



**HELLENIC ELECTRICITY DISTRIBUTION NETWORK OPERATOR S.A.**

NOTICE OF CALL FOR TENDERS No ND-207

**PROJECT: "Pilot Telemetry and Management System for the Electric Power Supply Demand by Residential and Small Commercial Consumers and Implementation of Smart Grids"**

**TECHNICAL DESCRIPTION OF THE PROJECT**

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## **1. PROJECT DESCRIPTION**

### **"Pilot Telemetry and Management System for the Electric Power Supply Demand by Residential and Small Commercial Consumers and Implementation of Smart Grids"**

#### **1.1 Introduction**

The purpose of electronic smart meters is to provide information related to the energy consumption of each consumer. These meters shall change the consumers' energy consumption habits in the short term, and shall also provide an important step towards the creation of Smart Grids in the future. This particular technology shall help consumers to save money from their electricity bills and contribute to the reduction of carbon dioxide emissions. For the consumers, the estimated bills shall no longer be issued. Therefore, the consumers themselves shall be able to manage their consumption (and the energy cost) more efficiently and it will become easier for them to select and switch between different energy suppliers. On the other hand, the energy suppliers shall be able to offer a wider range of reduced-cost packages - including the supply of energy during off-peak hours.

Smart meters and the technological field of telemetry play together an important role in regards to the reduction of consumed energy, as well as the reduction of emissions of carbon dioxide. They also improve the quality, accuracy and range of services provided by energy suppliers. In the long term, telemetry will become a very important factor for the creation of smart energy grids.

One of the main tools used for implementation of the open energy market is the Metering Device combined with the related recording and data acquisition equipment, which constitute an integral part of the Advanced Meter Infrastructure (AMI) system as well as the Meter Data Management (MDM) system.

An integral part of the proposed metering solution shall be the Telecommunications and IT Systems used for acquisition of meter data. AMI/MDM systems will include interfacing with 3<sup>rd</sup> party systems.

#### **1.2 Legal Framework**

The legal framework, which is in place in Greece and according to which the Greek Electricity Market functions, is the following:

- L.2773/GG.286/22.12.1999 (LIBERIZATION OF THE ELECTRICITY MARKET - REGULATION OF ENERGY POLICY ISSUES AND OTHER PROVISIONS)
- M.D.D5/B/F1/oik.8988 (GG B' 623/25-5-01): "Approval of the Power Exchange Code for Electricity" (Chapters A' - Meters, G' - Measured Quantities)
- M.D.D5/B/F1/8989 (G.G. B' 654/30-5-01): "Approval of the Grid Control Code for Electricity" (Chapter F' - Measurements)
- L.3175/GG.207/29.8.2003(DEVELOPMENT OF THE GEOTHERMAL POTENTIAL, DISTRICT HEATING AND OTHER PROVISIONS)
- M.D.D5/B/F5/oik.8311/9.5.2005 (GG.655/B/15.5.2005): "Approval of the Grid Control and Power Exchange Code for Electricity".

- Meter Readings Management and Grid Providers Periodic Settlement Manual (RAE Decision No. 182/2013)
- Code of Management of the Non-Interconnected Islands (RAE Decision No. 39 / 2014)
- L. 3855 - Measures to improve energy end-use efficiency and energy services. (With the provisions of the present law, Greek legislation is harmonized with Directive 2006/32/EC of the European Parliament and of the Council, of 5 April 2006, "on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC").
- Member states are to ensure that billing for electricity consumption is based on the actual consumption and that it is performed frequently enough to enable consumers to regulate their own energy consumption (2006/32/EC).
- Member states are to implement "smart" electricity metering systems by 2022 (80% implementation should be achieved by 2020).

### **1.3 Scope**

HEDNO plans to implement, as a primary objective, a Pilot Program for the installation, testing and operation of at least 170,000 meters in selected geographical areas of the distribution network, which will enable the documentation, on a technical and economic basis, of the selection of an appropriate combination of Meter, Telecommunication and Metering Data Collection and Processing Center technologies. A secondary objective of this Program is to ensure that the data from the meter network can be utilized by other internal systems within HEDNO. Utilization of data from the meter network shall be made without operational penalty to any interconnected system or the meter network itself.

The geographical areas at which the pilot program will be implemented and where all existing meters of categories No 0,1,2,3,4 will be replaced, are as follows:

- Xanthi Prefecture
- Lesvos Prefecture (Lesvos Island, Limnos Island, Ag. Efstratios Island)
- Lefkada Prefecture

Additionally, in the following areas will be selectively replaced existing meters of categories No 0,1,2,3,4 aiming the representativeness of the project.

- Athens
- Thessaloniki

As an option, it is possible to be replaced with smart meters, all existing meters of categories No 0,1,2,3,4, in the following islands:

- Thira Island
- Kythnos Island
- Milos Island

In the following Table, an indicative number of the meters to be replaced is presented.

<b>Geographical Area</b>	<b>Region or Prefecture / Local Authority</b>	<b>Number of LV Meters</b>
East Macedonia - Thrace	Xanthi Prefecture	~60,000
North Aegean	Lesvos Prefecture (Lesvos island, Limnos island, Agios Efstratios island)	~80,000
Ionio islands	Lefkada Prefecture	~20,000
Athens	Attica	~7,000
Thessaloniki	Central Macedonia	~3,000
	<b>Total</b>	<b>~170,000</b>
		Option
Cyclades	Thira Island	~17,000
	Kythnos Island	~3,000
	Milos Island	~10,000
	<b>Total</b>	<b>~30,000</b>

The communication technologies (PLC,GPRS) must be implemented in a minimum of 20% percentage of the total number of the pilot project meters (20% at least PLC and at least 20% GPRS in every geographical area). The contractor is free to select PLC or GPRS technology for the rest 60% percentage.

The contractor will implement site surveys in order to evaluate existing infrastructure that can be utilized (dark fiber, dark cable), as well as radio frequency coverage studies (GSM/GPRS/2G/3G).

Systems already in place, or intended for implementation in HEDNO, will interface with the MDM system. Consequently, data must be available for these systems on an ad-hoc basis and acquiring this data shall have no significant operational impact on the performance of the MDMS to complete its tasks. Such systems, which will interface with the MDMS using APIs, are the following:

- Information System HERMES as well its successor system: Communication will take place in predefined time slots every day. Specific data for this interface can be found in the Annex of this issue.
- AMR: Existing AMR system of HEDNO utilizes the telemetering of 60,000 major LV customers. This AMR system is of type ZFA-F by ITF-EDV Fröschl meters that are part of the HEDNO AMR system. These meters are not part of the present pilot project, but the data they produce is to be interfaced with the MDMS of the pilot project. Load data from these meters must be exported to the MDMS from the AMR system at least once a day.
- SCADA-DMS: SCADA-DMS system operates in real-time and shall receive periodic measurements from specialized meters that will be installed by the Contractor in the LV side of MV/LV distribution substations for the execution of various functions. The SCADA-DMS system is based on the SCATEX+ software by EFACEC, and the communication protocol used is IEC 101 for the North Aegean islands and soon for Athens area as well. Another SCADA

system (SPECTRUM by SIEMENS) is going to be implemented in Macedonia area.

- GIS. (Geographical Information System): Data transfer (site coordinates, customer ID, energy supply number, etc.) between MDM and GIS will take place in an Oracle Spatial system, at regular intervals.

Contractor must include in his offer, the development of special interfaces using XML Web services for the interconnection of the aforementioned applications.

Contractor shall develop a consumer web portal, which shall permit consumers to access both their current and historical consumption data.

Along with the consumer web portal, a consumer mobile platform will be implemented, permitting consumers to be informed about their consumption data.

The Pilot Project aims at expanding the existing infrastructure and creating the necessary new infrastructure and organization in order to achieve:

- Effective and reliable acquisition, processing, management and storage of metering data from customers and Distribution Network users in general.
- Provision of access to such information to any legally eligible parties.

#### **1.4 Implementation**

The under procurement Telemetry center shall, at this stage, be able to support **at least 300,000** independent metering points.

At this stage and in the scope of this project, the metering points to be included in the Main System shall be approximately 140,000 single phase and 30,000 three phase metering points. Indicative data about the number of metering points, number of substations, as well as representative substations for each category of population density for all the geographical areas are provided in this issue's Annex.

For the geographical area of Cyclades (Kythnos, Milos and Thira islands), the metering points to be integrated in the system shall be approximately 20,000 single phase and 10,000 three phase metering points. The total number of MV/LV substations in this area shall be approximately 300.

For the installation of the AMI/MDM systems, all appropriate rooms have been foreseen.

The operation of the systems shall be undertaken by the contractor under HEDNO's supervision, and shall include repair of any faults in the installed metering and communication equipment.

Throughout the project, complete data shall be recorded in order to enable statistical processing of the number and type of faults. Such data shall be made available to HEDNO at any time. It shall be possible to include HEDNO's staff in the operation of the center, for training purposes and familiarization with the operating procedures.

Following the final acceptance of the project, the Contractor shall be assigned with the operation of the AMI/MDM systems, using Contractor's personnel, for the next five (5) years (with option for five-year extension), which shall include repairing of any faults/malfunctions of the installed metering and communications equipment.

In addition to the operation of the AMI/MDM systems, the Contractor will be responsible for monitoring access security as well as data transfer safety.

The provision of services for operation, technical support, system maintenance and fault repairing for the overall metering and communication equipment by the Contractor shall be performed using procedures fully documented in manuals provided by the Contractor and approved by HEDNO.

At Corporation's discretion, HEDNO's personnel shall participate in such services for purposes of continuous training and familiarization with such procedures.

The Main System shall also include a Backup System (with same capacity), which shall be installed in a different area and shall be kept in "hot stand-by" status against the Main System. Both systems shall be installed in the region of Attica. The Backup System shall include all the capabilities of the main system, having the ability of full operation within 1 hour after the transition command, in case of a failover.

It is further clarified that this Backup System is NOT to be confused with the MDM "mirror" database. The MDM mirror serves the purpose of ensuring that there is no performance impact on the AMI/MDM system, as additional, external or 3<sup>rd</sup> party systems are interfaced with the "mirror" MDM.

However, for the critical functions, both systems must be synchronized, so that critical functions are successfully achieved without duplicate events and each system reflects the status of the completed function.

## **1.5 Work Schedule**

Tenderer shall submit a work plan, and meeting schedule, which must satisfy with respect to the timetable requirements, the time frame for the completion of the Project.

According to the Indicative Project Schedule, this time frame is 24 months. This schedule shall include the main parts of the Project and their duration (study, equipment supply, implementation and operation).

The Contractor is required to submit a detailed work plan within 15 days following the date of signing of the Contract in consultation with the Supervising Department.

This schedule shall completely, clearly, and accurately cover all categories and phases of the works to be performed by the Contractor in order to ensure timely construction and delivery of a well-constructed and fully operational System to the Corporation.

The overall detailed project implementation schedule shall be approved by the Supervising Department within five (5) days, while in case of conflict, the Contractor shall be informed in writing. The schedule to be submitted for approval is required to include a provision for implementing, in the first phase, within a maximum of nine (9) months from the effective date of the Contract, the installation and operation of the main and backup AMI/MDM System, as well as 10,000 meters' installation and integration. The replacement and integration in the System of the next 160,000 meters and communication media (modems) of the metering points at the selected geographical areas must have been completed within 15 additional months after the first phase completion.

The Contractor is required to regularly submit the next month schedule for approval to the Supervising Department, at least one week prior to the month for which the

schedule is made. Commencement of the works shall not begin prior to such approval.

### **1.6 List of Metering Points**

HEDNO shall provide, following written request from the Contractor and within five (5) calendar days, a detailed list of all Metering Points, in electronic format for ease of analysis and data integration, which shall include the following:

1. Name of Customer - Metering point
2. Address (City, Prefecture, etc.).
3. Contact telephone (if available).
4. Type and number (standardized size)of supply.
5. Any other information available to HEDNO.

The above information shall be delivered to the Contractor after signing a Confidentiality Statement for the information being made available to the Contractor for the purpose of project implementation, and after the Contractor expressly agrees that upon completion of the project all such information in the Contractor possession shall be destroyed.

### **1.7 Works in customer's premises**

The Contractor is required to perform in due time all necessary steps towards the customer representatives, for notification and planning of any works required for replacement and integration in the communications system of customer's metering device.

It is clarified that the Contractor shall proceed to all of the above actions with the Contractor's resources and at the Contractor's expenses (HEDNO is only responsible for approval of the required documents) and will not, therefore, be entitled to receive any special remuneration since the relevant costs are included in the prices of the services offered.

Prior to the commencement of the works, HEDNO shall send, a notification letter to the Customers, regarding the project implementation and the details for contacting the Contractor.

Contractor is required to set up and operate an appropriate help desk, which shall provide information about the project and shall facilitate work arrangements for the implementation time of the relevant works in each customer premises (telephone appointment, door-tag reminders, etc.). Moreover, the Contractor's personnel must have the technical skills to provide technical support to the consumers about any problems that may arise spanning from the installation of electronic meters to simple questions related to meters and in-home displays. Help desk will be responsible for the coordination of the Contractor's crews for the repairing of any faults. The average customer's waiting time should not exceed one minute. Help Desk response and performance shall be documented and made available to HEDNO via a website.

Help desk shall provide informative material to HEDNO for posting on the website including the aforementioned response and performance statistics as well as general information regarding the project and its benefits and technical information, such as the areas where installations are planned, manuals for in-home customer equipment, and procedures for customer inquiry.



The Contractor and subcontractors crews who shall perform works on the customers metering devices, will participate in a five (5) day training in PPC school, expense of the Contractor, before the field works start. The Contractor's crews, who shall perform works on the customers metering devices, may be accompanied by authorized HEDNO's staff at the discretion of the latter. For this purpose, the Contractor is required to notify HEDNO in writing about the daily works schedule, at least two working days in advance.

### **1.8 Operating requirements of the Pilot Program**

The requirements of the AMI/ AMD system include the following features:

- Daily metering data reading (registers, 15 min. load profiles)
- Special metering data readings
- Remote disconnection and reconnection
- Power Limitation
- In-home displays providing information to consumers
- Capability to integrate multi-zones tariffs
- Tamper alert and associated meter events
- Meter data management
- Ability to export consumption data for consumers/producers/suppliers/market bodies
- Remote configuration of meters
- Remote update of billing periods
- Time synchronization
- Remote update of meter/communication firmware
- Operational and network management capability for day-to-day operations and maintenance
- Communications, operations and reporting activities by specified meter groups

### **1.9 Architecture of the AMI/MDM Pilot System**

The architecture of the AMI/MDM systems is related to the network topology, i.e. the meter interconnection methods and the methods for transferring metering data and other orders from and to the meters. The system's architecture will be formed in such a way so as to implement modern telecommunication technologies for telemetering, taking into account the network structure and the meter density related to urban, suburban and rural areas.

In the Pilot Project the following communication technologies will be tested:

- PLC (Power Line Carrier) communication technology through distribution lines and appropriate concentrators installed at each MV/LV substation.
- GPRS (General Packet Radio Services) communication, including 2G/3G technologies through mobile.

It is clarified that it is acceptable to offer the same meter type for the different tested communication technologies.

Existing meters will be dismantled simultaneously with the installation of the new meters. The meters should come from at least two different manufacturers for each offered meter kind single phase (1P) or three phase (3P) with a minimum amount of meters / manufacturer 20%.

Interoperability and interchangeability between all meter types must be ensured. Interoperability is "the ability of a system to exchange data with other systems of different manufacturers, as they are defined in article 3 of the INVITATION issue". Interchangeability is "the ability to replace a meter/communication device with another, of different manufacturer, as it is defined in article 3 of the INVITATION issue, without loss of the original functionality and without malfunction or loss of efficiency for the whole system".

For each of the aforementioned technologies, the system architecture shall include all the necessary communication media (modems, concentrators), as well as the metering data acquisition and management system.

The offer shall include all the costs for the communication links between the AMI/MDM systems and all the metering points, as well as the communication links between the primary and the backup system.

Requests for access to data of the MDM system shall have no significant or measurable impact on the normal operations of the MDM system.

It is further clarified that the Pilot Project utilize a local MDM "mirror" database that is updated in real time so that data requests do not adversely impact the scheduling or performance of the primary MDM database. This MDM mirror database shall be updated/ synchronized with the primary MDM database at least once per minute so that data can be used by other authorized systems.

The system architecture shall also feature:

- 30,000 devices (In Home Displays - IHDs) capable of displaying energy data (minimally kWh) in real time, every 30 seconds or more often..
- A consumer web portal that permits customers to access consumption/production data that is sourced from the MDM mirror database.
- A consumer mobile platform that permits customers to access consumption/production data that is sourced from the MDM mirror database.
- Support for communication via mobile infrastructure, including bidirectional texting capabilities.
- It is further clarified that HEDNO will approve the proposed technical functionalities for the development/implementation of the consumer web portal and the consumer mobile platform.

The Contractor shall submit in his offer, a plan with respect to the proposed technology as dictated by topography, network capability, meter density, and communication methodology. The Contractor, after contract award, shall review and update the initial plan using detailed data from site surveys, where required, to improve the initial design plan. Evaluation of the original design and any suggested modifications shall be reviewed and approved by HEDNO prior to any further works.

The Contractor shall meet performance metrics as they relate to a service level agreement as further referred in the Special Terms issue.

### **1.10 Communication protocols**

The system must be compatible with standards approved by CENELEC or/and emerging standards that CENELEC/TC13 committee is currently evaluating (Meters & More, Prime, G3-PLC, CX-1, OSGP).

In physical layer, any technology is accepted, under the condition that service level agreements, as referred in the tender, are satisfied. A minimum communication speed of 4.8 Kbits/sec is required. All communication technologies (GPRS, Multicarrier, S-FSK, B-PSK, etc.) are accepted.

In data link layer any kind of technology is accepted (included among others, TCP/UDP IP and 1334-LLC).

In application layer, total compatibility with COSEM-OBIS/DLMS standard is required.

All above must be documented by compliance certification according the DLMS User Association procedure.

(<http://www.dlms.com/conformance/certificationprocess/index.html>)

The required minimum speed of 4.8 kbits/s must be certified by a certified laboratory according ISO / IEC 17025.

For meters which are directly communicating with the head-end through a Telecommunications Company (Telco) wireless infrastructure, communications shall utilize the fastest backhaul capability available. As new coverage capabilities are expanded to areas, meters shall automatically take advantage of the availability of faster communication links without having to be manually reconfigured.

The system shall provide network analysis capability that allows for end-to-end status analysis, overall link speeds between arbitrary points, and management of the communication-meter network.

In addition to the above and in the sense of pilot assessment of recent technological solutions, testing application of other communication protocols may be suggested by the Contractor or may be requested by HEDNO, and with the consent of both parties, the protocol assessment could be applied in part or in whole of the islands of the option (Thera island, Kythnos island, Milos island). For the remainder, the provisions of the invitation will apply, without any additional financial requirement.

### **1.11 Project Implementation Phases.**

The Contractor is required to provide for the timely procurement and delivery to the Contractor warehouses all required System equipment, and all required metering and communication equipment to be installed at the metering points.

For each delivery, the Supervising Department shall be notified in written form in order to perform the required material quality acceptance tests as specified in the HEDNO technical description for the material in question.

The Contractor is solely responsible to certify the successful integration of each metering point into the System.

During A phase of implementation, the Contractor, shall perform the following tasks:

1. Study of the consequences of the smart meter technologies under implementation, telemetering systems and smart grid to the consumers personal data.
2. End-to-end system design.
3. Set up / preparation of the areas indicated by HEDNO (installation of air conditioning - firefighting - security system - UPS etc.) for installation of the Main and backup systems.
4. Radio-frequency studies for GSM/GPRS/2G/3G coverage.
5. Surveys of communication infrastructure available for leasing (dark fiber, dark cable).
6. Installation of H/W-S/W of the Main AMI/MDM Central system systems.
7. Arrangement of all issues regarding the correct data transfer to the responsible bodies.
8. Replacement of at least 10,000 meters and integration in the systems AMI/MDM.
9. Upon completion of the above, the main central system's qualitative and quantitative acceptance shall be performed as referred in detail in the Special Terms issue.
10. Installation and integration in the system of at least ~~100~~ 500 in home displays.

Following completion of the above works, the installation and operation start of the backup central system will be performed, which will be completed within three months with its acceptance, while in parallel, meter replacement and integration into the AMI/MDM system shall continue.

The Contractor is required to enter the data concerning any dismantled meter and the data for any new meter in HEDNO's "HERMES" IT system or any successor system.

Invoicing for the replacement works and the material, shall be carried out following verification of such works by engineers authorized by HEDNO as well as the registration of each metering point in the AMI/MDM system that will be developed by the Contractor.

The project shall also include the installation of meters connected through current transformers to every Distribution sub-station of the selected areas of the project, using current transformers of the appropriate ratio.

The project shall also include surge protection of electronic telemetering equipment installed in every distribution substation of the selected project areas.

For this reason, all electronic equipment installed in the substations, must include an over-voltage protection system, suitable for three phase TN & or TT systems depending on the installation area.

The protection system elements must be of the Metal Oxide Varistor type or equivalent, class I, capable of withstanding a direct lightning strike with intensity 12.5 kA (10/350  $\mu$ s) per phase according to IEC 61643-11.

The protection system should be certified compliant with the above characteristics by an independent body (i.e. KEMA, VDE, TUV, etc.) according to the latest edition of IEC 61643-11 standard for TN & or TT systems depending on the installation area. The certificates should be submitted with the bid. In case of failure of the protection system should not cause explosion, ignition or emission of smoke, even if

exposed to lightning currents greater than the requirements of the protection device **up to the maximum defined by the relevant international standards.**

Compliance with the proper storage conditions of the project's materials (humidity, temperature, water-tightness of storage areas, security guard, etc.) is responsibility of the Contractor.

HEDNO has the right to inspect the storage conditions following oral or written request to the Contractor.

For project implementation, following tasks are also included:

- 1) Procurement and storage of the equipment for the main system, in Contractor's warehouse.
  - 2) Preparation of installation location for servers, control room, and associated support infrastructure (power, HVAC, backup power systems, etc.)
  - 3) Installation and Programming of the main system (and of the backup system) in the areas provided by HEDNO, and testing of the operation of both systems.
  - 4) Procurement - inspection - certification and storage of meters and modems in contractor's warehouse.
  - 5) Removal of the existing meter, installation of the new meter and the communication medium in the metering device to enable its successful integration into the system.
- Meters installed in the same location can communicate with the central system using a common GPRS communication device and appropriate connection between them (i.e. RS485).**
- 6) Sealing of metering points using proper seals as described in detail in the special tender issue.
  - 7) Integration of the metering point in the AMI/MDM Systems
  - 8) Delivery of dismantled materials to HEDNO warehouses.

### **1.12 Metering points sealing**

For external physical security, installation of meter seals is required. Meter seals should be able to be easily validated concerning unauthorized substitution or any form of tampering upon inspection, which can occur at any time. To achieve this, Contractor must suggest a methodology to validate any violation or modification to the meter seal, indicatively:

1. Upon installation and successful testing, the installer seals the meter (terminal cover) and the meter cover with bar-coded seals, which he reads using a special hand-held device.
2. The hand-held device, now containing the meter bar code and meter seals bar code, immediately transmits this data or stores and later transmits the meter/seal information to the MDM, which shall be able to perform basic asset tracking.
3. When authorized personnel revisit the meter, meter and seal codes are scanned and compared to the previous scan data. A comparison of the current scan to the previous scan will establish whether the seal is valid.

More details are described in the relevant tender issue.

## **2. TECHNICAL DESCRIPTION**

### **2.1 General**

This technical description covers the design, the preparation of all required operation and construction studies, the supply of all required metering, IT, communication and electromechanical equipment, the installation of such equipment, and finally the acceptance of the operational AMI/MDM system.

According to the following technical description, the technical specifications of the Project and of all partial equipment, the Tenderers are required to submit for evaluation and approval a detailed construction and operation study, communications/meter technology study with site surveys and a complete time schedule for the project.

The Contractor is required to design and construct a complete System, ready for continuous, satisfactory and reliable operation. To this effect, the Contractor is required to make provisions for all parts of the Project and for all required equipment, in every detail, even if no specific references are made for such items herein.

The Contractor is required to submit his complete study according to this technical description, for approval by HEDNO.

Any equipment, procedure or parts not included in this technical description, but is essential for the complete, safe and streamlined operation of the project, shall be included in Contractor's tender.

The Contractor shall ensure physical and operational compatibility of the Project with the existing infrastructures and standards of HEDNO.

The Contractor shall ensure the project implementation provides performance that meets the service level agreements as defined in the contract documents.

### **2.2 System Configuration**

For the utilization and rational operation of the metering infrastructure of HEDNO provision is made for the design, supply, installation and commissioning of an AMI/MDM System in premises owned by HEDNO, which shall be made available for this purpose in distinct locations, for the Main and Backup System.

In particular, the System shall include all required equipment as defined in the Tenderer's study and shall meet the automated meter reading and data management requirements for 300,000 metering points.

All equipment of the main and backup Systems shall be installed in indoor areas with suitable configuration. Inside the building, separate rooms shall be provided for the main IT and communication system and for the system users.

**It is pointed out that the Contractor shall be responsible for the provision of telecommunication services, as well as the solution of any communication problems for the entire AMI/MDM Pilot Project.**

The Contractor shall fully undertake the preparation of the complete study and the construction of the System and shall deliver it to HEDNO S.A. ready for operation ("Turnkey job").

## **2.3 Main parts of the Project**

The following are considered as main parts of the Project:

- Full layout and furnishing of the installation areas (equipment and operator stations):
  - For the main system area, for at least six (6) users and two (2) administrators.
  - For the backup system area, for at least six (6) users and two (2) administrators.
  - Supply, installation and complete commissioning of hardware and software for the main and backup automated meter reading - meter data processing systems.
- Hardware and software for the operation of the consumer web application.
- Hardware and software for the operation of the mobile platform.
- Supply, installation and integration of meters and communication media in the system (including the new metering points), as well as in the consumer web application, the mobile platform and in home displays (IHD).
- Supply, installation and integration of meters connected through current transformers to the MV/LV distribution substations as well as concentrators, where required. For this equipment (meters, concentrators), surge protection system shall be provided.
- Provide a test system (testbed) that replicates the main system capability, in order to allow testing of configurations, software upgrades, communications and equipment.
- Install security and protection systems (firewall, antivirus etc.).
- Provide uninterrupted power supply (UPS) for all AMI/MDM equipment.
- Installation of a secure access control and fire safety system and safety doors for all spaces of the central and backup system.
- Conduct user training
- Adequate lighting, air-conditioning, fire protection and ventilation for each area.
- Projectors, central printers (color laser), scanners, as well as fax machines both for the main and the backup system.
- Provision of telecommunication services in accordance with the requirements of the project from the beginning of the project, as well as for the next five (5) years after final acceptance. The cost of these services will be borne by the Contractor. All costs for telecommunication networks usage must be included in the bid.

The Contractor shall be responsible for any works additional to the aforementioned, which may be necessary for the sound and safe operation of the System.

The parts of the Project shall not include the following:

- The housing space for the equipment, consisting of two rooms of 30 and 40 sq.m. approximately (one for the system and one for the users), and the corresponding room for the backup system.
- Connections of the above areas with public utility networks.
- Telephone lines of the building and telephone appliances required.

## **2.4 Project design**

The bid submitted by each tenderer shall include:

- All required studies, specifications, technical descriptions, drawings and data, with detailed information regarding the design and operation principles for each part of the offered Project Equipment, according to the Tender documents and to the extent required in order for the Tender to be complete.
- Adequate presentation of the project including the proposed general methodology, the system architecture, any specific advantages of the proposed solution, and the individual operations of the proposed system.
- Description of the provided services for each work, of the corresponding methodology and of the proposed Project implementation procedures.
- A detailed description of architectural drawings that includes all proposed system technologies (generalized) including hardware, software, communications, meters, etc.
- Adequate presentation of security approach and overview of physical security (e.g. user access to AMI/MDM systems and associated subsystems; meter security, video monitoring capabilities in control rooms, etc.), information security (e.g. how consumer information is protected), as well as third party access (e.g. use of tokens, one-way firewalls, etc.).
- Adequate presentation of security approach and overview of logical security with all major subsystems of the AMI/MDM system (meter, concentrators, backhaul, MDM, system administration, system operations).
- Adequate presentation of security policy as it conforms to IEC/ISO 27001 series standards.
- Reference to the project implementation teams, the project management method and risk management plan must be stated.

To facilitate Contractor's project planning, indicative data about the number of meters and substations in the implementation areas will be available in the attached Annex.

Given that the method for classification and organization of the acquired and generated information is significantly important, the tenders shall include in detail:

- The methods used to examine data validity and the methodology for replacement, correction, estimation, and validation of any lost or erroneous data.
- The coding method, the data and system update mechanisms, the display of information and the access methods depending on its classification.
- Details regarding the creation of reports by the System. In particular, the standard reports prepared automatically by the System, and their type and



creation frequency shall be defined, as well as the process employed for the preparation of reports by the users according to their needs. Operational and troubleshooting reports which minimize labor requirements should be automatically exported.

- Professional capabilities / skills of the technical staff employed for the execution of the Project.

## **2.5 Offered Equipment and Services**

The Tender's Technical Folder is required to include a detailed description of all offered equipment and provided services.

As a minimum and in accordance with the requirements of the Tender Notice, it is required to:

- Present / describe all hardware and software.
- Describe in detail the methodologies employed for management of the project including a detailed report of control equipment, inventory management, fault monitoring, as well as work force management methods.
- Describe the proposed contingency and risk management plan which shall consider failure or non-performance of a specific technology or technologies as well as vendor inventory shortages
- Present / describe the methodology for contingency and risk management for the whole project.
- Describe in detail the whole system security.

Moreover, a description of the following shall be included:

- User training and user support services throughout project.
- Provision of operation, maintenance, system support and fault repair services for all metering and communication equipment following the final acceptance of the system.

## **2.6 Checks/Tests Procedures.**

The Contractor is required to submit the check and testing procedures for the whole project, as well as any other information required for proper documentation of the equipment to be installed. Such documentation is considered all drawings, technical brochures, presentations and any other technical documentation material.

The Contractor, following the installation of software, is required to deliver a perfectly and entirely checked system, thus establishing that the project fully meets the specification requirements.

To meet this obligation, the Contractor shall apply a methodology for testing IT systems, and shall document the test results. The methodology used by the Contractor shall not be different from the one presented in its tender.

It should be noted that all checks/tests (check/test scenarios) shall be designed under the form of delivery failure (critical-major-minor) and implemented by the Contractor, following approval by the Supervising Department.

The successful performance of the checks/tests is a prerequisite for the commencement of the test run period. Within ten (10) days following the completion of the checks/tests, HEDNO shall consider the results and decide whether the checks were successful, thus enabling the commencement of the test run period.

If the checks/tests are unsuccessful, the Contractor is required to make all necessary improvements in order to repeat the checks. Any resulting delays shall affect the project completion period, with all relevant consequences for the Contractor, as provided in the Contract.

The delivery time for the check/test scenarios shall be shown in the project implementation schedule.

## **2.7 Project documentation**

The Contractor, following the completion of the checks/tests at the system level (A phase), is required to deliver the complete system with full documentation, according to the project specification requirements. The documents shall be classified as technical, operational, supporting, etc., according to the implementation methodology as described in the offer.

Documentation includes the following minimum deliverables:

- Manufacturer manuals (with brief or detailed instructions in both Greek and English languages).
- System operation manuals / instructions in Greek language.
- Support Manuals / Instructions for troubleshooting, fault repair, risk management, in Greek language.
- Manual - Operation rulebook for the system.

### **2.7.1. Administrator and User Training**

Training shall be provided according to the Special Terms and Conditions of the Tender Notice and the project requirements, for the system administrators and users, as well as selected HEDNO personnel, during the whole project and the five (5) years period of maintenance and technical support.

## **2.8 Additional system capabilities**

The system shall include a test environment platform (testbed) for the purpose of running special applications, in an environment different from the one of the Main and Backup Systems.

## **3. TESTS**

### **3.1 General tests**

All hardware to be used by the Contractor for constructing the System, all individual structural and operational parts constituting the System, and the overall System as a complete and self-contained structural and operational block, shall be tested using appropriate tests to demonstrate that all the Tender specifications and requirements are met.

The tests are split into two categories:

- System and operational tests
- Equipment / hardware tests.

The cost of all tests to be performed shall solely burden the Contractor.

The Contractor shall be responsible for performing all necessary tests as soon as possible, so that any subsequently required corrections/rectifications shall not delay the completion of the Project.

### **3.2 System and operational tests**

Within ten (10) days from the Contractor readiness for the implementation of any systems or operational tests, the Contractor is required to submit to HEDNO the final and detailed programs and schedules for such tests. The test schedules shall be accompanied with accurate and clear time schedules regarding the prerequisites / conditions to be ensured by HEDNO for the performance of the tests.

Moreover, they shall include detailed descriptions of the methodology used for each test, the instruments and devices to be used, and the applicable rules.

All tests shall be performed by the Contractor, who is required to provide all instruments and all metering and monitoring equipment required for the performance of the tests. The Contractor is also required to provide all highly experienced personnel required for the performance of the tests.

HEDNO reserves the right to modify any program and schedule submitted by the Contractor within five (5) days from the date they were submitted to HEDNO.

### **3.3 Equipment / Hardware tests**

All offered equipment shall have type test certificates. The results of the tests shall be approved by HEDNO S.A. before loading the equipment for shipment.

All type tests that may be requested, as well as any required series tests for the partial delivery of the equipment, shall be performed in the presence of an authorized inspector engineer of HEDNO unless HEDNO provides written permission for the performance of tests in its absence.

HEDNO reserves the right to request the performance of all provisioned tests according to the relevant EN/IEC regulations.

# **ANNEX A**

## **INTERFACES- HERMES AND TELEMETERING CO-OPERATION**

This Annex chapter is available only in the Greek language.

# **ANNEX B**

## **Informative Data for Substations and Power Supplies**

The allocation of the substations based on the zone number, derived from the distance of the substations from the headquarters of the Distribution Area<sup>1</sup> is shown in the following tables.

### Zones definition

1. In mainland and Crete island, zones are defined as follows:

#### Zone 1 includes:

- Athens-Piraeus conurbation
- Salonika conurbation
- Cities with headquarters of a "Distribution area". City refers to a conurbation and not to municipality limits. For instance, municipality may also include rural areas, while a conurbation may consist of more than one municipality.

#### Zone 2 includes:

- Every area of mainland and Crete, not included in Zone 1 and Zone 3.

#### Zone 3 includes:

- Areas that are more than three hours away from the headquarters of the relevant "Distribution Area".

2. In Greek islands except for Crete, zones are defined as:

#### Zone 1 includes:

- Cities of islands with headquarters of a "Distribution Area".

#### Zone 2 includes:

- Islands that are "Distribution offices".
- Areas outside the city, of islands with headquarters of the "Distribution Area".

#### Zone 3 includes:

- Islands that are "Distribution branch offices".

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<sup>1</sup> Organization of the Greek Distribution network: 5 Regional Departments, 58 areas, 78 Offices, 87 Branch offices.

### Examples:

- Regional Department: Macedonia-Thrace
- Distribution area: Lesvos Prefecture / Headquarters of the Distribution Area are in Mytilini, the biggest city in Lesvos island.
- Distribution office: Limnos island/ Limnos island belongs to Lesvos Distribution area.
- Distribution branch office: Agios Efstratios island

**Area : Xanthi**

<b>Substation (KVA)</b>	<b>Zone</b>			<b>Total</b>	<b>Notes</b>
	<b>1</b>	<b>2</b>	<b>3</b>		
<b>15</b>	0	0	0	0	
<b>25</b>	1	21	4	26	
<b>50</b>	25	631	63	719	
<b>75</b>	2	17	1	20	
<b>100</b>	28	573	25	626	
<b>150</b>	5	21	2	28	
<b>160</b>	24	167	5	196	
<b>250</b>	37	95	3	135	
<b>320</b>	0	0	0	0	2 transformers 160kVA
<b>350</b>	0	1	0	1	2 transformers 250& 100kVA
<b>400</b>	5	10	0	15	
<b>500</b>	0	0	0	0	2 transformers 250kVA
<b>630</b>	68	0	0	68	
<b>800</b>	0	0	0	0	2 transformers 400kVA
<b>1000</b>	4	0	0	4	
<b>1030</b>	0	0	0	0	2 transformers 630&400 kVA
<b>1260</b>	10	0	0	10	2 transformers 630kVA
<b>1630</b>	1	0	0	1	2 transformers 1000& 630kVA
<b>2000</b>	0	1	0	1	2 transformers 1000kVA
-	0	0	0	0	Not registered power
<b>Total</b>	<b>210</b>	<b>1537</b>	<b>103</b>	<b>1850</b>	



**Area: Lesvos - Lesvos Island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	2	0	2	
25	2	45	0	47	
50	10	375	0	385	
75	0	45	0	45	
100	12	258	0	270	
150	5	39	0	44	
160	34	203	0	237	
250	58	131	0	189	
320	0	1	0	1	
350	0	0	0	0	2 transformers 250 KVA & 100kVA
400	37	37	0	74	
500	0	1	0	1	2 transformers of 250kVA
630	3	2	0	5	
800	0	0	0	0	2 transformers of 400kVA
1000	0	1	0	1	
1030	0	1	0	1	2 transformers of 630 kVA & 400 kVA
1260	0	0	0	0	2 transformers of 630kVA
1630	0	0	0	0	2 transformers of 1000 kVA & 630kVA
2000	0	0	0	0	2 transformers of 1000kVA
-	0	2	0	2	Not registered power
<b>Total</b>	<b>161</b>	<b>1143</b>	<b>0</b>	<b>1304</b>	

**Area: Lesvos- Limnos island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	4	0	4	
25	0	10	0	10	
50	6	148	0	154	
75	0	2	0	2	
100	8	81	0	89	
150	0	8	0	8	
160	7	41	0	48	
250	15	37	0	52	
320	0	0	0	0	
350	0	0	0	0	2 transformers 250& 100kVA
400	6	3	0	9	
500	0	0	0	0	2 transformers 250kVA
630	4	0	0	4	
800	0	0	0	0	2 transformers $\Sigma$ 400kVA
1000	0	0	0	0	
1030	0	0	0	0	2 transformers 630&400 kVA
1260	0	0	0	0	2 transformers 630kVA
1630	0	0	0	0	2 transformers 1000& 630kVA
2000	0	0	0	0	2 transformers 1000kVA
-	0	0	0	0	Not registered power
<b>Total</b>	<b>46</b>	<b>334</b>	<b>0</b>	<b>380</b>	

**Area: Lesvos- Agios Efstratios island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	0	0	0	
25	0	0	0	0	
50	4	0	0	4	
75	0	0	0	0	
100	0	0	0	0	
150	0	0	0	0	
160	1	0	0	1	
250	1	0	0	1	
320	0	0	0	0	
350	0	0	0	0	2 transformers 250& 100kVA
400	0	0	0	0	
500	0	0	0	0	2 transformers 250kVA
630	0	0	0	0	
800	0	0	0	0	2 transformers 400kVA
1000	0	0	0	0	
1030	0	0	0	0	2 transformers 630&400 kVA
1260	0	0	0	0	2 transformers 630kVA
1630	0	0	0	0	2 transformers 1000& 630kVA
2000	0	0	0	0	2 transformers 1000kVA
-	0	0	0	0	Not registered power
<b>Total</b>	<b>6</b>	<b>0</b>	<b>0</b>	<b>6</b>	

**Office : Lefkada Prefecture- Lefkada island & Meganisi island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	0	0	0	
25	0	2	0	2	
50	0	94	6	100	
75	0	6	0	6	
100	0	77	3	80	
150	0	4	0	4	
160	0	134	13	147	
250	0	82	3	85	
320	0	0	0	0	2 transformers 160VA
350	0	0	0	0	2 transformers 250& 100kVA
400	0	11	1	12	
500	0	0	0	0	2 transformers 250kVA
630	0	7	0	7	
800	0	0	0	0	2 transformers 400kVA
1000	0	0	0	0	
1030					2 transformers 400& 630kVA
1260	0	0	0	0	2 transformers 630kVA
1630	0	0	0	0	2 transformers 1000& 630kVA
2000					2 transformers 1000kVA
-	0	0	0	0	Not registered power
<b>Total</b>	<b>0</b>	<b>417</b>	<b>26</b>	<b>443</b>	

**Overview Table: Pilot project Substations**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	6	0	6	
25	3	78	4	85	
50	45	1248	69	1362	
75	2	70	1	73	
100	48	989	28	1065	
150	10	72	2	84	
160	66	545	18	629	
250	111	345	6	462	
320	0	1	0	1	2 transformers 160VA
350	0	1	0	1	2 transformers 250& 100kVA
400	48	61	1	110	
500	0	1	0	1	2 transformers 250kVA
630	75	9	0	84	
800	0	0	0	0	2 transformers 400kVA
1000	4	1	0	5	
1030	0	1	0	1	2 transformers 400& 630kVA
1260	10	0	0	10	2 transformers 630kVA
1630	1	0	0	1	2 transformers 1000& 630kVA
2000	0	1	0	1	2 transformers 1000kVA
-	0	2	0	2	Not registered power
<b>Total</b>	<b>424</b>	<b>3433</b>	<b>132</b>	<b>3989</b>	

**Area: Syros- Thira island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	0	0	0	
25	0	2	0	2	
50	0	28	1	29	
75	0	3	0	3	
100	0	50	2	52	
150	0	4	0	4	
160	0	34	3	37	
250	0	59	1	60	
300	0	0	0	0	2 transformers
320	0	0	0	0	2 transformers 160VA
350	0	0	0	0	2 transformers 250& 100kVA
400	0	51	0	51	
500	0	0	0	0	2 transformers 250 kVA
630	0	9	0	9	
800	0	3	0	3	2 transformers 400 kVA
1000	0	1	0	1	
1030	0	0	0	0	2 transformers 400& 630kVA
1260	0	0	0	0	2 transformers 630kVA
1630	0	0	0	0	2 transformers 1000& 630kVA
2000	0	0	0	0	2 transformers 1000kVA
-	0	0	0	0	
<b>Total</b>	<b>0</b>	<b>244</b>	<b>7</b>	<b>251</b>	

**West Cyclades Subsection- Kithnos island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	0	0	0	
25	0	0	0	0	
50	0	5	0	5	
75	0	0	0	0	
100	0	3	0	3	
150	0	0	0	0	
160	0	0	0	0	
250	0	0	0	0	
300	0	0	0	0	2 transformers
320	0	0	0	0	2 transformers 160kVA
350	0	0	0	0	2 transformers 250& 100kVA
400	0	2	0	2	
500	0	0	0	0	2 transformers 250kVA
630	0	0	0	0	
800	0	0	0	0	2 transformers 400kVA
1000	0	0	0	0	
1030	0	0	0	0	2 transformers 630&400 kVA
1260	0	0	0	0	2 transformers 630kVA
1630	0	0	0	0	2 transformers 1000& 630kVA
2000	0	0	0	0	2 transformers 1000kVA
-	0	0	0	0	Not registered power
<b>Total</b>	<b>0</b>	<b>10</b>	<b>0</b>	<b>10</b>	

**West Cyclades Subsection- Milos island**

Substation (KVA)	Zone			Total	Notes
	1	2	3		
15	0	0	0	0	
25	0	1	0	1	
50	0	17	0	17	
75	0	0	0	0	
100	0	3	0	3	
150	0	0	0	0	
160	0	0	0	0	
250	0	0	0	0	
300	0	2	0	2	2 transformers
320	0	0	0	0	2 transformers 160kVA
350	0	0	0	0	2 transformers 250& 100kVA
400	0	0	0	0	
500	0	0	0	0	2 transformers 250kVA
630	0	0	0	0	
800	0	0	0	0	2 transformers 400kVA
1000	0	0	0	0	
1030	0	0	0	0	2 transformers 630&400 kVA
1260	0	0	0	0	2 transformers 630kVA
1630	0	0	0	0	2 transformers 1000& 630kVA
2000	0	0	0	0	2 transformers 1000kVA
-	0	0	0	0	Not registered power
<b>Total</b>	<b>0</b>	<b>23</b>	<b>0</b>	<b>23</b>	



**Overview Table: Substations in Thira, Milos, Kithnos islands**

Substation power (KVA)	Zone			Total	Notes
	1	2	3		
15	0	0	0	0	
25	0	3	0	3	
50	0	50	1	51	
75	0	3	0	3	
100	0	56	2	58	
150	0	4	0	4	
160	0	34	3	37	
250	0	59	1	60	
300	0	2	0	2	2 Μ/Σ
320	0	0	0	0	2 Μ/Σ 160kVA
350	0	0	0	0	2 Μ/Σ 250&100kVA
400	0	53	0	53	
500	0	0	0	0	2 Μ/Σ 250kVA
630	0	9	0	9	
800	0	3	0	3	2 Μ/Σ 400kVA
1000	0	1	0	1	
1030	0	0	0	0	2 Μ/Σ 630&400 kVA
1260	0	0	0	0	2 Μ/Σ 630kVA
1630	0	0	0	0	2 Μ/Σ 1000&630kVA
2000	0	0	0	0	2 Μ/Σ 1000kVA
-	0	0	0	0	Μη καταχ. Ισχύς
<b>Σύνολο</b>	<b>0</b>	<b>277</b>	<b>7</b>	<b>284</b>	

The following table gives an indicative estimation on the allocation of the transformers of substations based on the area density.

**Transformers allocation for Xanthi area**

Transformers power (KVA)	Number of Transformers			Total
	Urban	Suburban	Remote	
<b>15</b>	0	0	0	0
<b>25</b>	2	20	4	26
<b>50</b>	66	405	243	714
<b>75</b>	4	8	8	20
<b>100</b>	107	334	185	626
<b>150</b>	10	8	9	27
<b>160</b>	69	92	38	199
<b>200</b>	0	0	0	0
<b>250</b>	81	47	7	135
<b>400</b>	10	5	0	15
<b>630</b>	89	0	0	89
<b>1000</b>	7	0	0	7
<b>Total</b>	<b>445</b>	<b>919</b>	<b>494</b>	<b>1858</b>

**Informative Data for Power Supplies in the Pilot project areas**

**Table : Xanthi Prefecture**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	47855	3967	3853	20	35	16	0	209	681	30	52679	52679
<b>1</b>	79	26	2913	68	3046	158	3	81	153	5	6435	17280
<b>2</b>	5283	2228	2032	70	684	97	12	86	74	0	8256	
<b>3</b>	1126	540	442	32	329	80	15	45	20	2	2044	
<b>4</b>	70	34	133	13	269	35	6	28	4	6	545	
<b>5</b>	1	0	187	5	149	55	6	32	1	8	433	
<b>6</b>	0	0	113	2	54	43	1	23	0	5	238	
<b>7</b>	0	0	51	1	20	26	0	10	0	6	113	
<b>Total</b>												<b>69959</b>

No 0 : 8 KVA
No 1: 15 KVA
No 2: 25 KVA
No 3: 35 KVA
No 4: 55 KVA
No 5: 85 KVA
No 6: 135 KVA
No 7: 250 KVA

<b>Table : Lesvos island</b>												
-	<u>Use</u>										-	
Standard Power Supply No	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities	Total	Total for No 0-4
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	51960	856	5733	8	1139	103	2	329	842	73	60179	60179
<b>1</b>	77	24	3136	38	3263	379	11	162	17	21	7055	15405
<b>2</b>	5515	1194	1158	28	134	87	10	95	3	8	7000	
<b>3</b>	225	82	566	23	107	85	13	74	2	11	1070	
<b>4</b>	20	3	142	4	31	23	5	54	2	8	280	
<b>5</b>	2	1	106	2	12	57	0	37	0	8	222	
<b>6</b>	0	0	42	0	7	42	0	28	0	7	126	
<b>7</b>	0	0	21	0	4	14	0	18	0	4	61	
<b>Total</b>												<b>75584</b>

**Table : Limnos island**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	9519	28	1145	0	5	8	0	164	175	18	11034	11034
<b>1</b>	1	0	552	1	218	73	1	123	19	7	993	4149
<b>2</b>	2269	389	448	7	13	36	0	71	14	5	2856	
<b>3</b>	83	32	116	9	2	15	3	27	2	4	249	
<b>4</b>	1	0	26	0	1	7	1	9	3	4	51	
<b>5</b>	0	0	17	0	0	8	0	9	0	1	35	
<b>6</b>	0	0	6	0	0	9	0	7	0	4	26	
<b>7</b>	0	0	2	0	0	7	0	11	0	9	29	
<b>Total</b>												<b>15183</b>

**Table: Agios Efstratios island**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	221	1	22	0	0	0	0	10	4	3	260	260
<b>1</b>	0	0	9	0	7	0	0	6	1	2	25	90
<b>2</b>	41	7	13	2	0	0	0	4	0	0	58	
<b>3</b>	0	0	2	0	0	0	0	3	0	0	5	
<b>4</b>	0	0	0	0	0	0	0	2	0	0	2	
<b>5</b>	0	0	0	0	0	0	0	0	0	0	0	
<b>6</b>	0	0	0	0	0	0	0	0	0	0	0	
<b>7</b>	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>												<b>350</b>

**Table: Lefkada & Meganisi islands**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	12505	9695	1903	1285	8	8	6	190	260	14	14888	14888
<b>1</b>	0	0	952	599	137	35	24	73	0	1	1198	6438
<b>2</b>	3222	2250	1341	892	15	27	19	101	1	3	4710	
<b>3</b>	52	33	295	182	7	17	13	34	0	1	406	
<b>4</b>	2	1	80	55	5	10	6	26	1	0	124	
<b>5</b>	0	0	35	9	3	14	5	23	0	0	75	
<b>6</b>	0	0	26	9	1	11	6	23	0	0	61	
<b>7</b>	0	0	7	3	0	0	0	7	0	0	14	
<b>Total</b>												<b>21326</b>

**Overview Table for the Pilot Project**  
**(Xanthi, Lesvos, Limnos, Agios Efstratios, Lefkada)**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	122060	14547	12656	1313	1187	135	8	902	1962	138	139040	139040
<b>1</b>	157	50	7562	706	6671	645	39	445	190	36	15706	43362
<b>2</b>	16330	6068	4992	999	846	247	41	357	92	16	22880	
<b>3</b>	1486	687	1421	246	445	197	44	183	24	18	3774	
<b>4</b>	93	38	381	72	306	75	18	119	10	18	1002	
<b>5</b>	3	1	345	16	164	134	11	101	1	17	765	
<b>6</b>	0	0	187	11	62	105	7	81	0	16	451	
<b>7</b>	0	0	81	4	24	47	0	46	0	19	217	
<b>Total</b>												<b>182402</b>



**Optionally**

**Table: Thira island**

-	<u>Use</u>										-	
Standard Power Supply No	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities	Total	Total for No 0-4
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	8261	123	1966	12	40	17	0	55	281	3	10623	10623
<b>1</b>	2	0	508	3	91	4	0	5	1	0	611	6474
<b>2</b>	3024	368	2132	29	11	13	1	33	11	1	5225	
<b>3</b>	60	15	475	17	0	10	1	7	0	0	552	
<b>4</b>	0	0	80	7	0	5	1	0	0	1	86	
<b>5</b>	1	0	53	0	0	2	0	4	0	0	60	
<b>6</b>	0	0	35	0	0	2	0	4	0	0	41	
<b>7</b>	0	0	1	0	0	2	0	4	0	0	7	
<b>Total</b>												<b>17097</b>

**Table: Milos & Kimolos islands**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	4538	25	591	0	0	0	0	22	150	5	5306	5306
<b>1</b>	0	0	214	3	99	7	0	7	1	0	328	1909
<b>2</b>	938	21	434	9	7	8	2	15	0	5	1407	
<b>3</b>	12	1	122	8	1	4	0	6	0	0	145	
<b>4</b>	2	1	15	1	0	4	2	7	0	1	29	
<b>5</b>	0	0	12	0	0	1	0	7	0	1	21	
<b>6</b>	0	0	10	1	0	4	0	4	0	0	18	
<b>7</b>	0	0	1	0	0	1	0	2	0	2	6	
<b>Total</b>												<b>7215</b>

**Table: Kithnos island**

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
	1	Night Tariff	2	Night Tariff	3	4	Night Tariff	5	6	8		
<b>0</b>	2001	1986	223	0	20	2	0	22	56	2	2326	2326
<b>1</b>	0	0	82	0	30	1	0	4	1	0	118	830
<b>2</b>	446	437	190	6	11	2	0	19	4	0	672	
<b>3</b>	5	5	26	0	1	1	0	2	0	0	35	
<b>4</b>	0	0	2	0	0	1	0	2	0	0	5	
<b>5</b>	0	0	0	0	0	0	0	1	0	0	1	
<b>6</b>	1	1	4	0	0	0	0	1	0	0	6	
<b>7</b>	0	0	0	0	0	0	0	0	0	0	0	
<b>Total</b>												<b>3156</b>

**Overview Table**  
(Thira, Milos, Kimolos, Kithnos islands)

Standard Power Supply No	Use										Total	Total for No 0-4
	Residential		Commercial		Agricultural	Industrial		Public buildings	Street and public spaces Lighting	Public entities		
		Night Tariff		Night Tariff			Night Tariff					
<b>0</b>	14800	2134	2780	12	60	19	0	99	487	10	18255	18255
<b>1</b>	2	0	804	6	220	12	0	16	3	0	1057	9213
<b>2</b>	4408	826	2756	44	29	23	3	67	15	6	7304	
<b>3</b>	77	21	623	25	2	15	1	15	0	0	732	
<b>4</b>	2	1	97	8	0	10	3	9	0	2	120	
<b>5</b>	1	0	65	0	0	3	0	12	0	1	82	
<b>6</b>	1	1	49	1	0	6	0	9	0	0	65	
<b>7</b>	0	0	2	0	0	3	0	6	0	2	13	
<b>Total</b>												<b>27468</b>

### L.V. Power Supply for direct grid-connection PV type

<b>Standard Power Supply No</b>	<b><u>Xanthi</u></b>	<b><u>Lesvos</u></b>	<b><u>Limnos</u></b>	<b><u>Ag. Efstratios</u></b>	<b><u>N. Lefkada</u></b>	<b><u>Total</u></b>
<b>0</b>	30	39	6	0	7	<b>82</b>
<b>1-2</b>	622	5	0	0	74	<b>701</b>
<b>3-4</b>	0	3	1	0	1	<b>5</b>