Part III

Electronic Payments and Other Reforms

Chapter 11

Energy Efficiency Investment Benefits and How to Achieve Them: The Energy Efficiency Obligation (EEO)

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The benefits of investing into energy efficiency measures are clear and have been proven by numerous pilot projects and activities in Bosnia and Herzegovina and through extensive international experience. In addition to the numerous benefits to citizens and businesses in BiH, as of October 16, 2015, the Energy Efficiency Directive[1] became obligatory for the Energy Community (EnC) Contracting Parties, including Bosnia and Herzegovina. The directive stipulates that the Contracting Parties must notify the EnC as to what energy efficiency policy measures they plan to adopt by October 15, 2017. The EE Directive requires all EnC Countries to set a savings target for an Energy Efficiency Obligation (EEO) model of at least 0.5 percent reduction of energy use in 2017 and 2018, and 0.7 percent in 2019 and 2020, or opt for alternative measures that show that the same targets will be achieved.

This paper proposes reaching the necessary investment values through the development of a market-based instrument for financing energy efficiency measures—the EEO. This mechanism obligates the companies supplying energy to customers to also invest in their customers' energy savings, and 52 such mechanisms functioning across the globe demonstrate that it is a very effective tool.

Some of the economic benefits that are analyzed in this paper, resulting from investing 100 million BAM annually[2] into energy efficiency measures in a systematic way are:

- Bosnia and Herzegovina's GDP could be increased by 370 million BAM annually, which in turn means:
  - 81 million BAM additional revenues from direct and indirect taxes

[1] European Union Directive, 2012.

[2] 100 million BAM annual investments into energy efficiency is used as a reference point in this paper for the calculations.

  - 58 million BAM additional income from social security contributions
- 4,900 new full-time jobs could be created annually
- The demand for materials and equipment, such as windows, could double or even triple in BiH
- Energy security could be increased. The annual energy savings would be equivalent to the annual electricity usage of 17,000 average BiH households
- The amount of CO_2 emissions reduction equivalent to the annual emissions of 19,000

Energy efficiency (EE) is the most cost-effective way to save energy and reduce greenhouse gas emissions; as a result, increasing energy efficiency should be included in a country's energy policy. The implementation of EE measures saves money for end consumers, who can then spend the saved funds on other needs. Also, energy security is increased because the overall need for energy is reduced. EE will have an economic impact on the country because it will transform the energy market by creating employment and business development opportunities. The investment potential for energy efficiency measures in Bosnia and Herzegovina (BiH) is close to 5 billion BAM; this amount will achieve the planned savings included in the National Energy Efficiency Action Plan and fulfill the current Energy Community requirements for BiH.

Bosnia and Herzegovina is among the least energy-efficient states in Southeast Europe. Its energy bill was 2.1 billion euros in 2008, which represents almost 20 percent of the country's GDP. This is three times more than in the U.S. or EU.[3]

To begin the process of reducing this ratio of energy use to GDP in BiH by initiating the process of EE market transformation in Bosnia and Herzegovina and enabling sustainable energy development, it is necessary to develop a market-based instrument to provide mechanisms to stimulate the implementation of energy efficiency measures.[4]

This paper presents one market-based instrument—the Energy Efficiency Obligation Scheme—and the benefits to BiH of implementing it.

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[3] UNDP BiH reports http://www.ba.undp.org/content/bosnia_and_herzegovina/en/home/ourwork/environmentandenergy/successstories/sustainable-energy-solutions/.

[4] International Energy Agency (IEA), Market Based Instruments for Energy Efficiency, Policy Choice and Design, Insight Series 2017. There are three basic energy efficiency

It is important to note that the total amount of investment generated by all market-based instruments has increased six-fold over the last ten years.[5]

What is the Overall Investment Potential of Energy Efficiency in BiH?

The National Energy Efficiency Action Plan for BiH envisages the implementation of a series of programs to increase energy efficiency and achieve energy savings in primary (generation and distribution) and final consumption. In order to achieve the planned savings and reach the current requirements of the Energy Community for BiH, approximately 5 billion BAM in total should be invested into energy efficiency measures.[6] This investment means the development of industries related to the implementation of energy efficiency measures, new employment possibilities, energy savings, air pollution reduction and numerous other benefits. Figure 1 shows the most important benefits of energy efficiency measures that reveal a broad range of potential positive impacts.[7]

The data in the table below gives an indication of the number of years it would take to actually reach the 5 billion BAM investment for energy efficiency measures based on various examples of annual investment levels (targets).

From Table 1 we see that significant annual investments are required in energy efficiency measures to reach the targets within a reasonable time frame. In addition, before setting the annual investment target, an analysis of the energy efficiency materials and services supply chain capacity and its geographical coverage of the country should be carried out in order to make sure that the local economy reaps the most benefits from the implementation of EE measures. The supply chain needs time to develop and may not be able to provide sufficient energy efficiency measures initially

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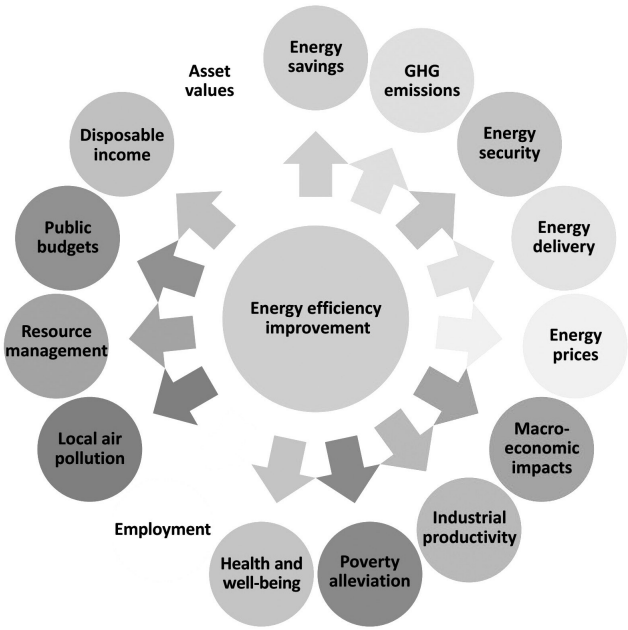
market-based instruments: auctions, white certificates and utility energy efficiency obligations (EEOs). https://www.iea.org/publications/insights/insightpublications/market-based-instruments-for-energy-efficiency.html.

5 *Ibid*.

6 The EU requirements are defined in the Energy Efficiency Directive (2012/27/EU), https://www.energy-community.org/legal/acquis.html. The requirements have been further quantified for Bosnia and Herzegovina in the draft National Energy Efficiency Action Plan, which has been used to approximate the investment potential.

7 Figure 1.1 The multiple benefits of energy efficiency https://www.iea.org/publications/freepublications/publication/capturing-the-multiple-benefits-of-energy-efficiency.html.

Figure 1. The Multiple Benefits of Energy Efficiency



to meet a very high target. If this is the case, the targets can be increased over time in line with the achievable implementation rate.

How to Finance Energy Efficiency Measures?

A strategic approach to energy efficiency is needed, which requires the creation of financing mechanisms, implementation mechanisms and mechanisms for monitoring the results and quality of implemented energy efficiency measures.

Table 1. Investments and Time Needed to Reach the EE Potential in BiH

Annual investments	Years needed to reach the 5 billion KM potential
10 million BAM	500 years
100 million BAM	50 years
250 million BAM	20 years

Financing energy efficiency measures can be done in several ways, and there is no single best practice, as countries have developed their own individual approaches. Financing of energy efficiency measures is usually done through one of the following three ways: 1) government budget expenditures, 2) bank loans, or 3) market-based instruments. In developing countries such as BiH, financing through government expenditures would not be sufficient for the levels of investments needed. Financing energy efficiency through bank loans also has its drawbacks, as citizens and public institutions have other needs that are a higher priority than energy efficiency. Market-based instruments by themselves only set a policy framework specifying the outcome (e.g., energy savings) to be delivered by market actors; they do not describe the delivery mechanisms. One of the three market-based instruments for financing energy efficiency measures is the Energy Efficiency Obligation Scheme (EEO).[8]

Background on Energy Efficiency Obligation (EEO) Schemes

One of the benefits of the EEO is that it involves the companies supplying energy to customers in the process of saving energy, which is not the case with most other energy efficiency programs. Once a country chooses an EEO as its market-based mechanism and sets the policy for the implementation of energy efficiency measures, then the process for actually implementing the EEO can start.

EEO schemes are market-based instruments that require obligated parties (energy distributors and/or suppliers) to deliver a specified amount of energy savings at the customer end within prescribed time periods. The obligated parties partially or fully fund energy efficiency measures for the end users to achieve the targeted amount of savings, and they recover the costs through energy prices. In other words, all energy customers pay an EEO fee, and the selected beneficiaries receive a subsidy for their energy efficiency works. Figure No. 2 below illustrates the EEO administrative process that has been defined through the BiH EEO Working Group.[9]

The EEO Scheme defines the financial mechanism(s) that can be implemented to reach the set targets. It also defines the procedures for monitoring, verification and reporting the achieved energy savings, which

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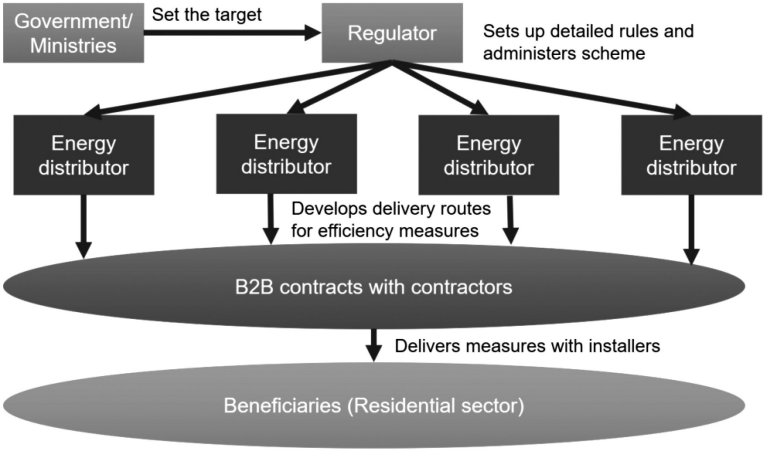
[8] International Energy Agency, *op cit.*, Footnote 3.

[9] See the Annex for more information on the BiH EEO Working Group and the BiH EEO formation steps that have been addressed.

Figure 2. EEO Administrative Architecture

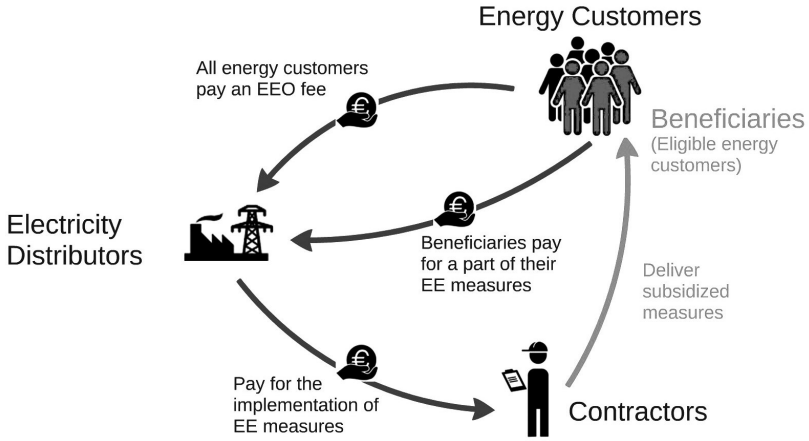


confirm that the activities actually took place. The EEO schemes are typically enforced based on legislation and regulation that prescribe financial penalties for parties that do not comply.

EEO schemes have proven to be an excellent way not only to generate funds for EE measures but also to stimulate the economy of the countries that implement them. Through this market-based instrument, energy efficiency measures are financed on a large scale through a domestic financing source that does not depend on donor funding or loans. In addition, EEOs set a clearly defined target that provides certainty, increasing investor and business confidence. This has far-reaching impact on job creation in the construction sector (companies implementing the works), the industrial sector (companies producing the equipment and materials needed), and the service sector (companies monitoring quality of service, issuing various building certificates, marketing, and the like.) The EEO Scheme can help energize the BiH economy, which is why it is also viewed as a means of development. In addition, the implementation costs of the EEO Schemes are much lower because of the existing infrastructure of the obligated energy distributors and/or retail energy sales companies. The EEO Financial Architecture is shown in Figure 3.

In the implementation of energy efficiency measures, besides the part of the cost covered by the EEO mechanism (subsidy), interested beneficiaries pay for the remaining part of the total costs of the energy efficiency

Figure 3. EEO Financial Architecture



works on their building; the remaining funds can be financed fully from the beneficiaries' own funds or through other financing sources, such as a bank loan or an EE Fund. An example of a financial structure for the implementation of EE measures for a single beneficiary is shown in the Figure 4 below.

Advantages of Investments in Energy Efficiency Measures through the EEO

Based on the market-based instruments for the IEA Energy Efficiency Report that analyzes 52 EEO mechanisms across the world, significant amounts of energy for less than the cost of supply are being saved through EEOs.[10] The blue columns in the table below show the expenditures by obligated parties per kWh saved in U.S. states and other countries. The variations in program costs are due to different factors, such as the amount of annual investment, policy focus, and overlap with other instruments if more than one market-based instrument is utilized.

As explained by Figure 4, the total cost of the EE measures comprises the EEO subsidy portion plus the additional portion of the costs covered by the beneficiaries. Figure 5 above shows only the expenditures by the

[10] International Energy Agency, *op cit.*

Figure 4. Financial Structure for a Single Beneficiary

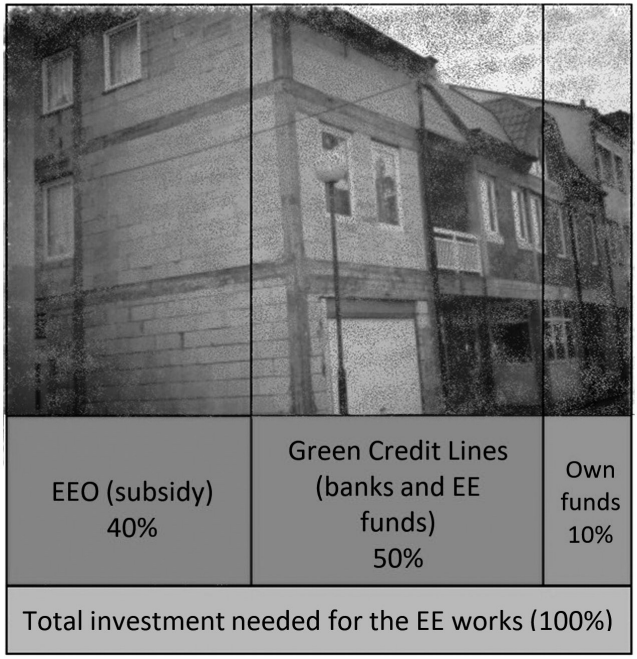


Figure 5. Expenditure by obligated parties per unit of energy saved

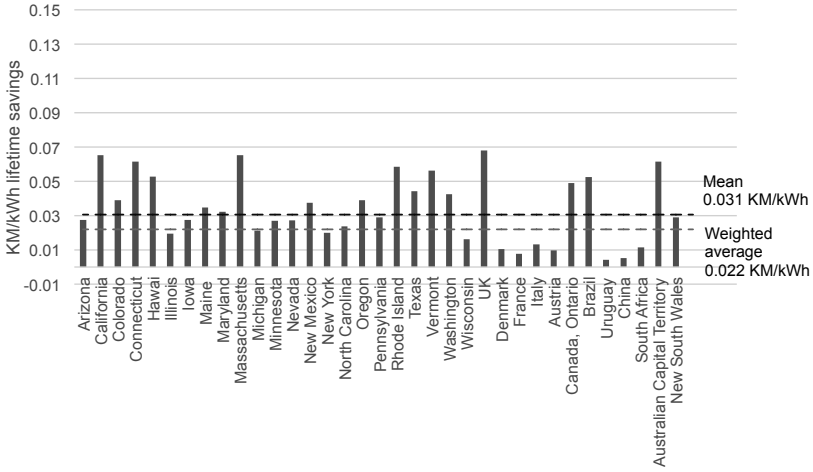
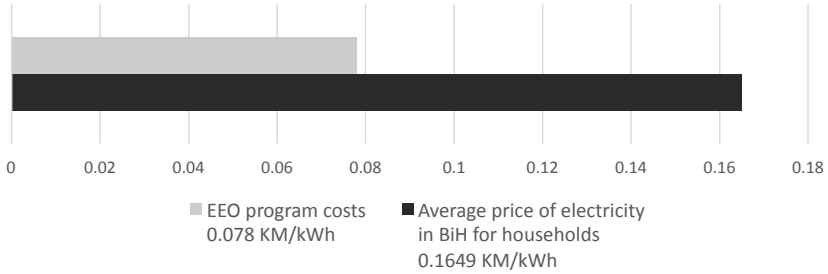


Figure 6. Total EEO Program Costs in Comparison with Electricity Price for Households in BiH, USAID EIA



obligated parties that make up the EEO subsidy. If we assume that a leverage ratio of three is used, meaning that approximately 60 percent of the total funds needed are covered by the beneficiaries, while the remainder is provided by the obligated parties, then the total EEO program costs (EEO subsidy + beneficiary funds) would add up to 0.078 BAM/kWh lifetime savings.

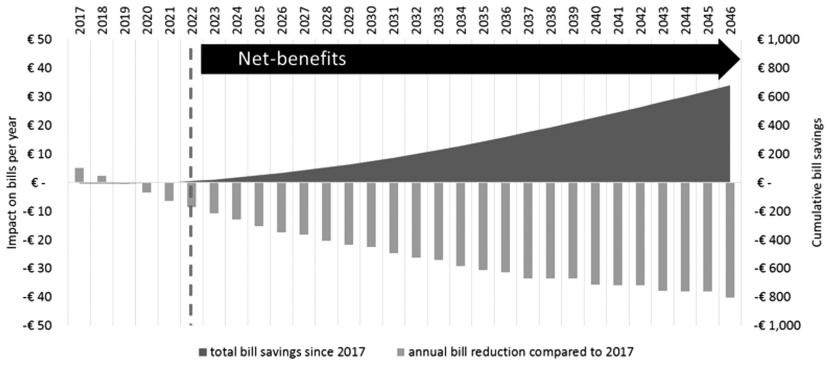
In comparison with the average cost of electricity for households in BiH, it is on average more than two times cheaper to invest in energy efficiency measures through the EEO and save energy rather than purchase the same amount of energy. The price for a kWh of electricity in BiH is about 0.1649 BAM/kWh for households, while the average cost of the saved energy based on the data from functioning EEO schemes across the world would be approximately 0.078 BAM/kWh lifetime savings as shown in Figure 6 above.

Long-Term Impact on Energy Bills for Households

Figure 7 below shows the net benefits for household energy bills of an EEO mechanism that lasts for 30 years. Note that even though the average energy bill amount in the initial period increases, over the long run, the amount of average bills decreases significantly.

The size of the energy savings target determines the overall effectiveness of an EEO model. If the target size is too low, very little energy savings over what would be attained in any event will be delivered, and there is a risk that the obligated parties would simply be subsidizing those parties who would have installed energy efficiency measures even in the absence of the EEO scheme. If the target is too high, obligated parties will incur

Figure 7. Potential Impact on Household Energy Bills for an EEO Lasting for 30 Years, USAID EIA



higher costs, which will be passed on to consumers, and struggle to meet a target, which would undermine the credibility of the effectiveness of an EEO model.

The EEO model can and should be revised if the annual reports show that the effectiveness of the model can be improved.

Transparency

Since the Energy Regulators have legal requirements to operate transparently, the fact that the EEO mechanisms are administered by the Energy Regulators means that the functioning of the mechanism and supervision of the obligated parties in the implementation of energy efficiency measures will be transparent. All steps in the selection of the beneficiaries will also be outlined in detail by the Energy Regulators, giving clear instructions to the Obligated Parties how the transparency of the process will be run, how the beneficiaries apply for EEO subsidies and what criteria is used for their selection.

In addition, web-based platforms run by the regulatory commissions that clearly outline the EEO process, the selection criteria and ranking-lists for selecting beneficiaries, reporting and monitoring processes also contribute to the transparency of the whole process.

Why Invest in Energy Efficiency Measures?

Energy efficiency should not be viewed only as an obligation, but also as a development opportunity for the overall economy of the country. In the following sections of the paper, an annual investment of 100 million BAM into energy efficiency measures will be used as a reference point for estimates that underscore the benefits of investing in energy efficiency measures.

Significant Increase in Gross Domestic Product (GDP)

In the economy, there is a circular flow of income and spending. Money that is earned flows from one entity to another, and most of it gets spent repeatedly as an investment or purchasing different goods and services, trickling down the value chain. This means that small increases in spending from consumers, businesses or the government lead to much larger increases in economic output. When money spent multiplies as it filters through the economy, economists call it the "multiplier effect." According to studies done in the European Union, the GDP multiplier for energy efficiency measures is up to 3.7 times.[11] This means that for every BAM spent on EE measures, GDP increases by 3.7 BAM, as illustrated in Figure 8 below:

For an annual investment of 100 million BAM in energy efficiency measures, due to the mentioned multiplier effect, the annual increase in BiH's GDP would be around 370 million BAM. For example, through an increase in GDP, other benefits such as increased revenues from taxes and social security contributions can be calculated. Based on the proportion of taxes (21.9 percent) and social security contributions (15.7 percent) of the BiH GDP,[12] this means that an increase of the BiH GDP by 370 million BAM would result in 81 million BAM in additional revenues from direct and indirect taxes and 58 million BAM in additional income from social security contributions.

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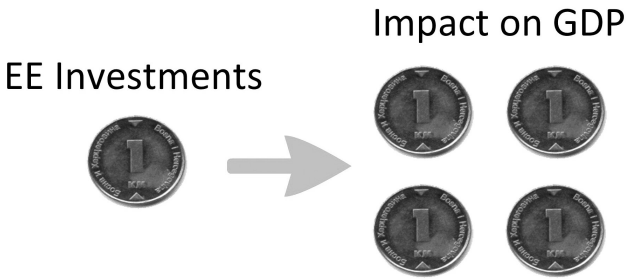
[11] Change in GDP per unit of investment (EUR/EUR), table 2.4: https://www.iea.org/publications/freepublications/publication/capturing-the-multiple-benefits-of-energy-efficiency.html.

[12] IMF Country Report No. 16/291.

Figure 8. Illustration Showing the GDP Multiplier of Energy Efficiency Investments



Decreasing the Energy Intensity of BiH

Energy intensity is a measure of the energy efficiency of a nation's economy. The energy intensity of a country indicates the quantity of energy required per unit of Gross Domestic Product (GDP): using less energy to produce the same quantity of GDP would lower the energy intensity of a country. Based on the energy intensity indicator shown below, BiH has the highest energy intensity in the region and is almost five times more inefficient than the EU-28 as shown in Figure 9 below. The lower the energy intensity, the more competitive a country is.

Energy efficiency is a proven way to reduce a country's energy intensity.

New Jobs

The investment of 100 million BAM in energy efficiency measures in BiH would result in the creation of nearly 4,900 direct full-time jobs. This data is calculated according to the Green Jobs Report,[14] which analyzed investments into energy efficiency measures for 34 facilities in BiH and its effects on direct employment.

The allotment and the type of works in the implementation of energy efficiency measures in buildings in BiH is shown in Figure 10 below. The

[13] www.energy-community.org/portal/page/portal/ENC_HOME/ENERGY_COMMUNITY/Overview/Characterising.

[14] Green Jobs Analyzing the Employment Impact of Energy Efficiency Measures in Bosnia and Herzegovina, CRP, UNDP 2016.

Figure 9. Energy Intensity of the Economy in 2013 [Gross Inland Energy Consumption (toe) / Gross Domestic Product (million EUR)][13]

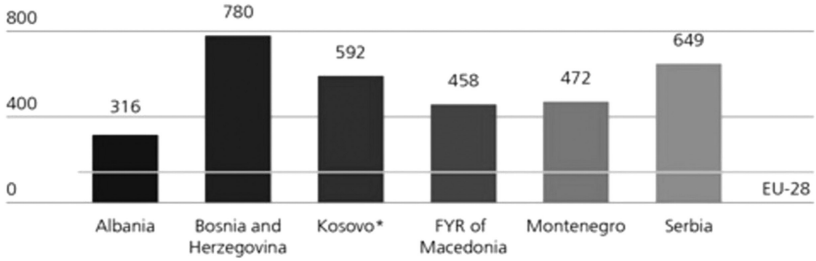
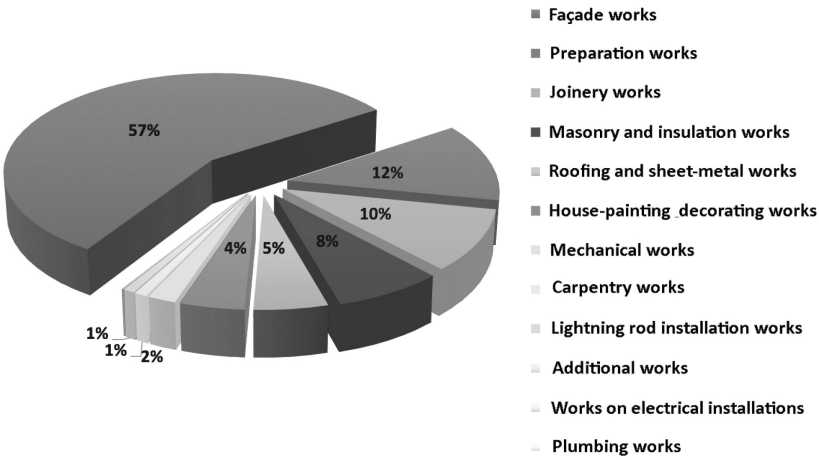


Figure 10. Types of Works in Implemented EE Measures

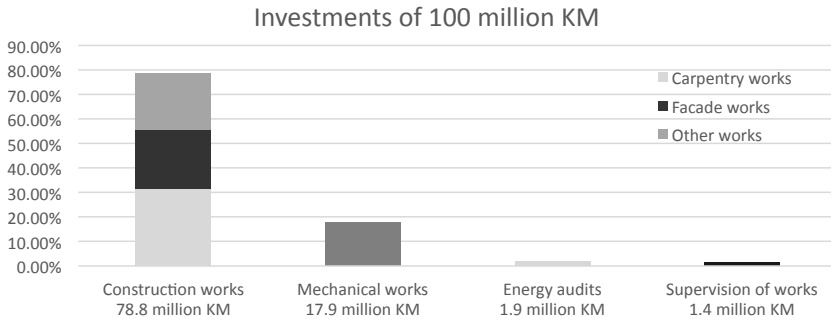


pie chart indicates which industries make up the biggest share of works and have the greatest potential for new employment.

Engagement of Domestic Industries by Type of Energy Efficiency Works

Figure 11 below shows the allocation of funds invested into energy efficiency measures in buildings grouped by the type of work (the costs in Figure 11 include materials, equipment and labor costs). The proportions

Figure 11. Allocation of Funds by the Type of Works



shown in the Green Jobs Report have been scaled up for an investment of 100 million BAM annually.

Within the total investment of the 100 million BAM shown in the illustration above, the share of carpentry works is about 32 million BAM and facade works are about 24 million BAM. Table 2 below depicts these works in terms of square meters of installed facades and windows.

Table 2. Approximate Quantities and Unit Prices for Carpentry and Façade Works Through EEO

	Investment	Price (BAM per m^2)	Quantity (m^2)
Carpentry works	32 million BAM	188	170,000
Façade works	24 million BAM	40	600,000

Based on analysis of the current market for facades and windows, currently in BiH 1.8 million m^2 of facades and 123,000 m^2 of windows are sold annually for the residential sector.[15] The implementation of the EEO in the residential sector would more than double the demand for windows in BiH and increase the demand for facades by a third, thus allowing for additional jobs and revenues for SMEs active in these sectors.

[15] The quantities of sold EE products in BiH and their prices have been derived from market surveys as presented in the report, "Market Analysis of Distributed Products for Energy Efficiency in BiH," Association of BiH Thermo-engineers, financed by the GIZ Promotion of Energy Efficiency in BiH Project.

Energy Security

The International Energy Agency (IEA) defines energy security as the uninterrupted availability of energy sources at an affordable price. Energy security has many aspects: long-term energy security mainly deals with timely investments to supply energy in line with economic developments and environmental needs. On the other hand, short-term energy security focuses on the ability of the energy system to react promptly to sudden changes in the supply-demand balance.[16]

Energy efficiency can be considered as a local energy resource since any quantity of energy that is saved does not have to be purchased in the first place. This means that instead of building new power plants to cope with rising energy demand, the energy savings made through the implementation of energy efficiency measures can postpone the building of new power plants or make them entirely unnecessary. Investing in energy efficiency is the quickest and least costly way of addressing energy security both on the individual and countrywide level.

Through the annual investment of 100 million BAM into energy efficiency measures in buildings, approximately 64 GWh[17] of energy could be saved annually in BiH. These annual energy savings are equivalent to the annual electricity usage of some 17,000 average BiH households.

Reduction of Air Pollution

An investment of 100 million BAM per year in energy efficiency measures in buildings would reduce CO_2 emissions by approximately 36,000 tons per year,[18] which is equivalent to the annual CO_2 emissions made by some 19,000 cars.

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[16] https://www.iea.org/topics/energysecurity/subtopics/whatisenergysecurity/.

[17] The amount of the energy saved has been extrapolated from the results of the USAID 3E Project that implemented energy efficiency measures in BiH, as described in the report "Energy Efficiency in Public and Residential Sectors—Projects Development and Implementation," USAID 3E, Spring 2014.

[18] The amount of the CO2 reduction has been extrapolated from the results of the USAID 3E Project that implemented energy efficiency measures in BiH, *Ibid*.

Conclusion

As explained in this paper, EEO schemes have proven to be excellent mechanisms to stimulate the economy of the countries that implement them. Through this instrument, energy efficiency measures are financed on a large scale through a domestic financing source that does not depend on donor funding or loans. This has far-reaching impact on job creation in the construction, industrial, and service sectors. Finally, the EEO mechanism can help energize the BiH economy, which is why it is viewed as a development mechanism.

What remains to be done next is the relevant BiH governments must reach a decision on which mechanism to implement, and then tackle the process of amending the necessary legislation.

Annex

The EEO Working Group, composed of all relevant ministries and institutions, was formed in 2015 in Bosnia and Herzegovina. The EEO Working Group is working with the assistance of the USAID Energy Investment Activity on the development of the detailed design, documents and procedures so that the necessary legislation can be drafted for the implementation of the EEO. The required EEO formation steps have been addressed for BiH, with the implementing parties defined and necessary tasks required, as set forth below:

- EEO target-setting body: Government.
- EEO administering body: Energy Regulator.
- Obligated parties: Electricity Distribution Companies.
- Target size: Carry out an assessment of the current supply chain and increase the EEO target gradually over time commensurate with growth in the BiH supply chain. This will allow the local EE industry to develop and avoid the imports that would be required if local industry does not have the time to grow fast enough to meet the demand.
- Obligation period: Set the target over a ten-year period to provide stability and allow for sufficient flexibility to modify the EEO model as needed.
- Sectoral coverage: Focus on the residential sector, as this sector provides significant potential for replicable low-cost energy efficiency

measures and is a major contributor to energy demand in Bosnia and Herzegovina. In particular, the focus should be on vulnerable customers.

- Fuel coverage: Oblige only electricity companies initially but allow them to achieve their targets through energy savings across all fuels.
- Eligible measures: Use only standardized measures, as they reduce the administrative burden and keep the scheme manageable.
- Reporting: Establish clear reporting requirements for obligated parties.
- Monitoring and verification: Implement robust monitoring and verification requirements.
- Compliance: Put in place penalties that are significantly higher than the cost of delivering the target.