

ANNEXURE-2.2  
to  
CONTRACT  
for  
SUPPLY, INSTALLATION, COMMISSIONING AND  
OPERATION & MAINTENANCE OF 25MW/100MWh  
BESS POWER PLANT

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**LIST OF ANNEXURES**

- Annexure 1 : SUMMARY OF ENERGY STORAGE PURCHASE AGREEMENT
- Annexure 2 : LIST OF TOOLS AND TACKLES TO BE PROVIDED BY CONTRACTOR
- Annexure 3 : INDICATIVE LIST OF EXPECTED MAJOR/MINOR INSPECTIONS AND PREVENTIVE MAINTENANCES

**1.0 SCOPE OF SERVICES DURING OPERATIONAL PHASE**

1.1 It is clearly understood by the parties that in respect of Services to be provided by Contractor under the Term of the Contract during Operational Phase, responsibility of Owner shall be limited to furnishing of Spare Parts for the equipment (except spares for Containerized Battery Storage System), procurement of Owner's insurance and obtain permits as detailed elsewhere in the Contract and the Contractor shall be responsible for:

- a. Providing all services and supplies including spares, materials, warranty, consumables etc. for Containerized Battery Storage System.
- b. Providing services and supplies including consumables, warranty management, AMC's (if applicable) for the Plant (except Containerized Battery Storage System, (BOS)).
- c. Complete operation and maintenance of the Plant.

1.2 For the sake of clarity, the Contractor agrees and acknowledges that Consumables include fasteners, chemicals, gases, consumables, oils, lubricants, filters, electrical accessories, construction/building repairing materials (like – steel, cement, grouting cement, sand, aggregates etc.) and other materials (except Spare Parts for all equipment except containerized battery storage system), required from time to time for the operation, maintenance, inspection, testing and repair of the Plant, which will be consumed during operation and maintenance of Plant (including inspection, testing and repair) and will then need to be replenished, starting from start of Operational Phase till expiry of the Term in accordance with the terms and conditions specified in the Contract and this Technical Specification shall be in the scope of Contractor. Supply of scaffolding material and installation of scaffolding for all maintenance to be carried out at the Plant including civil work shall also be in the scope of Contractor.

1.3 The Contractor under this Contract shall be responsible for (a) Comprehensive Operation and Maintenance Services of the complete Containerized Battery Storage System and (b) Non-Comprehensive Operation and Maintenance Services of the complete plant (except Containerized Battery Storage System) including the power evacuation system up to 132kV Switchyard of the plant for a period of 12 years from the date of Taking-Over of Facility by the Owner.

1.4 For the sake of clarity, the Contractor agrees and acknowledges that

Consumables, tools & tackles include inter-alia all the components required for successful operation and maintenance of the Plant are in the scope of Contractor. The consumables shall be replenished on time-to-time basis to ensure the availability during the Operation and Maintenance phase.

1.5

The Contractor shall be responsible for all the required activities for efficient and successful operation and maintenance, of the Plant and the associated power evacuation arrangement covering but not limited to: -

- a. Deployment of O&M personnel and regulation of their duties.
- b. Successful operation of the Plant.
- c. Monitoring, controlling, troubleshooting, calibration of meters/instruments, testing of relays, oil filtration of transformers etc., maintaining of records and registers for the same.
- d. Comprehensive O&M of the Containerized Battery Storage System including but not limited to: -
  - i. Preventive, Predictive, Corrective and Breakdown maintenance activities.
  - ii. Supply of all spares and consumables required for the above-mentioned maintenance activities and successful operation.
  - iii. Management of all Warranties and claims.
  - iv. If PCS is in-built in the Containerized Battery Storage System, then it shall also be governed under Comprehensive O&M.
- e. Non-Comprehensive O&M for the Plant (except Containerized Battery Storage System), i.e. Balance of System (BOS) including but not limited to:
  - i. Preventive, Predictive, Corrective and Breakdown maintenance activities.
  - ii. Management of all Warranties, claims, AMC's (if applicable) from the OEM/OES.
  - iii. Consumables required for the above-mentioned maintenance activities and successful operation of the Plant.
  - iv. Supply of spares, as mentioned in the Contract, are in the scope of the Owner.
- f. Area housekeeping on day-to-day basis of Plant facilities.
- g. Maintenance of Control Room etc.
- h. O&M of all roads, Street Lighting, CCTV etc.

- i. Supply of all types of consumables for taking use in maintenance works shall be as per recommendations of the equipment manufacturers throughout the contractual O&M period.
  
- 1.6 Comprehensive O&M of the Containerized Battery Storage System shall include all preventive maintenance and corrective maintenance including replacement of any component to ensure that equipment is working satisfactorily as per design/system requirement such as:-
  - a. Conducting periodical checking, testing, overhauling and preventive maintenance works.
  - b. Daily general up-keeping including cleaning of all equipment, building, amenities, roads, BESS area, etc.
  - c. Submission of periodical reports to Owner on the energy charged and discharged of the Plant measured at the point of interconnection.
  - d. To ensure longevity, safety of the core equipment and optimum performance of the system the Bidder should use only genuine spares of high-quality standards.
  - e. It shall be the responsibility of the Contractor to make periodic replacements/replenishments of unit batteries (if required), spares, consumables etc. as and when required, during the Term of the Contract. It is hereby agreed that the expense of such replacement(s) is already included in the Bid.
  - f. Warranty management
  
- 1.7 During O&M period, Owner's personnel shall have unrestricted entry to the Plant and Control Room any time. Owner may suitably depute its personals to associate with O&M activities. Bidder shall assist them in developing expertise through their day-to-day O&M activities. All records of maintenance must be maintained by the Bidder, which can be accessed by Owner on demand. These records are to be handed over to Owner after the O&M period of Contract.
  
- 1.8 The Contractor is suggested to refer the '**Draft AERC (Procurement and Dispatch of Battery Energy Storage System) Guidelines, 2024 - Dated - 13/08/2024**', in order to have a better understanding of the Technical, Commercial and Regulatory requisites of this Project.
  
- 1.9 Grid Outages shall be duly certified to this effect by the Grid Operator/Owner. The Contractor shall provide a guarantee for the maximum length of time required for

this type of maintenance operation.

- 1.10 The Bidder shall comply with the provision of all relevant Acts of Central or State Governments including payment of Wages Act 1936, Minimum Wages Act 1948, Employer's Liability Act 1938, Workmen's Compensation Act 1923, Industrial Dispute Act 1947, Maturity Benefit Act 1961, Employees State Insurance Act 1948, Contract Labor (Regulations & Abolishment) Act 1970 or any modification thereof or any other law relating whereto, and rules made there under from time to time.
- 1.11 Planned outages for Scheduled Maintenance of the plant shall be duly informed by the contractor to the Owner with at least 1 (One month) prior notice. The contractor to ensure that the planned outages shall be in line with the Minimum Availability requirement of the plant (i.e. 95%) both monthly and yearly.
- 1.12 In this Technical Specification, capitalized terms used but not defined shall have the meaning assigned to them under the Contract dated [●].

## **2.0 GENERAL OBLIGATION OF THE CONTRACTOR**

- 2.1 The Contractor shall obtain, at its expense, all Permits required to be obtained by the Contractor, except those required to be obtained by the Owner, to allow it to carry on its business and provide the Services under the Contract.
- 2.2 Pursuant to the Contract, the Owner is contracting for the Services of the Contractor, as an independent contractor, to (a) operate, maintain and repair the Plant on behalf of the Owner, (b) supply Consumables required to operate and maintain the Plant, (c) store and export energy from the Plant on behalf of Owner (d) schedule, coordinate and handle deliveries and perform all duties and responsibilities (other than payment responsibilities of the Owner) and (e) otherwise operate, maintain and repair and administer the Plant in accordance with the Contract. Without limiting the generality of the foregoing, Services to be performed by the Contractor hereunder shall include acts, activities and other matters for effective operation, maintenance and repair of the Plant. Contractor will also perform energy audits, safety audits and plant performance audits periodically as per standards for the improvement in the performance of the Plant at its own expense. Audit shall be performed by third party agency having necessary accreditation. If Contractor has independent and duly accredited wing for performing such audits, it may be considered on case-to-case basis subject to submission of necessary documents and information to establish for establishing its credentials satisfactory to Owner.

- 2.3 Subject to Applicable Laws, provisions of the Contract and Prudent Utility Practices, Contractor shall operate the Plant in accordance with Instructions of Owner.
- 2.4 The Contractor shall abide by the terms, conditions and requirements for the operation, maintenance, inspection, testing and repair of the Plant set forth in the Contract. Further, Contractor shall co-operate in good faith with and assist the Owner in administering and complying with Project Agreements and maximizing the benefits to be derived by the Owner there under as specified in the Contract.
- 2.5 The Contractor will provide Services for technical support and root cause analysis of unscheduled outage and review, analysis and interpretation of Plant operating parameters, improvement in MIS, improvement in planning, suggestions for improvement in performance and suggestions for improvement in efficiency. Contractor will also provide Services for preparation and review of Annual Operating Plan and Budget, O&M Plan and Procedures, Inventory Management and Procurement Procedure during the Term of the Contract.
- 2.6 The Contractor shall make sure that, during the term of the Comprehensive O&M Contract of the Plant, the OEM or its representative are required to visit at least once a year or as per OEM recommendation cycle for periodic maintenance.

### **3.0 STANDARD OF PERFORMANCE OF SERVICES**

- 3.1 The Contractor shall perform the Services required under the Contract including those set forth in Clause 4.0 or elsewhere in the Contract or Technical Specification in a prudent, efficient and careful manner and in accordance with:
- 3.2 The provisions of the Contract.
- 3.3 The Prudent Utility Practices.
- 3.4 the Annual Operating Plan and Budget and the policies, procedures and other plans and budgets to be established by the Owner during the Term;
- 3.5 The O&M Plan and Procedures for the Plant to be developed by Contractor and to be approved by Owner as described in Clause 1.0 or elsewhere in the Contract or Technical Specification.
- 3.6 The O&M Manuals provided by OEM and/or Contractor.
- 3.7 The recommendations in relation to Plant, equipment, materials or other work provided by the Contractor.
- 3.8 All Applicable Laws, Permits, clearances and Governmental Authorizations in relation



- to Contractor 's obligations under the Contract.
- 3.9 Applicable Dispatch Instructions.
- 3.10 The requirement of any System Operator.
- 3.11 The Project Agreements specified in the Contract; and
- 3.12 All insurance policies specified in the Contract.
  
- 3.13 **The Services shall be performed:**
  - 3.13.1 So as to achieve or improve upon guaranteed performance parameters defined in the Contract.
  - 3.13.2 So as to minimize Scheduled Outages and not to cause any outage except for Scheduled Outages.
  - 3.13.3 So as to assist in achieving efficient operation of the Plant and to minimize the overall operating and maintenance expenses of the Plant.
  - 3.13.4 In a manner consistent with insurance policies maintained either by the Contractor or Owner in relation to the Plant and so as not to vitiate or annul any cover afforded by such insurance policies; and
  - 3.13.5 So as to optimize useful life of the Plant and minimize the LCOS.
  
- 3.14 In the event that any of the standards and requirements specified under Clause 3.0 above or elsewhere in the Contract, for the performance of the Services by the Contractor hereunder require a higher level of performance or a greater duty of care or are otherwise more stringent, more restrictive or more onerous than other such standards and requirements, the more stringent, restrictive or onerous of the standards or requirements shall apply to the Contractor's performance of the Services.

**4.0 SERVICES TO BE PROVIDED BY CONTRACTOR DURING THE TERM OF CONTRACT**

- 4.1 In furtherance of and without limiting the obligations and responsibilities of the Contractor specified in Clause 1.0 above and elsewhere in the Contract, the Contractor shall, at all times commencing from the date of Taking-Over of Facility by the Owner and continuing through the Term and in accordance with the provisions of the Contract, perform the following services specified but not limited to:
  - 4.2 For the convenience only, Services have been categorized as services during the

Operational and Maintenance Phase. However, any Services envisaged under the Contract to be provided by Contractor, irrespective of their categorization, shall be provided as and when required.

**4.3 SERVICES DURING PRE-O&M PHASE**

4.3.1 During the Pre-O&M Phase as defined under the Contract, the Contractor shall perform the Services including but not limited to those specified in Clause 4.3 and its sub-clauses of this Technical Specification and or elsewhere in the Contract. O&M Phase is the period commencing for 12 years from the date of Taking-Over of Facility by the Owner.

**4.3.2 List of Activities to be carried out during the Pre-O&M Phase not limited to the following,**

- 1) Mobilization on Manpower
- 2) Acquiring of Necessary license permit
- 3) Setting up of basic infrastructures required for the carrying out of O&M activities for the facility.
- 4) Submission of O&M manuals to the owner for review and approval.
- 5) Receipt and acknowledgement of as built drawings, datasheet, maintenance procedures, and other related documents for the OEM/Contractor.
- 6) Organize a joined training session with the EPC team.

**4.3.3 Contractor Staff**

4.3.3.1 Staffing plan provided in Annexure 11 of Contract document shall be reviewed in conjunction with this clause.

4.3.3.2 Provide written job descriptions in reasonable detail for each category of Contractor Staff along with their name, CV, etc. for Owner’s approval 30 (thirty) days prior from the start of O&M phase.

4.3.3.3 Deploy trained and experienced Contractor Staff required for the performance of the Services during O&M phase as per the Contract.

**4.3.4 License, Permits and Clearance**

4.3.4.1 Obtain Permits, clearances and licenses required to be obtained and maintained by the Contractor pursuant to the Contract for providing Services under the Contract and submit copy of all such Permits, clearances and licenses to the Owner 30 days

prior to the start of the O&M phase.

#### 4.3.5 **Insurance Policies**

4.3.5.1 Procure insurance policies required to be procured and maintained by the Contractor as specified in the Contract and submit copy of all such insurance policies to the Owner 30 days prior to the start of the O&M phase.

#### 4.3.6 **Spare Parts, Consumables, Tools & Tackles**

4.3.6.1 The Contractor shall provide an inventory list of all chemicals, Consumables, oil, lubricants, Spare Parts, fixtures, special tools and tackles and equipment forming a part of the Plant or being the subject of the Services, which are the property of the Owner.

4.3.6.2 The Contractor shall arrange for all the necessary tools and tackles for carrying out all the maintenance work covered under the Contract.

4.3.6.3 Procure, supply, transport from supplier's works/warehouse, receive, inspect, store, use and manage Consumables required for uninterrupted and trouble-free operation and maintenance of the Plant during Term of the Contract.

4.3.6.4 Ensure availability of Spares, Consumables at Plant sufficiently in advance of start of Operational Phase, no later than 2 (two) weeks prior to the start of Operational Phase.

4.3.6.5 Procure all Consumables as per specification provided by OEM and preferably from source recommended by OEM (if any) and in each case approved by Owner.

4.3.6.6 Deploy tools & tackles, appliances, material handling equipment, technician's tools box, instruments etc. as specified in the Contract.

#### 4.3.7 **Drawings, Documents, Manuals and Procedures**

4.3.7.1 Review, modify, update and prepare O&M Plan & Procedure including maintenance plan consistent with standards of performance specified in Clause 3.0 of this Technical Specification and as specified in relevant clause of Technical Specification and submit the same to Owner for approval 30 days prior to the start of the O&M phase.

4.3.7.2 Review, modify, update and prepare list of Spares, Consumables and other materials as specified in the Contract and submit the same to the Owner for approval 30 days prior to the start of the O&M phase.

- 4.3.7.3 Submit Annual Operating Plan for first year of operation 30 days prior to the start of the O&M phase. Procedure to be followed for adopting/approval of Annual Operating Plan is specified in this Technical Specification.
- 4.3.7.4 Prepare work order for maintenance reservation of materials for maintenance, issue permit to work, update status, maintenance history, etc.
- 4.3.7.5 A Master list of all drawings, documents, O&M Manuals, O&M Plan and Procedures, logs, reports, records, etc. of the Plant including those developed by the Contractor while performing Services under the Contract is to be prepared and maintained by the Contractor.

#### 4.4 **SERVICES DURING OPERATIONAL PHASE OF THE CONTRACT**

- 4.4.1 During the Operational Phase as defined under the Contract, the Contractor shall perform the Services including but not limited to those specified in Clause 4.4 or elsewhere in the Contract. Operational Phase is the period starting from Date of Taking-Over of Facility by the Owner and shall continue till the expiry of Term or till termination date in case of early termination of the Contract as per the provision of the Contract.
- 4.4.2 List of Key activities to be carried out during the operational phase but not limited to the following,
  - 1) Monitoring of the system
  - 2) All O&M activities required for the successful operation of the plant.
  - 3) Conducting periodic test and inspections applicable to the Plant as per industry standards and OEM recommendation.
  - 4) Daily energy forecasting as per AERC norms / Owner guidelines
  - 5) Submission of test reports, inspection report, monitoring reports, PG test report, Daily charge discharge report, Reporting Annual degradation test and any other reports as required by the owner on mutually agreed timeline (daily/weekly/monthly/yearly) by both the parties.
  - 6) As per the Contract the OEM/EPC or its representative are required to visit at least once a year or as per OEM recommendation cycle for periodic maintenance. During O&M period, the OEM is required to respond within one working day through telecom or any electronic mean.
  - 7) Hydro static test of the firefighting cylinders as per statutory provision.

- 8) Periodic refilling of firefighting cylinders batch by batch (not all at a time).
- 9) Painting of the containers once in a year, painting of structures made of steel once in two years and transformers in once in two years.
- 10) To conduct structural stability test of all the installation once in a period of five years by engaging expert service and provide the report to the owner.
- 11) Apply for Consent to Operate (CTO) and its renewal from time to time on behalf of the owner as per prescribed APCB guideline.

**4.4.3 Operation & Maintenance of the Plant**

4.4.3.1 Plan, manage, operate, maintain, carryout tests and repairs of the Plant on a 24 (twenty-four) hours per day, 7 (seven) days per week and 365 (three hundred sixty-five) days per year basis including all auxiliary equipment and interconnecting equipment of the Plant ensuring achievement of guaranteed performance parameters.

4.4.3.2 Operation part consists of deputing necessary manpower required to operate the Plant. Operation procedures such as preparation to start up till synchronization, routine operations with safety precautions, monitoring of Plant etc. shall be carried out as per the manufacturer’s instructions to have trouble free operation of the complete system.

4.4.3.3 Daily work in the Plant involves logging of the operating parameters e.g. voltage, current, power factor, power and energy output, battery container temperature, state of health, state of charge, down time of the Plant. The Contractor shall note down failures, interruption in supply and tripping activated by different relays, reason for such tripping, duration of such interruption etc. The other task to check station battery (for auxiliary supply) voltage – specific gravity and temperature.

4.4.3.4 Cleaning of the plant inter-alia BESS yard, drains, cable trenches, etc. on regular basis or as when required.

- 4.4.3.5 Maintenance:
- a. The Contractor shall carry out the periodical / plant maintenance as given in the manufacturer’s service manual.
  - b. Regular periodic checks of the battery, PCUs and other equipment shall be carried out as a part of routine preventive maintenance.
  - c. In order to meet the maintenance requirements stock of consumables are

- to be maintained as well as various spare as recommended by the manufacturer/industry practice.
- d. Particular care shall be taken for outdoor equipment to prevent corrosion. Cleaning of the junction boxes, cable joints, insulators etc. shall also be carried out at every month interval.
  - e. Resistance of the earthing system as well as individual earthing is to be measured and recorded once in every six months. If the earth resistance is more than 1(one) ohm, suitable action is to be taken to bring down the same. Individual pit as well as grid earth resistance value along-with date of measurement shall be displayed on each earth pit as per norms.
  - f. A maintenance record/history sheet register is to be maintained by the Contractor to record the regular maintenance as well as any breakdown maintenance works carried out along with reasons thereof etc.
  - g. Contractor is required to maintain adequate O&M spares, consumables testing kits, and tools during the O&M Contract period of the Plant with a view to maximize availability of the plant. In order to meet the emergent requirements, Contractor, with the permission of Owner can utilize the mandatory/ specified spares being supplied under the Contract. However, the Contractor shall have to return/replenish the spare of the matching quality and rating within shortest possible time.
  - h. The Contractor shall check growth of vegetation and de-fertilize areas with vegetation that could eventually create disturbance on the battery containers or increase the risk of fire. Check the growth of vegetation in the microwave/infrared barriers lines and de-fertilize/herbicide it to prevent it from causing false alarms. Grass cutting in periodic basis.
  - i. The schedules shall be drawn such that some of the jobs other than breakdown, which may require comparatively long stoppage of the plant, shall be carried out with minimal interruption to the plant.
  - j. The Contractor shall deploy Plant In charge, adequate number of technical support staff and other supporting personnel during O&M period of Plant.
  - k. The Successful Contractor shall attend to any breakdown jobs immediately for repair/replacement/adjustments and complete at the earliest working round the clock. During breakdowns (not attributable to normal wear and tear) at O&M period, the Contractor shall immediately report the accidents,

if any, to the Engineer In charge showing the circumstances under which it happened and the extent of damage and or injury caused.

- l. The Contractor shall at his own expense provide all amenities to his workmen as per applicable laws and rules.
- m. The Contractor shall ensure that all safety measures are taken at the site to avoid accidents to his working personnel and Owners Workmen as per relevant statutory regulation. The Contractor shall comply with the provision of all relevant Acts of Central or State Government related with operational of plant.
- n. If negligence/maloperation on the part of the O&M personnel results in failure of equipment (including Containerized Battery Storage System) such equipment shall be repaired replaced by Contractor at free of charge.
- o. Replacement of equipment/spare parts/updating of software being phased out or not being supported by OEM's are also included in Contractor's scope.

4.4.3.6 Plan, schedule, carryout and manage day-to-day operation and perform daily, routine, preventive, corrective, predictive and breakdown inspection, testing (non-destructive testing), maintenance and repair of all Plant systems, equipment, components, etc., in accordance with the Contract, Prudent Utility Practice, Project Agreements, O&M Manuals, recommendations of Contractor/OEM, Applicable Laws, Permits, and approved O&M Plan and Procedure so as to ensure long term safe and reliable operation and maintenance of Plant.

4.4.3.7 Routine preventive maintenance activities shall include, without limitation, the monitoring of the following parameters:

- 1. Ambient temperature (°C)
- 2. AC Power after Inverter and PCS (W)
- 3. Inverter/PCS temperature
- 4. Battery Cell/Rack Voltage
- 5. Battery Cell/Rack Current
- 6. Battery Cell/Rack SoC
- 7. Battery Cell/Rack Temperature
- 8. BESS Charge/discharge control signal
- 9. Actual charge/discharge power and energy (from Transformer and PCS)
- 10. State of charge (SoC) - (from BMS)

11. Depth of discharge (DoD)- (from BMS)
12. State of Health (SoH) - (from BMS)
13. Battery cooling off period.
14. System Voltage and Current
15. System Power and energy
16. BESS Self Discharge Rate

4.4.3.8 Routine preventive maintenance activities shall include, without limitation.

1. Lubrication Checks.
2. Cleaning/flushing.
3. Preservation.
4. Visual Inspection
5. Operational monitoring
6. Vibrational analysis
7. Chemical analysis
8. Trend analysis
9. Calibration
10. Measurements
11. Adjustments
12. Oil analysis.
13. Replacement of wear/sacrificial parts; and
14. Resistance testing

4.4.3.9 Plan, execute and manage routine corrective maintenance activities to troubleshoot, inspect and repair the equipment upon identification and detection of certain conditions, including without limitation.

4.4.3.10 **Physical Fault Condition such as:**

- a. Loose contacts in connections.
- b. Cracks.
- c. Distortion/displacement; and
- d. Corrosion/discoloration.

4.4.3.11 **Demand fault condition such as failure to:**

- a. Start/run/operate.
- b. Stop.



c. respond.

4.4.3.12 **Abnormal characteristics such as:**

- a. Overheating.
- b. Noise;
- c. Chatter; and
- d. False response.

4.4.3.13 Corrective maintenance not requiring equipment shutdown shall be performed as soon as possible in order of priority. Corrective maintenance requiring equipment shutdown shall be performed when equipment is removed from service.

4.4.3.14 Above mentioned list of activities for preventive maintenance and corrective maintenance is indicative only. Contractor shall carryout all preventive maintenance activities and corrective maintenance activities which are required as per standard of performance described in Clause 3.0 above or elsewhere in the Contract.

4.4.3.15 Perform preventive and corrective maintenance activities on a system-by-system basis on all the equipment in the Plant.

4.4.3.16 Perform all unplanned, breakdown inspection, testing (including non-destructive testing), and repairs of the Plant whenever required.

4.4.3.17 Plan and perform statutory annual maintenance of major plant equipment by any approved agency approved by the Owner as per OEM recommendation.

4.4.3.18 Take all corrective actions whenever required consistent with Prudent Utility Practice and approved by Owner in order to achieve the Rated Capacity (or above) during each Time Block.

4.4.3.19 Notify the Owner by telephone as soon as reasonably practicable, and in any case, within 8 (eight) hours and in writing within 24 (twenty-four) hours of discovery of any unusual adverse operating condition or characteristic which cannot be immediately corrected by the Contractor.

4.4.3.20 Notify the Owner as mentioned in the Contract, in case of the Emergency Event.

4.4.3.21 Take action as mentioned in the Contract, in the event of extraordinary circumstances.

4.4.3.22 Be responsible, for the handling, management and disposal of all wastes in the Plant and comply with all directives in connection therewith.

4.4.3.23 Operate the Plant in accordance with the Dispatch Instructions of Owner.

- 4.4.3.24 Operate and maintain metering equipment and perform inspections, calibrations including calibration/testing of all electrical metering equipment, all operational parameters measuring instruments, for which the Owner is responsible under Project Agreements or as may be required by Prudent Utility Practices or by applicable laws or the Contract. Such calibration test/witnessing (in-house as well as by accredited third party agency) is also included in Contractor 's scope.
- 4.4.3.25 Condition monitoring of Plant equipment.
- 4.4.3.26 Monitoring the quality by performing equipment physical, and visual analysis and arranging cleaning and purification (online and offline) of transformer oils etc.
- 4.4.3.27 Control outages, both planned and unplanned, in a manner that is consistent with lowest financial implication, the obligations of the Owner, best utilization of labor and parts, and maximization of productivity by using detailed and integrated plans and schedules and resource management.
- 4.4.3.28 Obtain prior approval of Energy Storage Purchaser/Central Electricity Authority through Owner for scheduled outage.
- 4.4.3.29 Maintain Plant performance levels by using routine system and component performance testing.
- 4.4.3.30 Grass cutting/bush cutting/de-weeding of plant area as per requirement.
- 4.4.3.31 Repair of roads inside the Plant premises and outside area constructed by Contractor.
- 4.4.3.32 Operation, Maintenance and repair of air conditioning system, water supply system (including plumbing service 24X7 basis), sewerage system, associated system, electrical system, lighting, fire protection system, etc. of all the area of the Plant on 24 hours and 365 days basis including BESS control building, etc. is also included in Contractor 's scope of services.
- 4.4.3.33 The maintenance and repair of CCTV system, plant lighting, boundary wall including barbed wire fencing, security gate, road in the Plant and Plant drainage system is also included in Contractor 's scope of services.
- 4.4.3.34 Perform all the obligations of the Owner under the Project Agreements relating to the operation and maintenance of the Plant.
- 4.4.3.35 Ensure that operational goals and operating plans are consistent with approved Annual Operating Plan.
- 4.4.3.36 Ensure that Plant is operated and maintained in accordance with standard of performance defined in Clause 3.0 below or elsewhere in the Contract and in a safe,

reliable, efficient and prudent manner.

- 4.4.3.37 Ensure that expenses are controlled and managed in such a manner that they are consistent with approved Annual Operating Plan.
- 4.4.3.38 Perform certain tasks, duties, responsibilities and obligations assigned to Owner under the interconnection agreements, including, but not limited to, the following:
- a. Perform routine surveillance of all equipment routinely used to communicate with the Owner.
  - b. Notify the Owner, of any routine maintenance activities which will require clearance from the Owner's side;
  - c. Provide the Owner, with all required information regarding the Plant availability.
  - d. Monitor and adjust the reactive output of the Plant to maintain transmission voltage levels; and
  - e. Perform such other tasks and services which Owner may reasonably request from time to time in connection with operation and maintenance of the Plant.
  - f. Keep the Plant in good order and protect it from damage, premature deterioration, failure or malfunction.
  - g. Carry out energy audit, safety audit and plant performance audit every year and implement measures recommended in these audits for achieving highest standard of safety and maximizing efficiency and capacity enhancement of the Plant. All these audits shall be performed by reputed organization accredited for performing such audits as per terms of reference prepared by Contractor and approved by Owner.
  - h. Prior to finalization of each audit reports, detailed presentation on the findings and recommendations shall be made by the auditing agency to the Owner.
- 4.4.3.39 Constantly improve the following key performance indicator of the Plant:
- a. Plant availability.
  - b. Plant efficiency.
  - c. Equipment wise availability and efficiency.
  - d. Consumption of spares.
  - e. Shut down time for Unit and equipment; and
  - f. Number of times and quantum of power drawn from Grid.

- g. Coordinate settings of all protective relays as required by Owner/transmission utility.
- 4.4.3.40 Perform Root Cause analysis (RCA) for every incident of equipment/system failures / Unit tripping etc. and submit preliminary report within 24 hours and detail report (RCA) within fourteen calendar days of such incident and implement measures recommended in the RCA report approved by Owner for achieving highest standard of safety, and maximizing efficiency, availability and capacity enhancement of the Plant. All these measures shall be performed by the Contractor within mutually agreed timelines with approval from Owner. Transportation of failed components for RCA is in the scope of Contractor and expenses for which shall be borne by the Contractor.
- 4.4.3.41 Availability of maintenance team comprising of engineer, technician, and helper in night shift to ensure uninterrupted jobs during maintenance of major equipment like Battery, Bi-directional Inverters, transformers, 132kV Bay equipment, etc.
- 4.4.4 **Services and Obligation of Contractor related to Plant and Auxiliaries**
- 4.4.4.1 Perform all the services mentioned in the Scope of Service provided in this Technical Specification and Contract document.
- 4.4.5 **Contractor 's Staff**
- 4.4.5.1 Deploy experienced and trained staff in adequate number including replacement as per the Clause 4.3.3 to provide Services under the Contract. In no case the qualification and experience criteria required for any position shall be relaxed.
- 4.4.5.2 Contractor Staff shall possess knowledge of the Grid Code and provisions under ABT (availability-based tariff) so as to optimize the Plant operation and dispatch including the UI (uninterrupted interchange). Plant Manager shall be responsible for the enhancement of the benefits of ABT.
- 4.4.5.3 Provide legal, payroll, accounting and administrative support services with respect to Contractor Staff and make payment to Contractor Staff.
- 4.4.5.4 Direct and supervise the Contractor Staff while performing Services under the Contract.
- 4.4.5.5 Maintain discipline of Contractor Staff.
- 4.4.5.6 Provide boarding, lodging and make travel arrangements for all the Contractor Staff engaged in providing Services under the Contract.

- 4.4.5.7 Comply with labor rules, regulations and statutes.
- 4.4.5.8 Give preference to local people in employment under unskilled category.
- 4.4.5.9 Give preference to local people in employment of skilled workmen and staff wherever local people with requisite skills are available.
- 4.4.5.10 Implement proper attendance system for Contractor Staff including installation of punching system.
- 4.4.5.11 Any discrepancy brought to Contractor 's notice in attendance system shall be corrected immediately and Owner shall have right to deduct pro-rata fees as per price schedule in case of absence or following punching malpractices.
  
- 4.4.6 **Consumables and Spare Parts**
- 4.4.6.1 Procure, supply, package, transport from supplier's works/warehouse, obtain insurance, receive, inspect, store, preserve, use and manage Consumables including but not limited to.
- 4.4.6.2 Operation, maintenance, tests and repairs of the Plant on a 24 (twenty-four) hours per day, 7 (seven) days per week and 365 (three hundred sixty-five) days per year basis including all auxiliaries and interconnecting equipment of the Plant including 132kV Bay equipment, associated transmission line, and associated system, 132 kV switch yard, etc., ensuring achievement of Performance Guarantees as provided in (Guaranteed Performance) of the Contract.
- 4.4.6.3 Day-to-day operation, monitoring and daily, routine, preventive, corrective, predictive and breakdown inspection, testing, maintenance and repair of all equipment and ancillary equipment which are part of the Plant etc., in accordance with the Contract, Prudent Utility Practice, Project Agreements, O&M Manuals, recommendations of System Installer/OEM, Applicable Laws, Permits and the O&M Plan and Procedure so as to ensure safe and reliable operation and maintenance of Plant;
- 4.4.6.4 All unplanned, breakdown inspection, testing, and repairs of the Plant whenever required.
- 4.4.6.5 Taking all corrective actions whenever required consistent with Prudent Utility Practice and approved by Owner in order to achieve the Rated Capacity (or above) during each Settlement Period.
- 4.4.6.6 Performing Plant capacity test as and when required by any Governmental Authority or by Owner or required as per Project Agreements.

- 4.4.6.7 Operation of the Plant in accordance with the Dispatch Instructions of Owner.
- 4.4.6.8 Operation and maintenance of metering equipment and performing inspections, calibrations (including calibration of electrical metering equipment and Plant instrumentation by third party), metering and tests for which the Owner is responsible under Project Agreements or as may be required by Prudent Utility Practices or by Applicable Law or the Contract.
- 4.4.6.9 Controlling outages, both planned and unplanned, in a manner that is consistent with lowest financial implication, the obligations of the Owner, best utilization of labor and parts, and maximization of productivity by using detailed and integrated plans and schedules and resource management.
- 4.4.6.10 Maintenance and repair of CCTV system, Plant lighting, boundary wall including barbed wire fencing, security gate complex, all building and structures, Plant Road, and Plant drainage system. For clarity it is specified that supply of materials required for repair is in the scope of O&M Contractor.
- 4.4.6.11 Performing all the obligations of the Owner under the Project Agreements relating to the operation and maintenance of the Plant.
- 4.4.6.12 Operation and maintenance of the Plant in accordance with standard of performance defined in Clause 3.0 above or elsewhere in the Contract and in a safe, reliable, efficient and prudent manner; and constantly improving the following key performance indicators of the Plant:
- a. Plant Availability.
  - b. Plant Efficiency.
  - c. Equipment wise availability and efficiency.
  - d. Consumption of Spare Parts.
  - e. shut down time for Unit(s) and equipment; and
  - f. Number of times and quantum of power drawn from Grid.
- 4.4.6.13 Supply ancillary materials including but not limited to the following:
- a. First aid equipment, medicines etc. for on Site emergency medical treatment.
  - b. Tapes including insulation tapes, masking tapes, plastic cellulose tapes, fiberglass tapes, Teflon tape, etc.
  - c. Cutting and grinding tools including grinding wheels for cutting and buffing, grinding stones, grinding paste, blades, hacksaw, drills bits, tool and tool bits, hand tools and power tools, etc.

- d. Hardware including nails, split pins, binding wires, insulation screws, lead wire, hose clamp, fasteners like bolt/nut/washer (HT/SS/MS/GI), shim (brass/ss), Gouch screw, HT bolts, etc.
- e. Electrical accessories including electrical Lamps, protective glass for fixtures, electrical fixtures, winding wires, electrical insulation materials, bulbs, flashlights, dry cell batteries, indication lights for switchgear panels, fuses, cable ties, hand lamps with bulbs, plugs, cable glands, cable lugs, ferrules, cable ties, cable jointing and termination kit, soldering paste, soldering rods, etc.
- f. Stationeries including, computer stationery, recorder charts, chart pens, pen inks, calibration sticker, etc.
- g. Solvents, primers and paints (grade and make of primers and paints shall be same as originally applied by the Contractor/OEM);
- h. Transformer oil is in the scope of Contractor.
- i. Safety equipment, fire extinguisher chemicals, safety appliances and personal protective equipment, hand gloves, safety shields, gumboots aprons, fire hoses for replacement, fire blankets etc.
- j. Supply such items not specifically mentioned in this Technical Specification or the Contract but necessary for successful fulfillment of Contractor 's obligation under the Contract as per Prudent Utility Practices.
- k. Supply all chemicals, oils, compressor oils for HVAC, lubricants, grease, gases, etc. including transformer oils, etc. along with Material Safety Data Sheet. Maintain stock of each type and grade of oil, lubricants etc. at site in sufficient quantity to meet 12 months of regular consumption and also emergency requirement. Quantity of oil to meet emergency requirement shall be sufficient to fill at least one (largest) equipment to meet emergency situation.
- l. Procure all Consumables as per specification provided by OEM/Contractor and from source recommended by OEM/Contractor (if any) and in each case approved by Owner.
- m. Receive, inspect, store, preserve, use and manage Spare Parts (procured and supplied by Owner) required for uninterrupted and trouble-free operation and maintenance of the Plant supplied by Owner as specified

in the Contract.

- n. Ensure that Spare Parts, Consumables and other materials required for operation, maintenance and repair of the Plant are properly stored, and accounted for and that adequate stock is available at all times to support uninterrupted operation and maintenance of the Plant.

#### 4.4.7 **Power Supply/Sale**

- 4.4.7.1 Contractor shall perform on a day-to-day basis all the scope of services and obligations of the Owner under Energy Storage Purchase Agreements. The Contractor to provide the day ahead data of Energy export to the Owner as per STU/CTU and AERC guidelines (latest) every day. Contractor shall inform itself of the concepts of Security Constrained Economic Dispatch (SCED) and Security Constrained Unit Commitment (SCUC) and carry out the Operations of the plant accordingly.

#### 4.4.8 **Safety**

- 4.4.8.1 Comply with safety requirements as per the Contract.
- 4.4.8.2 Ensure safety of the Plant, the Contractor Staff, other personnel employed by Contractor for the Services and other individuals and invitees who are at any time on the Site, through the development and observance of an appropriate safety program.
- 4.4.8.3 Provide first aid equipment and staff trained in first aid for on-site emergency medical treatment. Owner shall provide reasonably equipped medical Center in due course of time. Contractor shall provide first aid training to 25% of its staff once in an Operating Year through a certified third party and submit the copy of certificates to the Owner for records.

#### 4.4.9 **Litigation, Clearances and Information**

- 4.4.9.1 Notify the Owner promptly upon obtaining knowledge of any event or casualty which may be claimed under an insurance policy of the Owner, or the Contractor maintained, pursuant to the Contract or any of the other Project Agreements, and provide all information required by the Owner to submit insurance claims and continue to assist the Owner in submitting and pursuing such claims. All claims related to insurance policies procured and maintained by Contractor shall be



submitted and pursued by Contractor .

- 4.4.9.2 Notify the Owner promptly upon obtaining knowledge of any potential warranty claim which may be asserted against any manufacturer, contractor or vendor providing services, materials or equipment for the Plant and provide all information required by the Owner to assert such warranty claims and continue to assist the Owner in asserting and prosecuting such claims.
- 4.4.9.3 Notify the Owner promptly upon obtaining knowledge of any litigation, claim, disputes or actions actually filed or any material litigation, claims, disputes or actions which are threatened in writing, concerning each case the Owner, the Contractor , the Plant or the Services.
- 4.4.9.4 Notify the Owner promptly upon obtaining knowledge of any actual refusal to grant, renew or extend or any delay or cause to anticipate delay in the grant, renewal or extension of any clearances/Permits/licenses or any action pending, or any action filed with respect to grant, renewal or extension of any clearances/Permits/licenses or any material action threatened in writing regarding the same.
- 4.4.9.5 Notify the Owner promptly upon obtaining knowledge of any penalty imposed or notices of violation issued by any Government Agency.

#### 4.4.10 **Drawings, Documents, Data and Reports**

- 4.4.10.1 Prepare and maintain operating logs, reports and records as specified in the Contract, documenting the operation and maintenance of the Plant including such logs, records and reports required under Project Agreements including PPA, applicable laws, permits, etc.
- 4.4.10.2 Establish and maintain the Master Document List and update drawings, O&M Manuals, O&M Plan and Procedures as and when required as specified in the Contract.
- 4.4.10.3 Prepare and submit to the Owner Daily Report, Monthly Report, Annual Report and other reports and information relating to operation and maintenance of the Plant as specified in the Contract.
- 4.4.10.4 Make available data and records including meter reading required by the Owner for the preparation of invoices to the Energy Storage Purchasers for billing periods established in connection with ESPA or Project Agreements.
- 4.4.10.5 Retain and preserve operating documents and historical operating data as specified in the Contract.

#### 4.4.11 **License, Permits, Clearance**

4.4.11.1 Obtain, renew, and maintain Permits, clearances and licenses required to be obtained and maintained by the Contractor pursuant to the Contract for providing Services under the Contract and submit copy of all such licenses, Permits and clearances to the Owner within 7 (seven) days of receipt of the same.

4.4.11.2 Ensure compliance with all the terms and conditions specified in Permits, licenses, clearances, etc. including environmental conditions specified in consent to operate issued by state regulations and clearance given by Ministry of Environment and Forest.

#### 4.4.12 **Insurance Policies**

4.4.12.1 Procure and maintain insurance policies required to be procured and maintained by the Contractor as specified in the Contract and submit copy of all such insurance policies to the Owner within 7 (seven) days of receipt of the same.

#### 4.4.13 **Access to the Plant by Owner**

4.4.13.1 It is understood by Contractor that the Plant is owned by the Owner, and it has a right to enter any part of the Plant any time, inspect, audit or do as it deem fit and is necessary in the interest of the Plant.

4.4.13.2 The Owner may allow access to the Plant to the consultants appointed by the Owner, Lender's engineer, Energy Storage Purchaser, insurance surveyor, any Government Agency or any other person as provided in the Contract.

#### 4.4.14 **Plant Metering, Testing and Inspection**

4.4.14.1 Contractor shall carryout, as and when requested by Owner, performance test, capacity test, tests or any other test of the Plant or any calibration tests of the invoice meters of electricity and provide the written reports and analysis on the test results.

4.4.14.2 These tests may be witnessed by the Owner, the Contractor, the consultants appointed by the Owner, Energy Storage purchaser, any Government Agency.

4.4.14.3 These tests shall be carried out using normal operating measuring equipment.

4.4.14.4 Contractor shall allow and facilitate at all times inspection of Plant, operation and maintenance logs, records, reports, plan, policy and procedures, drawings,

documents, licenses, Permits, clearances, etc. by Government Agency, Owner or any other person or agency or organization authorized by Owner.

4.4.14.5 Arrange and pay for timely testing and certification (including load test) of all material handling equipment including cranes, hoists and lifts by third party testing and certifying agency as per Applicable Laws. For clarity it is specified that arranging loads for testing of material handling equipment is in the scope of Contractor.

4.4.15 **Maintenance Tools & Tackles**

4.4.15.1 Provide all maintenance tools and tackles as specified in the Contract.

4.4.15.2 Indicative list of instruments to be deployed by Contractor is given in the Annexure-2 of this Technical Specification. This list is not exhaustive, and Contractor shall deploy all instruments required for providing Services under the Contract. If Owner believes that any additional tools and tackles or instruments are required to be mobilized over and above those mobilized by Contractor, same shall be mobilized by Contractor without any delay and without any additional expense to Owner.

4.4.16 **General**

4.4.16.1 The Contractor under this Contract shall be responsible for Comprehensive O&M of the Containerized Battery Storage System and Non-Comprehensive O&M of the Balance of the System (BOS) of the plant for a period of 12 years from the date of successful completion of trial run.

4.4.16.2 The Operation and Maintenance Manuals shall be provided in five (5) hard bound copies along with DVD or any permanent storage device (Five sets), and shall contain the following information in sufficient detail to enable the Owner to maintain, dismantle, reassemble, adjust and operate the Works with all its items of Works and installations:

- a. Table of Contents
- b. List of Illustrations
- c. Introduction
- d. The Introduction shall contain:
  - i. A brief general description of the Work items
  - ii. A brief description of the use of the Work items
  - iii. Definitions of technical terms used in subsequent graphs of the

instruction book.

- iv. A complete list of all items used in accordance with the Works Components Identification System.
- e. Detailed Description: Detailed description shall contain a complete and accurate description of the Works, all components and ancillaries, their assembling and dismantling.
- f. Operating Principles and Characteristics: A brief summary of the technical operating principles of the Works, including diagrams, circuit diagrams, sequence diagrams, etc.
- g. Operating Instructions: The instructions shall be accurate and easy to understand and shall contain the sequence of individual manipulations required for operation. The information shall be presented in such a manner that the contents of this paragraph can be used for instructing personnel in the operation of the Works. Tables, lists and graphic presentations should be used whenever possible for making the description readily understandable. An appropriate trouble-shooting list shall be included in this chapter.
- h. Testing and Adjustment: The entire testing and adjustment procedure required for the Works after overhauls and during operation shall be described.
- i. Maintenance Instructions: This section is divided into six paragraphs:
  1. Preventive maintenance, indicating the inspections required at regular intervals, the inspection procedure, and the routine cleaning operations, the regular safety checks and similar steps. The maintenance instructions shall include a tabular (or in other approved form) summary of the required activities sorted according to
    - Weekly
    - Monthly
    - Quarterly
    - Yearly
    - (Or other) cycles as applicable

This document shall provide the maintenance engineer with brief and yet fully comprehensive information including all references to the applicable, detailed service and maintenance instructions.

2. Repair and adjustment, describing the inspections, fitting and dismantling of parts, fault tracing as well as repair and adjustment procedures.
  3. Spare part lists, containing all the necessary data for ordering spare parts. These lists shall include all spare parts, those to be supplied and those not to be supplied under the present Contract. The above list should include minimum and maximum quantities of spares to be maintained by the project.
  4. Tool lists, containing all necessary data for identification of tools to be delivered under the present Contract.
  5. List of suppliers and alternative suppliers and addresses
  6. As-built drawings
- 4.4.16.3 Assist and cooperate with the Owner, stakeholders, contractors, and Government Agencies as and when requested/required.
- 4.4.16.4 Be responsible for good housekeeping and cleanliness of the Plant. Housekeeping shall not be limited to the buildings, cleaning of roads, drains, equipment, systems, cable trays, cable trenches, switch yard, all the ancillary plant buildings, including sanitary services, cleaning / housekeeping of cable trenches, dewatering of cable trench, cleaning of battery rooms cleaning / housekeeping of BESS Control Building etc. / all other amenities in the Plant.
- 4.4.16.5 Clean the Plant buildings, equipment, machines, apparatus, system, etc. periodically (at least once in every three months) including cleaning of jungle/bushes (including uprooting of rank vegetation, grass, brush wood, trees and saplings of girth up to 30 cm measured and removal of the rubbish & dump inside the periphery of the Plant designated area) on the periphery areas of all the equipment, buildings, and roads.
- 4.4.16.6 Mechanized/manual cleaning of equipment, floors, road, offices etc. by dedicated work force.
- 4.4.16.7 To ensure proper packaging of equipment and Spare Parts while sending for repair.
- 4.4.16.8 Proper housekeeping of store and proper stacking of Spare parts at its designated location.
- 4.4.16.9 Proper maintenance of store viz. roof/ shutter/ window repairing.
- 4.4.16.10 Arrange and provide necessary tools and equipment (like hand gloves etc.) for Contractor Staff and Owner's Staff.

- 4.4.16.11 Maintain the Plant free and clear of all liens and encumbrances resulting from any action of Contractor or work done at the request of Contractor.
- 4.4.16.12 Except where such action is expressly permitted by this Contract, Contractor shall not take any action that would cause default under any Project Agreements.
- 4.4.16.13 Promptly submit to the Owner any material information concerning new or significant aspects of the Plant's activities and, upon Owner's request, promptly submit any other information concerning the Plant or the Services.
- 4.4.16.14 Be responsible for disposing-off safely all Plant waste including waste oils, lubricants etc.
- 4.4.16.15 Provide Optional Services as provided in Clause 7.0 or elsewhere in the Contract.

4.4.17 **Exclusion from the Scope of Services of Contractor:**

- 4.4.17.1 Owner shall award the Contract for certain services to be performed during the Term of the Contract. Owner's obligation in respect of these services is limited to awarding contracts and making payment for these services. However, all other responsibilities in respect of these services including coordination with hired agencies for timely mobilization, supervision of work, providing necessary support by providing all required tools & tackles, skilled and unskilled workmen, and taking all necessary action for ensuring satisfactory and timely completion of work shall be in scope of Contractor.

4.5 **SERVICES BY CONTRACTOR ON EXPIRATION OR TERMINATION OF CONTRACT**

- 4.5.1 Upon expiration or termination of the Contract, the Contractor shall take following action:
  - 4.5.1.1 Leave the Plant in as good condition as it was at the time of taking over, normal wear and tear excepted.
  - 4.5.1.2 Prepare and hand over an updated inventory list of all equipment, consumables, Spare Parts, fixtures, special tools and tackles and equipment forming a part of the Plant or being the subject of the Services, which are the property of the Owner.
  - 4.5.1.3 Hand over all items of equipment, consumables, spares, special tools and tackles, equipment, desktops and any other material belonging to Owner to the Owner's stores in the condition in which such items were originally received by the Contractor, normal wear and tear excepted.
  - 4.5.1.4 Remove all of the Contractor's tools, equipment and materials bought by Contractor

from the Site (which are not identified on the updated inventory list) with Owner's approval.

- 4.5.1.5 Hand over an updated Spare Parts stock list taking into account all additions and deletions during the Term of the Contract.
- 4.5.1.6 Deliver to the Owner all drawings, documents, O&M Manuals, O&M Plan and Procedures, logs, reports, records, etc. of the Plant including those developed by Contractor while performing Services under the Contract.
- 4.5.1.7 Remove all the Contractor Staff except as otherwise instructed by Owner. Contractor shall solely be liable for resettlement, compensation or any other obligations towards Contractor's Staff. Contractor shall keep Owner indemnified against claims, if any pertaining to Contractor's Staff.
- 4.5.1.8 Settle all dues, recoveries, insurance claims relevant to Contractor, if any with the Owner.
- 4.5.1.9 Owner shall have the right, in its sole discretion, to assume and become liable for any contracts or obligations that Contractor may have taken with third parties in connection with the Services. Contractor shall cooperate in taking all reasonable steps requested by Owner required to effect the assumption of the contracts, provided that Owner agrees to indemnify and hold harmless Contractor from all liabilities out of events and obligations arising from the assumption of Contract rights and obligations after the date of any such assumption.
- 4.5.1.10 Use all reasonable efforts to cooperate with Owner or the Successor Contractor to assure that the operation, maintenance, repair and management of the Plant are not disrupted.

#### 4.6 **OPERATIONS & MAINTENANCE PROCEDURE**

- 4.6.1 The Contractor shall prepare and submit to the Owner:
  - 4.6.1.1 Six (06) complete sets of a preliminary draft of the O&M Plan and Procedures for review and comment by the Owner 30 days prior to the start of the O&M phase.
  - 4.6.1.2 Six (06) complete sets of a final draft of the O&M Plan and Procedures for review and approval by the Owner within 15 (fifteen) days from the date of receipt of Owner's comments on preliminary draft; and
  - 4.6.1.3 Six (06) complete sets of the final O&M Plan and Procedures for review and approval by the Owner within 15 (fifteen) days from the date of receipt of Owner's comments on final draft.

- 4.6.2 O&M Plan and Procedure to be prepared by Contractor shall be in accordance with, among other sources, this Contract, O&M Procedure available with Owner, Prudent Utility Practice, Project Agreements, Dispatch Instructions, O&M Manuals provided by Contractor, recommendations of Contractor/OEM, Installer Contract warranties, Applicable Laws, Permits, etc.
- 4.6.3 If the Owner determines that the O&M Plan and Procedures submitted by the Contractor Pursuant Clause 4.6.2 or elsewhere in the Contract are complete, accurate and in accordance with the standards set forth in relevant Clause or elsewhere in the Contract, then the Owner shall notify the Contractor of the Owner's acceptance of such O&M Plan and Procedures within 30 (thirty) days after receipt of the same from the Contractor. If the Owner reasonably determines that such O&M Plan and Procedures are not complete, accurate or in accordance with the standards under relevant Clause 4.6.2 or elsewhere in the Contract in any respect, the Owner shall, within such 30 (thirty) day period, provide written comments on such O&M Plan and Procedures to the Contractor stating the Owner's reasons for its disapproval of, and any proposed revisions to, any portion thereof. Within 7 (seven) days of receipt of the Owner's comments on such O&M Plan and Procedures, the Contractor shall respond in writing to the Owner's comments stating the Contractor's agreement or disagreement and noting any proposed revisions to the O&M Plan and Procedures or, if the Contractor disagrees with the Owner, explaining why no change to such O&M Plan and Procedures is required by the standards described in Clause 4.6.2 or elsewhere in the Contract. Thereafter, the Owner and the Contractor shall cooperate to agree upon O&M Plan and Procedures reasonably acceptable to the Owner. The foregoing review and approval procedure shall apply equally to each revision of the O&M Plan and Procedures submitted to the Owner pursuant to this Contract.
- 4.6.4 The Owner may from time to time, consistent with the standards described in Clause 4.6.2 or elsewhere in the Contract, request amendments or modifications to the O&M Plan and Procedures. The Owner and the Contractor shall meet to agree upon the text of any such amendments or modifications, provided that no such amendment or modifications shall be deemed included in the O&M Plan and Procedures without the written approval of both the Contractor and the Owner (which shall not be unreasonably withheld by either Party).



4.6.5 The Contractor from time to time may, and when necessary, shall by written request to the Owner, propose amendments or modifications to the O&M Plan and Procedures. Such request shall include the text of any proposed amendments and modifications as well as the reasons thereof in sufficient detail to permit the Owner to consider the proposed amendments and modifications in accordance with the standards set forth in Clause 4.6.2 or elsewhere in the Contract above within 15 (fifteen) days after receipt by the Owner of such request, the Owner shall respond in writing to the Contractor stating its acceptance of the proposed amendments and modifications (or any portion thereof) or stating the Owner's disapproval of any such amendments and modifications and its reasons thereof. The Owner and the Contractor shall thereafter meet to agree upon the final text of any amendments or modifications of the O&M Plan and Procedures required by the standards set forth in Clause 4.6.2 or elsewhere in the Contract; provided, however, that no such amendment or modification shall be deemed included in the O&M Plan and Procedures without the written approval of the Owner (which approval shall not be unreasonably withheld).

4.6.6 Such O&M Plan and Procedures shall be based on the standard of performance given in Clause 3.0 or elsewhere in the Technical Specification, designs of the Plant, and O&M Plan and Procedure available with Owner. This O&M Plan and Procedure shall deal with all operations interfaces between Owner, the Contractor, and transmission utility including the methods of day-to-day communication, Key Personnel, clearances, outages scheduling, capacity and energy reporting, operations log etc.

4.6.7 Suggested outline of O&M Plan and Procedure to be developed by Contractor are given hereunder and are subject to discussion and finalization.

4.6.7.1 **Project Performance Monitoring Program**

- Project description;
- Project performance monitoring;
- Battery key parameters monitoring
- Project permits and environmental reporting; and
- Status of major equipment.

**4.6.7.2 Unit Operating Program**

- Start-up procedure
- Shut down procedure;
- Standard Operating Procedure (SOP);
- Operating procedure for equipment;
- Shift / routine operating practices;
- Discharge procedure; and
- Interconnection Facilities.

**4.6.7.3 Unit Maintenance Program**

- Part identification;
- Inspection procedures;
- Overhauling procedure;
- Inspection and maintenance plan;
- Maintenance schedule;
- Preventive maintenance;
- Predictive maintenance;
- Condition monitoring – planning and procedure;
- Maintenance procedures; and
- Inventory Management Program
- The diagnostic testing program for maintaining the Plant and equipment, including both system and component level testing.
- The problem assessment program which provides the procedure for determining the cause(s) of operational or equipment failures and preventing future failures through recommended improvements, including justification for such recommendation.
- Unit testing program and procedure.
- Emergency procedures.
- Operating log requirements;
- Alarm and trip settings;
- Reportable events;
- Training procedure;
- Employee manual; and
- Waste disposal procedures.

#### 4.7 **Maintenance Plan**

- 4.7.1 Maintenance plan to be prepared and submitted to Owner, include but not be limited to the following:
  - 4.7.1.1 Preparation of report of preventive maintenance, predictive maintenance, trend and analysis report, inventory consumption, Plant availability/down time, failure analysis, preventive maintenance effectiveness and specific consumption etc.
  - 4.7.1.2 Records of equipment inspection's operational checks relating to facility as per good engineering practices, records of maintenance and repairs carried out.
  - 4.7.1.3 Devising maintenance strategy based on equipment criticality analysis to establish best practices of preventive maintenance, and condition-based maintenance.
  - 4.7.1.4 Planning and scheduling of maintenance jobs.
  - 4.7.1.5 Executing maintenance task of preventive maintenance/scheduled maintenance.
  - 4.7.1.6 To carry out the predictive maintenance/opportunity maintenances.
  - 4.7.1.7 To carry out reliability-based condition monitoring maintenance.
  - 4.7.1.8 Carry out repairs and replacement of the equipment.
  - 4.7.1.9 Ensuring optimum Plant/equipment availability for the operations.
  - 4.7.1.10 Ensure quality and workman ship for the operation and maintenance services is rendered.
  - 4.7.1.11 Provide periodic maintenance reports: daily/weekly/monthly/annual.

#### 5.0 **ANNUAL OPERATING PLAN & BUDGET**

- 5.1 At least 90 (ninety) days prior to beginning of each Operating Year, the Contractor shall prepare and submit to the Owner proposed annual operating and maintenance plan and budget ("Annual Operating Plan and Budget") for the part of the system under Non-Comprehensive O&M for the following Operating Year (or portion thereof), detailed on a monthly basis, and shall set forth, in form and substance reasonably acceptable to the Owner:
  - 5.2 Anticipated operations, repairs, capital improvements, teardowns and major overhauls;
  - 5.3 Routine, preventive and predictive maintenance and overhaul schedules;
  - 5.4 Planned procurement (including equipment, Spare Parts, chemicals, consumables, oils, lubricants inventories);
  - 5.5 Labor activities (including staffing, holidays, etc.);

- 5.6 Administrative and support activities;
- 5.7 Details of other services proposed to be performed by the Contractor;
- 5.8 Projected Fuel and water requirement;
- 5.9 Budgetary requirements for the Spare Parts, capital improvements and other services not included in Contractor's scope of Services; and
- 5.10 Assumptions and implementation plan.
- 5.11 In preparing and providing the Annual Operating Plan and Budget, the Contractor shall apply the standards of performance provided in Clause 3.0 above or elsewhere in the Contract and make such plan consistent with the guaranteed performance parameters in this Contract. Any actions proposed under the Annual Operating Plan and Budget shall be consistent with the O&M Plan and Procedures and the Contractor's obligations set forth in this Contract.
- 5.12 Owner shall review proposed Annual Operating Plan and Budget within 30 (thirty) days of receipt of same. Owner may, by written request, propose changes, additions, deletions and modifications to the proposals. Contractor shall provide Owner any expense information in Contractor's possession from previous operating years applicable to items in proposed Annual Operating Plan and Budget. Owner and Contractor will then meet and use their reasonable efforts to agree upon a final Annual Operating Plan and Budget, which shall be approved in writing by both parties. Except to the extent that the terms of Clause 3.0 or elsewhere in the Contract permit Contractor to take actions which are outside the approved Annual Operating Plan and Budget without the consent of Owner, the approved Annual Operating Plan and Budget shall remain in effect throughout the applicable Operating Year, subject to revisions and amendments proposed by either Party and consented to in writing by the other Party.
- 5.13 If by the first day of the any Operating Year after the first Operating Year, the parties are unable to reach agreement concerning any items or portion of the Annual Operating Plan and Budget for such Operating Year, then the amount(s) of such items or portion of the Annual Operating Plan and Budget shall be equal to 105% (one hundred five percent) of the amount for the corresponding item or portion of the approved Annual Operating Plan and Budget for the preceding Operating Year.
- 5.14 The Contractor shall notify the Owner as soon as reasonably possible of any significant deviations or discrepancies from the projections contained in the

approved Annual Operating Plan and Budget.

## **6.0 OBLIGATION OF THE OWNER**

- 6.1 The Owner shall furnish to the Contractor, at the Owner's expense, the information, documents, materials and other items described in this Clause 6.0 or elsewhere in the Contract. All such items shall be made available at such times and in such a manner as may be reasonably required for the expeditious and orderly performance of the Services by the Contractor. From the Taking-Over of Facility by the Owner and during the Term, the Owner shall:
- 6.1.1 Make the plant accessible to the Contractor.
  - 6.1.2 Make upgrades, addition, improvements and changes to the Plant which the Owner determines to be necessary or advisable in his judgment or in order to comply with any Directives and any relevant Change in Law. Contractor will be held harmless and will be compensated where applicable with regard to unsuccessful implementation of such measures as well as outages and non-availability of Plant due to such modifications and any increase in operation and maintenance expenses.
  - 6.1.3 Procure all Spare Parts as specified in the Contract.
  - 6.1.5 Obtain, renew and replace whenever required all Permits, clearances and licenses required to be obtained and maintained by the Owner pursuant to the Contract.
  - 6.1.6 Provide reasonable assistance to Contractor in obtaining, renewing and replacing all licenses and Permits required to be obtained and maintained by Contractor at his expense pursuant to the Contract;
  - 6.1.7 Make payment to the Contractor for Services performed under this Contract as per the Contract;
  - 6.1.8 Provide the Contractor with reasonable access to the Plant as specified in the Contract;
  - 6.1.9 Procure and maintain insurance policies required to be procured and maintained by the Owner as specified in the Contract.
  - 6.1.10 Administer Project Agreements, with reasonable assistance from Contractor as specified in of the Contract;
  - 6.1.11 Notify the Contractor of any emergency about which Owner has become aware and take further action as specified in the Contract;
  - 6.1.12 Liaise with the Government Agencies and the public and provide such

cooperation and information to public and Government Agencies and government officials as the Owner may determine to be necessary or appropriate under the circumstances on matters that are related to or will affect the provision of Services in accordance with this Contract;

## **7.0 OPTIONAL SERVICES**

- 7.1 The Owner may, from time to time, ask Contractor to perform any Optional Services, for which the Owner shall make payment on the basis of actuals.
- 7.2 The Owner may, from time to time, ask Contractor to perform additional service/items/materials (not otherwise covered under the Contract) for which the Owner shall make payment to be mutually agreed on case-to-case basis.
- 7.3 Owner shall be at liberty to procure Optional Services/additional services/items/materials from any other service provider without invalidating any provisions of the Contract.
- 7.4 Contractor may suggest implementing improvements, modifications, upgrading or addition to the original design of the Plant and the same may be executed only with prior approval of Owner. Any such services shall be considered as additional services to the extent that it requires external help from a consultant or a service provider for engineering and execution work. The basic concept development and techno-economic feasibility work along with report submission is included in original scope of Services to be provided by Contractor and shall not be considered additional services.
- 7.5 The Owner may, from time to time, ask Contractor to provide additional manpower for performing the services which is not included in the scope of Services of the Contractor. Contractor shall provide additional manpower, as and when requested by the Owner, as per the schedule for manpower provided by the Contractor.

**ANNEXURE-1****SUMMARY OF ENERGY STORAGE PURCHASE AGREEMENT****(TO BE ATTACHED)**

**ANNEXURE-2**
**LIST OF TOOLS AND TACKLES TO BE PROVIDED BY CONTRACTOR**

The list provided below is not exhaustive.

S. No	Item	Unit	Quantity
1.	Gas Leakage Detector	No.	1
2.	Leakage current analyser for Surge Arrester	No.	1
3.	CT / PT Test kit	No.	1
4.	CB analyser	No.	1
5.	Dew point meter for checking moisture of SF6 gas	No.	1
6.	Portable Leak Testing Equipment Airtight tooling is required.	No.	1
7.	Tooling kit One round and one square explosion-proof valve interface respectively.	No.	1
8.	Battery Discharge & Charge Tester	No.	1
9.	Lithium Battery Equalizing Maintenance System ACTM-5201. Module overall balance.	No.	1
10.	Balanced Transfer Harness.	No.	1



**ANNEXURE-3**
**INDICATIVE LIST OF EXPECTED MAJOR/MINOR INSPECTIONS AND PREVENTIVE MAINTENANCES**

The list provided below is not exhaustive.

S.no.	List of Activities
1.	Monitoring of the System
2.	All O&M activities required for the successful operation of the plant
3.	Conducting periodic test and inspections applicable to the plant as per industry standards and OEM recommendation.
4.	Daily energy forecasting as per AERC norms/Owner guidelines
5.	Submission of test reports
6.	Inspection report
7.	Monitoring reports
8.	PG test report
9.	Daily charge discharge report
10.	Reporting Annual degradation test report and any other relevant reports as required by the owner on mutually agreed timeline (daily/weekly/monthly/yearly) by both the parties
11.	Site visit as per OEM recommendation for Periodic maintenance of plant
12.	Hydro static test of the firefighting cylinders as per statutory provision
13.	Periodic refilling of firefighting cylinders batch by batch (not all at a time)
14.	Painting of the containers once in a year, painting of structures made of steel once in two years and transformers in once in two years.
15.	To conduct structural stability test of all the installation once in a period of five years by engaging expert service and provide the report to the owner.
16.	Apply for Consent to Operate (CTO) and its renewal from time to time on behalf of the owner as per prescribed APCB guideline.