

## Executive summary of the final evaluation report

of the project „Usage of renewable energy sources for district heating system in Nemila village, Bosnia and Herzegovina” - including its reconstruction after 2014 floods

### Purpose of the evaluation

The main purpose of this evaluation is to obtain independent, objectively substantiated and consistent findings, conclusions and recommendations that can be used by the Ministry of Foreign Affairs of the Czech Republic, in cooperation with the Czech Development Agency, for making decisions related the future direction and implementation modalities of the Czech Development Cooperation in Bosnia & Herzegovina (BaH) in the energy production and supply sector.

The subject of the evaluation is the project “Usage of renewable energy sources for central heating system in Nemila village, Bosnia and Herzegovina” including its rehabilitation after 2014 floods. The evaluation is based on the OECD – DAC criteria, with emphasis on impacts, sustainability and replicability.

### Brief description of the evaluated project and evaluation context

The evaluated project was financed from 58 % by Czech Development Cooperation and co-financed from 42 % by the recipient (Zenica Municipality). The rehabilitation after floods was financed by the Czech Development Cooperation. The project and its rehabilitation were coordinated by Czech Development Agency.

### Key characteristics of the evaluated interventions

Title	Duration	Implementer	Location	Total value	Main outputs
1. Usage of renewable sources of energy for central heating system in the village of Nemila, BaH	2011 - 2013	Consortium „EKO-CZT Nemila“ represented by MEVOS s. r. o.	Nemila	74.46 mil. CZK	<ul style="list-style-type: none"><li>• Feasibility study for the central heating system with focus on availability of biomass</li><li>• Construction of the main heat distribution network</li><li>• Construction of functional boiler room technology</li><li>• Construction of intermediate fuel storage</li><li>• Dissemination of information about the Czech Development Cooperation and the project activities</li></ul>
2. Rehabilitation of the central heating system after the floods	2014	MEVOS s. r. o.		0.96 mil. CZK	<ul style="list-style-type: none"><li>• Revision and inspection of the entire system</li><li>• Repair of the transfer stations</li><li>• Cleaning of the heat distribution system and repair of fittings</li><li>• Repair and rehabilitation of damaged and missing parts of the distribution system</li><li>• Testing</li></ul>

The basis for the current bilateral development cooperation between the Czech Republic and Bosnia & Herzegovina is the Program for Development Cooperation Bosnia & Herzegovina 2011 - 2017. Energy production and supply and general environmental protection are among the priorities of this Program. Cooperation on the utilization of renewable sources of energy belongs to the main objectives of the Czech Development Cooperation in the energy production and supply sector.

### Identification of the evaluation team

The evaluation is implemented by a four-member team 4G eval s.r.o. comprising:

- Marie Körner – Project management and quality assurance
- Monika Přibylková – Lead Evaluator
- Jan Štejfa – Expert on energy generation and supply and environmental issues
- Lejla Šuman – Local Expert

### Key findings and conclusions in relation to the terms of reference

#### Relevance

The evaluated project is consistent with the priorities of BaH in the areas of sustainable economic growth and natural resource management as well as with relevant strategic documents of BaH and

Czech Development Cooperation. The project contributes to the fulfilment of obligations arising from international commitments of BaH in the area of climate changes.

### **Efficiency**

Investment cost related to 1 MW of maximum operated capacity in Nemila are in the amount of 48 mil. CZK. In comparison with comparable heating plant in Gracanica these cost are higher because the capacity in Nemila is utilized only from 20 – 50%, while in Gracanica from 100 %. Investment cost per Nemila inhabitant reach nearly 1 000 EUR. Heat sales revenues in Nemila cover less than 40% of the total production cost.

The installed technology belongs to examples of good practices for central heating systems in BaH. The main advantage of this technology is its flexibility regarding the size of the used biomass.

Cooperation, communication and coordination among project partners have been very good. Project reports provided sufficient information about the progress in project implementation. The targets' adjustment has however been justified only partially; description of achieving some of the target and purpose indicators is missing. The target values needed to be adjusted because most of the large pre-selected objects were not ready for the connection. The necessary changes in numbers and types of connected objects required increase of the budget which was ensured by both Czech Development Agency and Zenica municipality.

### **Effectiveness**

The logical structure of the project has been sufficient for implementation purposes. The purpose, targets, outputs and indicators were however not sufficiently specified; some indicators are not measurable.

The project target has been modified during implementation by changing the numbers and types of connected objects. The revised target (connecting 91 smaller objects/family houses a 3 large objects including school with 1 380 students) has been met. Project outputs were generated in accordance with the requirements of the tender documentation. The installed capacity is 3 MW.

Knowhow gained during training in the heating plant operation and distribution system is applied in practice.

### **Impacts**

Replacement of the old boilers by the central heating system resulted in a reduction of fossil fuel burning (min. 200 t of coal and 10 m<sup>3</sup> of heating oil annually). However, 29% of the connected households complement the central heating by their "traditional" heating systems and 10 % of the connected households do not used the central heating at all.

The quality of air at the local level has improved in the following parameters: PM, SO<sub>2</sub>, NO<sub>x</sub>, CO. CO<sub>2</sub> emissions have also decreased; it is however not possible to establish by how much exactly. Improvements in the air quality after commissioning of the central heating plant have been perceived by 68% of the connected households.

Availability of affordable biomass fuel, meeting all commitments defined in the Memorandum of Understanding and rehabilitation after the floods were among the factors that contributed to achieving the project objective and results, although the biomass price has been higher than originally expected.

Achieving further improvements of air quality and better business economy are prevented by the fact that many connected households consume less heat from the central heating than originally planned.

The central system improves heating comfort for connected households, the school, health centre, police station, as well as for several other smaller connected buildings.

### **Sustainability**

The project did not include a specific phasing-out strategy and the operator Grijanje d.o.o. does not have a strategy for further development of the heating network. Trained technicians, 5-year service guarantee and the operator's subsidies of running expenses contribute to sustainable running of the plant.

The supplied technology including operating procedures is owned by the heating plant operator. Project outputs and heating plant operation are in compliance with the relevant legal requirements.

The selected combustion technology is suitable for its purpose; it is simple for operation and maintenance. The boiler feed in system allows combustion of a large scale of biomass grain.

The expected service life of the installed central heating system is 15 to 20 years. The technology has a control range of 10-110% of the capacity. The required fuel is provided through annual biomass supply tenders. The supplied biomass meets the quality requirements of the heating plant.

Ensuring quick repairs of the central heating system after the floods in 2014 enabled the timely resumption of operation in their entirety and contributed to the reliability of heat supply. After rehabilitation, the heating plant's insurance against natural disasters, including floods, was negotiated. The operator of the heating plant provides financial, human and organizational capacity for operation and maintenance. Owner of the operator (Zenica municipality) covers operating losses; this is not sustainable in the longer term. Improvement of business economy would be possible by significant increase in the number of connected objects. Additional households in Nemila expressed their interest in connections, but the operator has not yet found partner who would invest in the extension of the network.

#### **Follow-up cooperation**

On the basis of good cooperation and demand for similar projects, the implementing team and the external expert of the Czech Development Agency (involved in project monitoring) carried out several follow-up activities (other projects in the given sector in BaH and Serbia).

The town of Zenica as well as several other municipalities and towns from Bosna and Herzegovina, expressed interest in the introduction of the same technology.

#### **Findings of systemic character**

From the point of view of the medium term needs of BaH, the topic addressed by the project (construction of central heating system using renewable energy sources) is still relevant. Support to "green" heating, hot water production or energy production projects in smaller towns or in civic amenities is still appropriate. Support of central heating systems in municipalities, without sufficient number of public and commercial organizations, which are not ready or not interested in connection to central heating system, is not cost-effective. The main drawback of this project consist in not ensuring the feasibility study (including research of the interest to connect and willingness to pay, and analysis of technical and financial readiness) in the identification project phase.

#### **Cross-cutting principles of the Czech Development Cooperation – assessment according to the methodology of cross-cutting evaluation principles of the Czech Development Cooperation**

In terms of the environmental principle, there has been a significant improvement in the use of renewable energy sources and air quality.

In terms of the principle of good governance, there has been a significant improvement in the implementation of project-related commitments by local partners and a partial improvement in stakeholder involvement.

From the point of view of the principle of respect for human rights, including gender equality, there has been some benefits for all population of Nemila.

**External presentation in the partner country** - has been sufficiently secured by an information board, leaflets, project presentation in the school, at the university as well as at the International Fair, held in Zenica. Information has also been disseminated via media (newspapers, internet, TV spots).

### **Summary of conclusions**

<b>Evaluation criterion</b>		<b>Rate of fulfilment</b>
Relevance		High
Efficiency		Rather low
Effectiveness		Rather high
Impacts		Rather high
Sustainability		Rather low
Follow-up cooperation		Rather high
Cross-cutting principles of the Czech Development Cooperation	Environment and climate	High
	Good (democratic) governance	Rather high
	Respect for the human rights of beneficiaries, including equality between men and women	Rather high
External presentation in the partner country		High

## Recommendations

The most important recommendations divided in to two groups, depending on the type of recommendation, are presented below. The three key recommendations for the project sustainability improvement and elimination of future drawbacks in identification of similar project are marked in bold.

Recommendation	Level of importance <sup>1</sup>	Main addressee	Justification
<b>A. Recommendations related to the project and continuation of the Czech Development Cooperation in the given sector in BaH</b>			
<b>1. Creating a strategy for the further development of central heating systems in Nemila and business plan</b>	1	Grijanje d.o.o.	Improved economic efficiency and sustainability of operations
<b>2. Ensure funding to increase the number of consumers connected to central heating system</b>	1	Zenica Municipality, ZEDA <sup>2</sup> , Grijanje d.o.o., Nemila Local Authority	Improved economic efficiency of operations
3. Support the establishment of an energy cooperative	2	Zenica Municipality, Grijanje d.o.o., Nemila Local Authority	Support to economic development in Nemila and surrounding villages, Improve the economy of the heating plant operation
4. Conclude an agreement on after-guarantee services with the implementing partner	1	Grijanje d.o.o.	Ensuring the long-term operability of the central heating system
5. For future projects focused on building biomass-fired heating plants, add a backup power source for the technology	1	Czech Development Agency	Contributes to reliability of operations
6. Continue cooperation in the sector of energy production and supply in BaH in smaller towns in the form of constructing or rehabilitating central heating systems and cogeneration, using renewable sources of energy, solar systems for heating water, photovoltaics energy production; and consideration of the support of central management of smaller local energy sources	1	Czech Development Agency	Contribute to improving local air quality and reducing greenhouse gas emissions
<b>B. Procedural and systemic recommendations</b>			
<b>1. Preparing feasibility study at the identification phase of the project cycle and including the requirement for a feasibility study in the Project Cycle Methodology</b>	1	Czech Development Agency	Reduce the uncertainty of the information provided about the project intent and better specification of the assignment
2. Require the use of a cooperation agreement between the recipient and the implementer	1	Czech Development Agency	Improved project management, meeting Memorandum of Understanding commitments
3. Definition of specific and measurable objectives and related indicators in the project formulation	1	Czech Development Agency	Better control of project objectives in monitoring and evaluation
4. Require assessment of risks and assumptions in periodic project and monitoring reports	1	Czech Development Agency	Better project management and monitoring
5. Raising awareness about the development cooperation program in BaH, modalities of possible support and the project cycle of development cooperation among potential partners in BaH	1	Embassy of the Czech Republic in Sarajevo	Obtaining more project ideas for the identification phase
6. Modify the proposed Methodology for Evaluation of Cross Cutting Principles in accordance with recommendations in Annex 11 of the Report	2	INESAN s.r.o.	Improved understanding of the methodology and informative value of the assessment

<sup>1</sup> 1 – most important, 2 – important, 3 – least important

<sup>2</sup> Zenica Development Agency