



Consultation 02/2020 WESET

Acquisition of equipment in electrical
engineering (Wind Energy).
for :

**The WESET-Erasmus project, funded by the
European Union in collaboration with the
University of Valladolid and
the University of Sfax.**

2020

Detail on the project subject of this consultation

WESET- Wind Engineering Skills in Egypt and Tunisia project inscribes in the modernization, development and internationalization strategy of the HEIs involved, that share the common objectives of aligning Master degrees with the needs of Industry and the Society at large, and of creating links with foreign institutions.

The main goal is to transfer knowledge and technology on Wind Energy among experts in European, Egyptian and Tunisian institutions, strengthening the links between academic institutions and industry to produce engineers with the skills needed to support industrial growth in the wind energy sector.

The project aims also at promoting Bologna Process standards in the in South Mediterranean region.

The proposed project will contribute to the Engineering objective of the Capacity Building action in Tunisia and Egypt. Thus, it directly addresses the thematic national and geographic priorities set by the programme for South-Mediterranean countries (and Egypt and Tunisia in particular).

WESET project's specific objectives are

- fulfilling the lack of Engineers with multidisciplinary knowledge of Wind Technologies
- providing specific training materials and laboratories that support the training in Wind Engineering and the links HEIs-industry
- promoting the use of Wind as a reliable, cost-effective and pollution-free source of energy in SM countries, supporting their economic development and independence
- supporting the activities of WE companies in those countries and the creation of new companies by entrepreneurs, thanks to the technically qualified manpower of international standards.

WESET will achieve the purposed objectives through the following activities:

- By developing Master modules and laboratories suitable for capacity building in wind energy for on-campus learning in Egypt and Tunisia, linked with industry and official organizations in SM countries through the Wind Engineering Centers to be created as part of WESET;

- By elaborating training materials openly distributed to be used as part of Masters in Engineering
- By training trainees from Egypt and Tunisia in Europe on real-life Wind Engineering aspects and by using those training materials for Master courses.

ADMINISTRATIVE CLAUSES

Article 1: Terms of Reference

The University of Sfax launches a consultation for the acquisition of equipment in electrical engineering (Wind Energy) for the project **WESET - Erasmus « Wind Engineering Skills in Egypt and Tunisia »**

Article 2: Purpose of the consultation

The **WESET - Erasmus** project intends to acquire the electrical engineering (Wind Energy) equipment for the benefit of the University of Sfax.

Article 3: Method of sending bid envelopes

Tenders must be sent to the University of Sfax office during the work schedule by registered, fast-track or hand-delivered no **later than: July 06, 2020, 2020 at 12:00 pm** with the following mention:

Do not open, Consultation **02/2020 WESET**: Acquisition of electrical engineering (Wind Energy) equipment for the **WESET - Erasmus** project.

Address : Université de Sfax. Route de l'Aéroport Km 0.5 BP 1169 -3029 Sfax,

The stamp of the office of order of the University of Sfax or the post office being authentic.

The outer envelope includes, in addition to the two technical and financial offers, the following administrative documents:

- ✓ These specifications signed and initialed,
- ✓ The tax certificate provided by the legislation in force, valid. (Only for Tunisian Society)
- ✓ A certificate of affiliation to the CNSS, (Only for Tunisian Society)
- ✓ A copy of the register of commerce, (Only for Tunisian society)
- ✓ Letter of submission (Annex 01).
- ✓ Declaration of honor of no influence (Annex 02).
- ✓ Declaration of honor (Annex 3).
- ✓ Price slips (Annex 5).

The financial offer includes the duly completed and signed price schedule,

The technical offer includes the answer form + complete technical documentation (flyer-photo-sheets-etc.), obligatorily bearing the stamp of the tenderer

Note: The tenderer must provide all the characteristics (make - model) of all the elements constituting his tender and carefully fill in the point - by - point answer form.

Article 4: VALIDITY PERIOD OF THE OFFER:

All bidders will be bound by their bid for ninety (90) days from the day following the deadline set for receipt of bids. During this period, the bidder's proposed prices will be firm and non-revisable, on pain of nullity of the corresponding offer.

Article 5: ELECTION OF DOMICILE

For the performance of the consultation, the successful supplier elects domicile in his residence. In case of change of address, the holder of the contract must obligatorily and immediately inform the administration at any stage of execution of the consultation in question.

Article 6: CHOICE OF OFFERS:

- ✓ The financial comparison of the offers will be done by lot on the basis of the CFR (cost and freight) prices for residents and non-residents, after converting all the currency offers to Tunisian Dinars, applying the exchange rate on the day of the opening of the technical folds.
- ✓ In a first place, the internal commission proceeds with the opening of the bids and the counting of the financial offers batch by batch in an increasing order: the lowest bid is only admitted for the technical recounting
- ✓ If the lowest bid meets the technical requirements, it will be selected otherwise, the next bid will be examined in the same way and in the increasing order of the financial offers.
- ✓ The offers will be evaluated financially by lot (with the possibility of partial acquisition). The technical non-compliance of an Item is rejected.
- ✓ The offer must be presented in separate lots.
- ✓ Each tenderer must submit one basic offer without variants. Any variant will not be considered.

Article 7: COMPLIANCE OF EQUIPMENT:

The supply must comply with the characteristics and technical specifications given at the time of submission and specified on the descriptive sheets attached to the offer. The University of Sfax reserves the right to call on experts or technicians of its choice to examine the equipment or products to be received.

In the case where the material or product does not comply with those required by the University of Sfax and whose technical characteristics prove to be not in conformity with those specified in the technical instructions attached to the offer, the expert's fees will be at the expense of the supplier without prejudice to the replacement of rejected equipment or products. Equipment or products missing, deteriorated or not in conformity with the offer will be the object of a statement, under which the University of Sfax will ask for its replacement or an indemnity compensation for the damage suffered.

Article 8: METHOD OF PAYMENT:

Payment will be made by the University of Sfax - Tunisia by bank transfer upon presentation of a pro-forma invoice in four (4) copies with the delivery notes plus the receipt reports.

NB: Invoices and quotes must include the following data: University of Sfax

Article 9: GUARANTEE:

The supplier guarantees the material to be delivered against any defect of manufacture or defect of material during a minimum period of one (1) year or more than one year, these cases will be specified in the technical characteristics, as from the date of reception Provision of equipment or products installed. This warranty includes material, labor and travel.

The supplier warrants that all supplies delivered under this consultation are new, have never been used, are the most recent model in use and include all the latest design and material improvements.

Article 10: TIME LIMIT

The consultation must be performed for the entire order. The execution period takes effect from the date fixed in the service order by the administration; this period is fixed at 90 days. "Delivery time" means the delivery, the installation of equipment, with a detailed execution schedule that must include three components, namely: shipping, on-site delivery, installation and start-up. Ordered material.

Article 11: RECEPTION

The administration intends to buy equipment according to the rules of art, installed, and in working order. The receipt (in two phases) will be pronounced by the commission provided for this purpose, constituted by the representatives of the supplier and the Administration, on the basis of the conditions of the bid submitted by the tenderer in accordance with the technical specifications retained by the administration.

Reception will only be possible if the equipment and installation work meet the specifications specified in the specifications.

In case of refusal of equipment presented on provisional acceptance, because of the successful tenderer, the latter will bear the expenses related to the interventions necessary for its acceptance (equipment, services, etc.)

The reception of the equipment is done in two phases:

- ✓ Phase 1 Delivery: will be established following on-site delivery.
- ✓ Phase 2 "reception": PV will be established after switching on the equipment and checking the correct operation.

Article 12: COMPLAIN

Any claim of any kind whatsoever concerning the execution of this consultation and the installation of the material must be addressed to the University of Sfax Order Office.

Article 13: PENALTY OF DELAY

If delivery times are exceeded, the supplier will be subject to a late penalty equal to 1/1000 for each day of unjustified delay, capped at 5% of the total amount of the supply.

Article 14: LITIGATION OR DISPUTE

In the event of a dispute or dispute arising during the performance of the contract and failing an amicable solution, jurisdiction shall be conferred on the competent courts of Sfax.

Any contractor entered into between the successful bidder and the University of Sfax will be governed by its interpretation and execution by Tunisian law.

Article 15: REGULATION

For all that is not stipulated in the provisions of these specifications, the execution of this consultation will be governed by:

- The code of public accounting.
- Decree No. 1039 -2014 of 13 March 2014, regulating public procurement.

Sfax, on.....

READ AND ACCEPTED

The bidder

N.B.: The specifications and its annexes must be returned to the University of Sfax in their original form duly signed and initialed by the tenderer.

Minimum technical specifications

1 Introduction

This document presents the characteristics and expected functionalities of the electrical engineering (Wind Energy).

The equipment installation is scheduled **90 days** from the date of placing the order form.

2 General

The tenderer must provide all the characteristics (make - model) of all the elements constituting his tender and carefully fill in the answer form point by point.

The tenderer must deliver the material in question to the premises of the University of Sfax

List of equipment:

| N° | Description | Quantity |
|----|---|----------|
| 01 | <p>Test bench: Wind generator with energy storage.</p> <p>The bench represents the typical configuration of a wind generator, which converts the kinetic energy of the wind directly into mechanical energy. It includes an aero-generator with horizontal axis with a nominal power around 400 W, the support of which carries at the top the nacelle containing the transmission shaft, the electric generator and the auxiliary devices.</p> <p>The nacelle is able to turn relative to the most in order to keep the axis of the machine always parallel to the wind direction. For start-up, the wind speed must reach a minimum insertion threshold (around 3 m / s) (+ 10 %).</p> <p>An inverter and a storage battery are used to evaluate the energy transport and storage devices.</p> <p>A system of electrical users (lamps) simulates the operation of a typical stand-alone wind installation.</p> <p>A supervision and telemetry system present on the control and supervision panel, it is possible, by connecting it to a Personal Computer, monitors the main electrical operating parameters, both in direct</p> | 01 |

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| <p>current (upstream of the inverter) than in alternating current (downstream of the inverter).</p> <p>Composition:</p> <p>A) Horizontal axis wind power generator including a microprocessor-based controller</p> <p>B) Table top control panel with:</p> <p>B.1) Sinewave inverter</p> <p>B.2) Electric loads</p> <p>B.3) Electric instrumentation for detecting the energy flows in the different branches of the circuit</p> <p>B.4) Data acquisition board with USB interface for PC connection</p> <p>C) Buffer Battery</p> <p>D) Wind speed and direction sensor</p> <p>Main Characteristics :</p> <ul style="list-style-type: none"> • The unit can operate both in the presence and in the absence of wind • The wind generator can be used both outdoors and indoors. • In case of outdoors operation, the wind generator follows the wind direction being free able to rotate around its vertical axis. • Stainless steel support pole : <ul style="list-style-type: none"> - Length around 1.5 m - Outside diameter around 48 mm - Mounting kit <p>Table top control panel</p> <ul style="list-style-type: none"> • Steel structure with: <ul style="list-style-type: none"> - Front face: comprehensive colored diagram of the system - Back side: AC loading system consisting of 5 lamps 30 W with individual insertion switches • Inverter: <ul style="list-style-type: none"> - continuous output power: 600 W - peak output power: 1500 W - input voltage: 12 Vcc - output voltage: 230 Vac - 50 Hz - output waveform: modified sine wave - stop for low battery charge | |
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| <ul style="list-style-type: none"> - protection against overloads, short-circuits, over-temperature • Instrumentation: <ul style="list-style-type: none"> - digital voltmeter for DC parameters - digital ammeter for DC parameters - multifunction instrument microprocessor-based, for AC parameters • Socket for connection to an external optional AC load • Safety terminal for connection of to an external DC load <p>Battery buffer</p> <ul style="list-style-type: none"> • Nominal voltage: 12 Vdc • Capacity of: 100 Ah <p>Wind speed and direction sensor for measuring wind direction and speed, value transmitted to the control panel.</p> <ul style="list-style-type: none"> • Speed sensor type: Hall effect sensor • Type of direction sensor: potentiometer 20 kOhm • Wind Speed range: 0.5 to 40 m / s • Wind Direction range: 0 to 360 ° <p>PC Data acquisition</p> <ul style="list-style-type: none"> • The unit includes a data acquisition card with USB interface for PC connection and voltage and current converters • The unit includes also a specific software (LabVIEW environment) to monitor the various parameters of the system. • The parameters displayed are: <ul style="list-style-type: none"> - All parameters DC (V-I-P) and AC (V-I-P-S-Frequency- Power factor) - Wind speed and direction • The software enables to: <ul style="list-style-type: none"> - Calculate wind energy conversion efficiency - Visualize the trend over time of wind speed and energy flows to and from the buffer battery to the inverter and from the wind generator - Draw the wind generator power characteristic curve of power / wind speed for the detection of the | |
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| | <p>point of wind power generator maximum performance</p> <p>- Save exercise data for future analysis or project work. Power supply: 230 Vac 50 Hz single phase - 100 VA</p> | |
| <p>02</p> | <p>Internal operating system of the wind generator equipped with an Aerogenerator</p> <p>The device allows the use, inside, of an external wind generator on which the blades have been removed. Controlled by an asynchronous electric motor with continuously variable speed directly coupled to the wind generator to simulate the action of the wind. The change of the motor speed is carried out by a speed variator through a local potentiometer or by PC.</p> <p>The device is powered by the test bench item N ° 1 (Wind generator) or by the electrical network.</p> <p>The proposed equipment includes:</p> <ul style="list-style-type: none"> • Asynchronous electric motor for actuating the wind turbine for use in a closed place; • Coupling joint between electric motor and wind turbine; • Variator for regulating the number of revolutions of the electric motor; • Table support for the electric motor, the speed controller and the wind generator. The generator blades must be removed for use of the internal system; • Safety device: emergency push button; <p>By experimentally detecting the power generated by the turbine, we can go back to the corresponding value of the rpm of the turbine and, consequently, to the approximate wind speed using the graphs supplied with the equipment. The frequency control at the output of the drive is carried out continuously between 0 and the maximum value, via the potentiometer incorporated in the equipment or the possibility of detecting and modifying the frequency at the drive output deported with a computer.</p> | <p>01</p> |

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| 03 | <p>Digital signal processing card - Compact prototyping unit with connection Panel</p> <p>Card based on digital signal processor for applied engineering and control.</p> <p>Compact all-in-one development system for laboratory purposes.</p> <p>Advanced control educational kit.</p> <p>MicroLabBox consisting of DS1104, with interface PCI Express host interface.</p> <p>Processor: MPC8240 with PPC 603e processor</p> <p>Flash memory: 8 MB SDRAM</p> <p>Global memory: 32 MB SDRAM</p> <p>Processor frequency: 250 MHz</p> <p>20 analogy inputs (Resolution: 16 bits, input voltage = ± 10 V)</p> <p>08 analogy outputs (Resolution: 16 bit, input voltage = ± 10 V)</p> <p>Digital input / output: 32 bit parallel I / O</p> <p>06 inputs for digital incremental encoder</p> <p>01 input for analog incremental encoder</p> <p>Connection panel with LED</p> <p>Development software:</p> <p>CDP Control Development Software Package</p> <p>Microtec C Cross Compiler</p> | 01 |
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Technical Specifications requested see Annex 4

TECHNICAL CHARACTERISTICS

Annex 4 : Technical Specifications requested / Technical Specifications proposed

| Item | Minimum technical specifications requested | Qty | Technical Specifications proposed |
|------|---|-----|-----------------------------------|
| 01 | <p>Test bench: Wind generator with energy storage.</p> <p>General characteristics of the wind generator:</p> <ul style="list-style-type: none"> • Ease of installation and lightness of the complete generator + mast equipment • Blades in composite materials • Aluminum structure highly resistant to corrosion • Support for the propeller-generator coupling • Rotor diameter around 1.2 m – Weight around 6 kg • Start of electrical energy production at wind speed about 3 m / s (+ 10 %); at the speed of ~ 12.5 m / sec power output 400 W • Brushless type alternator • Internal charge regulator adaptable externally to any type of battery • Electronic adjustment system for controlling the voltage as a function of the rotor speed and the state of battery charge • Output voltage: 12 Vdc • Anemometric probe for the transmission of the wind speed and direction value to the control and supervision panel <p>Characteristics of the control and supervision panel:</p> <ul style="list-style-type: none"> • 1 DC voltmeter; 1 DC ammeter <p>Battery specifications:</p> <ul style="list-style-type: none"> • Nominal voltage: 12 Vdc • Capacity: 120 Ah <p>Characteristics of the inverter:</p> <ul style="list-style-type: none"> • continuous output power: 600 W • peak output power: 1500 W • input voltage: 12 Vdc (11 - 15 V) • output voltage: 230 Vac - 50 Hz | 01 | |

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| <ul style="list-style-type: none"> • output waveform: modified sine wave • stop for low battery charge • protection against input overvoltages • overload protection • short circuit protection • over temperature protection <p>Characteristics of the AC measurement system:</p> <ul style="list-style-type: none"> • Measurement and display of the following electrical parameters: voltage, current, active power, power factor, instantaneous and average powers, energy (supplied or absorbed), measurements in single-phase systems • 2 I / O for RS485 network • 1 conversion unit for Personal Computer: RS485 / RS232 <p>Characteristics of electrical users:</p> <ul style="list-style-type: none"> • Panel with 5 lamps of 220 V - 40 W, with insertion switches <p>Power supply: 230 Vac 50 Hz single phase - 100 VA</p> <p>Acquisition system:</p> <p>Thanks to the data acquisition and supervision system, with the use of the microcomputer, it is possible to acquire and then elaborate the characteristic parameters of the wind generator and in this way we can monitor the operation of the installation. In particular, we can:</p> <ul style="list-style-type: none"> • Display the instantaneous power at the generator output, at the output / input of the storage battery, at the input of the converter, the theoretical and effective wind energy conversion efficiency, the speed and the direction the wind • Define the altitude and temperature of the place where the wind turbine is installed • Visualize in graphical form the evolution as a function of time of the power generated by the wind turbine, of the power stored or supplied by the battery, of the power which supplies the converter • Check the dependence of the power produced by the wind turbine generator on the altitude and temperature of its installation location <p>Visualize in graphical form the evolution as a function of time of the wind speed expressed</p> | |
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| | <p>in m / s or in mph;</p> <ul style="list-style-type: none"> • Construct by points the characteristic curve of the wind generator generated power - wind speed and keep the acquired data to execute successive analysis • Construct by points the characteristic curve of the wind turbine generator - wind speed and keep the acquired data for successive analysis | | |
| 02 | <p>Internal operating system of the wind generator equipped with an aerogenerator.</p> <p>The device allows the use, inside, of an external wind generator on which the blades have been removed. Controlled by an asynchronous electric motor with continuously variable speed directly coupled to the wind generator to simulate the action of the wind.</p> <p>The change of the motor speed is carried out by a speed variator through a local potentiometer or by PC.</p> <p>The device is powered by the test bench item N ° 1 (Wind generator) or by the electrical network.</p> <ul style="list-style-type: none"> • Characteristics of three-phase asynchronous electric motor <ul style="list-style-type: none"> ➤ Output power minimum: 1.8 kW ; ➤ minimum Nominal speed: 1500 rpm; • Inverter specifications <ul style="list-style-type: none"> ➤ Applicable motor: 2.2 kW; ➤ Frequency at nominal output: 0 ÷ 50 Hz. | 01 | |
| 03 | <p>Digital signal processing card - Compact prototyping unit with connection Panel</p> <p>Card based on Digital Signal Processor for applied engineering and control</p> <p>Card based on digital signal processor for applied engineering and control.</p> <p>Compact all-in-one development system for laboratory purposes.</p> <p>Advanced control educational kit.</p> <p>MicroLabBox consisting of DS1104, with interface PCI Express host interface.</p> <p>Processor : MPC8240 with PPC 603e processor</p> <p>Flash memory : 8 MB SDRAM</p> <p>Global memory : 32 MB SDRAM</p> | 01 | |

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| | <p>Processor frequency : 250 MHz</p> <p>20 analog inputs (Resolution: 16 bits, input voltage = ± 10 V)</p> <p>08 analog outputs (Resolution: 16 bit, input voltage = ± 10 V)</p> <p>Digital input / output: 32 bit parallel I / O</p> <p>06 inputs for digital incremental encoder</p> <p>01 input for analog incremental encoder</p> <p>Connection panel with LED</p> <p>Development software: CDP Control Development Software Package Microtec C Cross Compiler.</p> | | |
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All the parts should be compatible with each other.

Annex 5

University of Sfax

BORDER PRICES

Acquisition of "Electrical engineering equipment (Wind Energy) within the framework of the project: WESET Erasmus

Social reason :.....

Tax identification number :.....

| N° | Elements | Quantity | Country of Origin | U.P.E.T.* | Total E.T. * |
|--------------|---|-----------------|--------------------------|------------------|---------------------|
| 1 | Test bench: Wind generator with energy storage. | 01 | | | |
| 2 | Internal operating system of the wind generator equipped with an aerogenerator. | 01 | | | |
| 3 | Digital signal processing card - Compact prototyping unit with connection Panel | 01 | | | |
| Total | | | | | |

***Unit Price Excluding Tax (U.P.E.T)**

*** CFR price base (cost and freight) Excluding Tax.**

NB: residents must present their prices in Tunisian Dinars. Non-residents must present their prices in foreign currency (Euros or Dollars).

Total amount in words in Euro

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(Signature and stamp of the tenderer)

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ANNEXES

Annex 01

UNIVERSITY OF SFAX

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Sfax, on.....

SUBMISSION

Subject: Acquisition of equipment in electrical engineering (Wind Energy) on behalf of the project **WESET-Erasmus**

I, the undersigned

Company denomination :

Headquarters (address):

Telephone: Fax:

Tax registration number :

CWB No .:

Certify to have reviewed the specifications, concerning consultation 02/2020 WESET, and have no reservations and have collected, by my own care and under my full responsibility, all information necessary for the perfect execution of my possible obligations as they derive from the various provisions of these specifications for the acquisition of the equipment "electrical engineering (Wind Energy), within the framework of the **Weset-Erasmus** project, for the University of Sfax", and I pledge on the honor that the information provided above is accurate.

We undertake to provide, in accordance with the technical specifications and specifications, the related supplies and services.

The total amount of my tax-free submission is (in words):

.....

(Signature and stamp of the tenderer)

Annex 02

Declaration of honor of no influence

I, the undersigned:

Chief Executive Officer (CEO) - Manager :

Declares on the honor of not having done and undertakes not to do by myself or by an intermediary, promises, gifts or presents in order to influence the different procedures for concluding a market and the stages of its realization.

Done at: on,

(Name and surname, Quality,
Stamp and signature of the authorized person
to engage the company)

Annex 03

Declaration on honor

I, the undersigned:.....

Chief Executive Officer (CEO) - Manager :

Declare on the honor that I was not a public official at the University of Sfax, having stopped my activity for less than five years.

Done at: on,

(Name and surname, quality, stamp and signature of the person authorized to commit the company)