



Country:	Bosnia and Herzegovina
Request Identification Number:	2015000059

Title:	Rehabilitation and modernization of the district heating (DH) system in the City of Banja Luka - focus on energy efficiency
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# Project summary

Banja Luka is the second largest DH system in BiH. It experiences significant energy losses (in large part due to hot water leakages and heat losses) during transmission and end-use, thereby incurring major, avoidable costs to the City and the DH Company, while also producing unnecessarily high amounts of GHG emissions.

Modernising the DH network would reduce fuel consumption by 27%, approximately 4,500 tons of crude oil which corresponds to 50,293.88 MWh of thermal energy - reducing emissions by 20,000tCO<sub>2</sub> annually and saving the City 4.5 million euros per year. Insulation of existing buildings would provide additional savings in energy consumption of 36,000 MWh and emission reduction of 14,400 tCO<sub>2</sub>. Developing the DH system to be fully renewable has the potential to save over 80,000 tCO<sub>2</sub> per year and would mean at least 1/3 of Banja Luka would receive renewable heat.

The CTCN technical assistance will deliver an actionable prefeasibility study with associated investment and policy development plan that will ensure the investment is a) attracted from private sector or other actors where required, b) does not deliver a technical solution without the policy framework that will ensure long-term sustainability of the DH system's business plan (e.g. building efficiency policies and tariff regulation). Major in country partners are (i) Ministry of Foreign Trade and Economic Relations of BiH, (ii) State Electricity Regulatory Commission, (iii) Ministry of Industry, Energy and Mining of Republika Srpska (RS), (iv) Ministry of Spatial Planning, Civil Engineering and Ecology of RS, (v) Regulatory Commission for Energy of RS, (vi) Fund for Environmental Protection and Energy Efficiency of RS, (vii) City of Banja Luka and District Heating Company A.D. "Toplana" Banja Luka.

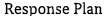
#### 1. Overview of the assistance

# 1.1 Objectives (outcomes)

The primary objective of this technical assistance is to prepare a comprehensive prefeasibility study focusing on (i) cost benefit analysis options of economic, technical (best practices), social and environmental impacts, (ii) reduction of energy costs, (iii) heat losses and Plant efficiency, (iv) improving building energy efficiency and comfort, (v) fuel switching to environmentally friendly sources. The Study will develop short term recommendations for DH system improvement, and a policy/regulatory gap analysis.

### 1.2 Results (outputs expected from CTCN assistance)

CTCN assistance will result in preparation of the consolidated report which will include (i) a report on present status of the DH system in the City including the analysis of the DH Company, socio economic analysis of the City and the DH network, (ii) a draft short-term strategy for efficient sustainable DH operation that will include potentials for smart technologies and fuel





switching, and that will define short term investment priorities, (iii) a financial analysis of the priority investments projects proposed in the short term-strategy, (iv) a rapid environmental assessment of proposed priority investment projects, and (v) a policy/regulatory gap analysis.

# 2. Description of the Assistance

### 2.1 Activities

CTCN will provide assistance for conducting the assessment of the present status of the DH system and for the development of a short-term priority investment and operational strategy for improvement and sustainability of existing DH system. This assistance involves the description of and assessment of the existing situation in the City of Banja Luka and the status of the DH system/services. Technical experts will conduct background analysis of the DH sector in general and DH operations in the City. The assessment will provide detailed, systemic and holistic understanding for short-term priority action of the current situation in technical, environmental, social, regulatory/legal and financial terms.

# Activity 1 Socio-economic analysis

# This activity includes:

- Analysis on population, including historical development (the number of people, general spatial distribution, in and out migration, minority and vulnerable groups, etc.), trends, growth rates, and review of proposed municipal development plans necessary for population projections;
- Compilation of data on household incomes and expenditures, household sizes, number of breadwinners, average expenditures for essential goods, percentage of single-headed households, people living with disabilities, etc;
- Establish what should be the correct price per dwelling if the network was functioning using ratios. This is the benchmark which would justify the short term measures to be put in place. Investigate also mini network solution as alternative.
- The affordability analysis (based on desk review and available data).

### Activity 2 DH system analysis

### This activity includes:

- Review/analysis of existing studies and identify shortcoming;
- A detailed site survey of the Plant and network.
- Analysis of previous initiatives undertaken by the City and the DH Company to improve the DH system of the City (with the identification of the key factors that limited, or had impact on successful implementation of the results);
- Description of the political structure in the City and decision making procedures related to the DH operations;
- General description of the DH company and its operations (including the analysis of the organizational structure of the DH Company, number of personnel, contractual relations with fuel suppliers, etc.);
- Overview of the main revenues and expenses of the City with the analysis of the City's ability to provide a guarantee to the DH company to secure future investments;
- Financial analysis of current operations of the DH Company;

Response Plan



- Analysis of current environmental status;
- Description of the current DH tariffs;
- Gap analysis of the technical capacities within the DH Company and the Mayor's Office of the City of Banja Luka including review of governance priorities;
- Diagnostic analysis of the DH system, including technology and distribution system focusing on:
  - Current service area (with comparison to the standards in the sector) price and technical KPI;
  - Analysis of heat consumption pattern with respect to, daily, weekly, and seasonal load variations, and based on that preparation of annual load duration curve as well as provide information on any differences in the distribution of load compared to what is considered standard for DH;
  - Overview description of the heat generation (installed and production capacity, extent
    of distribution system, number/size of substations, etc). This analysis has to highlight
    any design and operational issues that prevent the system to meet optimum
    performance levels;
  - Analysis of heat distribution network (with identification of the areas requiring immediate/urgent reconstruction);
  - Assessment of the demand side with the analysis of potentials for introduction of advanced meters and control systems at the levels of users group and individual users;
  - Analysis of possible local renewable heat sources or industry surplus heat sources;
  - Comparative analysis of the potentials for fuel switching.
- Feasibility assessment of how the technology and distribution system has to be improved or augmented.

# Activity 3 Analysis of regulatory/institutional framework

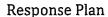
# This activity includes:

- Stakeholder analysis with the assessment of the effectiveness of the existing coordination mechanism, if any, between major stakeholders;
- Preparation of outline of relevant legislation and regulations applicable to the DH sector and operations of the DH Company;
- Description of relevance of energy and environment related legislation to the DH Company operations.
- The prices of Utilities oil, natural gas, biomass, and electricity needs to be considered today and medium term.

# Activity 4 Priority Investment Programme

On the basis of the results of the Activities 1 - 3 above, experts will prepare a short-term recommendation on the investment priorities with the list of the Priority Investment Projects which would be consulted in a public debate in the Municipality.

The Priority Investment Program will be oriented towards improvement of the operational efficiency of the company and its governance, which would contribute to sustainability of the DH system in the City taking into account all components analysed above (fuel, efficiency, tariffing etc) including a





financial analysis (cost estimate) for each of the proposed Priority Investment Projects. Solutions for energy losses due to the hot water leakages and heat losses will be proposed in the Priority Investment Program.

Experts will explain and justify the selection and affordability of the Priority Investment Projects, taking into account budget and financial capability of the DH company for new investments.

Experts will assess the potential environmental impacts, issues and concerns from proposed Priority Investment Projects, and will conduct a Rapid Environmental Assessment that will consider each Priority Investment Project proposed and its activities. The Rapid Environmental Assessment will be prepared based on the site visits, and discussion with relevant stakeholders, where appropriate.

# Activity 5 Policy/regulatory gap analysis

Based on the output of the Activity 3, experts will prepare a gap analysis on legal/policy requirements for sustainability of DH operations in the City, taking into account international best practices in district heating sector.

# Activity 6 Support to identify technical and financial partners

Based on the outcomes of Activity 5, the response team will assist the City of Banja Luka in identifying technical and financial partners for the implementation of the Priority Investment Projects.

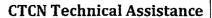
This response plan has identified follow-up actions needed to further enable the modernization of the DH system of the City of Banja Luka, for which additional funding will be required. As part of this assistance, the CTCN and UNEP will therefore support the identification of potential co-financiers for the activities described in section 3.3, as well as technology investments needed in the short and medium term.

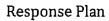
# **Deliverables**

Deliverables	Delivery date
Socio-economic analysis	Week 4
DH system analysis	Week 8
Analysis of regulatory/institutional framework	Week 8
Priority Investment Program	Week 16
Policy/regulatory gap analysis	Week 16

# 2.2 Timeline

A seludeu	Month			
Activity	1	2	3	4
Socio-economic analysis		344	3714	. 174







DH system analysis	X		11.3
Analysis of regulatory and institutional framework	X	X	
Priority Investment Programme	14.5		X
Policy/regulatory gap analysis			×

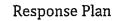
# 2.3 Expertise required

Expert 1	Economist/financial expert with experience in socio-economic analysis development.
Expert 2	Technical expert(s) with experience in DH sector planning, design, implementation and operations.
Expert 3	Institutional/Legal expert with knowledge of country legislation.
Expert 4	Environmental specialist(s) with specific expertise in DH projects.

Note: Apart from the required expertise presented in the table above, a Project Coordinator/Team Leader will be engaged to communicate and coordinate activities and outputs among experts.

# 2.4 Main partners

Stakeholder	Role to support the implementation of the CTCN assistance	
A.D "Toplana" Banja Luka (DH operator in Banja Luka	Provide for institutional capacity, technical knowledge, data and information.	
Mayor's Office of Banja Luka	Support in the development of the overall strategy for district heating operations. Ensuring the involvement of all the relevant stakeholders to the process, including strengthening of an institutional framework.	
University of Banja Luka, Faculty of Sciences	Serve as National Designated Entity (NDE) and focal point for the CTCN. It will:	
	<ul> <li>manage the national CTCN technical assistance required</li> </ul>	
	<ul> <li>ensure that support provided by CTCN is coordinated with other processes that address climate change at national level</li> </ul>	
	<ul> <li>ensure that relevant ministries, private sector, civil society, and academia representatives are involved in the process</li> </ul>	
Ministry of Industry, Energy and Mining of Republic Srpska	Provides data, participates in meetings for development of institutional and regulatory framework	
Ministry of Spatial Planning, Civil Engineering and Ecology	Provides data, participates in meetings for development of institutional and regulatory framework	
Ministry of Agriculture, Forestry and Water Management	Provides data, participates in meetings for development of institutional and regulatory framework	
Fund for Environmental Protection and Energy Efficiency of Republika Srpska	Participates in meetings, provides data, potential financing facility for implementation of the Project.	
UNEP and Relevant Regional and Country Offices (e.g. Bosnia and Herzegovina,	Provides information and liaises with global network of expertise and partners from the District Energy in	





Vienna, and Regional Office for Europe)	Cities Initiative

Project will ensure the participation of the representatives of the Homeowner Associations including the active participation of the final users,

# 2.5 Meetings required

Meetings	Responsible person/organization	Main Topics	Delivery date
Inception workshop	Response Implementer with the support of the City Mayor's Office	<ul> <li>Presentation of the activities and the expected outputs</li> <li>Presentation of the time frame</li> <li>Securing involvement of the main stakeholders</li> </ul>	Week 3
Strategic planning workshop	Response Implementer with the support of the City Mayor's Office	<ul> <li>Presentation of the findings from the preliminary assessment</li> <li>Presentation of the PIP's</li> <li>Public debate with the Municipality on the priority actions</li> </ul>	Week 16

Note: The expert team may organize additional meetings with Stakeholders, if such meetings will contribute to better quality of the outputs, as well as, to better understanding of the Stakeholders on expected results of the Project.

# 2.6 Indicative budget

The budget of this activity is estimated at around 90,000USD. (Details as Annex 2)

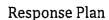
# 2.7 Gender considerations

The assistance will make sure to take into consideration gender aspects in the implementation of the activities and the outputs. Taking into account that women and children receive more benefits on heating services than men as they spend more time in home in general, multiple co-benefits are expected from this assistance concerning gender, in particular (i) access to cleaner, safer and reliable heating system, (ii) reduced domestic chores related to space heating, and (iii) reduced incidence of carbon monoxide poisoning and accidental fire.

# 2.8 Risk identification and risk mitigation

Risk	Consequence	Probability	Mitigation measure
City DH Strategy not going through the adoption process	Strategy not implemented	Low	All stakeholders involved in approval process are engaged from the beginning of the assistance
Adjusted tariff system	New tariff system not	Medium	Thorough analysis of







not adopted and being implemented	enacted		the existing system is conducted. Importance of adjustments to existing tariff system is communicated with stakeholders. Proposed tariffs are based on the affordability analysis.
Changes in regulatory framework are not accepted and implemented	Existing legislative framework remains unchanged	Low	Thorough analysis of relevant legislation and identification of gaps is conducted  All stakeholders involved in the decision making process are engaged from the beginning of the assistance
No interest/investment from public and private sector and from international finance institutions	No further actions are taken after the assistance is completed	Low	Potential investors are involved from the first stages of the Project, and their recommendations/views are taken into consideration

# 3. Long-term impacts of the assistance

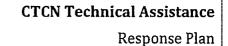
# 3.1 Expected climate change-related benefits

The implementation of the Project will contribute to fuel savings and reduction in CO<sub>2</sub> emissions. In the long-term the CTCN assistance will contribute to reduction in overall energy requirements and associated GHG emissions stemming from the City's space and water heating operations. Furthermore, partial fuel switching to environmentally friendly sources will additionally contribute to the reduction of the CO<sub>2</sub> emissions and improved air quality in the city.

# 3.2 Co-benefits

Implementation of the Project is expected to increase the energy efficiency of DH operations in the City, leading to reduction in the use and procurement of crude oil (mazut), helping the City to reduce losses and retaining wealth in the local economy encouraging local job development. Furthermore, the Project will contribute to improved operational efficiency of the DH Company, through the process of knowledge transfer to the City and the DH Company representatives.

Development and use of domestic energy resources such as biomass or geothermal energy brings a multitude of economic and employment benefits. Since the biomass is generally produced or is a byproduct of agricultural activities in rural areas, many of the jobs created will occur in these areas supporting the economic growth of local communities and local growth retention.





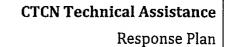
CTCN assistance will create a favourable environment that will enable private sector investment. The table below shows how and to which sustainable goals the request contributes to.

No.	Sustainable Development Goal	Contribution from CTCN assistance
1	End poverty in all its forms everywhere	Improved energy access and creation of direct and indirect employment. Increase in disposable income of population connected to DH network.
3	Ensure healthy lives and promote well being of all	Improved quality of life through reliable and efficient DH System. Reducing risks of incidence of respiratory diseases.
7	Ensure access to affordable, reliable, sustainable and modern energy for all	Increasing the share of renewable in total power generated. Expanding infrastructure to improve renewable and clean energy access.
8	Promote inclusive and sustainable economic growth, employment and decent work for all	Creation of direct and indirect employment.
9	Build resilient infrastructure, promote sustainable industrialization and foster innovation	Increasing energy efficiency and cost- effectiveness of the City's DH system. Modernisation of DH primary and secondary network.
11	Sustainable cities and communities	Improving resource efficiency, air quality, and access to safe and affordable energy.
13	Take urgent action to combat climate change and its impacts	Using more environmentally friendly energy sources for heating. Supporting low carbon development.

# 3.3. Post-assistance plans and actions

After the assistance described above, it is envisaged that the City, together with potential expert organizations and funders, will be able to implement the agreed priorities and develop detailed plans for their implementation in cooperation with private and public/international partners developing detailed plans and seeking financial support for their implementation

Activity a	Overall strategy for sustainable DH operations.	
Expert 1	Technical specialist(s) with experience in DH sector planning, design, implementation and operations.	
Expert 2	Engineer (s) with proven experience in DH.	
Activity b	Financial analysis and tariff setting	
Expert 1	Financial expert with knowledge of public financing.	
Expert 2	Technical/tariff expert with experience in tariff modeling.	
Activity c	Environmental analysis	
Expert 1	Environmental specialist(s) with specific expertise in DH projects.  Expert(s) need to have proven experience of the environmental requirements of the international finance institutions.	





Activity d	Report on policy/regulatory recommendations
Expert 1	Institutional expert with experience of similar assignments.
Expert 2	Legal experts with knowledge of country legislation in energy sector.

The table below serves as a basis for the CTCN, UNEP, the NDE, the City of Banja Luka, and the DH Company of the City of Banja Luka, to measure success of CTCN assistance in achieving its expected results and impacts. The City DH strategy will include action and monitoring plan that will enable the NDE to assess the exact outcomes triggered by the assistance. To the extent possible, lessons and regulatory recommendations developed through the assistance will be applied elsewhere in the country and region.

Performance indicators of CTCN Assistance					
Response output	How output will be used to ensure creation of result	Expected result	Expected outcome of result	Anticipated impact that outcome will produce	
DH Strategy for the City	Draft reviewed by the City Mayor's Office and the DH Company.  DH Strategy forwarded to the City Assembly.	DH Strategy is adopted by the City Assembly.	Financial and operational sustainability of the DH Company is ensured	Improved quality of life  Share of renewable energy in energy supply/production	
- New tariff system	Draft reviewed by the City Mayor's Office and the DH Company.  New decision on tariffs forwarded to the City Assembly.	New decision on tariffs is adopted by the City Assembly.	New tariff system is implemented ensuring economically and financially sustainable heat supply to consumers	is increased  CO <sub>2</sub> emissions from energy use and production reduced  Funds invested by	
Report on policy/regulatory recommendations	Report reviewed by the Stakeholders.	Recommendations from the Report will be used by the Stakeholders while drafting the policy(ies) and legal framework.	Favourable environment for private investors is enabled	multilateral donors and development banks  Funds invested by private investors  Air quality of the City improved  DH model is applied in other parts of the country	





# 3.4 Monitoring and Reporting of technical assistance results and impacts

Activities and deliverables will be monitored both by the NDE of BiH and CTCN. This document defines all the elements that are essential to effectively monitor project progress and achievements, including (i) project activities, (ii) objectives and expected impacts, (iii) the work plan and expected milestones (see also the logframe in Annex 1).

The NDE and CTCN will monitor the progress of technical assistance activities by:

- Maintaining regular communication with the Response Implementer and the City Mayor's Office as a Request Applicant;
- Verify Project progress against timeline and associated milestones.

The City Mayor's Office will coordinate activities between the response implementer and stakeholders involved. If necessary, the City Mayor's Office may suggest to the Response Implementer any adjustments and planning modification. Proposed adjustments and/or modification shall be previously agreed with the NDE and CTCN to be effective.

# 4. Signatures

Signatures of the requesting country

NDE

Name: GORLIN TRBIC

Title:

Date:

15.01,2016.

Request Proponent

Name: SLOBODAN GAVIMINOVIC

Title: MAYOR

Date:

Signature:

Signature:

Signatures of the CTCN

CTCN Director

Name: JUKKA UOSUKAINEN

Title: DIRECTOR CTCN

Date: 22 JAN 2016

Name: RAJIV GARG

Title: TECHNOLOGY MANAGER - MITIGATION

Climate Technology Manager AD INTERIM

Date: 22 JAN 2016

Signature:

Jule 12 Signature:



# CTCN Technical Assistance Response Plan

# Annex 1: Response Logframe

	Activity 1: Assessment of the present status of the DH system		Activity
the DH system	expenditure  Affordability analysis  Activity 2 DH system  analysis  General analysis of the DH Company  Description of decision making process  Overview of main revenues and expenses of the City  Review/analysis of existing studies and identify shortcoming  Gap analysis of the technical capacities  Diagnostic analysis of	Activity I.Socio- economic analysis  Analysis of population  Data on households	Description of sub- activities conducted by the CTCN
	Socio-economic analysis DH system analysis Analysis of regulatory institutional framework Priority Investment Programme Policy/regulatory gap analysis		Output/ Deliverable
	The City Mayor's Office DH Company		Main national partners involved
	Outputs approved by the City Mayor's Office Priority Investment Programme adopted by the City		Objectively Verifiable Indicator
	Response Implementer and the DH Company		Responsible person/organization



Response Plan

	Activity
<ul> <li>Feasibility assessment of how the technology and distribution system has to be improved or augmented</li> <li>Activity 3 Analysis of regulatory/institutional framework</li> <li>Stakeholder analysis</li> <li>Preparation of outline of relevant legislation and regulations</li> <li>Description of relevance of energy and environment related legislation to the DH Company operations</li> <li>Gap analysis on legal requirements for sustainability of DH operations</li> <li>Activity 4 Priority Investment Programme</li> <li>List of Priority Investment Projects</li> </ul>	Activity  Activity  activities conducted by  the CTCN
	Output/ Deliverable
	Main national partners involved
	Objectively Verifiable Indicator
•	Responsible person/organization



Response Plan

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Activity	Description of sub- activities conducted by the CTCN	Output/ Deliverable	Main national partners involved	Objectively Verifiable Indicator	Responsible person/organization
	<ul> <li>Analysis of current tariff levels and regulatory framework for tariff settings</li> </ul>				
	Activity 5 Policy/regulatory gap analysis				
Activity 2:_Overall strategy for sustainable DH operations		Meetings with stakeholders Draft DH strategy of the City	The City Mayor's Office DH Company	DH strategy adopted by the City	Response Implementer, DH Company and the City Mayor's Office
Activity 3: Financial analysis and tariff setting	Activity 3.1 Tariff setting Calculation of adjusted tariffs Identification of cross subsidies (if any) Draft legislation on	Drast of the new tariff system Financial model prepared	The City Mayor's Office DH Company	New tariff system approved by the City	Response Implementer and City Mayor's Office
	<ul> <li>Draft legislation on</li> </ul>				



Response Plan

recommendations	Activity 5: Report on policy/regulatory		Activity 4: Environmental Impact Analysis		Activity
				new tariff system  Activity 3.2 Financial  model  Preparation of financial model in line with the long-term strategy	Description of sub- activities conducted by the CTCN
	Draft report on policy/regulatory recommendations	i de la companya de l	Environmental assessment conducted		Output/ Delivérable
Ministry of Spatial Planning, Civil Engineering and Ecology	Ministry of Industry, Energy and Mining of RS	The City Mayor's Office	The City Mayor's Office DH Company		Main national partners involved
involved	Recommendations on policy/regulatory changes accepted by the national partners		Environmental analysis accepted by the City		Objectively Verifiable Indicator
	Response Implementer	,	Response Implementer		Responsible person/organization

# ANNEX 2 DRAFT BUDGET DETAILS

	Proposed bud
Staff	3,000.00
Travel	2,000.00
Meetings and PR	5,000.00
SSFA for consultancies	75,000.00
Equipment	5,000.00
Grants OUT	
Subtotal	90,000.00
Grants OUT IDC	
TOTAL	90,000.00