

## Section 3a: Schedule of Requirements and Technical Specifications

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### 1 **Background**

The municipal buildings (schools, kindergartens, hospitals etc.) in rural areas of Moldova are heated mainly by fossil imported fuel fired hot water boilers. Fuel prices have increased recently in Moldova. Fuel switching from gas and coal to biomass, as renewable local fuel source, is economical and environmentally preferred heat supply alternative.

In addition to fuel switching, the heat supply distribution piping, connecting boilers and building heating systems, will be renewed to decrease energy losses. Heat supply points in the municipal buildings will be renewed where modern heat temperature control and heat metering equipment will be installed. This increases energy efficiency by better heat supply temperature regulation e.g. decreasing of temperature during night time and during weekends.

The objective of this project is to provide all necessary equipment, labour and services as described herewith and in the attached technical design documentation (Appendixes 1-8) for the installation of briquettes / pellets based heating systems that will provide reliable heating needs of selected municipal buildings.

Bidders should not be associated, or have been associated in the past, directly or indirectly, with a firm or any of its affiliates which have been engaged by the Purchaser to provide consulting services for the preparation of the specifications, and other documents to be used for the procurement of goods and services to be purchased under this Invitation to Bid.

Bidders must not subcontract parts of works, equipment or any other goods or services from another bidder participating in the tender. Bids submitted by two or more bidders shall be all rejected in case they are subcontractors to each other's bid, or a subcontractor to one bid also submits another Bid under its name as lead Bidder.

### 2 **Scope of Works**

This scope of work ("Works") includes general construction works and installation of heating equipment, electrical work, plumbing, mechanical works, training, commissioning and tests.

The Contractor shall furnish all labour, engineering, materials, equipment, supplies, transportation, machinery, tools and travel necessary to perform this contract and execute all the works.

It is envisaged that the Works include the following activities:

- **Procurement and supply of all equipment**, materials and services needed for successful completion of the Works, and procurement of hand carts or trolleys for proper operation of the system., depending on the type of fuel and installed boilers.
- **Construction works and installation of all equipment:**
  - Complete briquettes / pellets boiler plant including briquettes / pellets boiler with all auxiliary equipment;
  - Complete heat supply point incl. heat metering system;
  - Heat distribution piping between boiler plant and heat supply point;
  - Fire protection equipment (fire extinguishers, portable mono-block pumps, and sets of firefighting equipment,) for boiler plant and for fuel storage;
  - Construction of a new building, in compliance with national building codes, for boiler plant (if necessary);
  - Repair works in the room for heat supply point and/or incorporated boiler plant room (by case);
  - Construction of power and water supply nets;
  - Territory development works (fences, pavement, outside lights, etc.) around boiler plant and chimney and ash collection place;
- **Commissioning** of all supplied systems, equipment, materials and construction works including making required performance test measurements.
- **The provision of detailed documentation on the operation and maintenance** of supplied heating system incl. the boiler plant and heat supply point.
- **The provision of basic training and training materials** for key persons responsible for boiler plant and heat supply point operation.

All equipment shall be manufactured in accordance with the requirements of the design documentation on each unit of equipment and have European certificate (CE) or local Moldovan certificates, which confirms its passport characteristics.

Contractor shall ensure that all the construction and installation activities are properly coordinated with representatives of building owners, local municipality and UNDP Moldova. Local authorities and UNDP Moldova will assist Contractor in obtaining and requesting necessary approvals, if necessary.

**Note to the Bidders:**  
Whenever the specifications require a particular product of a specific brand name/model, bidders may offer a substitute product that is equal in all respects to the specified product, meeting all its salient physical, functional and performance characteristics.

### 3 Sites

The Works are grouped into **two (2) lots** as follows:

	Name of Project	Community/District	Contact Person
<b>1.</b>	<b>Lot 1</b>		
<b>1.1</b>	Construction of briquette/pellet heating system in the kindergarten of the village Cotiujeni, district Briceni	Cotiujeni village, Briceni district	Ursu Mihai, Mayor of the village, tel: 0247 46336 / 069212662
<b>1.2</b>	Construction of briquette/pellet heating system in the kindergarten of the village Grimancauti, district Briceni	Grimancauti village, Briceni district	Dvorschi Vitalie, Mayor of the village, tel: 0247 48336 / 069150861
<b>1.3</b>	Construction of briquette/pellet fired heating system in the kindergarten of the village Hadarauti, district Ocnita	Hadarauti village, Ocnita district	Lupu Iurie, Mayor of the village, tel: 0271 76241 / 067176491
<b>1.4</b>	Construction of briquette/pellet fired heating system in the kindergarten of the village Ruseni, district Edinet	Ruseni village, Edinet district	Rusanovschii Tatiana, Mayor of the village, tel: 0246 65 336 / 079160765
<b>1.5</b>	Construction of briquette/pellet fired heating system for the gymnasium of the village Parcovă, district Edinet	Parcovă village, Edinet district	Marcel Snegur, Mayor of the village, tel: 0246 69 321 / 0769503579
<b>1.6</b>	Construction of briquette/pellet fired heating system in the gymnasium of the village Nicoreni, district Drochia	Nicoreni village, Drochia district	Mihail Rotaras, Mayor of the village, tel: 0252 37 236
<b>2.</b>	<b>Lot 2</b>		
<b>2.1</b>	Construction of briquette/pellet fired heating system in the kindergarten of the village Cocieri, district Dubasari	Cocieri village, Dubasari district	Mitcul Ion, Mayor of the village, tel: 0248 52236 / 0248 52238
<b>2.2</b>	Construction of briquette/pellet fired heating system in the mayor office of the village Ustia, district Dubasari	Ustia village, Dubasari district	Aurica Uritu, Mayor of the village, tel: 0248 55236 / 068363662

**Site visits:** Bidders are required to visit and examine the Sites and their surroundings and obtain all information that may be necessary for preparing the Bid and entering into a contract. Bidders should arrange site visits at their own cost. Bidders should arrange site visits with the following contact person from UNDP: Alexandru Ursul, Project Manager ([alexandru.ursul@undp.org](mailto:alexandru.ursul@undp.org)).

### 4 Management arrangements

Each construction project will be monitored by designated UNDP Engineer ("the Engineer") which will carry out systematic monitoring site visits. Additionally, the local administration will hire technical supervisors to monitor daily construction activities.

## **5 Required Deliverables**

The following is the list of required key deliverables.

**Deliverable 1:** Accomplishment of all construction works, supply and installation of all equipment within **90 calendar days** from Contract signature

**Deliverable 2:** Final Commissioning of works within **120 calendar days** from contract signature, including delivery and installation of the equipment, testing, putting into operation, commissioning and training of operators.

## **6 Technical Requirements**

### **6.1 Fuel**

Main fuel for the operation of boilers shall be biomass briquettes and/or pellets made of agricultural wastes as respectively indicated in each site's requirements in Appendix 1 "Site data and Requirements".

Moisture content of the fuel shall be lower than 10%.

The briquettes shall have a maximum length of 30cm. Pellets shall have a maximum length of 3cm and a maximum diameter of 1cm.

The minimum density of briquettes and pellets shall be not less than 1200kg/m<sup>3</sup>.

Alternative biomass (e.g. straw rape, sorghum, soybeans, sunflower, corn stalks and husk, wood) is according to boiler manufacturer's requirements.

The contractors will have to supply the fuel necessary for start-up and testing of boilers and heating system as a whole.

### **6.2 Boiler plant**

#### **5.3.1 Ash removal and boiler plant maintenance tool-kit**

In each project Site there must be provided solutions of ash removal from the boiler's furnace and heating surfaces, installation of containers for temporary accumulation of ash, which helps to keep the environment clean.

The ash container/s has to be installed in close proximity to the boiler plant and shall be made of minimum 1.5mm steel, with easily removable (hinged) cover. Paint-and-lacquer coating of container have to be heat-resistant and intended for outdoor use. Colour of paint-and-lacquer coating of container has to meet the general architectural requirements and be harmonious with the colour of the boiler plant.

Each boiler plant shall be equipped with suitable tools or mechanism for cleaning of heating surfaces, fire tubes (convective pipes) and flue gas duct/chimney, such as, but not limited to: ash bucket, poker, wheelbarrow, other tools depending on the specifics of each boiler plant and boiler manufacturer recommendations.

#### **5.3.2 Fire-fighting equipment**

Boiler plant shall be equipped with fire protection solution in accordance with applicable local legislation and norms.

Each project site shall be additionally equipped with a portable, petrol/diesel mono-block pump and 100 m fire hose. The pump shall have the following minimum specifications: water debit 35 m<sup>3</sup>/h, H=25m, 50mm fire hose connection diameter.

#### **5.3.3 Spare and wear parts**

Detailed List of recommended spare and wear parts with unit prices for 3 years of operation shall be proposed and total price shall be included as Option for Priced Activity Schedule. The proposed Option shall be valid during the Contract period.

### **6.3 Marking of equipment**

All the text markings, necessary for system operation (incl. boiler control units), shall be in Romanian language.

All the equipment should have name of the equipment in Romanian language and specific code (number) in accordance with drawing specifications. The name tags should be made from durable white (RAL 9010 or similar) plastic material, height of the font should be 10mm, colour of the text should be black (RAL 9005 or similar).

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All the equipment should be marked with the manufacturer's original name plate, which should include at least year on construction, equipment manufacturer technical parameters and type/ID of the equipment.

The safety advice label in Romanian language should be fitted on boiler/boiler plant. The label shall be covered with weather proof plastic coating.

The heat supply point scheme and heating system flow scheme should be located in the heat supply room and shall be covered with plastic coating. Schemes should be at least A3 format.

All the pipes (excluding underground piping) shall be marked properly with required colour according to ANSI/ASME A13.1, 67/548/EEC or similar standard.

Pipe markers should be positioned so that they can be easily seen from the normal angle of approach - for instance, below the centre line of the pipe if the pipe is overhead, and above the centre line if the pipe is below eye level. Labels are required at the following locations:

- Adjacent to all valves and flanges
- Adjacent to all changes of direction
- On both sides of wall or floor penetrations

Pipes too small to be directly labelled should be marked with a hanging tag.

#### **6.4 Operation and Maintenance Documentation**

Contractor should provide each Site with two (2) copies of detailed documentation on the Operation and Maintenance of supplied heating system incl. the boiler plant and heat supply point. Documentation should be complete, cover all equipment and should include well defined maintenance plan.

All the documentation should be in Romanian and/or Russian language as may be applicable.

The Operation and Maintenance documents shall be presented to UNDP Moldova for review and for approval at least 30 days prior to Commissioning.

To ensure maximum comprehension of technical processes related to sound system functionality, the Contractor will develop, based on the detailed Operation and Maintenance documentation pertinent to the equipment, a set of user-friendly Standard Operating Procedures (SOP), preferably on 2-3 pages for each of the core processes. SOPs are to be made available to each participant at the training.

An indicative list of SOPs could include, but needs not to be limited to the following processes:

- Start-up and shut-down of the systems;
- Monitoring and Control of operation parameters;
- Troubleshooting;
- Fuel feeding;
- Safety requirements for boiler operation;
- Boiler service incl. ash removal;

All SOPs are expected to be compiled in one file and made available – one each Site and presented to UNDP Moldova for review and for approval at least 30 days before Take Over.

#### **6.5 Training**

The Contractor should plan and deliver, at his own cost, one full day (8 hour) training for boiler plant and heating system operators. The training should be provided in Romanian (or Russian where required) language or with interpretation in Romanian, if applicable. The number of people to be trained from one Site will be maximum 5. Training is expected to be provided to all Lots - one each minimum by Lot of project site. If additional training is required, a separate arrangement between Contractor and UNDP Moldova will be negotiated and deployed. Location, number and names of participants and detailed agenda of the training activity shall be discussed and agreed with local municipalities and UNDP Moldova upon Contract signature. The training material shall be presented to UNDP Moldova for review and for approval at least 30 days before first training.

The training should include a maximum of **4 hours of basic training** regarding the overall functionality, key principles and requirements of the heat supply system, boiler operation requirements and key system controls, safety standards, etc., and **at least 4 hours of hands-on training/demonstration** on site (in one or location from the one Lot).

After the training course, the Contractor shall conduct a test in order to assess the general level of understanding and preparedness of the operators to manage and operate the systems independently, and Certificates of Successful Completion will be issued in close-operation with UNDP Moldova and building owner (recipient of equipment – beneficiary of the biomass heating system).

## **6.6 Commissioning and Taking Over**

After all the equipment are properly installed, construction works finished, trainings conducted, documents provided, then Taking Over of the whole heating system (boiler plant, heat supply point and heat distribution piping and building internal heating system) shall take place. Partial Commissioning of a heating system is not allowed.

Heating system shall be filled up with chemically treated water. Contractor should include all the water purchase costs to his Bid.

For heating system the pressure test shall be made in accordance with local norms and report shall be written Romanian language.

Before Taking Over the **test operation** of the heating system shall take place during **48 hours**. Test operating is successfully performed if the heating system is operating continuously 48 hours without any defects. The heat load conditions, fuel used and measurements shall be agreed before between Contractor and Engineer. Test operation report should be made in Romanian and summary in English language. It is recommended that the boiler manufacturer's representative is participating in the test operation process.

If the test run is not successful, then test run shall be repeated in full scope i.e. 48 hours.

As part of the commissioning phase the Contractor shall order from independent accredited laboratory flue gas **pollutant emissions measurements** and shall include all costs to Price Schedule. At least following pollutants emissions shall be measured: O<sub>x</sub>, SO<sub>2</sub>, CO, TSP and Dust as PM<sub>10</sub>. Measurement report should be made in Romanian and summary in English language.

In addition to above mentioned emission measurement Contractor should carry out **boiler performance test**. Contractor shall decide the right time for the test, taking ambient air conditions into account, organize the test instruments, make sure all local measurement grid points are in order, install all test instruments at the specified areas, do a trial test, and declare the guarantee test. Test should be carried out during the heating period. Report with all measurements and calculations shall be made in Romanian and summary in English language.

The contractors will have to supply the fuel necessary for start-up and testing of boilers and system as a whole.

## **6.7 Warranty Period**

The Warranty period shall commence upon the Take Over and last up to **36 month**.

In the event that any part is repaired and/or replaced within warranty period, for that single part new 36 month warranty period starts from the date of repair/replacement.