Co-funded by the Erasmus+ Programme of the European Union

ENBRAIN Building capacity in Renewable and sustAINable ENergy for Libya

ERASMUS+ CBHE PROJECT # 585760-EPP-1-2017-1-AM-EPPKA2-CBHE-JP

Building capacity in Renewable and sustainable Energy for Libya

Project: n.586221-EPP-1_2017_1_IT-EPPKA2-CBHE-JP

Invitation to Tender for Equipment Procurement University of Zawia

Equipment Procurement for creating

an educational laboratory on renewable energies

Secretariat of the ENBRAIN Project:
UNIVERSITY OF Zawia (ZU)
The International Cooperation Office
Address: Abdelnasr Street
Zawia, Libya
Email : ico@zu.edu.ly
Website: https://ico.zu.edu.ly

Zawia, 06.10. 2021

Reference person: Abdulbast Kriama
Email:kriama@zu.edu.ly

Dear Sir / Madam,

we kindly invite you to submit your tender for the supply of EQUIPMENT for setting up an educational laboratory focused on renewable energy technologies. This equipment procurement is within the framework of the ENBRAIN Project "*Building capacity in Renewable and sustainable Energy for Libya*", co-funded by the **ERASMUS+ Programme of the European Union**.

When preparing your tender, please follow the instructions described in this invitation to tender.

Tenders should be submitted in English through **one** of the following means not later than Saturday, October 23, 2021 at 14:00 (Tripoli local time):

a) **by email to** ico@zu.edu.ly: if you are submitting your tender by email, kindly ensure that the documents are the **PDF of your originally signed and stamped paper copies**. Please keep the original paper copies because you will be asked to provide them to the secretariat in case you won the tender. An acknowledgement of receipt will be sent to you accordingly.

b) **delivered by hand in a sealed envelope**: the documents have to be **originally signed and stamped** and a receipt shall be obtained as proof of submission, signed and dated by the receiving person at the university secretariat in charge (indicated on the cover page of this tender). The Office is open from 08:30 am to 14:00 pm Sunday to Thursday excluding holidays.

In all cases, please add the below reference:

ENBRAIN – University of Zawia "Invitation to Tender for Equipment Procurement"

For any additional information, please do not hesitate to contact us by phone or by email.
Prof. Dr. Meftah Elmrabed
President of the University
ENBRAIN Project Referent

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Part I - Project Description

1.1 About ENBRAIN

The "*Building capacity in Renewable and sustainable Energy for Libya*" - **ENBRAIN** is a three-year duration multi-country joint project co-funded by the **Erasmus+** Capacity Building in the Field of Higher Education **Programme of the European Union** launched in 2017. The aim of the project is to develop in the project Partner Country (PC) universities a new Master on Renewable and Sustainable Energy.

In line with the 2030 Agenda for Sustainable Development and its focus on people, the cross-cutting role of human capital becomes crucial to achieve a transformative change in energy – one that is efficient, effective, equitable, empowering, and long lasting. The overall objective of this project is to fill this gap through the design and development of an innovative educational platform based on new courses, e-learning methods, digital tools and educational laboratories that may promote a systemic multi-dimensional vision of the global energy challenge. This quality shift aims to be able to capture the disrupting changes of future energy transitions that deals with the growing use of renewable energy sources and access to modern energy services in Africa.

General aims of the project are to:

- Raise awareness about the importance of a multi-dimensional approach to the global energy challenge;
- Reinforce the role of Libya universities to promote energy transition within the multidimensional targets of sustainability;
- Create a new class of thinkers able to cope with global energy challenges, envisage future targets for local community, support institutions in decision-making, engage citizens in sustainable practices.

Specific achievements of the projects are to:

- Design of a Master in Renewable and Sustainable Energy with a multi-level approach to capacity building;
- Pilot start-up multi-disciplinary seed-courses and curricula about Renewable and Sustainable Energy, using digital tools and educational laboratories and with a linkage to the international community and the needs of the job market;
- Create an open platform to engage citizens in renewable and sustainable energy via the creation of a MOOC for citizens.

For more information about the ENBRAIN project please visit the project official Website: https://enbrain-project.com/ .

1.2 ENBRAIN Partners – Project Partnership

The following institutions from Partner and European countries are involved in the project partnership:

1. POLITECNICO DI TORINO – TORINO Italy
2. UNIMED - UNIONE DELLE UNIVERSITA DEL MEDITTERANEO - ROMA Italy
3. UNIVERSITAT DE BARCELONA - BARCELONA Spain
4. UNIVERSIDADE DE EVORA - EVORA Portugal
5. UNIVERSITY OF TRIPOLI – TRIPOLI, Libya
6. UNIVERSITY OF ZAWIA - ZAWIA Libya
7. MISURATA UNIVERSITY - MISURATA Libya
8. SIRTE UNIVERSITY – SIRTE Libya
9. SEBHA UNIVERSITY – SEBHA Libya

1.3 Current Phase of the Project

Creating a new Master in renewable energy and sustainability at the five Libyan Partner Universities arises the necessity of implementing their facilities creating laboratories in which students may actively put in practice the learned theory. In order to meet this goal, the Project Partnership is launching this tender for the procurement of equipment needed for the creation of **one laboratory on technologies for renewable energies at University of Zawia, Libya.**

The second part of this tender will specify the general rules for participating to this tender. The third part of this document will specify further details about the equipment needed by the **University of Zawia**. Please note that the other Libyan partner Universities may also launch a similar tender with a different request for the equipment. **The tenderer may participate to some or all the five sub-tenders**.

1.4 Disclaimer

"This project has been funded with support from the European Commission. This document reflects the views only of the author, and the Commission cannot be held responsible for any use which may be made of the information contained therein"

Part II – Tender Specifications

2.1 Object of the Tender

University of Zawia – Zawia Libya, Grant holder of the Erasmus+ CBHE Project n.586221-EPP-1_2017_1_IT-EPPKA2-CBHE-JP "Building capacity in Renewable and sustainable Energy for Libya" - ENBRAIN announces a tender for the procurement of the equipment with the technical specifications provided in the Part-III of this document.

This document represents an invitation to tender for the supply of educational laboratory equipment as part of the ENBRAIN Project co-funded by the ERASMUS+ Programme of the European Union.

This invitation to tender is in no way binding on the contracting authority. The contracting authority's contractual obligation commences only upon signature of the contract with the successful tenderer.

2.2 Special Conditions

According to the agreements between EU and the mentioned above **project partner countries**, all equipment purchased and any provision of services within the framework of Erasmus+ projects **is exempted from taxes (including VAT), duties and charges**. An appropriate Certificate for the VAT exemption will be provided by the Partner University to be presented to Libyan fiscal authorities.

In order to be eligible for exemption from the abovementioned taxes (including VAT), duties and charges **the equipment procured within this tender should be directly and eventually specifically imported in behalf of and delivered to the project partner indicated at point 2.1 of this tender specification**.

If **VAT or other taxes** will be charged on the offer, these will have to **be paid by the Partner Institution launching the tender**. These costs are not eligible for reimbursement from EACEA and have to be covered by own funds by the Partner Institution purchasing the equipment.

The offered equipment should be produced for the Libyan market. The provided warranties should be assured by the relevant brands' official Service Centers in the abovementioned country.

2.3 Currency and Language of the Tender

The tenders shall be presented in EURO for both the unit prices and the overall amount of the commitment. **The currency of payment will be also in EURO**. The tenders have to be presented in **English**.

2.4 Submission of the Tenders: Means and Deadline

Tenders should be submitted in English through **one** of the following means not later than

Saturday, October 23, 2021 at 14:00 (Tripoli local time).

a) **by email to** ico@zu.edu.ly: If you are submitting your tender by email, kindly ensure that the documents you are sending are the scanned copies (PDF format) of the originally signed and stamped. An acknowledgement of receipt will be sent to you accordingly. Please keep the original paper copies because if you won the tender, you will be asked to provide to the University the original paper copies.

b) **delivered by hand in a sealed envelope**: if you are submitting your tender by personal delivery, a receipt shall be obtained as proof of submission, signed and dated by the receiving person at the University – International Cooperation Office. The Office is open from 08:30am to 14:30pm Sunday to Thursday excluding holidays.

University of Zawia (ZU)
The International Cooperation Office
Address: Abdelnasr Street
Zawia, Libya
Email : ico@zu.edu.ly

In all cases, please add the below reference:

ENBRAIN – University of Zawia **"Invitation to Tender for Equipment Procurement"**

Please note that **all the written pages** of the documents you are submitting for the tender have to **be initialed by the Legal Representative of the Company**.

As mentioned above, the deadline for submission of tenders is 23/October/2021 at 14:00 (Tripoli local time). No offer may be submitted or modified after this date.

2.5 Documents to be Submitted by the Tenderer

The tenderer must complete and provide the following documents:

1. Tender duly signed, dated and sealed; including:
   - Profile of the company
   - Main contact's name, phone number, email and address
   - Completed bill of quantities (see Part III) for the selected section(s) with unit and total prices **excluding VAT**
   - Technical specifications of the offered equipment
   - Warranty conditions
   - Catalogs of the proposed equipment
2. A photocopy of the trade name registration papers
3. Signed letter for after-sales service and at least 12-month warranty letter

Additional documents such as instructions and operating manuals shall be required with the delivery of equipment.

2.6 Deadline for Engagement

Tenderers shall remain bound by their tenders for a period of **thirty (30) days** from the closing date for submission (23/10/2021) at 14:00 PM.

2.7 Subcontracting

It is prohibited for the tenderers to subcontract parts of the tender to third parties. The tenderer will be the only responsible part who will contact the coordinating institution.

2.8 Goods Delivery Charges and Locations

Equipment will have to be **delivered in Libya at the university indicated at point 2.1**.

The full addresses and contact details of the responsible persons at the partner university will be provided after the signature of the contract with the selected supplier.

A **delivery note** has to be produced by the tenderer and **countersigned** by the reference person of the destination Institution on the **day the delivery takes place**. The delivery note originally signed has to be archived at the Administrative office of the destination Institution.

The delivery note has to include an explicit note about the **correspondence and the integrity of the delivered goods**. If any damage is noted, it has to be described in the document. The document will

be processed by the Administrative office of the destination Institution and singularly managed as a separate process that will be activated in order to overcome the possible issues raised at the delivery.

Installation costs (and first test, if applicable) have to be included in the final offer. A **declaration of correct installation** (and **first test passed**, if applicable) has to be provided by the tenderer after having completed the installation. This document has to be **countersigned** by the reference person of the destination Institution. The declaration originally signed has to be archived at the Administrative office of the destination Institution.

All the delivered goods will be recorded in the inventory of the destination Institution.

2.9 Goods Delivery Time

The delivery period may not exceed **60 days** from the date of signature of the contract with the selected supplier.

2.10 Payment Terms

The payment shall be done according to the following terms:

A. **20% upon signature** of the contract and **within 30 days after POLITO receives** the scanned copy of the original **contract/order by the administrative office and the bank data of the company** by email from the Partner Institution launching the tender,

B. **80% after 30 days after delivery and the installation of equipment** and **within 30 days after POLITO receives** the scanned copy of the original **document stating the correct installation and operation tests of the equipment** by email from the Partner Institution launching the tender,

Payments will be done in EUROS. **The tenderer has to be able to receive EUROS on his bank account**.

The payment will be done by the Politecnico di Torino, the Coordinator of the project, that will **pay in name and on behalf of the Partner University** indicated at point 2.1. This procedure is officially foreseen in the Partnership Agreement, already in force, that ties the Institutions for the ENEBRAIN project.

Note 1: This call for tender, initialed by the supplier on each page, together with all the documents asked at point 2.5, can be considered a contract when accompanied by the official notification letter, sent by the University to the selected supplier.

Note 2: Tranches A and B can be transferred jointly (only one tranche of 100%) if the delivery and the installation phases are carried out jointly (within a reasonable short time-period) and the two documents, of the correct delivery and of the correct installation and operation test, are transferred to POLITO jointly. The awarded supplier will be asked to express his preference.

2.11 Evaluation and Award of the Contract

The key principles that shall govern the process of evaluation of tenders are listed as follows:

- **Non-discrimination:** Any discrimination with regard to tenderers on the basis of nationality is forbidden.
- **Equal treatment:** All tenders submitted within the set deadline are to be treated equally. They will be evaluated on the basis of the same terms, conditions and requirements set in the tender documents.
- **Transparency:** Detailed written records are be kept (normally in the form of reports and minutes of the meetings held) of all actions of the evaluation panel. All decisions taken will be sufficiently justified and documented. In this way, any discriminatory behavior can be prevented and if not prevented, then monitored.
- **Confidentiality:** The process of evaluation of tenders are be confidential. Information concerning the process of evaluation of tenders and the award recommendation is not to be disclosed to the tenderers or to any other person who is not officially concerned with the process, until information on the award of the contract is communicated to all tenderers.

Exclusion criteria: Tenderers are excluded from participation in procurement procedures if:

- they have submitted a tender that does not meet all the requirements provided in this document, including the ones in the clause 2.5.
- they are bankrupt or being wound up, are having their affairs administered by the courts, have entered into an arrangement with creditors, have suspended business activities, are the subject of proceedings concerning those matters, or are in any analogous situation arising from a similar procedure provided for in national legislation or regulations,
- they have been convicted of an offence concerning their professional conduct by a judgment which has the force of res judicata,
- they have been guilty of grave professional misconduct proven by any means which the contracting authority can justify,
- they have not fulfilled obligations relating to the payment of social security contributions or the payment of taxes in accordance with the national legal provisions,
- they have been the subject of a judgment which has the force of res judicata for fraud, corruption, involvement in a criminal organisation or any other illegal activity detrimental to the Communities' financial interests.

In the selection process only will be considered the suppliers who would provide delivery of the equipment to the above mentioned university in Libya.

Selection criteria: Tenderers will be selected based on the following criteria:

- having submitted the tender that complies with **all** of the specifications, requirements and offers the lowest price, as well as all other evaluation criteria indicated, shall be selected,

– having the necessary economic, financial, technical and professional capacity to perform the contract.

Award criteria: The awarded tenderer will be the one who offered the best quality and price tender out of those submitted by tenderers which are not excluded and which meet the selection criteria. The awarded tenderer should:

– be in full compliance of tender to the tender specifications, bill of quantities and technical specifications,
– have previous related projects and references including proofs of similar contracts completed in the past,
– Provided technical information for all the equipment to be supplied.

Apart from the abovementioned criteria, the tenderer's work experience in Libya will be taken into account.

The contract will be awarded to the tenderer whose tender has been found to be in conformity with the invitation to tender. The award method will be the "**best value for money**" meaning that the winning tender is the one offering the **best quality/price ratio**, taking into account the criteria announced in the specifications.

Below it is presented the table of the specific award criteria, with the maximum score of each criterion, that will be used by the selection board:

	Specific award criteria	Weighting
A	Compliance to the tender specifications, bill of quantities and technical specifications,	20
B	Previous related projects and references including proofs of similar contracts completed in the past,	10
C	Work experience in Libya	10
D	After-sale service	20
E	Technical quality of the material	20
F	Price	20

At the time of award of Contract or Purchase Order, the university reserves the right to **vary (increase or decrease)** the quantity of goods by 5-10% depending on the prices offered by tenderers.

2.12 Opening/Evaluation Committee

Tenders will be opened by the ENBRAIN Project Tender Evaluation Committee comprising at least 3 (three) members appointed for the purpose. The members will be all part of the staff of the university indicated at point 2.1.

2.13 Notification of Results

Tenderers will be notified of the results by email. Thus, it is important to provide the email of the main contact person.

2.14 Cancellation of the Contract

Cancellation of the Contract is due if the delivery/completion is delayed by **4 (four) weeks** from the delivery deadline stated herein in the clause 2.10, with the condition of **returning the down payment** to the coordinating institution.

Part III – Bill of Quantities and Technical Specifications

The following equipment is planned for procurement within this tender:

SECTION A: Equipment for e-learning

Section & number in the list	Equipment to be purchased	Quantity requested
A	**E-learning**	
A.1	Equipment in the classrooms (to be also used for flipped classroom and for video conferencing): video-projectors, headphones, webcams Add technical data and quatities	1
A.2	Setting up of communication lines for internet connection in 5 classrooms Add technical data and quatities	1
A.3	Workstations for Office use and Video Conference Add technical data and quatities	1
A.4	Licence for videoconferencing System Add technical data and quantities e.g. homer pro, star cfd, design builder, etc..)	1
A.5	Books for new courses Add technical data and quantities (max 40)	1
	Total number of items	***5***

Section A. Equipment for e-learning:

the estimate value of the contract for this section is 16'940,00 EUR including the delivery, installation, operation test and taxes, if any.

The tenderer is invited to complete the table in attachment (last page of this document) with his offer and return it to the Institution as indicated at Art. 2.4 together with all the documents listed at Art. 2.5.

SECTION B: Equipment for the laboratory on Renewable Energies

Section & number in the list	Equipment to be purchased	Quantity requested
B	**Laboratory on Renewable Energies**	
B.1	MINI-EEE 1 Wind Energy Basic Unit **GENERAL DESCRIPTION:** The Wind Energy Basic Unit, "MINI-EEE", is a small-scale unit designed to study wind energy and the influence of some factors on its generation. This unit consists of a transparent tunnel, a wind turbine with rotor to place up to six blades and a variable speed axial fan. The air speed is varied by changing the rotational speed of the axial fan and a sensor allows for measuring that air velocity. This fan generates the required air flow to make the rotor of the wind energy unit work. The generator converts the kinetic energy of the rotor into electric energy. The rotational speed of the wind turbine can be measured with a sensor.	1

The unit includes a DC load module with LEDs, a rheostat, a DC motor, a load selector and switches to select the type of load. Thus, the wind turbine may work in open circuit or connected to LEDS, to a rheostat or to a DC motor.
A voltage and current sensor measures the voltage and current provided by the wind turbine in order to determine the power.

SPECIFICATIONS:

Bench-top unit.
Anodized aluminum frame and panels made of painted steel.
Diagram in the front panel with distribution of the elements similar to the real one.

Air generator:

Axial fan with variable speed.
Maximum flow rate: 1473 m^3/h.
Finger guard included.

Wind turbine:

The safety turbine is a simple injection model that joins the ends of up to six air blades.
Set of six blades for the wind turbine.
Power (at a rotor speed of 2000 rpm): 1 W.
Outlet voltage (at a rotor speed of 1000 rpm): 5 V DC.
Outlet current (at a rotor speed of 1000 rpm): 50 mA DC.
Minimum speed of the wind required to generate electricity: 2 m/s.
Rotational speed sensor for the wind turbine, range: 0 – 2000 rpm.

Air tunnel:

Made of PMMA.
Length of 500 mm and diameter of 300 mm approximately.
Anemometer that allows to measure speeds below 20 m/s.

Voltage and current sensor.

Electronic console:
Metallic box.
Connector for the DC current and voltage sensor.
Digital display for the current (DC).
Digital display for the voltage (DC).
Connector for the turning speed sensor for the aerogenerator.
Digital display for the turning speed.
Switch for the axial fan.
Regulator for the speed of axial fan.
This electronic console includes a DC load module:
Two LEDs.
DC motor.
Rheostat.
Independent connection of each load thanks to the load selector:
Position 1: the wind turbine works at open circuit voltage.
Position 2: the LEDs are directly connected to the wind turbine.
Position 3: the rheostat is directly connected to the wind turbine.
Position 4: the DC motor is directly connected to the wind turbine.
Cables and Accessories, for normal operation.
Manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.
- Electrical supply: single-phase, 220 V/50 Hz

DIMENSIONS & WEIGHTS

Unit: -Dimensions: 600 x 400 x 500 mm approx.
-Weight: 20 kg approx.
Electronic console:
-Dimensions: 490 x 330 x 310 mm approx.

	-Weight: 10 kg approx.	
B.1	MINI-EESF 1 Photovoltaic Solar Energy Modular Trainer (Complete Version) **GENERAL DESCRIPTION:** Photovoltaic Solar Energy Modular Trainer "MINI-EESF" is a laboratory scaled unit designed to study all the parameters involved in the solar radiation direct conversion into electricity. The trainer is based on some application modules and photovoltaic solar panels assembled in mobile structures. It is specially designed for the theoretical and practical study of the electrical installations with photovoltaic solar energy, the typical configurations used in photovoltaic installations and the operation of the different elements involved in the conversion. The power obtained from the solar energy can be: Regulated to obtain a DC power to charge a battery, studying parameters such as solar module´s current output charge level, battery voltage, etc. Delivered to DC loads, studying parameters such as solar module´s current output and current consumption by the loads. Converted to AC power to be delivered to AC loads, studying parameters such as current consumption by the loads. Injected to the grid, studying parameters such as simulated solar module´s current and voltage outputs, power injected to the grid, mains voltage and frequency, etc. **SPECIFICATIONS:** Main features: Supply and Consumption at 12 V (DC). Supply and Consumption in alternating current (AC). Supply to the network (grid). Photovoltaic module: Solar Panel (polycrystalline) mounted on an anodized aluminum structure with wheels for mobility, and with calibrated cell to measure solar irradiation. It consists of 36 high performance photovoltaic cells (35 x 55 mm), with a typical power of 50Wp for a 17Vdc voltage. Both the protections and the used materials give it water proof properties, abrasion protection, hail impact protection and several other adverse environmental factors protection. Technical data: Maximum nominal power: 66W. Voltage at maximum power point (Vmpp): 17.8 V. Current at maximum power point (Impp): 3.70 A. Short-circuit current (Isc): 4.05 A. Open circuit voltage (Voc): 22.25 V. Dimensions: 660 x 35.5 x 780 mm. Weight: 3 Kg. approx. Lamps Module: Composed by two lamps to simulate the sunlight. Regulated Power from 0 to 400 W. Battery offering optimal performance with low power applications. Set of interconnection cables. Rack for modules allocation: Modules: N-ES10. Solar charge controller with an automatic recognition for operating voltage 12 V or 24 V. It monitors several parameters such as voltage, current and charge level of the battery, load current, status, etc. Additional functions can be activated such as the settings, night light function and auto-test. The regulator is equipped with various devices to protect its electronics, battery and load. N-ES20. Loads module that incorporates two 12 V, 20W lamps, with independent switches.	1

	N-ES30. DC/AC inverter that outputs a sinewave shaped output of 230V/50Hz ± 2% and the nominal input voltage is 12Vdc. Two different operating modes: continuous mode and ASB mode (Auto Standby) to reduce the power consumption. It is provided with a diagnosis system to indicate the user the status by different flash sequences. N-ES40. AC Voltage measurements module until 250V. and DC until 250 V. (digital multimeter). N-ES50. Loads module that incorporates two lamps of 220V., 50 W., with independent switches. N-ES80. Module for measurements of solar irradiation (W/m^2) and measurements of current until 10 A., with digital multimeter. N-ES90. Module for 12Vdc battery charger. EE-KIT2. Grid Connection Inverter Kit. Inverter used for the conversion and injection to the grid of the power generated by a simulated source of renewable energy. The simulated source is a simulator used to obtain a variable power to be injected to the grid. The operation mode is displayed by means of an indicating LED at the front side of the housing. It is equipped with extensive safety measures to ensure that it is immediately switched off as soon as the AC plug is removed from the wall socket or the operation of the public grid fails. The inverter can be connected to a computer (PC) through a RS232/USB communication to display some parameters, such as voltage and current inputs, mains voltage and frequency, maximum AC power, kWh, etc. - Grid Connection Inverter: Input (DC): Nominal power @ 25ºC: 150 W. Maximum power @ 25ºC: 220 W. MPP voltage: 45-125V DC. Maximum voltage: 155V DC. Nominal current: 3A. Output (AC): Voltage: 230V (207 - 253 V). Maximum power, fuse: 2A. Frequency: 50 Hz (49.8 ~ 50.2 Hz). This unit is supplied with the Grid Simulator (ESR), which simulates a low power grid to inject the power generated by the inverter. - Grid Simulator (ESR): ESR is designed to create an isolated low power grid. The unit uses a battery as voltage source and generates a sine signal of 220V/50Hz. The main features of the ESR are: Inlet voltage source: battery of 12Vdc. Output: 220V/50Hz. Isolation transformer. Battery charger included. Protection fuses. The user can work with this module safely. The devices included in the EE-KIT2 can be used worldwide. Cables and Accessories, for normal operation. Manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals. - PSA/PC. Polycrystalline photovoltaic solar panel. - PSA/MC. Monocrystalline photovoltaic solar panel. - PSA/AM. Amorphous photovoltaic solar panel. DIMENSIONS & WEIGHTS Rack with modules: Dimensions: 645 x 325 x 925 mm. approx. Weight: 10 kg. approx. Photovoltaic module: Dimensions: 730 x 510 x 1150 mm. approx. Weight: 10 kg. approx. Grid Connection Inverter Kit: Dimensions: 550 x 410 x 820 mm. approx.	

	Weight: 30 kg. approx.	
B.1	MINI-EEST 1 Thermal Solar Energy Basic Unit **GENERAL DESCRIPTION** This unit is a system that transforms solar energy into usable thermal energy. This unit uses the thermosiphon system to heat water or the traditional pumping system. In both cases, the absorbed thermal energy is given by the simulated solar radiation; in our case, it is done using panel with powerful luminous sources. The unit basically is formed by: Thermal solar panel, Tank, Solar simulator, Lamps, Pumping system, Temperature sensors, Flowmeter. Valves set to work in thermosiphon mode or pumping mode. The solar panel is made of polycarbonate. It is mounted on a metallic structure with a conduct for the thermal fluid. It has been developed taking into account the geometrical shape of the absorbing surface in order to obtain the highest output levels possible. The tank satisfies the established technical standards, both in its construction and in its equipment. The hot water outlet is through an overflow placed at the top of the tank. The lamps present radiation features that are similar to those of the sun. This unit makes it possible to simulate two different functioning modes: the thermosiphon mode, the water runs due to the temperature differences, that is to say, without pump; and the pumping mode. 5 Temperature sensors allow to know the temperature at different points of the unit. A flowmeter allows to know the water flow that is running through the pump and, therefore, through the collector. The unit has every pipe and connection for an optimal operation. **SPECIFICATIONS:** Unit mounted on a metallic structure with wheels for its mobility. Main metallic elements of steel. Diagram in the front panel with similar distribution to the elements in the real unit. Solar panel (thermal solar collector): Metallic structure. Solar panel, is made of polycarbonate, with polypropylene pipes. Pipes (already set) to connect the panel and the tank. Temperature sensors, "J" type. Tank of 30 l. Solar simulator: Aluminum structure with adjustable height. 2 Solar spectrum lamps of 300W each one. Pumping system: Pump, range: 0-2 l./min. Flowmeter. 5 Temperature sensors, "J" type, at different points of the unit. The unit includes two "Venetian" type blinds to reduce a direct visual contact with the lamps and to reduce the direct contact with the solar panel when the unit is working. Electronic console: Metallic box. Connections for the temperature sensors. Digital display for the temperature sensors. Selector for the temperature sensors. Pump switch. Lamps switch. Cables and Accessories, for normal operation. Manuals: Required Services, Assembly and Installation, Starting-up, Safety, Maintenance & Practices Manuals.	1

<table>
<tr><td></td><td>Electrical supply: single-phase, 220V./50 Hz

DIMENSIONS & WEIGHTS
Unit: -Dimensions: 1300 x 800 x 1500mm. approx.
-Weight: 70 kg. approx.
Electronic console: -Dimensions: 490 x 330 x 310 mm. approx.
-Weight: 10 kg. approx.</td><td></td></tr>
<tr><td>B.1</td><td>RT1 Smart Rooftop Monitoring System
GENERAL DESCRIPTION
The rugged housing of RT1 simply fits to the corner of a PV panel and contains the digital electronics. It also houses a sensor that reliably measures the incoming plane of array solar irradiance. The plug-in temperature sensor is easily attached to the back of the panel. RT1 is the perfect solution for monitoring the efficiency of commercial rooftop PV installations.

SPECIFICATIONS:
<table>
<tr><td>Irradiance
Spectral range
Non-stability (change/year)
Non-linearity (0 to 1000 W/m2)
Directional response (up to 55 ° with 1000 W/m2 beam)
Uncertainty in daily total
The combined calibration uncertainty
PV panel temperature
Calibration
Signal connections

Voltage and current range
Power consumption maximum
Ambient operating temperature
Recommended calibration interval
Standard Warranty
Ingress Protection (IP) rating
Supported PV panel heights when mounted on corner
Communication to host

Connections on instrument

Cable to host
Cable to temperature sensor</td><td>0 to 2000 W/m2
400 to 1100 nm
< 1 %
< 1 %
< 1.7 %
< 7 %
±3 % against traceable reference pyranometer
-40 to +100 °C, ± 1 °C, using a 10 k NTC
Against traceable reference pyranometer
1 - RS-485 connection to host
2 - PV panel temperature sensor
5 to 30 VDC, 2.5 to 10 mA
60 mW
-40 to +80 °C
2 years
2 years
IP67 with both plugs securely attached

30 to 50 mm
Modbus® Slave RTU over 2-wire EIA RS-485 connection 1200 to 38400 baud
Two connectors, 5 pin to host and 2 pin to temperature sensor
20 m
3 m</td></tr>
<tr><td>RS- 485 specifications:
Baud rates
Data bits
Parity
Stop bits</td><td>
38400, 19200, 9600, 4800, 2400 and 1200
8
Non, even, odd
1, 2</td></tr>
</table>
DIMENSIONS & WEIGHTS
77.5mm x 60.5mm x 81mm
RT1 main body 514 g
Complete boxed unit 1710 g
with cables, adapter and instruction sheet</td><td>1</td></tr>
<tr><td></td><td>Total number of items</td><td>1</td></tr>
</table>

Section B. Laboratory on Renewable Energies:

the estimate value of the contract for this section is 7'260,00 EUR including the delivery, installation, operation test and taxes, if any.

The tenderer is invited to complete the table in attachment (last page of this document) with his offer and return it to the Institution as indicated at Art. 2.4 together with all the documents listed at Art. 2.5

Response form - Table to be returned, completed with the offer of the tenderer:

Section A and B. Equipment for the e-learning and the laboratory on Renewable Energies					
				Price Estimation	
№	**Name and Specification**	**Unit**	**Quantity**	**Unit Price in EUR**	**Total Price in EUR**
A.1	Equipment in the classrooms (to be also used for flipped classroom and for video conferencing): video-projectors, headphones, webcams	Unit			
A.2	Setting up of communication lines for internet connection in 5 classrooms	Unit			
A.3	Workstations for Office use and Video Conference	Unit			
A.4	Licence for videoconferencing System	Unit			
A.5	Books for new courses	Unit			
B.1	Description of the item	Unit			
Total for Section A in EUR (excluding VAT/taxes, if any)				**EUR**	
Delivery cost				**EUR**	
Installation and first test, if applicable, costs				**EUR**	
VAT or taxes, if any (_____%)				**EUR**	
Grand Total for Section A in EUR				**EUR**	
Total for Section B in EUR (excluding VAT/taxes, if any)				**EUR**	
Delivery cost				**EUR**	
Installation and first test, if applicable, costs				**EUR**	
VAT or taxes, if any (_____%)				**EUR**	
Grand Total for Section A in EUR				**EUR**	

Date: _____

ATTACHMENTS:

- Profile of the company
- Main contact's name, phone number, email and address
- Technical specifications of the offered equipment
- Warranty conditions
- Catalogs of the proposed equipment
- A photocopy of the trade name registration papers
- Signed letter for after-sales service and at least 12-month warranty letter

_____

Stamp and signature of the tenderer