

Annex 1.2. Development of design documentation

1. Design requirements

Schedule 1. General requirements to technical solutions that have to be implemented into design of Glodeni BESS field BOP.

No	Section	Requirement
1.	Location	Glodeni locality, Cluj county. Mures, Centre Development Region, Romania, respectively the lands identified with no. cadastral area: 50604 – area 5,000 sqm, 52833 – area 1,720 sqm Site coordinates: 46.655513, 24.596842
2.	Type of construction	New construction
3.	Customer	GLODENI ENERGY S.R.L.
4.	Design stages	Technical Project / Proiect Tehnic (PT) and Execution Details / Detalii de Execuție (DE) design stage
5.	Engineering surveys	Will be provided by the Employer
6.	Data on special construction conditions (seismicity, subsiding soils, flooded areas, etc.).	According to the national standards
7.	Basic architectural and planning requirements, characteristics of the designed object	<p>Civil requirements:</p> <p>1. The type of basic equipment (PCS&MV Power station, BESS enclosures) shall be determined by the Employer. The Employer will provide all the necessary drawings and technical documentation of the main equipment.</p> <p>2. Provide the scope of works for building site preparation works – soil movement, ground planning, removing crop residues, bushes, one-standing trees, and other works if any. Provide a plan of preparatory works.</p> <p>3. Provide building organization plan with construction camp and other works if any.</p> <p>4. Provide rainfall and snow calculations, relief analysis. Provide drainage system organization plan if any.</p> <p>5. Foundations for transformer substations (MV), inverters, BESS enclosures have to be provided preferably of monolithic structures must be justified to the employer.</p> <p>6. Provide access roads, construction of internal site roads, construction of the service roads, construction of drainage system.</p> <p>Electrical requirements</p> <p>DC network</p> <p>1. The DC power from the enclosures to the inverters have to be collected by a copper cable with XLPE insulation with voltage up to 3 kV. Selected cable cross-section should be checked for voltage losses level. It is allowed not more than 1.5%.</p>

No	Section	Requirement
		<p>2. Direct current cables have to be laid in the ground and to be protected by the PVC pipes in the places of crossing with other communications.</p> <p>Low voltage network</p> <p>1. Provide AC power collection from inverters to Medium Voltage Substations (MVS) and Auxiliary network by the aluminium cables with cross-linked polyethylene insulation of appropriate cross-section. Selected cable cross-section should be checked for voltage losses level. No more than 2% voltage loss is allowed.</p> <p>2. Provide couplings for AC cables termination.</p> <p>Medium voltage network 33 kV</p> <p>1. Cable lines should be laid near the site internal roads at a sufficient distance in accordance with local regulations. In some places cables could be laid under the roads.</p> <p>2. Provide AC power collection from MVS to Substation by the Single-core cable with a rated voltage of 33 kV with XLPE insulation; cable brand, cross-section and cable laying method to be determined by the project. The calculation of the throughput capacity of the cable lines has to be provided for normal and post-emergency modes, provided and approved with the Employer.</p> <p>3. Provide sand-and-gravel mixture for under cable, protective reinforced technological material (to protect against damage in accordance with the standards of construction and operation in Romania) and signal tape along the entire length of the cable line in accordance with the requirements of the IEC;</p> <p>4. Provide for the installation of surge arresters to protect cable shields.</p> <p>5. Multicore control cables shall be labeled to maintain destination identification.</p> <p>All control cables to be supplied shall be connected to the relevant station equipment in an approved manner, including all necessary wiring. Their spare cores shall be terminated and marked for future extensions. Multi-core cables shall be connected to terminals as such that crossovers are avoided.</p> <p>A distinctive marking, including the following details, shall be embossed continually along with the complete outer covering:</p> <ul style="list-style-type: none"> - Manufacturer's name and/or trademark - Year of manufacture - Marks one meter apart, showing the cable length. <p>Data network</p> <p>1. The type and number of data cables should be determined in the project based on the requirements of the manufacturer main equipment and the network topology; when designing, take into account compliance with Employer IT standards (will be provided after the contract signing).</p>

№	Section	Requirement
		<p>Transformer stations (MVS) and inverters</p> <p>1. Provide installation and wiring as recommended by the equipment manufacturer. Employer supplies basic equipment: transformer substations, inverters, controllers.</p> <p>Fire alarm system</p> <p>In accordance with local codes and standards</p> <p>CCTV requirements</p> <p>1. Provide for the necessary number of cameras to continuously monitor the perimeter of the site, entrance gates and control points at the request of the Employer.</p> <p>2. Provide for the installation of cameras on hexagonal galvanized supports with a height of at least 3 m.</p> <p>3. Provide protection of cameras from vandalism (protective cover, fencing, etc.)</p> <p>4. Image quality: the type of cameras, the number of cameras on the perimeter and installation locations shall be agreed upon with the employer. The quality of images shall ensure the identification of the perpetrator's face. This can be achieved by increasing the picture quality of the camera or the number of cameras on the perimeter.</p> <p>5. The surveillance system must be interconnected with the perimeter security system. Output to the main monitor of the camera at the location identified by the perimeter security system as an "attempted intrusion".</p> <p>6. The surveillance system must be interfaced with the access control system. Output to the main monitor of the camera at the place of opening/closing of the controlled doors at the site (transformer stations, service building, entrance gates)</p> <p>7. Provide the necessary number of auxiliary surveillance monitors, the size of the picture on the monitor should not be less than 15x10cm (benchmark). To the required number of auxiliary monitors, it is envisaged plus one main monitor.</p> <p>8. Provide for server to store information. Archive should provide 2 weeks of storage of materials.</p> <p>9. Provide all switching devices to transfer information from sites to substation. Server, monitors, and computers with necessary programs</p> <p>10. Provide CCTV cameras in the premises and on the territory. The number of cameras should be agreed with the Employer.</p> <p>11. The software and server must integrate video surveillance of the BESS field.</p> <p>12. The software should combine a video surveillance system and a perimeter security system for the BESS field.</p> <p>Access control and perimeter security system</p> <p>1. Provide for control of service building doors and entrance gates at the site.</p> <p>2. Provide transmission of signals from transformer station sensors to the access control system. (transformer substation door control sensors are provided from the manufacturer).</p>

№	Section	Requirement
		<p>3. To provide interaction of access control and video surveillance systems. Output to the main camera monitor of the controlling place where the opening/closing event occurred.</p> <p>4. Provide server to store data with archive of at least 6 months (data: opening/closing time)</p> <p>Perimeter security system</p> <ol style="list-style-type: none"> 1. Provide perimeter control. 2. Provide perimeter identification of the object to be identified. 3. Provide interaction between the perimeter security system and video surveillance system. Display on the main camera monitor of the place where the event took place. 4. Provide necessary software and hardware for determining the location of the event (approaching, penetration) and transmission for displaying. Displaying to be done on the perimeter diagram. 5. Provide server for data storage with archive of at least 2 months (data: time, event point) <p>Roads and passages</p> <p>The roads shall be made of the following composition:</p> <ul style="list-style-type: none"> • Gravel filter layer • Gravel supporting layer <p>The roads shall be made of two types:</p> <ul style="list-style-type: none"> • Access gravel road • Concrete service road <p>The top of the roadway must be in line with the level of planning.</p> <p>Determining the constructive dimensions of the road is carried out taking into account the characteristics of the soil and the load from the vehicle. Transverse and longitudinal deviations are performed according to the standards and specificity of the relief.</p> <p>Fencing</p> <p>In accordance with local codes and standards</p> <p>Outdoor Lighting</p> <p>The total outdoor lighting system shall be switched from the gate by key switches and from the control room by main switches and/or photocells connected to the branch circuit in the low voltage distribution panel.</p> <p>The poles shall have installed cable end boxes and fuses, including cables connected to the lighting fittings.</p> <p>The lighting system of the outdoor part of the plots shall be implemented using the most advanced floodlights with LED bulbs.</p> <p>Grounding and Lightning Protection</p> <p>The Bidder have to design, the grounding and lightning protection systems for the BESS field.</p>
6.	Construction phases, start-up complexes	1 stages:

No	Section	Requirement
7.	Site improvement requirements	Provide for the improvement of the territory in accordance with national standards, taking into account the restoration of sites damaged during construction.
8.	Safety and health requirements	According to the requirements of current regulations on labour protection and fire safety
9.	Fire protection systems requirements	Define in the project according to the requirements of national standards. The functions of the fire alarm system should provide the possibility of data transmission via a wired optical network and/or radio channel.
10.	Initial data for the development of project documentation	<p>Drawings and requirements developed by the Employer.</p> <ol style="list-style-type: none"> 1. Layout 2. Main equipment manuals and main drawings 3. TOPO and Geo reports. 4. SLD (Single Line Diagram / Schema monofilara).
11.	Requirements for the design of project documentation	<p>Project documentation to be completed in full for P.W. stage in accordance with national standards.</p> <p>The Contractor must develop, execute, and transfer to the Customer a complete set of technical documentation, in 3 (three) original copies on paper (1 - in English and 2 - Romanian language), and in 2 (two) copies on electronic media: the first - in *.pdf format, the second - in the software format in which the document was developed in English and Romanian languages.</p>