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ΕΔΡΑ ΘΕΣΣΑΛΟΝΙΚΗ

INVESTMENT DIVISION
PROCUREMENT DEPARTMENT

Thessaloniki, 10./7/2019
Ref. No.: 4866/10.7.19

REQUEST FOR TENDER
FOR THE PROVISION OF A NEW SWITCHBOARD AV 20 KV FOR THPA SA

ThPA SA invites any interested companies to submit their tender for the provision of a new Switchboard AV 20 KV, in accordance with the following terms and conditions.

A' PART

1. Object

1.1. The object of the tender is the purchase of a new 20 KV medium-voltage switchboard, for the upgrade of the current substation No**6** of ThPA SA, in order to securely cover the ever-increasing electric charges required to meet the Company's electricity needs. More specifically, the new electrical equipment and the necessary work to be carried out consist of the following:

- The disconnection of all electrical input and output lines of the current 20kV medium voltage switchboard.
- The dismantling of the current old-technology MV switchboard from Substation No **6** and its transfer by the Contractor to a specific location within the space of ThPA SA designated by the Authority, at his own expense.
- The supply and installation of a new MV switchboard, of modern technology, fully assembled, according to the current standards and regulations regarding electrical installations, which will replace the current one in the same space of Substation **6** (*par. 1 of Part B'*).
- The connection of the new MV switchboard will be done with new medium voltage cables and terminal boxes (contractor's obligation) as described in *par. 1.2- Part B'* and the wiring will be maintained exactly as it was before dismantling the original medium voltage switchboard.
- The supply, installation, and activation of an uninterruptible power supply (UPS) system.
- The full activation of the new 20 KV switchboard and the performance of all tests and activation works, as it was prior to the dismantling of the original medium voltage switchboard.
- The compilation and completion of the dossier to be submitted to the Hellenic Electricity Distribution Network Operator (DEDDIE) regarding the modification of the electrical installation of Substation No **6** after the installation of the new 20 KV switchboard.

1.2 Minimum participation requirements

- A prerequisite for participation in the tender is that the participants have supplied, installed and commissioned at least ten (10) 20 KV switchboards in MV Substations with a power output bigger than or equal to 400 KVA.
- The manufacturer of the Electrical Switchboard to be offered by each participant must have supplied in Greece at least ten (10) 20 KV switchboards to MV Substations with a power output bigger than or equal to 400 KVA.
- The participants must have Quality Certificate ISO 9001 – 2015.

2. Description of procedure

2.1 Criterion of evaluation

Tenders shall be evaluated and contract will be awarded based on the offered price, provided that the general and technical requirements herein are met.

2.2 Submission of offers

Interested parties can submit their offer, by **26/7/2019**, at the latest, at the Procurement Department of ThPA SA by e-mail at the e-mail address cathanasiou@thpa.gr, copy to ptheologou@thpa.gr

2.3 Clarifications

Requests to provide general additional information or clarifications are submitted at the email: cathanasiou@thpa.gr copy to: ptheologou@thpa.gr and regarding technical matters at: hgagavouzis@thpa.gr, five (5) working days before the deadline for submitting tenders at the latest.

2.4 Cancellation-Modification

THPA SA reserves the right to cancel the procedure of assignment or may decide to repeat it at any stage. It also reserves the right to modify the terms of the procedure with transparency.

3. Offer Content

Bids shall be submitted in Greek, bearing the signature and stamp of the company and they shall include the following information:

3.1 Supporting Documents

- Solemn Declaration of Law 1599/86, as applicable, in which:
 - Information of the tenderer's legal representative is mentioned.
 - It is stated that the tenderer has become fully aware of the terms herein and accepts them fully and unconditionally
- Copy of the ISO 9001 - 2015 Quality Assurance Certificate
- Any other necessary information, at the discretion of the participants.

3.2 The financial offer, must include:

- The offer price in euros (€), exclusive VAT. The price offered shall include any kind of costs, expenses and workshop personnel.
- The offer validity period, which cannot be less than 60 days (from the tender closing date).

3.3 The technical offer, must include:

- A technical description (in Greek or English) that will correspond to each paragraph of the technical terms of **Part B' of the Call**, in the same order as these (technical terms) appear in the Call. The technical description should be comprehensive and clear and be accompanied by the necessary single-line & multi-line designs.
- Brochures of the manufacturers of the offered materials, referring to their organization and infrastructure.

- General designs and technical specifications of the offered devices and machinery in Greek or English.
- A reference list for the supply, installation and connection of at least ten (10) 20 KV switchboards to MV Substations, with a power output bigger than or equal to 400 KVA.
- Reference list by the manufacturer of the 20 KV switchboard, which will include ten (10) 20 KV switchboards installed in MV Substations with a power output bigger than or equal to 400 KVA that it has supplied in Greece. These lists shall mention similar types of MV switchboards installed, as well as the clients to which they were provided (buyer information).
- Timetable of work execution.

It is clarified that, with the above detailed technical description, the participant **MUST** communicate to ThPA SA the origin of all materials of the 20 KV switchboards, giving details of the types and their manufacturing companies along with appropriate brochures - PROSPECTUS which will show all the technical characteristics of the these materials, in order for the competent Tender Committee to make a technical inspection of their bid.

4. Special Terms of the Procurement Execution

4.1 Performance warranty bond

For the signing of the contract, a Performance Bond is required, the amount of which shall be 5% of the remuneration, exclusive VAT, and it shall be deposited before or during the signing of the contract.

The performance bond shall cover entirely and without exceptions the implementation of all the conditions of the contract and any claim of ThPA SA against the supplier.

The performance bond shall be forfeited in the case where the terms of the contract are violated, as specifically defined.

4.2 Time of guaranteed proper operation

The minimum acceptable time of guaranteed proper operation is one (1) year starting on the date of signature of the receipt protocol. During the period of the guarantee, the contractor is responsible for the proper operation of the luminaires and shall remedy any damage or malfunction resulting from a defective construction or a defective material.

If the system is replaced, the period of guarantee shall be extended accordingly.

4.3 Payment method

30% of the total expense, exclusive VAT, will be paid to the Contractor after the delivery of the Switchboard A.V. 20 KV and the remaining price (70%) plus VAT of the invoice, will be paid after the successful completion of its installation.

4.4 Time of the procurement delivery

The time of delivery and installation of the new Switchboard A.V. 20KV is defined in the period of three (3) months prior to the signature of the contract.

PART B' - TECHNICAL CONDITIONS AND STANDARDS

1. MV 20 KV ELECTRICAL SWITCHBOARD

1.1. The currently installed medium voltage switchboard of Substation No **6** consists of seven (7) fields with each one's dimensions (W x D x H) being approximately 1100 x 1120 x 1600.

- More specifically, in addition to the MV field which hosts the general automatic power switch connected to a 20 KV medium voltage directly from DEDDIE, the rest are output fields (O.F.) which supply MV to various charges, of a total current power of 21,000 KVA, as follows:
- Output field (O.F.) for current transformer No **1** , of a total power of 1000 KVA
- Output field (O.F.) for bridge crane No **2**, of a total power of 1,250 KVA
- Output field (O.F.) for the building of Substation No **6A'** , of a total power of 6,300 KVA
- Output field (O.F.) for three (3) power-operated cranes (42, 43 and 44), of a total power of 3,000 KVA
- Output field (O.F.) for three (3) power-operated cranes (39, 40 and 41), of a total power of 2,000 KVA

Also, in the same place but in a different position, along with the existing MV switchboard, there is:

- The Output field (O.F.) for current transformer No **2** of a total power of 1000 KVA which is installed in an independent space within the building of Substation No 6.
- The Output field (O.F.) for the building of Substation No **6B'** , of a total power of 6,450 KVA

1.2. The new MV switchboard to be installed, will be powered with medium voltage directly from DEDDIE through new 20KV (2XSY 3x1x95 mm²) cables and terminal boxes.

The Contractor's obligations also include, at his own expense, the following:

1. The supply, installation and connection of all medium voltage cables (with appropriate cross-section and length), terminal boxes and other materials required to connect the new medium voltage switchboard with:
 - The combiner of DEDDIE (2XSY 3x1x95 mm²);
 - The current transformer No **1** of the Substation on the medium voltage side (2XSY 3x1x 70 mm²);
 - The Output field (O.F.) for current transformer No **2** (2XSY 3x1x70 mm²);
 - The Output field (O.F.) for current transformer No **6B'** (2XSY 3x1x70 mm²)

The Contractor shall place all the above-mentioned materials of *par. 1.2.1 – B' Part* on the side walls of the already constructed ditches of the Substation, on special supports.

2. The performance of all necessary electrical tests, as described in *par. 1.19. – part B'*

1.3. The combiners of the new 20 KV switchboard to be supplied will be nine (9) in total, as shown in the attached diagram.

This medium voltage switchboard will include:

- Input Field
No **1** **1** unit
- Field of current transformers
No **2** **1** unit
- Measurement Field
No **1** **1**unit
- Output Fields (Output towards current transformer No **1**,

Bridge crane No **2**, Substation No **6A'**, Power-operated cranes 42 - 43 - 44, Power-operated cranes 39 - 40 - 41 and input to current transformer No **2** and Substation **6B'**) No **3, 4, 5, 6, 7** and **8 - 6** units

The switchboard will have a detachable base support of 10 cm height for each sector and will consist of metal enclosed combiners, suitable for operation at 20 KV and for laying on the floor. Future expansion of the switchboard will be done easily by simply adding extra combiners. Its dimensions will be suitable for the required electrical equipment and as low as possible for space saving. All the combiners will be constructed by the same company, in order to ensure uniformity in the overall facility.

The steel plates will have a thickness of 2 mm. Each combiner will be fully standardized and shall consist of fully processed and shaped sections before being painted. Assembling and disassembling the combiner will be very easy, will not alter the surface of its parts and expansion of the combiner in both directions shall be achieved.

The coating shall be electrostatic with a thickness of more than 40 microns. The thickness of the sheet metal, the dimensions of the combiners and their short circuit strength will be mentioned in the technical description of the participants in the tender.

On their front side, the combiners will have a door with a visual inspection port for their inner part and a special latch so that they do not open if the grounding is not in the "in" position.

All operations of the combiner will be made from the front side and only with the door closed.

Access to the interior will only occur if all electrical parts of the combiner are off and connected to the ground. When the door is open all electrical components are locked and can only change status when the door is safely closed.

With proper mechanical latches between door grounding-switches, the correct sequence of operations and staff will be ensured.

It will be possible to lock the combiner doors with padlocks that will all open with the same key.

Generally, all protection and control measures provided by the combiners will be described and the regulations governing their construction will be mentioned.

A plate with full verbal and diagrammatic instructions for operating the combiner will be placed on the front of the combiner to ensure its proper and safe operation. Distinct signs of danger from the presence of medium voltage will also be placed.

In the combiners, there will be suitable systems that will automatically open to release gas in the event of a short circuit, without being removed from their position, to avoid accidents. This means that a dynamic short-circuit strength of $IK = 12.5KA / 1 \text{ sec}$ (250MVA), according to IEC 62271-200, is ensured.

These openings shall comply with the requirements of EN 60298.

Cable entry and exit will be made from the bottom of the switchboard and it will only be accessible from its front and adjacent sides.

Metal lifting hoops will be placed on the top of the combiner to facilitate its movement. Each combiner can be transferred independently and flexibility and scalability can be achieved. The combiners will have suitable mechanical interconnection points and interconnection of the copper busbars (Cu) to connect with other combiners easily and safely.

The switchgear will be of a fixed type. The switch agent will be SF6 sulfur hexafluoride.

The combiner protection class will be IP 3X. The protection class of the internal parts in which the combiner is divided by the rotating switch is IP 2X.

Internally, the output combiners will be divided into the following sections:

- Bars section
It includes PVC insulated copper bars, which will be provided by the medium voltage supplier.
- Switchgear section
It includes the switch and the grounding in hermetically sealed SF6 shell.
- Cable connection section
Suitable for MV cables with entry from below
- Operating mechanism section
It includes the operating mechanism of the switches-grounding
- Low voltage section (auxiliary equipment)
It includes low voltage auxiliary equipment

The normal operating conditions will be the following:

- Maximum ambient temperature: 40°C (maximum mean temperature in 24 hours: + 35°C)
- Minimum ambient temperature: - 5°C

1.4. The technical characteristics of the Medium Voltage switchboard offered shall be at least the following:

- | | |
|--|-------------------------|
| - Rated operating voltage: | 24 KV |
| - Operating voltage: | 20 KV |
| - Busbar rated voltage (35°C): | 630 A |
| - Frequency: | 50 Hz |
| - Insulation voltage: | 24 kV |
| - Power frequency strength 50 Hz 1 mn | 50 KV rms |
| - Impulse testing voltage: | 125 kV |
| - Short-circuit current resistance: | 12.5 kA / 1 sec |
| - Rated peak intensity: | 31,5 kA |
| - Minimum internal arc resistance | IAC AFL 12.5 kA / 1 sec |
| - Category of losses due to continuous operation | LSC2A |

The medium voltage switchboard shall comply with EN 62271-200.

1.5. MV SWITCH

Each MV switch will use SF6 sulfur hexafluoride as a switch agent at low pressure and will not require maintenance. It will be in the form of a closed chamber. By means of a suitable indicative layout which will receive drive directly from the main control axle, it will be possible to identify the position of the switch contacts in the form of a mimic diagram.

The switch will be of increased operating frequency as defined in §3.104 of IEC 60265-1. It will have three operating positions (open - closed - ground position) and will be fully assembled and tested before leaving the production line. The relative pressure of the SF6 surrounding it will not exceed 0.5 bar. The construction of the switch cover will comply with the IEC 62271-200 (Annex G, §2.3 and 3.3) requirements for "sealed for life" systems for 30 years. During this period there is no need to refill the chamber with SF6. Switches requiring SF6 refilling or maintenance of major parts in the duration of 30 years are not acceptable.

The mechanical strength of the switch shall be at least 1000 operations.

1.6 SWITCHBOARD GROUNDING

Each field will include a copper grounding bar. The continuity of the ground circuit for the whole switchboard will be ensured by interconnecting the individual circuits of each field, i.e. with the MV materials, the cover and the secondary grounding elements of the current transformers etc. The interconnection will run across its whole width. The grounding bar will

be constructed to be easily connected with the grounding of the entire substation without requiring any dismantling. There will also be a flexible grounding on the doors.
The cross-section of the bars constituting the ground circuit shall have an appropriate sizing to resist a short-circuit in accordance with IEC 62271-200.

1.7. GROUNDING OF THE POWER CIRCUIT

The grounding of the power cables shall be carried out using a grounding device that, for safety reasons, shall have a making capacity for coupling as defined in IEC 60129.

It will be possible to operate the grounding device when the corresponding switch or disconnector is open so that the power cables can be tested.

By using a padlock, the ground switch can be locked in an open or closed position. The position of the grounding device will be visible from the front of the field.

Proper mechanical latches will prevent mistakes such as closing the ground switch when the switch or disconnector is closed.

It is not acceptable for the above latch to be achieved electrically or by using keys.

1.8. MV BUSBARS

The single compartment of the busbars will be at the top of the fields. It will include three parallel bars, insulated with PVC and horizontally mounted on the switches, which will be made of electrolytic copper.

No other access to this space will be acceptable.

The MV busbars will be placed in a suitable position to run through the combiners layout and will be retained by special insulating supports. The layout of the busbars, their cross-section, the mounting distance and the breaking limits of the insulators will provide a dynamic short-circuit strength of $IK = 12.5KA (250MVA)$ as per EN62271-200 / DIN 57103.

1.9. CABLE CONNECTION SECTION

The receptors for connecting the power cables will be suitable to receive monopolar dry-type cable terminal boxes.

Access to the compartment will only be possible after the corresponding ground switch has been closed.

No other access will be acceptable.

1.10. OPERATING MECHANISM SECTION

This section shall contain the operating mechanism for the operation of the disconnector, charge disconnector and ground switch as well as the indications from the capacitive distributors or the status indication of the MV fuses.

There will also be a mimic diagram that will faithfully reflect the state of the switchgear. For this information to be reliable, the mimic diagram will receive drive directly from the main contact axle.

There will be appropriate spots for the placement of signs that characterize the field or indicate its electrical characteristics.

This compartment will be accessible even if the field is under voltage.

The manual operation of the mechanism will be done using an anti-reflex control and will be independent of the applied force.

1.11. AUXILIARY EQUIPMENT SECTION

It will be at the top of the field and will include the low voltage materials required for operation and control (relay, pushbutton, switching materials, etc.) as well as any other auxiliary equipment.

In case the needs are increased and the available space is insufficient, then it will be possible to place an additional compartment with auxiliary equipment at the top of the field.

Both compartments will be accessible even if the field is under voltage.

1.12. AUXILIARY EQUIPMENT

It will comply with paragraphs 5.4 of IEC 62271-200 and 5.4 of IEC 60694.

To facilitate identification of the control circuits, the cables will be marked at both ends. The minimum cross section of the wires will be:

- 2.5 mm² for power circuits
- 1 mm² for the rest

1.13. MV FIELDS EQUIPMENT

A. Input Field No 1 - 1 unit

In this field, at least the following will be placed:

- One (1) MV charge switch

The three-pole MV switch will include SF6, with three operating positions (open, closed, ground position), 24KV, 630 A , 16KA/3 sec , 50kV 125 kVp with mimic diagram and an operating cylinder at ON position (which will work with the SF6 automatic switch), with a grounding device in the output, latched to the charge switch and the combiner door.

- One (1) automatic power switch

The MV automatic power switch will be of SF6, 24KV, 630 A rated voltage, 12.5 KA / 1sec rated disconnection intensity, fixed type. It will include a controller, manual RI operation mechanism for tensioning the springs, safety key in OFF position, 230V/50Hz working coil, operation counter and auxiliary contacts. It will also have a protection mechanism with keys or padlock to avoid possible grounding of the network of DEDDIE. Also, the combiner must carry an emergency warning sign prohibiting the operation of the grounding device before the power supply of the network of DEDDIE is deactivated.

- One (1) three-pole secondary protection relay suitable for operation via current transformer for overcurrent and short-circuit protection, with independent time setting and grounding fault protection, i.e. ANSI (50/51, 50N / 51N).

Specifically, the relay:

- will be of integrated circuit technology, with a programmable microcomputer;
- will control the primary current transformer to which the node of the secondary is directly grounded;
- will drive a power switch, installed on the primary of the current transformer;
- will gain indications from 3 current transformers (double wrapping in the secondary, one for measurement and one for protection) to protect the 3 phases, which will be placed at the Field of current transformers No2 and one (1) toroidal current transformer to protect from leakage to Earth;
- will have a RS485 / Modbus communication port

This relay will be powered by an uninterruptible power supply (UPS) system, in accordance with paragraph 3 of Part B hereof.

In addition, there will be at least the following by unit and quantity:

- Three-pole electrolytic copper bars 630 A
3 units
- Capacitive voltage distributors with the corresponding indicator lamps
3 units
- One (1) Three-phase voltage detection relay
1 unit
- 20 KV line lighting rods, 10 KA test intensity

with a support and disconnection device.

3 units

- Cable grounding device 24kV 16kA(3sec) 50kV 125kVp (full making capacity 40 kAp) capable of coupling to a short circuit.
- An extra box of low-voltage equipment in which, inter alia, the protection relay will be installed
- Suitable receptors for connecting cables at the given power.
- Auxiliary contacts for indicating the status of the charge switch and grounding device.
- 50 W, 230 V heating unit.

Indicative dimensions: W x D x H: 750 x 1120 x 1600 mm

B. Field of current transformers No 2 - 1 unit

In this field, three (3) current transformers made of epoxy resin will be installed, having the electrical characteristics (operating voltage, insulation level, short-circuit resistance) referred to in the comprehensive Table, DIN Type 300-600 / 5/5 (double wrapping in the secondary, one for measurement and one for protection) to protect the 3 phases.

- Capacitive voltage distributors with the corresponding indicator lamps 3 units
- Three-pole electrolytic copper bars 630 A 3 units
- 50 W, 230 V heating unit.

Indicative dimensions: W x D x H: 750 x 1120 x 1600 mm

C. Measurement Field No 2. 1 - 1 unit

In this field, at least the following will be placed:

- One (1) three-pole switch, with three operating positions (open, closed, ground position), SF6, 24KV, 630A, 16KA/3 sec, 50kV 125kVp, with a switch mechanism activated when even one fuse melts, 24KV, 630A, 16KA/1sec, with mimic diagram and an operating cylinder in a common shell with the grounding device.

In addition, there will be at least by unit and quantity:

- Three-pole electrolytic copper bars 630 A - 3 units
- Manual operating mechanism for the charge switch and grounding device
- Current transformers 1P - 3 units
- Tuning resistor - 1 unit
- Protective fuses for the 24 KV / 6 A current transformers - 3 units
- 100 A Fuse bases - 3 units
- Three-pole fuse disconnecter 32 A LV - 1 unit
- Cylindrical fuses 10 x 38 -3 units
- Mechanical indicator of melted fuse
- Multi-instrument or equivalent with digital indication for:
 - current measurement (I1, I2, I3)
 - voltage measurement phase-phase (U12, U23, U31) & phase – neutral (U1N, U2N, U3N)
 - frequency measurement
 - cosine measurement (cosφ)
 - power measurement (active - inactive - apparent)
 - energy measurement (active - inactive - apparent)
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The multi-instrument will have an RS485 / Modbus communication port.

- Auxiliary contacts for indicating the status of the charge switch and grounding device.
- An extra box of low-voltage equipment for the installation of the multi-instrument and the necessary equipment for smooth operation.

Indicative dimensions: W x D x H: 380 x 950 x 1600 mm

D. Output Fields - (OF 3 , OF 4 , OF 6 and OF 7) - 4 units

(Output Field to the current transformer No **1**, bridge crane No **2**, the power operated cranes 42 – 43- 44 and 39 - 40 - 41).

Each Output field will include at least:

- One (1) MV charge switch

The three-pole MV switch will include SF6, with three operating positions (open, closed, ground position), 24KV, 630 A , 16KA/3 sec , 125kVp50kV with mimic diagram and an operating cylinder at ON position (which will work with the SF6 automatic switch), with a grounding device in the output, latched to the charge switch and the combiner door.

- One (1) automatic power switch

The MV automatic power switch will be of SF6, 24KV, 630 A rated voltage, 12.5 KA / 1sec rated disconnection intensity, fixed type. It will include a controller, manual RI operation mechanism for tensioning the springs, safety key in OFF position, 230V/50Hz working coil, operation counter and auxiliary contacts.

- One (1) three-pole secondary protection relay suitable for operation via current transformer for overcurrent and short-circuit protection, with independent time setting and grounding fault protection, i.e. ANSI (50/51, 50N / 51N).

Specifically, the relay:

- will be of integrated circuit technology, with a programmable microcomputer;
- will control the primary current transformer on which the secondary node is directly grounded;
- will drive a power switch, installed on the primary of the current transformer; will gain indications from 3 current transformers made of epoxy resin, having the electrical characteristics (operating voltage, insulation level, short-circuit resistance) referred to in the comprehensive Table, DIN Type /5/5 (double wrapping in the secondary, one for measurement and one for protection) to protect the 3 phases and one (1) toroidal current transformer to protect from leakage to Earth.

This relay will be electrically powered by the same uninterruptible power supply (UPS) system. (Input Field No 1).

In addition, there will be at least the following by unit and quantity:

- Three-pole electrolytic copper bars 630 A - 3 units
- Capacitive voltage distributors with the corresponding indicator lamps
3 units
- Cable grounding device 24kV 16kA (3sec) 50kV 125kVp (full making capacity 40kAp) capable of coupling to a short circuit.
- An extra box of low-voltage equipment in which, inter alia, the protection relay will be installed
- Suitable receptors for connecting cables.

- Auxiliary contacts for indicating the status of the charge switch and grounding device.
- 50 W, 230 V heating unit.

It is noted that the relays of all the output fields will also have a RS485 / Modbus communication port.

Indicative dimensions: W x D x H: 750 x 1120 x 1600 mm

E. Output Fields - (OF 5 and OF 8) - 2 units

(Output Field to Substation No **6A** and Output Field to the Fields of the current transformer No **2** and Substation No **6B'**).

Each Output field will include at least:

- One (1) MV charge switch

The three-pole MV switch will include SF6, with three operating positions (open, closed, ground position), 24KV, 630 A , 16KA/3 sec , 125kVp50kV with mimic diagram and an operating cylinder at ON position (which will work with the SF6 automatic switch), with a grounding device in the output, latched to the charge switch and the combiner door.
- One (1) automatic power switch

The MV automatic power switch will be of SF6, 24KV, 630 A rated voltage, 12.5 KA / 1sec rated disconnection intensity, fixed type. It will include a controller, manual RI operation mechanism for tensioning the springs, safety key in OFF position, 230V/50Hz working coil, operation counter and auxiliary contacts.
- One (1) three-pole secondary protection relay suitable for operation via three current sensors 250A cl 05/5P125 for overcurrent and short-circuit protection, with independent time setting and grounding fault protection, i.e. ANSI (50/51, 50N / 51N).

Specifically, the relay:

 - will be of integrated circuit technology, with a programmable microcomputer;
 - will drive a power switch;
 - will gain indications from 3 current sensors 250A cl 05/5P125 and one (1) toroidal current transformer to protect from leakage to Earth.

This relay will be electrically powered by the same uninterruptible power supply (UPS) system. (Input Field No 1).

In addition, there will be at least the following by unit and quantity:

- Three-pole electrolytic copper bars 630 A - 3 units
- Capacitive voltage distributors with the corresponding indicator lamps - 3 units
- Cable grounding device 24kV 16kA(3sec) 50kV 125kVp (full making capacity 40 kAp) capable of coupling to a short circuit.
- An extra box of low-voltage equipment in which, inter alia, the protection relay will be installed
- Suitable receptors for connecting cables.
- Auxiliary contacts for indicating the status of the charge switch and grounding device.
- 50 W, 230 V heating unit.

It is noted that the relays of all the output fields will also have a RS485 / Modbus communication port.

Indicative dimensions: W x D x H: 750 x 1120 x 1600 mm

1.14 INSTALLATION OF ELECTRICAL - SWITCH GEAR - DEVICES

All electrical materials to be used for the construction of the Electric Fields will derive from well-known and established companies, indicatively, SIEMENS, ABB or SCHNEIDER ELECTRIC, in order to maintain uniformity with the rest of the installed electrical equipment in the port. The basic equipment (automatic power switch, charge switch, grounding devices, current transformers and sensors and relay) of the electrical switchboard will be made of materials of the same company.

1.15 DISMANTLING WORKS FOR THE OLD MV SWITCHBOARD AND INSTALLATION AND CONNECTION OF THE NEW MV SWITCHBOARD

The works include the complete restoration of the smooth operation of Substation No 6 by dismantling the old MV switchboard and the installation and reconnection of the new MV switchboard with new 20 KV cables.

All materials required for the above works, such as electrical connection cables, connectors (with joints or terminal boxes where needed) and other electrical equipment, will be supplied and installed by the Contractor and included in the object of this tender.

The Contractor, after visiting the site and being informed accordingly, will include them in his bid and will also include them in the total price of the project.

1.16 2XSY-type 12/20 KV MV Cable

The Contractor is required to perform all works necessary for the connection and activation of the necessary medium voltage power cables and other equipment of the new MV switchboard of Substation No 6 with:

- The combiner of DEDDIE (2XSY 3x1x95mm²)
- The current transformer No 1 of the Substation on the medium voltage side (2XSY 3x1x70mm²)
- The Output field (O.F.) for current transformer No 2 (2XSY 3x1x70mm²)
- The Output field (O.F.) to the current transformer No 6B' (2XSY 3x1x70mm²)

The passing of cables through the premises of the Substation building and their mounting will be carried out in accordance with the applicable Standards.

The MV cables to be used will be of similar technical characteristics to the existing, new, monopolar, 2XSY type, of appropriate cross-section and length, for a rated operating voltage of 20 KV, tested at 31,5 KV, otherwise according to IEC 502/83, VDE 0273/75, for medium voltage and transformer connection.

Technical specifications of the cable:

- Rated voltage: 20 KV
- Conductor: Copper
- Insulation: Cross-linked polyethylene (PE)
- Shielding:
 1. One layer of copper wires
 2. Copper tape, helical, wrapped around the copper wires
- Casing: Plastic PVC

1.17. TERMINAL BOXES

The indoor terminal boxes that will be used will be suitable for the 20 KV cables to be used and will be as safe as the corresponding cables.

The connection points of the terminal boxes will be very well tightened to avoid loosening from dynamic stresses on the contact points.

Before activation of the 20 KV systems, the terminal boxes will be tested under voltage without charges, along with the cables to which they are mounted.

1.18 QUALITY

The Contractor shall be able to provide a copy of the ISO 9001 - 2015 Quality Assurance Certificate (indicated as precondition in Part A' of the herein)

1.19 TESTS

A. Type tests

The Contractor shall be able to provide all TYPE Certificates of a corresponding series of 20KV switchboards (i.e. for Input Field, Current Transformers Field, Measurement and Output Fields) by recognized laboratories in Greece or abroad, at least for the following tests:

- impulse dielectric tests
- power frequency dielectric tests
- temperature-rise tests
- short-time withstand current tests

B. Routine tests

The routine tests will be performed by the supplier of the MV switchboard and he will be obliged to provide a relevant certificate stating that at least the following tests, as defined in IEC 62271-200, have been performed.

- power frequency dielectric tests
- dielectric tests on auxiliary and control circuits
- verification of the correct wiring
- mechanical operation tests.

2. **UNINTERRUPTIBLE POWER SUPPLY (UPS) SYSTEM**

The power supply for all relays of the medium voltage switchboard will be done via an uninterruptible power supply (UPS) system, of 1.5 KVA and 60 minutes of autonomy.

3. **Compilation of the dossier to be submitted to DEDDIE - RECORDING- STUDY – DESIGN OF MV AND LV NETWORKS FOR SUBSTATION No 6.**

The dossier shall include all necessary designs and documents required by DEDDIE, even if not mentioned in the present technical description, for the approval of the operation of Substation No **6** of ThPA SA, following the installation and connection of the new 20KV switchboard of Substation No **6** to the 20 KV combiner of DEDDIE, to the primary of current transformer No **1**, the Output field (O.F.) for current transformer No **2** and the Output field (O.F.) for Substation No **6B'**, as follows:

1. FORMAL STATEMENT OF INSTALLER

- ELECTRICIAN CONTACT INFORMATION
- CONSUMER CONTACT INFORMATION
- PROPERTY INFORMATION
- INSTALLER LICENSE INFORMATION
- TOTAL INSTALLED POWER
- INSTALLATION DESIGN (With reference to other installers)
- TYPE OF WORK - EXECUTED
- CHARGES
- OTHER INSTALLATION INFORMATION (regarding Medium Voltage)
- INSTALLER SIGNATURE

Medium Voltage (MV)

2. CLIENT STATEMENT (DEDDIE Document)
3. ENGINEER STATEMENT (DEDDIE Document)
4. BUDGET (of the project)
5. TECHNICAL DESCRIPTION Information regarding the Client and the address of the property where the installation took place Grounding, according to article 19.13.3 of the

Regulation on Internal Electrical Installations (Official Gazette B/61/2.2.77)

6. CUSHION CURVE (DEDDIE Document)
7. SINGLE-LINE DIAGRAM OF SUBSTATION No 6
8. DEI CABLE ROUTE SITE PLAN Site plan by ThPA SA. If it does not exist, the Contractor is obliged, at his own expense, to draw up a new site plan to be sealed by a competent engineer of his choice.
9. GROUNDING PLAN - GROUNDING TRIANGLES & MEASUREMENT
10. FLOOR PLAN OF SUBSTATION No6

Low Voltage (LV)

11. FORMAL STATEMENT OF INSTALLER
12. VERTICAL DIAGRAM
13. SINGLE LINE DIAGRAM OF THE MAIN LV SWITCHBOARD
14. FLOOR PLANS INCLUDING SWITCHBOARDS AND LIGHTING
15. ENGINEER SIGNATURE LIABILITY

The Contractor shall undertake all necessary procedures for disconnection and reconnection of the electricity of Substation No 6 of ThPA SA with DEDDIE, following consultation with the Authority.

4. MISCELLANEOUS OBLIGATIONS

- 4.1** The MV switchboard and its parts to be installed at Substation No 6 (*par. 1- Part B'*), will be new, recently manufactured by a recognized company and manufactured in accordance with standards of international or European specifications (IEC, DIN or others) and ready for immediate operation. Their technical characteristics will be guaranteed by the manufacturer's official Certificates and PROSPECTUS.

The Contractor shall install and connect all the above-mentioned materials of the new 20 KV switchboard, as well as other equipment for its connection to be used, to a specified area within Substation No 6 of ThPA SA, to be designated by the Authority and deliver the entire installation in full operation.

The above electrical works will be carried out by the Contractor in consultation with the Technical Service of ThPA SA. After completion of the above operations, the activation of the new MV switchboard and the connection of Substation No 6 with a medium voltage of 20 KV will be made by the Contractor only on a Sunday and after consultation with ThPA SA and DEDDIE.

- 4.2** At its delivery, the medium voltage switchboard:
- will be assembled, fully wired and tested (type tests and routine tests according to IEC 62271-200.). Type tests (*par. 1.19.A - Part B'*) will be carried out in a Testing Laboratory and the routine tests (*par. 1.19. B - Part B'*) will be carried out at the manufacturing plant. Copies of all the corresponding Test Certificates will accompany the MV switchboards.
 - will be accompanied by manufacturing Certificates of the plant, listing all relevant information.
- 4.3** In his bid, the Contractor shall explicitly state that he has the obligation to carry out the preparation and completion of the dossier (designs, technical descriptions, etc.) and its submission to DEDDIE, at his own expense, as well as the processing of all relevant and necessary documents for the approval of the new electrical installation of Substation No 6, as it is formed by the supply, installation and activation of the new MV switchboard and other electrical equipment.

Any financial burdens that may be required by DEDDIE for the above-mentioned approval process (e.g. fees, participation, guarantees, etc.) will be borne by ThPA SA.

It goes without saying that an authorized and competent engineer of the contractor shall sign the designs and other documents required by DEDDIE as an installer. Also, the contractor is obliged to provide technical data, information, etc. which will eventually be requested by DEDDIE.

The costs that will be required for the approval of the above dossier by DEDDIE are not included in the budget of the above tender.

4.4 In order to draft their bids, participants may, if they wish, visit Substation No 6, where the new 20 KV switchboard will be installed and connected. The competent staff of ThPA SA will provide any necessary information or facilitation (Tel.: 2310- 593.520- Mr. Gagavouzis).

4.5 At the signing of the Contract, the Contractor shall submit a statement to ThPA SA, specifying his lawful Technician who will be wholly responsible for monitoring and supervising all constructions, connections and links. The statement must also be signed by the appointed Technician, so that he appears to accept the assignment. He will also sign the special form of the Authority concerning the operation of the repair shop within the port. The Contractor's Technician will have the necessary licenses for works in MV Substations, which will be available at any demand by ThPA SA. Throughout the works and until receipt, the Contractor and his supervising Technician shall take all necessary measures for their staff and third parties working at the place of installation of the MV switchboard. In addition, all Contractor's technical staff will have the appropriate professional licenses for electrical works in 20 KV Substations to be carried out within the space of Substation No 6, which will be available at any demand by ThPA SA.

The Monitoring and Reception Committee will contact the above competent person of the Contractor for any technical matter that may arise during the execution of the project.

4.6 The new MV switchboard will be installed within the customs-controlled area of the Port and consequently the Contractor must be aware of and comply with what this special status entails. Also, during the installation works of the equipment of the 20 KV switchboard, the contractor must comply with all customs provisions on bringing tools and machinery in and out of the Port.

4.7 All works will be performed in accordance with the Greek and European regulations governing these constructions. During the performance of works, the Contractor is obliged to apply all safety measures provided by the relevant legislation.

The Contractor also assumes full and exclusive responsibility for the suitability, lawful provision of work and residence to the persons employed in the project that the hereby undertakes.

4.8 The contractor's employees will constantly wear Personal Protective Equipment (PPP), will faithfully follow what is required by the labeling on the indoor and outdoor spaces of ThPA SA and will place a warning sign regarding the risks created by the execution of their work.

4.9 The contractor bears full and exclusive civil and penal liability for any accident or damage caused to ThPA SA, his staff or the staff of ThPA or any third party, due to work that the contractor has undertaken or due to his actions or actions of the persons to be employed during the performance of the contract and until the expiration of the Contract. If an accident occurs, the Contractor will make all the required announcements.

4.10 The Contractor undertakes to comply with the health and safety provisions of the legislation and the of technical and scientific rules, for the totality of persons involved workers or not, including those indicatively referred to in the guide on Health and Safety in the Workplace ThPA SA. for which he was informed.

4.11 Also, ThPA SA does not bear any responsibility for any loss of materials, parts, machines and tools of the Contractor, who must ensure that they are adequately and effectively guarded.

4.12 The Contractor has according to Article 9 Law 4552/2018 the obligation to align to the provisions of the labor and insurance legislation, the legislation on health and safety of workers, as well as the legislation for the prevention of occupational risk, and is obliged to send every month to ThPA S.A. proof of payment of remuneration and any outstanding redundancy payments and statements of payment of the social security contributions of the employees employed by him for the performance of this contract.

For the rest, the provisions of Article 9 of Law 4554/2018 shall apply.

4.13 Upon request of the contractor, ThPA SA will supply three-phase 380 V power free of charge.

ATTACHMENTS:

1. Floor plan of Substation No 6
2. Indicative single-line diagram of the new MV switchboard

**THE CHAIRMAN OF THE BOARD
& MANAGING DIRECTOR OF THPA S.A.**
SOTIRIOS THEOFANIS



ΟΛΘ Α.Ε.

ΥΠΟΣΤΑΘΜΟΣ ΗΛΕΚΤΡΙΚΗΣ ΕΝΕΡΓΕΙΑΣ 6ου ΠΡΟΒΛΗΤΑ

ΚΛΙΜΑΚΑ 1 : 100



