UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Enterprise Energy Efficiency (3E)

PILOT PROJECT PROPOSAL NO. B3-4

PRIMARY AND SECONDARY SCHOOL IN OLOVO

SITE VISIT REPORT AND PILOT PROJECT PROPOSAL EVALUATION

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Chief of Party

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1. Pilot Project Proposal Screening Report

I Partners:
Ministry of Education, Science, Culture and Sport of the Zenica-Doboj Canton

II Proposed EE measures after USAID 3E analysis:	
1. Boiler house with biomass boiler (One for both schools)	$170,000
2. Installation of thermostatic valves (Both schools)	$10,000
3. Monitoring and Verification System	$15,000
Total cost:	**$195,000**[1]

III Co-funding contributions:	
1. Direct co-funding from partner's own funds;	0
2. Partner co-financing from borrowed funds;	0
3. Other donors` co-funding:	
Caritas Switzerland	$100,000
4. Provision of works and services (e.g., decommissioning of old equipment, installation of new equipment, design and supervision services, monitoring and verification (M&V));	
5. Provision of materials and equipment (e.g., piping, wiring, insulation material, control equipment); and	
6. Partnership with a private sector partner that might contribute any of above.	
Total confirmed co-funding by partner/donors:	**$100,000**

IV Co-funding by USAID 3E:	
Total 3E Project co-funding based on best estimate:	**$95,000**

V Compliance with criteria for selection:		
1. Replicability potential and relative ease of implementation;	0 - 12	12
2. Readiness and ability to put in place clear M&V procedures for reporting on post-implementation energy savings;	0 - 12	12
3. Appropriate geographic location, building type and types of technologies so that the total portfolio of 10 pilot projects when implemented demonstrates various EE measures, technologies and practices applied to different building types or EE practices and are located across the country;	0 - 24	20
4. Amount of co-financing for the pilot project that the partner is willing to or able to secure, or the amount of assistance the pilot project can obtain from other donors or private sector;	0 - 24	24
5. For the public sector - willingness to introduce energy management practices into other public buildings that are responsibility of the partner;	0 - 12	6
6. For municipalities - readiness to sign the EU Covenant of Mayors on EE;	0 - 4	0
7. For all – a willingness to support the raising of EE awareness of building users and citizens at large.	0 - 12	12
Total:	**100%**	**86%**

VI Environmental Compliance:	
Confirm that the pilot project implementation does not cause any environmental concerns or adverse environmental effects.	Yes

[1] Contacts with UNDP and the Japanese Embassy are in progress. If they join the project, the scope of work will be increased accordingly to include windows and facade insulation.

Project evaluation summary

Primary school "Olovo" - Basic data:

- Year of construction = 1975
- Number of floors = 2
- Heated area = 2000 m^2
- Top floor ceiling area = 750 m^2
- Heated volume = 7,500 m^3
- Outside wall area = 600 m^2
- Window area = 600 m^2
- Number of students = 630
- The building is thermally not insulated
- Number of operating days = 150-180 days
- Heat source – light fuel oil
- Heating supplied by two light fuel boilers, 2x 230 kW
- Annual total energy consumption = 30 tonnes of light fuel oil (360 MWh)
- Total annual light fuel oil costs = 65,000 KM ($50,000)

Secondary Polytechnic School - Basic data:

- Year of construction = 1967
- Number of floors = 3
- Heated area = 1500 m^2
- Top floor ceiling area = 500 m^2
- Heated volume = 6,000 m^3
- Outside wall area = 800 m^2
- Window area = 550 m^2
- Number of students = 450
- The building is not thermally insulated
- Number of operating days = 150-180 days
- Heat source – coal
- Heating supplied by a coal boiler, 320 kW
- Annual total energy consumption = 90 tons of coal (325 MWh)
- Total annual coal costs = 18,000 KM ($13,000)

Recommended measures:

1. Construction of a new boiler house with a biomass boiler that will be used by both schools.
2. Installation of thermostatic valves in both schools.

Rationale:

1. Biomass is a renewable resource that is abundant in the area where the school is located and in Bosnia and Herzegovina in general.
2. Biomass is a lot less expensive then light fuel oil, even the most expensive type of biomass – pellets, which will result in significant financial savings.
3. The type of biomass boilers that will be installed are able to handle different types of biomass – pellets, wood chips made of bark, branches and general wood waste from the wood processing industry, which will enable the school management to select the most economical biomass available on the market.

4. A new boiler house and a storage silo for biomass would be constructed in the secondary school backyard. The same boiler house and boiler would be used to heat the primary school located only 100m away.
5. Other types of biomass are readily available in the wooded areas around the city of Olovo, such as branches left from logging, which are currently left to decompose in the woods.
6. Stimulate local economy - there are several plants in Bosnia and Herzegovina that produce pellets and several wood processing plants with large amounts of wood waste in the region of Olovo. Increasing the demand for biomass as fuel may motivate companies to obtain concessions from the local government for collection of branches in the woods.
7. Thermostatic valves should be installed on all radiators in the buildings; and in conjunction with automatic regulation of heating water supply temperature, significant energy savings and optimal thermal comfort can be achieved.

Benefits:

- Demonstrate practically the reduction of fossil fuel consumption through the usage of a renewable energy source – biomass.
- Pave the way for wider usage of biomass in schools that use coal and light fuel oil.
- Capacity building – local companies will design, install and maintain the new boilers and boiler house.
- Stimulate economy – the project will increase the need for biomass that will be supplied from the local wood processing industry. It would also increase the need for biomass boilers, which can be purchased locally. In addition, if some local company succeeds in getting a concession from the local government for collection of branches in the woods, it will employ people and further reduce the cost of biomass. This also has an additional environmental benefit because decomposition of branches produces methane which is a 21-times more potent greenhouse gas than CO2. It could serve as an example and motivate the start-up of new companies across Bosnia and Herzegovina in the new business area of collection, processing and transport of forest biomass. This would also create an opportunity for companies from Bosnia and Herzegovina to manufacture the equipment needed for this new industry. The existing biomass boiler manufacturers from Bosnia and Herzegovina would also benefit from the increased demand for their products.
- Educate all students, teachers, parents and visitors, because an LCD panel will be mounted at the entrance of the schools, showing the amount of energy produced by biomass, financial savings compared to coal and tons of CO2 saved.
- Increase awareness of the local governments of the benefits of usage of renewable energy sources which may lead to new regulations related to renewable energy usage and financial support of local governments for such projects.
- Reduce usage of coal and CO2 and SO2 emissions.
- Public health improvement.

Site visit report and analysis

Introduction

In Bosnia and Herzegovina many schools use coal and light fuel oil for heating without consideration for its negative impact on environment because of its ease of use and availability. It is in the interest of the country to promote the usage of biomass, which is less expensive, environmentally friendly and plentiful in the region. Wood waste produced by a large number of wood processing plants in the region will be used as a fuel.

Primary School - Site visit report

The school was built in 1975 and is located in near the downtown area of Olovo. It has two floors (Figure 1). Its walls are made of brick and are not thermally insulated. Double glazed wooden frame windows were installed in 1997, but are of poor quality, poorly maintained and need to be repaired (weather stripping, painting).
The top floor is also not insulated, which leads to higher heat loss on that floor. The heat is provided by an oil fired boiler and is operated manually. The heating system has no automatic regulation and is therefore energy inefficient.

Figure 1. Primary School "Olovo" in Olovo

Figure 2. Double glazed windows installed in 1997

Secondary School – Site visit report

The school was built in 1967 and is located in near the downtown area of Olovo. It has three floors (Figure 1). Its walls are made of brick and are not thermally insulated. There are 2 types of windows installed: double frame single glazed windows, where the frames are connected and open together; and single glazed windows in the staircase (Figure 1). Both types cause high heat loss and need to be replaced .

The top floor is not insulated, which leads to higher heat loss on that floor. The heat is provided by a coal fired boiler and is operated manually. The heating system has no automatic regulation and is therefore energy inefficient.

Figure 3. Secondary Polytechnic School in Olovo

Figure 4. Windows in the hallways and classrooms (left) and in the staircase (right)

Technical and financial analysis

Energy savings will be achieved only on the installation of thermostatic valves. Installation of the bio-mass boiler will not have an effect on energy saving but will provide a saving on the cost of the energy source, because bio-mass costs much less then fuel oil there is a significant price saving. Energy consumption for these buildings is shown in the following table:

Table 1. Energy consumption

Energy carrier	Unit	Present	After measures	Savings
Light fuel oil (Primary School)	MWh	360	345	15
Coal (Secondary School)	MWh	325	310	15
Energy cost (both schools)	$	64,000	37,000	27,000

The reduction of CO2 emissions achieved by implementation of the measures is about 80 tons per year since biomass is CO2 neutral.

The cost for the measures and the payback period is shown in the following table.

Table 2. Preliminary cost and benefit analysis for recommended measures

Measures	Investment [$]	Annual Savings Est [$]	Simple payback period [year]
Boiler house with biomass boiler, installation of thermostatic valves.	195,000	27,000	7,2

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LETTER FROM CARITAS SWITZERLAND