

Strategies for improving energy efficiency in public buildings in Bosnia and Herzegovina

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ABSTRACT

The energy efficiency exemplifies a worldwide and complex phenomenon. It is paramount for Bosnia and Herzegovina (BiH), the former socialist and semi-developed country being situated in the Balkan region of the Southeastern Europe (SE). Buildings in the Balkan, including BiH, represent about 50 percent of the aggregate energy consumption. Estimated energy savings are projected to be between 20 and 40 percent. The research problem discussed in this work aims at the introduction of the existing or the improvement of the present strategies dealing with the energy efficiency. Thorough evaluation – literature review, of versatile resources, academic journal papers, government and private works, etc., was conducted. The inclusion and operation of funds addressing energy efficiency is of paramount importance. In that context the creation of statewide agency is deemed to be crucial to be responsible for the administration of the assistance of the European Union (EU) and the management of national energy efficiency action plan (NEEAP). Unfortunately, it cannot identify the totality of all-important external factors relating to the status of energy efficiency. Introduction of the energy management system (EMS) is another avenue worth exploring.

Keywords: energy efficiency, strategies,(NEEAP),energy management system (EMS), Bosnia and Herzegovina (BiH), Balkan region.

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1. Introduction

The energy efficiency is paramount for the sustainable growth of society. This in particular applies to the former socialist economies. Buildings in WBs, including BiH, represent about 50 percent of the aggregate energy consumption. Estimated energy savings are projected to be between 20 and 40 percent. The highest savings potentials are expected to be in the public sector being estimated to be between 35 and 40%. The national marketplace evaluation conducted by the secretariat belonging to the power-generating community projected the annual energy savings in the amount of 462 million Euros or almost 8,000.00 gigawatt hours (GWh) in 2012 (Spencer, 2015; OECD/IED, 2014, European Commission, 2018; Ganda & Ngwakwe, 2014).

Table 1, below, depicts the potential estimated energy efficiency related savings in addition to the investments needed and average investment Payback period For Bosnia Herzegovina (BiH), Albania, Kosovo and Northern Macedonia. From Table 1, below, it can be seen that potential energy savings were the largest in Kosovo with 79.3 GWh per year, followed by BiH with 69.8 GWh/year.

Table 1. Potential estimated energy efficiency savings, investments needed and average investment payback for BiH, Albania, Kosovo and North Macedonia, (Source: Limaye, Singh and Hofer, May 2014)

Country	Potential Energy Savings		Investment Needed	Average Payback
	GWh/year	Million €/year	Million €	Years
Albania	53.7	5.1	33.3	6.5
Bosnia & Herzegovina	69.8	4.5	32.4	7.2
Kosovo	79.3	4.3	23.3	5.4
FYR Macedonia	36.8	3.2	18.8	5.3

Fig. 2, below, depicts 15 major types of benefits, which could benefit BiH stemming from the energy efficiency improvements. Besides the macroeconomic impacts, such as the industrial productivity there are also visible energy savings, improved asset values, strengthened public budgets increased health and well-being, etc.

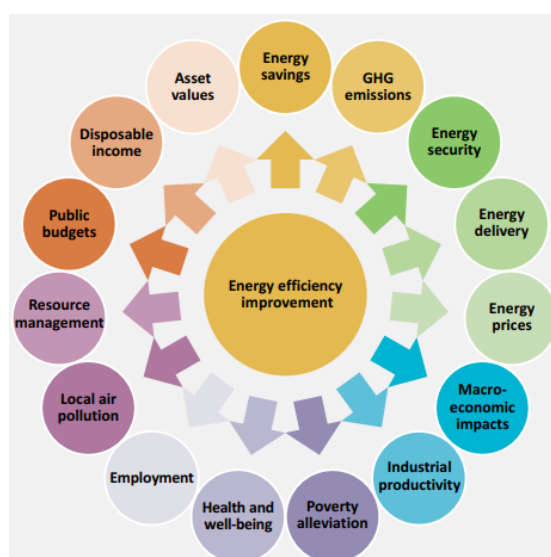


Figure 2. The multiple benefits of improvements in energy efficiency, (Source: OECD/IEA, 2014).

As Fig. 3, below, displays, the power utilization in the housing sector dominated in North Macedonia and was the least in BiH.

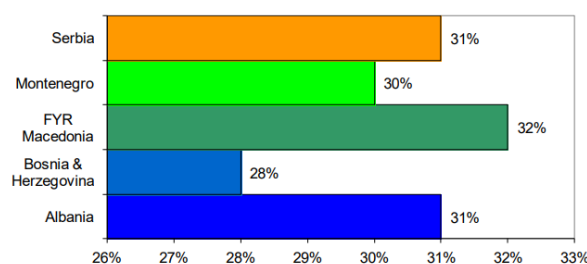


Figure 3. The power utilization in the Housing Sector (Source: Kalkum, May 2014)

Fig. 4, shown, below, depicts the largest amount of energy consumption in Serbia, followed by Albania, North Macedonia and Kosovo and the lowest utilization allocated to BiH.

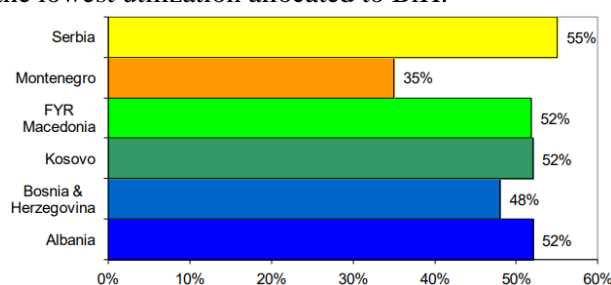


Figure 4. The percentages of electrical power consumption (Source: Kalkum, May 2014).

Fig. 5, below, displays the amounts of energy subsidies, as the percentage of gross domestic product (GDP). Kosovo dominates with the percentage in excess of three times of other countries.

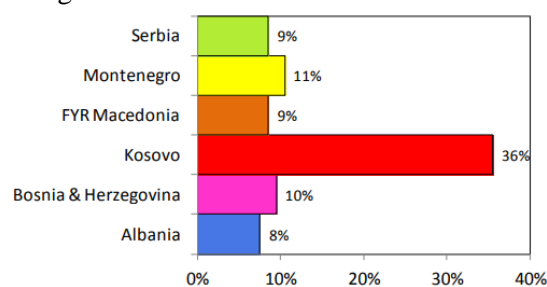


Figure 5. The amount of energy subsidies as % of GDP (Source: Kalkum, May 2014)

Faster implementation of the already passed legislation must be performed, as soon as possible. In addition, an improvement relating to the existing regulations is also in dire need of change. There must be concerted efforts aimed to the training and education of all the stakeholders, which may include authorities at various levels, the wide range of businesses and customers/end-users.

Energy management system represents a multitude of processes allowing utilization of data and information to maintain the existing and improve the future energy efficiency. The significant research and opportunities have been identified as the avenues in increasing energy efficiency and reduction both negative impacts on the environment in public housing presidential stock sector (Agić, Keran, Agić, Makić, 2012).

2. Material and methods

This work combines thorough evaluation – literature review, of versatile resources (academic journal papers, government and private works).

3. Discussion and Results

By conducting the comparison of the partner countries, the following topics have crystallized.

1. Legal and institutional frameworks;
2. Related energy efficiency measures;
3. Possible alternative financing arrangements;
4. Future prospects of Bosnia and Herzegovina on the energy efficiency; and
5. Recommendations in order to achieve plant objectives in the future (Acuner & Onaygil, 2015; European Commission, 2018).

The benefits related to the realization of energy efficiency measures in WB and BiH Herzegovina could be summed up in five benefit areas:

1. Improvement in energy delivery;
2. Improvement in industry productivity;
3. Macroeconomic development;
4. Strengthening of public budgets and
5. Health and well-being of the population (Acuner & Onaygil, 2015; European Commission, 2018).

The numerous benefits related to the improvements of energy efficiency involve macro-economic impacts, increased asset values and employment, disposable income and resource management (OECD/IEA, 2014).

4. Conclusion

In conclusion, Bosnia and Herzegovina could additionally benefit from the implementation of new an improvement of the existing energy efficiency policies by providing:

- a. Access;
- b. Growth and development;
- c. Affordability and poverty alleviation;
- d. Reduction in the local pollution; and
- e. Resilience to two detrimental effects of the climate change (Acuner & Onaygil, 2015; IEA, 2020, OECD/IEA, 2014).

In improving access the energy efficiency can assist Bosnia and Herzegovina enabling it to supply power to more of its citizens through the existing energy infrastructure. Growth and development can be augmented through the positive impact supporting the economic growth in a way of enhancing industrial productivity and reduction in the importation of fossil fuels/crude oil. Affordability and poverty alleviation can be achieved by the means of energy efficiency for families in the economic need by reducing per unit cost of lightning, heating, cooling, ventilating and air conditioning (HVAC). Local pollution can be addressed through the energy efficiency efforts, both on the supply, and end-use/demand side by decreasing the need for power generation, which in turn translates into decreasing greenhouse emissions and enhanced economic growth. Finally, the resilience to the climate change could be discussed through reduction of the need for energy infrastructure since energy efficiency decreases the amount of energy assets exposed to detrimental an extreme weather (Acuner, Onaygil, 2015; Duraković, 2020, Duraković, Torlak, 2017, Duraković, Yildiz, Yahia, 2020).

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