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Nevena PROLOVIĆ¹
Milorad STEFANOVIĆ²

ENERGY EFFICIENCY IN REPUBLIC OF SERBIA

ABSTRACT

Three main characteristics of the global energy situation currently are increasing energy efficiency, environmental consequences of energy development and intensive exploration of energy resources and new technologies. Energy efficiency is considered as a level of rational use of energy. If the level is higher the state is more energy efficient. Improvement of energy efficiency is one of priorities of The National Sustainable Development Strategy, but also a precondition that Serbia should fulfill to become a competitive EU member state. Therefore, energy efficiency is not just one of the main objectives of energy policy but also socio-economic project and a concept with a very positive goal -strengthening competitiveness of Serbian economy and improving living standard. In the next decade, Serbia could be closer to developed countries in the field of energy efficiency only if the suitable measures are carried out and if there is a grater state support. This paper analyzes an institutional- legal framework Republic of Serbia and its harmonization with EU Directive on Energy Efficiency. In this context, paper also examines results of the project "Energy Efficiency in Serbia", which is conducted by three ministries of Republic of Serbia - The Ministry of Health, Ministry of Education and Science and Ministry of Environment, Mining and Spatial Planning

Key words: energy efficiency, Serbia, European Union, policy

¹ Nevena Prolović, MA, Researcher Associate, Institute of International Politics and Economics, Belgrade, Serbia. This paper is a part of research results within the IIPE Scientific Project no. 179029 (2011–2014), which is financed by the Ministry of Education, Science and Technological Development of the Republic of Serbia.

² Milorad Stefanović, Bachelor of Faculty of Transport and Traffic Engineering, Belgrade, Serbia.

INTRODUCTION

One of the main objectives of Republic Serbia's foreign policy is EU membership. States wishing to become a full EU member state must carry out a comprehensive reform political but also economic and legal system to be able to operate in the EU. These criteria are defined as "Copenhagen Criteria" and include: 1) stable institutions that provide democracy, the rule of law, respect human and minority rights, 2) the existence of a functional market economy and the economy's ability to deal with competition and market forces of the Union. Additionally, states must fulfill another one criteria. It is an ability to implement commitments of membership including the development of such administrative capacities which will incorporate European legislations.

European Commission considers that the central issue of the Western Balkans integration is regional cooperation. Western Balkans countries took over responsibilities for cooperation on regional basis, which should enable long term region stability (the country can't be faster in European integration process than in regional integration process), while the EU will open its market and give financial help.

One of the Millennium's Development Goals and one of the EU policy is sustainable development, which is considered as one of priorities of The National Sustainable Development Strategy Republic of Serbia. This Strategy declares improvement of sector of energy efficiency as one of priority goal but also a precondition that Republic of Serbia must fulfill to become competitive EU member state. Therefore, energy efficiency is not just one of the main objectives of energy policy but also socio-economic project and a concept with a very positive goal - strengthening competitiveness of Serbian economy and improving living standard.

Therefore, it is necessary to formalize cooperation between Western Balkans countries, but also the region of the South Eastern Europe in the whole, which will provide an adoption the international treaty relates to environment and sustainable development. It would mean a step foreword because that concept will be significant contribution to a process of European integration Western Balkans countries, primarily by development necessary administrative capacities that will make conditions for applying many international treaties in this field. It would mean that Serbia in the next decade, could be closer to developed countries in the field of energy efficiency only if the suitable measures are carried out and if there is a grater state support, commitment of Government and wider public support. By the adoption of the Energy Law in July 2004 („Official Journal of the Republic Serbia" No.84/04), the process of energy sector reforms begun, in order to provide preconditions for the development and efficient operation of all

entities conducting an energy activity, as well as harmonization of this Law with European Union regulations.³

This paper analyzes an institutional- legal framework Republic of Serbia and its harmonization with EU Directive on Energy Efficiency. In this context, paper also examines results of the project "Energy Efficiency in Serbia", which is conducted by four ministries of Republic of Serbia - The Ministry of Health, Ministry of Education and Science, Ministry of Infrastructure and Energy and Ministry of Environment, Mining and Spatial Planning. According to this, the Energy Efficiency Agency is named as body with implementing responsibilities. (that was established in 2002.)

LEGISLATIVE AND STRATEGIC FRAMEWORK REGARDING ENERGY EFFICIENCY

The main idea of energy efficiency concept is using less energy for the same unit of GDP with products sustainability. Reduction of using energy and elimination environment pollution which is consequence of energy transformation are among the basic objectives of energy policy and many other EU policies. EU helps the implementation of energy efficiency in way that ensures competitiveness, security in supplying and assuming obligations from the Kyoto Protocol. Potential for decreasing consumption is undoubtedly present, especially in energy intensive sectors such as households, production, energy conversion and transport. In 2006, the European Union stipulated a reduction of total consumption primary energy to 20% by 2020, as main strategic objective of energy policy. The European Union has adopted several policy documents: *Energy Efficiency-Achieving the Goal of 20%*, *the Action Plan for Energy Efficiency*, *Green Paper on Energy Efficiency*.⁴ Due to this, the activities towards creation of minimum energy efficiency standards and rules on labeling efficiency of products, services and infrastructure have been carry out.⁵

The Western Balkans countries have relatively high energy intensity: degree of intensity is about 2.5 higher than the average of European countries that are members of OECD. Causes of such energy intensity are outdated

³ Energy in Serbia 2010, Ministry of Infrastructure and Energy of the Republic of Serbia, p. 9. 2010.

⁴ Communication from the Commission of 13 November 2008- Energy efficiency: delivering the 20% target [COM (2008) 772, Communication from the Commission of 19 October 2006 entitled: Action Plan for Energy Efficiency: Realising the Potential [COM (2006) 545, Commission Green Paper, 22 June 2005, „Energy Efficiency – or Doing More With Less” [COM (2005) 265 final.

⁵ Guide to EU Energy Policy – Energy, Research Center of the Slovak Foreign Policy Association, Slovakia Agency of International Development Aid, p. 83–84.

energy infrastructure, a large energy losses in energy transformation, transmission, transport and distribution, as well as inefficient sector of final consumption. The Republic of Serbia and Montenegro have the lowest level of energy efficiency while Croatia recorded the highest level.⁶

In order to improve energy efficiency of its member states, the Council of Ministers made decision D/2009/05/MC-EnC on a package of EU *acquis* which must at least be implemented, on 18 December 2009.⁷ The package includes three EU Directives in the field of energy efficiency services, energy performance of buildings and labeling efficiency. These are:

- Directive 2006/32/EC on energy end-use efficiency and energy services, which replaces Council Directive 93/76/EEC
- Directive 2002/91/EC on the energy performance of buildings from 16 December 2002.
- Directive 92/75/EC regarding energy labeling of household lamps and standard product information related to the consumption of energy and other resources using household appliances, from 22 September 2002.⁸

The Council of Ministers has determined that the deadline for implementing these regulations is from 31 December, 2011, until 1 January, 2017. In order to harmonize domestic legislation with the EU regulations, Serbian Government in 2005. adopted a National Sustainable Development Strategy.⁹

The purpose of the Strategy is to balance three key factors (three pillars) of sustainable development: sustainable development of economy, commerce and technology, sustainable development of society based on social balance and environmental protection with the rational management of natural resources. At the same time, the aim of the strategy is to put together three pillars in the whole, which will support the relevant institution.¹⁰

The Strategy significantly contributes to the harmonization of possible conflicting objectives established with the various aspects of socio-economic development, bridging the gap between the sectoral policies, and establishing

⁶ Ibid. p. 84.

⁷ Decision of the Ministerial Council of the Energy Community D/2009/05/MCEnC on 18 December 2009 on the implementation of certain Directives on Energy Efficiency.

⁸ Guide to EU Energy Policy – Energy, op. cit., p. 85

⁹ Solutions in the Strategy are in compliance with European integration process: the EU Sustainable Development Strategy (adopted in 2001 and revised 2006) and the Lisbon Strategy (adopted by European Council in March 2000). The strategy is in compliance with the Millennium' Development Goals (UN) and the National Millennium Development Goals in the Republic of Serbia, that Serbian Government adopted in 2006.

¹⁰ National Sustainable Development Strategy, 2005, Belgrade, p. 2–3.

a system of mutual benefits. This is due to fact that all key social groups were involved in Strategy making.

One of the five key national priorities of the Republic of Serbia which realization will support the vision of sustainable development by 2017 year is: protection and improvement of environment and rational use of natural resources, conservation and enhancement of environmental protection, pollution reduction and environmental pressures, the use of natural resources to remain available for future generations. Because of this, it is necessary:

- establish a system of protection and sustainable use of natural resources (air, water, land, mineral resources, forests, fish, wild plants and animals);
- strengthening mutual interaction and achievement of significant effects of environmental protection and economic growth, inclusion of environmental policy in development policy of other sectors;
- investing in reduction environmental pollution and the development of cleaner technologies;
- reduction of high energy intensity of the Serbian economy and efficient use of fossil fuels;
- promoting of using of renewable energy sources;
- planning of sustainable production and consumption and reduction of waste per unit of product;
- protection and conservation of biodiversity

In this aim, the Government of the Republic of Serbia, as the borrower, and the International Development Association (The International Development Association - IDA), as a creditor, signed on 8 September 2004, the Credit Agreement YF 3870. The purpose of this Agreement is financing the project "Energy Efficiency in Serbia", in the amount of \$ 21 million and 4 million dollars of its own share of the Republic of Serbia.¹¹ Ministry of Health and Ministry of Education and Science are empowered as credit borrowers, in coordination with the Ministry of Infrastructure and Energy, Ministry of Environment, Mining and Spatial Planning. For this purpose, Energy Efficiency Agency of Republic of Serbia is founded as a body of implementation. Besides the Agency, the institutions in the Republic of Serbia that are actively engaged in energy efficiency are: Vojvodina Provincial Secreteriat for Energy and Mineral Resources and five regional centers for energy efficiency in Belgrade, Novi Sad, Kragujevac, Kraljevo and Nis, Serbian Chamber of Commerce, the Standing Conference of Towns and Municipalities, and others.

¹¹ Project Appraisal Document on a Proposed Credit in the Amount of SDR 14,1 million (US\$21 million equivalent) to Serbia and Montenegro for a Serbia Energy Efficiency Project, dated February 18, 2004, p. 3.

The Ministry of Infrastructure and Energy is in charge of energy efficiency. In present, Energy sector development Strategy of the Republic of Serbia, energy efficiency is defined as one of the main objectives of energy policy and one of the five strategic priorities of the energy sector.¹² The Strategy implementation programme for energy sector development for the period 2007- 2012 defines measures and activities to be undertaken in order to save energy in sectors of energy consumption.¹³ In accordance with the commitments arising from the Treaty establishing the Energy Community, the Ministry has prepared the first Action Plan for Energy Efficiency of the Republic of Serbia for the period 2010-2012. This Action plan was adopted by the Government of the Republic of Serbia in July 2010. This Plan stipulates that mean indicative energy savings target for this period amounts to 1,5 of final domestic energy consumption compared to year 2008, i.e. 0.1254 Mtoe. This savings present a first step towards the ultimate goal of savings 9% of final energy in the ninth year since the beginning of Action Plan implementation. The Plan foresees final energy savings of 1,5 % to be achieved with implementation of measures in three sectors: households, public sectors and commercial activities(0,0235 Mtoe), industry sector (0,0566 Mtoe) and transport sector (0,0453 Mtoe).¹⁴

SERBIA ENERGY EFFICIENCY PROJECT

The main purpose of the Serbia Energy Efficiency Project is to improve energy efficiency by increasing the number of consumers connected to a district heating system, reducing energy consumption, obtaining a better and more functional health ambient as well as by reducing the local and global environmental impact of the use of dirty fuels for heating the public buildings in Serbia, with raising end-user awareness of energy consumption and their motivation towards further savings.

The Serbia Energy Efficiency Project started in 2004 and should be carried out in several phases. The first phase of the Project (2004–2009) included rehabilitation of the heat supply system of the Clinical Centre of Serbia (CCS) along with energy efficiency improvements in several public buildings (16 schools and 12 hospitals). The objective has been to obtain the heating system improvement through a better availability and energy efficiency, to achieve an improved functional and health ambient, as well as to reduce the local and

¹² Energy in Serbia 2010, Ministry of Infrastructure and Energy of the Republic of Serbia, p. 12., 2010.

¹³ Ibid, p. 12.

¹⁴ Ibid, p. 12.

global environmental pollution caused by using dirty fuels for public building heating in Serbia.¹⁵ According to the First Phase Final Report to the Serbia Energy Efficiency Project the above measures have obtained a considerable energy savings amounting to 40%.¹⁶ Average savings for the total number of buildings (16 schools and 12 hospitals) amount about 35%.¹⁷

As regards energy savings, the outcomes of the first phase of the Project have resulted in both considerable financial savings with an improved end-user i.e. patient comfort, and in the environmental improvement and protection. On the other hand, the outcomes as such are measurable in technical, sociological and ecological sense. That makes this Project one of the proactive and preventive health protection projects with not only clear economic and technical goals, but also distinct sociological and ecological dimensions.

Regarding financial tools, financial benefits are one of the basic motives for implementation of energy efficiency projects. A reduced energy consumption or use of cheaper energy fuels enables significant financial savings expected to exceed the project investments, together with operational and maintenance costs, and bring an adequate profit in the years to come. The other argumentation in support of energy efficiency projects lies in the facts that the fossil fuel reserves are limited and that the demand on fossil fuels shows a rising trend inducing a price increase and an inevitable (not yet financially assessed) environmental degradation.

Higher prices of the conventional fuels make the EE and RES projects more lucrative and more attractive. In addition to that, the prices of fossil fuels may often vary depending on the various developments at the local, national, regional and global level, which represent an additional risk for companies and individual consumers and creates problems in maintaining economic stability for the countries dependant on energy import. According to the First Phase Final Report to the Serbia Energy Efficiency Project the average energy savings achieved are considerable and amount to 40% (in range between 15% and 63%).¹⁸

The average period of return is 7, 5 years (for hospitals 5, 3, for schools 12, 8). The difference in periods of investment return is based on the higher energy consumption in hospitals compared to the schools due to specific working hours 24/7. The schools are closed on weekends and during holidays, with a periodical heating (instead of a non-stop heating). Taking

¹⁵ Ibid, p. 4.

¹⁶ Serbia Energy Efficiency Project, The First Phase Final Report, Belgrade 2010, p. 40

¹⁷ Ibid, p.39.

¹⁸ Ibid. p. 36.

into account the invested funds it makes the applied level of investment and energy efficiency measures more profitable at hospitals.¹⁹

Application of energy efficiency measures in terms of rational behaviour and RES use can have a considerable and multiple impacts on state of the environment and the global climate. The example in support of this assumption is the construction of the new gas fired boiler house for the Clinical Centre of Serbia started up in September 2008.²⁰ One central boiler house within the complex of the Clinical Centre of Serbia has replaced the nineteen existing coal and heavy fuel oil-fired boiler houses. Based on this switch from the solid and liquid fuels to the gaseous one the CCS has got a chance to improve its ecological status and to change its reputation as the top polluter in Belgrade. Upon completion of the Project's first phase, the average annual CO₂ emission in schools and hospitals has been reduced by average 40% enabling a considerable improvement of the health environment²¹.

The assessment of the sociological aspect of the Serbia Energy Efficiency Project has been developed based on the on-site research carried out in 2005, 2006 and 2007, before and after the work done, validating the subjective evaluation of the energy efficiency improvement achieved in the respective schools and social care institutions. The research sample covers one third of the total number of buildings with applied energy efficiency measures, using two basic research tools – questionnaires: a questionnaire for pupils and patients and a questionnaire for employees in schools and social care institutions.²² The research has taken into consideration the following aspects:

- End-user subjective sense of comfort and satisfaction
- Knowledge in the field of energy efficiency issue
- Opinion on energy efficiency
- Openness and readiness to cooperate and make changes.

Regarding the sociological research concept, evaluation of the project and the undertaken activities, three basic indicators are set:

- Increased subjective sense of end-user comfort
- Increased subjective sense of end-user satisfaction
- Increased awareness of project and energy efficiency importance

The results and conclusions made based on the data collected under the research are expected to show the extent of fulfilling the goals set under the terms of reference as regards savings, end-user indoor comfort and the

¹⁹ Since there are no energy standards for schools and hospitals in Serbia at the moment, for the purpose of comparison the relevant available energy standards of UK and Germany have been used.

²⁰ *Ibid.*, p. 7.

environmental protection. With overall 18 on-site researches conducted, these results represent a significant source and data base for further trend monitoring.²³

Answering the questionnaire before refurbishment the patients complained, among other things, about cold air coming from the windows, lack of ventilation, too high indoor temperature compared to the outside conditions, improper heating, faulty ventilation, high exposure to the sun during summer, lack of sunblind, bad window seals, etc. In the questionnaire conducted after refurbishment the patients have not repeated many of the previous complaints, expressing their satisfaction with a cosy atmosphere, space nicely refurbished, and other positive impressions about what they see and how they feel in the respective space, disregarding the fact that not everyone of them witnessed the situation before and was not able to make a direct comparison.

The research outcomes show that the application of tailored energy efficiency measures has resulted in a sociological component of sustainable goals realized through a significant improvement of the subjective sense of end-user satisfaction and comfort, as well as the opinion and awareness of energy efficiency. Complemented by the communication activities, the awareness of energy efficiency importance has also been increased. The results have confirmed the starting positions taken at goal setting, wherefore they are going to considerably contribute to the future decision making processes based on the concrete data, and the efforts shall be made toward influencing the EE policy instrumentalisation.²⁴ The results and findings shall play an important role in initiating and giving recommendations for conducting EE policy in the future. It also gives some new inputs for further improvement of knowledge and awareness as well as for potential modifications.

The Clinical Centre of Serbia, as the medical institution the most of the Project funds has been invested in, consists of 76 buildings located at 38ha intended for clinical activities, education, administration and technical support. The energy supply system of the CCS included 19 individual boiler houses with totally 72 boiler units of various capacities for thermal energy supply (some of them with over 40 years of service, coal or heavy fuel oil fired).²⁵ The annual boiler house fuel consumption amounted to about 11.500

²¹ Ibid, p. 36.

²² Inquiry on subjective sense of comfort, satisfaction and end-user awareness of energy efficiency, Evaluation Report for Serbia Energy Efficiency Project, The First Phase Final Report, Hill&Knowlton, Belgrade 2008, p. 9.

²³ Ibid, p. 10.

²⁴ Ibid, p. 59.

²⁵ Serbia Energy Efficiency Project, The First Phase Final Report, Belgrade, 2010, p. 8.

t of heavy fuel oil, 650 t of fuel oil and 6.850 t of coal, which resulted in an extremely high pollution not only within the clinical complex and the campus, but also in the surrounding municipalities of Savski Venac and Vračar, as well as the central city area.²⁶

The Project implementation has improved the energy efficiency, foremost through improvements in building heating (better heating and savings) as the main factor in energy consumption, making the heating more affordable and enabling significant reduction in pollution, improvement of health and ecology environment, better medical treatment conditions for the patients and better working conditions for the personnel.

The new boiler house started up in September 2008 noted considerable savings in energy fuel consumption, pollution reduction and overall efficiency increase in the first heating season. Single central gas-fired boiler house (construction value amounting to EUR 12 million) replaced the existing 19 coal and heavy fuel oil-fired boiler houses. Switching from the solid/liquid fuel to the gaseous one enabled the Clinical Centre of Serbia to change its reputation as the top polluter in Belgrade.²⁷

The emission of ashes and sulphur dioxide has been fully eliminated, with the carbon dioxide emission cut by half. Among other results, the reduced thermal energy consumption with overall efficiency increase by about one third is of special importance. The savings in energy fuel consumption in 2009 amounted to about RSD 75 million and the earnings of the Clinical Centre of Serbia from selling thermal energy to third parties in 2009 amounted to RSD 52 million.²⁸ It confirms that the CCS has invested these funds in health protection improvement i.e. equipment procurement and regular maintenance. A successful project implementation enabled the first heating season in Belgrade to be realized without a massive air pollution coming from the CCS's system.

A successful fulfillment of the goals defined under the first phase of the Serbia Energy Efficiency Project sets the ground for a further cooperation and support of the World Bank towards strengthening the positive effects and promoting the results achieved. There is ongoing realization of the second phase of the Serbia Energy Efficiency Project (2009 – 2012), USD 28 million worth, covering energy system modernization of the Clinical Centre of the City of Nis and energy efficiency improvement in 10 social service buildings across Serbia.²⁹ Heat supply system rehabilitation and construction of the new

²⁶ Ibid, p. 9.

²⁷ Ibid, p. 10.

²⁸ <http://www.zdravlje.gov.rs/showelement.php?id=2342> (entry date: 06.04.2012).

²⁹ Financing Agreement, Additional Financing for the Serbia Energy Efficiency Project between Republic of Serbia and International Development Association, dated July 27, 2007, p. 6.

facility at the Clinical Centre Nis shall contribute to significant energy savings and a better functionality of this institution. A lower emission of coal dioxide and other combustion products should considerably reduce the local level of environmental pollution and improve the ecology status of the city.

CONCLUSION

In order that the Republic of Serbia by 2017. becomes an institutionally and economically developed state with the appropriate infrastructure, compatible with the EU standards, with the industry oriented at knowledge, efficient use of natural and produced resources, higher efficiency and productivity, a high number of educated people, well preserved environment, historic and cultural heritage, a state nurturing a partnership between the public, private and civil sector with a level playing field for all the citizens (as set by the strategic goals of sustainable development and based on a detailed analysis of the state potentials) it is necessary to implement the leading EU principals and increased competitiveness based on knowledge, innovations and entrepreneurship as set under the Lisbon Strategy.

As already stressed under the introduction, the easiest method for the implementation of the principles mentioned above is through the regional cooperation. Focus should be set to mutual interests of the countries in the region within the European integration process, but also to the establishment of a strong institutional structure designed to deal with this issue. The European Integration Office of the Republic of Serbia emphasized that Serbia got very much behind in terms of strengthening regional cooperation in the field of environmental protection. Such initiatives are very important and should be fostered and implemented as soon as possible, especially considering the requirements and obligations under the Agreement on Stabilization and Association.

Taking into account all the above mentioned items, foremost the basic goals of the National Strategy of Sustainable Development and the World Bank's „Green Award“ awarded to the Serbian Energy Efficiency Team for the most successful ecology project in 2007, it might be considered that Serbia has taken the necessary initial step towards it's further integration in that field. It shall mean further approximation of the national legislation with the EU Directives, foremost in the field of energy efficiency, renewable sources and security of supply.

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