Energy and Environment

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GREEN ECONOMIC DEVELOPMENT PROJECT

II PHASE

-

PROJECT DOCUMENT

November, 2017

Short document description

The Green Economic Development 2nd phase detailed project proposal document is developed in a manner to firstly provide the reader with key SWEDEN's project contribution effects (I SUMMARY), followed by a detailed description of current policy and legislative processes, as well as challenges facing the energy efficiency environment in Bosnia and Herzegovina, with focus on public sector buildings (II ENERGY EFFICIENCY IN THE PUBLIC SECTOR BUILDINGS IN BOSNIA AND HERZEGOVINA – POLICY AND CHALLENGES). Chapter III (GREEN ECONOMIC DEVELOPMENT PROJECT) provides detailed overview and introduces the reader to GED 2nd phase project goals, components, activities and the inter-linkage of activities. Chapter IV (SWEDEN's INVOLVEMENT) identifies project components which would significantly contribute from SWEDEN's involvement, and provides detailed overview of envisaged budget, sustainability and effects on the project. Chapter V (PROJECT ARRANGEMENTS – MANAGEMENT & REPORTING) provides an overview of Management and Reporting arrangements. Logical framework and Results matrix are provided in Annexes.

CONTENTS

I. SUMMARY - SWEDEN'S PROJECT CONTRIBUTION RESULTS

SWEDEN's involvement in the Green Economic Development project (about 4m € within three years) would result in:

- motivating end-users to enter into EE/RES investments (and later into the newly established financial mechanisms) while further contributing to leverage and unlock additional funds from end-users
- new financial mechanism established within Fund and proof provided to BiH based financial sector (government and commercial) that EE/RES investments are economically and financially attractive and cost-effective
- at least **40 detailed energy audits conducted per year**
- at least **18 infrastructure projects implemented per year**
- about **180.000 € annual energy costs savings** achieved
- higher co-financing amount from end-users (matching at least 1:2 for EE and 1:1 for RES measures, or leveraging up to three times) – **at least 875,000 € co-financing by end-users/project partners** ensured per year **higher co-financing amount from end-users**
- **425 man-months direct employment/"green jobs" generated**
- **3.900 tons of CO_2 emission reduced annually**
- scaling-up and creation self-sustainability within EE/RES related activities in BiH and contribution to BiH's EU accession and fulfilment of Energy Community Treaty obligations

Short-term aim:

- create interest and motivate end-users to invest into EE/RES by promoting co-financing
- develop capacity and skills of Environmental Funds (systematic approach to decision making processes of EE/RES investments)
- achieve budget cost savings through implementation of EE/RES projects and reinvest savings into EE/RES or other infrastructure projects

Mid-term aim:

- institutionalize energy monitoring and reporting mechanisms / energy management
- generate employment of domestic workforce
- increase public awareness and understanding of EE/RES benefits
- develop and adopt sustainable financial mechanisms within Environmental Protection Funds for EE project financing (performance based granting, ESCO Fund window)
- contribute to BiH's EU accession (EPBD, EED and RES directives)
- lower the risk to enter EE investments/provide loans for EE/RES investments in BiH

II. ENERGY EFFICIENCY IN THE PUBLIC SECTOR BUILDINGS AND PUBLIC LIGHTNING IN BOSNIA AND HERZEGOVINA – POLICY AND CHALLENGES

2.1 INTRODUCTION

From an energy consumption perspective, Bosnia and Herzegovina is characterized as a country with very high inefficiency within the residential, non-residential/public, industry and service sector. At the same time however, Bosnia and Herzegovina has one of the most significant energy conservation potentials in the region and could base its further mid-term economic development and generation of new employment on energy efficiency improvement measures in the residential and public sector. Currently, BiH consumes about 20% of its GDP on energy1, which is three times higher than in the U.S. and EU countries. According to the Report "Regular Review of Energy Efficiency Strategies in BiH" prepared under the obligations of the Energy Charter Treaty, gross total primary energy consumed per unit of GDP is 0.938 toe / USD 20002, which is 2.5 times the average of 27 EU countries and higher than almost any other country in the SEE region. Moreover, the average energy consumption of a public building in Bosnia and Herzegovina is three times higher than the EU average, categorizing them as *completely energy inefficient buildings* (in accordance to EU Eco-Management and Audit Scheme – EMAS). In order to meet this energy intensive consumption demand, a significant amount of budget funds must be allocated for energy expenditures of public buildings (educational, health, cultural, municipal and entity/state institutions etc.) representing a major proportion of the already inadequate public budget.

Most of the western economies base their economic development on strategic documents incorporating energy efficiency measures in the public and residential sector and the utilization of renewable energy sources, while contributing to fight climate change, fulfil EU and UNFCCC multilateral binding agreements and goals, and simultaneously generate new employment through mid/large scale public works. Unemployment is a challenge that has long been present in BiH as a consequence of war devastation and transition to a market economy. The unemployment rate in 2016 was 25,4%, and in the same period of 2015 the rate was 27,7% (according to ILO methodology)3. While there is some positive trend, the unemployment rate is still very high. Some efforts are being made to increase employment by encouraging investment in strategic projects such as energy facilities and systematic decrease of energy consumption, the potential of these investments which have been traditionally linked with the concept of public works employing a sizeable proportion of workforce is currently significantly limited, primarily due to a number of non-existing legislative commitment factors within the energy efficiency / renewable energy primary and secondary legislation and undeveloped MVR (monitoring-verification-reporting), market and financial mechanisms.

In 2012 the European Union financed project "Support to BiH to meet the requirements of the Energy Community Treaty with special focus on EE and RE", which had the goal to support BiH in meeting the requirements of the Energy Community Treaty, within the European Commission's 2016 published

1 World Bank data

2 Regular Review of Energy Efficiency Strategies in BiH, 2011

3 Labour Force Survey, 2016. Agency for Statistics of the Bosnia and Herzegovina

"Bosnia And Herzegovina 2016 Progress Report" it has been stated that "Bosnia and Herzegovina remains at an early stage of preparations in this area. Some progress was made over the past year". 4

Bosnia and Herzegovina in 2016 adopted a National Renewable Energy Action Plan ("NREAP") and a national emissions reduction plan. In the beginning of February 2017, the FBiH enacted the Law on Energy Efficiency ("FBiH Energy Efficiency Law"), which had been in the process of adoption since 2013. The FBiH Energy Efficiency Law entered into force on 1 April 2017. Now, in both Entities, the Energy Efficiency Law is in place. Energy Efficiency Action Plan of Republika Srpska has been adopted in 2013, which needs to be updated and updated version needs to be adopted again. In July 2017, the FBiH Government adopted Energy Efficiency Action Plan of the Federation of BiH (EEAPF). Both Entity Energy Efficiency Action Plans will be an integral part of the National Action Plan for Energy Efficiency of the State (NEEAP BiH). Once Entity EEAP adopted, the conditions for the adoption of the state plan (NEEAP BiH) will be created. In July 2017, the FBiH Government gave a positive opinion on a road map for the transposition and implementation of the commitments under the Energy Community Treaty in the field of energy efficiency. However, some of the Entity's and/or State level energy efficiency action plan(s) and a credible roadmap(s) for transposition of the relevant EU legislation to meet obligations under the Energy Community Treaty are still missing.

The energy sector in BiH is organized in accordance to the General Framework Agreement for Peace in Bosnia and Herzegovina, positioning entity line ministries as the key players in the EE / RES framework while giving the state-wide level, represented by the Ministry of Foreign Trade and Economic Relations (MOFTER), a coordinating/reporting role for multilateral binding agreements. As such, the direct implementation of EE / RES related activities and EU aquies (such as achieving energy saving targets, energy monitoring, enforcements of legislations, financing mechanisms etc.) is to be carried out on the entity/cantonal levels. At this time Bosnia and Herzegovina has no official Energy Policy or Strategy and is not in the position to purposefully absorb or allocate required funds for EE investments. In July 2017, the Council of Ministers has received the Proposal of the framework energy strategy of Bosnia and Herzegovina, prepared by the Ministry of Foreign Trade and Economic Relations and drafted by representatives of all levels of government. Still the Parliament of the FBiH needs to adopt the FBiH Framework Strategy for Energy until 2035 (the FBiH Government gave a positive opinion), which, together with the updated Energy Strategy of the Republic of Srpska (updated version needs to be adopted) and the District Energy Strategy of the Brčko District, will form the basis for the adoption of the BiH Framework Strategy for Energy until 2035. These documents have been drafted and they are waiting for their final adoption.

The ESCO regulation was enabled by adopted Energy Efficiency Law in February 2017 in Federation of Bosnia and Herzegovina, and work on secondary legislation is ongoing. In Republika Srpska ESCO regulation was enabled by adopted Energy Efficiency Law in 2013. However, the procedures for ESCO services stipulated in the public private partnership laws of both entities require further simplification. The state level public procurement legislation should enable the use of energy efficiency criteria and the technology life-cycle cost method in the tender evaluation, suitable for ESCO projects. Still, there are no ECSO projects in BiH, mostly due to the fact that current legal framework is not allowing full implementation of ESCO requirements and principles (i.e. no rules for selection of private partner in PPPs in FBiH and at the level of some FBiH cantons, no legal framework in FBiH and RS for multi-year

4 Bosnia And Herzegovina 2016 Progress Report, EC, 2016

budgeting of EE projects in public sector, public sector entities obligation to subsequently pay for energy services provided should not be construed as part of public/state debt, etc.).

As of now, development and capacity building projects to meet BiH's EE / RES EU accession obligations focused solely on the state level while the involvement of entity and cantonal level authorities has been limited, resulting in limited success of EE/RES projects.

Due to stated facts, due to limited and therefore relatively slow state-level planning processes, the complexity of state-entity interactions and the country's administrative divisions and responsibilities, this situation analysis argues that further enforcement of energy efficiency / renewable energy in BiH should continue focus on a bottom-up (local-ministries/canton/entity-state) rather than top-down (state-ministries/canton/entity-local) approach while creating MVR, market and financial EE / RES mechanisms in Bosnia and Herzegovina. This approach has been successfully proven by the GED project, and its results, implemented from 2014 to 2017. This would contribute to faster creation of an environment attractive for EE /RES investments in the public and residential sector, generation of new employment and would result in the creation of clear energy monitoring and target achieving mechanisms within the country.

2.2 CURRENT SITUATION AND MAJOR CHALLENGES

2.2.1 EE / RES in public and residential buildings and public lightning systems

In accordance to conducted energy studies, most of the energy in Bosnia and Herzegovina is consumed within the public and residential building sector – about 55% of total final energy consumption. The rest is consumed by the industry, service and transportation sector. The energy characteristic of public and residential sector is described as very energy-intensive due to high energy inefficiency. From the latest data from conducted Typology of public buildings in BIH in 2017, the average annual required energy for heating of typical public building is about 220 kWh/m^{2}a5, categorizing them completely energy inefficient (if we exclude buildings constructed after 2010 because one can assume they should meet the minimum requirements for thermal protection).

Table 1. Average values of annual required energy for heating of typical buildings in the current state

Construction period /Clasification of public building		Qhnd (kWh/m²) for region „north“						
		I	II	III	IV	V	VI	VII
		KINDERGARTEN	EDUCATION	HEALTH	SPORTS	KULTURE	OFFICE BUILDINGS	ALL DAY STAY
A	**Up to 1945**		173,19	191,12		249,60	176,65	
B	**1946 - 1965**	278,70	199,91	206,29	382,44	271,05	195,34	191,41
C	**1966 - 1973**	240,43	197,25	198,71	343,88	263,92	178,83	175,80
D	**1974 - 1987**	270,50	197,32	212,35	299,74	264,85	187,29	200,07
E	**1988 - 2009**	176,81	148,09	181,20	281,36	156,26	136,18	137,04
F	**After 2010**	155,61	101,86		291,73		124,86	

As it can be seen from Table 1, the annual required energy for heating is ranging from 101,86 kWh/m^{2}a until 382,44 kWh/m^{2}a. The conclusion is that in Bosnia and Herzegovina there is strong potential to improve energy efficiency, especially in public buildings where average annual required energy for heating is 217,6 kWh/m^{2}a, while in developed European countries it is 30-50 kWh/m^{2}a.

In Bosnia and Herzegovina, according to the data from 2008 about 90%6 of the current building stock does not meet the current technical standards in BiH. Due to its inefficiency, the average public building in Bosnia and Herzegovina can achieve an energy consumption reduction of up to 60% with investments resulting in a rather short pay-back period (up to six years). However, a systematic approach and allocation of investments into energy efficiency and the utilization of renewables is missing. In EU, depending on the Member State, about 0.4-1.2%7 of the stock is renovated each year, and in BiH assumption is that less than 0.2% of the stock is renovated each year, which is significantly lower than EU average. The current state of energy (in)efficiency in BiH is characterized by the non-harmonized Laws and the lack of by-laws in the field of energy efficiency and especially renewable energy sources, as well as the energy price policy. Although since 2015, in accordance with the demands of the Energy Community Treaty, electricity market is officially open and begun its liberalization, in practice, this is not applicable, especially for households, due to the current prices of electricity, as well as the lack of competitive suppliers. In BiH, large suppliers are subsidizing household

5 Typology of public buildings in BIH, Green Economic Development Project, UNDP 2017

6 Energy sector study in BIH, 2008

7 Commission seeks to improve Energy Efficiency of Buildings, web - accessed on Sep 2017, from link

prices at the expense of industry, resulting in one of the lowest energy prices in the region and Europe. Besides, there are no emission taxes for fossil fuels, electricity generated to large extent from fossil fuels is often used for heating purposes and district heating services are usually paid on a fix-term basis while consumption based billing is very rare.

These facts contribute to the lack of motivation for investing in energy efficiency and renewable energy in the residential sector. On the other hand, in the public sector, the situation is different, and in the past period there has been an increase in investments in energy efficiency measures and renewable energy sources on public sector buildings, which makes the public sector a good example in the country. Acquired knowledge and benefits of energy efficiency should be adequately transferred to the general public.

Up to day, clear legislation framework, strategy and action plans, as well as reporting and monitoring mechanisms, are not fully established, which makes it harder to enable an investing environment, a systematic and comprehensive undertaking to increase energy efficiency and utilize renewables in the public sector in BiH. Since the legislation on EE / RES is only partially drafted and has not been fully adjusted to BiH context during the drafting stage, once adopted (Law on EE adopted in RS in 2013, and in FBiH adopted in 2017, but bylaws are jet to be harmonized and adopted), an additional concern is that it will not be ready for implementation and will require additional interventions by line Ministries. Moreover, one major concern is that, once adopted, the primary and secondary legislation framework will not be implementable due to lack of human and technical resources, lack of understanding and planning on various authority/government levels, as well as fragmented energy related cost covering jurisdictions (and therefore responsibilities) of public buildings throughout BiH. Even though a lot has been done during the past period (EMIS system introduced into public sector buildings, EE laws under force, information system rule book is under development, public buildings typology is conducted), there is still a lack of data and overview of current public building stock, which is the most challenging and basic issue to address energy efficiency and utilization of renewable energy in BiH public sector. The fragmented and complex inter-authority jurisdictions, especially in FBiH, only adds to the struggle to have a clear overview of public sector buildings. Without implemented EMIS in public sector buildings, authorities and line ministries, would not have enough data on energy and water related consumption as well as costs they bear on a monthly/annual basis, and would not be able to submit reports on energy consumption and other requested data stipulated in adopted EE Laws.

Therefore, due to omission of lower level governments during and after EE / RES legislation drafting, due to the fragmented jurisdiction of different types of public buildings and not present communication and knowledge and information sharing on expected obligations and actions which will be required to be undertaken, it is highly recommended that further EE / RES activities focus on a bottom-up approach in order to be in the position to achieve and communicate energy savings while creating sustainable energy monitoring and reporting mechanisms on entity and state level in BiH and an systematic approach to decision making process on energy efficiency and renewables. This would highly contribute to BiH obligations under the Energy Community Treaty.

In accordance to UNDP's past experience and Environment Fund of FBiH planned project portfolio and demand from end-users (municipalities), very high energy conservation potential is existing within the

public lightning system in BiH. Moreover, UNDP's energy management software EMIS features a ready to be used module for tracking, monitoring, verification and reporting of energy consumption and energy, costs and CO_2 savings (and indicators) for public lightning systems. Currently high costs related to electricity consumption within BiH's public lightning systems are the common fact to all municipalities in BiH, resulting in vast amount of public expenditures and lack of financial resources for public lighting, as well as other municipal related services and infrastructure projects. Investments in public lighting systems, namely in the replacement of old inefficient light bulbs with LED technology are low hanging fruits due to high energy and costs savings and CO_2 emission reduction. Therefore, by piloting support to implementation of EE public lightning system in FBIH by Environmental Fund of FBiH, e.g. the development of methodology, evaluation procedure and energy audits, the support for these kinds of energy efficiency infrastructure projects will be enabled. By providing the FBiH and RS Environmental Funds with internal documents (methodology and evaluation procedure), as well as development of energy audits for public lightning energy efficiency infrastructure measures, the GED project would contribute to strengthen Environmental Fund's capacities and capabilities to financially support public lightning energy efficiency infrastructure project as of 2018, resulting in energy and costs savings, CO_2 emission reduction, as well as reallocation of savings into other infrastructure projects. These activities would also enable the support to public lightning energy efficiency infrastructure projects via the EE Revolving Fund.

Furthermore, the public lighting sector is linked within the existing legislation in BiH in regards to road safety, lighting conditions and maintenance, not to energy efficiency. Implementation of these project will contribute to improvement of road safety for all participants in traffic and elimination of the security concerns and concerns related to fear of crime for women, children and the elderly people, especially during night and lack of appropriate lightning.

In most cases road lighting systems and pedestrian lighting systems fall under municipal jurisdiction. Municipalities are responsible for maintenance, control and are obliged to cover electricity costs. Even though, there is no EE regulation for public lighting, most municipalities have recognized the benefits of EE lighting (mostly LED). Some EE interventions are then implemented through their in-house maintenance programs. Frequently there is a rebound effect of unchanged or even increased electricity costs, as baseline public lighting systems did not meet required lighting conditions. Municipal short-term planning of public lighting maintenance often ignores projections of electricity prices in the future and technical parameters of lighting conditions. That way, maintenance plans lead to a simplistic optimum of changing the lighting bodies for energy efficient ones, ignoring the long-term benefits of control systems and larger scale investments.

There is a need of unified and systematic approach to solve issues of rebound effects, unmet lighting conditions and poor planning, to avoid overly simplistic solutions that could lead to non-optimum solutions in the long term.

2.2.2 Monitoring and reporting on energy consumption and emissions in public sector buildings and public lightning

One of the main challenges various levels of governments are facing throughout BiH is the identification and allocation mechanisms of energy and water related costs of public buildings and public lightning systems. During the implementation of GED project (2014 - 2017), the vast number of governments/ministries with jurisdiction of energy and water costs payment, were covered with institutionalization activities, which includes introduction of EMIS into public sector buildings. Those Ministries have been provided with an overview of the public building type and the amount of energy and water related costs. GED activities covered public sector buildings on state, entity and cantonal level, but there are 143 municipalities in BiH with significant number of buildings that are not entered into the system, and are jet to be reached. Also, even though EMIS allows public lightning data entry, there is no systematical approach to this issue, as public lightning is also under the jurisdiction of municipalities and the linkage of public lightning and EMIS has only been piloted through GED (in 2016 and 2017).

In accordance to the expected energy related goals/target communicating (top-down) and implementation achieving (bottom-up) mechanisms, which shall be backed-up by EE / RES legislation adoption, public buildings under ministerial, cantonal and municipal jurisdiction shall increase their energy efficiency and utilize renewable energy in accordance to yet to-be-developed actions plans. However, the concern is that the present situation and understanding of BiH's ECT obligations on authority levels below the entity level and outside EE / RES legislation related line ministries (the monitoring and reporting on energy consumption, energy savings, emissions etc.) is non-existing or very limited, and is by far not able to absorb and implement the required activities. Furthermore, without an existing baseline overview on current energy consumption and emissions, in the absence of state level statistical data and reliable and relevant data from entities, a clear and well structured energy monitoring and reporting mechanisms cannot be implemented and BiH's obligations to multilateral agreements only partially, if at all, met. The non-existence of statistical data favors a bottom-up approach over unreliable top-down estimations.

Since Energy efficiency law in Federation of BIH was passed in 2017, all government levels are obliged to report data on annual energy consumption in buildings and other constructed facilities that they use. Secondary legislation on energy efficiency information system is in drafting phase, which will define modalities and obligations of data entry, monitoring and reporting. According to the drafted secondary legislation on energy efficiency information system EMIS is recognized as official tool/software for energy management and monitoring of energy consumption in public sector buildings and public lightning systems. Even though GED project shifted the baseline for statistical data with introduction of EMIS into public sector buildings, with the enforced secondary legislation defining all steps of this process, it will be easier to implement systematical approach on all levels.

In August 2017, Environmental Fund of Federation of Bosnia and Herzegovina developed and released Methodology and selection of criteria for financing and implementation of energy efficiency projects for public lighting. This is the first systematic approach to large scale identification of non-efficient public lighting in Federation of Bosnia and Herzegovina, which is also linked to Fund's financing mechanisms developed under GED project. The approach consists of an authority's (mostly municipalities) providing technical information about respective public lighting systems through an application form. Such information is evaluated based on several criteria for environmental impacts

and energy efficiency levels, which is used for construction of final rank. The same process is in the development stage in Environmental Fund of Republika Srpska.

2.2.3 Utility prices, Financing EE / RES activities and financial mechanisms in place

Bosnia and Herzegovina has a relatively low living standard (GDP per capita approx. 70% below the EU-28 average 8 , 33,3% of households are poor 9 , it is 101st in world rankings according to Inflation/Average Consumer Prices10), with *average income per households* of net EUR 440 and a *consumption basket* of EUR 920. The average distribution of living expenses on utilities in BiH amounts 10% of total expenses. These factors, among others, influence that utility prices (energy and water) are kept artificial low by authorities.

Over the past years, through UNDP's GED project, thousands of public building utility bills have been collected and entered into EMIS. In order to estimate energy prices, one must include not only unit prices from bill lines, but also several fixed costs that are part of almost any bill, depending on commercial energy source that is billed. In this particular case, such cost for solid fuels such as pellet, firewood and coal is usually transportation cost. Electricity bills, in addition to some fixed costs like monthly costs for maintenance of metering equipment and installed power, contain several variable costs such as system peak charges. All such costs must be taken taken into account in order to get a less biased picture of energy costs in BiH. All prices are expressed in BAM per kWh with VAT excluded.

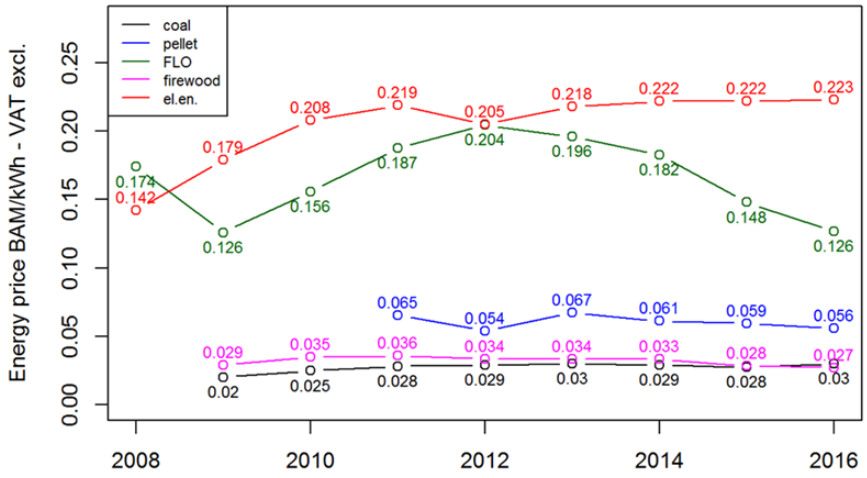


Figure 1. Comparison of energy prices in BiH, 2008-2016 (Source: UNDP own estimates based on EMIS data)

Figure 1 gives comparison of energy prices in BiH, from 2008 to 2016, based on EMIS data. There is a big difference between relatively expensive electricity and much cheaper domestic coal and firewood.

8 Eurostat

9 National Human Development Report 2016, UNDP, 2016

10 World Bank data

Electricity price

Electricity pricing is set by the entity regulators (FERC in Federation of Bosnia and Herzegovina and RERS in Republic of Srpska). In both entities, there are different rates for different categories of consumers, season and daily periods. There are no direct taxes related to CO_2 emissions. Electricity prices for public consumers and households are the lowest in Europe (in accordance to Eurostat, for second half of year 2015, only Kosovo, Serbia and Albania has lower electricity prices) valuing on average 2.54 times less per kWh consumed. The mean electricity price for 2016 is 0.223 BAM/kWh but can vary between 0.152 BAM/kWh and 0.319 BAM/kWh in 90 % of all cases.

Firewood and Coal prices

Regarding prices of the firewood and coal they remain a most affordable solution in BiH. The price of the firewood throughout the year may vary from 0.0261 BAM/kWh (VAT excl.) to 0.0454 BAM/kWh in 90% of all cases. The 2016 firewood price is a 6 year low, but with lower extreme being all time high, which indicates probable increase of price in the next period. The mean coal price for 2016 is 0.03 BAM/kWh but may vary between 0.022 BAM/kWh and 0.036 BAM/kWh in 90 % of all cases. There is no trend of significant changes in prices.

Pellet price

There is enough biomass, as well as other renewable energy resources available to ensure full switch away from fossil fuels in BiH public buildings; however their financial viability varies significantly and depends on the type of baseline fuel supply in a particular building/community. The mean pellet price for 2016 is 0.056 BAM/kWh but may vary between 0.049 BAM/kWh and 0.067 BAM/kWh in 90 % of all cases. The price is a four year low. Possible increase of prices is probable.

Light Fuel Oil (LFO)

The price of this energy carrier is being influenced by the oil market. The mean price is 8 year low with high probability of increase. The mean price for 2016 is 0.126488 BAM/kWh.

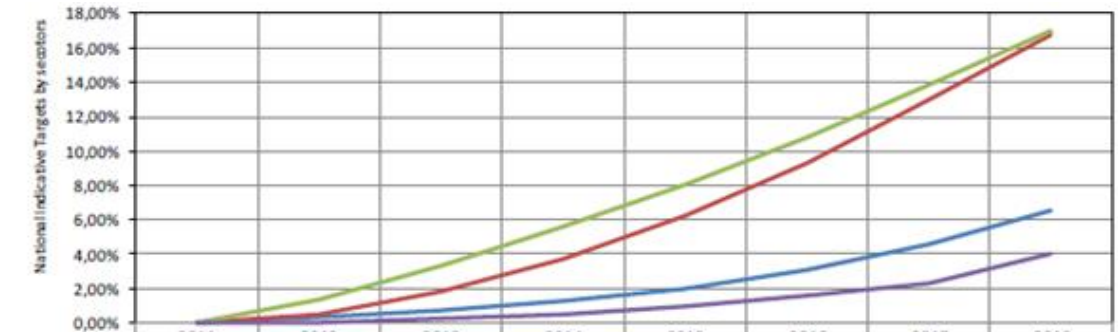
District heating and water prices

The majority of district heating and water utility companies in BiH are public companies funded by municipal or cantonal authorities. Although those companies in BiH are legal bodies with full responsibilities and obligations in accordance to the local and entity commercial law, and other binding legislations, they have only limited influence to the pricing policy for their services. Namely, since companies are in full ownership of local/cantonal authorities, all prices for the different tariff groups (households, commercial buildings, public buildings) are regulated and determined by the authorities itself based adopted methodologies. Therefore, it is the Municipality Council and the Mayor which is responsible for setting up the prices of utility services within the utility companies in BiH, while the company's management provides price policy suggestions but is not in the position to enforce any tariff changes. The full responsibility of the tariff policies in BiH is at the

municipal/cantonal level. There is no entity or state level legislation, regulation body or whatsoever, which regulates or prescribes a common methodology on thermal energy and water prices for district heating/water utility companies. Due to the situation where artificially prices are kept low, annual financial losses are the very usual reflection among BiH utilities resulting in cross-subsidizing mechanisms – covering financial losses through the local budget. Furthermore, there are no fossil fuel taxes or emission limitations for public and residential buildings in place which would stimulate energy efficiency and renewable energy investments.

As a result of non-existing market-driven energy prices and the existing market-driven EE / RES equipment and technology purchase prices (equivalent to average European prices), the average BiH citizen is not motivated to invest into energy efficiency improvement measures or the utilization of renewable energy sources due to mid and long-term expected pay off periods. Moreover, there are no financial mechanisms or incentives in place for the general public/individuals which might act as encouraging for such investments. In the public sector in Bosnia and Herzegovina, within the 2010 – 2015 periods, several financial mechanisms (mostly grant and/or co-financing) contributed to the implementation of energy efficiency measures. However, all of them were rather small scale in terms of volume of funds available and/or in terms of distribution of funds. GED project supported the development and operationalization of the Revolving Fund for energy efficiency.

In February 2012, the Final Draft of the 1st Action Plan for Energy Efficiency of Bosnia and Herzegovina (NEEAP BIH) for the period 2010-2018 was drafted (Final Draft APEE BiH 2010-2018), later on 2nd and 3rd NEEAP BiH, but until today they were never adopted on the state level. Although not adopted, NEEAP BiH reflects a strategic approach to achieve EE targets of FBiH and RS by 2018 and proposes financial incentives for residential, public and commercial buildings.



	2011	2012	2013	2014	2015	2016	2017	2018
Residential	0,00%	0,30%	0,72%	1,24%	1,98%	3,06%	4,60%	6,52%
Services	0,00%	0,47%	1,78%	3,69%	6,20%	9,31%	13,02%	16,80%
Industry	0,00%	1,37%	3,34%	5,57%	8,06%	10,81%	13,82%	17,00%
Transport	0,00%	0,04%	0,21%	0,52%	0,97%	1,56%	2,29%	4,00%

Figure 2. Energy savings targets by different sectors

Based on the requirement of ESD, Bosnia and Herzegovina has adopted a national indicative energy savings target of not less than 9% of the final inland energy consumption for 9 years by 2018 (a quite high rate for the existing conditions an average 1,1 % annually), which means that the country should ensure energy savings to the amount of 12,47 PJ, including 3,77 PJ energy savings for Republika Srpska and 8,31 PJ for the Federation of BiH.

Sweden has a system of 16 national environmental quality objectives that describe the state of the Swedish environment in 2020 or 2050 respectively (NEEAP_SE, 2011). One of the 16 environmental quality objectives is to achieve "A good built environment". This objective incorporates six interim targets, one of which is to achieve more efficient energy use in buildings. An objective was adopted through the Riksdag's decision on a national energy efficiency and energy-smart building programme whereby —the total energy use per unit of heated area in residences and business premises [is] to be reduced by 20% by 2020 and 50% by 2050 in comparison with the usage in 1995.‖Objectives are supported by several implementing programmes and financial incentives, including tax deductions.11

Financial instruments (Figure 3) foreseen within the NEEAP BiH are:

- VAT reduction on selected EE products and tax rebates provided by state/entities/cantons for EE investments;
- Soft loans provided by commercial banks and other financial institutions and supported by government/authorities;
- Subsidies provided by energy efficiency funds.

11 Boosting building renovation. An overview of good practices, Buildings Performance Institute Europe, 2013

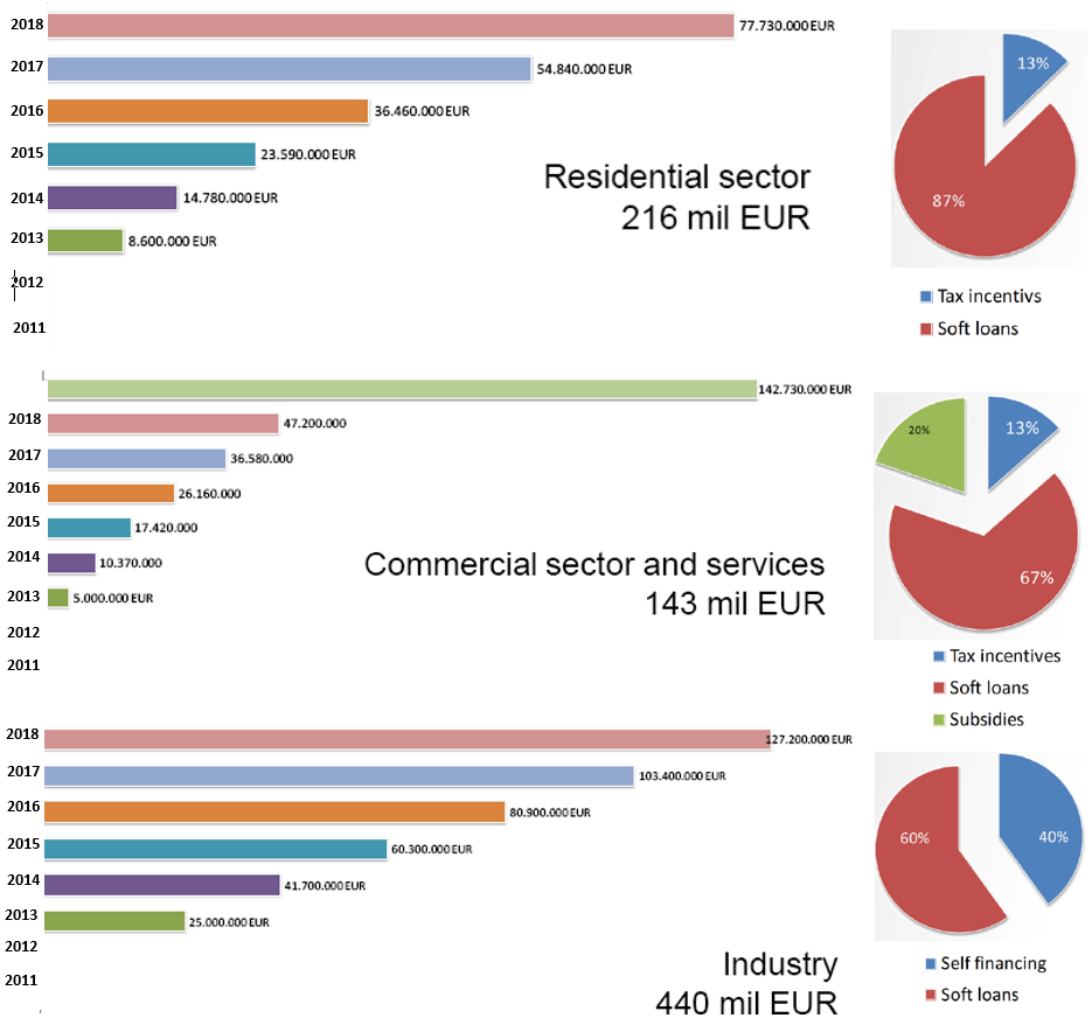


Figure 3. NEEAP BiH - Financial instruments

Although foreseen, currently there only a few financial incentives (for energy efficiency products, activities or measures in Bosnia and Herzegovina) mainly due to the fact that EEAP has never been adopted on the state level. Some of the financial mechanisms are their initiation phase or in planning phase (performance based granting through the Revolving Fund on energy efficiency). Also, the policy is ready to adjust energy prices to the market prices, and will be readier with more introduced financial mechanisms which will enable realization of larger scale investments but a market transformation with the revolving Fund and other financial mechanisms is yet to happen and therefore needs to be further supported.

Revolving Fund

In 2014, through Green Economic Development project a Study was conducted on development of energy efficiency financial mechanisms (revolving fund, performance based granting, soft-loans, guarantees) within Environmental Protection Fund in FBiH and RS. Based on findings from the Study and follow-up activities in 2015 enabled development of internal acts of the Environmental Fund of the FBIH which enabled new financial mechanisms to be enforced. These acts enabled establishment

of an Energy Efficiency Revolving Fund (EE RF) within the Environmental Fund of the FBIH which is operational as of 2016.

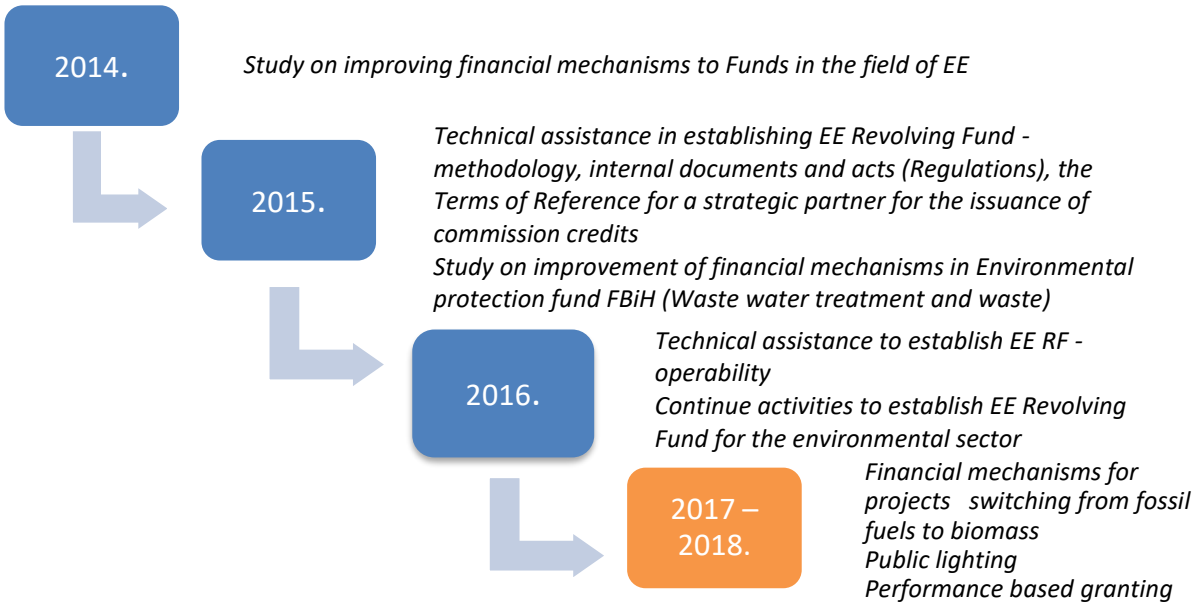


Figure 4. Support Environmental Protection Funds for improving financial mechanisms

In August 2016, first public call for the use of resources of the Revolving fund on energy efficiency was announced. Funding was available for three LOTs, each with many of sub-measures:

- LOT1: EE in non-residential (public) buildings
- LOT2: EE and RE in non-residential (SMEs) buildings/facilities
- LOT3: SMEs – EE in industrial processes

Besides the listed ones, eligible projects within Energy Efficiency Revolving Fund (EE RF) are EE in public lighting systems and currently activities are being implemented through UNDP project „Biomass Energy for Employment and Energy Security" in order to engage fuel switch projects from fossil fuels to woody biomass as well. More details about EE RF will be given in point 3.2.1.2.

Although the Revolving Fund is established in FBiH (the establishment of the RF is expected soon in RS), it needs to be further supported in order to further advance the existing financial mechanisms and to introduce the new ones, as for example:

- The Performance Based Granting and
- The ESCO that should support the Funds (whether these are guarantees, whether it is the ESCO Fund within the existing Environmental Funds/ Revolving Funds)

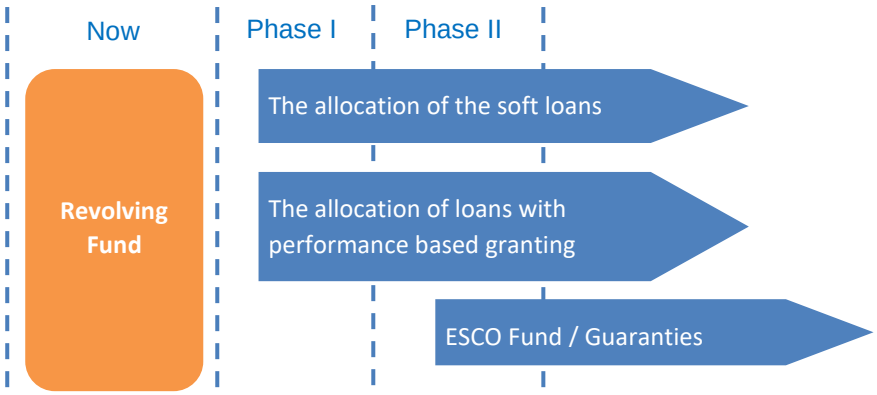


Figure 5. Future Support Environmental Protection Funds for improving financial mechanisms

ESCO Funding window

Experience from other countries around the world shows that the best way to promote a gradual shift from grant based financing to an ESCO based business model for energy efficiency in buildings is by implementing a range of policy and financial de-risking measures that improve the regulatory framework and lower the cost of capital. The GED 2nd phase project will support the development and enactment of specific regulations enabling implementation of energy performance contracts (EPC) in the public sector to open up market opportunities for private investment, including identification of appropriate contracting authorities, applicable procurement rules, selection criteria and payment arrangements. Such regulations are currently lacking, as a result, municipalities and other public building end-users are not able to enter into multi-year EPC contracts with private companies which are providing a technical and a financial solution for energy efficiency (i.e - ESCOs.) This GED-supported activity will build upon earlier project implemented by EBRD under the "Regional Energy Efficiency Programme (REEP) for the Western Balkans", which have prepared EPC templates and other recommendations for ESCO market development in the Western Balkan, including BiH. However, it also revealed a number of additional policy and regulatory barriers, which need to be addressed before such EPC contracts can operate effectively in BiH which includes, inter alia, issues related to public procurement and multi-year budgeting for municipalities.

Access to affordable capital for ESCOs is another critical barrier, which needs to be addressed to enable EPC market growth in BiH. To do so, the GED 2nd phase project will work with the Environmental Funds to support them to establish and operationalize dedicated ESCO financing mechanism (funding window under EFs through which ESCOs can access concessional loan, at 1,5-5% interest rate as well as selected grants from the national environmental funds, where appropriate). The advantage of enabling ESCOs to access low interest rate capital is that it will enable the implementation of projects with longer payback periods to be implemented.

2.3 SOLUTIONS - EE / RES AS ECONOMY AND LOCAL DEVELOPMENT DRIVING FORCES IN BIH

The currently developed secondary legislation on EE and RES, which shall be adopted within FBiH and RS governments, will not be sufficient to enforce and implement energy related EU Directives in Bosnia and Herzegovina resulting in continued failure to meet the country's obligations to the ECT. Moreover, while secondary legislation and action plans will and do mention various types of possible financial EE / RES mechanisms, the legal framework within the entities and state level for financial mechanisms has not yet been analysed nor required legal framework amendments identified.

This situation analysis suggests activities to be undertaken by the UN system in BiH and the international community in order to overcome the barriers on transposing and implementing energy efficiency and renewable energy related directives into BiH legal environment and thus creating a favourable investing environment resulting in economic and local development through reallocation of public budget funds (from energy/water expenses to investments in education, health, infrastructure, culture etc.) and generation of employment.

In order to enable such an environment, further focus should be given to the following matters:

- Bottom-up approach to energy management capacity building and legal obligation understanding
- Creating monitoring and reporting mechanisms
- Identification and development of EE / RES financial mechanisms
- Further policy level interventions

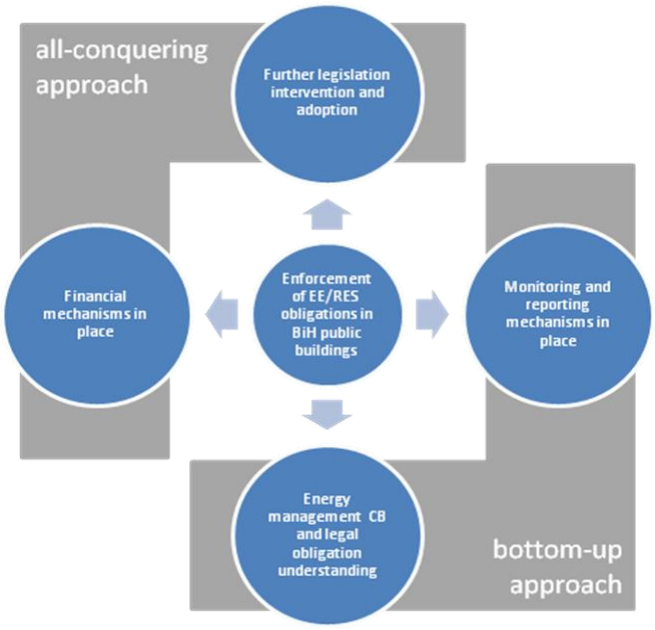


Figure 6. EE / RES enabling investment environment model in BiH12

12 Base on: Energy efficiency in BiH - current status, legal regulations, implemented and planned projects, S. Avdić, 2012

In accordance to UNDP experience, and due to targeted implementation requirements and the highly fragmented public sector jurisdictions, a bottom-up approach for energy management and legal obligation understanding, as well as the development of a sustainable monitoring and reporting mechanisms, is essential. A comprehensive, all-conquering approach with much stronger involvement of entity and cantonal line ministries is required for further EE/ RES policy level interventions and the alignment of EU directives to BiH environment, as well as for the identification and development of EE /RES financial mechanisms to support the public sector in its energy conservation activities.

2.3.1 Bottom-up approach to energy management capacity building and legal obligation understanding

If EU directives and primary and secondary legislation on energy efficiency and renewable energy are expected to be enforced in BiH, it is essential that lower level governments understand BiH's obligations on targeted energy savings, in particular goals set for public buildings, and develop energy management decision making capacities within their jurisdictions. In the BiH given complex administrative context, only if municipalities, and cantonal and entity line ministries, have an understanding and are enabled to manage energy related issues, Bosnia and Herzegovina will be able to fulfill its multilateral obligations and create sustainability of required EE / RES undertakings in the public sector.

Therefore, UNDP's *Municipal Training System* (MTS, and MTS II), Municipal Environmental and Economic Governance (MEG) and *Green Economic Development* (GED) projects already targeted the municipal and cantonal/ministry level authorities with the aim to familiarize them with required energy management knowledge and skills and create understanding of BiH's current legal obligations and upcoming cantonal/municipal responsibilities in the implementation chain.

GED project implements institutionalization of energy management on cantonal level, and by the end of the project it is expected that all cantons will have a well-established energy management system, monitoring of consumption, as well as the reporting of end users to the relevant ministries, and EFs. Taking into account cantons with already implemented all phases of institutionalization, including the effective *Decision on mandatory data entry and regular reporting for end users – public sector buildings*, it could be concluded that established monitoring and reporting mechanisms based on EMIS system in cantons are well developed and functional. Up to today (September 2017), five cantons adopted similar decisions, and reporting mechanisms are in effect. More details about where decisions are adopted up to today will be given in point 2.3.2.

Considering the fact that under the GED activities, all cantons will be covered with institutionalization, and decisions will be under effect and in accordance with EE law, it can be concluded that energy management on cantonal level in FBIH will be fully established. Same mechanisms will be applied on both entity levels, as well as State level by end of 2017 and 2018.

Other mentioned projects, developed and conducted within UNDP activities, provided local governments' councils and administrations, through capacity development and improvements various trainings and also distributed educational materials to municipality employees, but on the other hand, they covered multiple topics, so energy efficiency, energy management and reporting mechanism are

just superficially touched. Also, systematical approach and reporting obligations of municipalities are jet to be defined and implemented.

Besides UNDP activities, GIZ and USAID also covered some municipalities with various projects and activities with an aim to strengthen the role of municipalities as the driving force for the implementation of energy efficiency measures through pilot projects on several municipalities. In cooperation with various government institutions, such as MOFTER, they provided trainings, conferences and consultations on various topics in relation to energy efficiency. These activities were not able to cover all municipalities throughout country. Since there are 143 municipalities in BiH, it is necessary to create systematical approach towards understanding their obligations, as well as creating defined mechanism regarding data collection, monitoring, verification, as well as reporting mechanisms which will be harmonized with obligations from adopted Energy Efficiency Laws in FBIH and RS. A collaboration (EE Join Programme) on energy efficiency in BiH has been developed among GiZ, USAiD, UNDP and state level MoFTER (coordinated by MoFTER) in order to maximize efforts and create synergies.

2.3.2 Creating monitoring and reporting mechanisms

Even though laws on energy efficiency are in force in both entities, all neccesery bylaws are not jet created, nor harmonized with an aim of joint reporting at the entity/state level. Taking into account the current state, it is obvious that improvement of the current countrywide organisational set-up and implementation arrangements in the area of energy monitoring database management and especially reporting is one of the key energy related challenges in Bosnia and Herzegovina. In these circumstances, a top-down approach to track energy consumption, emissions and achieved energy savings is not reliable. Therefore, entity authorities e.g. Environmental Funds (since identified and required by Law on EE as institutions supporting the EE targets), should be involved in the data collection process. In order to help to overcome these challenges, to provide authorizes with a reliable monitoring tool through which they can base their further EE / RES investment decision on, and to contribute to BiH's reporting obligations to multilateral agreements (ECT, UNFCCC), UNDP is guiding its efforts to develop a clearly structured and unified energy and CO_2 emission monitoring and reporting system in both entities in BiH. Namely, UNDP further developed Energy Management Information System – EMIS, which provides BiH's authorities the operational component for energy and emission indicator (consumption, costs etc.), target setting and achieving, management and reporting monitoring tool. Moreover, it now enables state, entity and cantonal line ministries/institutions to develop their baseline building stock and static database of public buildings under their jurisdiction.

Along EMIS, for developing building inventory and statistical database of public buildings of great help will be recently developed (throught GED project) *Public building typology of BiH*, which is a comprehensive catalogue of information for assessment of the entire public building stock. This includes defined building physics parameters, data on energy consumption for 36 typical buildings which are representatives of samples consisting of 2.156 buildings from estimated population of 7.600

public buildings. In other words, 36 reference buildings differentiated by construction period and sector (childcare, education, health, etc.), are representatives of 7.600 public buildings. The typology is developed in accordance with directive 2010/31/EU (Annex I and Annex III) in order to primarily serve as input for cost-optimal calculations, defined by Commission Delegated Regulation (EU) No 244/2012. As mentioned, the GED project did create a significant change in this thematic, primarily by creating database of public sector buildings through EMIS system. Through past activities on the *MGD-F Environment* and Green Economic Development projects, EMIS has been installed in about 4.000 buildings throughout BiH in which, among other parameters, energy consumption, energy costs and CO_2 emission are monitored on a monthly basis. Until 2018 it is expected that all public sector buildings on state, entity and cantonal levels will be covered by EMIS system. This means creating a database of all buildings with statical data (type of building, building characteristics, etc.), but dynamic data entry (regular data on energy and water consumption) is the duty of the public institutions themselves. Until now about 2.500 public sector buildings, out of 4.000 in the database do have regularly entered data, and are fully monitored through the system as a result of the adoption of *Decision on mandatory data entry and regular reporting for end users – public sector buildings*.

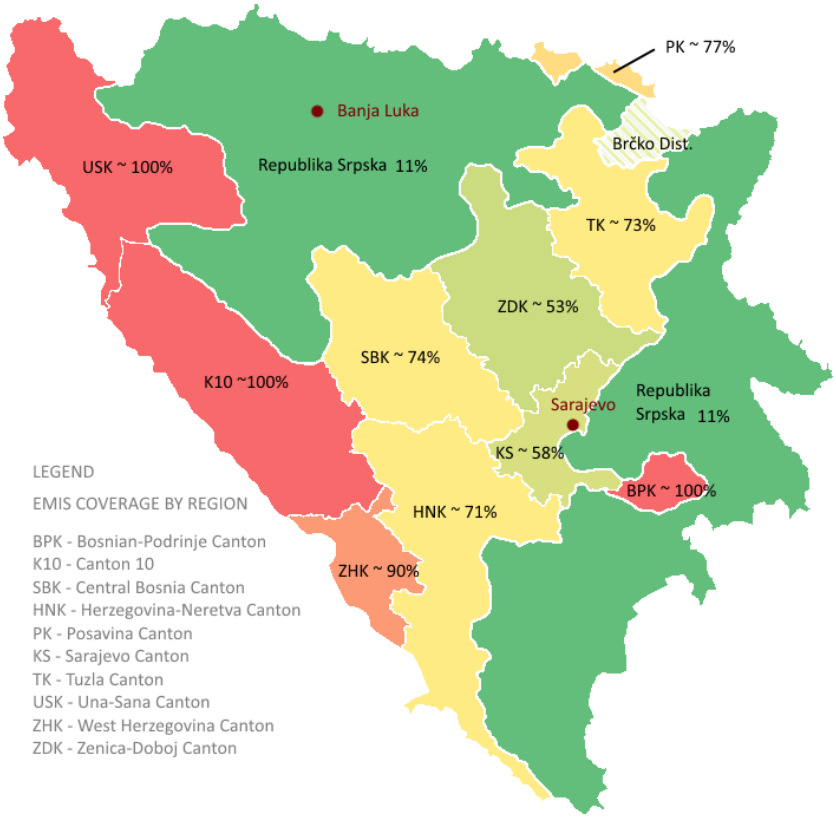


Figure 7. The percentage overview of public sector buildings monitored through the EMIS system (without municipal coverage)

The percentage overview of public sector buildings which are monitored through the EMIS system in FBiH and RS (this excludes municipal buildings) is shown on Figure 7.

The lack of the bylaws on obligatory data entry and reporting has led to a situation that data entry is not secured on all levels, since end-users (public employees) still sees it as unoblogatory and as an „additional“ acctivity which is not in their job description.

The solution to BiH's non-existing energy reporting and monitoring mechanisms is a top-down target setting flow (state-entity-canton/ministry/municipality), assured through entity adoption of primary and secondary legislation on EE / RES, and a bottom-up reporting flow (canton/ministry/municipality-entity-state). Further inter-entity and entity-state cooperation and coordination shall follow.

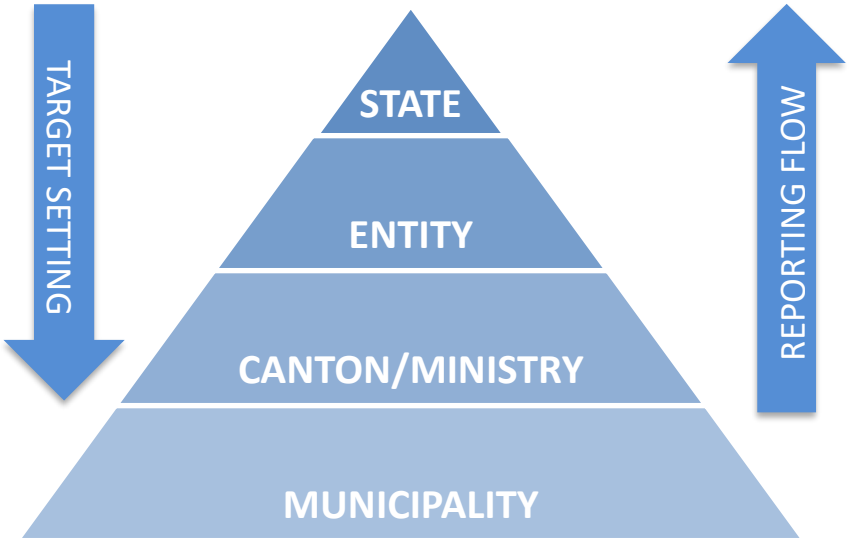


Figure 8. Proposed BiH's reporting and monitoring mechanisms on energy consumption, energy costs and CO_2 emission

Within the institutionalization activities on cantonal level, creating a Decision on mandatory data entry and regular reporting for end users – public sector buildings was one of the main activities to secure the sustainability of the system. Decision is a tool that will secure continuous data entry for cantonal public buildings into EMIS system, until the bylaws regulate obligatory data entry into EMIS on all government levels. Currently, under GED institutionalization activities, 5 cantonal Decisions are adopted and are legally binding for all public sector buildings in those cantons.

USC (Una-Sana Canton) Government was the first one to adopt Decision in December 2014. WHC (West Herzegovina Canton) Government adopted Decision on 22.10.2015., C10 (Canton no. 10) adopted Decision on 05.11.2015., BPC (Bosnian Podrinje Canton) adopted Decision on 14.07.2016. and SC (Sarajevo Canton) on 25.08.2016. It is expected that further 3 cantons will adopt the similar decisions till the end of 2017.

It is important to note that in FBIH these decisions define obligations of end-users (public buildings) towards the canton, as well as penalty provisions defined on ministry levels, and in no way will be contradictory to future obligations in accordance with the abovementioned Law and By-laws.

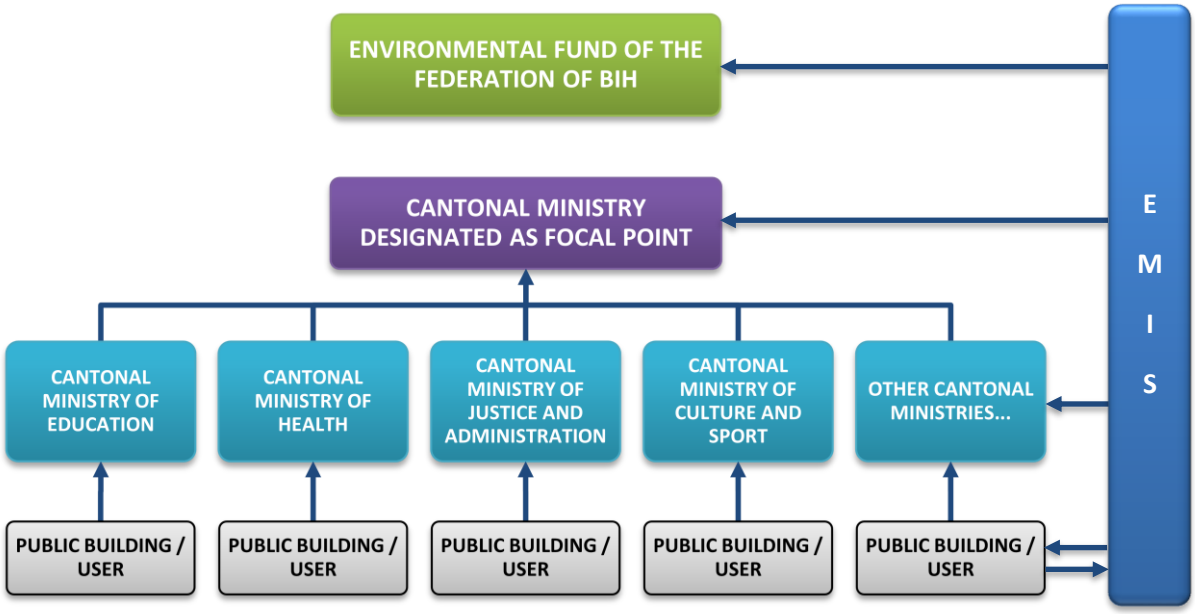


Figure 9. Methodology of data entry and reporting using the EMIS inFBiH

As showed in Figure 9, the reporting process starts with data entry by end-users, public sector buildings, obliged by the Decision. With range of options that EMIS offers, it is possible to create the annual report, which institutions submit to the EFs or competent ministry (Cantonal level in FBIH). In Federation of BiH, each Canton has one ministry designated as focal point (usually spatial planning), which has access to all data o energy consumption within whole canton, while all data in EMIS are automaticly available for the Environmental Fund of the FBIH (designated as Agency for EE). In accordance with the Law on Energy Efficiency in the Federation of Bosnia and Herzegovina (Official Gazette of the Federation of Bosnia and Herzegovina No. 22/17), the Environmental Protection Fund of the Federation of BiH (hereinafter: the Fund) establishes, manage and maintains an information system for energy efficiency.

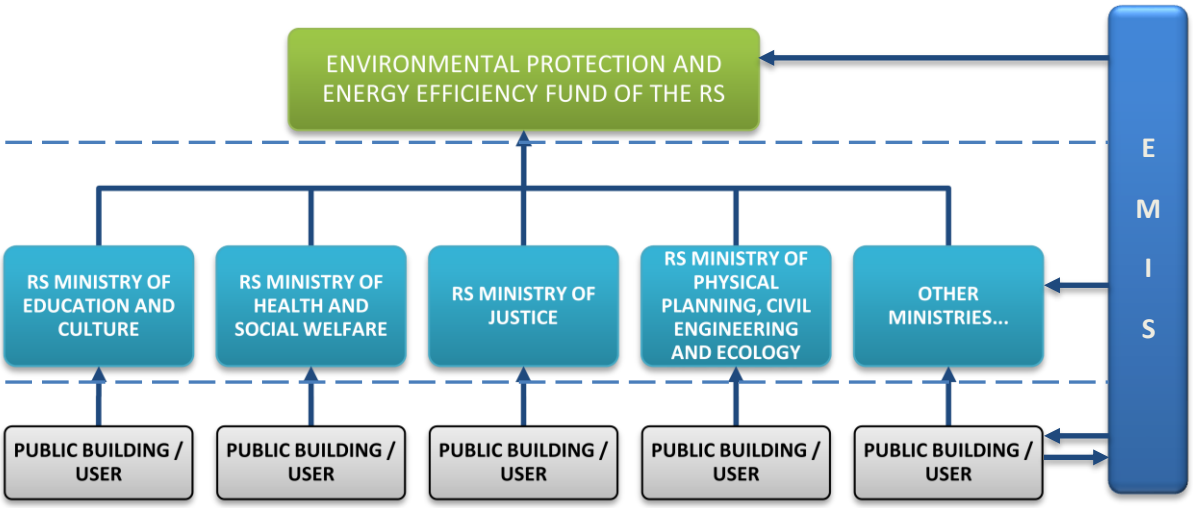


Figure 10. Methodology of data entry and reporting using the EMIS in RS

In Republika Srpska, there are no cantonal levels; therefore the reporting mechanism are easier (ledd complex) structured. End-users, public sector buildings enter the data into system, and submit reports to EF / Entity ministries, while each ministry has all data from respective public buildings under their jurisdiction, while all data in EMIS are automaticly available for the Environmental Fund of the Republika Srpska (Figure 10). In RS there are no decisions on obligatory data entry, but Law on EE obligates institutions to monitor and report the data. GED project expirience showed that in RS this system works.

Entity ministries, both in FBIH and RS will also be coverd with EMIS system, an laws on EE obligates them to monitor and report the data on energy and water consumption and savings.

Currently GIZ and UNDP are providing asistance to its partners in the entity ministries and enviriomental funds in providing professsional expertise on the establishment of an information system for energy efficiency (ISEE). ISEE is a comprehensive system that integrates a variety of existing information systems (EMIS, MVP, EE Action Plans, Energy Performance Certificates data base) in Bosnia and Herzegovina in a single platform and thus will allow easy access to information relevant to the energy efficiency sector, in accordance with the legal framework that regulates this field. „*The Rule Book on the information system for energy efficiency (ISEE) of the Federation of BiH*“ is in the final stage of drafting. The above Rule Book will prescribe the content and functional characteristics of the ISEE of the Federation of BiH, as content, the method of entering and submitting the necessary data, and the manner of reporting. Within ISEE, EMIS will cover component of energy consumption in following sector groups: (i) public sector (public buildings and public lightning systems), (ii) large consumers / industry and (iii) energy distributors, distribution system operators and energy suppliers.

Ministry of Foreign Trade and Economic Relations will be focal point for state level of buildings and togheter with summarised data from lower levels of governance create State report, as obliged by various Directives and agreements.

As mentioned, Law obliges all levels of government to report, including municipality level. Since GED project did not systematically approach to this level, there is still lack of statistical data on municipality level. Moreover, the jurisdiction on public buildings differs from the canton to the canton. For example, in Zenica-Doboj canton the kindergartens, health care centers, outpatient clinics etc., are under municipal jurisdiction, in Canton 10 the primary schools are under municipal jurisdiction, while in Sarajevo canton all these types of buildings are under the line cantonal ministries jurisdiction. A vast number of other buildings i.e. for sport, social and cultural activities are under municipal jurisdiction too. It is important to note that jurisdiction differs between municipal – cantonal level from the canton to the canton, not just for public buildings, but also for a high number of public lightning systems. Estimated number of municipal buildings is likely to be more than 3,000. This estimate is based upon number of municipal buildings identified through conducted "Public building typology of BiH". Considering that "Public building typology of BiH" estimated total number of buildings in BiH to be 7.600, then approx. 41,2% of all buildings fall under municipal authority. These public sector buildings under municipal jurisdiction are yet to be covered by EMIS (GED 2nd phase, 2018 - 2020).

Furthermore, EMIS data collection sets the basis for the creation of Energy Efficiency Action Plan's on Municipal/Cantonal/Entity level – one of the EE legislation requirements. The main challenge however, is to adopt energy and emission monitoring indicators and reporting mechanisms on cantonal government/ministry level in FBiH and RS, which will assure a long-term sustainable and reliable mechanism in place. EMIS system could be expanded to provide clear reporting mechanisms, which will be in accordance with law and bylaws.

One of the most important issues regarding energy monitoring in BiH is to avoid a huge number of institutions collecting data, without coordination and policy guidance. Otherwise, it would not ensure data compatibility, or take each other's practices into account, when upgrading or further developing systems for data collection and management.

2.3.2.1 Measurement and verification (M&V) module within EMIS

An intrinsic challenge facing energy efficiency projects is linked to the particular feature that their benefits—energy savings and others—are not physically visible. The difficulty in reliably predicting the energy that will be saved and quantifying the associated nonenergy benefits (e.g., environmental benefits or increased comfort levels in the case of energy efficiency in buildings) can make it more difficult/less interesting for policy makers, investors, and energy users in general to focus efforts and resources to scale up energy efficiency.

Effective measurement and verification (M&V) systems are crucial not only to capture the energy efficiency gains but also to appropriately capture multiple benefits of energy efficiency (MBEE) so investment and policy decisions are better informed and enabled.

M&V is recognized as a crucial confidence building tool for assessing the performance of energy efficiency interventions. It is also key for sustaining energy efficiency over time. Moreover, M&V will be the basis of certain contracts in cases where payments for energy efficiency investments are performance based (e.g., energy performance contracts). Once the EE / RE projects are implemented on the field, energy-efficiency savings will be the basis for performance-based grants13 / financial payments for loan users within EE Revolving Funds.

All Measurement and verification protocols share the common objective, which is to "assess the outcome" of an energy efficiency intervention. Apart from measuring and verifying the energy savings, it is important that the M&V methodology employed should enhance the effectiveness of energy efficiency programs.

Application of M&V to GED 2

Two separate M&V mechanisms will be applied, for the public building sector and public lighting. Both models for measurement and verification will capture independent variables that influence consumption/savings.

In case of public buildings, regression model is suited to describe savings in relation to activity (independent variables). Construction of relation of energy consumption to number of occupants, change in heating area before and after EE intervention, outdoor and indoor temperatures, requires periodical data gathering and verification, commonly on weekly or monthly basis. EMIS (Energy Management Information System) is well suited for the task of data acquisition as it is web based, user friendly and modular. Modularity provides the possibility to develop M&V modules and adequate web services for automatic data gathering besides manual data entry.

M&V for public lighting system in comparison to public buildings is easier to develop and implement because of lower complexity (lower number of independent variables). In addition, energy consumption of public lighting system is more predictable. Energy savings are usually measured by taking into consideration technical characteristics of lighting systems being compared. In most cases, operating hours, characteristics of control systems and lighting conditions.

With regards to complexity, the M&V model for public building sector will consider following attributes and parameters:

13 The performance-based granting can be described as one is taking a favorable loan, and if the estimated savings from the conducted detailed energy audit/feasibility study are achieved, part of the total value of the loan (5-20%) is written off or that part of the money will be returned to the user

- Measured energy consumption and related data (energy price, measurement dates, etc.) in a period before and after EE intervention.
- Building physics and parameters of the heating system before and after EE intervention. Parameters of interest may be extracted from detailed energy audits and walk-through audits.
- Climate data (mostly average outdoor temperatures) for a required period before and after EE intervention. Climate data can be downloaded automatically via web services for a location of interest.
- Measured indoor temperatures to avoid the rebound effect of indoor comfort.
- Change in number of end-users/occupants in a building.
- Change in heating area before and after EE intervention.
- Heating prices during given period before and after retrofit.
- Other parameters that can influence energy intensity.

Development of an M&V EMIS module or independent software tool that communicates with EMIS will transform this approach into an investment grade tool for energy performance contracting in the public sector (public buildings and public lighting).

2.3.3 Identification and development of financial mechanism

Once the legal framework for EE / RES primary and secondary legations is in place, energy efficiency improvement activities and the utilization of renewables (and thus the generation of employment and economic development) will not occur in volume required for meeting BiH's targets due to non-existence of financial mechanisms which have to contribute to its implementation. Namely, although some financial supporting mechanisms and models for EE / RES investments in the public sector have been listed by non-official NEEAP, a clear identification of necessary legislative bylaws, required amendments to existing legislation, identified actors, obligation and responsibilities, as well as financing models, incentives and mechanisms suitable for BiH's environment are not identified nor is it discusses or on the political/authority agenda present. This vacuum has to be over-bridged with clear directions and guidelines for compulsory actions leading to the formation of sustainable and reliable financial market mechanisms and modalities in BiH's entity level institutions (ministries, development banks, funds etc.).

UNDP's past activities contributed to draft amendments to Law on Environmental Protection Fund in RS, FBiH and Brčko District, with the intention to extend their jurisdiction to energy efficiency and thus enable them to provide constant EE project financing through their existing financial mechanisms. In RS amendments have been adopted, while in FBiH they are in adoption phase. UNDP's *Green Environmental Development* project developed in 2014 a *Study on development of energy efficiency financial mechanisms (revolving fund, performance based granting, soft-loans, guarantees)* within Environmental Protection Fund in FBiH and RS, based on which in 2016 the Revolving Fund has been operationalized in FBiH (expected to be in early 2018 in RS), followed by development of performance based granting in 2017 (on-going).

2.3.3.1 Performance based granting

The objective of financing energy efficiency projects is to achieve positive changes, i.e. to achieve financial savings, energy savings and reduction of emissions, while retaining or improving the user's comfort. In addition to already established concept of financing projects in the form of loans, a special form of grants (subsidies) for borrowers will be implemented. It is a concept that combines targeted funds in form of favorable loans and grants, with grants only approved if it is proved that the planned savings have been achieved. Therefore, the concept rewards the user if he achieves targeted savings. This combined concept is in compliance with the applicable Law on the Fund, which states that the Fund is obliged, when allocating funds, to apply the principle that available funds will achieve the highest overall environmental benefit.

Given that funding through subsidies cannot fully provide guarantees to achieve targeted savings, as well as the fact, that due to the general economic situation, the borrowing of entities for achieving energy savings does not attract sufficient attention, the mechanism of allocation of subsidies based on achieved savings through favorable loans is a good approach in which all parties can find their interest.

In that case, Funds interest income enables sustainable financing of energy efficiency improvement projects and greater control to achieve planned energy savings at the entity level. At the same time, the end user receives a favorable loan that will not impair his cash flows and operations, and a concrete incentive for achieved savings.

This subsidy is conditioned by the regular settlement of the borrower's obligations towards the Fund. Therefore, this mechanism is also an incentive for the borrower to fulfill his obligations. By regular repayment of the loan by the beneficiary, the Fund is able to plan further placement of funds more easily, while the revolving fund is not endangered by an unplanned lack of funds.

This model, i.e. Performance based granting, will scale up energy efficiency projects by continuous accumulation of funds for refinancing purposes. A combination of loans and the award as subsidies based on savings achieved, known as Performance based granting, is one of the better solutions the Fund can offer to improve the self-sustainability of the Fund's work and enable greater availability of funds for this purpose.

Although different models of performance based granting exist, this model focuses on combination of loans and conditioned grants to achieve the improvement of energy efficiency with a predetermined measurement and verification procedure of the savings achieved.

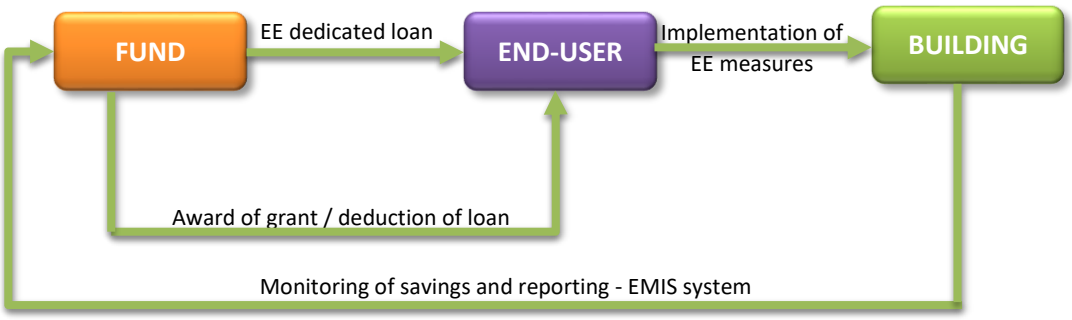


Figure 11. Simplified visualization of Performance based granting

The grant, as percentage of loans amount to be allocated to the borrower in the event of the achievement of the set target of savings in practice ranges from 5% to 20% of the total loan. The Fund will adjust percentages according to the type of user, e.g. one rate can be applied for users from the corporate sector, and the other one for public sector users, such as municipalities. Also, percentages will be changed according to the savings achieved, to a pre-defined scale, which would motivate the user not only to achieve the goals but also to overachieve.

The performance based granting scheme will scale up energy efficiency investments in the public sector at a faster rate than any other mechanism on the market. The key to success is obvious, the performance based award for the end user, generated by achieving energy savings, reduction of emissions and the related savings of energy costs.

2.3.3.2 ESCO Funding window

One of the project outputs will include establishment of the Financial mechanism (ESCO Funding window) established at BiH's Environmental funds (EF's) and capitalized with EF's own finance including defining the process and criteria for the financial mechanism (ESCO funding window within EFs). The GED 2nd phase project will work with the Environmental Funds to help them establish and operationalize dedicated ESCO financing mechanism (funding window under EFs through which ESCOs can access concessional loan, at 1,5-5% interest rate as well as selected grants from the national environmental funds, where appropriate).

As mentioned earlier, this activity will provide technical assistance to design the ESCO-related component of the National Framework and support its implementation on a pilot basis. The objective will be to develop a detailed financial mechanism which represent an Energy Service Company (ESCO) funding window within Environmental Funds of the Federation of Bosnia and Herzegovina and Republic of Srpska. Building on UNDP's prior work with EFs, the project will support the design of an innovative financing mechanism that will support a gradual shift from predominantly grant-based financing of LCUD towards an ESCO-based model whereby public subsidies (grants) are used to address specific structural, technical and financial barriers in BiH. In doing so, the project will simultaneously address the following barriers which limit municipalities' access to finance:

- Limited EFs' revenues base/sources of capitalization;
- SMEs' limited borrowing capacity preventing them to offer ESCO services on a larger scale;
- Municipalities high level of indebtedness preventing them accessing commercial financing.

Since the targeted sectors are public facilities and municipalities, the pivotal role in this project is that of the EFs. Under the proposed financial mechanism, the EFs will act as ESCO funds thus compensating both i) for SMEs limited borrowing capacity and ii) for municipal high indebtedness, restricted access to commercial financing and limited resources for projects preparation and implementation.

The financial mechanism (ESCO funding window within EFs) should support energy efficiency (EE) retrofit of public buildings, EE solar thermal and solar PV projects and EE public lightning saving measures, all according to NEEAP priorities and in line with municipalities' SEAPs. Recognizing complex administrative and political structure in BiH, the project will work and support both EFs separately at first to come up with design of the financial support mechanism for LCUD, which is appropriate for each BiH entity. To ensure that approaches are harmonized among entities, the project will also work

with MOFTER and facilitate inter-entity dialogue and exchange of relevant experiences and approaches.

The project will develop the ESCO business model processes (performance-based), eligibility criteria for grants, monitoring and verification procedures for proving savings achieved, and procurement methods with criteria for awarding grants and revolving loans. Capitalization of the ESCO funding window will be done from the EFs' own resources. To test and demonstrate the ESCO funding mechanism, the EFs will select on a competitive basis several pilot projects to be implemented according to the developed business model and specified eligibility criteria.

2.3.4 Further policy level interventions

Further policy level interventions (secondary legislation related to technical parameters and requirements), due to its partial drafting and not fully alignment to BiH context, should be developed and adopted in order to fully implement BiH EU accession requirements and enable a EE / RES market in BiH. Further policy development shall take place for:

- EE / RES in buildings sector
- EE of appliances
- EE / RES in industry sector
- EE / RES market mechanisms

More specified further policy development needs in BiH, aligned to BiH's EU accession process, are given below.

EU Energy Efficiency Directive (EED)

EU members states have accepted BiH's membership application, but still the European Commission needs to determine whether BiH meets criteria to become a candidate country. Therefore, it is not yet mandatory to implement most EU directives in BiH, including the EU Energy Efficiency Directive (EED). However, looking to the future it is important that BiH plans for accession when full implementation of the EU acquis will be required. Furthermore, BiH has signed the Energy Community Treaty that requires it to implement Article 5 of the EED, which concerns the renovation of public buildings. The deadlines for implementation and scale of the energy savings to be delivered in BiH differ from the text of the EED, but the scope remains the same in terms of renovating a certain percentage of specific government buildings each year to meet at least the minimum energy performance requirements.

According to the Article 5 of EE Directive, CP's must ensure that, as from 1 December 2017, 1% of the total floor area of heated and/or cooled buildings owned and occupied by their central government is renovated each year to meet at least the minimum energy performance requirements set out in the recast EPBD. The 1% should be calculated on the total floor area of buildings with a total useful floor area over 500 m^2 owned and occupied by the central government that do not meet the national

minimum energy performance requirements. This threshold will be lowered to 250 m^2 as of 1 January 2019.

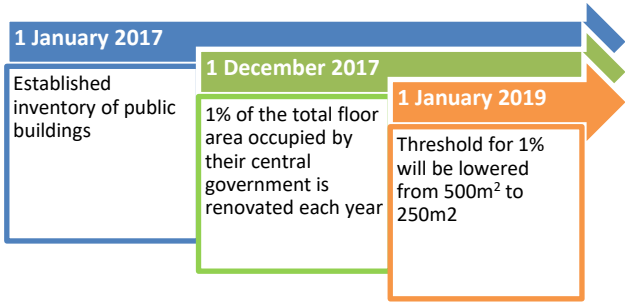


Figure 12. Timeline to implement Article 5 of the EED

As a first step towards implementing Article 5, the scope of Central Government buildings must be defined, which was supposed to be implemented by the beginning of 2017. As it can be seen, this deadline has already passed. Green Economic Development project will contribute to implementation of Article 5, especially in establishing inventory of central government buildings, since all data from EMIS and from conducted Typology for Public Buildings in BiH could be a useful basis for public inventory. The scope of the public inventory is specified in EED, including:

- A list of all central government buildings, as per the definition;
- For each building:
    1. its floor area expressed in square metres; and
    2. data on the energy performance, or relevant energy data - this means data on energy consumption or total energy use, or data from Energy Performance Certificates (EPCs).

Article 5 targets public buildings that do not meet minimum energy performance requirements. In relation to setting these requirements, Articles 4 and 5 of EU Energy Performance of Buildings Directive (EPBD) (31/2010/EU) set out specific actions:

- Take the necessary measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to achieving cost-optimal levels14.
- Differentiate between new and existing buildings and between different categories of buildings.

14 The cost-optimal level is defined in Article 2.14 of the EPBD as “the energy performance level which leads to the lowest cost during the estimated economic lifecycle”

- Calculate cost-optimal levels in accordance with the comparative methodology framework in the European Commission guidance15. The cost optimal methodology is a tool to facilitate a smooth transition towards nearly zero energy buildings (nZEB).
- Report on the comparison between the existing minimum energy performance requirements with the calculated cost-optimal levels.

BiH has not submitted its first report on cost-optimality to the Energy Community Secretariat yet, since calculations on cost-optimality for residential buildings are in process of adoption (activities financed by GiZ BiH), while calculations on cost-optimality for public buildings need to be done in near future, and will be financed through GED 2nd phase project (as the logical follow up after finished Typology for Public Buildings in BiH which was financed by GED project).

According to the Article 4 of EE Directive, Contracting Parties shall establish a long-term strategy for mobilizing investment in the renovation of the national stock of residential and commercial buildings, both public and private. According to the unofficial draft version of NEEAP BiH, a first version of the strategy shall be published by 30 November 2018 and updated every three years thereafter and submitted to the Energy Community Secretariat as part of the National Energy Efficiency Action Plan.

In fourth quarter of 2017, GIZ, USAID and UNDP established Joint Energy Efficiency cooperation and coordination of their activities with regards to the transposition of the Energy Efficiency Directive in BiH within their scopes of work, to develop a joint approach to EE public outreach, as well as to cooperate and coordinate other activities related to the Energy Efficiency in BiH.

EU Energy Performance of Buildings Directive (EPBD)

For the transposition of Directive 2010/31/EU, Republika Srpska adopted in May 2013 the Law on Physical Planning and Construction. This Law includes the main requirements of the Directive (definitions, minimum energy performance requirements for new and existing buildings, certification of buildings etc.) and creates a basis for further transposition of Directive 2010/31/EU through secondary legislation. In the Federation of Bosnia and Herzegovina, the Law on Physical Planning and Land Utilization was adopted in 2010. Under this general framework, secondary legislation on methodology for calculation of energy performance of buildings, energy audits of buildings and energy certification of buildings has been adopted, and implementation started. A training scheme for energy auditors and authorized companies for certification of buildings is in place.

The degree of compliance with Directive 2010/31/EU on the energy efficiency in buildings differs between the entities. Overall, Bosnia and Herzegovina still fails to comply with that Directive.

In the Federation of Bosnia and Herzegovina the Directive's requirements related to calculation methodology for minimum energy performance of buildings, energy audits and energy certification of

15 Guidelines accompanying Commission Delegated Regulation (EU) No 244/2012 of 16 January 2012 supplementing Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings by establishing a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements

buildings are already transposed through the existing Law on Physical Planning and Land Utilization, as well as respective by-laws. However, certain issues related to the Directive still need to be completed, i.e.:

- cost-optimal calculations,
- calculation methodology should include all the aspects which determine the final and primary energy consumption of the buildings,
- definition and plans for achievement of nearly zero-energy buildings,
- regulation on inspection of heating and air conditioning systems, etc.

Directive 2010/31/EU was transposed in Federation of Bosnia and Herzegovina by the 2017 Energy Efficiency Law, the 2013 Law on Physical Planning and Land Utilization and several bylaws. In Republika Srpska, the key requirements of Directive 2010/31/EU were implemented by the 2013 Law on Physical Planning and Construction, including the setting of minimum energy performance requirements of new and existing buildings, certification of buildings and energy audits of buildings.

Nearly Zero-Energy Buildings

The EPBD also contains an important provision regarding nearly zero-energy buildings. These are buildings which have both very low energy inputs and are able to meet the new energy requirements using renewable energy sources. The EPBD requires all EU newly constructed buildings to achieve near zero-energy status by 31 December 2020. This requirement is brought forward to 31 December 2018 if the building is occupied and owned by public authorities. Member States are also responsible for a system of certification of the energy performance of buildings, which must include information on the energy performance of a building and the reference values for that category of building.

Article 9(2) of the EPBD requires Member States to, "*following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into NZEBs, and inform the Commission thereof in their national plans…*".

Nearly zero-energy buildings are not defined in enforced regulation in BiH, and the one of the activities of the Green Economic Development Project in 2nd phase will be drafting /updating regulation regarding definition of the Nearly Zero-Energy Public Buildings with the aim to start advocating and communicating the required Nearly zero-energy buildings approach in BiH.

Renewable Energy Directive

BiH has submitted in April 2017 to the Energy Community Secretariat its *National Renewable Energy Action Plan* (NREAP). According to the NREAP - within the heating and cooling sector, an increase in the share of renewable energy sources from 805.8 ktoe in the base year is forecasted to be 1085.2 ktoe in 2020. This share of energy from renewable sources will be increased from 43.3% to 52.4%, an increase of 9.1%. The goal in the heating and cooling sector for Bosnia and Herzegovina is based on the parameters from the entity action plans where these targets for 2020 are set. In order to achieve the set goals in the heating and cooling sector in Bosnia and Herzegovina by 2020, besides using

biomass for domestic heating, it is also necessary to use other forms of renewable energy that have not been sufficiently used so far, with the aim reducing the share of energy from fossil fuels."

Therefore, based on the National Renewable Energy Action Plan of BiH, and the entity action plans, the goal to utilize solar energy is clearly marked, which is one of the planned activities under infrastructure (Project Component 4) works of GED 2nd phase. The project will directly contribute to this goals by setting up public sector buildings with PV and solar thermal systems.

III. GREEN ECONOMIC DEVELOPMENT PROJECT

3.1. BASELINE SITUATION / ENERGY EFFICIENCY AND FINANCIAL MECHANISMS IN BIH

The currently developed legislation on energy efficiency (EE) and renewable energy (RES) in BiH will not be sufficient to enforce and implement EE and RES related EU Directives in Bosnia and Herzegovina. Moreover, while secondary legislation and action plans mention various types of possible financial EE mechanisms, the legal framework within the entities and state level for financial mechanisms has not yet been developed while the required legal framework gaps have only been partially identified in the last few years. Therefore, in order to enable an EE and RES investing environment into public sector buildings, but also into SMEs and, as a result of development of financial mechanisms and further EE and RES by-laws, in a few years from now into the residential building sector, further focus should be given to the following matters:

- Continued bottom-up approach to energy management capacity building and legal obligation understanding
- Creating monitoring and reporting mechanisms on energy consumption and energy costs (focusing on municipalities and linking municipalities, cantons, entities with stale level)
- Further development of EE financial mechanisms within Environmental Funds

3.2. UNDP'S PAST EXPERIENCE AND ON-GOING ACTIVITIES

Energy efficiency was and remains a strategic priority for the United Nations Development Program (UNDP) in Bosnia and Herzegovina (BiH). UNDP CO BiH is one of the leading agencies promoting energy efficiency in Bosnia and Herzegovina. During 2009-2013 period, primarily acting within MDG-F Environment and Climate Change programme, UNDP piloted activities with a focus on replicable energy efficiency projects and introduction of Energy Management Information System (EMIS) into public sector buildings. A total number of 38 energy efficiency pilot projects were implemented across the country.

In fall of 2013, UNDP made an agreement with Environmental Fund of Federation BiH on implementing the Green Economic Development (GED) Programme. By that time, developed legislation on energy efficiency wasn’t sufficient to enforce and implement energy related EU Directives in Bosnia and Herzegovina. Moreover, the legal framework within the entities and state level for financial mechanisms has not yet been analyzed nor required legal framework amendments identified. Taking into account abovementioned, the primarily goal of GED project was set to contribute to the creation of a favorable environment for investing in EE measures in BiH, as well as creating self-sustainable system supported by secondary legislation.

A five year GED Programme (2014-2018) was created with various aims:

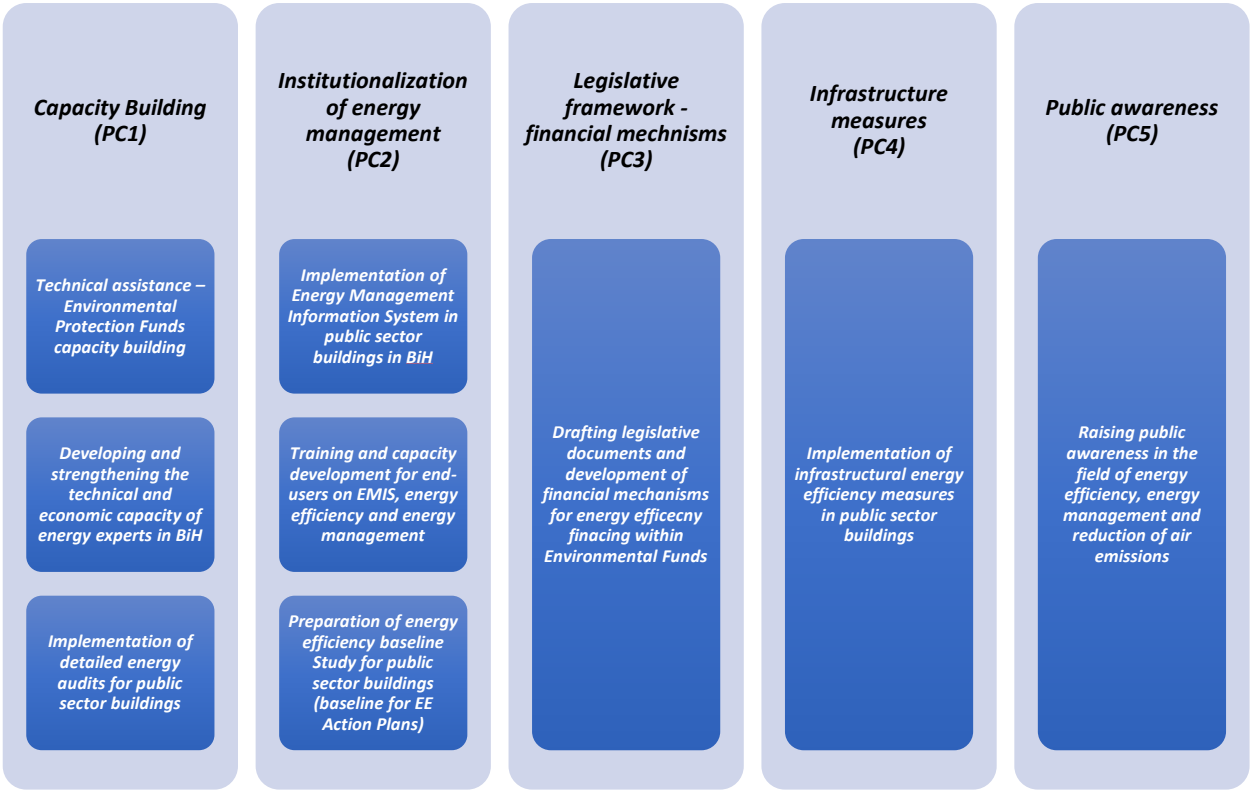
- develop capacity and skills of Environmental Funds (systematic approach to decision making processes of energy efficiency investments)
- develop and adopt sustainable financial mechanisms within Environmental Funds for EE project financing (performance based granting, revolving mechanisms, soft-loans, etc.)
- institutionalize energy monitoring and reporting mechanisms / energy management
- achieve budget cost savings through implementation of EE projects in public sector buildings and reinvest savings into energy efficiency or other infrastructure projects
- generate employment of domestic workforce
- increase public awareness and understanding of EE benefits
- contribute to BiH's EU accession (EPBD and EED directives)

GED Programme components and activities

In accordance with main goal, as well as with specific aims, Programme was built on five interlinked and supplementing project components:

- ***Capacity Building*** – Development and capacity building of Environmental Funds and energy professionals.
- ***Institutionalization of energy management*** – Institutionalization of energy, costs and emission management and monitoring in public sector buildings of BiH.
- ***Legislative framework / financial mechanisms*** – Development and adoption of sustainable financial mechanisms within Environmental Funds.
- ***Infrastructure measures*** – Implementation of energy efficiency measures in public buildings.
- ***Public awareness / marketing campaign*** – increasing public awareness on energy efficiency

As already mentioned, project consists of various activities that are interlinked, and are in strong correlation and interdependency with each other and Project Components. Activities were grouped into nine activity groups, as given below.



Technical assistance – Environmental Protection Funds capacity building – under this activity UNDP staff provided regular technical assistance to the Environmental Protection Funds in the field of energy efficiency, energy management and management of EMIS, in the form of consultative, advisory and technical support, as well as hiring consultants for niche expertise/knowledge.

Developing and strengthening the technical and economic capacity of energy experts in BiH – under this activity, the Association of Thermo-energetical engineers in BiH was established in February 2015, and up to day has more than **200 members**. Besides, annual training programs were conducted with an aim to develop and strengthen the capacity of energy experts, and create understanding of the legislative framework in FBiH/RS/BiH on EU directives in the field of energy efficiency and energy management. Improvement of techno-economic skills is necessary to perform energy audits and making bankable documents.

Implementation of detailed energy audits (DEAs) for public sector buildings - Based on the collected energy, economic and emission data through EMIS, and the resulting indicators, a techno-economic prioritization was conducted and up to day, **more than 180 DEAs** were conducted. Capacity building and skills development of Funds internal capacities on energy efficiency investments decision making processes is ensured through these evaluation, analysis and prioritization activities.

This activity is linked with almost all other activities, since based on recommendations from DEAs, infrastructure measures are implemented.

Implementation of Energy Management Information System (EMIS) in public buildings in BiH – through various activities, including initialization of energy management, UNDP BiH introduced EMIS in **more than 4.000 public buildings in BiH**. It is expected that in the next two years this number will reach 5.000 (3.000 in FBiH and 2.000 in RS). It is important to emphasize that taking into account the fact that most state, entity and cantonal levels are covered with these numbers, we still need data on

local municipal buildings, which are certainly high potential (including sport and concert halls, libraries, other cultural-sports institutions, municipality buildings, etc.)

Training and capacity development for end-users on EMIS, energy efficiency and energy management Up to day (September 2017), around 150 trainings were conducted for end-users (public sector buildings representatives) on EMIS, energy efficiency and energy management in public buildings. There were **more than 1.500 participants** on these trainings. Since number of building, and number of institutions are not same, so number of public sector buildings in EMIS with trained active users is over 3.000. In 2017, the training for the public sector buildings without users, previously entered into EMIS, continues in parallel with the 2017 EMIS training activities.

Preparation of energy efficiency baseline Study for public sector buildings - The baseline Study on the energy efficiency of public buildings in BiH is complementary to the implementation of EMIS. The study complements EMIS in terms of investment calculations of energy efficiency measures and their environmental effects. Using the methodology of "walk-through audits", 500 buildings per year in FBiH are processed and analyzed through a single Study that in addition of individual assessment for each facility will provided an analysis of all the buildings together, according to the type and sector (educational institutions, health care, etc.). In the past period **three of these studies were developed**, enabling further analysis and creation of new publications.

Drafting legislative documents and development of financial mechanisms for energy efficiency financing within Environmental Funds - Drafting legislative and guidance documents on financing energy efficiency in BiH included the creation of guideline documents and secondary legislation, in order to create a sustainable financial model for the establishment of financial mechanisms for energy efficiency financing within Environmental Funds. The financial mechanisms included revolving mechanisms, performance based granting, soft loans, guarantees and other financial modalities which could be provided by the Environmental Funds with the aim to create a legal framework for sustainable investments and reinvesting possibilities in energy efficiency.

Up to day, these documents enabled successful startup of the EE Revolving Fund within Environmental Fund of the FBIH, and the same one is prepared and almost operational in RS within Environmental Protection and Energy Efficiency Fund of RS. Other financial mechanisms are not jet developed, but offer great potential.

Implementation of infrastructural energy efficiency measures in public sector buildings - On the basis of detailed energy audits findings, techno-economical analysis and socio-economic factor, infrastructure measures are implemented yearly in order to conduct so called "Deep retrofits" (in accordance with the requirements of EU directives EED and EPBD) and respecting newly developed and adopted construction and energy conservation standards (EPBD directive). Infrastructure measures imply civil, mechanical and electrical works with an aim to improve energy efficiency of public sector buildings. Tot**al of 86 infrastructure works** were conducted in period of 2013-2016. In 2017-2018 it is expected to conduct works on more than 60 more buildings.

Raising public awareness in the field of energy efficiency, energy management and reduction of emissions to air - During the past years, UNDP run a comprehensive marketing campaign using mainstream and online media aiming to make the youth proactive advocates of smart energy use. This activity will target population that is commonly active in promoting issues related to preservation of the nature and innovations in energy use. The activities of designated domestic institutions, such as environmental funds and ministries in charge of energy and environment, were also promoted within the campaign. The campaign promoted the mascot Professor Atom and key message “Lajk za pametnu

energiju"; both became well-known among targeted group. Social media channels were created during the campaign. (Professor Atom Facebook page, Twitter, Instagram, YouTube channel and web page "www.lajkzapametnuenergiju.ba"). Each year, campaign included raising public awareness events in cities around the country, workshops in schools, on-line competitions, as well as schools competitions. Up to day (September 2017), more than 70 educational events were held all over BiH, 36 workshops in schools, and two schools competitions, where over **60.000 citizens** attended mentioned events, 70 educational videos were created, and more than 300 various graphics. Besides, educational publications that explain EE from the basics to the technical details related to energy savings, energy management and emission reduction were developed, both for younger and older target group. Brochures "50 savjeta prof Atoma", "Izvori energije" and "Pametno i lako, uštediti može svako" were developed, as well as coloring book, foldable leaflet/timetable, working materials and various promotional materials were designed.

i) Project achievements and targets overcomes

The project started in 2013 where in the first reporting period 4 infrastructure projects were implemented. Even second reporting period, also with four implemented infrastructure projects, showed higher interest of local governments, since local co-financing exceeded planned 25% with average 40% of co-financing.

In 2015 a higher number of EE infrastructure investments than the years before has been achieved due to Sweden's involvement in the GED project. Moreover, instead of 20 infrastructure projects, as planned and defined within the ProDoc, a total number of 28 projects has been implemented. This is the result of competitiveness among construction companies during the tendering phase but also, and mostly, due to assured co-financing from end-users.

In 2016, co-financing exceeded 66% of total amount of implemented measures, which allowed implementation of more than 40 projects of infrastructure measures.

In a period 2014-2016, project reached significant achievements, which highly exceeded targeted objectives:

- Total project value achieved: **over 14 m USD**
- Infrastructure investment amount: **8,9 m USD**
- Co-financing amount (end users and responsible institutions): **5,9 m USD**
- Number of public buildings with implemented infrastructure measures: **86 public buildings**
- Total energy savings: over **17.000 MWh** (achieved average savings of 72,5 kWh/m^2)
- Total energy cost savings: **1,8 m USD annually** (up to six years average pay-back period)
- Total emission reduction: over **7.000 t CO_2 annually**
- Total direct employment achieved: **over 800 man/months** (total worth in net salaries 2,8 m USD)
- Improved indoor conditions for: **over 60.000 end-users**

In the upcoming period 2017-2018, it is expected to almost double these numbers.

3.2.i.1. Public lightning systems

During the project implementation, various queries on enhancing public lightning systems in local communities were received. These queries could not be processed under existing conditions of project. To be able to monitor public lightning systems, new module under EMIS was developed in 2016, exclusively for tracking, monitoring, verification and reporting of energy consumption and energy, costs and CO_2 savings (and indicators) for public lightning systems. It allows entry of data on lighting fixtures, and provides calculations on energy consumption and costs, specific sighting density, reference price and annual costs per various indicators. New module allowed comparison of indicators for public lightning systems, which allowed prioritization of infrastructure projects.

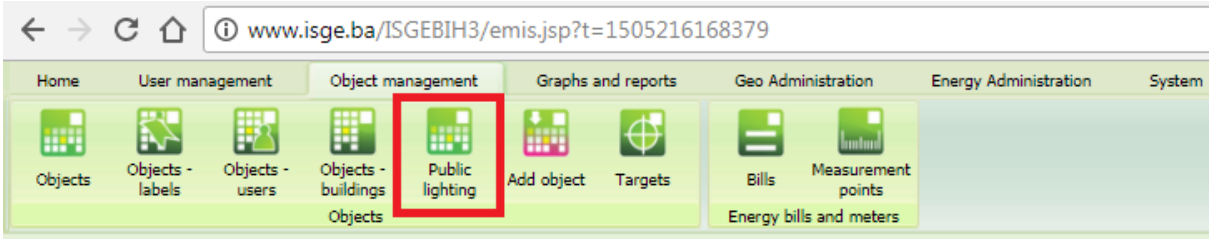


Figure 13. Module under EMIS for public lightning systems

In 2016, Sweden supported the capacity development through development of methodology and evaluation procedure within Environmental Fund of FBiH and enabled the implementation of EE public lightning system in FBIH. In 2016, public call for conducting five energy audits for public lightning was announced. High interest was recorded with more than 80 applications.

In 2017, based on conducted energy audits, piloting the first EE public lightning system infrastructure projects via grant financing to end-users (municipalities) will be conducted. However, it is important to continue to support these investments via grant financing, as well as soft loans/revolving fund.

3.2.i.2. Revolving Fund

As expected, GED project activities contributed in 2015 to enable developing internal acts of the Environmental Fund of the FBIH which would enable new financial mechanisms to be enforced. The internal acts are:

- Regulation on EE RF within the Environmental Fund of the FBIH
- ToR for strategic partnership with a Financial Institution in FBiH
- Methodology of evaluation EE RF projects.

These acts enabled establishment of an Energy Efficiency Revolving (EE RF) Fund within the Environmental Fund of the FBIH and allows it to be operational in 2016.
In August 2016, first public call for the use of resources of the Revolving fund on energy efficiency was announced. Total budget intended for the financing projects was BAM 2,000,000, where maximum amount for single project was BAM 200,000. Funding was available for three LOTs:

- SMEs – EE in industrial processes
- SMEs – EE of facilities
- Public sector buildings – EE of facilities

The funds from the Revolving Fund were subject to the favorable conditions, compared to commercial bank loans. There were 4 applications in total, and three projects were allocated funds, one in each LOT, and approved in December. Since interest was shown for higher funds per project, second call is announced in April 2017, where higher amounts per projects are intended, up to BAM 1,000,000.
Also novelty is that types of projects has been extended, so eligible projects could be from various sectors:

- non-residential buildings (public sector and SMEs)
- industrial process
- public lighting
- activities and processes in the performance utility services (remote systems heating, water supply and sewage, etc.).

Interest in this kind of financing, and implementation of these projects would mark the key milestone for BiH's investing environment into EE infrastructure since it would in the mid-term, if managed properly, significantly contribute to proof BiH based financial institution sector (government and commercial) that energy efficiency investments are economically and financially attractive and cost-effective, resulting in risks reduced to provide loans for EE investments in BiH, and provide loans to municipalities and other beneficiaries/clients for EE infrastructure investments.

3.2.i.3. Study on human development benefits and gender mainstreaming thought energy efficiency effects

Energy efficiency measures contribute to reduce energy costs, energy consumption, CO2 emission, fulfillment of EU accession and other multilateral obligations (UNFCCC), and job generation. However, beside those well-known positive effects, energy efficiency actions have also an impact on human development and gender mainstreaming which is, in BiH, still not known. Therefore, it was necessary to analyze and assess the empirical human development effects which emerged in the healthcare, education, safety and security, transparency and gender areas (and others) as a result of the implementation of energy efficiency measures in more than 80 public sector buildings in BiH.

In 2017, additional funding was secured by Sweden Government to develop a *Study on human development benefits and gender mainstreaming thought energy efficiency effects.* Selection process of experts to conduct study is finished and Study is expected to be be developed till the end of the year.

By developing a Study, further activities on energy efficiency advocacy and its political agenda mainstreaming can be undertaken and thus a continuity of energy efficiency actions and local (political and market) ownership assured after project implementation. This would additionally contribute that non energy efficiency civil society organizations would advocate and mainstream energy efficiency measures in Bosnia and Herzegovina.

3.2.i.4. Green jobs study

Within the framework of the GED project, UNDP prepared a study entitled "Green Jobs - Analysis of the Effects of Energy Efficiency on Employment in BiH" in 2016. The study analyzed the achieved work engagement in the implementation of energy efficiency measures on the public sector buildings, conducted through the GED project, as well as the potential for employment according to the National Energy Efficiency Action Plan (NEEAP) of BiH for the period 2010-2018.

34 public sector buildings, with conducted infrastructure works were included into analysis. In addition to the implementation of concrete infrastructure works, the budget also took into account the accompanying activities for the implementation of the above mentioned works, which included the implementation of detailed energy audits, techno-economic analysis, project documentation drafting, as well as supervision over the works. The achieved work engagement was determined through the completed works at 34 facilities in the amount of 3,871 man-months, which represents 322 EPRV - working engagement or 322 full-time employees for one year.

The very low employment rate that is present in BiH is one of the priority problems for which the solution is partly ensured through green jobs. Considering that the most energy is consumed in the building sector, this study represents a base for further investment decisions in terms of improving energy efficiency, but also improving potentials of employment.

3.2.i.5. Public sector building typology

With membership in the Energy Community, BiH has also undertaken the obligation to accept and implement Directive 2012/27/EU of the European Parliament and the Council of 25.10.2012. (EED) on energy efficiency, which among other things includes the obligation to develop typology of residential and non-residential buildings.

Residential sector is covered with GiZ project, and residential buildings typology was created by the end of 2016. Typology for public buildings was finished in june 2017, and was covered by GED project.

The backbone of typology is a sufficiently large and representative statistical sample of buildings. Thanks to the fact that UNDP in the past period, within the GED project, established a data base with real data on consumption within the EMIS system, and based on them, prepared seven energy efficiency studies of public buildings in BiH, for the establishment of a representative sample, data for 2.210 public buildings covered by these studies were initially available, which was a sufficient statistical sample.

Given the lack of an official register and precise statistical data, it was decided to make an inventory list of all public buildings in Bosnia and Herzegovina within the framework of the typology, in order to determine the total population of public buildings.

The matrix for the classification of building types was defined with three parameters for the classification of public buildings: construction period, the sector of purpose and the shape of the building's base.

The use of actual data for the analysis of the statistical sample of 2.156 public buildings allowed the rationalization of the number of types in the typology classification matrix from the initial 280 to 36 typical buildings which are representatives of samples consisting of 2.156 buildings from estimated population of 7.600 public buildings.

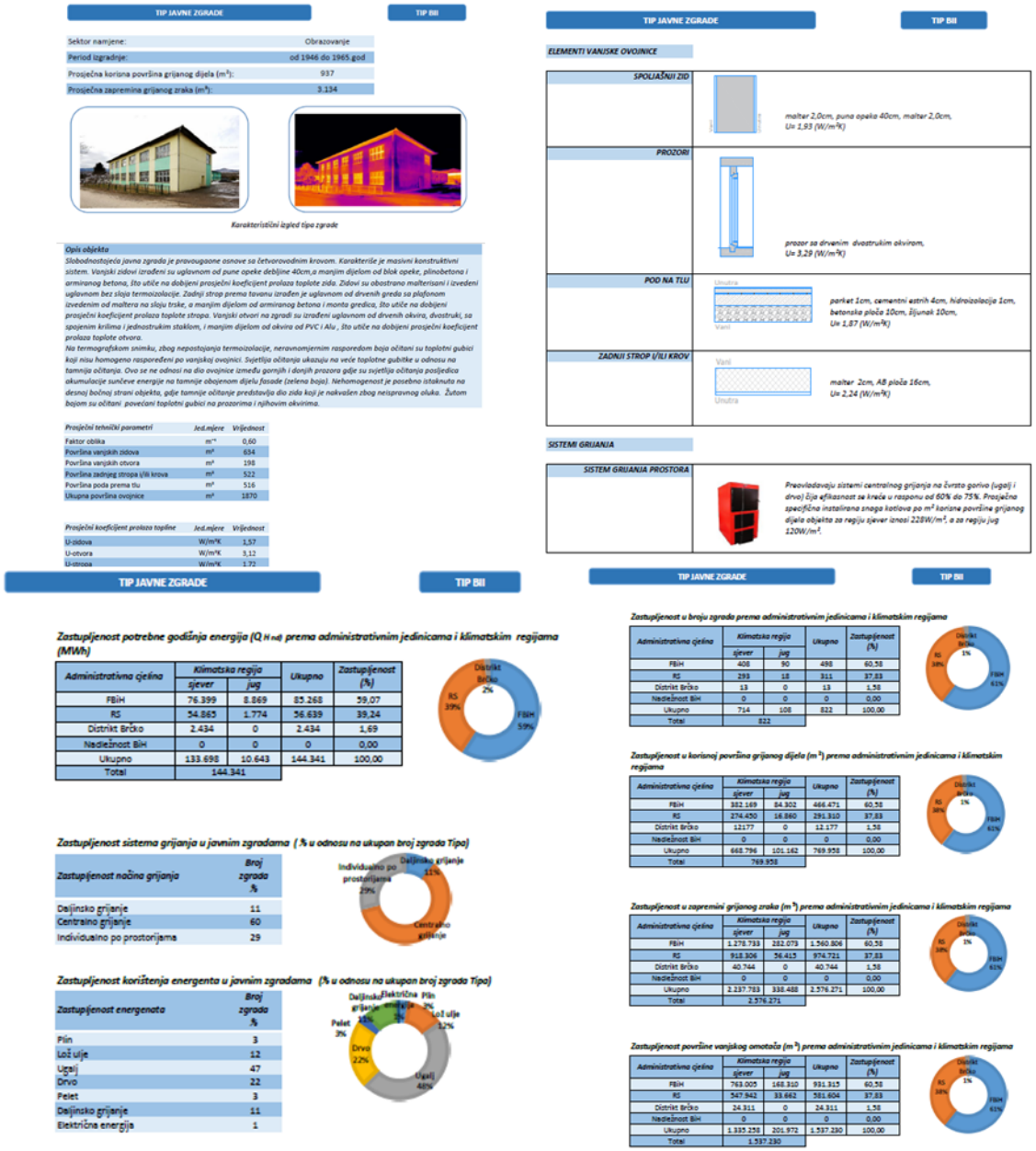


Figure 14. Summary data representation for a representative building

The typology is developed in accordance with directive 2010/31/EU (Annex I and Annex III) in order to primarily serve as input for cost-optimal calculations, defined by Commission Delegated Regulation (EU) No 244/2012. This way, by having fully defined reference buildings will reduce the number of necessary calculations to assess the complete building stock of BiH. In addition, typology will be used:

- by relevant ministries for development of strategic documents on energy efficiency;
- by local authorities for development of energy action plans to set targets on final energy consumption;
- by management of public buildings for fast assessment of savings potential;
- by financial institutions for testing of financial mechanisms related to public building sector;
- by private investors for assessment of ESCO models;

- by manufacturers and large retailers of equipment to assess market potentials in the public sector;
- by scientific communities for testing energy efficient solutions.

From a task driven perspective Public building typology will:

- Define baseline energy consumption, costs and CO_2 emissions by region (municipality, city, canton, etc.)
- Propose of energy conservation measures in the public building sector;
- Estimate energy conservation investments on specific regions and/or sector (education, administration, health etc.)
- Analyze investment potential of individual energy efficiency measures
- Analyze potential of Green Jobs by region.

3.2.i.6. Professional Development Programs

Under project component 1, activity 2, annual Professional Development Programme for energy professionals under name ProEngineer were conducted with an aim to develop and strengthen the capacity of energy experts, create further in-depth understanding and increase skills of energy professionals in BiH in the area of energy efficiency, renewables, energy management, relevant energy policies and norms and standards. Professional sessions were held in two groups in each city, based on professional orientation. Expected number of energy professionals participating was exceeded, and during 2015-2016, total of 556 energy professionals participated on training programs for skills and knowledge development.

Following the needs that resulted from creation of Revolving Fund and taking into account that Association of Thermo-energetical engineers will provide continuous education for professionals, in 2017, ProEngineer is changing its focus and target group. This year program is held under the tittle "*How to finance energy efficiency measures for municipalities, public facilities, public utilities, small and medium enterprises through the Revolving Fund*". Participants will educated to be able to create proposals and projects to apply to Revolving Fund. Besides energy efficiency in public and commercial buildings, which is more familiar topic, program covers topics on energy efficiency of water supply, taking into account electricity consumption and optimization, energy efficiency of public lighting systems, revitalization of the electrical infrastructure, energy efficiency in industrial processes and replacement of primary fuel in power plants with environmentally friendly energy source.

This type of training will help various target groups, not only to apply projects to Revolving Fund, but also to be able to create projects for various international calls for financing projects in the field of EE and RES.

3.2.i.7. Institutionalization – decisions

Within the activity on institutionalization of different levels of government, it is important to mention the steps towards sustainability of the system. Process of monitoring, analysis, and reporting on

consumption of public sector buildings is the backbone of sustainable energy management. Introducing EMIS in public sector buildings make it possible. Lack of legislative made it difficult to systematically approach on all levels of government and interlink it. Also end-users had no obligation to enter data into the system.

By that time, it was only possible to make a systematic approach at the cantonal level. Institutionalization on cantonal level includes following activities:

- detection of objects under the jurisdiction of the Canton;
- development of baseline study on energy characteristics state of all public buildings in the Canton;
- development of detailed energy audits for selected buildings;
- introduction of EMIS software in all public buildings and providing trainings for end users in all public facilities on the use of EMIS;
- capacity building and trainings for energy management at Canton level;
- development of an operational action plan for energy efficiency for public buildings;
- drafting a Decision on mandatory data entry and regular reporting for end users – public sector buildings.

Abovementioned Decision is a tool that will secure continuous data entry for cantonal public buildings into EMIS system, until the bylaws regulate obligatory data entry into EM informational system on all government levels. Up to day, under institutionalization activities, **5 cantonal Decisions are adopted** and are legally binding for all public sector buildings.

USC (Una-Sana Canton) Government was the first one to adopt Decision in December 2014. WHC (West Herzegovina Canton) Government adopted Decision on 22.10.2015., C10 (Canton no. 10) adopted Decision on 05.11.2015., BPC (Bosnian Podrinje Canton) adopted Decision on 14.07.2016. and SC (Sarajevo Canton) on 25.08.2016.

3.2.i.8. Mid-term review results and recommendation for GED 2nd phase

Mid-Term Review results

In the period august to September 2017 a Mid-Term Review has been undertaken in order to evaluate GED project results and achievements, as well as to provide recommendation for the way forward. The Mid-Term Review, undertaken by international consultants, summarized following conclusions:

- Overall impressions of project results achieved so far based on the documentary review, interviews with project stakeholders and site visits are extremely positive. Project team is well structured and effective, the project interventions covered all geographical areas of BiH, the quality of work on visited site is very good, and building users are very satisfied with the improvements achieved, comfort levels increased and energy costs reduced.

- Project has achieved or surpassed all targets which in itself is a reason for high ratings, but what is also important to emphasize is that the project's counterparts in Federation, RS and Cantons are also very satisfied with joint work on the projects which they are co-financing.

- Moreover, Canton Sarajevo and Municipality of Teslić (as two examples) are already making plans to expand their activities beyond the scope of jointly financed project. This is an important result of all the Project components in changing perception of local authorities toward importance of EE in public buildings and it is a cornerstone for project sustainability.

- EE Fund in Federation has introduced new financial mechanisms and EE Fund in RS is going to follow soon. Public awareness activities are changing perception of general public towards energy, as well as decision makers on the local level. They do demonstrate understanding of needs for proper EE planning and are increasingly ready to co-finance and finance implementation of EE projects.

- It can therefore be concluded that project has successfully initiated EE market transformation for public buildings and that it is on a strong path of achieving sustainability through further actions over the next 2-3 years.

- The project has made tangible contribution to a number of SDGs, including to poverty reduction (SDG1), improvement of health (SDG 3) and education (SDG4), gender empowerment (SDG5), access to sustainable energy (SDG 7) and fight against climate change (SDG 13).

GED project Mid-term review and achievement summary table is given below (Table 2).

Table 2. Mid -term review and achievement summary

Project Strategy	Midterm Level & Assess-ment	Achieve-ment Rating
OBJECTIVE: to create a favorable environment for investing in EE infrastructure measures in BiH.		**S**
Outcome 1: To develop capacity and strengthen skills of Environmental Fund staff and energy professionals		**HS**
Outcome 2: To develop capacity and strengthen skills of energy professionals		**S**
Outcome 3: To establish energy monitoring and reporting mechanisms in BiH		**HS**
Outcome 4: To enable financing for EE infrastructure projects in BiH		**HS**
Outcome 5: To increase general public's understanding of EE benefits		**S**
OVERAL RATING		**HS**

Indicator Assessment Key	Green= Achieved	Yellow= On target to be achieved	Red= Not on target to be achieved

HS – Highly Satisfactory; S - Satisfactory; MS - Moderately Satisfactory;

MU - Moderately Unsatisfactory

Recommendation for GED 2nd phase

During the Mid-Term Review mission the consultants also focused on exploring the way forward for a possible GED 2nd phase. The recommendation summary, based on which the Green Economic Document 2nd phase has been developed, is given below.

Table 3. Recommendation summary for GED 2nd phase

Rec #	Recommendation
A	**Outcome 1**
A.1	*Supporting Energy performance certificates (EPC):* EPC are gaining acceptance and certification process is going to expand. In order to provide support for relevant Ministries for monitoring the process and assuring quality of accredited certificators work, EMIS should be extended with a module which supports related calculations for preparation EPC in an objective, transparent and comparable manner.
B	**Outcome 2**
B.1	*Universal acceptance:* Project should aim to achieve universal acceptance of EMIS as a tool for fostering EE in public buildings across both entities and all cantons, as well as on the state level.
B.2	*EMIS 'face lifting':* EMIS platform is already of a mature age and requires face lifting both in terms of user-friendliness and functionality. The graphical user interface has to be upgrade in line with current similar products standards (GIS aspects, google map, satellite images of cites and buildings, interactive dashboard, etc.). In terms of functionally, an building energy intensity mapping feature should be added. Once all public buildings are entered in the data base, these feature will allow immediate colour coded insight into energy efficiency of individual buildings
B.3	*Adding Street lighting:* Street lighting efficiency improvement is very important for municipalities because it is a drain on their budget. Therefore street light module should be added to EMIS.
C	**Outcome 3**
C.1	*Performance-based granting*: consider introduction of performance-based granting modality in lieu of “classic” upfront grant-making scheme.
C.2	Consequently, EMIS should be upgraded with a monitoring and verification module which will provide unbiased report on energy savings achieved.
D	**Outcome 4**

D.1	
D.2	*Extending coverage:* In line with universal acceptance, Project should aim to spread retrofit project across all entities and cantons.
E	**Outcome 5**
E.1	*Projects Fact Sheets*: Prepare and make publicly available information about investment projects in the form of simple fact sheets containing key information about achieved results, as well as visual (like "before and after" pictures)
E.2	Integrate in the scope of communication strategy and plan impact monitoring, in terms of improved awareness and behavioural changes among various targeted categories. In particular, the focus on monitoring changes in awareness and motivation among investment decision-makers could be additionally assessed and monitored
E.3	Put more emphasis on communicating sustainable development impacts of EE investment (i.e. those which go beyond budgetary and energy saving), in particular such aspects as improved comfort and occupancy conditions for building users, health and education impacts of such investment, as well as gender dimension (see also recommendations from the gender section)

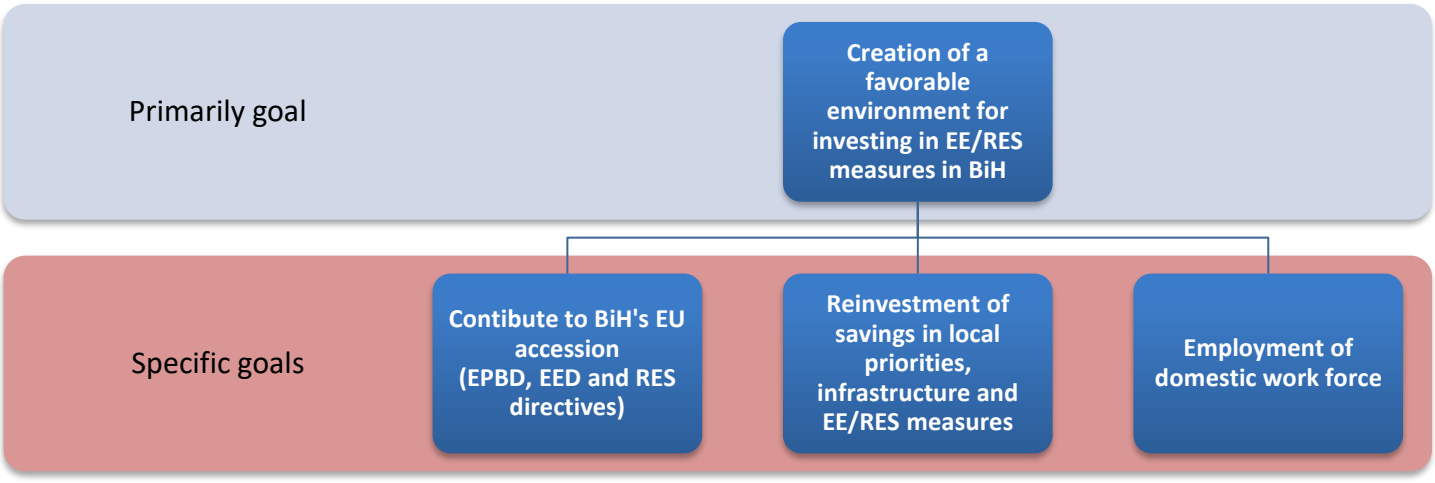
Based on the GED project results and reflecting the needs for further assistance to be provided to BiH authorities on state, entity, cantonal and municipal level, as well as given the recommendations from the Mid-Term Review, green Economic Development 2nd phase (2018 - 2020) project document has been developed and its activities defined making it a logical continuation to of the GED project supported by SWEDEN in the period 2015 - 2017.

3.3. GREEN ECONOMIC DEVELOPMENT 2nd phase

The primarily goal of **Green Economic Development 2nd phase** project is to contribute to the creation of a favorable environment for investing in EE and RES measures in BiH.

Within UNDP's GED 2nd phase project, a three-year project (2018 - 2020) has been launched with Environmental Protection Funds in BiH, and supported by a number of cantonal governments in FBiH and ministries in RS as well as stale level MoFTER. The aim of the project is to:

- Create understanding within municipal authorities and various government levels in BiH on benefits of energy efficiency and renewable energy projects.
- Institutionalize energy monitoring and reporting mechanisms / energy management on municipal level for public sector buildings and public lighting (and thus cover all authorities' levels in BIH, i.e. GED project covered all entity and cantonal public sector buildings.
- Develop and adopt self-sustainable financial mechanism within Environmental Protection Funds in BIH for green economic through energy efficiency and renewable energy project financing.
- Achieve budget cost savings through implementation of i) renewable energy projects in public sector buildings, and ii) energy efficiency projects in public lighting systems and reinvest savings into other infrastructure projects.
- Generate employment of domestic workforce.
- Increase public awareness and understanding of human development as a result of renewable energy and energy efficiency project benefits.
- Contribute to BiH's EU accession (EPBD, EED and RES directives



i) Overview of GED 2nd phase project Components

In accordance with the goals, the project consists of six interlinked and supplementing project components:

- ***Capacity Building & Legal Framework for EE/RES (PC1)*** – Development and capacity building of municipal authorities, Environmental Funds and energy professionals on energy efficient public lighting systems and renewable energy sources and human development benefits of EE/RES projects.
- ***Institutionalization of energy management (PC2)*** – Institutionalization of energy, costs and GHG emission management and monitoring in BiH municipalities (the GED project previously covered the entity (RS and FBIH) and cantonal level (FBiH)).
- ***Development of financial mechanisms for green economic financing in BiH (PC3)*** – Development and adoption of sustainable financial mechanisms within Environmental Protection Funds on energy efficiency and renewable energy sources which are based, contribute and capture/monitor environmental and human development.
- ***Infrastructure measures (PC4)*** – Implementation of:
  i) energy efficient public lighting systems in BiH municipalities,
  ii) solar systems at public sector buildings in BiH municipalities,
  iii) infrastructural energy efficiency and renewable energy measures in public sector buildings in BiH municipalities.
- ***Public awareness / marketing campaign (PC5)*** – increasing public awareness on human development as a result of clean/renewable energy and on energy efficiency.
- ***Renewable energy solution for households living in rural areas off the power grid (PC6)*** – provide hybrid photovoltaic and solar system (electricity and thermal heat generation) solutions to remote areas (not connected into the electricity grid) without electricity in BIH.

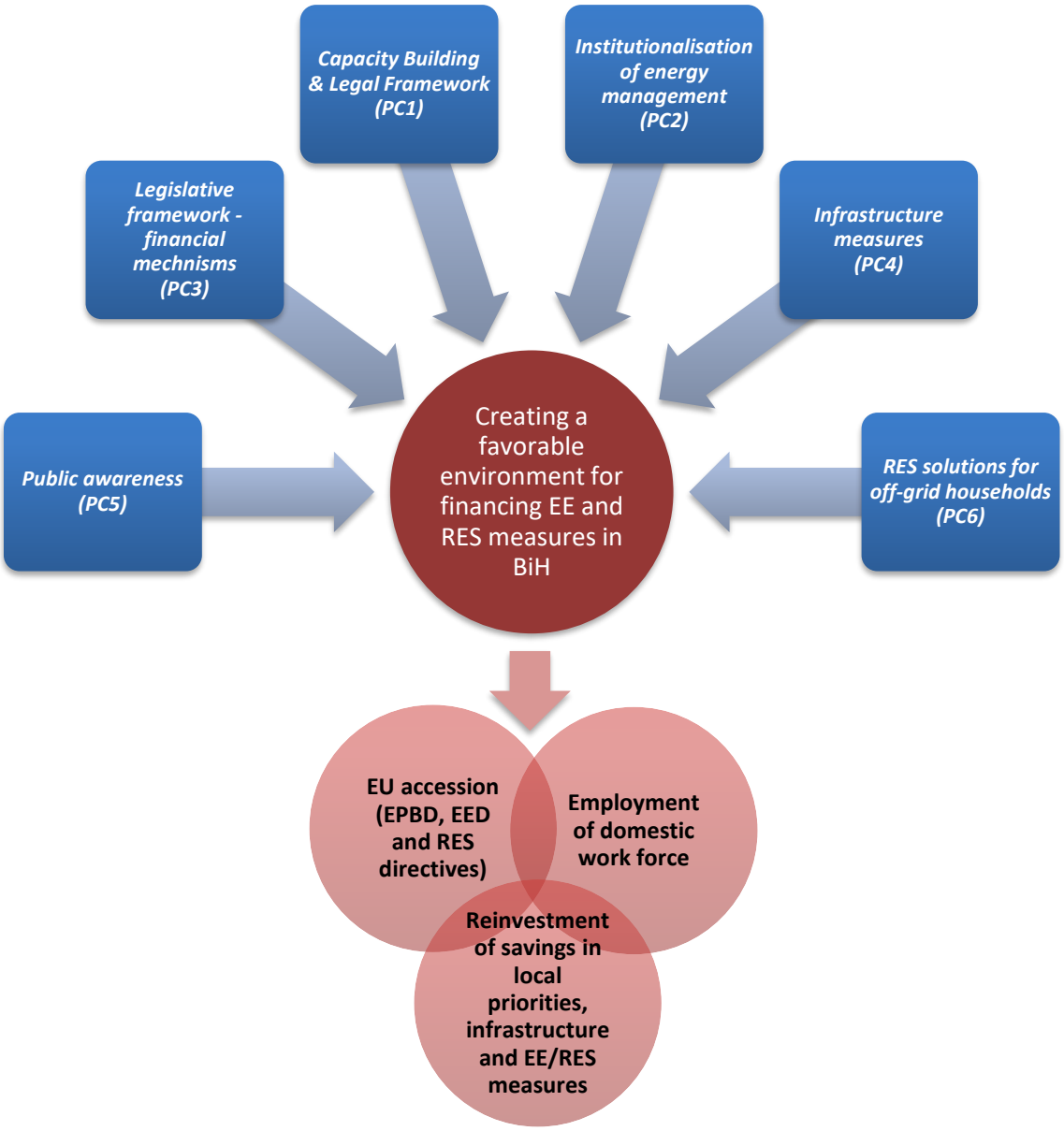
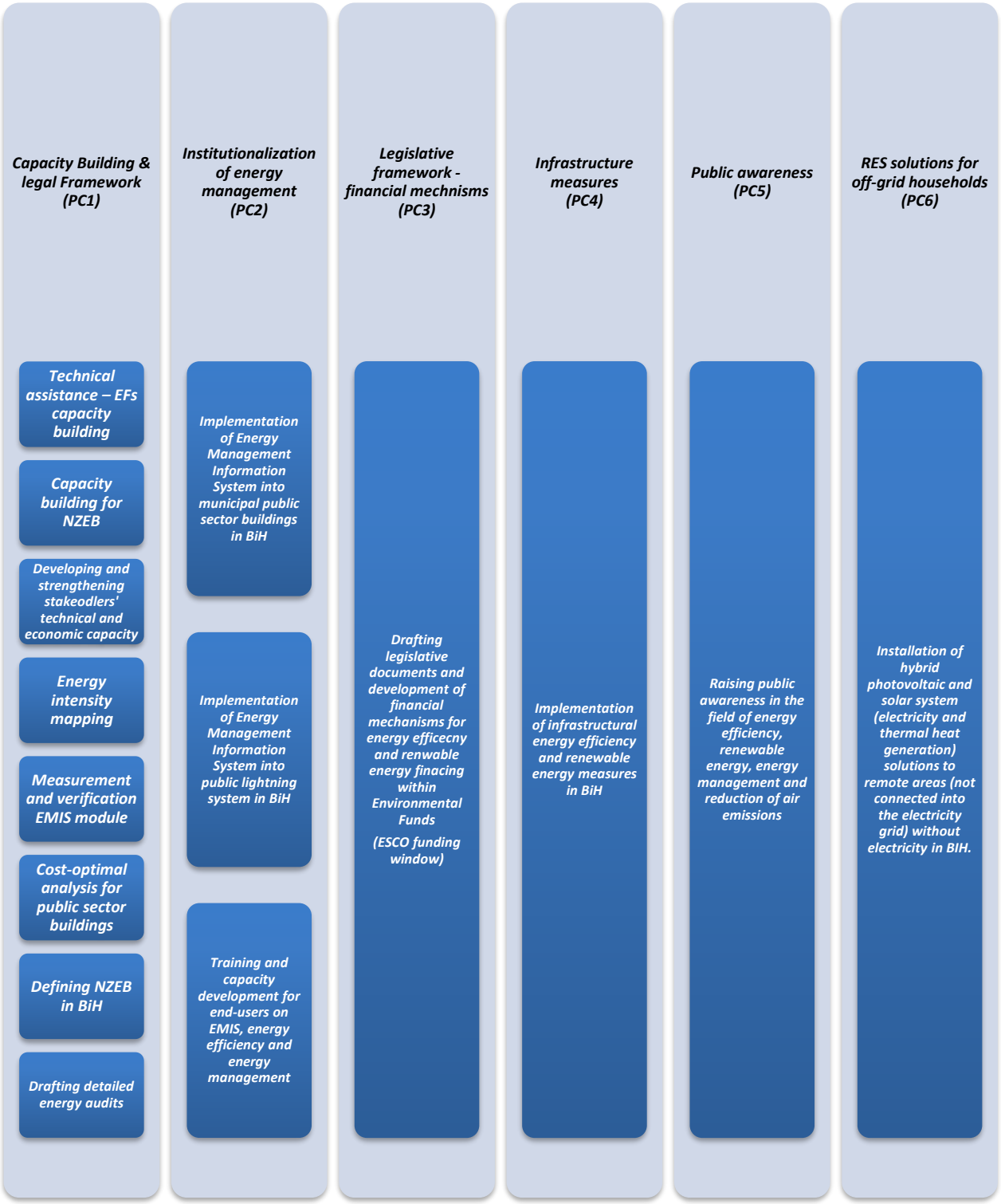


Figure 15. Overview of GED 2nd phase project Components

ii) Overview of GED 2nd phase planned activities

GED 2nd phase activities can be grouped into fifteen activity groups, with strong correlation and interdependency among those activities and six Project Components. Short overview and description of activities is given below.



iii) Description of GED planned activities

Activity 1 - Technical assistance to Environmental Protection Funds, EE & RE capacity building and skills development (refers to PC1)

- During the GED project, UNDP provided technical assistance, capacity building and skills development trainings to Environmental Protection Funds. By the end of project it is expected that EMIS system will be monitored, managed and driven by Founds, and even though activities conducted under GED project are and will provide Funds with methodologies and internal acts, it will be necessary that UNDP continue to provide technical assistance to the Environmental Protection Funds in the field of energy efficiency, energy management and management of EMIS (*Energy Management Information System*), understanding of Laws, by-laws and EU directives. Assistance will be conducted in the form of consultative, advisory and technical support, through annual training for Fund staff. Also UNDP staff will provide technical assistance throughout project implementation and skills development via on the job training/assistance on all phases of project:
    - Analysis, evaluation and development of energy indicators and reports out of EMIS database;
    - Analysis, evaluation and development of prioritization list of public sector buildings and public lightning systems for energy audits;
    - Analysis, evaluation and development of technical, economic, financial, environmental and social parameters/factors (including co-financing from end-users) and development of ranking list of public sector buildings for the implementation of EE infrastructure measures;
    - Monitoring and verification of energy and costs savings, emission reduction;
    - Tracking of indicators;
    - decision making process cycle/methodology for EE infrastructure investments (identification, evaluation, decision, implementation and monitoring/reporting).
- Continuous assistance is still very important, since it will provide understanding of energy savings potential, improve knowledge and understanding of relevant EU directives, Laws and by-laws regarding energy management, as well as public lightning efficiency and usage of renewable energy sources. This also provides practical help in understanding energy indicators, decision making process and evaluation of public sector buildings and public lightning systems for the implementation of EE infrastructure measures. Moreover, new financial mechanisms shall be based on EMIS (performance based granting and its corelated monitoring, verification and reporting system).
- This activity correlates with all others, since it upgrades knowledge and gives technical assistance through all phases of the project assuring that all other activities can be implemented smoothly and timely.

Activity 2 - Capacity building for Nearly Zero Energy Buildings - NZEB* and *for understanding of RE in public sector building (refers to PC1)

- As the contracted Party of the Energy Community, Bosnia and Herzegovina has to develope Roadmap for implementation of energy efficiency directives, among which is Directive on Energy Performance of Buildings (EPBD). This Directive introduces Nearly Zero Energy Buildings (NZEB) and establishes that all new residential buildings in European Union have to be NZEB by the end of 2020 and all new public buildings have to be NZEB by 2018. Buildings using "almost no energy" are powered by renewable energy sources. As EU directives are expected to be enforced in BiH it is necessary that governments at all levels, municipalities, Energy Service Companies (ESCOs), public facilities, building owners, public utilities, small and medium enterprises, producers, distributors, installers, as well as engineers and professionals understand NZEB policy and legislation but also to understand the needs of existing building stock to be renovated to the NZEB energy performance standard. To comply with these requirements, UNDP will provide professional training courses on Nearly Zero Energy Buildings. These NZEB courses aim to empower target group through the development of skills in energy efficiency and integration of renewables in the existing building stock. The target groups cover governments at all levels, municipalities, Energy Service Companies (ESCOs), public facilities, building owners, public utilities, small and medium enterprises, producers, distributors, installers, as well as engineers and professionals.

- In the period of 2013 to 2017 within the Green Economic Development Project, general survey on raising energy efficiency awareness is done every year to show the behavior, knowledge, attitudes and opinions on energy efficiency and smart energy in Bosnia and Herzegovina. Despite of intensive activities on these topics, there is still evident lack of knowledge about energy efficiency and renewables benefits. On EMIS trainings, representatives of public institutions had the opportunity to get a lot of information on what is energy efficiency and what are the benefits, but it has been shown that additional training is needed where end users will learn more about energy, renewable energy and different technologies, etc.

- The end users of the buildings on which energy efficiency measures were implemented throughout the GED project implementation period, have noticed improvements in terms of comfort and energy and financial savings. Public sector buildings that are reconstructed within Green Economic Development Project are great example to show how both, comfort and savings could be achieved. Therefore, UNDP will provide for end users of public sector buildings training courses on renewable energy, covering solar thermal, solar photovoltaic, ground source heat pump, biomass etc. The course will address the fundamentals, as well as deep knowledge in renewable energy technologies, their implementation and impact on the environment. Social, economic and legal aspects will be covered as well.

Activity 3 - Developing and strengthening the technical and economic capacity of municipalities, public facilities, public utilities, small and medium enterprises in BiH (refers to PC1)

- UNDP will give support in developing and facilitating a *Professional Development Program for municipalities, public facilities, public utilities, small and medium enterprises on how to finance energy efficiency measures for these institutions through Revolving Fund in BiH*. UNDP will develop ToRs for delivery of trainings. The purpose of developing, organizing and delivering a Professional Development Program on how to finance energy efficiency measures for municipalities, public facilities, public utilities, small and medium enterprises through the

Revolving Fund is to create further in-depth understanding and increase skills of potential users and applicants. Allocation of funds for energy efficiency project through the Revolving Fund will be done according requirements stipulated in public calls by Environmental Protection and Energy Efficiency Fund of the Republika Srpska and Environmental Protection Fund of the Federation of BiH.

- The *Professional Development Program* will be open to all representatives in front of municipalities, public facilities, public utilities, small and medium enterprises. UNDP will develop ToRs for development and delivery of *Professional Development Program*, in accordance with internal procedures. It is envisaged that senior experts from BiH and the region provide lectures to representatives in front of the municipalities, public facilities, public utilities, small and medium enterprises on ten one-day events in BiH.
- Following tasks will be conducted (developed by UNDP and delivered by contractor):
- Deliver training activities and materials for each participant. Hold ten (10) events in BiH, of which are four (6) different sites in FBiH and two (4) in RS which will last for one day each. Each event/ program will have the same content just will take place at other locations and on other dates. Location and dates must be agreed with UNDP. Preliminary, trainings should be held from May until November 2017.
- Each event/training program consists of two groups and one combined group:

1. One Combined group for all participants for common introductory presentations about Revolving Fund, Methodology for applying, rulebooks, Energy efficiency in public and commercial buildings etc.)
2. Group 1 for municipalities, public facilities, public utilities,
3. Group 2 for small and medium enterprises.

- Facilitation of the whole Professional Development Program will be carried out by minimum 8 experts.

1. Lecturer/s in the field of certification according to EPBD, energy audits and energy efficiency (mechanical, civil or architecture engineer).

Targeted group 1 and group 2. Energy efficiency in public and commercial buildings. Energy efficiency measures on outside envelope of the buildings (walls, roof, joinery), heating, cooling and ventilation systems, lighting systems, use of renewable energy sources (solar,

biomass…) as a measure of energy efficiency, which are used at the production site ie. for their own use, this exclude the production of energy from renewable sources which is intended for distribution (sell in the network).

2. Lecturer/s in the field of energy efficiency in the electrical systems (electrical engineer).

   Targeted group 1. The energy efficiency of water supply. The introduction of efficient electric motor drives. Analysis of electricity consumption and optimization of consumers: the active energy, the reactive energy, the simultaneity factors, the rate of power input, etc. Optimization of water supply systems other interventions in the production process resulting in reduction of energy consumption of electricity.

   Targeted group 1. The energy efficiency of public lighting systems. Analysis of the current situation, power consumption, energy indicators; Proposed measures to increase electricity; Management of the of public lighting systems.

   Targeted group 2. Revitalization of the electrical infrastructure for SME's. Interventions on power generators to reduce power consumption; The introduction of efficient electric motor drives; Technological changes and other interventions in the production process resulting in reduced consumption of electricity;

3. Lecturer/s in the field of energy efficiency in thermal plants and renewable energy sources (mechanical engineer).

   Targeted group 2. Energy efficiency in industrial processes. Revitalization of heat infrastructure; Improving efficiency in the use of thermal energy in the production processes; The introduction of efficient industrial refrigeration systems; Interventions on power generators to reduce energy consumption; Technological changes and other interventions in the production process resulting in reduced consumption of heating energy;

   Targeted group 2. Replacement of primary fuel in power plants with environmentally friendly energy source. The use of renewable energy sources (solar, biomass…) as energy efficiency measures, which are used in the place of production ie. for their own use, and exclude the production of energy from renewable sources which is intended for distribution (sell in the network).

4. Lecturers from the thematic sessions will explain to the audience how to fill out the application forms for an example that relates to the topic of the presentation itself.

- Expected topics to be covered, but not limited to:

Combined Group:

Common introductory presentations for all participants such as, but not limited to:

- Presentation of the Revolving Fund - the main principles of the revolving fund, qualified financing projects from the Revolving Fund, current and future financing mechanisms from the Revolving Fund.
- Revolving Fund for energy efficiency projects in the Fund for environmental protection of FBiH - what is Revolving Fund? How to apply? Mode of realization.
- Increase of energy efficiency in public and commercial facilities - architecture-building measures; replacement of lightning systems and introduction of efficient systems of heating, cooling and ventilation in the building.
- Fuel switch projects from fossil fuels to wood biomass in the public buildings

Group 1:

Presentations of various topics for municipalities, public facilities, public utilities such as, but not limited to:

- Energy and cost efficient public lightning - measures for optimization
- Energy efficient water supply systems - optimization of electricity consumption
- Monitoring and verification of energy saving, costs and equivalent CO2 emissions of public lighting systems after implementation of energy efficiency measures (EMIS)

Group 2:

Presentations of various topics for small and medium enterprises such as, but not limited to:

- Energy efficiency and renewable energy sources in industrial plants
- Efficiency of production and use of steam; waste heat waste use in industrial plants

- Energy efficiency and renewable energy sources in industrial plants - energy carrier selection for heating supply of production processes; on-site production of energy and security of energy supply
- Optimization of electricity consumption in electric motors and processes
- Alternative systems and renewable energy sources (focus on biomass and solar)

The above mentioned key topics are expected to be covered. However, this list is only indicative and the consultant is encouraged to suggest further/alternate topics, which can help in achieving the objectives. Each event at the Professional Development Program should have minimum 50 participants on each event.

- Evaluate the professional development program/participants (municipalities, public facilities, public utilities, small and medium enterprises) using a feedback form on change of in-depth understanding of Revolving Fund for financing projects to reduce energy consumption and use of renewables as energy efficiency measures, ability to identify potential project, and ability to submit necessary documentation needed to apply for public call.
- Since the Revolving Fund has been recently established in Federation BiH and since it is in Republika Srpska is the implementation phase, there is lack of knowledge on existence of the RF and low understanding on how to finance energy efficiency measures with municipalities, public facilities, public utilities, small and medium enterprises through the Revolving Fund. The Professional Development Program will create in-depth understanding on how to finance energy efficiency measures through the Revolving Fund and increase skills of potential users and applicants.

Activity 4 - Energy intensity mapping application (refers to PC1)

- Accessing information on energy consumption, CO_2 emissions and costs for an individual public building or public lighting system includes the use of EMIS (Energy management information system). The form of information displayed depends on user's preferences and needs. Some users prefer visualized information such as charts, whereas some users prefer raw information in a tabular form in order to create customized analysis and reports. Municipal energy managers are often interested in customized information related to benchmarking, i.e. comparison of energy performance of multiple public buildings or comparison of total energy use of their municipality to another one. Comparison analysis is often complex and if not done correctly, biased, by ruling out relevant independent factors that can influence the energy performance. A unified and standardized approach is necessary, but also user friendly even for non-technical personnel to represent energy data per building or public lighting. One way to solve the representation problem is energy intensity mapping.
- The idea behind this concept is to represent every single public building and public lighting system registered in EMIS, online on a geographical map, more precisely google maps or open

street maps. Each building on a map would correspond to its real location. By moving the mouse over an individual building or lighting system on a map, the user would access its data in a user-friendly form. At least, three kinds of data would be accessible and visualized:

1. Different colors on the location of the object on the map will represent the different energy intensities of the objects (simple colors red, yellow, green, etc.)
2. Absolute energy consumption, related costs and CO_2 emissions, and/or
3. Indicators related to energy consumption, costs and CO_2 emissions, suited for benchmarking.

- Options for grouping public buildings by parameters such as municipality, climate zone or similarity by building physics, would provide the user with data summaries on energy performance, establishing benchmarking for defined groups. This option could also provide information on total consumption in a municipality or statistical summaries on consumption by parameters of interest such as number of users, gender, institutions and other features.
- Energy intensity mapping would allow users, even non-professional, to execute advanced analyses, in a visual manner, without using complex tools.
- UNDP will develop ToR for development of an energy intensity mapping application.

Activity 5 – Measurement and verification (M&V) module within EMIS (refers to PC1)

- Development of an M&V EMIS module that communicates with EMIS will transform this approach into an investment grade tool for energy performance contracting in the public sector (public buildings and public lighting).
- Two separate M&V mechanisms will be applied, for the public building sector and public lighting. Both models for measurement and verification will capture independent variables that influence consumption/savings.
- M&V is recognized as a crucial confidence building tool for assessing the performance of energy efficiency interventions. It is also key for sustaining energy efficiency over time. Moreover, M&V could be the basis of certain contracts in cases where payments for energy efficiency investments are performance based (e.g., energy performance contracts). Once the EE / RE projects are implemented on the field, energy-efficiency savings will be the basis for performance-based grants / financial payments for loan users within EE Revolving Funds.
- UNDP will develop ToR for development of an M&V EMIS module or independent software tool that communicates with EMIS.

Activity 6 - Cost-optimal analysis for public buildings (refers to PC1)

- As stated previously, BiH has not submitted first report on cost-optimality to the Energy Community Secretariat, since calculations on cost-optimality for residential buildings are in progress and financed by GiZ BiH (as the logical follow up after finished Typology for residential Buildings in BiH which was financed by GiZ BiH), while calculations on cost-

optimality for public buildings need to be done in near future, and will be financed through GED 2nd phase project (as the logical follow up after finished Typology for Public Buildings in BiH which was financed by GED project).

- Reference public buildings needs to be established in order to make cost-optimal calculations. This is now enabled with the finished Typology for Public Buildings in BiH.
- The Commission Cost-Optimality Delegated Regulation (EC, 2012a) establishes a comparative framework methodology to determine a cost-optimal level of minimum energy performance of buildings and building elements. A guidance document (EC, 2012b) on how to implement the methodology at national level was published by the EU Commission in April 2012.
- UNDP will develop ToR for calculations on cost-optimality for public buildings.

Activity 7 - Definition of the Nearly Zero-Energy Public Buildings (refers to PC1)

- Nearly zero-energy buildings are not defined nor enforced by any regulation in BiH, and one of the activities of the Green Economic Development Project in 2nd phase will be drafting /updating regulation regarding definition of the Nearly Zero-Energy Public Buildings.
- This will be done after completed previous Activity No 6.
- UNDP will develop ToR for calculations on cost-optimal analyis for public buildings.

Activity 8 - Drafting of detailed energy audits for public sector buildings and public lightning systems (refers to PC1)

- A prioritization list of public sector buildings and public lightning systems for the conductance of detailed energy audits, based on technical and economic parameters, collected energy consumption and costs data, as well as energy conservation potential and emission reduction emission potential (all based on EMIS database and analysis) will be developed by UNDP and Fund staff. At least 20 buildings during project implementation will be chosen to conduct detailed energy audits and at least 20 public lightning systems (combined in FBiH and RS). UNDP will develop ToRs for delivery of energy audits, in accordance with internal procedures and will tender the conductance and development of energy audits. DEA (detailed energy audits) will provide an in depth analysis of the current baseline situation of a:

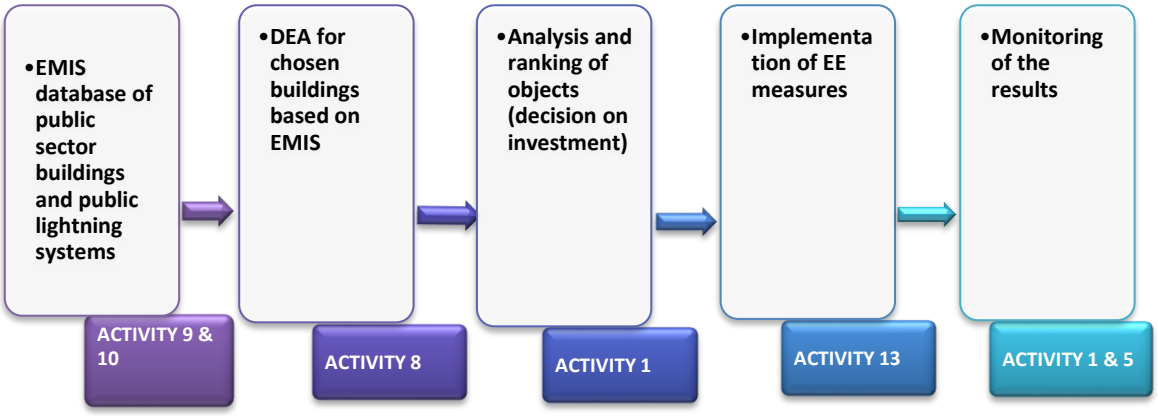
    1. public sector buildings:
        1. determine energy losses,
        2. current energy efficiency of the heating,
        3. cooling and lightning system (including all other energy forms and/or energy usage purposes)
        4. analyze and propose possible measures of increasing energy efficiency of the building and perform a comparative analysis of different scenarios

(combination of measures), based on technical, economic and environmental related indicators.

2. public lightning systems:

    1. analyze energy characteristics of the street lighting and characteristics of energy consumption and cost management,
    2. analyze energy and maintenance costs and projections of further energy consumption,
    3. analyze possible measures of increasing energy efficiency of lighting system,
    4. propose measures of increasing energy efficiency of the lighting system,
    5. analyze energy, economic and environmental related effects of proposed measures;
    6. Perform comparative analysis of energy consumption indicators.

- Capacity building and skills development of Funds internal capacities, on energy efficiency investments decision making processes, will be ensured with UNDP coordination and on the job training through evaluation, analysis and prioritization activities. Finally, a ranking list of public sector buildings for the implementation of EE infrastructure measures will be developed and updated annually.
- For enabling this Activity it is necessary to establish EMIS database through Activity 9 and Activity 10. This Activity represents practical usage of earlier acquired knowledge, as well as developing and upgrading skills for the Funds future work (Activity 1).
- As specified before, this is a complex process which can be showed as follows:



- Evaluation process and development of priorities/rankings are necessary for choosing the most cost-effective investments, as well as to justify the investment decision and to assure transparency throughout the process. As a start of promoting energy efficiency, public sector buildings are great example to show how both, comfort and savings could be achieved.

Activity 9 - Implementation of Energy Management Information System into municipal public sector buildings in BiH (refers to PC2):

- Easiest way of monitoring, evaluating and making analysis of energy consumption is using one single application. Energy efficiency laws in both entities includes information system for energy consumption monitoring and reporting under their provision, and EMIS is recognized by FBIH government to be that system. By-laws defining EMIS as the tool to be used are under development. This will provide clear view of energy consumption for public buildings, as well as possibilities of savings. UNDP BiH and the Environmental Protection Funds until 2018, will already implement Energy Management Information System (EMIS) in more than 5.000 public buildings in BiH (3.000 in FBiH and 2.000 in RS) in joint activities under GED project. This database covers most of the state, entity and cantonal level buildings. Funds and UNDP will extend this database through institutionalization activities within municipality level, as well as annual Call for Proposals for identification of public sector buildings/end-users interested in EE investments.
- Public sector buildings submit application to Fund/UNDP by filling out pre-defined survey of interest with basic building data and co-financing potential, followed by the creation of accounts (static input data) for the public buildings. Further input/information on consumption and costs of energy and water in the last 36 months period is collected and entered into EMIS. During this process, Funds and UNDP staff will provide technical support and assistance to contact persons in identified public facilities. Besides that, UNDP staff is preparing technical, economic and environmental parameters and energy conservation potential indicators within EMIS database, managing, administrating, keeping maintenance, monitoring, error identification and correction activities for further development of EMIS database. EMIS provides the ability for monitoring and reporting of achieved energy and cost savings (kWh, KM), CO_2 emission (t CO_2) reduction and other specific indicators.
- By using a software which enables a continuous monitoring of energy consumption and costs (monitor parameters before/after EE measures implementation) additional energy savings can be achieved (for example, it has been proved in public sector buildings in Croatia that just using EMIS brings energy consumption down up to 20%, since the awareness of users is improved, and they know that every usage is monitored). By expanding EMIS modalities on MRV, it will also become tool for obligatory reporting on energy savings
- By developing a database of public sector buildings it is possible to accomplish Activity 8 (and choose the public sector buildings with the highest energy conservation potential for conducting detailed energy audits) and to monitor parameters before/after measures implementation, which is possible only if public building representatives pass the training (Activity 11) and keep updating information about energy consumption (monitoring and reporting is part of obligation in accordance to Law on EE, while EMIS provides the tool for monitoring energy consumption in public sector buildings).

Activity 10 - Implementation of Energy Management Information System in public lightning systems in BiH (refers to PC2):

- Same as it is with public sector buildings, easiest way of monitoring, evaluating and making analysis of electricity consumption in public lightning systems is using one single application. Under the GED programme activities, UNDP BiH developed public lightning module within EMIS. This provided clear view of electric energy consumption for public lightning, as well as possibilities of savings. Up to day, it is estimated that up to 5% of public lightning systems in BiH are already created in EMIS. Fund and UNDP will extend this database through annual Call for Proposals for identification of public lightning systems interested in EE investments, as well as through sub-national partner involved in GED.
- Municipalities (or other authorized institutions) submit application to Fund/UNDP by filling out pre-defined survey of interest with basic public lightning data and co-financing potential, followed by the creation of accounts (static input data) for the public lightning systems. Further input/information on consumption and costs of electric energy in the last 36 months period is collected and entered into EMIS. During this process Fund and UNDP staff will provide technical support and assistance to contact persons. EMIS provides the ability for monitoring and reporting of achieved energy and cost savings (kWh, KM), and other specific indicators.
- By using a software which enables a continuous monitoring of energy consumption and costs (monitor parameters before/after EE measures implementation) additional energy savings can be achieved. On an example of public lightning systems automatic remote gauges could show when energy is unnecessary spent.
- By developing a database of public lightning systems it is possible to accomplish Activity 8 (and choose the public lightning systems with the highest energy conservation potential for conducting detailed energy audits) and to monitor parameters before/after measures implementation, which is possible only if municipality representatives pass the training (Activity 11) and keep updating information about energy consumption (monitoring and reporting is part of obligation in accordance to Law on EE, while EMIS provides the tool for monitoring energy consumption).

Activity 11 - Training and capacity development for end-users on EMIS, energy efficiency and energy management by UNDP (refers to PC2):

- UNDP staff will provide training for end-users on EMIS, energy efficiency / energy management in public buildings and public lightning systems for abovementioned d public sector buildings end-users and municipalities representatives. UNDP will organize training facilities throughout BiH, equipment (laptops) and travel arrangements, contact all identified end-users, provide information, conduct training on EMIS and provide technical support and assistance to trained persons throughout project implementation.
- This database will provide sub-national governments with the ability to monitor and report on energy consumption, energy savings and reduced CO_2 emission from public sector buildings and public lightning e.g. in accordance and obligation with Law on EE and defined EEAPs. Moreover, the Environmental Funds are envisaged per Law to enable and conduct reporting activities through IT systems.

Activity 12 - Financial mechanism (ESCO Funding window) established at EFs and capitalized with EF's own finance (refers to PC3)

- Define the process and criteria for the financial mechanism for Environmental Funs in BiH (ESCO funding window within EFs). The mechanism should support energy efficiency (EE) retrofit of public facilities, EE public lightning and water saving measures according to NEEAP priorities. Recognizing complex administrative and political structure in BiH, the project will work and support both EFs separately at first to come up with design of the financial support mechanism, which is appropriate for each BiH entity.
- The project will develop the ESCO business model processes (performance-based), eligibility criteria for grants, monitoring and verification procedures for proving savings achieved, and procurement methods with criteria for awarding grants and revolving loans. Capitalization of the ESCO funding window will be done from the EFs' own resources. To test and demonstrate the ESCO funding mechanism, the EFs will select on a competitive basis (call for proposal) several pilot projects to be implemented according to the developed business model and specified eligibility criteria.

Activity 13 - Implementation of infrastructural energy efficiency and renewable energy measures in BiH (refers to PC4):

- Within Activity 13 three types of RES/EE infrastructure projects will be implemented in BiH municipalities, i.e.:
    1. EE in public sector buildings (EED i EPBD)
    2. Solar hot water systems and photovoltaic systems in public sector buildings (RES)
    3. Energy efficient public lighting systems (EED)

Activities 8, 9, and 10 will provide EMIS and energy audits based evaluation of energy and cost saving potential as well as financial calculations based on which a ranking of public sector buildings and public lighting systems will be developed in order to make decision on infrastructural EE investments.

EE in public sector buildings

- On the basis of technical, economic and environmental parameters, from detailed energy audits, infrastructure measures will be implemented in up to five public sector buildings per year in order to conduct so called "Deep retrofits" (in accordance with the requirements of EU directives EED and EPBD) and respecting newly developed and adopted construction and energy conservation standards (EPBD directive). The ranking list/evaluation will include the best case techno-economic scenarios developed under Activity 8 (detailed Energy Audits).

- Once the list is developed UNDP will arrange co-financing from end users (third-parties), develop and sign Cost Share Agreements on co-financing the implementation of infrastructural energy efficiency measures.
- The next phase is followed by procurement process for development of design documentation which includes publication of a public tender/call for qualified bidders, evaluation of bids and Contract signing. As per UNDP's Financial Regulations and Rules, the main principles which guide UNDP procurement are: Best Value for Money, Fairness, Integrity, Transparency, Effective International Competition and the Interest of UNDP.
- After contract has been awarded, the contractor will start working on development of design documentation (architectural, construction, mechanical, electro etc.), technical descriptions, drawings, bill of quantities etc. During design process UNDP will hire independent revision in order to ensure quality assurance of designed technical documentation and after that will start bidding process and selection of the deep energy retrofit contractor. Common energy retrofit measures are: improvement of the thermal insulation of the building envelope (insulation of external walls, roofs, windows replacement), improvement the efficiency of building equipment, improvement of the automatic control systems and use renewable energy generation sources (fuel switch from fossil fuels to biomass). The quality of site supervision has a major influence on the overall performance and efficiency of construction projects. Inadequate supervision is believed to be one of the major causes of rework. Therefore, quality assurance will be ensured by UNDP through an independent on-site quality control (works supervision) engineer who will closely monitor all executed works, materials used and absence of the work schedule/plan. This engineer/s will be independently contracted just for this purpose. Additionally, Investors (UNDP) supervision will be present on the filed who will additionally monitor the works and progress and inform of any discrepancy from the contracted works or plans. Payments will be done upon the works completion and following signing of monthly payment certificates by both construction supervisory entities: Independent company for supervision of works hired by UNDP and UNDP Engineer. Moreover, warranty period for the works performed will be 2 years following the technical acceptance of the works, during which period the contractor will remove all eventual defects relating to their work. The warranty period will also be covered by the Performance Guarantee (10% of the contract value).
- After the project has been designed, built, and commissioned, its energy consumption needs to be measured. This will be achieved by installing calorimeters for energy consumption monitoring (heating, electricity and water) and its integration with EMIS system. This is very important part of the project, since concrete measures are implemented, and possibility to measure before/after indicators is enabled, and gives visible outputs that are easily demonstrated to public. The generated savings will be reinvested into other EE projects as per EEAP and/or through the obligation in respect to financial mechanisms (a description on project sustainability and the obligation to reinvest generated savings into new EE projects/measures, or to use the savings to finance the investment, is further described in Chapter 3.3.6).

Solar hot water systems and photovoltaic systems in public sector buildings

- Under the current portfolio of the Green Economic Development project, in over 100 public sector buildings energy efficiency measures have been implemented and energy savings achieved through insulated building walls and roofs, high-performance windows, new biomass boilers, new high-efficient pumps, thermostatic valves and reconstruction of lighting systems. In only two buildings solar hot water systems have been implemented, enabling significant reduction of energy consumption. However, a large energy saving potential remained unused together with unrealized environmental benefits which could be obtained by implementation of these projects. Solar hot water systems do not pollute and they are helping to avoid carbon dioxide, nitrogen oxides, sulfur dioxide, and the other air pollution and wastes created when the local utility generates power or fuel is burned to heat domestic water. Solar hot water systems would be connected to existing building heating systems as back-up, when solar energy is not available or when hot water demand exceeds the solar-heated supply. Solar hot water systems, can efficiently serve up to 80% throughout the year of hot water needs depending on location and surroundings. Solar systems are with no fuel cost or pollution and with minimal operation and maintenance expenses.

Energy efficient public lighting systems

- Public lighting systems are powered by photovoltaic panels generally mounted on the lighting structure or integrated in the pole itself. Energy generated by the photovoltaic panels is stored in batteries, which are then used to power the LED lights at night. By this activity, targeted will be areas that have an existing public lighting infrastructure, with inefficient light bulbs, in which cost of regular maintenance and repair of those systems could be sidestep by installing solar LED fixtures. When solar energy is not available or there is not enough stored energy in batteries, solar public lighting system will be use grid electricity from existing public lighting infrastructure. Public lighting (beside heating energy costs) is one of the biggest expenses for a communities/local government budgets, and implementation of the solar LED lighting projects could permanently reduce budget expenses through monthly savings on utility bills up to 60%. During planning phase, attention will be paid on possible street lighting control and smart management system which will enable additional savings and environmental benefits.

<u>Activity 14 - Raising public awareness / marketing campaign – Increasing public awareness on human development as a result of clean/renewable energy and on energy efficiency (refers to PC5):</u>

- Public awareness campaign will aim to increase knowledge and change perceptions, attitudes and behaviors of BiH citizens about energy efficiency and renewable energy sources while promoting the economic, environmental and social advantages to citizens living in urban and rural areas throughout the country.

- The attention will be given to municipalities where the GED 2nd phase project conducted energy efficiency measures, introduced renewable energy sources on public buildings and improved public lightening system. The campaign will try to achieve positive change by at least 15 percent annually (measured using pre and post surveying of target audience).
- GED 2nd phase will build on the previous efforts and continue to further promote to public sectors officials, municipal staff and consumers the benefits and positive aspects of energy efficiency measures and renewable energy sources on economic development.
- GED 2nd phase will design a logo and prominently apply it on all materials that will be developed within the scope of the Project. In addition to GED logo, Swedish logo along with other key partners will be applied on all communications material.
- To change BiH citizen's energy-use behaviors the awareness campaign will address barriers to change, as well as making the behaviors easy, convenient, and socially desirable. Prior to the development of Communications Strategic Plan, GED 2nd phase project will obtain feedback of each target audience on campaign design and potential effectiveness. Focus groups will gather input from municipal staff, officials, representatives of public buildings that were retrofitted, energy experts, citizens that are aware of energy efficiency benefits, citizens that are skeptical of energy efficiency benefits, youngsters, civil sector.
- Upon completion of research, the Communications Strategic Plan will be designed and executed. The Strategy will define objectives, target audience, key messages, optimal channels and tools, visibility guidelines, spokespersons, monitoring mechanisms. Monitoring mechanisms will track improved awareness and behavioral changes among target groups. The focus will be given on increasing of understanding of target groups about sustainable development impact of energy efficiency investments on improved comfort, health and education impact, gender dimension and other.
- GED 2nd phase project will select the channels to communicate its messages depending of on audience and the context they will be receiving it. Thus, the campaign will deploy various tools (but not limited to): events (trainings, workshops, conferences, presentations, official ceremonies, study trips, open air events, contests, etc.), promotional and educational materials (factsheets, leaflets, infographics, brochures, guides, professional publications, cartoons, human development stories, newsletters, bulletins, banners, calendars, etc.), media relations (press conferences, press kit, TV reportages, media advisories, press releases, workshops, media appearances), marketing (media-buying, print and online ads, video spots, radio jingles, paid search), digital marketing (social networks, web banners, web platforms, working with bloggers and influencers, etc.)
- To increase the knowledge and skills of municipalities, public officials, private sector and energy professional about NZEB Directive specialized trainings will be organized. Trainings will cover topics such as renewable energy, solar thermal, solar photovoltaic, ground source heat pump, biomass topics, how to finance energy efficiency measures through Revolving Fund in BiH.
- Promotional and educational materials will be customized using consumer segmentation (low income families, householders, residential flat owners, office saving tips, etc.) what drives consumer attitudinal reactions, emotional appeal. A booklet with the information about all

the public buildings where energy efficiency measures and renewable energy sources were implemented will be prepared on annual basis. For each building will be prepared, and publicly available, the Fact Sheet with the key information about achieved results including photos "before and after". Quarterly e-newsletter will be designed with the aim to provide updated information on the latest news and information regarding GED 2nd phase project Project. Considering that some municipalities are issuing newsletters covering municipal topics, GED 2nd phase project Project will explore an option to include energy efficiency advices to help citizens to better understand the benefits of energy efficiency measures and how to lower utility bills.

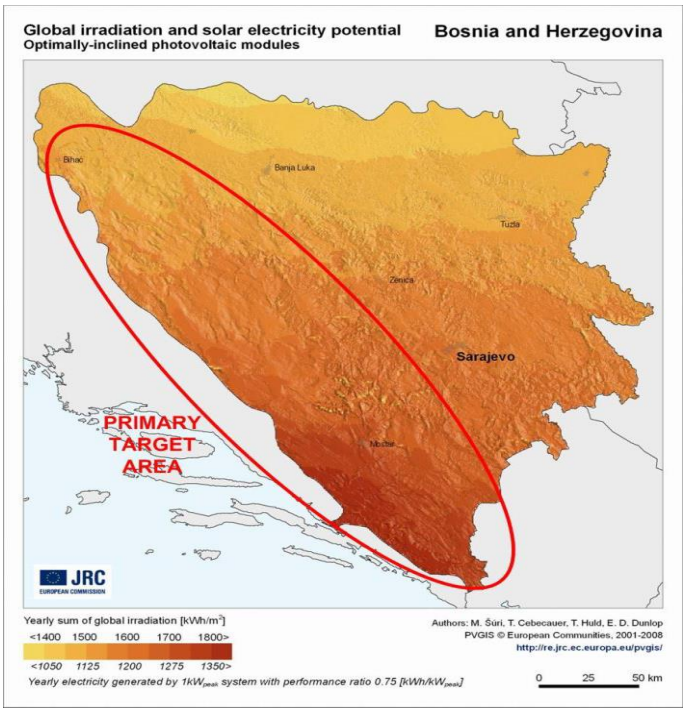
- In each public building where the energy efficiency measures were implemented, the GED 2nd phase project will install the energy performance monitors to track the energy and financial savings. This will be a way to publicly display the achieved energy and financial savings as well as to stimulate public employees and beneficiaries to further promote EE.
- GED 2nd phase project will ensure the background information and any relevant materials are shared with the media representatives. Beside the standard public relations activities, GED 2nd phase will engage with the media and share human development stories. Public employees/staff where GED Project implemented energy efficiency efforts will be featured in the local media as they have seen with their own eyes what it means to have a building that is energy efficient and that uses renewable energy sources. They will serve as a positive model of energy saving for other facilities and will act as GED energy efficiency "ambassadors".
- Each municipality will be provided with GED 2nd phase information package and encouraged to incorporate the Project information on their website. Where feasible municipalities will be asked to set up Energy Efficiency box at their website where educational and promotional materials with the energy efficiency tips will be displayed.
- To support the Project with the public camping and marketing activities, selected contractor, together with GED staff, will be engaged to ensure efficient implementation of public campaign. GED 2nd phase project will aim to reach no less than 100,000 people through a combination of communications tools and channels and no less than 4,500 persons (direct communication at open-air events in 15 cities).
- To ensure wider reach, GED 2nd phase project will foster multi-stakeholder cooperation as it can play a significant role in making awareness campaign more successful. In addition, the GED 2nd phase will seek for synergies with other projects funded by the Government of Sweden such as Strengthening the Role of Local Communities/Mjesne zajednice (MZs) in BiH, international institutions USAID, GIZ, World Bank and the private and civil sector.

Activity 15 - Installation of hybrid photovoltaic and solar system (electricity and thermal heat generation) solutions to remote areas (not connected into the electricity grid) without electricity in BIH (refers to PC6):

- Almost 3,000 households in the country live without electricity. For illustration, a village in North-West BiH (Veliko Ocijevo), with some 20 households, would need a total of 350,000 € to be connected to the electricity grid. UNDP, through past initiatives implemented a Global Renewable Energy Challenge in 2012 seeking renewable energy solutions for war-

returnee/marginalized families living in rural areas off the power grid. The successful proposal had to cover the energy needs of an average family and cost only 5,000 Euros, more than 3 times cheaper than what it would cost for commercial electricity installation. It also had to be flexible, reliable, easy to install, maintain and replicate, with good battery life and hot water capacity, and low maintenance costs. The result was a solar unit that actually provided more energy (2kW) and longer battery storage capacity (4.65 days) than specified by specified. Since then, installed renewable energy kits have transformed 44 families' lives, and have helped them supplement their income by selling cheese and other dairy products, which was impossible before the renewable energy system was installed. Now, children in these families do not have to do their homework or study under the candle light, but proper energy efficient light bulbs, they can enjoy watching TV or listen to music as their peers do in other parts of the country. The village of Veliko Ocijevo became first community living 100% on renewable energy. This approach would be replicated to other parts of BiH. (more info under the link/video: https://www.youtube.com/watch?v=DJ6FHhqQE1A)

- Typical user is a family with 1-5 members, living in rural returnee community in areas of Bosnia and Herzegovina indicated in the map below. Their homes were connected to the grid before the war, but the infrastructure is destroyed with repairs unrealistic as a result of both largescale investments and low feasibility given the number of scattered families living in isolated locations. Primary target area for application of the system will be the return areas in north-west, west and south parts of Bosnia and Herzegovina (pls. see the enclosed map). The area has favorable conditions for use of solar and wind based solutions



- On the basis of primary target area (global irradiation and solar electricity potential cross-checked with the area where most such returnee families live), vulnerability factor, number of family members (children, woman, man, elderly, etc.) UNDP will select families to be supported by the project.

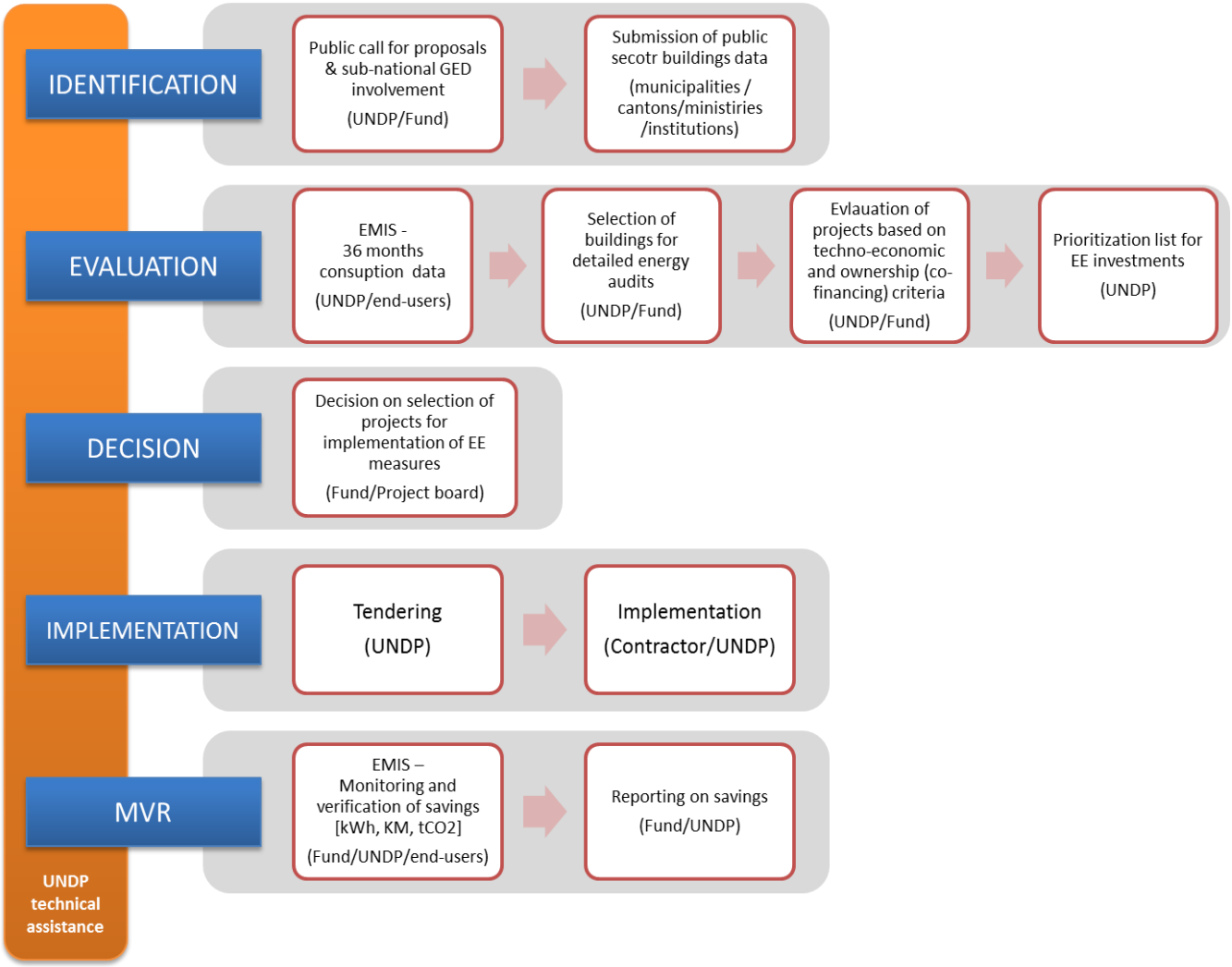
- Once the list of beneficiary families is developed UNDP will perform detailed assessment, in terms of identifying exact needs for installation of renewable energy kits. In some cases, certain works needs to be performed prior to installation of renewable energy kits (small scale reconstruction: plumbing, electrical installations – works that were not part of post-war reconstruction, but needed for full functionality of renewable energy kits). The next phase is followed by procurement process for design documentation which includes publication of a public tender/call for qualified bidders, evaluation of bids and Contract signing. Wherever possible and feasible, UNDP will seek for other party co-financing (municipalities, local organizations etc.). Should co-financing materialize, project savings will be directed to

additional number of families that will be supported by this project activity. After contract has been awarded, the contractor will start with implementation of works on site. The quality of site supervision has a major influence on the overall performance and efficiency of projects. Inadequate supervision is believed to be one of the major causes of rework. Therefore, quality assurance will be ensured by UNDP through an independent on-site quality control (works supervision) engineer who will closely monitor all executed works, materials used and absence of the work schedule/plan. This engineer/s will be independently contracted just for this purpose.

iv) Methodology on selection of public sector buildings for the implementation of energy efficiency infrastructure measures

Under the GED project activities, the *Methodology on selection of public sector buildings for the implementation of measures to increase energy efficiency* has been developed and its validity justified in 2013 on activities conducted within Environmental Protection Fund of FBiH. Activities conducted during the implementation of the given Methodology contribute to increase internal capabilities, skills and develop capacities within Environmental Protection Funds on strategic approach to energy efficiency investment decision making.

Key Methodology steps are given below, while detailed description is provided in Annex 1.



Methodology - example case from 2016 activities

Based on the methodology, decision making process flows efficiently for the last 5 years. There is a total number of about 4.000 public sector buildings which submitted applications to a "Permanent public call for the establishment of a database of public facilities" to Environmental Funds in BiH and UNDP in this period, and all applied buildings were created within Energy Management Information

System (EMIS) software and, invited to deliver consumption data, as well as designate representative to pass the training on data entry into EMIS. About 2.500 buildings delivered consumption data, and became eligible to be analyzed and compared to each other with an aim to find most promising to conduct detailed energy audits on. Based on technical, environmental and economic indicators from the software, 64 buildings have been chosen for further analysis in 2016, e.g. conduction of detailed energy audits (DEAs). Since each year DEAs are conducted on various number of buildings, total number of DEAs to be assessed, prioritized and ranked was 240. Based on technical, environmental, economic, financial and social parameters gathered from energy audits, as well as taking into account possibilities and shares of investments by end-users, a decision to invest into 41 EE infrastructure projects has been made. It is important to mention that process don't end with implementation of infrastructure measures, but monitoring of energy consumption through EMIS system is continued afterwards with an aim to monitor and compare consumption before and after conducted measures, and to be able to create necessary reports on savings.

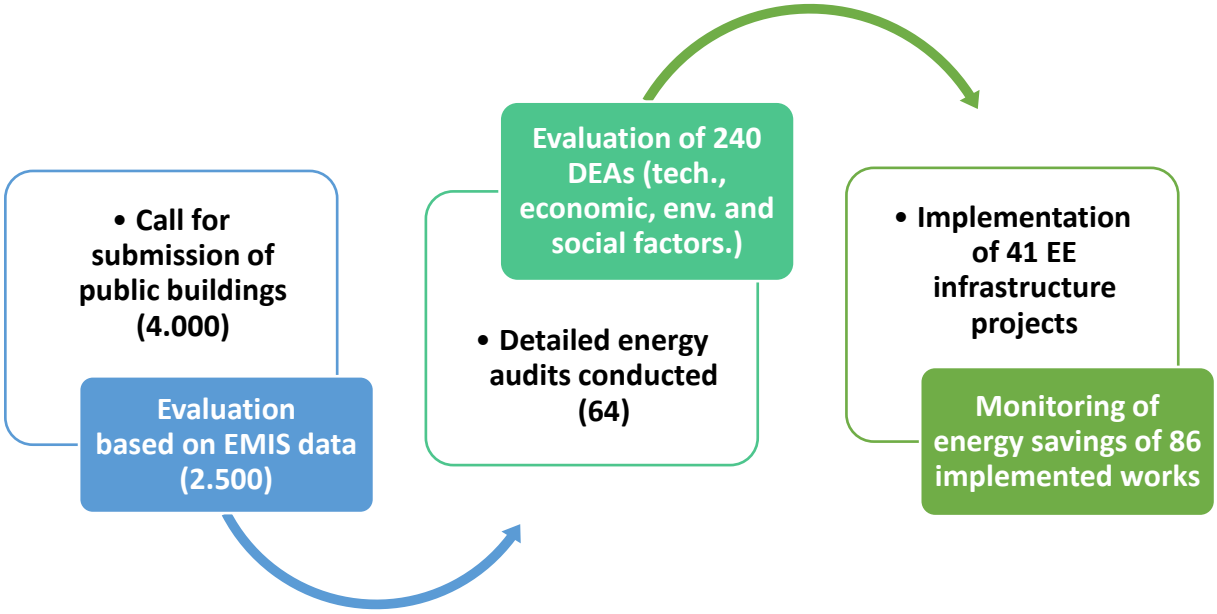


Figure 16. EE investment decision making process flow in 2016

Methodology for public lightning - example case from 2016/2017 activities

Under additional GED activities, methodology on decision making process for public lightning was developed. Total number of more than 86 public lightning systems' applications were submitted in 2016 to a public call for the detailed energy audits for public lightning systems within Environmental Fund of the F BiH. Based on technical, environmental and economic indicators, 6 public lightning systems have been chosen for conduction of detailed energy audits (DEAs). Taking into account possibilities and shares of investments by end-users, up to 5 infrastructure projects will be started by the end of the year. It is important to mention that EMIS system has been upgraded, so decision making process for public lightning systems, as well as monitoring of energy consumption is enabled.

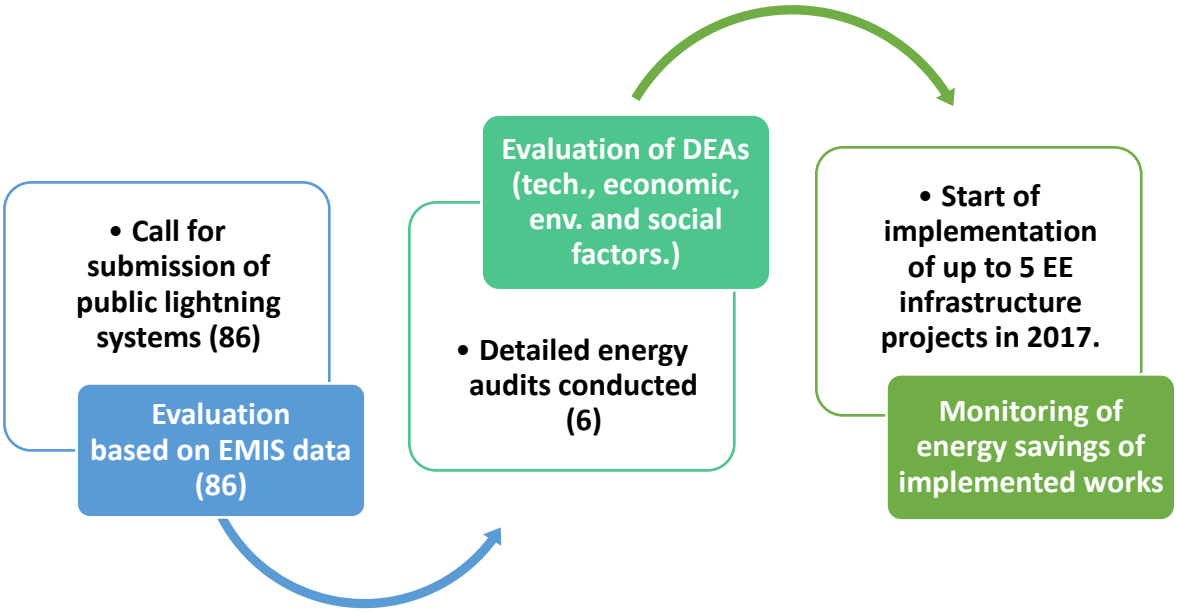


Figure 17. EE investment decision making process flow for public lightning systems in 2016/2017

v) GED 2nd phase project financing

The Green Economic Development 2nd phase project will be funded or supported by several BiH institutions, while the biggest financial contributor is the Environmental Protection Fund of FBiH (2 m USD for the period 2018 - 2020) and Environmental Protection Fund of RS (1m USD for period 2018-2020). Institutions funding or supporting the GED project are:

- Environmental Protection Fund of FBiH
- Environmental Protection and Energy Efficiency Fund of RS
- Cantonal Governments in FBiH
- Municipal authorities in BiH

Additional co-financing for infrastructure measures (Project Component 4) is ensured through end-users (municipalities, sub-national governments and institutions), e.g. through a competitive ownership based co-financing ratio evaluation.

vi) Project sustainability and legislative development processes

The aim of GED 2nd phase project activities is to create self-sustainability and ensure that savings generated through implemented energy efficiency and renewable energy infrastructure measures are

continuously reinvested into other energy efficiency and renewable energy projects (or other infrastructure projects) or are used to finance the investment.

Sustainability will be ensured by:

- **Further strengthening of energy efficiency Revolving Fund within Environment Protection Funds (introduction of M&V system and performance based grnating)**;
- **Creation of ESCO funding window for energy efficiency and renewable energy investments within Environment Protection Funds**;
- **sub-national government/end-user obligation to reinvest generated savings and/or to invest into other EE/RES projects** (or other infrastructure projects), based on Energy Efficiency Action Plans (EEAP) and sub-national level based environment protection strategic planning and budgeting; Namely, in accordance with the Law on EE, EEAPs (covering sectors with indicated plans on improvement of energy efficiency) and Operational EEAPs (covering sectors with operational plans, allocated financial resources, targeted public sector buildings and timeframe for assigned actions) will require from end-users to allocate financial resources within their budget (municipal, cantonal and ministerial) for EE/RES infrastructure projects and, simultaneously, to reallocate generated savings to budget lines for additional EE infrastructure projects, and thus enabling them to reinvest savings into new projects. Even without the Law on EE, reinvesting into EE/RES infrastructure from generated savings is possible under the "sanitation/renovation/maintenance" categories within public budgets, with a clear two to three year plan on investments (which includes boiler house/heating system fuel switch projects, solar heaters, EE windows, envelope, and other construction works). Therefore, it is suggested that, as an additional monitoring mechanism, institutions/end-users (responsible for energy costs), sign a Statement on reinvesting generated savings into other infrastructure projects and report back to UNDP on allocation of generated savings.
- **Law on Energy Efficiency by-laws, based on EU's EPBD, EED and RE directives** (which identifies Environmental Funds in both entities as responsible institutions to: i) monitoring energy consumption and savings, ii) supporting EE/RES targets iii) supports the implementation of EE/RES projects; The Law on EE (it's by-law) also incorporates EMIS as one of IT tools to monitor and report on energy consumption);
- **Selection of public sector buildings and public lightning system decision making process on investments** - Since not all public sector buildings provide attractive and cost-effective financial results, it is very important that a large pool of potential public sector buildings is identified, analyzed and prioritized based on several technical, economic and environmental factors in order to justify the right investment decision. This is made available through i) Project Component 2 - *Institutionalization of energy management*, which sets the baseline pool/building stock of public sector buildings, ii) the developed Methodology (*Chapter 3.3.4. Methodology on selection of public sector buildings for the implementation of energy efficiency infrastructure measures*), and iii) conducted detailed energy audits (which include detailed techno-economic and financial analysis of proposed EE/RES measures, e.g. required investments, expected energy and costs savings, expected emission reduction, pay-back period, NPV, IRR etc.).

Moreover, currently, and throughout the GED 2nd phase project implementation period, various legislative processes are on-going which are aligned and in favor of GED 2nd phase project's sustainability and creation of financial mechanisms within Environmental Funds, and which will also be supported by GED 2nd phase project (as described in project activities).

Repayment of co-financing amounts to the Revolving Fund as well as the ESCO Fund window, as well as the reallocation of energy costs savings to other EE projects/other infrastructure projects, will be assured by:

- Fund is a financial institution, already some financial mechnisms in place
- Law on EE
- Budgeting EE savings and allocation to other EE activites/projects
- Secondary legislation on budgeting energy savings and Law on procurement
- Obligation to invest into EE project as of EEAPs
- Obligation through financial mechanisms of Environmental Protection Funds
- Reduced grnat financing by Efs for EE7RES projects (i.e. revenue generating proejcts), focusing on providing financial support to EE/RES projects via Revolving Fund and ESCO Fund windos wihtin EFs

vii) Project rights' perspective

A rights perspective has been considered in the project document design, specifically with regard to ensuring that public policies, legislation, financing mechanisms and service outcomes to be supported within the project are non-discriminative and offer equal opportunities (access to services, funding, employment opportunities) for all, regardless of their age, ethnic, sex or social status. Highly participatory approach in policy-making, legislating or funding assisted by the project reinforces the principle of transparency. Ensuring wide publicity in the course of project work and making publically available policy deliverables and measurable results reinforces the accountability principle.

viii) Gender equality

Under the GED 2nd phase project, there were systematic collection of sex segregated data for each project activity. The improved working and living conditions, as well as raised comfort levels, will contribute towards new employment, and will have numerous quantifiable benefits for beneficiaries, as well as the gender impact. EMIS system was updated, so data on gender of training participants was entered. This enables overview of involvement of women in the administration work of the public sector. It showed that more than 55 % of trainees were women. Participation of women in the labor market, which is currently only at 37% (the lowest in South Eastern Europe region), could be raised, since it is noticeable that in public sector, a majority of employees are women.

Furthermore, there is an evident involvement of women in all GED 2nd phase project activities, and in some cases in equitable ratios or even exceeding numbers of men. For example, the „Energy professionals training program for skills and knowledge development" was attended by around 40%

female participants. Even though accurate data has not been collected, cumulatively the project reached 60% of male and 40% of female beneficiaries. This conclusion is drawn from the fact that the users of public institutions that were improved through the project, i.e. social and educational institutions- are in fact the daily structures of life which are frequented by both men and women, boys and girls in more or less equitable ratio- both as beneficiaries and employees.

Within the GED 2nd phase activities, a "Study on human development benefits and gender mainstreaming" is under development. Findings of the Study will contribute to better understanding of GED project impact, both on human development and gender mainstreaming, which will be further taken into account for GED 2nd phase. Up to day impacts of promoting and implementing energy efficiency and renewable energy are jet unknown in BiH. Based on the Study findings, further activities on energy efficiency and renewable energy advocacy and its political agenda mainstreaming will be undertaken and will additionally contribute that non-energy civil society organizations advocate and mainstream energy efficiency and renewable energy measures in BiH.

GED 2nd phase project activities will improve and systematize the process of sex disaggregated data collection, based on experience and developed methodology under the Study. Gender equality will also be mainstreamed within the project implementation strategy. Particular attention will be given to ensuring gender-sensitive design of regulatory and policy frameworks, as well as warranting that both men and women benefit equally from services, funding, employment and capacity development opportunities supported by the project. Women will be encouraged to participate equally in activities led by the project. Also, the annual project work-plan will be made available for consultations to the UNDP gender specialist in BiH (UNDP CO BIH, and Energy & Environment gender focal points), who will together with the team and all relevant stakeholders identify and propose entry points for meaningful and contextualized gender interventions. The project will also ensure that any publications and report incorporate a gender dimension in its methodology and text.

To provide gender-sensitive monitoring and evaluation, the outcomes and impacts of project activities within all Project Components now include at least one gender-related indicator, as well as gender disaggregated indicators.

ix) EMIS/Monitoring, analysis and evaluation of cost and energy savings and emission reduction

The Energy Management Information System (EMIS) is a web application (address: www.isge.ba) used as basic tool for systemic energy management in public buildings / institutions and public lighting. As with any web application, EMIS can be accessed (authorized access) with a web browser. Key partners for EMIS implementation and enforcement in BiH are the two Environmental Funds of FBiH and RS, state level MoFTER and cantonal line-Ministries in FBiH.

EMIS has functionalities are as follows:

- Creation and management of databases of public buildings and public lighting that are included in a program of systematic energy management (monitoring energy and water consumption).

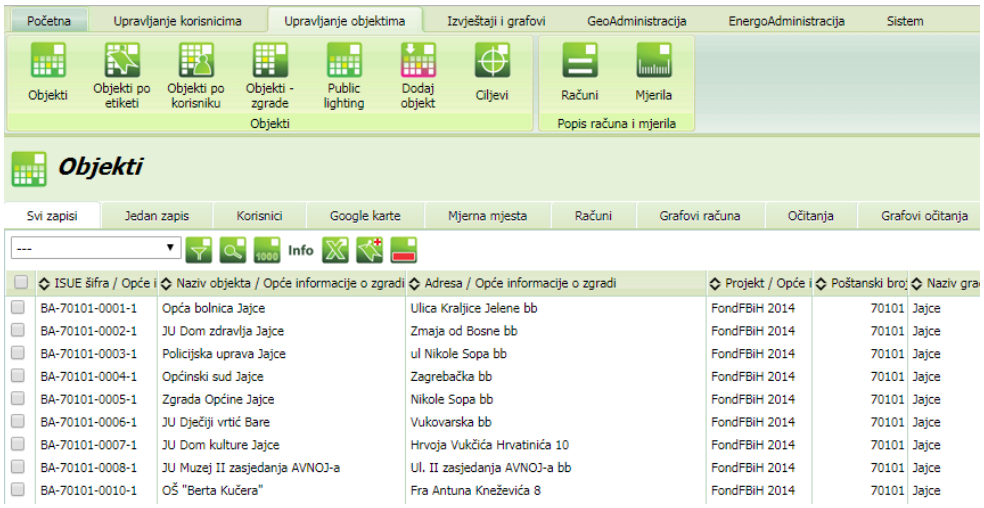


Figure 18 – Table view of all registered public buildings

- Recording and maintaining the accuracy/relevance of the relevant data needed to define the condition of an individual facility in the EMIS, i.e. general data (name, address, purpose, area, year of construction), construction and energy data (types of energy carriers in the facility, associated costs and equivalent CO_2 emissions).

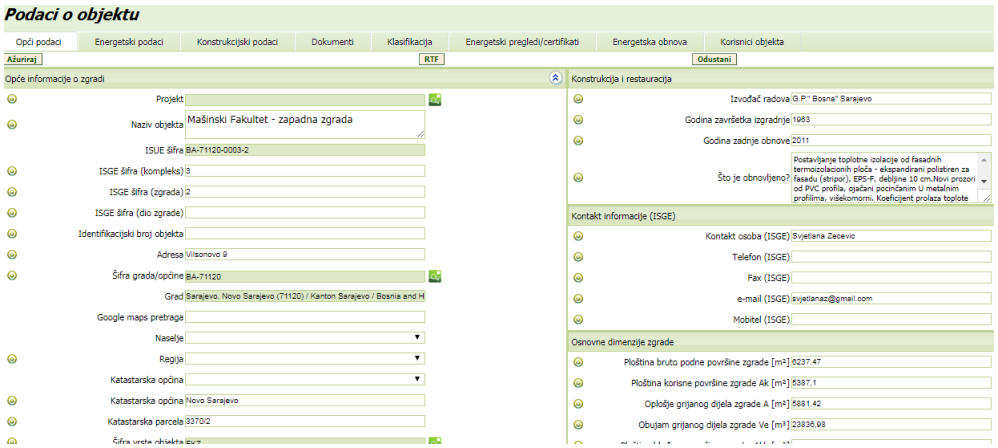


Figure 19 – Web form for general building data

- Continuous collection and control of data on consumption of all types of fuels (natural gas, fuel oil, heating wood, coal, heat, steam, electricity, etc.) and drinking water.

Objekti Mašinski Fakultet - zapadna zgrada [BA-71120-0003-2] - Vilsonovo 9, Sarajevo, Novo Sarajevo

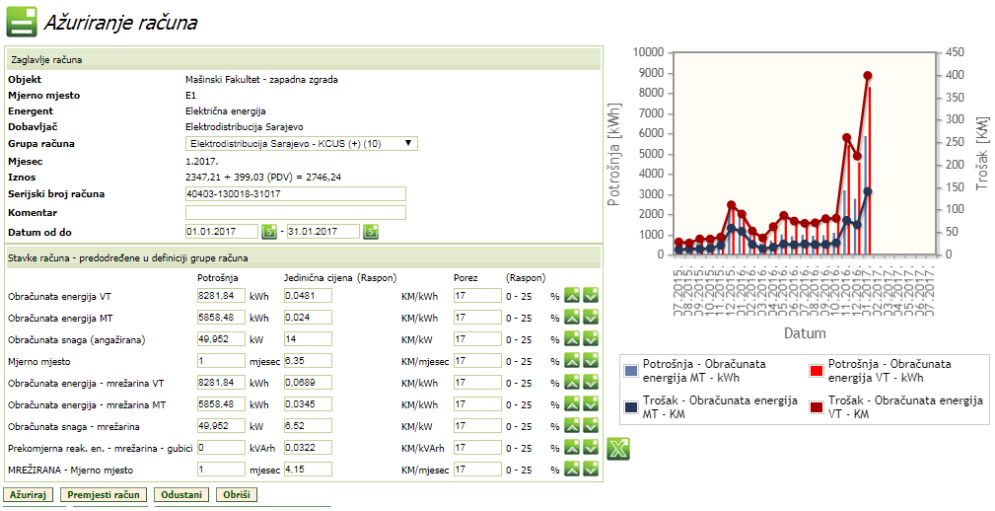
Svi zapisi | Jedan zapis | Korisnici | Google karte | Mjerna mjesta | Računi | Grafovi računa | Očitanja | Grafovi oč

--- Info Promijeni grupu računa | Masovna promjena | Premjesti račun | Prikaži stavk

Naziv energenta (	Godina /	Mjesec /	Serijski broj računa / Zaglavlje	Naziv dobavljača / Opći podac	Naziv grup	Izračunata kc	Izračunata c
Električna energija	2017	1	40403-130018-31017	Elektrodistribucija Sarajevo	KCUS	14 140,32	2 347,21
Prirodni Gas	2017	1	01-283/2017	SarajevoGas	plin	6 760,37	5 011,34
Voda	2017	1	31313934	Vodovod i Kanalizacija	vodovod	219,00	380,68
Električna energija	2017	1	40403-120675-31017	Elektrodistribucija Sarajevo	el.energija	3 373,90	659,69
Električna energija	2016	12	40403-130018-31126	Elektrodistribucija Sarajevo	KCUS	14 622,84	2 472,22
Prirodni Gas	2016	12	01-4112/2016	SarajevoGas	plin	5 882,05	4 354,78
Voda	2016	12	31138479	Vodovod i Kanalizacija	vodovod	214,00	372,08
Električna energija	2016	12	40403-120675-31126	Elektrodistribucija Sarajevo	el.energija	1 592,80	380,07
Električna energija	2016	11	40403-120675-30116	Elektrodistribucija Sarajevo	el.energija	1 193,80	235,15
Prirodni Gas	2016	11	01-3627/2016	SarajevoGas	plin	3 567,39	2 527,17
Voda	2016	11	30964186	Vodovod i Kanalizacija	vodovod	208,00	361,76
Električna energija	2016	11	40403-130018-30116	Elektrodistribucija Sarajevo	el.energija	10 620,04	2 045,25
Električna energija	2016	10	40403-120675-31106	Elektrodistribucija Sarajevo	KCUS	1 399,70	359,60
Prirodni Gas	2016	10	01-3157/2016	SarajevoGas	plin	1 869,10	1 418,11
Voda	2016	10	30787312	Vodovod i Kanalizacija	vodovod	175,00	305,00
Električna energija	2016	10	40403-130018-31106	Elektrodistribucija Sarajevo	el.energija	9 970,88	2 019,20

Figure 20 – View of basic information of entered bills for a particular building

- The consumption data is entered manually and / or automatically. Manually entering data into predefined forms is done via the Web form by the end users. Unit items of the bills are entered, and the correctness of the entry is done by comparing the total item of the bill with calculated values in the EMIS. Automatically - downloading data from smart meters that have the possibility of remote reading (gas meter, water meter, calorimeter, electricity meter, fuel oil level meter, etc.)



Ažuriranje računa

Zaglavlje računa

Objekt	Mašinski Fakultet - zapadna zgrada
Mjerno mjesto	E1
Energent	Električna energija
Dobavljač	Elektrodistribucija Sarajevo
Grupa računa	Elektrodistribucija Sarajevo - KCUS (+) (10)
Mjesec	1.2017.
Iznos	2347,21 + 399,03 (PDV) = 2746,24
Serijski broj računa	40403-130018-31017
Komentar	
Datum od do	01.01.2017 - 31.01.2017

Stavke računa - predodređene u definiciji grupe računa

	Potrošnja		Jedinična cijena (Raspon)		Porez	(Raspon)	
Obračunata energija VT	8281,84	kWh	0,0481	KM/kWh	17	0 - 25	%
Obračunata energija MT	5858,48	kWh	0,024	KM/kWh	17	0 - 25	%
Obračunata snaga (angažirana)	49,952	kW	14	KM/kW	17	0 - 25	%
Mjerno mjesto	1	mjesec	6,35	KM/mjesec	17	0 - 25	%
Obračunata energija - mrežarina VT	8281,84	kWh	0,0689	KM/kWh	17	0 - 25	%
Obračunata energija - mrežarina MT	5858,48	kWh	0,0345	KM/kWh	17	0 - 25	%
Obračunata snaga - mrežarina	49,952	kW	6,52	KM/kW	17	0 - 25	%
Prekomjerna reak. en. - mrežarina - gubici	0	kVArh	0,0322	KM/kVArh	17	0 - 25	%
MREŽIRANA - Mjerno mjesto	1	mjesec	4,15	KM/mjesec	17	0 - 25	%

Ažuriraj | Premjesti račun | Odustani | Obriši

Figure 21 – Form for manual entry of individual bill items for an energy carrier in a billed time period

- Processing and analyzing acquired data and interpretation through the system in the form of predefined energy reports, graphs and analysis modules.

Figure 22 – First figure shows energy consumption of natural gas in kWh in a given time period. The heating periods are nicely recognizable. The second figure shows a linear regression between average monthly outdoor temperatures and monthly natural gas consumption.

- Easy creation of reports for individual public buildings, or a predefined group of public buildings (e.g. all schools in a city). The reports include summaries of energy consumption by year, various statistics on data consumption such as number of entered bills by energy carrier, calculated indicators for energy, costs and CO_2 emission and visualization of results.

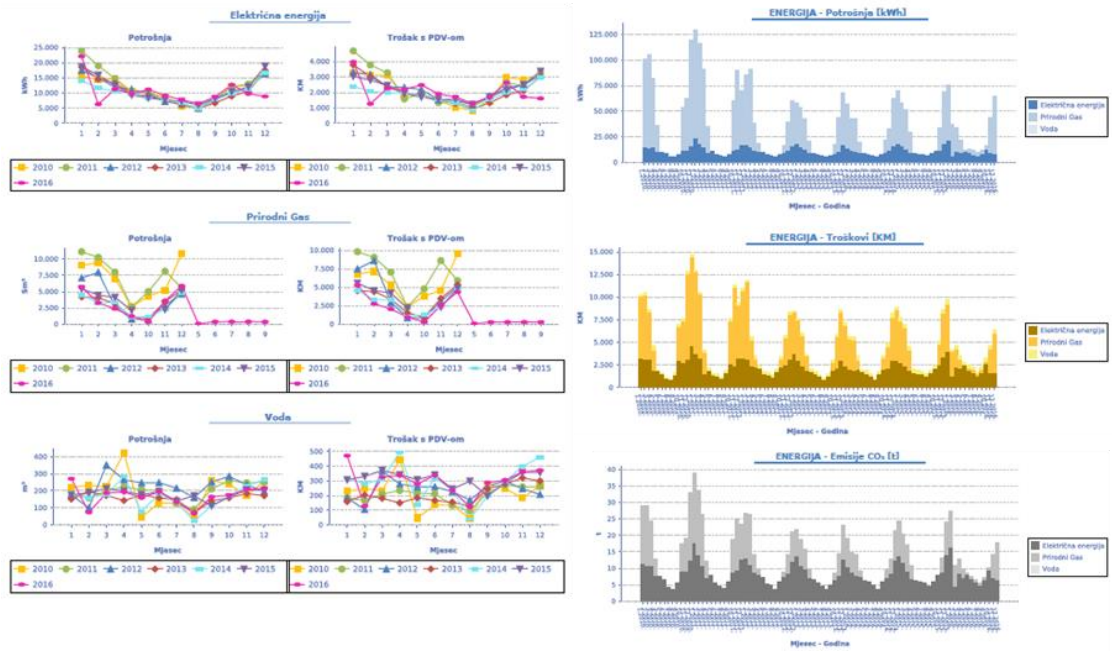


Figure 23. Visualization in a report - data for a public building

- Control of costs and definition of targets for reduction of energy and water costs.
- Apps for statistical control on consumption data and alarm apps for excessive consumption of energy and water.
- User friendly monitoring of the results of implementation of energy efficiency improvement projects. Functionalities are primarily aimed at defining key indicators and targets of energy consumption values.
- Connectivity – possibility of using web services for acquisition of various datasets – climate data (mostly outdoor temperatures), daylight data (for public lighting analysis).
- Modularity – new modules for additional tasks can be developed.

Energy management in a broader sense includes strategic planning and sustainable management of energy resources. As for any sustainability, human resources are crucial. Therefore, continuous education of public sector energy managers, responsible for public buildings and public lighting system should be incorporated in any programme/project. From IT perspectie, only professionally trained energy managers can provide correct technical information about respective energy systems. For example, EMIS users enter or provide “static” information about the building, which includes construction details and building physics data. For public lighting, this data implies technical parameters of lighting bodies, outdoor site- lighting performance and other technical parameters. Also, users/energy managers periodically enter consumption data based on the utility bills that are delivered, or if applicable the data is provided via smart metering automatically.

Provided data is automatically processed and visualized in several EMIS modules and presented to authorized users and energy managers to understand of where, when and how they consume energy in respective public sectors. Provision of such processed information to relevant authorities (municipal, cantonal) and their managers gives the possibility to identify inefficient energy use, excessive spending of resources and public money. It is not possible to tackle inefficient energy use without baseline information provided by EMIS.

IV. SWEDEN'S INVOLVEMENT

In accordance with Results Strategy for Sweden's reform cooperation with Western Balkans for the period 2014 – 2020, the Green Economic Development 2nd phase project is fully aligned to expected result 3 – A better environment, reduced climate impact and enhanced resilience to environmental impact and climate change.

EU integration is crucial to Bosnia and Herzegovina's pursuit of democracy, rule of law and sustainable economic development. However, due to its administrative complexity, political lock-down and lack of human and financial resources, Bosnia and Herzegovina needs substantial assistance on its path to EU accession in form of capacity building and strengthening of EU related processes and the transposition of EU directives into national legal framework.

The Green Economic Development 2nd phase project will contribute to BiH's EU accession process, targeting the EPBD (Energy Performance Building Directive), EED (Energy Efficiency Directive) and RES (Renewable Energy Directive) directives by enabling entity Environmental Protection Funds to monitor, analyze and evaluate energy consumption, costs, emission, energy investments and savings data from public sector buildings, as well as to support BiH's related energy efficiency and renewable energy targets (in accordance with the Energy Community Treaty and its obligations) by providing financial support to EE/RES infrastructure projects and contributing to enable a favorable environment for EE/RES investments in BiH. Moreover, the state of BiH (MoFTER) would be empowered with consolidated, valuable and reliable data for further submission to Energy Community Secretariat and other multilateral agreements (for example – United Nation Framework Convention on Climate Change).

With SWEDEN's involvement in GED 2nd phase project, the promotion of more economical, social and environmental sustainable management of resources in BiH would be enhanced significantly.

4.1. SWEDEN's POTENTIAL INVOLVEMENT

Out of six Project Components (PC) SWEDEN's potential involvement in the GED 2nd phase project would most effectively contribute and create add-value on *Capacity building* (PC 1), *Infrastructure EE measures* (PC 4), *Public awareness* (PC 5) and *RES solutions for off-grid households* (PC 6) components (market orange in Figure 244).

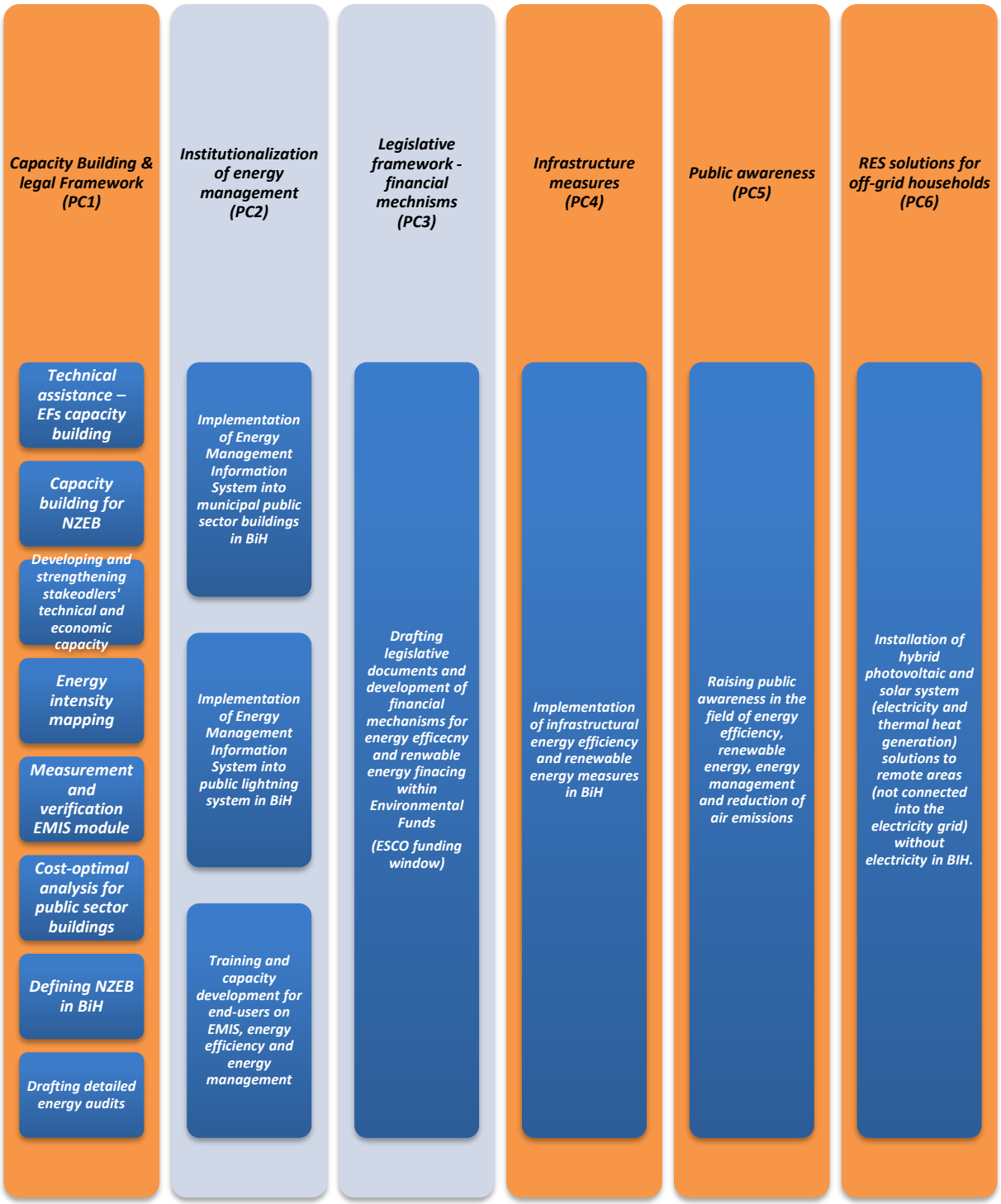


Figure 24. Overview of identified potential for SWEDEN's involvement

As a logical continuation of GED project activities (2015 - 2017) and due to lack of financial resources, only a limited number of energy efficiency/renewable energy infrastructure projects can be implemented under the future portfolio of Green Economic Development 2nd phase project, as well as only a limited volume of Capacity Building and Raising Awareness activities, and no installations of hybrid photovoltaic and solar system solutions to remote areas without electricity in BIH. Moreover, the aim to create an ambient favorable to invest into energy efficiency and renewable energy infrastructure projects, resulting in government financial institutions (Environmental Protection and Energy Efficiency Funds) and commercial financial institutions providing different financial mechanisms to municipalities/end-users of public sector buildings (loans, guarantees, revolving, performance based granting) and the reinvestment of savings (or repayment of loans out of the cost savings achieved), would most probably not be scaled-up nor mature within the next years without SWEDEN's involvement. SWEDEN's support would help to increase the number of projects implemented under the current (grant) and newly established financial mechanism – Revolving Fund (loans) and well as to be established under GED 2nd phase Esco Fund window within EFs.

Therefore, SWEDEN's involvement would significantly contribute to proof BiH based financial institution sector (government and commercial) that energy efficiency and renewable energy investments are economically and financially attractive and cost-effective. Currently, commercial financial institutions do not provide targeted and for this purpose structured loans, guarantees, revolving modalities nor performance based granting for EE/RES measures in public or private sector buildings. Moreover, there is low awareness on the high technical and economic potential of EE/RES projects to generate significant cost savings out of which investments could be repaid and further reallocation of savings into other EE/RES projects implemented.

Moreover, without SWENED's involvement in GED 2nd phase Bosnia and Herzegovina would further continue to miss the introduction of EU EPBD directive part which requires that every new public building from the year 2018 has to be of Net Zero Energy Building Standard. BiH will not be able to coper with the directive's requirement during project implementation but the GED 2nd phase project will start to define and communicate its gaols and obligation into BiH's legal environment and among BiH stakeholders.

As stated previously, BiH has not submitted first report on cost-optimality to the Energy Community Secretariat, since calculations on cost-optimality for residential buildings are in progress and financed by GiZ BiH (as the logical follow up after finished Typology for residential Buildings in BiH which was financed by GiZ BiH), while calculations on cost-optimality for public buildings need to be done in near future, and will be financed through GED 2nd phase project (as the logical follow up after finished Typology for Public Buildings in BiH which was financed by GED project). This will enable BiH to re-define its secondary legislation related to EPBD directive and to define new and accurate energy classification of public sector buildings as well as to introduce more strict levels of energy requirements for new and buildings which are going through retrofits.

As suggested ba the Mid-term review, Energy intensity mapping will be implemented with SWEDEN's support allowing users and non-professional to execute advanced analyses of energy consumption (via EMIS), in a visual manner, without using complex tools. The idea behind this concept is to represent every single public building and public lighting system registered in EMIS, online on a geographical map, more precisely google maps or open street maps. Each building on a map would correspond to its real location.

One of the key requirements for a self-sustainable financial mechanism based on performance based granting and ESCO Fund window is to enable the right tool for measurement and verification of savings in order to be able to track precisely the energy and money savings achieved and thus base obligations under ESCO and performance based granting contractual agreements on data measured and verified by both parties (investor and user; and/or financial institution/EFs and investor). Therefore, the development of an M&V EMIS module that communicates with EMIS will transform this approach into an investment grade tool for energy performance contracting in the public sector (public buildings and public lighting). Without SWEDEN's support this tool would not be developed nor EFs capacities enriched to provide the market with ESCO Fund and performance based granting financial mechanisms.

Funds from SWEDEN would also contribute and enable higher volume of activities under Project Components 1 and 3 – resulting in developing and strengthening technical and economic capacity of a larger number of energy experts in BiH and implementation of more energy audits, as well as better execution, coverage and outreach of GED's 2nd phase planned marketing campaign and general awareness.

Logical framework and **result and risks matrix**, aligned to SWEDEN's involvement, are provided in *Annex 2* and *Annex 3*.

4.2. ACCELERATING THE CREATION OF A FAVORABLE ENVIRONMENT FOR ENERGY EFFICIENCY INFRASTRUCTURE INVESTMENTS

The intention of GED 2nd phase project activities, among others, is to:

- Link all government levels in BIH with energy consumption monitoring data (municipal, cantonal, entity and stale level),
- develop and adopt sustainable financial mechanisms within Environmental Protection Funds for EE/RES project financing (performance based granting, ESCO window etc.),
- achieve budget cost savings through implementation of EE/RES projects in public sector buildings and public lightning systems in BiH,
- reinvest savings into EE/RES or other infrastructure projects,
- to generate employment of domestic workforce,
- increase awareness and understanding on EE benefits and proof that energy efficiency investments are economically and financially attractive and cost-effective in BiH, and
- enable energy access (electricity and thermal heat) for off-grid households in BiH.

From an EE financing perspective, SWEDEN's participation in the project would accelerate Environmental Protection and Energy Efficiency Fund's **shifting process from "grant financing of EE/RES projects" to "loans and other innovative financial mechanisms provided to end-users for EE/RES projects"** and "risk minimized/guarantees provided" within the public (and potentially private) sector in BiH, as well as risks mitigated and awareness created for commercial financial institutions (Figure 25).

Namely, as of now, the Revolving Fund on EE has been established and operationalized in FBIH which provides soft loan to BiH's SMEs and public authorities to co-finance EE projects. In RS the same Fund is going to be established by the end of 2017/early 2018. Moreover, a performance based granting policy will be enabled within the EFs but will need further support to be implemented (Measurement & verification tool) as well as capacity buildings within the EFs and communicating its modalities to the wider audience/potential clients. From 2019 onwards, it is planned that the Funds provide ESCO Fund window for energy efficiency and renewable energy investments in public sector buildings, public lightning as well as into SMEs production facilities (although enlabled, not tracked and monitored under GED project). With SWEDEN's involvement in GED 2nd pahse awareness for EE/RES projects and their financial, environmental and economic benefits, as well as motivation and attractiveness to enter into newly developed financial mechanisms would be created within end-users (sub-national level authorities/municipalities/institutions). SWEDEN would significantly contribute to proof BiH based financial institution sector (government and commercial) that energy efficiency investments are economically and financially attractive and cost-effective, resulting in:

- **Risks reduced to provide loans for EE investments in BiH**
- **FIs provide loans to municipalities and other beneficiaries/clients for EE infrastructure investments**

As of 2019, Environmental Protection and Energy Efficiency Funds in BiH would provide performance based granting, revolving mechanisms, soft-loans and ESCO Fund window for EE/RES investments in

BiH, which should be followed by supporting the individual client for EE/RES investments from 2021 (since market maturity and EFs capacities are not yet established to do so in GED 2nd phase).

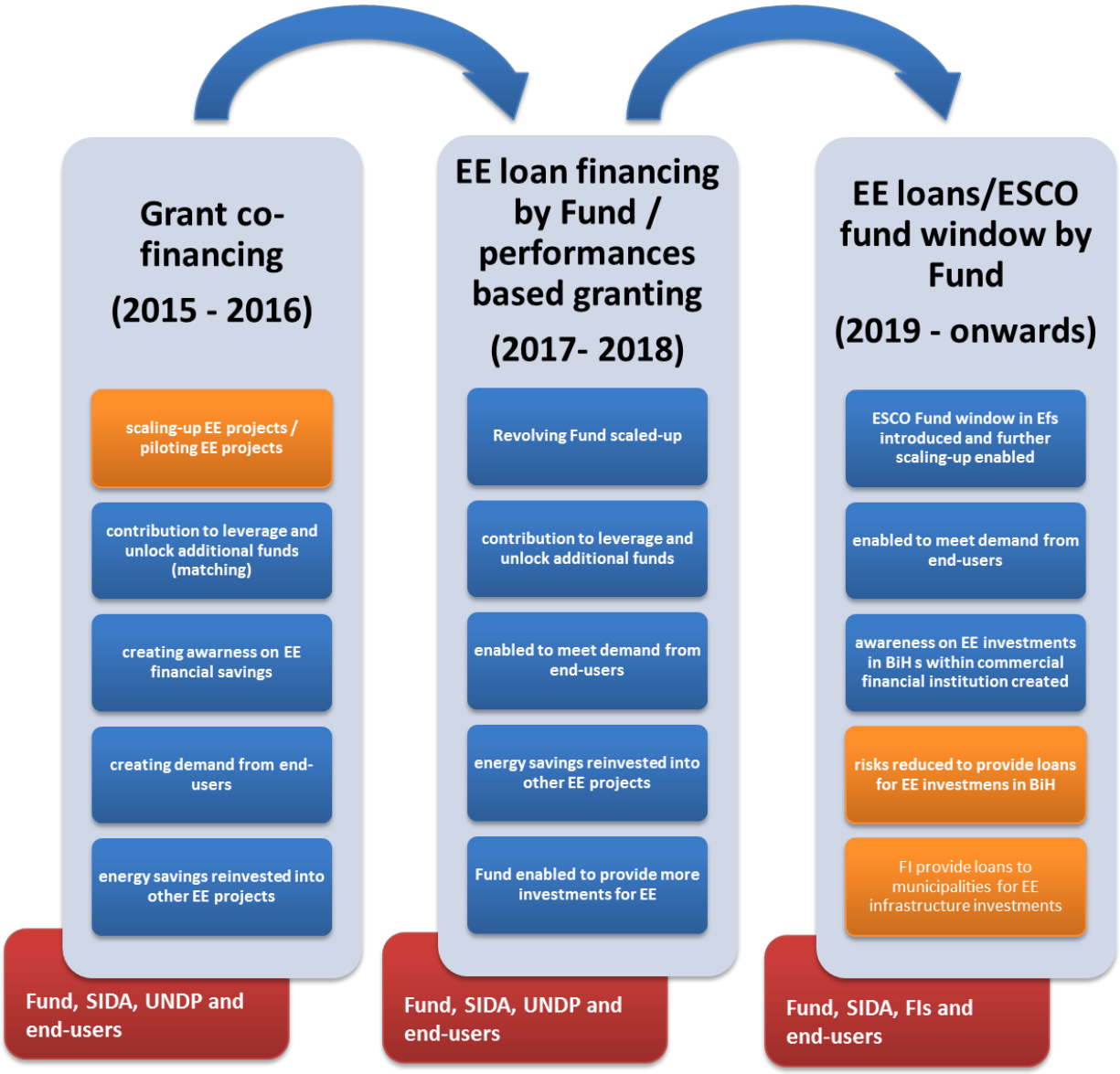


Figure 25. Financial mechanisms shifting process within Environmental Funds with SWEDEN's involvement

4.2.1. End-user's ownership and affordability

Ownership

Ownership by end-users will be assured through their participation in co-financing EE/RES investments. GED 2nd phase project will provide incentives in form of grant financing and will merge funds from all parties involved, resulting in an attractive modality to invest into EE/RES. However, the goal is to create awareness on benefits of investing into energy efficiency and renewable energy projects, e.g. that savings are used to finance the investments, which makes EE/RES investments interesting for end-users, authorities and general public.

A detailed description on project sustainability closely linked to ownership creation and the obligation and/or necessity to reinvest generated savings into new EE projects/measures, or to use the savings to finance the investment, is described in Chapter 3.3.6.

Affordability

Affordability depends on case by case basis e.g. on end-users' current possibility to co-finance projects or to plan future allocations for projects/investments. It cannot be generalized or assessed on BiH level, nor on entity, regional/cantonal or municipal level. Various types of end-users, depending on the jurisdiction of public sector buildings, have different possibilities to allocate a certain amount of financial sources. Those possibilities depend on:

- General level of governance and motivation
- Budget planning and allocation of resources for infrastructure/maintenance projects
- Level of understanding cost-benefits of energy efficiency investments
- Level of understanding financial mechanisms
- Current energy related conditions of public sector buildings and related expenditures/costs

However, within the GED 2nd phase project it is clearly required and mandatory to have co-financing from end-users in order to be eligible for financing (this is the very first requirement for all public sector buildings in the EMIS pool of buildings, followed by EMIS technical parameter analysis of current conditions, conducting detailed energy audits, conducting techno-economic evaluations, decision on investing, entering agreements, project design, tendering, and finally infrastructure works and commissioning).

SWEDEN's grant co-financing contribution would be co-financed by:

- Environmental Fund
- End-users (institutions, municipalities, sub-national authorities)

During the implementation of GED project (2015 - 2017) it was expected that SWEDEN's grant financing involvement would unlock additional funds in the matching ratio of 1:1, or leveraging funds of up to two times; however, due to very high interest of end-users, and due to generation of high

ownership, the co-financing ratio of energy efficiency infrastructure investments by end-users in the past three years constantly grew, as shown in the table below.

Year	Co-financing ratio by end-users	Total investment into EE infrastructure [USD]
2014	40%	522,021.00
2015	54%	2,742,865.51
2016	66%	3,298,741.91
2016*	73%	5,851,378.48

** WB parallel funding included*

It is expected that within GED 2nd phase (2018 - 2020) this ration will be increased to 1:2 for EE infrastructure measures in public sector buildings, while for RES measures and public lighting the ratio will be 1:1.

4.2.2. Relation to other EE financing schemes in BiH

This project does not disturb or undermine any other efforts that offer EE finance, but would rather contribute to create awareness on EE financing, reduce risks and create synergies if other new financing sources would emerge in BiH. Moreover, the GED 2nd phase project would set the basis for other schemes in BiH (USAiD's Obligation scheme), while contributing to set up a structure and in the long-term, a marked based financial scheme for EE investments.

Currently there are no donors providing finance for infrastructure projects. Commercial financial institutions (banks and micro-credit foundations) do not provide financing for the public sector but rather loans without incentives which makes them not attractive.

SWEDEN's involvement would significantly contribute to speed up the development of EE financial mechanisms for public sector buildings and public lightning while setting an example for residential and commercial buildings (private sector), and would proof to BiH based financial institution (government and commercial) that energy efficiency investments are economically and financially attractive and cost-effective.

An joint programming with GiZ and USAiD for energy efficiency/renewable is currently being developed under the coordination of MoFTER with the aim to strengthen further synergies in BIH.

4.3. BUDGET OVERVIEW

Based on SWEDEN's potential involvement in Project Components 1, 4, 5 and 6, a detailed annual based cost-breakdown for the years 2018, 2019 and 2020 is given in *Annex 4*.

4.4. EFFECTS OF SWEDEN'S INVOLVEMENT IN GED

With funds secured through SWEDEN's involvement in the amount of about 4m €, and additional co-financing by end-user's, following effects would be achieved:

- **higher co-financing amount from end-users (matching at least 1:2 for EE and 1:1 for RES measures, or leveraging up to three times)**
- **at least 875,000 € co-financing by end-users/project partners ensured per year**
- **motivating end-users to enter into EE/RES investments (and later into the newly established financial mechanisms) while further contributing to leverage and unlock additional funds from end-users**
- **18 additional infrastructure projects implemented per year**
- **possible higher investment volume and resulting generated savings per project**
- **about 180.000 € additional annual energy costs savings achieved**
- **proof provided to BiH based financial sector (government and commercial) that energy efficiency and renewable energy investments are economically and financially attractive and cost-effective**
- **425 man-months direct employment/"green jobs" generated per year**
- **3.900 tons of CO_2 emission reduced annually**
- **higher utilization rate of conducted detailed energy audits and implemented EE/RES projects**
- **at least 40 detailed energy audits conducted per year**
- **improved execution, coverage and outreach of GED's marketing campaign**
- **scaling-up and creation self-sustainability within energy efficiency and renewable energy related activities in BiH and contribution to BiH's EU accession and fulfilment of Energy Community Treaty obligations**

4.4.1. Expected CO_2 emission reduction and green job generation

Expected CO_2 emission reduction with SWEDEN's involvement in GED 2nd phase project is given below.

	2018	2019	2020	Total GED 2nd phase 2018 - 2020
CO_2 emission reduction with SWEDEN's involvement [t CO_2]	1,300	1,300	1,300	**3,900**

SWEDEN's involvement in GED project would result in enabling infrastructure projects to be implemented and thus additional CO_2 emission to be reduced – total 3,900 in the period 2018 - 2020. Namely, SWEDEN would contribute to additional 1,300 tCO_2 reduced annually, and 3,900 additional tCO_2 during project duration. Moreover, SWENED's involvement will directly contribute to the generation of 425 new green jobs in Bosnia and Herzegovina.

4.4.2. Remarks

- All funds provided by project parties involved in GED 2nd phase (Fund, SWEDEN, end-users/sub-national governments, UNDP) would go through UNDP. UNDP would be responsible for financial and project management assuring a transparent use of funds, clear and effective processes and political neutrality.
- All funds provided by third party/SWEDEN would, on an annual basis, be subject of external financial audit revision.
- Third party/SWEDEN's visibility obligations and guidelines would be fully respected within all GED 2nd phase activities, produced documents and raising awareness marketing campaign.

4.5. CONTRIBUTION TO FIVE PERSPECTIVES OF SIDA PRIORITIES

This chapter elaborates the contribution of the GED 2nd phase project to five perspectives of SIDA priorities – poverty reduction, conflict perspective, democracy/human rights, gender and anticorruption.

Poverty reduction

Green Economic Development 2nd phase project will contribute to poverty reduction in Bosnia and Herzegovina in several ways – green jobs generation which directly contribute to economic growth into sustainable poverty reduction, and increased and more efficient public investment in health, education and other priority social sectors.

By providing and leveraging additional investment in EE building retrofits (for the total of 5,6 million Euro over 20015-2016) the project has directly generated 1,6 million Euro in net salaries, including 600.000 Euro for low-skilled workers (i.e. the category of people who are more likely to be unemployed and face the risks of poverty[16]). Assuming minimum monthly wage for BiH of 202-210 Euro/month (as of January 2017), this translates into direct poverty reduction impact for at least 122 people (counting only net salaries for low-skilled workers).

Increased and more efficient public investment in health, education and other priority social sectors. BiH Mid-Term Development Strategy (Poverty Reduction Strategy Paper) calls for reorientation and increased efficiency of public spending in priority social sectors, such as health-care and education. GED project has provided a tangible and practical example how such reorientation can be achieved: as a result of GED project interventions, a total of 2,1 million BAM/year has been re-allocated from non-core expenditures in public services sectors (i.e. payment for energy bills by public building end-users) to investment in core activities, i.e. spent on procurement of new medical equipment, educational needs, etc, leading to increased share of the governmental spending on essential services, such as education and health. This corresponds to an increase in 0,1% of the total BiH expenditures for goods and services in public sector[17]. The GED 2nd phase will continue to build on this success since it will link energy efficiency and renewable energy with poverty reduction through contributing to reduced consumption of energy within public buildings and public utilities, which in turn creates savings in public budgets and subsequently unlocks capital for further public service delivery improvement.

Conflict perspective

GED 2nd phase project will apply a conflict-sensitive approach to its implementation, with consideration that the international community can support local peace-building through the role that energy efficiency can play in policy making, public service delivery, sustainable development, etc. Namely, the project will contribute to cooperation among BiH entities (RS and FBiH) and among

[16] Western Balkan Labor Market Trends 2017. World Bank 2017. Available at http://pubdocs.worldbank.org/en/336041491297229505/170403-Regional-Report-Western-Balkan-Labor-Market-Trends-2017-FINAL.pdf

[17] Estimated based on data from Public Expenditure and Financial Accountability Assessment. World Bank: 2014. Available at: https://openknowledge.worldbank.org/bitstream/handle/10986/20768/826460WP0P13180Report0Sept020140eng.pdf?sequence=1&isAllowed=y

cantons in FBiH, as well as municipalities thought BiH in order to assure a harmonized and common energy management system in BiH.

Democracy/human rights

A rights perspective has been considered in the project document design, specifically with regards to ensuring that public policies, legislation, financing mechanisms and service outcomes to be supported within the project are non-discriminative and offer equal opportunities (access to services, funding, employment opportunities) for all, regardless of their age, ethnic, sex or social status. Highly participatory approach in policy-making, legislating or funding assisted by the project reinforces the principle of transparency. Ensuring wide publicity in the course of project work and making publicly available policy deliverables and measurable results reinforces the accountability principle.

Adopting a human rights approach in the overall GED 2nd phase project implementation, thus conveying the message that universal access to energy services is becoming a common right of citizens globally. This also contributes to reducing discrimination in terms of access to energy services.

Gender

The project aims to create linkages between women's empowerment, sustainable energy and sustainable development since project-supported policy, regulatory and investment actions will consider gender equality and equal benefits for men and women in their application. A gender analysis is given in Annex 5.

Anticorruption

The project intents to further strengthen energy management decision making processes with clear allocation of responsibilities in the decision making process (methodology on selection of public sector buildings and public lightning systems for implementation of EE/RES infrastructure measures, further described in Annex 1), eligibly criteria for financing EE/RES projects and a clear and IT (EMIS) back-up monitoring of results (monetary cost savings and energy savings), which all contribute to the creation a transparent system with all parties involved.

Moreover, during project implementation UNDP's internal standard operating procedures and processes will assure anticorruption. Since 1996, UNDP has delivered more than 320 million USD in development assistance to Bosnia and Herzegovina. While UNDP finances some intervention activities with its core funds or other UN special-purpose resources, majority of its funding comes from partnerships with multilateral funds and bilateral donors, who recognize UNDP as a reliable and strategic development partner.

The UNDP operational system is composed of an accountability framework and an oversight policy. The accountability framework underscores the commitment of UNDP to results-based performance management, as well as to the shared values of accountability and transparency. The oversight policy of UNDP includes conducting independent internal and external audits providing assurances to the Executive Board and the Administrator that functional systems of internal controls are in place, including evaluation of the policy framework, efficient utilization of resources, and adherence to

professional and ethical standards. Government counterparts participate directly in the design, as well as in the implementation and monitoring of UNDP activities through joint project boards, regular meetings with project and programme staff to review the results achieved and to take decisions on future actions.

The Programme and Operations Policies and Procedures provide the operational standards and give procedural guidance on core business processes globally, and are the basis for all aspects of UNDP operations. UNDP also uses the Atlas software system as a results-based platform to support the management of projects, finances, human resources, inventory and procurement, and this forms the basis for UNDP's internal control and accountability framework. UNDP has a long-standing commitment to transparency, with Country Offices publishing financial, procurement and programme information annually. The Transparency Portal allows open, comprehensive public access to data on more than 4,000 active UNDP projects globally. The organisation has also adopted the International Public Sector Accounting Standards (IPSAS), as a significant step towards further enhancing UNDP's transparency and accountability.

V. PROJECT ARRANGEMENTS - MANAGEMENT & REPORTING

5.1. MANAGEMENT ARRANGEMENTS

UNDP's role

Management Arrangements of the Green Economic Development 2nd phase project are already in place. UNDP Country Office in Bosnia and Herzegovina is the Implementing Entity for the project and would be accountable to SWEDEN for the disbursement of funds. Working closely with project partners (Environmental Funds), UNDP will be responsible for: (i) providing project assurance services (ii) recruitment of project staff and contracting of consultants and service providers; (iii) overseeing financial expenditures against project budgets; and (iv) ensuring that all activities including procurement and financial services are carried out in strict compliance with UNDP procedures. A UNDP Project Manager is already assigned with the responsibility for day-to-day management and control over project finance.

UNDP Country Office in Bosnia and Herzegovina will provide full support to the national project implementation and will assume full responsibility and accountability for the overall management, including monitoring and evaluation of project interventions, achievement of project outputs and specified results, and the efficient and effective use of resources18.

The UNDP country office shall provide support services for the Project as follows: (i) HR activities including recruitment of project personnel, issuance of project personnel contracts etc.; (ii) process of undertaking procurement processes for acquiring of project goods and services; (iii) financial transactions; etc. The UNDP Country Office in Bosnia and Herzegovina offers the following dedicated staff capacity for project implementation support in the area of environment and energy: (i) Energy and Environment Sector Leader who oversees programme implementation on daily basis, including quality assurance and monitoring and evaluation; (ii) Programme Support Officer - reviews the budgets and monitors project delivery status; (iii) Head of Operations Unit - assures compliance with overall fiduciary standards of UNDP; (iv) UNDP Resident Representative, who shall liaise with high-levels of with the Government and will negotiate key policy changes proposed by the project.

UNDP Bosnia and Herzegovina will maintain the oversight and management of the overall project budget. It will be responsible for monitoring project implementation, timely reporting of the progress to SWEDEN, as well as organizing mandatory and possible complementary reviews and evaluations on an as-needed basis. It will also be responsible for procurement of the required expert services and other project inputs and administer the required contracts. Furthermore, it will support the co-ordination and networking with other related initiatives and institutions in the country.

18 The roles and responsibilities for the implementation of the project will be in line with the global UNDP User Guide on Program and Project Management for Results which defines minimum requirements for ensuring accountability for programmed activities and use of resources.

Environmental Funds' role

The Environmental Funds' in BiH are project implementation partners whose role is to develop capacities and gradually contribute more and more to project implementation activities as their skills raise during project implementation. Environmental Funds' representatives work on daily basis together with UNDP project staff, where technical assistance in the field of energy efficiency, energy management and management of EMIS (*Energy Management Information System*), understanding of Laws, by-laws and EU directives is provided. Environmental Funds' absorb the assistance in the form of consultative, advisory and technical support, through annual training for Fund staff and project implementation and skills development via on the job training/assistance on all phases of project.

Environmental Protection Fund of FBiH

The Environmental Protection Fund of FBiH derives its operating income mainly from fees charged to polluters and natural resources users, as well as from fees levied on motor vehicle registration and donor funds from international cooperation. Total income for the Fund amounted to about BAM 60 million (about EUR 31 million) in 2016. The Fund has about 35 employees, and the administrative budget represents 6.7% the Fund's annual income. It has implemented 800 projects over the 2010 – 2017 period.

The Fund requires at least 20% co-financing by the end-user of a project (30% is required if the end-user is a private sector entity). The Fund is managed by a Steering Committee/Management Board and controlled by the Supervisory Board. The day-to-day operations are managed by the Director, who is appointed and by the Management Board with the approval of the Government of FBiH. The Fund is audited by auditors appointed by the Federation.

The Fund is administratively, economically and technically capable of working with energy efficiency and already participates in the GED Project. UNDP has entered into a five year agreement with the Fund to implement the GED Project.

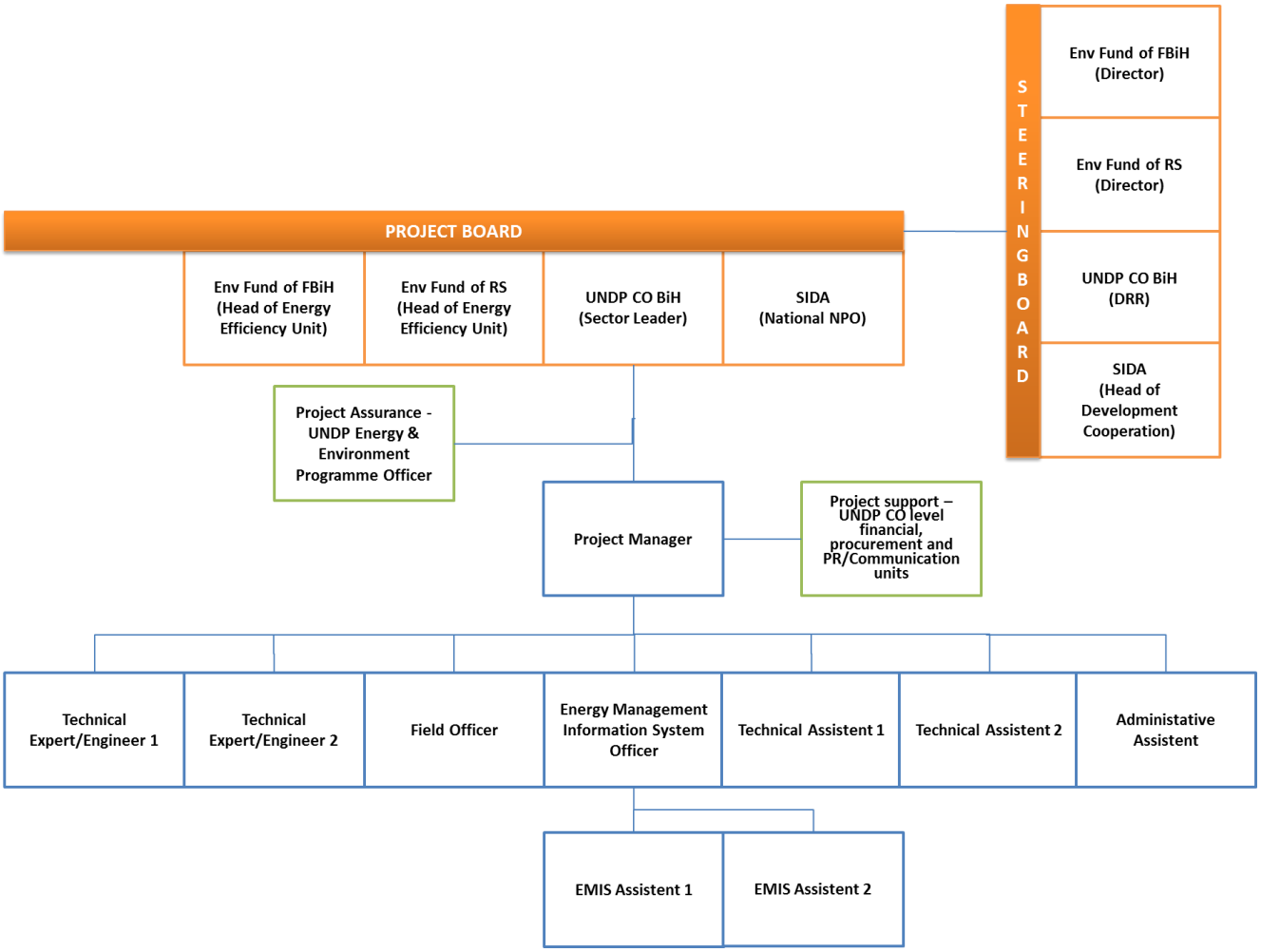
Environmental Protection and Energy Efficiency Fund of RS

The Environmental Protection and Energy Efficiency Fund of RS currently has only one income source, which is an allocation of 10% of the feed-in tariff that is accorded to energy producers that utilise renewable energy sources. The Fund is also to be allocated 15 % of the proceeds from the water protection fees levied in RS on owners of motor vehicles, once this mechanism is enforced (which is expected beginning of 2015). Other potential sources of income are 'polluter pays' fees and fees for waste disposal as well as donor funds. Total income for the Fund amounted to about BAM 6 million (about EUR 3 million) in 2016. The Fund has around 30 employees.

The Fund requires at least 30% co-financing by the end-user of a project. So far, the Fund has only financed projects related to water quality, mainly in the private sector. The Fund is managed by the Steering Committee, which consists of seven members that are appointed by the Government of RS.

The members are representatives of relevant ministries and authorities. The Director of the Fund is appointed by the Government of RS on the basis of a public competition.

Project Organizational Structure



Steering Board

The Steering Board has been established under the GED project, with SWEDEN involvement in the project. The Steering Board is the highest-level body and as such responsible for the strategic alignment of activities under the GED 2nd phase project with relevant policies of organizations involved, and can act as the body which activities removes barriers, if occurred.

The Steering Board will consist of the following roles:

- Executive role - UNDP Deputy Resident Representative;
- SWEDEN, Head of development cooperation;
- Environment Funds of FBiH and RS, Directors of Environmental Funds.

The Steering Board will meet once a year, or as necessary when raised by the Project Board, to review strategic alignment of project activities, progress and discuss on project plans.

Project Board

The Project Board is the group responsible for making management decisions through consensus for a project when guidance is required by the Project Manager, including giving recommendations for UNDP/Implementing Partner approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance to standards that shall ensure management for development results, best value for money, fairness, integrity, transparency and effective international competition. The Project Board plays a critical role in commissioned project evaluations by quality assurance the evaluation process and products, and using evaluations for performance improvement, accountability and response actions. This group is consulted by the Project Manager for decisions when Project Manager's tolerances (normally in terms of time and budget) have been exceeded (flexibility). Based on the approved UNDP's annual work plan (AWP), the Project Board may review and approve project quarterly plans when required and authorizes any major deviation from these agreed quarterly plans. It is the authority that signs off the completion of each quarterly/annual plan as well as authorizes the start of the next quarterly/annual plan. It ensures that required resources are committed and arbitrates on any conflicts within the project or negotiates a solution to any problems between the projects and external bodies.

The Project Board will consist of the following roles:

- Executive, representing project ownership, and acting as chair of the board, in this case, the UNDP Energy & Environment Sector Leader;
- SWEDEN, National NPO;
- Environment Funds of FBiH and RS, Heads of Energy Efficiency Units;
- MoFTER, head of energy Unit.

A Project Board has been established at the inception of the project to monitor project progress, to guide project implementation and to support the project in achieving its listed outputs and outcomes. The Project Board will be enlarged with SWEDEN representative. The Board will meet regularly (at least once a year), or as necessary when raised by the Project Manager, to review project progress, discuss and agree on project work plans.

Project Assurance

Project Assurance is the responsibility of each Project Board member. However, the Project Board might create detailed instructions how to perform the project assurance. The project assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance has to be independent of the Project Manager. Therefore, the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. The role of Project Assurance will be performed by the UNDP Energy & Environment Programme Officer.

Project Management and project team

The Project Manager has the authority to run the programme on a day-to-day basis on behalf of UNDP BiH. The Project Manager has the responsibility to ensure that the programme produces the required results that are capable of achieving the benefits defined in this document. He is responsible for day-to-day management and ensures that the project produces the results specified, to the required corporate standards and within the constraints of time and cost. The GED 2nd phase project will have one National Project Manager. The project currently employs a core team of one senior technical expert, one EMIS officer, two technical assistants and two EMIS assistants to support the successful project implementation and actions outlined in this document. One additional Technical Expert and one Field Officer will be engaged to support the intensive organization, coordination and delivery of GED 2nd phase project. Project administrative assistance is ensured by one full-time post.

The project personnel is selected on a competitive basis in accordance with the relevant UNDP rules and procedures.

Other expertise and resources

The project deploys expertise in various fields as the need arises, in accordance to GED 2nd phase project activities. Equipment and vehicles are already in place. Accordingly, no financial resources from SWEDEN will be invested in purchasing of new equipment or assets.

5.2. MONITORING AND EVALUATION

UNDP introduced results-based management as its corporate management approach, so that performance at the level of development goals and outcomes is systematically measured and improved. In that sense, monitoring and evaluation are key factors in helping improve performance and achieve results. Monitoring and evaluation will be performed through the analysis of the results-based quantitative and qualitative indicators outlined in the Project's expected results framework (Annex 3).

The main tools for organising the project monitoring system encompass a series of main documents, providing baseline and target quantitative and qualitative indicators, more particularly:

- Logical Framework (as described within Annex 2 of this project document);
- Result and Risk Matrix (as described within Annex 3 of this project document);
- Annual Work Plans, Quarterly Work Plans, detailed financial annual and quarterly plans (in accordance with UNDP standards).

The project will adopt the following reporting modalities:

- Annual Narrative Report prepared by the project and submitted to SWEDEN;
- Annual Financial Report prepared by the project and submitted to SWEDEN;
- External mid-term project evaluation prepared by independent consultant/s and engaged by SWEDEN;
- Final Project Narrative Report prepared by the project and submitted to SWEDEN;
- Final Project Financial Report prepared by the project and submitted to SWEDEN;
- Final project evaluation prepared by independent consultant/s and submitted to SWEDEN.

Furthermore, Annual Project Reviews will be held late each year and will be initiated by the Project Board and may involve other project stakeholders as required. It shall focus on the extent to which progress is being made towards outputs, and that these remain aligned to appropriate outcomes.

Project evaluation will look at the efficiency, effectiveness, sustainability, and relevance of the project objectives. Such analysis will ensure that quantitative results and achievements based on practical experience are not forgotten, as well as that the project builds upon lessons-learnt, sustains positive results and replicates successful initiatives.

A major mid-term project review will be undertaken in late 2019 in order to provide feedback from stakeholders, and if needed, allow adjustments to the project by the Project Board. The mid-term project review shall also be used to identify and evaluate potential SWEDEN's potential continuation of support.

An independent final project evaluation will be conducted in first quarter 2021, so as to examine the overall project`s effectiveness, efficiency, sustainability, achievements, as well as capture lessons

learnt and provide strategic recommendations for consolidation and/or exit-phase of the intervention.

GED 2nd phase project indicators, outputs and outcomes are reflected in the One United Nations Programme / United Nation Development Assistance Framework (2015 – 2019) for Bosnia and Herzegovina, as well as within UNDP's Country Programme Document (2015 – 2019) for Bosnia and Herzegovina.

VI. RESPONSE TO THE RECOMMENDATIONS OF SIDA'S APPRAISAL COMMITTEE

This chapter provides responses to SIDA's appraisal committee for the Green Economic Development 2nd phase project which had to be further addressed while submitting the final Project Document.

- **Detailed explanation on how this project supports the BIH's EU accession path as well as obligations which BIH has towards EU membership**

Response:

EU integration is crucial to Bosnia and Herzegovina's pursuit of democracy, rule of law and sustainable economic development. However, due to its administrative complexity, political lock-down and lack of human and financial resources, Bosnia and Herzegovina needs substantial assistance on its path to EU accession in form of capacity building and strengthening of EU related processes and the transposition of EU directives into national legal framework.

If EU directives and primary and secondary legislation on energy efficiency and renewable energy are expected to be enforced in BiH, it is essential that lower level governments understand BiH's obligations on targeted energy savings, in particular goals set for public buildings, and develop energy management decision making capacities within their jurisdictions. In the BiH given complex administrative context, only if municipalities, and cantonal and entity line ministries, have an understanding and are enabled to manage energy related issues, Bosnia and Herzegovina will be able to fulfill its multilateral obligations and create sustainability of required EE / RES undertakings in the public sector.

The Green Economic Development 2nd phase project will contribute to BiH's EU accession process, targeting the EPBD (Energy Performance Building Directive), EED (Energy Efficiency Directive) and RES (Renewable Energy Directive) directives by enabling entity Environmental Protection Funds to monitor, analyze and evaluate energy consumption, costs, emission, energy investments and savings data from public sector buildings, as well as to support BiH's related energy efficiency and renewable energy targets (in accordance with the Energy Community Treaty and its obligations) by providing financial support to EE/RES infrastructure projects and contributing to enable a favorable environment for EE/RES investments in BiH. Moreover, the state of BiH (MoFTER) would be empowered with consolidated, valuable and reliable data for further submission to Energy Community Secretariat and other multilateral agreements (for example – United Nation Framework Convention on Climate Change).

Energy Efficiency Directive (EED)

EU members states have accepted BiH's membership application, but still the European Commission needs to determine whether BiH meets criteria to become a candidate country. Therefore, it is not yet mandatory to implement most EU directives in BiH, including the EU Energy Efficiency Directive (EED). However, looking to the future it is important that BiH plans for accession when full implementation of the EU acquis will be required. Furthermore, BiH has signed the Energy Community Treaty that requires it to implement Article 5 of the EED, which concerns the renovation of public buildings. The deadlines for implementation and scale of the energy savings to be delivered in BiH differ from the text of the EED, but the scope remains the same in terms of renovating a certain

percentage of specific government buildings each year to meet at least the minimum energy performance requirements.

According to the Article 5 of EE Directive, CP's must ensure that, as from 1 December 2017, 1% of the total floor area of heated and/or cooled buildings owned and occupied by their central government is renovated each year to meet at least the minimum energy performance requirements set out in the recast EPBD. The 1% should be calculated on the total floor area of buildings with a total useful floor area over 500 m2 owned and occupied by the central government that do not meet the national minimum energy performance requirements. This threshold will be lowered to 250 m2 as of 1 January 2019.

As a first step towards implementing Article 5, the scope of Central Government buildings must be defined, which was supposed to be implemented by the beginning of 2017. As it can be seen, this deadline has already passed. The Green Economic Development 2nd phase project will contribute to implementation of Article 5, especially in establishing inventory of central government buildings, since all data from EMIS and from conducted Typology for Public Buildings in BiH could be a useful basis for public inventory. The scope of the public inventory is specified in EED, including:

- A list of all central government buildings, as per the definition;
- For each building:
    - its floor area expressed in square meters; and
    - data on the energy performance, or relevant energy data - this means data on energy consumption or total energy use, or data from Energy Performance Certificates (EPCs).

Article 5 targets public buildings that do not meet minimum energy performance requirements. In relation to setting these requirements, Articles 4 and 5 of EU Energy Performance of Buildings Directive (EPBD) (31/2010/EU) set out specific actions:

- Take the necessary measures to ensure that minimum energy performance requirements for buildings or building units are set with a view to achieving cost-optimal levels[19].
- Differentiate between new and existing buildings and between different categories of buildings.
- Calculate cost-optimal levels in accordance with the comparative methodology framework in the European Commission guidance[20]. The cost optimal methodology is a tool to facilitate a smooth transition towards nearly zero energy buildings (NZEB).
- Report on the comparison between the existing minimum energy performance requirements with the calculated cost-optimal levels.

BiH has not submitted its first report on cost-optimality to the Energy Community Secretariat yet, since calculations on cost-optimality for residential buildings are in process of adoption (activities financed

19 The cost-optimal level is defined in Article 2.14 of the EPBD as "the energy performance level which leads to the lowest cost during the estimated economic lifecycle"

20 Guidelines accompanying Commission Delegated Regulation (EU) No 244/2012 of 16 January 2012 supplementing Directive 2010/31/EU of the European Parliament and of the Council on the energy performance of buildings by establishing a comparative methodology framework for calculating cost-optimal levels of minimum energy performance requirements for buildings and building elements

by GiZ BiH), while calculations on cost-optimality for public buildings need to be done in near future, and will be financed through GED 2nd phase project (as the logical follow up after finished Typology for Public Buildings in BiH which was financed by GED project). This will enable BiH to re-define its secondary legislation related to EPBD directive and to define new and accurate energy classification of public sector buildings as well as to introduce more strict levels of energy requirements for new and buildings which are going through retrofits.

According to the Article 4 of EE Directive, Contracting Parties shall establish a long-term strategy for mobilizing investment in the renovation of the national stock of residential and commercial buildings, both public and private. According to the unofficial draft version of NEEAP BiH, a first version of the strategy shall be published by 30 November 2018 and updated every three years thereafter and submitted to the Energy Community Secretariat as part of the National Energy Efficiency Action Plan.

In fourth quarter of 2017, GIZ, USAID and UNDP established Joint Energy Efficiency cooperation and coordination of their activities with regards to the transposition of the Energy Efficiency Directive in BiH within their scopes of work, to develop a joint approach to EE public outreach, as well as to cooperate and coordinate other activities related to the Energy Efficiency in BiH.

Moreover, essential tools for the implementation of the obligations defined in the Energy Efficiency Directive, that will be developed is *Measurement and verification (M&V) module within EMIS in order to facilitate p*erformance based granting scheme and ESCO scheme in line with:

i) EED, Annex V: Common methods and principles for calculating the impact of energy efficiency obligations schemes or other policy measures under Article 7(1), (2) and (9) and Article 20 (6) (b) metered savings, whereby the savings from the installation of a measure, or package of measures, is determined by recording the actual reduction in energy use, taking due account of factors such as additionality, occupancy, production levels and the weather which may affect consumption. The generic approach is termed 'ex-post';
ii) EED, Annex XIII: Minimum items to be included in energy performance contracts with the public sector or in the associated tender specifications. Clear and transparent provisions on measurement and verification of the guaranteed savings achieved, quality checks and guarantees.

Energy Performance of Buildings Directive (EPBD)

For the transposition of Directive 2010/31/EU, Republika Srpska adopted in May 2013 the Law on Physical Planning and Construction. This Law includes the main requirements of the Directive (definitions, minimum energy performance requirements for new and existing buildings, certification of buildings etc.) and creates a basis for further transposition of Directive 2010/31/EU through secondary legislation. In the Federation of Bosnia and Herzegovina, the Law on Physical Planning and Land Utilization was adopted in 2010. Under this general framework, secondary legislation on methodology for calculation of energy performance of buildings, energy audits of buildings and energy certification of buildings has been adopted, and implementation started. A training scheme for energy auditors and authorized companies for certification of buildings is in place.

The degree of compliance with Directive 2010/31/EU on the energy efficiency in buildings differs between the entities. Overall, Bosnia and Herzegovina still fails to comply with that Directive.

In the Federation of Bosnia and Herzegovina the Directive's requirements related to calculation methodology for minimum energy performance of buildings, energy audits and energy certification of buildings are already transposed through the existing Law on Physical Planning and Land Utilization, as well as respective by-laws. However, certain issues related to the Directive still need to be completed, i.e.:

- cost-optimal calculations,
- calculation methodology should include all the aspects which determine the final and primary energy consumption of the buildings,
- definition and plans for achievement of nearly zero-energy buildings,
- regulation on inspection of heating and air conditioning systems, etc.

Directive 2010/31/EU was transposed in Federation of Bosnia and Herzegovina by the 2017 Energy Efficiency Law, the 2013 Law on Physical Planning and Land Utilization and several bylaws. In Republika Srpska, the key requirements of Directive 2010/31/EU were implemented by the 2013 Law on Physical Planning and Construction, including the setting of minimum energy performance requirements of new and existing buildings, certification of buildings and energy audits of buildings.

Nearly Zero-Energy Buildings

The EPBD also contains an important provision regarding nearly zero-energy buildings. These are buildings which have both very low energy inputs and are able to meet the new energy requirements using renewable energy sources. The EPBD requires all EU newly constructed buildings to achieve near zero-energy status by 31 December 2020. This requirement is brought forward to 31 December 2018 if the building is occupied and owned by public authorities. Member States are also responsible for a system of certification of the energy performance of buildings, which must include information on the energy performance of a building and the reference values for that category of building.

Article 9 (2) of the EPBD requires Member States to, "*following the leading example of the public sector, develop policies and take measures such as the setting of targets in order to stimulate the transformation of buildings that are refurbished into NZEBs, and inform the Commission thereof in their national plans…*".

Nearly zero-energy buildings are not defined in enforced regulation in BiH, and the one of the activities of the Green Economic Development Project in 2nd phase will be drafting /updating regulation regarding definition of the Nearly Zero-Energy Public Buildings with the aim to start advocating and communicating the required Nearly zero-energy buildings approach in BiH.

Moreover, without SWENED's involvement in GED 2nd phase Bosnia and Herzegovina would further continue to miss the introduction of EU EPBD directive part which requires that every new public building from the year 2018 has to be of Net Zero Energy Building Standard. BiH will not be able to coper with the directive's requirement during project implementation but the GED 2nd phase project will start to define and communicate its goals and obligation into BiH's legal environment and among BiH stakeholders.

Renewable Energy Directive

BiH has submitted in April 2017 to the Energy Community Secretariat its *National Renewable Energy Action Plan* (NREAP). According to the NREAP - within the heating and cooling sector, an increase in

the share of renewable energy sources from 805.8 ktoe in the base year is forecasted to be 1085.2 ktoe in 2020. This share of energy from renewable sources will be increased from 43.3% to 52.4%, an increase of 9.1%. The goal in the heating and cooling sector for Bosnia and Herzegovina is based on the parameters from the entity action plans where these targets for 2020 are set. In order to achieve the set goals in the heating and cooling sector in Bosnia and Herzegovina by 2020, besides using biomass for domestic heating, it is also necessary to use other forms of renewable energy that have not been sufficiently used so far, with the aim reducing the share of energy from fossil fuels.

Therefore, based on the National Renewable Energy Action Plan of BiH, and the entity action plans, the goal to utilize solar and biomass energy is clearly marked, which is one of the planned activities under infrastructure (PC4) works of GED 2nd phase. The project will directly contribute to this goals by setting up public sector buildings with PV and solar thermal systems, contribute to the targets sets in the National Renewable Energy Action Plan.

The above-mentioned activities and financial mechanisms which will be developed through defined project activities, are related to creation of favorable market opportunities for investing in energy efficiency and are in line with the mentioned EU Directives. Activities related to technical assistance, provided by GED 2nd phase project to BiH authorities as a direct contribution support for BIH's EU accession, are given in a Table 2.

Table 2. Activities related to technical assistance to BiH authorities as a direct contribution support for BIH's EU accession

Description	Activity	Implementation	Technical Assistance
1. Building Renewal Strategy (Article 4 EED & Article 5 EPBD)	Article 4 of the EED, which concerns the reconstruction of buildings, requires Member States to establish a long-term strategy for mobilizing investments in the reconstruction of national stock of residential and business facilities, both public and private. Such renewal strategy supports and reinforces many of the EED and EPBD requirements.		
1.1 Determining the typological framework and the cost justification of the implementation of measures planned for the renovation of buildings (EPBD ANNEX I, ANNEX III, Commission Delegated Regulation 244/2012, ANNEX I - Cost – optimal methodology framework)	There is a need to establish a framework for increasing energy efficiency and reducing energy consumption in the construction sector, which implies the creation of a typological framework for the building fund and the introduction of criteria for cost optimization for the implementation of measures in that sector. It is necessary to create typologies of residential and public buildings in Bosnia and Herzegovina, while the introduction of the typology results in the framework of the energy characteristics of buildings should be done by the competent ministries. It is also necessary to introduce criteria of cost justification of the implementation of measures planned for the renovation of buildings, in accordance with the existing competencies.		
	Activity 1.1.1: Development of typology of residential buildings	Finished in December 2016	GIZ developed Typology of residential buildings
	Activity 1.1.2: Development of typology of public buildings	Finished in June 2017	GED project developed Typology of public buildings
	Activity 1.1.3 (Activity 6 in ProDoc): Determination of cost-optimal levels for implementation measures in buildings	Implementation starts from 2018	It is necessary to conduct Cost-optimal analysis for public buildings
2. Buildings of central authorities as example model (Article 5 of the EED)	Buildings owned or managed by central authorities represent a small portion of the total stock of buildings of the BiH or the member states of the EU or the Energy Community. However, it is important to begin implementing these measures, bearing in mind that the public sector must be an example to other sectors in the implementation of these measures. It will create opportunities for construction companies and opportunities for new job creation, and it will contribute to the accelerated development of the energy services market.		
	Article 5 of the EED, adapted to the requirements of the countries that are Energy Community signatories, requires central governments to renew each year 1% of the total area of central		

Description	Activity	Implementation	Technical Assistance
2.1 Refurbishment of central government buildings	government buildings that do not meet the minimum energy efficiency requirements established by the EPBD on energy efficiency of buildings, at least to the level of efficiency set out in the application of this Directive. Bosnia and Herzegovina, as well as all other parties to the Energy Community Treaty, have obligation to establish and publish a list of all relevant buildings in this category, and begin the process of their renewal of 1% per annum.		
	Activity 2.1.1: Public building inventory	Implementation starts from 2018	It is necessary to establish inventory of public buildings owned and used by the central authorities (to define floor area and data on energy consumption or total energy use).
	Activity 2.1.2: Establishing calculation baseline	Implementation starts from 2018	Based on established inventory of public buildings owned and used by the central authorities and data on energy consumption it is necessary to define the annual goals for the reconstruction of public buildings owned and used by the central authorities.
	Activity 2.1.3: Creation of operational plans for the renovation of buildings owned by central authorities	Implementation starts from 2018	Carriers of obligations under Article 5 of the EED in BiH and its entities will prepare operational plans for the renewal of buildings owned by the central authorities for a period of five years, taking into account the realization of the objectives defined in the previous activity.
2.2 Measurement and verification (M&V) module within EMIS & performance based granting scheme and ESCO scheme	Essential tools for the implementation of the obligations defined in the Energy Efficiency Directive, that will be developed is Measurement and verification (M&V) module within EMIS in order to facilitate performance based granting scheme and ESCO scheme in line with: i) EED, Annex V: Common methods and principles for calculating the impact of energy efficiency obligations schemes or other policy measures under Article 7(1), (2) and (9) and Article 20(6) (b) metered savings, whereby the savings from the installation of a measure, or package of measures, is determined by recording the actual reduction in energy use, taking due account of factors such as additionality, occupancy, production levels and the weather which may affect consumption. The generic approach is termed 'ex-post'; ii) EED, Annex XIII: Minimum items to be included in energy performance contracts with the public sector or in the associated tender specifications. Clear and transparent provisions on measurement and verification of the guaranteed savings achieved, quality checks and guarantees.		
	Activity 2.2.1 (Activity 5 in ProDoc): Measurement and verification (M&V) module within EMIS	Implementation starts from 2018	Development of an M&V EMIS module that communicates with EMIS will transform this approach into an investment grade tool for energy performance contracting in the public sector (public buildings and public lighting).
3. Nearly Zero Energy Buildings - NZEB (Article 2 (2) and Article 9 (1) of the EPBD)	The EPBD also contains an important provision regarding nearly zero-energy buildings. These are buildings which have both very low energy inputs and are able to meet the new energy requirements using renewable energy sources. The EPBD requires all EU newly constructed buildings to achieve near zero-energy status by 31 December 2020. This requirement is brought forward to 31 December 2018 if the building is occupied and owned by public authorities. Member States are also responsible for a system of certification of the energy performance of buildings, which must include information on the energy performance of a building and the reference values for that category of building.		
	Activity 3.1.1. (Activity 2 in ProDoc):	Implementation starts from 2018	As EU directives are expected to be enforced in BiH it is necessary

Description	Activity	Implementation	Technical Assistance
3.1 Definition of the Nearly Zero-Energy Public Buildings	Capacity building for Nearly Zero Energy Buildings - NZEB and for understanding of RE in public sector building		that governments at all levels, municipalities, Energy Service Companies (ESCOs), public facilities, building owners, public utilities, small and medium enterprises, producers, distributors, installers, as well as engineers and professionals understand NZEB policy and legislation but also to understand the needs of existing building stock to be renovated to the NZEB energy performance standard.
	Activity 3.1.2. (Activity 7 in ProDoc): Definition of the Nearly Zero-Energy Public Buildings	Implementation starts from 2018	NZEB are not defined in enforced regulation in BiH, and the one of the activities of the GED 2nd phase Project will be drafting /updating regulation regarding definition of the Nearly Zero-Energy Public Buildings with the aim to start advocating and communicating the required Nearly zero-energy buildings approach in BiH.
4. Directive on the promotion of the use of energy from renewable sources (Article 3 and Article 14 of the RED)	Article 3 of the RED, requires Member States to ensure the share of energy from renewable sources in gross final consumption of energy in 2020. Article 14 requires Member States to ensure that information on support measures is made available to all relevant actors, such as consumers, builders, installers, architects, and suppliers of heating, cooling and electricity equipment and systems and of vehicles compatible with the use of energy from renewable sources. As well as the information on the net benefits, cost and energy efficiency of equipment and systems for the use of heating, cooling and electricity from renewable energy sources is made available either by the supplier of the equipment or system or by the national competent authorities.		
4.1 Mandatory national overall targets and measures for the use of energy from renewable sources (Article 3) & Information and training (Article 14)	There is a need to increase the share of energy from renewable sources in gross final consumption of energy in Bosnia and Herzegovina according to the targets set up in the National Renewable Energy Action Plan (NREAP) of Bosnia and Herzegovina. There is a need for information sharing and trainings to all relevant actors in renewable sector.		
	Activity 4.1.1 (Activity 2 in ProDoc): Capacity building for renewable energy and different technologies	Implementation starts from 2018	GED project will provide for end users of public sector buildings training courses on renewable energy, covering solar thermal, solar photovoltaic, ground source heat pump, biomass etc. The course will address the fundamentals, as well as deep knowledge in renewable energy technologies, their implementation and impact on the environment. Social, economic and legal aspects will be covered as well.
	Activity 4.1.2 (Activity 14 in ProDoc): Implementation of infrastructural energy efficiency and renewable energy measures in BiH	Implementation starts from 2018	The GED project will directly contribute to the targets set up in the NREAP and the entity action plans by setting up public sector buildings with PV, solar thermal systems, and biomass as well, contribute to the targets sets in

Description	Activity	Implementation	Technical Assistance
			the National Renewable Energy Action Plan.

- **Elaborate on how project contribute to 5 perspectives of SIDA priorities: Poverty reduction, Conflict perspective, democracy/human rights, gender and anticorruption**

Response:

The elaboration on how the project contributes to five perspectives of SIDA priorities in given in the chapter 4.5. of this document.

- **Outreach and communication component to be further refined in order to reach adequate audience, such as general public, politicians and decision makers as well as media. Suggestion is that UNDP consult with two Communication experts from Sweden when developing communication strategy for the Project.**

Response:

GED 2nd phase will combine outreach with advocacy activities to obtain politicians and key decision-makers buy-in and support for the energy efficiency projects. The BiH public building stock needs substantial retrofit to meet carbon reduction targets. Thus, it is critical that politicians and decision-makers understand the overall scale of the energy efficiency opportunities and the associated benefits. GED 2nd phase will improve decision makers knowledge of respective EU energy efficiency directives, laws and bylaws so they have better understanding of the overall concept. To increase decision makers interest and financial contribution, the focus will be on raising their awareness and knowledge on benefits EE projects bring to municipalities, citizens, economic development, carbon reduction targets and country in fulfilling the EU requirements. Since the level of funding allocated to energy efficiency projects is a political decision, completed infrastructure projects and success stories will be promoted so it can help decision makers to clearly see the benefits. GED 2nd phase will further promote energy efficiency and the use of renewable energy sources of such projects to increase the decision-makers' knowledge how important EE projects are for municipalities/cantons as well as the adoption of energy management related plans. Various communications activities will be deployed to engage with politicians and key decision-makers such as advocacy to support enforcement of the NZEB and RES legislation, workshops (EMIS), trainings (NZEB), thematic round tables, exhibitions in parliament, government or municipal buildings, etc.

The role of the **media** is critical in promoting positive effects of energy efficiency and renewable energy sources to general public. To have successful media relations the Communications Strategy will cover a Public Relations segment too. To alleviate journalist's knowledge about energy efficiency, NZEB, RES, public lighting, financing energy efficiency measures, GED 2nd will organize customized media trainings. Also, the media representatives will be invited to take part in press tours to see the results of the GED 2nd phase. The journalists will visit kindergartens, schools, hospitals and other public institutions which were retrofitted and where it is easy to determine that the positive impacts of EE measures are real. The press tours will be organized in cooperation with the local authorities to highlight the results of energy efficiency measures and to showcase how saved public funds (through

EE projects) were reinvested in the local communities. To simplify information for the media representatives, GED 2nd will think how the information can be visualized (tables, videos, images) in order to increase the engagement with journalists.

GED 2nd phase will give higher priority to **general public** - adults, house owners, BiH citizens in general. To change citizen's energy-use behaviors the awareness campaign will address barriers to change, as well as making the behaviors easy, convenient, and socially desirable. The GED 2nd phase will promote the positive effect energy efficiency measures and usage of renewable sources have on the economic development, domestic employment, wellbeing of citizens, public budget savings and protection of the environment. Public officials and staff where the EE measures were implemented will be encouraged to promote benefits of implemented measures in their municipalities and through media outlets as they know what it means to have a building that is energy efficient. Promotional and educational materials will be customized using consumer segmentation (low income families, householders, residential flat owners, office saving tips, etc.) what drives consumer attitudinal reactions, emotional appeal.

Prior to the development of Communications Strategic Plan, GED 2nd phase project will obtain feedback of each target audience on campaign design and potential effectiveness. Through focus groups/meetings the input will be gathered from politicians, decision makers, public officials, municipal staff, journalist, representatives of public buildings that were retrofitted, energy experts, citizens that are aware of energy efficiency benefits, citizens that are skeptical of energy efficiency benefits, youngsters, civil sector. During the Communications Strategy development process, UNDP will consult Communication experts from Sweden.

- **Detailed gender analyses**

Response:

The Gender Analysis of GED 2nd phase project is given in Annex 5.

- **Explain how different levels of society participate in the project (entity, cantons, EFs, municipalities), given that there is a lot of co-funding by local institutions and many interlinked activities.**

Project consists of various activities that are interlinked, and are in strong correlation and interdependency with each other and Project Components. Participation of different levels of society in the Project Components Activities, is shown in a simplified table below (Table 3).

Table 3. Participation of different levels of society in the Project Components Activities

	Capacity Building & legal Framework (PC1)	Institutionalization of energy management (PC2)	Legislative framework - financial mechanisms (PC3)	Infrastructure measures (PC4)	Public awareness (PC5)	RES solutions for off-grid households (PC6)
MoFTER / State level	✓	✓	✓	✓	✓	✗
EF's / Entity level	✓	✓	✓	✓	✓	✗
Cantons / Ministries	✓	✓	✓	✓	✓	✗ ✓***
Municipalities	✓	✓	✓	✓	✓	✗ ✓***

Public end-users	✓	✓	✗✓ *	✓	✓	✓
SME's	✓	✗	✓	✗✓ **	✓	✗
Wider society	✓	✗	✗✓*	✗	✓	✗

* Public end-users and wider society are not directly involved in drafting legislative documents and development of financial mechanisms for EE and RES, but public building users are able to use the established financial mechanisms, while the wider society will be in the long run (namely in residential sector).

** Infrastructure measures for SME's are currently not supported directly by co-financing through GED project, but EE measures for SME's are supported by soft loans through established EE Revolving Fund.

*** RES solutions for off-grid households will be financed by GED 2nd phase project, but wherever possible and feasible, GED Project will seek for other party co-financing (municipalities, local organizations etc.).

S**tate level**, activities with the Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina (MoFTER) officially started in October 2017, primarily on the institutionalization of energy management, energy monitoring, reporting mechanisms and capacity building. These activities, will enable directly or indirectly implementation of all other activities within Project on the short/mid-term i.e.: EE Action Plan for public buildings on state level, Decision on mandatory data entry and regular reporting for end users, EE investments in public buildings on state level directly through co-financing or Revolving Funds (EF's), public awareness, etc.

Entity EF's are key partners in implementing the Green Economic Development (GED) Programme in all project components and activities. EF's have crucial role in Project sustainability and legislative development processes. Law on Energy Efficiency, related by-laws based on EU's EPBD, EED and RE directives, identifies EF's in both entities as responsible institutions to: i) monitoring energy consumption and savings, ii) supporting EE/RES targets, iii) supports the implementation of EE/RES projects. The Law on EE (it's by-law) also incorporates EMIS as one of IT tools to monitor and report on energy consumption. Based on the methodology, decision making process flows efficiently for the last 5 years, there is a total number of about 4.000 public sector buildings in EMIS. The Revolving Fund on EE has been established and operationalized in FBIH which provides soft loan to BiH's SMEs and public authorities to co-finance EE projects. Infrastructure measures for SME's are currently not supported directly by co-financing through GED project, only with soft loans through Revolving Fund. Moreover, currently, and throughout the GED 2nd phase project implementation period, various legislative processes are on-going which are aligned and in favour of GED 2nd phase project's sustainability and creation of financial mechanisms within Environmental Funds, and which will also be supported by GED 2nd phase project. Furthermore, a performance based granting policy will be enabled within the EF's but will need further support to be implemented (Measurement & Verification tool) as well as capacity buildings within the EFs and communicating its modalities to the wider audience/potential clients. From 2019 onwards, it is planned that the Funds provide ESCO Fund window for energy efficiency and renewable energy investments in public sector buildings, public lightning as well as into SMEs production facilities (although enabled, not tracked and monitored under GED project). With SWEDEN's involvement in GED 2nd phase awareness for EE/RES projects and their financial, environmental and economic benefits, as well as motivation and attractiveness to enter into newly developed financial mechanisms would be created within end-users (sub-national level authorities/municipalities/institutions).

Cantons, Ministries & Municipalities have important role in implementing all project components and activities within the GED Programme, direct benefit to participate in the development and establishment of monitoring and reporting mechanisms due to legislative obligation and resulting financial support due to low affordability to conduct EE/RES investments without co-financing. There is often low awareness and understanding of sub-national level authorities (cantons, ministries, municipalities) to undertake required activities, lack of commitment to establish energy monitoring

and reporting mechanisms and in general lack of capacity and skills to absorb obligations and required activities. Law obliges all levels of government to report, including municipality level. In the previous years GED activities covered public sector buildings on state, entity and cantonal level, but there are 143 municipalities in BiH with significant number of buildings that are not entered into the system, and are jet to be reached. The GED 2nd phase project will extend this database through institutionalization activities within municipality level, as well as annual Call for Proposals for identification of public sector buildings/end-users interested in EE investments.

In Republika Srpska, there are no cantonal levels; therefore, the reporting mechanism are easier (less complex) structured. The focus will be on institutionalization activities within municipality level in Republika Srpska, as well as in the FBiH.

Estimated number of municipal buildings is likely to be more than 3,000. This estimate is based upon number of municipal buildings identified through conducted "Public building typology of BiH". Considering that "Public building typology of BiH" estimated total number of buildings in BiH to be 7.600, then approx. 41,2% of all buildings fall under municipal authority. These public sector buildings under municipal jurisdiction are yet to be covered by EMIS (GED 2nd phase, 2018 - 2020).

Public end-users are targeted group which directly experience the benefits of EE investments. In a period 2014-2016, project reached improved indoor conditions for over 60.000 end-users. End-users/ public sector buildings are the base of the pyramid in a bottom-up approach to energy management capacity building and legal obligation understanding, as well as in the development of a sustainable monitoring and reporting mechanisms. Up to day, around 150 trainings were conducted for end-users (public sector buildings representatives) on EMIS, energy efficiency and energy management in public buildings. There were more than 1.500 participants on these trainings. End-users, public sector buildings enter the data into system, and submit reports to EF's / Entity ministries / Canton /Municipality, while each ministry has all data from respective public buildings under their jurisdiction, while all data in EMIS are automatically available for the respective Environmental Fund in RS and FBiH.

SME's and implementation of EE infrastructure measures in appropriate buildings and production processes within particular SME, are currently not supported directly by co-financing through GED project, but implementation of EE infrastructure measures for SME's is supported by soft loans through established EE Revolving Fund. The GED 2nd phase project will support the development and enactment of specific regulations enabling implementation of energy performance contracts (EPC) in the public sector to open up market opportunities for private investment, including identification of appropriate contracting authorities, applicable procurement rules, selection criteria and payment arrangements. Such regulations are currently lacking, as a result, municipalities and other public building end-users are not able to enter into multi-year EPC contracts with private companies which are providing a technical and a financial solution for energy efficiency (i.e - ESCOs.). The GED 2nd phase project will be working on improving, developing and strengthening the technical and economic capacity of municipalities, public facilities, public utilities, and SME's in BiH.

Wider society was included in public awareness campaigns with aim to increase knowledge and change perceptions, attitudes and behaviours of BiH citizens about energy efficiency and renewable energy sources while promoting the economic, environmental and social advantages to citizens living in urban and rural areas throughout the country. The GED 2nd phase project will continue with public awareness campaigns on benefits of energy efficiency, renewable energy, Nearly Zero Energy Buildings (NZEB), energy management and reduction of emissions to air.

Renewable energy solution for households living in rural areas off the power grid, activity related to the project component 6, will provide hybrid photovoltaic and solar system (electricity and thermal heat generation) solutions to remote areas which are not connected into the electricity grid in BIH. This activity is will be financed by GED 2nd phase project, but wherever possible and feasible, GED Project will seek for other party co-financing (municipalities, local organizations etc.). Should co-financing materialize, project savings will be directed to additional number of families that will be supported by this project activity.

SWEDEN's grant co-financing contribution would be co-financed by: i) Environmental Funds and ii) end-users, institutions, municipalities, cantons, ministries and other sub-national authorities.

- **Elaboration on project's contribution to job creation in the country**

Response:

The economy of Bosnia and Herzegovina is characterized by a high unemployment rate of people of working age and youth. The total ILO-defined unemployment rate is 25,4%, while the official or registered unemployment rate is 32,2% (Agency for Statistics of BiH, 2016). Though the situation on labor market in BiH has somewhat improved in the past decade, the employment rate is still extremely low. Increasing employment rates and reducing unemployment should be the main political and national prioritiy. As shown by numerous studies in the region and Europe, investing in energy efficiency and renewable energy (EERE) measures has very positive impacts on employment. Improving the energy performance of buildings and implementation of relevant measures delivers a range of benefits, job creation being of the important ones. Since energy efficiency and renewable energy represent a very important and highly relevant area of environmental production, employment opportunities generated under these aspects fall into the category of "green jobs".

In 2016, within the GED project, UNDP prepared the Study "Green Jobs - Analysis of the Effects of Energy Efficiency Measures on Employment in BiH". The purpose of the Study was to analyze and present the effects of investment in EERE on direct employment in BiH, and to show potential for employment according to the National Action Plan for Energy Efficiency (NEEAP) of BiH for the period 2010-2018.

According to calculations, €1 million spent in EERE measures generates 96 FTE (Full-time Equivalent) jobs. Thus, it is possible to employ 96 individuals on a full-time basis for one year. This number is suitable for comparison with other countries and projects, whereas for the in-country purposes it is more suitable to express it in national currency, where KM 1 million spent in EERE measures creates the potential for 49 new jobs, primarily in the construction sector. The structure of these 49 new jobs includes mostly skilled workers – about 26, followed by about 18 semi-skilled workers, about three highly skilled workers, about three workers with university education and 0,2 unskilled workers.

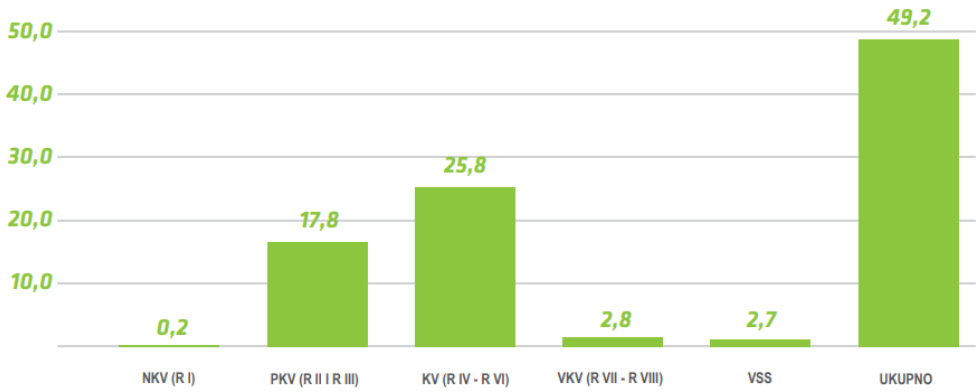


Figure 26. Direct employment potential by category of workers expresses as FTEs per KM 1 million investment in EERE measures (Green Jobs Study, 2016)

The green economy is an extremely important trigger and lever for enhancing a BiH's growth potential. It should result in meaningful employment creation. The projects of improving energy efficiency and use of renewables take a big role in that segment. The "Green Jobs" Study showed that within 34 implemented infrastructure works through UNDP's GED Project till the end of 2016, 3.871 man-months, i.e. working engagement of 322 full-time employees for one year has been achieved.

Although such analysis attempt to estimate the direct employment of working force, not less important are indirect effects on employment associated with manufacturing sector of the domestic materials, operations and maintenance services, industries that supply intermediate goods and services for the targeted green investment activities, etc.

Considering all the above, the GED 2nd phase project with its project activities more comprehensive than the activities of the GED project, is of the huge importance for implementation in BiH as it will contribute to more rapid development and progress. With funds secured through SWEDEN's involvement and additional co-financing by end-user's, it is expected to achieve 425 man-months direct employment / "green jobs" generated per year.

This will ensure that medium and long-term objectives and targets for development are met, since activities of increasing energy efficiency directly or indirectly affect all areas of human activity, as well as the social and economic progress of country.

- **Explain how achieved energy savings (in ongoing project) are redistributed (to other EE activities or to social infrastructure) and what is a follow up mechanism.**

Response:

Measurement of Multiple Benefits of Energy Efficiency (MBEE) are in this case characterized from the perspective of the beneficiary to which a particular MBEE accrues.

In order to make benefits more sustainable in the long-term, GED project beneficiaries for which energy efficiency measures have been implemented had to sign a statement to reinvest accumulated savings into additional energy efficiency measures/project.

For recipients of an energy efficiency measure, accumulated monetary savings are often reinvested in additional energy efficiency measures or invested into new assets in order to increase quality, capacity or service levels. For example, Kindergartens often engage in investments related to new teaching

equipment, furniture and capacity expansion by employment. Healthcare centers may reinvest into new medical equipment which increase service levels and/or capacities to serve patients. Municipalities could redistribute saved funds from energy efficient public lighting to social activities.

Unfortunately, reinvestment of accumulated savings cannot be monitored in the short-term. In average, at least three years have to pass after implemented measures in order to accumulate significant amount of savings to reinvest. In addition to accumulation period, capturing the large variety of reinvestment benefits can be challenging. Fortunately, the ongoing *Study on Human Development Benefits and Gender Mainstreaming through Energy Efficiency Effects*, will provide methodology and results on benefits.

The know-how from relevant studies will be used for development of a follow-up mechanism, a monitoring tool for relevant reinvestments and redistribution of accumulated funds. Due to large variety of information, the follow-up mechanism will be developed in a direction of a comprehensive survey. The population of interest are beneficiaries, mostly public buildings which are operative at least three years after implementation of energy efficiency measures.

Generic information of interest that will be acquired by the follow-up mechanism is as follows:

I. <u>The monetary value of each investment;</u>
The monetary value is a quantification of reinvested energy savings. It captures the magnitude and the willingness of the end-user to reinvest. This data can be crosschecked to EMIS data related to annual savings.

II. <u>The nature of investment, with detailed description;</u>
As there is a wide range of possibilities to reinvest dependent on end -user's preferences and needs, this is a qualitative piece of information.

III. <u>Put to use date;</u>
In case of reinvesting into equipment (e.g. medical equipment, teaching equipment, new energy conservation measures) it is important to capture the operational start of such investments in order to accurately assess long term effects of such investments.

IV. <u>Operational benefits;</u>
Reinvestments will eventually lead to direct and indirect benefits to the end-users, beneficiaries and local community. This is also captured by the mechanism.

The main goal of the follow-up mechanism in form of a survey and analysis of collected data is to give insight into end-user's reinvestment, type of reinvestment (EE related or not), his needs, its magnitude, effects and sustainability over time.

- **Consider higher ratio of co-financing for EE measures in public buildings. Suggestion is to lift it to 1:2, instead of 1:1. For RES measures and public lighting it can remain 1:1.**

Response:

The Project Document has been revised in order to reflect the suggested lift to 1:2 for EE measures.

- **Provide management response explaining on how they incorporated recommendations of mid-term review into the new intervention.**

Response:

The management response to recommendations of the Mid-Term Review of GED project is given in Annex 6.

Annex 1 – DETAILED DESCRIPTION OF METHODOLOGY ON SELECTION OF PUBLIC SECTOR BUILDINGS AND PUBLIC LIGHTNING SYSTEMS FOR IMPLEMENTATION OF ENERGY EFFICIENCY INFRASTRUCTURE MEASURES

PUBLIC SECTOR BUILDINGS & SOLAR SYSTEMS

Methodology development

- Development of methodology with clear weighing factors for selection (development of prioritization and ranking lists) and decision making on implementation of EE infrastructure measures– preparation of detailed technical and economical evaluation, clearly defined criteria and valuing methodology for identification, evaluation and final selection of public sector buildings (UNDP/Fund)

- Methodology adoption – (Project Board)

1. STEP – Identification

1. **Call for proposals** - announcement of Call for Proposals with incorporated Questionnaire on basic information of end-user's public sector buildings (Fund/UNDP)

2. **Submission of proposals by end-users (municipalities, institutions) /sub-national GED partners (cantons, ministries)**

2. STEP – Evaluation

1. **Entering basic data of public sector buildings into EMIS database** – based on submitted questionnaire, entering basic characteristics (square meters, square meters heated, building type, energy carrier type, etc.) into database, as well as data on energy and water consumption for the past 36 months (data collected, codified and entered into EMIS by UNDP)

2. **Selection of public sector buildings for development of detailed energy audits** – based on developed prioritization list with key energy conservation potential indicators (energy carrier, type of heating/cooling system, net heated square meters, average energy cost [KM/m²], specific heat consumption kWh/m^2, specific emission of tCO_2/m^2), public sector buildings will be chosen on annual basis for conducting detailed energy audits (UNDP/Fund)

3. **Analysis and evaluation of detailed energy audits** – based on energy audits results, e.g. techno-economic, environmental, financial and co-financing criteria, all public sector buildings will be evaluated against each other in order to develop a ranking list of most cost-effective energy conservation investments. (UNDP/Fund)

4. **Development of ranking list** – based on detailed energy audits findings, as well as further conducted evaluation of energy, environment, economic and financial parameters a

ranking list of most cost-effective energy conservation investments will be developed. (UNDP/Fund)

3. STEP – Decision

1. **Decision on co-financing energy efficiency investments of public sector buildings** – based on completed evaluation and recommended ranking list, decision on co-financing energy efficiency investments of public sector buildings will be made. (Project Board)

4. STEP – Implementation

1. **Contracting/Procurement** - proceeding procurement of services and works of selected projects/implementation of EE infrastructure projects (UNDP)
2. **Implementation and monitoring** - Implementation of EE infrastructure projects by contractors (including supervision as per Law), investor supervision and QA by UNDP

5. STEP – Monitoring, verification and reporting (MVR)

1. **Monitoring and verification of savings and consumption**– clear identification of energy and expenses savings (kWh, KM, tCO_2, specific energy consuption...) through automatic analysis of energy consuption and energy consumption indicators data, processed in EMIS software (UNDP/Fund/end-user)
2. **Reporting** – development and drafting of comprehensive reports with information on reduced energy consumption, costs, and emission

PUBLIC LIGHTNING SYSTEMS

Methodology development

- Development of methodology with clear weighing factors for selection (development of prioritization and ranking lists) and decision making on implementation of EE infrastructure measures– preparation of detailed technical and economical evaluation, clearly defined criteria and valuing methodology for identification, evaluation and final selection of public lightning systems (UNDP/Fund)
- Methodology adoption – (Project Board)

1. STEP – Identification

1. **Call for proposals** - announcement of Call for Proposals with incorporated Questionnaire **on basic information of end-user's public lightning systems (Fund/UNDP)**
2. **Submission of proposals by end-users (municipalities, institutions) /sub-national GED partners (cantons, ministries)**

2. STEP – Evaluation of public lightning systems

1. **Entering basic data of public lightning systems into EMIS database** – based on submitted questionnaire, entering basic characteristics (length of lightning system, type of light source, type and number of posts and lamps, total power, etc.) into database, as well as data on electric energy consumption for the past 36 months (data collected, codified and entered into EMIS by UNDP)
2. **Selection of public lightning systems for development of detailed energy audits** – based on developed prioritization list with key energy conservation potential indicators (type of light source, average energy cost [KM/m^2], etc.), public lightning systems will be chosen on annual basis for conducting detailed energy audits (UNDP/Fund)
3. **Analysis and evaluation of detailed energy audits** – based on energy audits results, e.g. techno-economic, environmental, financial and co-financing criteria, all public lightning systems will be evaluated against each other in order to develop a ranking list of most cost-effective energy conservation investments. (UNDP/Fund)
4. **Development of ranking list** – based on detailed energy audits findings, as well as further conducted evaluation of energy, environment, economic and financial parameters a ranking list of most cost-effective energy conservation investments will be developed. (UNDP/Fund)

3. STEP – Decision

5. **Decision on co-financing energy efficiency investments of public sector buildings and public lightning systems** – based on completed evaluation and recommended ranking list, decision on co-financing energy efficiency investments of public sector buildings and public lightning systems will be made. (Project Board)

4. STEP – Implementation

6. **Contracting/Procurement** - proceeding procurement of services and works of selected projects/implementation of EE infrastructure projects (UNDP)
7. **Implementation and monitoring** - Implementation of EE infrastructure projects by contractors (including supervision as per Law), investor supervision and QA by UNDP

5. STEP – Monitoring, verification and reporting (MVR)

8. **Monitoring and verification of savings and consumption**– clear identification of energy and expenses savings (kWh, KM, tCO_2, specific energy consuption...) through automatic analysis of energy consuption and energy consumption indicators data, processed in EMIS software (UNDP/Fund/end-user)
9. **Reporting** – development and drafting of comprehensive reports with information on reduced energy consumption, costs, and emission

Annex 2 – GED LOGICAL FRAMEWORK

LOGICAL FRAMEWORK for GREEN ECONOMIC DEVELOPMENT PROJECT				
	Intervention logic	**Objectively verifiable indicators of achievement**	**Sources and means of verification**	**Assumptions**
Overall goal	The overall objective is to create a favorable environment for investing in EE/RES infrastructure measures in BiH.	Number of infrastructure projects directly and indirectly benefiting from improved of financing mechanisms in BiH for EE investments (target value: 154).	Official project-related reports from BiH authorities at cantonal/entity/state levels. Project reports.	
Outcome / Strategic objective	SO1a: To develop capacity and strengthen skills of Environmental Fund staff SO1b: To develop capacity and strengthen skills of energy professionals SO2: To establish energy monitoring and reporting mechanisms in BiH SO3: To enable financing for EE/RES infrastructure projects in BiH	SO1a: Number of detailed energy audits assessed, prioritized and ranked by Environment Funds (target value: 120). SO1b: Number of energy stakeholders participating on training programme for skills and knowledge development on EE and RES (NZEB) (target value: 600) SO2:Number of municipal authorities with reporting mechanisms in place (target value: 90). SO3: % of increase of financial resources allocated for EE measures	Project reports and relevant technical/tender documentation. Public media coverage; information posted on websites of local/cantonal/entity/state authorities in Bosnia and Herzegovina.	Environmental Funds have internal capacities and capabilities to manage and continue to operationalize energy efficiency thematic area within the Fund. Environmental Funds continue to finance EE/RES projects offering various financial mechanisms/modalities (performance based grants, loans, ESCO Fund window) and thus reduce risks for investors and financial institutions.

		through the Fund by the end of 2020 (target value: 40%).		Energy monitoring and reporting mechanisms are replicated and applied as a harmonized system country-wide.
	SO4: To implement cost-optimal, green jobs generating and emission reducing EE/RES infrastructure projects in BiH	SO4: Number of effectively implemented EE/RES infrastructure projects (target value: 54).		Energy professionals and companies are aware of norms and standards and invest into knowledge and skills development.
	SO5: To increase general public's understanding of EE/RES benefits	SO5: Number of people reached through marketing campaign (target value: 100.000)		EE/RES infrastructure measures generate significant number of "green jobs".
	SO6: To provide access to energy for off grid households in BiH	SO6: Number of households provided with RES solution in off grid areas in BiH (target value: 24)		The general public is aware that EE/RES is an economic/development driver.
Output / Result	Result 1: 260 detailed energy audits of public sector buildings drafted and assessed for EE/RES infrastructure investments Result 2: EMIS is implemented and continuously updated in BiH municipalities	1.1 Number of detailed energy audits conducted (target value: 120) 1.2 Number of investment decisions made based on evaluation of detailed energy audits (target value: up to 15 annually)	Source 1: Project reports and relevant technical documentation (all indicators); Source 2: EMIS – official report by Fund to Government (indicators 2.1., 4.1., 4.2., 4.3., 4.4., 4.5.);	Fund's senior management is commitment to enforce EE/RES thematic area within the Fund. Fund's employees motivated to develop and gain additional skills and

	Result 3: Financial mechanisms and modalities for EE/RES investments within Environmental Funds are established and operational Result 4: In at least 54 EE/RES infrastructure measures have been implemented with EU required technical standards. Result 5: Public awareness on benefits of energy efficiency, renewable energy, NZEB, energy management and reduction of emissions to air is increased. Result 6: At least 24 off grid households in remote areas in BiH provided with thermal heat/electricity	1.3 Number of Fund staff participating on annual capacity development training on energy efficiency, EMIS and EE/RES policy (target value: 12) 1.4 Number of Fund staff actively working on EMIS investment decision making process cycle, monitoring, assessing and evaluating energy indicators (target value: 6) 1.5 Number of stakeholders participated on training programme for energy management, skills and knowledge development and NZEB (target value: at least 200 annually) 1.6 Number of female energy professionals participated on training programme for skills and knowledge development and NZEB (target value: at least 40 annually) 1.7 Number of Energy intensity mappping applications developed (target value:1)	Source 3 – Energy Community Reports on BiH (indicators 3.1., 4.1., 4.2., 4.3., 4.4., 4.5.)	apply them in daily routine work. Sub-national level authorities and municipalities are interested to gain capacity and skills in order to absorb Law on EES obligations and required activities related to energy monitoring and reporting. Energy professionals/ construction companies able to absorb planned annual volume of work. Financial mechanisms and modalities for EE/RES investments are timely been developed within Environmental Funds. Existing end-user's interest to implement and invest/co-finance EE/RES infrastructure projects.

		1.8 Measurement and verification (M&V) module within EMIS enabled 1.9 Nearly Zero-Energy Public Buildings integrated into EE/RES by-laws in BiH 1.10 Number of cost-optimal analysis for public buildings developed (RS, FBiH, BiH) (target value:3) 2.1 Number of public sector buildings monitored through EMIS database (target value: 7000) 2.2 Number of end-users trained on EMIS (out of which at least 40% women) (target value: 7000) 3.1 Number of EE/RES infrastructure projects implemented with non-grant (ESCO, performance based granting and loans) co-financing modality (target value: 18) 4.1 Number of implemented EE/RES infrastructure projects in public sector buildings (target value:18 annually)		Energy professionals/ construction companies are able to perform high quality of work and assure timely infrastructure project implementation.

		4.2 % of total energy consumption savings within implemented public sector buildings (target: more than 65%) 4.3 Achieved energy class of public sector buildings after EE/RES infrastructure measures (target: energy class "A") 4.4 % of total energy cost savings (target value: 50%) 4.5 Amount of direct CO_2 emission reduction (target value: 3900) 4.6 Number of generated man-months "green jobs" (target value: 425) 4.7 Number of women as direct benefitiearies of EE/RES project benefits (target value: 10800) 5.1 Media campaign outreach (out of which at least 40% women) (target value: 100000) 5.2 Number of awareness raising events held in BiH (target value:45)		

		5.3 Number of promotional materials distributed (target value:50000) 6.1 Number of persons benefiting from RES solutions (target value:50) 6.2 Number of female benefiting from RES solutions (target value: 30)		
Activities	<u>Activity 1</u> - Technical assistance to Environmental Protection Funds, EE & RE capacity building and skills development (R1): 1.1. Annual training on energy efficiency, energy management, EMIS, Laws, by-laws and EU directives for Fund staff provided by UNDP staff and/or consultants for niche expertise/knowledge 1.2. Technical assistance throughout project implementation on energy management, EMIS, public lightining efficiency, usage of renewable energy sources, relevant EU directives, Laws and by-laws understanding, provided by UNDP	***Means:*** <u>Activity 1</u> Technical assistance human resources and staffing (interlinked with all other activities) Engagement of one additional engineer and field officer (interlinked with all other activities) Staffing (Project Manager, Chief Technical Advisor for EE, Project Assistant, Project Associate x2, EMIS Technical officer) (interlinked with all other activities)	***Annual Costs*** € € (*SWEDEN contribution)* €	Strong motivation by the Management and operational staff of the Fund to participate, engage and develop EE window/thematic area of work within Fund. Existing end-users interest for increasing EE within public sector buildings. Co-financing supply side (SWEDEN/Fund/UNDP) increased – co-financing volume for infrastructure projects is significantly higher.

	staff and/or consultants for niche expertise/knowledge 1.3. Skills development via on the job training/assistance provided by UNDP staff and/or consultants for niche expertise/knowledge on: • Understanding of energy conservation potential • Analysis, evaluation and development of energy indicators and reports out of EMIS database • Analysis, evaluation and development of prioritization list of public sector buildings and public lightning systems for energy audits • Analysis, evaluation and development of technical, economic, financial, environmental and social parameters/factors (including co-financing from end-users) and development of ranking list of public sector buildings			Law on EE is adopted/in process of adoption in both entities. Institutional willingness of sub-national level authorities (cantons, ministries) to establish energy monitoring and reporting mechanisms. Governments/authorities recognize EE improvements as a potential development generator.

	and public lightning systems for the implementation of EE infrastructure measures • Monitoring and verification of energy and costs savings, emission reduction • Tracking of indicators • Decision making process cycle/methodology for EE infrastructure investments (identification, evaluation, decision, implementation and monitoring/reporting) <u>Activity 2 -</u> Capacity building for Nearly Zero Energy Buildings - NZEB and for understanding of RE in public sector building (R1) 2.1 Training programme on NZEB policy and legislation, as well as on energy efficiency and integration of renewables in the exicting building stock for governments at all levels, municipalities, ESCOs, public facilities, building owners, public utilities, small and medium enterprises, producers, distributors,	<u>Activity 2</u> Development and delivery of training programme by UNDP/Contractor	€ (*SWEDEN contribution)*	

	installers, engineers and professionals, provided by UNDP staff and/or consultants for niche expertise/knowledge 2.2 Training programme on energy efficiency for representatives of public institutions 2.3 Training programme on renewable energy for end users of public sector buildings <u>Activity 3</u> - Developing and strengthening the technical and economic capacity of municipalities, public facilities, public utilities, small and medium enterprises in BiH (R1) 3.1. Development of ToR for development and delivery of training programme for development of technical and economic capacity on how to finance energy efficiency measures through the Revolving Fund 3.2 Deliver training activities by contractor 3.3 Evaluation of the professional development program/participants	<u>Activity 3</u> Development and delivery of training programme by UNDP/Contractor	€ (*SWEDEN contribution)*	

	Activity 4 - Energy intensity mapping application (R1) 4.1 Development of ToR for development of energy intensity mapping application	Activity 4 Development of application by UNDP/Contractor	€ (*SWEDEN contribution), only applicable in first year of project implementation*	
	Activity 5 - Measurement and verification (M&V) module within EMIS (R1) 5.1 Development of ToR for development of an M&V EMIS module or independent software tool that communicates with EMIS 5.2 Applying two separate M&V mechanisms, for the public building sector and public lighting systems	Activity 5 Development of the software tool by UNDP/Contractor	€ (*SWEDEN contribution), applicable in second and third year of project implementation*	
	Activity 6 - Cost-optimal analysis for public buildings (R1) 6.1 Development of ToR for calculations on cost-optimality for public buildings	Activity 6 Consultancy services/contractors	€ (*SWEDEN contribution), only applicable in first year of project implementation*	

	Activity 7 – Policy/definition of the Nearly Zero-Energy Public Buildings (R1) 7.1 Drafting/updating regulation (Law on EE; by-laws) regarding definition of the Nearly Zero-Energy Buildings Activity 8 - Drafting of at least 20 (for each entity in BiH) detailed energy audits for public sector buildings and public lightning systems (R1) 8.1. Based on technical and economic and parameters, collected energy consumption and costs data, energy conservation potential and emission reduction emission potential from EMIS database (Activity 9), development of prioritization list of public sector buildings and public lightning systems for the conductance of detailed energy audits 8.2. Development of ToR for tendering of detailed energy audits, in accordance with UNDP technical requirements and procedures (SOPs).	Activity 7 Consultancy services/contractors Activity 8 Development of energy audits by consultant	€ (*SWEDEN contribution), applicable in second and third year of project implementation* € (*SWEDEN contribution)*	

	8.3. Coordination and management of development of detailed energy audits and Quality assurance 8.4. Evaluation of technical, economic, financial, environmental and social parameters/factors (including co-financing from end-users) and development of ranking list of public sector buildings and public lightning systems for the implementation of EE infrastructure measures 8.5. Decision on infrastructure investments <u>Activity 9</u> - Implementation of Energy Management Information System into municipal public sector buildings in BiH (R2): 9.1. Annual open Call for Proposals by Fund and UNDP for identification of public sector buildings/end-users interested for EE investments 9.2. Submission of public sector buildings application to Fund/UNDP by filling out pre-defined survey of interest with basic building data and co-financing potential (sub-national project partners submission of list of	<u>Activity 9</u> Activity 9 financing is provided by the Environmental Protection Fund of FBiH and RS, UNDP and is part of several other agreements.		

	public sector buildings in their jurisdiction) 9.3. EMIS database update (by UNDP/Fund): • Opening an account (static input data) for the identified public facilities • Collecting information on consumption and costs of energy and water in a period of the last 36 months, adjusted for entry into EMIS • Technical support and assistance to contact persons in identified public facilities • Creation of dynamic data for identified public buildings 9.4. Preparation of technical, economic and environmental parameters and energy conservation potential indicators within EMIS database (by UNDP/Fund for Activity 8)		-	

	9.5. Management, administration, maintenance and further development of EMIS (by UNDP) 9.6. Monitoring, error identification and correction activities on database (by UNDP/Fund) 9.7. Monitoring and reporting of achieved energy and cost savings (kWh, KM), CO_2 emission (t CO_2) reduction and other specific indicators (by UNDP/Fund) <u>Activity 10 -</u> Implementation of Energy Management Information System in public lightning systems in BiH (R2) 10.1. Annual open Call for Proposals by Fund and UNDP for identification of public lightning systems interested for EE investments 10.2. Submission of application to Fund/UNDP by filling out pre-defined survey of interest with basic public lightning data and co-financing potential by municipalities 10.3. EMIS database update (by UNDP/Fund):	<u>Activity 10</u> Activity 10 financing is provided by the Environmental Protection Fund of FBiH and RS, UNDP and is part of several other agreements		

	• Opening an account (static input data) for the identified public lightning systems • Collecting information on consumption and costs of electric energy in a period of the last 36 months, adjusted for entry into EMIS • Technical support and assistance to contact persons • Creation of dynamic data for identified public lightning systems 10.4 Management, administration, maintenance and further development of EMIS (by UNDP) 10.5 Monitoring and reporting of achieved energy and cost savings (kWh, KM), CO_2 emission (t CO2) reduction and other specific indicators (by UNDP/Fund) <u>Activity 11</u> - Training and capacity development for end-users on EMIS,	<u>Activity 11</u> Activity 11 financing is provided by the Environmental Protection Fund of		

	energy efficiency and energy management by UNDP (R2): 11.1. Development and delivery of EMIS, energy efficiency and energy management training module • Contact all identified end-users • Organize training facilities throughout BiH, equipment (laptops) and travel arrangements • Conduct training on EMIS 11.2. Technical support and assistance to trained persons throughout project implementation Activity 12 - Financial mechanism (ESCO Funding window) established at EFs and capitalized with EF's own finance (R3) 12.1 Define the process and criteria for the financial mechanism for Environmental Funds in BiH (ESCO funding window within EFs)	FBiH and RS, UNDP and is part of several other agreements. Activity 12 Consultancy services/contractors	€ 	

	12.2 Development of the ESCO business model processes, eligibility criteria for grants, monitoring and verification procedures for proving savings achieved and procurement methods with criteria for awarding grants and revolving loans <u>Activity 13</u> - Implementation of infrastructural energy efficiency measures and renewable energy measures in BiH (R4): 13.1. Selecting appropriate facilities for deep retrofits and set performance objectives. • Based on technical, economic and environmental parameters and energy conservation potential from conducted detailed energy audits, development of prioritization list of public sector buildings for the implementation of deep retrofit energy efficiency measures (focused on the EPBD Directive).	<u>Activity 13</u> Project design (by consultant) EE/RES infrastructure measure (by consultant) Supervision (by consultant)	€ (*SWEDEN contribution)* € (*SWEDEN contribution),* at least € additional co-financing by end-users/institutions/municipalities € (*SWEDEN contribution)*	

	• The prioritization list of public sector buildings includes the best case scenario for deep savings in building energy consumption, annual energy and cost savings, investment costs, payback period and other relevant indicators. 13.2. Arranging co-financing by end users: • Development of Agreement on co-financing the implementation of infrastructural energy efficiency measures, • Signature and entry into force of the Agreement on co-finance measures to increase energy efficiency of end-users. 13.3. Procurement process for development of design documentation • Development of Terms of Reference for the mechanical, electrical and			

	structural part of the building • Publication of a public tender / call for qualified bidders • Evaluation of bids • Contracting / signing 13.4. Design process • Development of design documentation (architectural, construction, mechanical, electro etc.): technical descriptions, drawings, bill of quantities… • Issuance of required permits and elaborates • Independent design document revision 13.5. Procurement process for selection of construction Contractor • Development of Terms of Reference • Publication of a public tender / call for qualified bidders			

	• Evaluation of bids • Contracting / signing 13.6. Construction process • Organizing the construction site • Start up • Construction supervision (Quality assurance will be ensured through an independent on-site quality control – supervision engineer, and additionally investor-UNDP supervision) • Commissioning 13.7. Measurement and Verification (M&V). After the project has been designed, built, and commissioned, its energy consumption needs to be measured. This is achieved by installation of calorimeters for monitoring the energy consumption (heating, electricity, water) and its integration with EMIS system. <u>Activity 14</u> - Raising public awareness / marketing campaign - Increase public awareness on human development as a result of	<u>Activity 14</u> EE Marketing campaign (by consultant)	€ € (*SWEDEN contribution)*	

	clean/renewable energy and on energy efficiency (R5): 14.1 Logo design and appliance of logo on all materials developed within the scope of the Project 14.2 Development of the Communications Strategic Plan after research of targeted audience on energy efficiency benefits 14.3 Organization of NZEB Directive specialized trainings <u>Activity 15</u> - Installation of hybrid photovoltaic and solar system (electricity and thermal heat generation) solutions to remote areas (not connected into the electricity grid) without electricity in BIH (R6) 15.1 The families which will be supported by the project are selected on the basis of primary target area (global irradiation and solar electricity potential cross-checked with the area where most such returnee families live), vulnerability factor, number of family members (children, woman, man, elderly, etc.) by UNDP	Designing and printing of promotional material (by consultant) <u>Activity 15</u> Consultancy services/contractors	€ € (*SWEDEN contribution)* € (*SWEDEN contribution)*	

	15.2 Detailed assessment is developed in terms of identifying exact needs for installation of renewable energy kits 15.3 Procurement process for selection of construction Contractor • Development of Terms of Reference • Publication of a public tender / call for qualified bidders • Evaluation of bids • Contracting/signing 15.4 Construction process • Organizing the construction site • Start up • Construction supervision (Quality assurance will be ensured through an independent on-site quality control – supervision engineer, and additionally investor-UNDP supervision) • Commissioning			

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Annex 3 – RESULTS AND RISK MATRIX

Outcome objective 1	To develop capacity and strengthen skills of Environmental Fund staff and energy professionals									
	Indicator	Baseline	Target	Source of verification	Results	Results	Results	Risks and Assumptions	Likelyhood	What should be done for risk reduction
		2017	2020		2018	2019	2020			
Indicator	Number of detailed energy audits assessed, prioritized and ranked by Environment Funds	140	260	Project reports and relevant technical/tender documentation	40	40	40	LOW • Lack of Fund's senior management commitment to develop, empower and enforce energy efficiency thematic area within the Fund • Lack of motivation by Fund's employees to develop and gain additional skills • Lack of motivation by energy professionals to develop skills and knowledge	MIDDLE • The Fund's current senior management as well as employees are motivated to enter a new thematic area and provide financing support for EE/RES projects • It is the Fund's obligation, in accordance to its statute and by Law on EE to provide support to EE/RES projects • Energy professionals are generally motivated to gather skills and enter new areas of work in order to be able to supply the market with consultancy in EE/RES	• Create a vital commitment, knowledge and understanding of importance of developing Fund's capacities in the thematic area of EE/RES within Environmental Fund • Disseminate to BiH's private and academia sector information on knowlede and skills development reqired to enter new market niches within the EE/RES area of work.
Indicator	Number of energy stakeholders participating on training programme for skills and knowledge development on EE and RES (NZEB)	500	1100	Project reports and relevant technical/tender documentation	200	200	200			
Output objective	260 detailed energy audits of public sector buildings drafted and assessed for EE/RES infrastructure investments									
	Indicator	Baseline	Target	Source of verification	Results	Results	Results			
		2017	2020		2018	2019	2020			
1.1 Indicator	Number of detailed energy audits conducted	140	260	Project reports	40	40	40			
1.2 Indicator	Number of investment decisions made based on evaluation of detailed energy audits (target value: up to 15 annually)	65	85		5	20	20			
1.3 Indicator	Number of Fund staff participating on annual capacity development training on energy efficiency, EMIS and EE/RES policy	10	12		10	10	12			

1.4 Indicator	Number of Fund staff actively working on EMIS investment decision making process cycle, monitoring, assessing and evaluating energy indicators	4	6		4	4	6		
1.5 Indicator	Number of stakeholders participated on training programme for energy managemnt, skills and knowledge development and NZEB	500	1100		200	200	200		
1.6 Indicator	Number of female energy professionals participated on training programme for skills and knowledge development and NZEB	90	210		40	40	40		
1.7 Indicator	Number of Energy intensity mapping applications developed	0	1		1	1	1		
1.8 Indicator	Measurement and verification (M&V) module within EMIS enabled	no	yes		no	yes	yes		
1.9 Indicator	Nearly Zero-Energy Public Buildings integrated into EE/RES by-laws in BiH	no	yes		no	no	yes		
1.10 Indicator	Number of cost-optimal analysis for public buildings developed (RS, FBiH, BiH)	0	3		3	3	3		
Outcome objective 2	**To establish energy monitoring and reporting mechanisms in BiH**								
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**	**Risks and**	**Likelyhood**	**What should be done**
		2017	**2020**		**2018**	**2019**	**2020**	**Assumptions**		**for risk reduction**
Indicator	Number of municipal authorities with reporting mechanisms in place	0	90	Project reports and Official Gazette	0	30	90	LOW/MIDDLE • Lack of commitment by sub-national level authorities (cantons, ministries, municipalities) to establish energy monitoring and reporting mechanisms• Lack of capacity and skills by sub-national level authorities (cantons, ministries, municipalities) to absorb obligations and required activities	LOW • It is of interest and direct benefit of sub-national level authorities (cantons, ministries, municipalities) to participate in the development and establishment of monitoring and reporting mechanisms due tolegislative obligation and resulting financial support due to low affordability to conduct EE/RES investments without co-financing• Low awareness and understanding of sub-national level authorities (cantons, ministries, municipalities) to undertake required activities	• Continues dialog, awareness raising and capacity development activities with sub-national level authorities • Further extension of the project to other municipalities

Output objective	EMIS is implemented and continuously updated in BiH municipalities						
	Indicator	Baseline	Target	Source of verification	Results	Results	Results
		2017	2020		2018	2019	2020
2.1 Indicator	Number of public sector buildings monitored through EMIS database	4100	7000	Project reports, EMIS – official report by Fund to Government	4100	5500	7000
2.2 Indicator	Number of end-users trained on EMIS (out of which at least 40% women)	4100	7000	Project reports	4100	5500	7000

Outcome objective 3	To enable financing for EE/RES infrastructure projects in BiH									
	Indicator	Baseline	Target	Source of verification	Results	Results	Results	Risks and Assumptions	Likelyhood	What should be done for risk reduction
		2017	2020		2018	2019	2020			
Indicator	% of increase of financial resources allocated for EE/RES measures through the Fund by the end of 2020	0	40%	Project reports and relevant technical documentation, Official Reports by Funds to Governments	0	20%	40%	LOW • Lack of Fund's senior management commitment to develop, and enforce financial mechanisms supporting the EE/RES thematic area within the Fund• Lack of understanding by Fund's employees for introduction of financial mechanisms supporting the EE/RES thematic area within the Fund• Financial mechanisms and modalities for EE/RES investments within the Fund are not timely been established during the GED project indicated timeframe	MIDDLE/HIGH • The Fund's current senior management as well as employees are motivated to develop and enforce financial mechanisms supporting the EE/RES thematic area within the Fund• Before any new financial mechanism is introduced within the Fund, UNDP and consultants build capacity among Fund's employees• The development of grant co-financing and revolving/loans with performance based granting has started timely	• Timely, and aligned to Fund's legal possibilities, development and enforcement of financial mechanisms for Environmental Funds• Grant and loan co-financing modalities already in place which assures the basis that most of the GED project indicators could be meet

Output objective	Financial mechanisms and modalities for EE/RES investments within Environmental Funds are established and operational						
	Indicator	Baseline	Target	Source of verification	Results	Results	Results
		2017	2020		2018	2019	2020
3.1 Indicator	Number of EE/RES infrastructure projects implemented with non-grant (ESCO, performance based granting and loans) co-financing modality	2	20	Project reports and relevant technical documentation, Energy Community Reports on BiH	4	10	20
Outcome objective 4	To implement cost-optimal, green jobs generating and emission reducing EE/RES infrastructure projects in BiH						
	Indicator	Baseline	Target	Source of verification	Results	Results	Results
		2017	2020		2018	2019	2020
Indicator	Number of effectively implemented EE/RES infrastructure projects	100	154	Project reports and relevant technical documentation, Energy Community Reports on BiH, Official Reports by Funds to Governments	118	136	154
Output objective	In at least 54 EE/RES infrastructure measures have been implemented with EU required technical standards.						
	Indicator	Baseline	Target	Source of verification	Results	Results	Results
		2017	2020		2018	2019	2020
4.1 Indicator	Number of implemented EE/RES infrastructure projects in public sector buildings	100	154	Project reports and relevant technical documentation, Energy Community Reports on BiH, Official Reports by Funds to Governments	118	136	154
4.2 Indicator	% of total energy consumption savings within implemented public sector buildings	0%	>65%		>65%	>65%	>65%

Risks and Assumptions	Likelyhood	What should be done for risk reduction
LOW • Financing mechanisms supporting EE/RES project investments not in place • Lack of co-financing possibilities by Fund/UNDP • Lack of co-financing possibilities by end-users • Lack of end-user's interest to invest into EE/RES measures	MIDDLE/HIGH • Grant co-financing modalities already in place which assures the basis that most of the GED project indicators might be meet • Fund/UNDP have only limited amount of financial sources to support EE/RES infrastructure projects; SIDA's involvement significantly scales up the possibility to supply the demand side with co-financing and thus implementation of EE infrastructure projects • Empirical and practical evidence shows that public sector building's end-users have the possibilities to co-finance EE projects to a certain extend • Empirical and practical evidence shows that public sector building's end-users have increased interest to invest into to EE/RES projects (high energy costs, expected increase of energy prices, upcoming obligation to invest into EE/RES as per EE Action Plans, redirection of saving to EE/infrastructure measures)	• Grant co-financing modalities already in place which assures the basis that most of the GED project indicators could be meet • Involvement of third party/SIDA into GED project in order to assure supply side co-financing • Continues dialog, awareness raising and understanding creation on EE benefits with sub-national/local level authorities • Energy efficiency action plans will oblige sub-national authorities to invest info EE/RES measures within public sector buildings

4.3 Indicator	Achieved energy class of public sector buildings after EE/RES infrastructure measures	Energy class "E" (average consumption of 220 kWh/m2 a)	Energy class "A" (average consumption <55 kWh/m2 a)		Energy class "C" (average consumption <135 kWh/m2 a)	Energy class "A" (average consumption <55 kWh/m2 a)	Energy class "A" (average consumption <55 kWh/m2 a)			
4.4 Indicator	% of total energy cost savings	0%	50%		50%	50%	50%			
4.5 Indicator	Amount of direct CO2 emission reduction	0	3900		1300	1300	1300			
4.6 Indicator	Number of generated man-months "green jobs"	0	425		140	140	145			
4.7 Indicator	Number of women as direct benefitiearies of EE/RES project benefits	0	10800		3600	3600	3600			
Outcome objective 5	**To increase general public's understanding of EE/RES benefits**									
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**	**Risks and**	**Likelyhood**	**What should be done**
		2017	**2020**		**2018**	**2019**	**2020**	**Assumptions**		**for risk reduction**
Indicator	Number of people reached through marketing campaign	0	100000	Project reports and relevant technical documentation	30000	35000	35000	**LOW** • GED project missed to communicate to wider audience the benefits related to improving EE/RES • The message is not communicated in a understandable manner	**LOW** • Due to UNDP experience on similar activities in BiH, it is not expected that the GED project will miss-out to communicate, create understanding and raise awareness on EE/RES	• UNDP's communication & PR team supports the GED project throughout its raising awareness activities • All activities under the media campaign will be communicated in a understandable manner to the wider audience • Media buying and outreach are timely planned; with SIDA's involvement additional outreach and media campaign coverage will be assured
Output objective	**Public awareness on benefits of energy efficiency, renewable energy, NZEB, energy management and reduction of emissions to air is increased.**									
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**			
		2014	**2018**		**2014**	**2015**	**2016**			
5.1 Indicator	Media campaign outreach (out of which at least 40% women)	0	100000	Project reports and relevant technical documentation	30000	35000	35000			
5.2 Indicator	Number of awareness raising events held in BiH	0	45		15	15	15			

5.3 Indicator	Number of promotional materials distributed	0	50000		15000	15000	20000	
Outcome objective 6	**To provide access to energy for off grid households in BiH**							
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**	**Risks and**
		2017	**2020**		**2018**	**2019**	**2020**	**Assumptions**
Indicator	Number of households provided with RES solution in off grid areas in BiH	0	24	Project reports and relevant technical documentation	8	16	24	
Output objective	**At least 24 off grid households in remote areas in BiH provided with thermal heat/electricity**							
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**	
		2017	**2020**		**2018**	**2019**	**2020**	
6.1 Indicator	Number of persons benefiting from RES solutions	0	50	Project reports and relevant technical documentation	15	15	20	
6.2 Indicator	Number of female benefiting from RES solutions	0	30		10	10	10	

Likelyhood	What should be done for risk reduction
LOW • Lack of co-financing possibilities by municipality • Lack of end-user's interest to participate in the project activity	LOW • In 2013 to 2014 a totoal number of 44 households got supplied with RES solution for thermal energy and electricity generation (energy access); the municipality's interest to co-finance is high (based on UNDP experiance)	• Involvement of SIDA into GED project in order to assure sfinancing • Database on off-grid households location and energy needs updated

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Annex 4 – PROJECT BUDGET

PC1 - Capacity Building	Description	Units (annually)	Unit price	Total annually	Y1	Y2	Y3
Developing and strengthening the technical and economic capacity of municipalities, public facilities, public utilities, small and medium enterprises in BiH	i) Training venue ii) Lecturers iii) Materials and meals iv) Programme/event organization, promotion and mngt	i) 10 ii) 8 iii) 450 iv) 1	i) € ii) € iii) € iv) €	**€**	€	€	€
Energy intensity mapping application	-	1	€	€	€	0	0
Measurement and verification (M&V) module within EMIS	-	1	€	€	0	€	€
Cost-optimal analysis for public buildings	-	1	€	€	€	0	0
Policy of the Nearly Zero-Energy Public Buildings	-	1	€	€	0	€	€
Development of detailed energy audits	-	i) 20 for public sector buildings ii) 20 for public lighting systems	i) € ii) €	€	€	€	€
			Sub-total		**€**	**€**	**€**
PC4 - Infrastructure EE measures	**Description**	**Units (annually)**	**Unit price**	**Total annually**	**Y1**	**Y2**	**Y3**
Project design 18 projects	-	18	€ (average per building)	**€**	€	€	€
Implementation of EE measures/works & commissioning for 18 projects	i) EE/RES in public sector buildings ii) Solar hot water systems / PHV systems in public sector buildings iii) EE public lightning	i) 6 ii) 10 iii) 2	i) € ii) € iii) €	€	€	€	€

Supervision for 18 projects	-	18	€ (average per building)	€	€	€	€
			Sub-total		€	€	€
PC5 - Public awareness	**Description**	**Units/services (annually)**	**Unit price**	**Total annually**	**Y1**	**Y2**	**Y3**
Development and printing of project related publications, guidelines and raising awareness documents	copywriting, production, post-production of any-all promotional materials	1	€	€	€	€	€
Awareness raising campaign - media buying (TV and radio), guest appearances at broadcast media, organization of RA events, disseminating media advisories and press releases, administration of social networks related to awareness raising campaign, press clipping, pre and post campaign surveying of targeted audiences	Media buying PR services, social networks administration, etc.	1	€	€	€	€	€
			Sub-total	€	€	€	€
PC6 - RES off-grid solutions	**Description**	**Units/services (annually)**	**Unit price**	**Total annually**	**Y1**	**Y2**	**Y3**
Installation of hybrid photovoltaic and solar system (electricity and thermal heat generation) solutions to remote areas (not connected into the electricity grid) without electricity in BIH	-	8	€	€	€	€	€
Management & GMS*				**Total annually**	**Y1**	**Y2**	**Y3**
Engagement of one additional Technical expert (SB4/1)				€	€	€	€
Engagement of one additional Field Officer (SB3/2)				€	€	€	€
GMS – 8%				€	€	€	€
			Sub-total	€	€	€	€
			TOTAL	**€/a**	**€ [3 years]**		

Annex V – GED 2ND PHASE GENDER ANALYSIS

It is essential to take into consideration that many of the GED Programme interventions impact men and women differently, which is why gender is considered as one of the cross-cutting issues requiring due consideration in the planning, implementation and evaluation stages of the activities.

Gender refers to the socially constructed differences between females and males throughout the life cycle that are learned and deeply rooted in every culture, are changeable over time, and have wide variations both within and between cultures. Gender, coupled with intersections of age, class, race and able-bodiedness, governs the roles, opportunities, power and resources for women and men in any society[21].

In accordance with main goal, as well as with specific aims, GED Programme was built on five strongly interlinked and supplementing project components including c***apacity building, institutionalization of energy management, legislative framework / financial mechanisms, infrastructure measures as well as public awareness / marketing campaign.*** *Hence, the project* could be perceived as a multi-dimensional approach that encompasses social transformation and changes in production patterns and technologies, avoiding dangerous climate change and ensuring energy security.

The Sustainable Development Goals (SDG) include energy security for all, health, sustainable livelihoods, for women and men. With SDG 5 aiming to achieve gender equality and empower all women and girls, GED II project aims at taking into consideration the interplay between techno-economic and social-political aspect, by taking into account institutional settings (i.e. care economy), gender-biased power relations, and cultural values throughout all of its interdependent and correlated project components.
GED II project will continue to aim at an interdisciplinary and multilevel approach, encompassing vertical (national-local) and horizontal (academia, private sector, women's groups) levels of governance and decision-making[22].

The following text box shows the important role of gender and energy and gender intersections which shall be considered during the implementation of the project impacts.

[21] UNDP and GGCA. Gender and Energy.
http://www.undp.org/content/dam/undp/library/gender/Gender%20and%20Environment/PB4-AP-Gender-and-Energy.pdf
22 ICLEI Local Governments for Sustainability. Women and Climate Change Manual.
http://seas.iclei.org/fileadmin/user_upload/SEAS/Documents/Women_and_Climate_Change_Manual.pdf

Gender and Energy Intersections: Gendered Energy Divide

- ✓ Energy poverty has gender dimensions: Men and women have different energy dynamics (roles in household, decision-making areas, energy needs, coping mechanisms). For example, women are generally more vulnerable to health hazards from pollution generated by fuels such as coal, wood, and charcoal.
- ✓ Without access to modern energy services, women (especially poor women) spend most of their day performing basic subsistence tasks which limits wage, education opportunities as well as social and political interaction.
- ✓ Women are often excluded from discussions about energy plans and policies. Excluding women from decision-making is likely to result in gender-blind planning, financing, execution and implementation.
- ✓ Energy policies and programs need to be gender-responsive. This means incorporating meaningful roles for women in planning, designing and executing energy programs.
- ✓ Energy-health nexus. The provision of modern sustainable energy services to health facilities especially in off-grid areas or rural communities can improve women's health. Improved access to energy (SE4All) can lead to gender equity.
- ✓ Barriers, such as lack of access to credit and training, limit the possibilities for women to develop and use energy-based technologies. Thus capacity-building activities, financing and technological development should incorporate a gender perspective.

[23]

Taking this into consideration, the project will throughout its aims of achievement of the objectives, seek to capitalise on the know-how and experience that women could provide to the process. Not assuming that such processes are gender neutral will lead to utilizing female perspectives and leadership in BiH for recognising the benefits and further promoting benefits of EE&RES measures. Empowering women, therefore, can be the key to creating interest and motivating end-users to invest into EE/RES by developing capacities and skills, systematic and gender inclusive approach to decision making and reinvesting savings from implemented infrastructure projects.

Having said this, the project will through the following segments of work, treat the gender perspectives in more depth:

- Engage Women for Unique Perspectives

Engaging women as active stakeholders in project processes and using them as agents of change to promote and carry forward the activities to contribute to the creation of a favorable environment for investing in EE and RES measures in BiH - this is important because women have noteworthy experience and know-how as a result of their multiple societal roles - they have critical insight, perspectives and knowledge to significantly recognize and support the benefits of the energy efficiency measures. If women continue to be excluded from discussions about energy plans and

[23] Policy Talk: Importance of Gender Equity in Low Carbon Development for a Sustainable Asia Marvin Lagonera ICLEI

policies and decision-making- this is likely to result in gender-blind planning, financing, execution and implementation.

In practical terms, this project can do both, crowdsource the ideas of women throughout the project cycle, as well as promote parity and equitable inclusion of women while cooperating with the partners, such as the environmental finance institutions: the Environmental Funds of FBiH and RS, as well as all levels of government in B&H.

- Empower Women

The project puts forward the argument that women and men should be involved in the project whenever possible on equal terms, or at least in a more balanced way. This entails all aspects from project planning, decision making processes including membership of project boards, and internal management arrangements- that should be based on the principles of parity. This also means ensuring that women benefit on equal or fair terms from all capacity building activities provided by the project, especially those relevant to the Objective 1 of the project.
Additionally, the project will seek to ensure equal participation of women while working with municipal staff on strengthening capacities for establishment of energy monitoring and reporting mechanisms, especially through EMIS implementation and update. The project will seek to ensure that at least **40%** of end-users (of the 7000 total participants) trained on EMIS are women. Besides capacity and knowledge development, the project will seek to enhance the roles and status of women as participants and agents of change, build on their strengths and experiences, knowledge and coping capacity, and ensure women's access to information. This includes developing and integrating gendered and accessible capacity building programs.

- Gender Mainstreaming

Gender mainstreaming is "the process of assessing the implications for women and men of any planned action, including legislation, policies, or programs, in all areas and at all levels. It is a strategy for making women's, as well as men's, concerns and experiences an integral dimension of the design, implementation, monitoring, and evaluation of policies and programs in all political, economic, and societal spheres so that women and men benefit equally, and inequality is not perpetuated" (UN ECOSOC, 1997).

Gender mainstreaming has been the primary method for integrating a gender approach into environment and development efforts. In practice, gender mainstreaming means deliberately giving visibility and support to both women's and men's contributions individually, rather than assuming that both groups will benefit equally from gender-neutral development interventions[24]. Within a project context, gender mainstreaming commonly includes identifying gaps in equality through the use of sex-disaggregated data, developing strategies and policies to close those gaps, devoting resources and expertise to implementing such strategies, monitoring the results, and holding individuals and institutions accountable for outcomes that promote gender equality.

[24] UNDP and GGCA. Gender and Energy.
http://www.undp.org/content/dam/undp/library/gender/Gender%20and%20Environment/PB4-AP-Gender-and-Energy.pdf

For example, while working on the Project Objective 1, while working at the local level with relevant public authorities with the aim to ensure draft of **260 detailed energy audits of public sector buildings** - the project will aim to ensure that the number of female energy professionals participated at training programme for skills and knowledge development and NZEB will be at least **210** professionals.
Furthermore, under the Objective 4 of the project – through the aim of **implementation of cost-optimal, green jobs generating and emission reducing EE/RES infrastructure projects in BiH,** the project will aim at **10800** of women as direct beneficiaries of EE/RES project benefits.

- Data Collection

The project will ensure both that the sex disaggregated data is collected, and also that data collection process is gender-sensitive:

- Secure balanced number of women and men participating in all aspects of the project, and ensure that diversity is reflected in staff composition
- Collect opinions of recognized women's representatives as well as women NGOs
- Collect sex disaggregated data on project activities (training, projects, partners).

According to previously gathered gender disaggregated data about participants of EMIS trainings through the GED project, so far 888 women and 797 men attended those trainings (i.e. **52.7%** women and **47.3%** men attendees). During the year 2015, 225 women and 230 men attended those trainings (i.e. **49.5%** women and **50.5%** men attendees) while in 2016, 313 women and 224 men were recorded at the trainings (i.e. **58.3%** women and **41.7%** men attendees). Moreover, according to preliminary results of the "Study on human development benefits and gender mainstreaming" that has been currently in finalization phase within the GED project, **85%** of women employees and **91%** of women users of buildings where EE measures have been applied recognize that females and males have equal opportunities to obtain education in the field of energy efficiency which shows a positive result directly linked to the relevant project activity.

- Awareness Raising

It is of a crucial importance to inform the wider public about all effects of energy efficiency and renewable energy sources, because in addition to costs savings (as the most relevant to institutions and managers), it is necessary to make a step ahead towards the effects for final users per all relevant and applicable segments of Human Development Index as well as Gender Development Index. In such a situation, the basis shall be established of the satisfied users and employees as the best promoters of energy efficiency and renewable energy sources who will through their experiences further promote the benefits of energy efficiency and renewable energy sources. This shall be conducted through the planed study within the GED 2nd phase activities "Study on human development benefits and gender mainstreaming".

Additionally, gender aspects and issues will be explored and adequately included through the output of increase of *Public awareness on benefits of energy efficiency, renewable energy, NZEB, energy management and reduction of emissions to air.* Through the project's Media campaign outreach the project awareness raising and advocacy campaign will aim to reach at least 100 000 people of which at least **40 000** will be women **(40%).**

Not only will women be adequately represented in this campaign, but a number of issues will be addressed from a gender lens, and the perspectives of women included in order to mobilise greatest possible support of female population in promoting behavioural changes towards creation of raised awareness and public understanding of human development as a result of renewable energy and energy efficiency project benefits.

- Consultation and stakeholder involvement

In the project preparation phase, consultation have been carried out with key stakeholder groups, allowing for equal inputs from both men and women. Women have equal roles in preparation of the project proposal and on the team who has worked on this project proposal **50%** are women (4 out of 8 persons).

Every effort will be made to ensure that qualified women will be proportionally represented on the Project Board. Institutions to be consulted on gender issues at national level will include, but not limited to focal points for gender at government ministries, civil society organizations working in the fields of gender and climate change, as well as research institutions and development partners working on gender issues.

- Gender impacts monitoring

To provide gender-sensitive monitoring and evaluation, the outcomes and impacts of project activities within all Project Components now include at least one gender-related indicator, as well as sex disaggregated indicators.

Table below shows indicators and targets for project activities, taken directly from the Project logical framework matrix, with gender-related conditions highlighted:

Outcome objective 1	**To develop capacity and strengthen skills of Environmental Fund staff and energy professionals**						
Output objective	**260 detailed energy audits of public sector buildings drafted and assessed for EE/RES infrastructure investments**						
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**
		2017	**2020**		**2018**	**2019**	**2020**
1.6 Indicator	Number of women energy professionals participated on training programme for skills and knowledge development and NZEB	90	210		40		40

Outcome objective 2	**To establish energy monitoring and reporting mechanisms in BiH**						
Output objective	**EMIS is implemented and continuously updated in BiH municipalities**						
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**
		2017	**2020**		**2018**	**2019**	**2020**
2.2 Indicator	Number of end-users trained on EMIS (out of which at least 40% women)	4100	7000	Project reports	4100	5500	7000
Outcome objective 4	**To implement cost-optimal, green jobs generating and emission reducing EE/RES infrastructure projects in BiH**						
Output objective	**In at least 54 EE/RES infrastructure measures have been implemented with EU required technical standards.**						
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**
		2017	**2020**		**2018**	**2019**	**2020**
4.7 Indicator	Number of women as direct beneficiaries of EE/RES project benefits	0	10800		3600	3600	3600
Outcome objective 5	**To increase general public's understanding of EE/RES benefits**						
Output objective	**Public awareness on benefits of energy efficiency, renewable energy, NZEB, energy management and reduction of emissions to air is increased.**						
	Indicator	**Baseline**	**Target**	**Source of verification**	**Results**	**Results**	**Results**
		2014	**2018**		**2014**	**2015**	**2016**
5.1 Indicator	Media campaign outreach (out of which at least 40% women)	0	100000	Project reports and relevant technical documentation	30000	35000	35000
Output objective	**At least 24 off grid households in remote areas in BiH provided with thermal heat/electricity**						

	Indicator	Baseline	Target	Source of verification	Results	Results	Results
		2017	2020		2018	2019	2020
6.2 Indicator	Number of female benefiting from RES solutions	0	30		10	10	10

Furthermore, throughout project implementation, the activities will be, among others, focused on identifying various effects of energy efficiency measures in buildings, particularly public buildings. Energy efficiency effects mainly imply the factual effects related to energy savings, fuel saving, etc. Besides, there are related effects reflecting in employment of labour on preparing for and implementation of energy efficiency measures. However, in addition to those effects, there are plenty of those effects that are not factual, but should be tested, those related to change of behaviour and access to consumption of resources, comfort, productivity, air pollution on micro-locations, health, sick leaves and absence from work due to inadequate conditions, satisfaction with work environment, education environment and residential premises, etc. To ensure that the analysis of those effects is not random, the "Study on human development benefits and gender mainstreaming"; which is already in preparation through the GED project and expected to be completed by the end of 2017. uses the elements of the UN Human Development Index (HDI) as well as Gender Development Index (GDI) as the basis for assessment and analysis.
This study will show important results of the GED project, achieved through conducting a complex multi-disciplinary research including the analysis of economic, social, gender and psychological elements felt by managers, employees and users of the target buildings.

For the purpose of making of this study, visits have been made to the 84 target buildings (around 4500 employees) 225 employees have been interviewed and around 3000 users/beneficiaries (out of total 60650). The information has been collected which, among others, assesses the gender differentiated impact of energy efficiency measures, i.e. the influence of project measures and those measured which will be included in the GED II project as well.

According to the preliminary results around **85%** of women employed in buildings where energy efficiency measures have been applied through the GED project have stated that working conditions have been adjusted to their needs after application of EE measures, at scale from significant to highly significant. Effects of applying EE measures on their productivity and comfortable work environment can be witnessed with information that around **95%** of women employees are aware of their increased work-time activity and they have more energy for performing their duties, at scale from significant to highly significant.

Those changes significantly affect females' motivation to participate in decision making process within their work environment whereas **91%** of female employees express their increased readiness to participate in such processes. Similarly, **89%** of female employees noticed increase of concentration during fulfilment of their work tasks, at scale from significant to highly significant. When it comes to the opportunities to obtain education in field of energy efficiency, around **85%** of female employees consider that females and males have equal opportunities for such educations.

Further on, results have shown that around **81%** of female users of buildings where EE measures have been implemented through the project noticed that their activities have been increased at scale from significant to highly significant. Moreover, **85%** of female users feel more energetic and they noticed improvement of their efficiency in accomplishment of work tasks, at scale from significant to highly significant.

On the example of female users of the school buildings, results revealed that **90%** of female users noticed that students achieve better results during heating season due to the EE measures applied, at scale from significant to highly significant. Similarly, **80%** of female users of kindergartens noticed how quality of educational process has been increased during the heating season at scale from significant to highly significant.

Energy efficiency measures contribute to reduction of energy costs, energy consumption, CO_2 emission, fulfilment of EU accession and other multilateral obligations (UNFCCC), as well as job generation. However, beside those well-known positive effects, energy efficiency actions have also an impact on human development and gender mainstreaming which is, in BiH, still not known. Therefore, it is suggested, and would contribute to widen the understanding of GED project impact, to analyse and assess the empirical human development effects which emerged in the healthcare, education, safety and security, transparency and gender areas (and others) as a result of the implementation of energy efficiency measures in more than 80 public sector buildings in BiH.

The project will continue, through its previous and hopefully future phases, to ensure that further activities on energy efficiency advocacy and its gender mainstreaming can be undertaken and thus a continuity of energy efficiency actions and local (political and market) gender ownership assured after project implementation. This would additionally contribute that non-energy efficiency civil society organizations would advocate and mainstream energy efficiency measures in Bosnia and Herzegovina.

Annex 6 – MANAGEMENT RESPONSE TO GED PROJECT'S MID-TERM REVIEW

Evaluation Recommendation or Issue 1: Universal acceptance				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking***	
			Status	**Comments**
1.1. Institutionalization of energy monitoring and reporting (EMIS) a. Incorporating EMIS into rulebooks for energy monitoring and reporting on entity level b. further strengthening of entity funds for using EMIS as main tool for energy reporting and monitoring of savings in Public sector c. Introduction and acceptance of EMIS on state level government (MoFTER)	a. September 2018 b. January 2018 – December 2020 c. January 2018 – December 2020	Energy and Environment Sector and Green Economic Development Project	a. on-going b. on-going c. to be initiated	Both entity funds accepted EMIS as main tool for energy monitoring. Signed MoU with MOFTER for institutionalization of energy management.
Evaluation Recommendation or Issue 2: Extending coverage				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
2.1. Fundraising and expanding project activities throughout the country a. The sector and the project prepared and submitted new funding proposal for project extension and scaling up with intention to add minimum 54 new public buildings for retrofit. b. Project aim is to strengthen current and establish new	a/b/c. January 2018 – December 2020	Energy Environment Sector and Green Economic Development Project	Project proposal submitted to SIDA	n/a

partnerships with key local stakeholders (new cantons, municipalities, cities, institutions…) c. New activities will be added (renewable energy sources to remote areas off-grid, renewable energy sources installations into public sector buildings and public lighting)				
Evaluation Recommendation or Issue 3: Enlarging scope of retrofit projects				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
3.1 Implement additional energy efficiency measures in public sector buildings a. The project aims to perform "deep retrofit" in public sector buildings by installation of energy efficiency/ renewable energy source equipment and therefore promote country's move towards NZEBS (net zero energy building standard) b. Develop Policy for Nearly Zero Energy Building Standard	a. January 2018 – December 2020 b. January 2019 – December 2020	Energy Environment Sector and Green Economic Development Project	Project proposal submitted to SIDA. Project plans to implement this activity at minimum 18 public buildings	n/a
Evaluation Recommendation or Issue 4: Upgrading EMIS				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
4.1 In line with MTR, project integrated into new project proposal the development of	January 2018 – December 2019	Energy Environment Sector and Green Economic	Project proposal submitted to SIDA.	n/a

Energy intensity mapping application		Development Project		
Evaluation Recommendation or Issue 5: Adding street lighnting				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
5.1 The sector and the project prepared and submitted new funding proposal for project extension and scaling up with intention to add minimum 54 new public buildings/ infrastructure for retrofit, out of which 6 are intended for public lighting.	January 2018 – December 2020	Energy Environment Sector and Green Economic Development Project	Project proposal submitted to SIDA.	n/a
Evaluation Recommendation or Issue 6: Supporting Energy performance certificates (EPC)				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
6.1 Development of Measurement and verification (M&V) module within EMIS Supporting Energy Performance Certificates	January 2019 – December 2020	Energy Environment Sector and Green Economic Development Project	Project proposal submitted to SIDA	n/a
Evaluation Recommendation or Issue 7: SDGs				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
7.1 The project will work towards development and implementation of monitoring framework for regular monitoring and assessment of	January 2018	Energy Environment Sector and Green Economic	No progress yet	n/a

SDG-related benefits of the project interventions, at the level of individual investment sub-projects and broadly for the whole project.		Development Project		
Evaluation Recommendation or Issue 8: Gender				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
8.1 Development of "Study on human development benefits and gender mainstreaming"	August 2017 – April 2018	Energy and Environment Sector and Green Economic Development Project	Under development. Findings of the Study will contribute to better understanding of GED project impact, both on human development and gender mainstreaming, which will be further taken into account in next projects.	n/a
Evaluation Recommendation or Issue 9: Communications				
Management Response:				
Key Action(s)	**Time Frame**	**Responsible Unit(s)**	**Tracking**	
			Status	**Comments**
9.1 Upgrade and further develop communication strategy	January 2018 – December 2020	Energy and Environment Sector and Green Economic Development Project	Projects communication strategy developed in 2017. Needs upgrading and further development	n/a
Evaluation Recommendation or Issue 10: Donnor's visibility				
Management Response:				

Key Action(s)	Time Frame	Responsible Unit(s)	Tracking	
			Status	Comments
10.1 Within communication strategy, integrate donnor's visibility	January 2018 – December 2020	Energy and Environment Sector and Green Economic Development Project	n/a	n/a