

**REPUBLIC OF MOLDOVA**

**Chisinau Municipality**

**TERMOCOM S.A.**

**District Heating Efficiency Improvement Project (DHEIP)**

**ENVIRONMENTAL IMPACT ASSESSMENT  
&  
ENVIRONMENTAL MANAGEMENT PLAN**

27.11.13

*Prepared by:* EcoExpert



CHISINAU 2013

## Acronyms

CHP	Combined Heat and Power plant
DH	District heating
EA	Environmental Assessment
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EU	European Union
GoM	Government of Moldova
GHS	Group Heating Substation
ME	Ministry of Environment
IHS	Individual Heating Substation
OHS	Occupational Health and Safety
OP/ BP	Operational Policies, Bank Procedures
RAP	Resettlement Action Plan
SEE	State Ecological Expertise
SEI	Sate Ecological Inspectorate
SH	Space heating
PAP	Project Affected Person
WB	World Bank

## Table of Contents

<b>1. EXECUTIVE SUMMARY .....</b>	<b>1</b>
<b>2. PROJECT BACKGROUND AND OBJECTIVES OF THE ENVIRONMENTAL ASSESSMENT .....</b>	<b>4</b>
<b>3. ENVIRONMENTAL ASSESSMENT POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK.....</b>	<b>7</b>
3.1 World Bank EA rules and procedures .....	7
3.2 National legal environmental and EA framework.....	10
<b>4. BASELINE ANALYSIS AND DESCRIPTION OF THE PROJECT SITES LOCATION .....</b>	<b>14</b>
<b>5. ENVIRONMENTAL IMPACTS AND RISK ASSESSMENT OF PROJECT ACTIVITIES .....</b>	<b>15</b>
<b>6. ENVIRONMENTAL MANAGEMENT PLAN .....</b>	<b>18</b>
6.1. Mitigation activities .....	18
6.2. Monitoring of EMP implementation .....	27
6.3. Implementing arrangements .....	30
6.4. EMP implementation costs.....	31
6.5. TORs for environmental auditing and assessing the cost of: decommissioning, dismantling and environmental remedial measures for CHP 1 closure .....	31
6.6. Public consultation and information disclosure.....	32
<b>7. ANNEXES.....</b>	<b>33</b>
Annex 1. TORs for environmental auditing and assessing the cost of: Decommissioning, dismantling and environmental remedial measures .....	33
Annex 2. Report on Consultation on the draft EA&EMP with interested parties .....	46
Annex 3. Pictures from sites .....	49
Annex 4. Maps of Project areas .....	52

## 1. EXECUTIVE SUMMARY

---

***Project objective and activities.*** The objective of the proposed project is to contribute to improvements of the operational efficiency and financial viability of the district heating (DH) sector in Chisinau. It is composed by four components: *Component 1: Priority investments in the DH system to improve energy efficiency, quality and affordability of heat supply.* This component will support priority investments aimed at optimizing and modernizing the heat distribution network, with the objective to achieve reduced heat losses, improved service quality and more efficiency and secure supply of heat and hot water to end-user consumers. Specifically, financing would be provided for: (i) modernization of selected pumping stations to reduce electricity consumption and provide for modern and efficient variable flow operation mode of the DH system; (ii) rehabilitate selected segments of the distribution network to ensure continued secure DH service and reduce losses of heat and hot water; (iii) replace old and inefficient central heat substations (CHS) with modern fully automated individual building level heat substations (IHS) for more efficient, secure and affordable heat supply to end-users (iv) reconnect about 40 public buildings, which were earlier disconnected, to the DH system to improve the usage of the DH system. *Component 2: Support for shut-down of CHP-1 operations.* This component will support the Government's decision to close down the operation of CHP-1, which has been operational for more than 60 years with no major rehabilitation. In order to ensure stability of DH operations after CHP-1 ceases its operations and smooth transition in corporate restructuring process, the following programs will be supported under the component: (i) Connection of alternative heat distribution network and construction of new pumping station to service area supplied by CHP-1, (ii) Social Impact Mitigation Program for staff who may be affected by the restructuring, and (iii) Environmental Audit for CHP-1 site. *Component 3: IBRD Partial Credit Guarantee (PCG).* This component will support the improvement of the operational efficiency and financial viability of the DH sector in Chisinau by guaranteeing the repayment of a portion of commercial debt financing of the yet to be formed New Company (Newco) with an IBRD PCG; and *Component 4: Project Management and Technical Assistance.* This component will provide technical and financial support for project management.

***Objective of the Environmental Assessment (EA).*** The objective of the EA is to analyze the potential environmental and social issues related to the proposed Project and to ensure that these aspects are addressed, mitigated and monitored during the project implementation in compliance with WB requirements and Moldovan environmental legislation.

***Project site location and characteristics.*** The project will provide reconstruction of several GHSs to IHSs, rehabilitation of pumping stations, upgrade of main pipeline of DH systems in several districts of Chisinau municipality and in particular: (a) replacing the existing and obsolete distribution of thermal heating pipes along several streets in Sculeni district; (b) upgrading the pumping station Nr. 8 in Riscani district; and (c) construction of new Group Heating Substations (GHSs) in Riscani and Sculeni districts and one Individual Heating Substation in Riscani district. All this sites are located in residential areas and in their vicinity there are no any protected areas and/or valuable natural habitats and physical cultural resources.

***Project Environmental Category.*** The project was assigned Category B for the purpose of its EA. For such type of projects it is necessary to conduct an EIA and prepare an EMP which should be based on WB and national EA rules and procedures. The project EMP should be used for the project implementation and its main provisions need to be included in the project documents.

***Project environmental impacts and risks.*** It is anticipated that the Project will generate mostly positive socio-economic benefits due to the improvement of population hot water supply and heating services along with improved environmental conditions on the Chisinau Municipality territory and will generally support sustainable development in the region. The overall findings of the EMP are that short-term negative impacts on air, soil, water, and acoustic environment can be expected, especially during civil works. The environmental issues likely to be associated with the project activities include: noise generation; impact on soil and on water by the construction run-offs; disturbance of traffic during construction and rehabilitation works; construction dust and wastes; and workers safety. However, these adverse impacts will be temporary and site specific and could be easily mitigated through implementing adequate avoidance and/or mitigation measures.

***Environmental Management Plan.*** The project EMP includes, along the WB safeguards policies applied to the current project, a description of the policies, legal, and administrative framework in place in the Republic of Moldova regarding EA, environmental management and the technical norms for centralized heating sector. It contains also: (a) a series of activities targeted at mitigating identified adverse impacts; (b) monitoring plan for EMP implementation; (c) implementing arrangements as well as a short analysis of project beneficiary (Termocom), EA capacity and EMP financing.

***Environmental mitigation measures.*** The EMP stipulates all adverse environmental impacts associated with the project will be prevented, eliminated, or minimized to an acceptable level. This can be achieved through continuous refinement and effective implementation of the environmental mitigation measures, including careful selection of project sites that would avoid or minimize potential adverse impacts on the environment of surrounding urban areas; replacing of old pipes and pumps and conducting rehabilitation works in a way that would prevent as much as possible cutting of trees, destroying of landscape in one involved green square, pollution of air and soil; ensuring labor safety and health impacts during welding operations etc.

***Environmental monitoring.*** Environmental monitoring during project implementation provides information about the project environmental impacts and the effectiveness of mitigation measures. Such information enables the client and the Bank to evaluate the success of mitigation as part of project supervision, and allows corrective action to be taken when needed. The monitoring section of the EMP provides: (a) details, of monitoring measures, including the parameters to be measured, methods to be used, sampling locations, frequency of measurements; and, (b) monitoring and reporting procedures to (i) ensure early detection of conditions that necessitate particular mitigation measures, and (ii) furnish information on the progress and results of mitigation.

***Environmental supervision and reporting.*** The EMP implementation will be supervised by MEPIU and Termocom staff periodically (as per monitoring schedule), as well as by the WB (during its supervision missions) and by the local ecological inspectors. Furthermore, Termocom semiannually will present short information about the EMP implementation as part of the Progress Reports to be presented to the WB by the client.

***Integration of the EMP into project documents.*** The EMP provisions will form part of the design documents for the project, and will be included in construction contracts for proposed activities, both into specifications and bills of quantities. Furthermore the Contractors will be required to include the associated to EMP mitigation and monitoring costs in their financial bids and required to comply with the EMP provisions while implementing the project activities.

**Implementing arrangements.** The main implementing agency (Ministry of Economy) as well as the implementing entity (MEPIU) has good experience in successfully implementing safeguards issues within two World Bank projects (Energy II; and Competitiveness Enhancement Project). MEPIU is staffed with highly qualified and experienced professionals, both in technical and safeguards aspects, will ensure project implementation in accordance with the Operations Manual (OM), as well as that the EMP provisions are fully integrated into project implementation, conducting monitoring and reporting required by the World Bank. The main responsibilities with regard to day to day implementation of safeguards requirements are assigned to district heating company “Termocom” which is well prepared and has long time experience in this regard. The company is currently certified under both ISO 14001 (Environmental Management) as well as under ISO 18001 (Operational Health and Safety Management System) and has in its structure three subdivisions responsible for the issues related to environmental safeguards (Chemical Service, in charge of all environmental issues; Safety and Occupational Hazards division; and Technical Supervision division, which is responsible for ensuring all civil works financed by the company are done in compliance with the design documents and existing norms and standards). These entities have very experienced staff with all necessary licenses and certificates. The proposed mitigation measures will be implemented by the Contractors, being monitored and supervised by Construction Supervision Company and Termocom staff.

**TORs for environmental auditing of the CHP 1.** As currently the GoM is considering closing this plant, the EIA&EMP report contains a draft of the TORs for an assignment which is aimed at undertaking an environmental auditing of the CHP 1 (presented in the Annex 1), for identifying: (a) current and past environmental liabilities; (b) designing alternative scenarios and action plans for partial/full decommissioning strategies and associated dismantling and clean-up remediation activities; (c) estimating necessary costs for identified scenarios and action plans; and (d) identifying key environmental impacts of formulated dismantling and remediation action plans and proposing mitigation measures and monitoring activities. The results of this auditing would serve for GoM as a basis in deciding the closure of the plant and in selecting the decommissioning scenario.

**EIA&EMP disclosure and public consultation.** The draft EIA&EMP report was consulted with all key stakeholders. For that purpose on November 8, 2013 the draft Summary and the EMP in Romanian language along with the full report in English have been disclosed to all interested parties by posting it on Termocom website ([www.termocom.md](http://www.termocom.md)). Additionally the hard copies of the report and its translated Summary and EMP have been distributed to: Ministry of Economy, MEPIU, Ministry of Environment, State Ecological Inspectorate and Municipal Ecological Agency. On November 22, 2013 the Termocom conducted a public briefing and consultation meeting on the document (see minutes of the consultation in the Annex 2). The meeting concluded that the draft EIA&EMP document covers practically all potential impacts and possible mitigation measures along with clear procedures from environmental screening and monitoring. The draft document was revised after the meeting, taking into account outputs from the previous consultations. The final versions of the EIA&EMP will be posted on the Termocom website and submitted to the World Bank for its disclosure in Infoshop. The EMP will be used by the Termocom during the project implementation.

## 2. PROJECT BACKGROUND AND OBJECTIVES OF THE ENVIRONMENTAL ASSESSMENT

1. **Project goals and proposed activities.** The objective of the proposed project is to contribute to improvements of the operational efficiency and financial viability of the district heating (DH) sector in Chisinau. The WBG will assist the new integrated company to: (i) improve the efficiency of its operation, and (ii) support the resolution of the historical debt stock.

The project will have four components:

**Component 1: Priority investments in the DH system to improve energy efficiency, quality and affordability of heat supply (IDA and IBRD funding : US \$ 33.6 million).**

This component will support priority investments aimed at optimizing and modernizing the heat distribution network, with the objective to achieve reduced heat losses, improved service quality and more efficiency and secure supply of heat and hot water to end-user consumers. The DH network operated by Termocom is old, worn-out, and with large heat and water losses, and requires urgent rehabilitation and modernization. The low quality of service and lack of ability by the consumer to control their heat has resulted in significant disconnections from the DH system, mainly among the wealthy population who can afford to invest in individual boilers. Also a large number of public buildings (state and municipality owned) were disconnected from the DH system about 15-10 years ago. As a result, the vulnerable population of Chisinau will stand to be disproportionately affected should there be interruptions in the DH services. Therefore, the investments proposed under the Project will focus on ensuring the operational sustainability of Termocom, as well as efficiency. Specifically, financing would be provided for: (i) modernization of selected pumping stations to reduce electricity consumption and provide for modern and efficient variable flow operation mode of the DH system; (ii) rehabilitate selected segments of the distribution network to ensure continued secure DH service and reduce losses of heat and hot water; (iii) replace old and inefficient central heat substations (CHS) with modern fully automated individual building level heat substations (IHS) for more efficient, secure and affordable heat supply to end-users (iv) reconnect about 40 public buildings, which were earlier disconnected, to the DH system to improve the usage of the DH system.

**Component 2: Support for shut-down of CHP-1 operations (IDA: US\$ 5.4million)**

This component will support the Government's decision to close down the operation of CHP-1, which has been operational for more than 60 years with no major rehabilitation. The Plant is being operated well beyond the designed life and being operated very inefficiently. Closing down CHP-1 itself would have a net benefit of over MDL 8 million per year for the energy consumers. In order to ensure stability of DH operations after CHP-1 ceases its operations and smooth transition in corporate restructuring process, the following programs will be supported under the component: (i) Connection of alternative heat distribution network and construction of new pumping station to service area supplied by CHP-1, (ii) Social Impact Mitigation Program for staff who may be affected by the restructuring, and (iii) Environmental Audit for CHP-1 site.

**Component 3: IBRD Partial Credit Guarantee (PCG) to partially cover commercial debt to Newco of up to US\$138 million (with [58% or US\$80 million] IBRD PCG coverage).**

This component will support the improvement of the operational efficiency and financial viability of the DH sector in Chisinau by guaranteeing the repayment of a portion of commercial debt financing of the yet to be formed Newco with an IBRD PCG. On the basis of the current status of due diligence, the financial restructuring plan currently foresees that an amount of up to MDL [1,424.6] million (equivalent to US\$ [138] million) of cumulative payment arrears by CHP-1, CHP-2 and Termocom to Moldovagaz would be repaid by the disbursed proceeds of a long term commercial loan to be availed by [international commercial bank(s)]<sup>1</sup> to Newco. The proposed long term loan from [international commercial bank(s)] would be benefiting from an IBRD PCG under this Component 2 for up to US\$80 million (equivalent in MDL) of net present value of debt service under the loan. While the final terms and conditions of the guarantee are yet to be negotiated, it is currently proposed that the IBRD PCG would guarantee payment of Newco’s full debt services under this long term loan payable to [international commercial bank(s)] in the first [four] years, regardless of the cause of the default of Newco. It is further envisaged that the guarantee coverage would be provided on a “rolling basis”, which implies that coverage could be rolled over to the following uncovered years continuously under the condition, that the guarantee has not been called by the lenders and up to the maximum guarantee amount of US\$80 million<sup>2</sup>. Further details on this component are found in Annex 2 and Annex 7.

**Component 4: Project Management and Technical Assistance (US 1 million).**

This component will provide technical and financial support for project management. The implementation agency for the proposed project will be the Ministry of Economy (MoE). The Moldovan Energy Projects Consolidated Unit, which is directly subordinated to MoE, has more than 10 years of experience in implementing the World Bank and will serve as a fiduciary agent for the implementing agency. This component will finance activities such as: (i) MEPIU staff and operations, including Monitoring and Evaluation activities; (ii) public awareness campaigns for dissemination of the benefits of energy efficiency improvements and efficiently operating DH systems; and (iii) implementation support consultancy, and (iv) training programs. The MEPIU will also monitor a gender indicator, specifically number of female beneficiaries of the improved DH sector.

The project investments will include a series of activities provided in the table below (see table 1).

**Table 1. Proposed investments in modernizing Chisinau DHS.**

<b>Rank</b>	<b>Investment</b>
1	<i>Investment no. IHS0:</i> Reconnecting of 41 public buildings/objects, including 86 new IHSs plus associated piping
2	<i>Investment no. PSI:</i> Three pumps and three motors in pumping station no. 8 and installation of VSDs and a 6 kV/400 V or 690 V transformer. Pumping station no. 8 is the largest pumping station in the Chişinău DH system
3	<i>Investment no. HP2a:</i> Underground pipe CT-1/10 to PV-3 in the area of HOB West
4	<i>Investment no. HP2b:</i> Underground pipe PV-4 to SPRT N9 in the area of HOB West

<sup>1</sup> The final agreement on the lending entity will also be subject to the Bank’s due diligence and confirmation of acceptability.

<sup>2</sup> While this is the current structure envisaged further due diligence and market soundings with commercial banks may change this coverage profile as requested by the market.



5	<i>Investment no. HP1a:</i> Underground pipe SPRR N19 to C-319 to the area connected to HOB South
6	<i>Investment no. IHS1:</i> > 180 new IHSs plus associated piping in the area close to HOB West (installation of IHSs in this area will permit extension of the period that CHP-2 operates alone during the transition periods)
7	<i>Investment no. IHS2:</i> > 60 new IHSs plus associated piping in the area close to HOB South (installation of IHSs in this area will permit extension of the period that CHP-2 operates alone during the transition periods)
8	<i>Investment no. PS2:</i> Two pumps and two motors in each of pumping station nos. 12 and 13 and installation of VSDs and 10 kV/400 V or 690 V transformers
9	<i>Investment no. IHS3:</i> 52 IHSs plus associated piping in a number of different locations (required due to problems in delivering SH and DHW as a result of low pressure difference)
10	<i>Investment no. IHS4:</i> Replacement of GHSs by 151 IHSs
11	<i>Investment no. IHS5a:</i> Replacement of GHSs by 151 IHSs

*Installation of individual substations in existing buildings.* Rehabilitation of the Chisinau DH system requires installation of modern IHSs in buildings which are currently connected via GHSs to the DH system or, in some cases, directly to the transmission system. JSC Termocom already has experience of successful installation and operation of more than 150 modern prefabricated IHSs in existing residential and public buildings; some of which have been in operation for five years. There are also a number of older substations with conventional GHS design installed and operating inside connected buildings. There will be two types of required civil works while installing individual HS in existing buildings:

*Buildings with usable basements.* The vast majority of multistoried- and some one-storied buildings connected to the DH system (residential buildings, public buildings, private buildings, etc.) have basements through which the DH pipes enter the buildings. In the basements there are dedicated rooms where the equipment for connection to the DH system is located - DH connection and metering units; containing shut-off valves, heat meters, DHW meters and (in most buildings) hydroelevators. Some buildings (in particular, residential buildings with many entrances) have several connections to the DH system with separate connection and metering units. Rooms for DH connection equipment were provided in the original design of the buildings, and are usually located (in residential buildings) under staircases or kitchens, but can also be under other rooms. In most cases, these rooms can be used for installation of new IHSs. Generally, this has been the practice when JSC Termocom installed new modern IHSs in old buildings. In other cases other rooms can be identified in the basements if it is more convenient or appropriate (e.g. to avoid installation under living rooms/bedrooms, or other special rooms in other types of buildings).

*Buildings without basements.* There is a relatively small number of buildings without basements; small multi-apartment residential buildings, some institutions or private entities. There can be several solutions for installing IHSs in such buildings:

- Identification of a room inside the building (room or part of a room to be dedicated, in particular in buildings with a single owner).
- Installation of prefabricated IHSs or IHSs, with individual design, under the staircases.
- Installation in each apartment of individual prefabricated apartment substations.

- If all the above options are not available: building of a substation room attached to the building.

If the use of shutoff valves between various pieces of equipment is justified in large GHSs with large volumes of water it is not really necessary in IHSs which have relatively small volumes of water. Generally, shutoff valves are only necessary in IHSs on the connections and where they are functionally necessary (including small valves for air release, drainage and cleaning-in-place of heat exchangers, and shutoff valve on make-up water line).

*The scope of the project EA.* The objective of the project Environmental Assessment (EA) is to analyze the potential adverse environmental issues related to the proposed activities in and to ensure that these aspects are adequately addressed and mitigated during the project implementation in full compliance with WB requirements and Moldovan environmental legislation.

*Project environmental Category.* The project was assigned Category B for the purpose of its EA. For such type of projects it is necessary to conduct an EIA and prepare an EMP which will be based on WB and national EA rules and procedures. The project EMP should be used for the project implementation and its main provisions need to be included in the project documents.

### **3. ENVIRONMENTAL ASSESSMENT POLICY, LEGAL, AND ADMINISTRATIVE FRAMEWORK**

#### **3.1 World Bank EA rules and procedures**

Per the WB safeguards policies Environmental Assessment (EA) is a process of the pre-implementation stage which evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, sitting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

EA is mandatory for projects, which may potentially have negative impacts. Furthermore, a well-organized public participation is mandatory in all the stages of the process. Depending on the project, a range of instruments can be used to satisfy the Bank's EA requirements: Strategic Environmental Assessment (SEA), Environmental Impact Assessment (EIA), regional or sectorial EA, environmental audit, hazard or risk assessment and/or Environmental Management Plan (EMP).

The EA is a process of the pre-implementation stage which evaluates a project's potential environmental risks and impacts in its area of influence; examines project alternatives; identifies ways of improving project selection, sitting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

*Environmental screening.* The Bank undertakes environmental screening of each proposed project to determine the appropriate extent and type of EA. The Bank classifies the proposed project into one of four categories, depending on the type, location, sensitivity, and scale of the project and the nature and magnitude of its potential environmental impacts. The Bank's OP/BP/GP 4.01 provides for the following environmental categories of projects:

*Category A:* A proposed project is classified as Category A if it is likely to have significant adverse environmental impacts that are sensitive, diverse, or unprecedented. EA for a Category A project requires a full EIA Assessment.

*Category B:* A proposed project is classified as Category B if its potential adverse environmental impacts on human populations or environmentally important areas - including wetlands, forests, grasslands, and other natural habitats – are less adverse than those of Category A projects. These impacts are site-specific; few if any of them are irreversible; and in most cases mitigatory measures can be designed more readily than for Category A projects. The EA for a Category B projects examines the project’s potential negative and positive environmental impacts and recommends specific measures needed to prevent, minimize, mitigate, or compensate for adverse impacts and improve environmental performance. The findings and results of Category B EA are described in the project documentation (Project Appraisal Document and Project Information Document).

*Category C:* A proposed project is classified as Category C if it is likely to have minimal or no adverse environmental impacts. Beyond screening, no further EA action is required for a Category C project.

*FI Category:* Finally, there is a special case of Category FI, when investment of Bank funds is made through a financial intermediary (FI), of subprojects that may result in adverse environmental impacts.

Based on the results of the study the following WB OPs will be triggered by the projects (see Table 2 below):

**Table 2. World Bank’s Safeguard Policies and their relevance to the project**

Safeguard Policies	Relevance
<b><i>Environmental Assessment (OP/BP 4.01)</i></b> This Policy aims to ensure that projects proposed for Bank financing are environmentally and socially sound and sustainable; to inform decision makers of the nature of environmental and social risks; to increase transparency and participation of stakeholders in the decision-making process	<b>Yes</b> (refer to the description below)
<b><i>Natural Habitats (OP/BP 4.04)</i></b> This Policy aims to safeguard natural habitats and their biodiversity; avoid significant conversion or degradation of critical natural habitats, and to ensure sustainability of services and products which natural habitats provide to human society	No – The project will be implemented in urban areas where are no NHs
<b><i>Forestry (OP/BP 4.36)</i></b> This Policy is to ensure that forests are managed in a sustainable manner; significant areas of forest are not encroached upon; the rights of communities to use their traditional forest areas in a sustainable manner are not compromised	No – the project will be implemented in urban areas
<b><i>Pest Management (OP 4.09).</i></b> This policy is to ensure pest management activities follow an Integrated Pest Management (IPM) approach, to minimize	N/A

Safeguard Policies	Relevance
environmental and health hazards due to pesticide use, and to contribute to developing national capacity to implement IPM, and to regulate and monitor the distribution and use of pesticides	
<p><b>Physical Cultural Resources (OP/BP 4.11)</b> This policy is to ensure that: Physical Cultural Resources (PCR) are identified and protected in World Bank financed projects; national laws governing the protection of physical cultural property are complied with; PCR includes archaeological and historical sites, historic urban areas, sacred sites, graveyards, burial sites, unique natural values; implemented as an element of the Environmental Assessment</p>	No – the EA work confirmed all activities will not involve any such resources and/or will have impacts on them.
<p><b>Indigenous Peoples (OP/BP 4.10)</b> IP – distinct, vulnerable, social and cultural group attached to geographically distinct habitats or historical territories, with separate culture than the project area, and usually different language. The Policy aims to foster full respect for human rights, economies, and cultures of IP, and to avoid adverse effects on IP during the project development.</p>	No. This Policy is not applicable for Moldova
<p><b>Involuntary Resettlement (OP/BP 4.12)</b> This policy aims to minimize displacement; treat resettlement as a development program; provide affected people with opportunities for participation; assist displaced persons in their efforts to improve their incomes and standards of living, or at least to restore them; assist displaced people regardless of legality of tenure; pay compensation for affected assets at replacement cost; the OP Annexes include descriptions of Resettlement Plans and Resettlement Policy Frameworks</p>	No. Proposed project activities will not results in any resettlement issues as they will be conducted on public lands and will be temporary in their nature.
<p><b>Safety of Dams (OP/BP 4.37)</b> This Policy is to ensure due consideration is given to the safety of dams in projects involving construction of new dams, or that may be affected by the safety or performance of an existing dam or dams under construction; important considerations are dam height &amp; reservoir capacity</p>	N/A
<p><b>Projects on International Waterways (OP/BP 7.50)</b> The Policy aims to ensure that projects will neither affect the efficient utilization and protection of international waterways, nor adversely affect relations between the Bank and its Borrowers and between riparian states</p>	N/A
<p><b>Disputed Areas (OP/BP 7.60)</b> The Bank may support a project in a disputed area if governments concerned agree that, pending the settlement of the dispute, the project proposed for one country should go forward without prejudice to the claims of the other country</p>	N/A
<p><b>Disclosure Policy (BP 17.50)</b> supports decision making by the borrower and Bank by allowing the public access to information on environmental and social aspects of projects and has specific requirements for disclosure</p>	<b>Yes.</b> The EIA&EMP have been disclosed and consulted in the country before project appraisal and will be also disclosed in the WB Infoshop.

### 3.2 National legal environmental and EA framework

*Legal framework.* During last 20 years the Republic of Moldova has totally renewed its legal environmental framework. The main laws related to the project are the following:

- Law on the Environmental Protection Nr.1515-XII of June 16 (1993);
- Law on Ecological Expertise and Environmental Impact Assessment Nr. 851-XIII of 29.05.1996 (1996);
- Land Code (1991) 828-XII of 25.12.91;
- Law on State Supervision of Public Health, #10-XVI of February 03, 2009;
- The Law on the Fund of Natural Areas Protected by the State, No. 1538-XIII of 25 February 1998;

Other laws relevant for this project are:

- Law on Quality in Construction (#721 of February 02, 1996);
- Law on Construction Works authorizations, # 163 of July 09, 2010;
- Law about access to information (982-XIV of 11.05.2000);
- Law on Payment for Environmental Pollution (787- XIII of 26.03.96);
- Law on the Vegetal Kingdom No. 239 of 11 August 2007;
- Law on Town-planning and Territorial Development, No. 835, 1996;
- Law on Industrial and Domestic Wastes No. 1347 of 9 October 1997;
- Law on Air Protection (1422- XIII of 17.12.97).

The Governmental Decisions and Instructions specifying issues related to the project activities are the following:

- Instruction on Order of Organization and Conduction of the State Ecological Expertise (2003);
- Governmental Decision regarding Concept of sustainable development of cities and towns in Republic of Moldova (HGO1491 of 2002);
- Governmental Decision on State Supervision Service of Public Health (#384 of May 12, 2010);
- Sanitary Rules on atmospheric air prevention in localities (1998);
- Governmental Decision on increasing of exploitation safety of buildings and constructions, installations and pipe-lines which are sources of a heightened risk (1996);

*Technical heating norms.* The existing norms and design instructions for the heating sector in Moldova originate in the Soviet period and are based mainly on Group Heating Systems. In this context, the relevant documents used by designers are NCM G.04.07-2006 "Thermal Networks" (Moldovan construction norm based on the Russian identical norm adopted by the Republic of Moldova and a number of other CIS states) and the Manual for Design of Heating Substations (Moscow, Stroyizdat, 1983). Many requirements are unified for substations of all sizes and types - from large GHSs to IHSs, from substations using high-pressure steam to lower temperature hot water DH. Designing IHSs in accordance with the above makes the substations more expensive than similar IHSs designed according to western practice. This is related to the use of a larger number of elements, in particular - shutoff valves between pieces of equipment (pumps, heat exchangers, etc.), and some redundancy measures.

*EA rules and procedures.* According to the Law on Ecological Expertise and Environmental Impact Assessment (1996), project documentation for the objects that may adversely affect environment is a subject of a *State Ecological Expertise* to determine whether documentation

complies with environmental protection requirements. The principal objective of the SEE is to check whether all environmental standards/ principles are adhered, and the environmental protection measures are addressed. Ecological Expertise is conducted prior to making decision on planned economic activity and is compulsory for project and planning documentation with regard to planned economic objects and activities that affect or may affect environmental conditions and/or envisage use of natural resources, regardless destination, placement, type of ownership and subordination of these objects, the amount of capital investments, source of funding and method of execution of construction works.

Decision on Ecological Expertise can be considered as basis for further approval or refusal project documentation. In case the objects may severely affect the environment, their planning documentation is a subject of EIA to be conducted prior to Ecological Expertise. The purpose of the EIA is to identify impacts effects that objects/ activities may have on the environment and to provide solutions to mitigate any significant effects that could occur as a result of the project implementation.

According to the Law on EE and EIA, not later than in 10 days after making a decision (positive or negative) on Environment Impact Assessment documentation, the central environmental authority through the mass media, in an obligatory order inform the public about results of the ecological expertise on Environmental Impact Assessment.

Public consultations for the projects liable to EIA (those listed in the Annex to the Law on EE and EIA) are compulsory at the initial stage of the project before conducting EIA and on a later stage, when the Statement on Environmental Impact Assessment is disclosed for public prior to complying of the final (corrected) documentation on Environmental Impact Assessment. It should be mentioned that in relation to the projects liable to EIA, including the current project, national public consultation procedure complies with the Bank's one. In relation to projects which are not listed in the Law, public consultation is not compulsory.

Besides, in addition to compulsory State Ecological Expertise, so called "ministerial" and/ or "public" expertise can be voluntarily applied.

Based on the results of the State Ecological Expertise of the EIA documentation and consideration of results of public consultations, the opinion letter is being compiled. A positive opinion letter/decision of SEE on the EIA documentation serves as official basis to proceed with further project's design.

All projects, which may have negative impact to environment, but not listed in Regulation on Environmental Impact Assessment, will require applying of SEE procedures before implementation. The SEE procedures are usually applied after feasibility and engineering design stages. The design documentation for these projects usually linked with construction, reconstruction and enlargement is being developed in conformity with a technical documentation.

Sections "Environment Protection" and "Environment Protection during Construction" in the project documentation should be developed only by specialists in the fields. Technical solutions, reflected in the submitted for SEE technical documentation have to be sufficiently substantiated in relation to mitigation of impact on the environment.

*EA Administrative framework.* There are several institutions in Moldova with a mandate to protect the environment and EA responsibilities. The most important of them being described below.

*Ministry of Environment (ME).* The Ministry of Environment (ME) is the central authority responsible for the development and promotion of the state policy in the field of environment protection and use of natural resources. It consists of the following departments: Department of policies analyses, monitoring and review; Department of natural resources and biodiversity; Department of water management; Department of pollution prevention and waste management; Department of finance and accounting;

The Ministry has been mandated to deal with broad environmental protection issues, and it has primary responsibility for the supervision of environmental laws, norms, programs, and decrees in the Republic of Moldova. The Ministry's basic responsibilities are set out in the Law on Environmental Protection and its Regulation. It covers environmental management, protection and monitoring.

*State Ecological Inspectorate (SEI).* The SEI represents a public authority subordinated to the Ministry of Environment established as a separate legal entity and it is an environmental enforcement agency performing the state control over the rational use and protection of the natural resources. Its basic responsibilities include monitoring environmental pollution and carrying out regular inspections for environmental violation and protection, as well as provision of monitoring data and information. The SEI is also responsible for final approval of EIA studies prepared at pre-feasibility, feasibility and design stages of development projects.

The main role of the SEI is to implement and enforce the environmental legislation through the control the following divisions of the inspectorate.

- Division of control of soil, subsoil, wastes, chemical substances;
- Division of control of water resources and atmospheric air;
- Division of fighting of poaching and illegal cutting
- Division of physical-chemical and metrological analyses of the environmental factors (central laboratory).

The SEI has 4 Ecological Agencies in Cahul, Balti, Comrat, Chisinau and Ecological Inspections in each rayon.

According to its Regulations the SEI plays a key role in controlling the development process and protecting the environment and human health from damage caused by pollution, in the assessment of proposed new development projects and extension, modifications, reconstruction, conservation demolition or liquidation of those already in existence. This goal is achieved through performing of the state ecological expertise of the design documentation of the proposed projects. In case of non-compliance with established regulations it can stop any activity. It also has powers to request initiation of criminal proceedings, and may impose penalties if laws are breached.

The SEI monitors all facilities throughout the country with high environmental impact or large consumption of natural resources. The SEI issues permits to the relevant operations and carries out enforcement of the permit by inspection visits, monitoring and levying of fines in cases of non-compliance.

*National Centre for Public Health (NCPH).* The NCPH is an agency subordinated to the Ministry of Health and represents the main organization with responsibility for maintaining the state sanitary and epidemiological supervision system with the aim to protect public health at the national level. Its responsibilities include monitoring drinking water quality and pollution; carrying out regular inspections for violation and protection of satisfactory sanitary conditions;

providing monitoring and information, information dissemination, education with respect to public health, hygiene etc.

### ***The comparison of National and WB EA requirements***

While the basic provisions of the National EA rules and procedures are to some extent similar to the WB requirements, there are several important differences. These differences are related primarily to the following: (a) project environmental screening categories; (b) Environmental Management Plan; (c) EA disclosure and public consultation; and (d) EIA reviewing process.

*Differences in screening categories.* In the existing EIA legal framework there is formal EIA categorization system and the SEE requires all projects with a potential environmental impact should have in the project design an assessment of the potential impacts as well as a set of mitigation measures. Thus, as the project will sub-projects with some environmental impacts, all of them would require environmental assessment and respectively - ecological expertise. The projects which do not require an EA mainly correspond activities which are expected to have minor impacts on environment and therefore do not need to be passed through the formal procedures of EIA and SEE (sub-projects that propose purchasing agricultural or agro processing machinery, small scale construction or reconstruction activities). The scale of the project EA is decided in each concrete case by the SEE/Ecological Inspectors during the preliminary approval of the project location and of its technical specifications. In the case where World Bank and national categorization/EIA requirements differ, the more stringent requirement will apply. This refers mostly in the case of deciding about Category C sub-projects - the national EIA legislation doesn't refer to small scale activities, including construction and rehabilitation of various buildings. In these cases the client will apply the WB criteria.

*Differences concerning EMP.* While the national legislation requires for all projects with potential environmental impacts to have relevant mitigation measures in place, it doesn't require a special EMP which should specify, along with the proposed mitigation activities a monitoring plan and reporting requirements, institutional arrangements for EMPs implementation. Neither does the national legislation require needed capacity building activities and necessary expenses in this regard. Similarly, in the case of Category B grant and sub-projects, the beneficiaries will be required to apply WB rules and prepare not a list of mitigation measures but EMPs.

*Differences with regard to disclosure and public consultation.* Conducted analysis shows there is no harmonization between World Bank and national requirements in this regard. According to national legislation, the EIA disclosure and public consultation is mandatory only for large projects (WB Category A projects). At the same time, per the Law on SEE the public might organize at its own initiative a public ecological expertise. Public expertise is being conducted on the basis of NGO's written request toward local public authority. While organizing such expertise, within 7- days, the local public authorities should inform public association about taken decision concerning permission to do so. Public associations conducting ecological expertise are obliged to inform broad local public about beginning of expertise and its results. These associations have the right to obtain planned and project documentation as well as documentation on EIA and get acquainted with normative-technical documentation on conducting of the State Ecological Expertise. The results of public ecological expertise are delivering to the bodies conducting the State Ecological Expertise and to the bodies which make decision of implementation of activity – the subject of expertise. The results and conclusion of public ecological expertise have recommendation character and can have the juridical power only after their approval by the responsible state body in field of ecological expertise. The results of public ecological expertise can be published in mass-media, deliver to the local public



authority, other stakeholders. In the case of World Bank EA policy, the Sub-borrower is responsible for conducting at least one public consultation for all Category B projects to discuss the issues to be addressed in the EMP or to discuss the draft EMP itself. Therefore, for the sub-project, the PIU will review any documentation of the public consultation conducted in the preparation of any national EA documentation to determine if it is consistent with World Bank requirements. If the national public consultation is satisfactory, there would be no further consultation requirement. However, if no public consultation was conducted or the PIU determines that the public consultation documentation is not adequate, the sub-borrower will be required to perform at least one public consultation to discuss the environmental issues of concern to the locally affected communities and include these issues in the content of the EMP. Documentation for the consultation should be submitted to the PIU as part of the sub-project file. Romanian language version of the EMP and the record of the public consultation should be located at in public location near the project site and, if available - on the sub-borrower website. Category B EIA sub-project would be made available to project-affected groups and local NGOs in an easily accessible PFI and/or PIU website.

#### 4. BASELINE ANALYSIS AND DESCRIPTION OF THE PROJECT SITES LOCATION

Project locations are spread all over the city. One of the first priority investments is to *move heat generation from CHP-1 (Combined Heat and Power Plant) to CHP-2* for what the Central DH system needs to be fed by the cheaper heat from CHP-2. In the case CHP-1 will be closed down, there would be a need to build a short interconnecting pipe and pumping station in the return pipe to have sufficient flow to CHP-2.

*Reconnect all public buildings/objects to the HS.* The public buildings/objects that have disconnected from the DH system and are proposed to be reconnected are also located in different parts of the city. Reconnection of these buildings/objects could be achieved by a political decision in the context of development of the city DH system. This would require to provide them with modern IHSs where they are not present today. The use of properly designed and modern IHSs will ensure that the quality and flexibility of the services after reconnection to the DH system will not be lower than when using individual gas-fired heat supply sources. Reconnection of these buildings/objects will increase not only the sales of JSC Termocom but also the load demand on the system thereby increasing its operating efficiency.

*HOB West.* For this investment the project proposes to replace (1) underground pipe CT-1/10 to PV-3 and (2) underground pipe PV-4 to SPRT N9 as well as installation of > 180 new IHSs plus associated piping in the area close to HOB West. This will allow extension of the period that CHP-2 operates alone during the transition periods (*see Maps no. 2, 6 in annex*).

*HOB South.* It is proposed that in the area close to HOB South at least 60 new IHSs with a total design capacity for SH and DHW of 7.2 and 3.7 Gcal/h, respectively will be install. Additionally an underground pipe SPRR N19 to C-319 to the area connected to HOB South need to be changed. (*see Maps no. 3,8, 9 in annex*)

*Pumping stations.* The project will support replacement of three pumps and three motors in pumping station no. 8 and installation of VSDs and a 6 kV/400 V or 690 V transformer. Pumping station no. 8 is the largest pumping station in the Chişinău DH system. This investment will reduce the considerable maintenance cost that this pumping station requires just to keep it in operation. Two of the new pumps shall be in operation and the third shall be reserve. Also two

pumps and two motors in each of pumping station nos. 12 and 13 and installation of VSDs and 10 kV/400 V or 690 V transformers will be supported by the project.

*Other IHSs.* The 52 IHSs plus associated piping in a number of different locations (required due to problems in delivering SH and DHW as a result of low pressure difference) need to be installed. These are close to transmission pipes and will not result in the replacement of any GHS:

- Ciocana: 3 IHSs.
- Centru: 12 IHSs.
- Rîșcani: 16 IHSs.
- Botanica: 15 IHSs.
- Buiucani: 6 IHSs.

Also need investments to replacement of GHSs by 151 IHSs in a number of different locations. (in Centru, Buiucani, Ciocana, Rîșcani and Botanica) (*see image 1-6 from annex.*)

*Replacement of transmission lines.* The other important project activities are replacement of transmission lines in different project sites: the HOB South from SPRR N18 (pumping station no. 18) to SPRR N19 (pumping station no. 19) and SPRR N19 to C-406; the transmission line SPRR N19 to C-319 to the area connected to HOB South; the pipes PV-3 to PL-3aS and PL-3S to SPRT N10; the Magistral pipes from CT-1/10 to PV-3 in the area of HOB West; the pipe PV-4 to SPRT N9 in the area of HOB West; the C306/19-13 to C306/19-20 pipes; SPRT N13 to MC-Budesti; the pipes HOB South from CT-SUD to C-134. All these sites are located in different part of the city in Riscani, Cecani, Buiucani districts. (*see Maps no. 1-9 in annex*)

## 5. ENVIRONMENTAL IMPACTS AND RISK ASSESSMENT OF PROJECT ACTIVITIES

The Project will generate mostly positive socio-economic benefits due to the improvement of population hot water supply and heating services along with improved environmental conditions on the Chisinau Municipality territory and will generally support sustainable development in the region. The overall findings of the study are that there also might be short-term negative impacts on air, water, and acoustic environment are expected, especially during some construction works. The environmental issues likely to be associated with all Project activities include: noise generation; impact on water quality and resources; impact on water by the construction run-offs; disturbance of traffic during construction and rehabilitation works; construction dust; and workers safety. However, these adverse impacts will be temporary and site specific and could be easily mitigated through implementing adequate avoidance and/or mitigation measures. The table No 3 below presented potential project impacts for both construction and operation phases. All potential negative impacts during construction phase are of short-term magnitude and with proper mitigation measures these impacts can be minimized to insignificant levels.

**Table 3. Potential project impacts**

<b>Impacts during Construction/Rehabilitation Phase and magnitude</b>			
<b>Construction phase</b>			
<b>Sector</b>	<b>Impacts</b>	<b>Magnitude</b>	
		<b>Duration</b>	<b>Significance</b>
a. <i>Water Quality</i>	Unauthorized dumping of wastewater.	Short-term	Regional moderate

	Handling chemical materials surface/ground water pollution.		
<i>b. Air Quality</i>	<p>Dust generated from asphalt removals, earth excavation, loading, hauling, and unloading,</p> <p>Dust generated by the movement of vehicles and heavy machinery on unpaved access and haul roads,</p> <p>Exhaust discharged from vehicles and equipment.</p> <p>Dust emission associated with site conditions (soil, weather, or seasons)</p> <p>Dust generated by the vehicles delivering granular and/or fine materials to the sites</p>	Short-term	Local (city), moderate
<i>c. Noise</i>	Significant increase in noise is expected during works, due to various construction and transport activities.	Short-term	Local, high
<i>d. Soil Quality</i>	<p>Rainfall runoff from the construction sites may pollute the soil in the parks (Alunelu, and near Bucuriei str. (see image 7-10 from annex.) whereby the mainline heating pipe will be rehabilitated.</p> <p>Welding or cutting pipes will get splinters of iron that will impact on the ground. The same soil pollution can be from oil spills from transport equipment and machinery used in the work that contain oils.</p> <p>Small particles of mineral wool and polyurethane can remain on the ground.</p>	Short-term	Local, moderate
<i>e. Ecosystem</i>	Air pollution caused by emissions from vehicle and machinery might affect the vegetation along the transportation road and around the site. These impacts are short-term and are considered as on the eco-environment.	Short-term	Local, minor
<i>f. Solid Wastes</i>	<p>The solid wastes generated from the construction are old pipes, abandoned construction materials, scattered sands/stones, concretes and domestic wastes.</p> <p>Emissions from equipment / machinery for welding, gas metal cutting, drilling;</p> <p>When carrying out welding or cutting pipes will get splinters of iron that will impact on the ground. The same soil pollution can be from oil spills from transport equipment and machinery used in the work that contain oils.</p>	Short-term	Local, moderate

	Small particles of mineral wool and polyurethane can remain on the ground.		
g. <i>Construction Traffic</i>	Construction activities and traffic could lead to traffic congestion and inconvenience to the public due to: (i) increased vehicles for materials and solid wastes transportation, and (ii) deterioration of the roads condition after excavation and leveling. It might bring negative effects to the narrower road and cause larger vehicle flux.	Short-term	Local, moderate
h. <i>Public and Safety</i>	Due to fact that the all the project activities will be in Chisinau urban area a high risk of accidents and injures for public may occur.  During works inside the buildings risk of explosions, pollution and inhalation of gases is high especially during welding works.	Short-term	Local, low
i. <i>Cultural Properties</i>	Archaeological findings during the excavation works.	Short-term,	Local, minor, low probability
<b>Operation phase</b>			
j. <i>Water Quality</i>	Handling chemical materials surface/ground water pollution.	Short-term	Regional moderate
k. <i>Air Quality</i>	Exhaust discharged from vehicles and equipment during small repairs and maintenance.  Dust emission associated with site conditions (soil, weather, or seasons) during small repairs and maintenance.	Short-term	Local, minor
l. <i>Noise</i>	Increase of noise is expected during works, due to various small repairs, maintenance and transport activities.	Short-term	Local, minor
m. <i>Soil Quality</i>	Impacts are associated with small repairs, maintenance and transport activities:  Rainfall runoff from the construction sites may pollute the soil in the parks (Alunelu, and near Bucuriei str. (see image 7-10 from annex.) whereby the mainline heating pipe will be rehabilitated.  Welding or cutting pipes will get splinters of iron that will impact on the ground. The same soil pollution can be from oil spills from transport equipment and machinery used in the work that contain oils.  Small particles of mineral wool and polyurethane can remain on the ground.	Short-term	Local, minor

n. <i>Ecosystem</i>	Air pollution caused by emissions from vehicle and machinery might affect the vegetation along the transportation road and around the site. These impacts are short-term and are considered as on the eco-environment.	Short-term	Local, minor
o. <i>Solid Wastes</i>	<p>The solid wastes generated from the construction are old pipes, abandoned construction materials, scattered sands/stones, concretes and domestic wastes.</p> <p>Emissions from equipment / machinery for welding, gas metal cutting, drilling;</p> <p>When carrying out welding or cutting pipes will get splinters of iron that will impact on the ground. The same soil pollution can be from oil spills from transport equipment and machinery used in the work that contain oils.</p> <p>Small particles of mineral wool and polyurethane can remain on the ground.</p>	Short-term	Local, moderate
p. <i>Public and Safety</i>	<p>Due to fact that the all the operations activities will be in Chisinau urban area a high risk of accidents and injures for public may occur.</p> <p>Due to small works inside the buildings risk of explosions, pollution and inhalation of gases is high especially during welding works.</p>	Short-term	Local, high

## 6. ENVIRONMENTAL MANAGEMENT PLAN

The Environmental Management Plan (EMP contains: (a) mitigation measure to address potential adverse environmental and social impacts under Component 1; (b) civil works supervision methods and monitoring actions; and (c) implementing arrangements.

### 6.1. Mitigation activities

These activities cover all identified impacts and are focused on avoiding and reducing potential adverse impacts.

*Water Quality.* During pipe replacement, pumping stations and other equipment's maintenance water from pipes and heat system will become wastewater. Surface and groundwater pollution during construction will occur due to following: (i) discharge of the residential sewage and wastewater from the work sites, (ii) washing water from the vehicle and machinery maintenance; and (iii) muddy runoff along with particles in rainy days. Leakage of water from heating system will be prevented as much as possible.

Environment-friendly mobile toilets and oil separation tanks will be installed on the construction camp. Wastewater from oily waste tanks will be collected by an authorized company. Similarly, the wastewater from mobile toilets will be collected and treated in septic tanks and discharged to an existing sewer system by authorized for this purpose city company. Unauthorized discharge of wastewater will be prohibited.

An Operational instruction on handling chemical materials (e.g., store the chemical away from watercourses and provision of retention areas to contain accidental spills of such toxic and harmful construction materials as caustic and acidic substances, oil and petroleum products) will be prepared and applied to prevent soil and surface/ground water pollution. A prevention and emergency response plan will be developed and implemented to train the workers on safe and diligent handling of chemicals to avoid accidental spills and on emergency response when a spill would occur.

*Air Quality.* Proposed investments in reconnection of 41 public buildings/objects, including 86 new IHSs plus associated piping will reduce consumption of natural gas in Chisinau and speeded emission of burned gases will not pollute more the urban area. Move heat generation from CHP-1 to CHP-2 will also reduce air pollution in Chisinau city.

Anticipated sources of air pollution from construction activities on site include dust generated from/by: a) earth excavation, loading, hauling, and unloading; the movement of vehicles and heavy machinery on unpaved access and haul roads; b) aggregate preparation, concrete-mixing, and haulage activities; and c) exhaust from vehicles and equipment.

Dust emission is associated with site conditions, mechanization and management of the construction works. The vehicles delivering granular and/or fine materials to the sites will be covered with protective sheets. Overloading of these vehicles should be avoided. Vehicle speed will be controlled on construction sites.

Water trucks will be used to wet the construction roads twice a day if dry conditions may occur, according to a daily schedule and taking weather conditions into consideration. These urban areas (streets) will be kept clean, solid, smooth, and clear of all dust, mud, or extraneous materials dropped from transportation vehicles.

*Noise.* A significant increase in noise is expected during underground heating pipe replacement, due to various construction and transport activities. Construction facilities and equipment will include excavators, stabilizers, concrete mixers, drills, rollers, poker vibrations, concrete pumps, loading machines, and other heavy machineries.

It is recommended to avoid any temporary barracks constructions for living destination near the construction sites because all the works will be in Chisinau city and is very close to several hotel/residential areas and the workers can be located there.

Large amounts of construction waste materials will be transported to and from the construction sites, frequently during the 8~10 h workday for the construction period. Therefore, ensuring the tracks and other transportation machinery do not exceed noise standards are essential for construction activities to meet Moldovan noise criteria and to protect the local population.

Construction machinery will be properly maintained to minimize noise. Noise reduction devices or methods (the use of temporary hoarding or noise barriers and vibration-proof equipment) will be applied to shield noise sources where piling equipment is operating. Noise from equipment and machinery will comply with Noise standard limits (GOST 12.1.003-83) for construction site

according to national legislation. In accordance with noise standard, the sites for concrete-mixing plants and similar activities should be located at least 1 km away from sensitive areas such as residences, schools, and hospitals. But it is strongly recommended using prepared concrete from specialized concrete plants from Chisinau region.

The operation of machinery generating high levels of noise, such as piling, will be restricted near the sensitive areas (hospitals, schools, administrative buildings etc.) and stopped between 10:00 p. m. and 6:00 a.m. in accordance with Moldovan regulations. The movement of heavy vehicles along urban and adjacent roads will also be restricted to between 10:00 p.m. and 6:00 a.m. Adequate route for large trucks will be selected to keep away from residential areas.

Construction activities will be scheduled to minimize the impact of machinery noise. Also suitable measures will be taken to protect workers' hearings while operating heavy equipment according to the worker health protection law of the Republic of Moldova.

*Soil Quality.* Because heating pipes to be replaced are going thru two Buiucani green squares special attention has to be taken to avoid soil pollution. Rainfall runoff from the construction sites may pollute the soil. Secondly, one important tasks is to protect storm drains so that soil washed out of the construction site does not go into them, thus eventually polluting the waters that these storm drains eventually empty into. Therefore, during rainstorm days the excavation activities should be avoided. Stripped topsoil will be stockpiled. A drainage system will be built to minimize the soil erosion. The soils on the tires of construction vehicles will be regularly cleaned. After the construction, the excavated soils will be refilled on construction site. As soon as refill and land leveling is done, re-vegetation with trees and grasses will be undertaken.

*Solid Wastes.* The solid wastes generated from the construction are abandoned construction materials, scattered sands/stones, concretes and domestic wastes. These solid wastes are harmless, however, it will affect environmental sanitation of the construction site, hamper the traffic and transportations, damage the surface of roads, further increase idle exhaust emissions of cars, and pollute the ambient air. The solid wastes must be collected regularly by the contractors and cleaned up in a timely manner and sorted, transported to the municipal landfill.

*Construction Traffic.* Construction activities and traffic could lead to traffic congestion and inconvenience to the public due to: (i) increased vehicles for materials and solid wastes transportation, and (ii) deterioration of the roads condition after asphalt milling and excavation and leveling. It might bring negative effects to the narrower road and cause larger vehicle flux. In conjunction with the local traffic management authority, traffic flow regulation plans will be prepared before construction begins, if necessary. Proper transportation time and route will be selected to avoid rush hours and reduce traffic congestion.

*Health and Safety.* Health & Sanitation is a key public health issue during construction. Sanitation services will be maintained, including air quality, food quality and water supply. Medical first aid kits and health services will also be provided.

Contractors will be required to take safety measures at the construction site to protect the workers and the public, including provision of appropriate personal protective equipment for workers and arrangement of warning signs to alert the public of potential safety risks in and around the construction sites.

The potential environmental risks during operation of the project infrastructure are related to accidental spills and leakage of wastewater that may cause less serious surface and ground water

pollution that receive the water from construction site in case of high flow of water used in large diameter heating pipes. Automated flow meter and water quality monitoring system will be advisable to be installed. However, the regularly basic water tests will be done by the existing laboratory of Termocom or SEI/Apa Canal Chisinau. Specific measures should be taken if any potential incidents or illegal discharge is found during regular inspection and maintenance. Standby equipment and pipes should be installed in such a way that will reduce the risk of accidental overflow. Furthermore, an emergency response plan for accidental water overflows or spills will be also prepared.

An operation and maintenance manual for equipment will be provided by the suppliers. The equipment operators and plant manager will be continuously trained in operational safety, maintenance of the facilities, emergency procedures and contingency plans will be prepared. Periodic training and practice sessions in safe operating procedures will be held during the DH system operation.

The proposed mitigation measures are summarized and presented in the table 4.



**Table 4. Environmental Mitigation Plan**

Phase : Pre-construction – P-C Construction - C Operation – O Decommissioning - D	Environmental Impact	Mitigating Measure(s)	Cost		Institutional Responsibility		Significance & probability of occurrence	Comment
			Install	Operate	Install	Operate		
<b>General issues</b>								
P-C	Permanent or temporary withdrawal of land sites	Selection of optimal location of site and routes for access roads, pipes	To be determined	N/A	Termocom	N/A	Significant	Subject of RAP
		Use proper temporary storage of construction materials	To be determined	N/A	Contractor	N/A	Moderate-Possible	
		Ensure a sufficient land, spaces and access for project activities	To be determined	N/A	Local authorities , Termocom	N/A	Significant	Subject of RAP
C	Injury to contractor's workers and other persons during works	Safe working procedures to be written and followed by contractor	Bill of Q	N/A	Contractor	N/A	Moderate-Possible	
		Working areas to be temporarily out of bounds to non-works	To be determined	N/A	Contractor	N/A	Moderate-Possible	
		Special equipment and clothing corresponding to type of work to be assured	Bill of Q	N/A	Contractor	N/A	Moderate-Possible	
C , O, D	Injury to contractors workers and others from unsafe storage of waste	All waste material to be stored in a secure, designated area prior to removal to a designated waste landfill site	To be determined	N/A	Contractor	Termocom	Moderate-Possible	
		No easy flammable waste will be stored on/near site	To be determined	N/A	Contractor	Termocom	Significant	
C , O, D	Pollution (visual and other) caused by improper disposal of waste materials	Waste to be disposed of at a designated waste landfill site.	To be determined	N/A	Contractor	Termocom	Moderate-Possible	
		Recycling of materials will be allowed if is case	To be determined	N/A	Contractor	Termocom	Minimal	
		Workers will be instructed regarding waste management procedures	To be determined	N/A	Contractor	Termocom	Moderate-Possible	
C	Destroying of green areas	Manage accurate works activities in order to damage as minimum and restore after completion	N/A	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible
C, D	Soil, surface water, air pollution with transported materials	Cover the trucks transporting the fine materials or waste	N/A	N/A	Contractor		Not applicable	Moderate-Possible

Phase : Pre-construction – P-C Construction - C Operation – O Decommissioning - D	Environmental Impact	Mitigating Measure(s)	Cost		Institutional Responsibility		Significance & probability of occurrence	Comment	
			Install	Operate	Install	Operate			
C	Loss of topsoil leading to increased soil erosion	Separation of topsoil and subsoil during excavation works, with careful replacement of topsoil after pipe is laid	Bill of Q	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
		No long time storage of topsoil will be allowed	N/A	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
		Avoid topsoil erosion from temporary storage, to insure measures against overflow in case of heavy rainfall	N/A	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
C, D	Oil pollution of soil and water at construction site	Daily checks of machinery for leaking oil	N/A	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
		No washing of machinery at urban construction site	N/A	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
C, D	Noise pollution on site	Works performed strictly during normal weekday working hours	Bill of Q	N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
C, D	Noise pollution on adjacent localities	Works performed strictly during normal weekday working hours	Bill of Q	N/A	Contractor, supervision	Construction	Not applicable	Minimal	
		No explosion materials has to be used		N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
C, D	Temporary air pollution (CO2, NOx, dust etc.) from construction works and increased traffic	Minimize dust and traffic emissions by good operation management and site supervision		N/A	Contractor, supervision	Construction	Not applicable	Moderate-Possible	
		Apply dust suppression measures (water sprinkling), especially during long dry periods	Bill of Q	N/A	Contractor		Not applicable	Significant	
C	Pollution and damages of the construction site in case of flooding.	Construction of fence / safety dams (if applicable)	Bill of Q	N/A	Contractor		Not applicable	Significant	
C	Archaeological “chance finds”	If any archaeological artifacts are found, work must stop immediately and the respective local authorities and experts informed	To be determined	N/A	Contractor, supervision	Construction	Not applicable	Significant	
<b>Rehabilitation of Main Heating Networks</b>									
C	Pollution by waste gas from construction machinery and transport vehicles	Repair and maintenance of construction machinery and transport vehicles will be strengthened at normal time; traffic control will be properly done to avoid traffic jam and reduce gas emission	To be determined	N/A	Contractor, State Sanitary Inspection, Ecological Inspection, Termocom		Termocom	Significant	

Phase : Pre-construction – P-C Construction - C Operation – O Decommissioning - D	Environmental Impact	Mitigating Measure(s)	Cost		Institutional Responsibility		Significance & probability of occurrence	Comment
			Install	Operate	Install	Operate		
C	Noise pollution/ vibrations from hauling tracks/ moving vehicles and working equipment	Control construction methods and used machinery and equipment  Careful timing of works in residential areas/ restrict construction to certain hours  To avoid loud beep signals in residential areas / to minimize disturbance to residents	To be determined	N/A	Contractor, State Sanitary Inspection, Ecological Inspection, Termocom	Termocom	Significant	
C	Littering of territory adjacent / roads damage to landscape due to waste & excavated materials disposals/ stockpiling of materials	To plan carefully construction works to minimize impact on parks and street flora, careful siting, alignment, design of associated infrastructure to minimize impacts	To be determined	N/A	Contractor, Termocom	Termocom	Significant	
C	Rehabilitation and construction works will possibly result in removal or relocation of trees and vegetation along or within the construction sites.	To plan carefully construction works to minimize impact on flora, habitats/ careful siting, alignment, design of associated infrastructure to minimize impacts  Replanting trees and vegetation after heating infrastructure rehabilitation	To be determined	N/A	Contractor, Termocom	Spatii Verzi	Moderate-Possible	
C	Human health / settlements	<ul style="list-style-type: none"> <li>To train personnel on occupational safety and measures towards compliance with occupational safety requirements</li> <li>Appropriately experienced contractor, good supervision, careful planning and scheduling of work activities</li> <li>Excavated potholes should be either covered with crushed stone or sand or fenced if they are going to be left opened over night</li> <li>Avoid working during unfavorable weather conditions to minimize risk of accidents/ bitumen should not be applied during strong winds or heavy rains</li> </ul> To ensure accident prevention for population in residential areas/ to plan carefully construction works to minimize impact on local residents	To be determined	N/A	Contractor, State Sanitary Inspection, Ecological Inspection, Labor Inspection, Termocom	Termocom	Moderate-Possible	

Phase : Pre-construction – P-C Construction - C Operation – O Decommissioning - D	Environmental Impact	Mitigating Measure(s)	Cost		Institutional Responsibility		Significance & probability of occurrence	Comment
			Install	Operate	Install	Operate		
P-C / C	Health impact on workers due to work with hazardous materials	<ul style="list-style-type: none"> <li>Incorporation of safety and environmental requirements in contract documents/ providing of workers with uniforms, glasses, gloves, etc.</li> <li>Foreseeing compensations in case of health damage</li> <li>Fencing of dangerous areas (stockpiling of hazardous materials)</li> </ul>	To be determined	N/A	Contractor, State Sanitary Inspection, Ecological Inspection, Labor Inspection, Termocom	Termocom	Moderate-Possible	
P-C / C	Fire and explosion hazards due to accidents during works	<ul style="list-style-type: none"> <li>Incorporation of safety and environmental requirements in contract documents/ providing of workers with uniforms, glasses, gloves, etc.</li> <li>Foreseeing compensations in case of health damage</li> <li>Fencing of dangerous areas (stockpiling of hazardous materials)</li> <li>To train personnel on occupational safety and measures towards compliance with occupational safety requirements</li> <li>Appropriately experienced contractor, good supervision, careful planning and scheduling of work activities</li> </ul>	To be determined	N/A	Contractor, State Sanitary Inspection, Ecological Inspection, Fire service  Construction supervision	Termocom	Moderate-Possible	
P-C / C	Impact of accidental discharge of pollutant	<p>Emergency measures for specific accidents will be worked out, so that control and solution can be done promptly in case of an accident;</p> <p>In case of an accident, the cause will be found out as soon as possible, to organize prompt repair and to solve the problem in the shortest possible time, to prevent spreading of pollution.</p> <p>To prevent leaks/spills during transportation/loading-unloading of waste materials</p> <p>To plan carefully construction works to minimize air / water / soil pollution</p>	To be determined	N/A	Contractor, State Sanitary Inspection, Ecological Inspection,  Construction supervision	Termocom	Moderate-Possible	

Phase : Pre-construction - P-C Construction - C Operation - O Decommissioning - D	Environmental Impact	Mitigating Measure(s)	Cost		Institutional Responsibility		Significance & probability of occurrence	Comment
			Install	Operate	Install	Operate		
	Complying with the technical design documents and effective construction norms	<p>To be certain that the project implementation is complying with the technical design documents and effective construction norms.</p> <p>Verify if:</p> <p>Appropriate human health and worker safety measures during construction are developed and implemented by the construction company, which will be responsible for these measures;</p> <p>The documents prepared for specific works by the construction company are correct;</p> <p>The reconstruction works are conducted in accordance with construction norms and according to construction technologies;</p>	To be determined	N/A	Contractor, construction supervision, State Sanitary Inspection, Ecological Inspection,	Termocom	Significant	

## 6.2. Monitoring of EMP implementation

In order to ensure efficient implementation of the mitigation measures proposed, including compliance with environmental requirements during the construction stage, a program of monitoring activities will be required, which includes two major types of monitoring: (a) compliance monitoring - the general environmental monitoring of construction and operation site and activities; (b) impact monitoring - the specific monitoring of water and air quality, noise Project activities’.

The monitoring will be conducted by respective authorities State Sanitary Inspection, Ecological Inspection, Fire Service, Labor Inspection, and beneficiary - Termocom, during the construction and operation stages.

It should be noted that the monitoring plan presented below in table 5 is generic one, and it is expected that a detailed operational monitoring plan(s) will be developed for specific interventions, following detailed project planning by selected contractors.

*Compliance monitoring.* The proposed measures for compliance monitoring for the construction and operation stages is presented in table 5 below. It should be noted that: (a) State Labor Inspection is responsible for the issues related to occupational safety and health; (b) State Construction Inspectorate is responsible for overall supervision of construction works; (c) Ministry of Culture is responsible for cultural issues, including handling of archaeological sites and finds; and (d) Municipal environmental authorities are responsible for environmental supervision. Inspections of construction sites are among the duties of these authorities’ staff and are covered form their budgets.

*Impact monitoring.* This section specifies general requirements for monitoring of water and air quality, noise, done by Contractors and Termocom. The estimated costs for implementing the mitigation measures and monitoring activities are provided in below table. As most of the costs for mitigation and monitoring measures are included in the technical costs (e.g. mitigation measures referring to equipment operation or site restoration) not all mitigation and monitoring activities show up in the table. Costs for monitoring activities during construction phase of the Project shall be included in the bill of quantity for proposed civil works.

**Table 5. Environmental Monitoring Plan**

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
<b>During preparation</b>							
Potential tree losses	Trees to be cutted	Survey on site during detailed design	Visual monitoring, mapping of tress, include in detail design	During detailed design Before works starts,	Constructions may affect municipal green zones	Construction costs	Termocom, Design Company, SEI
Air quality	Dust, smog, waste burning	To be determined during design	Visual monitoring	During works Daily	Air pollution prevention	Construction costs	Termocom, SEI
Top soil preservation	Soil	In parks, green areas	visual monitoring	Monthly	Soil pollution prevention, Aesthetic view	To be included in BoQ	Termocom, SEI
<b>During implementation</b>							
Potential tree losses	Trees to be cutted  Trees to be planted	Survey on site during works  Green areas	Visual monitoring,  Obtain cutting trees permits	Permanently  Before works starts,	Constructions may affect municipal green zones	Construction costs	Termocom, Design Company, Construction Supervision, SEI
Air quality	Dust, smog, waste burning	Survey on site during works	Visual monitoring	During works Daily	Air pollution prevention	Operation costs	Contractor, Termocom, CPH, SEI
Air pollution from improper maintenance of equipment	Technical condition	Car parking area Onsite	Regular technical inspection	During works Daily	Air pollution prevention	Operation costs	Contractor, CPH, SEI

Phase	What (Is the parameter to be monitored?)	Where (Is the parameter to be monitored?)	How (Is the parameter to be monitored?)	When (Define the frequency / or continuous?)	Why (Is the parameter being monitored?)	Cost (if not included in project budget)	Who (Is responsible for monitoring?)
Top soil preservation	Soil	In parks, green areas	Visual monitoring	Monthly	Soil pollution prevention, Aesthetic view	To be included in BoQ	Termocom, SEI
Worker's safety and health	Workers safety	Works sites	Accident register Training register Provide PPE Organize adequate works planning	Permanently	To protect workers safety and health	Construction costs	Contractor, Labor Inspection, Engineer
Material transport	Are the truck loads covered or wetted? Compliance with legislation (restricted working hours; haul routes) dust suppression methods where required	Job site / municipal streets	Supervision	Unannounced inspections during work	Avoid dust and split of fine material Avoid damage and pollution of municipal routes	Construction costs	Construction Supervision (Engineer), Road police
<b>During supervision</b>							
Planting trees	Regular monitoring and control of successful growth of new planted trees	At locations of new planted trees	Replanting of trees that have died	Monitoring to be conducted in autumn so as to allow for replacement of failures	Successful grow of trees	Construction costs in BoQ	Contractor 1 <sup>st</sup> Year / Municipal agency "Spatii Verzi" subsequent year(s)



*Supervision and monitoring activities.* During subproject implementation Termocom will have overall supervision responsibility for assuring that the measures indicated in the EMP are being properly performed. In collaboration with the local environmental authorities will perform the subproject environmental monitoring during both construction and operation phases as specified in the monitoring plan of the EMP.

*Reporting.* Regular subproject progress reports should include a section entitled “Environmental Management”. The section should be as brief as possible: providing a condensed description of the monitoring activities, any issues identified and how they were or are planned to be resolved. The main roles and responsibilities under the EMP are indicated in above summary tables of environmental management and monitoring plans. During construction period of the Project a monitoring report shall be produced on a quarterly basis. It shall describe respective progress concerning the implementation of the proposed mitigation and monitoring measures. Reporting should be within the responsibility of the Termocom. Quarterly reports shall also contain corrective actions that may be required concerning environmental issues.

### **6.3.Implementing arrangements**

*Main implementing institutions and assessment of their EA institutional capacity.* The main implementing agency is the Ministry of Economy as well as the implementing entity MEPIU. Both of them have good experience in successfully implementing safeguards issues within two World Bank projects (Energy II; and Competitiveness Enhancement Project). MEPIU is staffed with highly qualified and experienced professionals, both in technical and safeguards aspects, will ensure project implementation in accordance with the Operations Manual (OM), as well as that the EMP provisions are fully integrated into project implementation, conducting monitoring and reporting required by the World Bank. The main responsibilities with regard to day to day implementation of safeguards requirements are assigned to district heating company “Termocom” which is well prepared and has long time experience in this regard. All key elements of the environmental management system such as policy, procedures and practices are therefore established. Regular work safety training relevant to specific job activities is provided to all employees. Annual training programs are established for specific categories of workers, engineers, specialists and managers. The company is currently certified under both ISO 14001 (Environmental Management) as well as under ISO 18001 (Operational Health and Safety Management System) and has in its structure three subdivisions responsible for the issues related to environmental safeguards (Chemical Service, in charge of all environmental issues; Safety and Occupational Hazards division; and Technical Supervision division, which is responsible for ensuring all civil works financed by the company are done in compliance with the design documents and existing norms and standards). These entities have very experienced staff with all necessary licenses and certificates.

*Major Termocom responsibilities.* The main goal of Termocom is to ensure that the project activities are implemented in full compliance with the WB and national EA rules and procedures as well as with the EMP requirements. In this regard this body will be responsible for: (a) coordination of all environmental and EA related issues; (b) conducting EMP supervision and monitoring and assessing the environmental impacts and efficiency of mitigation measures; (c) communication with an EIA competent authority (ME, SEI); and (d) if needed providing support to contractors in EMP implementation; (e) reporting to the MEPIU, ME and WB with regard to EMP implementation.

*Contractors' responsibilities.* The actual investment program will be carried out by contractors selected through a public tender process according to local procurement law. They have to operate in full compliance with national environmental legislation and with the EMP requirements. Further, the contractors are obliged to follow regulative requirements of the Moldavian law related to traffic safety, occupational health and safety; fire safety; environmental protection; and community health and safety. All EMP associated activities will be financed by the contractors. The contractors will also be requested to designate a person in charge of environmental, health and safety issues and for implementing the EMP.

*Integration of EA requirements into project documents.* The bidding documents for selecting the contractors will include specifications that would ensure effective implementation of environmental, health and safety performance criteria by the winning bidder. The contract with winning bidder will include necessary conditions related to HSE compliance with EMP and an obligation to inform the Termocom of any significant HSE accidents and events among subcontracted project workers. The tender documents will, according to this EMP, require the winning bidder to: (i) develop an operational EMP that include measures to prevent/limit disturbance of soils and vegetation removal to the minimum; prevent soil compaction as well as other potential impacts; (ii) ensure that all ground disturbing activities are conducted consistent with the construction requirements; (iii) develop a traffic management plan that include measures to ensure work zone safety for construction workers and the travelling public; and (iv) the traffic management plan should be approved by the Traffic Police prior to commence of any construction/repair works.

#### **6.4.EMP implementation costs**

During the (re)construction/implementation phase, the EMP implementation will be funded by the contractors. All (re)construction and installation activities will be provided by contracted companies. They are responsible for full and qualitative implementation of the EMP provisions.

EMP implementation costs are related with expenses of salaries, reporting, and supervision and monitoring costs. Also EMP cost are measures to reduce the pollution, impact to environment, preventive mitigation measures - all this expenses are included in overall construction costs.

#### **6.5.TORs for environmental auditing and assessing the cost of: decommissioning, dismantling and environmental remedial measures for CHP 1 closure**

*The reason for closure CHP 1.* Currently the GoM is considering the closure of CHP 1 due to a series of reasons. First of all, as it was shown in the project feasibility study done by the Swedish company (SWECO), based on the present low load (and therefore inefficient) operation of CHP-1 and CHP-2, both these CHPs being in the same circuit and CHP-1 being too small to take the full heat load from CHP-2 (especially looking in the long term and an increase in heat demand). Since CHP-1 cannot operate at any reasonable load in condensing mode without significant investment (since today CHP-1 has only small fan coolers) this would lead inevitably to CHP-1 closing down or acting only as a reserve in the case CHP-2 was to be out of operation. Secondly, as the plant it is located in the city it doesn't have good perspectives to expand its capacities as the demand for energy would emerge.

*The scope and main objectives of environmental auditing.* The proposed auditing is aimed at identifying the following: (a) current and past environmental liabilities; (b) designing alternative

scenarios and action plans for partial/full decommissioning strategies and associated dismantling and clean-up remediation activities; (c) estimating necessary costs for identified scenarios and action plans; and (d) identifying key environmental impacts of formulated dismantling and remediation action plans and proposing mitigation measures and monitoring activities. All these will allow the GoM to select the most optimal decommissioning scenario for the CHP 1.

*The structure of the TORs.* After a short background information, the draft TORs contains several sections: (a) scope, objectives and main tasks of the TORs; (b) designing alternative scenarios for plant decommissioning; (c) main focus of environmental auditing for identified decommissioning scenarios, associated environmental risks and necessary mitigation measures, and environmental remediation implementation plans; (d) cost estimations for decommissioning, dismantling and remediation activities for proposed alternative scenarios; (e) outline of the environmental auditing report; and (f) guidance for environmental auditing report disclosure and consultation. The whole text of the TORs is presented in the Annex 1. It is proposed during the project implementation before tendering the document will be revised, clarifying technical aspects of the auditing and necessary efforts in terms of timing and needed financial resources.

## **6.6. Public consultation and information disclosure**

The draft EMP was consulted with all key stakeholders. For that purpose on November 8, 2013 the draft EIA&EMP Summary in Romanian language along with the full report in English have been disclosed to all interested parties by posting it on Termocom website ([www.termocom.md](http://www.termocom.md)) and inviting them to the public consultation. Additionally the hard copies of the report and its translated Summary along with the invitation for participation at the consultation meeting, have been distributed to: MoE, MEPIU, Ministry of Environment, State Ecological Inspectorate and Municipal Ecological Agency. On November 22, 2013 the Termocom conducted a public briefing and consultation meeting on the document (see minutes of the consultation in the Annex 2). The meeting concluded that the draft EMP document covers practically all potential impacts and possible mitigation measures along with clear procedures from environmental screening and monitoring. The draft document was revised after the meeting, taking into account outputs from the previous consultations. The final versions of the EMP (in English and summary in Romanian) were posted on the Termocom website and submitted to the World Bank. The EMP will be used by the Termocom during the project implementation.

## 7. ANNEXES

### *Annex 1. TORs for environmental auditing and assessing the cost of: Decommissioning, dismantling and environmental remedial measures*

#### **Background**

*1. Project objective and activities.* The proposed project development objective is to improve the coverage, quality, efficiency, and sustainability of centralized heating services in selected urban area. It is composed by three components: (a) Investments to the DH system as well as conducting environmental auditing for assessing associated costs for decommissioning, dismantling and remediation activities of the CHP-1 closure and of staff retrenchment; (b) Partial Credit Guarantee (PCG) for debt restructuring; and (c) project management. The project will support demand-side priority investments aimed at optimizing and modernizing the heat distribution network, such as switching from Centralized Heating Sub-stations (CHSs) to Individual Heating Sub-stations (IHSs) for better and more efficiency supply of heat and hot water to end-user consumers. Specifically, financing would be provided for: (i) modernization of selected pumping capacities by replacing the old pumps by new ones with lower voltage motors and variable speed drives, to reduce internal energy consumption and provide for automated flow of heat agent; (ii) rehabilitate selected segments of the distribution network by replacing the most severely damaged, corroded and leaking pipes with modern pre-insulated pipes to ensure continued service and reduce losses of heat; (iii) construct a new DH pipe line and pumping station to allow the closure of CHP1; (iv) retrofit CHSs to IHSs installing DHW recirculation pumps and pipes for more efficient heat supply to end-users and better control of heat consumption.

*2. Project implementing arrangements.* The main implementing agency is the Ministry of Economy (MoE) which will be assisted by an implementation unit. While the ministry will be responsible for overall project implementation, the Project Implementation Unit (PIU) will ensure project implementation in accordance with the Operations Manual (OM), as well as that the EMP provisions are fully integrated into project implementation, conducting monitoring and reporting required by the World Bank. The main responsibilities with regard implementation of the first component would be the responsibility of district heating company “Termocom” which is well prepared and has long time experience in this regard.

*3. Legislative Framework for TORs.* These Terms of Reference (ToR) for an Environmental auditing for the CHP 1 have been developed in accordance with the requirements of the “Regulation environmental auditing of public enterprises subject to privatization” approved by the GoM (No. 394 from 08.04.1998). The regulation specifies the procedures for environmental auditing of public enterprises subject to privatization with the main goal of assessment and compensation of past environmental liabilities as well as of preparing an investment remediation action plan. For this purpose the Regulation specifies an express environmental auditing should be conducted which have to be based on the following: analysis of enterprise’s documents that specify usage of environmental resources; ecological passport of the enterprise; inventories of environmental pollution sources; environmental permits – for water usage and discharges; for air pollutants emissions; for wastes disposal; documents on maximum allowable emissions and discharges; annual reports on environmental protection at enterprises as well as the results of state ecological control at the enterprises. In the result of this express auditing of the enterprises should be prepared an EIA Statement which has to include the following: (a) priority environmental remediation activities that should be provided in the privatization clauses; (b) determination of sources of funding for remediation activities as well as the obligations of the

new owners; and (c) remediation action plan which might specify the closure activities, relocation of the enterprise or its equipment, conservation or transfer of land use categories, including activities for remediation of adjacent areas to the enterprises; (d) remediation of polluted territories, their remediation, compensation of land use owners and farmers for land pollution; (e) other environmental remediation and protection measures. All these measures are included in a special remediation action plan which should be part of privatization documents. The Regulation also specifies the environmental remediation activities should constitute no more than 20% from the total amount of proposed privatization investments. These remediation and compensatory costs can be deducted from the total costs of privatized enterprise against the obligation of new owner that he will invest that amount and will implement the remediation action plan on its own resources.

*4. CHP 1 background.* CHP-1 was built during 1951-1961. It has an installed capacity of 66 MW, the available being about 40 MW. Its main fuel is natural gas, and the reserve one - heavy oil. The oil is delivered to the plants by railroad and it is stored in tanks with a total capacity of about 1,600 m<sup>3</sup>. The wear degree of the equipment is about 60%. The plant produces along with electricity also thermal heating and has a capacity of about 296 MW thermal energy. Overall its heating index that represents the ratio between the installed thermal capacity of the installations that function in the co-generation cycle and the total thermal capacity (co-generation plus hot water boilers) is quite small. The CHP-1 is located inside the city and it is surrounded by industrial enterprises and garages. The residential areas are overall located outside of the required environmental protective zone (see figure 1).

*Fig. 1 Location of CHP 1.*



*5. The reason for closure CHP 1.* Currently the GoM is considering the closure of CHP 1 due to a series of reasons. First of all, as it was shown in the project feasibility study done by the Swedish company (SWECO), based on the present low load (and therefore inefficient) operation of CHP-1 and CHP-2, both these CHPs being in the same circuit and CHP-1 being too small to take the full heat load from CHP-2 (especially looking in the long term and an increase in heat demand). Since CHP-1 cannot operate at any reasonable load in condensing mode without significant investment (since today CHP-1 has only small fan coolers) this would lead inevitably to CHP-1 closing down or acting only as a reserve in the case CHP-2 was to be out of operation. This conclusion is based on the assumption that the heat demand in the CHP-2 circuit will not increase above that which can be supplied by CHP-2 before further investments are made in the system to reach the “Regulated Flow state” and therefore if CHP-1 is closed down then further investments in the DH system (in addition to that for the interconnecting pipe and pump station) should be made to reach the “Regulated Flow state” (i.e. investing in some thousands IHSs) otherwise the circuit in which CHP-2 is located would not have sufficient capacity if the heat demand was to increase about that available from CHP-2. Thus, any decision taken to close

CHP-1 should be in conjunction with the decision to continue investments towards reaching the “Regulated Flow state”. Secondly, as the plant it is located in the city it doesn’t have good perspectives to expand its capacities as the demand for energy would emerge.

6. *Definition of used main terms.* The term “*decommissioning*” refers in this TORs to the process of a well-coordinated shutdown of plant systems at the end of its economic life taking into account environmental and safety requirements. “*Dismantling*” means the well-coordinated demolition and recycling of related buildings and installations for site clearance and environmental clean-up enabling the further commercial use of the plant site. “*Remediation*” means removal of pollution or contaminants from environmental media such as soil, groundwater, sediment, or surface water for the general protection of human health and the environment.

7. *Social impact analysis of the CHP 1 closure.* From the provided by the GoM data it is known about 600 employees of the plant would be affected by its closure. In this regard a special social impact assessment will be conducted separately to this study and relevant severance pay and retraining costs will be proposed for the personnel. Thus this TORs doesn’t make reference to social issues.

8. *The structure of the TORs.* After a short background information, these TORs contains several sections: (a) scope, objectives and main tasks of the TORs; (b) designing alternative scenarios for plant decommissioning; (c) main focus of environmental auditing for identified decommissioning scenarios, associated environmental risks and necessary mitigation measures, and environmental remediation implementation plans; (d) cost estimations for decommissioning, dismantling and remediation activities for proposed alternative scenarios; (e) outline of the environmental auditing report; and (f) guidance for environmental auditing report disclosure and consultation. During the project implementation the document will be revised, clarifying the objectives of the auditing and necessary efforts in terms of timing and needed financial resources.

## **A. Scope, objectives and main tasks of the TORs**

9. *The scope and main objectives of the assignment.* The assignment is aimed at undertaking an environmental auditing of the CHP 1, identifying: (a) current and past environmental liabilities; (b) designing alternative scenarios and action plans for partial/full decommissioning strategies and associated dismantling and clean-up remediation activities; (c) estimating necessary costs for identified scenarios and action plans; and (d) identifying key environmental impacts of formulated dismantling and remediation action plans and proposing mitigation measures and monitoring activities.

10. *Concrete tasks.* To achieve specified above scope and objectives the Consultant has to fulfill the following tasks:

*Task 1: Review of the existing situation at CHP 1 site and gathering background information including:* (a) collecting baseline environmental, economic and social information; (b) seeking for legal documents accompanying decommissioning of CHP 1; (c) identifying plant’s environmental performances and problems; (d) creating a provisional list of contamination that might be detected and hazardous material that can be found based; (e) formulating a strategy for detailed environmental site assessment of the plant.

*Task 2. Analysing policy, legal and administrative framework with regard to environmental auditing, decommissioning and remediation activities.* Conduct an assessment of the WB and national legal framework for EA activities and in particular for environmental auditing and for identifying current and past environmental liabilities as well as concerning environmental clean-up activities.

*Task 3. Undertaking preliminary site assessment.* This includes site visiting and identifying environmental and social issues and risks. The main focus of the assessment is to: determine the level of environmental contamination: soil contamination; groundwater and surface water pollution; identification of any chemical residues within the plant; identification of possible asbestos containing building materials; inventory of hazardous substances stored or used on site; etc. Based on the results of this assessment, if needed, design strategy for detailed site evaluation with relevant sampling activities.

*Task 4. Drafting alternative decommissioning strategies.* This should include a detailed analysis of several alternative options for partial or full decommissioning and associated dismantling and environmental remediation activities. For that purpose it will be necessary to provide details of the needed dismantling and environmental remediation activities associated with those scenarios, which might comprise a preparation phase, followed by an engineering planning phase defining steps of decommissioning, dismantling and environmental clean-up plan.

*Task 5. Analyzing of environmental impacts and risks of the plant decommissioning strategies and designing environmental remediation action plans.* This would include an assessment of environmental and social impacts and risks of alternative scenarios of the plant decommissioning, providing a set of mitigation and monitoring activities that should be applied for identified scenarios. Based on that, for each scenario there should be drafted environmental remediation action plans, proposing best available and internationally recognized remediation technologies.

*Task 6. Cost estimation.* Within this task the proposed alternative decommissioning scenarios and remediation action plans should be estimated in terms of necessary financing as well as in terms of needed institutional support. These estimations would include, aside of the costs for dismantling activities the following: quantification of asbestos, mineral wool, oil, and fuel (diesel and fuel oil) or other hazardous materials decontamination, as well as the costs for demolition and disposal of various materials with the ultimate clean-up goal of reuse of the plant territory for industrial, commercial and/or for residential purposes.

*Task 7. Report disclosure and consultation.* This will require translation of the report in Romanian language and its disclosure on the MoE and/or Termocom website and organization of a public briefing for all interested parties, including key stakeholders, environmental NGOs and local population. The results of consultation should be reflected in the final version of the report.

## **B. Designing alternative scenarios for plant decommissioning**

11. *Decommissioning tasks.* The GoM may decide on varying degrees of power plant decommissioning (i.e., leaving some buildings, the switchyard, etc.) and different property reuses (i.e., residential, commercial, or industrial). The following process assumes the plant is still operating and that decommissioning will require complete dismantlement of buildings and removal of equipment with associated site cleanup to brownfield condition. The decommissioning normally consists of the following major tasks: decommissioning planning;

necessary administrative actions; plant shutdown; site preparation for dismantlement; dismantlement of buildings and equipment; and site remediation and restoration.

12. *Selecting decommissioning strategies.* Currently the GoM proposes to analyze several such strategies, including the following:

- Maintain the site at present condition with minimal cleanup to meet environmental compliance and ensure safety (i.e., remove chemicals and oils, restrict access, i.e., remove asbestos lying on the floor and lead-based paint from the floor area; clean up mercury, PCB oil, or other spills upon discovery; etc.);
- Perform dismantling and demolition in addition to maintaining the site to meet environmental compliance and ensure safety (i.e., remove salable and salvageable equipment, remove safety hazards, remove chemicals and oils, restrict access, etc.), as well as to the degree required to meet specific needs of a planned reuse of the site (meet residential, commercial, or industrial environmental standards regarding cleanups; etc.)
- Full decommissioning (i.e., dismantle all equipment; demolish all buildings and structures; clean up entire site, including disposal areas, etc., per required environmental standards.). Compliance with environmental standards must be maintained throughout demolition and remediation regarding any permits that have post-closure requirements, such as permits for hazardous waste storage or accumulation areas, or chemical cleaning ponds.

13. *Decommissioning planning and stages.* The initial task of decommissioning planning will include necessary information gathering, such as site and building drawings, safety engineering survey, environmental site assessment, and asset inventory. This information will be used to prepare preliminary scheduling and cost estimates. Based on these preliminary evaluations, decisions can be made as to the need for temporary storage of salvaged materials and equipment and whether temporary storage of hazardous materials will be required before shipment for offsite disposal. Planning should also include an environmental assessment of the decommissioning process, including state environmental authorities in the process, before actual decommissioning commences. The environmental assessment should result in designing of environmental management plans which should be approved by State Ecological Inspectorate. The decommissioning, dismantling and remediation action plans should include and describe the following phases: Phase 1. Preparatory measures; Phase 2. Engineering of the decommissioning and disaggregation of units and balance of plant; Phase 3. Preliminary and in-depth exploration of the power plant site; Phase 4. Development of the mass balance and disposal concept(s); Phase 5. Development of a decommissioning safeguard design; Phase 6. Compilation of licensing and tender documents for dismantling; Phase 7. Cost and time schedule planning; Phase 8. Contract award planning; Phase 9. Safeguarding measures; Phase 10. Implementation of dismantling, disposal, recycling and disposal works.

14. *Required decommissioning measures to be reflected in the dismantling and remediation action plans.* Decommissioning, dismantling and remediation activities have to be described providing the following details: (a) type and methods of civil works to be employed; (b) decommissioning timetable, including expected start-up dates, hours of operation and end date; (c) construction equipment to be used; (d) materials or plant to be transported onto the disposal sites; (e) the location of the source/origin of construction materials and the transport mode to be used; (f) the extent of surface disturbance; and (g) the estimated number of personnel to be employed during the dismantling and remediation phase, including labour histogram. The means of decommissioning the Project, in terms of removal of plant, equipment, concrete footings and foundations, hardstand areas, storage tanks, wharfage (including any potential for reuse of these facilities) and buildings should be also described. This should also include demolition and site



clearance including supervision/monitoring; asbestos and/or other hazardous materials mapping and remedy supervision; recycling of demolition material.

### **C. Main focus of environmental auditing and environmental remediation implementation plans**

15. *CHP 1 closure environmental risks.* CHP 1 closure might be associated with a series of environmental, health and safety (EHS) risks and impacts which are diverse, but generally limited and well understood. They can be readily identified and mitigated through recognized good practices applied by the power industry and in construction practices. These risks and impacts are related mainly to: storage, handling and disposal of hazardous substances such as transformer oils which may potentially include PCBs (polychlorinated biphenyls); occupational and public health and safety due to the involved electric and electromagnetic hazards; used lamps from public lighting operations; paints and solvents; waste disposal associated with network rehabilitation and maintenance; issues related to the operation of maintenance depots, workshops and service vehicles; site-related liabilities in case of localized oil contamination at transformer substations; and social impacts if restructuring of the Company is involved that may result in retrenchments of employees.

16. *Conducting preliminary site assessment.* The main scope of preliminary assessment (known also as *Phase I of Environmental site Assessment*) is targeted at analyzing plant environmental risks and contaminated areas and defining a cadaster of hazardous waste detected by place and volume. This also includes examination of potential soil contamination, groundwater pollution, surface water quality and issues related to hazardous substances. The examination of a site may include: definition of any chemical residues within existing plant structures; identification of possible asbestos containing building materials; inventory of hazardous substances stored or used on site; and evaluation of air quality parameters. Generally this stage of site assessment might include:

- Performance of an on-site visit to view present conditions (chemical spill residue; hazardous substances or petroleum products usage (presence of above ground or underground storage tanks, storage of acids, etc.); and evaluate any likely environmentally hazardous site history.
- Review records of environmental impacts out to distances (ranging up to 500 meters, - which represent the limits of the plant's sanitary zone);
- Interview of persons knowledgeable regarding the plant history concerning past environmental problems and accidents (plant managers and specialists, environmental inspectors, neighboring population).
- Conduct file searches with public state Ecological Inspectorate and/or Sanitary-Epidemiological Service having oversight relative to water and air quality, hazardous wastes and soil contamination issues.

The Phase I Environmental Site Assessments includes also visual inspections or records review searches in particular for: (a) Asbestos Containing Materials (ACM); (b) Lead-Based Paint; (c) Mercury poisoning; (d) PCBs; and (e) petroleum hydrocarbons.

17. *Phase II Environmental Site Assessment.* In the case the plant site will be considered contaminated, a Phase II environmental site assessment should be conducted with a more detailed investigation involving sampling and chemical analysis for hazardous substances and/or petroleum hydrocarbons. During this phase it is necessary to collect original samples of soil, groundwater or building materials to analyze for quantitative values of various contaminants. The most frequent substances tested are petroleum hydrocarbons, PCBs, solvents, and asbestos.

18. *Phase III Environmental Site Assessment.* In the case of significant environmental contamination of the plant site it would be necessary to undertake an investigation aimed at remediation of the site delineating the physical extent of contamination based on recommendations made in Phase II assessments. This may involve intensive testing, sampling, and monitoring, “fate and transport” studies and other modeling, and the design of feasibility studies for environmental remediation plans. This phase also involves assessment of alternative cleanup methods, costs and logistics along with the details of the steps taken to perform site cleanup and the follow-up monitoring for residual contaminants.

19. *Major potential environmental liability issues at CHP 1 plant.* Existing international practice and published materials allows specifying the following issues in this regard that should be in the focus of environmental auditing:

*Chemicals and materials removal and disposal.* Any laboratory chemicals or inventories of metal-cleaning chemicals, including batteries, and residual oils (i.e., used lubricants, fuel, etc.) which cannot be completely used before shutdown, should be sent for reuse at other company facilities, sold, or disposed properly. Thus the auditing has to identify all such chemicals, providing their description in terms of amount, composition and conditions of storage and disposal.

*Chemical treatment ponds.* The existing on the plant ponds should be checked and their contents should be assessed in particular those that collect acidic substances from electrical equipment treatment.

*Fuel/oil storage and transport.* The auditing should be also focused on areas and materials contaminated by hydrocarbons. Some parts of the ground and the buildings at the plant might show visible signs of such contamination due to the extensive use of oils. The critical sites on what the attention should be focused are as follows: (a) waste storage area; (b) transformers; (c) underground oil pipes; (d) oil storage; (e) oil-conducting channels and pipes.

*Polychlorinated Biphenyls (PCBs).* The environmental auditing has also to identify and assess any potential contamination of soil with transformer oil, including oils containing PCBs. The PCBs are of particular concern and requires a full inventory of the PCB containing transformers, capacitors and switchgear that the plant has. If such equipment is detected the CHP1 the report will need to propose an appropriate hazardous waste management plan to phase out and dispose of such transformers, capacitors and switchgear. PCBs may also be present in electrical cables, wiring, fire retardant coatings, paint coatings, hydraulics, relays and controls inside the control room, lighting ballasts, and various items of switchyard equipment. All equipment or cables containing PCBs must be managed per regulations specified by the national Regulation on PCBs in Energy sector (No. 81 from February 2, 2009), by “Handbook of environmental sound PCBs management and in electrical equipment”, prepared in Moldova, and by internationally accepted rules and procedures, provided by UNEP.

*Removal and disposal of light bulbs, fluorescent lighting and high pressure mercury vapor lighting.* The CHP 1 might have light bulbs and pressure-vapor lighting that contain mercury. During dismantlement all these should be removed and disposed per local and state regulatory requirements. These requirements and necessary disposal activities have to be clearly specified in the environmental auditing report.

*Lead Paint.* Numerous areas of the plant might be polluted by the lead paint that had fallen to the floor, becoming a hazardous waste. Of greatest concern is the possibility that the lead paint can be swept up and disposed in a regular solid waste container, resulting in the illegal disposal of a hazardous waste. Identification and removal of lead contamination should be required before workers can safely begin equipment salvage and demolition activities – all these have to be in the focus of the environmental auditing.

*Asbestos issues.* It is known asbestos containing products have primarily been used for the walls and roofs of individual buildings and installations (as weather protection, partition walls, as fixtures in the cooling towers, and as the underlay on cable trays). To ensure safety during dismantling and environmental remediation an asbestos survey should be performed during the preliminary site assessment and reflected in the report.

*Contaminated Land.* Land contamination may be encountered due to known or unknown historical releases at the plant of hazardous materials or oil, or due to the presence of abandoned infrastructure formerly used to store or handle these materials, including underground storage tanks. The soils can be contaminated also due to small amounts of machinery maintenance materials, such as oily rags, used oil filters, and used oil, as well as spill cleanup materials from oil and fuel spills, petroleum based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment. These materials may also be encountered during decommissioning activities in building components or industrial process equipment. The report should provide relevant information in this regard and, if needed, recommendations for detailed sampling and analysis for determination of details of contamination.

*Wastewaters.* The wastewater streams in a thermal power plant include cooling tower blow down; wet FGD system discharges; material storage runoff; metal cleaning wastewater; and low-volume wastewater, such as air heater and precipitator wash water, boiler blow down, boiler chemical cleaning waste, floor and yard drains and sumps, laboratory wastes, and back flush from ion exchange boiler water purification units. Contamination of water may also arise from demineralizers; lubricating and auxiliary fuel oils; trace contaminants in the fuel (introduced through the ash-handling wastewater and wet FGD system discharges); and chlorine, biocides, and other chemicals used to manage the quality of water in cooling systems. All these types of wastewaters have to be assessed and the results of investigations provided in the auditing report.

20. *Environmental Impact Assessment (EIA).* For all proposed decommissioning, dismantling and remediation action plans should be conducted an EIA, identifying and describing potential environmental and social impacts as well as developed relevant mitigation and monitoring measures. The main scope of the EIA is to identify potential environmental impacts of the project (both positive and negative), specifying appropriate preventive actions and mitigation measures (including appropriate monitoring scheme) to prevent, eliminate or minimize any anticipated environment and social adverse impacts. The EIA would provide the framework and model for preparation of site-specific plans by the contractors once the GoM will proceed with the CHP 1 decommissioning activities.

21. *Assessing potential environmental impacts.* The EIAs have to identify and describe potential impacts of proposed dismantling and remediation activities for proposed action plans and clean-up technologies. These might include direct and indirect as well as long term and possible cumulative impacts, describing their significance and timing.

22. *Main requirements for proposed mitigation measures.* The proposed mitigation measures should be practical, implementable and monitorable. They also should be estimated in terms of

required costs and institutional support for implementation. Among most important aspects of these measures are the following.

*Safety requirements.* The safety engineering survey should identify potential situations that, during dismantlement, might require special preparations to prevent accidents. The survey also should identify any specialized training that might be required. Based on that it would be necessary to formulate a site Health and Safety Plan.

*Requirements for ACM abatement.* Due to the high hazard of asbestos, prior to demolition comprehensive inventories of asbestos are to be drawn up. After dismantling the ACM must be packed in a hermetically sealed receptacle and undergo special disposal. Only coated asbestos cement products may be wrapped and transported in a dry state. Uncoated asbestos cement products: must be kept moist during the dismantling, or sprayed with a dust-binding agent are to be kept moist in their shipping container (not required if a dustbinding agent has been used) must not be allowed to break or pulled over the edges). Proper notification to regulatory officials and proper recordkeeping on ACM abatement is required and upheld during decommissioning.

*Main requirements for conducting land decontamination activities following dismantlement.* Actions necessary to manage the risk from contaminated land will depend on factors such as the level and location of contamination, the type and risks of the contaminated media, and the intended land use. However, a basic management strategy should include: (a) managing contaminated media with the objective of protecting the safety and health of occupants of the site, the surrounding community, and the environment post construction or post decommissioning; (b) understanding the historical use of the land with regard to the potential presence of hazardous materials or oil prior to initiation of construction or decommissioning activities; (c) preparing plans and procedures to respond to the discovery of contaminated media to minimize or reduce the risk to health, safety, and the environment; and (d) preparation of a management plan to manage obsolete, abandoned, hazardous materials or oil consistent with the approach to hazardous waste management.

23. *Preparing environmental remediation action plan.* Based on site investigations and on possible sampling of the contaminated land, buildings and equipment and on the dismantling plan the consultant has to prepare an environmental remediation action plan. In this document should be fully characterized necessary activities for environmental clean-up, for removing released hazards, and stabilizing environmental liabilities (i.e., encapsulating friable asbestos, removing low-cost mercury-filled equipment, disposing PCBs, etc.). The action plan has to provide a description of the sequence of proposed measures as well as health and safety requirement for their implementation.

24. *Remediation technologies and standards.* The remediation action plan has to provide also possible clean-up technologies that should be internationally recognized and based on best available practices in the power sector. Furthermore, as Moldova doesn't have its own remediation standards, the remediation action plan should specify those applied internationally and first of all EU countries.

25. *Required authorizations.* The remediation action plan should include a review of existing permits for proposed activities as well as appropriate national EA documentation before work commences.

#### **D. Cost estimations for decommissioning, dismantling and remediation activities**

26. *Accounting costs for decommissioning alternative scenarios.* Cost estimate of decommissioning, dismantling and remediation of CHP 1 should include the costs of dismantling and demolition work at the sites, the preparation of the demolished materials, their transportation and disposal, as well as the costs for clean-up activities after demolition activities. Additionally to that it would be necessary to estimate the safeguarding and revitalization costs of contaminated soil, including taxes. For that it would be necessary to undertake a mass volume analysis based on what it will be possible to estimate the costs of the proposed civil works.

### **E. Environmental auditing report disclosure and consultation**

27. *Report disclosure.* The report should be translated in Romanian language and its disclosure on the MoE and/or Termocom website. It is proposed also hard copies of the report to be submitted to key stakeholders, - Ministry of Environment, Ministry of health and of Economy, State Ecological Inspectorate and to municipality Council. At the same time it will be necessary to send invitations for public consultation, announcing in advance (at least by two weeks) the timing and location for the venue.

28. *Public consultations.* This would require carrying out consultations on the draft of the auditing report and organization of a public briefing for all interested parties, including key stakeholders, environmental NGOs and local population. Based on that it would be necessary to prepare an annex detailing all consultations held, issues/concerns raised and their relevance to the CHP 1 decommissioning, how relevant ones were or are being addressed, preferably in the form of a matrix.

### **F. Deliverables**

29. Main deliverables include the following:

- *Inception report:* The inception report for conducting environmental auditing to include the results/findings of the first three tasks and would include detailed description of major gaps in baseline data, analysis of alternatives, assessment of potential impacts etc., proposed actions and timeline to address the gaps and a detailed outline of the final report.
- *Draft auditing report:* The consultant will submit soft and hard copies the draft auditing reports for review and feedback by the GoM and key stakeholders.
- *Final auditing report and its Executive Summary:* Based on held consultations the consultant will prepare the final version of the auditing report and an EA executive summary.

### **G. Outline of the environmental auditing report**

The environmental auditing report should be drafted taking into account the following provisional structure:

*Executive Summary.* This summarizes the significant findings and recommended actions. The structure should follow that of the report, though focused strongly on the key issues allowing the reader to obtain a clear understanding of the CHP 1 status (pre-construction, construction and operational activities) and the existing environment, proposed decommissioning strategies an outline of the principal environmental impacts predicted, associated costs for identified decommissioning strategies.

*Glossary of Terms.* A glossary of technical terms and acronyms should be provided.

*Introduction.* The introduction should explain the main scope and objectives of the environmental auditing, why the study was conducted. It should also define the audience to whom it is directed, and contain an overview of the structure of the document. Factual information contained in the document should be referenced wherever possible.

*Section 1. Background information on CHP 1.* Describe relevant CHP 1 physical, biological and social condition including any significant changes anticipated before the plant closure begins. Data should be relevant to proposed closure and remediation measures. The description should also include a map of the project site, and identify any off-site or support facilities that will be required for the CHP 1 closure. This section should include a detailed description of:

- (a) the location of the plant;
- (b) surrounding industries and other land uses and sanitary zones; photo images at appropriate scales; and the plant in relation to adjacent rail and road infrastructure as well as details on adjacent areas that have been previously be affected by the plant operation and existing infrastructure facilities available on, and adjacent to, the site.
- (c) topography & geomorphology. Maps should be provided locating the plant and its environs. The topography of the proposal site should be detailed with contours at suitable increments, the features of the landscape and any environmentally sensitive areas or areas of conservation value, if any, should be included on the maps and discussed.
- (d) geology & soils. The report should provide a description, map and a series of cross-sections of the geology of the plant area, with particular reference to the physical and chemical properties of surface and sub-surface materials. A description of the soil types and properties should include erosion potential, engineering and structural properties, dispersion characteristics, and permeability.
- (e) groundwater. The study should review the quality of groundwater in the CHP 1 area, based existing groundwater wells on its territory.
- (f) vegetation. It is required to provide a description of existing on the site vegetation.
- (g) infrastructure. The location of existing buildings and facilities, major electrical equipment, roads, railways etc., covering the affected land should be shown. Locations of gas and water pipelines, power lines, and any other easements should also be indicated.

*Section 2. Methodology of the study.* A brief description of the study approaches and conducted surveys which have been undertaken for the purposes of environmental auditing of the CHP 1 should be provided. This should include reference to relevant baseline studies and investigations undertaken previously for the auditing of the site and surrounding area, making also clear the objectives of the study under the national legislation. This section should include a description of the assessment process steps, timing and decisions to be made for relevant stages of the CHP 1 closure.

*Section 3. Environmental and EA policy, legal and administrative framework.* This section summarizes the WB and national legal and regulatory framework that applies to environmental management for power plant decommissioning and remediation activities as well as the EA rules and procedures, identifying gaps if any, and proposing actions to address them.

*Section 4. Decommissioning scenarios.* The strategies and methods for the decommissioning, dismantling and remediation of the environment disturbed by the plant should be described. This section should provide several alternative decommissioning strategies and details of the needed dismantling and environmental remediation activities associated with them.

*Section 5. Identified hazardous materials/wastes.* This section will provide the results of the assessment of the contents of hazardous materials and petroleum-based products identified at the plant (e.g. PCB containing electrical equipment, asbestos-containing building materials) and process equipment that need to be removed prior to initiation of decommissioning activities.

*Section 6. Assessment of land contamination.* The detailed description of land known to be contaminated by hazardous substances which may pose a risk to human health or the environment should be provided. Such a description should incorporate a Stage 1 preliminary site investigation of the site.

*Section 7. Environmental impacts of the dismantling and remediation activities and generic mitigation measures.* Describe the likely or expected positive and negative impacts in quantitative terms to the extent possible. Identify mitigation measures and estimate residual impacts after mitigation. Describe the limits of available data and uncertainties related to the estimation of impacts and the results of proposed mitigation. The section has to focus on the following types of impacts that are typical for decommissioning activities: noise and vibration; soil erosion; sediment mobilization and transport; clean runoff management; road design; disturbance to water bodies; structural (slope) stability; dust and air quality; solid waste; hazardous materials (petroleum based products, such as lubricants, hydraulic fluids, or fuels during their storage, transfer, or use in equipment, PCB containing electrical equipment, asbestos-containing building materials, chemicals, hazardous or flammable materials, and wastes in a combination of liquid, solid, or gaseous forms); wastewater discharges; contaminated land; occupational health and safety, including over-exertion, work in heights, struck by objects and moving machinery; confined spaces and excavations; community health and safety, and disease prevention. Distinguish between significant positive and negative impacts, direct, indirect and cumulative impacts, and immediate and long-term impacts. In designing necessary mitigation and monitoring activities there should be taken into consideration the recommendations provided in the IFC Environmental, Health, and Safety (EHS) Guidelines<sup>3</sup> with regard to construction and decommissioning projects.

*Section 8. Providing remediation alternatives and action plan.* Based on the data collected from the site assessment and investigation phases, clean-up alternatives have to be presented and evaluated and a special remediation plan be drafted. The technologies should be evaluated for their capability to meet accepted international standards as well as specific clean-up levels and redevelopment objectives, such as schedules, costs, and compatibility with the surrounding environment, area (urban, rural, etc.). The need for future monitoring or controls also should be considered when evaluating the various technologies.

*Section 9. Permitting system.* Describe procedures for notifications for dismantling and remediation including asbestos removal notification and, if needed, blasting permits.

*Section 10. Cost estimates.* The cost estimation should take into account all associated expenditure for proposed decommissioning, dismantling and remediation scenarios, taking into account all steps, starting from closing the plant and finishing with the remediation activities.

Section 11. The results of the report disclosure and consultation. This should provide details of report disclosure and of conducted public briefing with specification of issues/concerns raised and their relevance to the CHP 1 decommissioning, how relevant ones were or are being addressed.

<sup>3</sup>

See:

<http://www.ifc.org/wps/wcm/connect/3aa0bc8048855992837cd36a6515bb18/4%2BConstruction%2Band%2BDecommissioning.pdf?MOD=AJPERES>

*References.* All references used in the preparation of the report should be presented in a recognized format such as the Harvard standard (refer to the Style Guide, Australian Government Publishing service). This standard lists references by presenting in the following order: author (date of publication) title, publisher, and place of publication.

*Appendices.*

*Final Terms of Reference.* The finalized Terms of Reference should be included as an Appendix to the study.

*Consultation Report.* A list of advisory agencies should be provided. A chronological record of meetings and consultations with interested parties, key stakeholders, NGOs and local population.

*Study Team.* The qualifications and experience of the study team and specialist sub-consultants should be provided.

*Technical Data and Baseline Studies.* Relevant supporting data and information generated from studies and surveys undertaken as part of the environmental auditing are to be included as appendices. These may include: geology; soil survey; hazardous materials and wastes, including PCBs; ACM survey; groundwater quality; etc.

Where possible, information provided in the study should be clear, logical, objective and concise, so that non-technical persons may easily understand it. Where appropriate, text should be supported by maps and diagrams. Factual information contained in the document should be referenced wherever possible. Where applicable, aerial photography and/or digital information (e.g. of Project sites, road, rail and conveyor corridors etc) should be presented. Maps, diagrams and other illustrative material should be included in the report. The report should be produced on A4-size paper capable of being photocopied, with maps and diagrams on A4 or A3 size.



**Annex 2. Report on Consultation on the draft EA&EMP with interested parties**

**Date:** November 22, 2013

**Venue:** Chisinau

Location/ venue	Objective	Invitees	Participants	Summary, conclusions and comments
Chisinau, Temocom conference hall	To describe the project, including EA & EMP and receive feedback from participants.	There were not sent personal invitations. The invitation to participate in Consultation was sent by post and electronically to the following institutions: <ul style="list-style-type: none"> <li>• Ministry of Environment</li> <li>• National environmental NGOs</li> <li>• Chisinau Mayoralty</li> <li>• Interested agencies</li> </ul>	<ol style="list-style-type: none"> <li>1.Veaceslav Vladicescu</li> <li>2.Diana Garstea</li> <li>3.Elena Vladicescu</li> <li>4.Valeriu Holban</li> <li>5.Mariana Petreanu</li> <li>6.Eleonora Solomon</li> <li>7.I.N Gherncia</li> <li>8.Dumitru Aparatu</li> <li>9.Artur Popa</li> <li>10. Marin Crutoi</li> <li>11. Olga Sarateanu</li> <li>12. V.D. Doncenco</li> <li>13. Vitalie Rata</li> <li>14. Vladimir Garaba</li> <li>15. Olga Pruteanu</li> <li>16. Natalia Lipca</li> <li>17. Vasile Leu</li> </ol>	<p>During the meeting, there were made presentations on: project activities and EMP.</p> <p>The attendees actively participated in discussions which were mainly focused on the project activities, environmental possible impacts and associated mitigation measures. Other discussions were regarding environmental monitoring activities. Also the following specific questions were answered:</p> <ul style="list-style-type: none"> <li>- If vegetation period of trees will be taken in consideration before cutting.</li> <li>- If mini equipment's will be used in order to prevent damages of trees and green areas.</li> <li>- If network loss after rehabilitation was calculated.</li> </ul> <p>After the meeting, on the basis of</p>

			<p>input from participants as well as electronically received comments from interested parties on Summary Draft EMP posted ten days earlier on Termocom and other websites, there were made relevant corrections both in the EMP main text and EMP Annexes to better meet stakeholders' concern.</p>
--	--	--	--





Termocom - consultări publice. 22.11.2013

Nr.	Nume	Compania	Semnătura
1	Vencescu Radicescu	EcoExpert SRL	[Signature]
2	Garstea Diana	EcoExpert SRL	[Signature]
3	Radicescu Elena	"EcoExpert" SRL	[Signature]
4	Holban Valeriu	Inspectoratul Ecologic de Stat	[Signature]
5	Petrescu Mariana	Inspectoratul Ecologic de Stat	[Signature]
6	Solomon Elanora	ANRE	[Signature]
7	Teperza R. V.	HAPD	[Signature]
8	Apărău D.	TEB	[Signature]
9	Letus Papa	S.A. "Termocom"	[Signature]
10	Căruța Marin	S.A. "Termocom"	[Signature]
11	Sârdeanu O.	S.A. Termocom	[Signature]
12	Doncenco V. D.	S.A. "Termocom"	[Signature]
13	Costa Cătălina	S.A. "Termocom"	[Signature]
14	Stăruș Vladimир	Inspectoratul Ecologic de Stat	[Signature]
15	Bruteanu Olga	SA "Termocom"	[Signature]
16	Chiriac Ecaterina	Primăria Chișinău	[Signature]
17	Basile Leu	SA "Termocom"	[Signature]
18			
19			

Fig.2. Scanned version of attendance list and public consultation pictures.

**Annex 3. Pictures from sites**



**Picture 1. GHS in Chisinau**



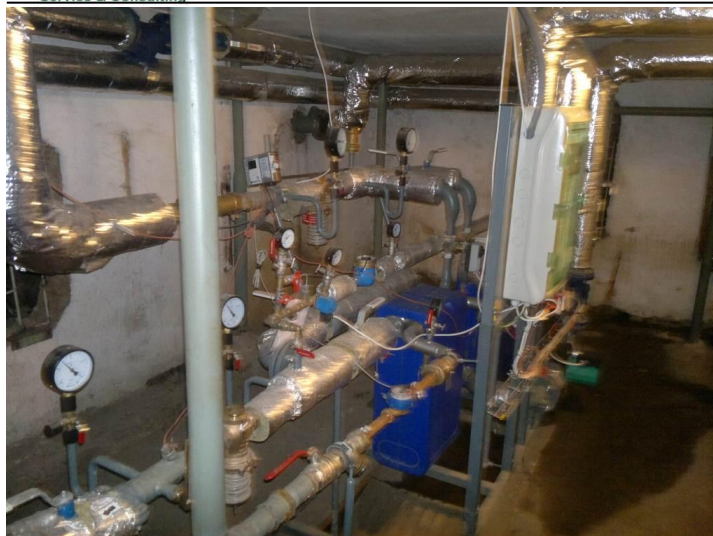
**Picture 2. GHS in Chisinau, fire extinguishers**



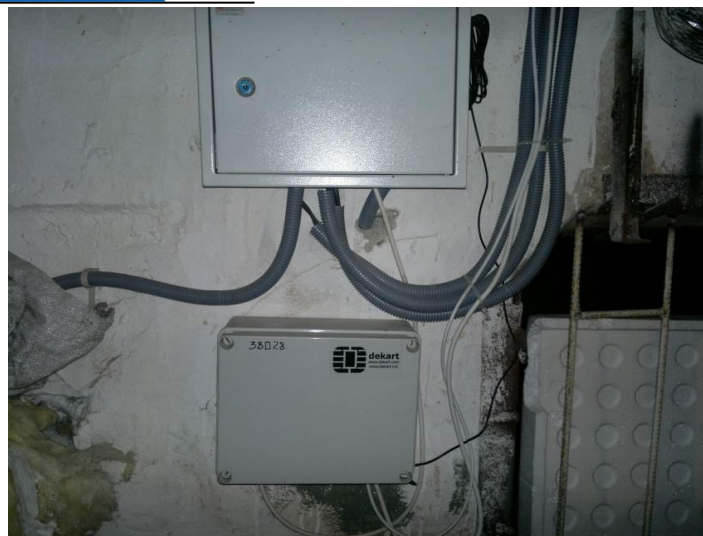
**Picture 3. GHS in Chisinau, heat exchangers**



**Picture 4. GHS in Chisinau, PPE**



*Picture 5. IHS rehabilitated, Andrei Doga str.*



*Picture 6. IHS rehabilitated, Andrei Doga str.*



*Picture 7. Park near SRA and Creanga str. roundabout (view from roundabout)*



*Picture 8. Park near SRA and Creanga str. roundabout*



*Picture 9. Calea Iesilor str. (Buiucani)*

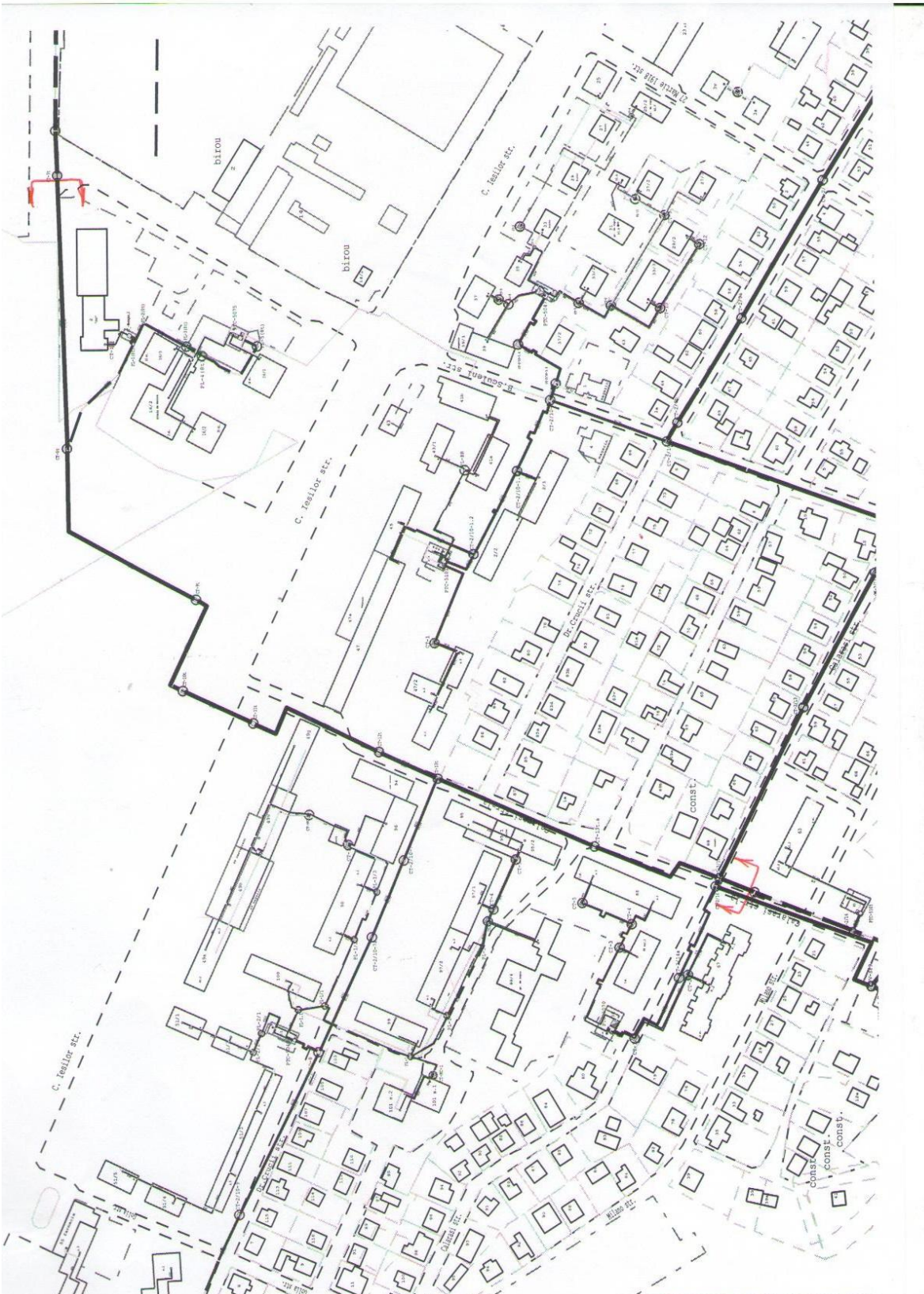


*Picture 10. Parcul Alunelul (Buiucani)*

**Annex 4. Maps of Project areas**

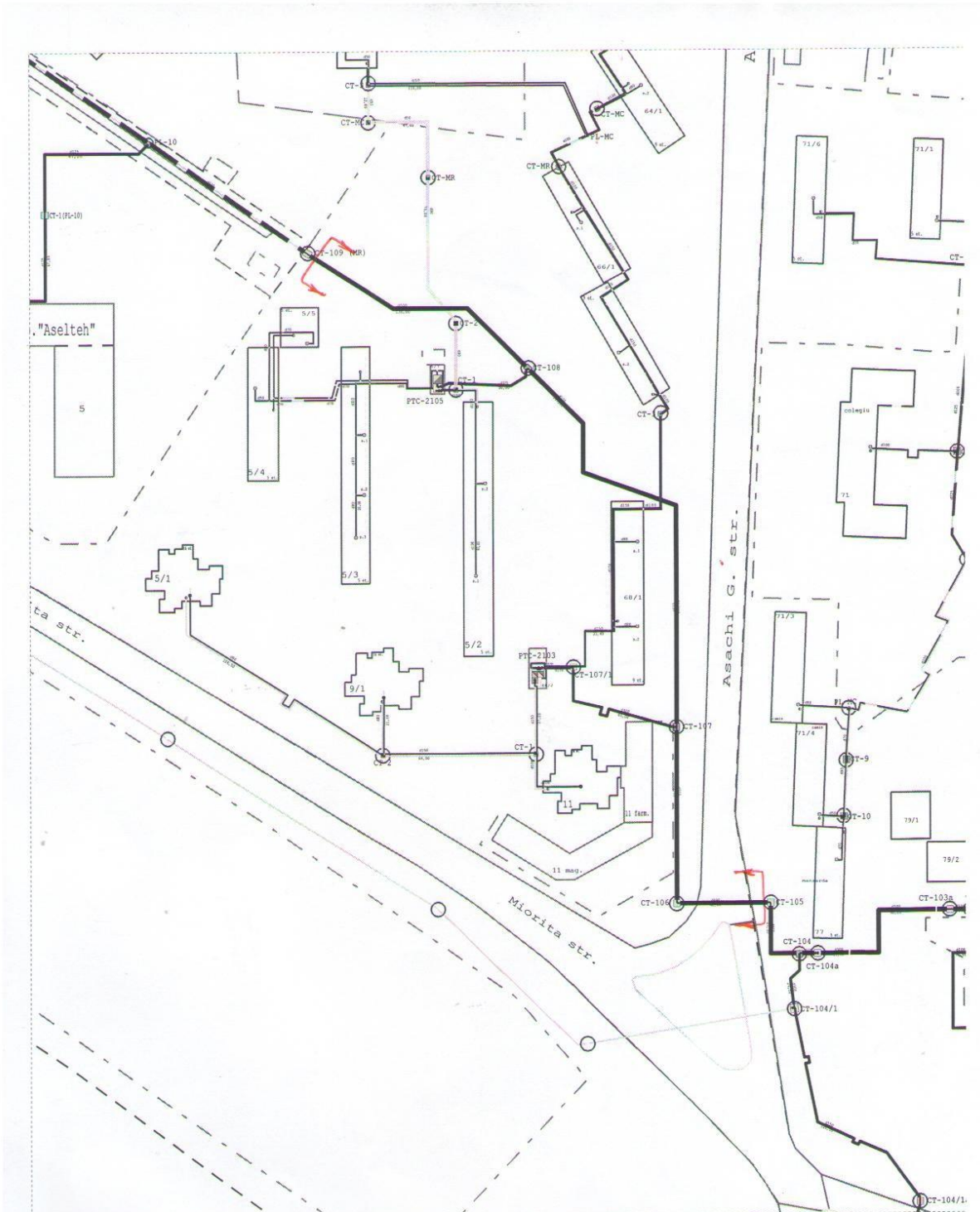


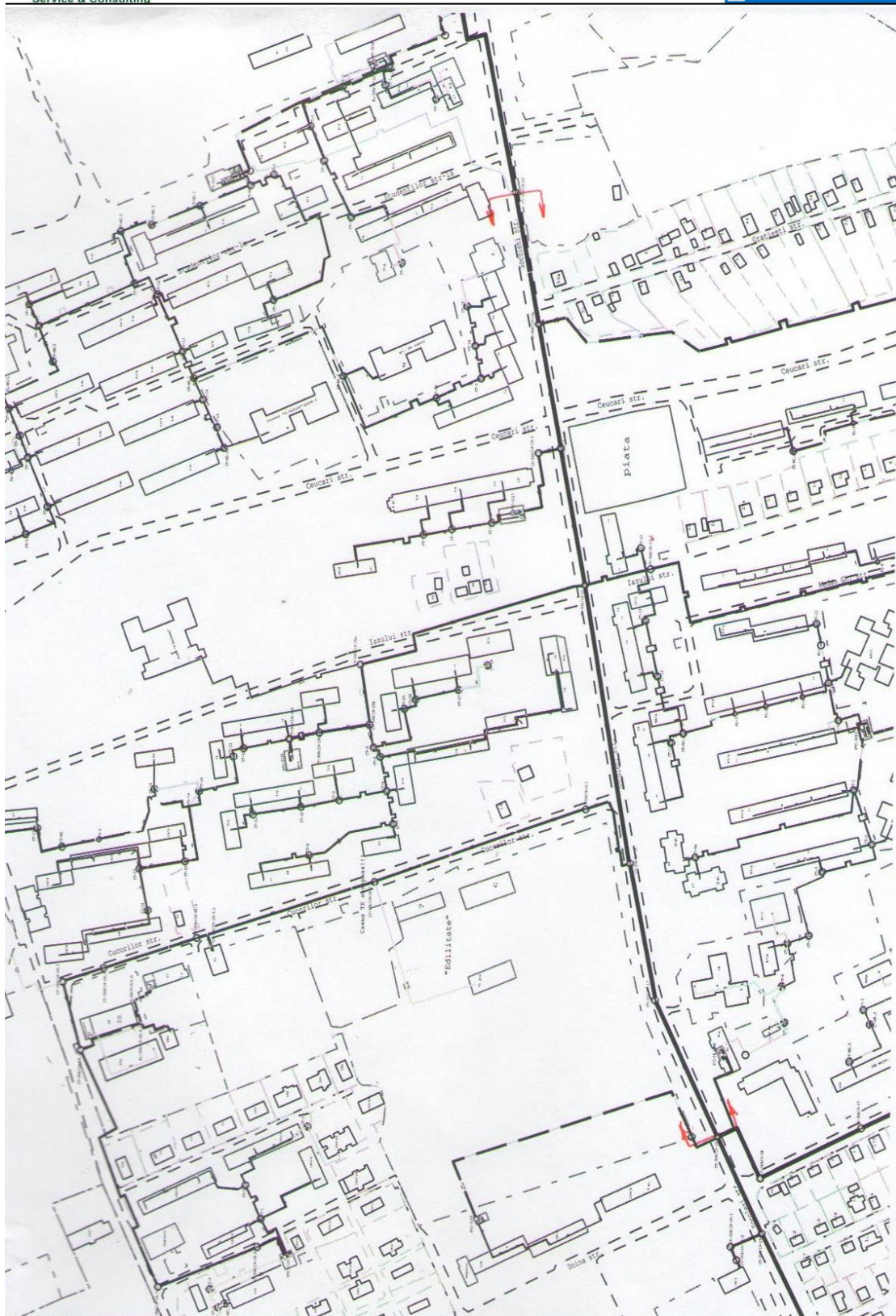
*Map1. Sculeni (Mitropolit Dosoftei, Bucuriei, Calea Iesilor, str.)*



Map2. Calea Iesilor str. Magistrala in Buiucani area







Map 4. Socoleni str. Posta Veche, Rascani region.



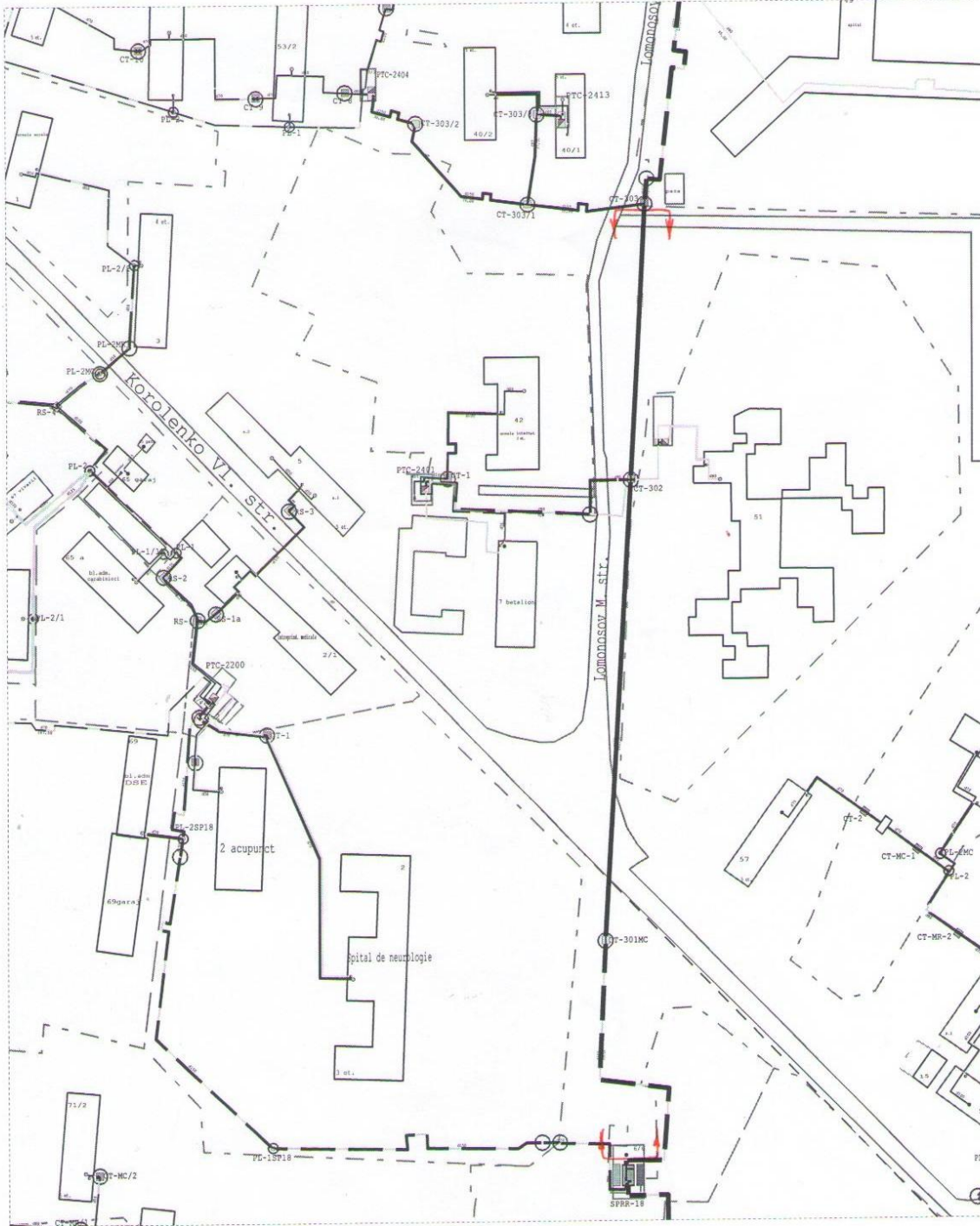
Map 5. Lomonosov, Alecsandri str. Telecentru, Centru region.



Map 6. Neculce str. Buiucani region.



Map 7. Mesterul Manole str. Ciocana Region (close to CHP2.).



Map 8. Corolenko, Lomonosov str. Telecentru, Centru Region.



Map 9. Drumul Viilor, Lomonosov str. Telecentru, Centru Region.