UNITED STATES AGENCY FOR INTERNATIONAL DEVELOPMENT

Enterprise Energy Efficiency - 3E

PILOT PROJECT PROPOSAL No. B1-2
SUISSE CARITAS – INSULATING 20 INDIVIDUAL HOUSES

SITE VISIT REPORT AND PILOT PROJECT PROPOSAL EVALUATION

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Chief of Party

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CONTENTS

1. PILOT PROJECT PROPOSAL SCREENING REPORT
2. PROJECT EVALUATION SUMMARY
3. PROJECT TECHNICAL DESCRIPTION AND ANALYSIS

ATTACHMENT

A. LETTER FROM CARITAS SWITZERLAND

1. Pilot Project Proposal Screening Report

I Partners:
Suisse Caritas and Home owners

II Proposed EE measures:	
Installation of 10cm Expanded Polystyren (EPS) thermal insulation	$126,000
Total cost of proposed EE measures	$126,000

III Co-funding contributions:	
1. Direct co-funding from partner's own funds – home owners;	$75,000
2. Partner co-financing from borrowed funds;	0
3. Other donors` co-funding:	
SUISSE CARITAS	$26,000
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));	Labor of home owners included under item 1.
5. Provision of materials and equipment (e.g., piping, wiring, insulation material, control equipment); and	Included under item 1.
6. Partnership with a private sector partner that might contribute any of above.	0
Total confirmed co-funding by partner/donors:	$101,000

IV Co-funding by USAID 3E:	
Total 3E Project co-funding based on best estimate:	**$25,000**

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	8
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	N/A
6. For municipalities - readiness to sign the EU Covenant of Mayors on EE;	0 - 4	N/A
7. For all – a willingness to support the raising of EE awareness of building users and citizens at large.	0 - 12	12
Total:	**100%**	**90.5%**

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

Note: Not applicable criteria is not used in the calculation of the score (in this case 90.5%=76/84)

2. Project evaluation summary

2.1 Basic data about the project:

- Project is to improve thermal insulation of 20 family houses
- Implementation period = May to October 2011
- Thermal insulation = minimal or none
- Number of individual family houses = 20
- Average heated area per house =130m2
- Number of occupants = 90
- Number of operating day = Heating season = 200-220 days
- Annual total energy consumption and costs = 8 - 12 tons of coal and wood
- Analyzed house heated area = 140 m2
- Analyzed house facade area = 133 m2

2.2 Recommended measures:

1. Thermal insulation of building envelope by installing 10 cm of expanded polystyrene (EPS) on external walls, roof and floor.
2. Installation of sealing strips on windows.

2.3 Rationale:

1. Project management and implementation supervision will be carried out by Suisse Caritas for the region of Sarajevo and for the region of Tuzla by the implementing partner CEETZ (Center for Ecology and Energy Tuzla). The project is technically supported by the engineering company Seecon GmbH from Aarau, Switzerland. USAID 3E will finance EPS procurement costs for approximately 20 houses located in the Tuzla and Sarajevo area, and its involvement in implementation supervision will be limited to a couple of visits of selected houses during implementation and final inspection of all 20 houses. USAID 3E will insist that the houses are completely finished, including final painting. Caritas Switzerland and its partners have the necessary experience to oversee implementation of the project. USAID will sign a contract with Suisse Caritas only, while Suisse Caritas will sign contracts with individual house owners. In the contracts between Caritas and the home owners (sample attached), it is stipulated that Suisse Caritas will provide EPS, the manual for the installation of EPS and supervise installation, while the house owners will provide the rest of the necessary materials, hire a construction company to carry out the works as defined in the supplied manual, and provide energy consumption, indoor and outdoor temperature data before and after installation of EPS.
2. Caritas project leaders and a number of practitioners including craftsmen, teachers and students (in total 40 persons) have been trained by a vocational school Polybau from Switzerland on how to properly install EPS in the autumn of 2010. This will insure proper installation of EPS.
3. Minimal cost to USAID 3E with maximum results
4. USAID 3E cooperation with another international donor in the area of energy efficiency
5. Very large co-funding percentage by house owners (60%) demonstrates their commitment to the project and ensures successful project implementation. This project

can pave the way for replication of the project on an individual basis without the involvement of international donors and possibly motivate local government to subsidize such projects in the same way.

6. Reduction of usage of coal – heating source with largest negative environmental impact.
7. Smaller pilot project with 10 houses already implemented where energy consumption was measured before and after installing thermal insulation which enabled exact determination of energy savings (40-50%).
8. Building envelope of these houses is either not insulated or inadequately insulated and installing thermal insulation has a relatively short payback period.
9. The joint procurement of the insulation material facilitates is at lower prices than the homeowners would pay on an individual basis.
10. Home owners are required to record indoor and outdoor daily temperatures and to keep track of coal consumption – energy monitoring.
11. Windows on most houses are double glazed air-filled windows installed in the period after 1995. Their heat transfer factor is too high for today's standards, but replacement is expensive and the payback period is longer, so their replacement is not recommended. Only single glazed windows should be replaced where applicable.
12. It would be ideal to also inspect heating systems and replace inefficient boilers, replace windows and switch completely to biomass heating. However, for such a large number of houses, the cost would be prohibitive and the project coordination extremely difficult. USAID 3E will investigate the possibility that one or more of the house owners implements a complete energy efficiency project by implementing the mentioned measures.

2.4 Benefits:

- Demonstrates successful implementation of small scale projects where beneficiaries are the main investors and take on responsibilities related to quality of work and implementation deadline
- Significant reduction of soot, CO2 and SO2 emissions, since coal is the main heating source.
- Capacity building through training of craftsmen and supervision of EPS installation
- Practical demonstration of financial benefits of thermal insulation
- Promote the practice of insulation of houses and energy consumption monitoring
- Stimulate local economy - local craftsmen will install EPS and increase the demand for EPS, which is also produced in Bosnia and Herzegovina
- Increase public awareness about the advantages of improved insulation of houses
- Increase awareness of the local government of benefits of thermal insulation for the community which may lead to financial support of local governments for such projects
- Public health improvement

3. Project Technical Description and Analysis

3.1 Introduction

Suisse Caritas implemented a pilot project (October 2008-March 2010) of adding thermal insulation to 10 family houses that use coal and wood for heating (5 houses in each of Sarajevo and Tuzla regions). Contracts with home owners were signed that defined their obligations (insulate the house, cooperate on the measurement of the energy saving). Before the heating season, a heat meter was installed in the main heating pipe. The quantity of fuel stored for the winter was qualitatively and quantitatively recorded as well as additional deliveries during the heating season. In summer 2009 the houses were insulated and fuel consumption was measured during the heating season 2009/2010. According to the measurements 40-50% of energy was saved by the insulation measures.

A new project of the same type, only on a larger scale (50 houses), was started by Suisse Caritas in November 2009. The fuel consumption before measures (heating season 2009/2010) is available and fuel consumption after measures (heating season 2010/2011) will be measured. Similar savings as those achieved in the first project are expected.

The pilot projects also included the following activities:

- Awareness campaigns (presentations of the project to various institutions in the Sarajevo and Tuzla regions)
- Two-day practical workshops in Olovo held at vocational training schools and construction companies from the project area organized by a Suisse vocational training school specialized in insulation, Polybau (http://www.polybau.ch)
- Demonstration projects (thermally insulated houses in the project region and insulation of the gym hall roof at the high school "Musa Cazim Catic" in Olovo).

Suisse Caritas plans to implement a project of installation of thermal insulation on 20 family houses in 2011, 10 in Tuzla region and 10 in Sarajevo regions and asked USAID 3E to support the project financially. Project management and implementation supervision will be carried out by Caritas Switzerland (which is based in Sarajevo) for the region of Sarajevo and for the region of Tuzla by the implementing partner CEETZ (Center for Ecology and Energy Tuzla). The project is technically supported by the engineering company Seecon GmbH from Aarau, Switzerland.

The project provides insulation material (10 cm thick EPS) to the homeowners. The homeowners also receive technical assistance for installation of the EPS by the project. The homeowners pay for the additional materials and labor, which amounts to 60% of the funds necessary for implementation - a very high homeowner financial participation rate. This project can pave the way for replication of the project on an individual basis without the involvement of international donors and possibly motivate local government to subsidize such projects in the same way.

3.2 Site visit report

Because of the large number of houses involved, USAID 3E did not conduct site visits of applicants. There are over 500 applicants of which 30 will be selected by Suisse Caritas. From these 30 houses USAID 3E chose 20 houses. The 20 houses proposed with addresses, names and other relevant information is shown in Table 1. One of the houses included in the first part of the project is located at Binjezevo 12, Sarajevo and is owned by Mr. Admir Residagic. The relevant data collected by Suisse Caritas. The house is depicted in Figure 1. The house was insulated in 2009 and the energy consumption during heating season 2008/09 (before measures) and energy consumption during heating season 2009/10 (after measures) recorded. USAID 3E team visited this house and concluded that the quality of material and workmanship is excellent.

Table 1. Energy consumption

	Owners	Municipality	Object size (m)	Floor / heating	Address	Telephone number
1	**Kramar Željko**	Ilidža	9,3X8	2/II	Doglodske Barice 8	033 808539
2	**Halilović Rasim**	Ilidža	10X8,5	2/II	Ivana Brkića 10	033 636603
3	**Milidrag Mile**	I. Ilidža	9,2X8,6	2/II	Aerodromska 13	065 663598
4	**Lubura Slobodan**	I. Ilidža	10X11	2/II	II Sr.Brigade 61	065 378848
5	**Mario Kolak**	Sarajevo - Novi grad	10X9	3/III	Gatačka 54	062 316822
6	**Tabaković Džemo**	Sarajevo - Novi grad	9,5X8,5	3/II	S.Poturka 4	033 452208
7	**Mitar Kovačević**	Pale	6.5X9.5	3/III	Javor bb	065 705840
8	**Milavica Fuad**	Vogošća	8,2X8,7	3/II	Orahov Brijeg 25	061 503953
9	**Fikret Stambolić**	Ilidža	6,5X13	3/II	Butmirska C 156	061 192079
10	**Turkušić Hasiba**	Sarajevo - Novi grad	8X12,5	4/II	Rasima Turkušića 28	033 451621
11	**Valdet Alijević**	Tuzla	14,5x4,5	2/II	Hendek 14	061 231 956
12	**Suad Sejfić**	Tuzla	9x12	3/III	Brdo Čikma 23	061 168 609
13	**Senad Jogunčić**	Tuzla	17,5x6,5	2/II	Kicelj do 20	035 257 549
14	**Sead Kušljugić**	Gornja Tuzla	10x8	2/II	Meldina Hajdarevića 56	061 178 589
15	**Admir Suljić**	Tuzla	8x10	2/II	Šići 57	061 886 907
16	**Tomislav Toman**	Gračanica	9,10x11	3/II	Podrinjska bb	035 707 084
17	**Dragutin Toman**	Gračanica	10x17	2/II	Podgaj bb	061 731 197
18	**Rasim Softić**	Lukavac	8,5x8	2/II	Gnojnica	061 196 129
19	**Slobodan Dedić**	Živinice	14x9	3/III	Sjever C 64	062 341 229
20	**Suad Avdagić**	Živinice	10x15,5	3/III	Školska 24	061 146 481

The heated area in the house consists of a ground floor and a first floor – in total 140 m2. The house also has a boiler room and a garage. The house frame is made of reinforced concrete and the external walls are 20cm thick made of clay blocks. On the concrete slab of the top floor 10cm of mineral wool is laid and the ground floor is insulated with 5cm of EPS. Even though the floor and the roof of the main part of the house do not meet the latest thermal insulation standards, they are well insulated, compared to the external wall; hence, the recommended measure is to insulate the external walls with 10cm of EPS and the walls and flat roof of the garage and boiler room.

The energy consumption before the measures was 10 tons of coal, and the energy consumption after the measures is 5 tons of coal. This calculated savings potential is supported by actual measurements of energy consumption after the measures carried out in earlier projects. The energy consumption data for this house are shown in table 2.

Table 2. Energy consumption

Energy carrier	Unit	Present	After measures	Savings
Coal	ton	10	5	5

The reduction of CO2 emissions achieved by implementation of the measures is 8 tons per year.

Figure 1. Family house at Binjezevo 12, Sarajevo

Table 3. Preliminary cost and benefit analysis for thermal insulation

EE Measure	Investment [$]	Annual Savings Est [$]	Simple payback period [year]
Thermal insulation – 10cm EPS	5,000	700	7

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