HELLENIC ELECTRICITY DISTRIBUTION NETWORK OPERATOR S.A.

NOTICE OF CALL FOR TENDERS No ND-207

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

TECHNICAL DESCRIPTION OF WORKS

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CONTENTS

A. General Technical Description of Works

1. General

For the installation of a Metering Device with modern electronic meters of modern technology equipped with a communication medium and in-home display, as well as the installation of PLC concentrators and LV meters equipped with communication medium on MV/LV substations, and the integration of the above to the Central System with simultaneous dismantling/removal of the existing metering devices, the following shall be implemented.

2. Certification of Dismantled / Removed - Installed Metering Devices

During project implementation, dismantling / removal works shall be performed, followed by the installation, at the same location, of the new electronic metering equipment in the metering devices of HEDNO Low Voltage customers within the geographical area specified in the Tender Notice Issues and to avoid as long as possible the inconvenience to the customer, the Contractor is required to notify by phone the customer through the Help Desk prior to the start of any works, as well as to paste appropriate leaflets on the customer door about the time of the works. Subsequently the Contractor shall implement and certify the following procedures:

2.1. Dismantling / Removal of Metering Device

Prior to the dismantling / removal of the whole metering device of each customer (the existing meter installation box and the meter itself with its protection device), the following customer data shall be recorded, verified and forwarded certified to the appropriate departments in the project implementation area:

- Customer Address.
- Customer Connection ID Number (marked on an aluminium plate installed on the cover of the metering device box or written with permanent marker).
- Meter ID Number.
- Readings of the Meter / Meters (depending on connection type and current tariff for each customer), with a signed notification of the customer (whenever possible).
- Meter Type - Manufacturer Name.
- Meter's operating current range (i.e. 10-60A).

- Nominal current of meter fuse or the circuit breakers of the meter (i.e. 3x40A).

- Gauges and color-coding (correspondence of color and phase) of customer cables.

- If the meter was fitted with a Ripple Control Receiver for triggering the second tariff, the details of the ripple control receiver.

- Any abnormal status, which may indicate tampering or energy theft. Before the start of the meter replacement works, the Contractor shall receive the check procedure of the meter devices that are going to be dismantled. In case of such findings, the Contractor employees will notify immediately the HEDNO Area in order for the HEDNO Area to take the appropriate actions, while a written notification to the area should follow.

- Any possible health and safety hazard.

2.2. Installation of New Metering Device

Following the installation of the new metering device, the following customer data shall be recorded, verified, and forwarded to the retail departments in the project implementation area:

- Customer Connection ID Number (reinstallation of the aluminium plate on the cover of the metering device box or write of the Customer Connection ID Number with permanent marker).

- Serial number of the new meter

- The meter type

- The initial meter reading after powering on the meter (depending on connection type and current tariff for each customer).

- The program (configuration) of the meter in relation to the tariff zones in which it shall operate (single or double tariff).

- The seal ID number used for sealing the terminal box cover of the meter, the connection box and the metering device box.

The above procedures shall be recorded in electronic files, whose structure shall be approved by HEDNO.

All the above data collected during project implementation shall be forwarded in electronic format and on a daily basis to the relevant Departments of HEDNO for check and confirmation before entering the

billing data into the existing billing system of the Corporation.

Any more steps that may be required (additional to the installation requirements as provided in the project contract) for efficient operation of the device(s), shall be verified by photographic evidence collected by the Contractor. HEDNO shall approve the requirement for installation of an external high-gain antenna following sufficient documentation proving the inability to communicate with the existing meter-modem (e.g. low signal level).

3. Description of General Works in Contractor's Laboratories

The Contractor, prior to the construction of the metering device, is required to study the tariff rate for each particular customer or MV/LV substation and the complete technical data required for implementing the metering device, i.e. operating voltage, maximum operating current (for connections via current transformers, the primary-secondary winding ratio of the current transformers), as well as the required wiring.

The above data shall be provided by HEDNO to the Contractor following signing of the Contract.

The Contractor shall study the above data and appropriately configure the electronic meter in its laboratory (or manufacturing plant).

Following programming, the electronic meter shall be put on the test bench in order to establish its proper operation, precision and the results of the series tests should be delivered to HEDNO in electronic format.

After verifying proper operation of the electronic meter, the meter shall be placed in a suitable box, ready for connection.

The meter shall be sealed and certified.

4. Description of General Works in Contractor's Laboratories

The Contractor shall install the above metering device and shall dismantle and remove the existing device of each customer, according to the submitted work schedule, which shall be approved by the Supervising Department.

In particular, the following procedure shall be followed:

- After recording the customer data as described in paragraph 2, the existing customer's metering device shall be dismantled/removed (except the junction box), leaving only the existing distribution cable of the customer (no operation is allowed on this particular cable as it is property and responsibility of the customer), which should be labels (with appropriate sticker) with the customer connection ID number in

order to avoid mistakes.

- Then the new device shall be installed at the mounting position of the old device.

- Then, the cables of the customer connection and the cables from the junction box, which were previously disconnected, shall be connected, in order to provide power to the device.

- The overall work shall be carried out under live conditions, so it is required to take all necessary protection measures. In cases where it may be required to replace the junction box cables and the power should be disconnected, suitably licensed Contractor staff shall perform such disconnections.

- The Contractor is responsible for supplying any cables and other installation materials (connectors, plugs, screws, cable glands, ducts etc.) that may be required for the connection of the devices.

- After completion of the above works, the customer shall be reconnected with the network.

- For the three-phase connections, the Contractor shall check the phase sequence prior and following the performance of the works and notify the customer, with a signed confirmation of the briefing, before restoring the power of the customer installation.

- Subsequently, the Contractor shall integrate the new meter in the Central System, according to the communication medium installed on the meter.

- If required, the Contractor's staff shall be able to program the meter on-the-spot in order to operate seamlessly with the new communication medium.

- In such cases, the Contractor's staff shall be equipped with portable computers and any other equipment required for programming the meter.

- In case that the meter is equiped with a GPRS/GSM communication medium, the SIM card shall be installed and then the meter shall be integrated in the Central System.

- In case GPRS/GSM communication cannot be established due to special circumstances (e.g. low signal level), the Contractor shall consider the installation of an extension cable (protected inside suitable plastic duct) for the existing antenna.

- In case that the meter has PLC communication medium the integration

to the Central System must be automatic through the PLC concentrator, without the operators intervention.

- In case PLC communication cannot be established due to special circumstances (e.g. low signal level), the installation of PLC signal repeaters should be considered.

- If communication cannot still be established, HEDNO should be notified in writing as soon as possible.

- After communication is established, the device shall be sealed and the seal numbers must be recorded.

4.1. Replacement of the old single and three phase installation boxes with new

During the project implementation, the Contractor shall replace all meter installation boxes with new boxes which the contractor shall provide according to the material technical specifications (attached to the tender), as well as all materials required to mount and install the boxes (screws, anchors, seals, plastic tubes to the junction box, etc.)

4.2. Replacement of ~~all~~ fuses – circuit breakers with circuit breakers in HEDNO connections

During the project implementation, the Contractor will replace all fuses and the porcelain fuse boxes as well as existing circuit breakers with new circuit breakers that the contractor shall provide, according to the material technical specifications (attached to the tender), as well as plastic cover for protection against incidental contact.

In order to choose the appropriate protective circuit breaker for the HEDNO connections, the appendix of this issue provides the table of the standard HEDNO connection types.

Note: The No4 connections include fuse box with 3x100A fuses. Those particular boxes are not replaced and the fuses remain as are.

Special cases are considered on a case-by-case basis and under the directions of the supervising department.

4.3. Project Log

The works completed every day by Contractor's crews shall be recorded in a suitable log, which shall be kept by each crew and shall be signed by the authorized representative of the Supervising Department; such records shall include any notes/comments made by the supervising

engineer regarding defects or problems that occurred. A copy of the corresponding log sheet shall be delivered to the supervising service.

4.4. Dismantled/Removed Materials and Management by the Contractor

All removed materials will be dismantled, will be assorted by type (meter, box, fuse, circuit breaker, Ripple Control Receiver, etc), will be packaged in carton boxes and pallets and delivered to the HEDNO Areas warehouses. Especially for the meters the contractor will record on every removed meter the HEDNO connection ID, without modifications to the meter, especially the meter indications and the cover seals.

In particular:

1. Dismantle of meter devices

2. Separation of removed materials (meter boxes, fuse boxes, fuses per type, electromechanical meters, electronic meters, Ripple Control Receivers by type, Auxiliary Relays with their boxes, cables) and distinct packaging per material type.

3. Especially for the meters, every package should be accompanied with a list with connection ID and date of removal.

4. The removed electronic meters will be packaged separately from the removed electromechanical meters.

5. The removed active materials will be transferred indoors as the may be reused by HEDNO.

6. The removed materials will be packaged in pallets 120cm x 80cm.

7. Transfer of materials for return to the HEDNO Areas warehouses.

8. Unloading and delivery to HEDNO warehouses according to the management of the warehouses instructions.

Remarks:

- The meters shall be returned on pallets in carton boxes, separate the parts for repair (X) from the broken beyond repair parts (Γ) and according to material code (same material code and category per carton box) with the category indiction visible, the number (items), the Area, the removal dates and with a list of the meter number and connection id of origin. Those records will be available on a plasticized label and be readable from distance, except the list of the meter number and the connection ID.

- The Ripple Control Receivers and the auxiliary relays should be returned in pallets separately by material code and material category (Χ & Γ).

- The quantity of the materials shall be certified by the HEDNO warehouse responsible who receives the materials on return slip.

4.5. Termination of Works on the Customer's Metering Devices

The completion of the works and integration of the metering point in the Central System, as well as the transfer of customer billing data to the HEDNO billing system, and the entry of customer details in the WEB server shall be considered as certification and order for termination of the works.

B. Invdividual Works – Pricing/Invoicing

AT 1 : REPLACEMENT OF OLD SINGLE PHASE ENERGY METER IN HEDNO CONNECTIONS No 03, 05 WITH NEW ELECTRONIC METER WITH PLC COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

The cables, circuit breakers, meter box and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

1. Disconnection of HEDNO and customer cables (voltage, neutral and Ripple Control Receiver cables) from the old energy meter and (temporary) isolation thereof (i.e. by connecting them to terminal blocks).

2. In case that the cables from the junction box to the meter are worn out, they will be replaced with new.

3. In case that the meter is powered by the adjacent meter instead of the junction box the connection will be replaced based on standardization such as every meter will be powered in a star network from the junction box.

4. Removal of the old energy meter.

5. Mount of the new electronic meter installation box in the position where the old one was mount.

6. Connection of the HEDNO and customer cables on the new electronic meter (phase, neutral to the corresponding input terminal blocks of the meter). The possible cable from the Ripple Control Receiver or the auxiliary relay to the meter for the tariff change will be removed, while the auxiliary conductor from the Ripple Control Receiver to the client shall be appropriately connected to the meter.

7. Confirmation of the automatic communication with the PLC concentrator on the substation and the Central System.

8. Meter activation on the Central System.

9. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

10. Confirmation of the customer power restoration.

11. Installation check

12. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 2 : REPLACEMENT OF OLD SINGLE PHASE ENERGY METER IN HEDNO CONNECTIONS No 03, 05 WITH NEW ELECTRONIC METER WITH GSM/GPRS/3G COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

The cables, circuit breakers, meter box and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

1. Disconnection of HEDNO and customer cables (voltage, neutral and Ripple Control Receiver cables) from the old energy meter and (temporary) isolation thereof (i.e. by connecting them to terminals blocks).

2. In case that the cables from the junction box to the meter are worn out, they will be replaced with new.

3. In case that the meter is powered by the adjacent meter instead of the junction box the connection will be replaced based on

standardization such as every meter will be powered in a star network from the junction box.

4. Removal of the old energy meter.

5. Mount of the new electronic meter installation box in the position where the old one was mount.

6. Connection of the HEDNO and customer cables on the new electronic meter (phase, neutral to the corresponding input terminal blocks of the meter). The possible cable from the Ripple Control Receiver or the relay to the meter for the tariff change will be removed, while the auxiliary conductor from the Ripple Control Receiver to the client shall be appropriately connected to the meter.

7. Confirmation of the communication with the Central System. The GSM communication medium will be installed in the meter installation box.

8. Meter activation on the Central System.

9. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

10. Confirmation of the customer power restoration.

11. Installation check

12. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 3 : REPLACEMENT OF OLD THREE-PHASE PHASE ENERGY METER IN HEDNO CONNECTIONS No 1, 2, 3, & 4 WITH NEW ELECTRONIC METER WITH PLC COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

The cables, circuit breakers, meter box and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

1. Check for the correct phase sequence for HEDNO and customer cables.

2. In case of incorrect phase sequence, the customer should sign a document that he is notified that the correct phase sequence will be restored with the power restoration of the electrical installation.

3. Marking of the phase sequence on the HEDNO and customer cables

4. Disconnection of HEDNO and customer cables (voltage, neutral and Ripple Control Receiver cables) from the old energy meter and (temporary) isolation thereof (i.e. by connecting them to terminals blocks).

5. In case that the cables from the junction box to the meter are worn out, they will be replaced with new.

6. In case that the meter is powered by the adjacent meter instead of the junction box the connection will be replaced based on standardization such as every meter will be powered in a star network from the junction box.

7. Removal of the old energy meter.

8. Mount of the new electronic meter installation box in the position where the old one was mount.

9. Connection of the HEDNO and customer cables on the new electronic meter (phase, neutral to the corresponding ~~input~~ terminal blocks of the meter). The possible cable from the Ripple Control Receiver or the auxiliary relay to the meter for the tariff change will be removed, while the auxiliary conductor from the Ripple Control Receiver to the client shall be appropriately connected to the meter. The cables should be connected with the correct phase order.

10. Confirmation of the automatic communication with the substation PLC concentrator and the Central System.

11. Meter activation on the Central System.

12. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

13. Confirmation of the customer power restoration.

14. Installation check

15. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 4 : REPLACEMENT OF OLD THREE-PHASE PHASE ENERGY METER IN HEDNO CONNECTIONS No 1, 2, 3, & 4 WITH NEW ELECTRONIC METER WITH GSM/GPRS/3G COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

The cables, circuit breakers, meter box and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

1. Check for the correct phase sequence for HEDNO and customer cables.

2. In case of incorrect phase sequence, the customer should sign a document that he is notified that the correct phase sequence will be restored with the power restoration of the electrical installation.

3. Marking of the phase sequence on the HEDNO and customer cables

4. Disconnection of HEDNO and customer cables (voltage, neutral and Ripple Control Receiver cables) from the old energy meter and (temporary) isolation thereof (i.e. by connecting them to terminals blocks).

5. In case that the cables from the junction box to the meter are worn

out, they will be replaced with new.

6. In case that the meter is powered by the adjacent meter instead of the junction box the connection will be replaced based on standardization such as every meter will be powered in a star network from the junction box.

7. Removal of the old energy meter.

8. Mount of the new electronic meter installation box in the position where the old one was mount.

9. Connection of the HEDNO and customer cables on the new electronic meter (phase, neutral to the corresponding input terminal blocks of the meter). The possible cable from the Ripple Control Receiver or the auxiliary relay to the meter for the tarrif change will be removed, while the auxiliary conductor from the Ripple Control Receiver to the client shall be appropriately connected to the meter. The cables should be connected with the correct phase order.

10. Confirmation of the automatic communication with the substation PLC concentrator and the Central System.

11. Confirmation of the communication with the Central System. The GSM communication medium will be installed in the meter installation box.

12. Meter activation on the Central System.

13. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

14. Confirmation of the customer power restoration.

15. Installation check

16. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 5 : INSTALLATION OF NEW SINGLE PHASE ENERGY METER IN HEDNO CONNECTIONS No 03, 05 WITH NEW ELECTRONIC METER WITH PLC COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and

safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

Works:

1. Mount of the new electronic Meter and the circuit breaker in the installation box.

2. Verification of the customer wire gauge, based on the standards (03- 3x10mm2 & 05- 3x16mm2)

3. Cables connection, based on standardization, such that the meters are powered in a star connection from a single feed.

4. Connection of the HEDNO and customer cables of the new electronic meter. The auxiliary conductor (used to provide neutral to the internal electrical installation during reduced tariff), if it exists, it will be connected to the new meter and not to a Ripple Control Receiver.

5. Confirmation of the automatic communication with the PLC concentrator on the substation and the Central System.

6. Meter activation on the Central System.

7. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

8. Confirmation of the customer power restoration.

9. Installation check.

10. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 6 : INSTALLATION OF NEW SINGLE PHASE ENERGY METER IN HEDNO CONNECTIONS No 03, 05 WITH NEW ELECTRONIC METER WITH GSM COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

Works:

1. Mount of the new electronic Meter and the circuit breaker in the installation box.

2. Verification of the customer wire gauge, based on the standards (03- 3x10mm^2 & 05- 3x16mm^2)

3. Cables connection, based on standardization, such that the meters are powered in a star connection from a single feed.

4. Connection of the HEDNO and customer cables of the new electronic meter. The auxiliary conductor, if it exists, it will be connected to the new meter and not to a Ripple Control Receiver.

5. Confirmation of the communication with the Central System. The GSM modem maybe installed on the installation box of the meter or to an adjacent meter box.

6. Meter activation on the Central System.

7. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

8. Confirmation of the customer power restoration.

9. Installation check

10. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 7 : INSTALLATION OF NEW THREE-PHASE PHASE ENERGY METER IN HEDNO CONNECTIONS No 1, 2, 3, & 4 WITH NEW ELECTRONIC METER WITH PLC COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

Works:

1. Mount of the new electronic Meter and the circuit breaker in the installation box.

2. Verification of the customer wire gauge, based on the standards (1- 5X6mm^2, 2- 5X10mm^2, 3- 5X16mm^2 & 4- 3X25mm^2+16 mm^2+16 mm^2)

3. Cables connection, based on standardization, such that the meters are powered in a star connection from a single feed.

4. Connection of the HEDNO and customer cables of the new electronic meter. The auxiliary conductor, if it exists, it will be connected to the new meter and not to a Ripple Control Receiver.

5. Check for the correct phase sequence for HEDNO and customer cables with the phase sequence indication and cables color code. In case of non-compliance of the customer cables with the phases color code, there shall be permanent phase cables marking and signed statement of the customer’s technician electrician before the connection.

6. Confirmation of the automatic communication with the substation PLC concentrator and the Central System.

7. Meter activation on the Central System.

8. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

9. Confirmation of the customer power restoration.

10. Installation check

11. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 8 : INSTALLATION OF NEW THREE-PHASE PHASE ENERGY METER IN HEDNO CONNECTIONS No 1, 2, 3, & 4 WITH NEW ELECTRONIC METER WITH GSM COMMUNICATION MEDIUM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

Works:

1. Mount of the new electronic Meter and the circuit breaker in the installation box.

2. Verification of the customer wire gauge, based on the standards (1- 5X6mm2, 2- 5X10mm2, 3- 5X16mm2 & 4- 3X25mm2+16 mm2+16 mm2)

3. Cables connection, based on standardization, such that the meters are powered in a star connection from a single feed.

4. Connection of the HEDNO and customer cables of the new electronic meter. The auxiliary conductor, if it exists, it will be connected to the new meter and not to a Ripple Control Receiver.

5. Check for the correct phase sequence for HEDNO and customer cables with the phase sequence indication and cables color code. In case of non-compliance of the customer cables with the phases color code, there shall be permanent phase cables marking and signed statement of the customer’s technician electrician before the connection.

6. Confirmation of the communication with the Central System. The GSM modem maybe installed on the installation box of the meter or to an adjacent meter box.

7. Meter activation on the Central System.

8. Update customer for the procedure to be followed in the domestic electrical installation to complete the power restoration.

9. Confirmation of the customer power restoration.

10. Installation check

11. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 9 : INSTALLATION OF NEW SINGLE-PHASE METER INSTALLATION BOX FOR A NEW HEDNO CONNECTION.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, suitably authorized Contractor's staff shall carry out such disconnection.

The cables and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

It involves the installation of a new single-phase installation box in a location desigated by the HEDNO engineer, with all required materials (Screws, plugs, seals, plastic tubes as the junction box etc). For the installation, it is required that Contractor should verify compliance with the technical preconditions of the connection study.

AT 10 : INSTALLATION OF NEW THREE-PHASE METER INSTALLATION BOX FOR A NEW HEDNO CONNECTION.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, suitably authorized Contractor's staff shall carry

out such disconnection.

The cables and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

It involves the installation of a new single-phase installation box in a location desigated by the HEDNO engineer, with all required materials (Screws, plugs, seals, plastic tubes as the junction box etc). For the installation, it is required that Contractor should verify compliance with the technical preconditions of the connection study.

AT 11 : INSTALLATION OF COMMUNICATION MEDIUM (GSM/GPRS/3G MODEM) ON A NEW ELECTRONIC METER AND INTEGRATION TO THE CENTRAL SYSTEM.

Works:

It involves the installation works for the communication medium (modem) and antenna inside the installation box of the electronic meter, the installation of the appropriate SIM card, its electrical and communication connection, as well as the integration of the metering point to the central system.

AT 12 : CONNECTION FOR THE SHARED USE ~~INSTALLATION~~ OF COMMUNICATION MEDIUM (GSM/GPRS/3G MODEM) ~~ON MORE THAN ONE (~~AT THE SAME LOCATION~~) ELECTRONIC METER~~ AND INTEGRATION OF METERS TO THE CENTRAL SYSTEM.

Works:

~~A GSM modem shall be installed as described above, in o~~One of a set of meters in the same location~~, and the said meter shall be~~ is defined as the primary meter and shall be considered as reference point and is considered integrated to the Telemetering Center, with the work AT11. In order for neighboring meter to communicate with that (the primary meter) an appropriate interconnection (i.e. RS-485) is implemented in order to achieve communication. This work is AT12 as well any additional connection of neighboring meters for this purpose. ~~The rest of the meters are connected using serial communication with appropriate protocol (i.e. RS485) and all of them are integrated in the Central System.~~

Example: For an 8-apartments apartment block, a shared communication device (modem) will be installed on a meter (AT 11), and all other meters will be connected in parallel with 7 AT12 works, this means that in total 1 AT11 + 7 AT12 works are required.

AT 13 : INSTALLATION OF A HIGH GAIN ANTENNA TO A COMMUNICATION DEVICE (GSM/GPRS/3G MODEM) DUE TO LOW LEVEL SIGNAL.

Preconditions:

Communications with the Central System is not possible.

Works:

It involves the procurement and installation of an antenna of at least 9 Dbi (omni directional) sensitivity, in order to be used at low-level signal cases. The antenna cable will be routed from the meter installation box, in a Φ16 heavy-type plastic spiral tube, which will connect with the meter installation box with a gland. The cables, the antenna of sensitivity of at least 9Dbi (omni directional) and the installation materials (pipes, plugs, screws, glands, etc) that will be required for the connection of the devices are of provision and responsibility of the Contractor and are not included in this AT.

AT 14 : EXTENDED INSTALLATION OF COMMUNICATION DEVICE (GSM/GPRS/3G MODEM) IN HEDNO CONNECTIONS LOCATIONS DUE TO LOW SIGNAL LEVEL, FOR TRANSFERRING THE ANTENNA WITH OR WITHOUT THE COMMUNICATION DEVICE, TO A LOCATION WITH SUFFICIENT SIGNAL LEVEL.

Preconditions:

Communications with the Central System is not possible.

Works:

1. In case the GPRS communication is problematic due to low signal level in the location, the simple antenna, either with or without the modem, shall be installed at a distance from the Meter and at a location where the measured signal level is sufficient for data transmission.

2. The data FTP cable (Cat 5) shall be routed from the Meter to the modem inside a heavy duty spiral plastic tube (Φ16).

3. The modem shall be protected inside a watertight standard box/structure, which shall be provided by the Contractor and shall be sealed following completion of the works.

4. The modem shall be power supplied from the Meter's 230 V output (parallel routing of the power supply cable with the data cable). The line shall be electrically secured.

5. In special cases it shall be possible to use RF connection.

6. The offered price will be independent of the transfer length that will be required.

Cables and installation material (electrical equipment, tubes, plugs, screws, glands etc) that will be required for the connection of the devices are of provision and responsibility of the contractor and are not included in this AT.

AT 15 : INSTALLATION OF PLC COMMUNICATION DEVICE ON A NEW ELECTRONIC METER AND INTEGRATION TO THE CENTRAL SYSTEM.

Works:

It includes the installation works for the PLC communication device (modem) inside the installation box of the electronic meter, its electrical and communication connection, as well as the integration of the metering point to the central system.

In case that the PLC modem is integrated with the meter, this AT refers to the integration from a communications point of view of the meter to the Central System.

AT 16 : INSTALLATION OF IN-HOME DISPLAY.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department.

The cables and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Coordination with the customer for the exact date and time of installation in the customer's premises.

Works:

It concerns the installation connection and communication with the paired meter of the in-home display at a location in the customer's premises, which will be determined in coordination with the customer and it includes the delivery of the in-home display user instructions and operations demonstration.

Relevant instruction and problem solving with respect to the in-home display operation shall be provided to the customers through the web pages of the Contractor and HEDNO and by phone through the Contractor's Help Desk.

AT 17 : INSTALLATION OF THREE-PHASE MAX-INDICATING ELECTRONIC LV METER (CONNECTION THROUGH CURRENT TRANSFORMERS) ON LV/MV SUBSTATIONS AND INTEGRATION WITH THE CENTRAL SYSTEM.

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department. In cases of safety issues and is required to disconnect the substation transformer, the disconnection will be carried out exclusively by HEDNO personnel, certified for such work and following consultation with the supervising department

The cables~~, circuit breakers, meter box, test box~~ and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT. In addition, any protection device of the electronic equipment (meter and concentrator) required for installation at the substation is included.

Works:

1. Installation of a ~~split-core~~ current transformer on the substations ~~inside the pillar on the bars between the three-phase circuit breaker and the feeds fuse bases~~. In case that there is no circuit-breaker,

power shall be disconnected by the HEDNO area in order to install the current transformers ~~on the bars before the fuse bases~~. The transform ratio for the transformers will be proportional to the transformer power and the pillar feeds fuses. In case where more than one pillar is installed on the substation, separate current transformers and meters will be installed per pillar. It should be mentioned that any existing current transformers inside the pillars shall not be used for the new meters.

2. The Contractor shall document that:

   - The distances between conductors and other equipment (current transformers, etc) are adequate according to standards in order to avoid flashovers between phases/neutral/ground for the seamless operation of the substation.

   - The equipment and wiring do not obstruct substation operations (i.e. replacement of LV feed fuses in the pillar).

   - The wirings and routings of the equipment do not obstruct the climbing with climbing irons on the wooden posts for various operations (ie replacement of MV fuses) and are safe electrically for personnel protection.

3. Installation of the meter box near to the pillar with test box and circuit breaker. The box will be mounted:

   - On the post for open-air substations at ~~the~~ appropriate for indications reading height (about 1.5 m) ~~of the pillar~~. On wooden posts, circular adaptation bases and screws shall be used. On concrete posts, metal collars shall be used (not metal straps) of appropriate size, without penetrating the post.

   - The box installation will be performed according to Streets and Squares Lighting (ΦΟΠ) and the boxes should be appropriately installed such as they do not introduce problems, i.e. for two post substations they should be installed on the side between the posts.

   - On the wall, on closed substations

   - Inside the LV space in the compact substations

4. The box may be used for more meters or/and concentrators.

5. Routing cables from ~~the current transformers (~~the pillar~~)~~ to the meter box through closed pipes and sealing connections using glands.

6. Check for the correct phase sequence on the pillar with phase sequence indicator and cables color coding/labeling.

7. Mounting of the new electronic max-indicating meter, the test box and the circuit breaker inside the meter installation box.

8. The connection of the pillar metering device shall be according to the standardization of the low voltage connections 5,6 &7 with respect to cable gauges, cables color coding, test box and circuit breaker of the test box.

9. Confirmation of the communication (either through PLC concentrator, or using GSM/GPRS/3G modem) with the Central System.

10. Installation check.

11. Sealing. The seals are placed on the meter terminal blocks, the installation box and junction box and they will be recorded in the information system.

AT 18 : INSTALLATION PLC CONCENTRATOR ON THE SUBSTATIONS AND INTEGRATION WITH THE CENTRAL SYSTEM

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, such disconnection shall be carried out by suitably authorized Contractor's staff, and following consultation with the supervising department. In cases of safety issues and is required to disconnect the substation transformer, the disconnection will be carried out exclusively by HEDNO personnel, certified for such work and following consultation with the supervising department

The cables and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

1. The concentrator installation may be inside a substation meter installation box. In case of a separate box, the box should be mount:

- On the post for open-air substations ~~at the height of the pillar~~. On wooden posts, circular adaptation bases and screws shall be used. On concrete posts, metal collars shall be used (not metal straps) of appropriate size, without penetrating the post.

- The box installation will be performed according to Streets and Squares Lighting (ΦΟΠ) and the boxes should be appropriately installed such as they do not introduce problems, i.e. for two post substations they should be installed on the side between the posts.

- On the wall for closed substations

- Inside the LV area for compact substations

2. The Contractor should document that:

    - The distances between conductors and other equipment (current transformers, etc) are adequate according to standards in order to avoid flashovers between phases/neutral/ground for the seamless operation of the substation.

    - The equipment and wiring do not obstruct substation operations (i.e. replacement of LV feed fuses in the pillar).

    - The wirings and routings of the equipment do not obstruct the climbing with climbing irons on the wooden posts for various operations (ie replacement of MV fuses) and are safe electrically for personnel protection.

3. Cables routing from the pillar to the box through the closed pipes and sealing connections using glands.

4. Check for correct phase sequence of the Pillar with phase sequence indicator and cables color coding/cables labeling.

5. Mount of of the concentrator inside the meter box.

6. The connection between the concentrator and the piller shall be using the bars between the three-phase circuit breaker and the feeds fuse bases. In case there is no circuit breaker and it is not possbile to connect the concentrator without disconnecting the MV, the HEDNO area will disconnect the MV for the substation.

7. Confirmation of the communications with the Central System. The GSM/GPRS/3G modem communication device may be installed on the same meter box or adjacent.

8. Meter activation on the Central System.

9. Sealing. The seals are placed on the concentrator terminal blocks and the installation box and shall be recorded in the information system.

AT 19 : EXECUTION OF OPERATIONS OF ISOLATION AND RESTORATION IN A LOW VOLTAGE NETWORK

It involves the execution of operations of isolation and restoration on a LV network in order for the Contractor crews to work. The execution of the operations will be implemented exclusively by the certified technicians employed by the Contractor, after customer notification and coordination with the HEDNO Area.

AT 20 : RECORDING OF GEOGRAPHICAL COORDINATES OF THE CONNECTION LOCATION(LONGITUDE, LATITUDE) AND REGISTERING THEREOF IN CUSTOMER CARD

The Contractor will record in the customer file the geographical coordinates of the electrical installation using an appropriate device (GPS). The record format shall allow the afterwards straightforward import to other systems (i.e. GIS, Google Maps, etc).

AT 21 : PHOTOGRAPH TAKING (READINGS OF OLD METER, BEFORE AND AFTER THE END OF THE WORKS) OF THE CONNECTIONS WITH DIGITAL CAMERA AND REGISTERING THEREOF IN CUSTOMER CARD

It involves the taking and registering in the file with the customer data before and after the end of the works ~~3~~ a set of at least four (4) photographs of the installation, with digital camera of mid resolution (3 MP), in which it should be depicted:

1. The external view of the meter installation box, before the removal of the seal, and the environment space.

2. The internal view of the meter installation box with the old meter and the terminal cover open, the circuit breaker or the fuse box and the relevant wirings. In the photograph the meter readings, the meter serial number and the connection id, which should me marked by hand using permanent marker by the Contractor' s crews, should be clearly visible.

3. The internal of the meter installation box, after the completion of the new meter installation works.

4. The external view of the meter installation box, after the completion of the installation works and the box sealing. The customer connection id

and the appropriate sealing should be clearly visible.

For the required evidence ~~charging of extra AT~~, which are not proved with the photographs above, it ~~is~~ may be required to take additional documentation photos. The cost of ~~the~~ any required extra photographs is included in this AT. ~~The document photo shall be certified the relevant AT.~~

The registration of the photograph files will include the connection ID and the photograph number (i.e. 512345678_01 for the first photo). The photographs are delivered in electronic form to HEDNO.

AT 22 : RECORDING OF GEOGRAPHICAL COORDINATES OF THE SUBSTATION LOCATION(LONGITUDE, LATITUDE) AND REGISTERING THEREOF IN THE CENTRAL SYSTEM

The Contractor will record in the file with the substation data the geographical coordinates of the installation using an appropriate device (GPS). The record format shall allow the afterwards straightforward import to other systems (i.e. GIS, Google Maps, etc).

AT 23 : PHOTOGRAPH TAKING (CURRENT TRANSFORMERS & METERS, CONCENTRATORS, BOXES) OF THE SUBSTATION WITH DIGITAL CAMERA AND REGISTRATION THEREOF TO THE CENTRAL SYSTEM

It involves the taking and registering to a file with the substation data before and after the end of the works of installation photos, using a digital camera of mid resolution (3 MP), which will depict:

- The MV/LV transformer (s) and the Pillar (s), before the start of the works with the doors closed. The name of the substation should be clearly visible.
- The internal of every Pillar.
- The new installed current transformers.
- The routing infrastructure for the Pillar(s) to the meter(s) and/or concentrator(s) box(es). From the photographs it should be documentable that the installation is safe.
- The meter(s) and/or concentrator(s) box(es). The box should be open and the meters, the test boxes, the circuit breakers, the concentrators and internal wiring should be visible.

The photograph files registration will include the Area, the HV substation or the ΑΣΠ/ΤΣΠ, the MV line, the MV/LV substation name and the photograph number (i.e. ΛΕΣΒΟΣ_ΤΣΠ/ ΑΓ. ΕΥΣΤΡΑΤΙΟΥ_21_02Β_001/

512345678_01 for the first photograph). The photographs shall be delivered electronically to HEDNO.

AT 24 : UNSUCCESSFUL VISIT

It involves the Contractor crews visit to the location of the customer, during which, it is not possible to implement the intended works without liability of the Contractor.

The unsuccessful visit shall be fully documented by the Contractor in order to be accepted.

AT 25 : REPLACE CURRENT TRANSFORMER ON A SUBSTATION PILLAR

It involves the replacement works of an existing installed transformer during the project implementation or maintenance with new of different transformation ratio (visit – cost of replacement works – metering point configuration on the central system). The works involve only cases that are not covered by the material guarantee (i.e. increase of a substation transformer, pillar replacement) or are not caused by incorrect operation by the Contractor.

Preconditions:

1. If a power outage is required, the Customers and the HEDNO area should be notified.

2. In case of disconnection the Pillar circuit breaker should be open and the feed fuses should be removed by the certified for such works Contractor personnel. In case that no circuit breaker exists, HEDNO personnel will carry out the disconnection on the MV.

Works:

1. Disconnect existing current transformers

2. Remove existing current transformers

3. Install new current transformers

4. Connect new current transformers

5. Secure Pillar

AT 26 : REMOVE SUBSTATION EQUIPMENT (BOXES, CURRENT TRANSFORMERS, METERS, MODEM)

It involves the works to remove equipment that has been installed for the project, during the implementation or maintenance phase, on the substation (visit – cost of removal works for future use). The works involves only cases that are not covered by materials guarantee (i.e. removal or move of the substation) or are not caused by incorrect operation by the Contractor.

Preconditions:

1. If a power outage is required, the Customers and the HEDNO area should be notified.

2. In case of disconnection the Pillar circuit breaker should be open and the feed fuses should be removed by the certified for such works Contractor personnel. In case that no circuit breaker exists, HEDNO personnel will carry out the disconnection on the MV.

Works:

1. Disconnect and removal of the existing substation equipment, which has been installed during this project.
2. Secure Pillar

AT 27 : REMOVE OF THE REMOTE CONTROL RECEIVER, AUXILIARY RELAY AND RELATED WIRING

Preconditions:

The Contractor shall implement all necessary protection, health, and safety measures for its authorized staff working under live voltage conditions. Furthermore, it is required to perform all necessary checks, prior and following the completion of works, for the case of incorrect connections/wiring. In case a safety issue arises requiring disconnection of the power supply, suitably authorized Contractor's staff shall carry out such disconnection.

The cables and installation materials required for connection of the devices are provided by the Contractor and are not included in this AT.

Works:

It involves the disconnection and removal of the Ripple Control Receiver, The Auxiliary Relay and their boxes and the removal of all the relevant wiring. The auxiliary conductor for each connection will be moved and connected to the corresponding meter.

Note: The Ripple Control Receiver, the Auxiliary Relay, the boxes and the relevant wring are not dismantled and they remain as they are in case of meters for the Lighting of Streets and Squares (ΦΟΠ).