was assumed that the market of fuel and energy as well as the system regulating the operation of power enterprises function efficiently, rational behaviour of customers when selecting energy suppliers was used for the calculation model.

In the domain of environmental protection, general assumptions were adopted which take into account the following:

- Charges for CO_2 emissions consistent with arrangements of the European Council and the Parliament of December 2008;Restrictions on SO_2 and NO_x emissions to the levels resulting from current international regulations;Development of low-emission generation technologies as well as combined and dispersed sources.

Macroeconomic projection

The adopted projection of economic growth until 2030, prepared in 2007 by the Gdańsk Institute for Market Economics, has been adjusted due to the current financial crisis and the predicted economic slowdown in the coming years. Both the lower rate of GDP growth in the years 2008–2011, namely: in 2008 – 4.8% (preliminary estimate by GUS), in 2009 – 1.7%, 2010 – 2.4% and in 2011 – 3.0%, and gradual increases over 2012–2020 have been taken into account so that in the years 2020-2030 the GDP would be compliant with the projection by the Gdańsk Institute for Market Economics (Table 2).

Table 2. Synthesis of the projected pace of changes in Gross Domestic Product and value added

	2007-2010	2011-2015	2016-2020	2021-2025	2026-2030	2007-2030
GDP	103.9	105.8	105.2	105.7	104.6	105.1
Value added	103.7	105.6	105.0	105.4	104.4	104.9

It was assumed that in the projection period, services would be the most rapidly developing sector of the Polish economy (Table 3). Its share in value added would increase from 51.7% in 2006 to 65.8% in 2030. The share of industry in value added would decrease from 25.1% in 2006 to 19.3% in 2030. Over the period, the construction industry would retain its share of about 6%. The share of transport would be slightly lower and the share of agriculture would decrease from 4.2% to ca. 2.2%.

Table 3. Share of selected sectors in total value added (%)

	2006*)	2010	2015	2020	2025	2030
Industry	25.1	23.2	22.1	21.3	20.8	19.3
Agriculture	4.2	4.9	3.9	3.5	2.6	2.2
Transport	7.2	6.9	7.2	6.8	6.7	6.4
Construction	6.4	7.4	6.3	8.5	7.2	6.4
Services	57.1	57.6	60.4	59.9	62.7	65.8

*) *Statistical data.*

Projection of fuel prices and taxes on energy

It was assumed that following an adjustment over the years 2009–2010, prices of fuels imported to Poland would be increasing at a moderate pace (Table 4). In addition, it was assumed that in 2010, domestic prices of Polish hard coal would reach the 2010 level of import prices.

Table 4. Projection of prices of basic fuels imported to Poland (fixed prices in USD in 2007)

	Unit	2007*)	2010	2015	2020	2025	2030
Crude oil	USD/BOE	68.5	89.0	94.4	124.6	121.8	141.4
Natural gas	USD/1000m^3	291.7	406.9	376.9	435.1	462.5	488.3
Power coal	USD/t	101.3	140.5	121.0	133.5	136.9	140.3

*) *Statistical data.*

Taxation on energy carriers will be adapted to the requirements of the European Union. Taxes on hydrocarbon fuels and energy will reflect the current structure and increase along with inflation. The excise tax will also be imposed on coal and coke as well as on natural gas, with simultaneous exemption of coal and coke from the excise tax from 1 January 2012 and of natural gas from 31 October 2013.[3]

Availability of primary energy carriers

Despite the limited domestic hard coal extraction capacity in operating deposits, no limitations as to supplies of this energy carrier from large global resources have been

[3] Act of 6 December 2008 on excise tax (Dz.U. [Journal of Laws] of 2009, No 3, item 11).

assumed. Similarly, no limitations as to import of crude oil and natural gas have been assumed. In the projection, both the extraction capacity of lignite in existing mines and prospective deposits of lignite have been taken into account. It has been assumed that over the period under analysis, gradual exploitation of unused deposits would start.

It has been assumed that nuclear fuel would be widely available on the global market, both with regard to supplies of uranium ore and processing capacities of enrichment plants as well as the production capacity of fuel elements of water reactors.

Polish resources of renewable energy including, first of all, wind energy and biomass (energy crops, agricultural, industrial and forest waste, and biogas) have been taken into account during the execution of Poland's commitments foreseen in the draft Directive on the development of the renewable energy industry. Geothermal energy has been taken into account insofar as it may be a reasonable potential of renewable energy for heat generation.

It has been assumed that the balance of electricity exchange with foreign countries would amount to zero.

Environmental requirements

In the projection, it has been assumed that power generation devices of the utility and industrial energy industry would undergo complete technical and environmental modernisation to comply with standards of dust, sulphur dioxide, and nitrogen oxides emission consistent with the Regulation of the Minister of the Environment of 20 December 2005 on standards of emission from fuel combustion installations (Dz.U. [Journal of Laws] No 260, item 2181). Both transitional periods granted as a result of negotiations with the European Union, included in the Treaty of Accession to the EU, and emission caps for all sources covered by the LCP Directive have been taken into consideration. The new draft Directive on industrial emissions (IED Directive), which will make emission norms significantly more stringent, particularly as concerns existing sources, has not been taken into account. Compliance with emission norms for engine vehicles and for sulphur content in transport fuels and heating oils, required pursuant to European Union's regulations, has been assumed.

With reference to CO_2 emission for power generation plants covered by the ETS (Emission Trading Scheme) system, it has been predicted that by 2012 free CO_2 emission allowances would be granted to the extent specified by the Decision of the European Commission of 26 March 2007 and the Regulation of the Council of Ministers of 1 July 2008 on the adoption of the National Allocation Plan concerning Allowances for emission of carbon dioxide for the years 2008-2012 for the Community emission allowance trading system (Dz.U. [Journal of Laws] No 202, item 1248). In this period, the purchase of missing allowances on the ETS market, at the projected price amounting to EUR 25/tCO_2, has been envisaged.

For the period beyond 2013 – according to proposals included in the Climate and Energy Package and in arrangements of the European Council of 11–12 December 2008 as well as in arrangements of the European Parliament on the amendment of the Directive on emission trading of 17 December 2008 – it has been assumed that:

- For electricity sources, both existing ones and those whose construction started before the end of 2008, an obligation to purchase CO_2 emission allowances on auctions will

be introduced and gradually increasing from 30% in 2013 to 100% in 2020; it has been assumed that the rate of the increase would be 1% per year; 10% per year?????

- The power industry would meet the requirements which are essential in order to obtain the European Commission's consent for derogation from the full obligation of purchasing allowances for sources, both existing and under construction, by way of implementation of projects reducing CO_2 emissions at costs comparable to the value of the allowances for which derogations have been obtained;

- For new electricity sources, an obligation to purchase allowances for 100% of CO_2 emission will be introduced;

- Free CO_2 emission allowances will be provided for combined district heat generation in electricity generation plants and in high-efficiency cogeneration installations which generate heat for the heat industry's purposes whose scope would be reduced to 30% in 2020 and to zero in 2027;

- In case of other plants, an obligation to purchase allowances for district heat generation, increasing to 100% in 2027, will be introduced.

It has been assumed that after 2012, the prices of CO_2 emission allowances sold on auctions would amount to ca. EUR 60/tCO_2.

Determined losses and gains in generation capacity in the power industry

The power consumption plan included withdrawals forecast by power companies (Table 5) and determined gains and recovery of generation capacity in base-load power plants (Table 6).

Table 5. Planned and forecast withdrawals of gross generation capacity in base-load power plants [MW]

	2008-2010	2011-2015	2016-2020	2021-2025	2026-2030
Total					
- withdrawals	570	2,898	4,125	2,805	4,527
- deep modernisation	1,702	4,204			
Hard coal					
- withdrawals	330	1,825	2,785	2,805	4,527
- deep modernisation	222	444			
Lignite					
- withdrawals	240	1,073	1,340		
- deep modernisation	1,480	3,760			

Table 6. Determined gains/recoveries of gross generation capacity in base-load power plants [MW]

	2008-2010	2011-2015	2016-2020

Total			
- new capacity/recoveries	1,778	1,980	2,600
- after deep modernisation	992	5,332	
Hard coal			
- new capacity/recoveries	460	1,380	1,700
- after deep modernisation	232	1,392	
Lignite			
- new capacity/recoveries	1,318		500
- after deep modernisation	760	3,940	
Natural gas		200	400

Technological assumptions of the power industry

Technologies which are currently included in published commercial offers have been taken into account during the selection of the optimum structure of new base-load electricity sources. Model calculations for coal units included purchase costs of CO_2 emission allowances. Apart from demonstration facilities, no power plants with CCS installations have been envisaged to be put into operation in the projection period. For nuclear power plants, it has been assumed that they would be equipped with 3rd generation water reactors. It has been assumed that the first unit of the nuclear power plant would be put into operation not sooner than in 2020. Launching further nuclear power plants is to take place at intervals of minimum three years.

The projection assumed the development of high-efficiency heat and electricity cogeneration in utility, industrial, and local heat and power plants. It has been assumed that the system of cogeneration support based on "red" and "yellow" certificates would remain in force. In addition, it has been assumed that:

- Increased demand for heat in industry would be covered in ca. 60% by increased cogeneration of heat in industrial heat and power plants and in ca. 40% by the development of gas and biomass heat plants as well as by the purchase of district heat in accordance with economic criteria;

- Increased demand for district heat in other sectors of the economy would be covered mainly by cogeneration, whereby it has been assumed that the average annual increase in capacity of commercial heat and power plants would not exceed 200 MWe. MWt (heat)?????

2. Methodology behind the projection

To prepare the projection, the methodology used worldwide in studies on energy has been adopted, in which economic growth, described by means of macroeconomic variables, is considered the general driving force behind the increased demand for power.

To prepare the projection of the demand for effective energy, the end-use model called MAED has been applied. In this model, projections of demand for effective energy are created for each direction of the use of energy within each sector of the economy.

The MAED model results are a batch for the simulation energy and environmental model called BALANCE, which determines demand for final energy divided by individual carriers as well as national power consumption plans and pollution emission volumes. The idea behind this model consists in market approach: the activity of each type of energy producers and customers on the energy market is simulated. The effect of the BALANCE model operation consists in the most probable projection of the energy economy's future status with the assumptions adopted and boundary conditions related to primary fuel prices, the state energy policy, technological progress, and limitations in access to energy carriers as well as time limitations in investment processes.

The projection of the demand for individual final energy carriers has been prepared assuming the continuation of the market reform in the national economy and in the energy sector, with consideration given to additional efficiency measures foreseen in Directive 2006/32/EC and in the Green Paper on Energy Efficiency. The draft Act on energy efficiency has also been taken into account.

The projection of the structure of electricity sources with the lowest discounted generation costs has been determined using the WASP IV model. The real discount rate has been adopted at 7.5%.

3. Projection results

3.1. Demand for final energy

The projected increase in final energy use over the period covered with the projection (Table 7) amounts to ca. 29%, whereby the highest increase of 90% is expected in the sector of services. In the industry sector, this increase would amount to ca. 15%.

Over the period covered with the projection, it is expected that final electricity use would increase by 55%, of gas by 29%, of district heat by 50%, of oil products by 27%, and of renewable energy for direct use by 60% (Table 8). Such a high increase in renewable energy use results from the necessity to meet the requirements of the Climate and Energy Package.

Table 7. Demand for final energy by sectors of the economy [Mtoe]

	2006	2010	2015	2020	2025	2030
Industry	20.9	18.2	19.0	20.9	23.0	24.0
Transport	14.2	15.5	16.5	18.7	21.2	23.3
Agriculture	4.4	5.1	4.9	5.0	4.5	4.2

Services	6.7	6.6	7.7	8.8	10.7	12.8
Households	19.3	19.0	19.1	19.4	19.9	20.1
TOTAL	65.5	64.4	67.3	72.7	79.3	84.4

Table 8. Demand for final energy by carriers [Mtoe]

	2006	2010	2015	2020	2025	2030
Coal	12.3	10.9	10.1	10.3	10.4	10.5
Oil products	21.9	22.4	23.1	24.3	26.3	27.9
Natural gas	10.0	9.5	10.3	11.1	12.2	12.9
Renewable energy	4.2	4.6	5.0	5.9	6.2	6.7
Electricity	9.5	9.0	9.9	11.2	13.1	14.8
District heat	7.0	7.4	8.2	9.1	10.0	10.5
Other fuels	0.6	0.5	0.6	0.8	1.0	1.2
TOTAL	65.5	64.4	67.3	72.7	79.3	84.4

Demand for final energy generated from renewable sources will be presented separately in Table 9 divided into electricity, heat, and transport fuels. It is projected that in the period under analysis, the volume of all energy carriers from renewable sources would increase (electricity – almost tenfold, heat – almost twofold, and liquid fuels – by twenty times).

Table 9. Demand for gross final energy from RES by types of energy [ktoe]

	2006	2010	2015	2020	2025	2030
Electricity	370.6	715.0	1,516.1	2,686.6	3,256.3	3,396.3
Solid biomass	159.2	298.5	503.2	892.3	953.0	994.9
Biogas	13.8	31.4	140.7	344.5	555.6	592.6
Wind	22.0	174.0	631.9	1,178.4	1470.0	1530.0
Water	175.6	211.0	240.3	271.4	276.7	276.7
Photovoltaics	0.0	0.0	0.0	0.1	1.1	2.1
Heat	4,312.7	4,481.7	5,046.3	6,255.9	7,048.7	7,618.4
Solid biomass	4,249.8	4,315.1	4,595.7	5,405.9	5,870.8	6,333.2
Biogas	27.1	72.2	256.5	503.1	750.0	800.0
Geothermal	32.2	80.1	147.5	221.5	298.5	348.1
Solar	3.6	14.2	46.7	125.4	129.4	137.1
Transport biofuels	96.9	549.0	884.1	1,444.1	1,632.6	1,881.9
Sugar and starch bioethanol	61.1	150.7	247.6	425.2	443.0	490.1
Rape biodiesel	35.8	398.3	636.5	696.8	645.9	643.5
2nd generation bioethanol	0.0	0.0	0.0	210.0	240.0	250.0
2nd generation biodiesel	0.0	0.0	0.0	112.1	213.0	250.0
Biohydrogen	0.0	0.0	0.0	0.0	90.8	248.3
TOTAL gross final energy from RES	4,780	5,746	7,447	10,387	11,938	12,897
Gross final energy	61,815	61,316	63,979	69,203	75,480	80,551
% share in renewable energy	7.7	9.4	11.6	15.0	15.8	16.0

Meeting the energy policy objective with regard to the 15% share of renewable energy in the structure of gross final energy[4] in 2020 is plausible provided that the development in the use of all types of renewable energy sources, especially wind energy, accelerates. The additional goal regarding the increase of the share of RES in gross national final energy use to 20% in 2030, included in the energy policy draft, will not be plausible due to natural limitations to the development rate of these sources.

In 2030, the share of biofuels in consumption of petrol and diesel oil in 2020 would amount to 10% and ca. 10.4%.

3.2. Demand for primary energy

The projected increase in demand for primary energy until 2030 amounts to ca. 21% (Table 10), whereby this increase is to occur mainly after 2020 due to higher projected GDP increases in absolute terms and the introduction of nuclear power plants whose electricity generation capacity would be lower than that of coal-fired ones. Therefore, it is possible to maintain zero-energy economic growth until ca. 2020, after which a moderate increase in demand for primary energy is expected.

The prices of greenhouse gas emission allowances assumed at the level of EUR 60 '07/tCO_2 are the reason for which the use of hard coal within the structure of primary energy carriers would decrease by ca. 16.5% and of lignite by 23%, whereas consumption of gas would increase by ca. 40%. The increase in demand for gas is the result of the expected civilization-related increase in consumption of this carrier by final customers, expected development of high-efficiency steam and gas technology sources, and the necessity to build gas sources for the power industry to provide peak capacity and reserve capacity for wind power plants.

The share of renewable energy in total primary energy use is expected to increase from ca. 5% in 2006 to 12% in 2020 and 12.4% in 2030.

As concerns the expected developments in the nuclear energy industry, in 2020 nuclear energy is to be included in primary energy structure and in 2030 its share in total primary energy is expected to reach ca. 6.5%.

[4] Gross final energy has been defined in the European Commission's proposal of a new RES Directive as: final use of energy carriers for energy purposes + grid loss of electricity and heat + own use of electricity and heat for generation of electricity and heat.

Table 10. Demand for primary energy divided by carriers [Mtoe, natural units]

	Unit	2006	2010	2015	2020	2025	2030
Lignite*)	Mtoe	12.6	11.22	12.16	9.39	11.21	9.72
	million tons	59.4	52.8	57.2	44.2	52.7	45.7
Hard coal**)	Mtoe	43.8	37.9	35.3	34.6	34.0	36.7
	million tons	76.5	66.1	61.7	60.4	59.3	64.0
Oil and oil products	Mtoe	24.3	25.1	26.1	27.4	29.5	31.1
	million tons	24.3	25.1	26.1	27.4	29.5	31.1
Natural gas***)	Mtoe	12.3	12.0	13.0	14.5	16.1	17.2
	billion cubic metres	14.5	14.1	15.4	17.1	19.0	20.2
Renewable energy	Mtoe	5.0	6.3	8.4	12.2	13.8	14.7
Other fuels	Mtoe	0.7	0.7	0.9	1.1	1.4	1.6
Nuclear fuel	Mtoe	0.0	0	0	2.5	5.0	7.5
Electricity exports	Mtoe	-0.9	0.0	0.0	0.0	0.0	0.0
TOTAL PRIMARY ENERGY	Mtoe	97.8	93.2	95.8	101.7	111.0	118.5

*) *– calorific value of lignite 8.9 MJ/kg*
**) *– calorific value of hard coal 24 MJ/kg*
***) *– calorific value of natural gas 35.5 MJ/m3.*

3.3 Demand for electricity

Table 11 presents gross domestic demand for electricity divided by components. It is expected that the final demand for electricity would moderately increase from ca. 111 TWh in 2006 to ca. 172 TWh in 2030, i.e. by ca. 55%, due to the projected use of the existing market transformation reserves and efficiency-oriented measures in the economy. The demand for peak capacity would increase from 23.5 MW in 2006 to ca. 34.5 MW in 2030. The demand for gross electricity would increase from ca. 151 TWh in 2006 to ca. 217 TWh in 2030.

Table 11. Domestic demand for electricity [TWh]

	2006	2010	2015	2020	2025	2030
Final energy	111.0	104.6	115.2	130.8	152.7	171.6
Power sector	11.6	11.3	11.6	12.1	12.7	13.3
Grid loss	14.1	12.9	13.2	13.2	15.0	16.8
Net demand	136.6	128.7	140.0	156.1	180.4	201.7
Own needs	14.1	12.3	12.8	13.2	14.2	15.7

Gross demand	**150.7**	**141.0**	**152.8**	**169.3**	**194.6**	**217.4**

Due to environmental requirements, nuclear power plants, whose development pace is limited for organisational and technical reasons, are expected to be included in the optimum structure of electricity sources in terms of costs (Tables 12–14). It has been assumed that the first nuclear power unit would be ready in 2020. By 2030, three nuclear power units would operate at total net capacity amounting to 4,500 MW (4,800 MW gross).

Meeting European Union objectives with regard to renewable energy would require generation of gross electricity from RES of ca. 31 TWh in 2020, which would account for 18.4% of total generation, and 39.5 TWh in 2030, which accounts for ca. 18.2% of total generation. The largest share would be achieved by energy from wind power plants – ca. 18 TWh in 2030, which would account for ca. 8.2% of projected total gross generation.

Generation of electricity by way of high-efficiency cogeneration is expected to increase from 24.4 TWh in 2006 to 47.9 TWh in 2030. The share of generation of electricity by high-efficiency cogeneration in domestic gross demand for electricity would increase from 16.2% in 2006 to 22% in 2030.

Table 12. Generation of net electricity divided by fuels [TWh])

	2006	2010	2015	2020	2025	2030
Hard coal	86.1	68.2	62.9	62.7	58.4	71.8
Lignite	49.9	44.7	51.1	40.0	48.4	42.3
Natural gas	4.6	4.4	5.0	8.4	11.4	13.4
Oil products	1.6	1.9	2.5	2.8	2.9	3.0
Nuclear fuel	0.00	0.00	0.00	10.5	21.1	31.6
Renewable energy	3.9	8.0	17.0	30.1	36.5	38.0
Pump water	0.97	1.00	1.00	1.00	1.00	1.00
Waste	0.6	0.6	0.6	0.6	0.7	0.7
TOTAL	**147.7**	**128.7**	**140.1**	**156.1**	**180.3**	**201.8**
Share of RES energy [%]	2.7	6.2	12.2	19.3	20.2	18.8

Table 13. Consumption of fuels for electricity generation (including combined electricity and heat generation) [ktoe]

	2006	2010	2015	2020	2025	2030
Hard coal	25,084	20,665	18,897	17,722	16,327	18,331
Lignite	12,517	11,091	12,036	9,266	11,095	9,615
Natural gas	961	970	1,094	1,623	2,114	2,473
Oil products	533	591	732	791	806	837
Nuclear power	0	0	0	2,515	5,030	7,546
Renewable energy	703	1,461	2,912	5,128	5,995	6,212
- *Water*	174	209	239	270	275	275
- *Wind*	22	174	632	1,178	1,470	1,530
- *Biomass*	458	943	1,566	2,693	2,749	2,805
- *Biogas*	48	135	475	986	1,500	1,600
- *Solar*	0	0	0	0	1	2
Waste	144	154	162	168	185	201
Total fuel consumption	39,942	34,933	35,832	37,213	41,552	45,215

Table 14. Generation capacity of gross electricity [MW]

Fuel/technology	2006	2010	2015	2020	2025	2030
Lignite – PC boiler/fluidized-bed furnace	8,819	9,177	9,024	8,184	10,344	10,884
Hard coal – PC boiler/fluidized-bed furnace	15,878	15,796	15,673	15,012	11,360	10,703
Hard coal – CHP	4,845	4,950	5,394	5,658	5,835	5,807
Natural gas – CHP	704	710	810	873	964	1,090
Natural gas – GTCC	0	0	400	600	1,010	2,240
Large water	853	853	853	853	853	853
Pump water	1,406	1,406	1,406	1,406	1,406	1,406
Nuclear	0	0	0	1600	3200	4800
Industrial Coal – CHP	1,516	1,411	1,416	1,447	1,514	1,555
Industrial Gas – CHP	51	50	63	79	85	92
Industrial Other – CHP	671	730	834	882	896	910
Local Gas	0	0	22	72	167	278
Small, water	69	107	192	282	298	298
Wind	173	976	3,396	6,089	7,564	7,867
Solid biomass – CHP	25	40	196	623	958	1,218
Biogas CHP	33	74	328	802	1,293	1,379
Photovoltaics	0	0	0	2	16	32
TOTAL	35,043	36,280	40,007	44,464	47,763	51,412

3.4. Projection of electricity and district heat prices

It is expected that prices of electricity and district heat would increase significantly due to enhanced environmental requirements, particularly charges for CO_2 emission allowances and higher prices of primary energy carriers (Tables 15 and 16).

Table 15. Prices of electricity [PLN'07/MWh]

	2006	2010	2015	2020	2025	2030
Industry	233.5	300.9	364.4	474.2	485.4	483.3
Households	344.5	422.7	490.9	605.1	615.1	611.5

Table 16. Prices of district heat [PLN'07/GJ]

	2006	2010	2015	2020	2025	2030
Industry	24.6	30.3	32.2	36.4	40.4	42.3
Households	29.4	36.5	39.2	44.6	50.5	52.1

Costs of electricity generation are expected to increase rapidly in 2013 and 2020 as 30% of energy generated in 2013 and 100% of that generated in 2020 will be subject to the obligation to purchase greenhouse gas emission allowances. If this increase is transferred to electricity prices, then, at the assumed price of allowances amounting to EUR 60'07/tCO_2, it is expected that prices for the industry would increase from ca. PLN 304 '07/MWh in 2012 to ca. PLN 356 '07/MWh in 2013 and from ca. PLN 400 '07/MWh in 2019 to ca. PLN 474 '07/MWh in 2020. After 2021, the price would remain unchanged or decrease slightly thanks to the introduction of nuclear energy.

District heat prices are expected to rise more monotonically as generation of district heat for the heat industry will gradually be subject to the commitment to purchase greenhouse gas emission allowances.

3.5. Energy intensity of the economy

Table 17 presents the projected energy intensity and electricity intensity of the GDP.[5] It is expected that primary energy intensity per GDP unit would significantly decrease from ca. 89.4 toe/PLN million '07 in 2006 to ca. 33.0 toe/PLN million '07 in 2030. Moreover, electricity intensity of GDP would decrease from 137.7 MWh/PLN'07 in 2006 to 60.6 MWh/PLN'07.

The level of the economy's energy efficiency corresponding to the average level of efficiency in EU-15 countries in 2005 (177.4 toe/$ million '00) will be reached at the very end of the projection period.

[5] According to Eurostat methodology, energy intensity of GDP is the quotient of the use of primary energy and GDP, while electricity intensity of GDP is the quotient of the use of gross electricity and GDP.

Table 17. Energy intensity and electricity intensity of GDP

	2006	2010	2015	2020	2025	2030
Energy intensity [toe/PLN million '07]	89.4	73.1	56.7	46.6	38.6	33.0
Electricity intensity [MWh/PLN million '07]	137.7	110.4	90.4	77.8	67.8	60.6

3.6. Emissions of CO_2 and air pollutants: SO_2, NO_x, and dust

Table 18 summarises projected domestic emissions of three main air pollutants (sulphur dioxide – SO_2, nitrogen oxides – NO_x, and dust) as well as carbon dioxide – CO_2 related to combustion of fuels as charge during industrial processes.[6]

Emission of CO_2 will be significantly decreasing from ca. 332 million tons in 2006 to ca. 280 million tons in 2020. The decrease in emission, when compared to emission in 1990,[7] amounts to ca. 15% despite the 11% increase in demand for final energy over the period. It will result from increasing use of energy from renewable sources and cogeneration, from the increase in consumption of biofuels by the transport industry, from the increase in consumption of natural gas in all sectors, from the improved efficiency of electricity and heat generation, transmission and distribution, as well as from the launch of the first nuclear power plant in 2020. After 2020, emission of CO_2 would be gradually increasing, however, owing to introduction of further nuclear power units, emission would exceed 300 million tons only in 2030, still remaining about 8.5% lower than 1990 emission.

It is projected that the decrease in emission of SO_2 in the next decade would be high – by more than 60% when compared to 2006. With the adopted assumptions, emission of SO_2 would decrease from 1,216 kt in 2006 to ca. 480 kt in 2020 and further to 450 kt in 2030. The emission cap resulting from the 2nd Sulphur Protocol (national emission of sulphur oxides below 1,398 kt by 2010) is easy to achieve. Nevertheless, the SO_2 emission cap for large combustion plants, adopted as a result of accession negotiations pursuant to Directive No 2001/80/EC (reduction of sulphur dioxide emission to the level below 454 kt in 2008, 426 kt in 2010, and 358 kt in 2012), will not be reached in 2008 even in spite of all measures taken. It is possible, however, that it would be reached in the following years.

The emission cap for nitrogen oxides resulting from the 2nd Nitrogen Protocol (national emission below 880 kt by 2010) will be achieved. On the other hand, maintaining emission of NO_x from large combustion plants below the caps specified in the Treaty of Accession to EU (254 kt in 2008, 251 kt in 2010, and 239 kt in 2012) would be more difficult to achieve – in 2008, the cap would not be achieved, whereas in the years 2010–2012 achieving required caps will probably be a consequence of lower demand for energy as a result of the projected economic slowdown. Ensuring achieving of required caps, similarly as in the case of SO_2 emission, in fact means shortening the derogation periods provided for in the Treaty of Accession. Significant decrease in emission from large sources may be expected only after 2015. National emission of NO_x would decrease from 857 kt in 2006 to ca. 650 kt in 2020 and further to 630 kt in 2030.

[6] Data after the *Projection of demand for fuels and energy until 2030*, ARE, March 2009.

[7] CO_2 emission in Poland amounted to ca. 368 million tons in 1990.

Emission of volatile dusts will be significantly decreasing as factors positively influencing reduction in sulphur emission are also conducive to reducing dust emission; this relates in particular to reduction in coal use in small combustion sources. The decrease in emission after 2015 would also be a result of tightening emission norms planned by the European Commission (proposal for a new IPPC directive).

Table 18. Emissions of CO_2, SO_2, NO_x, and dust

CO_2 emission [million tons]	**2006**	**2010**	**2015**	**2020**	**2025**	**2030**
Country	331.9	299.1	295.7	280.3	294.7	303.9
- growth rate (2006=100)	*100.0*	*90.1*	*89.1*	*84.5*	*88.8*	*91.6*
Energy industries	188.5	170.3	167.7	148.7	154.1	157.2
including Utility electrical power industry	151.0	131.7	130.1	110.6	114.2	115.7
Heat plants	13.1	13.7	13.7	12.9	13.9	14.8
SO_2 emission [thousand tons]	**2006**	**2010**	**2015**	**2020**	**2025**	**2030**
Country	1,216.4	733.1	588.6	477.8	451.3	447.5
- growth rate (2006=100)	*100.0*	*60.3*	*48.4*	*39.3*	*37.1*	*36.8*
Energy industries	866.2	460.4	357.4	268.2	252.4	253.2
including Utility electrical power industry	717.0	337.7	267.9	193.4	182.0	180.7
Heat plants	69.1	53.3	35.1	24.4	23.6	25.2
Large combustion sources	784.1	392.1	311.4	228.0	213.3	213.0
NO_x emission [thousand tons]	**2006**	**2010**	**2015**	**2020**	**2025**	**2030**
Country	857.4	786.7	725.6	651.6	636.5	628.6
- growth rate (2006=100)	*100.0*	*91.7*	*84.6*	*76.0*	*74.2*	*73.3*
Energy industries	316.8	266.8	240.9	197.6	203.5	203.0
including Utility electrical power industry	252.7	207.1	176.9	124.8	121.5	117.2
Heat plants	28.5	27.6	29.9	26.8	29.1	31.3
Large combustion sources	284.5	235.0	204.3	152.5	150.1	146.7
Dust emission [thousand tons]	**2006**	**2010**	**2015**	**2020**	**2025**	**2030**
Country	279.5	246.1	218.2	196.7	187.7	182.8
- growth rate (2006=100)	*100.0*	*88.0*	*78.1*	*70.3*	*67.1*	*65.4*
Energy industries	56.7	46.7	39.8	35.0	31.5	29.7
including Utility electrical power industry	38.9	29.2	26.5	22.5	20.9	18.7
Heat plants	8.1	7.8	6.3	5.3	3.1	3.4

Data for 2006 provided by Agencja Rynku Energii S.A.

Ministry of Economy

ACTION PLAN
FOR THE YEARS 2009–2012

Appendix 3

to draft Energy Policy of Poland until 2030

Warsaw, 10 November 2009

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Priority I Improving energy efficiency

Measure 1.1	**Setting the national objective of enhancing energy efficiency**
Implementation method	1. Establishing a legal framework for setting the national objective of enhancing energy efficiency in terms of enhancing energy saving by end users in the Act on energy efficiency – 2009. 2. Issuance of the regulations of the Council of Ministers specifying the national objective of enhancing energy efficiency – periodically since 2010. 3. Monitoring the completion of the national objective of enhancing energy efficiency – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (task 1 and 2) • Body designated by the Act on energy efficiency (task 3)

Measure 1.2	**Introducing a systemic mechanism to support measures aimed at attaining the national objective of enhancing energy efficiency**
Implementation method	1. Establishing the legal framework for the support system by way of the Act on energy efficiency – 2009. 2. Supporting selected projects – on an ongoing basis since 2011. 3. Monitoring the operation of the support system – on an ongoing basis since 2011.
Responsible bodies	• Minister competent for the economy (task 1) • Body designated by the Act on energy efficiency (tasks 2 and 3)

Measure 1.3	**Stimulating development of cogeneration through support mechanisms, taking into account cogeneration from sources up to 1 MW and appropriate commune policy**
Implementation method	1. Preparation and gradual implementation of new principles of regulating network heat prices which would ensure elimination of the present cross-financing of combined heat and power generation with revenues from electricity generation and certificates through the implementation of the benchmarking method for the determination of heat prices – from 2010. 2. Maintaining the electricity support system in a highly efficient co-generation technology at the level ensuring profitability of investments in new generation capacity as well as predictability of this system over the next 10 years – on an ongoing basis. 3. Providing a regulation to specify the procedure for the preparation of assumptions and plans for heat, electricity, and gas fuel supply by communes as well as implementation methods for these plans, in particular the planning process will be supported by the obligation to create a ranking of potential heat supply methods and selection of the optimal option in order to ensure the

	implementation of Poland's energy policy – 2011. 4. Preparation of a report evaluating progress achieved in increasing the share of electricity generated in highly efficient co-generation in total domestic electricity generation – 2011. 5. Evaluation of the efficiency of the existing co-generation energy support system – on an ongoing basis. 6. Considering introduction of the obligation of joining the heat network for new projects implemented in areas where such networks exist into spatial development plans – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1–5) • President of the Energy Regulatory Office (tasks 1, 2, and 5) • Communes (task 6)

Measure 1.4	**Using mandatory energy performance certificates for buildings and apartments upon their marketing or renting**
Implementation method	1. Issuing authorisations for individuals authorised to prepare energy performance certificates for buildings and apartments – on an ongoing basis. 2. Participation in the EU legislation work on improving efficiency of the system of energy performance certificates of buildings – from 2009. 3. Increasing minimum standards for energy efficiency of buildings – 2010/2011.
Responsible body	• Minister competent for construction, spatial and housing management (tasks 1–3)

Measure 1.5	**Determining energy intensity of devices and power-consuming products, introducing minimum standards for power-consuming products**
Implementation method	1. Participation in the EU legislation work on the design of a new label and extension of the scope of the obligation to determine energy intensity of devices – 2009–2010. 2. Implementation of new EU regulations on energy intensity designation into the Polish legal system – 2012. 3. Participation in the European Commission legislative work on the regulations implementing Directive 2005/32/EC on the ecodesign requirements for energy-using products[1] – 2009–2011. 4. Analysis of possibilities to apply incentives to buy energy-efficient products and their potential implementation – 2011–2012. 5. Informational and educational measures relating to implemented legal changes – 2012.
Responsible body	• Minister competent for the economy (tasks 1–5)

[1] Directive 2005/32/EC of the European Parliament and of the Council of 6 July 2005 establishing a framework for the setting of ecodesign requirements for energy-using products and amending Council Directive 92/42/EEC and Directives 96/57/EC and 2000/55/EC of the European Parliament and of the Council (OJ L 191, 22.7.2005, p. 29–58).

Measure 1.6	**Committing the public sector to serve as a role model of economical energy usage**
Implementation method	1. Specification of the list of measures for enhancing energy efficiency applied by public sector entities – 2010. 2. Introduction of the obligation for public sector entities to save energy and inform about energy savings and measures undertaken to improve energy efficiency – 2010. 3. Introduction of the obligation to save energy by public sector entities – on an ongoing basis. 4. Extension of the scope of heat, electricity, and gas fuel assumptions and plans by planning and organising measures aimed at rationalization of energy consumption and promoting energy reducing solutions in communes – 2010. 5. Popularisation of best available practice for model role of public sector entities from other EU countries – from 2011. 6. Adjustment of the main building of the Ministry of Economy to serve as a model of energy efficiency – 2010 – 2011. 7. 8. Monitoring the implementation of the commitment to save energy imposed on public sector bodies – from 2011.
Responsible bodies0	• Minister competent for the economy (tasks 1, 2, 5, and 6) • Public sector bodies (task 3) • Communes (task 4)

Measure 1.7	**Supporting investments in energy saving through preferential loans and grants from domestic and European funds**
Implementation method	1. Securing budget funds to support investments in energy efficiency, in particular for the implementation of the act on supporting thermo-modernisation and renovations. 2. Granting preferential loans pursuant to the Act on supporting thermo-modernisation and renovations. 3. Supporting investments in best available technologies in industry, highly efficient co-generation, reduction of electricity and heat grid loss, as well as in thermo-modernisation of buildings under the *Operational Programme Infrastructure and Environment* for the years 2007–2013 and regional operational programmes. 4. Preferences in supporting projects bringing about positive effects in the area of energy savings with European funds. 5. Preparation and implementation of energy efficiency support programmes with environmental protection and water management funds; in particular implementation of the following: o Programme for projects aimed at introducing technologies ensuring cleaner and energy-efficient production as well as saving natural resources and primary energy; o Programme for projects aimed at energy saving. The above tasks are implemented on an ongoing basis.
Responsible bodies	• Minister competent for public finance (task 1) • Minister competent for construction, spatial and housing management (task 2) • Minister competent for the economy (task 3) • Minister competent for the environment (tasks 3 and 5) • Province authorities (tasks 3 and 4) • Minister competent for regional development (tasks 3 and 4) • National Fund for Environmental Protection and Water Management (task 5)

Measure 1.8	**Supporting research and development on new solutions and technologies reducing energy consumption, in all kinds of its processing and use**
Implementation method	1. Securing measures in the amount of at least PLN 100 million for co-financing of research and development with respect to energy efficiency in the years 2010–2012. 2. Performance of tasks stemming from the strategic research and development programme *Advanced Technologies for Energy Generation* by the National Centre for Research and Development (NCBiR). The above tasks are implemented on an ongoing basis.
Responsible body	• Minister competent for science (tasks 1 and 2)

Measure 1.9	**Applying Demand Side Management techniques, stimulated by diversification of distribution prices during the day and of electricity prices on the basis of reference prices as a result of introduction of an intra-day market and sending price signals to customers with the use of remote bilateral communication via electronic meters**
Implementation method	1. Imposing the obligation to implement new architecture of the electricity market on the electricity transmission system operator, including implementation of the intra-day market – 2010. 2. Gradual implementation of the obligation to use electronic meters enabling transmission of price signals to energy customers – from 2011. 3. Application of the Demand Side Management (DSM) techniques which allow increasing the peak electricity consumption time ratio – on an ongoing basis. 4. Creating conditions for application of an incentive system with a view to rationalising electricity consumption through distribution tariffs (e.g. introduction of zoning to tariffs) – 2011. 5. Introducing a digital communication standard ensuring creation of conditions conducive to building a uniform all-national system of radio communication for the needs of the power sector that would ensure voice communication and data transmission both in normal times and in crisis – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, 4, and 5) • President of the Government Legislation Centre (tasks 1 and 2) • President of the Energy Regulatory Office (task 4)
Commercial entities recommended for implementation:	• Power enterprises (trade and distribution) (task 3)

Measure 1.10	**Informational and educational campaigns promoting efficient energy use**
Implementation method	1. Conducting informational campaigns with the use of public media. 2. Lectures, trainings, and education. 3. Distribution of information and promotion materials. 4. Setting up a website. 5. Supporting competitions relating to energy efficiency. 6. Organisation of outdoor events. Task implementation period – 2009–2012.
Responsible bodies	• Minister competent for the economy (tasks 1–6) • Minister competent for the environment (tasks 1–6) • President of the Energy Regulatory Office (tasks 2 and 4)

Priority II Enhanced security of fuels and energy supplies

Coal

Measure 2.1	**Introducing regulations which take into account the objectives proposed under the energy policy, particularly instruments motivating to carry out preparatory work and to retain appropriate level of mining capacity** **Developing modernised pre-treatment technologies for coal to be used for energy production**
Implementation method	1. Establishing a coal fund for maintaining proper mining capacity, including for setting up reserve fronts, by way of an act – 2010. 2. Implementation of amendments into the Environmental protection law enabling financing provided by the National Fund for Environmental Protection and Water Management (NFOŚiGW) to support modernised technologies of coal preparation for energy use (e.g. coal dust, liquid and gas fuels from coal as well as ecological coal fuels) – 2010.
Responsible bodies	• Minister competent for the economy (task 1) • President of the Government Legislation Centre (task 2) • Minister competent for the environment (task 2)

Measure 2.2	**Abolishing legal barriers to making new deposits of hard coal and lignite available**
Implementation method	1. Providing geological administration bodies with opportunities to establish rules as regards management of deposit areas which have not been subject to exploitation yet, and which are a valuable raw material reserve by introducing a planning hierarchy – by means of an amendment to the Act on spatial planning and management – 2010. 2. Specifying objective conditions for obtaining an environmental approval for mining projects – by way of amending the regulations Act of 3 October 2008 on the provision of information on the environment and its protection, participation of the society in the environmental protection and environmental impact assessment – 2010. 3. Limiting fiscal stringency related to the process of obtaining the right to geological information – 2010. 4. Amending the Geological and mining law by unambiguously including lignite deposits in deposits belonging to the State Treasury (mining property), irrespective of the way of their exploitation – 2010. 5. Introducing the possibility to acquire properties located within a mining area by companies pursuing public objectives related to lignite mining from local authorities and State Treasury without a tender in the Act on property management– 2010. 6. Simplification of the procedure of reconciliation of local spatial development plans connected with mining in relation to deposits included in public objective

	investments of national importance – 2010. 7. Considering abandoning certain charges imposed pursuant to the Act on arable land and forest area protection – 2010. 8. Amending provisions concerning qualification of rehabilitated post-mining areas – 2010.
Responsible bodies	• Minister competent for the economy (tasks 1 and 2) • Minister competent for construction, spatial and housing management (tasks 1, 5, 6, and 8) • Minister competent for the environment (tasks 2, 3, 4, and 7) • President of the Government Legislation Centre (tasks 1–8)

Measure 2.3	**Identifying strategic national resources of hard coal and lignite and protecting them through inclusion in spatial development plans.** **Securing access to strategic resources via investment projects implemented as public purpose investments of supra-local significance**
Implementation method	1. Introducing provisions ensuring protection of hard coal and lignite strategic resources (documented and prospected ones) featured in geological maps into Geological and mining law and the Act on spatial planning and management, as well as specification of criteria for the selection and protection of deposits – 2010. 2. Issuing a regulation on the list of hard coal and lignite deposits of strategic importance to national energy security – 2010. 3. Introducing provisions concerning protection of selected hard coal and lignite deposits of strategic importance to national energy security from further development to the national spatial development policy and, gradually, to provincial and local spatial development plans – 2010. 4. In case there was no investor, authorisation of a competent government body or another entity to serve as a substitute investor – 2010. 5. Introduction of procedures facilitating effective control of state authorities of provisions of local spatial development plans relating to the possibility of setting up coal mining operations in areas where the presence of hard coal and lignite deposits of strategic importance to the national economy was documented – 2010. 6. Introduction of provisions ensuring protection of documented coal deposits against further infrastructure development (in particular: lignite deposits – “Legnica,” “Gubin,” and “Złoczew”; hard coal deposits – “Bzie-Dębina,” “Śmiłowice,” and “Brzezinka”) into the national spatial development policy and respective regulations – 2010.
Responsible bodies	• Minister competent for the environment (tasks 1, 2, and 4) • Minister competent for construction, spatial and housing management (tasks 1, 3, 5, and 6) • Minister competent for the economy (tasks 1–4) • President of the Government Legislation Centre (task 1) • Minister competent for regional development (tasks 3 and 6)

Measure 2.4	**Intensifying geological research to extend the coal resource base, making use of state of the art prospecting and surveying techniques**
Implementation method	1. Detailed survey of coal resources – on an ongoing basis. 2. Introduction of the possibility to finance the above tasks by the National Fund for Environmental Protection and Water Management (NFOŚiGW) and earmarking funds for that purpose – 2010. 3. Implementation of the *Programme for projects concerning research into geological structure of Poland and managing mineral resources and underground waters* – on an ongoing basis.
Responsible bodies	• Minister competent for the environment (tasks 1 and 2) • National Fund for Environmental Protection and Water Management (tasks 1 and 3)
Commercial entities recommended for implementation	• Mining enterprises (tasks 1 and 3)

Measure 2.5	**Completing organisational and structural changes**
Implementation method	1. Organisational and structural activities targeted at building strong business entities capable of successful competing on the market – on an ongoing basis. 2. Establishing capital groups based on coal and energy generation companies, respecting social dialogue rules and having obtained the opinion of the President of the Energy Regulatory Office, in economically justified cases.
Responsible bodies	• Minister competent for the economy (tasks 1 and 2) • Minister competent for the Treasury (task 2)

Measure 2.6	**Supporting the industrial use of methane released when extracting hard coal in mines**
Implementation method	1. Establishing a system supporting industrial use of methane released when extracting hard coal in mines by means of establishing certificates of origin for electricity generated from methane – 2010. 2. Efficiency analysis of the implemented system supporting methane-based electricity production – 2011. 3. Potential preparation of the proposal to correct/supplement the support system based on the results of the above analysis – 2011/2012.
Responsible body	• Minister competent for the economy (tasks 1–3)

Measure 2.7	**Introducing technology solutions which allow recovery of methane from ventilation air pumped out of hard coal mines**
Implementation method	1. Evaluation of the possibility to use globally available technologies of methane recovery from ventilation air – 2010. 2. Obtaining funds for the implementation of the above technology from European funds and the National Fund for Environmental Protection and Water Management (NFOŚiGW) – on an ongoing basis. 3. Considering the option and potential inclusion of work on new technologies of methane recovery from ventilation air into the strategic research and development programme "Advanced technologies of energy generation" and the National Research Programme – 2011.
Responsible body	• Minister competent for science (task 3)
Commercial entities recommended for implementation:	• Coal companies (tasks 1 and 2)

Measure 2.8	**Obtaining funds for development of the mining industry through privatisation of coal companies whose legitimacy, the volume of shares, and the IPO date will be analysed in terms of energy policy objectives**
Implementation method	1. Privatisation of mining companies observing the principles of social dialogue, assuming that funds generated by privatisation will be used to maintain production capacity. 2. Simultaneous obtaining of funds for initial and replacement projects that serve maintaining the output level in order to improve national energy security by way of the following: o Loans from international financial institutions, e.g. the World Bank; o Issuance of bonds by mining companies; o Seeking alternative financing methods. The above tasks are implemented on an ongoing basis.
Responsible bodies	• Minister competent for the Treasury (task 1) • Minister competent for the economy (task 1)
Commercial entities recommended for implementation	• Coal company boards (task 2)

Measure 2.9	**Supporting research and development of technologies permitting to use coal for liquid and gas fuels production, mitigating the negative environmental impact of processes of obtaining energy from coal as well as coal fuel cells technologies**

Implementation method	1. Promoting pilot investment projects in coal gasification and coal liquefaction on the assumption that fuel production must be a commercial venture – on an ongoing basis. 2. Carrying out tasks stemming from the strategic research and development programme "Advanced technologies of energy generation" in respect of coal-based production of liquid and gas fuels as well as coal fuel cells by the National Research and Development Centre – on an ongoing basis. 3. Promoting the establishment of research and industrial consortia in order to implement prototype semi-industrial installations – on an ongoing basis. 4. Making use of the possibility to support innovative projects under the Operational Programme "Innovative Economy" for the years 2007–2013 – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (task 1) • Minister competent for science (tasks 2 and 3) • Research and development entities (tasks 2–4)
Commercial entities recommended for implementation	• Commercial enterprises (tasks 3 and 4)

Measure 2.10	**Retaining the competence of the minister in charge of the Treasury in respect of mining companies by the Minister of Economy**
Implementation method	1. Extending the application of art. 20 of the Act of 7 September 2007 on the functioning of the hard coal mining industry in the years 2008–2015 until 2030 – deadline: 2010.
Responsible body	• Minister competent for the economy

Gas

Measure 2.11	**Appropriate tariff policy encouraging investment in pipeline infrastructure (gas transmission and distribution)**
Implementation method	1. Devising methodology of transferring the cost of using new elements of infrastructure of particular significance to national energy security and diversification of supplies, as well as security of the national gas system, to all gas system users (e.g. by transferring a portion of costs to transmission charges) – 2010. 2. Devising and implementing a model of regulation for infrastructure companies operating within the gas sector, including introduction of model rules of calculating operational costs of a business, as well as the rules of calculating depreciation and interest on capital based on the market value of assets used to pursue a business – 2011. 3. Supporting extension of gas infrastructure in areas where gas supply is scarce and in areas where wind power generation and dispersed co-generation is planned, particularly under the *Operational Programme Infrastructure and Environment* – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1–3) • President of the Energy Regulatory Office (tasks 1 and 2) • Minister competent for regional development (task 3)

Measure 2.12	**Building a terminal for receiving liquefied gas (LNG)**
Implementation method	1. Concluding contracts for liquefied gas supplies to the LNG terminal – 2009. 2. Performing necessary preparatory and reconciliation work as regards environmental impact and construction permit – 2010. 3. Construction of an external port, a breakwater, and a transhipment station – 2010–2012. 4. Obtaining the concession for LNG regasification – 2012. 5. Construction of regasification liquefied natural gas terminal in Świnoujście together with a connecting network – 2010–2014. 6. Launching trainings for personnel managing sea transport of liquefied natural LNG gas in Świnoujście sea port – 2009. 7. Submitting applications for project co-financing from *Operational Programme Infrastructure and Environment* and the European Economic Plan for Recovery – 2009/2010.
Responsible bodies	• Minister competent for the Treasury (tasks 1, 2, 3, and 5) • Local government (task 2) • Minister competent for maritime economy (task 3) • Szczecin Maritime Office (task 3)

	• Maritime University of Szczecin (task 6)
Commercial entities recommended for implementation	• PGNiG S.A. and other entities (task 1) • Polskie LNG sp. z o.o. (tasks 2, 5, and 7) • Zarząd Morskich Portów Szczecin i Świnoujście S.A. [Managing Company of Szczecin and Świnoujście Ports, Joint Stock Company] (task 3) • Commercial companies or Polskie LNG Sp. z o.o. (task 4)

Measure 2.13	**Concluding arm's length contracts for diversified natural gas supplies to the liquefied gas reception terminal and from the north**
Implementation method	1. Concluding arm's length contracts for natural gas supplies dedicated to the liquefied gas reception terminal and from the north – from 2009. 2. Providing support to business entities responsible for concluding contracts in negotiations with foreign partners – on an ongoing basis. 3. Creating appropriate conditions for gas supplies with the use of the regasification terminal and for gas supplied from the north by means of tariff and regulation policy – 2010. 4. Supporting sea transport of liquefied natural gas by commercial entities – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (task 2) • Minister competent for foreign affairs (task 2) • President of the Energy Regulatory Office (task 3) • Minister competent for infrastructure (task 4)
Commercial entities recommended for implementation	• PGNiG S.A. (task 1)

Measure 2.14	**Establishing sustainable management policy for domestic gas resources to allow extension of natural gas reserve base in the territory of Poland**
Implementation method	1. Intensification of geological research with a view to extending the natural gas resource with the use of state of the art prospecting and surveying techniques – on an ongoing basis. 2. Establishing a system which stimulates prospecting and surveying in Poland based on model solutions applied in other countries – 2012. 3. Identification of national strategic deposits and their protection by means of their inclusion in spatial development plans – 2010. 4. Policy support to activities related to gas deposit prospecting and surveying carried out by companies from the Polish crude oil sector in the Baltic Sea shelf – on an ongoing basis.
Responsible bodies	• Minister competent for the environment (tasks 1 and 3) • Minister competent for the economy (tasks 2, 3, and 4) • Minister competent for construction, spatial and housing management (task 3)

	• Minister competent for the Treasury (task 4) • Minister competent for foreign affairs (task 4) • Minister competent for regional development (task 3)
Commercial entities recommended for implementation	• Commercial companies (task 1)

Measure 2.15	**Investments which allow extending natural gas extraction in the territory of Poland**
Implementation method	1. Gradual resignation from extraction cost regulation after a detailed market analysis – from 2010. 2. Drafting regulations resulting in acceleration of the use of documented gas and crude oil deposits, including simplification of the procedure for granting prospecting, surveying, and exploitation concessions, *inter alia* by reducing the scope of required documents and reconciliations – 2010. 3. Concession policy encouraging investment in domestic deposits – on an ongoing basis. 4. Ownership policy encouraging investment in domestic deposits – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (task 1) • President of the Energy Regulatory Office (task 1) • Minister competent for construction, spatial and housing management (task 2) • Minister competent for the environment (tasks 2 and 3) • Minister competent for the Treasury (task 4)

Measure 2.16	**Diversification of supplies by building a transmission system for natural gas supplies from the north, west, and south, as well as building connections to primarily meet the requirement of supply sources diversification**
Implementation method	1. Building the transmission system to allow natural gas supplies from the north, west, and south – from 2010. 2. Construction of interconnectors – from 2009. 3. Monitoring the progress of investment projects and periodical reports on the progress in the linear infrastructure development – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (task 3) • Minister competent for the Treasury (task 3)
Commercial entities recommended for implementation	• OGP Gaz-System S.A. (tasks 1 and 2) • Commercial companies (task 2)

Measure 2.17	**Polish companies winning access to natural gas deposits located outside Poland**
Implementation method	1. Providing diplomatic support to businesses pursuing investment projects in individual countries – on an ongoing basis. 2. Investigating into the possibility to provide businesses pursuing investment projects with government guarantees and financial support – 2009. 3. Concluding relevant international agreements in order to avoid double taxation related to running an extraction business outside Poland – on an ongoing basis.
Responsible bodies	• Minister competent for the Treasury (task 1) • Minister competent for the economy (tasks 1–3) • Minister competent for foreign affairs (task 1) • Minister competent for public finance (tasks 2 and 3)

Measure 2.18	**Supporting investments in infrastructure with the use of European funds**
Implementation method	1. Supporting infrastructural investments in the area of transmission, distribution, and storage of natural gas under *Operational Programme Infrastructure and Environment* and regional operational programmes – on an ongoing basis. 2. Actions taken by Polish administration on the forum of the European Union aimed at creating conditions for building infrastructure ensuring energy security of the European Union based on Community funds – on an ongoing basis. 3. Replacing the TEN-E system with one that allows financing gas infrastructure projects which are key to the EU, with particular emphasis placed on projects aimed at opening new supply routes, considering that the projects should not pose a threat to security of energy supplies of any EU Member State – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, and 3) • Minister competent for regional development (task 1) • Province authorities (task 1) • Minister competent for foreign affairs (task 2)

Measure 2.19	**Streamlining the crisis response mechanism**
Implementation method	1. Committing all companies dealing in natural gas transmission and distribution to have in place plans for introducing restrictions in gas consumption by amending the Energy Law or Act on stocks of crude oil, petroleum products and natural gas, the principles of proceeding in circumstances of a threat to the fuel security of the State and disruption on the petroleum market – 2010. 2. Plausibility analysis of improving efficiency of restrictions in natural gas consumption by amending relevant legal regulations – 2009–2010. 3. Participation in amending Directive 2004/67/EC concerning measures to safeguard security of natural gas supply – 2010.

	4. Implementation of new legal regulations concerning crisis response – 2010. 5. Working out a coherent and efficient design of the Early Warning Mechanism in the framework of dialogue between the EU and Russia to include crude oil, natural gas, and electricity, as well as appropriate provisions of the PostPCA – 2009/2010. 6. Working out a coherent and efficient design of the Early Warning Mechanism in the framework of dialogue between the EU and transit countries and other countries supplying energy carriers to include crude oil, natural gas, and electricity – 2009/2010. 7. Devising new and applying the existing instruments to ensure secure and uninterrupted supplies of hydrocarbons to the EU from supplier and transit countries – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, 3,4, 5, 6, and 7) • President of the Government Legislation Centre (task 1) • Companies obliged to maintain gas reserves (task 4)
Commercial entities recommended for implementation	• Companies obliged to maintain gas reserves (task 4)

Measure 2.20	**Securing state interests in strategic companies of the gas sector**
Implementation method	1. Securing interests of State Treasury in EuRoPol Gaz S.A. in the framework of exercising owner's rights resulting from ownership of shares in PGNiG S.A. and personal rights due to the Treasury pursuant to the company's articles of association – on an ongoing basis. 2. Termination of the contract of lease for the transmission system between PGNiG S.A. and OGP GAZ-SYSTEM S.A. by transferring a dividend in kind – 2011. 3. Considering recapitalisation of PGNiG S.A. by contributing shares of other companies, if required by Poland's energy security.
Responsible body	• Minister competent for the Treasury (tasks 1–3)

Measure 2.21	**Investment incentives for building storage space (by appropriate tariff structure and ensuring return on invested capital)**
Implementation method	1. Introduction of monitoring of storage space extensions and projects consisting in the construction of new reservoirs by amending the Act on stocks of crude oil, petroleum products and natural gas, the principles of proceeding in circumstances of a threat to the fuel security of the State and disruption on the petroleum market – 2009. 2. Creating favourable conditions for the construction of storage space by relevant tariff and regulation policy, in particular by applying increased interest on capital invested in new projects – 2010.

Responsible bodies	• Minister competent for the economy (tasks 1 and 2) • President of the Government Legislation Centre (task 1) • President of the Energy Regulatory Office (task 2)

Measure 2.22	**Legislative measures aimed at lifting barriers to investments, particularly in respect of large investment projects in infrastructure (warehouses, LNG infrastructure, gas compressor stations, mines, etc.) and linear investments**
Implementation method	1. Preparation of assumptions to the act facilitating linear investments in the gas sector – 2009. 2. Preparing a draft act facilitating linear investments – 2010. 3. Devising draft regulations facilitating procedures for implementation of linear investments in the gas sector, including those which relate to property management, administrative proceedings, spatial planning and development, protection of agricultural and forest land, environmental protection, and nature conservation – 2010. 4. Implementation of new regulations aimed at lifting barriers to investment – from 2011. 5. Monitoring the progress of investment projects and drafting periodical reports on the progress in linear infrastructure development – on an ongoing basis. 6. Imposing the obligation to carry out regular demand studies on gas system operators and entities which intend to take up new large investment projects in gas sector infrastructure – 2011. 7. Introducing the obligation to apply the open season procedure prior to launching large investment projects in gas sector infrastructure – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1–7) • President of the Government Legislation Centre (task 2) • Minister competent for construction, spatial and housing management (tasks 3–4) • Minister competent for the environment (tasks 3 and 4) • Minister competent for rural development (tasks 3 and 4) • President of the Energy Regulatory Office (tasks 5 and 6)
Commercial entities recommended for implementation	• Operators of transmission, storage, and distribution systems (tasks 5 and 6)

Measure 2.23	**Further pilot work on making methane from hard coal deposits available**
Implementation method	1. Consideration of methane extraction from hard coal deposits – 2010. 2. Performing an economic analysis aimed at selecting the best available technology adapted to Polish conditions – 2009–2010.
Responsible body	• Minister competent for the economy (tasks 1 and 2)

Crude oil and liquid fuels

Measure 2.24	**Building infrastructure to allow transport of crude oil from other regions of the world, *inter alia* from the Caspian Sea region within the Euro-Asian Oil Transportation Corridor project**
Implementation method	1. Having performed the necessary analyses, making a decision on building and the project scope of the Odessa-Brody-Plock-Gdansk pipeline – 2010. 2. Diplomatic support on the international scene – on an ongoing basis. 3. Using EU funds under the *Operational Programme Infrastructure and Environment* for the years 2007–2013 – on an ongoing basis. 4. Taking actions aimed at working out tools to support investment projects at the level of the European Union, *inter alia* by extending the TEN-E system to include oil infrastructure – 2010. 5. Taking actions aimed at providing investors with ways to obtain support from Community funds and initiatives such as the Eastern Partnership and Baltic Interconnection Plan with a view to building infrastructure of significance to Poland's security – from 2009.
Responsible bodies	• Minister competent for the economy (tasks 2, 3, 4, and 5) • Minister competent for foreign affairs (task 2) • Minister competent for regional development (task 3)
Commercial entities recommended for implementation	• Przedsiębiorstwo Eksploatacji Rurociągów Naftowych "Przyjaźń" Spółka Akcyjna (Oil Pipeline Operation Company "Przyjaźń" Joint Stock Company) (task 1) • International Pipeline Company "Sarmatia" or another entity designated to execute the task (tasks 1, 3, and 5)

Measure 2.25	**Supporting actions of Polish companies aimed at intensification of prospecting and enhancing national exploitation on land, in the Baltic Sea shelf and outside Poland**
Implementation method	1. Measures to support Polish companies on the international scene through legal and economic support for investment projects of strategic importance to national energy security and for companies with State ownership investing in projects which envisage prospecting and extraction abroad. 2. Coordination of investment plans of companies with State ownership, taking into account investment risk analysis. 3. Implementation by companies with State ownership of internal information systems for planning and execution of investment projects in prospecting and exploitation of crude oil resources as well as supporting initiatives and international projects in this area. 4. Concluding relevant international agreements in order to avoid double taxation related to running an extraction business outside Poland. The above tasks are implemented on an ongoing basis. 5. Investigating into the possibility to provide businesses pursuing investment projects with government guarantees and financial support – 2009.

Responsible bodies	• Minister competent for the economy (tasks 1–5) • Minister competent for foreign affairs (task 1) • Minister competent for public finance (tasks 1, 4, and 5) • Minister competent for the Treasury (tasks 2–3)
Commercial entities recommended for implementation	• Oil sector companies (task 3)

Measure 2.26	**Extending transmission, transhipment, and storage infrastructure (including caverns) for crude oil and liquid fuels**
Implementation method	1. Introduction of the obligation to monitor storage capacity and projects consisting in the construction of new storage tanks by way of amending the Act on stocks of crude oil, petroleum products and natural gas, the principles of proceeding in circumstances of a threat to the fuel security of the State and disruption on the petroleum market – 2009/2010. 2. Monitoring storage development process – on an ongoing basis. 3. Construction of underground crude oil and fuel storages in salt reservoirs (cavern storages) – from 2010. 4. Construction of pipeline cross-border connections for transmission of liquid fuels – from 2010. 5. Monitoring the progress of investment projects on the basis of periodical reports submitted by entities which execute the projects – on an ongoing basis. 6. Supporting measures aimed at devising a joint mechanism to support the development of storage and transmission infrastructure in limitrophe states of the EU in order to allow joint response of EU Member States in crisis – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, 5, and 6) • President of the Government Legislation Centre (task 1) • Office of the Committee for European Integration (task 6)
Commercial entities recommended for implementation	• OLPP, PERN, Lotos co-operating with other entities (tasks 3 and 4)

Measure 2.27	**Application of owner's supervision tools of the State Treasury to stimulate and monitor execution of projects in respect of security of crude oil and liquid fuel supplies**
Implementation method	1. Retaining direct and indirect State Treasury shares in PERN "Przyjaźń" S.A., OLPP Sp. z o.o., and PKN Orlen S.A. at least at the current level.
Responsible body	• Minister competent for the Treasury (task 1)

Measure 2.28	**Legislative changes concerning liquid fuel reserves, particularly lifting the obligation of physical maintenance of reserves by enterprises in exchange for a special purpose fee intended for maintenance of reserves by a public law entity**
Implementation method	1. Analysis of the storage capacity market in Poland as regards demand for intervention reserves and state reserves in the context of amendment to principles of mandatory reserves maintenance – 2009/2010. 2. Preparation of the amendment draft of the Act on stocks of crude oil, petroleum products and natural gas, the principles of proceeding in circumstances of a threat to the fuel security of the State and disruption on the petroleum market as regards*:* o Replacing the system of physical maintenance of mandatory reserves by commercial entities covered by the act with financial obligations; o Designating the entity responsible for mandatory crude oil and fuel reserves for crude oil companies; o Devising a schedule for the transition to a new system; o Devising of the system financing form (taking into account timing of reserves take-over from companies, related costs, and charging principles). Task execution period – 2009/2010.
Responsible body	• Minister competent for the economy (tasks 1–2)

Measure 2.29	**Lifting barriers to development of fuel infrastructure and supporting investment projects in infrastructure with the use of European funds**
Implementation method	1. Preparation of assumptions to the act facilitating linear investments – 2009/2010. 2. Preparing draft act facilitating linear investments – 2010. 3. Devising draft regulations facilitating procedures for implementation of linear investments, including those which relate to property management, administrative proceedings, spatial planning and development, protection of agricultural and forest land, environmental protection, and nature conservation – 2010. 4. Implementation of new regulations – from 2011. 5. Monitoring the progress of investment projects and drafting periodical reports on the progress in linear infrastructure development – on an ongoing basis. 6. Supporting investments in infrastructure in the area of transmission and storage of crude oil and fuels using EU funds under the *Operational Programme Infrastructure and Environment* for the years 2007–2013 – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1–6) • President of the Government Legislation Centre (task 2) • Minister competent for construction, spatial and housing management (tasks 3–4) • Minister competent for the environment (tasks 3 and 4) • Minister competent for rural development (tasks 3 and 4) • Minister competent for regional development (task 6)

Measure 2.30	**Ensuring fuel transport by sea**
Implementation method	1. Implementation and enforcement of international standards and requirements concerning sea navigation and sea ports – on an ongoing basis. 2. Development of training and enhancing qualifications of ship personnel in respect of handling fuel transhipment and transport by sea – on an ongoing basis. 3. Extending fuel transhipment and storage capacities of sea ports in accordance with the *Strategy of the development of sea ports until 2015* – on an ongoing basis.
Responsible bodies	• Minister competent for maritime economy (tasks 1, 2, and 3) • Minister competent for the Treasury (task 3) • Field maritime administration bodies (task 1) • Maritime Universities (task 2)
Commercial entities recommended for implementation	• Sea port managing companies (task 3)

Electricity and heat

Measure 2.31	**Imposing an obligation to prepare development plans of the transmission and distribution grid on grid operators, with particular indication of preferred locations of new generation capacity and the costs of their connection**
Implementation method	1. Modification of the statutory obligation to prepare development plans of the transmission and distribution grid (amendment of the Energy Law) taking into account: o The need for coordination of development plans of the transmission and distribution grid; o Including preferred locations of new generation capacity and the cost of their connection to electricity grids in plans (to facilitate investment planning); o Updating and publishing of grid development plans and location of generation capacity by relevant grid operators at least once every three years. Task implementation deadline – 2011. 2. Introduction of the mechanism of transparent participation of operators in tenders for the connection of new generation units in the preferred location – 2011. 3. Implementation of modified regulations concerning the obligation to prepare development plans of the transmission and distribution grid – 2012. 4. Preparing a programme o government tasks concerning the development of transmission grid and presenting it to the Council of Ministers – 2010. 5. Using regulatory tools with a view to monitoring implementation of grid development plans – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, and 4) • President of the Government Legislation Centre (task 1) • President of the Energy Regulatory Office (task 5)
Commercial entities recommended for implementation	• Operators of transmission and distribution systems (task 3)

Measure 2.32	**Legislative measures aimed at lifting barriers to investments, particularly linear investments**
Implementation method	1. Preparing assumptions for amendments to regulations facilitating linear investments in the energy sector – 2009/2010. 2. Preparing a draft act facilitating linear investments in the energy sector – 2010. 3. Devising draft regulations facilitating procedures applied for linear investments in the energy sector and enabling the regulation of the legal status and exploitation of the existing grid property, including regulations which relate to

	property management, administrative proceedings, spatial planning and development, protection of agricultural and forest land, environmental protection and nature conservation – 2010. 4. Implementation of new regulations – from 2011. 5. Monitoring the progress of investment projects and drafting periodical reports on the progress in linear infrastructure development – on an ongoing basis. 6. Consideration of validity and potential implementation of solutions aimed at conferring public purpose status to investment projects consisting in construction of power stations as well as power and heat stations – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1–6) • President of the Government Legislation Centre (task 2) • Minister competent for construction, spatial and housing management (tasks 2–3) • Minister competent for the environment (tasks 2 and 3) • Minister competent for rural development (tasks 2 and 3)

Measure 2.33	**Introducing long term contracts for system regulatory services covering intervention reserves and rebuilding supply to the national power system by the transmission system operator**
Implementation method	1. Introducing the possibility for Transmission System Operators to conclude long term contracts for system services covering intervention reserves and rebuilding supply to the national power system, particularly by adjusting Public Procurement Law to contracts for the said system services – 2010. 2. Concluding contracts for the said system services – 2012.
Responsible bodies	• Minister competent for the economy (task 1) • President of the Public Procurement Office (task 1) • President of the Government Legislation Centre (task 1)
Commercial entities recommended for implementation	• Transmission system operators (task 2)

Measure 2.34	**The transmission system operator announcing tenders for intervention capacities essential to ensuring safety of the power system operation**

Implementation instruments	1. Specification of the intervention capacity necessary until 2030 – 2010. 2. Specification of technical conditions required from intervention units as well as preferred locations of these units within the system – 2010. 3. Introducing regulations to allow participation of the President of the Energy Regulatory Office in the preparation of Terms of Reference and factual participation in tenders for intervention capacity – 2011. 4. Introducing incentives to maximise economic efficiency of intervention capacity purchase – 2011. 5. Including the costs resulting from intervention capacity purchase in revenues from regulated activities – 2011. 6. Announcing a tender for intervention capacity – 2010/2011.
Responsible bodies	• Minister competent for the economy (tasks 3 and 4) • President of the Energy Regulatory Office (tasks 3 and 5)
Commercial entities recommended for implementation	• Transmission system operator (tasks 1, 2, 5, and 6)

Measure 2.35	**Reconstruction and reinforcement of the existing power lines and building new ones, particularly those enabling cross-border electricity exchange with neighbouring countries**
Implementation method	1. Identification of new and replaced cross-border grid investment projects as well as analysis of possibilities to obtain support for their implementation, *inter alia* under the *Operational Programme Infrastructure and Environment* for the years 2007–2013 – 2009/2010. 2. Preparation of legal solutions enabling financing for this type of investment projects from funds other than TSO and DSO – 2011. 3. Devising development plans for new power lines and cross-border connections, taking into account the eastern direction and specification of plan elements which may be financed externally – 2010. 4. Supporting investments in power grid (including the Poland-Lithuania power connection) under the *Operational Programme Infrastructure and Environment* for the years 2007–2013 and regional operational programmes – on an ongoing basis. 5. Monitoring grid investment project implementation under Operational Programmes – on an ongoing basis until project completion. 6. Initiative consisting in establishing a new financial instrument of the European Union to support building cross-border connections with Poland's eastern neighbours – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, 4, and 5) • Minister competent for regional development (tasks 4 and 5) • Province authorities (tasks 4 and 5) • Office of the Committee for European Integration (task 6)
Commercial entities recommended	• Operators of transmission and distribution systems (tasks 2 and 3)

for implementation	

Measure 2.36	**Establishing methodology for calculating return on invested capital as an element of cost justified in transmission and distribution tariffs for investments in grid infrastructure**
Implementation method	Creating stable perspectives for investments in transmission and distribution infrastructure by way of the following: 1. Devising an algorithm of regulated activity in the area of transmission and distribution grid to be applied by power companies and the President of the Energy Regulatory Office – 2010. 2. Introducing incentives to maximise economic efficiency of grid-related operations – 2011. 3. Preparing legal solutions (Energy Law and tariff regulations) – 2011. 4. Implementation of new regulations – 2012. 5. Monitoring operation of the system – on an ongoing basis after implementation of the said solutions.
Responsible bodies	• Minister competent for the economy (tasks 1–3) • President of the Energy Regulatory Office (tasks 1,2, 4, and 5)

Measure 2.37	**Introducing amendments into the Energy Law consisting in defining the responsibility of local government bodies for drafting local supply assumptions for plans and plans for heat, electricity, and gas fuel supply**
Implementation method	1. Specifying the method of enforcing responsibility of local government bodies for the preparation and implementation of assumptions and plans for heat, electricity, and gas fuel supply (amendment of the Energy Law) – 2011. 2. Considering of implementation of changes in legislation to enable planning of heat, electricity, and gas fuel demand at the poviat or province level – 2011. 3. Implementation of regulations – 2012. 4. Considering and potential introduction of the obligation to reconcile spatial development plans by gminas with power utility suppliers – 2012.
Responsible bodies	• Minister competent for the economy (tasks 1–4) • President of the Government Legislation Centre (task 1) • Minister competent for construction, spatial and housing management (task 4)

Measure 2.38	**Transferring owner's supervision over the operator of electricity transmission system (PSE Operator S.A.) into the competence of the Minister of Economy**
Implementation instruments	1. Transferring owner's supervision over PSE Operator S.A. into the competence of the Minister of Economy – 2009/2010.
Responsible bodies	• Minister competent for the economy • Minister competent for the Treasury

Measure 2.39	**Retaining a majority stake in PGE Polska Grupa Energetyczna S.A. and a controlling stake in Tauron Polska Energia S.A. at the level which ensures retaining owner's supervision by the State Treasury**
Implementation method	1. Retaining owner's supervision of the State Treasury with a view to active supervision of investment policy and economic efficiency towards these entities.
Responsible bodies	• Minister competent for the Treasury • Minister competent for the economy

Measure 2.40	**Introducing a qualitative element into transmission and distribution tariffs to which transmission and distribution system operators would be entitled if they reduced failure frequency rates and maintained them at levels specified by the President of the Energy Regulatory Office for the given grid type**
Implementation method	1. Preparing a mechanism to stimulate retaining high reliability by introducing incentives for power grid operators to reduce failure frequency rates and retain them at levels specified by the President of the Energy Regulatory Office for the given grid type into tariffs – 2011. 2. Preparing amendments to regulations (Energy Law and executive regulations) – 2012.
Responsible bodies	• Minister competent for the economy (tasks 1 and 2) • President of the Government Legislation Centre (task 2) • President of the Energy Regulatory Office (task 1)

Measure 2.41	**Changing regulation mechanisms by introducing methods of heat price-fixing with the use of reference prices and incentives to optimise the heat supply cost**
Implementation method	1. Preparing new principles of regulating network heat prices by introducing a comparative method – 2010. 2. Gradual implementation of the new principles – from 2011.
Responsible bodies	• Minister competent for the economy (task 1) • President of the Energy Regulatory Office (tasks 1 and 2)

Measure 2.42	**Preferential treatment of combined generation as the technology recommended for building new generation capacity**
Implementation method	1. Including the use of local utility heat capacity in investment plans of companies with State ownership by building combined units – on an ongoing basis. 2. Retaining the system to support electricity generation in highly efficient cogeneration. 3. Using commitments in respect of preparing plans of supplying communes in heat, electricity, and gas fuels to replace exhausted unbundled heat sources with cogeneration units – on an ongoing basis.

	4. Plausibility analysis and potential supplementing of the system of issuing permits for new electricity or heat generation capacity with the obligation to submit a plausibility analysis of using highly efficient cogeneration – 2011. 5. Applying preferences for cogeneration units in tenders for new capacity announced by the President of the Energy Regulatory Office.
Responsible bodies	• Minister competent for the Treasury (task 1) • Minister competent for the economy (task 2) • Local government bodies (task 3) • Minister competent for construction (task 4) • President of the Energy Regulatory Office (task 5)

Priority III Diversification of the electricity generation structure by introducing nuclear energy

Measure 3.1	**Establishing an institutional basis for preparing and implementing the Polish nuclear power programme**
Implementation method	1. Establishing a legal framework for functioning of the institution preparing and implementing the Polish Nuclear Power Programme – 2010. 2. Establishing and organisation of the institution responsible for the Polish Nuclear Power Programme – 2011. 3. Providing the above institution with assets required to launch its activities – 2011. 4. Supplementing the personnel of the above institutions and providing funds necessary for their operation– 2011/2012 (the necessary funds of PLN 6,000,000 for 2011 and PLN 6,000,000 for 2012).
Responsible bodies	• Government Plenipotentiary for Polish nuclear power (task 1, 2, and 4) • Minister competent for the economy (tasks 1, 2, and 4) • Appointed owner's supervision body (task 3)

Measure 3.2	**Defining essential amendments to the legal framework for implementing the Polish nuclear power programme, preparing and coordinating implementation of the amendments**
Implementation method	1. Preparation of legal analyses comparing the existing legal systems as regards the use of nuclear energy to a peaceful purpose – 2009. 2. Preparing draft legal acts enabling the implementation of the Polish Nuclear Power Programme and earmarking budget funds for that purpose of PLN 100,000 for 2010 and PLN 65,000 for 2011 – 2009/2010. 3. Participation in the work of the Parliament on legal acts relating to nuclear power – 2010. 4. Coordinating the implementation of amendments to legal acts with respect to nuclear power – from 2010.
Responsible bodies	• Government Plenipotentiary for Polish nuclear power (tasks 1–4) • Minister competent for the economy (tasks 1–4) • President of the National Atomic Energy Agency (task 2)

Measure 3.3	**Preparing a draft of the Polish nuclear power programme to constitute the basis for public consultations; holding the consultations and submitting the Polish nuclear power programme for approval by the Council of Ministers**
Implementation method	1. Earmarking state budget funds of PLN 1,500,000 for 2010 for preparation and consultation on the draft Polish Nuclear Power Programme – 2009. 2. Preparing draft Polish Nuclear Power Programme taking into account, *inter alia*, the strategy for management of spent nuclear fuel and radioactive waste,

	including its financing – 2010. 3. Social consultations and strategic environmental impact analysis of the draft Polish Nuclear Power Programme – 2010. 4. Submission of the draft Polish Nuclear Power Programme to the Council of Ministers for approval – 2010.
Responsible bodies	• Minister competent for public finance (task 1) • Government Plenipotentiary for Polish nuclear power (tasks 1, 2–4) • Minister competent for the economy (tasks 1, 2–4)

Measure 3.4	**Preparing the National Atomic Energy Agency to execute nuclear and radiological supervision of the nuclear power sector**
Implementation method	1. Preparing the organisational structure, financing principles, and tasks of the National Atomic Energy Agency to execute nuclear and radiological supervision for the needs of the nuclear power sector – 2010/2011. 2. Completing the process of adapting the National Atomic Energy Agency – 2011. 3. Including the Central Laboratory for Radiological Protection in the structures of nuclear and radiological supervision and earmarking State budget funds for that purpose of PLN 3,600,000 for 2011 – 2010. 4. Supplementing the personnel of the above institution, providing funds necessary for its operation, and securing State budget funds for that purpose of PLN 450,000 for 2010 and PLN 600,000 for 2011 – 2010/2011.
Responsible bodies	• President of the National Atomic Energy Agency (task 1) • Government Plenipotentiary for Polish nuclear power (tasks 1–3) • Minister competent for the environment (tasks 1, 2, and 4) • Minister competent for the economy (task 3)

Measure 3.5	**Implementing the personnel training programme for institutions dealing with nuclear power**
Implementation method	1. Securing State budget funds of PLN 720,000 for 2009; PLN 10,080,000 for 2010; PLN 7,200,000 for 2011; and PLN 7,200,000 for 2012 for implementation of the personnel training programme – 2009–2011 r. 2. Analysing the financing methods of nuclear power sector personnel training programme under Operational Programmes (particularly Operational Programme "Human Capital") as well as plausibility of providing funds of PLN 31,680,000 for this purpose from European funds for the years 2010–2013 – 2009/2010. 3. Signing contracts with foreign institutions concerning co-operation in personnel training – 2009/2010. 4. Recruitment of candidates to be trained – from 2009. 5. Furthering knowledge of university teachers and personnel for institutions responsible for the Polish Nuclear Power Programme – from 2009.
Responsible bodies	• Government Plenipotentiary for Polish nuclear power (tasks 1, 3–5) • Minister competent for the economy (tasks 1, 3–5)

	• Minister competent for regional development (task 2) • Minister competent for tertiary education (tasks 4 and 5)

Measure 3.6	**Preparing and holding an informational and educational campaign on the Polish Nuclear Power Programme**
Implementation method	1. Preparing the guiding idea of the informational campaign – 2009. 2. Preparing informational materials and carrying out the campaign – from 2010 (PLN 10,000,000 for 2010; PLN 10,000,000 for 2011; PLN 10,000,000 for 2012). 3. Preparing educational materials (PLN 5,000,000) and their distribution in schools – 2010.
Responsible bodies	• Government Plenipotentiary for Polish nuclear power (tasks 1, 2, and 3) • Minister competent for the economy (tasks 1 and 2) • Minister competent for education (task 3)

Measure 3.7	**Location analyses for nuclear energy plants**
Implementation method	1. Earmarking State budget funds of PLN 30,000,000 for 2010; PLN 20,000,000 for 2011; and PLN 20,000,000 for 2012; and additionally funds provided by the National Fund for Environmental Protection and Water Management for location analysis and studies for nuclear power plants – 2009–2011. 2. Analysis of the existing information on the locations of nuclear power plants investigated into heretofore and the proposed new locations – 2009/2010. 3. Selection of locations complying with legal conditions for the construction of a nuclear power plant – 2010. 4. Carrying out studies and analyses of the selected locations of a nuclear power plant – from 2010.
Responsible bodies	• Minister competent for the environment (task 1) • National Fund for Environmental Protection and Water Management (task 1 – the part concerning geological surveys) • Government Plenipotentiary for Polish nuclear power (tasks 1, 2–4) • Minister competent for the economy (tasks 1, 2–4)
Commercial entities recommended for implementation	• Investors selected to build nuclear power plants (task 4)

Measure 3.8	**Location analyses for the radioactive cemetery, its design and construction preparations**

Implementation method	1. Earmarking State budget funds of PLN 8,000,000 for 2010; PLN 8,000,000 for 2011; and PLN 10,000,000 for 2012 and additionally funds provided by the National Fund for Environmental Protection and Water Management for location analyses and studies for the radioactive cemetery and for social consultations in this respect – 2009–2011. 2. Review of locations of the radioactive cemetery examined so far for – 2009. 3. Carrying out studies and selection of the site of the radioactive cemetery and holding social consultations for the location – 2010–2012. 4. Preparing infrastructure for the construction of the radioactive cemetery as well as preparing the radioactive cemetery design – 2012.
Responsible bodies	• Minister competent for the environment (task 1) • National Fund for Environmental Protection and Water Management (task 1) • Government Plenipotentiary for Polish nuclear power (tasks 1, 2–4) • Minister competent for the economy (tasks 1, 2–4) • Polish Geological Institute (tasks 2 and 3)

Measure 3.9	**Building research and development capacity and supporting work on new reactor technologies and nuclear-coal synergy. Preparing the programme of Poland's participation in all phases of the fuel cycle**
Implementation method	1. Earmarking State budget funds of up to PLN 5,000,000 for 2009; up to PLN 10,000,000 for 2010; up to PLN 15,000,000 for 2011; and up to PLN 20,000,000 for 2012 for maintenance of the technical infrastructure of the scientific and research capacity – 2009–2011. 2. Analysing plausibility of financing research and development in the area of nuclear power from European funds and plausibility of earmarking PLN 40,000,000 per year for that purpose from European funds – 2009/2010. 3. Establishing a grant system for financing analyses and calculations carried out within the scientific and research capacity – 2010. 4. Establishing the National Nuclear Research Laboratory for the use of nuclear energy to a peaceful purpose – 2010.
Responsible bodies	• Government Plenipotentiary for Polish nuclear power (tasks 1, 3, and 4) • Minister competent for the economy (tasks 1, 3, and 4) • Minister competent for regional development (task 2) • Minister competent for science (tasks 3 and 4)

Measure 3.10	**Preparing Polish industry's participation in the nuclear energy production programme**
Implementation method	1. Running an informational campaign concerning the requirements for the production of nuclear power machinery as well as gathering information from companies adapted to participation in the nuclear energy production programme – from 2010.
Responsible bodies	• Polish Agency for Enterprise Development (PARP) • Government Plenipotentiary for Polish nuclear power

	• Minister competent for the economy

Measure 3.11	**Preparing plans of adapting the transmission grid to nuclear power plants**
Implementation method	1. Analysing and selecting optimal locations of the nuclear power plant taking into account the existing configuration of the power grid – 2009. 2. Analysing the impact of the selected locations of the nuclear power plant on the transmission grid with a view to selecting locations optimal from the point of view of transmission grid operation security – 2009/2010. 3. Preparing transmission grid development plans required to connect the nuclear power plants in selected locations – 2011/2012.
Commercial entities recommended for implementation	• Transmission system operator (tasks 1–3)

Measure 3.12	**Prospecting uranium deposits in the territory of Poland**
Implementation method	1. Earmarking State budget funds of PLN 2,000,000 for 2010; PLN 2,000,000 for 2011; and PLN 2,000,000 for 2012; and additionally funds provided by the National Fund for Environmental Protection and Water Management for geological research – 2009–2011. 2. Review of the existing data on uranium deposits in Poland – 2009. 3. Devising methodology of surveying uranium deposits in Poland – 2010. 4. Surveying the geological structure of Poland for presence of uranium deposits – 2010–2012.
Responsible bodies	• Government Plenipotentiary for Polish nuclear power (task 1) • Minister competent for the economy (task 1) • Minister competent for the environment (tasks 1–4)

Priority IV Development of the use of renewable energy sources, including biofuels

Measure 4.1	**Devising a path to reach a 15% share of renewable energy sources in the sustainable use of final energy, broken down into individual energy types, namely: electricity, heat, cold and renewable energy in transport**
Implementation method	1. Preparing the action plan necessary to implement the Directive 2009/28/EC on the promotion of the use of energy from renewable sources[2] – 2009. 2. Consideration of plausibility and potential implementation of solutions aimed at awarding public objective status to investment projects in the area of renewable energy sources – 2010. 3. Drafting the *Action Plan for the increase in the use of renewable energy sources until 2020* presenting development paths to achieve a 15% share of renewable energy sources in final energy consumption, broken down into individual energy types: electricity, heat and cold, and renewable energy in transport – 2010. 4. Analysis of necessary changes in regulations essential to implementing the Directive on the promotion of the use of energy from renewable sources – 2010. 5. Transposition of the Directive on the promotion of the use of energy from renewable sources into Polish law – 2010.
Responsible body	• Minister competent for the economy (tasks 1–5)

Measure 4.2	**Retaining support mechanisms for producers of electricity from renewable sources, e.g. by means of a system of certificates of origin**
Implementation method	1. Monitoring the operation of the support mechanism in the form of certificates of origin as regards its applicability for achieving the objectives and its potential improvement – from 2010. 2. Cost efficiency analysis of the support mechanism, with particular consideration of the substitution fee formula due to gradual increase in prices of energy from fossil fuels, ensuring stability of the mechanism at the same time – 2010. 3. Implementation of potential changes – 2012.
Responsible body	• Minister competent for the economy (tasks 1–3)

Measure 4.3	**Retaining the obligation to gradually increase the share of bio-components in transport fuels so as to meet the planned objectives**

[2] Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC (OJ L 140, 5.6.2009, p. 16–62).

Implementation method	1. Amending regulations on bio-components and liquid biofuels, in particular as regards: o Increasing the share of bio-components in liquid fuels (petrol and diesel); o Changes to the calculation method of attaining the National Indicator Target; o Enabling the transfer of surplus in the area of compliance with the National Indicator Target between entities committed to meeting it; o Enabling achievement of the National Indicator Target by applying new technologies in the production of liquid biofuels and covering these fuels with tax reliefs and exemptions (e.g. excise tax reliefs). Task implementation deadline – 2010. 2. Adjustment of quality requirements for bio-components and liquid biofuels to the new norms in order to allow marketing of new kinds of liquid biofuels – on an ongoing basis. 3. Analysis of validity of maintaining the existing tax-based support instruments in the light of completion of the notified public aid programme on 30 April 2011 – 2010. 4. Analysis of compliance of liquid biofuels and bio-components produced by the existing installations with the criteria of sustainability featured in the Directive on the promotion of the use of energy from renewable sources in terms of introducing technological changes or their replacement with new ones that meet the criteria – 2012.
Responsible bodies	• Minister competent for the economy (tasks 1–4) • Minister competent for public finance (task 1)

Measure 4.4	**Introducing additional support instruments encouraging more extensive production of heat and cold from renewable energy sources**
Implementation method	1. Introducing the system to support the use of heat and cold from geothermal resources (including the use of heat pumps) and solar energy (with the use of solar collectors) – 2010. 2. Plausibility analysis of implementation of additional support mechanisms for district heat and cold energy generated from renewable energy sources – 2010. 3. Potential preparation of a draft regulation on supporting district heat and cold energy production from renewable energy sources – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1–3) • Minister competent for public finance (task 1 – co-operation)

Measure 4.5	**Implementing the directions of building agricultural biogas plants, on the assumption that at least one biogas plant is set up in each commune by 2020**

Implementation method	1. Adoption of the document entitled “Development directions agricultural biogas plants in Poland" by the Council of Ministers – 2009. 2. Lifting barriers to agricultural biogas plants as identified in the Programme – from 2009. 3. Drafting a guide for investors willing to build agricultural biogas plants, including, *inter alia*, sample biogas plat designs – 2010. 4. Conducting an informational campaign to provide comprehensive and reliable information on advantages of construction of biogas plants, in co-operation with local authorities – 2010. 5. Monitoring programme implementation – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1–5) • Minister competent for agriculture (task 2) • Minister competent for the environment (task 2) • Minister competent for education (task 2) • Minister competent for public finance (task 2 – co-operation) • Minister competent for regional development (task 2) • Local government bodies (task 4)

Measure 4.6	**Creating conditions to facilitate making investment decisions on building off-shore wind farms**
Implementation method	1. Identification of legal barriers preventing or hindering the construction of off-shore wind farms – 2010. 2. Preparing draft amendments to regulations aimed at lifting the identified barriers, in particular amendments to the Act on marine areas of the Republic of Poland and maritime administration – 2010. 3. Making a decision on Poland’s participation in the construction of the international off-shore energy cable line (“Supergrid”) of key importance to the development of off-shore wind farms – 2010. 4. Selecting potential sites of wind farms in marine areas of the Republic of Poland – 2010.
Responsible bodies	• Minister competent for the economy (tasks 1–3) • Minister competent for maritime economy (tasks 2 and 4) • President of the Government Legislation Centre (task 2) • Field maritime administration bodies (task 4)

Measure 4.7	**Direct support to building new renewable energy generation units and power grids that could be connected with the use of European funds and environmental protection funds, including funds gathered in the form of the substitute fee and fines**
Implementation methods	1. Providing assistance for the construction of new renewable energy generation units, including those which produce bio-components and liquid biofuels as well as infrastructure necessary for their connections from public funds, *inter alia* under: o *Operational Programme Infrastructure and Environment* for the years 2007–2013;

	o Regional Operational Programmes for the years 2007–2013; o National Fund for Environmental Protection and Water Management (NFOŚiGW) programmes for projects in the area of renewable energy sources, high efficiency co-generation units, and biofuels. The task is being implemented on an ongoing basis. 2. Analysing procedures in terms of implementing potential solutions facilitating the access to domestic and foreign aid funds through the elimination of excessively stringent requirements and restrictions – 2010. 3. Devising subsequent priority programmes financed with the substitution fee and fines and arranging it with the Minister of Economy – 2010.
Responsible body	• Minister competent for the economy (tasks 1 and 2) • Minister competent for the environment (tasks 1 and 3) • Minister competent for regional development (task 1) • Province authorities (task 1) • National Fund for Environmental Protection and Water Management (tasks 1, 2, and 3)

Measure 4.8	**Stimulating the development of the Polish industry's which manufactures machinery for the renewable energy sector, also with the use of European funds**
Implementation method	1. Analysing the possibilities to develop production of machinery for renewable energy sector in Poland both for domestic purposes and for export – 2010. 2. Exploration of possibilities and creating conditions for investments in renewable energy sources abroad by Polish companies, in particular in developing countries – 2010. 3. Supporting the production of machinery for the renewable energy sector from the funds provided by *Operational Programme Infrastructure and Environment* for the years 2007–2013 and Regional Operational Programmes – from 2009. 4. Analysing the possibilities to introduce a support system for enterprises pursuing new investment projects in production of machinery for renewable energy production and introducing potential amendments to Polish legislation – 2012. 5. Supporting research into new technologies used to produce fuels and energy from renewable sources, taking into account technologies ensuring stability of power supply into the power system, including implementation of tasks stemming from the strategic research and development programme "Advanced Technologies for Energy Generation" by the National Centre for Research and Development (NCBiR) – on an ongoing basis.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, 3, and 4) • Minister competent for regional development (task 3) • Province authorities (task 3) • Minister competent for public finance (task 4 – co-operation) • Minister competent for science (task 5)

Measure 4.9	**Supporting the development of technologies and building installations to obtain renewable energy from waste comprised of biodegradable materials**

Implementation method	1. Issuing a regulation on detailed technical conditions for qualifying a portion of energy regained from heat treatment of municipal waste as renewable energy – 2010.
Responsible bodies	• Minister competent for the environment (task 1) • Minister competent for the economy (task 1)

Measure 4.10	**Evaluation of plausibility of using the existing damming structures owned by the State Treasury to generate power by way of taking their inventory, establishing their framework environmental impact, and devising the rules of making them available**
Implementation method	1. Taking inventory of damming structures owned by the State Treasury according to criteria devised by the Minister competent for water economy in co-operation with the Minister responsible for the environment and the Minister in charge of rural development – 2011. 2. Analysis of the compensated environmental impact of water power plants (evaluation of existing hydrotechnical facilities, existing and planned nature conservation forms, the condition of the fish population) – 2011. 3. Selecting the existing damming structures owned by the Treasury which – due to the interests of the Treasury and justified interests of water users – may be used for power generation purposes by entities exercising water ownership – 2012. 4. Devising the rules of making the existing damming structures owned by the Treasury available for power generation purposes to entities other than those exercising water ownership – 2012.
Responsible bodies	• Minister competent for water economy (tasks 1–4) • Minister competent for the environment (tasks 2 and 4) • Minister competent for rural development (task 3) • Minister competent for the Treasury (task 3)

Priority V Development of competitive fuel and energy markets

Measure 5.1	**Implementing a new model of the electricity market which consists, *inter alia*, in introducing the intra-day market, the power reserve market, transmission rights market, and generation capacity market, as well as introducing a mechanism to manage system services and system constrained generation**
Implementation method	1. Devising a national system of grid charges by the transmission system operator to replace the system based on average prices (copperplate model) – 2010. 2. Making a decision by the Council of Ministers regarding introduction of the model and adopting a programme of gradual implementation of the system together with a set of protective measures to benefit the groups and areas affected by the negative effects of adopted solutions – 2010. 3. Devising the assumptions of the IT system to exchange information essential to implement the solutions – 2010. 4. Introducing changes to the electricity (commodity) and power reserves pricing system leading to introduction of marginal prices and alternative costs – 2010. 5. Devising, by the transmission system operator, of the legal and organisational concept enabling universal implementation of solutions for the electricity wholesale market, including implementation of the intra-day market allowing market participants to significantly adjust contract periods and timetable preparation to their actual completion date, implementation of the power reserves, transmission rights, and generation capacity markets, as well as introducing a mechanism to manage systemic services and system constrained generation – 2010.
Responsible bodies	• Minister competent for the economy (tasks 2 and 4) • President of the Energy Regulatory Office (tasks 2 and 3)
Commercial entities recommended for implementation	• Transmission system operator (tasks 1, 3, and 5)

Measure 5.2	**Facilitating switching between power sellers, *inter alia* through introducing national standards for technical features of electronic electricity meters, as well as their installation and reading**
Implementation method	1. Devising the catalogue of prohibited contractual clauses for contracts concluded with household customers – 2010. 2. Devising good practice with respect to sales and contracts (e.g. a friendly seller) – 2010. 3. Devising a standard contract between the distribution system operator and the seller as well as amending the Energy Law in this respect – 2011. 4. Popularisation of the use of electronic electricity meters, including introduction of Polish national standards of meter technical features, their installation and

	reading – 2012. 5. Introduction of the obligation to apply the so-called "tariff calculator" by electricity sellers which enables electricity users to compare trade offers of various sellers – 2011. 6. Introduction of the principle that the grid operator is the owner of meters provided to users – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1, 3, 5, and 6) • President of the Energy Regulatory Office (tasks 1, 2 and 4)
Commercial entities recommended for implementation	• Electricity sellers and operators of transmission systems (tasks 2 and 4)

Measure 5.3	**Creating conditions allowing to fix electricity reference prices on the market**
Implementation method	1. Introduction of the obligation to make a part of the electricity trading publicly available – 2010. 2. Monitoring the implementation of the obligation – on an ongoing basis. 3. Change in the operating principles of the electricity trading platforms to enhance the appeal of the market to electricity buyers and sellers – from 2010.
Responsible bodies	• Minister competent for the economy (task 1) • President of the Energy Regulatory Office (task 2)
Commercial entities recommended for implementation	• Entities managing trading platforms (task 3)

Measure 5.4	**Optimising the conditions of pursuing a business in Poland by energy-intensive customers in order to prevent their products sold in international markets from losing competitive appeal**
Implementation method	1. Preparing amendments to regulations in order to prevent deterioration of competitiveness of energy-intensive customers, e.g. by reducing other cost factors, in particular relating to energy costs – 2010.
Responsible bodies	• Minister competent for the economy (task 1) • Minister competent for public finance (task 1)

Measure 5.5	**Protecting the poorest electricity customers from the effects of electricity price increase**

Implementation method	1. Devising and introducing an appropriate solution in the framework of the national social assistance system concerning protection of the poorest electricity customers among households – 2010. 2. Preparing and introducing an additional solution which consists in providing assistance to the poorest electricity customer groups by power companies under the assistance programs they devise (the so-called Corporate Social Responsibility (CSR) principle) in the electricity sector in the conditions of the competitive electricity market – 2010.
Responsible body	• Minister competent for social security (task 1) • Minister competent for the economy (tasks 1 and 2)

Measure 5.6	**Changing competition-supporting regulation mechanisms of the gas market and introducing arm's length methods of gas price-fixing**
Implementation method	1. Devising and introducing regulations aimed at abandoning tariffs of trading, including introduction of the following: o Rules of efficient access to gas infrastructure; o The entry-exit model; o The idea of a virtual gas sales point; o Market model which allows isolating physical flows from trade flows; o Market balancing rules; o Market model which allows effective switching between sellers. Task implementation deadline – 2010. 2. Devising a regulation model for the sector targeted gradual abandoning of tariffs on trade (including adjusting of the regulation model to conditions set forth in task 1) – 2010. 3. Devising a roadmap to achieve a competitive gas market that would set forth a package of measures to lift market barriers and ensure actual development of the gas market, taking the following issues into account: o Infrastructural conditions of competition development, including extension and modernisation of the transmission and distribution grid and the storage infrastructure taking into account the TPA principle; o Ensuring access to gas infrastructure; o Devising assumptions for regulations to allow implementing the competition principles; o Implementing the rules on switching between sellers; o Extending access to gas sources for entities operating on the market. Task implementation deadline – 2010. 4. Implementation of the roadmap – from 2010.
Responsible bodies	• Minister competent for the economy (tasks 1 and 4) • President of the Energy Regulatory Office (tasks 1–4) • Minister competent for the Treasury (task 4) • Minister competent for the environment (task 4)
Commercial entities recommended	• Operators of gas systems (task 4)

for implementation	

Priority VI Mitigating the environmental impact of the power industry

Measure 6.1	**Establishing a system to manage national emission caps of greenhouse gases and other substances**
Implementation method	1. Establishing operating rules and introducing a national system to finance green investments in Poland, under which funds obtained from selling emission units allocated under the Kyoto Protocol in the years 2009–2012 will be used to co-finance implementation of programmes or projects connected with environmental protection, in particular with reducing or avoiding national emission of greenhouse gases – 2009. 2. Devising a national programme to reduce emissions with a view to meeting obligations imposed on Poland in case the country exceeds or is about to exceed the national emission cap. 3. Devising an assessment of Poland's capacity to reduce greenhouse gas emissions – 2010. 4. Operation of the system managing emissions of greenhouse gas and other substances, execution of tasks assigned to the National Centre for Emissions Balancing and Management (KOBIZE) and tasks concerning monitoring the emission volume of substances covered by the system – on an ongoing basis.
Responsible bodies	• Minister competent for the environment (tasks 1, 2, and 4) • Minister competent for the economy (task 3) • National Fund for Environmental Protection and Water Management (task 4)

Measure 6.2	**Introduction of acceptable product emission rates for electricity and heat generation as a tool which allows reducing SO_2 and NO_x emission levels and reaching the emissions cap set forth for Poland in the Accession Treaty**
Implementation method	1. Preparing a draft Act on the system of balancing and settlement of sulphur dioxide and nitrogen oxide emission volumes for large incineration sources – 2010. 2. Devising the scope of measures connected with the implementation of the new IED/IPPC Directive (on industrial emissions) – 2012.
Responsible bodies	• Minister competent for the environment (tasks 1 and 2) • President of the Government Legislation Centre (task 1) • Minister competent for the economy (task 2)

Measure 6.3	**Meeting the commitments for the power and heat sectors stemming from the new ETS Directive**

Implementation method	1. Devising a list of installations generating electricity (existing ones and those physically started prior to the end of 2008) eligible to granting a transition period and consulting the list with the European Commission – 2009–2011. 2. Devising a path to reducing CO_2 emission for installations subject to a transition period as to the commitment to purchase all allowances to emit CO_2 in auctions – 2010. 3. Drawing up standards to allow implementing the above path based on the multi-fuel index method or emission volumes of installations covered by the ETS system in the years 2005–2007 – 2010. 4. Devising a national investment plan to allow reducing CO_2 emission volumes, taking into account modernisation and supplementing of the power infrastructure, development of clean coal technologies, diversification of the fuel structure and fuel supply sources – 2010. 5. Drawing up an application to the European Commission for granting free allowances that would include the methodology of allocating allowances to emit greenhouse gases to electricity producers for the years 2013–2019 – 2010. 6. Drawing up a list of heat installations and high-efficiency cogeneration installations, in relation to generating heat and cold, which could be granted free allowances based on indices set forth by way of commitology – 2010. 7. Considering the possibility and taking steps aimed at amending the new ETS Directive towards full consideration of the specific character of coal-based economies – 2012.
Responsible bodies	• Minister competent for the economy (tasks 1–7) • Minister competent for the environment (task 7) • Office of the Committee for European Integration (task 7)

Measure 6.4	**Using the income from auctions of CO_2 emission allowances to support measures aimed at reducing greenhouse gas emission volumes**
Implementation method	1. Devising a system and principles for the use of proceeds from CO_2 emission allowance auctions – 2010. 2. Setting priorities as to the use of proceeds from CO_2 emission allowance auctions, including support granted for: o Improving coal gasification technologies; o Developing the use of renewable energy sources; o Building new high-efficiency cogeneration units committed to purchase 100% of CO_2 emission allowances from 2013; o Building CCS installations and conducting research in the area; o Research and development on fuel cells of the next generation and hydrogen economy. Task implementation period – 2010.
Responsible bodies	• Minister competent for the economy (tasks 1 and 2) • Minister competent for public finance (task 1) • Minister competent for the environment (tasks 1 and 2) • Minister competent for science (task 2)

Measure 6.5	**Introducing standards for building new power plants under the system of preparation for carbon capture and setting national capacity for geological CO_2 storage**
Implementation method	1. Participation in the work on the part of the European Commission on devising the standards for the construction of new power plants under the system of preparation for the carbon capture – from 2009. 2. Implementation of the Directive on the geological storage of carbon dioxide[3] into the Polish legislation – 2011. 3. Conducting an information campaign targeted at the society on the most significant aspects of the CCS technology – until 2012. 4. Implementation of the *Programme for recognition of formations and structures for safe geological CO_2 storage and their monitoring* – 2009–2012. 5. Drawing up and adopting a report presenting information obtained during programme implementation – 2012.
Responsible bodies	• Minister competent for the economy (tasks 1 and 3) • Minister competent for the environment (tasks 2–5)

Measure 6.6	**Active participation in implementing the initiative of the European Commission to build large-scale demonstration facilities for carbon capture and storage (CCS) technologies**
Implementation method	1. Undertaking comprehensive activities on the EU forum aimed at including two Polish CCS installations in the European Commission list of demonstration projects co-financed from the reserve pool of allowances for new ETS system installations – 2009/2010. 2. Determining support instruments for Polish CCS projects – 2009–2010. 3. Consideration of and making the decision to finance development of CCS technologies under the *Operational Programme Infrastructure and Environment* – 2009–2010. 4. Commencement of implementation of two projects – 2009–2010. 5. Preparing the national flagship programme on the development of clean coal technologies, including CCS – 2010.
Responsible bodies	• Minister competent for the economy (tasks 1, 2, 3, and 5) • Minister competent for regional development (task 3)
Commercial entities recommended for implementation	• Power companies (task 4)

Measure 6.7	**Applying CCS technologies to support crude oil and natural gas extraction**

[3] Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the geological storage of carbon dioxide and amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006 (OJ L 140, 5.6.2009, p. 114–135).

Implementation method	1. Devising a programme indicating, *inter alia*, potential sites of application of CCS technologies to support crude oil and natural gas extraction, including an implementation schedule – 2010. 2. Consideration and potential inclusion of work on methods to support crude oil and natural gas extraction using CO_2 in the National Research Programme – 2009–2010.
Responsible bodies	• Minister competent for the environment (task 1) • Minister competent for the economy (task 1) • Minister competent for the Treasury (task 1) • Minister competent for science (task 2)
Commercial entities recommended for implementation	• Fuel sector companies (task 1)

Measure 6.8	**Intensifying research and development on the CCS technology and on new technologies which allow using captured CO_2 as a raw material by other industry branches**
Implementation method	1. Securing funds of at least PLN 100 million for the years 2010–2012 for co-financing of research and development in this field. 2. Establishing a co-operation platform between science and business within the National Research and Development Centre – on an ongoing basis. 3. Announcing competitions for projects eligible to support – 2009.
Responsible bodies	• Minister competent for science (task 1) • National Research and Development Centre (Polish abbreviation: NCBiR) (tasks 2 and 3)

Measure 6.9	**Industrial use of waste coal**
Implementation method	1. Introduction of measures to reduce waste generated during coal extraction in mining companies – 2010. 2. Making waste generated during coal extraction and stored on the surface available to all interested entities – on an ongoing basis. 3. Analysis and potential introduction of financing mechanisms to encourage companies to start using waste coal for industrial purposes – 2011.
Responsible bodies	• Minister competent for the economy (tasks 1 and 3)
Commercial entities recommended for implementation	• Coal companies (tasks 1 and 2)

Measure 6.10	**Increasing the use of incineration by-products**

Implementation method	1. Implementation of the Directive on waste[4], particularly the provisions supporting industrial use of incineration by-products – 2010. 2. Consideration and potential inclusion of work on technologies of post-generation waste, particularly high-calcium waste, processing in the National Research Programme – 2011.
Responsible bodies	• Minister competent for the environment (task 1) • Minister competent for science (task 2)

Measure 6.11	**Using high-efficiency closed cooling cycles in power plants and in heat and power stations**
Implementation method	1. Devising a financial system encouraging power generation companies to use water-saving technologies – 2011. 2. Amending regulations in force in respect of financial and legal measures provided for in the *Environmental protection law* – 2011.
Responsible bodies	• Minister competent for water economy (task 1) • Minister competent for the environment (tasks 1 and 2)

Measure 6.12	**Diagnosing the possibility of unintended production of persistent organic pollutants (dioxins and furans) by the power sector**
Implementation method	1. Establishing the impact of inorganic salts of chloride (KCl, NaCl, $CaCl_2$) contained in hard coal on the volume of dioxin and furan emissions in Poland (PCDD/F) – 2011. 2. Taking steps aimed at reducing production of the above pollutants by the power sector in case a considerable impact of the sector on their production in Poland is discovered – 2012.
Responsible body	• Minister competent for the environment (tasks 1 and 2)

Measure 6.13	**Supporting measures in respect of environmental protection with the use of, *inter alia*, European funds**
Implementation method	1. Supporting projects reducing the volume of pollutants produced by the power sector under the *Operational Programme Infrastructure and Environment* for the years 2007–2013 and regional operational programmes – on an ongoing basis. 2. Supporting projects with respect to environmental protection from environmental protection and water management funds, in particular by way of the following: o Programme for projects aimed at reducing emissions of volatile organic compounds; o Programme for projects aimed at reducing emissions from combustion of fuels for energy purposes.

[4] Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste and repealing certain Directives (OJ L 312, 22.11.2008, p. 3–30).

	The above task is being implemented on an ongoing basis. 3. Supporting projects aimed at reducing emissions from the National Climate Fund – from 2011. 4. Establishing a long term programme to reduce emissions from combustion in the residential sector aimed at reducing demand for heat used for heating purposes, replacing solid fuels with environmentally-friendly fuels, and using renewable energy sources to meet the needs of households – 2011.
Responsible bodies	• Minister competent for the environment (tasks 1–4) • Province authorities (task 1)

Ministry of Economy

CONCLUSIONS FROM THE STRATEGIC ENVIRONMENTAL IMPACT ASSESSMENT OF ENERGY POLICY

Appendix 4

to draft "Energy Policy of Poland until 2030"

Warsaw, 10 November 2009

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1. Legal basis and social consultations

The obligation to carry out strategic environmental impact assessment of the draft Energy Policy results from the Act of 3 October 2008 on the dissemination of information on environment and its protection, on participation of the society in environmental protection, and on environmental impact assessment. To this end, an *Environmental Impact Assessment of the Draft Energy Policy of Poland until 2030* (hereinafter referred to as the *Assessment*) has been prepared. The *Assessment* has been drawn up on the request of the Ministry of Economy by Proeko CDM Sp. z o.o. (hereinafter referred to as the Consultant). Full text of the *Assessment*, due to its size, has not been attached to the draft Energy Policy. It is available on the website of the Ministry of Economy.

The *Assessment*, along with the draft *Energy Policy of Poland until 2030*, was subject to social consultations which were held between 29 April and 3 June 2009. The consultations were also carried out according to the procedure provided for in the Act of 6 December 2006 on principles of conducting the development policy (Dz.U. [Journal of Laws] of 2006 No 22, item 1658, as amended). The procedure of social consultations was open – each interested person or entity could present their position.

Table 1. The course of strategic environmental impact assessment of the draft Energy Policy of Poland until 2030.

Task	Implementation status
Agree the scope of *Assessment* with the Minister of the Environment and the Chief Sanitary Inspector	Agreed in 2008
Ensure that *Environmental Impact Assessment* is devised of implementing the analysed *Energy Policy* provisions, whose scope complies with relevant legal regulations	Public procurement proceedings have been carried out; an agreement with the selected Consultant has been signed
Announce the information on initiating proceedings for the strategic environmental impact assessment	Published on 29 April 2009, time for submitting reservations – 22 days
Present the draft *Assessment* to the public and organise the process of public consultations, at least 21 days long, under which proposals are received, as well as remarks, reservations and opinions of the consultations participants	The consultations were carried out in May and June 2009
Present the draft *Assessment* for opinion to the General Director for Environment Protection and to the Chief Sanitary Inspector	The *Assessment* was submitted for opinion when the consultations started
Examine (adopt or reject and provide relevant justifications) the proposals, reservations and opinions received in the course of social consultations	Proposals, reservations and opinions have been examined; the analysis of remarks have been attached to the complete report containing the Environmental Impact Assessment, and it has been published on the website of the Ministry of Economy

Task	Implementation status
Prepare a final version of the *Assessment*, taking account of the opinions received from the competent authorities indicated above, and of social consultations results	Completed in June 2009, after remarks, opinions and reviews have been gathered and analysed
Examine the recommendations contained in the *Assessment*, as well as resulting from the social consultation process, and take them into account in the process of verification and adoption of *Energy Policy* content	According to the Council of Ministers work schedule

Representatives of local government, ecology organizations, economic chambers and associations, scientific circles, trade unions and employers' associations, energy enterprises, as well as individuals participated in social consultations. They submitted over 1,100 detailed remarks to the draft energy policy and its attachments. Due to diversified profile and different interests of those groups, the remarks were often contradictory or mutually exclusive. Therefore, the process of incorporating the remarks in the draft document required many decisions, often of strategic importance.

In line with Article 55(3) of the Act on the dissemination of information on environment, this Appendix is a summary justifying the selection of the option of energy policy implementation in the context of alternative solutions. It also provides information on the manner and scope the following were taken account of:

- Arrangements provided in the Environmental Impact Assessment,
- Opinions of the General Director for Environment Protection and the Chief Sanitary Inspector,
- Submitted remarks and proposals,
- Suggestions on the methods and frequency of monitoring the effects of implementation the document's provisions..

2. Justification of the selected option of energy policy implementation in the context of alternative solutions

The analysis of the draft *Energy Policy*, including a comparison of the Policy provisions with proposals of alternative energy strategies, and taking account of the demands put forward during the consultations, did not allow to identify any quickly applicable alternatives for the desired trends in the energy sector changes to be implemented and stimulated, as outlined in the *Policy*.

In the light of information collected while working on the *Assessment* it has not been unanimously determined whether possible implementation of future investments, currently only outlined within individual priority measures, would be the source of impact that could threaten cohesion of protected areas or lead to destruction of priority habitats. It is, therefore, necessary to confirm the information by detailed analyses at the stage of strategic assessment and impact assessment of the planned actions, only after the investment plans have been specified.

In the Consultant's opinion, the projection of demand for fuels and energy, attached to the draft *Policy*, best reflects the trends of probable changes, ensuring at the same time that diversified energy mix will be created, making use of various available sources and resources of energy carriers. Such scenario makes it also possible at least to maintain the present energy security level due to diversified energy sources and diversified energy carriers supply, and to mitigate the environmental impact, in particular as a result of considerably reducing the use of coal and developing emission-free or low-emission energy sources.

3. Application of findings contained in the Environmental Impact Assessment

Taking into account the framework and strategic character of the document, the *Environmental Impact Assessment* formulates recommendations focussed on reinforcing the possibilities to implement the objectives included in the document under analysis. Assuming that the set of measures proposed in the draft *Policy* contributes in general to the reduction of environmental pressure, it has been emphasised that the specified objectives are feasible, and some potential is still available. It has been emphasised that:

1. Activities related to energy efficiency should be carried out in an equally intensive manner in two complementary areas: the fastest possible improvement of primary energy efficiency (by increasing efficiency of generation equipment and preferences for co-generation processes) and the reduction in demand for final energy, in particular in service, household, and transport sectors (*inter alia* by replacing equipment and vehicles with those which consume less energy, thermo-modernisation, passive construction, lighting rationalisation).
2. Instruments adopted to implement the *Energy Policy*, including environmental and energy standards, as well as flexible mechanisms for balancing most important emission sources (CO_2, SO_2, NO_x), should be adjusted to the issues related to the improvement of energy efficiency, which will ensure preferences for the use of installations with highest energy efficiency.
3. The development of nuclear energy, as compared to the EU average, may be the ultimately effective method to ensure balancing and significant reduction in demand for non-renewable energy carriers. However, these matters are socially controversial and a wide, national debate on the issue must be carried out and also the conditions for the development of this part of the energy sector should be determined sooner, which is crucial to developing and modernising other energy subsectors.
4. The *Assessment* shows that the share of the renewable energy sources in total demand for final energy supply at 20-30% is realistic, which would give the renewable energy sub-sector a share comparable with other energy sources. This would also support creation of new jobs and would be a significant step forward to “balance” the Polish energy and would ensure long-term energy security, enabling significant reduction in the use of non-renewable fossil fuels. However, in order to achieve this level of satisfying the domestic energy demand, it is necessary to limit the increase in the demand for final energy, in particular for electricity, and ensure maximum use of the potential offered by the renewable energy sector.

Recommendations resulting from the *Assessment* were taken into account in the final version of the draft *Energy Policy*. The only exception was the last recommendation concerning more ambitious objectives for renewable energy sources. The Minister of Economy concluded that

in the present economic circumstances, especially in the times of increasing energy prices and economic slowdown, there is no justification for setting the proposed objective for the renewable energy resources development. The objective formulated in the *Energy Policy* does not limit the development of these resources to the assumed level, it only determines their minimum acceptable share in the final energy use at 15% in 2020, according to our commitments to the EU.

4. Opinions of the General Director for Environment Protection and the Chief Sanitary Inspector

Opinions of the General Director for Environment Protection and the Chief Sanitary Inspector on the draft *Energy Policy of Poland until 2030* and the *Environmental Impact Assessment* have been taken into account in these documents.

The opinion of the Chief Sanitary Inspector concerned the inclusion of health protection measures resulting from the *Assessment* into the *Energy Policy.* These measures have been provided for in Appendix 3 under priority VI *Mitigating the environmental impact of the power industry.*

In accordance with the remarks of the General Director for Environment Protection, provisions on the need to carry out a strategic assessment of environmental impact of the planned nuclear energy development programme have been included in the *Energy Policy*. The Director has also pointed out the provisions of Measure 2.2, which have been clarified in line with the current legal status. The remarks to the *Assessment* have been taken into account.

5. Reservations and proposals submitted following social consultations

All the reservations as to the *Energy Policy* and to the *Assessment* have been examined and partly incorporated in these documents. The most important amendments resulting from the reservations are as follows:

- Specifying measures undertaken to reduce emissions of NO_x and SO_2;
- Defining measures to reduce the quantity of waste produced in fuel and energy sector and to use industrial, agricultural and municipal waste for energy purposes;
- Defining measures to reduce emissions from low combustion sources;
- Mitigating the negative impact of energy sector on waters.

However, the requests to incorporate very detailed provisions in the document, as such provisions that can only be examined at the stage of implementing individual measures, have not been taken into account.

A detailed analysis of remarks is available on the website of the Ministry of Economy as an Appendix to the *Assessment.*

6. Incorporation of suggestions concerning the methods and frequency of monitoring the effects of implementing provisions of the document

According to proposals contained in the *Assessment*, the evaluation of environmental impact of implementing *Energy Policy* will be carried out with the use of existing statistical tools, as

well as data and information gathered under the State Environmental Monitoring and the National Emission Inventory System. No need has been established to create a new information system or to develop the existing ones .

The analyses will be drawn up as simplified reports submitted to the Council of Ministers on an annual basis, and as detailed analysis – once every four years, when the new energy policy will be at the stage of preparation. This will allow taking account of changes occurring in the energy system and modifying ecology policy objectives and measures accordingly, with a view to stimulating changes and the behaviour of enterprises.

Detailed reports on implementation of *Energy Policy* objectives as regards environmental protection in a wide sense and sustainable development will cover in particular the following issues:

- The primary energy use volume and the efficiency indicators for primary energy conversion into final energy,
- The volume of final energy use and the structure of final energy supply,
- The renewable energy supply volume,
- Growth rates of wind energy supply,
- Growth rates of the use of biomass,
- Growth rates of bio-fuels supply and their share in the fuel market,
- Changes in the volume of emission of basic pollutants, carbon dioxide and other greenhouse gases from the energy sector,
- Investment projects implemented in the mining industry and in the energy production sector (capacity above 20 MWt),
- Transmission infrastructure projects, already implemented and planned.