



TERMS OF REFERENCE

Contract Number: TR2009/0135.01-04-002-AA referred to EuropeAid/135429/DH/ACT/RMD(ENPI)

Tender Title: Design and development of functional unit photovoltaic predictive management and control system, integrated in a web platform.

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1. BACKGROUND INFORMATION

1.1. General information about your project

This project is part of a larger project which aims to promote an increase in energy independence of the Palestinian people through better control over their own natural resources through energy self-sufficient that provide photovoltaic systems for self consumption.

The project of this tender consists of the design and development of functional unit photovoltaic predictive management and control system, integrated in a web platform.

1.2. Contracting Authority

Geomatic sciences, information & communication technologies (ICT) and energy; research, diffusion and innovation society.

Acronym: GEREDIS SOCIETY

2. CONTRACT OBJECTIVES

2.1. Results to be achieved by the service provider

- Recording data of 5 existing photovoltaic plants and storage in a centralized data base.
- Real time monitoring of 5 existing photovoltaic plants and corresponding buildings self consumption.
- Visualization, analysis and management of photovoltaic plants data.
- Fault detection and prediction in early stage.
- Graphical reports of daily, weekly, monthly and yearly production.
- Accuracy calculation of the future energy production, depending on the weather forecasts, the solar radiation, besides the location and state of the plant.
- Allows preventive maintenance of major equipment (photovoltaic modules, inverters, etc.) according to the manufacturer's recommendations and industry standards.
- Technical Failure Alerts by email.



- The web platform includes different user profiles.
- Scalability: Possibility of future growth.

3. SCOPE OF THE WORK

3.1. General

The project consists of the design and development of functional unit photovoltaic predictive management and control system, integrated in a web platform.

3.2. Specific list of activities

3.2.1. Analysis and previous study

Planning, study and definition: variables to be monitored and processed, web interface structure, results to be reached, etc.

3.2.2. Supply and configuration of electric consumption meter

Supply and configuration of 5 units of CIRCUTOR WIBEEE-T-L. This consumption meter is easily fitted (plug and play) in general electric panel. It communicates via WIFI (protocols HTTP, Modbus TCP, XML).

3.2.3. Installation and configuration of real time core tool

The real time core tool will include the following characteristics:

- The real time core tool will be installed in a cloud server and it will allow to store photovoltaic plants data in a centralized database. The cost and maintenance of the server shall be provided for by the company during the first 3 years (until December 2019).
- It will use high data compression and will work in signal domain, allowing advanced mathematical processing.
- The number of signals (tags) will be 1000 tags. With the possibility of increasing to 20000 in the future.
- In order to communicate with the photovoltaic systems and with electric meter (section 3.2.3) it will have communication driver based on one of the following protocols: HTTP or Modbus TCP/UDP.

The tasks associated to this section are:

- Installation of the software tool.
- Configuration of communication interface in order to access each of the photovoltaic plants.
- Tags creation and configuration.



- Startup the system and checking of correct operation.

3.2.4. Design and implementation of web interface and functionalities

The web platform will contain the following sections:

- Plant data monitoring and analysis

This module shows the different production and state parameters of the plant in real time, i.e. the electrical characteristics of PV system, the radiation sensor and temperature sensor.

- Real production displaying and future prediction

This module allows the user to know the present plant production in addition to calculate the expected future production at the same time, considering the behaviour of each photovoltaic system depending on its status and the expected weather patterns in the area where the plant is located.

- Alarms and maintenance

This module shows the alarms of each of the solar inverters. In addition, based on real time data analysis, it shows faults which usually remain hidden by traditional maintenance, reducing operating and maintenance costs and increasing the efficiency power production. The customers will receive the alarms by e-mail.

- Graphic representation of efficiency data

This module represents graphically the photovoltaic plant efficiency and the causes that make go downs the efficiency.

- Monetization and self consumption

This module, using graphics and tables, shows the energy fed into de grid (by de photovoltaic plant) and the energy consumed by the building, so the customer knows in real time the money he is earning and the money saved by self consumption. It compares the real values with the expected, so that the customer will be able to know in real time the economic impact of the equipment breakdowns and fails.

- Histogram

This module shows the histogram with the state along the time of each inverter and photovoltaic string. So we can see when these elements were in production, in scheduled shutdowns, in faults, etc.

3.2.5. User guide

User guide of the web platform, including description of functionalities and instructions for use.



3.3. Outputs

The outputs of this project have been specified in section 3.2 (specific list of activities).

4. LOGISTICS AND TIMING

4.1. Location where the service should be provided

Tubas (Palestine)

4.2. Commencement date & Period of execution

The intended commencement date is 01/07/2016 and the period of execution of the contract will be **6 months** from this date.

5. REQUIREMENTS

5.1. Personnel

It's required 5 years of experience of the contractor in real time projects.

Also, the company will have to provide from its workforce the following key expert:

- Key expert 1: A minimum of 1 computer Engineer with demonstrated experience in real time projects.

6. MANAGEMENT / SUPERVISION AND FINAL APPROVAL

6.1. Supervisor

The contractor shall follow the instruction of the provided specifications of the person in charge of Geredis who will supervise the execution of the services.

6.2. Visibility

All materials published and/or used during the meetings, presentations etc. should respect the visibility rules. Cooperation logo should be used for all visibility actions.

6.3. Disclaimer

All materials published should include a disclaimer by the following text:

*"This publication has been produced with the assistance of the European Union. The contents of this publication are the sole responsibility of **GEREDIS SOCIETY** and can in no way be taken to reflect the views of the European Union."* Special requirements or conditions.



6.4. Special requirements or conditions: Guarantee

- 5% tender guarantee: Tenderer must attach to the offer a bank guarantee of 5% of the total tender amount. This 5% guarantee will be valid for 90 days.
- 10% performance guarantee: The successful supplier must provide a bank guarantee of 10% of the total tender amount.

GEREDIS SOCIETY

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Valencia, 2 May 2016

