Terms of Reference for Individual Contractor (IC)

National or International consultant: International Consultant

Description of the assignment (Title of consultancy): Detailed design and implementation follow-up for the Steam System improvement, Steam Condensate Return and control in one selected industrial facility

Project Title: Country Entrepreneurship for Distributed Renewables Opportunities (CEDRO 5) - 00118152

Period of assignment/services: 35 working days spread over 16 months

Is this a LTA (yes/no): No

1. Project Description

The United Nations Development Programme, in support of the Ministry of Energy and Water, has initiated the implementation of the CEDRO 5 project, which is co-funded by the European Union. The CEDRO 5 project is implemented in partnership with the Association of Lebanese Industrialists (ALI), The Lebanon Green Building Council (LGBC), and the International Renewable Energy Credits (I-REC) Institution.

The European Commission (EC) is encouraging innovation and entrepreneurship in Lebanon to support a clean energy transition. The overall aim of the EC is to address job creation and growth in support of Lebanon's economy, in line with the first priority sector of the Single Support Framework for EU Support to Lebanon (2017-2020), while supporting Climate Change Mitigation in Lebanon. The specific objective is to promote innovation, entrepreneurship and job creation in support of Lebanon's clean energy transition and Nationally Determined Contributions (NDCs) for the energy sector. The EC proposes the gradual shift towards a clean energy transition (gradual phasing out from fossil fuels by switching to renewable energy sources) and circular economy principles, paving the way for (1) tapping into the potential for green jobs and growth (in particular in the energy sector), (2) alleviating financial and economic burden of the current energy system on the various sectors and sub-sectors of Lebanon, (3) facilitating access to financing, and (4) improving the linkages amongst green entrepreneurship, small-and-medium sized enterprises (SMEs), industries and research/technology centers.

The UNDP CEDRO 5 project aims to achieve the objectives outlined above through enhancing innovation, entrepreneurship and research, assisting in technology transfer and the creation of new value chains in the renewable energy and energy efficiency sector, supporting and imitating enabling policy, training and capacity building, and targeting effective awareness initiatives on renewable energy (RE) and energy efficiency (EE).

2. Scope of work, responsibilities and description of the proposed work

Objective

The objective of the Consultancy is to provide the necessary technical support for the effective design, technical specifications drafting, monitoring of the implementation of energy efficiency activity (steam system improvement, steam condensate return and control), and technology transfer for Gemayel Freres.

In specific, the technology intervention aimed for will be steam system improvement, steam condensate return and control in Gemayel Freres (GF), Mount Lebanon, an industry specialized in the production of corrugated cardboards. GF sells and packages corrugated cardboards for both industrial and agricultural products. GF has one office building and three hangars used for production and storage and operates 24 hours a day, 7 days a week.

GF has a boiler of 17 Bars, 7 Tonnes/hr, which supplies steam at 180°C to the corrugator line. Another back up boiler of 4 Tonnes/hr exists for emergency cases. An Energy Audit was done in 2015 for the industry and identified the energy efficiency solutions that can save energy. The main energy efficiency solution is the steam network improvement along with steam condensate return with a control to the steam system and steam traps.

The existing steam network generates steam in the process of corrugated board manufacturing mainly to condition the paper and to dry out the starch-based glue in order to ensure a good and quick bonding between the paper layer and to remove excess moisture from the board. The steam is generated by a fire tube boiler at 13-14 Bar. There are two types of heat exchangers in the process: rotating cylinders and flat plates. Both heat exchangers are currently equipped with spiral type steam traps. The flat plates of the double backer section are equipped with steam pressure reducers while the rotating cylinders of the single facers and the double glue unit are supplied with live steam at line pressure. The condensate is collected from the heat exchangers through two lines and conveyed to an atmospheric feed water tank by steam pressure. No condensate pumps are used. The mixture of condensate and make up water is then pumped to the boiler. The industry is considering upgrading the condensate system to become pressurized to improve the thermal efficiency. The project might introduce other improvements to the steam system to control, enhance, and monitor its performance.

The Consultant, in close coordination with the UNDP Project Management Unit (PMU) and the Association of Lebanese Industrialists (ALI) will be required to develop the full technical specifications (bidding documents) for the steam system improvement and steam condensate return with control to be implemented at the selected beneficiary facility, and assist in capacity building of the specified technology, including the publication of a guideline report, as per the below two tasks:

- **Task 1:** Support in the optimization of energy efficiency measures (steam system improvement, steam condensate recovery and control) in one selected site, including the design, technical specifications drafting, and monitoring of implementation of end-use energy efficiency project in the chosen industrial facility in Lebanon.
- **Task 2:** Support the process of technology transfer for the implemented energy efficiency application for Lebanon

Scope of Work

The tasks mentioned below shall be performed in close cooperation with the UNDP/CEDRO 5 team. It is understood that the consultant shall perform all the services/work as necessary to fulfill the objectives of the consultancy contract. The Consultant will be supported by the Project Team to ensure a good understanding of the local context and conditions for the development of the tender.
The Tasks involved will cover the followings:

Task 1: Support in the optimization of energy efficiency measures (steam system improvement, steam condensate recovery and control) in one selected site, including the design, technical specifications drafting, and monitoring of implementation of end-use energy efficiency project in the chosen industrial facility in Lebanon.

In order to develop the full technical specifications, the Consultant will be required to undertake the following:

1.1 Support in the design of the selected beneficiary site

1.1.1 Validate the energy audit (ASHRAE level 2 complete in 2015 by UNDP) recommendations for the installation of a steam condensate return system with steam system improvement and control; estimate the financial requirements for the recommendation; and establish the timeframe and major milestones for the proposed works;

1.1.2 Prepare the necessary technical specifications and tender documents for the procurement of goods and services for all proposed works. The Tender documents and technical specifications will include: detailed design and engineering specifications (complete with all relevant calculation and sizing notes); Bill of Quantities breakdown, equipment specifications with required standards compliance; installation requirements; testing and commissioning procedures; monitoring and verification methods; warranty arrangements, evaluation criteria, etc.;

1.1.3 Assist in replying to queries by prospective contractual bidders, and in the review and evaluation of the received bids/offers;

1.1.4 Assist in the establishment of general work procedures for contractors, including: supply schedules, goods inspection and certification, quality control and assurance procedures and measures, receipt of goods procedures and arrangements, standard site work formats, etc.

1.2 Support in the supervision of the selected project

1.2.1 Develop checklists for the following: site supervision; operation and maintenance (O&M) (taking into consideration suppliers' recommendations); performance monitoring, and data collection and evaluation;

1.2.2 Support the review of certificates of works, and provide advice to address technical challenges that may arise during the execution of works; as well as advice on handover arrangements and spare parts arrangements;

1.2.3 Assist remotely the PMU in the supervision of the project mainly troubleshoot technical issues in specific occasions that may arise during implementation and/or operation (qualified engineers from PMU are responsible of site supervision);

1.2.4 Assist in capacity building on the operation and maintenance of selected EE solution for the facility team of the selected site (through guiding winning contractor that will be responsible for O&M training for the facility staff)

1.2.5 Prepare guideline report for the completed works (technology in question: steam condensate return with control).

Task 2: Support the process of technology transfer for the implemented energy efficiency application for Lebanon

The process of technology transfer will involve the technology identified and implemented under Task 1.
The Consultant is to develop and deliver a capacity building program based on the implemented technology detailed under Task 1. More specifically:

2.1 Technology Transfer Activity

The Consultant is to develop and deliver one technical workshop (face-to-face in Lebanon) detailing the energy efficiency and technology/solution deployed by the project. The target audience will include: engineering professionals in the field, facility managers and engineers, final year engineering students. The UNDP project management unit (PMU) will be in charge of organizing and covering the financial costs of the local logistics related to this capacity building workshop. The workshop will focus on the following:

- Introduction to the technology (general);
- State of the technology (from a technical / financial feasibility perspective);
- Design process (data collection, needs identification, sizing / process identification, developing specifications, implementation guidelines, testing and commissioning, operation and maintenance);
- Implementation procedure and case study examples (the case of Lebanon and others from the region / international);
- Questions and answers.

2.2 Guideline Report

Prepare one Guideline Report for the Lebanese context on the technology type implemented as outlined in Table 1. The report will feature the following sections:

- Procedure for sizing and design;
- Recommended specifications for system components;
- Installation best-practices;
- Operation and maintenance standards and procedures, and;
- Financial appraisal of the systems.

The report is to be prepared in English and must be proof-read by English-writing editors for publication objectives. An executive summary is required.

The general expected and tentative timeline of Tasks 1 and 2 is spread out over a period of 16 months from contract signature, in accordance with the schedule outlined in Table 2.

Table 1 Tentative International Consultancy Timeline

	2021												2022											
Activity	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Project Signature & kick off meeting																								

Review and validate the Energy Audit Report and Pinch Analysis																									
Design and technical specification for Activities for the selected site																									
Assist PMU in response to clarifications & Evaluation of bids for all activity tenders																									
Assist PMU in supervision of implementation of sites up to commissioning																									
Preparation of guideline report																									
Technology Transfer Workshop																									
Validation of Project results final project document																									

As outlined in Table 1, two site visits are expected over the course of the consultancy. Details of the working trips are found in section 6 (Duty Station).

3. Expected Outputs and deliverables

The deliverables are to be submitted in stages of draft and final. Each deliverable is to be submitted in the form of a soft copy to the UNDP PMU team. The time needed by the Project Management Unit for the Review of each submitted deliverable is 2 weeks. All deliverables are to be submitted in the English Language. The Required deliverables under the terms of reference are:

Table 2 Deliverables and Due dates

ID	Deliverables/ Outputs	Estimated Duration to Complete	Target Due Dates	Review and Approvals Required

1	• Kick-off meeting • Validation of the energy audit recommendation for the installation of a steam condensate return system; estimate the financial requirements for the recommended EE works; and establish the timeframe and major milestones for the proposed works (Task 1.1.1)	3	1 month after contract signature	UNDP Project Manager
2	• Full technical specifications (Task1.1.2) • Assist PMU in clarifying procurement related questions (Task 1.1.3) • Assist in the bid evaluation (Task 1.1.3) • General work procedures for contractors (Task 1.1.4) and checklists (Task 1.2.1)	15	6 months from contract signature	UNDP Project Manager
3	• Supervise the implementation and commissioning (Tasks 1.2.2, 1.2.3) • Review the winning contractor's program for O&M training for the selected facility (Task 1.2.4) • Prepare the commissioning reports for 1 implemented site (Task 1.2.5)	14	13 months from contract signature	UNDP Project Manager
4	• Assist CEDRO 5 team in monitoring of the site • 1 Technology transfer workshop (Task 2.1) • Development of 1 guideline report (Task 2.2)	3	16 months from contract signature	UNDP Project Manager

It is important to note that the PMU will work to expedite the process of project implementation and commissioning, and therefore the timeframe indicated above, along with the deliverables, can be subject to a shorter timeframe.

4. Institutional arrangements

The consultant will work under the direct guidance of the CEDRO 5 Project Manager. Regular coordination with the Gemayel Freres is expected and shall be channeled through the Project.

5. Duration of work

The start date for this consultancy is immediate after Contract signature.

The overall duration of the contract covered by this ToR is 35 person-days spread over a period of 16 months from the date of contract signature.

The awarded party has to comply with the terms of reference of this consultancy service, and to have all deliverables submitted and approved before/by the last working day of the consultancy period. The time required for deliverable review is 2 weeks.

The approval of the submitted deliverables will be based on clearance and review of the CEDRO 5 project manager.

Payments will be issued upon satisfactory completion of the required outputs.

Extensions, if deemed necessary, can only be granted through mutual agreement between the parties.

6. Duty station

The assignment is home based; the work will be with the support of CEDRO 5 team from Lebanon.

Two site visits are expected by the consultant, first to technically assess Gemayel Freres industry before design and tender preparation, and second at commissioning phase and workshop presentation.

As outlined in Table 3, two site visits are expected over the course of the consultancy. The table below outlines the number of working days per site visit expected and the description of tasks per visit:

Table 3 Number of working days in Lebanon expected & total no. of expected trips

Visit #	Description	Exp. No. of working day(s)
1	Site visit for the selected industry for the steam condensate return with control (Task 1.1.2)	1
2	Site visit during commissioning of industrial EE site & workshop day (Task 2.1)	2
Total no. of working days on site visits*		3
Total no. of trips (i.e., plane tickets) to Lebanon expected		2

* Additional site visits and personnel could be accepted if the consultant considers this necessary
* * The price of tickets and accommodation shall be included in the submitted price.

7. Qualifications of the Successful Individual Contractor

The Individual Consultant should possess the following minimum qualifications:

Table 4 Consultant's Minimum Qualifications

I- Academic qualification:	- Bachelor's degree in mechanical engineering or related field (required) - Masters' degree in mechanical engineering or related field with focus on industries (is a plus) Copy of degrees / certifications must be submitted for full evaluation grading.
II- Years of Experience:	- At least 5 years of experience in conducting feasibility studies and detail design of energy efficiency systems for industries. List of projects (relevant) detailing the consultant's scope of work along with completion date must be submitted for full evaluation grading.
III- Technical experience:	- Demonstrated experience in energy efficiency systems for industries mainly focused on steam boilers and steam condensate return. The bidder should submit proof of completed assignment. At least 3 completed projects in steam condensate return with similar scope (i.e., design and implementation follow up). The list of completed projects (to be accounted for in the experience) should be provided listing: project name, nature of work completed and exact role of consultant within this work, year of completion, description of type of facility. Failure to submit the here mentioned information, the criterion will not be considered. - Knowledge of thermal simulation software (STARe, SIMSCALE, Siemens Thermal Simulation, or similar). - Previous experience in the region of in the countries with similar conditions. - Previous experience in corrugated cardboard manufacturing industries is a plus.
IIV- Competencies:	- Proficiency in English language. - Ability to work with tight deadlines amending based on the CEDRO team's feedbacks.

8. Scope of Price Proposal and Schedule of Payments

The payments will be issued upon submission and approval of deliverables as per the following:

Table 5 Schedule of Payments

Task	Payment	Deliverables	Payment due date
1	10% upon completion of Task 1	• Kick-off meeting • Validation the energy audit recommendation in the installation of a steam condensate return system; estimate the financial requirements for the recommended EE works; and establish the timeframe and major milestones for the proposed works (Task 1.1.1)	1 month from contract signature
2	40% Upon completion of Task 2	• Full technical specifications for 1 beneficiary site (Task1.1.2) • Assist PMU in clarifying procurement related questions (Task 1.1.3)	6 months from contract signature

		• Report on the evaluation of bid (Task 1.1.3) • General work procedures for contractors (Task 1.1.4) and checklists (Task 1.2.1)	
3	40 % upon completion of Task 3	• Supervision of implementation and commissioning of 1 site (Tasks 1.2.2, 1.2.3) • Supervision of winning contractor's program for O&M training for 1 selected facility (Task 1.2.4) • Prepare the commissioning reports for 1 implemented site (Task 1.2.5)	13 months from contract signature
4	10% upon completion of Task 4	• Assist PMU in monitoring of the site • 1 Technology transfer workshop (Task 2.1) • Development of 1 guideline report (Task 2.2)	16 months from contract signature

The Consultant is expected to submit a financial proposal based on a Lump Sum amount including fees and foreseeable expenses, including all travel to Lebanon and within Lebanon during missions.

- Lump sum amount must be "all-inclusive"[1];
- The contract price is fixed regardless of changes in the cost components

Payment will be done upon full completion of the mentioned deliverables as set in the Terms of Reference, and upon submission of certificate of payment that shall be reviewed and validated by E&E Programme Manager.

[1] *The term "all inclusive" implies that all costs (professional fees, travel costs, living allowances, communications, consumables, etc.) that could possibly be incurred by the Contractor are already factored into the final amounts submitted in the proposal.*