



Feasibility Studies on JI Project under Kyoto Protocol Municipal Energy Agency- Rousse, Bulgaria

Summary

This project is developed as a Joint Implementation (JI) project by Municipal Energy Agency – Rousse in cooperation with local district heating company “Toplofikatsia-Rousse SPJsC” (TPP Rousse), Heating Supply Company – Shoumen, Center for Energy Efficiency EnEffect, Sofia and Regional Environment Centre for CEE. The project aims to optimize production processes and extend the existing district heating network supplied by TPP Rousse in the city of Rousse (see figure below). At present the residents in the target area (6 432 flats) are using individual heating equipment/systems for space heating and domestic hot water (DHW) fuelled by electricity, briquettes, wood and diesel. After the implementation of the project, the individual heating equipment/systems will be replaced by district heating system, resulting in the change of energy sources and sources of emissions arising from space heating and DHW in the target area and providing higher comfort of living for the citizens.

End-user area

New buildings
 Refurbishment of buildings
 Transport and mobility
 ■ Financial instruments
 Industry
 Legal initiatives (regulations, directives, etc)
 Planning issues
 Sustainable communities
 User behaviour
 Education
 Other

Target Audience

Citizens
 Households
 ■ Property owners
 Schools and universities
 Decision makers
 ■ Local and regional authorities
 Transport companies
 Utilities
 ■ ESCOs
 Architects and engineers
 ■ Financial institutions
 Other

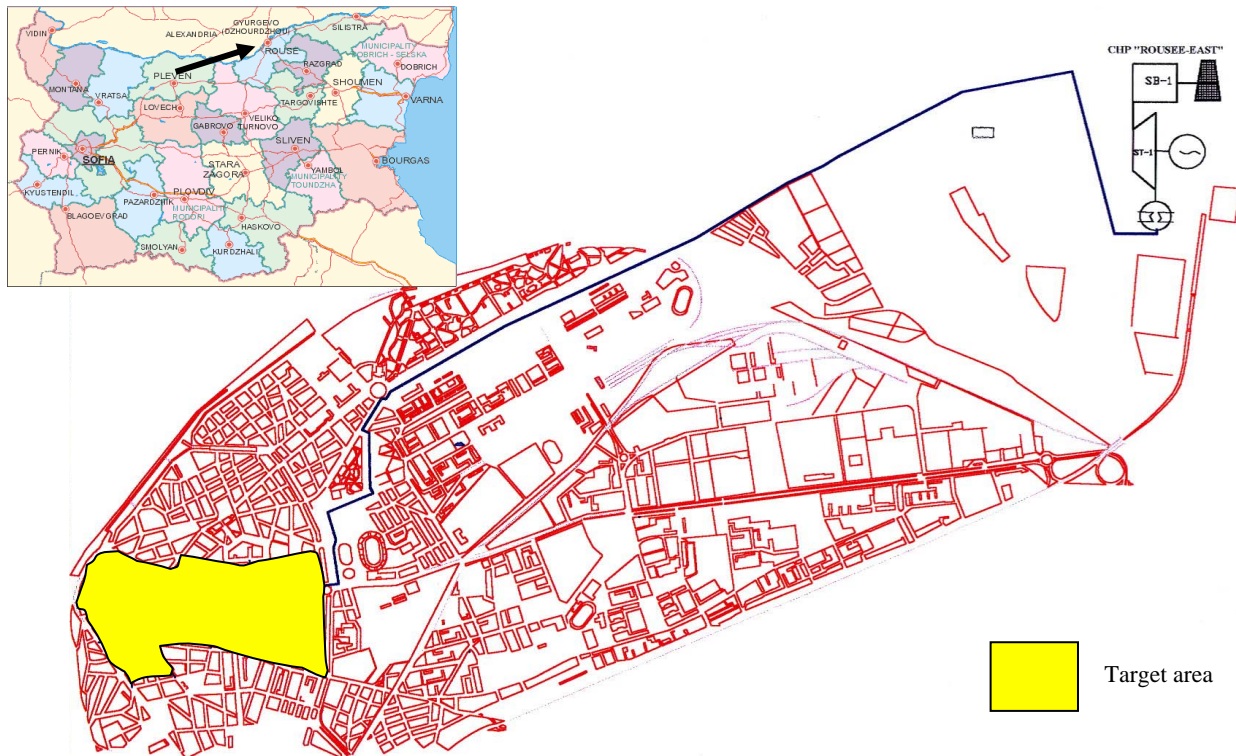
Technical

Energy efficiency
 ■ Heating
 Cooling
 Appliances
 Lighting
 ■ CHP
 ■ District Heating
 Solar energy
 Biomass
 Wind
 Geothermal
 Hydro power
 Other

Context

Main socio-economic and technical reasons for the project development:

- that target area is very close to the existing pipeline route and underground canal, which provides easy and cheap way for the construction of the main pipeline route;
- the lack of alternative cheap energy sources for customers living in the area;
- as the target area is one of the largest districts in the City of Rousse, where the customers use mainly electricity, large GHG reduction can be expected after the implementation of the project; and
- the implementation of the project needs an investment of more than 6 million Bulgarian leva (BGL) with relatively low return, which is extremely difficult to finance by domestic sources. Through JI mechanism this financing is more feasible.



Objectives

The main aim of the project is to meet the needs of the citizens of cheaper and environment friendly heat and hot water supply and on the other hand to optimize the production processes of the local district heating company using most appropriate financial mechanism. The project aims to **extend the existing district heating network supplied by “Toploficatsia-Rousse SPJsC” to a south-western district of the city centre and to significantly reduce emissions of green house gases**. Measures on the supply side includes: construction a 1 555 m-long heat mains and 12 secondary branches of a total length of 5 454 m, connection of 6 432 households to district heating network until 2007, optimizing production of combined heat and electricity processes and reduction of emitted GHG. On the demand side: save expenses for space heating and hot water by 50-60% per household, increased quality of life etc.

Process

The key concept of the project and the starting point were to meet citizen's needs of cheaper and environment friendly heat and hot water supply. After technical and economical analyses it was set that possibilities for extension of the district-heating network is the best solution for the target area - situated in the city centre of Rousse. The area has a surface of 97 415 m² and includes 378 buildings 6 schools, 6 public buildings, churches, banks, small industrial enterprises, and company offices. Altogether the numbers of block of flats are 270. For Feasibility study 264 buildings have been chosen as potential consumers of the project. The choice was based on the technical possibility for construction of the heat supply network and the heat load density. In addition to those 264 buildings additional mainly low-rise buildings were identified as possible consumers suitable for connection according to the proposed heat supply network layout. The citizens living in the target area currently use different energy sources for space heating and DHW. Some typical appliances for space heating and DHW are shown below:

Jl mechanism was chosen as the best solution for implementation and financing the project on a base of deep analysis of regulatory and legislative base and technical and financial indicators. The Municipal Energy Agency-Rousse has entered into cooperation with the REC- Hungary to complete the Feasibility Study.



District Heating Extension

Replacing Electricity, Diesel Oil, Coal and Wood

GHG Emissions Reduction

The study includes an assessment of the technical and financial feasibility and greenhouse gases reduction potential of the proposed project. During development of the study all international rules and procedures under UNFCCC were strictly followed: Presentation of different possible Baseline Scenarios for expansion of district heating network, production processes, number of connected customers etc; Selection of the most plausible Baseline Scenario; Identification of the source of replaced electricity; Estimation of annual energy consumption projection for the project timeframe by type of fuel for Baseline Scenario and Project Scenario; Calculation of annual GHG emissions for Baseline Scenario and Project Scenario; Calculation of annual net GHG emissions reductions for the project timeframe; and determination of ERUs for the crediting period. Based on this study the Project Design Document (PDD) ready for the international validation has been prepared. Results are more than satisfactory (see below) for all stakeholders of the project: citizens of the City of Rousse (including residents in the target area), TPP Rousse, the Municipality of Rousse and other institutions. The positive opinion of the population was collected by two opinion surveys.

Using JI mechanism main barrier – lack of financial resources will be overcome. Preliminary conversations with potential Japanese investor are already done.

Financial resources and partners

The cost of the Project is 3252 kEuro and main source of funding (amount of 2600 kEuro) should be received from foreign investor or against ERUs selling. CHP-Rousse will invest the remaining part (amount of 652 kEuro, or 20 %). Partners: Electric Power Development Co., Ltd. (J-Power), Japan (project investor); Municipal Energy Agency – Rousse (coordination of local stakeholders, preparation of feasibility study and PDD); CHP – Rousse (project host), EnEffect – Sofia and Regional Environmental Centre for Central and Eastern Europe (REC, Budapest) - management of feasibility study and PDD.

Results

A full set of documents is ready for validation and approval according to UNFCCC and Bulgarian internal JI procedures. According to developed feasibility study expected results after project implementation are:

The population living in the proposed area will decrease expenditures for space heating and DHW by 50-60% compared with using electricity. Replacing obsolete individual heating systems with district heating system at the end users will improve the overall energy efficiency of end-users and TPP Rousse East.



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District heating company: Increasing the heat load of the local district heating company will improve the overall energy efficiency (i.e. less fuel consumption per unit of energy produced). Combined production of electricity and heat, by which heat will be supplied in the project, is a highly efficient technology for energy production. Promoting combined generation of electricity and heat is part of the strategy for efficient use of the primary energy sources and it is in compliance with national priorities. Application of modern and highly efficient insulation for district heating network will minimize heat losses in transmission and distribution.

There are obvious advantages for **the Municipality** from implementation of the project: municipal buildings would get better quality of the heating service; residents would live and pupils would study in healthier indoor air quality environment; less expenditure for energy and healthcare services could be expected. Additional effect in terms of employment is envisaged: more than 200 employees during construction and 15 employments for maintenance of the new network.

The table below describes expected reductions of the GHG by the project activity until end of the first commitment period of the Kyoto protocol. It is expected, using JI mechanism, some of the project activities to be financed through selling all or part of reduced GHG.

GHG emission	2006	2007	2008-2015 annually	2006-2015 total	2008-2012 total
CO ₂	11 488	66 735	121 527	1 050 440	607 636
CH ₄	1,0	3	5	44	26
N ₂ O	3	17	30	252	146
Aggregated GHG emissions reduction, ERUs, (tonnes CO₂ eq.)*	12 439	72 068	130 932	1 129 484	653 442

* Calculated using the Global Warming Potential for CH₄ = 21 and N₂O = 310.

Lessons learned and repeatability

A specialized study, conducted at the beginning of 2004, revealed that for CHP Rousse there are possibilities for further improvement of the financial results through extending the service to new consumers, increasing the electricity production from co-generation, and from emissions trading. Similar opportunities exist for the district heating companies in the Municipalities of SOFIA, PLOVDIV, VARNA, BOURGAS, PERNIK and VRATZA, which deserve higher focus of attention.

Above pointed opportunities exist also for the district heating companies in New Member States, Associated and Candidate Countries.

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