

Energy efficiency, renewable resources (their application) and energy strategies in Kosovo

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Abstract

Management of energy efficiency, exploitation of renewable energy resources (RES) and the improvement of efficient use of energy by the end users (EE) can contribute in reducing primary energy consumption, reducing greenhouse gas emissions, thus preventing dangerous climate change. Untapped potential of biomass, solar energy, hydro energy, wind energy and geothermal resources is still high. However, in recent years, due to the significant public incentives in the form of feed in tariffs, in many European countries the development of this sector has been continuously increased. The EU approved its strategy to combat climate change and approved a plan for a sustainable European growth in 2020, which sets ambitious objectives in terms of energy (the so-called 20-20-20 objective). Moving towards an economy emitting less carbon requires a public sector able to identify and support economic opportunities. In particular, the local public sector can play a strategic role as a manager of the territory and the last executor of public policies. Therefore, in the field of sustainable energy, it is necessary to strengthen the capacities of local public sector by delegating functions to its employees.

Keywords: Energy efficiency, renewable resources, energy strategy, Kosovo.

Introduction

Energy is the physical size that represents the working capacity of a matter (body). Energy (like materia) can neither be created nor destroyed, rather it transforms from one form to another (Berisha, 2007, 12). The Law No. 03/L-184 on Energy, which in total includes 35 articles and 9 chapters, has been approved in the Republic of Kosovo. Energy sector, especially the one for generation of electricity, continues to be one of the most problematic sectors in Kosovo. Consumers, such as households and businesses are facing with poor quality and unreliable supply of electricity, which has become the barrier to economic development.

The purpose of this paper is to assess the current state of energy, taking into account the energy and its resources for energy consumption in general. Application of efficiency, energy management and changes subsequent to the application of measures of energy efficiency are measures that would impact on improving the quality of energy services. Another element of the purpose of the paper is the handling the application of energy efficiency, and that the use of renewable energy sources will significantly reduce the cost of electricity and dust emissions will be reduced by more than 90%, those of SO_x and NO_x by 70% and there will be no increase in carbon dioxide emissions per unit of electricity produced.

Expected results

An initial and concrete step that would encourage individual investment in EE would be the fiscal measures of the government regarding the taxation of imports of materials and services that are directly related to energy efficiency. Exemption from taxes on finished products or semi-products used for implementation of EE projects would make EE projects more attractive. This would bring other economic benefits in creating jobs in the contracting companies implementing the projects.

The methods used for the research:

Gathering of data for the assessment of this Project is done in two methods:

- research of secondary data;
- interviews

With regard to secondary data, sufficient and productive material has been collected by the Government institutions, non-government organizations, KEK, the World Bank etc. Study results presented here are based on the survey conducted with the consumers of services (public institutions) and households, according to the following categories:

- heating of spaces;
- heating of sanitary water;
- cooking, and;
- no-thermal use.

Energy Strategy

The key objective of the Ministry of Economic Development, responsible for energy, is the provision of reliable and secure energy to all customers, taking into account the preservation of the environment, the use of energy efficiency, diversification of energy sources and the promotion of the use of renewable energy sources.

Kosovo options for electricity supply depend on the limited availability of renewable resources, old power generation plants, in which the citizens cannot rely much; supply shortages in the Balkans that limits the ability of Kosovo's ability to import electricity, including the absence of any natural gas resources or pipeline to import gas.

The Government of Kosovo¹ is interested to ensure adequate and reliable power supply for its citizens and improve energy efficiency nationally. Kosovo also wants to shut down a 40 year old plant called Kosovo A, which is one of the worst sources of pollution in Europe.

The combination of the power supply under consideration by the Government of Kosovo would include a 300-MW hydropower plant, 60 MW from small hydropower plants and 395 MW in wind, biomass and biogas-fired power generation, as well as a proposed 600-MW coal power plant that would enable Kosovo to shut down Kosovo A power plant and eliminate supply shortages that cripple the economy of Kosovo.

Options Study of the World Bank compared projected economic and environmental costs for the 600-MW lignite plant, a 575-MW natural gas plant and a 575-MW fuel oil

¹ Strategy on Energy of the Republic of Kosovo for the period 2009-2018.

plant. This study found that the lignite power plant is the lowest-cost option, taking into account the environmental costs.

Calculations provided by the Ministry of Economic Development² indicate that after the start-up of a new plant, the closure of Kosovo A and rehabilitation of Kosovo B, dust emissions will be reduced by more than 90%, those of SO_x and NO_x by around 70%, and there would be no increase in carbon dioxide emissions per unit of electricity produced.

The three distinguished energy experts that comprise the independent panel are: Dr. János Beér, Dr. Wladyslaw Mielczarski and Dr. Derek Taylor. In their review of the project, they noted Kosovo's fragile, post-war economy, its limited capacity for growth and they agreed that the supply of secure and affordable electricity is vital for its development and stability. The panel of experts unanimously agreed that the project met the six following criteria, subject to certain modifications and recommendations to the government:

1. There would be a demonstrated development impact of the project, including improving overall energy security and reducing power shortage. The new power plant, together with a modernized Kosovo B, should result in increased system reliability and fewer power shortages.
2. Assistance is being provided to identify and prepare low carbon projects. This work includes an assessment of renewable energy resources, a prefeasibility study for small hydropower, updating an existing feasibility study for a hydropower plant at Zhur, assistance for studies on carbon capture and storage and a proposed credit for energy efficiency improvements and renewables.
3. Energy sources are being optimized and considerable efforts are being made to improve energy efficiency. There is a need for increased efforts to reduce energy demand and the technical and commercial losses related to electricity supply and to promote energy conservation.
4. After full consideration to viable alternatives it was agreed that the project would represent the least cost option for Kosovo, including taking into account environmental costs. The Expert Panel also agreed that renewables should play an important role in the future energy mix with the construction of the Zhur hydropower plant, additional small hydro and wind power, sustainable biomass and biogas. The Panel noted that significantly increased renewables and, eventually, natural gas would require a more regional approach to energy markets and more interconnections with neighbouring countries than are available today.
5. The project would be designed using the best appropriate available technology for high efficiency. The Panel strongly urges the Government of Kosovo to encourage bidders to provide a plant with the highest possible efficiency rather than simply meet a minimum efficiency level.
6. Environmental externalities are being incorporated in project analyses. The Panel noted the importance of establishing baseline emissions, especially for carbon dioxide and other greenhouse gases, to quantify the expected benefits. This will require greater monitoring capabilities. The Panel also recommended that studies continue to assess the impact of possible future carbon price variations on the economics of

² Strategy on Energy of the Republic of Kosovo for the period 2009-2018.

lignite-fired power plants in Kosovo.

Opportunities and risks

The challenges of Kosovo in the energy sector are great, as the generation of electricity relies on coal-fired power plants. For decades, generation of electricity is focused on the use of coal without paying much attention to environmental issues. Development of databases for energy consumption for public institutions, households, industry, transportation services would enable the identification of energy consumption and creation of results monitoring process (Weedy, 1972, 35).

Energy consumption will considerably grow in the coming years and decades. The Kosovo's Energy Strategy envisages an annual growth according to 2 scenarios of economic development: low scenario - 3%, the high scenario - 5%. The strategy energy paper 2009-2018 and sector relevant laws provide a framework for the implementation of energy efficiency in the Republic of Kosovo. With the implementation of adequate policies and measures, the effects of energy efficiency measures and other measures such as thermal isolation of buildings and improvement of household appliances are expected to reach average savings of 10-15% (USAID 2008) and more. Despite the increase of EE in household appliances, the energy consumption in SEE countries, until 2027, will increase by 2% per year. If the EE measures would not be implemented in the coming decades, the consumption would dramatically increase. Improvement of EE cannot be done without investment and without costs. Investments in this area, however, provide economic value not only in reducing energy bills and energy imports, but also in increasing employment and competitiveness of products. As a contracting party of the Energy Community Treaty (ECT) and a member of the Task Force of EE-TEC, Kosovo has drafted a national plan for energy efficiency. This plan sets national targets for energy savings by implementing EE measures for the period 2009-2011 in amount of 3% of 1021.08 ktoe. This amount of energy (31ktoe) foreseen to be saved for such a short period is a robust target, which can be hardly achieved.

Energy consumption

Approximately 98% of the energy in Kosovo is generated by the two, coal and lignite power plants, "Kosova A & B". These power plants are owned and operated by the Kosovo Energy Corporation (KEK), vertically integrated power enterprise of Kosovo responsible for coal mining, generation, distribution and supply.

PP Kosova A consists of five units (A1-A5), with a total installed capacity of 800-MW, although the A1 and A2³ units are not operational and considered unsuitable for further commissioning.

PP Kosovo B consists of two larger units (B1 and B2) with an installed capacity of 678-MW.

Availability of PP Kosovo A and B is low due to the frequent system failures,

³ Generation Adequacy Plan, 2011-2020 http://www.kostt.com/website/images/stories/doku_mente/tjera/Generation_Adequacy_Plan_2011-2020.

disconnection and repairs. It has been particularly difficult for the manufacturing and construction sector. In 2009, companies have reported an average of 43 power outages per month. These outages have caused losses which are equivalent to 17% of annual sales of companies, comparing it with less than 4% for similar economies in transition.

Low availability of PP Kosovo A & B partially occurs due to the damages caused during the war. Damages in low-pressure rotors of units B1 and B2, for example, have reduced the maximum available capacity of 240 MW and 280 MW, respectively.

- Total annual gross generation of PP Kosova A & B (2010) = 5041 GWh;
- Total annual net generation of PP Kosova A dhe B (2010) = 5010 GWh

Hydro Power Plants (HPP) are accounted for the remainder of ~ 2.2% of net electricity generation in Kosovo in 2010. HPP Ujmani/Gazivoda (HPP Ujmani) is managed by the public enterprise Iber-Lepenci. In 2010, this hydro power plant, which directly supplies the transmission network, had net generation of 114 GWh (corresponding to a capacity factor of ~ 41%). The remaining small hydropower plants (all owned by private investors) connect to Kosovo's distribution network in various places. In total, these small HPP had a net generation of 42 GWh (capacity factor ~ 48%). KOSTT JSC manages and operates the electricity transmission system in Kosovo and is responsible for the transmission of the high electricity voltage network. KOSTT was founded in 2006 as a result of the restructuring of the power sector under the Energy Community Treaty for Southeast Europe. In addition to transmission in Kosovo, KOSTT system is connected to the neighbouring countries such as Montenegro (400 kV), Macedonia (400 kV), Albania (220 kV) and Serbia (400 kV, 220 kV and 110 kV) enabling transit, imports and exports of electricity. The maximum capacity of energy exchange between Kosovo and its neighbours (calculated as the amount of the natural transmission capacity of each line) is 1740 MW. Republic of Kosovo is characterized by a high consumption of energy and the total import of petroleum products. On the other hand, outdated power generation capacities available to the country, despite the continual increase of performance and increase of generation in recent years and in 2010, were not sufficient to cover the increased needs of the consumers. Import of electricity, as previous years, was necessary to cover the consumption. The sector with the highest consumption during 2010 was the household sector.⁴

In the coming years and decades, until 2027, the consumption of energy is projected to increase for more than 3% per year in each energy sector. The greatest increase is projected in the services sector, followed by industry sector and the household sector where the increase is projected to be 60%.

Inevitable increase of consumption must be slowed by strenuous efforts on the management of consumer demand and the implementation of energy efficiency measures, which would manifest with energy savings in each sector.

Planning of efficient policies for energy saving requires accurate energy data based on the Eurostat guidelines. No effective plan can be implemented and monitored without accurate and reliable data.

⁴ USAID/IRG, Future Energy Scenario in SEE and the Potential for Energy Efficiency (2008).

Conclusions

Saving energy in the process of generation and transformation of energy, including the distribution energy network, reducing losses of transmission and distribution, improving the energy efficiency of power plants, increasing the component of power generated by the high efficiency cogeneration.

Energy efficiency relates and interferes with more policy fields, knowledge and dispersed competencies and responsibilities. These, appear as obstacles in the main elements of the institutional framework. Therefore, among others, the following is needed:

- Completion of the institutional framework and strengthening the law enforcement;
- Improvement of data and records collection and implementation of EUROSTAT statistical methods;
- Implementation of management measures on consumer demand for energy,
- Action Plan for EE must be in compliance with the directive of energy services and in coordination with ministries;
- Monitoring of EE measures at the proper level and responsibility.

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