Polish Energy Policy Concerning Hard Coal Mining Economy after 1989

Tadeusz OLKUSKI[1)]

[1)] D.Sc., Engineer. AGH University of Science and Technology, Faculty of Energy and Fuels, Department of Sustainable Energy Development

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Abstract

Energy policy is part of the national economy policy of each government. Assurance of national energy security, based on the country's own energy raw material resources and the prospects of their import and export belong to the essential tasks of energy policy. Hard coal was and has been the most important energy raw material for Poland, and this paper is devoted to that topic.
In 1990–2009, five documents entitled "Assumptions of the Polish Energy Policy" or "Assumptions of the Energy Policy of Poland...," with references to particular years, were drafted together with the "Evaluation of the Implementation and Revisions of the Assumptions of the Polish Energy Policy until 2020." After 2009, however, the Polish Parliament failed to approve any such document, although several more or less recognised prognostic documents had been prepaid, but none was ever approved or implemented. Consequently, the "Energy Policy of Poland until 2030," approved by the Polish Parliament on 10 November 2009, is the last binding document in that area. This paper presents the evolution of the approach to coal in subsequent government documents in the recent years. Besides, drafts or bills were intentionally omitted here, as they have never been approved by the Parliament and have remained unofficial.

Keywords: *energy policy, energy security, hard coal*

Introduction

The purpose of the government's energy policy is to ensure energy security of the nation. That type of security, according to the Polish Energy Law (the "Law"), is understood as such a condition of economy that allows for covering both current and prospective demand for fuel and energy, in the manner that is technically and economically justified, with the observation of environmental protection requirements (the "Law 1997"). The Law determines the principles of developing the government's energy policy and the principles and conditions of supply and consumption of fuels and energy, also specifying the government agencies that are responsible for fuel and energy economy in the country. As we know, Poland has based its energy generation system on coal, mainly hard coal. For that reason, the regulations concerning that raw material, acted in the government documents, were and have been so important to determine the Polish energy policy.

Assumptions of the Polish Energy Policy in 1990–2010

On 4 September 1990, the Polish Council of Ministers approved the "Assumptions of Polish Energy Policy in 1990–2010" (the "Assumptions 1990"). That document was drafted in connection with the Resolution of the Parliament of the People's Republic of Poland of 24 May 1989, regarding rationalisation of the energy and fuel consumption in the national economy. The contents of the document concerned the development prospects of the national fuel and energy complex twenty years ahead. The data presented there and the scenarios of possible future directions of the development of the national power industry were based on the simulation analyses performed with the use of certain computer models. The authors of those "Assumptions" realised that the figures presented there were only tentative because no-one was able to assume any continuation of current trends in the future, in the abruptly changing socio-economic situation in Poland at that time. The transition from a centrally planned economy to a market economy created a new situation that had been previously unknown in the world. For that reason, the assessment of the future fuel and energy demand by the country was very difficult a challenge. In addition to own scenarios, the Polish Ministry of Economy also used analytical documents drafted by foreign expert consultants, applying the methods that had been successful in market economy. Besides, relevant research was conducted in co-operation with the World Bank's International Energy Agency and the French Ministry of Industry. When evaluating the then energy generation situation, the analysts identified basic assets of the Polish economy. The essential ones included the following (Assumptions 1990):

- Unfavourable structure of mining primary-energy sources from national resources.
- Inappropriate structure of primary energy source application.
- Considerable air pollution.
- High changeability of weather conditions.
- Low primary energy source consumption per person.
- Low energy consumption in the municipal and household sectors and in agriculture per person.
- Low gross national income (GNI) per capita.
- High energy intensity of the GNI.
- Low energy consumption effectiveness.

The local evaluation results were compared to similar results obtained in well developed countries. The following three scenarios were considered in the assumptions of the nation's economic development:

- Low (L), with the average rate of economic growth of about 3%/year in 1991–2010

Tab. 1. Primary energy source demand under particular scenarios, PJ. *tcu: ton of coal equivalent. Source: Assumptions 1990
Tab. 1. Zapotrzebowanie na energię pierwotną w poszczególnych scenariuszach, PJ

No.	Energy Source			Scenarios					
				L		M		H	
		Year							
		1988	1990	2000	2010	2000	2010	2000	2010
1.	Hard coal	3,606	2,930	3,123	3,267	3,211	3,756	3,331	3,994
2.	Lignite	592	589	545	551	545	551	560	700
3.	Natural gas	406	308	577	779	715	946	894	1,105
4.	Liquid fuels	740	621	832	1,011	993	1,227	1,134	1,301
5.	Nuclear fuel	0	0	0	231	0	375	0	375
6.	Other	102	135	135	135	135	135	135	135
TOTAL	PJ	5,447	4,583	5,212	5,974	5,599	6,991	6,053	7,609
	10^6 tcu*	186	156	178	204	191	239	207	260
GNI energy intensity (1985=100)		94	111	90	80	82	64	68	52

Tab. 2. Primary energy source demand under particular scenarios, %. Source: Assumptions 1990
Tab. 2. Zapotrzebowanie na energię pierwotną w poszczególnych scenariuszach, %

No.	Energy Source			Scenarios					
				L		M		H	
		Year							
		1988	1990	2000	2010	2000	2010	2000	2010
1.	Hard coal	66.2	63.9	59.9	54.7	57.4	53.7	55.0	52.5
2.	Lignite	10.9	12.9	10.5	9.2	9.7	7.9	9.3	9.2
3.	Natural gas	7.4	6.7	11.1	13.0	12.8	13.5	14.8	14.5
4.	Liquid fuels	13.6	13.6	15.9	16.9	17.7	17.6	18.7	17.1
5.	Nuclear fuel	0.0	0.0	0.0	3.9	0.0	5.4	0.0	4.9
6.	Other	1.9	2.9	2.6	2.3	2.4	1.9	2.2	1.8
TOTAL		100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

- Medium (M), with the average rate of economic growth of about 5%/year in 1991-2010,
- High (H), with average the rate of economic growth of about 8%/year in 1991-2000.

The three scenarios, presented in the above Table, assumed the growth of primary energy demand. For obvious reasons, the highest demand was assumed under the High Scenario. That involved not only hard coal, but also the remaining energy sources. From today's perspective, it is interesting that the nuclear fuel demand was expected to be available in Poland in 2010. A limited development of nuclear energy production of up to 2,000 MW in 2005 and 6,000 MW in 2010 was planned at the time of drafting Assumptions 1990. To improve the energy production effectiveness and the production structure adjustment to the parameters existing in developed countries, a drop in GNI energy intensity was planned under all scenarios, mostly for 2010.

The Table below presents the proportional primary energy source demand under particular scenarios.

When we analyse the proportional shares of particular energy sources in primary energy demand, we can notice that only the share of hard coal exceeded 50%, under each scenario.

The scenarios of the production, export and import of particular energy sources looked quite interesting. Table 3 shows only the data relating to hard coal.

It is equally interesting that import of coal to Poland was planned for as early as 1990. The 2010 import figures were the following: 4.2 mio. tons under the Low Scenario, 13.2 mio. tons under the Medium Scenario, and 15.9 mio. tons under the High Scenario. However, in reality, coal import figures exceeded export figures already in 2008. The document stated that the import of 27 mio. tons of thermal coal (20% of the total thermal coal import in respect of all the European OECD countries) could face shortage of supply and cause a significant rise of coal prices.

The document also stressed the necessity of deep restructuring of the Polish hard coal industry, resulting in the liquidation of about 10% of coal-mine divisions that generated high costs of extraction. It was also proposed to close down the coal mines in those regions where such actions would not cause significant social problems, and the laid off miners could be offered new jobs in other coal mines. It was further suggested to increase coal mining concentration in large mines to reduce operating costs. The document also discussed the issue of effective environmental protection, underground storage of mining-waste, and underground water management. The authors considered an economic justification of coal preparation, especially in old and small coal mines. It was concluded that the justification of thermal coal import should be considered, instead of coking coal export from Poland. Economic analyses demonstrated that such a replacement would be profitable. The price differences allowed for transportation cost reduction, and thus the northern regions of Poland would be rather supplied with imported coal.

On 9 November 1990, the Parliament of the Republic of Poland, having considered the "Assumptions," approved the 1990 Resolution, recognizing that the submitted study was inadequate and inconsistent with the ecological policy assumptions, as well as failed to provide proper economic analysis. The Parliament identified the following basic directions of the national policy as regarded primary energy sources:

Tab. 3. Production, export and import of hard coal under the scenarios, mio. tons. Source: Assumptions 1990
Tab. 3. Produkcja, eksport i import węgla kamiennego w zależności od scenariusza, mln ton

	1988	1990	Scenarios					
			L		M		H	
			2000	2010	2000	2010	2000	2010
Production	193	163	145	145	144	154	144	162
Export/Import	31.2	28.6	2.2	-4.2	-0.9	-13.2	-2.5	-15.9

Tab. 4. Hard coal balance under the "survival" scenario. Source: own study, based on Assumptions 2000
Tab. 4. Bilans węgla kamiennego w scenariuszu Przetrwania

Specification	2005	2010	2015	2020
	[mio. tons]			
Output	101.0	90.0	85.0	80.0
Import	2.0	2.0	2.0	3.5
Export	10.1	4.1	1.0	0.0
Demand	92.9	87.9	86.0	83.5
Including:				
- Households	7.6	7.4	6.7	6.0
- Power plants and CHP's	50.7	53.7	53.7	53.6

- Reduction of the shares of solid fuels, with the increase of the proportion of hydrocarbon fuels and various types of renewable energy sources.
- Improvement of hard coal quality.
- Analysis of the actual costs of using the local lignite deposits, taking into account the environmental protection requirements.
- Increase of the supply of natural gas originating from both local resources and import.
- The development of the refinery and petrochemical industries adapted to the changes in the directions from which crude oil was imported, including the increase of reloading capabilities in the liquid fuel handling terminals in the Polish ports.

Polish Energy Policy Assumptions until 2010

On 17 October 1995, the Polish Council of Ministers approved the government document called the "Assumptions of the Polish Energy Policy until 2010" (the "Assumptions 1995"). Three functions of the government were distinguished there as follows: the energy policy developer, the business activity regulator, and the enterprise owner.

In the fourth chapter of the document on the energy policy implementation instruments, it was determined that restructuring projects would be implemented in the Polish hard coal industry, intended to retire the coal mines that were permanently unprofitable, with the strengthening of the economic and financial condition of the remaining coal mines through some financial restructuring processes. It was assumed as a rule that it was required to preserve the business structure allowing for the competition of mining companies, taking into account technical and environmental conditions that were specific in particular coal mines. It was expected that the past due financial obligations, including unpaid social insurance premiums and other fees, owed to the government, would also be restructured on the condition that the mining companies would adopt effective projects facilitating their operation on local and foreign markets. The costs of the technical retirement of coal mines and the costs of the social protection schemes for miners would be covered by the government.

As to hard coal price setting, no long-term government involvement was expected to continue, in the form of determination of raw material prices in Poland. It was assumed that prices should be established in compliance with the world market trends. Besides, long-term contracts would be signed for the delivery of Polish coal to the Polish power plants and CHP's, with the government's determination of contract prices in that case, as well as the methods of price revisions, in respect of the changing trends on international markets. The document stated that customs protection measures would be applied only exceptionally, in the case of threat to the local coal mining industry and to the degree that would control the government's energy security policy, but still with the observation of the international obligations of Poland.

Hard coal prices were deregulated in Poland in the third quarter of 1992. The price level was established then upon negotiations between the mining companies on one side and the power plants and CHP enterprises on the other side. In 1994, the price level was agreed as equivalent to 31.00 USD/ton, in respect of reference coal, with the calorific value of 21 MJ/kg, ash content of 22%, and sulphur content of 0.9%. Since the beginning of 1995, the price level was agreed at 35 USD/ton for both local and foreign customers, while the economic price of extraction amounted to 36-42 USD/ton. The difference in respect of the economic price was covered by non-payment of past-due financial obligations and suspension of necessary replacement or modernisation capital investments.

In reference to the power plants, CHP's, and heating enterprises, the document imposed the requirement of holding at least 30-day fuel reserves for basic operations, in reference to either the average level of power generation, or the maximum storage-yard capacity.

The document stated that the Polish Coal Corporation (WWK) would be replaced by the State Coal Agency (PAWK), as part of a restructuring project. The state sector structure was supplemented by the establishment of seven companies, solely owned by the State Treasury, to manage 57 coal mines. Other four coal mines were transformed into single-member State Treasury companies, three into limited liability companies, and five remained as state-owned enterprises. Nine coal mines were put in liquidation, and other five were subjected to a partial liquidation process. In addition, the Central Coal Sale Office (CZW) was transformed into the "Węglozbyt" owned by the State Treasury.

Tab. 5. Hard coal balance under the "reference" scenario. Source: own study, based on Assumptions 2000
Tab. 5. Bilans węgla kamiennego w scenariuszu Odniesienia

Specification	2005	2010	2015	2020
	[mio. tons]			
Output	101.0	90.0	85.0	80.0
Import	2.0	2.0	2.0	2.0
Export	11.7	7.7	3.1	0.1
Demand	91.3	84.3	83.9	81.9
Including:				
- Households	7.4	7.2	6.4	5.7
- Power plants and CHP's	49.6	51.2	53.0	53.1

Tab. 6. Hard coal balance under the "progress plus" scenario. Source: own study, based on Assumptions 2000
Tab. 6. Bilans węgla kamiennego w scenariuszu Postępu-plus

Specification	2005	2010	2015	2020
	[mio. tons]			
Output	101.0	90.0	85.0	80.0
Import	2.0	2.0	2.0	2.4
Export	17.5	7.4	2.5	0.0
Demand	85.5	84.6	84.5	82.4
Including:				
- Households	7.3	7.1	6.3	5.6
- Power plants and CHP's	43.6	46.9	48.3	47.3

Besides, the second stage of the restructuring programme was also mentioned, specifying the following directions (Assumptions 1995):

- Maintenance of the hard coal extraction profitability, without subsidies.
- Staged restructuring programme.
- Coverage of a portion of past due financial obligations of the unprofitable coal mines to be liquidated, from the government's special-purpose financial reserves.
- Coverage of the costs of the technical liquidation of unprofitable coal mines and of the costs of social protection schemes for miners by the government.

In Chapter II entitled the "Projections of the development of energy situation in Poland until 2010," hard coal consumption was anticipated at 42.3 mio. tons in 2010, based on the projections provided by the Polish Academy of Sciences (IPPT PAN), or 51.1 mio. tons, based on the Polskie Sieci Energetyczne S.A. projections.

It was concluded that hard coal demand would be completely covered by local supplies. However, the local supplies were not considered to be critical for the national economy, although an economically justified level of mining capacities of the Polish coal mines would obviously increase the security of primary energy source supply. The authors also predicted the drop of coal export, owing to high costs of mining in Poland, and anticipated arrival of low coal prices on the European market.

In the subsection devoted to environmental protection issues, it was noticed that the fossil fuel domination, including especially the high share of coal, in the primary energy source consumption structure, created serious ecological problems at that time, to be continued in the future, and that would lead to the limitation of the global energy consumption rates. The increasing environmental protection requirements could turn into serious barriers facing development, especially in case of poor countries. That could lead immediately to an abrupt limitation of coal consumption, and, once hydrocarbon fuels have been exhausted, to the limitation of primary energy source limitations, reducing the development of global civilisation.

Assumptions of the Polish Energy Policy until 2020

The "Assumptions of the Polish Energy Policy until 2020," approved by the Polish Council of Ministers on 22 February 2000, with the main government energy policy targets, indicated the following (the "Assumptions 2000"):

1. Energy security understood as such a condition of the Polish economy that allows for covering both current and future fuel and energy demand.
2. Increase of the competitiveness of local businesses, products, and services offered on both international and local markets.
3. Environmental protection by control of the negative effects of energy generation processes.

That "survival" scenario was definitely the most pessimistic, in terms of the macroeconomic development of Poland. The scenario assumed potential global political shock waves causing suppression of global development. The Polish economy was supposed to continue its raw-material structure, with the average GNP growth rate of ca. 2.3%. The unemployment rate was anticipated at 14%. It was predicted that if the "survival" scenario came true, the Polish membership in the European Union would be either postponed beyond 2010, or completely excluded.

The "reference" scenario assumed the continuation of unfavourable economic transformations in a stable international business environment. What was a weak point of that scenario was the exhaustion of simple development reserves, causing regular drops of GNP growth rates in the future, down to ca. 4.0%. That, however, would not prevent Poland to enter the EU, although it could have caused the delay in obtaining membership until about 2010.

The "progress plus" scenario was the only optimistic scenario among all the three projections drafted by the Polish government. That one anticipated favourable economic transformations in Poland at concurrent favourable international conditions. The planners assumed a high GNP growth rate of ca. 5.5%, what would allow Poland to join EU before 2005. The

Tab. 7. Proportional shares of hard coal in the final energy demand, within the baseline and effectiveness options. Source: own study, based on Short-Term Forecast 2002
Tab. 7. Procentowy udział węgla kamiennego w zapotrzebowaniu na energię finalną w wariancie bazowym i efektywnościowym

Baseline Option		Effectiveness Option	
2003	2005	2003	2005
26.8	25.6	25.9	24.3

Tab. 8. Hard coal mining capacity. Source: Short-Term Forecast 2002
Tab. 8. Zdolności wydobywcze węgla kamiennego

Specification	2000	2001	2002	2003	2004	2005
Output	102.2	102.8	103.4	102.9	102.8	101.5
Local sales, including	78.2	76.9	77.2	77.4	77.6	77.0
Thermal coal	66.3	63.4	64.0	64.5	64.7	64.2
Coking coal	11.8	13.6	13.3	12.9	12.8	12.8
Export, including	23.0	25.4	24.6	23.6	23.7	23.1
Coking coal	17.6	20.7	19.7	18.0	18.2	17.7
Total sales	101.2	102.3	101.9	101.0	101.3	100.1

Tab. 9. Demand for primary energy generated from coal, within the baseline and effectiveness options. Source: own study, based on Short-Term Forecast 2002. *) statistical data, without adjustment for weather, **) statistical data, with adjustment for weather
Tab. 9. Zapotrzebowanie na energię pierwotną z węgla w wariantach, bazowym i efektywnościowym

				Baseline Option		Effectiveness Option	
Units	1999	2000*	2000**	2003	2005	2003	2005
PJ	2,026	1,851	1,943	1,969	1,939	1,897	1,829
mio. tons	86.14	80.18	84.17	85.78	84.58	83.06	80.25

development of such sectors, as e.g. pharmaceutical, computer, or telecommunication industries was further assumed, similarly to IT, consulting, or banking services.

Assumptions 2000 also presented the national fuel and energy balance figures for hard coal, lignite, natural gas, crude oil, petroleum products, renewable energy, cogeneration sources (thermal and electricity sources), electricity, and heat.

As regards the Polish membership in EU, the "progress plus" scenario was fulfilled; however, as regards coal import and export, neither scenario was right.

Evaluation and Revision of Assumptions 2000

On 2 April 2002, the "Evaluation and Revision of the Assumptions of the Polish Energy Policy until 2020" (the "Evaluation 2002") was published. The authors criticised the previous implementation actions under the relevant policy, as well as the intended and never implemented actions. The general evaluation of the actions taken by the government, ministers, regional government administration, local governments, and business companies or state enterprises was negative. Out of nearly sixty planned tasks, only several were either completed or at some stage of implementation. The main charges specified lack of consistent actions and lack of progress monitoring.

In the section concerning solid fuels, the authors stated that the thermal coal reserves amounted to more than 14 mio. tons in 2000 of which 7 mio. tons were stored by power plants. The indicators describing the solid fuel reserves in Poland were close to those applied in EU at that time. Such reserves guaranteed the maintenance of electricity and thermal energy source supplies at the levels required by the energy generating customers.

The section concerning the Polish Energy Policy Revision claimed that the "progress plus" scenario was a preferred scenario. However, the beneficial changes in the external environment, assumed under that scenario, never occurred. The global economic growth rate was lower, while the Polish government failed to develop active and progressive development policies. The changes occurring in the external environment and the national economy caused that the GNP rate reached only the "survival" scenario projections in 2000-2001. Besides, structural transformations were rather closer to the ones anticipated under that scenario. The economic slowdown resulted in the reduction of demand for fuel and energy. Consequently, the fuel and energy consumption figures were lower than those projected in Assumptions 2000. However, the authors stated that the most arduous issue, for both the citizens and the government finances, were the costs of maintenance of a huge production surplus occurring in nearly all branches of the fuel and energy generation sectors (power plants, CHP's, heating plants, and hard coal and lignite mines). It was stated straightforward that, in view of reduced electricity and heat demand, together with power surplus, the fuel and energy generation sector had turned into economic ballast that prevented further development of the country.

Evaluation 2002 requested that the desired government's targets should primarily include the attainment of a balanced structure on the primary fuel source market, taking into account the local energy raw-material resources. In the light of imminent Poland's accession to the EU, it was necessary to make all efforts for the fuel and energy generation sectors to become ready for seamless integration with the European structures between 2003 and 2004, without harming the interests of both citizens and state.

In the "Short-Term Forecast" for the national energy generation sector, attached to the document, the projected fuel and energy balances were supposed to satisfy the demand resulting from the economic development under all the scenarios presented in the Polish Government's Economic Strategy of January 2002; however, the baseline option for the energy generation forecast was closer to the development scenario of the whole Polish economy, contained in that document, as regarded both basic macroeconomic figures and mechanism for the simulation of economic growth.

Tab. 10. Projected hard coal balance until 2005. Source: Short-Term Forecast 2002
Tab. 10. Prognozowany bilans węgla kamiennego do 2005 roku

			Baseline Option		Effectiveness Option	
Specification	1999	2000	2003	2005	2003	2005
Local output	110.2	102.8	103.9	102.5	103.9	102.5
Import	2.4	1.5	2.2	2.2	2.2	2.2
Export	24.1	23.2	20.3	20.1	23.0	24.5
Local demand, including:	88.5	83.4	85.8	84.6	83.1	80.2
- Power plants and CHP's	43.4	44.5	41.1	42.4	40.4	41.5
- Heating plants	7.7	6.7	7.0	6.2	6.4	5.4
- Corporation power plants	11.3	10.7	9.5	9.1	10.2	9.6
- Coking Plants	11.4	12.3	11.1	10.9	10.7	10.3
- Households	12.2	9.0	12.1	11.4	11.3	10.3

Tab. 11. Projections of demand for primary energy from hard coal in 2005–2025, Mtoe. Source: own study, based on Policy 2002
Tab. 11. Prognozy zapotrzebowania na energię pierwotną z węgla kamiennego w latach 2005–2025, Mtoe. Źródło: opracowanie własne na podstawie Policy 2002

Option	Year				
	2005	2010	2015	2020	2025
Treaty	43.7	42.0	41.8	46.5	48.2
Baseline, coal	44.3	45.3	44.5	48.7	50.1
Baseline, natural gas	44.1	45.6	42.3	42.3	42.5
Effectiveness	43.8	45.2	41.3	41.6	42.1

The data presented in the Table above demonstrate that one could have expected a drop in the hard coal share in the final energy consumption until 2005.

Table 8 presents the hard coal mining capacity in Poland. The data were collected from the database of the Hard Coal Mining Restructuring Agency, the reports on hard coal trading, and the reports obtained from particular coal companies.

Table 9 presents the demand for primary energy generated from coal, within the baseline and effectiveness options.

Table 10 presents the projected hard coal balance until 2005.

It was anticipated in the professional power plants and CHP's (however, corporation power plants, owned by large companies, are mentioned here only in Table 10 above) to maintain coal demand, in respect of the increased electricity demand and low competitiveness of generation technologies burning natural gas. It was rightly concluded that a continuous improvement of competitiveness, depending on the hard coal mining restructuring processes, would be of key importance for coal mining.

Energy Policy of Poland until 2025

The "Energy Policy of Poland until 2025" was implemented in January 2005. The document was composed of two parts (the "Policy 2005"):

The "Doctrine of the Polish Energy Policy until 2025," formulating the energy policy objectives, principles, and priorities, and stressing energy security management in market conditions (EU market after 2004), and

The "Long-Term Directions of Actions until 2025, with the Implementation Tasks until 2008," determining the tasks within nine areas (in compliance with the EU requirements).

Those tasks were the following (Policy 2005):

1. Capacity for the production of local fuel and energy sources.
2. Types and quantities of fuel reserves.
3. Electricity transmission capacity, including trans-border capacity.
4. Energy effectiveness of the Polish economy.
5. Environmental protection.
6. Use of renewable energy sources.
7. Restructuring and ownership transformations in the fuel and energy generation sectors.
8. Research and development works.
9. International co-operation.

Four options of energy demand were prepared, in respect of energy demand in Poland until 2025:

1. Treaty Option.
2. Baseline Coal Option.
3. Baseline Natural Gas Option.
4. Effectiveness Option.

The Treaty Option took into account the provisions of the EU Accession Treaty as follows: reaching 7.5% of electricity consumption from renewable sources in 2010, reaching 5.75% of biofuel share in the total petrol and diesel fuel sales in 2010, and limitation of total pollution emission from large fuel-burning facilities, down to the values specified in the Treaty.

The Baseline Coal Option was different from the Treaty Option by inclusion of the requirement to fulfil the provisions of the Treaty in the area of pollution emission; however, large fuel-burning facility issue was replaced by the implementation of the National Plan for Pollution Emission (KPRE) that permitted to postpone until 2020 the deadline of the attainment of pollution emissions established in the EU Accession Treaty until 2012. The second Option did not assume any limitation of coal supplies, or decisions whether coal should be delivered by the local producers or imported.

The Baseline Natural Gas Option assumed that the hard coal supplies to electricity generators would be maintained at the then existing level, while natural gas would be burnt to produce indispensable additional quantities of electricity.

The Effectiveness Option provided for obtaining additional improvement in the effectiveness of electricity generation, transmission, distribution, and consumption, based on active government's policy. The relevant forecast specified the maximum possible effectiveness increase, in respect of the other Options. The relevant values were the following:

– Increase of the average electricity generation efficiency by

Tab. 12. Forecast of hard coal consumption for electricity generation in 2005–2025. Source: own study, based on Policy 2002
Tab. 12. Prognoza zużycia węgla kamiennego do produkcji energii elektrycznej w latach 2005–2025. Źródło: opracowanie własne na podstawie Policy 2002

Option	Year				
	2005	2010	2015	2020	2025
Treaty	24.3	22.1	23.8	30.0	32.9
Baseline, coal	24.8	25.3	26.4	32.2	34.8
Baseline, natural gas	24.6	25.8	24.0	24.9	25.6
Effectiveness	24.4	25.3	23.0	24.7	26.0

Tab. 13. Demand for final energy generated from coal in particular years of the projected period, Mtoe. Source: Enclosure 2, 2009
Tab. 13. Zapotrzebowanie na energię finalną wytworzoną z węgla w poszczególnych latach prognozowanego okresu, Mtoe. Źródło: Załącznik 2, 2009

Unit	Year					
	2006	2010	2015	2020	2025	2030
Mtoe	12.3	10.9	10.1	10.3	10.4	10.5

Tab. 14. Demand for primary energy generated from hard coal in particular years of the projected period, Mtoe and tons. Source: Enclosure 2, 2009
Tab. 14. Zapotrzebowanie na energię pierwotną wytworzoną z węgla kamiennego w poszczególnych latach prognozowanego okresu, Mtoe i tony. Źródło: Załącznik 2, 2009

Unit	Year					
	2006	2010	2015	2020	2025	2030
Mtoe	43.8	37.9	35.3	34.6	34.0	36.7
Mio. tons	76.5	66.1	61.7	60.4	59.3	64.0

1.3 of a percentage point, in the areas of electricity transmission and distribution.

– Reduction of grid losses by 1.5 of a percentage point, in the areas primary energy source consumption.

– Reduction of GNP energy intensity by 5.0% and of general energy intensity by 7.0%.

All the options provided for the construction of the first nuclear power plant in Poland about 2021–2022.

When evaluating the implementation of the then energy policy, in respect of coal mining, the authors of Policy 2005 mentioned such coal mining reforms, carried out in the preceding years, as the Hard Coal Mining Reform in Poland in 1998–2002 (the "Reform 1998"), or the Hard Coal Restructuring Programme in Poland in 2003–2006, under anti-crisis regulations, as well as the initiation of the privatisation processes in certain coal mines (the "Programme 2003").

It was estimated that the fulfilment of the sector reform programme caused a considerable reduction of the coal production capacity and of the number of employees. Considerable public resources were spent on the reform implementation. It was stated in Policy 2005 that, owing to the significance of hard coal in the Polish energy balance, the coal mining restructuring processes should be continued.

When evaluating the accessibility of primary fuel sources, it was mentioned that the local hard coal resources would be adequate to cover the coal demand in the whole projected period. Coal supply limitations could be, however, caused by the reduction of mining capacities, resulting from the programmes of adjusting the local mining industry to the global market conditions. If that happened, the relevant limitations would be compensated by import of coal available on global markets.

The authors also forecast the demand for particular primary energy sources. Table 11 presents the demand for primary energy from hard coal in 2005-2025 under several options.

Rapid increase of electricity demand was projected under all the Options. For example, the demand under the Effectiveness Option would amount to 211.9 TWh, 223.1 TWh under the Baseline Natural Gas Option, 225.1 TWh under the Baseline Coal Option, and the most under the Treaty Option: 225.6 TWh, all in 2020. However, in the cases of Treaty and Baseline Coal Options, the increase of electricity production would be based on hard coal burning.

Table 12 presents a forecast of hard coal consumption for electricity generation in 2005–2025.

In the document under discussion, the costs of covering local demand for energy were also presented. We can conclude that the Baseline Coal Option would be less expensive than the Baseline Natural Gas Option, as reflected by lower electricity production costs and lower electricity costs for customers. And lower dependence of Poland on fuel import would be an additional advantage under the former Option.

The document also contained a statement that the implementation of the Treaty Option would not be possible because of capital investment and substantive limitations. Such resources would be required to spend on large ecological projects. However, own hard coal and lignite resources and the cost of generating electricity and thermal energy from those sources indicated that the Polish sources would provide base fuels for the generation of both types of energy (electrical and thermal), within the projected period. However, in another section of the text, the authors pointed out that the then self-sufficiency of Poland in the areas of hard coal and lignite, as well as the progressing deregulation of the electricity market, both in Poland and the EU, would contribute in the future to the reduction of the significance of coal reserves, as means to support electricity supply security on the way to improve energy effectiveness, power grid synchronisation, expansion of inter-system links, and strengthening of the Third Party Access (TPA) policy.

Energy Policy of Poland until 2030

On 10 November 2009, the Polish government published its document entitled the "Energy Policy of Poland until 2030" (the "Policy 2009"). It was hard to expect at that time that the document would be still valid during the subsequent dozen of years, because, even today, in 2020, the Polish Council of Ministers has not adopted any new policy, although several drafts were published but failed to be approved by the Parliament.

Tab. 15. Demand for electricity generated from hard coal in particular years of the projected period, TWh. Source: Enclosure 2, 2009
Tab. 15. Zapotrzebowanie na energię elektryczną wytworzoną z węgla kamiennego w poszczególnych latach prognozowanego okresu, TWh. Źródło: Załącznik 2, 2009

Unit	Year					
	2006	2010	2015	2020	2025	2030
TWh	86.1	68.2	62.9	62.7	58.4	71.8

Tab. 16. Hard coal consumption for electricity generation, together with the consumption for cogeneration purposes, ktoe. Source: Enclosure 2, 2009
Tab. 16. Zużycie węgla kamiennego do produkcji energii elektrycznej wraz ze zużyciem na cele kogeneracyjne, ktoe. Źródło: Załącznik 2, 2009

Unit	Year					
	2006	2010	2015	2020	2025	2030
ktoe	25,084	20,665	18,897	17,722	16,327	18,331

Tab. 17. Gross capacity of electricity generation from hard coal. Source: Enclosure 2, 2009
Tab. 17. Zdolność wytwarzania energii elektrycznej brutto z węgla kamiennego. Źródło: Załącznik 2, 2009

Technology	Year					
	2006	2010	2015	2020	2025	2030
PC/Fluidal	15,878	15,796	15,673	15,012	11,360	10,703
CHP	4,845	4,950	5,394	5,658	5,835	5,807

The document in question took into account the conditions set by the EU, as regards ecology, or Directive 2009/29/WE (the "Directive 2009"), containing a collection of binding regulations intended to implement the EU assumptions on counteracting climate change. The Directive determined the climate targets for 2020, including the reduction of greenhouse gas emission by 20%, in comparison to the 1990 values, reduction of energy consumption by 20%, in comparison to the EU forecasts for 2020, increase of the renewable energy source share of up to 20% of the total energy consumption in the EU, as well as the increase of the use of energy from renewable sources in transportation by up to 10%. The "Energy Policy of Poland until 2030" was intended to respond to the essential challenges facing the Polish energy generation sector, both in short-term and long-term perspectives. The following were recognised to be the basic directions of energy policy (Policy 2009):

- Improvement of energy effectiveness.
- Increase of fuel and energy supply security.
- Diversification of the electricity generation structure by the implementation of nuclear power generation.
- The increase of the consumption of energy generated from renewable sources, including biofuel.
- Increase of the competitiveness of fuel and energy markets.
- Limitation of the influence of power generation on the environment.

The Energy Policy under discussion was prepared in compliance with the priorities specified in the "National Development Strategy for 2007–2015," approved by the Polish Council of Ministers on 29 November 2006 (the "Strategy 2006").

The diversification of raw material and fuel supplies to increase energy security was strongly stressed in the Policy. The diversification was understood there as the varieties of technologies, not just the choice of suppliers. Due to gradual exhaustion of hard coal and lignite deposits in the currently mined locations, the planning horizon reached 2030 to include the preparation and commencement of new deposits for mining. The authors also pointed out the necessity to correlate mineral mining plans with the capital investment plans in other sectors, e.g. road construction. The document clearly stated that all available coal-based energy generation technologies would applied, with the assumption that they assure the reduction of air pollution. As to the objectives and actions involving coal, the document specified, in bold, that "The main purpose of energy policy, in respect of coal, is to manage reasonably and effectively the coal deposits of the Republic of Poland." That was followed by the idea that coal would remain to be the main fuel for power generation to guarantee energy security in the country.

Detailed objectives (Policy 2009):

- Assurance of the national energy security by satisfaction of the local demand for coal, with the provision of stable supplies to customers, as well as the required quality parameters.
- Use of coal, with the application of efficient and low-emission technologies, including those of coal gasification and liquefaction to obtain fuels.
- The implementation of modern technologies in the coal mining sector to increase competitiveness, work safety, and environmental protection, as well as create foundations for technological and research development.
- Maximum possible use of methane released during coal mining.

To attain those objectives, it was planned to approve proper legal regulations to motivate enterprises and business to maintain necessary mining capacities, remove legal barriers that prevented making new deposits available, protect strategic coal resources by including them in local physical plans, protect access to coal resources, intensify geological prospecting, and complete the ongoing organisational and structural transformations. The policy makers also offered support for economic use of methane released during hard coal mining, including recuperation of methane from exhaust ventilation air, obtain funds designated for coal mine development through the privatisation of coal enterprises, support research and development works on the technologies for the use of coal to produce liquid and gas fuels, reduce negative influence of coal-burning energy production on the environment, and produce coal fuel cells.

Enclosure 2 to the "Polish Energy Policy until 2030" ("Enclosure 2, 2009) predicted that the thermal coal prices (USD

value of 2007), paid for coal imported to Poland would be as follows: 140.5 USD/ton in 2010, 121.5 USD/ton in 2015, 133.5 USD/ton in 2020, 136.9 USD/ton in 2025, and 140.3 USD/ton in 2030. It was further assumed that the local hard coal prices would equal the import prices in Poland in 2010. Besides, taxation of the energy sources would be harmonised with the EU requirements and an additional excise tax would be imposed on coal, coke, and natural gas, with concurrent coal and coke excise tax exemption until 1 January 2012 and natural gas excise tax exemption until 31 October 2013. Another assumption stated that the CO2 emission permit prices would reach the level of 60.00 EUR/ton after 2012.

Table 13 presents the demand for final energy generated from coal in particular years of the projected period. Year 2006 is the base year.

Table 14 presents the demand for primary energy generated from hard coal in particular years of the projected period.

Table 15 presents the demand for electricity generated from hard coal in particular years of the projected period.

Table 16 presents hard coal consumption for electricity generation, together with the consumption for cogeneration purposes.

Table 17 presents the gross capacity of electricity generation from hard coal.

Enclosure 3 ("Enclosure 3, 2009") to the document under discussion presented the planned implementation actions for the years 2009-2012. What was especially interesting was Priority II entitled "The increase of fuel and energy supply security." Ten tasks were distinguished in the section devoted to coal. Implementation methods and the positions of responsible officials were assigned to each of the tasks. The tasks were the following (Enclosure 3, 2009):

1. Implementation of legal regulations, taking into account the targets proposed in the Energy Policy, and, in particular, the instruments to motivate people to conduct preparatory works and maintain suitable mining capacities, as well as develop modern coal preparation technologies to be used in energy generation.
2. Removal of legal barriers that prevent making new hard coal and lignite deposits available.
3. Identification of national strategic hard coal and lignite resources, with their protection by inclusion in local physical plans, and the protection of access to the strategic resources by the implementation of capital investment projects, as public-purpose projects of supra-local significance.
4. Intensification of geological prospecting to expand the availability of coal resources, with the application of modern exploration and appraisal methods.
5. Completion of the ongoing organisational and structural transformations.
6. Supporting the business use of methane released during hard coal mining.
7. Implementation of technological solutions allowing for the recuperation of methane from exhaust ventilation air removed from coal mines.
8. Obtaining funds for the development of mining through the privatisation of coal enterprises, whose justification, volumes of shares, and the dates of public offers will be analysed in compliance with the implementation of the Energy Policy.
9. Supporting research and development works on the technologies for the use of coal to produce liquid and gas fuels, reduce negative influence of coal-burning energy production on the environment, and produce coal fuel cells.
10. Keeping current competences of the Minister of Economy, as the minister proper for the State Treasury matters, in respect of mining enterprises.

Various persons and agencies were appointed to carry out those tasks, including the following: the Minister proper for Economy, the Minister proper for the Environment, the Minister proper for Building, Economy, Spatial Planning, and Housing, the Minister proper for the State Treasury, the Minister of Education, the President of the Government Legislation Centre, Mining Enterprises, Coal Company Managements, and Research and Development Units.

In Priority VI, related to the limitation of the influence of power on the environment, Action 6.9 was dedicated to coal. That Action concerned the use of coal waste as follows:

1. Implementation of actions in mining enterprises designed to limit the quantities of waste generated during coal mining: until 2010.
2. Making coal waste, stored in heaps, available to the interested businesses: continuous operation.
3. Analysis of the possibilities to apply and introduce financial instruments to encourage business entities to process coal waste: until 2011.

The Minister proper for Economy and the coal mining companies were responsible for the implementation of those tasks.

"The Energy Policy of Poland until 2030" was the last government document approved by the Polish Parliament in that matter. Similar subsequent documents were only drafts and bills.

Conclusions

After the economic and political transformations that happened in Poland in 1989, some government documents determining the directions of the Polish Energy Policy for the subsequent years were published every several years. Initially, they were entitled the "Assumptions of the Polish Energy Policy," later as the "Energy Policy of Poland until Year..." The documents contained national development scenarios, in respect of energy demand. The studies complied with the policies conducted by changing governments, with their contents corresponding to a large extent to the preparation of Polish membership in the EU. Once Poland joined the EU, the country had to harmonise the Polish regulations with the EU legislation, although Poland enjoyed certain derogations in the area of energy generation transformations, allowing for the country's adjustment to the conditions prevailing in the so-called "old EU" countries.

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Polityka energetyczna Polski w zakresie gospodarki węglem kamiennym po 1989 roku

Polityka energetyczna jest częścią polityki gospodarczej każdego państwa. Najważniejszym jej zadaniem jest zapewnienie bezpieczeństwa energetycznego kraju w oparciu o własne zasoby surowców energetycznych oraz możliwość ich importu i eksportu. Dla Polski najważniejszym surowcem energetycznym był, i jest nadal, węgiel kamienny i właśnie temu surowcowi poświecony jest ten artykuł. W latach 1990–2009 opracowano pięć dokumentów o nazwie Założenia polityki energetycznej Polski lub Polityka energetyczna Polski do określonego roku oraz Ocenę realizacji i korektę Założeń polityki energetycznej Polski do 2020 roku. Po 2009 roku nie przyjęto przez parlament RP żadnego nowego dokumentu, choć opracowano kilka prognoz mniej lub bardziej udanych, żadna jednak nie została wdrożona. Tak więc przyjęta przez parlament 10 listopada 2009 roku Polityka energetyczna Polski do 2030 roku jest ostatnim obowiązującym dokumentem w tym zakresie. W artykule przedstawiono jak zmieniało się podejście do węgla w kolejnych dokumentach rządowych na przestrzeni lat. Świadomie pominięto projekty, gdyż nie zostały one nigdy zatwierdzone przez parlament i przez to nie są oficjalnymi dokumentami.

Słowa kluczowe: *polityka energetyczna, bezpieczeństwo energetyczne, węgiel kamienny*