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Geo-politics in the 21st Century over Energy Security:
In the Case of Current Polish Energy Policies

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Geo-politics in the 21st Century over Energy Security: In the Case of Current Polish Energy Policies

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1: Preface

1-1 : Aim of the Paper

The aim of the paper is to examine the content and direction of Polish energy policies after EU (the European Union) accession. Why should the paper look particularly at the Polish case and examine its energy policies? There are several reasons.

1-2 : Reasons for Particular Treatment of Poland

First of all, Poland has a very characteristic energy structure. According to a working paper published by World Resources Institute in 2012, coal consumption was 141.85 million tons (8th in the world) and coal production was 133.22 million tons (9th in the world) in Poland in 2010 ¹. These figures show that Poland is a typical coal resource country. Electricity generated in coal-fired plants was 133.42TWH in 2009 (10th in the world) ², coal exports were 10.08 million tons in 2010 (10th in the world) and export ratio relative to production was 7.6% ³. According to the International Energy Agency (IEA), coal represented about half of primary energy supply in Poland in 2009 (Figure 1) and the share of coal in final energy consumption in Poland is still high (Figure 2). Especially remarkable is the share of coal in electricity generation in Poland. Almost 90% of electricity in Poland is generated by coal-fired plant (Figure3).

The EU is nowadays promoting the so-called “Triple 20” climate-energy package, which aims to reduce greenhouse gas (GHGs) emissions by 20%, to improve energy efficiency by 20%, and to raise energy supply from renewable

energy sources to 20%. In the context of this policy, Poland, which insists on continuing to use coal as a primary energy source, is stigmatized as a “Coal Kingdom” and “trouble maker”⁴. A lot has been written about the EU policy and its aim of a low-carbon society, but research on Poland’s energy policies is relatively scarce. In view of the diversity of the EU and the complexity of its energy security needs, it is instructive to take a closer look at Polish energy policies.

The second reason is the bad image of coal-fired power plants in the world at least from 2013. For example, U.S. President Barak Obama published “*The President’s Climate Action Plan*” in June 2013, in which the U.S. decided to strengthen the regulation on carbon dioxide (CO₂) emission of coal-fired plant in the U.S.⁵. President Obama announced that under this plan, except for two cases namely using the best available coal technology and using Carbon Capture and Storage (CCS) technology, the U.S. was going to stop exporting and investing in new coal power plant construction in foreign countries⁶. The World Bank also announced its decision not to support new coal power plants emitting large amounts of GHGs⁷ in July 2013, and the European Investment Bank (EIB) similarly decided to reduce its support for coal power plants⁸. How does Poland intend to react to this adverse climate of opinion against its primary energy source? To understand this complex situation, it is necessary first to examine Polish energy policies as a whole.

Figure 1 : Primary Energy Supply in Poland (1973-2030)

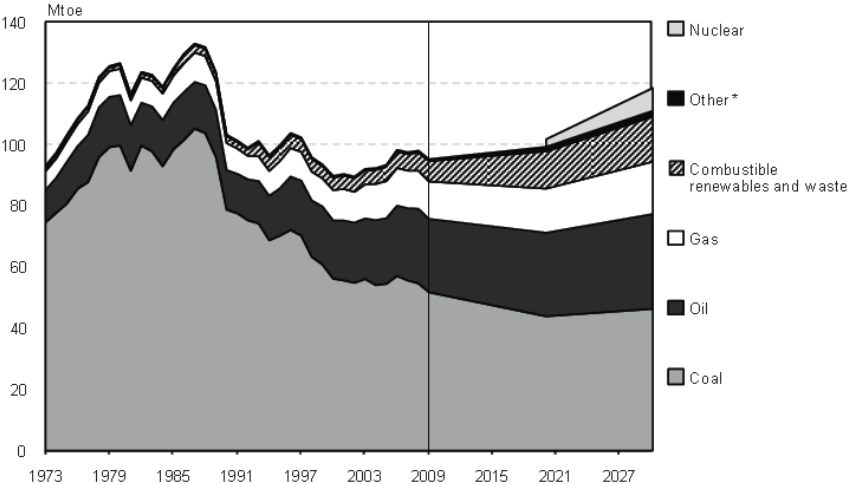
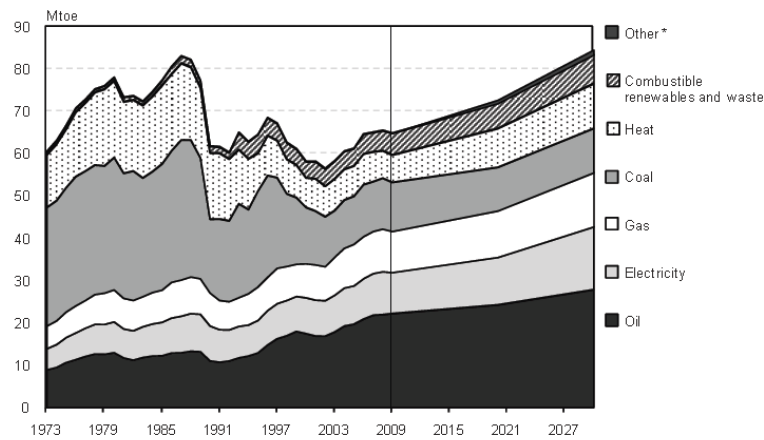
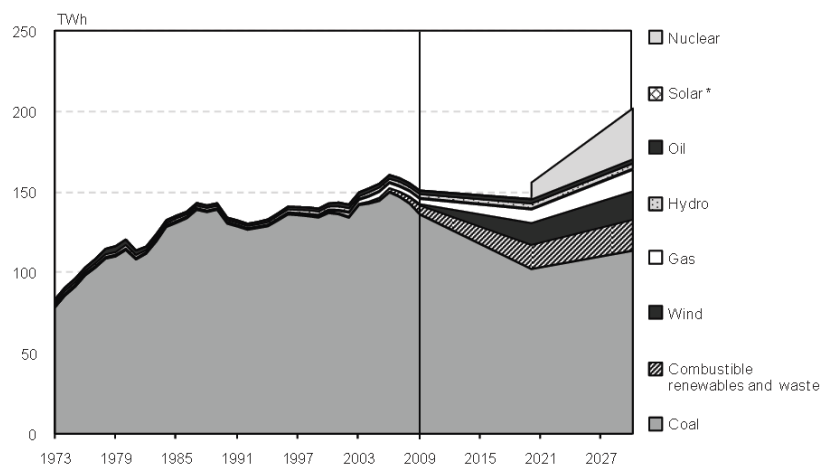


Figure 2 : Final Energy Consumption in Poland (1973-2030)



[Source : IEA(2011), p.19]

Figure 3 : Origins of Electricity in Poland (1973-2030)



[Source : IEA(2011), p.63]

2: Relationship between Japan and Poland on Energy Issues

The previous section described the coal-centered energy structure of Poland and the worsening climate against coal since 2013. This section will look at energy cooperation between Poland and Japan and the possibilities of developing that cooperation, with regard to international cooperation frameworks, technologies related with coal, nuclear power technologies and emission trading schemes

2-1: International Cooperation (the V4+Japan Framework)

Japan and the Vishegrad 4 (Poland, Hungary, Czech Republic and Slovakia - V4⁹⁾) countries' governments are today trying to deepen their cooperation in the environment and energy areas (the V4+Japan Framework)¹⁰. The beginning of "the V4+Japan" Framework was the visit of the then Japanese Prime Minister (PM) Junichiro Koizumi to the Czech Republic and Poland in August 2003 and to Hungary in October 2004. After these meetings, V4 and Japan agreed to promote dialogues and cooperation. Later, in November 2006, the then Foreign Minister Taro Aso made a speech¹¹ at the Japan Institute of International Affairs in which he stressed the importance of cooperation between the V4 countries and Japan.

In May 2009, a V4+Japan foreign ministers conference was held in Hanoi, at which the governments agreed to hold foreign ministers meeting regularly and to focus at such meetings on the economic and financial crisis, the reform of the U.N. Security Council and climate change¹². In October 2009, a V4+Japan environment and climate change workshop was held in Tokyo. At this meeting the Japanese government introduced its domestic technologies related to energy saving, renewable energies and clean coal technologies and advocated closer cooperation between V4 and Japan in these areas¹³. In November 2010 a V4+Japan energy saving seminar was held in Bratislava¹⁴ and in April 2012 a V4+Japan meeting on energy efficiency, renewable energies and nuclear power technologies in Tokyo¹⁵. Between these meetings, in June 2011 a V4+Japan foreign ministers meeting was held in Budapest, at which the ministers agreed on specific practical cooperation in the areas of climate change, energy saving and nuclear power¹⁶. Most recently, in June 2013, a V4+Japan summit was held in Warsaw in which the current Japanese Prime Minister Shinzo Abe participated. The talks covered the export of the energy related technologies including nuclear power to V4 countries and agreement was reached on positive cooperation with V4 governments at the UNFCCC-COP19¹⁷.

Thus, the importance for Japan of relations with the V4 countries on issues related to the environment and energy is increasing, This is especially the case with the biggest of the V4 countries, Poland, which can be good partner for Japan in these

areas.

2-2: Desulfurization Technology and Coal-Fired Power Plants

Poland is an attractive market for Japanese manufacturers in the environment and energy areas. A first important example concerns desulfurization equipment. In 2008, the EU decided to tighten its regulation of sulfur dioxide (SO_x) emissions. After this decision Hitachi obtained orders worth 4 billion yen for desulfurization equipment for a coal-fired power plant at Kozienice 80km south of Warsaw ¹⁸ in June 2004 and 13 billion yen in June 2008 ¹⁹. After the EU decided to strengthen the SO_x regulation for thermal power plants from January 2016, Babcock-Hitachi, a subsidiary of Hitachi, obtained an order for desulfurization equipment worth 5 billion yen with the Polish public power company “Enea” ²⁰. These examples show that the tightening of EU air pollution regulations opens up major opportunities for Japanese companies working in the field of environment and energy technologies.

The second example concerns actual coal-fired power plants and the related technologies. In May 2010 Chugoku Electric Power entered into an agreement on technology cooperation and information exchange with PGE and Tauron, which are major electric power companies in Poland. The agreement focused on improvement of the efficiency of the coal power plant, development of CCS technology and CO₂ emission trading schemes ²¹. Chugoku Electric Power also obtained a contract for a feasibility study on high efficiency coal power plant construction ²². Hitachi Power Europe in September 2012 was awarded a contract worth 150 billion yen by Enea for construction of a coal power plant ²³.

With Poland depending on coal-fired power plants for more than 90% of its power generation, Japanese companies with their highly developed technologies for coal power plants can find lucrative markets for their expertise in Poland.

2-3: Nuclear Power Technologies

Poland today intends to introduce more nuclear power plants in order to be able to continue using coal for energy generation while decreasing CO₂ emissions. In January 2006 Russia cut its supplies of natural gas to Central and Eastern European Countries (CECs), causing an energy crisis in Poland. Since then energy

security has been a very important consideration in political and economic circles in Poland ²⁴. Developing nuclear power in order to avoid such a crisis in future has been a major issue in Poland since 2007 ²⁵. Mr. Tomasz Jakobski, a specialist in the Department of Nuclear Power of the Polish Economy Ministry, spoke at the Japan Atomic Industrial Forum (JAIF) in Yokohama in 2009, in which he expressed his expectation that Japan would participate in the nuclear development program in Poland, including technology cooperation and development of human resources ²⁶. In September 2009 a program of nuclear power plant construction in Poland was published, and in October 2009 Ms. Hanna Trojanowska, of the plenipotentiary committee on nuclear power of the Polish government, announced that 3-5 sites for nuclear power plants were being identified, that it was to government's intention to generate 15% of the country's electricity in nuclear power plants by 2030, and that the relationship between coal and nuclear power would be complementary, i.e. that nuclear power would not be threat for coal industry in Poland ²⁷. In this situation, a Hitachi-GE alliance, Westinghouse and AREVA were all interested in obtaining contracts for construction of nuclear power plants in Poland ²⁸.

Despite the catastrophic accident at the Fukushima nuclear power plant in March 2011, Poland has continued to pursue the objective of introducing nuclear power. In April 2012, Dr. Jadwiga Rodowicz-Czechowska, Polish Ambassador in Japan, told the JAIF meeting that nuclear power plants were a very important project for diversifying the sources of electricity in Poland and that the government was determined to introduce nuclear power plants ²⁹. This led to a visit of Japanese PM Abe to Warsaw in June 2013 to promote the sale of Japanese nuclear power technologies ³⁰.

With Poland also showing a positive attitude towards nuclear power, this area, too, is an attractive potential market for Japanese companies that have advanced technologies to offer their European partners.

2-4: Emission Trading Schemes

Poland also has a positive attitude to utilizing the Joint Implementation (JI) scheme of the Kyoto Protocol. The GHG reduction goal for Poland was calculated

based on the year 1988. However, after 1989 Poland was going through a transition from socialism to democracy and market economy and was also undergoing changes in its industrial structure with a switch away from heavy industries. This gives Poland greater scope for reducing CO₂ emissions and for utilizing advanced environmental and energy technologies ³¹.

Chugoku Electricity saw an opportunity in this situation. In September 2009 Chugoku Electricity concluded a deal covering 300 thousand tons of CO₂ equivalent emission rights with Kompania Węglowa utilizing methane gas capture and storage technology ³². In February 2010 the same company made an agreement covering 210 thousand tons of CO₂ equivalent emission rights in Poland ³³, and in November 2010 it began feasibility studies on cutting CO₂ emissions utilizing highly efficient Japanese technologies at a Polish coal-fired power plants ³⁴.

At present the post-Kyoto international GHGs emission framework is in a state of flux. Nevertheless, Poland and Japan can find opportunities for cooperation on emission trading schemes by exploiting Japanese environmental and energy-saving technologies.

2-5: Summary

In conclusion, there is tremendous scope for Poland and Japan to cooperate on nuclear technologies, coal related technologies and in the framework of V4+Japan initiatives and international emission trading schemes. But in Japan there is little information published about Poland's energy policies. This paper seeks to help fill that gap in focusing on energy policies in Poland, especially after EU accession.

3: Polish Energy Policies in the EU Accession

The author of the paper analyzed the process of the dissemination of EU environmental policies into Poland's before the country's accession to the EU ³⁵. The conclusion was that the EU's eastern enlargement should be seen as an "essential asymmetry ³⁶". The Central and Eastern European countries had strong incentives for accession into the EU, while the EU's incentives for eastern

enlargement were relatively low. Being in a strong bargaining position in the process, the EU set the conditions to be met by the candidate countries. To enter the EU Poland had to accept the environmental *acquis communautaire* ³⁷.

As for environmental policy, Poland also had to accept EU energy policies before its accession. Take the example of renewable energy policies ³⁸. The EU published a white paper on “Energy for the Future: Renewable Sources of Energy ³⁹” in 1997. This led to a convergence of the energy policies of the EU and Poland. In 1997 the Polish government issued a new Energy Act based on the EU white paper ⁴⁰ with particular reference to renewable energy, and the regulation of the Ministry of Economy 2nd Feb 1999 on the obligation to purchase electricity and heat from unconventional sources and the scope of this obligation was issued ⁴¹.

In 2001 the EU issued Directive 2001/7/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market ⁴², in which it set the ratio of renewable energy to be achieved by 2010. Poland followed immediately with the issue of a “Development Strategy of Renewable Energy Sector ⁴³” on 23 August 2001.

Thus it can be said that Polish energy policies before accession to the EU were a kind of “download” from the EU and EU energy policies. Karolina Jankowska aptly described the attitude of Poland at this time as that of a “policy taker ⁴⁴”.

4: Energy Policy of Poland until 2025

Poland became a member state of the EU on 1st May 2004. Before accession, Poland had downloaded the EU policies as a “policy taker”. Since accession, it has asserted its own priorities and has attempted to “upload” its domestic energy policies into the EU framework. The first step was “Energy Policy of Poland until 2050”, adopted by the government on 4th January 2005 ⁴⁵.

4-1: Objectives and Principles of Energy Policy of Poland until 2025

The policy has 3 main objectives. The first is to ensure the energy security of Poland, the second is to increase the competitiveness of the Polish economy and its energy efficiency, and the third to protect its environment from the negative

effects of energy-related activities, such as power generation, transmission and distribution of energy and fuels ⁴⁶.

Six important principles of Polish energy policy are also enunciated, namely 1: energy security, 2: ecological security, 3: security of supply energy, 4: the economic environment surrounding energy security, 5: diversification of sources of supply of fuels and energy, and 6: energy self-sufficiency ⁴⁷. The salient feature is th basis of the policy mainly on “energy security” considerations.

4-2: Long-term Action Plans until 2025

The policy contains 9 concrete long-term action plans ⁴⁸ based on the objectives and principles referred to in section 4-1 above.

The first action plan was to maintain generation capacity for domestic fuels and energy sources. For that purpose, 5 priority actions were needed; 1: ensuring security and efficiency of supply of hard coal for Poland’s economy and those of other EU countries, 2: maintaining the share of domestic natural gas in the volume of gas used in Poland, 3: ensuring sufficient supply to meet the increasing demand for electricity, 4: maintaining the significant market share of domestic liquid fuels and improving the quality of liquid fuels, and 5: enhancing the local character of demand for heat ⁴⁹. With particular reference to coal, the policy confirmed that it would be the staple fuel in Poland until 2025 and that to keep coal as the staple fuel was essential from the point of view of energy security. For that purpose, the policy stated that domestic coal mine enterprises should maintain their capacity for extracting coal to meet energy demand in Poland and should improve the technical and environmental aspects of their operations ⁵⁰.

The second action plan concerned the volume and types of stocks of fuels. There are 3 priority actions: 1: efficient management of liquid fuels stocks, including the maintenance of 90-day stocks and elaboration of a comprehensive action plan for emergency situations, 2: formulation and implementation of the rules for functioning and organization of the system of stocks and storage of natural gas, and 3: establishing proper structures for hard coal and lignite stocks ⁵¹.

The third action plan concerned transport capacities and cross-border

connections. There are 2 priority actions: 1: development of Poland's electricity, gas, and oil transmission systems, including interconnections and the creation of alternative methods and directions for supplies of imported fuels and energy, and 2: development and modernization of distribution networks ⁵².

The fourth action plan deals with the energy efficiency of the Polish economy. Establishing sustainable energy policies to improve energy efficiency in Poland is central. There are 5 priority actions: 1: reducing the energy intensity of goods at the stages of design, manufacture, use and disposal, 2: increasing the efficiency of energy generation, 3: reducing the energy intensity of industrial processes, 4: reducing energy losses in transmission and distribution, and 5: implementation of management systems for energy demand in order to increase the efficiency of energy consumption ⁵³.

The fifth action plan focuses on protection of the environment. To avoid threats to the environment from energy policies 6 priority actions are contemplated: 1: full adaptation of sources of fuel combustion for energy to legal requirements for environmental protection, 2: changes in the structure of energy carriers, 3: application of clean coal technologies, 4: limiting the impact of the hard coal and brown coal sectors on the environment, 5: application of liquid fuels with improved ecological properties in road transport and for heating purposes, and 6: implementation of mechanisms to reduce air pollution from emissions ⁵⁴.

Action plan No 6 concerns development of use of renewable energy sources. To increase renewable energy sources in power generation sector adequately, there are 6 priority actions: 1: maintaining stable support mechanisms for the use of renewable energy sources, 2: use of biomass in electricity and heat generation, 3: intensification of use of small-scale water power, 4: increased use of wind power, 5: increase in the share of bio-components in the liquid fuel market, and 6: development of the renewable energy generation industry ⁵⁵.

The seventh action plan deals with restructuring and ownership changes. In this long-term action plan, there are 3 sub action plans; 1: creation of competitive fuel and energy markets, 2: establishment of conditions enabling the emergence of

competitive entities in the fuel and energy markets, and 3: gradual reduction of the state's direct influence on the operation of energy companies ⁵⁶.

Action plan 8 concerns research and development. To develop energy related research work 3 priority actions are planned: 1: ensuring the contribution of Polish science to the global development of energy technologies and economics through concentration of resources on priority research areas, 2: efficient implementation of modern technology and management solutions, and promotion of energy knowledge in society ⁵⁷.

The ninth action plan deals with international co-operation. To strengthen Polish energy security 10 priority actions on international cooperation in energy related areas are foreseen: 1: participation in the work of EU bodies formulating the common energy policy, 2: tightening international relations for the promotion of regional cooperation, in particular in the Baltic region and in the Vishegrad Group, 3: maintaining active bilateral cooperation with neighboring countries with a view to enhancing security of supplies and ensuring diversification of supply, 4: promotion of extension of cross-border interconnections for the creation of an internal market in electricity and natural gas within the EU, 5: promotion of Polish energy entities abroad, 6: cooperation with other countries with view to securing, and proper allocation of, EU or other funds available to the energy sector, 7: Poland's participation in carrying out the common policy of the EU and in international organization, 8: international cooperation for the fulfilment by Poland of the objectives of the Kyoto Protocol with regard to emission reduction and development of trade in emissions certificates, 9: gaining membership and participation in the work of the International Energy Agency, and 10: participation in the work of the International Atomic Energy Agency ⁵⁸.

4-3: Direction of the Energy Policy of Poland until 2025

In this section, the paper highlights from the contents of the Energy Policy of Poland until 2025 three main directions of this policy.

The first is the emphasis on "energy security". In this context the policy stresses 4 main elements, namely stable supplies of energy, diversification of energy

suppliers, continuing the use of coal resources as the staple energy source and meeting electricity demand.

The second direction is the position of the Polish government that the country should continue to use coal resources until 2025 on the same scale as previously. The policy alludes to this objective in the following terms.

“As regard energy security, activities have been conducted to ensure long-term supply of fuels and energy at reasonable prices. These activities have been supported by a restructuring of the mining and extraction sector. Work has also been undertaken to contribute to the development of infrastructure for the transmission of energy and its carriers within the international energy market ⁵⁹.”

Thus, the policy of Poland centered on its “Coal Kingdom” resources marks a sharp contrast to the “low carbon society” aspirations of the EU.

The third direction relates to the change in the Polish government’s attitude to its relationship with the EU. Immediately after accession to the EU, the Polish government issued a policy based on its original energy policy thinking. Poland changed its attitude toward the EU on energy related issues from a “policy taker” from the EU to a “policy shaper” ⁶⁰. This is the most important feature of the policy.

5: The Energy Policy of Poland until 2030

Just 4 years after it issued “Energy Policy of Poland until 2025”, on 10th November 2009 the government approved a document entitled “Energy Policy of Poland until 2030” ⁶¹ produced by the Ministry of Economy. This section will discuss the contents and objectives of the new policy.

5-1: Background of “Energy Policy of Poland until 2030”

There were two main reasons why a new energy policy white paper was needed, although “Energy Policy of Poland until 2025” had been issued only 4 years previously.

The first was that energy security had come to the surface as an urgent issue, after Russia reduced its gas supplies to central and eastern European countries in January 2006. This had posed a threat to energy security in Poland and greater attention therefore needed to be paid to this question.

The second was the effect of the moves towards a low-carbon society in the EU. In the EU, the negotiation on “the Climate Energy Package”, called “triple 20”, had been started by a 2006 green paper entitled “A European Strategy for Sustainable, Competitive and Secure Energy”⁶² ⁶³. In this negotiation process, some important documents were issued by the European Commission, such as “Limiting Global Climate Change to 2 Degrees Celsius: The Way ahead for 2020 and Beyond”⁶⁴”, “An Energy Policy for Europe”⁶⁵ in January 2007 and “20 20 by 2020: Europe’s Climate Change Opportunity”⁶⁶”. The Council of Environmental Ministers and the Council of Energy Ministers had argued the issue intensively, and finally in June 2009 “triple 20” had become a directive by the initiatives of French government which held the Council Presidency in the latter half of 2008.

The EU had set itself the objective to achieve a 20% decrease in GHG emissions by 2020 compared with 1990 and in the long-term it was beginning to think about 80-95% decrease of GHG emissions. The mainstreaming of low-carbon strategy in the EU led Poland to change its energy strategy, because in its previous energy policy paper “Energy Policy of Poland until 2025” it had regarded coal resource as the main pillar of its energy policy.

5-2: Objectives of “Energy Policy of Poland until 2030”

In the policy, there were 6 main objectives⁶⁷.

The first is enhancing energy efficiency. One of the goals of the “triple 20” is improvement of energy efficiency by at least 20 % compared with the BAU (business as usual) scenario. But the energy intensity (GDP/energy unit) in Poland was about half the average of EU member states, therefore enhancing energy efficiency was an urgent issue for Poland to deal with. So there are 2 main priority actions; 1: to achieve “zero-energy growth”, i.e. economic growth with no extra demand and 2: reducing the energy intensity of Polish economy to the EU-15 level⁶⁸.

The second is enhanced security of fuels and energy supplies. This objective intended to secure fuels and energy supplies to meet domestic demand at acceptable prices for the Polish economy and Polish society. For that purpose, the effective and efficient management of resources in Poland was essential. In the policy, therefore, coal continues to be regarded as the main energy resource in Poland until 2030. There are 4 main priority actions to this end: 1: ensuring energy security for Poland by meeting domestic demand for coal, ensuring stable supplies to customers and the required qualitative parameters, 2: use of coal in energy industry by application of efficient and low-emission technologies, including coal gasification and processing of coal into liquid or gas fuels, 3: 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, and 4: maximum use of methane released when extracting coal in mines ⁶⁹.

The third objective of the new policy is diversification of the structure of electricity generation by introducing nuclear energy. To secure energy security in Poland, meeting domestic demand of electricity is, of course, important, but on the other hand to secure environmental security is also important. Poland, in the policy, intended coal to be the central pillar of the energy structure, therefore to secure both energy and environmental security nuclear power, which does not emit GHGs and generates a stable electricity supply, was needed. The new policy was the first time that the Polish government declared a positive attitude toward nuclear power officially ⁷⁰.

The fourth is development of the use of renewable energy sources, including biofuels. There are 5 main priority actions; 1: increasing the use of renewable energy sources in final energy use to at least 15% in 2020 and further increases in the following years, 2: increasing the share of biofuels in the transport fuels market to 10 % by 2020, and increasing the use of second generation biofuels, 3: 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 to preserve biodiversity, 4: using the existing weirs owned by the State Treasury for power generation, and 5: increasing the diversification of supply sources and the creation of optimal conditions for distributed power generation based on locally available resources ⁷¹.

Objective No 5 is development of competitive fuel and energy markets. There are 9 main priorities; 1: enhancing diversification of sources and directions of supplies of natural gas, crude oil, and liquid fuel, 2: removing barriers to switching between electricity and gas suppliers, 3: developing the competition mechanism as the primary means of rationalizing energy prices, 4: regulating the fuel and energy market in areas characterized by natural monopoly in a way which ensures balancing of interests of all market participants, 5: reducing regulations where a competitive market functions and is developing in its own way, 6: participation in building a regional electricity market, in particular enabling international exchanges, 7: 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, 8: establishing a liquid spot market and an electricity futures market, and 9: introducing market-based methods of heat price fixing ⁷².

The final sixth objective is mitigating the environmental impact of the power industry. Based on the newly adopted concept of “zero-energy growth” and the introduction of nuclear energy, there are 5 priority actions; 1: reducing CO₂ emission by 2020, while maintaining a high level of energy security, 2: reducing emission of SO₂, NO, and dust, including PM₁₀ and PM_{2.5}, to the level set forth in the current and drafted EU regulations, 3: reducing the negative impact of the power sector on the condition of surface water and groundwater, 4: minimizing waste dumping by re-using waste in the economy to the greatest possible extent, and 5: changing the structure of energy generation towards low-emission technologies ⁷³.

5-3: Directions of Energy Policy in Poland until 2030

There are 3 important directions in the policy.

The first is that the policy has clear numerical targets influenced by “triple 20” in the EU, compared with Energy Policy of Poland until 2025 (table1). The numerical targets are harmonized with the main objectives of the policy, such as energy supply based on coal resources, diversification of energy supplies, introducing nuclear power, development of renewable energy, and improvement of energy efficiency.

The second is that the policy clearly describes the introduction of nuclear energy to solve the problems of both energy security and reduction of GHG emissions. One and a half years after adoption of the new policy adopted by the Polish government, the Fukushima nuclear power plant suffered a catastrophic accident following a major earthquake and tidal wave in north-east Japan. The Polish government has not, however, changes its policy decision to introduce nuclear power as a result.

The third direction of the policy is the new concept “zero-energy growth” to encompass the first and second directions. The concept signifies economic growth not accompanied with growth of energy consumption. Under the concept, a series of policy objectives, such as improving energy efficiency, introducing nuclear energy, and development of renewable energies, are justified. Today for the mitigation of climate change emerging economies and developing countries also need such a concept. Therefore, the success or failure of the concept in Poland deserves wider attention.

Table 1: Numerical Targets of Energy Policy of Poland until 2030

Index	Baseline (2007)	Target (2030)
Annual Average Change in Primary Energy Consumption in the Country since 2005 (%)	2.7	Below 1
Hard Coal and Lignite Extraction to Domestic Consumption Ratio (%)	105	Over 100
Maximum Share of Total Natural Gas and Crude Oil Import from Single Direction in the Domestic Consumption of Both Those Resources (%)	85	Below 73
Generation Capacity of Domestic Generation Sources (Conventional and Nuclear) to Maximum Demand for Electricity Ratio (%)	130	Over 115
Share of Nuclear Power in the Electricity Production (%)	0	Over 10
Share of Energy from Renewable Sources in the Final Consumption of Energy (%)	7.7	Over 15
Annual Emission of CO2 in Utility Power Generation as Compared to the National Electricity Generation (tons/MWh)	0.95	Below 0.7

[Source : Ministry of Economy(2009), p.26]

6: Conclusion

The paper mainly focused on “Energy Policy of Poland until 2025” and “Energy Policy of Poland until 2030” and examined their contents and the directions of the policy, against the background of the adverse attitudes towards coal-fired generation in the world and the EU’s own movement toward a low-carbon society, as illustrated by the “triple 20” directive. On the basis of the analysis, this section will show the further research topics to be expected.

In November 2013, the UNFCCC COP19 was held in Warsaw, Poland. Some of the partners of the conference were the major steel company Mittal and Alstom, which is a major supplier of coal-fired plants in Poland. Some environmental NGOs criticized such attitude of Polish government as chair country⁷⁴. The Polish Ministry of Economy held “Climate Coal Summit” in Warsaw alongside the COP19, to promote the continued use of coal which emits large amounts of CO₂ and is regarded as the “enemy in climate change”⁷⁵.

The reality in Europe in 2013 has also made the situation complicated. Because of the German’s decision to phase out nuclear power, the so-called “Shale Gas Revolution” in the U.S., and the economic recession in Europe, the use of coal in Europe has been rehabilitated. The “Shale Gas Revolution” has brought cheap coal from the U.S. into European countries. At the same time, natural gas prices remain at a high level. As a result of the recession in Europe, the demand of electricity has fallen, while expensive electricity from renewable energy, such as wind and solar PV, has increased. According to Credit Suisse, the price of electricity produced from natural gas is 6cent/1KWh, from coal 3.6cent, and from lignite 2.5cent⁷⁶.

The relationship between climate change, energy and economic development is surely a tight nexus. The efforts by Poland to achieve low emissions of GHGs, energy security by domestic coal-based energy structure, and economic development, are a remarkable case stud when considering a roadmap towards a low-carbon society in emerging and developing societies.

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