

The Strategy of Energy as a Good Opportunity for Protection of the Environment in the Republic of Kosovo

Vehebi Sofiu,¹ Amantina Pervizaj,² Bekim Selimi,³ Edmond Erxhepi⁴

¹, International Postgraduate School "Jozef Stefan", Ljubljana, Slovenia
^{2, 3, 4}, South East European University "UEJL", Tetovo-Macedonia

Abstract: The power supply system in Kosovo is mainly thermal and is one of the only potential opportunities to become possible exploitation of this natural resource including the fossil burnings as the biggest pollutant of the environment with CO₂. Also, the strategic position that Kosovo possesses makes possible the completion of fossil energy with pure renewable energy, enabling energizing opportunities of energy suppliers and consumers, district heating pipelines, heating of storage facilities and electricity transmission lines both in cities and region. Production and distribution of energy has taken an increasingly significant role in the energy market and has become a regional indispensability. In this strategy is presented a model for structural and operational optimization of development which is presented as a model of efficiency for the production and consumption of the electricity, heating, transport of fuels in production plants, water transport in district heating pipelines and accumulation of heating. The problem is formulated as comprehensive unfulfilled problem in terms of not achieving the objectives in the short-term and medium-term strategic plan that in front of itself presented the Republic of Kosovo. The strategic solution provides structural development, ie. which are predicted for them to have their units of production, heating transportation lines and warehouses for storage of coals which should be built upon a construction of a new power plant, as well as their spaces to be together with the designing parameters for plants and district heating pipelines of the Pristina city. Such a model enables an integration of all suppliers, consumers of all categories and coordination with relevant authorities in order to form a common view of different situations as a basis for decision-making based on a regional energy policies drafted according to projects with the guidelines of treaties to the communities of energy signed as a member.

Keywords: Energy strategy, protection of environment, energy systems, optimization;

I. Introduction

Review of Energy Strategy is based on the program and the decisions of the Government of Kosovo, the document of the medium-term sectorial policies, as well as a number of relevant studies and analyzes. Particular attention is paid to the compatibility of this strategy with the *acquis* of the European Union, these mandatory *acquis* for Kosovo within the membership of the Energy Community Treaty. The Kosovo Energy Strategy also aims the effective management of the existing energy resources and environment protection. It focuses on increasing the security of supply according to European standards and the diversification of energy sources. This strategy aims to stimulate the rational use of energy and increase the efficiency of its use, the use of renewable energy sources, the introduction of new technologies that do not irreparably damage the environment while respecting the application of internationally accepted environmental standards. This strategy involves a 10-year period, representing a clear document that is developed based on relevant documents and studies. Measures for the implementation of the revised strategy include the medium-term up to 2015, and the long-term until 2025. Goals and measures set out in this document constitute a clear vision for some key aspects of high interest for the development of the energy sector during the decade 2009-2025 [1].

Policies, legal framework and institutions of the energy sector

Development of policies, organization, regulation and management of the energy sector in the Republic of Kosovo are conducted through a set of laws that are generally in line with the directives of the European Union (EU) for energy, while sector institutions including government, regulatory and energy enterprises for all possibilities of exploitation of natural energy resources include and those subsidized ones.

II. Legal framework

Laws, regulations and below highlighted decisions of the Government constitute the legal basis for the organization and management of the Kosovo Energy Sector:

Law on Energy No. 2004/8;

Law on Energy Regulator No. 2004/9;

Law on Electricity No. 2004/10;

Law on Spatial Planning No. 2003/4;

Regulation on Mines and Minerals No. 2005/3;

Regulation for the Independent Commission of Mines and Minerals No. 2005/2, respectively Law on Amendment of the Regulation on the Establishment of the ICMM;

Law on Environmental Protection No. 2003/9;

Law on Trade of Petroleum and its Derivatives No. 2004/5;

Law on Scientific Research Activities No. 2004/42;

Regulation for the Long-term Allocation of the Real Estate of Social-owned Property, managed by municipalities in Kosovo No. 2005/13;
Law on Foreign Investment No. 02/2005;
Government's Decision to restructure KECJ.S.C., No. 06/2005;
Government's Decision for unbundling of KECJ.S.C., No. 04/36, 2008;
Government's Decision on the Establishment of the Company for Distribution and Supply of Electricity No. 03/38, 2008; and its privatization through private tender No. 03/38, 2008 and No. 08/39;
Law on Public Enterprises No. 03/2008;
Government's Decision on ownership policy of the Central PE No. 11/39 and No. 13/39;
Law on competition No. 36/2004; and
Government's Decision on the possibility of energy project development of the Hydro Power Plant Zhur, No. 02/40 2008 [2].

KOSOVO ENERGY CORPORATION is the Kosovo public company which is included into its ownership and operates with the assets of generation, supply and distribution of electricity in the phase of privatization and lignite mining. From 1999 until late 2006, is managed by international staff while from January in 2007 was followed by technical assistance, also from a foreign company. However, such technical assistance, along with local management, by the end of 2008 failed to make KEC financially viable due to the low rate of collection and large losses, since 2009 the Kosovo Energy Corporation is governed by local management and this made possible to be a financially stable company making progress for every year in all fields (production, collection rate, losses) from production to energy distribution [2].

TRANSMISSION SYSTEM OPERATOR (KOSTT J.S.C.) was founded in 2006, in accordance with the unbundling provisions of the Law on Energy and conditions of the Energy Community Treaty. KOSTT j.s.c. is a public owned company, responsible for the operation, planning, maintenance and development of the transmission network and its interconnections with neighbouring power systems, in order to maintain security of supply in Kosovo. In addition, KOSTT j.s.c. is responsible for the functioning and operation of the wholesale electricity market in Kosovo. The main source of incomes for KOSTT j.s.c. comes in the form of transfer payment paid by KEC j.s.c. as defined by ERO. In the strategic plan the system operator is in the modernization of contemporary technologies of power lines and facilities [2].

III. Production of lignite and electricity

Electricity sector in Kosovo is dominated by thermal production of KEC j.s.c., a vertically integrated system, with the exception of the transmission system that is not a part of KEC j.s.c. KEC j.s.c. is consisted of two lignite mines in Bardh and Mirash, two thermal power plants with lignite burning Kosovo A and B, with the overall effective capacity of 740-1000 MW (with an installed capacity of 1878 MW), from the distribution network, and from supply which is in the stage of privatization in May 2013 [3].

IV. Production of lignite

In the long run lignite will remain the main fuel for production of electricity in Kosovo. The reserves of lignite in Kosovo are found in two major basins, labeled as "Kosova" and "Dukagjini". Geological lignite reserves are estimated to be about 14 billion tons (this includes all categories of reserves) [4].

V. Generation of electricity

The assets of generation in table 1, distribution and lignite mining are operated by energy sector of the public company of KEC j.s.c. KEC j.s.c. suffers from major financial, technical, personnel (number of employees) and managerial problems. Most of the generating capacity of KEC j.s.c. is in two thermal power plants of – Kosovo A and Kosovo B. Technically installed capacity of two thermal power plants, despite their long-standing approximately 24-46 years, would be able to meet consumption demands for basic electricity, but, due to the degradation and lack of investment in the lignite sector and the thermal power plants in Kosovo during 1990-1999 period, then, deficient maintenance, and no indispensable and timely rehabilitation, technical readiness and performance of generating units, despite the continuously identified growth up to 2008 are below the level of installed parameters. Table 5 summarizes the data for thermo-electro-existing generating capacities in Kosovo. Kosovo operates only about 43 MW of installed capacity in hydro power plants, though it possesses more hydro potentials [5].

Tabele 1: Energy generation's in Kosovo					
Block of the thermal power plant	Capacity of block of the thermal power plant MWh			Type of fuel	Starting year of the work (long-standing)
	installed	Threshold	Net available		
TC KOSOVO A					
Block A1	65	58	0	LIGNIT/FIRED OIL	1962
Block A2	125	113	0	LIGNIT/FIRED OIL	1964(44)
Block A3	200	182	110-120	LIGNIT/FIRED OIL	1970(38)
Block A4	200	182	110-120	LIGNIT/FIRED OIL	1971(38)
Block A5	200	187	125-130	LIGNIT/FIRED OIL	1975(33)
TC KOSOVO B					
Block B1	339	309	240-260	Lignit-Mazut	1983(25)
Block B2	339	309	200-280	Lignit-Mazut	1984(24)

VI. Transmission of electricity

The transmission system is managed by the Transmission System and Market Operator (KOSTT j.s.c.). Kosovo is a contracting party to regional Energy Community and is connected to the regional system through interconnections with Serbia, Macedonia, Montenegro and Albania. The overall length of transmission lines (400 kV, 220 kV and 110 kV) is 1,187 km. Most of the transmission lines are put back in operation, after the overwar repairs, while some of the substations are still in bad technical situation. Transmission network of 400 kV and 220 kV of Kosovo is an integral part of regional interconnection system figure 1[6].

Linking with regional power system



Figure 1: Managed system in Kosovo

VII. Protection of the environment

Protection of the environment is in the legal mandate of the Ministry of Environment and Spatial Planning (MESP). However, this strategy should be dealt with the environment from the energy sector standpoint. Emission of current gases, dust and discharge of contaminated waters from existing thermal power plants, due to outdated technologies and improper operation of equipment and plants are above the levels permitted by relevant Directives of the European Union (EU). The Final Report of the Strategic Environmental and Social Assessment (SESA) was completed in November 2008, after consultation with experts and the public. This report, in the strategic level, involves issues and environmental and social impacts associated with the existing situation and development of energy sector and lignite in the wider region of planned New Mine. The report of SESA explores and examines the results of strategic solutions that the Government of Kosovo and investors in the future should undertake in the context of improving the situation and development of the project of New Kosovo. The most significant development options from environmental and social perspectives are analyzed and related to construction location of the TPP of New Kosovo, scheme and dynamics of mine development, the size of TPP's blocks, selection of technology, and the development pace of the project in relation to the demand of output power level and the remaining operational life of existing thermal power plants, especially of TPP of Kosovo A.

VIII. Project of 'New Kosovo'

In order to have a sustainable development of the energy sector, the Kosovo government is planning the involvement of expertise and private capital from abroad. The World Bank is supporting Kosovo in its efforts to attract investment for the development of the project of "New Kosovo", through Technical Assistance Project of Lignite Energy

(TAPLE). This effort is also supported by the EU through the Funding of Study Options, as well as other technical studies that are in the function of TAPLE. The project of “New Kosovo” anticipates the construction of a new thermal power plant in two phases. The first phase includes the capacity of 1000 MW and the second phase, later, with the same capacity of 1000 MW. For these units will be developed the relevant mining of lignite and development of installed capacity up to 2000 MW. The main objectives of TAPLE are: (a) the Government’s support in strengthening the policy, legal and regulatory framework that enable new investments in the energy sector; and (b) the Government’s support to attract qualified private investors for the construction of the new thermal power plant with lignite, based on high principles of environmental and social sustainability [3].

IX. Regional and European integrations

Kosovo is strongly committed to European integrations. The energy sector of integration process takes place on two fronts: (I) participation in the Energy Community, and (II) integration process in Europe in the framework of the Tracking Mechanism for the Stabilization and Association.

X. Energy Community Treaty

Kosovo is a signatory to the Treaty of Energy Community Establishment (ECT) of Southeastern Europe, which entered into force in June 2006. In this context, the Government of Kosovo is substantially committed to develop the energy sector in accordance with the requirements of the ECT. This Treaty obliges an implementation of ‘Acquis Communautaire’ of the EU by each Contracting Party according to a timetable for the implementation of the required reforms.

European Integration Process for Kosovo

The Tracking Mechanism of Stabilization and Association (TMSA) is designed to provide Kosovo the expertise and the political leadership of the European Commission, in order to assist the Kosovo authorities to take advantages of various instruments of the Stabilization and Association process.

Table 2: Two scenarios of the GDP’s rate of growth [%] for the period 2009-2018

Scenario	2009-2010	2011-2014	2015-2018
Medium	3.20	3.10	3.00
High	6.20	5.29	5.00

Regular meetings are held to assess the progress made in Kosovo in terms of political, economic and institutional reforms in accordance with the conditioned Stabilization and Association Process of the EU. The European Commission regularly monitors progress in the Stabilization and Association Process in Kosovo by STM. European Partnership and its Plan of Action (EPPA) presents a framework for monitoring progress that Kosovo is making a year-on-year in terms of the European Community. The Institutions of Kosovo are strongly committed to the implementation of EPPA which on one hand provides all steps for reform and on the other hand directs the assistance of the European Community to Kosovo.

XI. Anticipation of energy demand

In the context of plans for economic development of the country and anticipation of energy demands as more realistic are supposed two scenarios of rate of growth of the Gross Domestic Products (GDP) for the period 2009-2018 as shown in Table 2.

Anticipation of electricity production in Kosovo for the period 2009-2018

During the entire period 1999-2008, the annual output of electricity from local sources was below the level of demand. The current level of the local annual production of electricity is about 4300 – 4600 GWh. Electricity production forecast for 2009-2018 period is based on the production of electricity from thermal power plants of Kosovo B, Kosovo A, hydro power plant of Ujman, the existing and the new distributive hydro power plants, HPP of Zhur and from production of the “New Kosovo” thermal power plant. Coverage of demand for electricity is expected to achieve the following: Production of electricity in thermal power plant of Kosovo A with operating Blocks A3, A4 and A5. The implementation of the European Directive for Large Plants burnings, the units of the HPP of Kosova A will be de-commissioned by the end of 2015.

Production of electricity in thermal power plant of Kosovo B with operating blocks of B1 and B2. In 2016 and 2017 are expected to be carried out and realized the revitalization projects to meet environmental demands required by the European Directive for Large Plants burnings. Then, these blocks will be able to continue commercial operating even 15 years after the revitalization, respectively by 2030.

Electricity production in Hydro power plant of Ujman, which with maintenance and revitalization will be into commercial operation in the long run period.

Electricity production from distributive hydro power plants.

Electricity generation from hydro power plant in Zhur, which is expected to be built by 2015 and put into commercial operation by 2016.

Electricity production in the new blocks of the TPP of New Kosovo is expected that the first generating block to be put into commercial operation by 2016.

In the period 2010-2018 will be built and put into operation more than 16 small hydro power plants with total installed capacity greater than 60 MW. Meanwhile, will be rehabilitated and put into use and the small existing hydro power plants.

For a certain period in future until the activation of the TPP of New Kosovo, coverage of the electricity balance will be achieved through import.

Based on the above receptions, for the period 2009-2018, the production of electricity from local generation plants is expected to be as shown in the following Table 3[4]

Table 3: Prediction of electricity production [GWh]

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
TPP of Kosovo A	1300	1300	1300	1450	1450	950	500	0	0	0
TPP of Kosovo B	3300	3300	3300	3300	3300	3300	3300	2500	2500	3400
TPP of New Kosovo	0	0	0	0	0	0	1750	5500	7500	7500
HPP of Ujman	79	79	79	79	79	79	79	79	79	79
HPP of Zhur	0	0	0	0	0	0	398	398	398	398
Distributive HPP	42	100	125	150	175	200	210	225	240	250
Total	4721	4779	4804	4979	5004	4529	6237	8702	10717	11627

Electricity supply of Kosovo for the period 2009 – 2018

Supply of electricity in the period 2009 – 2018 will be conducted through domestic production and imports which will be needed by the end of 2015. In 2016 is expected to put in operation the first block in the thermal power plant of New Kosovo and definitely there will be no need for imports. Amount of electricity import depends on the control of its consumption, mostly from the elimination of commercial losses. Demands according to above described scenarios and the estimated production of electricity for the period 2009–2018 are summarized in Table 4[5].

Table 4: Supply of electricity in the period 2009 – 2018

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Demand [GWh]										
SMK	4994	5226	5418	5621	5834	6059	6295	6500	6715	6939
SLK	5299	5514	5713	5929	6164	6422	6662	6898	7153	7431
Production	4721	4779	4804	4979	5004	4529	6237	8702	10717	11627
Balance [GWh]										
For SMK	-273	-447	-614	-642	-830	-1530	-58	2202	4902	4688
For SLK	-578	-735	-909	-950	-1160	-1893	-425	1804	4464	4196

Supply of thermal power plants with lignite for the period 2009-2018

Demands for lignite to supply the existing thermal power plants and the TPP of New Kosovo (for the first phase up to 1000 MW) are shown in Table 5.

In these demands of coal are not included the market demands for the crude and dried coal[5].

Table 5: Demands for coal in tonnes

Year	TPP A	TPP B	TPP New Kosovo	Market	Total
2009	2405	4785	0	50	7240
2010	2405	4785	0	70	7260
2011	2405	4785	0	100	7290
2012	2683	4785	0	110	7578
2013	2683	4785	0	120	7588
2014	1758	4785	0	130	6673
2015	925	4785	1925	150	7785
2016	0	3625	6050	160	9835
2017	0	3625	8250	170	12046
2018	0	4585	8250	180	13015



Figure 2: Ring of natural gas to Western Balkans

XII. Energy efficiency to be applied

Under the provisions of the Energy Community Treaty, Kosovo is committed to increase the share of energy obtained from renewable sources in its generation portfolio. The government has set a target for Kosovo, which is an achievement of energy proportion from renewable sources from 7% till 2016. Energy efficiency is an important additional tool for achievement of this goal. Also, with this will reduce the release of gases of greenhouse effect, consumers will reduce their energy bills, as well as demand in general, at least in relative terms. It is clear that an increase in the energy share from renewable sources is important for Kosovo in terms of diversification of energy sources and almost complete dependence from generating capacities with lignite burnings.

Fulfillment of anticipations for the production of energy from RES represents a long-term objective that relates to compliance with the obligations of ECT. Increased EE and use of RES will contribute to the realization of three of the country's energy policy goals: support for overall economic growth, increased security of energy supply and environmental protection [7].

XIII. Measures to be taken

In order to implement the aforementioned policies and measures, the Government will:

In 2009, prepare the National Action Plan for Energy Efficiency, as defined by the 'Task Force' on Energy Efficiency of ECT;

Transpose the EU Directive for Energy Services in the law and local regulations during the period 2009-2010;

Meet the existing legal and regulatory frameworks for energy efficiency and renewable sources in compliance with the requirements of the ECT, including the Law on Energy Efficiency which will establish the Agency for Energy Efficiency and Energy Efficiency Fund and Renewable Sources;

Define and adopt a strategy for heating sector, based on the study of heating market in Kosovo (2007), including the option of connecting the central heating system of Pristina with the thermal power plant of Kosovo B;

Review existing policies and adopt incentives that will support the development of renewable sources sector;

Cede with concession the construction of the hydro power plant of Zhur, after being subjected to acceptable feasibility studies, environmental and social security measures and go through the public consultation process;

Identify and evaluate, during 2009 and 2010, other small existing hydro-potentials in Kosovo;

By the end of 2011, cede under concession building of all small identified hydro power plants to private investors and that will be identified during 2009-2010 through a transparent and competitive tendering process;

Zhvillojë dhe fuqizojë, deri në fund të vitit 2009, masat stimuluese fiskale për promovimin e efikasitetit të energjisë dhe teknologji të energjisë së ripërtëritshme;

By the end of 2010, develop a comprehensive programme for the promotion of private investments in energy efficiency projects and renewable energy; and

Ratify the Convention Framework of the UN on Climate Change and the Kyoto Protocol as soon as possible [8].

European Integrations and International Cooperation

European integrations, as a top priority of the Government of Kosovo in the energy sector, will continue to be implemented through:

Tracking Mechanism Process for Stabilization and Association with EU (STM),

Participation in the Energy Community Treaty (ECT), and

Development of Bilateral Cooperation.

MEM will continue to coordinate work for well-being of activities of the energy sector within the implementation of the Tracking Mechanism Process for Stabilization and Association with the EU. Annual reports of the European Community for Kosovo pay special attention to the energy sector. They identify progress and challenges for the future. These challenges

will be constantly in the focus of institutional work of the energy sector. MEM will continue to take appropriate measures for each challenge to prepare a concrete plan of measures and undertake proper activities to overcome it [9].

Development of local institutional capacities

Capacity development of policy-making, regulatory and managerial represents another significant challenge for Kosovo that relates and directly affects the implementation of this Revised Energy Strategy. The Government each year will allocate funds from its budget for the development of human capacities, as well as will encourage and support the energy and mining regulatory entities to act in the same way. But the only support of budget will not be sufficient, so it's required and expected that in the framework of cooperation with international donors to provide support for human capacity development in the field of policy-making, economic regulation of energy sector and management of energy companies. This assistance has not missed until now, but it should be increased because the challenges facing the energy sector currently are larger.

Development of research capacities and application of new technologies is another field where attention and support are required. The Government is committed in this respect and will support scientific research institutions and universities in the best focus of their work in the development of research capacities, introduction of new technologies and their application in Kosovo [10].

Measures for the implementation of the Energy Strategy

Implementation programme of Energy Strategy (IPES) for the period 2009-2018 will include:

Those measures and projects (revised as needed) that have not been financed and implemented during the period 2006-2012 and are considered as priority and required by this revised energy strategy;

Measures and new projects that have been identified and included in this revised energy strategy for the short-term and the medium-term;

Concrete proposals related to manner of funding for each measure, programme, or project involved in it (including funding under the MTEF during 2009-2012, or by concrete donors); and

A measure for institutionalization of local inter-institutional cooperation for the implementation of the IPES during 2009-2012. IPES during 2009-2012 will consider in particular and the projects presented in the Donors Conference for Kosovo, held in Brussels on 11 July 2008. IPES in advance will consult with MEF and the main donors in order to achieve its better funding for the three years 2009-2012. Coordinate the preparation of IPES during 2009-2012 will be made by MEM during the period from February to March 2012. IPES during 2010-2012 is presented for approval by the Government of Kosovo and completed as a whole and was adopted by the Assembly of Kosovo [11].

XIV. CONCLUSION

Based on the priority list related to electricity production opportunities, and, in conformity with the European directives on renewable energy, Kosovo includes 20% of it regarding to climatic and geographic conditions. Today, for this reason, Kosovo has its natural coal resource which makes up over 97 % of electricity production with the outdated and amortized equipments that, in general, are the biggest polluters with CO₂ in Kosovo. In general, in order to reduce the emissions according to EU standard, in the thermal power plants of Kosovo are installed filters and protective equipment for the purpose of CO₂ reduction which probably is one of the shortcomings that the Kosovo thermal power plants are being faced with. These evasions can be achieved putting into operation and the other resources of the renewable energy being efficient with exploitation of natural resources. From these possibilities can be clearly seen that the number of advantages with benefits significantly exceed the number of deficiencies in relation to the requirements of developing technologies protecting the living environment from climate change on the occasion of the global warming and measures taken by the effects of greenhouse gases, putting in use the management and monitoring of the types of efficient energy. In general, the legal and regulatory infrastructure for renewable energy sources in the Republic of Kosovo is unified as that of the European Union, according to relevant directives of the Law on Energy Efficiency that has been put in use by the European Union for RES and their further institutional development until 2020 according to the parity 20+20+20, and at the same time this is the strategic goal of the Republic of Kosovo aimed to energy and technology development.

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